



RF TEST REPORT

For

Shenzhen Inkbird Technology Co., Ltd

Product Name: Air Quality Monitor

Test Model(s): IAQM-129-W

Report Reference No. : POCE240401002RL001

FCC ID : 2AYZD-IAQM-129-W

Applicant's Name : Shenzhen Inkbird Technology Co., Ltd

Address : Room 1803, Guowei Building, NO.68 Guowei Road, Xianhu Community,
Liantang, Luohu District, Shenzhen, China

Testing Laboratory : Shenzhen POCE Technology Co., Ltd.

Address : 101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology
Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China

Test Specification Standard : 47 CFR Part 15.247

Date of Receipt : April 1, 2024

Date of Test : April 1, 2024 to April 8, 2024

Data of Issue : April 8, 2024

Result : Pass

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	POCE240401002RL001	April 8, 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.

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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	Standard	Method	Requirement	Result
Antenna requirement	47 CFR Part 15.247		47 CFR 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	ANSI C63.10-2013 section 6.2	47 CFR 15.207(a)	Pass
Occupied Bandwidth	47 CFR Part 15.247	ANSI C63.10-2013, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(2)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	ANSI C63.10-2013, section 11.9.1 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(b)(3)	Pass
Power Spectral Density	47 CFR Part 15.247	ANSI C63.10-2013, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(e)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	ANSI C63.10-2013 section 11.11 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	ANSI C63.10-2013 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (below 1GHz)	47 CFR Part 15.247	ANSI C63.10-2013 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (above 1GHz)	47 CFR Part 15.247	ANSI C63.10-2013 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : Shenzhen Inkbird Technology Co., Ltd
Address : Room 1803, Guowei Building, NO.68 Guowei Road, Xianhu Community, Liantang, Luohu District, Shenzhen, China

Manufacturer : Protech International Group Co., Ltd
Address : 5th Floor, Building A, No. 9, Dakan Gongye 2nd Road, Dakan Community, Xili Street, Nanshan District, Shenzhen, Guangdong, China.

2.2 Description of Device (EUT)

Product Name:	Air Quality Monitor
Model/Type reference:	IAQM-129-W
Series Model:	IAQM-129, IAQM-130, IAQM-130-W, IAQM-131, IAQM-131-W, IAQM-129-B, IAQM-129-A, PTH-1, PTH-2, PTH-3, PTH-3M, PTH-3T, PTH-4, PTH-5, PTH-8, PTH-12, PTH-12W, PTH-9A, PTH-9AW, PTH-9B, PTH-9BW, PTH-9C, PTH-9CW, PTH-9D, PTH-9DW, PTH-9E, PTH-9EW, PTH-9F, PTH-9FW, PTH-9R, PTH-9RW, PTH-10D, PTH-10DW, PTH-10DH, PTH-10E, PTH-10EW, PTH-11D, PTH-11DW, PTH-11E, PTH-11EW, PTH-13A, PTH-13AW, PTH-13B, PTH-13BW, PTH-13C, PTH-13CW, PTH-13D, PTH-13DW, PTH-13E, PTH-13EW, PTH-14A, PTH-14AW, PTH-14B, PTH-14BW, PTH-14C, PTH-14CW, PTH-14D, PTH-14DW, PTH-14E, PTH-14EW, PTH-15A, PTH-15AW, PTH-15B, PTH-15BW, PTH-15C, PTH-15CW, PTH-15D, PTH-15DW, PTH-15E, PTH-15EW, PTH-16A, PTH-16AW, PTH-16B, PTH-16BW, PTH-16C, PTH-16CW, PTH-16D, PTH-16DW, PTH-16E, PTH-16EW, PTH-17A, PTH-17AW, PTH-17B, PTH-17BW, PTH-17C, PTH-17CW, PTH-17D, PTH-17DW, PTH-17E, PTH-17EW, PTH-18A, PTH-18AW, PTH-18B, PTH-18BW, PTH-18C, PTH-18CW, PTH-18D, PTH-18DW, PTH-18E, PTH-18EW, PTH-19A, PTH-19AW, PTH-19B, PTH-19BW, PTH-19C, PTH-19CW, PTH-19D, PTH-19DW, PTH-19E, PTH-19EW, PTH-20A, PTH-20AW, PTH-20B, PTH-20BW, PTH-20C, PTH-20CW, PTH-20D, PTH-20DW, PTH-20E, PTH-20EW, PTH-21A, PTH-21AW, PTH-21B, PTH-21BW, PTH-21C, PTH-21CW, PTH-21D, PTH-21DW, PTH-21E, PTH-21EW, PTH-22A, PTH-22AW, PTH-22B, PTH-22BW, PTH-22C, PTH-22CW, PTH-22D, PTH-22DW, PTH-22E, PTH-22EW, PTH-23A, PTH-23AW, PTH-23B, PTH-23BW, PTH-23C, PTH-23CW, PTH-23D, PTH-23DW, PTH-23E, PTH-23EW, PTH-24A, PTH-24AW, PTH-24B, PTH-24BW, PTH-24C, PTH-24CW, PTH-24D, PTH-24DW, PTH-24E, PTH-24EW, PTH-25A, PTH-25AW, PTH-25B, PTH-25BW, PTH-25C, PTH-25CW, PTH-25D, PTH-25DW, PTH-25E, PTH-25EW, PTH-26A, PTH-26AW, PTH-26B, PTH-26BW, PTH-26C, PTH-26CW, PTH-26D, PTH-26DW, PTH-26E, PTH-26EW, PTH-27A, PTH-27AW, PTH-27B, PTH-27BW, PTH-27C, PTH-27CW, PTH-27D, PTH-27DW, PTH-27E, PTH-27EW, PTH-28A, PTH-28AW, PTH-28B, PTH-28BW,

	PTH-28C, PTH-28CW, PTH-28D, PTH-28DW, PTH-28E, PTH-28EW, PTH-29A, PTH-29AW, PTH-29B, PTH-29BW, PTH-29C, PTH-29CW, PTH-29D, PTH-29DW, PTH-29E, PTH-29EW, PTH-30A, PTH-30AW, PTH-30B, PTH-30BW, PTH-30C, PTH-30CW, PTH-30D, PTH-30DW, PTH-30E, PTH-30EW, PTH-31A, PTH-31AW, PTH-31B, PTH-31BW, PTH-31C, PTH-31CW, PTH-31D, PTH-31DW, PTH-31E, PTH-31EW, PTH-32A, PTH-32AW, PTH-32B, PTH-32BW, PTH-32C, PTH-32CW, PTH-32D, PTH-32DW, PTH-32E, PTH-32EW, PTH-33A, PTH-33AW, PTH-33B, PTH-33BW, PTH-33C, PTH-33CW, PTH-33D, PTH-33DW, PTH-33E, PTH-33EW, PTH-34A, PTH-34AW, PTH-34B, PTH-34BW, PTH-34C, PTH-34CW, PTH-34D, PTH-34DW, PTH-34E, PTH-34EW, PTH-35A, PTH-35AW, PTH-35B, PTH-35BW, PTH-35C, PTH-35CW, PTH-35D, PTH-35DW, PTH-35E, PTH-35EW, PTH-36A, PTH-36AW, PTH-36B, PTH-36BW, PTH-36C, PTH-36CW, PTH-36D, PTH-36DW, PTH-36E, PTH-36EW, PTH-37A, PTH-37AW, PTH-37B, PTH-37BW, PTH-37C, PTH-37CW, PTH-37D, PTH-37DW, PTH-37E, PTH-37EW, PTH-38A, PTH-38AW, PTH-38B, PTH-38BW, PTH-38C, PTH-38CW, PTH-38D, PTH-38DW, PTH-38E, PTH-38EW, PTH-39A, PTH-39AW, PTH-39B, PTH-39BW, PTH-39C, PTH-39CW, PTH-39D, PTH-39DW, PTH-39E, PTH-39EW, PTH-40A, PTH-40AW, PTH-40B, PTH-40BW, PTH-40C, PTH-40CW, PTH-40D, PTH-40DW, PTH-40E, PTH-40EW, PTH-9W, PTH-9S
Model Difference:	since the electrical circuit design, layout, components used and internal wiring were identical for the above models, Only the sales customers, sales region, product appearance is different. Test sample model: IAQM-129-W
Trade Mark:	N/A
Power Supply:	DC 5V/2A from adapter Battery: DC 3.7V 2700mA
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 Gain:	1.37dBi
Hardware Version:	V1.0
Software Version:	V1.0

Remark: The Antenna Gain is supplied by the customer. POCE is not responsible for this data and the related calculations associated with it

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)
	802.11b/802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz
Test channel	802.11n(HT40)
Lowest channel	2422MHz
Middle channel	2437MHz
Highest channel	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.
Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.		

2.4 Description of Support Units

Title	Manufacturer	Model No.	Serial No.
AC-DC adapter	HUAWEI TECHNOLOGY	HW100400C01	

2.5 Equipments Used During The Test

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
loop antenna	EVERFINE	LLA-2	80900L-C	2024-02-19	2025-02-18
Power absorbing clamp	SCHWARZ BECK	MESS-ELEKTRONIK	/	2023-12-12	2024-12-11
Electric Network	SCHWARZ BECK	CAT5 8158	CAT5 8158#207	/	/
Cable	SCHWARZ BECK	/	/	2023-12-27	2024-12-26
Pulse Limiter	SCHWARZ BECK	VTSD 9561-F Pulse limiter 10dB Ateennator	561-G071	2023-12-12	2024-12-11
50ΩCoaxial Switch	Anritsu	MP59B	M20531	/	/
Test Receiver	Rohde & Schwarz	ESPI TEST RECEIVER	ID:1164.6607K 03-102109-MH	2023-06-13	2024-06-12
L.I.S.N	R&S	ESH3-Z5	831.5518.52	2023-12-12	2024-12-11

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
DC power	HP	66311B	38444359	/	/
RF Sensor Unit	Tachoy Information Technology(she nzhen) 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

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

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	2024-02-19	2025-02-18
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2024-02-19	2025-02-18
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 POCE Technology Co., Ltd.
Address:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyao, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252

Identification of the Responsible Testing Location

Company Name:	Shenzhen POCE Technology Co., Ltd.
Address:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyao, 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 Number:	778666
A2LA Certificate Number:	6270.01

2.8 Announcement

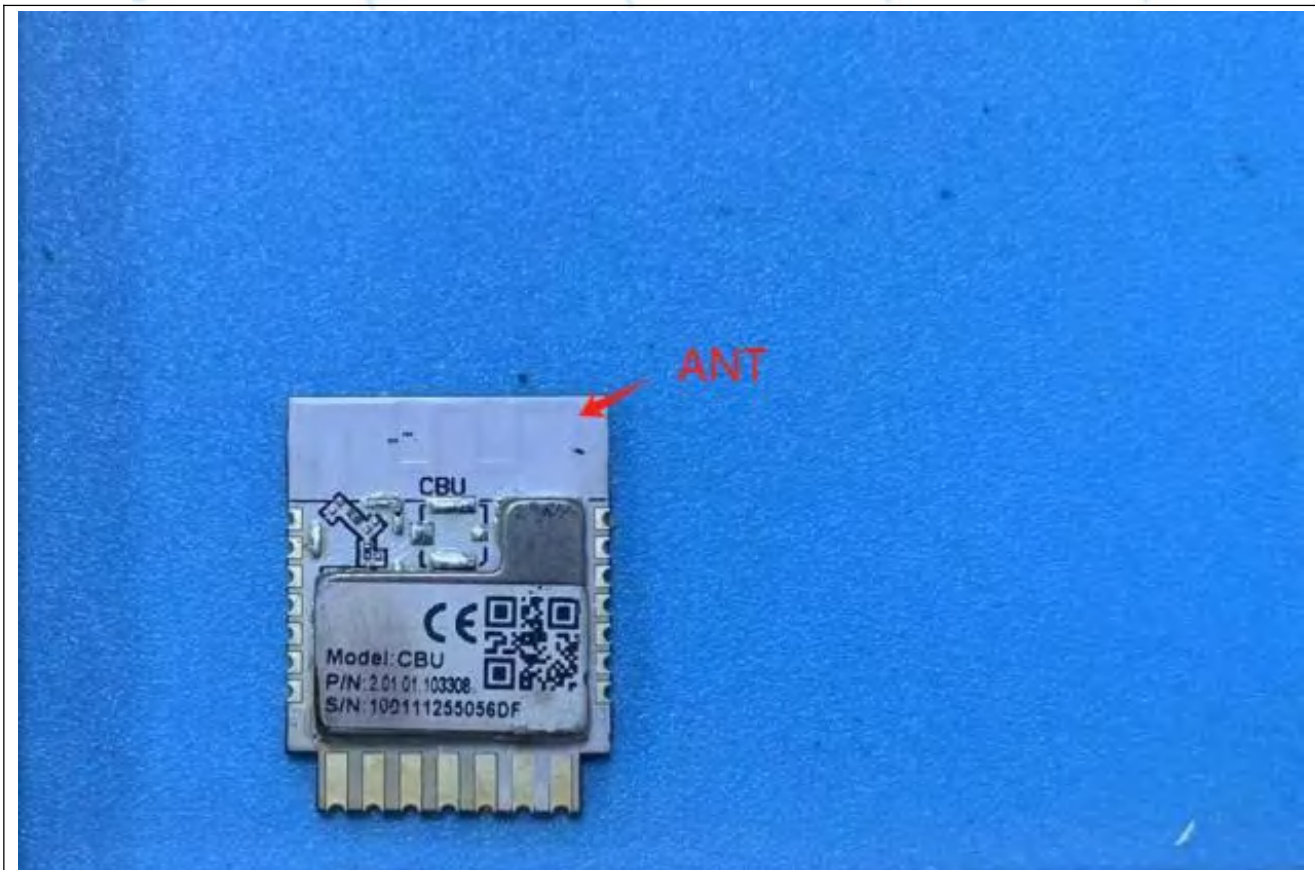
- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by POCE 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) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

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.
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3.1.1 Conclusion:



4 Radio Spectrum Matter Test Results (RF)

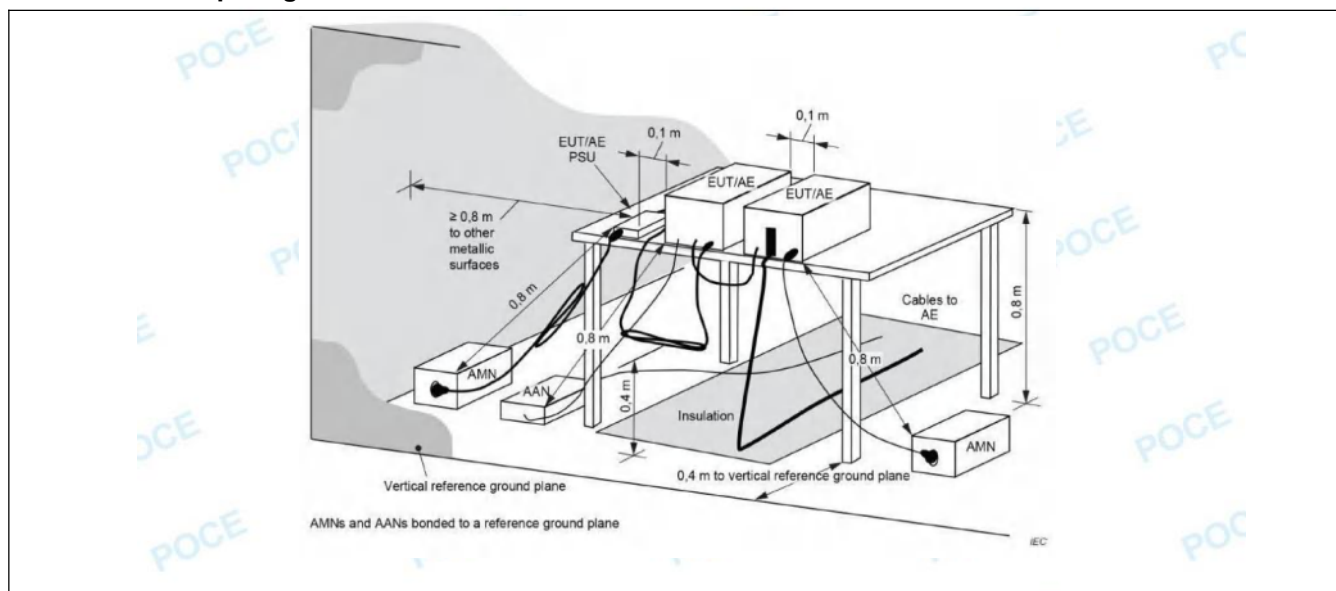
4.1 Conducted Emission at AC power line

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 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 kPa
Pretest mode:		TM1			
Final test mode:		TM1			

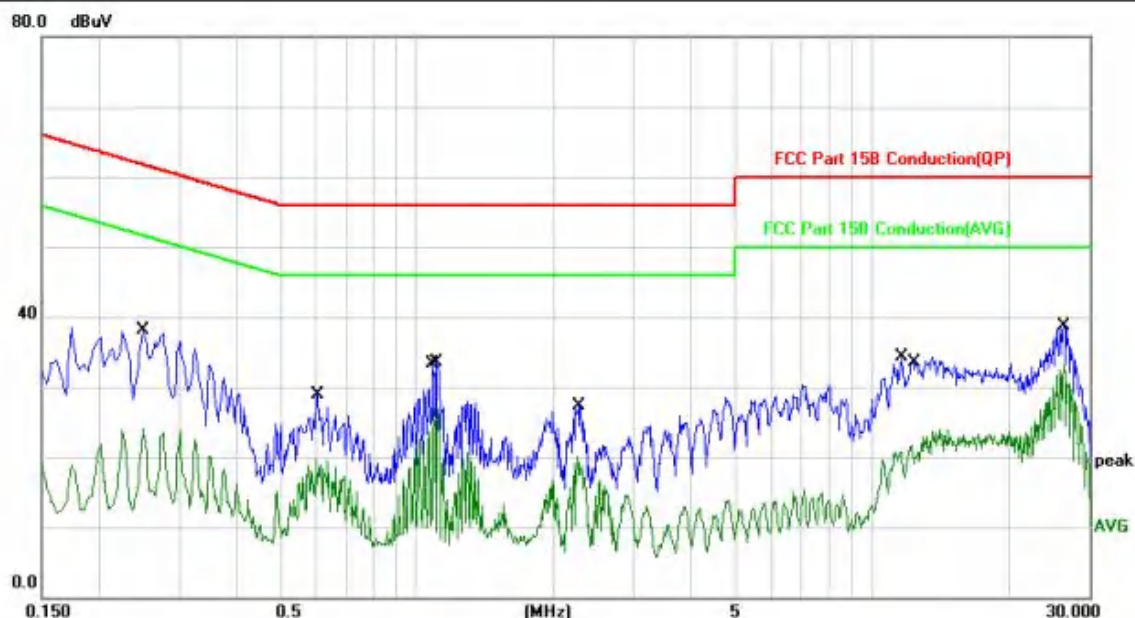
4.1.2 Test Setup Diagram:



4.1.3 Test Data:

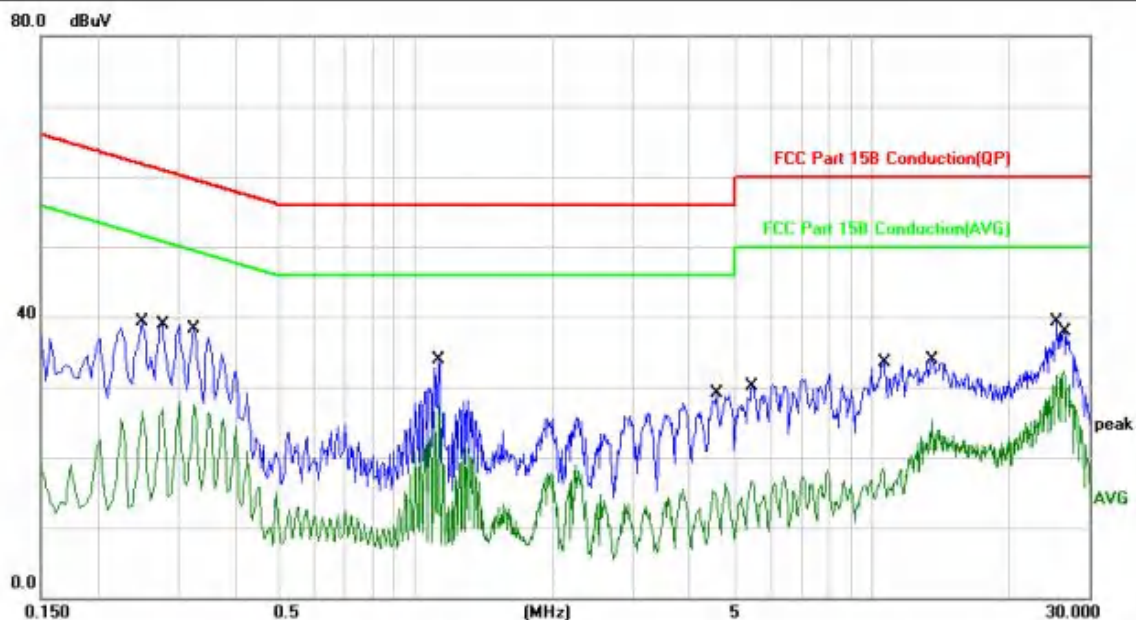
TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 20 / CH: L

Power:AC120V60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2500	28.02	10.03	38.05	61.75	-23.70	QP	
2		0.2500	14.08	10.03	24.11	51.75	-27.64	AVG	
3		0.6020	9.72	9.98	19.70	46.00	-26.30	AVG	
4		0.6060	18.87	9.98	28.85	56.00	-27.15	QP	
5		1.0900	16.89	9.95	26.84	46.00	-19.16	AVG	
6		1.1100	23.59	9.90	33.49	56.00	-22.51	QP	
7		2.2580	10.15	9.99	20.14	46.00	-25.86	AVG	
8		2.2620	17.25	9.99	27.24	56.00	-28.76	QP	
9		11.5700	23.91	10.45	34.36	60.00	-25.64	QP	
10		12.2180	11.24	10.45	21.69	50.00	-28.31	AVG	
11		26.3420	28.06	10.61	38.67	60.00	-21.33	QP	
12	*	26.3420	22.47	10.61	33.08	50.00	-16.92	AVG	

TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 20 / CH: L
Power: AC120V60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2500	29.25	10.03	39.28	61.75	-22.47	QP	
2		0.2779	16.80	10.02	26.82	50.88	-24.06	AVG	
3		0.3260	17.55	10.01	27.56	49.55	-21.99	AVG	
4		0.3268	27.27	10.01	37.28	59.53	-22.25	QP	
5		1.1220	23.98	9.90	33.88	56.00	-22.12	QP	
6		1.1220	17.40	9.90	27.30	46.00	-18.70	AVG	
7		4.5700	19.02	10.12	29.14	56.00	-26.86	QP	
8		5.4620	6.44	10.16	16.60	50.00	-33.40	AVG	
9		10.6780	23.04	10.44	33.48	60.00	-26.52	QP	
10		13.5540	14.87	10.46	25.33	50.00	-24.67	AVG	
11		25.5780	28.73	10.59	39.32	60.00	-20.68	QP	
12	*	26.3420	21.76	10.61	32.37	50.00	-17.63	AVG	

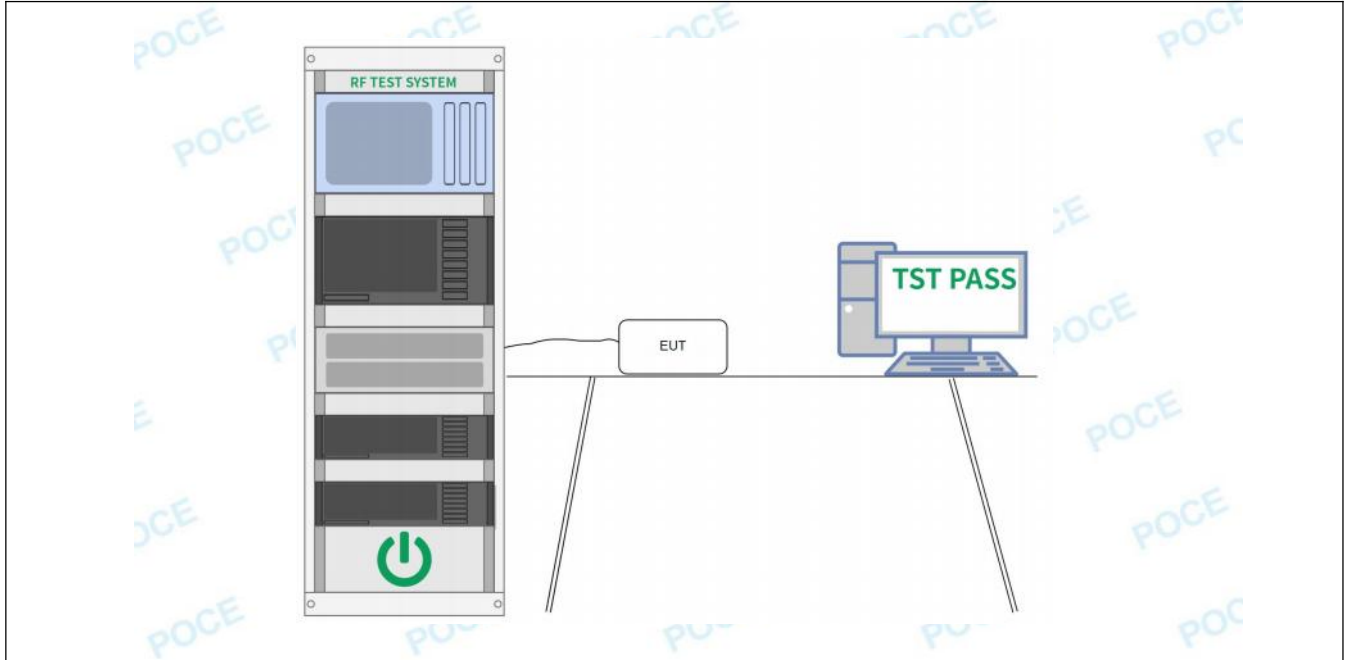
4.2 Occupied Bandwidth

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 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW $\geq [3 \times \text{RBW}]$. 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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 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

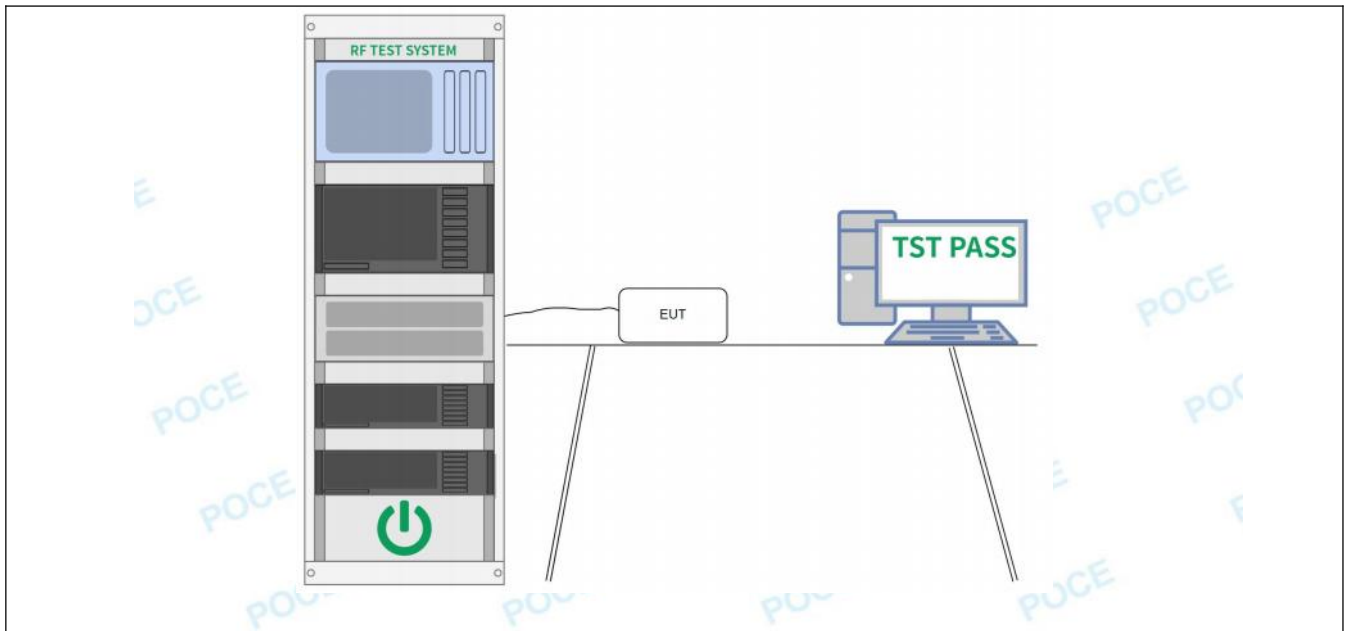
Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of 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 KDB 558074 D01 15.247 Meas Guidance v05r02
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 only 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 = $10 \cdot \log[(10G1/20 + 10G2/20 + \dots + 10GN/20)^2 / NANT]$ dBi For completely uncorrelated unequal antenna gain Directional gain = $10 \cdot \log[(10G1/10 + 10G2/10 + \dots + 10GN/10) / NANT]$ 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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1, TM2, TM3, TM4				

4.3.2 Test Setup Diagram:

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4.3.3 Test Data:

Please Refer to Appendix for Details.

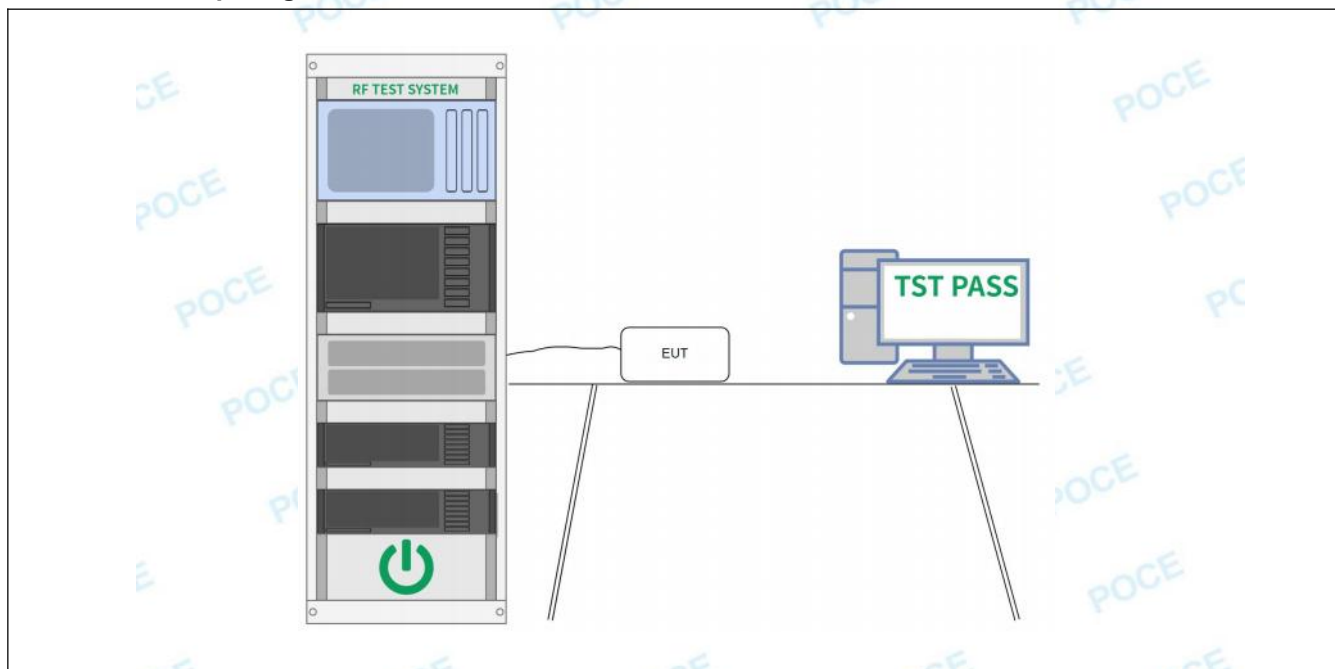
4.4 Power Spectral Density

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 KDB 558074 D01 15.247 Meas Guidance v05r02
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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 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.

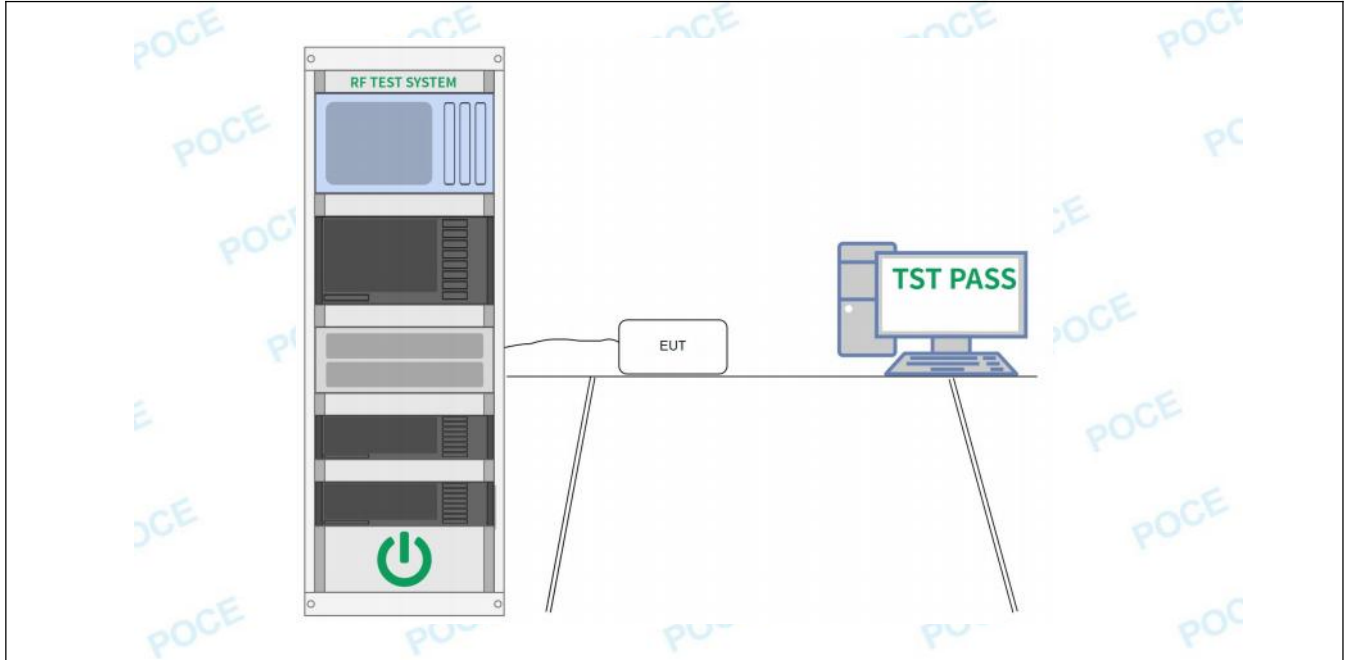
4.5 Emissions in non-restricted frequency bands

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 KDB 558074 D01 15.247 Meas Guidance v05r02
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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 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.

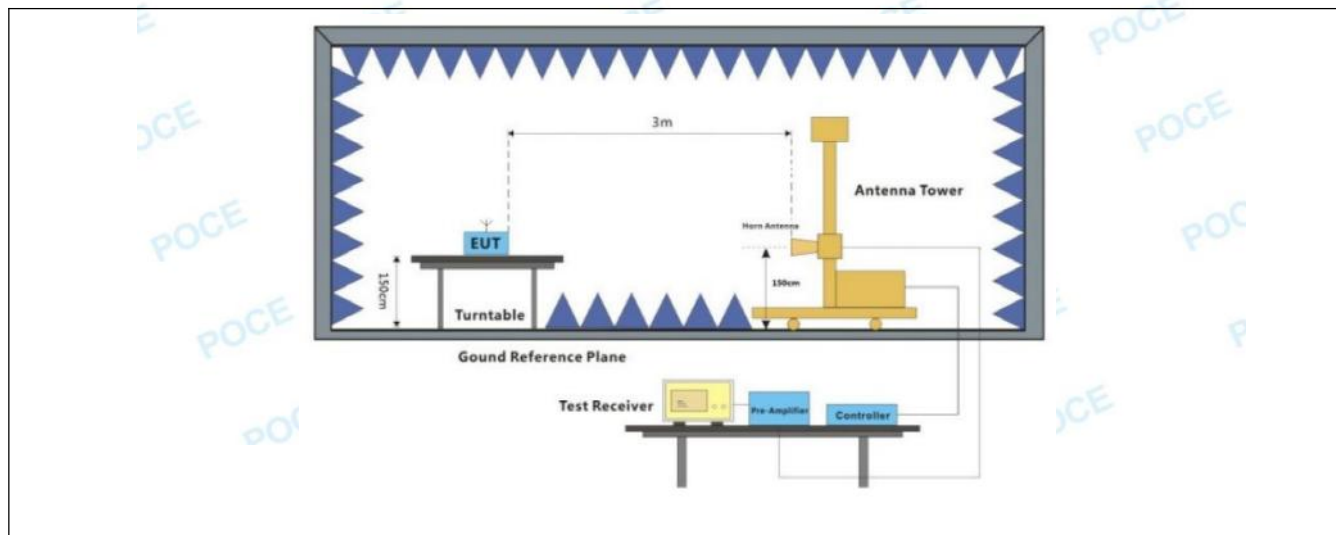
4.6 Band edge emissions (Radiated)

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 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	ANSI C63.10-2013 section 6.10.5.2		

4.6.1 E.U.T. Operation:

Operating Environment:			
Temperature:	23.6 °C	Humidity:	47.9 %
		Atmospheric Pressure:	102 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:

Both Horizontal and Vertical directions were tested, and the report only reflects the worst Horizontal direction.

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	38.67	-6.93	31.74	74.00	-42.26	peak	150		P	
2	2310.000	29.16	-6.93	22.23	54.00	-31.77	AVG	150		P	
3	2390.000	48.28	-6.72	41.56	74.00	-32.44	peak	150		P	
4 *	2390.000	40.12	-6.72	33.40	54.00	-20.60	AVG	150		P	

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



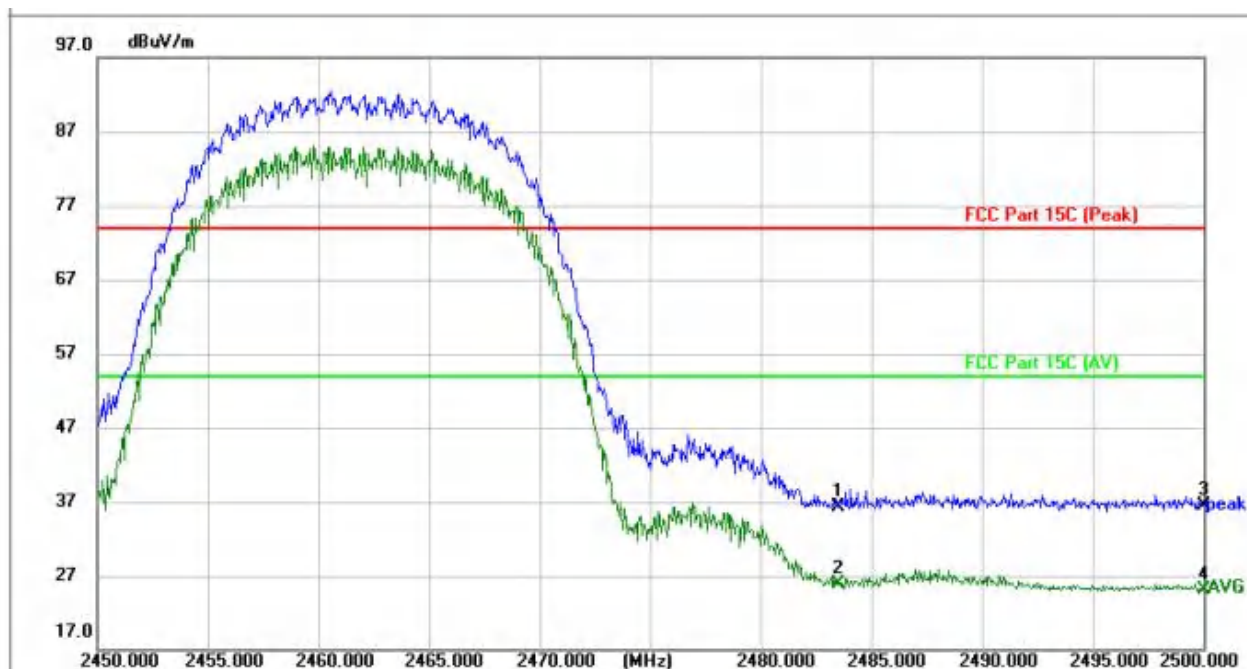
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	42.01	-5.23	36.78	74.00	-37.22	peak	100		P	
2	2310.000	29.99	-5.23	24.76	54.00	-29.24	AVG	100		P	
3	2390.000	42.14	-4.91	37.23	74.00	-36.77	peak	100		P	
4 *	2390.000	31.70	-4.91	26.79	54.00	-27.21	AVG	100		P	

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



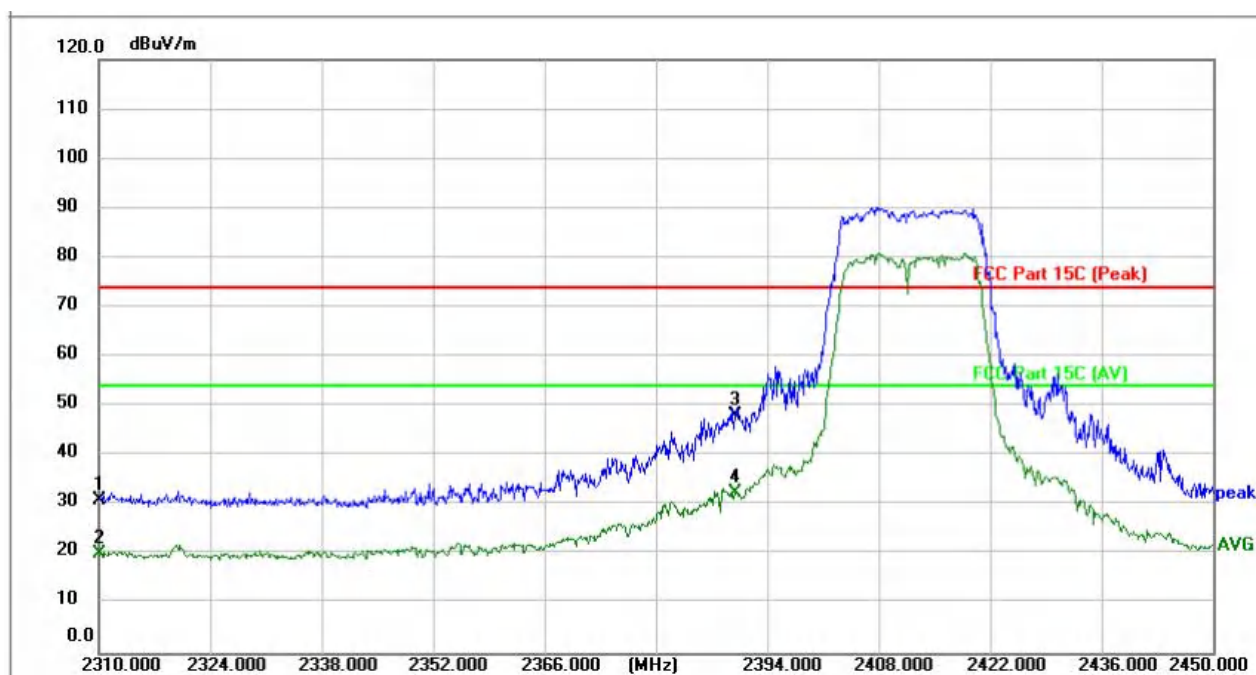
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	43.54	-6.47	37.07	74.00	-36.93	peak	150		P	
2 *	2483.500	33.42	-6.47	26.95	54.00	-27.05	AVG	150		P	
3	2500.000	38.96	-6.43	32.53	74.00	-41.47	peak	150		P	
4	2500.000	28.43	-6.43	22.00	54.00	-32.00	AVG	150		P	

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



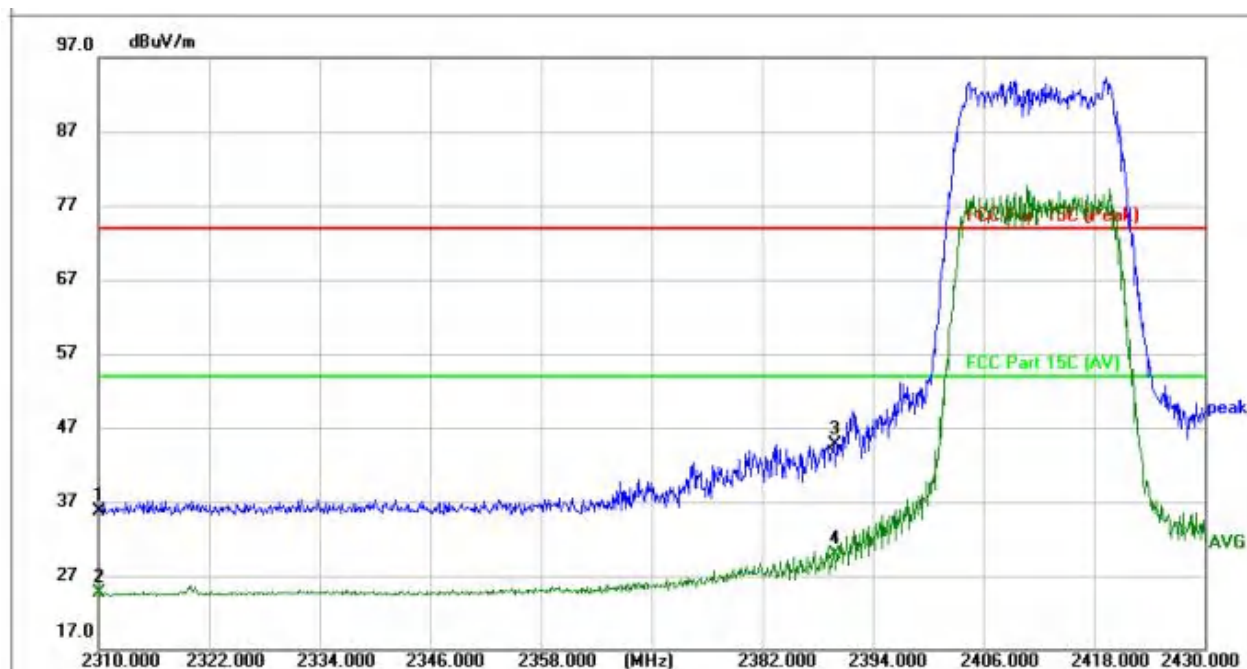
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	40.74	-4.54	36.20	74.00	-37.80	peak	100		P	
2 *	2483.500	30.43	-4.54	25.89	54.00	-28.11	AVG	100		P	
3	2500.000	40.96	-4.48	36.48	74.00	-37.52	peak	100		P	
4	2500.000	29.68	-4.48	25.20	54.00	-28.80	AVG	100		P	

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



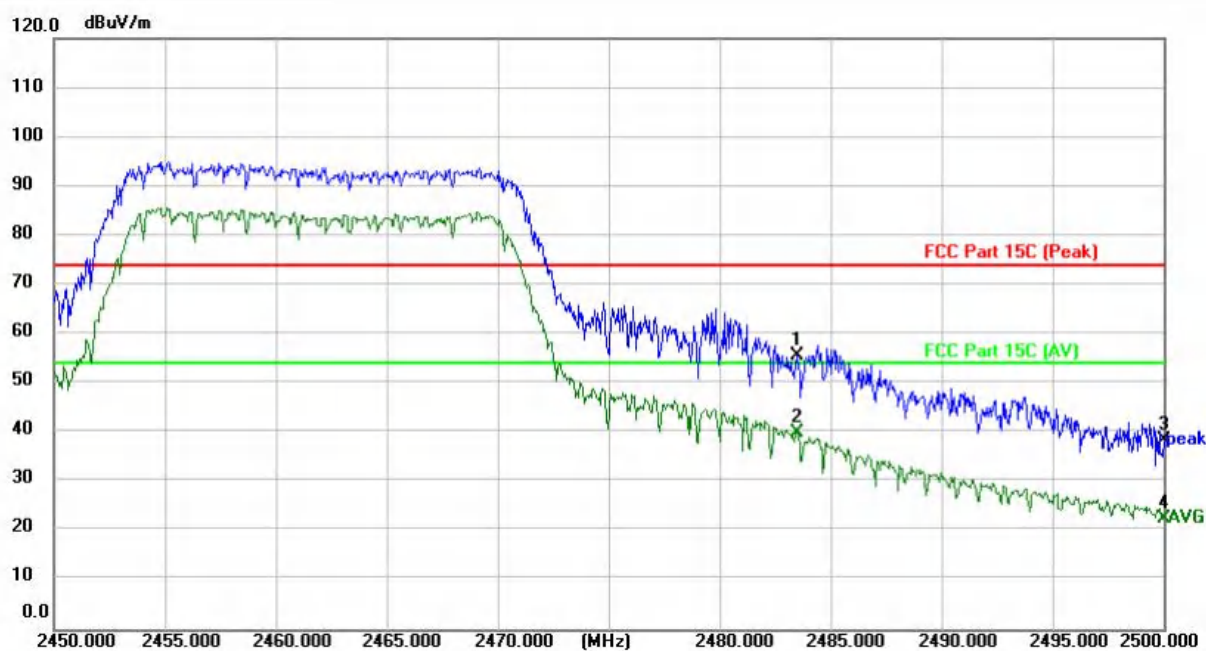
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	37.91	-6.93	30.98	74.00	-43.02	peak	150		P	
2	2310.000	27.22	-6.93	20.29	54.00	-33.71	AVG	150		P	
3	2390.000	54.85	-6.72	48.13	74.00	-25.87	peak	150		P	
4 *	2390.000	39.30	-6.72	32.58	54.00	-21.42	AVG	150		P	

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



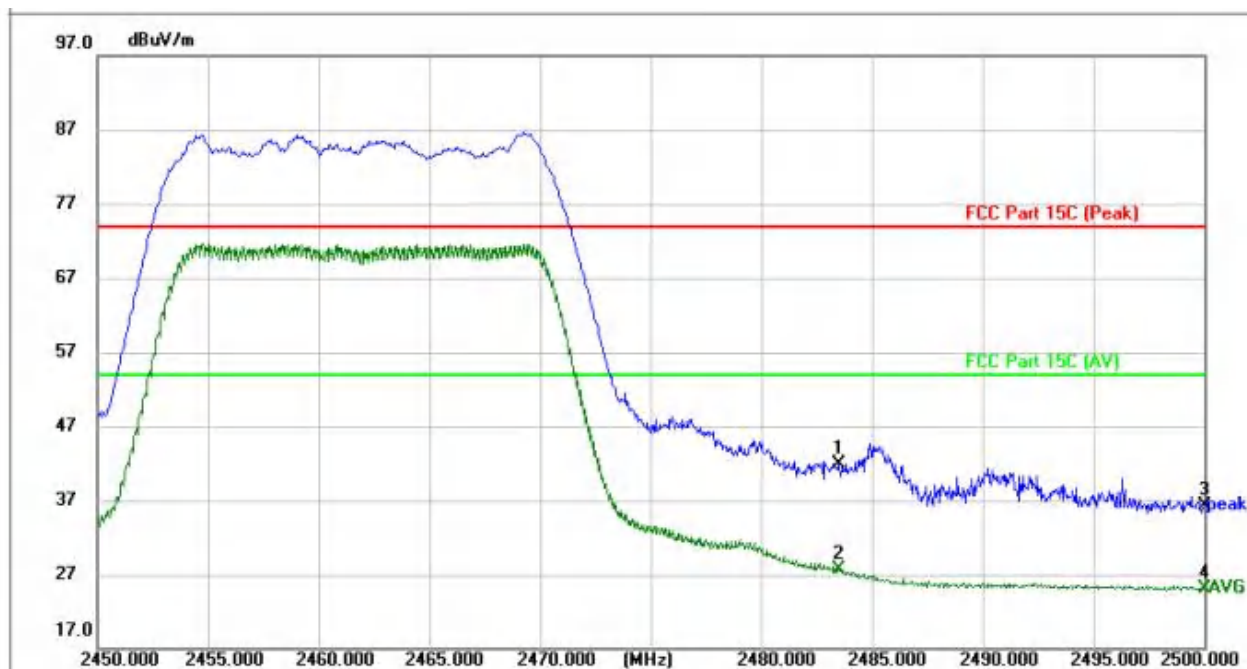
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.02	-5.23	35.79	74.00	-38.21	peak	100		P	
2	2310.000	29.88	-5.23	24.65	54.00	-29.35	AVG	100		P	
3	2390.000	49.60	-4.91	44.69	74.00	-29.31	peak	100		P	
4 *	2390.000	34.87	-4.91	29.96	54.00	-24.04	AVG	100		P	

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



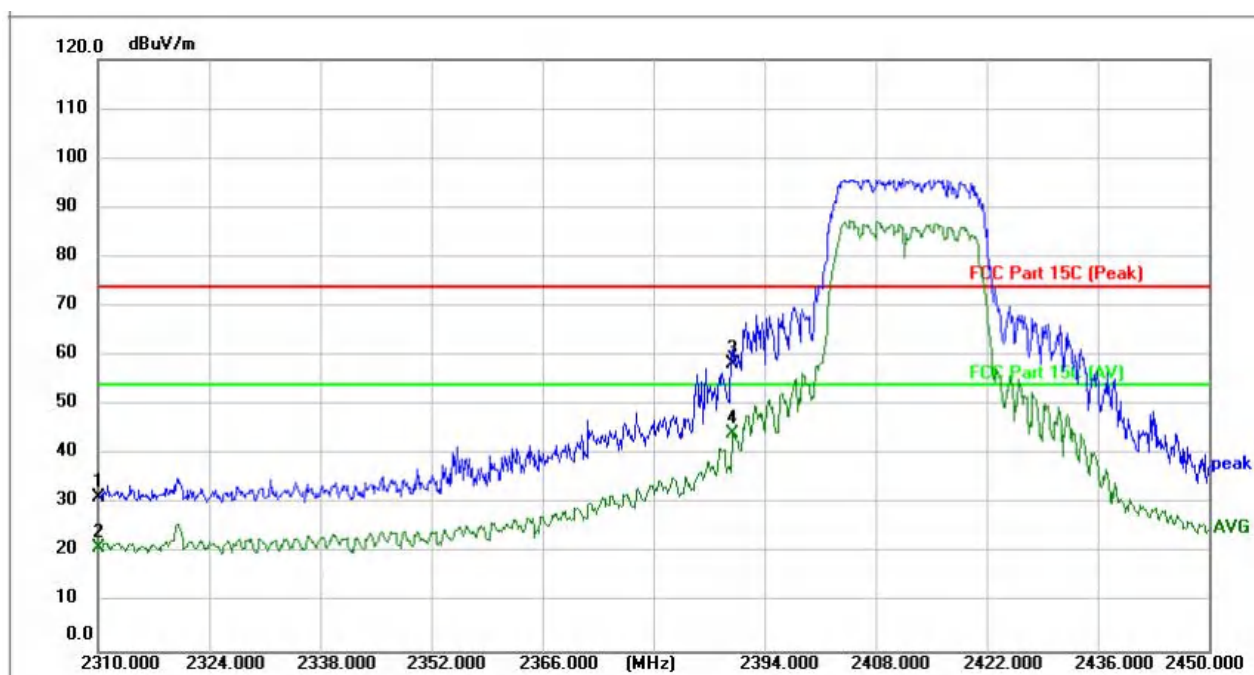
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	62.06	-6.47	55.59	74.00	-18.41	peak	150		P	
2 *	2483.500	46.62	-6.47	40.15	54.00	-13.85	AVG	150		P	
3	2500.000	44.88	-6.43	38.45	74.00	-35.55	peak	150		P	
4	2500.000	28.94	-6.43	22.51	54.00	-31.49	AVG	150		P	

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



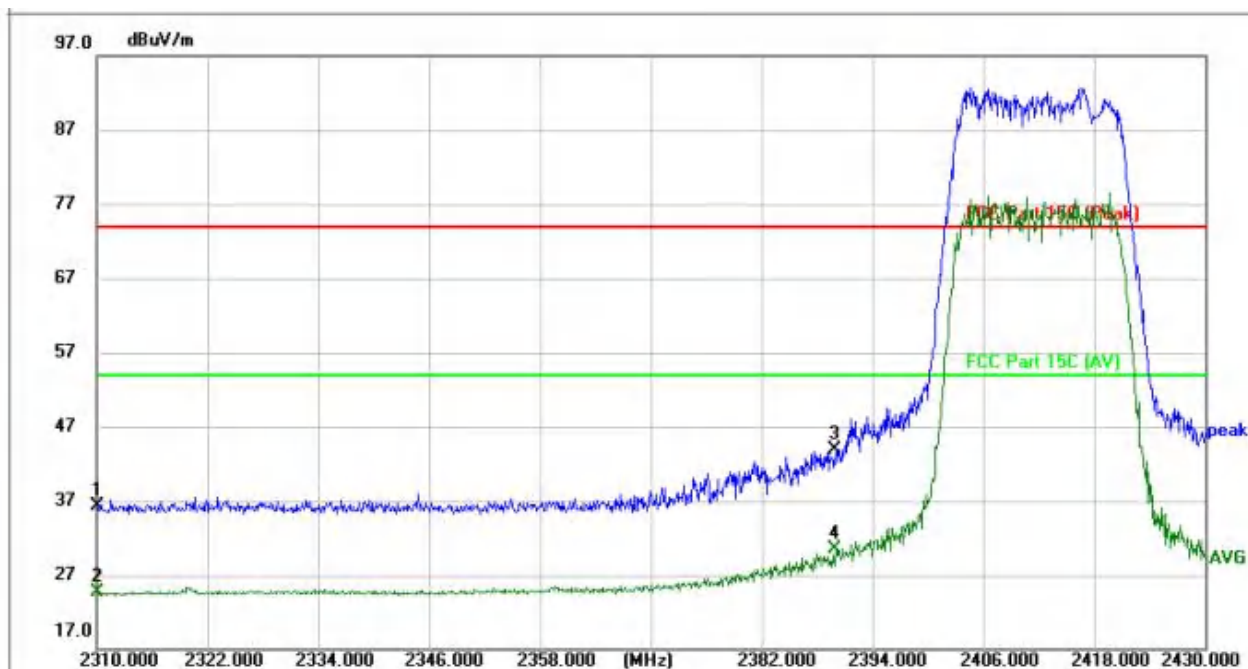
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	46.52	-4.54	41.98	74.00	-32.02	peak	100		P	
2 *	2483.500	32.15	-4.54	27.61	54.00	-26.39	AVG	100		P	
3	2500.000	40.82	-4.48	36.34	74.00	-37.66	peak	100		P	
4	2500.000	29.53	-4.48	25.05	54.00	-28.95	AVG	100		P	

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



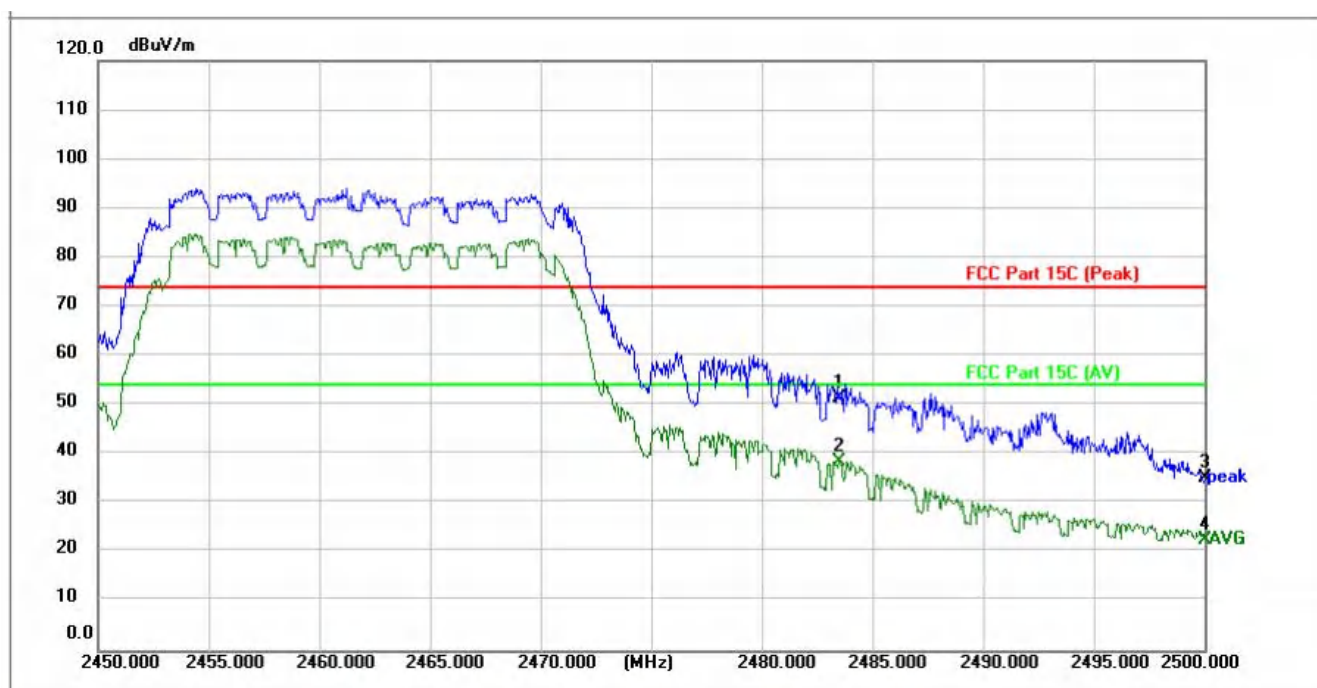
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	38.34	-6.93	31.41	74.00	-42.59	peak	150		P	
2	2310.000	28.09	-6.93	21.16	54.00	-32.84	AVG	150		P	
3	2390.000	65.00	-6.72	58.28	74.00	-15.72	peak	150		P	
4 *	2390.000	50.89	-6.72	44.17	54.00	-9.83	AVG	150		P	

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



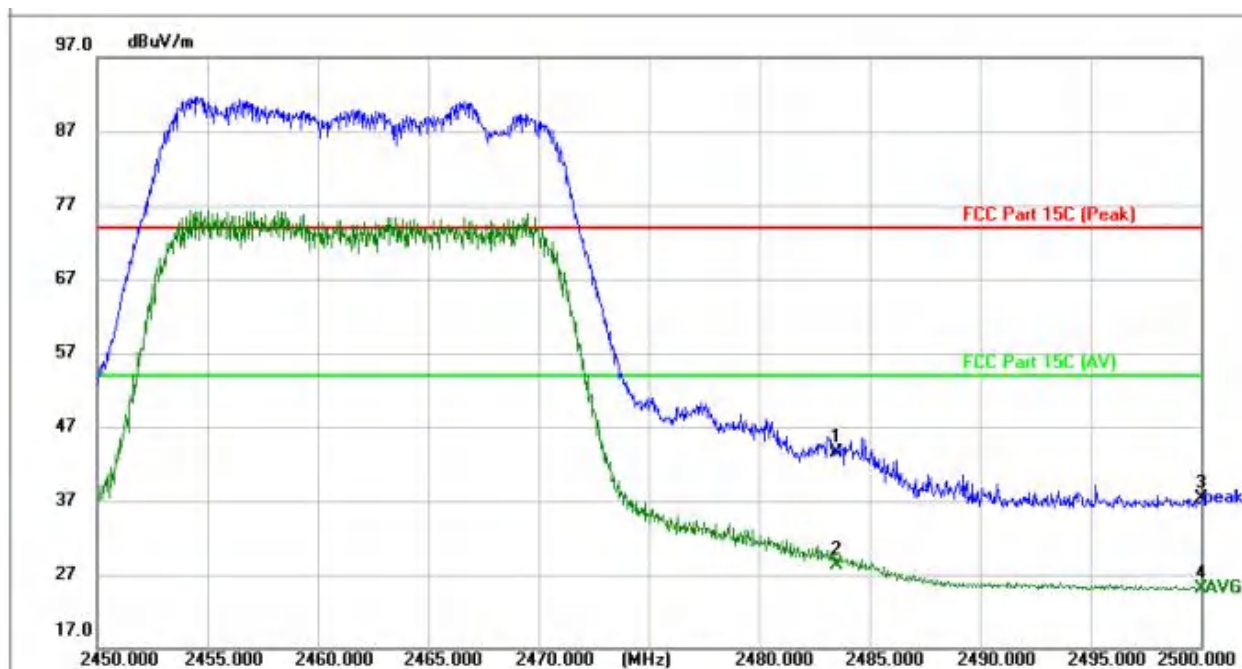
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.55	-5.23	36.32	74.00	-37.68	peak	100		P	
2	2310.000	29.93	-5.23	24.70	54.00	-29.30	AVG	100		P	
3	2390.000	48.74	-4.91	43.83	74.00	-30.17	peak	100		P	
4 *	2390.000	35.36	-4.91	30.45	54.00	-23.55	AVG	100		P	

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



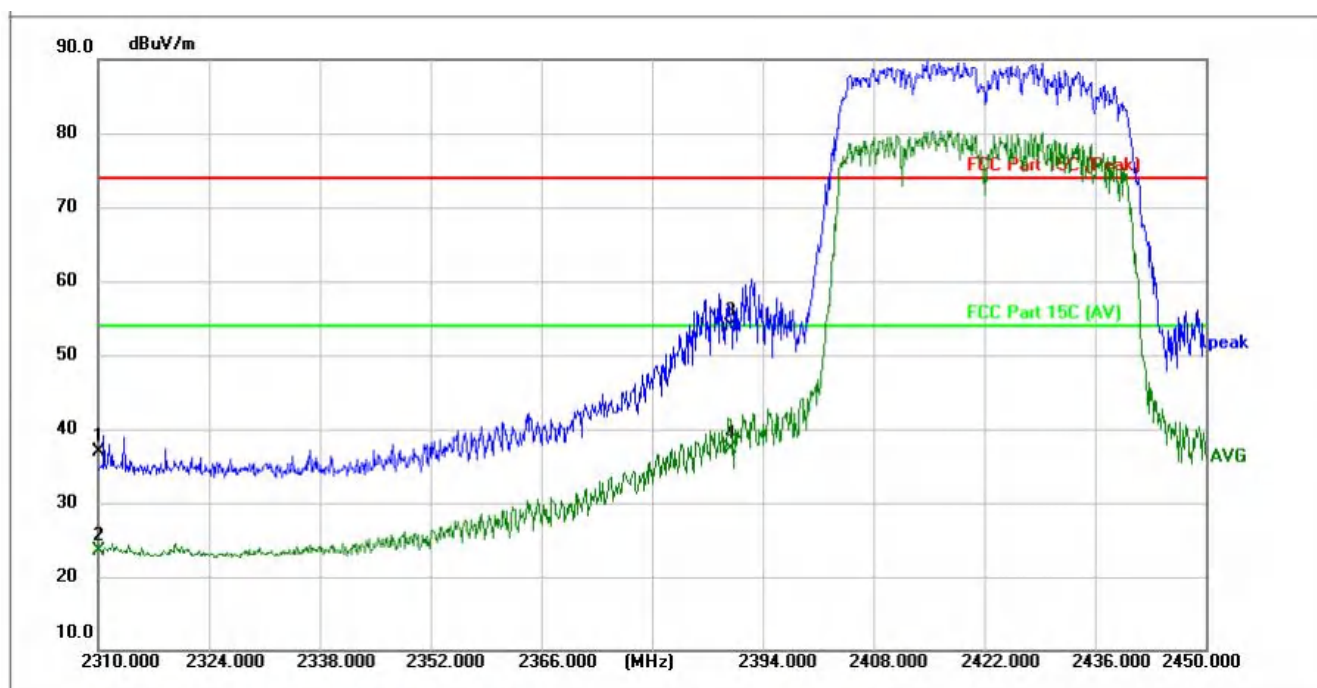
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	58.03	-6.47	51.56	74.00	-22.44	peak	150		P	
2 *	2483.500	45.07	-6.47	38.60	54.00	-15.40	AVG	150		P	
3	2500.000	41.61	-6.43	35.18	74.00	-38.82	peak	150		P	
4	2500.000	28.97	-6.43	22.54	54.00	-31.46	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	48.11	-4.54	43.57	74.00	-30.43	peak	100		P	
2 *	2483.500	32.86	-4.54	28.32	54.00	-25.68	AVG	100		P	
3	2500.000	41.71	-4.48	37.23	74.00	-36.77	peak	100		P	
4	2500.000	29.56	-4.48	25.08	54.00	-28.92	AVG	100		P	

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



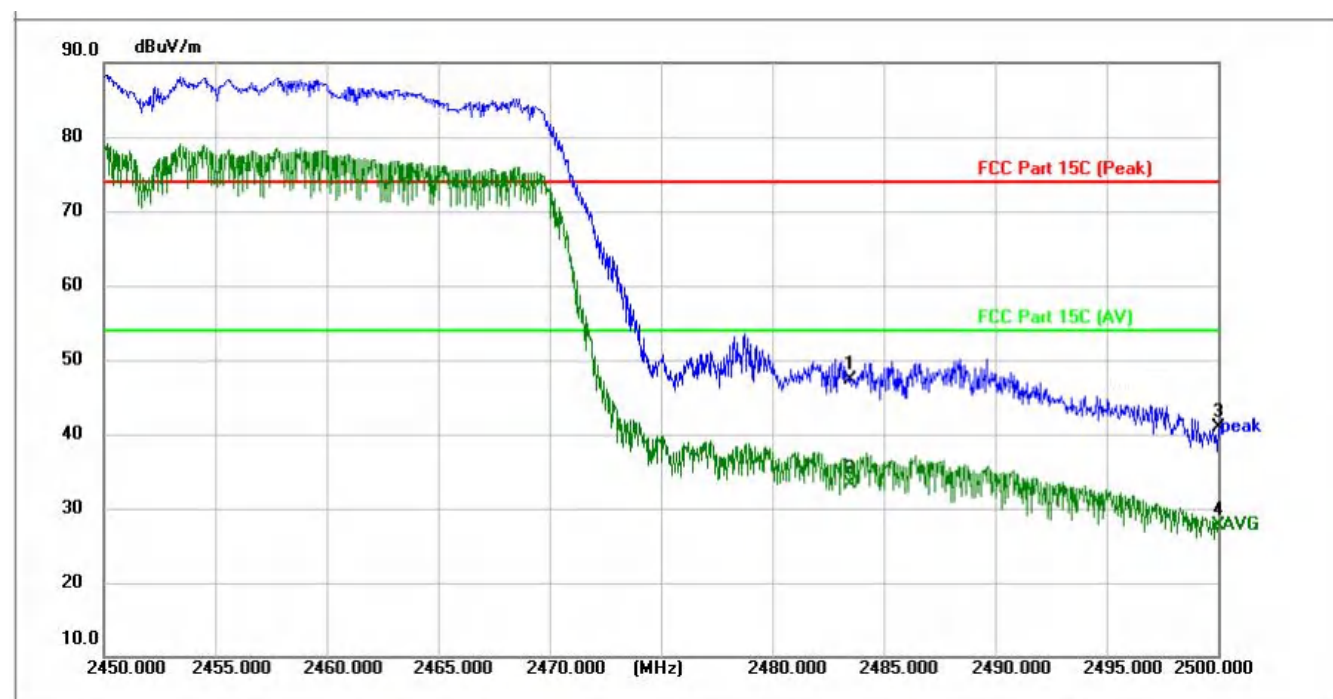
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	40.78	-3.93	36.85	74.00	-37.15	peak	150		P	
2	2310.000	27.45	-3.93	23.52	54.00	-30.48	AVG	150		P	
3	2390.000	57.63	-3.72	53.91	74.00	-20.09	peak	150		P	
4 *	2390.000	40.98	-3.72	37.26	54.00	-16.74	AVG	150		P	

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



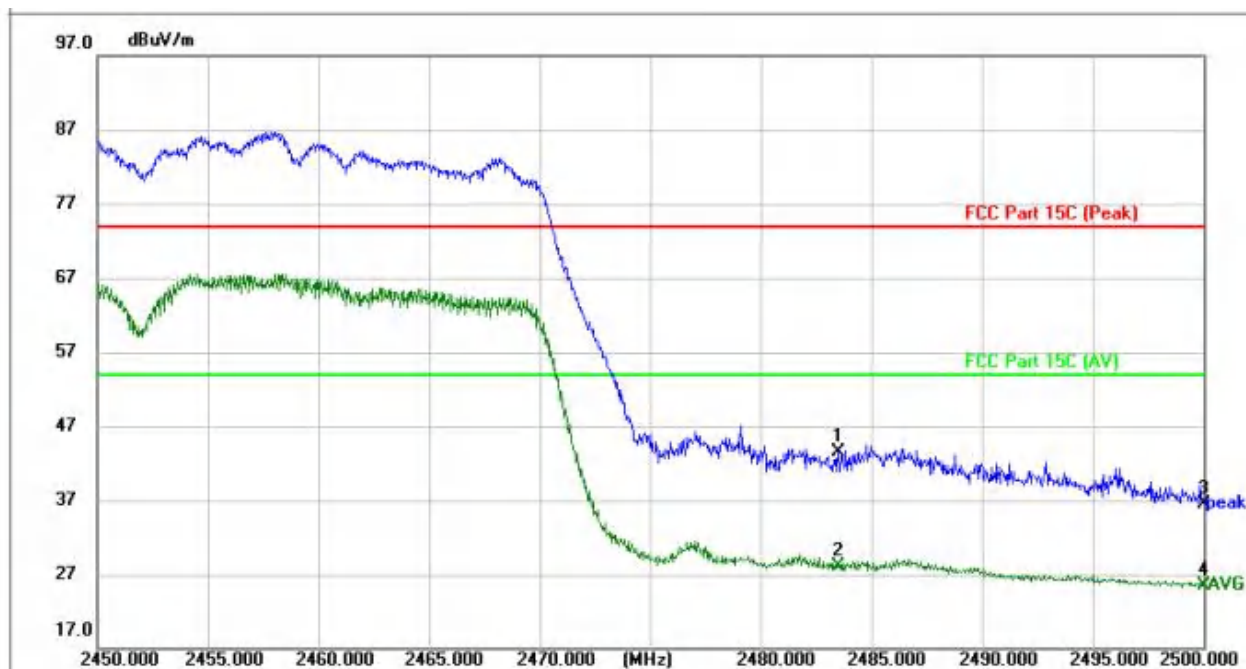
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.57	-5.23	36.34	74.00	-37.66	peak	100		P	
2	2310.000	29.86	-5.23	24.63	54.00	-29.37	AVG	100		P	
3	2390.000	49.19	-4.91	44.28	74.00	-29.72	peak	100		P	
4 *	2390.000	34.35	-4.91	29.44	54.00	-24.56	AVG	100		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	50.77	-3.47	47.30	74.00	-26.70	peak	150		P	
2 *	2483.500	36.70	-3.47	33.23	54.00	-20.77	AVG	150		P	
3	2500.000	44.40	-3.43	40.97	74.00	-33.03	peak	150		P	
4	2500.000	31.18	-3.43	27.75	54.00	-26.25	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	47.97	-4.54	43.43	74.00	-30.57	peak	100		P	
2 *	2483.500	32.69	-4.54	28.15	54.00	-25.85	AVG	100		P	
3	2500.000	40.90	-4.48	36.42	74.00	-37.58	peak	100		P	
4	2500.000	29.90	-4.48	25.42	54.00	-28.58	AVG	100		P	

4.7 Emissions in frequency bands (below 1GHz)

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 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	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 & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + 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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1				

4.7.2 Test Data:

TM1 is worse case and only reported

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	97.1148	28.61	-5.66	22.95	43.50	-20.55	QP	100		P	
2	199.9856	27.34	-2.94	24.40	43.50	-19.10	QP	100		P	
3	213.0151	31.41	-2.73	28.68	43.50	-14.82	QP	100		P	
4	281.0075	29.63	-0.38	29.25	46.00	-16.75	QP	100		P	
5 *	365.5391	38.67	1.64	40.31	46.00	-5.69	QP	100		P	
6	839.1818	28.22	6.66	34.88	46.00	-11.12	QP	100		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	73.3593	34.81	-8.29	26.52	40.00	-13.48	QP	100		P	
2 *	84.1100	41.55	-7.00	34.55	40.00	-5.45	QP	100		P	
3	96.0986	41.62	-5.71	35.91	43.50	-7.59	QP	100		P	
4	102.7192	41.15	-5.45	35.70	43.50	-7.80	QP	100		P	
5	153.7385	31.59	-3.66	27.93	43.50	-15.57	QP	100		P	
6	213.0151	34.15	-2.73	31.42	43.50	-12.08	QP	100		P	

4.8 Emissions in frequency bands (above 1GHz)

Test Requirement:	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 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	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 & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + 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:	23.6 °C	Humidity:	47.9 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1				

4.8.2 Test Data:

TM1 is worse case and only reported

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	4821.757	51.61	3.78	55.39	74.00	-18.61	peak	150		P	
2 *	4821.757	38.70	3.78	42.48	54.00	-11.52	AVG	150		P	
3	8229.291	24.64	12.58	37.22	54.00	-16.78	AVG	150		P	
4	8250.266	36.65	12.64	49.29	74.00	-24.71	peak	150		P	
5	10723.474	25.82	16.55	42.37	54.00	-11.63	AVG	150		P	
6	10778.207	37.83	16.63	54.46	74.00	-19.54	peak	150		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	4821.757	54.85	3.16	58.01	74.00	-15.99	peak	150		P	
2 *	4821.757	42.05	3.16	45.21	54.00	-8.79	AVG	150		P	
3	8042.903	36.33	12.49	48.82	74.00	-25.18	peak	150		P	
4	8292.376	24.67	13.12	37.79	54.00	-16.21	AVG	150		P	
5	10778.207	37.99	16.98	54.97	74.00	-19.03	peak	150		P	
6	11312.308	25.61	17.55	43.16	54.00	-10.84	AVG	150		P	

TM1 / 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	4871.103	51.87	3.33	55.20	74.00	-18.80	peak	150		P	
2	4871.103	39.37	3.33	42.70	54.00	-11.30	AVG	150		P	
3	7820.819	36.52	11.74	48.26	74.00	-25.74	peak	150		P	
4	8042.903	24.78	12.49	37.27	54.00	-16.73	AVG	150		P	
5	11084.271	38.57	17.42	55.99	74.00	-18.01	peak	150		P	
6 *	11370.046	25.70	17.59	43.29	54.00	-10.71	AVG	150		P	

TM1 / 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	4871.103	51.97	3.94	55.91	74.00	-18.09	peak	150		P	
2	4871.103	38.90	3.94	42.84	54.00	-11.16	AVG	150		P	
3	8063.403	24.76	12.14	36.90	54.00	-17.10	AVG	150		P	
4	8083.955	36.44	12.20	48.64	74.00	-25.36	peak	150		P	
5	11112.522	38.12	17.17	55.29	74.00	-18.71	peak	150		P	
6 *	11399.026	25.67	17.54	43.21	54.00	-10.79	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	4920.955	45.01	4.11	49.12	74.00	-24.88	peak	150		P	
2	4920.955	32.31	4.11	36.42	54.00	-17.58	AVG	150		P	
3	8659.098	37.82	13.71	51.53	74.00	-22.47	peak	150		P	
4	8659.098	25.51	13.71	39.22	54.00	-14.78	AVG	150		P	
5	11312.308	38.10	17.42	55.52	74.00	-18.48	peak	150		P	
6 *	11545.036	25.67	17.72	43.39	54.00	-10.61	AVG	150		P	

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

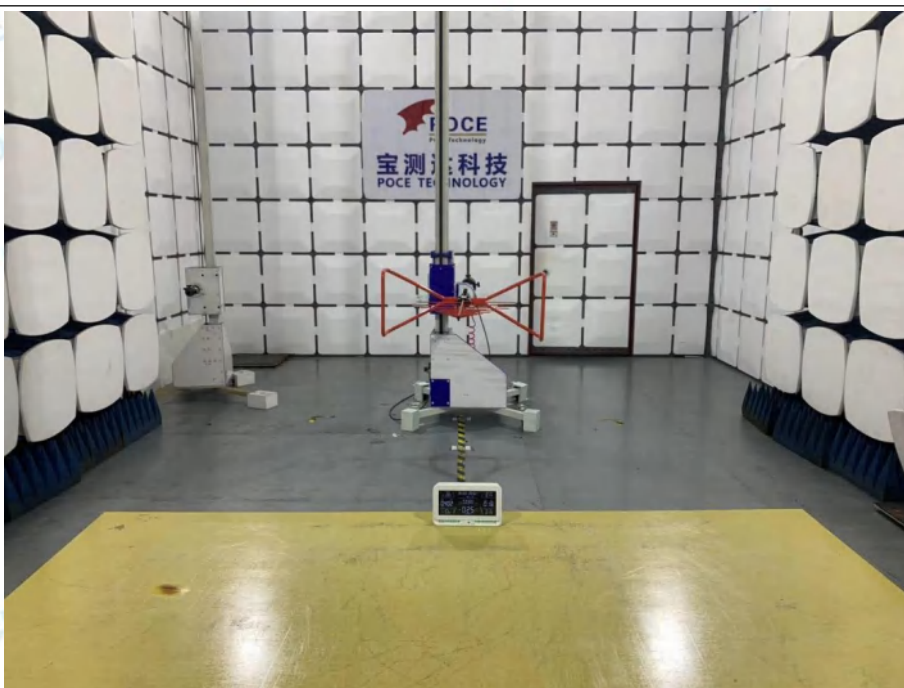
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1	3653.463	29.84	0.09	29.93	54.00	-24.07	AVG	150		P	
2	3854.077	41.32	0.70	42.02	74.00	-31.98	peak	150		P	
3	6628.177	37.36	8.38	45.74	74.00	-28.26	peak	150		P	
4	6713.077	25.45	8.71	34.16	54.00	-19.84	AVG	150		P	
5	9322.501	37.58	15.06	52.64	74.00	-21.36	peak	150		P	
6 *	9370.083	25.57	15.07	40.64	54.00	-13.36	AVG	150		P	

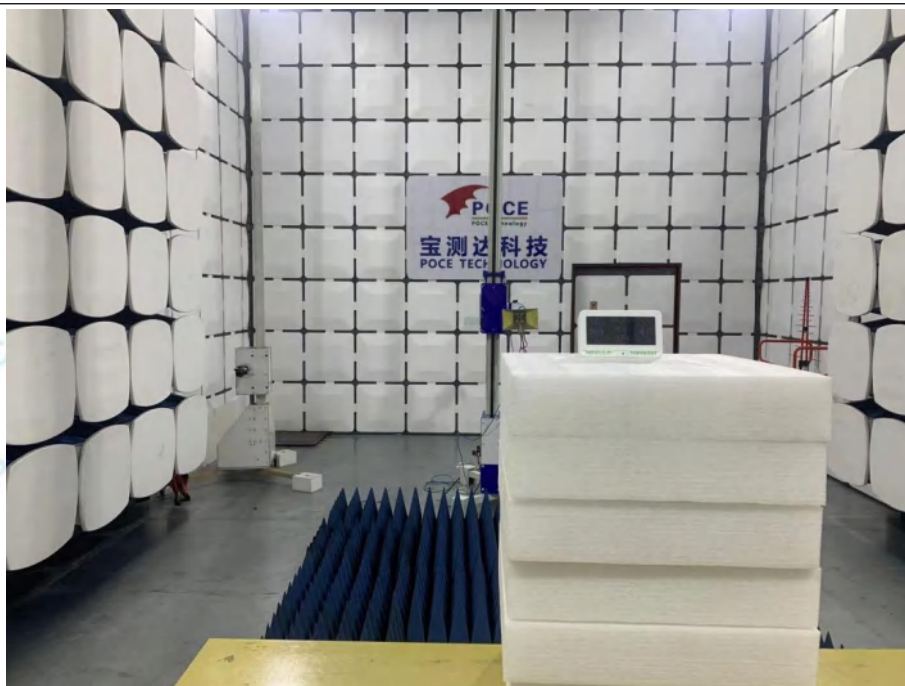
5 TEST SETUP PHOTOS

Conducted Emission at AC power line



Emissions in frequency bands (below 1GHz)



Emissions in frequency bands (above 1GHz)

6 PHOTOS OF THE EUT

External



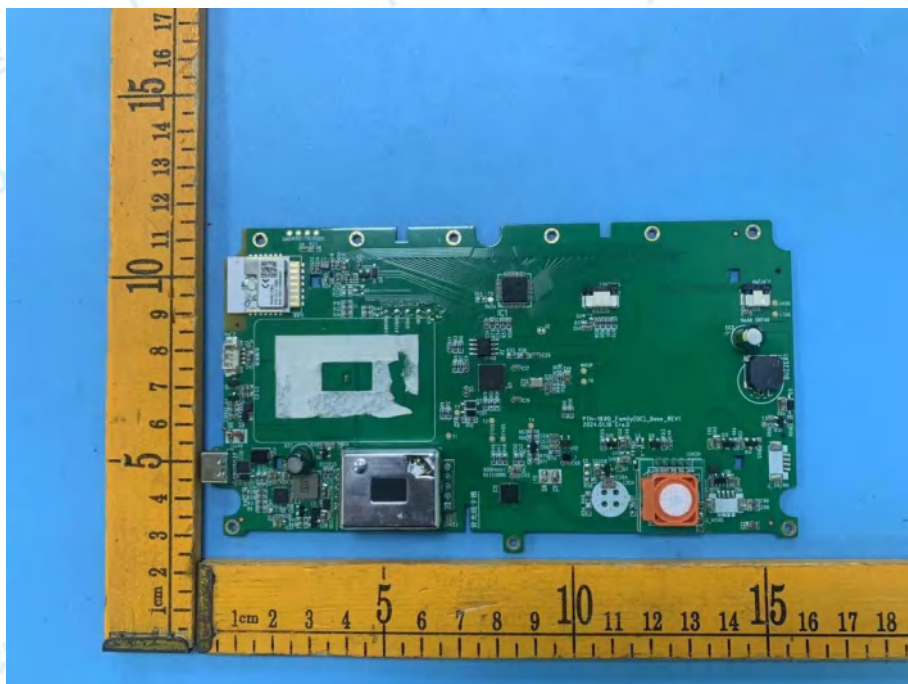
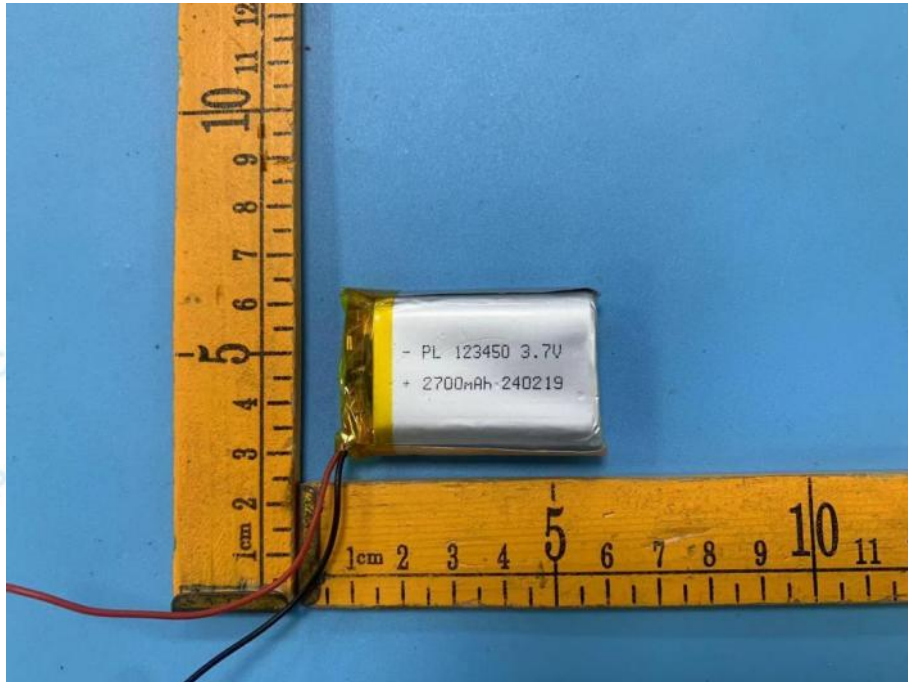


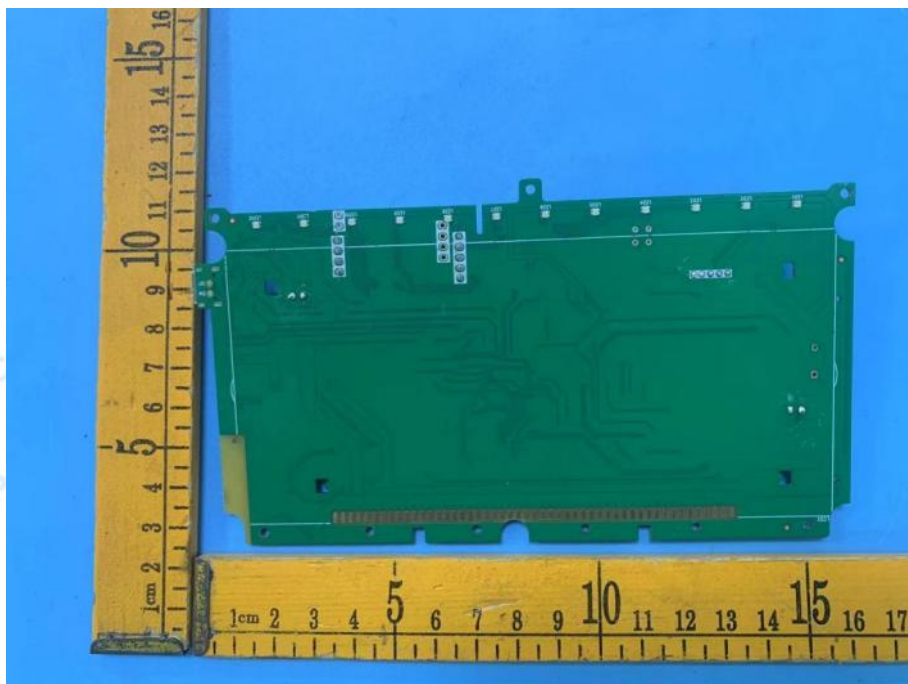


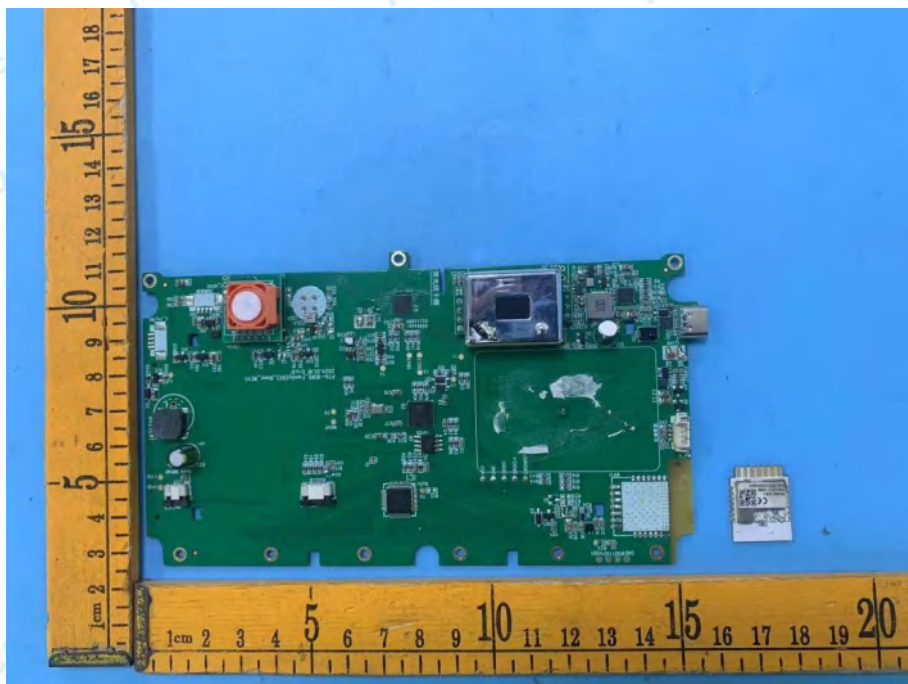
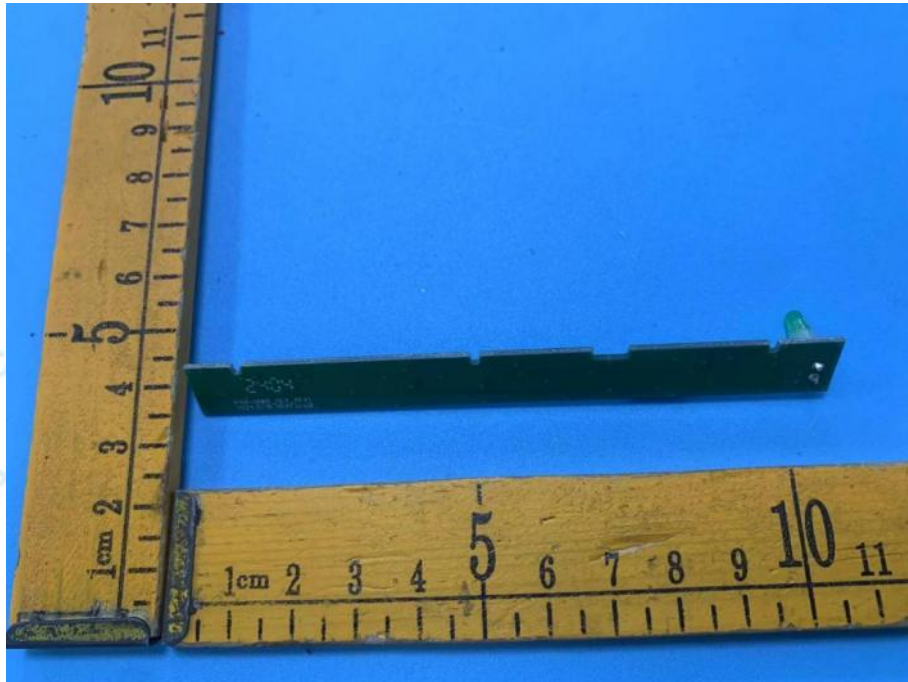


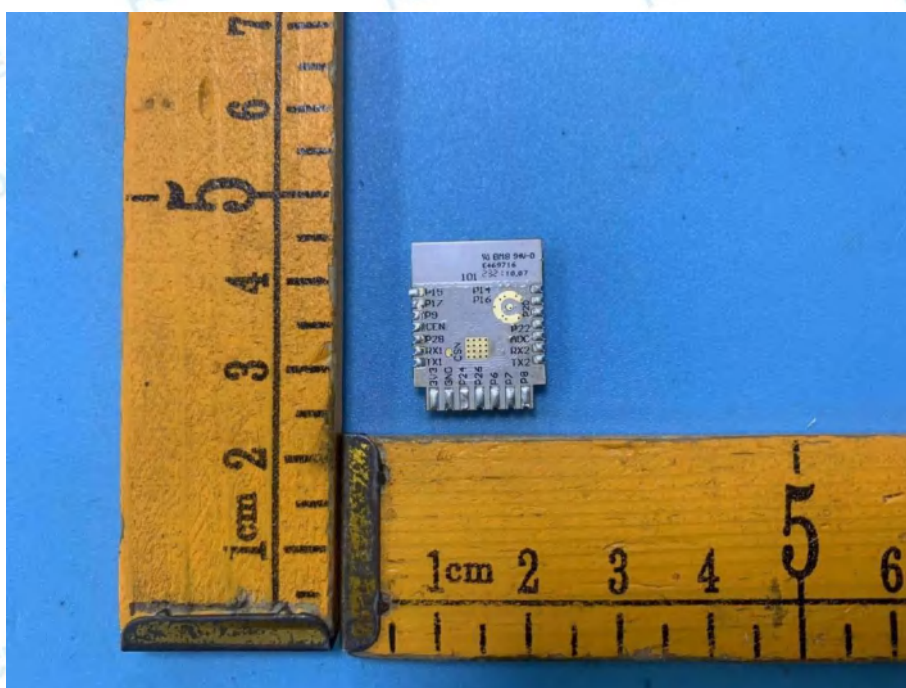
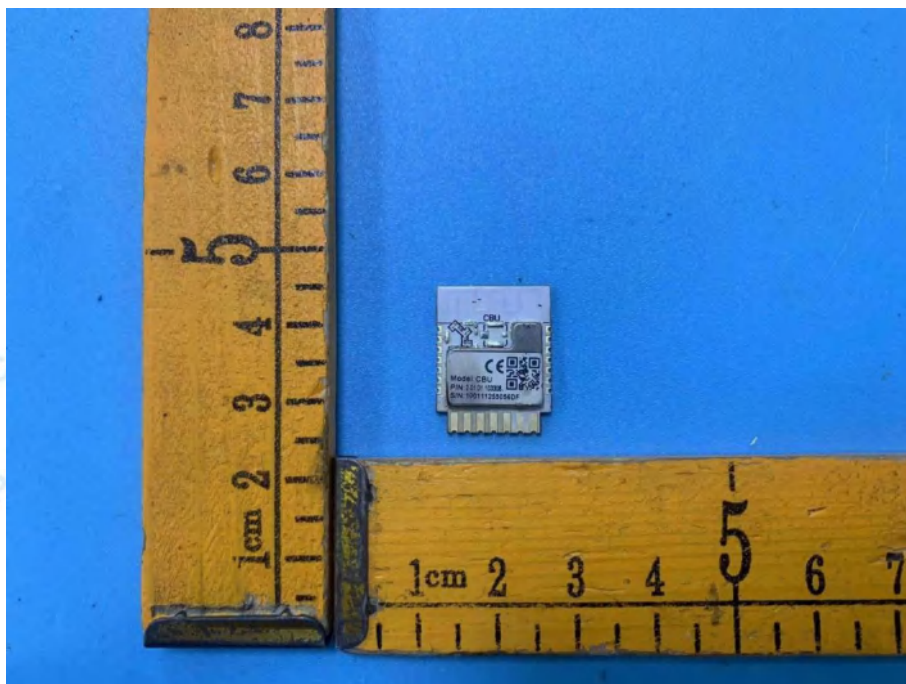
Internal











Appendix

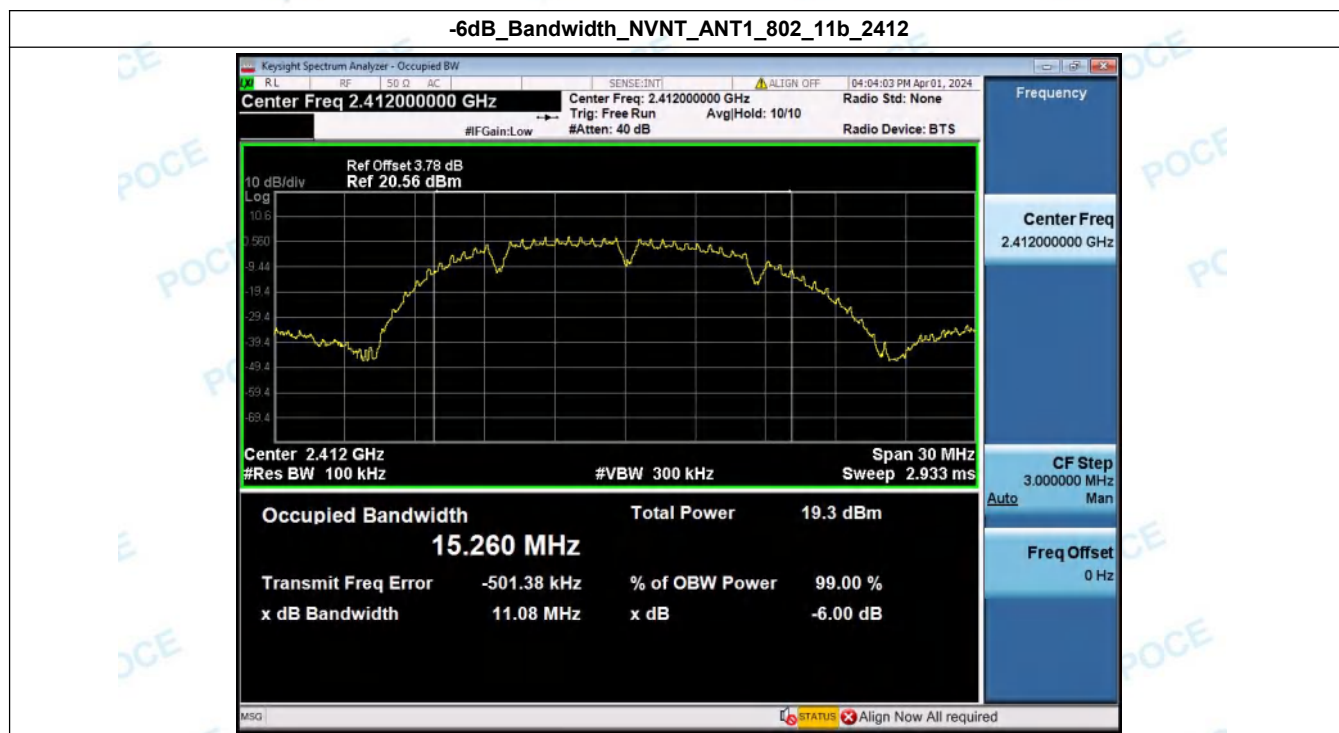
IAQM-129-W--FCC ID

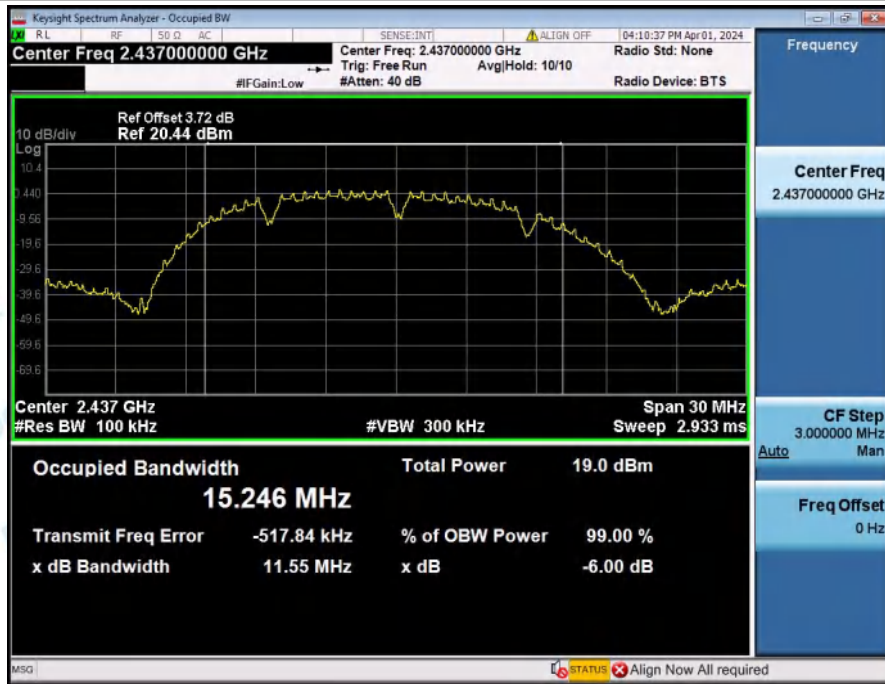
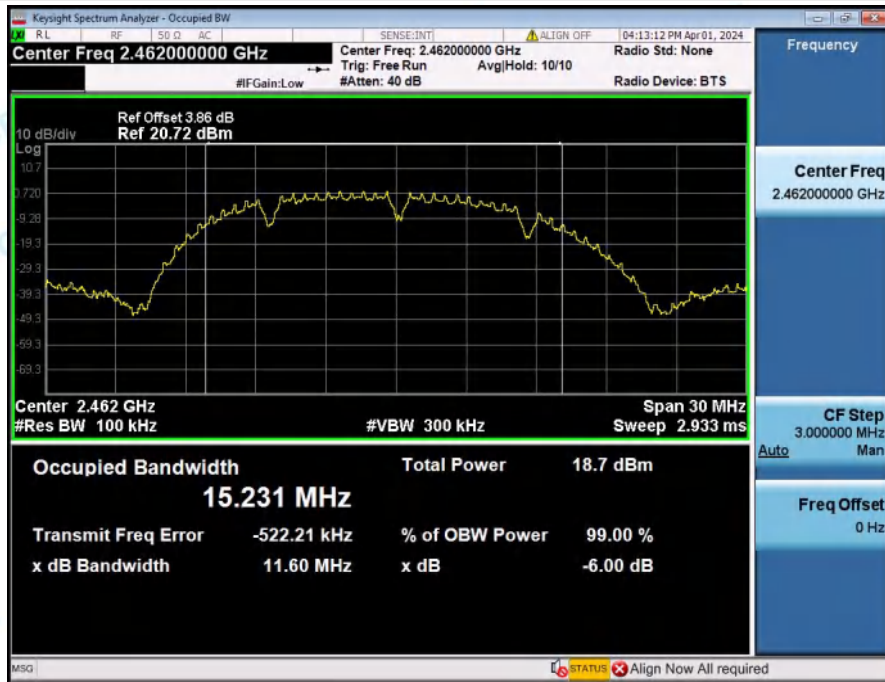
FCC_2.4G_WIFI (Part15.247) Test Data

1. -6dB Bandwidth

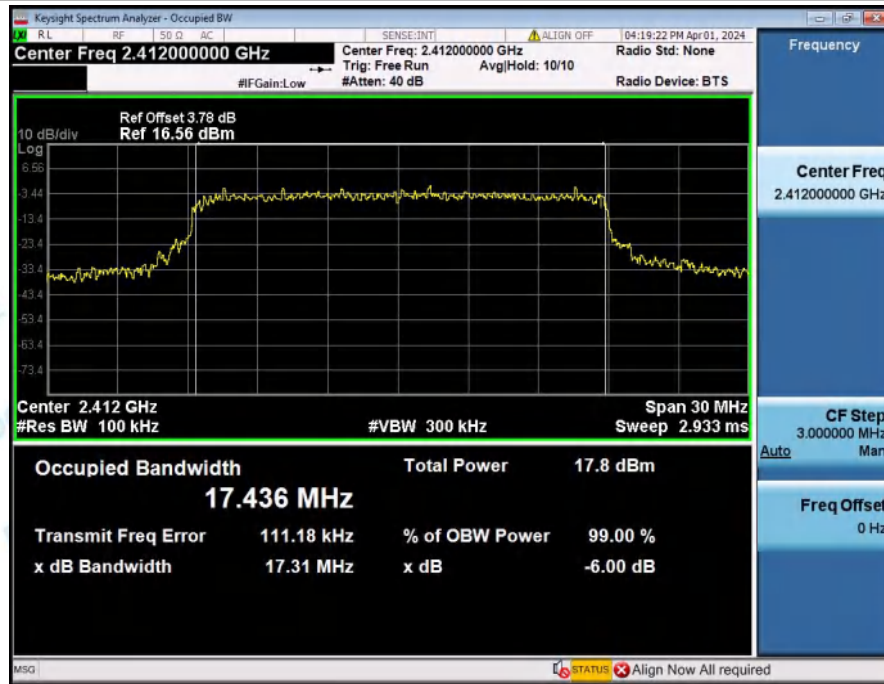
Condition	Antenna	Modulation	Frequency (MHz)	-6dB BW(MHz)	limit(kHz)	Result
NVNT	ANT1	802.11b	2412.00	11.08	500	Pass
NVNT	ANT1	802.11b	2437.00	11.55	500	Pass
NVNT	ANT1	802.11b	2462.00	11.60	500	Pass
NVNT	ANT1	802.11g	2412.00	17.31	500	Pass
NVNT	ANT1	802.11g	2437.00	17.30	500	Pass
NVNT	ANT1	802.11g	2462.00	17.53	500	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	18.32	500	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	18.26	500	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	18.36	500	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	35.21	500	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	35.19	500	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	35.37	500	Pass

-6dB_Bandwidth_NVNT_ANT1_802_11b_2412

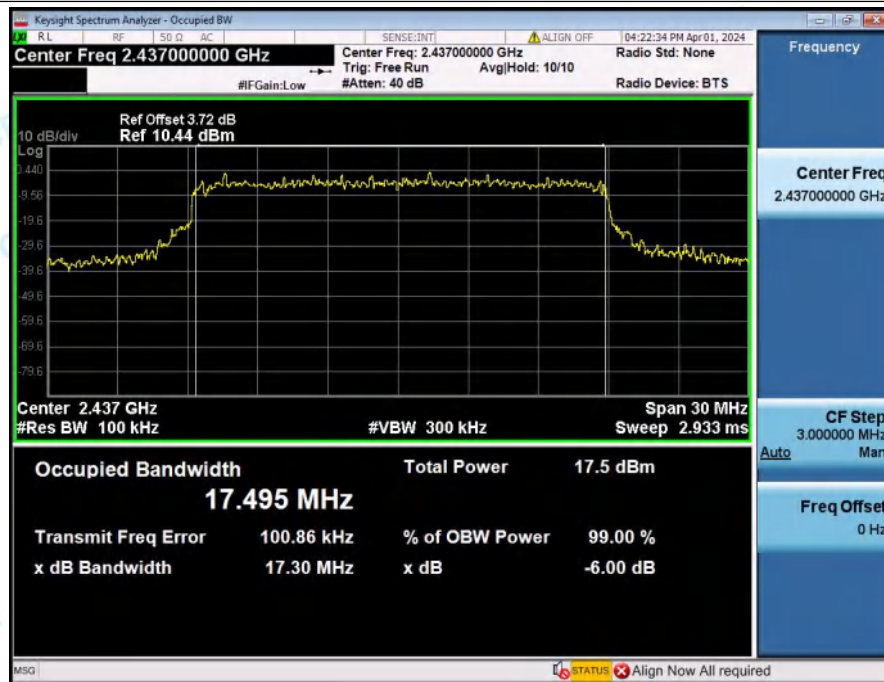


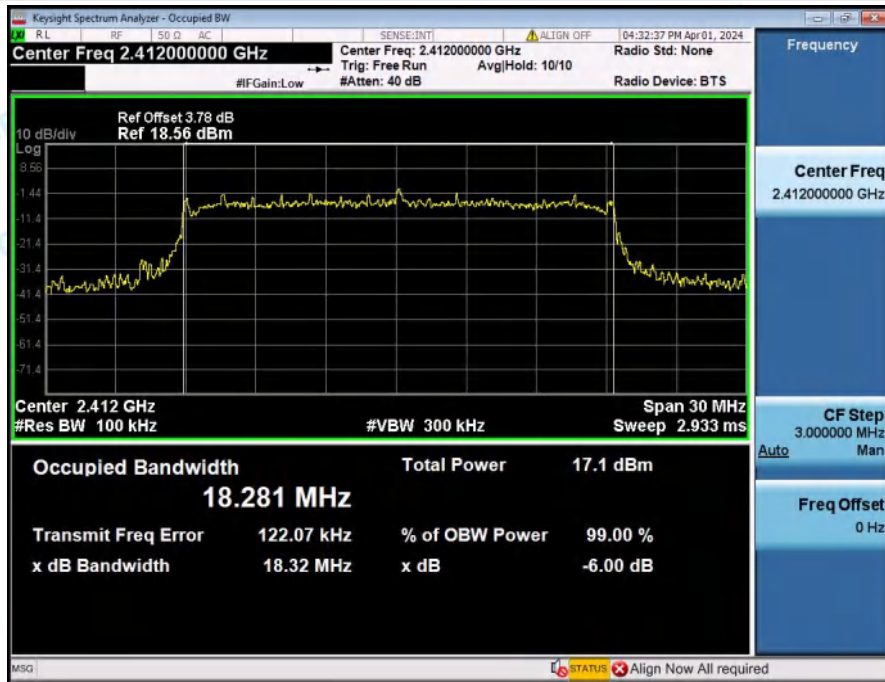
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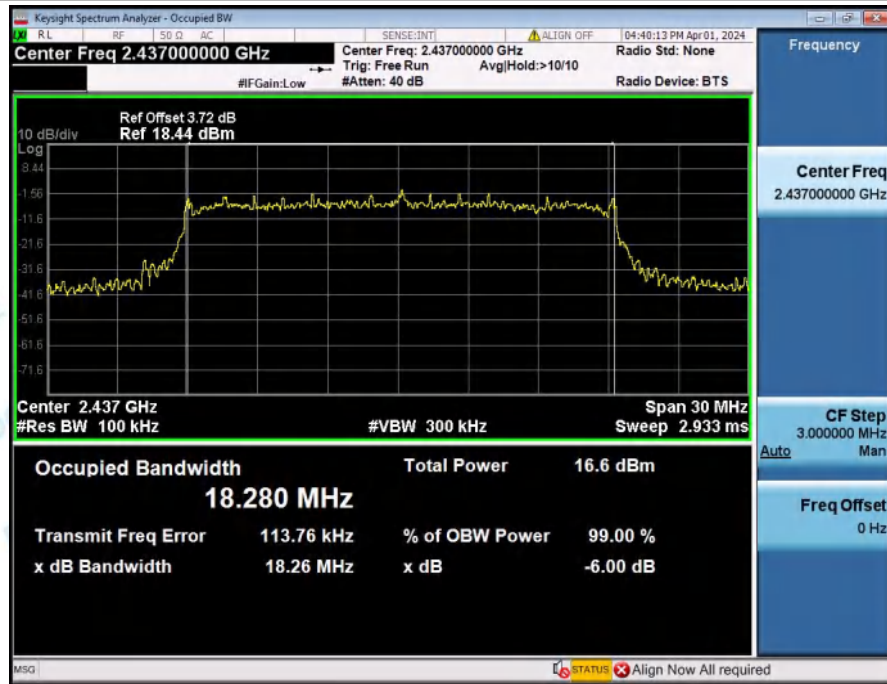
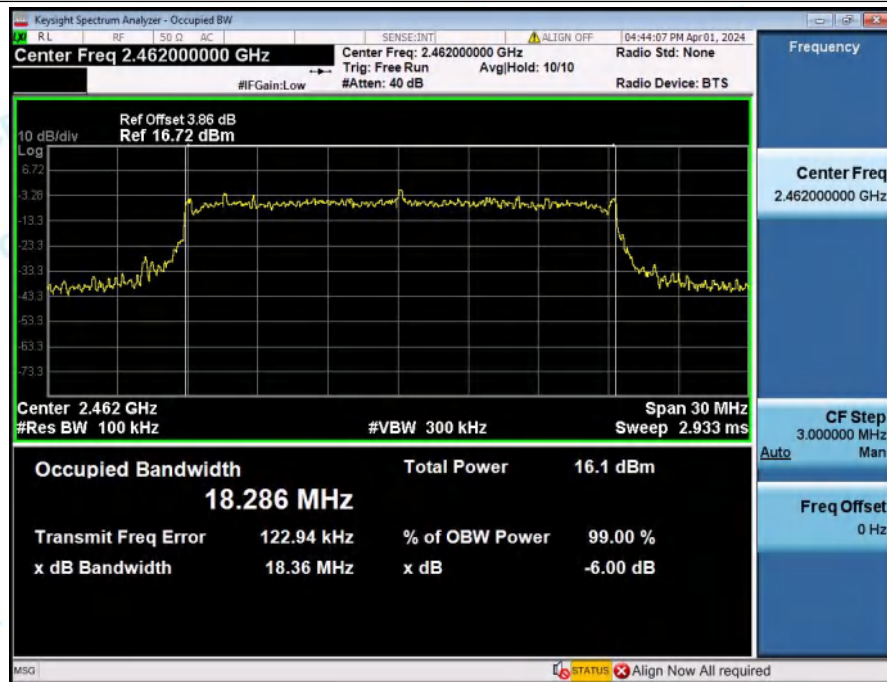
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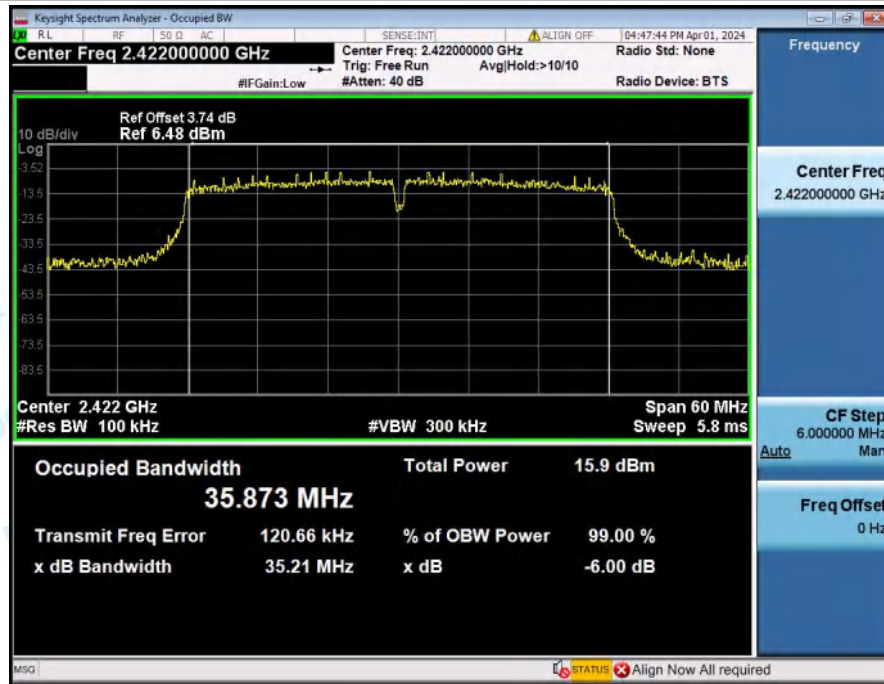
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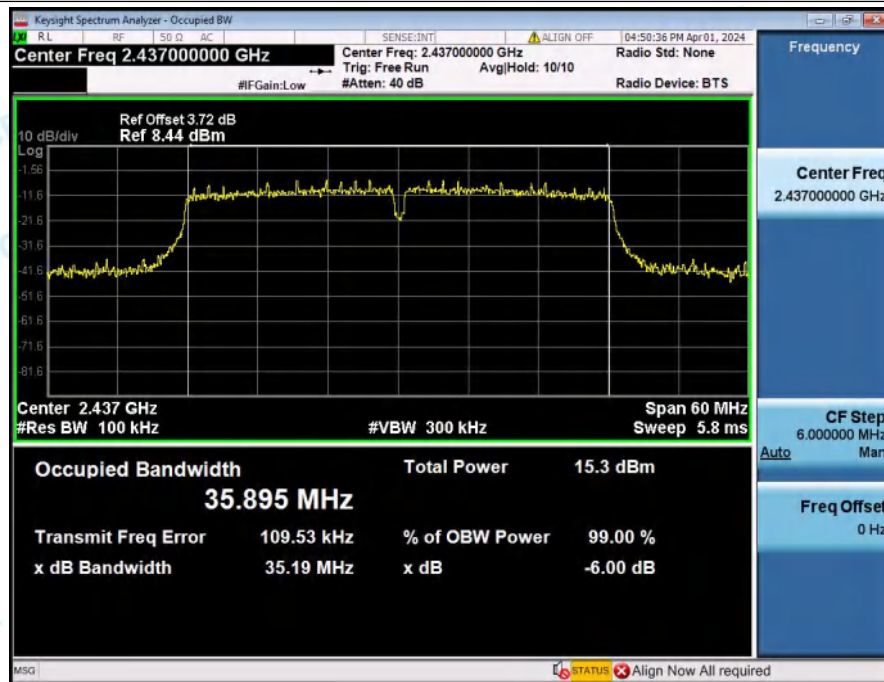
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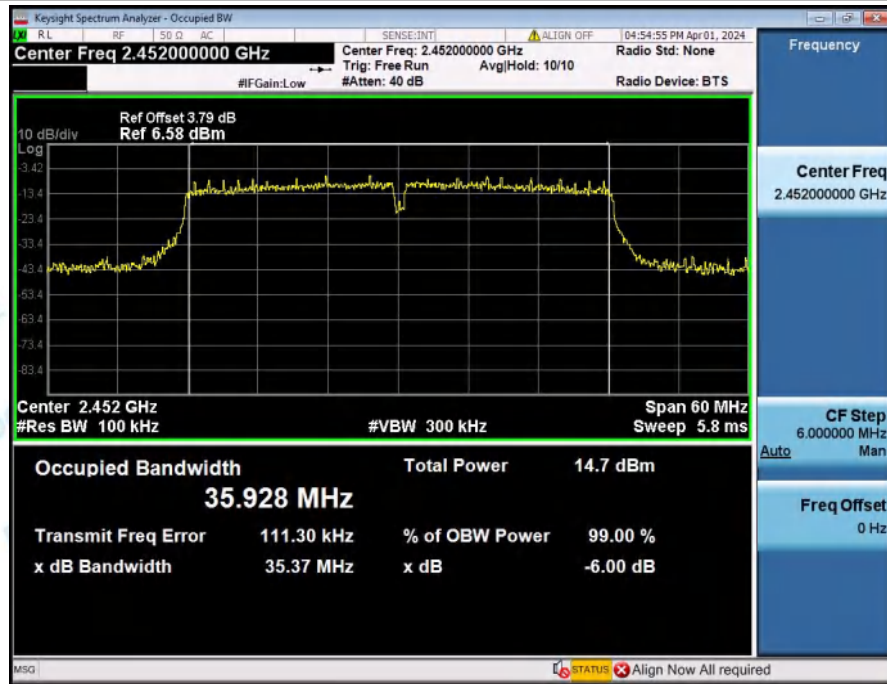
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-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2422



-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	15.331
NVNT	ANT1	802.11b	2437.00	15.304
NVNT	ANT1	802.11b	2462.00	15.327
NVNT	ANT1	802.11g	2412.00	17.819
NVNT	ANT1	802.11g	2437.00	17.710
NVNT	ANT1	802.11g	2462.00	17.787
NVNT	ANT1	802.11n(HT20)	2412.00	18.607
NVNT	ANT1	802.11n(HT20)	2437.00	18.521
NVNT	ANT1	802.11n(HT20)	2462.00	18.613
NVNT	ANT1	802.11n(HT40)	2422.00	36.269
NVNT	ANT1	802.11n(HT40)	2437.00	36.433
NVNT	ANT1	802.11n(HT40)	2452.00	36.365

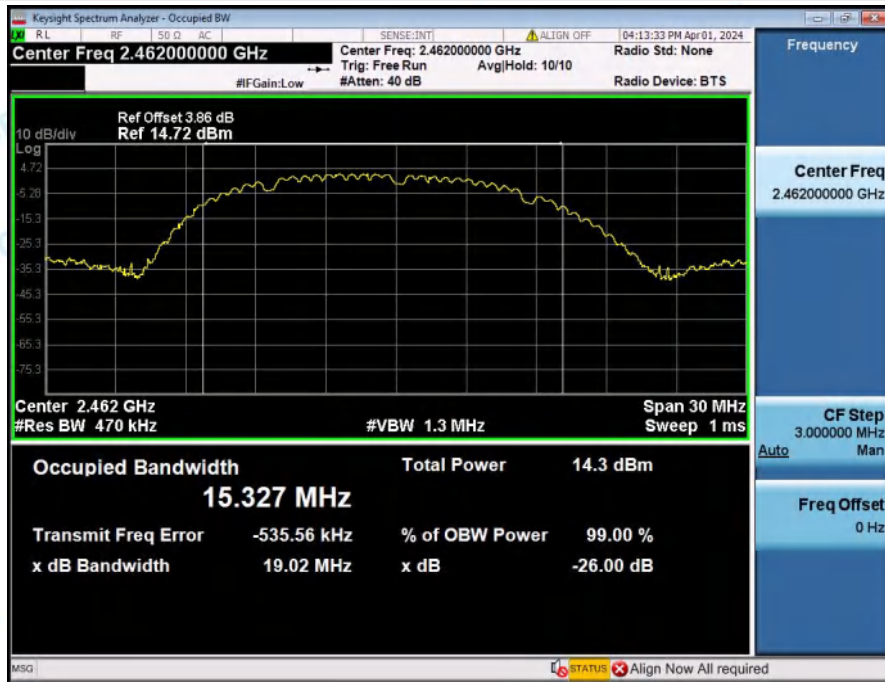
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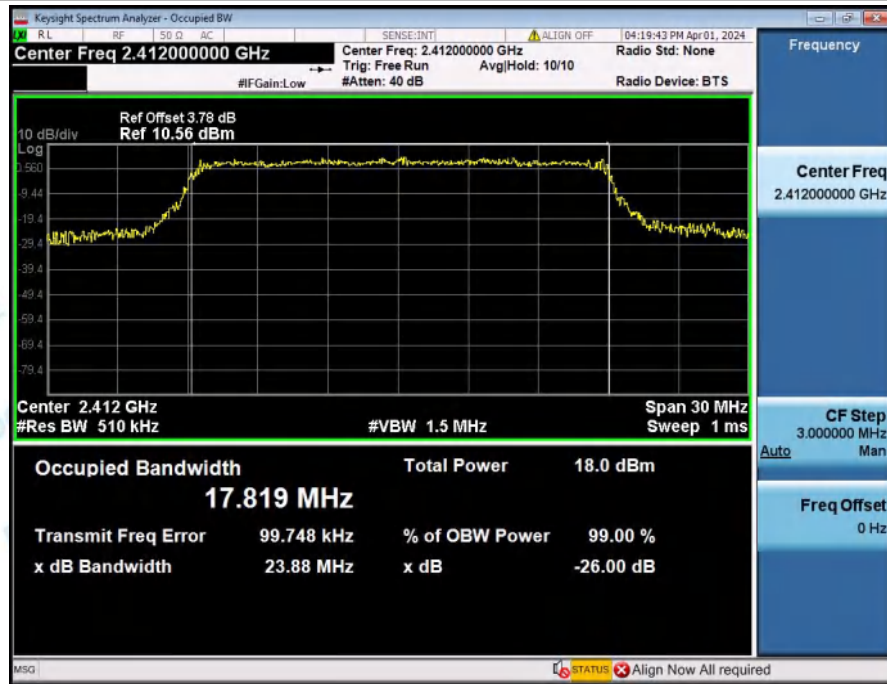
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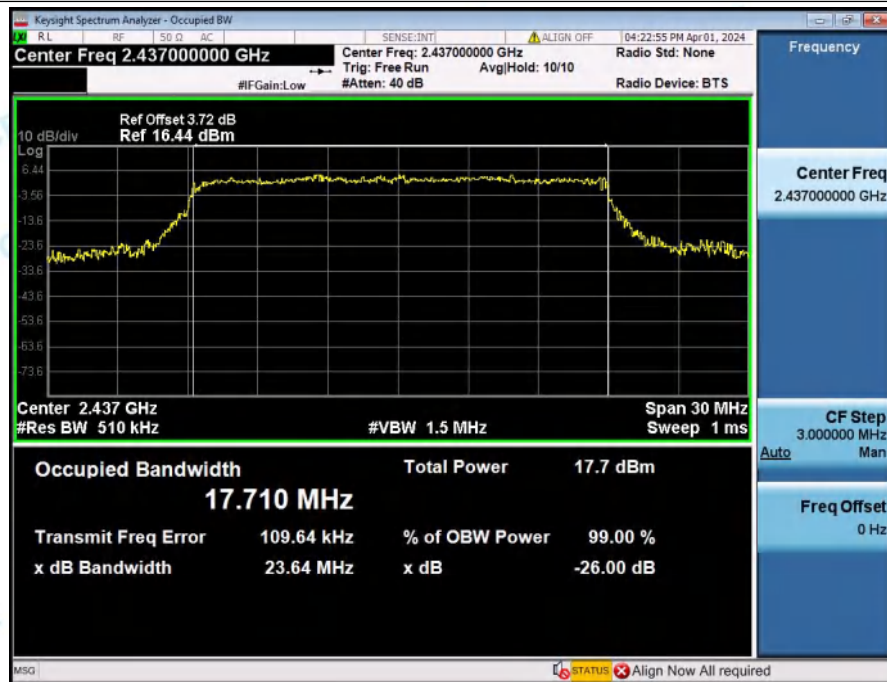
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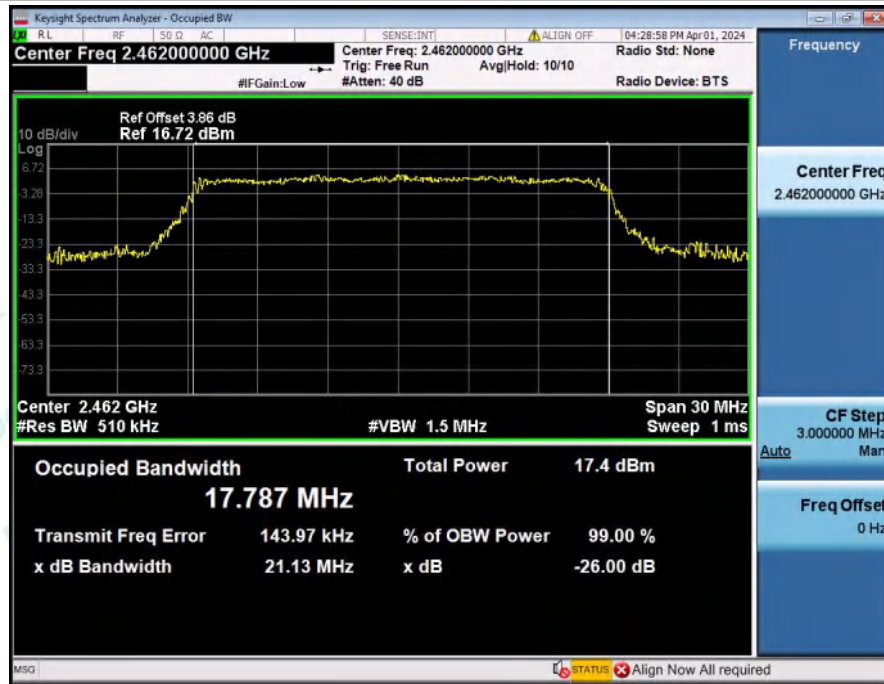
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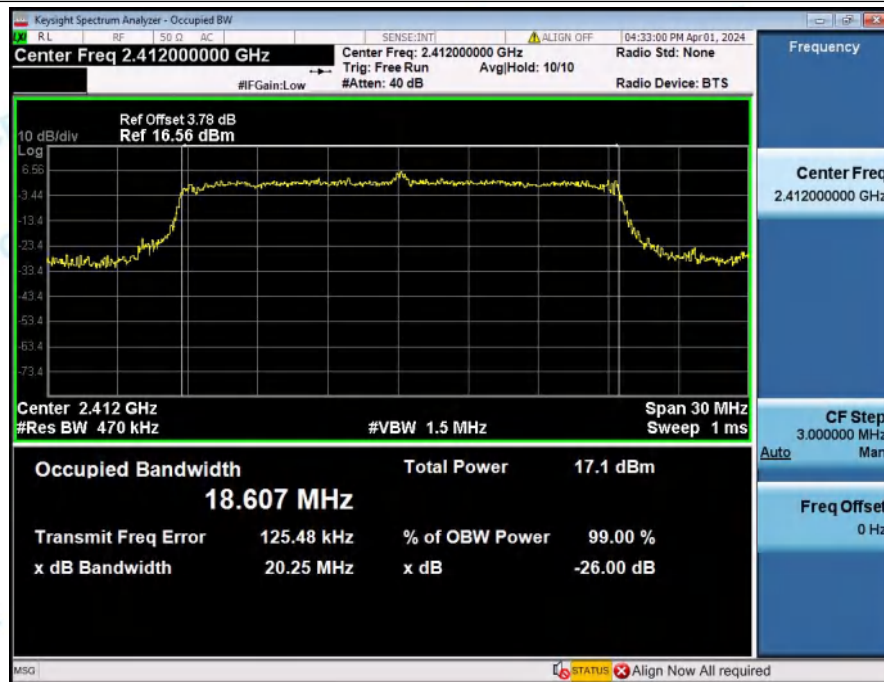
99%_Occupied_Bandwidth_NVNT_ANT1_802_11g_2437



99%_Occupied_Bandwidth_NVNT_ANT1_802_11g_2462



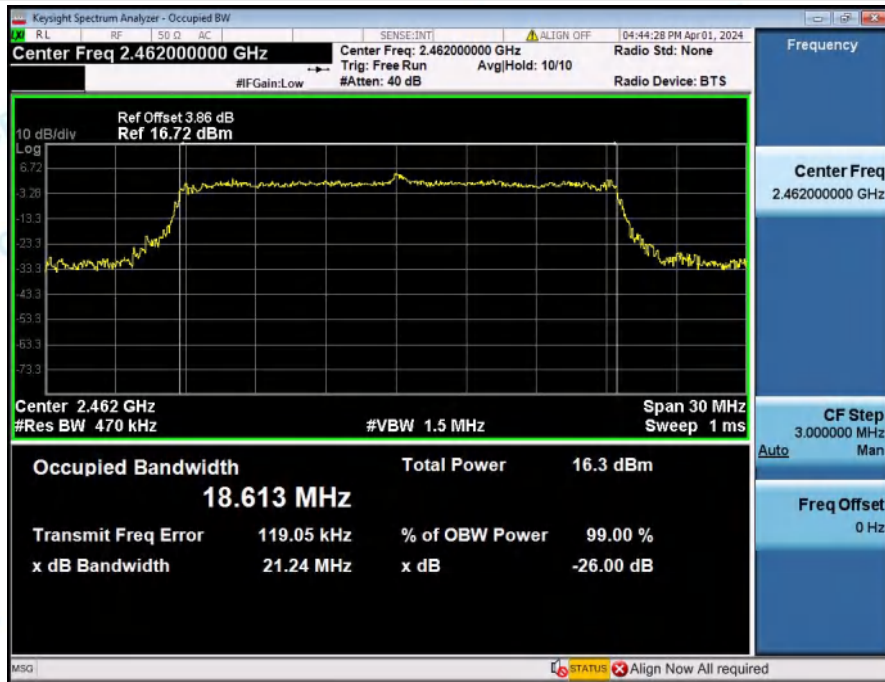
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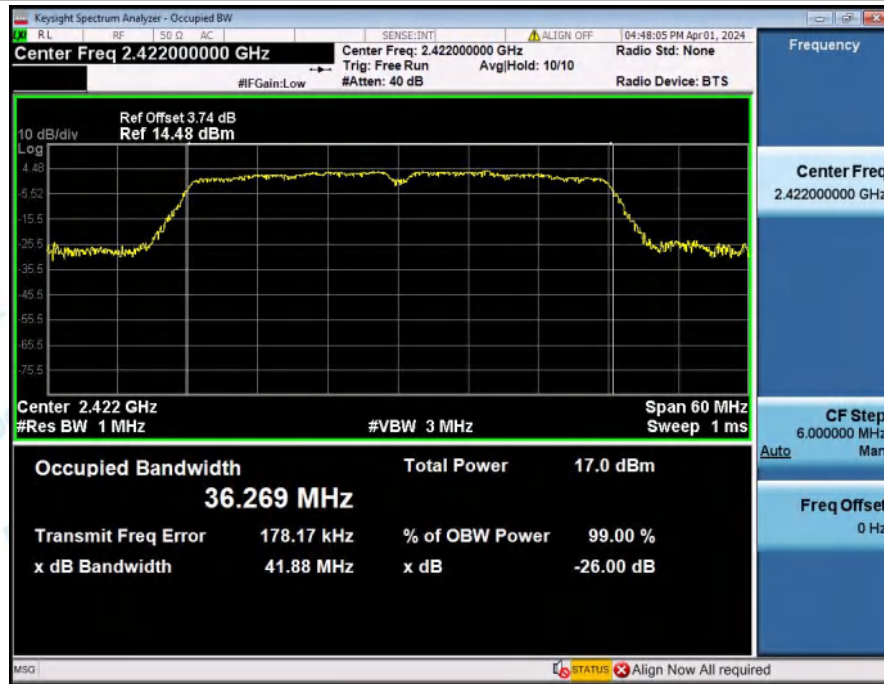
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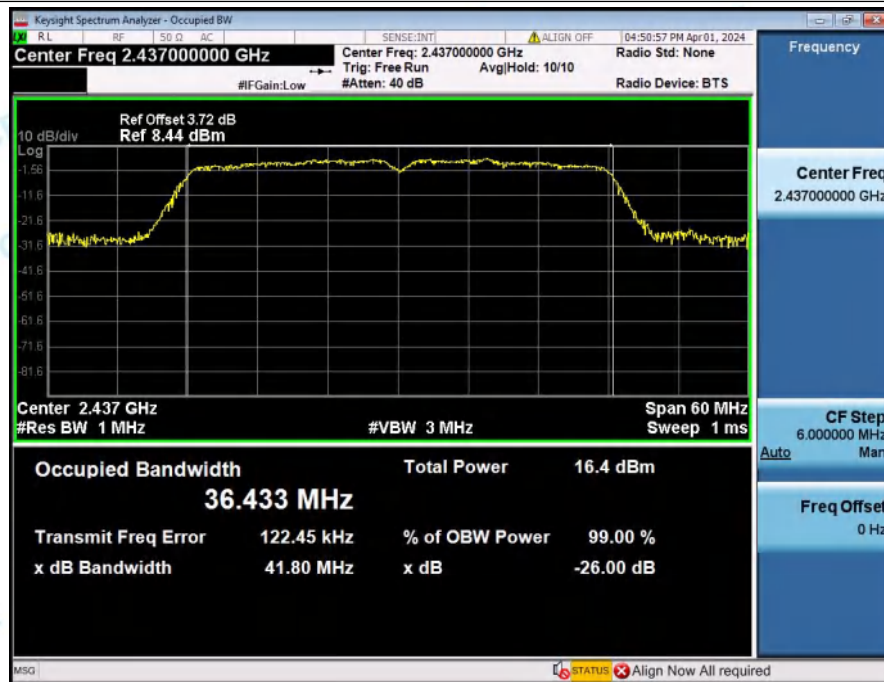
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT20)_2462



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)	Duty factor(dB)	Total Power(dBm)	limit(dBm)	Result
NVNT	ANT1	802.11b	2412.00	Peak	8.84	N/A	8.84	30	Pass
NVNT	ANT1	802.11b	2437.00	Peak	8.62	N/A	8.62	30	Pass
NVNT	ANT1	802.11b	2462.00	Peak	8.47	N/A	8.47	30	Pass
NVNT	ANT1	802.11g	2412.00	Peak	8.57	N/A	8.57	30	Pass
NVNT	ANT1	802.11g	2437.00	Peak	8.68	N/A	8.68	30	Pass
NVNT	ANT1	802.11g	2462.00	Peak	8.42	N/A	8.42	30	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	Peak	8.65	N/A	8.65	30	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	Peak	8.57	N/A	8.57	30	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	Peak	8.67	N/A	8.67	30	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	Peak	7.48	N/A	7.48	30	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	Peak	7.38	N/A	7.38	30	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	Peak	7.98	N/A	7.98	30	Pass

4. Power Spectral Density

Condition	Modulation	Frequency (MHz)	PSD(dBm/30kHz)	limit(dBm/3kHz)	Result
NVNT	802.11b	2412.00	-2.01	8	Pass
NVNT	802.11b	2437.00	-2.24	8	Pass
NVNT	802.11b	2462.00	-2.55	8	Pass
NVNT	802.11g	2412.00	-5.61	8	Pass
NVNT	802.11g	2437.00	-5.54	8	Pass
NVNT	802.11g	2462.00	-5.40	8	Pass
NVNT	802.11n(HT20)	2412.00	-6.60	8	Pass
NVNT	802.11n(HT20)	2437.00	-6.95	8	Pass
NVNT	802.11n(HT20)	2462.00	-7.47	8	Pass
NVNT	802.11n(HT40)	2422.00	-9.94	8	Pass
NVNT	802.11n(HT40)	2437.00	-10.32	8	Pass
NVNT	802.11n(HT40)	2452.00	-10.84	8	Pass

Power_Spectral_Density_NVNT_ANT1_802_11b_2412



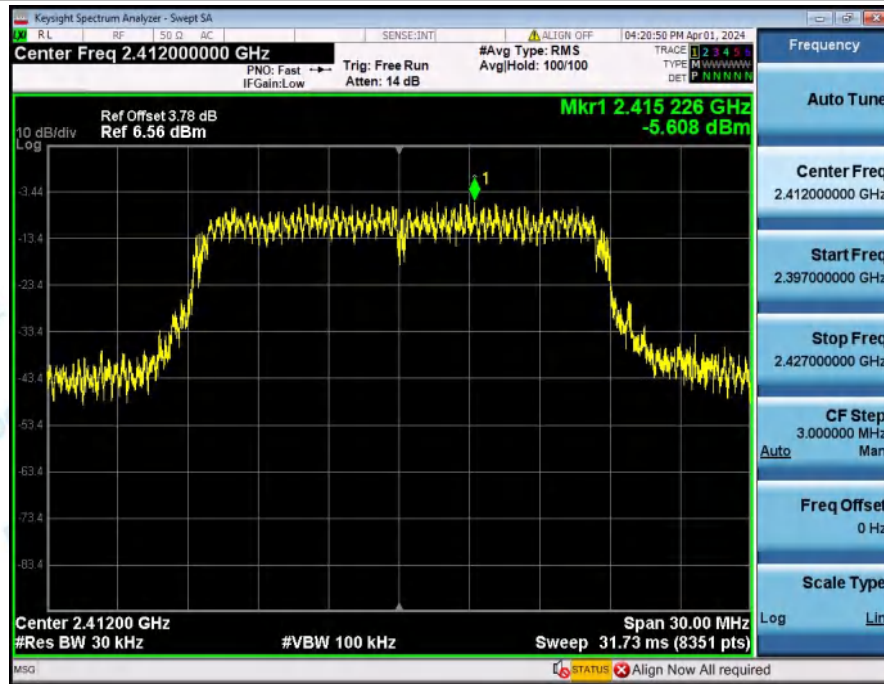
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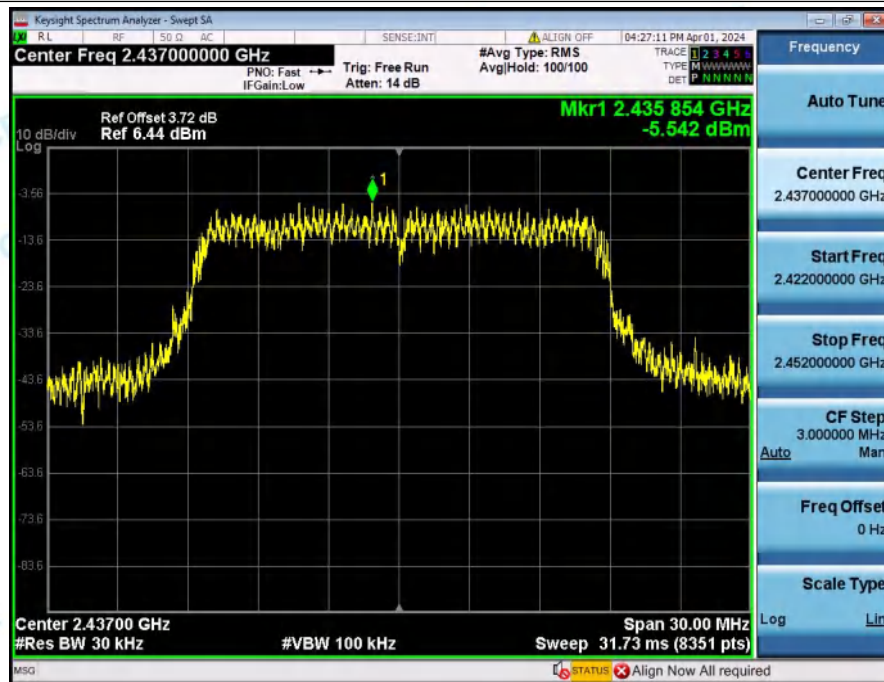
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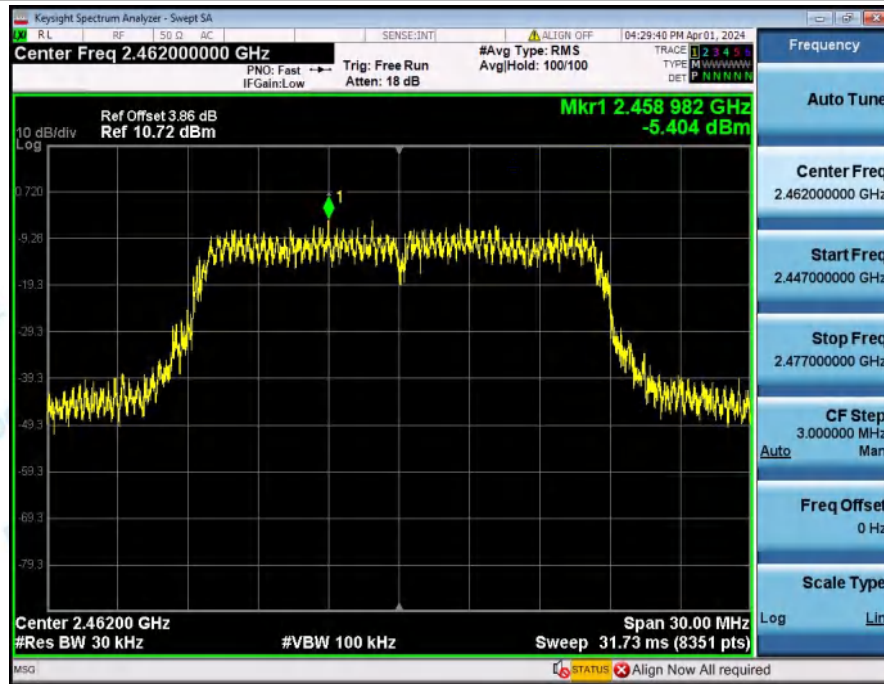
Power_Spectral_Density_NVNT_ANT1_802_11g_2412



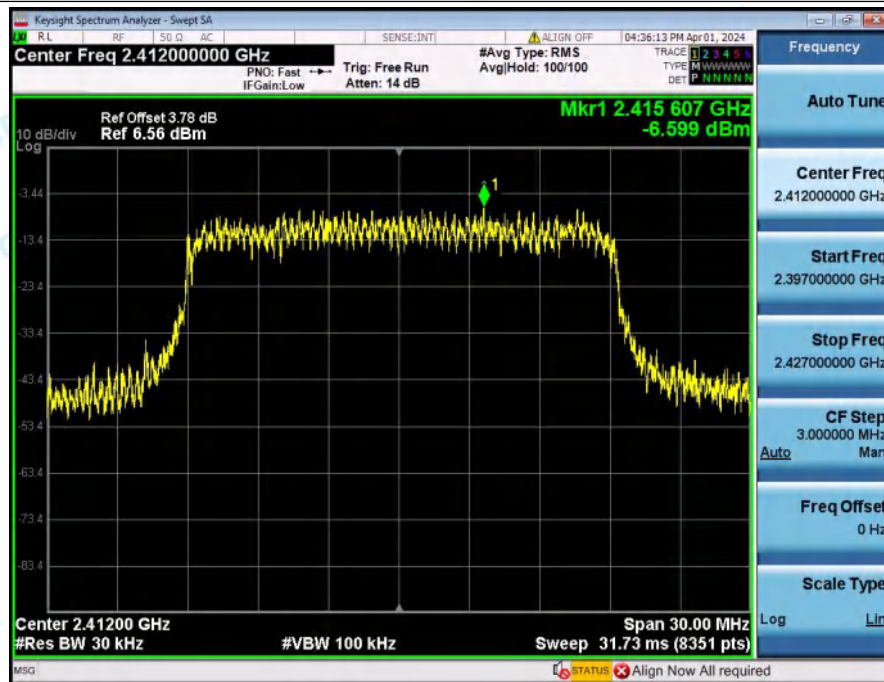
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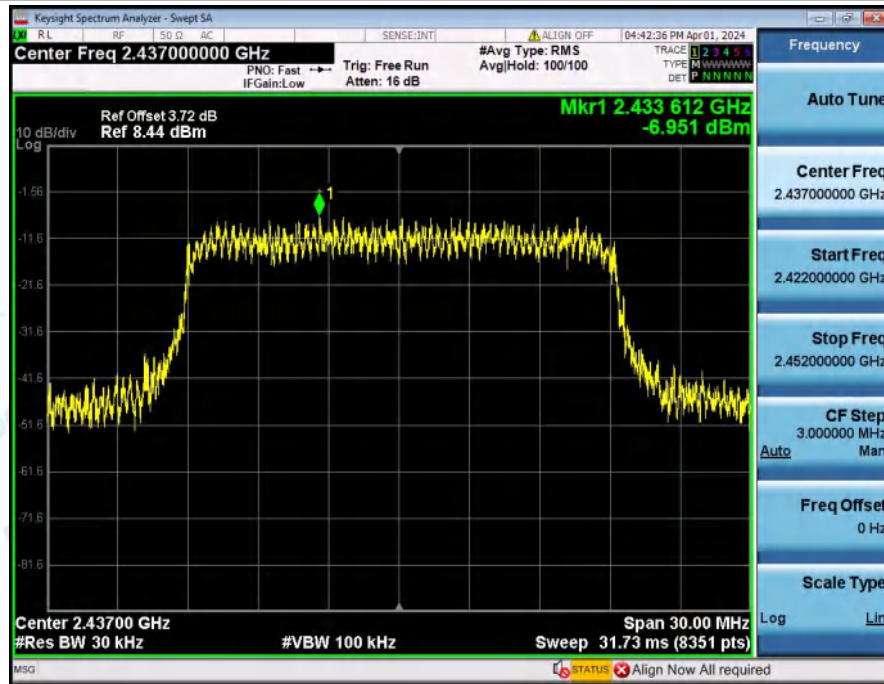
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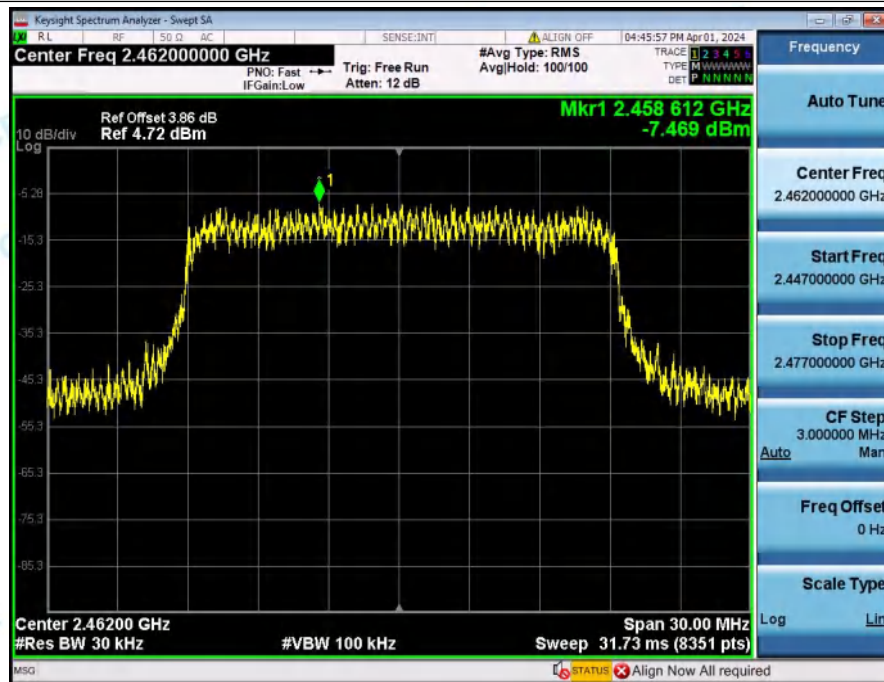
Power_Spectral_Density_NVNT_ANT1_802_11n(HT20)_2412



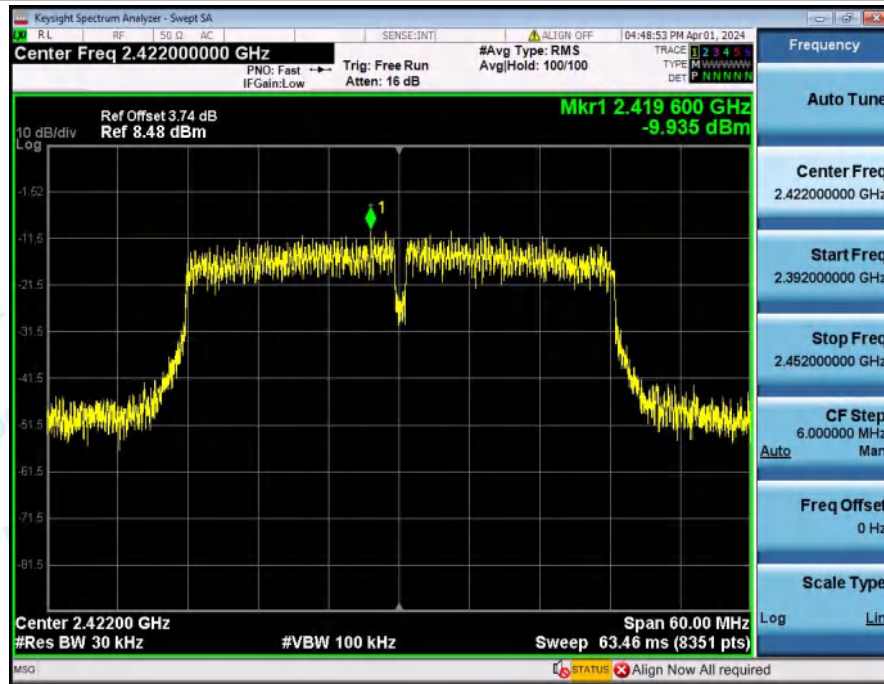
Power_Spectral_Density_NVNT_ANT1_802_11n(HT20)_2437



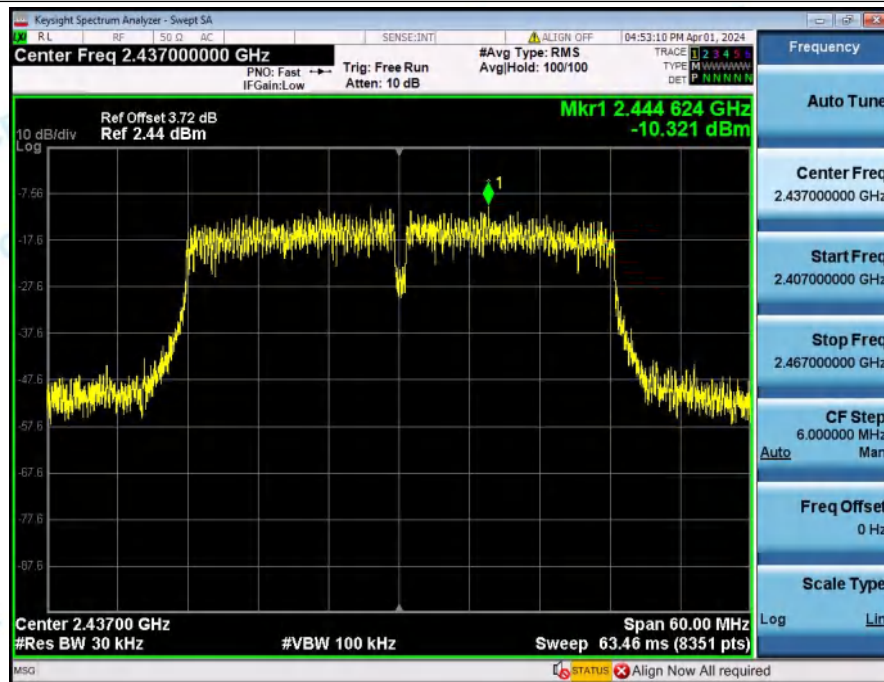
Power_Spectral_Density_NVNT_ANT1_802_11n(HT20)_2462



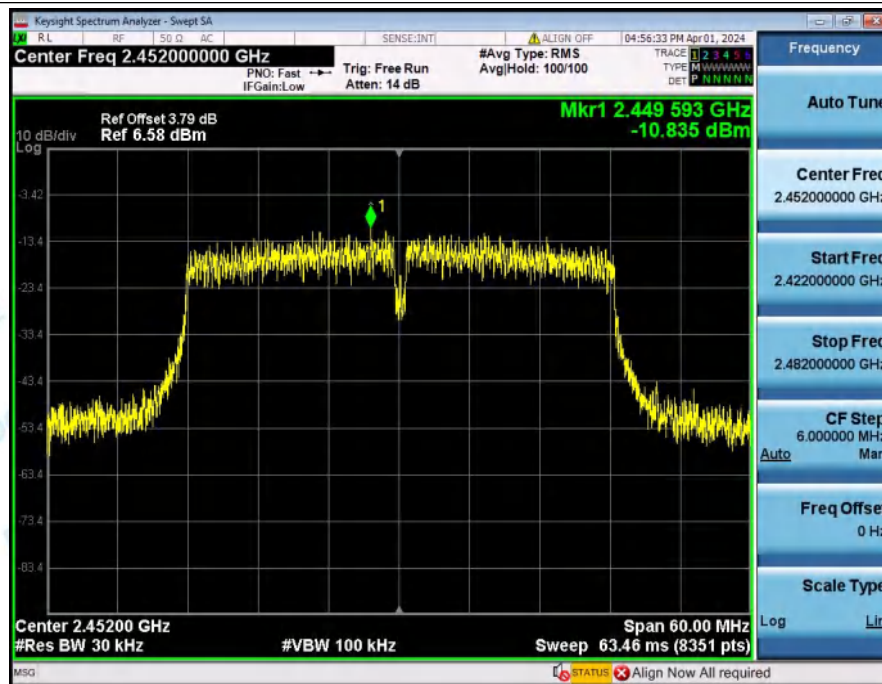
Power_Spectral_Density_NVNT_ANT1_802_11n(HT40)_2422



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	2397.136	-35.357	-17.623	Pass
NVNT	ANT1	802.11b	2462.00	2483.536	-52.689	-19.025	Pass
NVNT	ANT1	802.11g	2412.00	2397.136	-33.886	-21.941	Pass
NVNT	ANT1	802.11g	2462.00	2483.968	-44.126	-21.793	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	2398.704	-39.183	-19.848	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	2484.208	-44.700	-22.830	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	2399.892	-39.078	-24.854	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	2484.088	-45.535	-25.990	Pass

1_Reference_Level_NVNT_ANT1_802_11b_2412



2_Bandedge_NVNT_ANT1_802_11b_2412



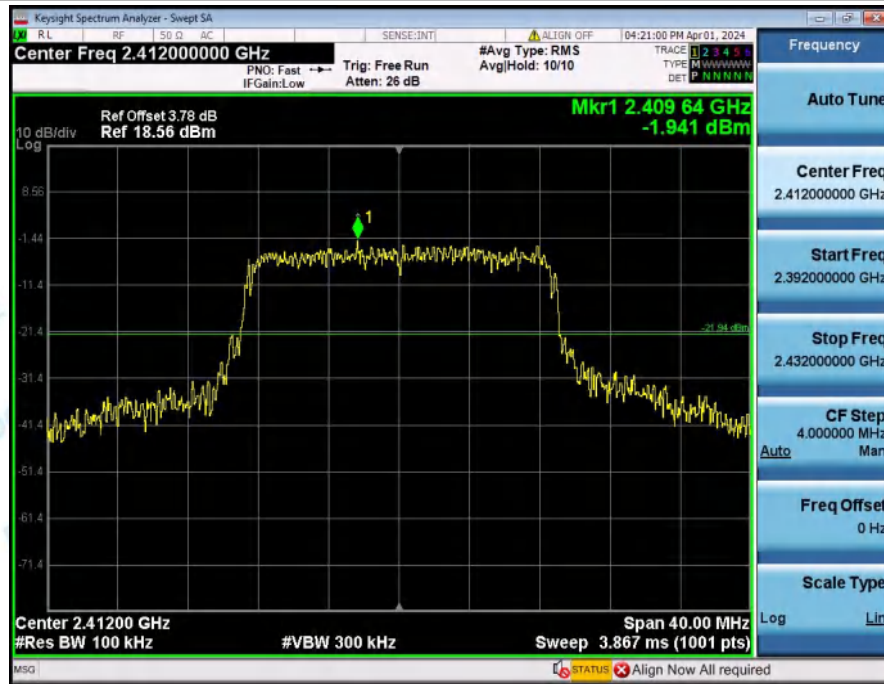
1_Reference_Level_NVNT_ANT1_802_11b_2462



2_Bandedge_NVNT_ANT1_802_11b_2462



1_Reference_Level_NVNT_ANT1_802_11g_2412



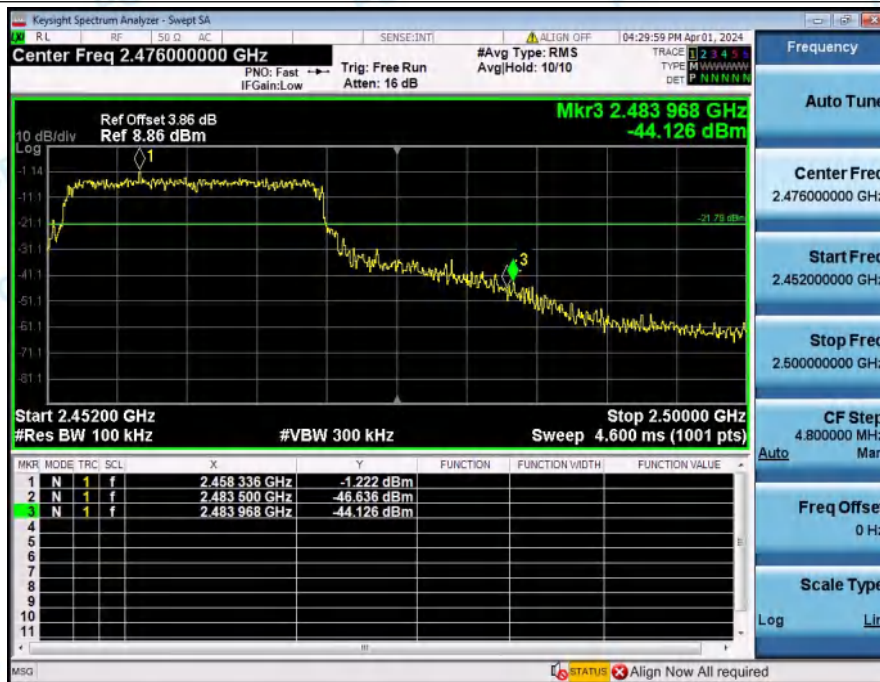
2_Bandedge_NVNT_ANT1_802_11g_2412



1_Reference_Level_NVNT_ANT1_802_11g_2462



2_Bandedge_NVNT_ANT1_802_11g_2462



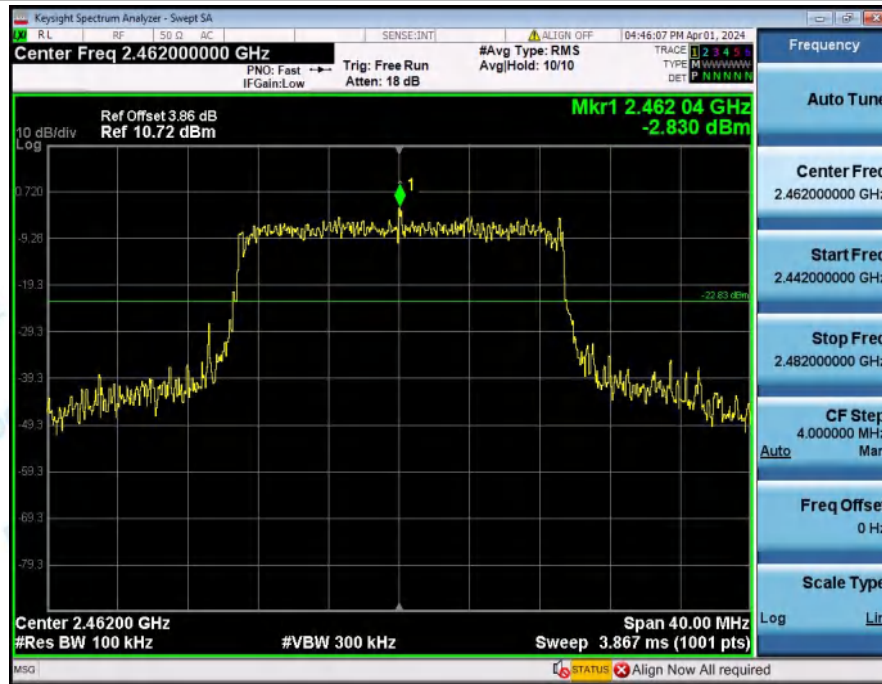
1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2412



2_Bandedge_NVNT_ANT1_802_11n(HT20)_2412



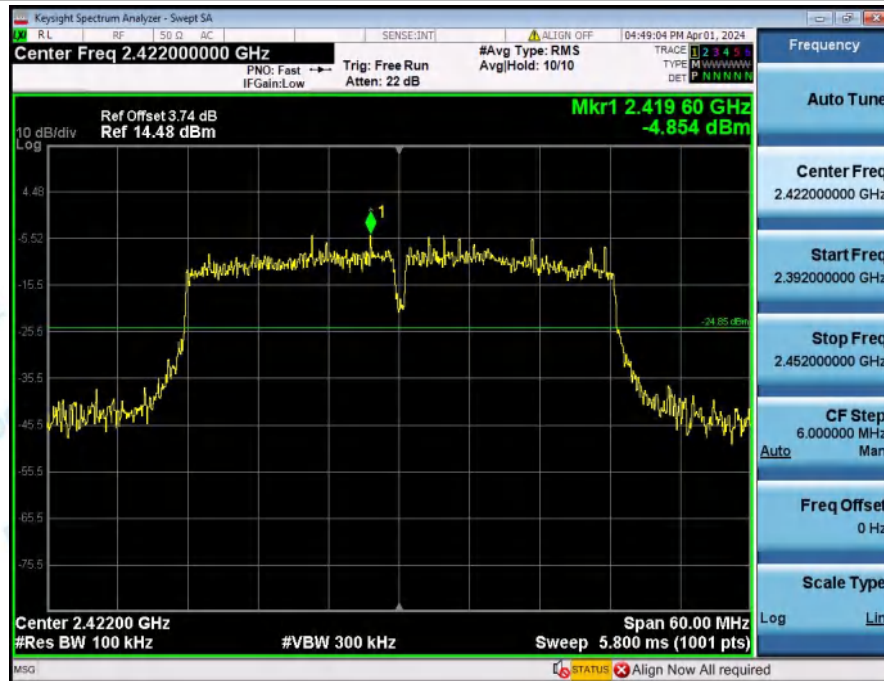
1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2462



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



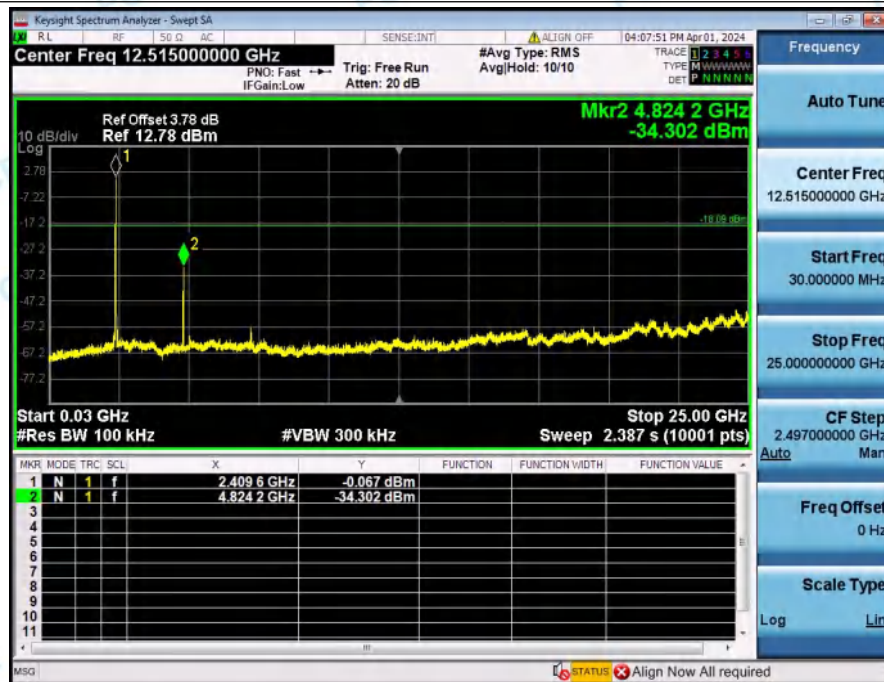
6. Spurious Emission

Condition	Antenna	Modulation	TX_Frequency (MHz)	Max. Mark_frequency(MHz)	Spurious level(dBm)	limit(dBm)	Result
NVNT	ANT1	802.11b	2412.00	4824.240	-34.302	-18.087	Pass
NVNT	ANT1	802.11b	2437.00	4874.180	-35.219	-18.306	Pass
NVNT	ANT1	802.11b	2462.00	4924.120	-36.057	-19.025	Pass
NVNT	ANT1	802.11g	2412.00	4824.240	-47.166	-21.941	Pass
NVNT	ANT1	802.11g	2437.00	4876.677	-48.424	-22.296	Pass
NVNT	ANT1	802.11g	2462.00	4916.629	-51.099	-21.793	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	24932.581	-48.187	-22.517	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	4874.180	-48.032	-21.992	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	4929.114	-51.747	-22.830	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	24533.061	-53.019	-24.854	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	4871.683	-53.335	-25.984	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	2559.461	-53.750	-25.990	Pass

1_Reference_Level_NVNT_ANT1_802_11b_2412



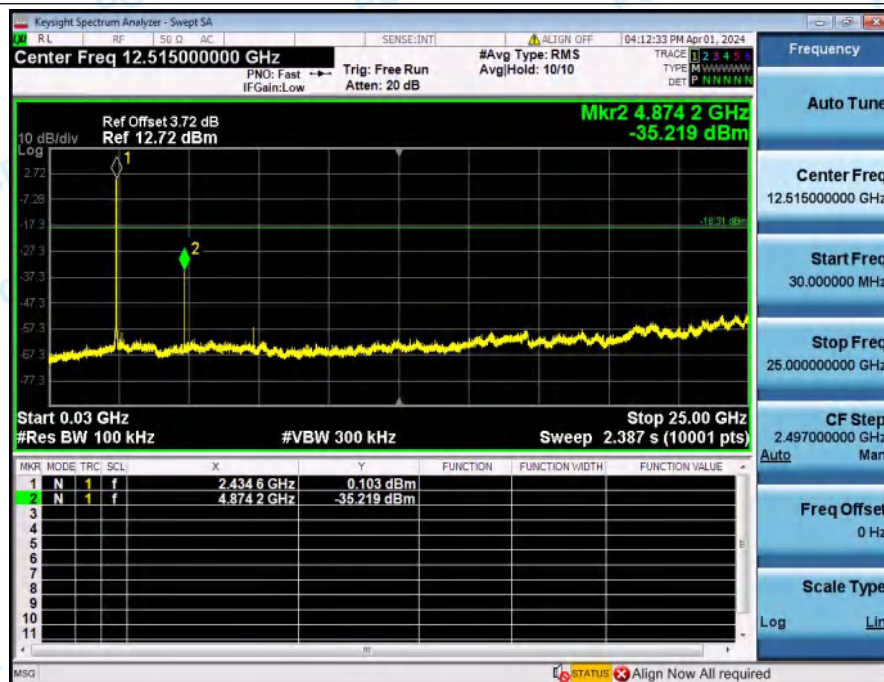
2_Spurious_Emission_NVNT_ANT1_802_11b_2412



1_Reference_Level_NVNT_ANT1_802_11b_2437



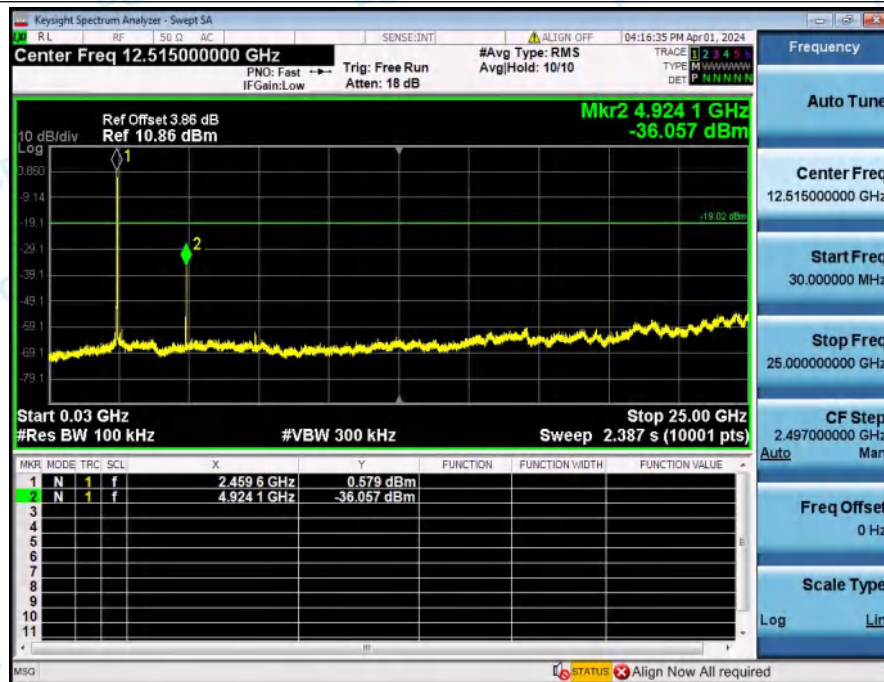
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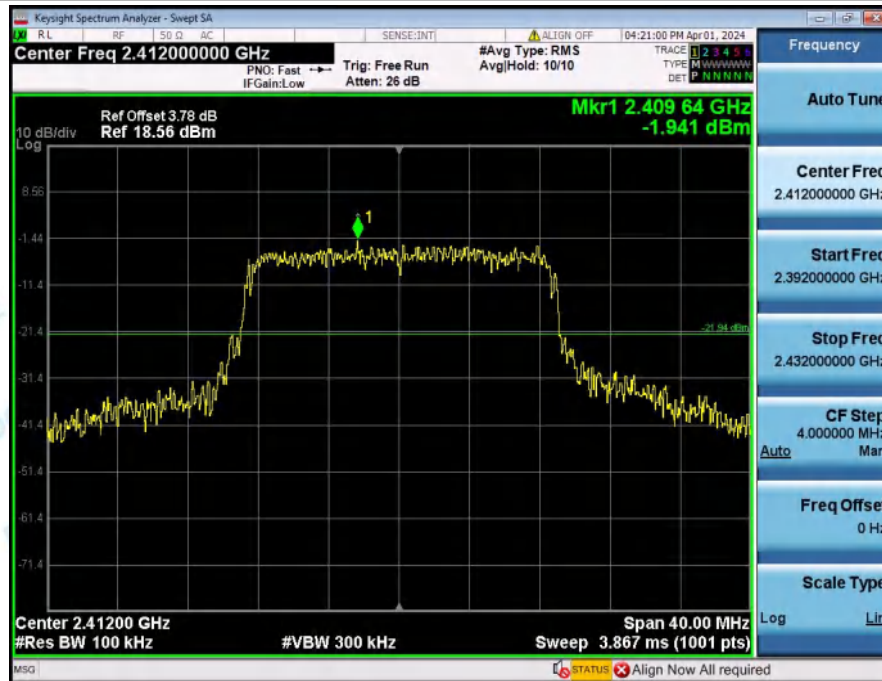
1_Reference_Level_NVNT_ANT1_802_11b_2462



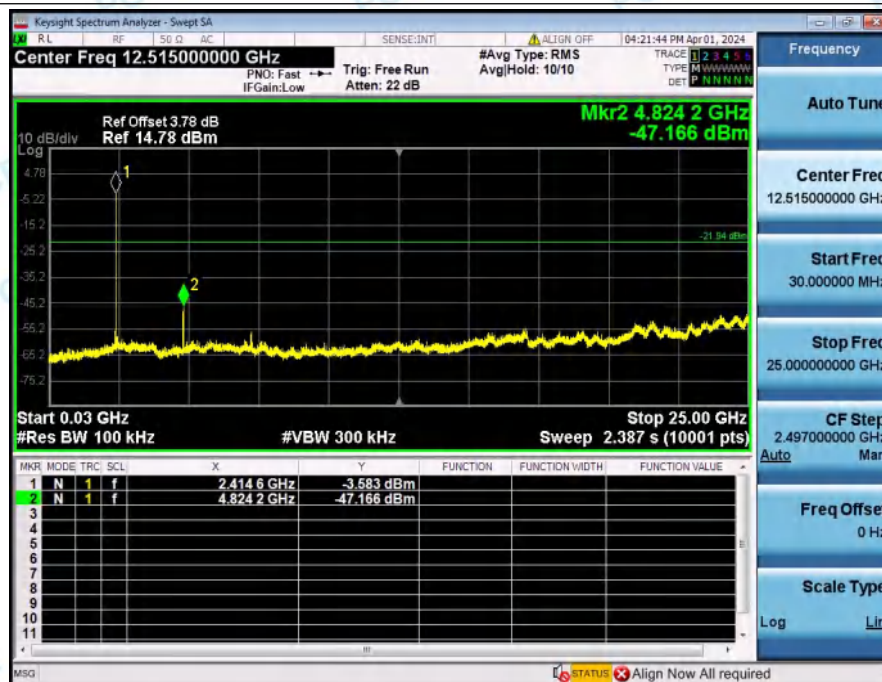
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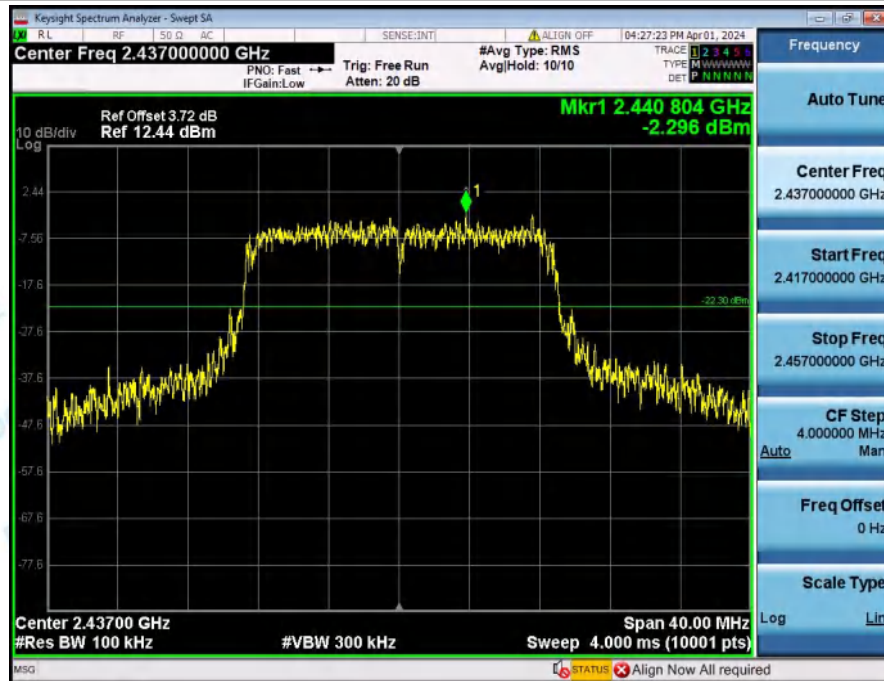
1_Reference_Level_NVNT_ANT1_802_11g_2412



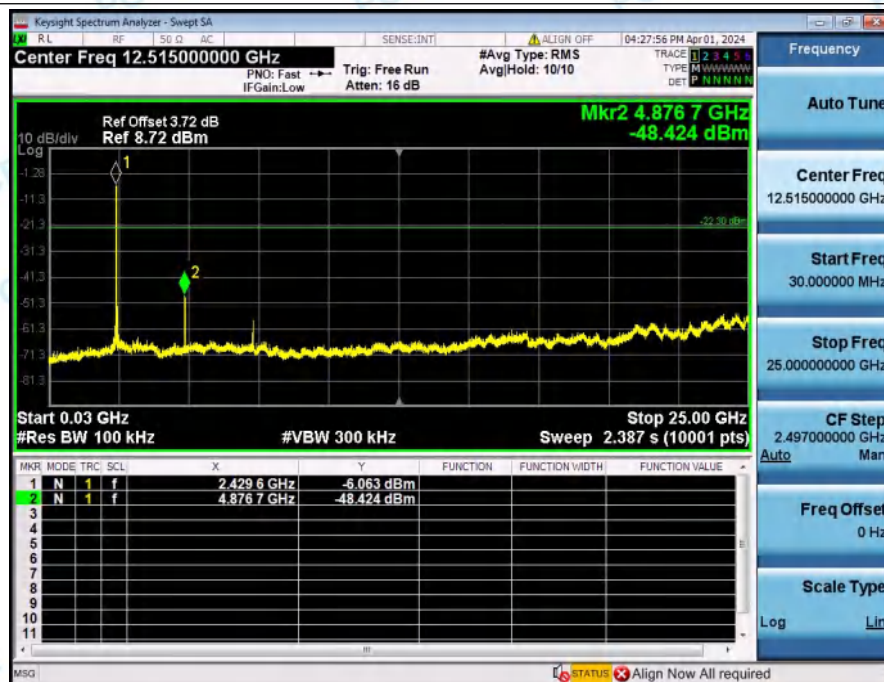
2_Spurious_Emission_NVNT_ANT1_802_11g_2412



1_Reference_Level_NVNT_ANT1_802_11g_2437



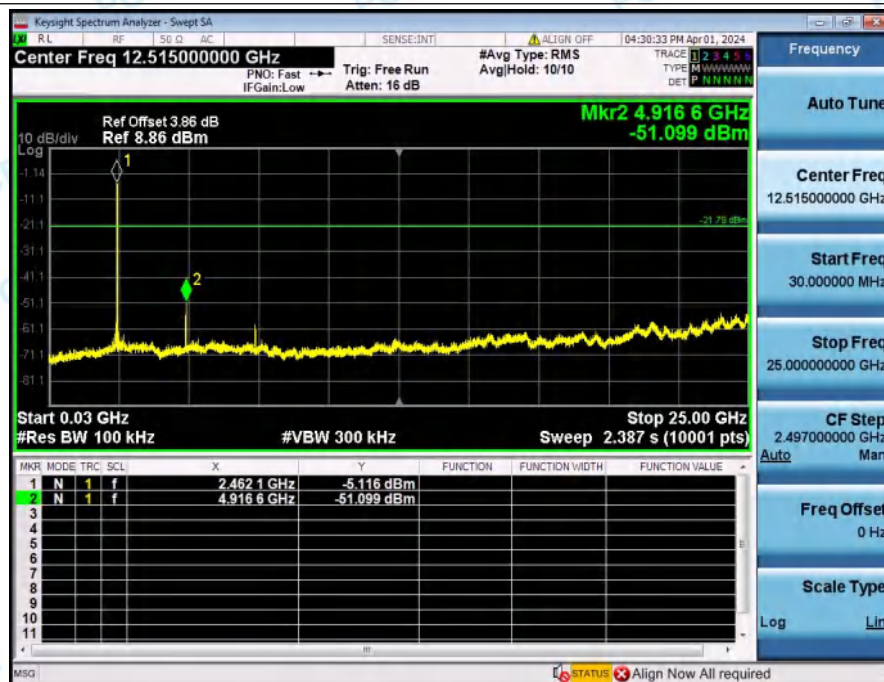
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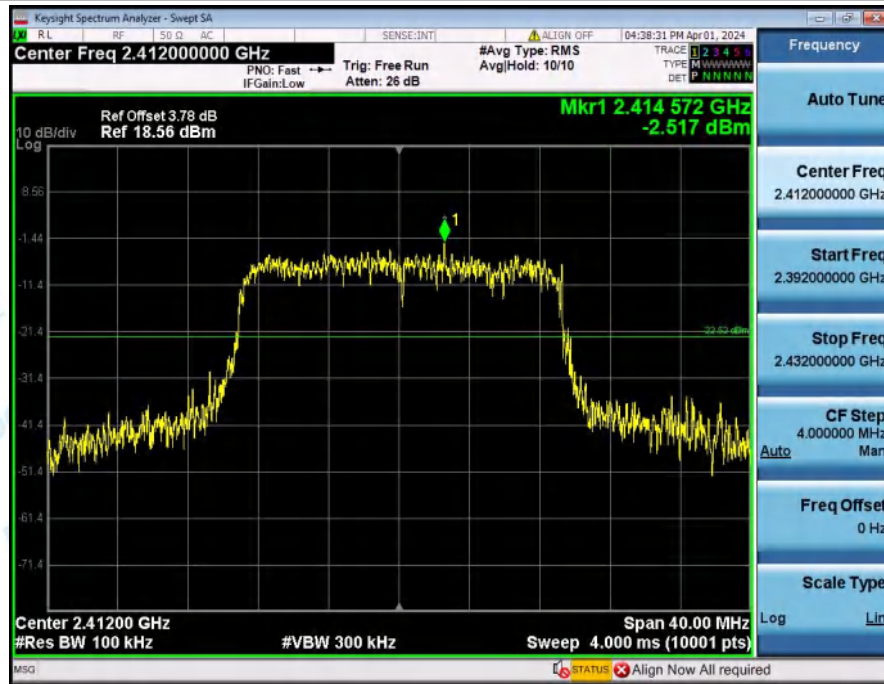
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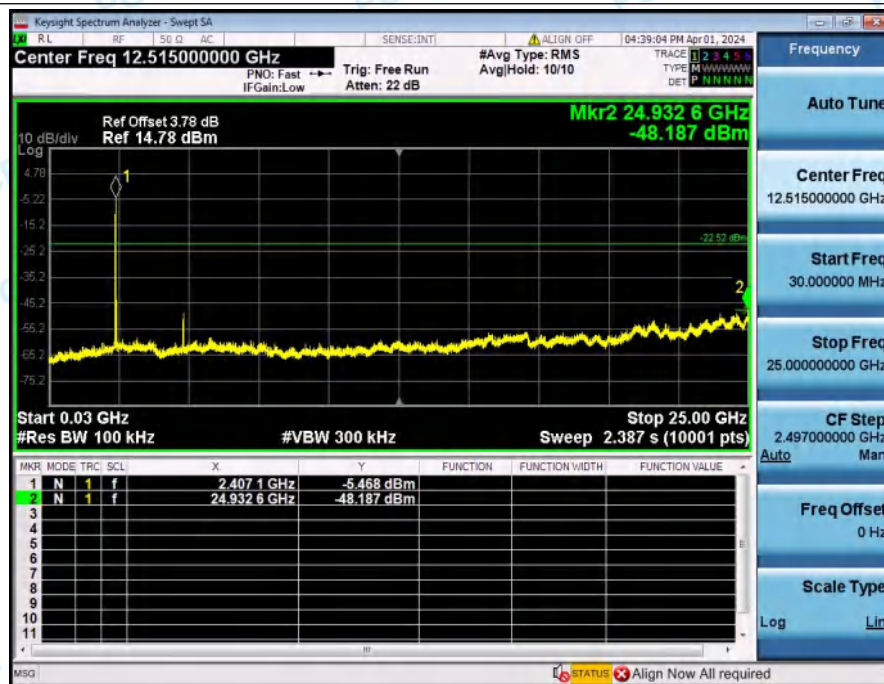
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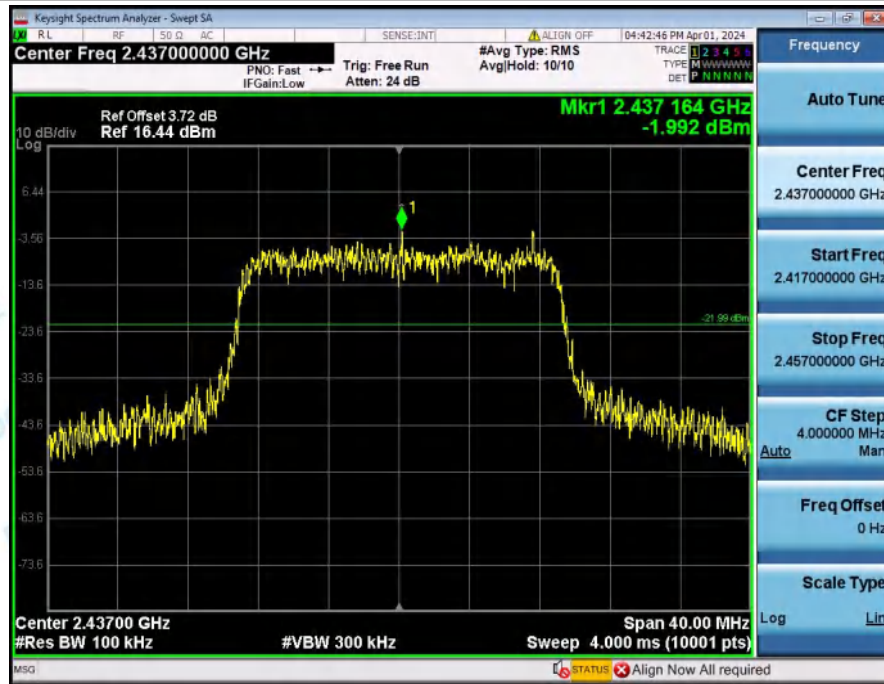
1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2412



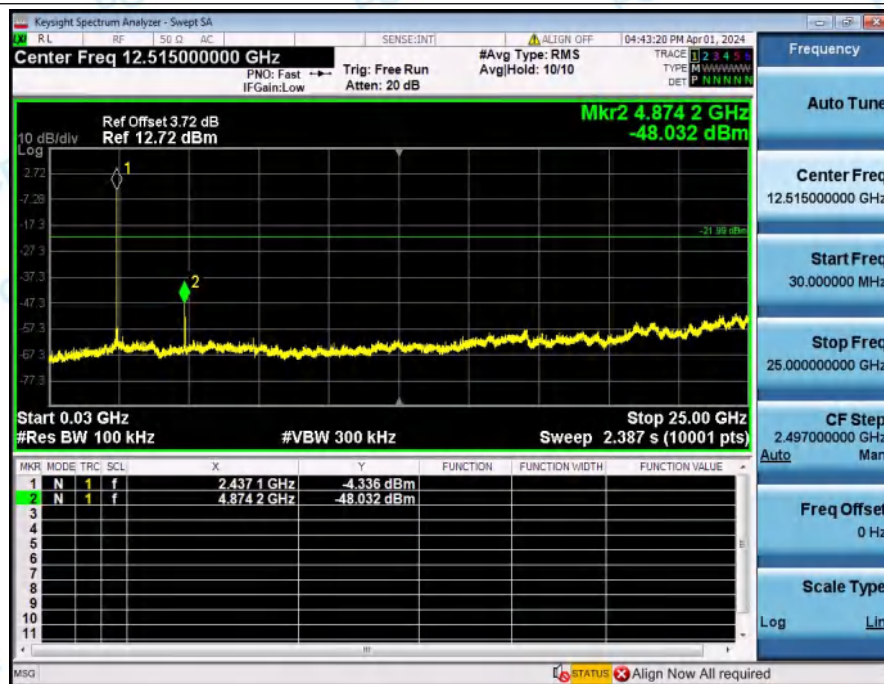
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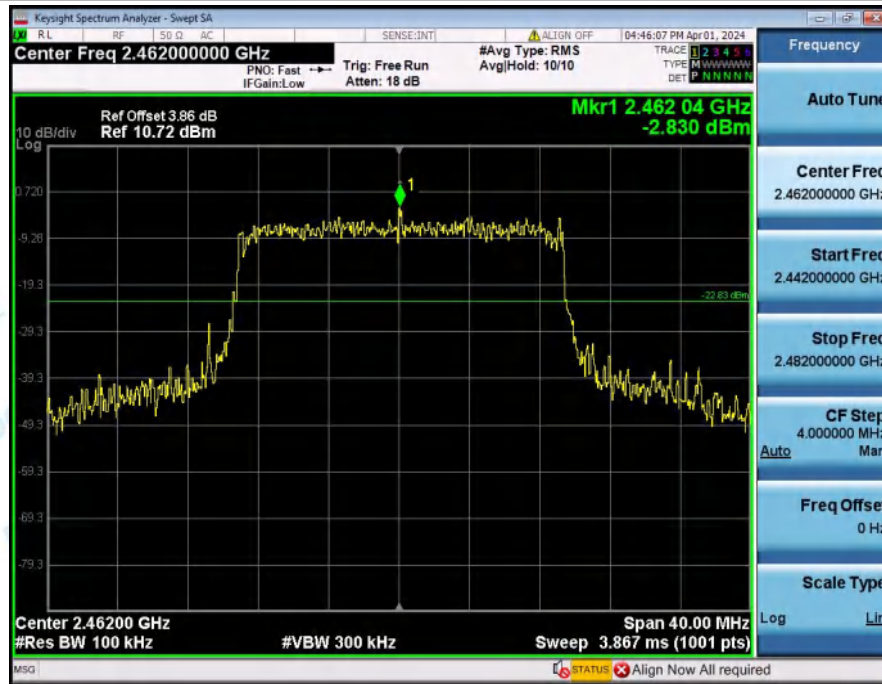
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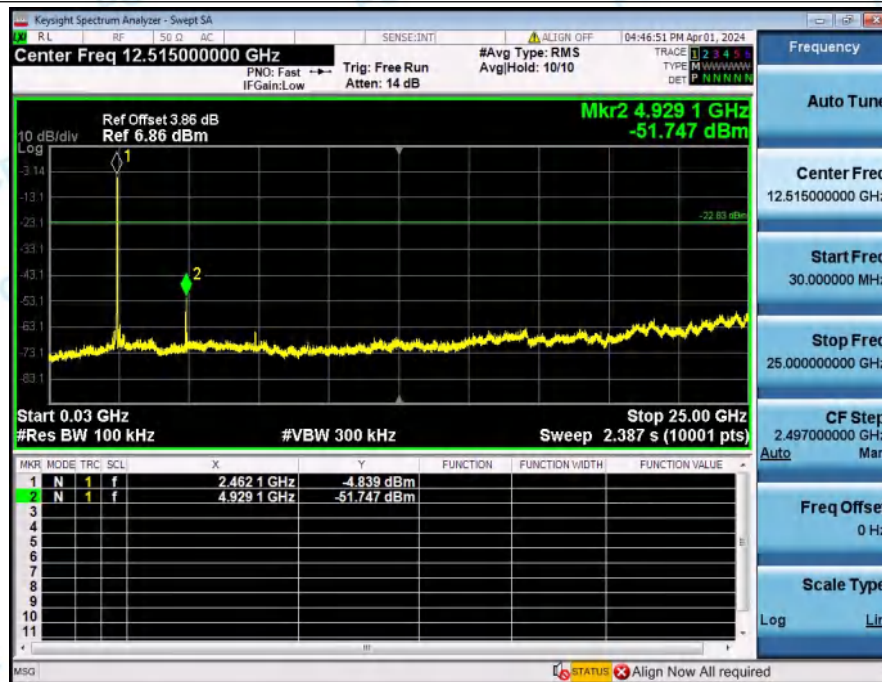
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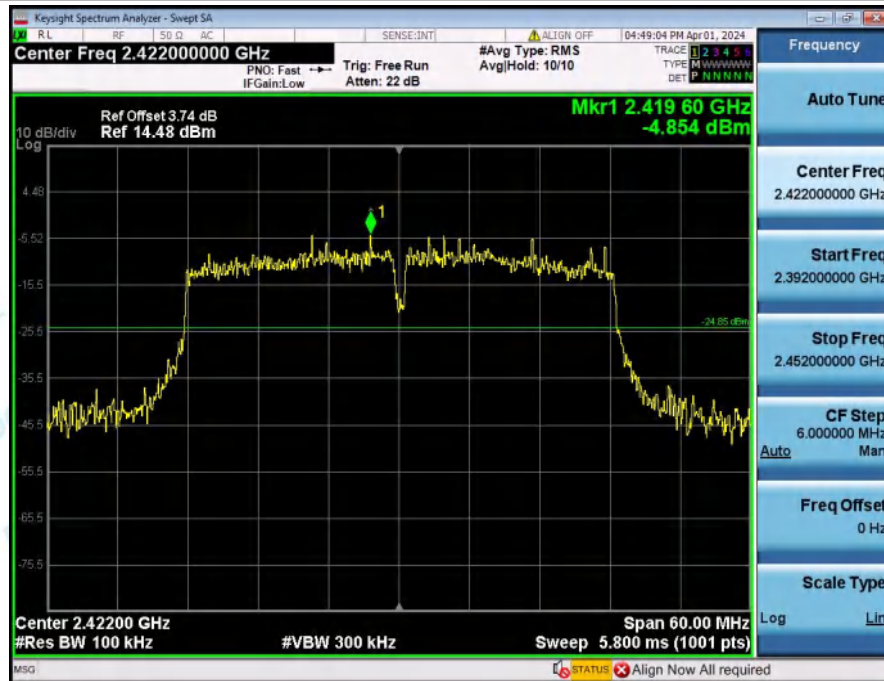
1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2462



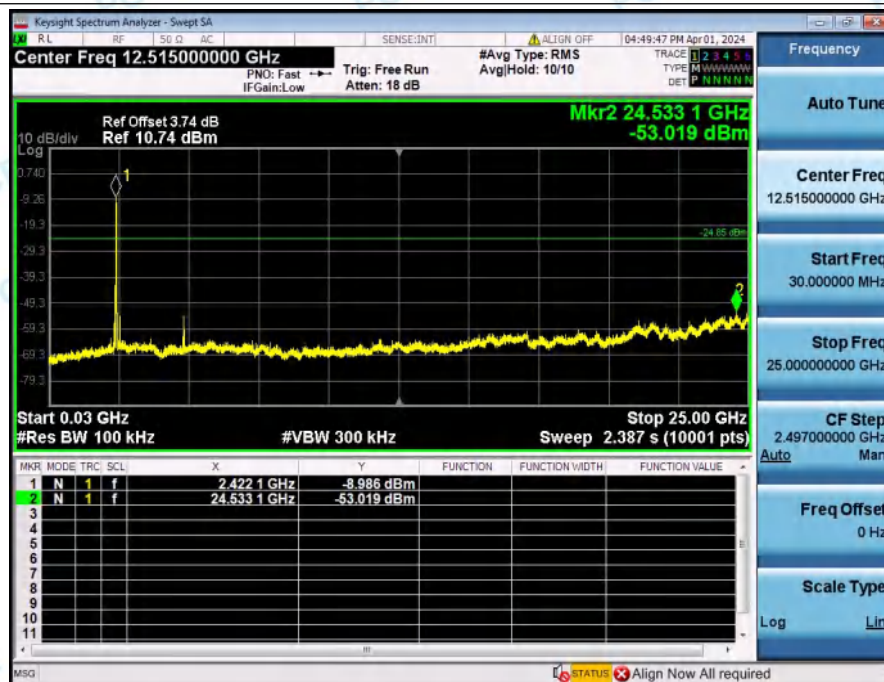
2_Spurious_Emission_NVNT_ANT1_802_11n(HT20)_2462



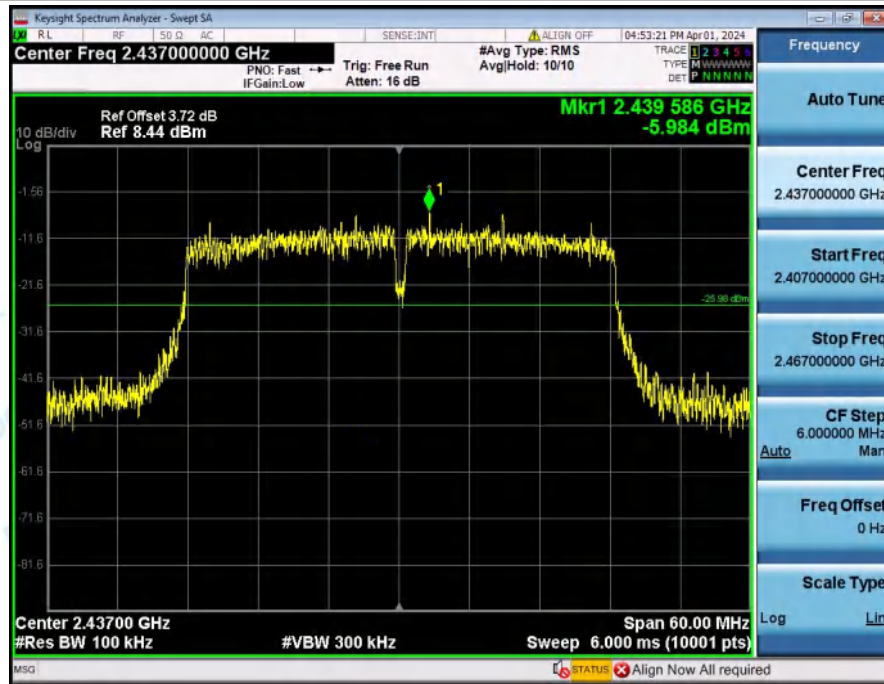
1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2422



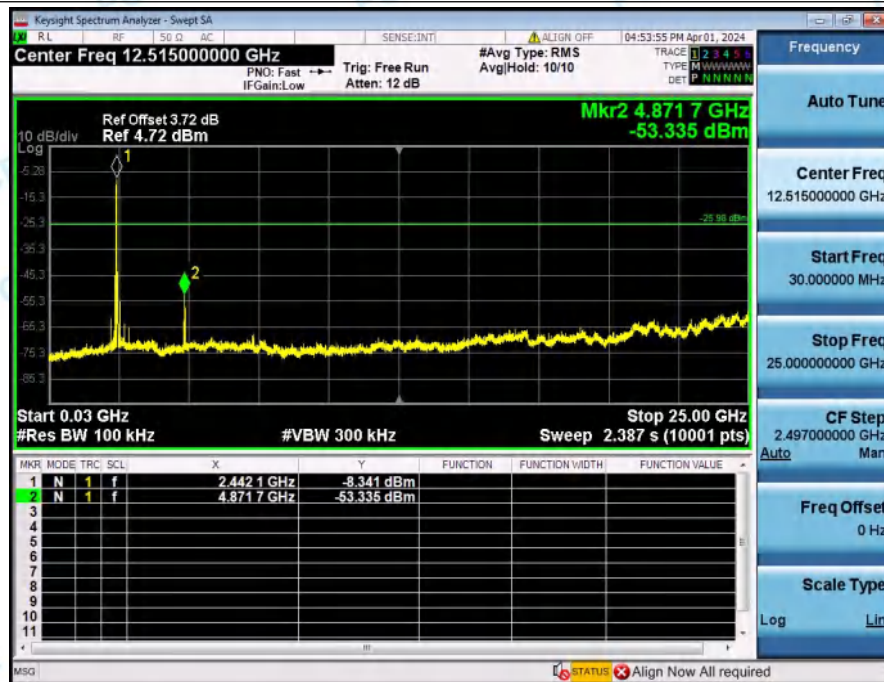
2_Spurious_Emission_NVNT_ANT1_802_11n(HT40)_2422



1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2437



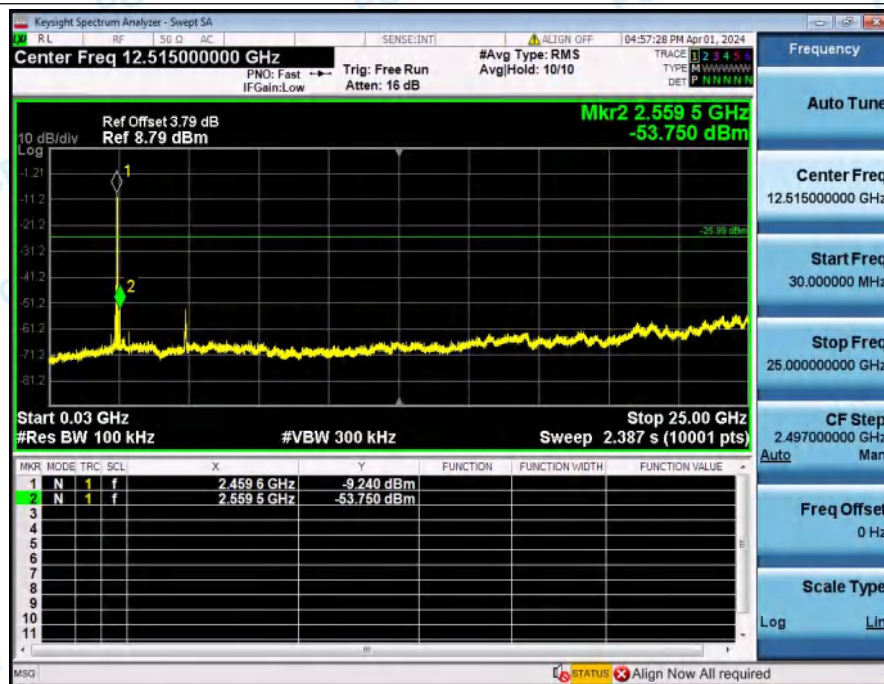
2_Spurious_Emission_NVNT_ANT1_802_11n(HT40)_2437



1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2452



2_Spurious_Emission_NVNT_ANT1_802_11n(HT40)_2452



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