



RF TEST REPORT

For

VITRINEMEDIA Enterprise

Product Name: Eco Smart Display

Test Model(s): 0103_5_00

Report Reference No. : POCE240112006RF003

FCC ID : 2AR5X-0103500

Applicant's Name : VITRINEMEDIA Enterprise

Address : 50 route de la Reine 92100 Boulogne-Billancourt FRANCE

Testing Laboratory : Shenzhen POCE Technology Co., Ltd.

Address : 102 Building H1 & 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 : January 12, 2024

Date of Test : January 12, 2024 to February 28, 2024

Data of Issue : February 28, 2024

Result : Pass

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	POCE240112006RF003	February 28, 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 : VITRINEMEDIA Enterprise
Address : 50 route de la Reine 92100 Boulogne-Billancourt FRANCE

Manufacturer : Huizhou Vitrinemedia Optoelectronic Technology Co., Ltd.
Address : Building #4,Desheng Industrial Park, Changbu Village, Xinxu Town, Huiyang District, Huizhou City, China

2.2 Description of Device (EUT)

Product Name:	Eco Smart Display
Model/Type reference:	0103_5_00
Series Model:	0103_3_00,0103_4_00, 0103_6_00, 0103_7_00, 0103_8_00, 0103_4_01, 0103_5_01,0103_6_01, 0103_7_01,
Model Difference:	The product has many models, only the model name is different, and the other parts such as the circuit principle, pcb and electrical structure are the same.
Trade Mark:	Vitrinemedia
Power Supply:	AC120V60Hz
Operation Frequency:	802.11b/g/n/ax(HT20): 2412MHz to 2462MHz; 802.11n/ax(HT40): 2422MHz to 2452MHz
Number of Channels:	802.11b/g/n/ax(HT20): 11 Channels; 802.11n/ax(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) 802.11ax: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Antenna Type:	External
Antenna Gain:	2dBi
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/ax(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz
Test channel	802.11n/ax(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.
TM5	802.11ax(HT20) mode	Keep the EUT in 802.11ax(HT20) transmitting mode.
TM6	802.11ax(HT40) mode	Keep the EUT in 802.11ax(HT40) transmitting mode.
Remark: Only the data of the worst mode would be recorded in this report.		

2.4 Description of Support Units

The EUT was tested as an independent device.

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	2023-02-27	2024-02-26
Power absorbing clamp	SCHWARZ BECK	MESS-ELEKTRONIK	/	2023-02-28	2024-02-27
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	2023-02-27	2024-02-26
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	2023-12-28	2024-12-27

Occupied Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in non-restricted frequency bands					
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 nzhcn) 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	2023-12-28	2024-12-27
Spectrum Analyzer	Keysight	N9020A	MY53420323	2023-12-28	2024-12-27

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	/	/	2023-02-27	2024-02-26
Cable(LF)#1	Schwarzbeck	/	/	2023-02-27	2024-02-26
Cable(HF)#2	Schwarzbeck	AK9515E	96250	2023-02-28	2024-02-27
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2023-02-27	2024-02-26
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)	$\pm 3.41\text{dB}$
Occupied Bandwidth	$\pm 3.63\%$
RF conducted power	$\pm 0.733\text{dB}$
RF power density	$\pm 0.234\%$
Conducted Spurious emissions	$\pm 1.98\text{dB}$
Radiated Emission (Above 1GHz)	$\pm 5.46\text{dB}$
Radiated Emission (Below 1GHz)	$\pm 5.79\text{dB}$
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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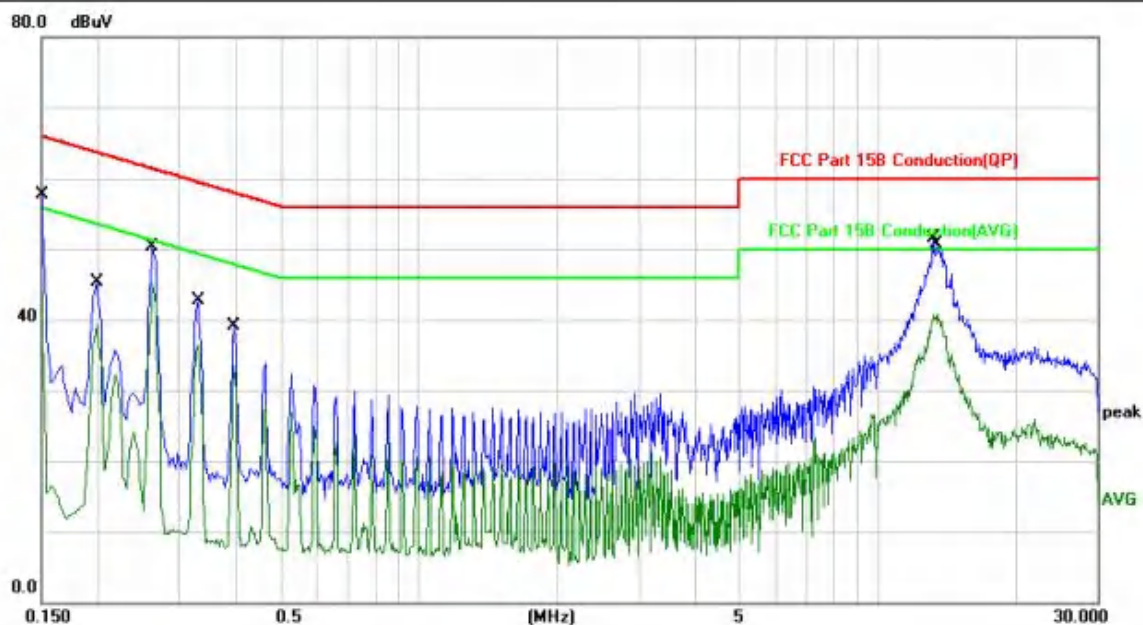
3.1.1 Conclusion:



4.1.3 Test Data:

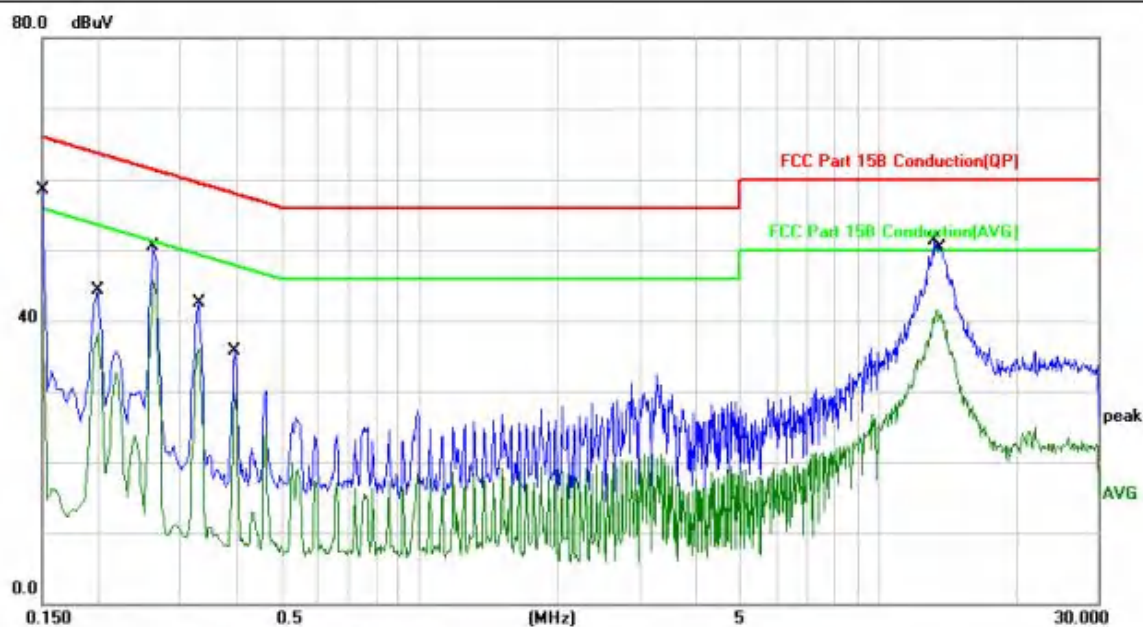
TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L

Power: AC120V60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	47.58	10.05	57.63	65.99	-8.36	QP	
2		0.1500	33.85	10.05	43.90	55.99	-12.09	AVG	
3		0.1980	35.35	10.03	45.38	63.69	-18.31	QP	
4		0.1980	29.22	10.03	39.25	53.69	-14.44	AVG	
5		0.2620	40.28	10.02	50.30	61.36	-11.06	QP	
6	*	0.2620	35.08	10.02	45.10	51.36	-6.26	AVG	
7		0.3300	32.75	10.01	42.76	59.45	-16.69	QP	
8		0.3300	26.44	10.01	36.45	49.45	-13.00	AVG	
9		0.3940	29.09	10.00	39.09	57.98	-18.89	QP	
10		0.3940	23.47	10.00	33.47	47.98	-14.51	AVG	
11		13.1340	41.12	10.43	51.55	60.00	-8.45	QP	
12		13.4660	30.57	10.43	41.00	50.00	-9.00	AVG	

TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1 / CH: L
Power: AC120V60Hz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	48.43	10.05	58.48	65.99	-7.51	QP	
2		0.1500	32.54	10.05	42.59	55.99	-13.40	AVG	
3		0.1980	34.25	10.03	44.28	63.69	-19.41	QP	
4		0.1980	28.34	10.03	38.37	53.69	-15.32	AVG	
5		0.2620	40.46	10.02	50.48	61.36	-10.88	QP	
6	*	0.2620	35.69	10.02	45.71	51.36	-5.65	AVG	
7		0.3300	32.51	10.01	42.52	59.45	-16.93	QP	
8		0.3300	26.06	10.01	36.07	49.45	-13.38	AVG	
9		0.3940	25.66	10.00	35.66	57.98	-22.32	QP	
10		0.3940	19.76	10.00	29.76	47.98	-18.22	AVG	
11		13.2660	40.83	10.43	51.26	60.00	-8.74	QP	
12		13.5300	31.02	10.44	41.46	50.00	-8.54	AVG	

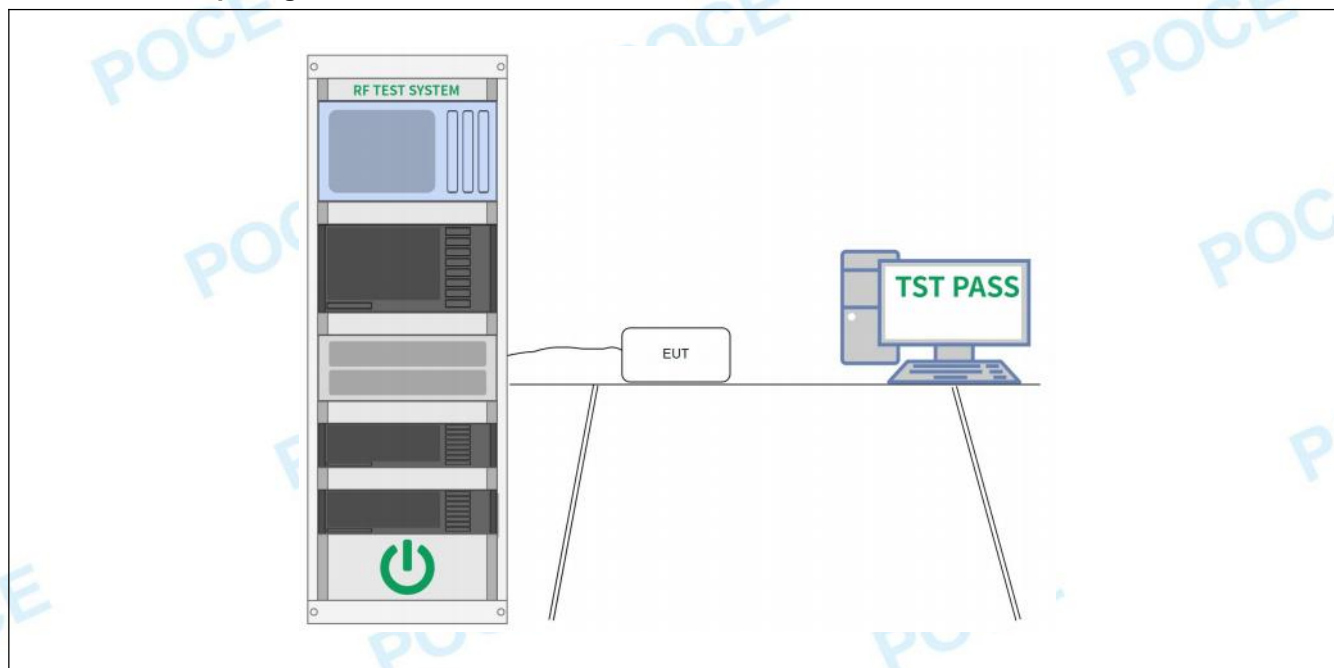
4.2 Occupied Bandwidth

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:	23.4 °C	Humidity:	47.7 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5,TM6				
Final test mode:	TM1,TM2,TM3,TM4,TM5,TM6				

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Please Refer to Appendix for Details.

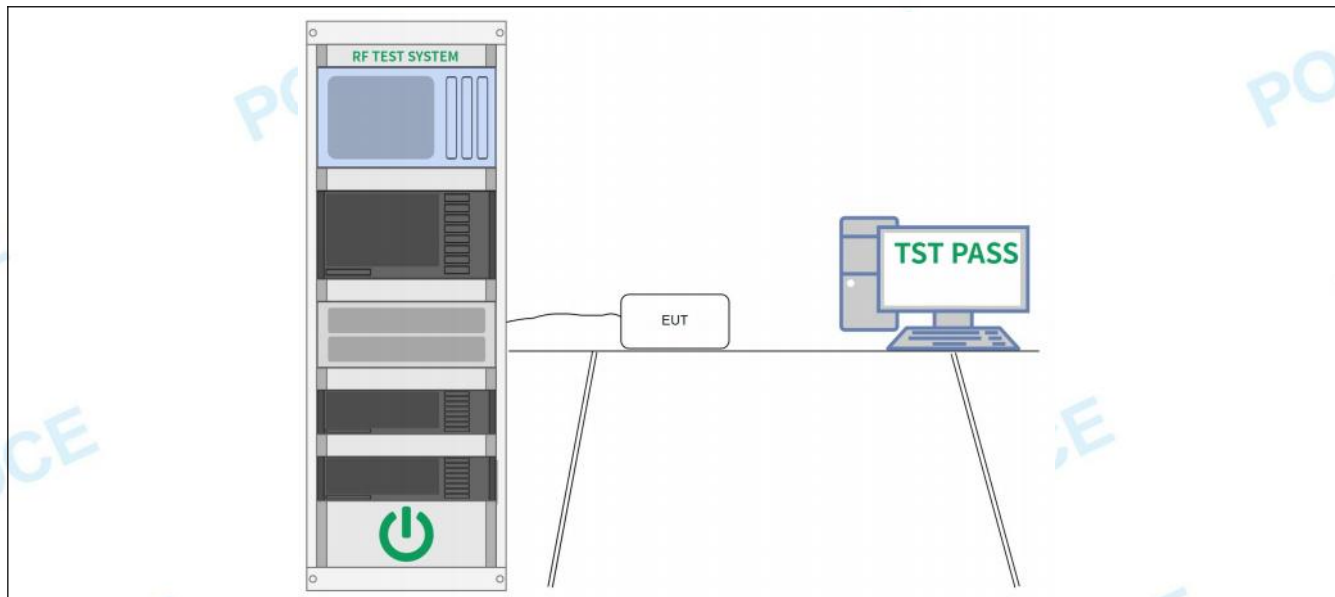
4.3 Maximum Conducted Output Power

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 antennas, 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 = $10 \cdot \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)^2 / NANT]$ dBi For completely uncorrelated unequal antenna gain Directional gain = $10 \cdot \log[(10G_1/10 + 10G_2/10 + \dots + 10G_N/10) / NANT]$ 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:	23.4 °C	Humidity:	47.7 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4, TM5, TM6				
Final test mode:	TM1, TM2, TM3, TM4, TM5, TM6				

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Please Refer to Appendix for Details.

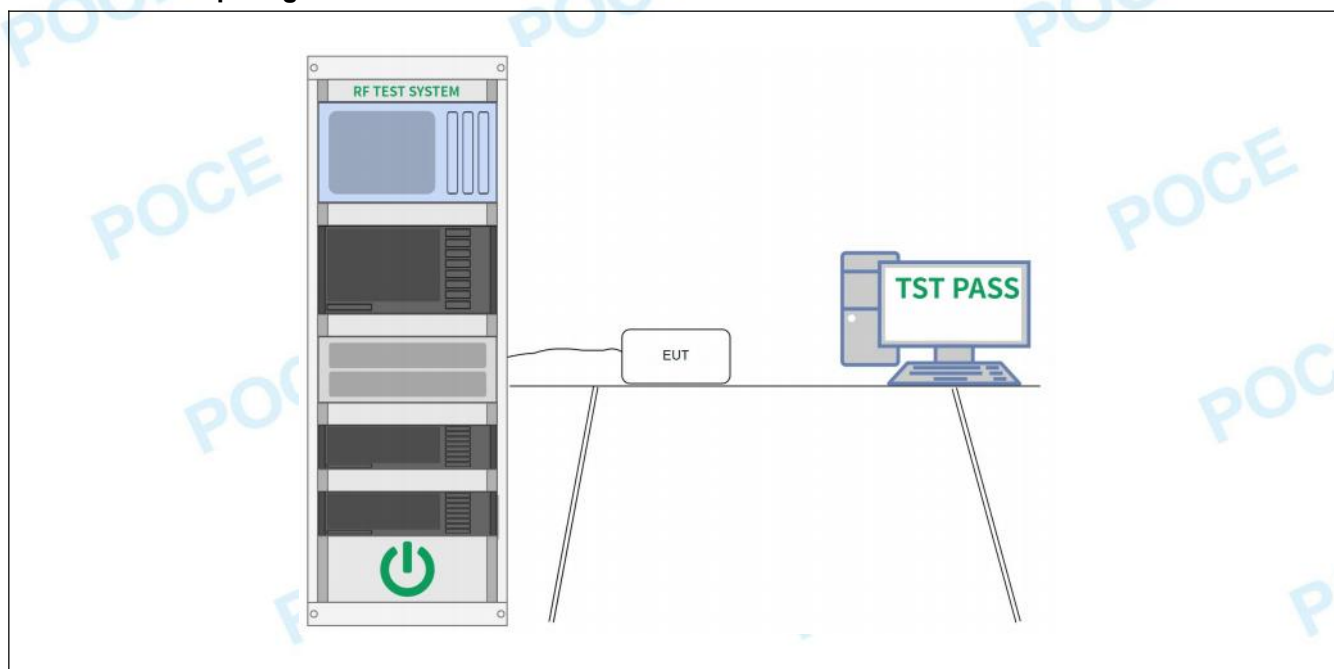
4.4 Power Spectral Density

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 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:	23.4 °C	Humidity:	47.7 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5,TM6				
Final test mode:	TM1,TM2,TM3,TM4,TM5,TM6				

4.4.2 Test Setup Diagram:



4.4.3 Test Data:

Please Refer to Appendix for Details.

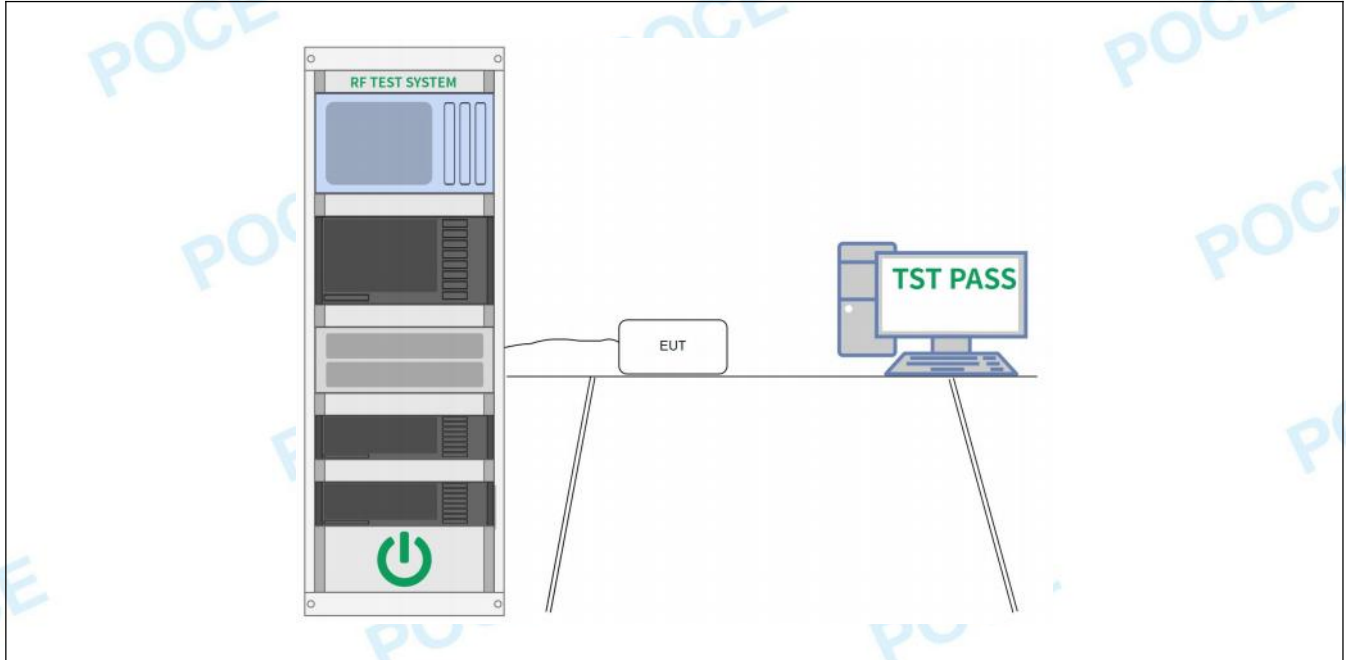
4.5 Emissions in non-restricted frequency bands

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:	23.4 °C	Humidity:	47.7 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5,TM6				
Final test mode:	TM1,TM2,TM3,TM4,TM5,TM6				

4.5.2 Test Setup Diagram:



4.5.3 Test Data:

Please Refer to Appendix for Details.

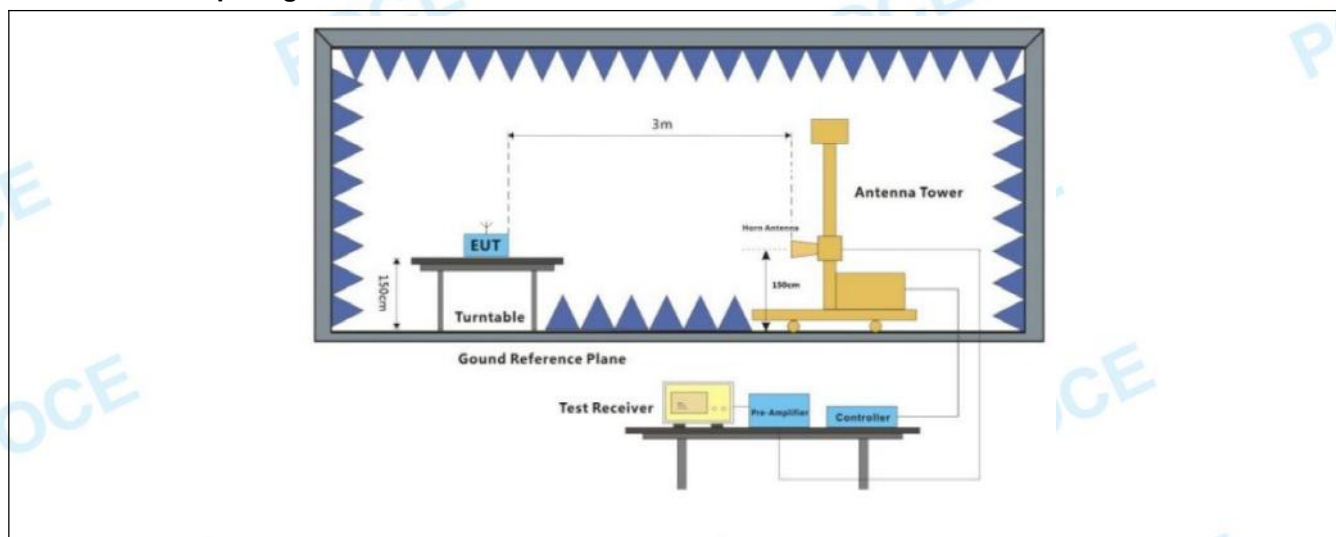
4.6 Band edge emissions (Radiated)

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:

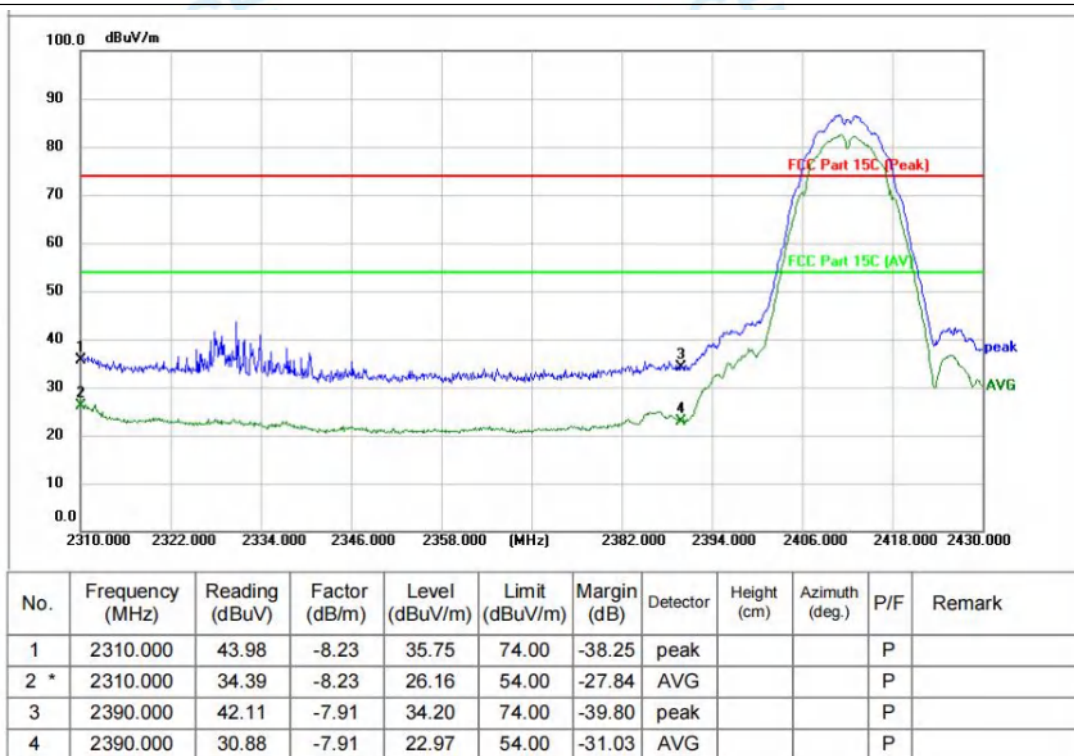
Operating Environment:			
Temperature:	23.4 °C	Humidity:	47.7 %
Pretest mode:		Atmospheric Pressure:	101 kPa
Final test mode:		TM1,TM2,TM3,TM4,TM5,TM6	
		TM1,TM2,TM3,TM4	

4.6.2 Test Setup Diagram:

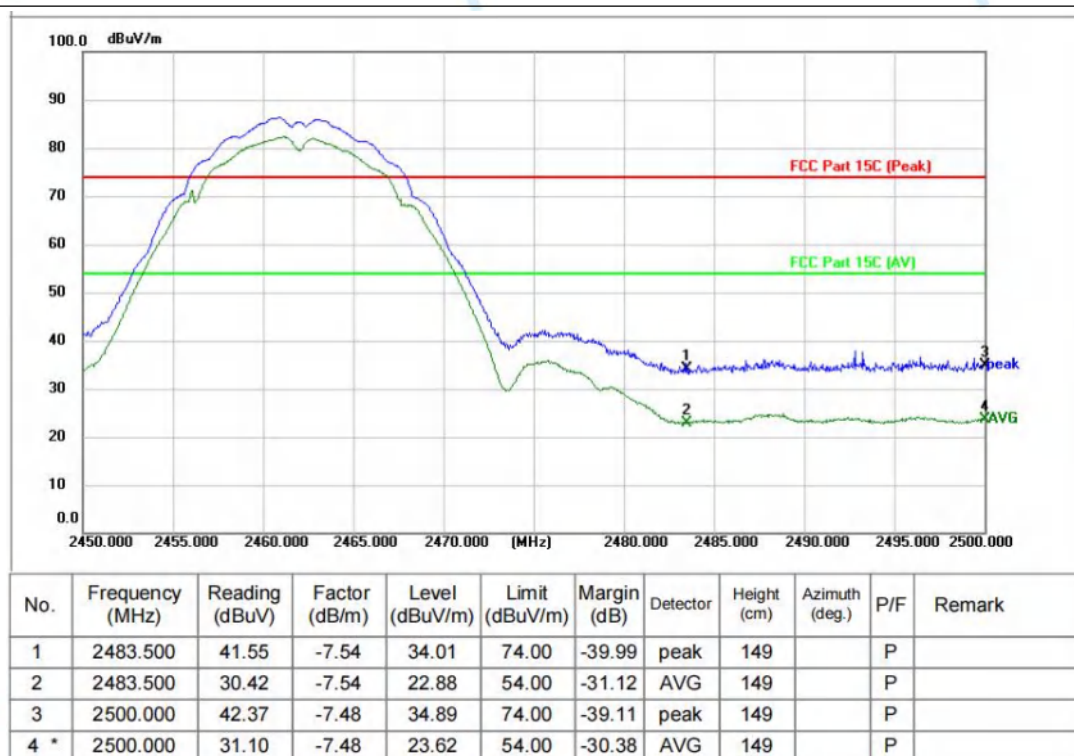


4.6.3 Test Data:

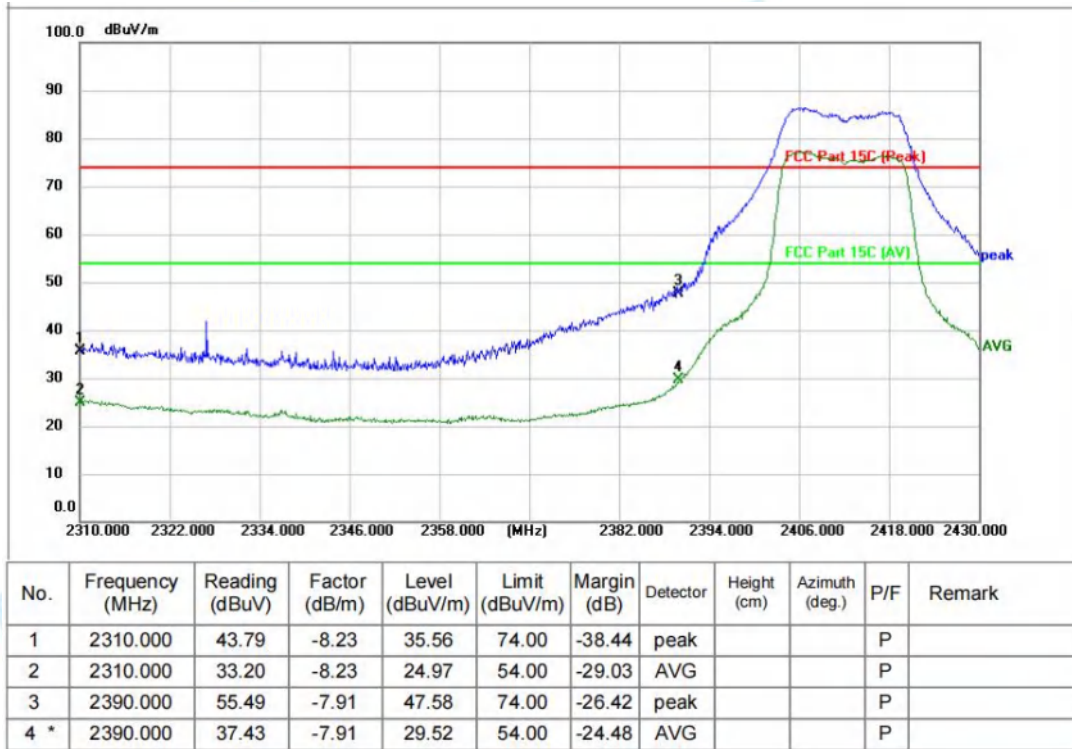
TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L



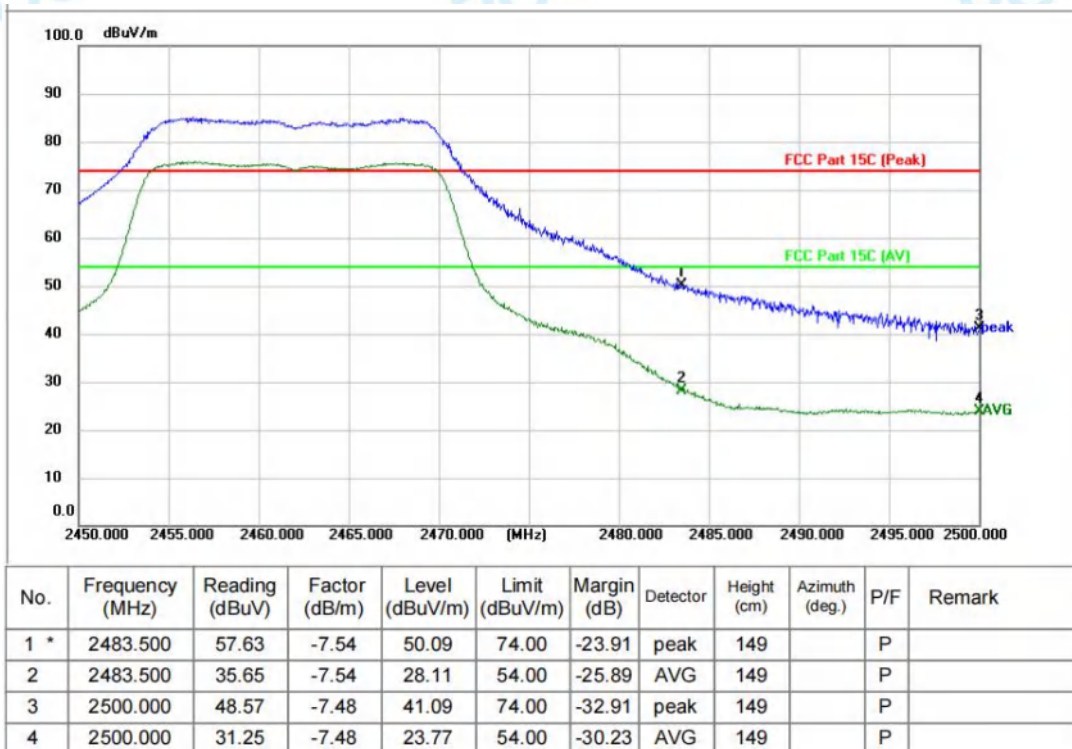
TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



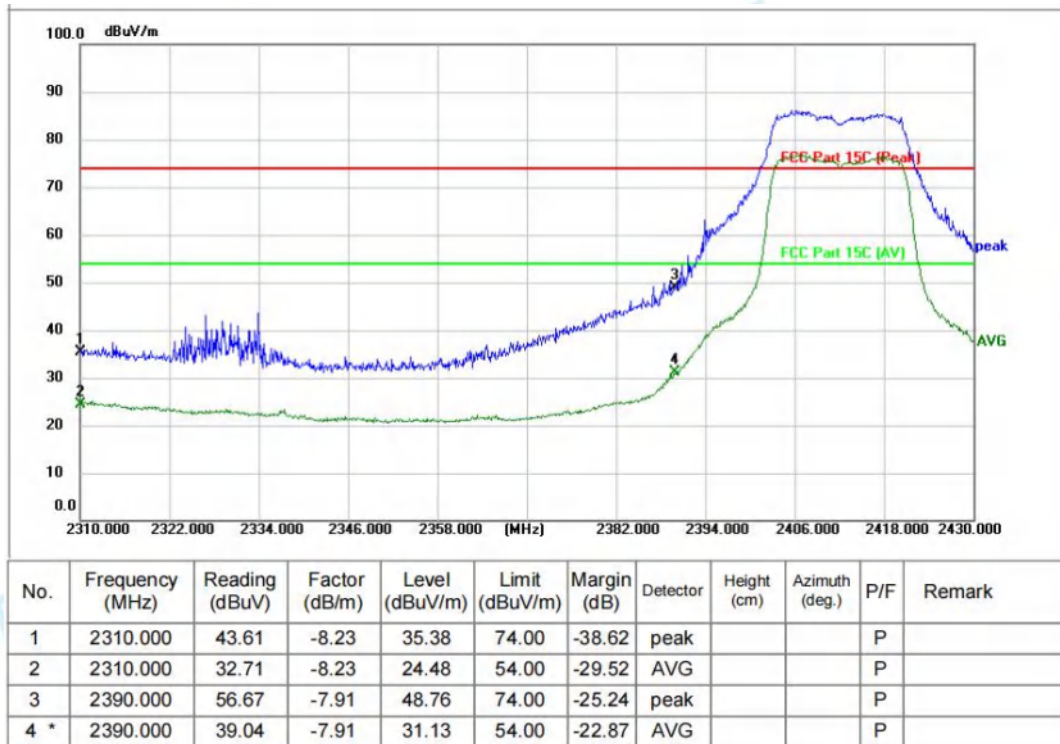
TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L



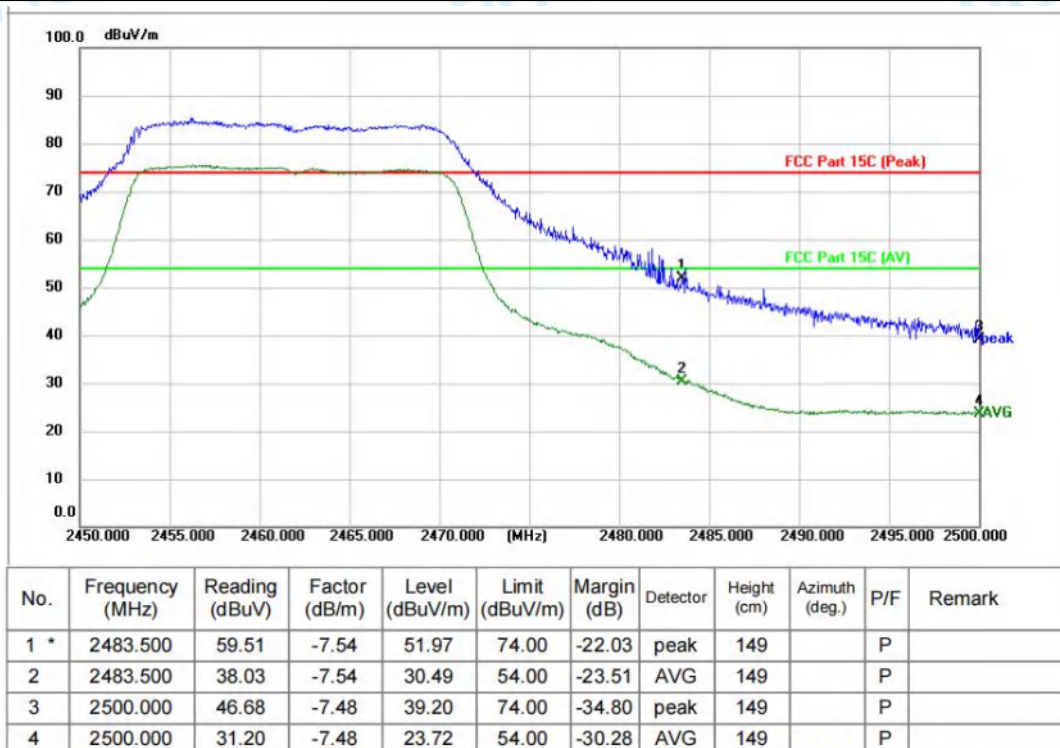
TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



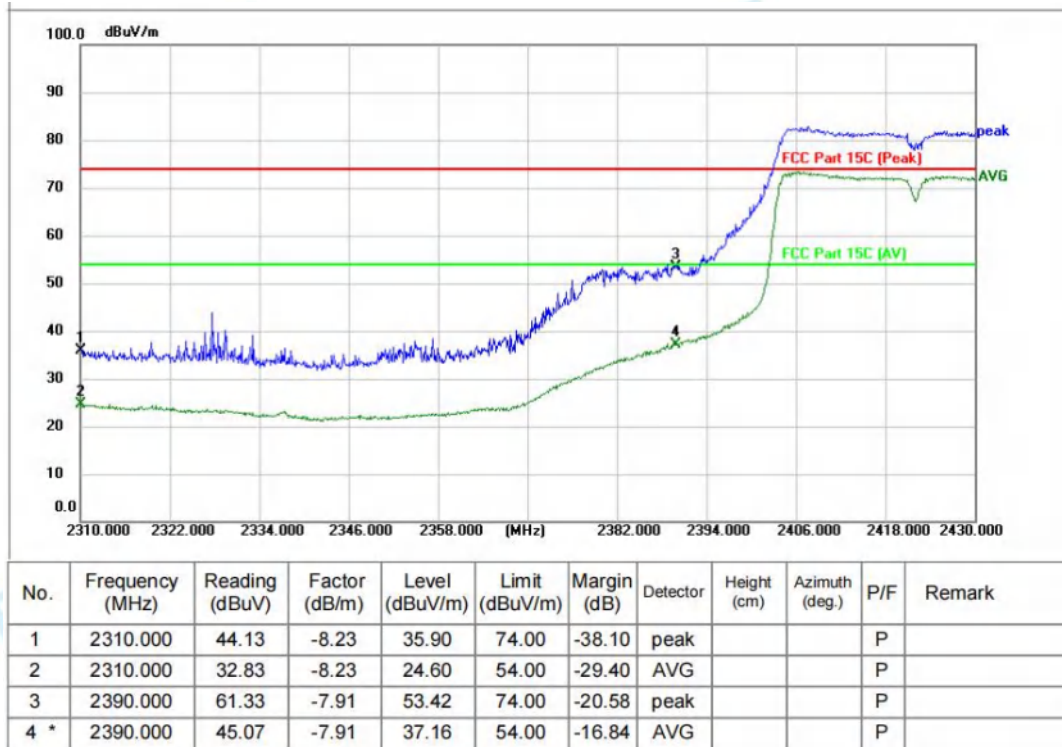
TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L



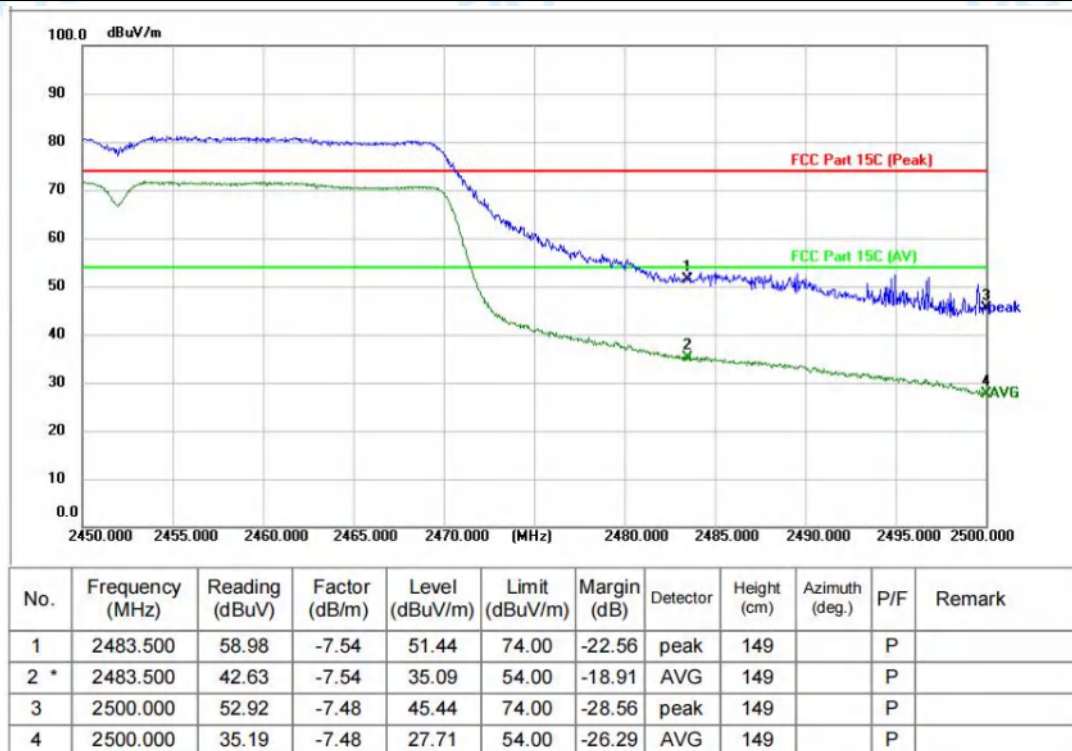
TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



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



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



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.
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4.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.4 °C	Humidity:	47.7 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5,TM6				
Final test mode:	TM1				

4.7.2 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	53.1313	33.30	-9.60	23.70	40.00	-16.30	QP			P	
2	100.5806	34.99	-5.52	29.47	43.50	-14.03	QP			P	
3	136.4598	38.93	-4.25	34.68	43.50	-8.82	QP			P	
4	189.0740	39.20	-3.03	36.17	43.50	-7.33	QP			P	
5	584.7894	32.59	2.85	35.44	46.00	-10.56	QP			P	
6 *	919.2865	32.22	8.28	40.50	46.00	-5.50	QP			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	63.5356	36.46	-8.87	27.59	40.00	-12.41	QP			P	
2	101.6443	40.36	-5.48	34.88	43.50	-8.62	QP			P	
3	135.5061	38.95	-4.29	34.66	43.50	-8.84	QP			P	
4	210.0481	37.09	-2.78	34.31	43.50	-9.19	QP			P	
5	333.6865	35.40	0.48	35.88	46.00	-10.12	QP			P	
6 *	919.2865	32.22	8.26	40.48	46.00	-5.52	QP			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.
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4.8.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.4 °C	Humidity:	47.7 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1,TM2,TM3,TM4,TM5,TM6				
Final test mode:	TM				

4.8.2 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	4818.750	48.92	-0.85	48.07	74.00	-25.93	peak	149		P	
2 *	4818.750	36.47	-0.85	35.62	54.00	-18.38	AVG	149		P	
3	7236.000	36.09	4.17	40.26	74.00	-33.74	peak	149		P	
4	7236.000	25.46	4.17	29.63	54.00	-24.37	AVG	149		P	
5	9648.000	35.79	8.10	43.89	74.00	-30.11	peak	149		P	
6	9648.000	24.55	8.10	32.65	54.00	-21.35	AVG	149		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	4818.750	48.80	-0.23	48.57	74.00	-25.43	peak	149		P	
2 *	4818.750	36.06	-0.23	35.83	54.00	-18.17	AVG	149		P	
3	7236.000	36.68	4.16	40.84	74.00	-33.16	peak	149		P	
4	7236.000	25.85	4.16	30.01	54.00	-23.99	AVG	149		P	
5	9648.000	35.35	8.05	43.40	74.00	-30.60	peak	149		P	
6	9648.000	24.68	8.05	32.73	54.00	-21.27	AVG	149		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	4877.500	52.71	-0.65	52.06	74.00	-21.94	peak	149		P	
2 *	4877.500	37.07	-0.65	36.42	54.00	-17.58	AVG	149		P	
3	7311.000	36.46	4.29	40.75	74.00	-33.25	peak	149		P	
4	7311.000	25.14	4.29	29.43	54.00	-24.57	AVG	149		P	
5	9748.000	36.60	8.10	44.70	74.00	-29.30	peak	149		P	
6	9748.000	24.79	8.10	32.89	54.00	-21.11	AVG	149		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	4877.500	49.94	-0.04	49.90	74.00	-24.10	peak	149		P	
2 *	4877.500	34.95	-0.04	34.91	54.00	-19.09	AVG	149		P	
3	7311.000	35.65	4.34	39.99	74.00	-34.01	peak	149		P	
4	7311.000	25.02	4.34	29.36	54.00	-24.64	AVG	149		P	
5	9748.000	36.71	8.12	44.83	74.00	-29.17	peak	149		P	
6	9748.000	24.91	8.12	33.03	54.00	-20.97	AVG	149		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	4924.500	49.29	-0.50	48.79	74.00	-25.21	peak	149		P	
2 *	4924.500	36.87	-0.50	36.37	54.00	-17.63	AVG	149		P	
3	7386.000	36.34	4.41	40.75	74.00	-33.25	peak	149		P	
4	7386.000	25.31	4.41	29.72	54.00	-24.28	AVG	149		P	
5	9848.000	35.80	8.10	43.90	74.00	-30.10	peak	149		P	
6	9848.000	24.84	8.10	32.94	54.00	-21.06	AVG	149		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	4924.500	48.06	0.11	48.17	74.00	-25.83	peak	149		P	
2 *	4924.500	35.59	0.11	35.70	54.00	-18.30	AVG	149		P	
3	7386.000	36.75	4.52	41.27	74.00	-32.73	peak	149		P	
4	7386.000	25.32	4.52	29.84	54.00	-24.16	AVG	149		P	
5	9848.000	36.15	8.19	44.34	74.00	-29.66	peak	149		P	
6	9848.000	24.75	8.19	32.94	54.00	-21.06	AVG	149		P	



5 TEST SETUP PHOTOS

Please refer to Setup Photo file

6 PHOTOS OF THE EUT

Please refer to external photos file and internal photos file



Appendix

Eco Smart Display--0103_5_00--FCC ID FCC_2.4G_WIFI (Part15.247) Test Data

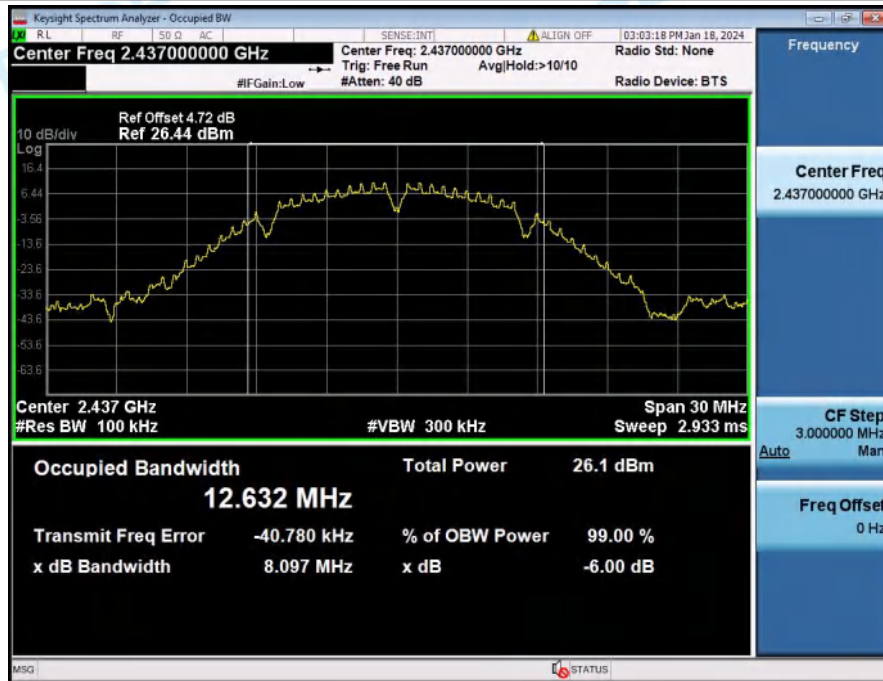
1. -6dB Bandwidth

Condition	Antenna	Modulation	Frequency (MHz)	-6dB BW(MHz)	limit(kHz)	Result
NVNT	ANT1	802.11b	2412.00	8.09	500	Pass
NVNT	ANT1	802.11b	2437.00	8.10	500	Pass
NVNT	ANT1	802.11b	2462.00	7.67	500	Pass
NVNT	ANT1	802.11g	2412.00	16.48	500	Pass
NVNT	ANT1	802.11g	2437.00	16.48	500	Pass
NVNT	ANT1	802.11g	2462.00	16.45	500	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	17.62	500	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	17.62	500	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	17.62	500	Pass
NVNT	ANT1	802.11ax(HE20)	2412.00	19.00	500	Pass
NVNT	ANT1	802.11ax(HE20)	2437.00	19.00	500	Pass
NVNT	ANT1	802.11ax(HE20)	2462.00	18.97	500	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	36.37	500	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	36.35	500	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	36.35	500	Pass
NVNT	ANT1	802.11ax(HE40)	2422.00	38.03	500	Pass
NVNT	ANT1	802.11ax(HE40)	2437.00	38.03	500	Pass
NVNT	ANT1	802.11ax(HE40)	2452.00	38.03	500	Pass

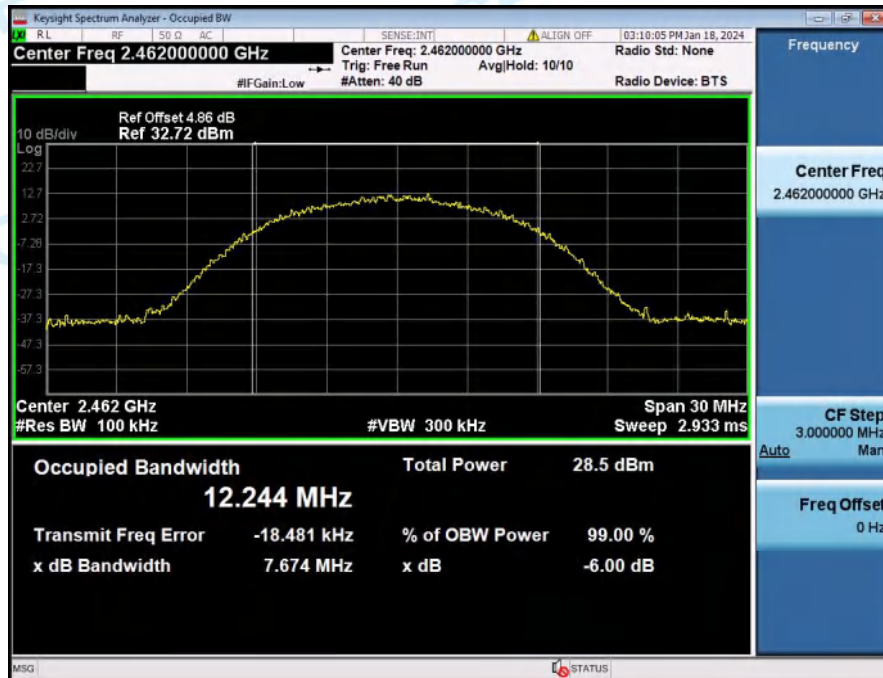
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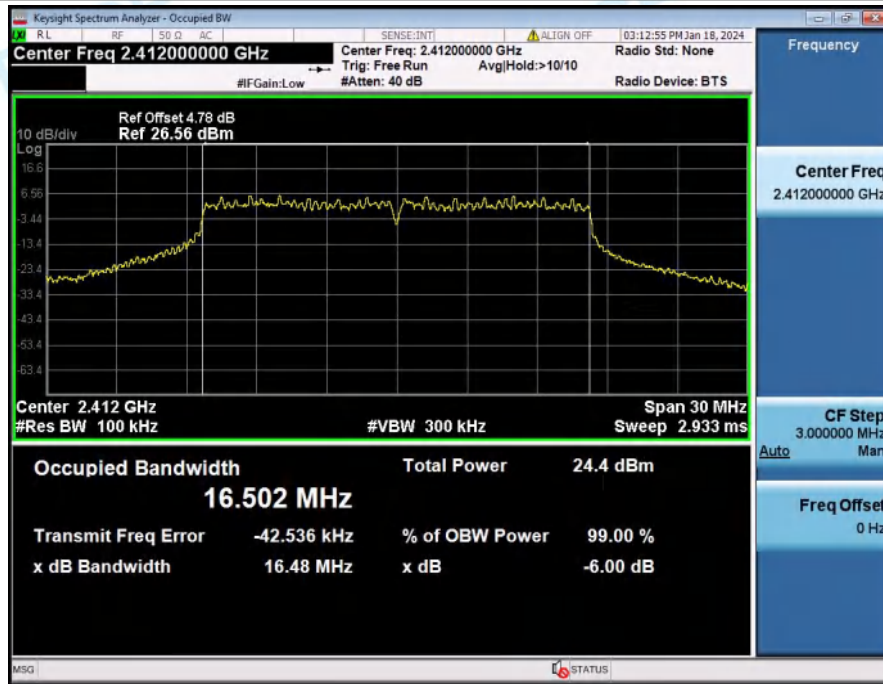
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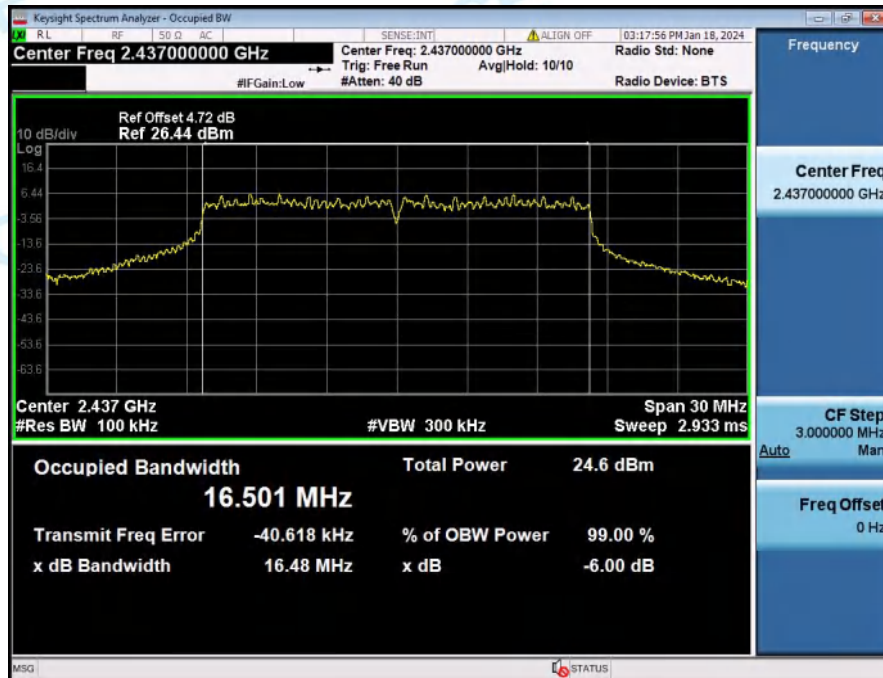
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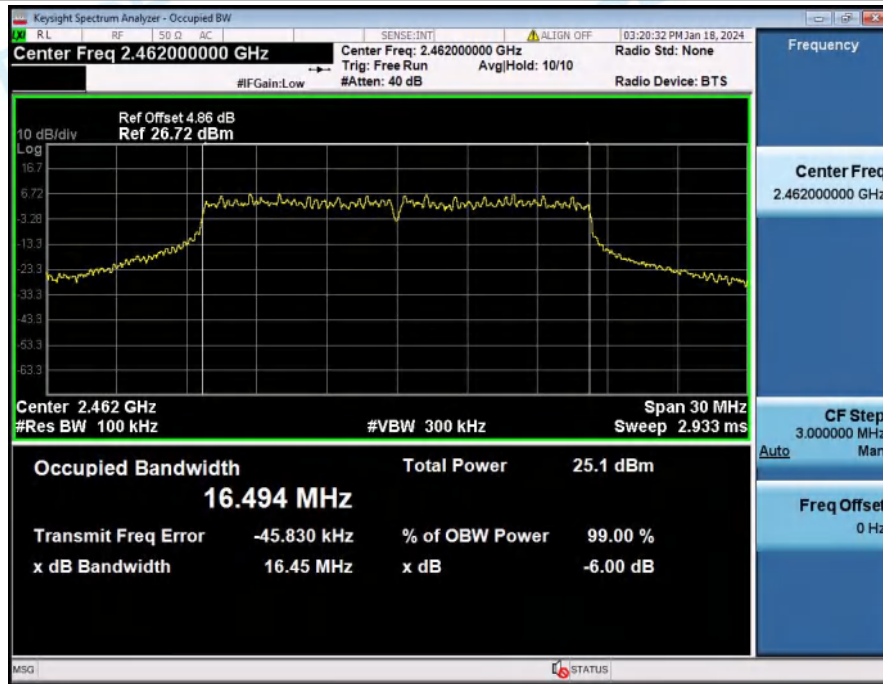
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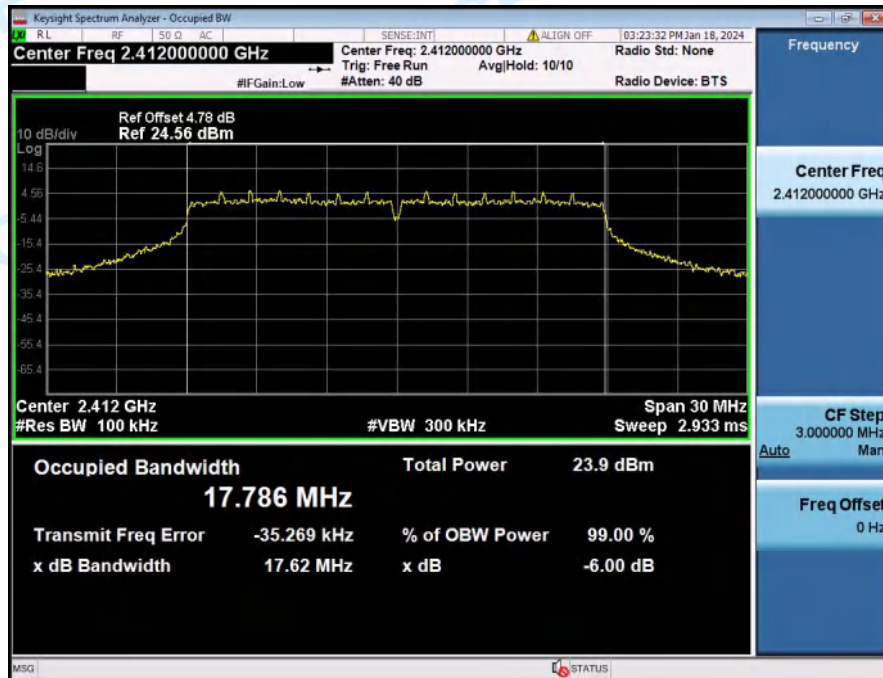
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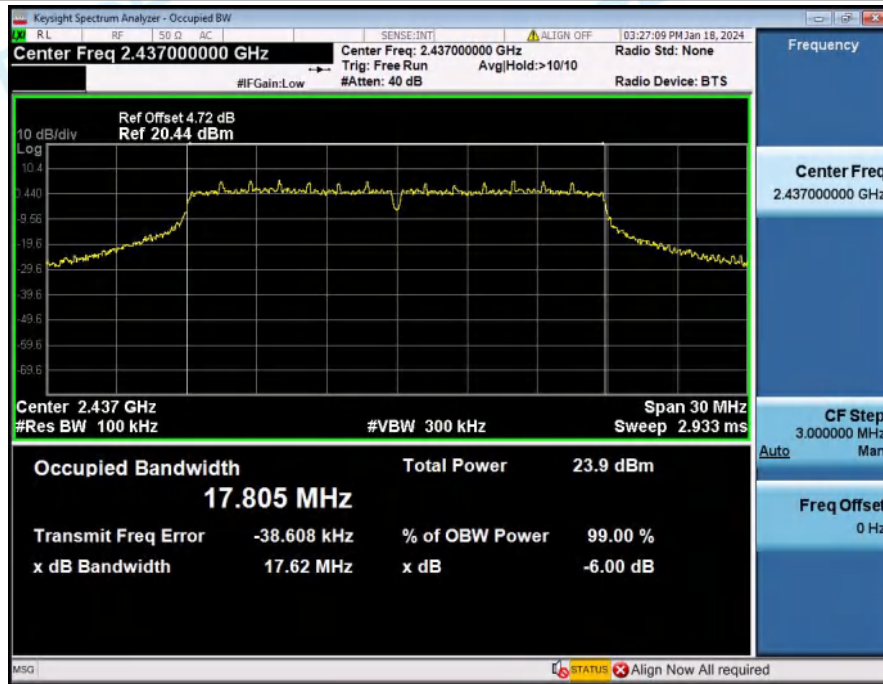
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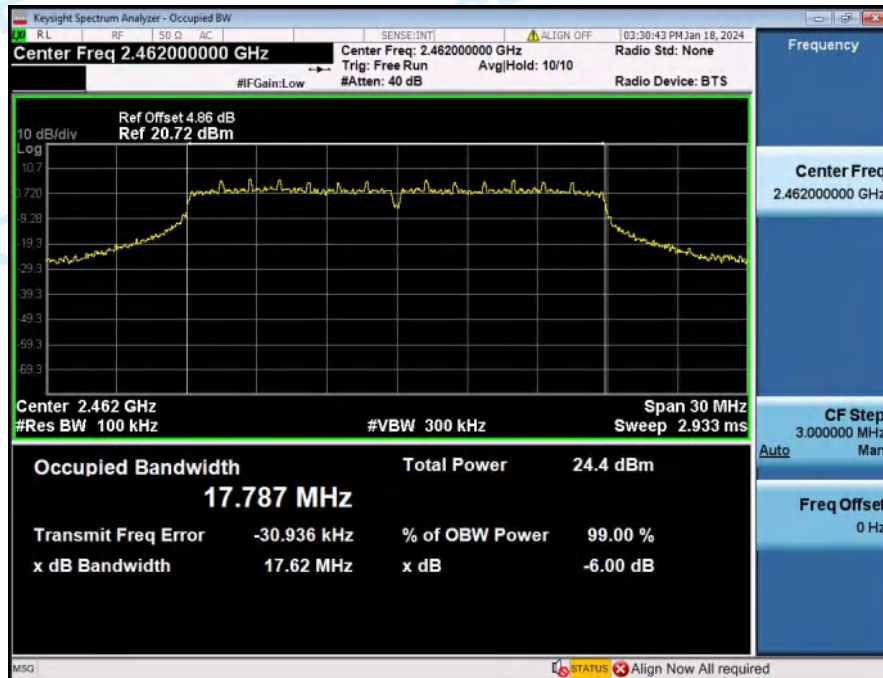
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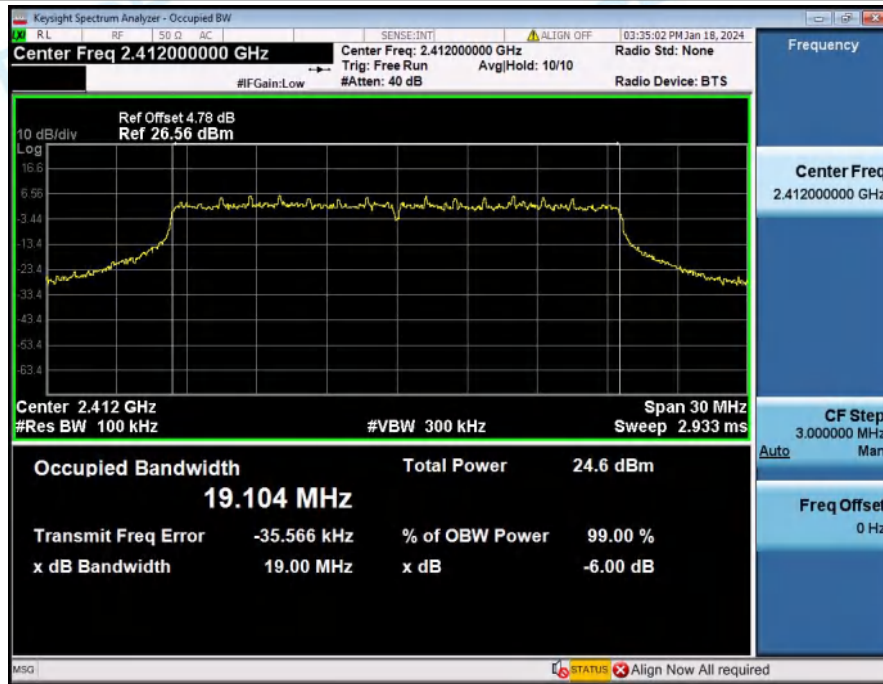
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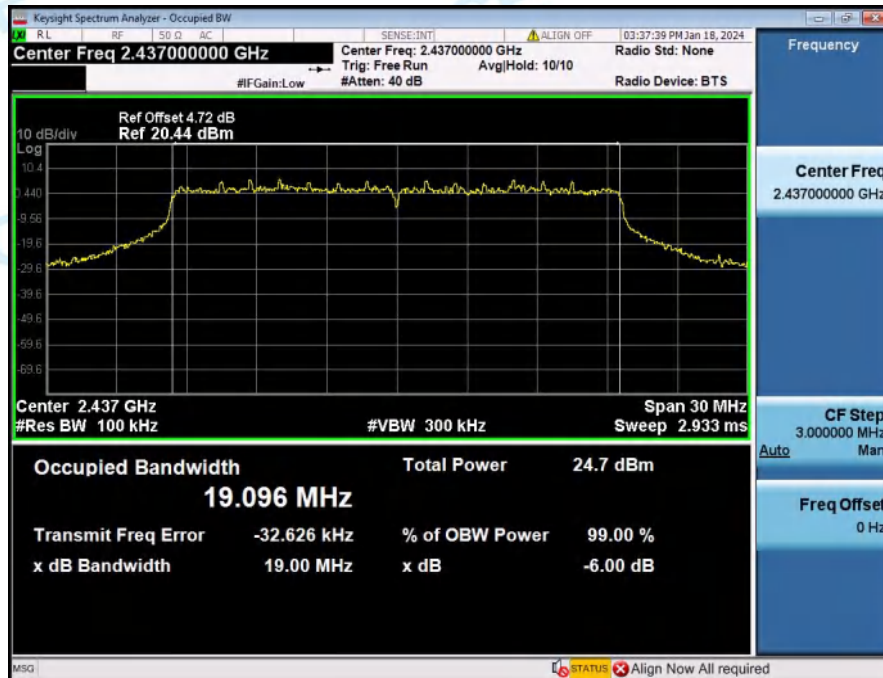
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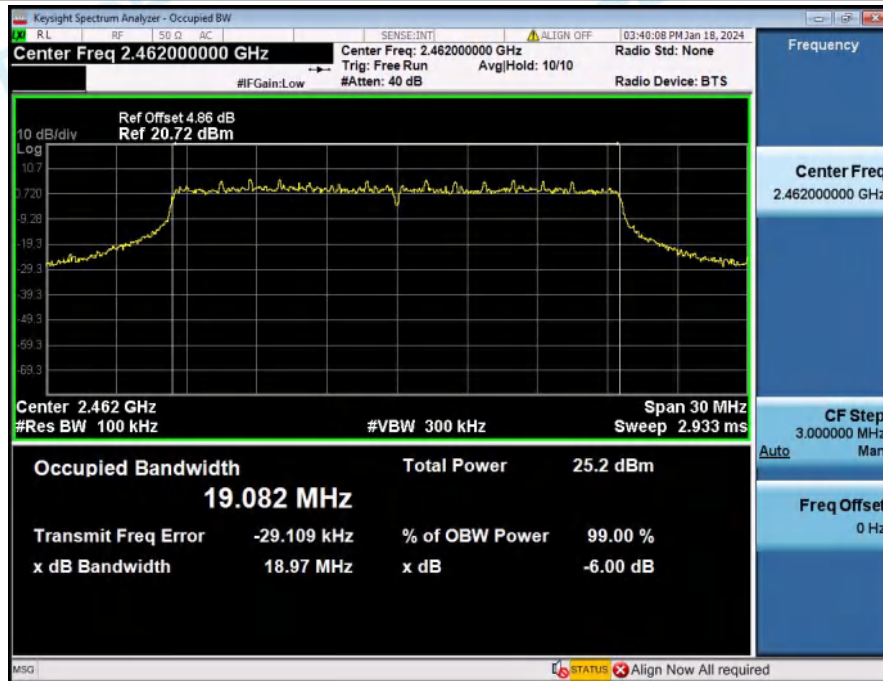
-6dB_Bandwidth_NVNT_ANT1_802_11ax(HE20)_2412



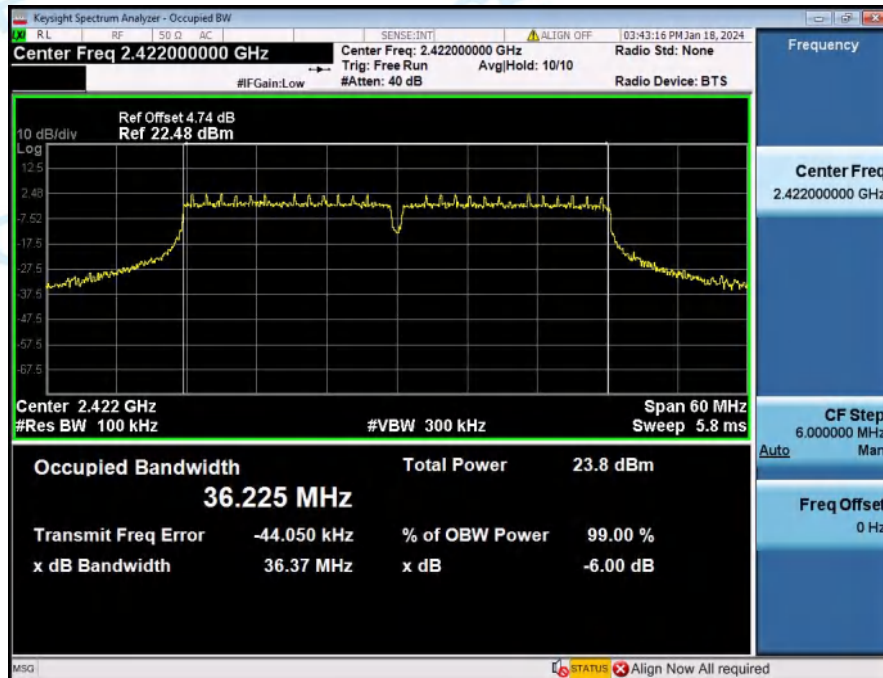
-6dB_Bandwidth_NVNT_ANT1_802_11ax(HE20)_2437



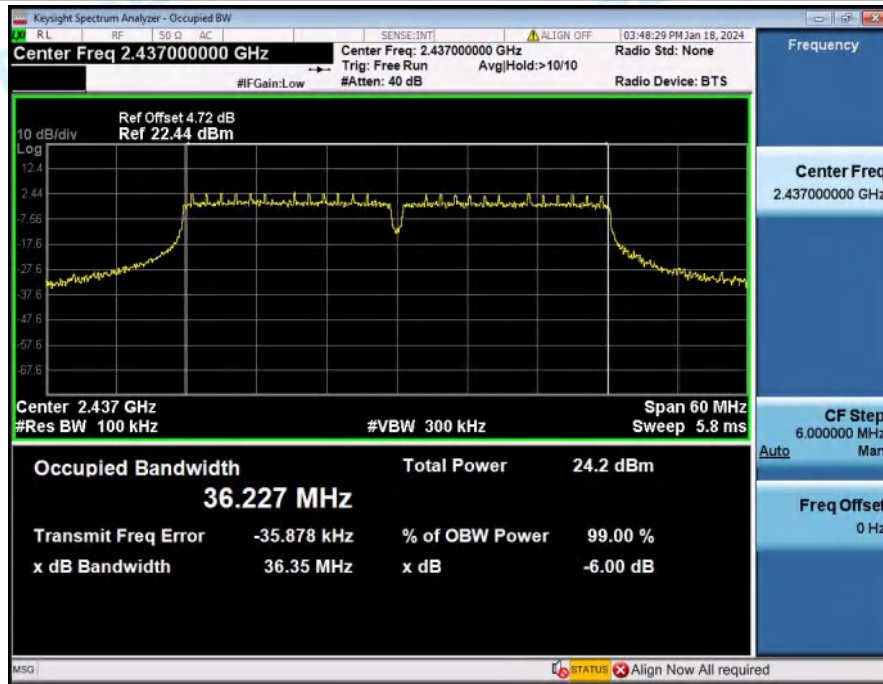
-6dB_Bandwidth_NVNT_ANT1_802_11ax(HE20)_2462



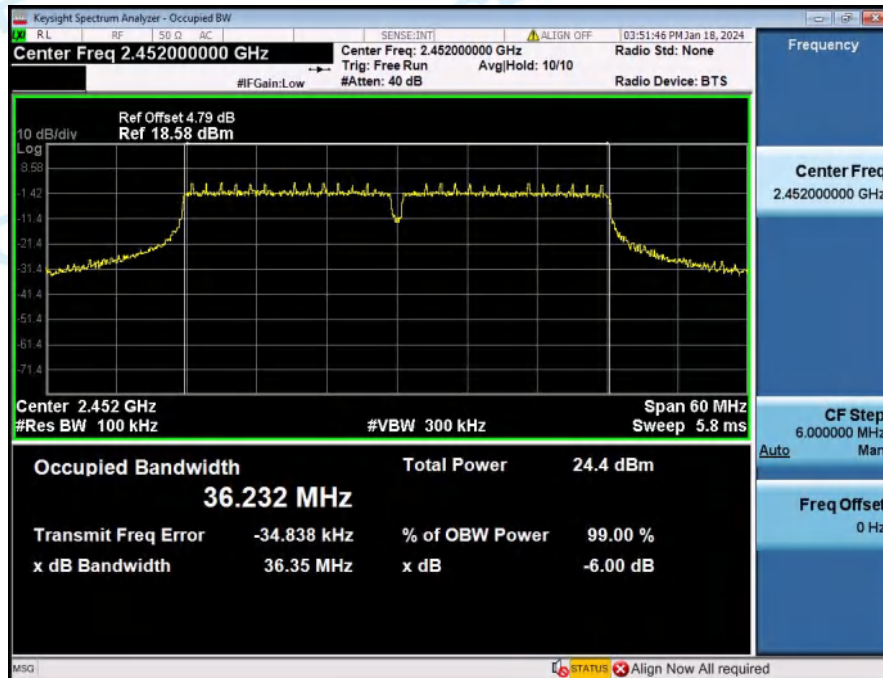
-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2422



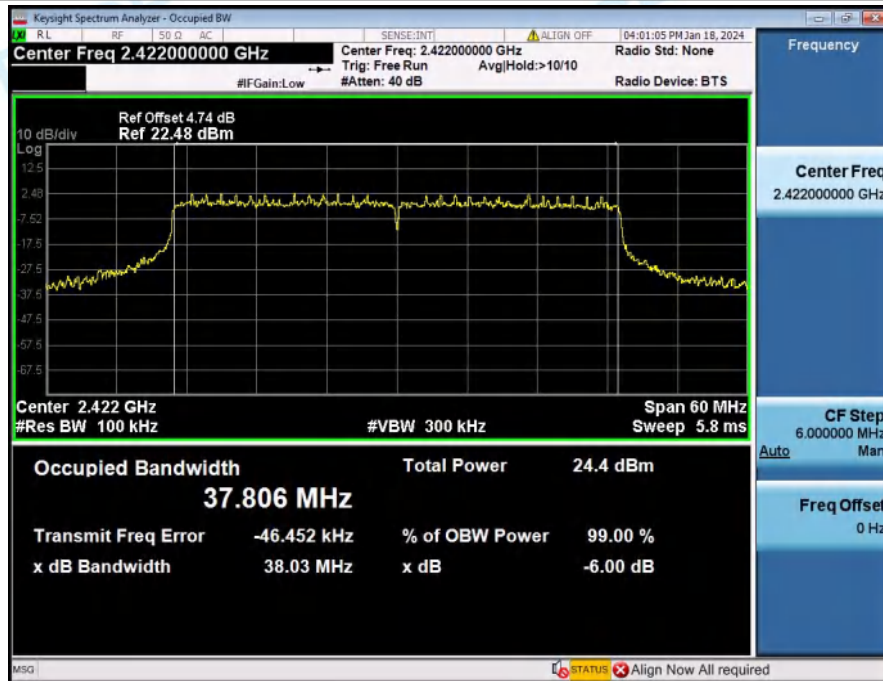
-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2437



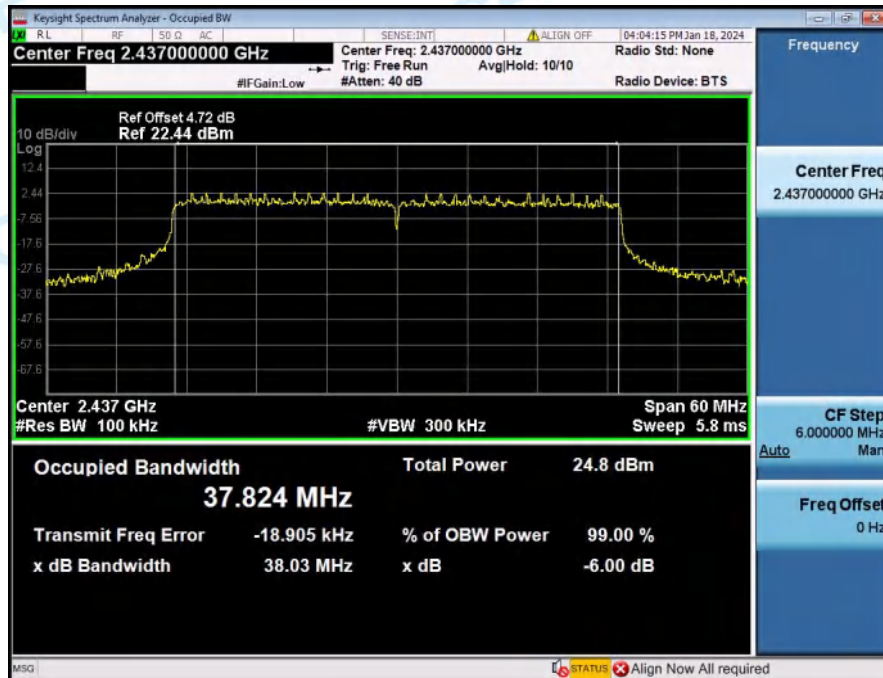
-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2452



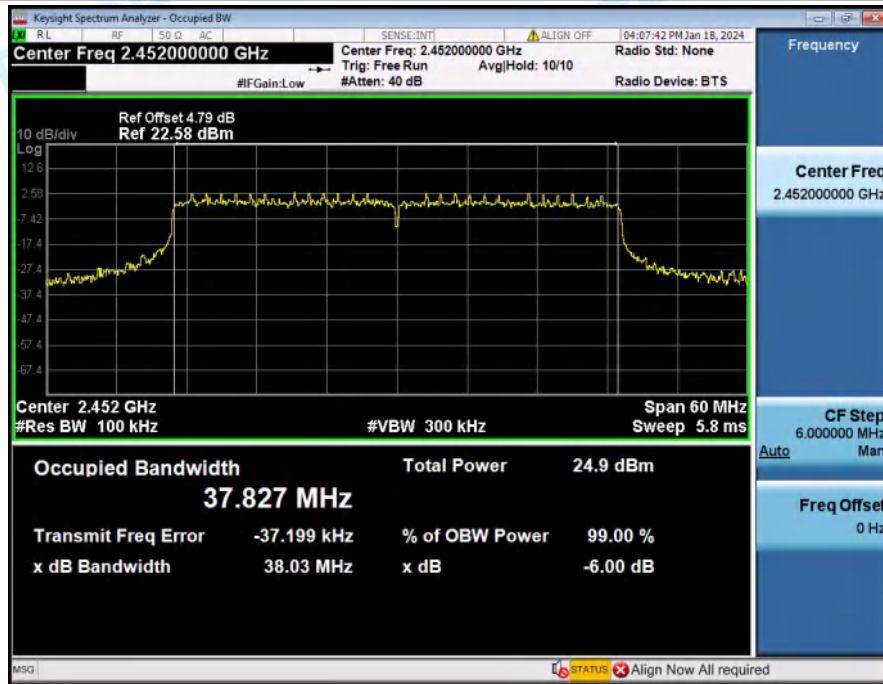
-6dB_Bandwidth_NVNT_ANT1_802_11ax(HE40)_2422



-6dB_Bandwidth_NVNT_ANT1_802_11ax(HE40)_2437



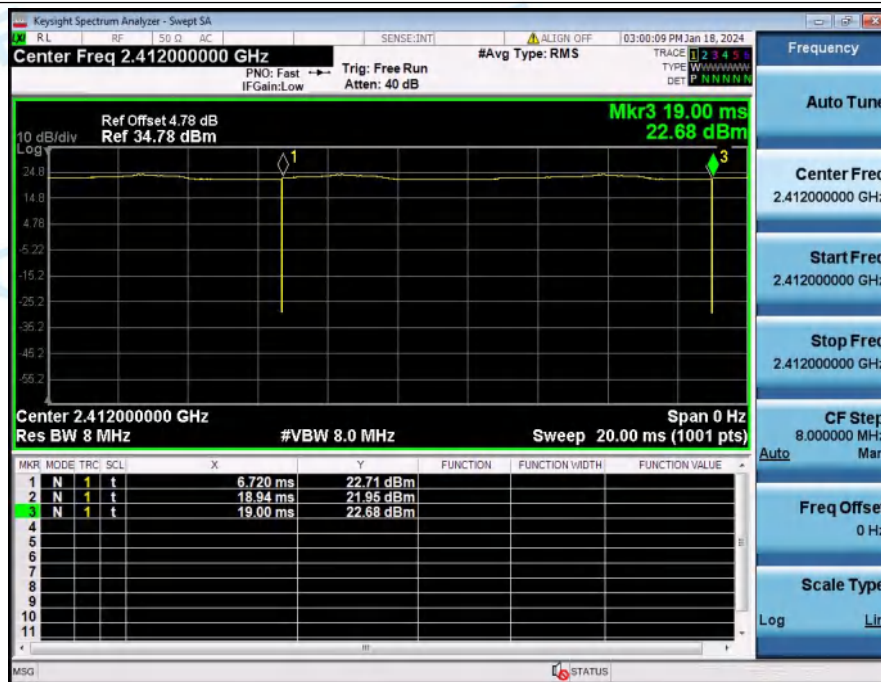
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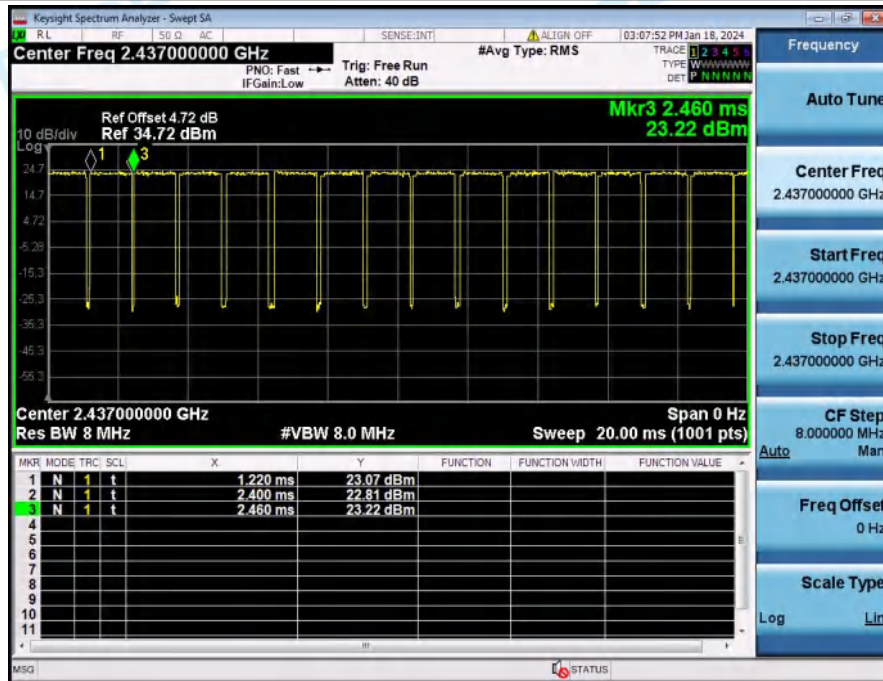
2. Duty Cycle

Condition	Antenna	Modulation	Frequency (MHz)	Duty cycle(%)	Duty factor(dB)
NVNT	ANT1	802.11b	2412.00	99.67	0.00
NVNT	ANT1	802.11b	2437.00	96.77	0.14
NVNT	ANT1	802.11b	2462.00	98.36	0.00
NVNT	ANT1	802.11g	2412.00	63.16	2.00
NVNT	ANT1	802.11g	2437.00	86.67	0.62
NVNT	ANT1	802.11g	2462.00	93.33	0.30
NVNT	ANT1	802.11n(HT20)	2412.00	95.00	0.22
NVNT	ANT1	802.11n(HT20)	2437.00	92.23	0.35
NVNT	ANT1	802.11n(HT20)	2462.00	94.12	0.26
NVNT	ANT1	802.11ax(HE20)	2412.00	88.10	0.55
NVNT	ANT1	802.11ax(HE20)	2437.00	92.50	0.34
NVNT	ANT1	802.11ax(HE20)	2462.00	98.67	0.00
NVNT	ANT1	802.11n(HT40)	2422.00	66.20	1.79
NVNT	ANT1	802.11n(HT40)	2437.00	94.12	0.26
NVNT	ANT1	802.11n(HT40)	2452.00	94.12	0.26
NVNT	ANT1	802.11ax(HE40)	2422.00	92.68	0.33
NVNT	ANT1	802.11ax(HE40)	2437.00	84.78	0.72
NVNT	ANT1	802.11ax(HE40)	2452.00	88.37	0.54

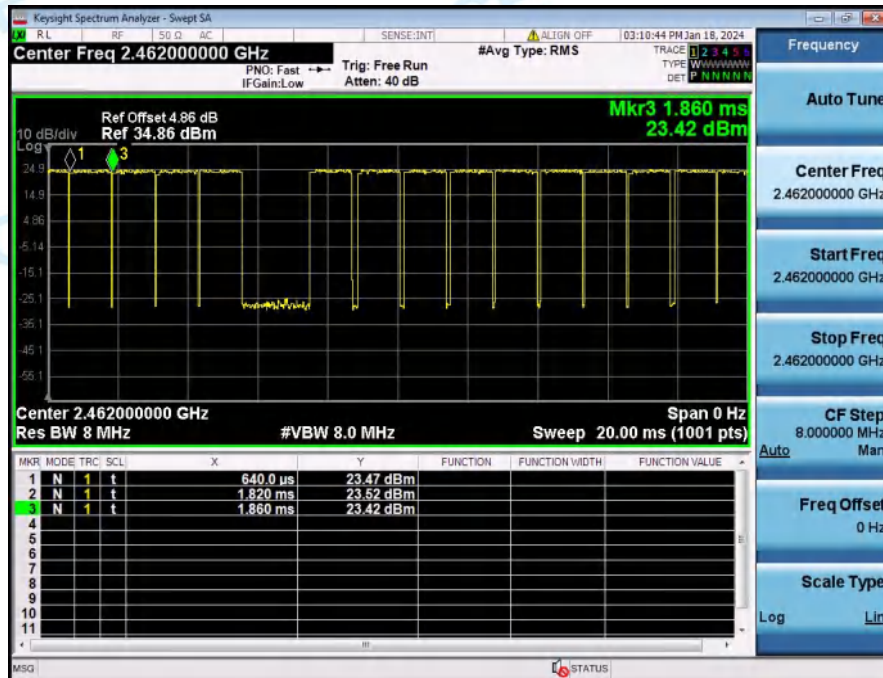
Duty_Cycle_NVNT_ANT1_802_11b_2412



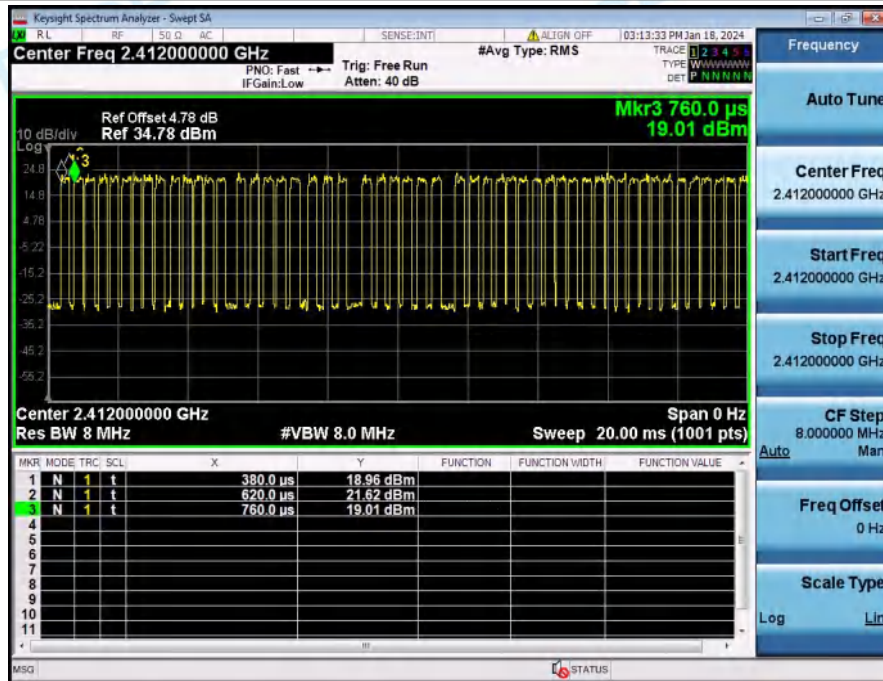
Duty_Cycle_NVNT_ANT1_802_11b_2437



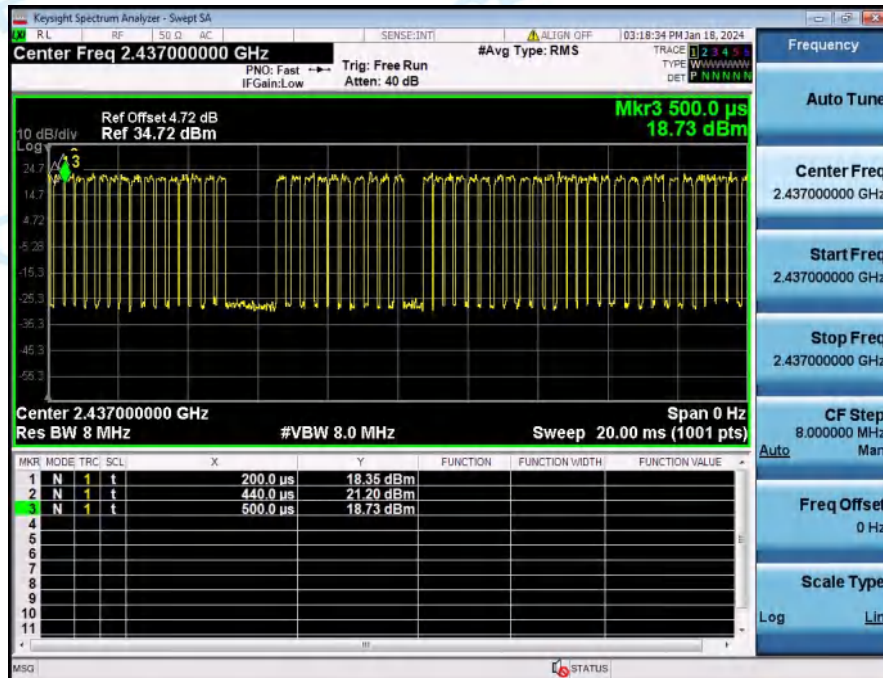
Duty_Cycle_NVNT_ANT1_802_11b_2462



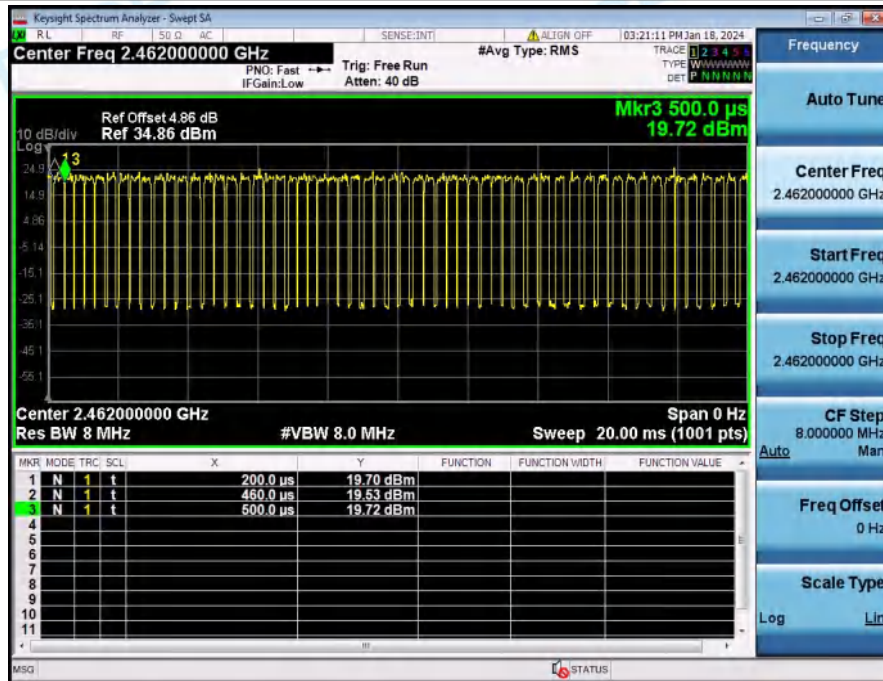
Duty_Cycle_NVNT_ANT1_802_11g_2412



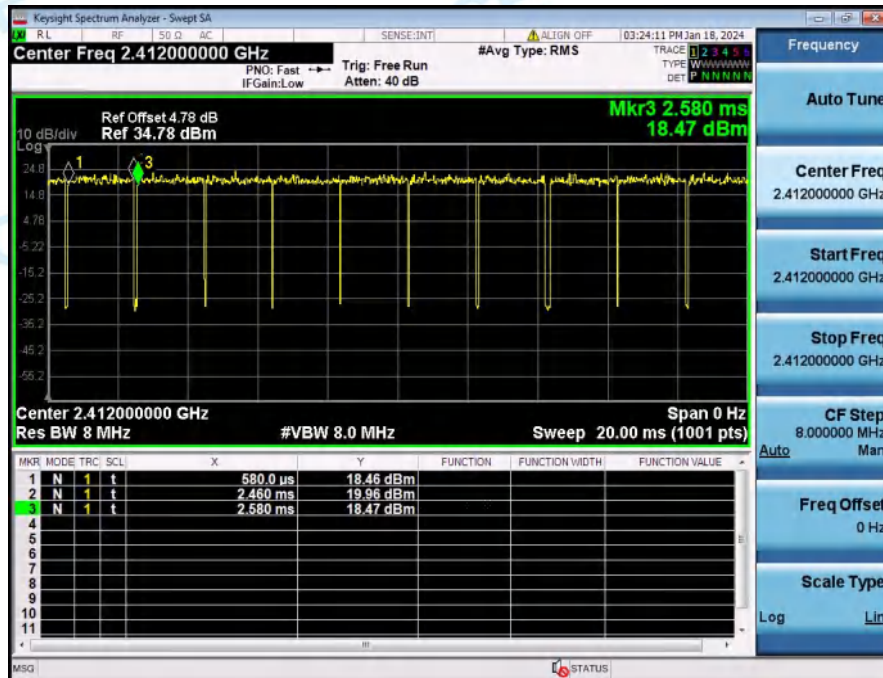
Duty_Cycle_NVNT_ANT1_802_11g_2437



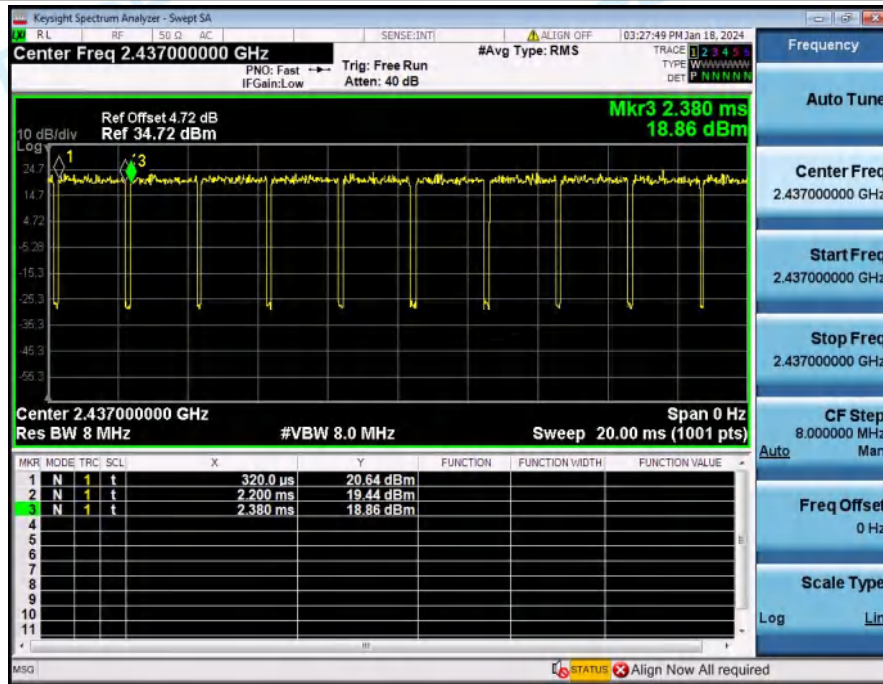
Duty_Cycle_NVNT_ANT1_802_11g_2462



Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2412



Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2437



Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2462

