



RF Test Report

For

Applicant Name: Shenzhen annengxin technology co.,ltd
Address: Floor 3, Building 13, Futing Industrial Park, Fucheng Street, Longhua District, Shenzhen, Guangdong, China
EUT Name: Smart Switch
Brand Name: N/A
Model Number: AN-WDS01
Series Model Number: Refer to section 2

Issued By

Company name: BTF Testing Lab (Shenzhen) Co., Ltd.
Address: F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

Report number: BTF230228R00102
Test standards: FCC CFR Title 47 Part 15 Subpart C (§15.247)
FCC ID: 2BAF7-ANWDS01
Test conclusion: Pass
Date of sample receipt: 2025-04-16
Test date: 2025-04-16 to 2025-05-06
Date of issue: 2025-05-08

Test by:

Sean He
Sean He / Tester

Prepared by:

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Chris Liu/ Project engineer



Olic Huang

Olic Huang/EMC manager

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Test Report Number: BTF230228R00102

Revision History		
Version	Issue Date	Revisions Content
R_V0	2025-05-08	Original
Note: Once the revision has been made, then previous versions reports are invalid.		

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1 Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130
FCC Registration Number:	518915
Designation Number:	CN1409

1.3 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 BTF 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.

2 Product Information

2.1 Application Information

Company Name:	Shenzhen annengxin technology co.,ltd
Address:	Floor 3, Building 13, Futing Industrial Park, Fucheng Street, Longhua District, Shenzhen, Guangdong, China

2.2 Manufacturer Information

Company Name:	Shenzhen annengxin technology co.,ltd
Address:	Floor 3, Building 13, Futing Industrial Park, Fucheng Street, Longhua District, Shenzhen, Guangdong, China

2.3 Factory Information

Company Name:	Shenzhen annengxin technology co.,ltd
Address:	Floor 3, Building 13, Futing Industrial Park, Fucheng Street, Longhua District, Shenzhen, Guangdong, China

2.4 General Description of Equipment under Test (EUT)

EUT Name:	Smart Switch
Test Model Number:	AN-WDS01
Series Model Number:	AN-WS01, AN-WS01L, AN-WCS01, AN-WFS01, AN-WFLS01, AN-WHS01, AN-WHS02, AN-WS02, AN-WS02L, AN-WS03, AN-WS03L, AN-WS04, AN-WS04L
Description of Model name differentiation:	Only the model name is different, everything else is the same.
Rating:	Voltage:AC 100-240v 50~60hz Output:400W

2.5 Technical Information

Power Supply:	AC100-240V 10A
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	40
Modulation Type:	GFSK
Antenna Type:	PCB ANT
Antenna Gain#:	1.3 dBi
Note: #: The antenna gain provided by the applicant, and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.	
Bluetooth Version:	5.0

Channel List:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
...
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Remark: Channel 0, 19 & 39 have been tested.

3 Summary of Test Results

3.1 Test Standards

Identity	Document Title
FCC CFR Title 47 Part 15 Subpart C (§15.247)	Intentional Radiators - Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10-2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of The FCC Rules

3.2 Uncertainty of Test

Measurement	Value
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Supply voltages	±3 %
Time	±5 %
Radiated Emission (30MHz ~ 1000MHz)	±4.80 dB
Radiated Emission (1GHz ~ 18GHz)	±4.82 dB

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

3.3 Summary of Test Result

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	Pass
Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.247(a)(2)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(3)	Pass
Power Spectral Density	47 CFR Part 15.247	47 CFR 15.247(e)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass

4 Test Configuration

4.1 Test Equipment List

Radiated test method					
Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Rohde & Schwarz	ESCI7	101032	2024/10/25	2025/10/24
Signal Analyzer	Rohde & Schwarz	FSQ40	100010	2024/10/25	2025/10/24
Log periodic antenna	Schwarzbeck	VULB 9168	01328	2024/10/28	2025/10/27
Preamplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9744	00246	2024/09/24	2025/09/23
Horn Antenna (1GHz ~18GHz)	Schwarzbeck	BBHA9120D	2597	2024/10/30	2025/10/29
Horn Antenna (15GHz ~ 40GHz)	SCHWARZBECK	BBHA9170	1157	2024/10/24	2025/10/23
Preamplifier (1GHz ~ 40GHz)	TST Pass	LNA10180G45	246	2024/09/24	2025/09/23
Test Software	Frad	EZ EMC	Version: FA-03A2 RE+		

Conducted Emission Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Rohde & Schwarz	ESCI3	101422	2024/10/25	2025/10/24
V-LISN	Schwarzbeck	NSLK 8127	01073	2024/10/25	2025/10/24
Coaxial Switcher	Schwarzbeck	CX210	CX210	/	/
Pulse Limiter	Schwarzbeck	VTSD 9561-F	00953	/	/
Test Software	Frad	EZ EMC	Version: EMC-CON 3A1.1+		

Conducted test method					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020A	MY50410020	2024/10/25	2025/10/24
ESG Vector Signal Generator	Agilent	E4438C	MY45094854	2024/10/25	2025/10/24
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2024/10/25	2025/10/24
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	161997	2024/10/25	2025/10/24
Temperature Humidity Chamber	ZZCKONG	ZZ-K02A	20210928007	2024/10/25	2025/10/24
DC Power Supply	Tongmen	etm-6050c	20211026123	2024/10/25	2025/10/24
RF Control Unit	Techy	TR1029-1	/	2024/10/25	2025/10/24
RF Sensor Unit	Techy	TR1029-2	/	2024/10/25	2025/10/24
Test Software	TST Pass	/	Version: 2.0		

4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

4.3 Test Modes

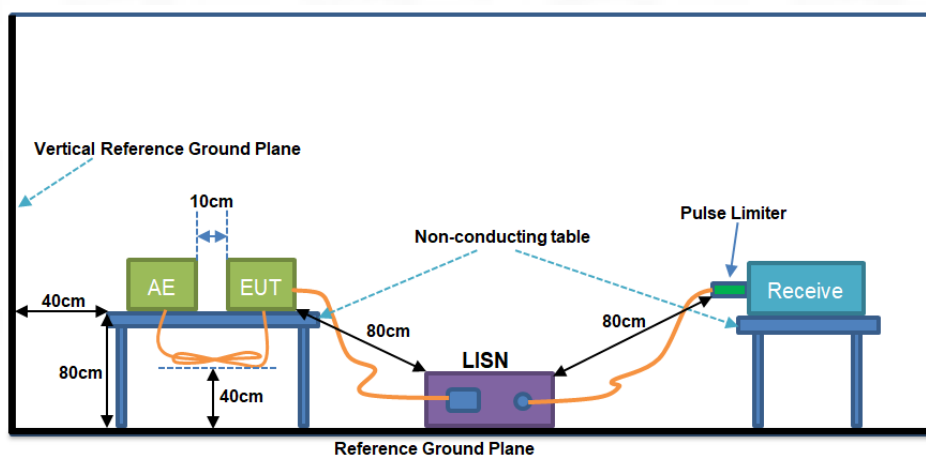
No.	Test Modes	Description
TM1	TX mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with GFSK modulation.

4.4 Test software

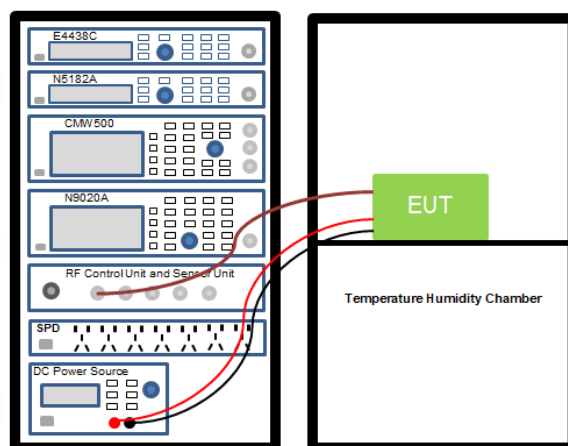
Test software:	FCC assist	Version:	1.0.0.2
Power Class:	4		

4.5 Test Setup Block

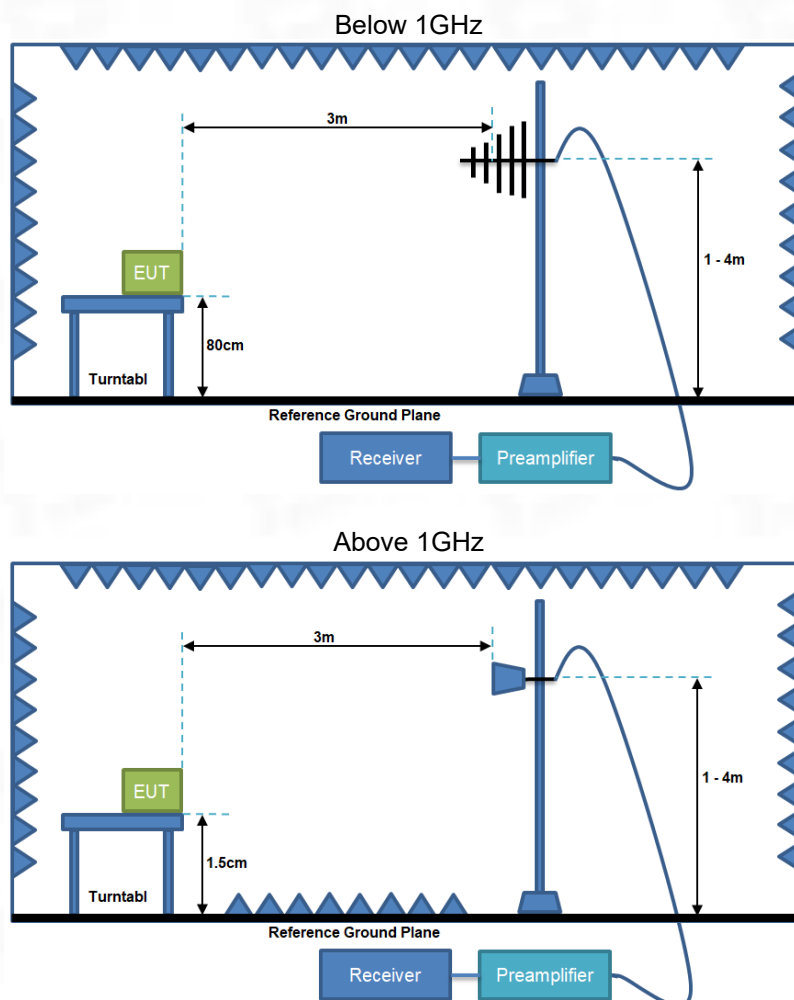
1) Conducted emission measurement:



2) Conducted test method:



3) Radiated test method:

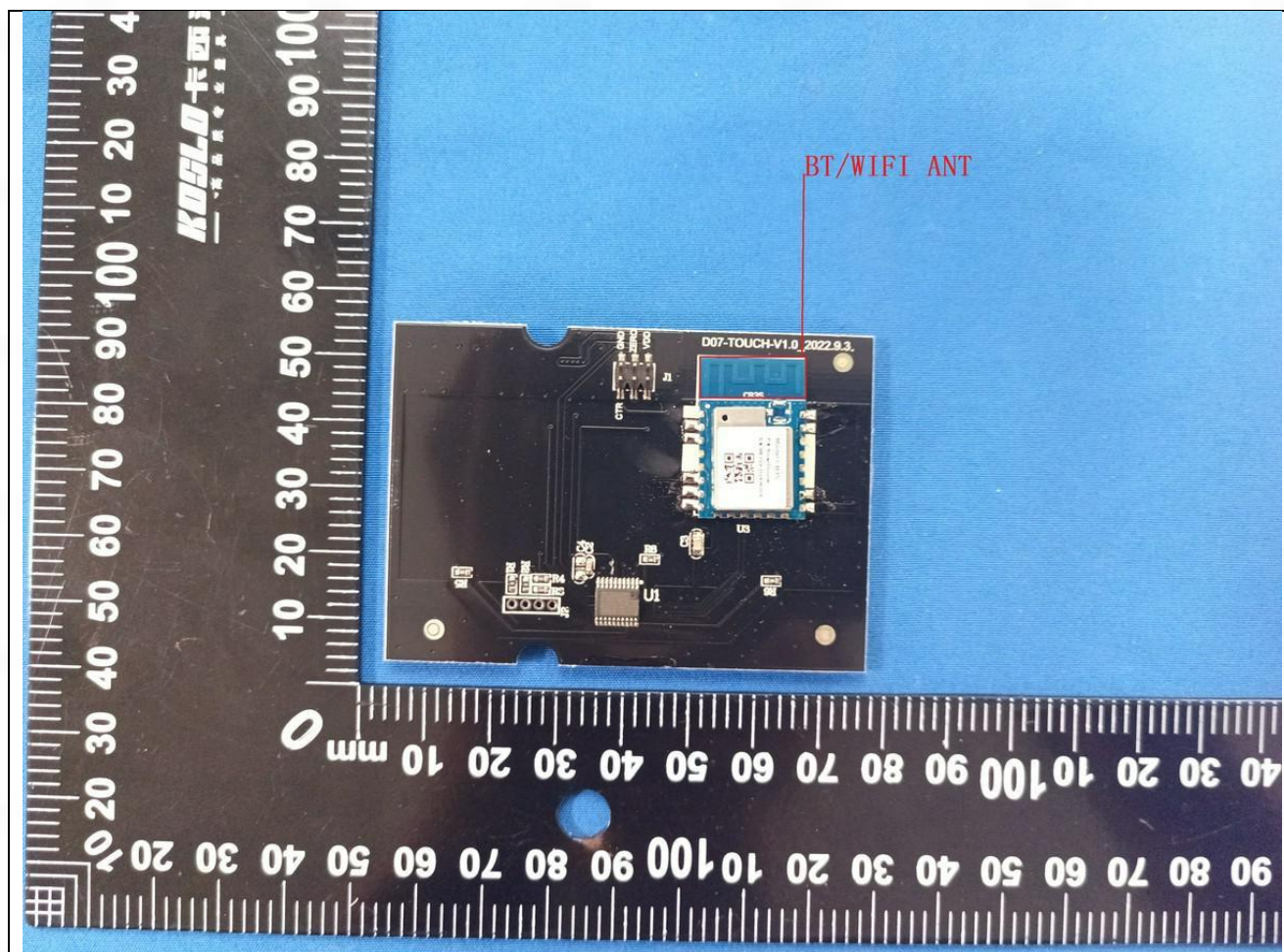


5 Evaluation Results (Evaluation)

5.1 Antenna requirement

Test Requirement:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
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5.1.1 Conclusion:



6 Radio Spectrum Matter Test Results (RF)

6.1 Conducted Emission at AC power line

Test Requirement:	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 Method:	Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		
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.			

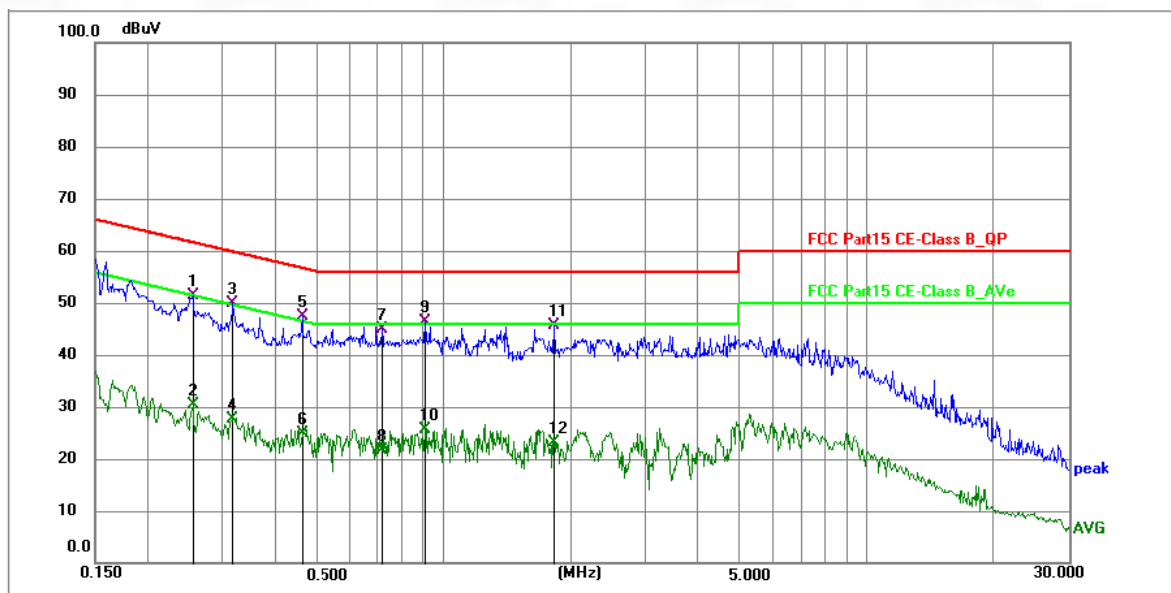
6.1.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25 °C
Humidity:	49.5 %
Atmospheric Pressure:	1010 hpa

6.1.2

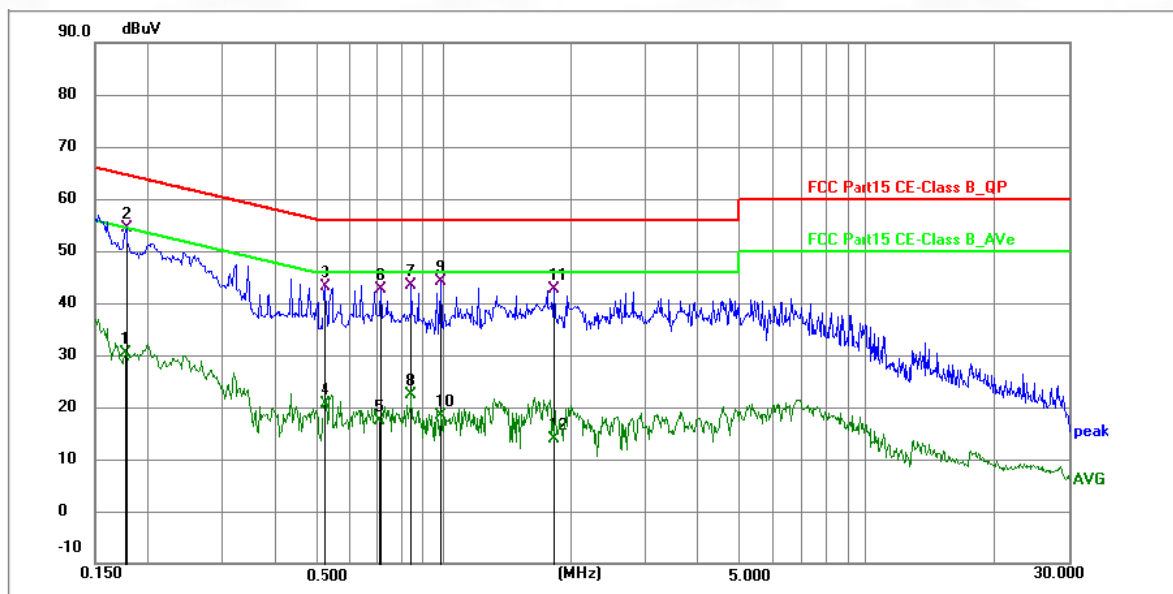
6.1.3 Test Data:

TM1 / Line: Line / Band: 2.4G



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2535	40.85	10.63	51.48	61.64	-10.16	QP	P	
2	0.2535	19.63	10.63	30.26	51.64	-21.38	AVG	P	
3	0.3165	39.21	10.62	49.83	59.80	-9.97	QP	P	
4	0.3165	17.06	10.62	27.68	49.80	-22.12	AVG	P	
5 *	0.4605	36.76	10.61	47.37	56.68	-9.31	QP	P	
6	0.4636	14.24	10.61	24.85	46.63	-21.78	AVG	P	
7	0.7170	34.24	10.73	44.97	56.00	-11.03	QP	P	
8	0.7170	10.93	10.73	21.66	46.00	-24.34	AVG	P	
9	0.9060	35.65	10.76	46.41	56.00	-9.59	QP	P	
10	0.9060	14.80	10.76	25.56	46.00	-20.44	AVG	P	
11	1.8240	34.80	10.71	45.51	56.00	-10.49	QP	P	
12	1.8240	12.51	10.71	23.22	46.00	-22.78	AVG	P	

TM1 / Line: Neutral / Band: 2.4G



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1766	19.78	10.57	30.35	54.64	-24.29	AVG	P	
2 *	0.1770	43.73	10.57	54.30	64.63	-10.33	QP	P	
3	0.5231	32.62	10.62	43.24	56.00	-12.76	QP	P	
4	0.5231	10.06	10.62	20.68	46.00	-25.32	AVG	P	
5	0.7080	6.60	10.73	17.33	46.00	-28.67	AVG	P	
6	0.7125	32.02	10.73	42.75	56.00	-13.25	QP	P	
7	0.8430	32.71	10.75	43.46	56.00	-12.54	QP	P	
8	0.8430	11.60	10.75	22.35	46.00	-23.65	AVG	P	
9	0.9870	33.32	10.78	44.10	56.00	-11.90	QP	P	
10	0.9870	7.56	10.78	18.34	46.00	-27.66	AVG	P	
11	1.8190	32.00	10.71	42.71	56.00	-13.29	QP	P	
12	1.8190	3.20	10.71	13.91	46.00	-32.09	AVG	P	

Note:Margin=Level-Limit=Reading+factor-Limit

6.2 Occupied Bandwidth

Test Requirement:	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:	DTS bandwidth
Test Limit:	Section (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.
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW \geq [3 \times 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.

6.2.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.7 °C
Humidity:	53.4 %
Atmospheric Pressure:	1010 hpa

6.2.2 Test Data:

Please Refer to Appendix for Details.

6.3 Maximum Conducted Output Power

Test Requirement:	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:	Maximum peak conducted output power
Test Limit:	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.
Procedure:	ANSI C63.10-2020, section 11.9.1 Maximum peak conducted output power

6.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.7 °C
Humidity:	53.4 %
Atmospheric Pressure:	1010 hpa

6.3.2 Test Data:

Please Refer to Appendix for Details.

6.4 Power Spectral Density

Test Requirement:	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:	Maximum power spectral density level in the fundamental emission
Test Limit:	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.

6.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.7 °C
Humidity:	53.4 %
Atmospheric Pressure:	1010 hpa

6.4.2 Test Data:

Please Refer to Appendix for Details.

6.5 Emissions in non-restricted frequency bands

Test Requirement:	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:	Emissions in nonrestricted frequency bands
Test Limit:	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.
Procedure:	ANSI C63.10-2020 Section 11.11.1, Section 11.11.2, Section 11.11.3

6.5.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.7 °C
Humidity:	53.4 %
Atmospheric Pressure:	1010 hpa

6.5.2 Test Data:

Please Refer to Appendix for Details.

6.6 Band edge emissions (Radiated)

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 Method:	Radiated emissions tests		
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.			
Procedure:	ANSI C63.10-2020 section 6.10.5.2		

6.6.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.6 °C
Humidity:	54.8 %
Atmospheric Pressure:	1010 hpa

6.6.2 Test Data:

Remark: During the test, pre-scan 1M, 2M mode, found 2M was worse case mode. The report only reflects the test data of worst mode.

Test Mode: 2M							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.00	91.38	-43.68	47.70	74.00	-26.30	peak	Pass
2310.00	78.62	-43.68	34.94	54.00	-19.06	AV	Pass
2390.00	92.81	-43.64	49.17	74.00	-24.83	peak	Pass
2390.00	76.39	-43.64	32.75	54.00	-21.25	AV	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.00	91.70	-43.68	48.02	74.00	-25.98	peak	Pass
2310.00	75.69	-43.68	32.01	54.00	-21.99	AV	Pass
2390.00	94.13	-43.64	50.49	74.00	-23.51	peak	Pass
2390.00	88.95	-43.64	45.31	54.00	-8.69	AV	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.50	92.51	-43.58	48.93	74.00	-25.07	peak	Pass
2483.50	78.62	-43.58	35.04	54.00	-18.96	AV	Pass
2500.00	90.94	-43.54	47.40	74.00	-26.60	peak	Pass
2500.00	74.62	-43.54	31.08	54.00	-22.92	AV	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.50	92.33	-43.58	48.75	74.00	-25.25	peak	Pass
2483.50	85.69	-43.58	42.11	54.00	-11.89	AV	Pass
2500.00	90.55	-43.54	47.01	74.00	-26.99	peak	Pass
2500.00	82.69	-43.54	39.15	54.00	-14.85	AV	Pass

Note:Margin=Level-Limit=Reading+factor-Limit

6.7 Emissions in restricted frequency bands (below 1GHz)

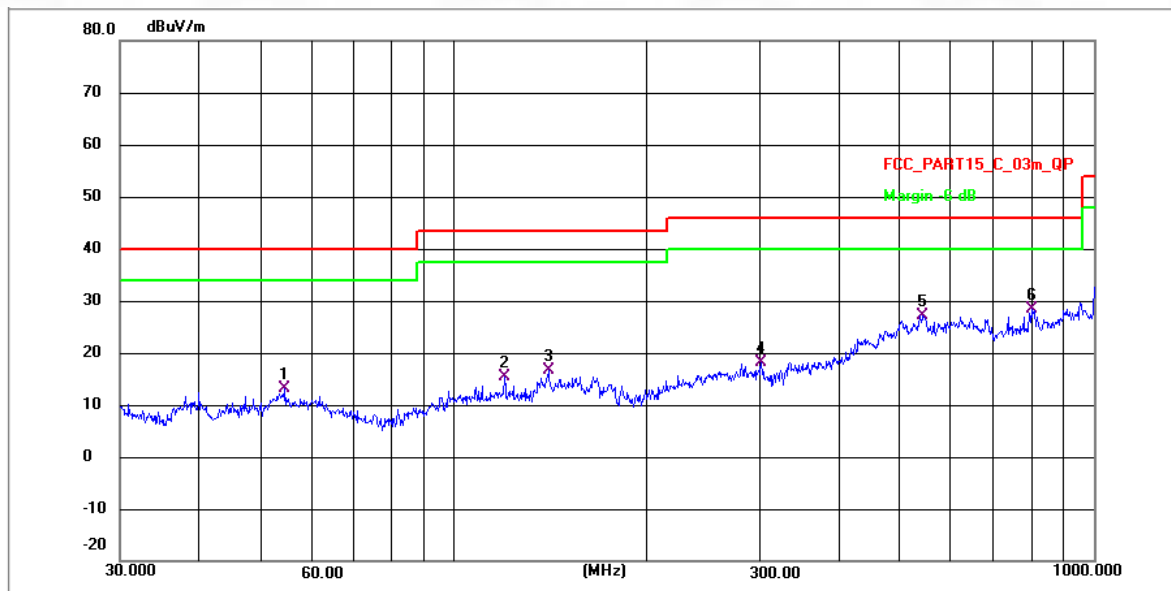
Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Method:	Radiated emissions tests		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	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.			
Procedure:	ANSI C63.10-2020 section 6.6.4		

6.7.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.6 °C
Humidity:	54.8 %
Atmospheric Pressure:	1010 hpa

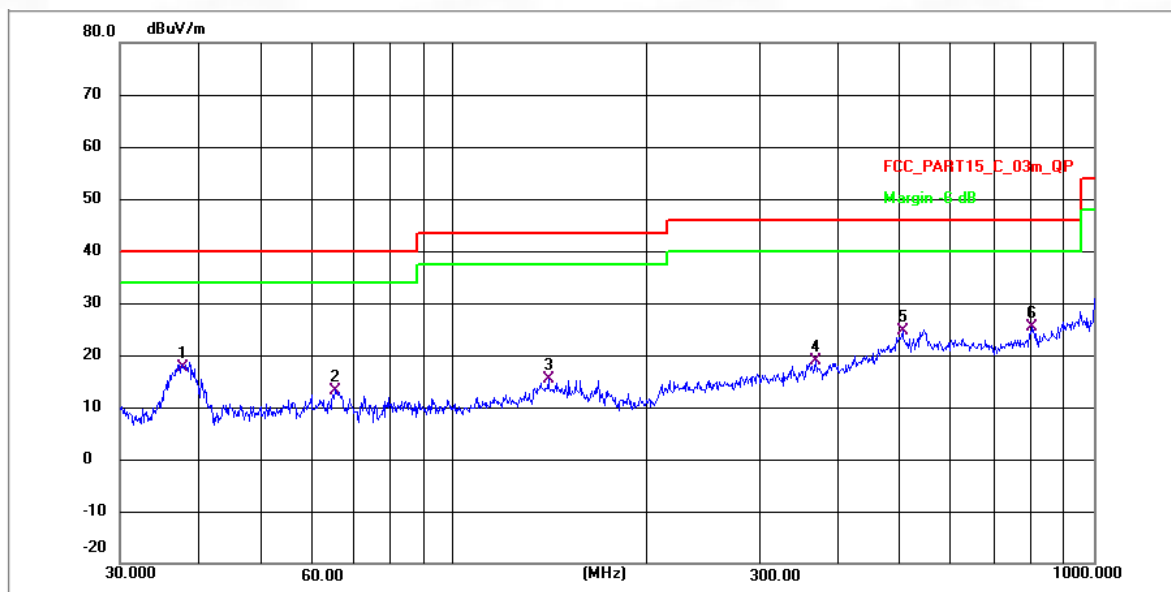
6.7.2 Test Data:

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	54.4515	31.29	-18.24	13.05	40.00	-26.95	QP	P
2	120.0660	43.54	-28.05	15.49	43.50	-28.01	QP	P
3	140.5883	44.39	-27.87	16.52	43.50	-26.98	QP	P
4	301.9513	43.45	-25.42	18.03	46.00	-27.97	QP	P
5	540.4240	48.79	-21.56	27.23	46.00	-18.77	QP	P
6 *	798.9796	52.19	-23.72	28.47	46.00	-17.53	QP	P

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: M



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	37.7460	38.26	-20.58	17.68	40.00	-22.32	QP	P
2	64.8864	33.08	-20.07	13.01	40.00	-26.99	QP	P
3	140.8350	43.22	-27.86	15.36	43.50	-28.14	QP	P
4	366.8231	43.82	-24.89	18.93	46.00	-27.07	QP	P
5	503.8220	45.87	-21.18	24.69	46.00	-21.31	QP	P
6 *	800.3817	49.05	-23.72	25.33	46.00	-20.67	QP	P

Note:Margin=Level-Limit=Reading+factor-Limit

6.8 Emissions in restricted 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 Method:	Radiated emissions tests		
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.			
Procedure:	ANSI C63.10-2020 section 6.6.4		

6.8.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.6 °C
Humidity:	54.8 %
Atmospheric Pressure:	1010 hpa

6.8.2 Test Data:

Remark: During the test, pre-scan 1M, 2M mode, found 2M was worse case mode. The report only reflects the test data of worst mode.

Test Mode: 2M							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	91.49	-48.83	42.66	74.00	-31.34	peak	P
4804.000	90.06	-48.83	41.23	54.00	-12.77	AV	P
7206.000	90.06	-46.88	43.18	74.00	-30.82	peak	P
7206.000	90.06	-46.88	43.18	54.00	-10.82	AV	P
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	92.41	-48.83	43.58	74.00	-30.42	peak	P
4804.000	90.88	-48.83	42.05	54.00	-11.95	AV	P
7206.000	90.88	-46.88	44.00	74.00	-30.00	peak	P
7206.000	90.04	-46.88	43.16	54.00	-10.84	AV	P
Test Channel: Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4880.000	92.05	-48.82	43.23	54.00	-10.77	peak	P
4880.000	92.05	-48.82	43.23	74.00	-30.77	AV	P
7320.000	90.62	-46.87	43.75	54.00	-10.25	peak	P
7320.000	90.62	-46.87	43.75	74.00	-30.25	AV	P
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4880.000	92.79	-48.83	43.96	74.00	-30.04	peak	P
9760.000	92.79	-48.83	43.96	54.00	-10.04	AV	P
7320.000	91.26	-46.88	44.38	74.00	-29.62	peak	P
14640.000	91.26	-46.88	44.38	54.00	-9.62	AV	P

Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	93.27	-48.71	44.56	74.00	-29.44	peak	P
4960.000	91.84	-48.71	43.13	54.00	-10.87	AV	P
7440.000	91.84	-46.76	45.08	74.00	-28.92	peak	P
7440.000	91.84	-46.76	45.08	54.00	-8.92	AV	P
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	93.97	-48.71	45.26	74.00	-28.74	peak	P
4960.000	92.44	-48.71	43.73	54.00	-10.27	AV	P
7440.000	92.44	-46.76	45.68	74.00	-28.32	peak	P
7440.000	92.19	-46.76	45.43	54.00	-8.57	AV	P

Note:Margin=Level-Limit=Reading+factor-Limit

Appendix

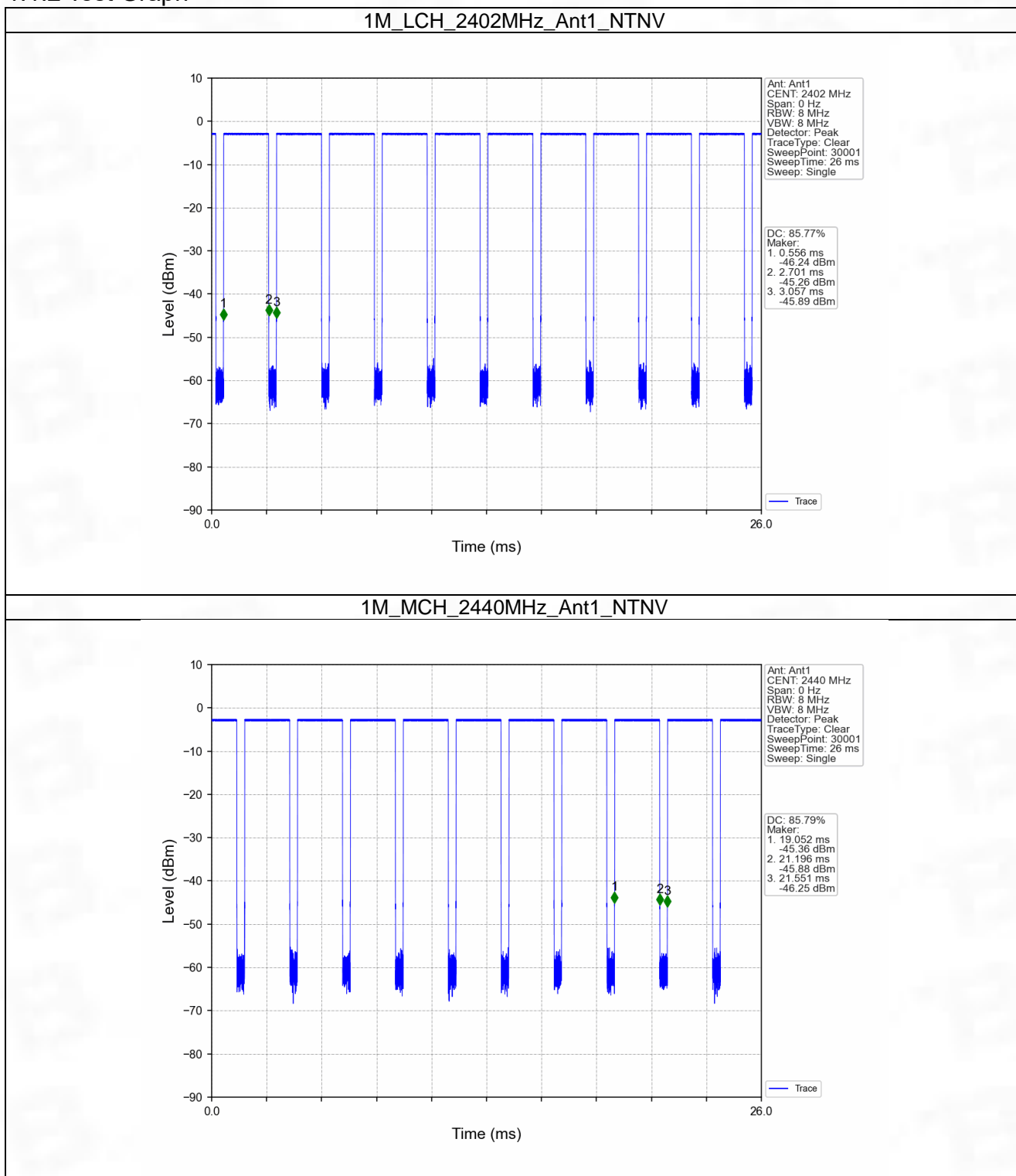
1. Duty Cycle

1.1 Ant1

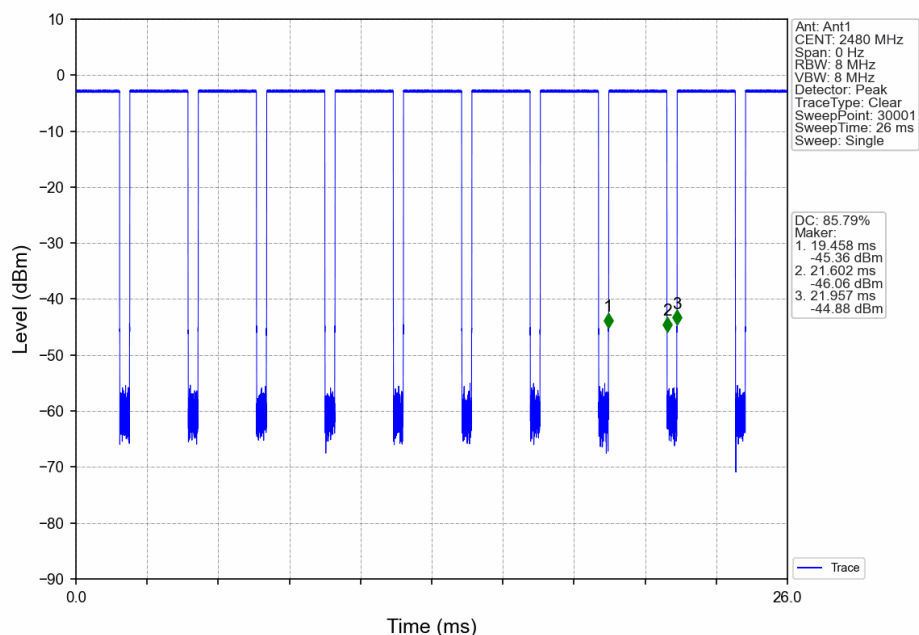
1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	2.145	2.501	85.77	0.67	0.03
		2440	2.144	2.499	85.79	0.67	0.03
		2480	2.144	2.499	85.79	0.67	0.03
2M	SISO	2402	1.091	1.875	58.19	2.35	0.03
		2440	1.090	1.875	58.13	2.36	0.03
		2480	1.090	1.875	58.13	2.36	0.03

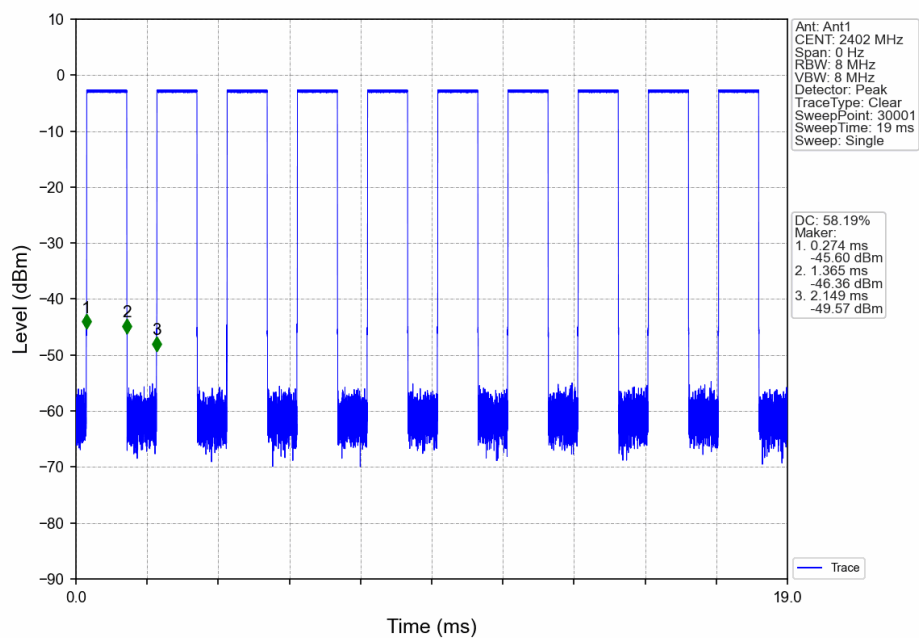
1.1.2 Test Graph



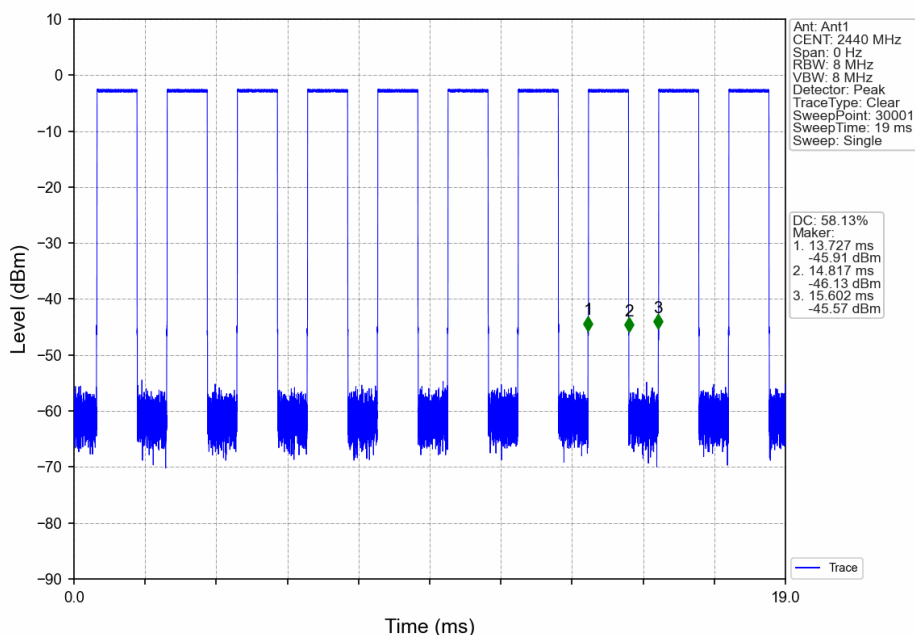
1M_HCH_2480MHz_Ant1_NTNV



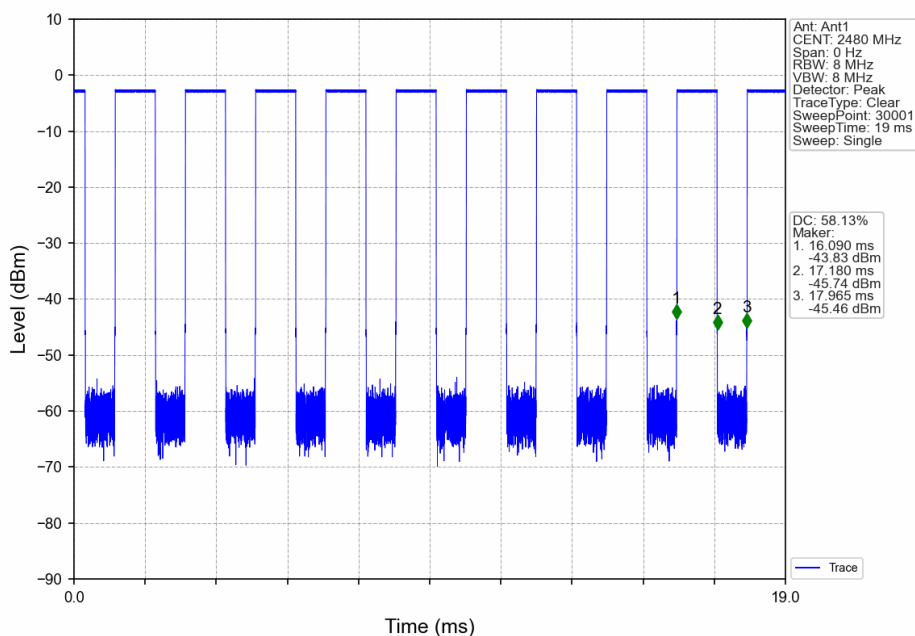
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



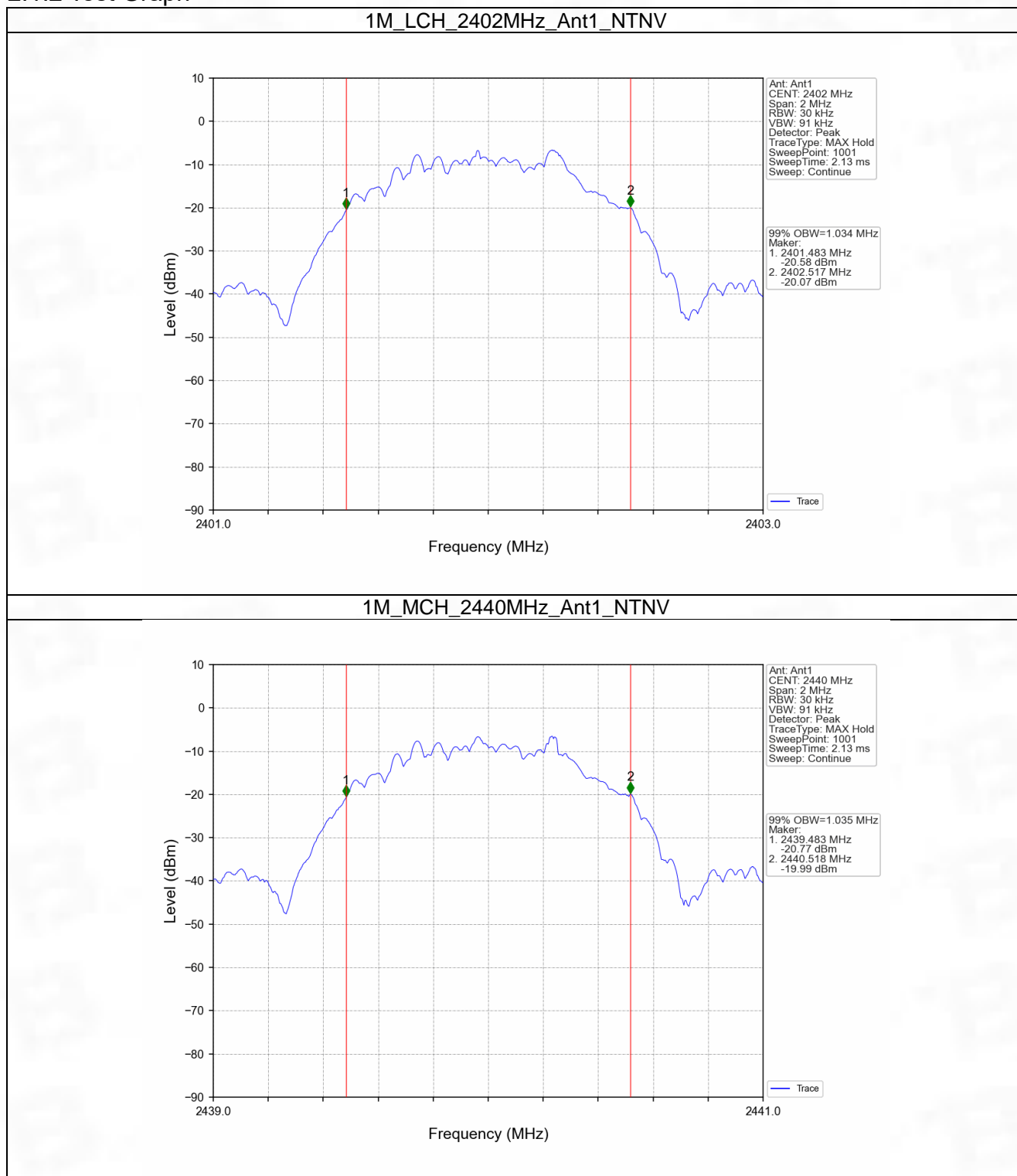
2. Bandwidth

2.1 OBW

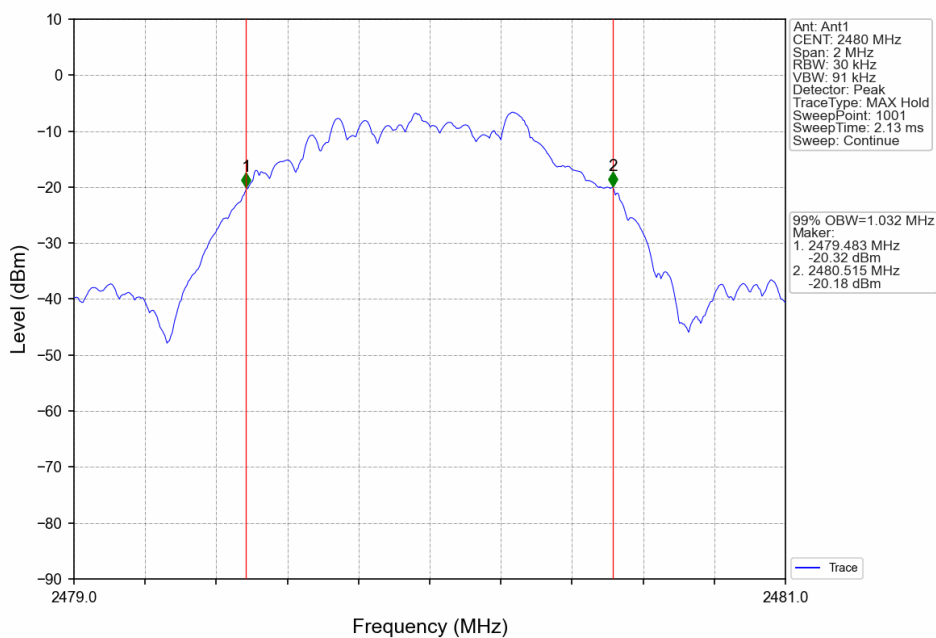
2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)	Verdict
				Result	
1M	SISO	2402	1	1.034	Pass
		2440	1	1.035	Pass
		2480	1	1.032	Pass
2M	SISO	2402	1	2.063	Pass
		2440	1	2.063	Pass
		2480	1	2.062	Pass

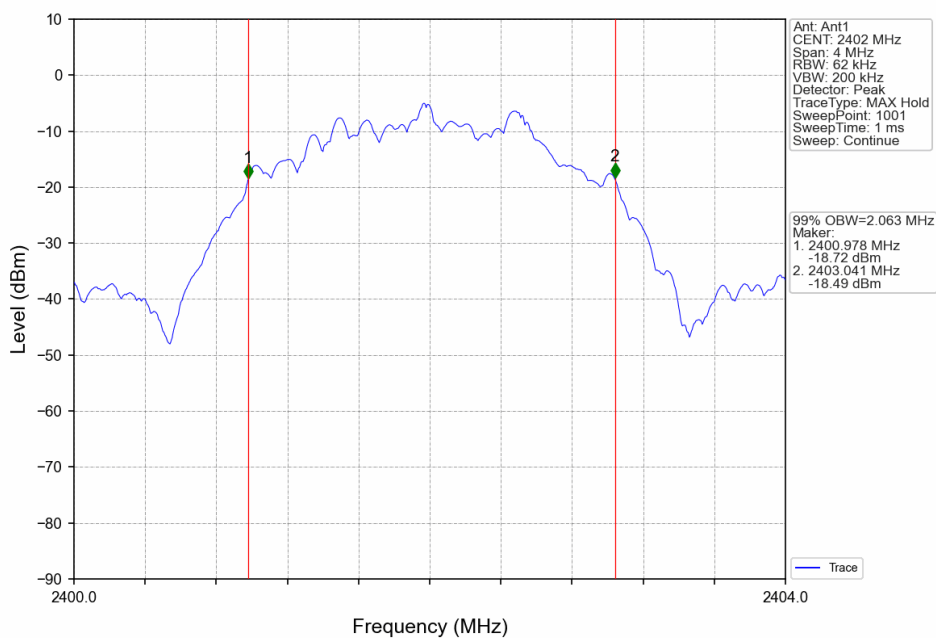
2.1.2 Test Graph



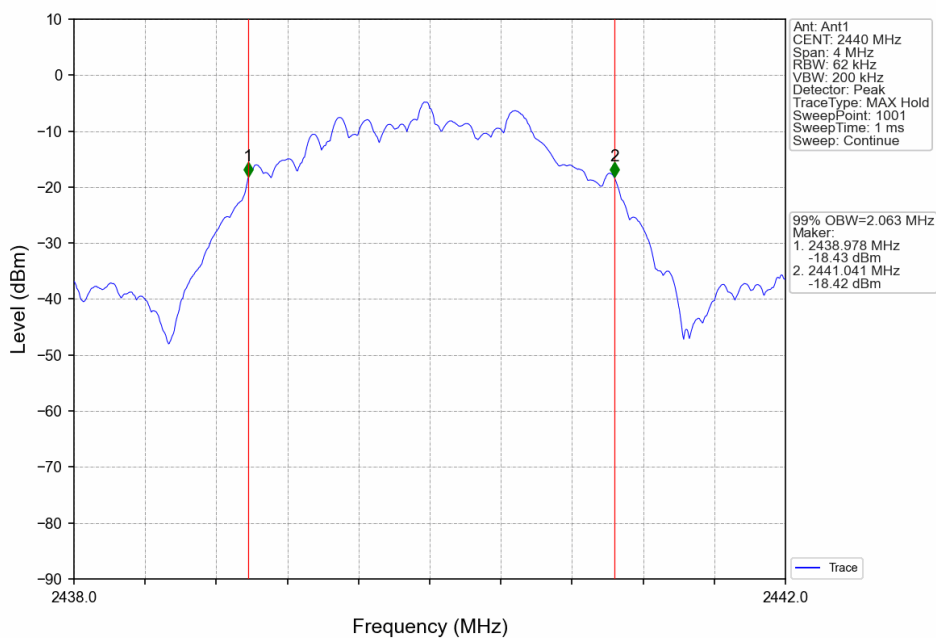
1M_HCH_2480MHz_Ant1_NTNV



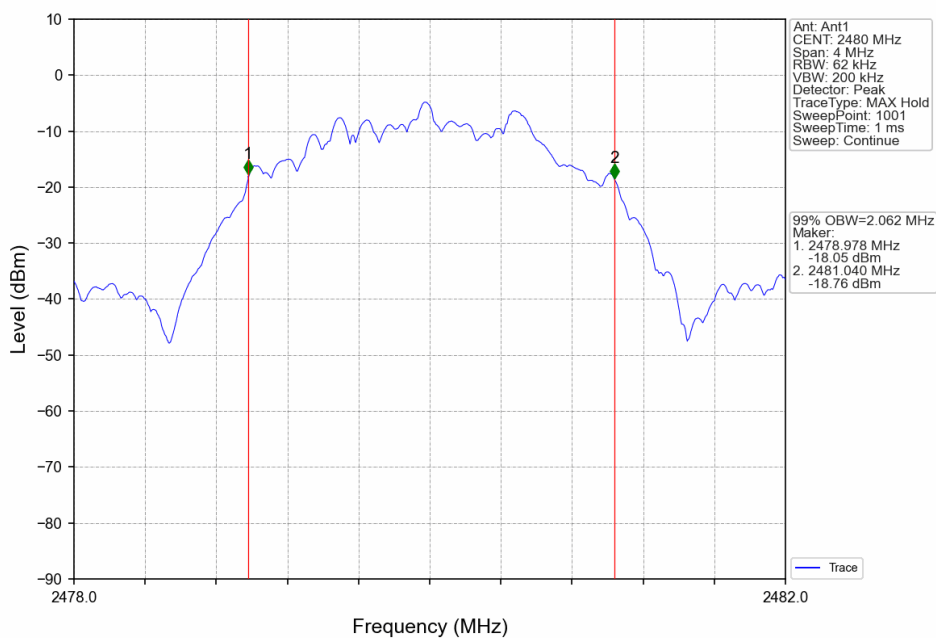
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV

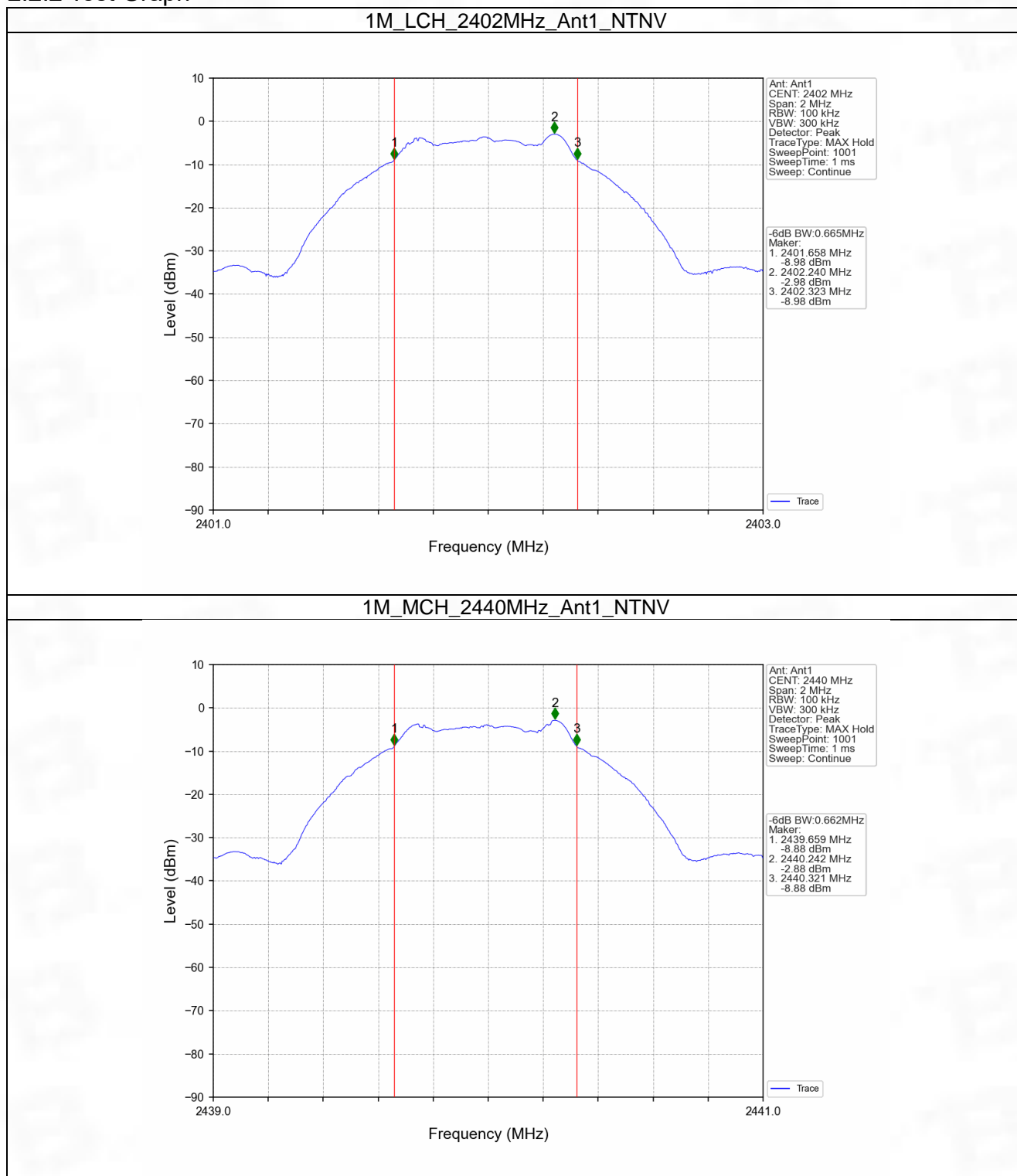


2.2 6dB BW

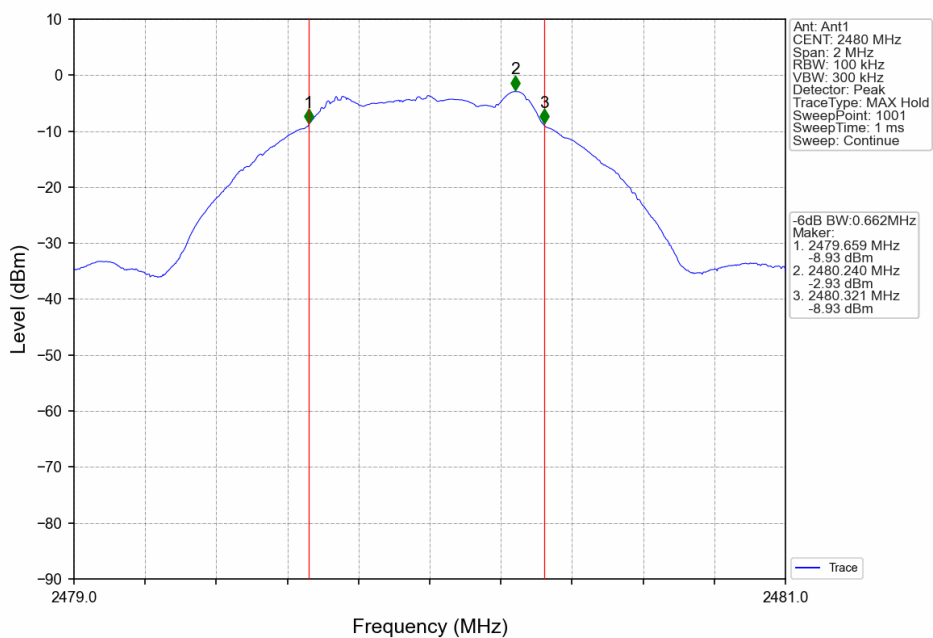
2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.665	≥ 0.5	Pass
		2440	1	0.662	≥ 0.5	Pass
		2480	1	0.662	≥ 0.5	Pass
2M	SISO	2402	1	1.181	≥ 0.5	Pass
		2440	1	1.184	≥ 0.5	Pass
		2480	1	1.177	≥ 0.5	Pass

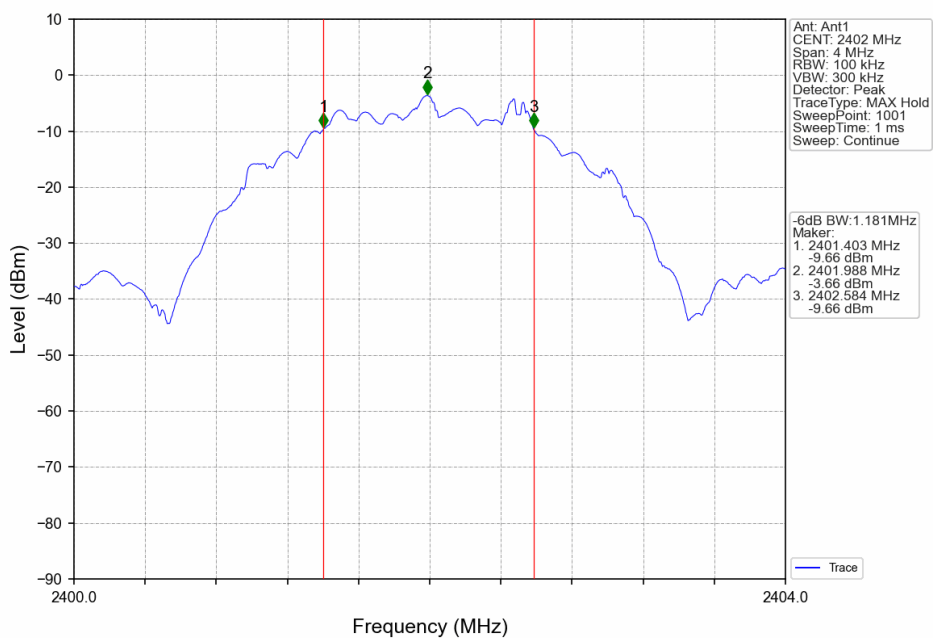
2.2.2 Test Graph



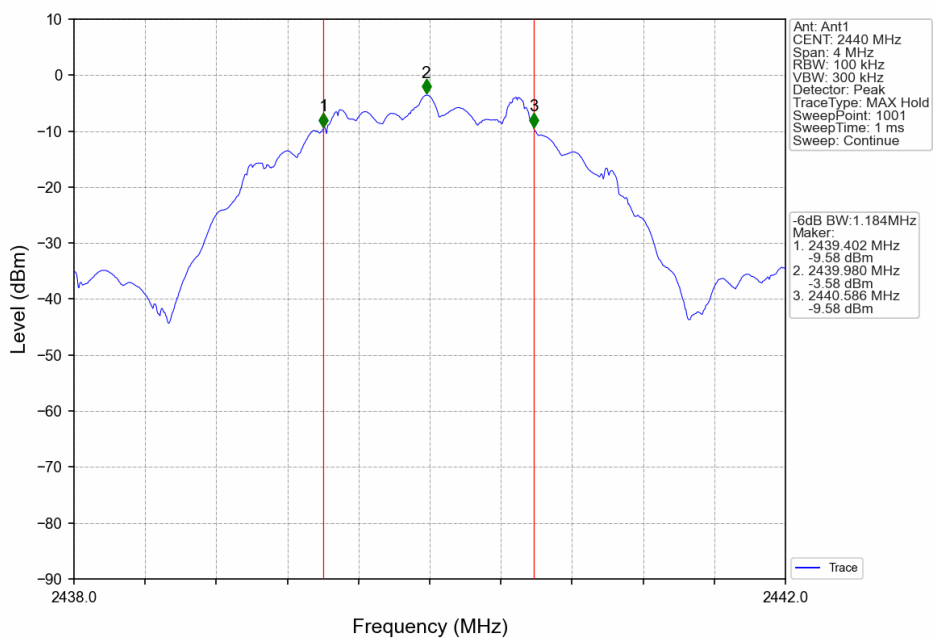
1M_HCH_2480MHz_Ant1_NTNV



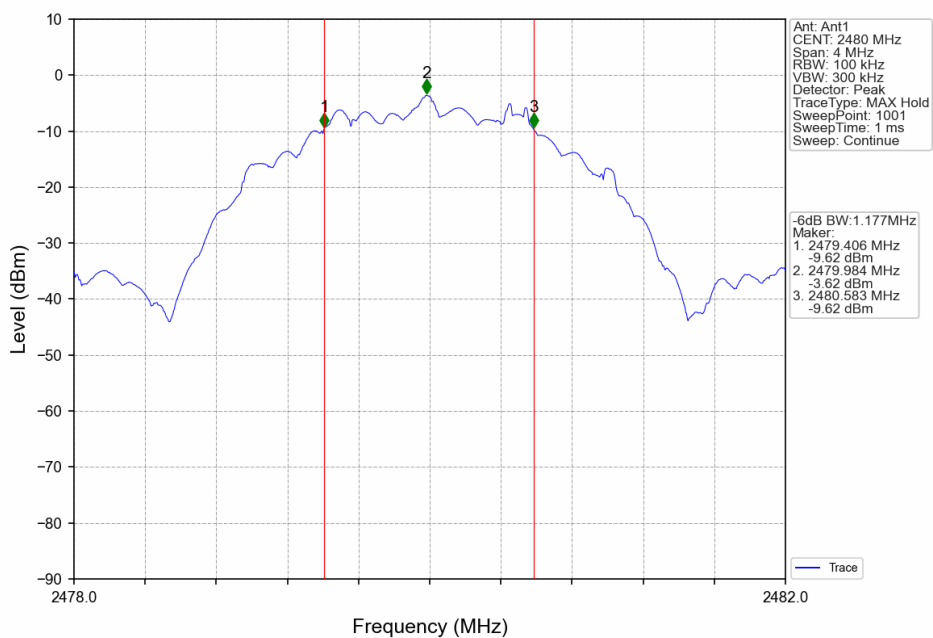
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

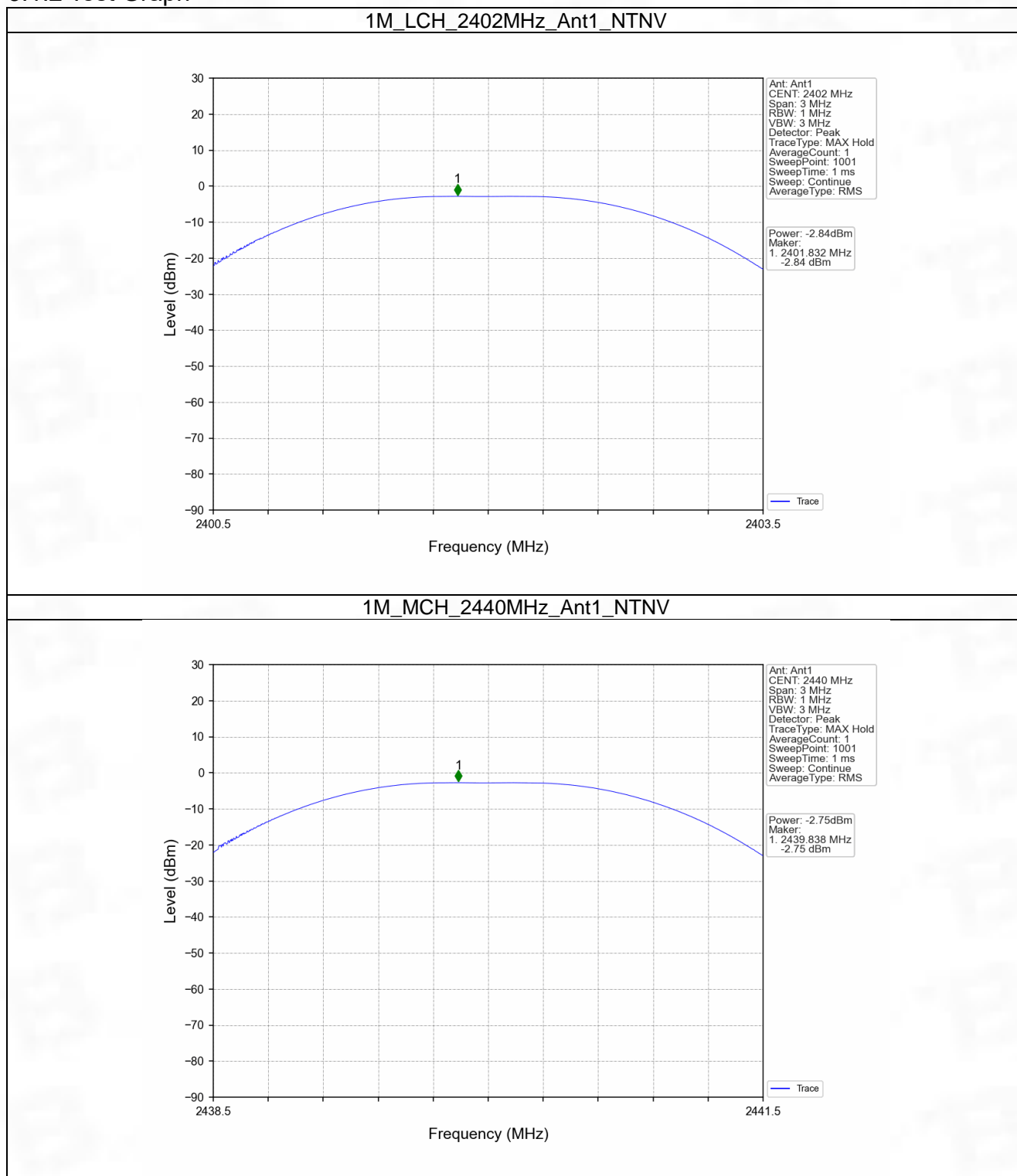
3.1 Power

3.1.1 Test Result

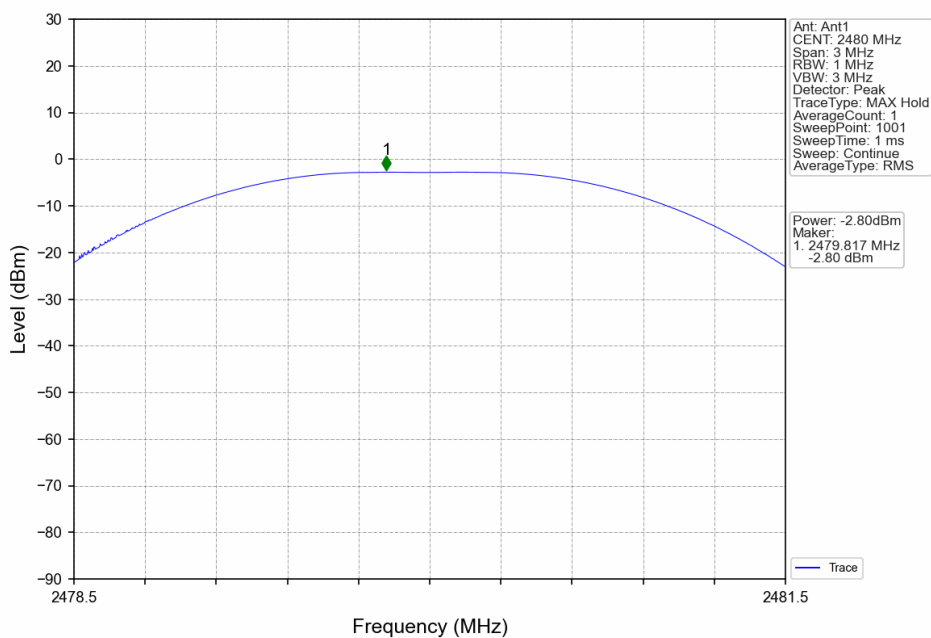
Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	-2.84	<=30	Pass
		2440	-2.75	<=30	Pass
		2480	-2.80	<=30	Pass
2M	SISO	2402	-2.77	<=30	Pass
		2440	-2.68	<=30	Pass
		2480	-2.72	<=30	Pass

Note1: Antenna Gain: Ant1: 1.30dBi;

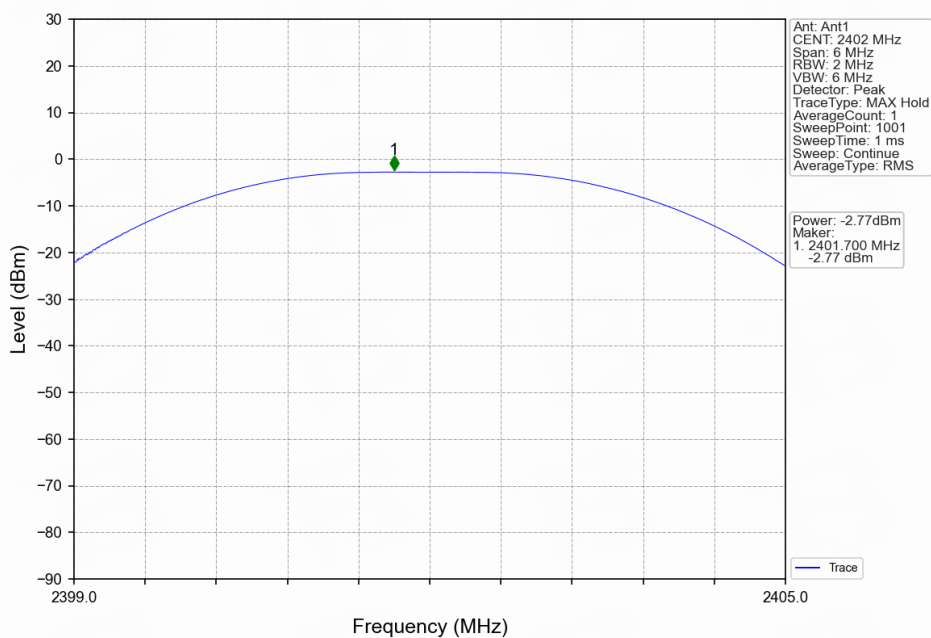
3.1.2 Test Graph



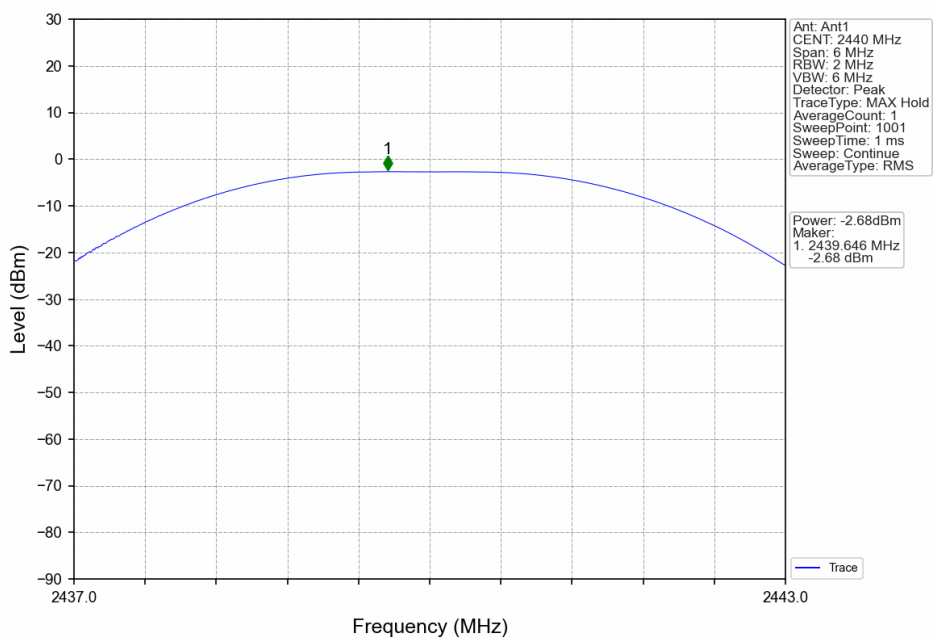
1M_HCH_2480MHz_Ant1_NTNV



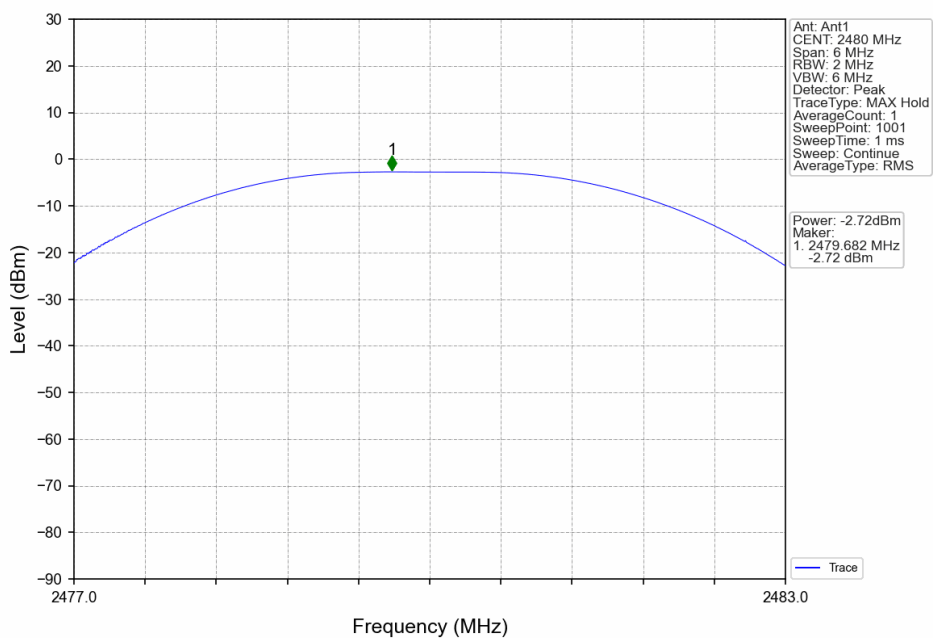
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



4. Maximum Power Spectral Density

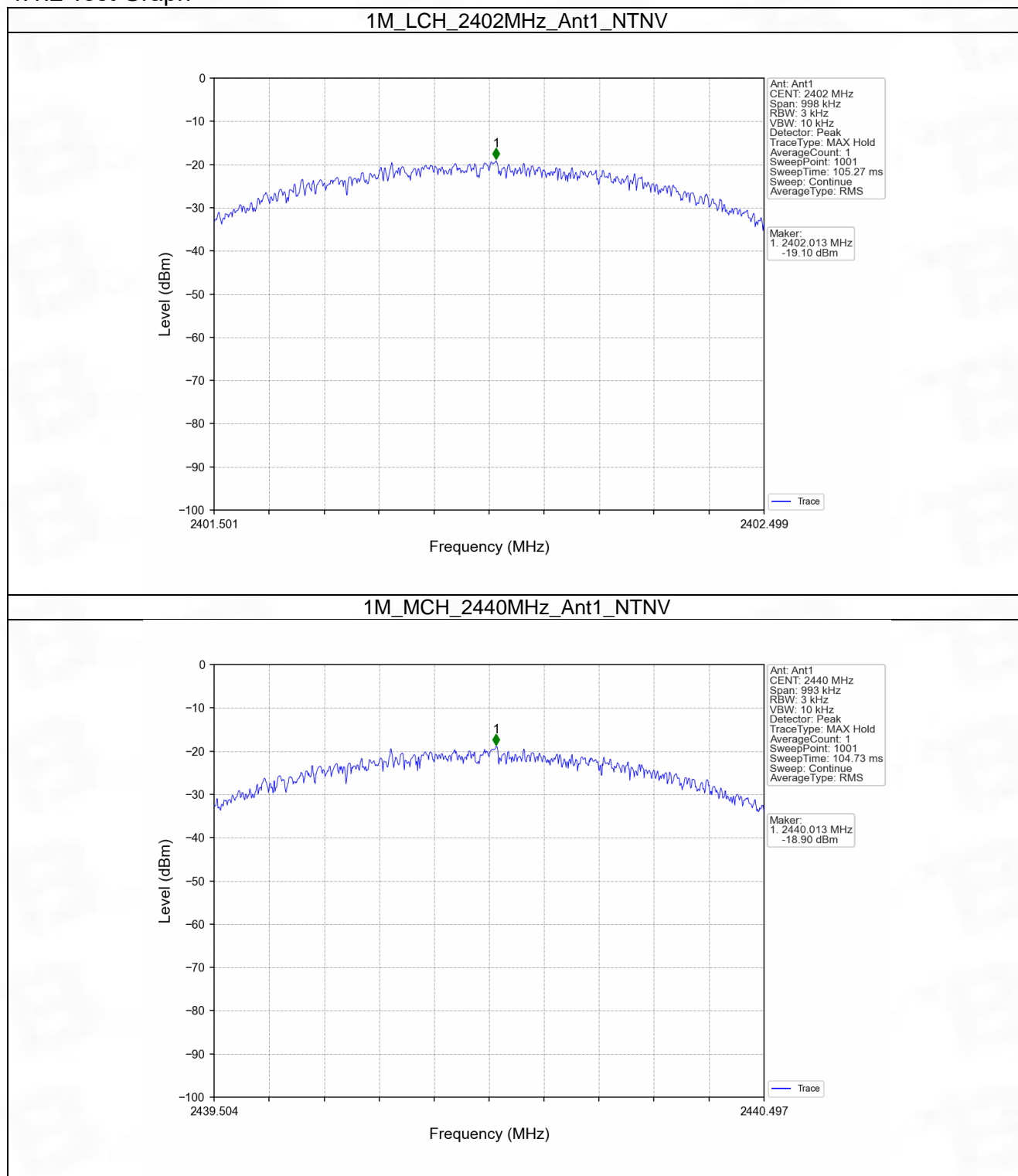
4.1 PSD

4.1.1 Test Result

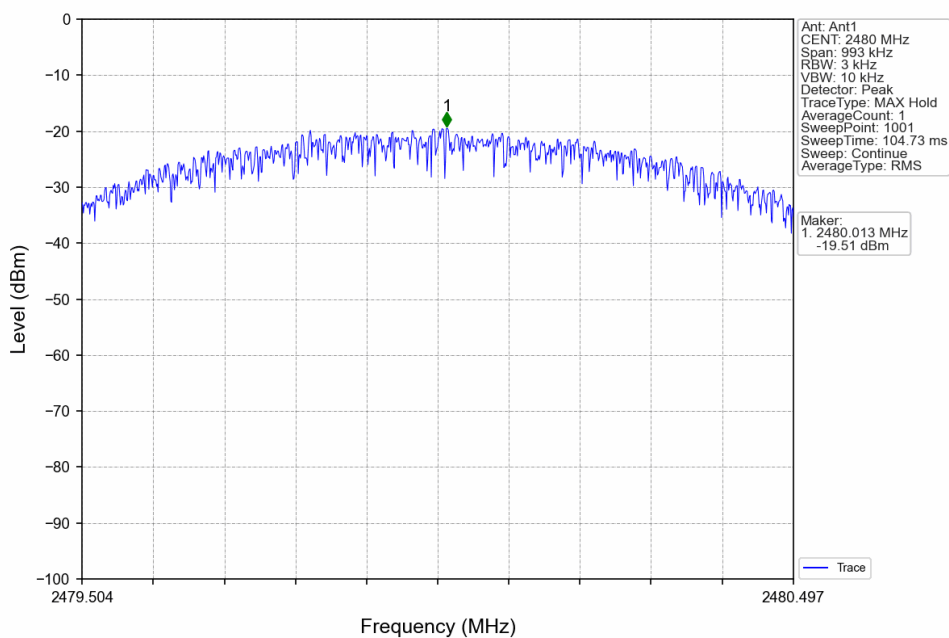
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-19.10	<=8	Pass
		2440	-18.90	<=8	Pass
		2480	-19.51	<=8	Pass
2M	SISO	2402	-21.38	<=8	Pass
		2440	-22.10	<=8	Pass
		2480	-22.17	<=8	Pass

Note1: Antenna Gain: Ant1: 1.30dBi;

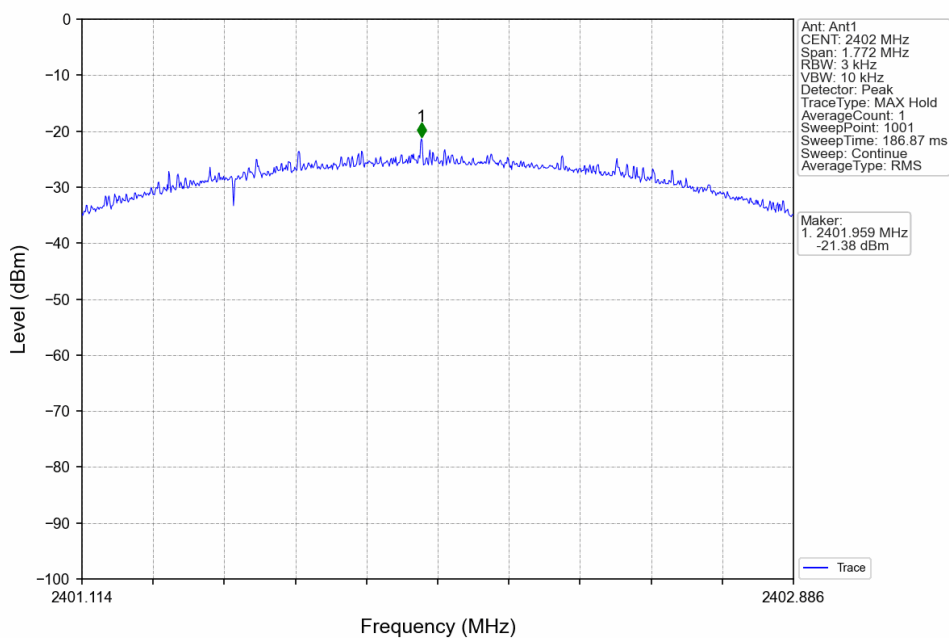
4.1.2 Test Graph



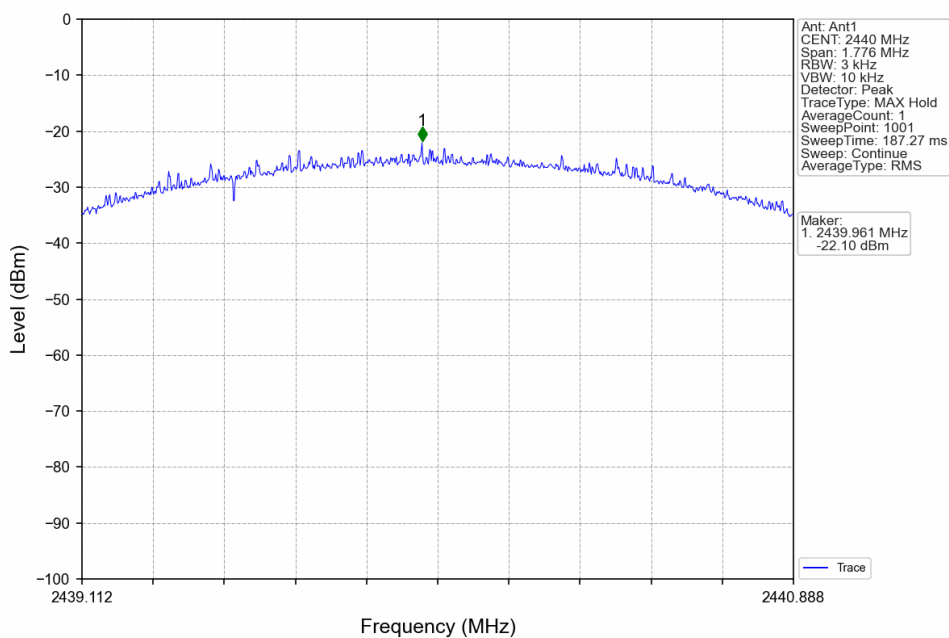
1M_HCH_2480MHz_Ant1_NTNV



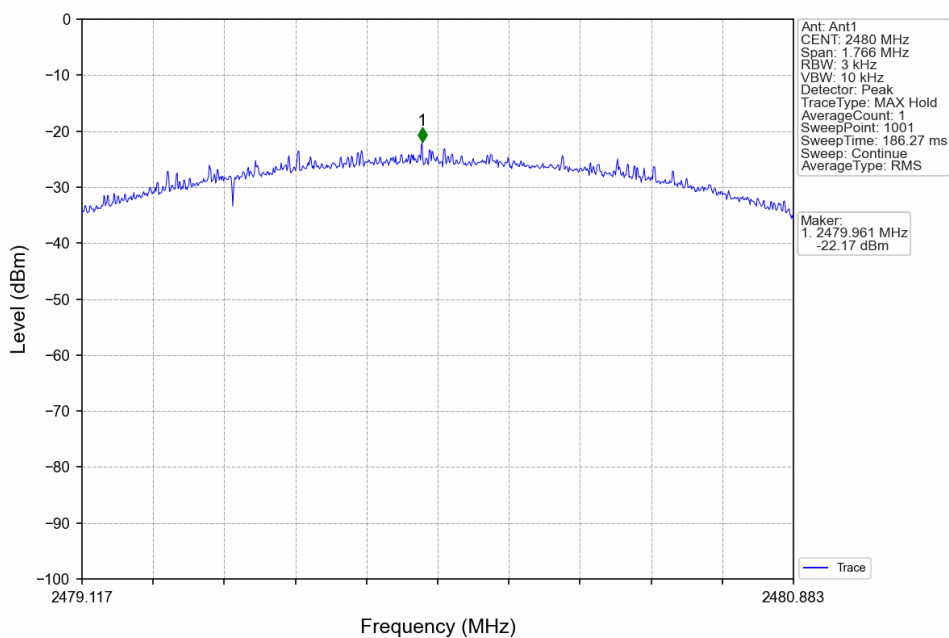
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

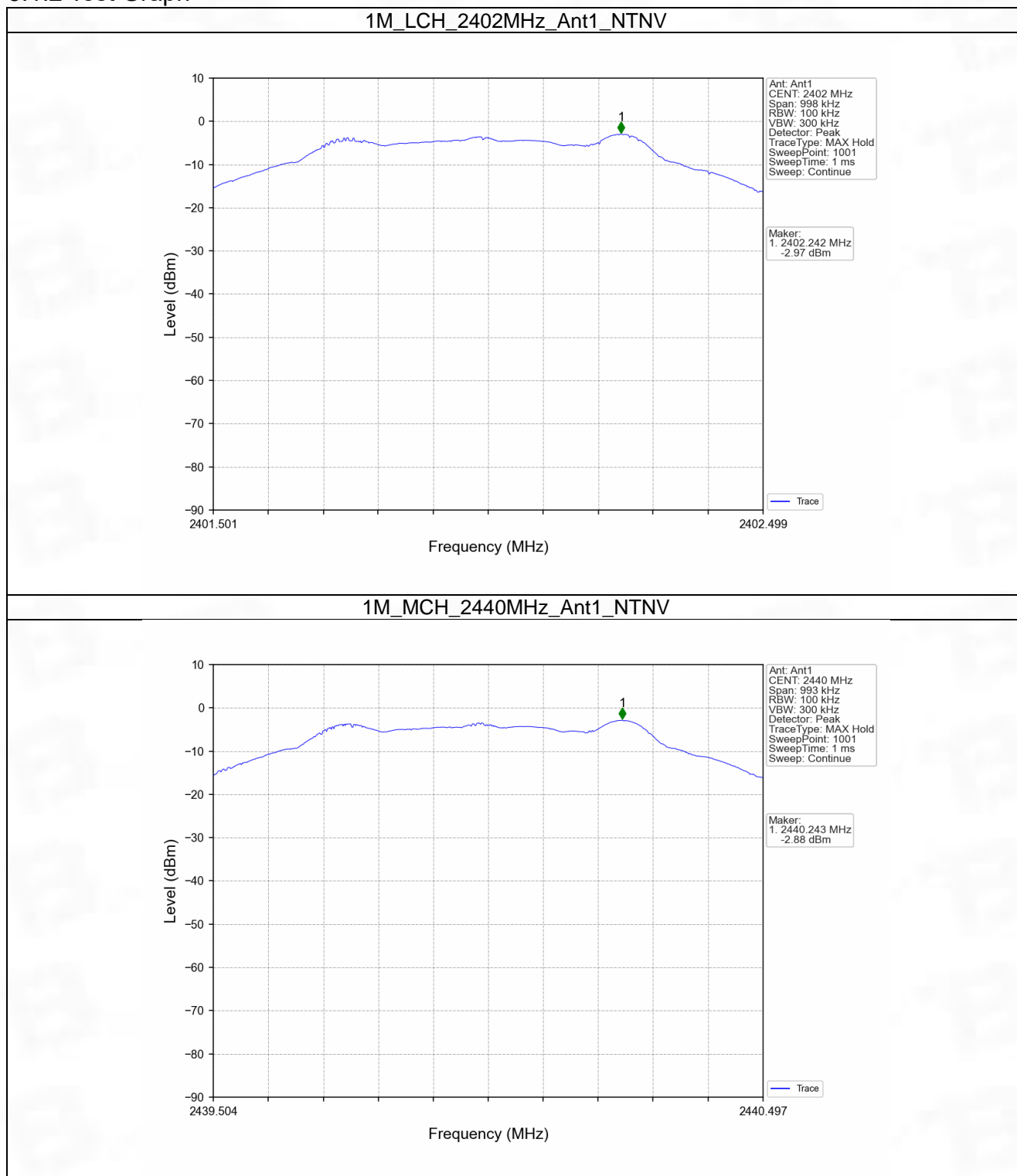
5.1 Ref

5.1.1 Test Result

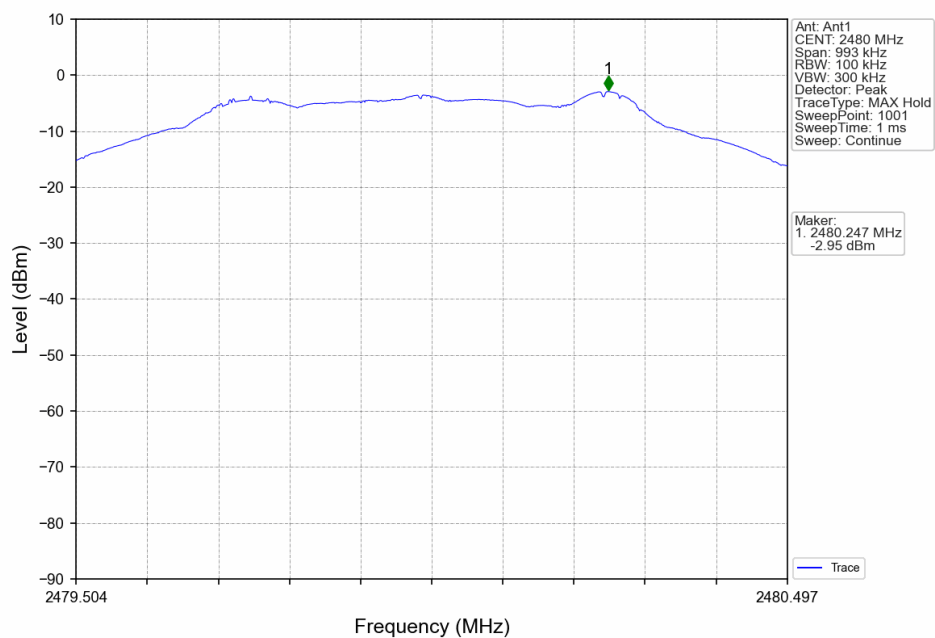
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	-2.97
		2440	1	-2.88
		2480	1	-2.95
2M	SISO	2402	1	-3.69
		2440	1	-3.60
		2480	1	-3.65

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

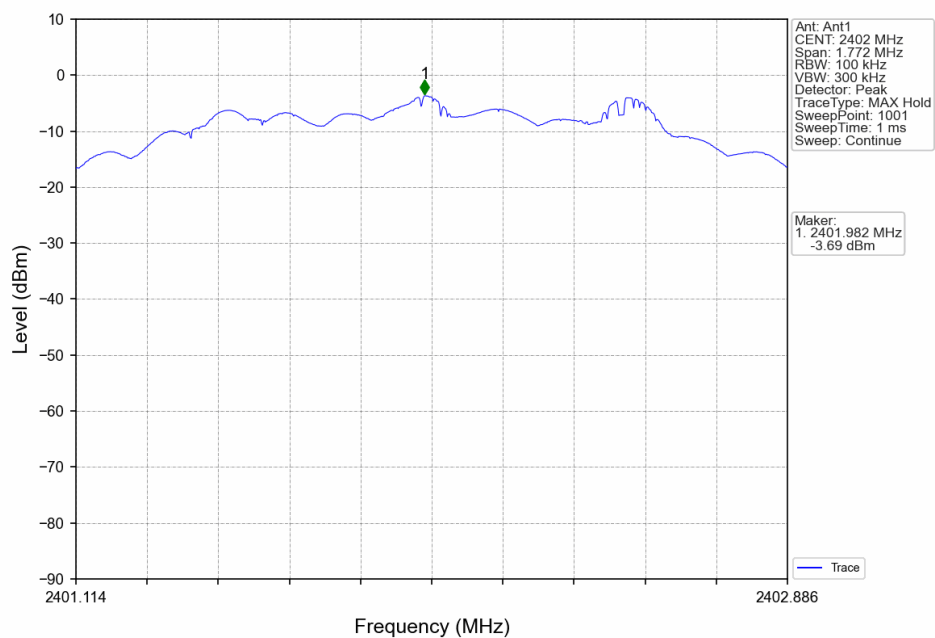
5.1.2 Test Graph



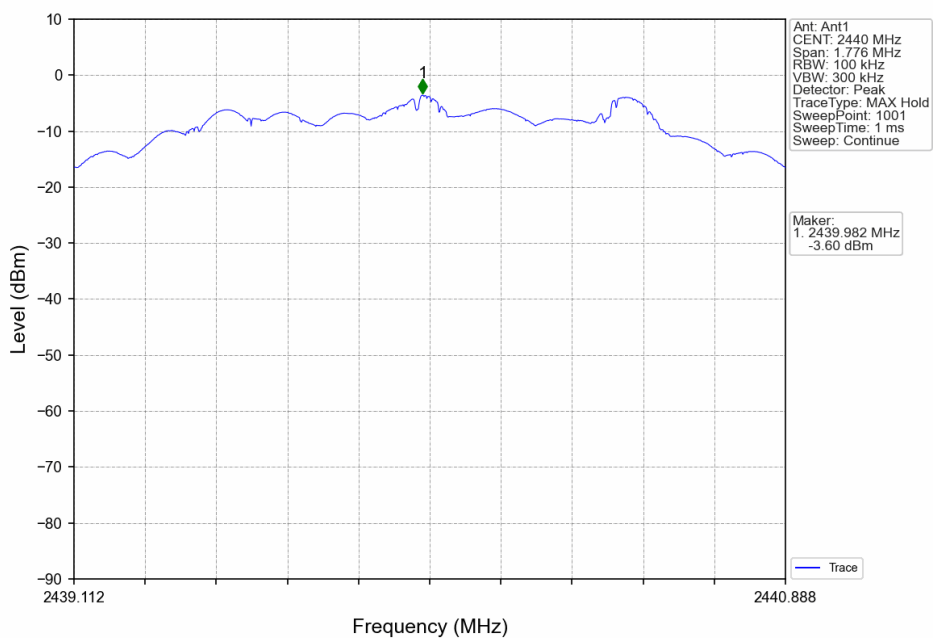
1M_HCH_2480MHz_Ant1_NTNV



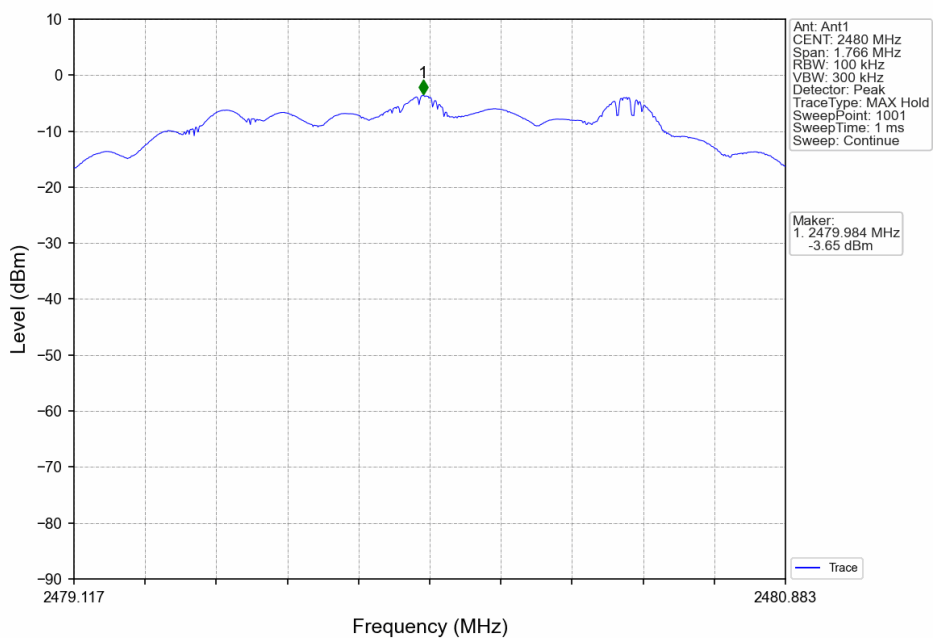
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV

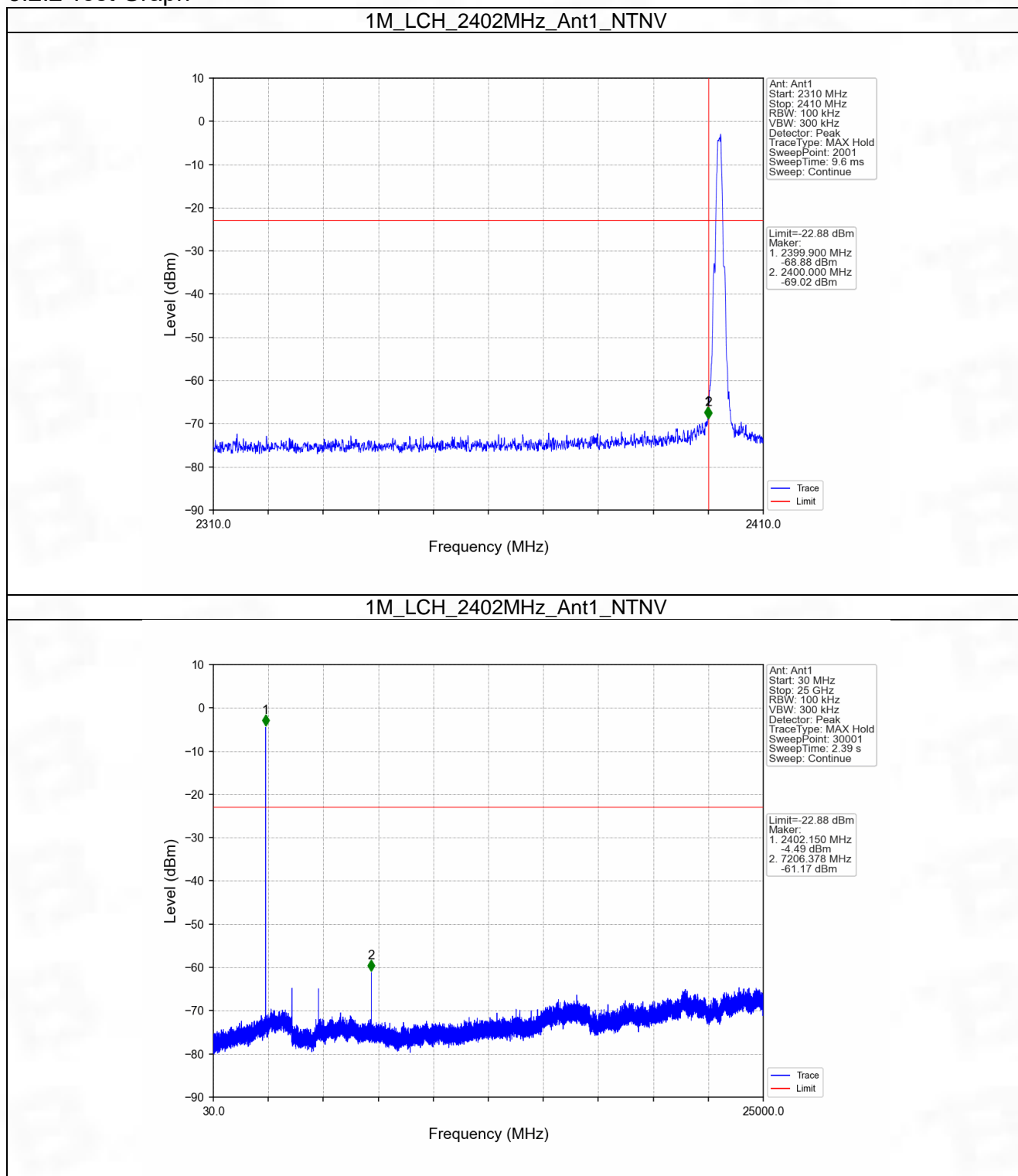


5.2 CSE

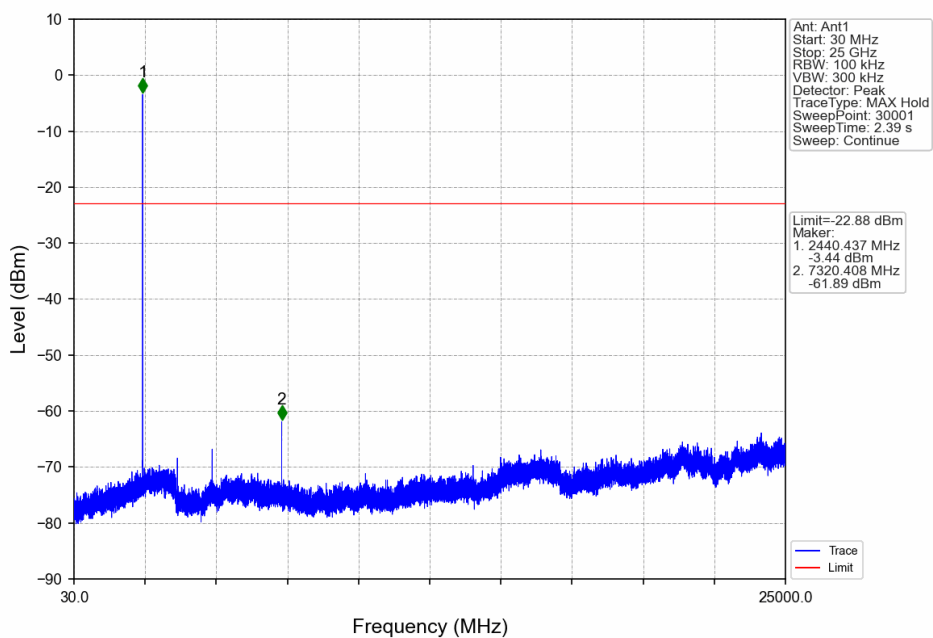
5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Measure(dBm)	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-61.17	-2.88	-22.88	Pass
		2440	1	-61.99	-2.88	-22.88	Pass
		2480	1	-59.55	-2.88	-22.88	Pass
2M	SISO	2402	1	-38.18	-3.60	-23.60	Pass
		2440	1	-60.36	-3.60	-23.60	Pass
		2480	1	-63.45	-3.60	-23.60	Pass
		Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.					

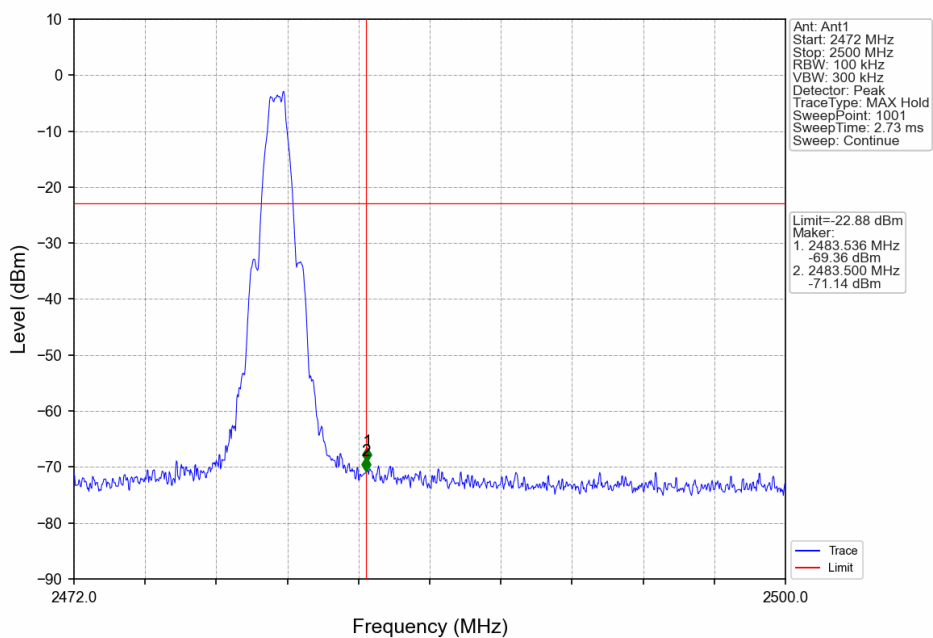
5.2.2 Test Graph



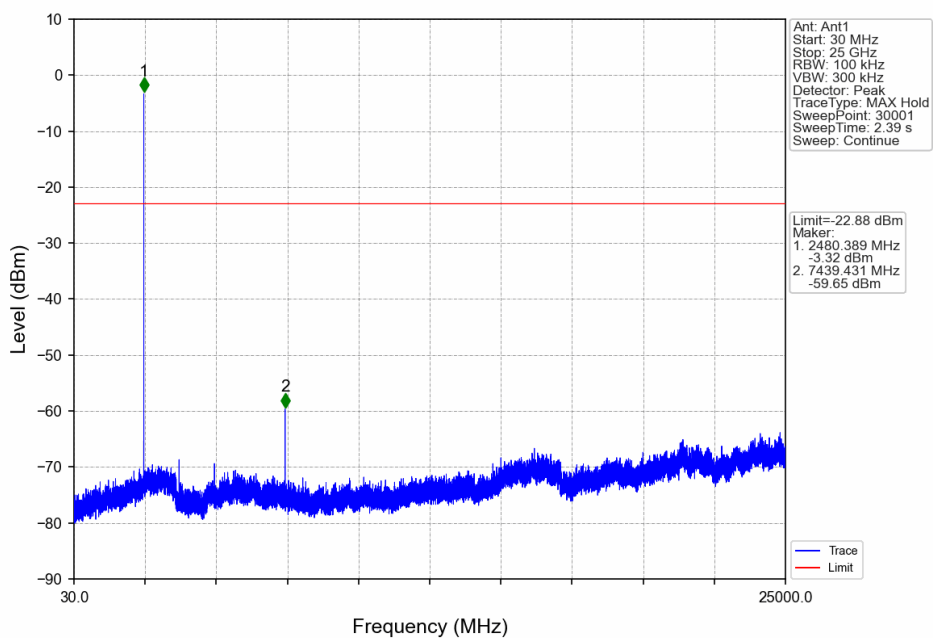
1M_MCH_2440MHz_Ant1_NTNV



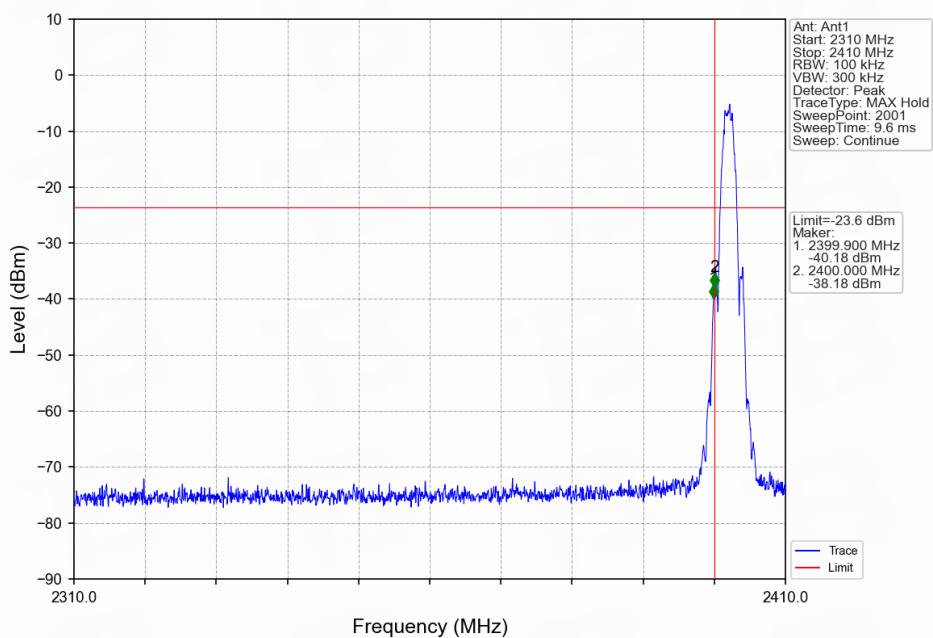
1M_HCH_2480MHz_Ant1_NTNV



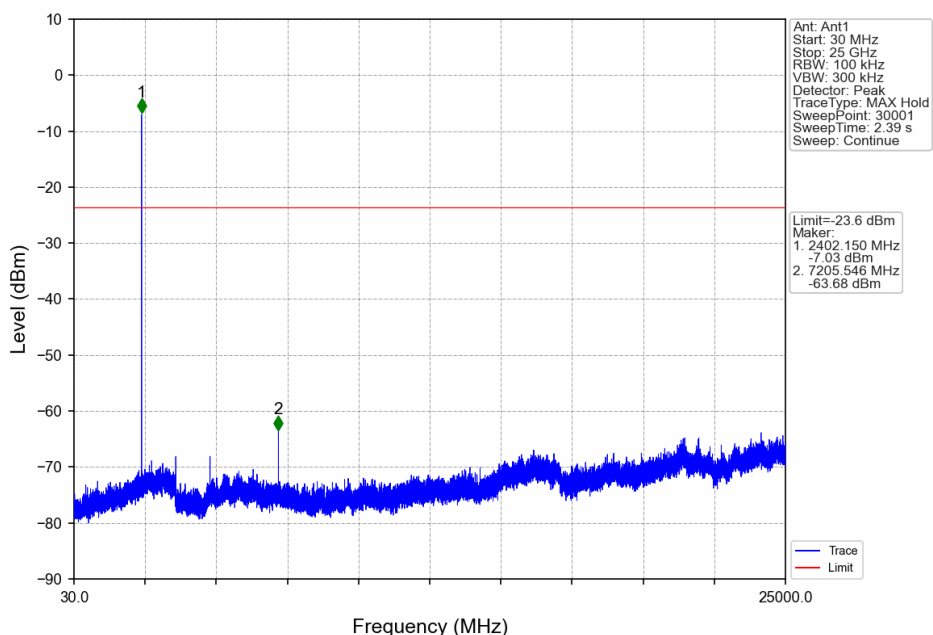
1M_HCH_2480MHz_Ant1_NTNV



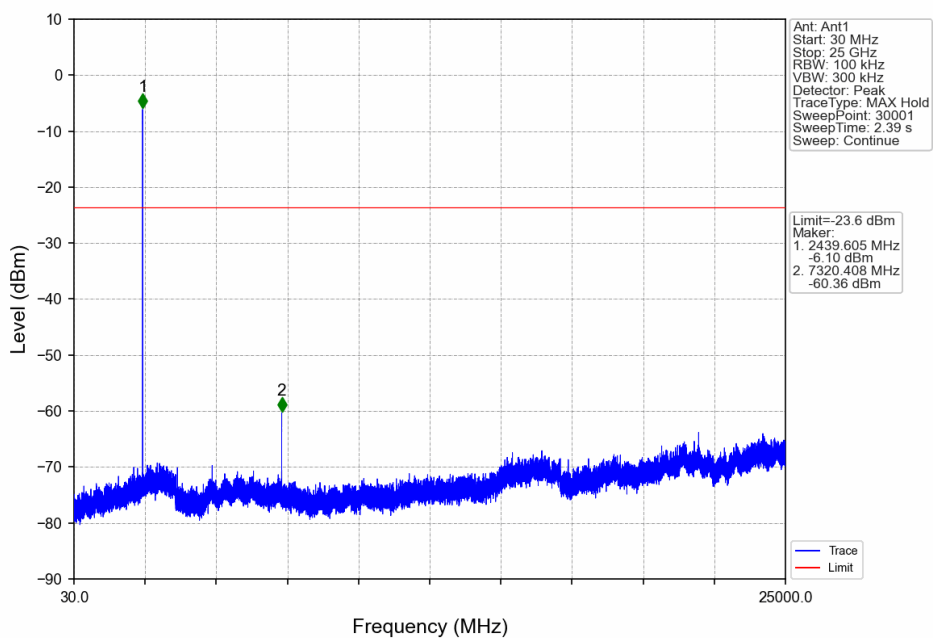
2M_LCH_2402MHz_Ant1_NTNV



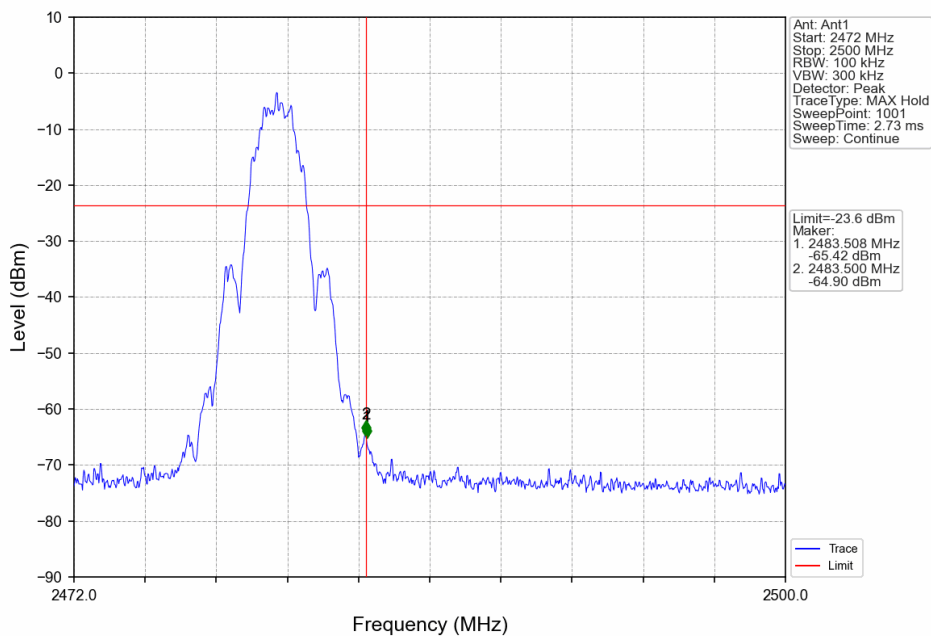
2M_LCH_2402MHz_Ant1_NTNV



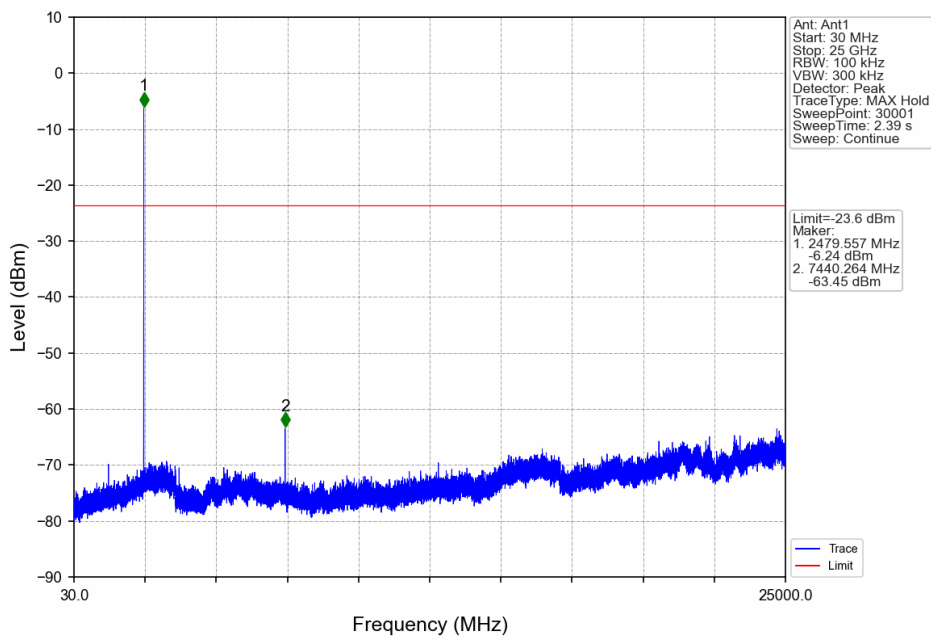
2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



6. Form731

6.1 Form731

6.1.1 Test Result

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0005	-2.68



Test Report Number: BTF230228R00102



BTF Testing Lab (Shenzhen) Co., Ltd.

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