TEST REPORT

Report No.:	8336EU122803W
Applicant:	Shenzhen Xiaoqie Electronics Co., Ltd
Address:	Room 301, Building B12, Yintian Industrial Zone, Yantian Community, Xixiang Street, Bao'an District, Shenzhen City, China
Product Name:	clip-on wireless headphones
Model No.:	Clip04 (refer to clause 2.4)
Trademark:	N/A
FCC ID:	2BTND-CLIP04
Test Standard(s):	47 CFR Part 15.247
Test Result:	Pass
Date of Receipt:	Nov. 28, 2025
Test Date:	Dec. 01, 2025 - Dec. 10, 2025
Date of Issue:	Dec. 15, 2025

ISSUED BY:

SHENZHEN EU TESTING LABORATORY LIMITED

SHENZHEN EU TESTING LABORATORY LIMITED APPROVED

Prepared by: **Reviewed and Approved by:**

Landon Qiu/ Engineer

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Revision Record

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2 General Information

2.1 Applicant Information

Applicant	Shenzhen Xiaoqie Electronics Co., Ltd
Address	Room 301, Building B12, Yintian Industrial Zone, Yantian Community, Xixiang Street, Bao'an District, Shenzhen City, China

2.2 Manufacturer Information

Manufacturer	Shenzhen Xinyihong Electronics Co., Ltd
Address	Room 403, Building B2, Anle Industrial Zone, No. 172, Hangcheng Avenue, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, China

2.3 Factory Information

Factory	Shenzhen Xinyihong Electronics Co., Ltd
Address	Room 403, Building B2, Anle Industrial Zone, No. 172, Hangcheng Avenue, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, China

2.4 General Description of E.U.T.

Product Name	clip-on wireless headphones
Model No. Under Test	Clip04
List Model No.	Clip03
Description of Model differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in appearance color and model name. (this information provided by the customer)
Rating(s)	Input: 5VDC, 0.2A Battery Capacity (for charging base): 3.7VDC, 230mAh, 0.851Wh Battery Capacity (for earbud):3.7VDC, 30mAh, 0.111Wh
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Test Sample No.	8336EU122803W-1/2(Normal), 8336EU122803W-2/2(Engineering)
Hardware Version	N/A
Software Version	N/A
Remark	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.5 Technical Information of E.U.T.

Network and Wireless Connectivity	Bluetooth (BDR+EDR)

The requirement for the following technical information of the EUT was tested in this report:

Operating Frequency	2402MHz to 2480MHz
Modulation Type	GFSK, π/4 DQPSK
Number of Channels	79
Antenna Type	Ceramic Antenna
Antenna Gain(Peak)	2.70 dBi
Remark	The above information are declared by the applicant, EU-LAB is not responsible for the information accuracy provided by the applicant.

All channels were listed on the following table:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-

3 Test Summary

3.1 Test Standard

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

Remark:

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

3.2 Test Verdict

Test Items	Standard	Method	Requirement	Results
Antenna requirement	47 CFR Part 15.247	---	47 CFR 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	ANSI C63.10-2020 section 6.2	47 CFR 15.207(a)	Pass
20dB Bandwidth	47 CFR Part 15.247	ANSI C63.10-2020, section 7.8.6 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	ANSI C63.10-2020, section 7.8.5 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(b)(1)	Pass
Channel Separation	47 CFR Part 15.247	ANSI C63.10-2020, section 7.8.2 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)	Pass
Number of Hopping Frequencies	47 CFR Part 15.247	ANSI C63.10-2020, section 7.8.3 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)(iii)	Pass
Dwell Time	47 CFR Part 15.247	ANSI C63.10-2020, section 7.8.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)(iii)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	ANSI C63.10-2020 section 7.8.7 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d)	Pass
Band edge emissions	47 CFR Part 15.247	ANSI C63.10-	47 CFR 15.247(d),	Pass

(Radiated)		2020 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02	15.209, 15.205	
Emissions in frequency bands (below 1GHz)	47 CFR Part 15.247	ANSI C63.10-2020 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 C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass
Note: (1) “N/A” denotes test is not applicable in this Test Report.				

3.3 Test Laboratory

Test Laboratory	Shenzhen EU Testing Laboratory Limited
Address	101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Designation Number	CN1368
Test Firm Registration Number	952583

4 Test Configuration

4.1 Test Environment

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	30% to 60%	
Atmospheric Pressure	86 kPa to 106 kPa	
Temperature	NT (Normal Temperature)	+15℃ to +35℃
Working Voltage of the EUT	NV (Normal Voltage)	120VAC, 60Hz for adapter 3.7VDC battery inside

4.2 Test Equipment

Conducted Emission at AC power line					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	EE-004	2025-01-08	2026-01-07
EMI Test Receiver	Rohde & Schwarz	ESCI	EE-005	2025-01-08	2026-01-07
Test Software	Farad	EZ-EMC	EE-014	/	/

Channel Separation **Number of Hopping Frequencies** **Dwell Time** **Emissions in non-restricted frequency bands** **20dB Bandwidth** **Maximum Conducted Output Power**					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
MXA Signal Analyzer	Agilent	N9020A	EE-011	2025-01-08	2026-01-07
MXG RF Vector Signal Generator	Agilent	N5182A	EE-012	2025-01-08	2026-01-07
MIMO Power Measurement Module	TSTPASS	TSPS 2023R	EE-016	2025-01-08	2026-01-07
Wideband Radio Communication Tester	ROHDE & SCHWARZ	CMW500	EE-402	2025-02-14	2026-02-13
MXG RF Analog Signal Generator	Agilent	N5181A	EE-406	2025-02-14	2026-02-13
Power Meter	Anritsu	ML2495A	EE-416	2025-02-14	2026-02-13
Constant Temperature Humidity Chamber	Guangxin	GXP-401	ES-002	2025-07-29	2026-07-28
RF Test Software	TSTPASS	TS32893 V2.0	EE-017	/	/

Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver	ROHDE & SCHWARZ	ESPI	EE-006	2025-01-08	2026-01-07
Double Ridged Horn Antenna	A-INFOMW	LB-10180-NF	EE-008	2023-01-12	2026-01-11
Pre-amplifier	Agilent	8449B	EE-010	2025-01-08	2026-01-07
MXG RF Vector Signal Generator	Agilent	N5182A	EE-012	2025-01-08	2026-01-07
DRG Horn Antenna	SCHWARZBECK	BBHA 9170	EE-410	2025-02-14	2026-02-13
Pre-amplifier	SKET	LNPA-1840-50	EE-411	2025-02-14	2026-02-13
Test Software	Farad	EZ-EMC	EE-015	/	/

Emissions in frequency bands (below 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver	ROHDE & SCHWARZ	ESPI	EE-006	2025-01-08	2026-01-07
Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	EE-007	2023-01-14	2026-01-13
Pre-amplifier	Agilent	8447D	EE-009	2025-01-08	2026-01-07
MXA Signal Analyzer	Agilent	N9020A	EE-011	2025-01-08	2026-01-07
Test Software	Farad	EZ-EMC	EE-015	/	/

4.3 Description of Support Unit

No.	Title	Manufacturer	Model No.	Serial No.
1	Adapter	MI	A232-050200U-CN2	EMC-PJ-004

4.4 Test Mode

No.	Test Modes	Description
TM1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation at lowest, middle and highest channel.
TM2	TX-π/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with π/4DQPSK modulation at lowest, middle and highest channel.
TM3	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation.
TM4	TX-π/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with π/4DQPSK modulation.

4.5 Description of Calculation

4.5.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS (dBuV/m) = RA (dBuV) + AF (dB/m) + CL (dB) – AG (dB)

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

4.5.2 Disturbance Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

CD (dBuV) = RA (dBuV) + PL (dB) + CL (dB)

Where CD = Conducted Disturbance	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	PL = 10 dB Pulse Limiter Factor

4.6 Measurement Uncertainty

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.

Test Item	Measurement Uncertainty
Conducted Emission	2.64 dB
Occupied Channel Bandwidth	70 kHz
RF output power, conducted	1.04 dB
Time of Occupancy (Dwell Time)	1.8 %
Unwanted Emissions, conducted	2.72 dB
Radiated Emission (1GHz- 18GHz)	Ur = 3.50 dB (Horizontal) Ur = 3.50 dB (Vertical)
Radiated Emission (9kHz- 30MHz)	Ur = 2.50 dB
Radiated Emission (30MHz- 1GHz)	Ur = 2.70 dB (Horizontal) Ur = 2.70 dB (Vertical)
Radiated Emission (18GHz-40GHz)	Ur = 5.15 dB (Horizontal) Ur = 5.24 dB (Vertical)

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Condition

None

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5 Evaluation Results (Evaluation)

5.1 Antenna requirement

5.1.1 Test Specification

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.
Test Method:	---

5.1.2 Test Data

PASS.

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

6 Radio Spectrum Matter Test Results (RF)

6.1 Conducted Emission at AC power line

6.1.1 Test Specification

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

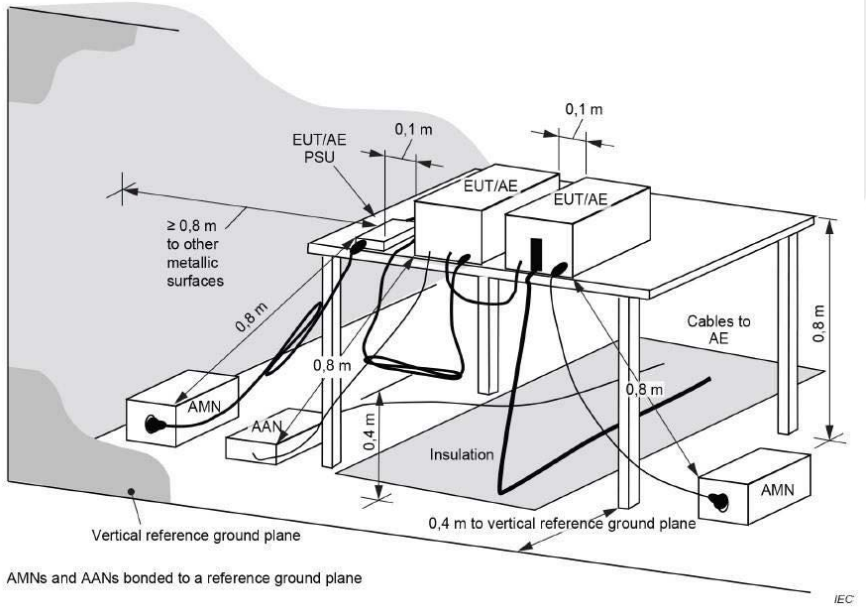
*Decreases with the logarithm of the frequency.

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

6.1.2 E.U.T. Operation

Pre test mode:	TM1
Final test mode:	TM1

6.1.3 Test Setup Diagram



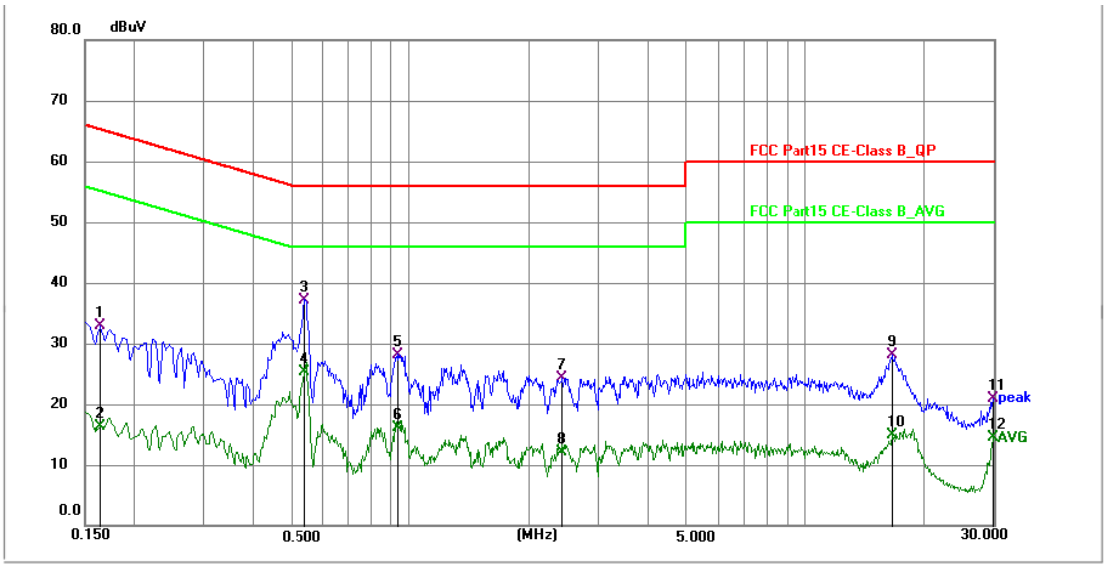
6.1.4 Test Data

PASS.

Only the worst case data was showed in the report, please to see the following pages.

Conducted Emission at AC power line Test Data

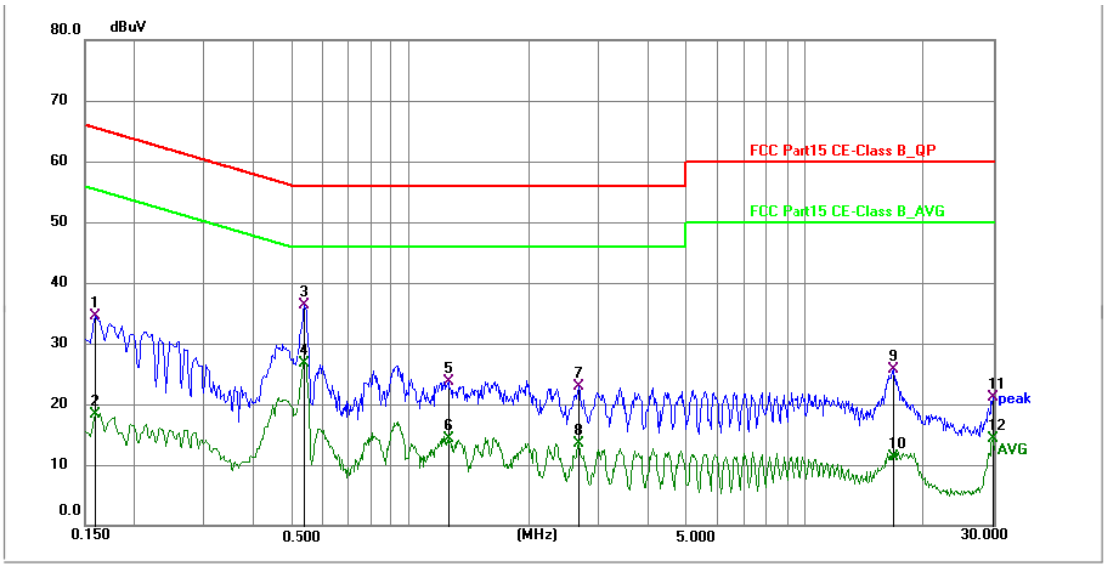
TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1635	22.98	9.96	32.94	65.28	-32.34	QP	P	
2	0.1635	6.34	9.96	16.30	55.28	-38.98	AVG	P	
3 *	0.5415	27.16	10.04	37.20	56.00	-18.80	QP	P	
4	0.5415	15.25	10.04	25.29	46.00	-20.71	AVG	P	
5	0.9330	18.16	10.04	28.20	56.00	-27.80	QP	P	
6	0.9330	6.04	10.04	16.08	46.00	-29.92	AVG	P	
7	2.4224	14.23	10.04	24.27	56.00	-31.73	QP	P	
8	2.4224	1.98	10.04	12.02	46.00	-33.98	AVG	P	
9	16.6335	18.09	10.00	28.09	60.00	-31.91	QP	P	
10	16.6335	4.83	10.00	14.83	50.00	-35.17	AVG	P	
11	29.8725	10.71	10.26	20.97	60.00	-39.03	QP	P	
12	29.8725	4.29	10.26	14.55	50.00	-35.45	AVG	P	

Conducted Emission at AC power line Test Data

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



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1590	24.50	9.98	34.48	65.52	-31.04	QP	P	
2	0.1590	8.25	9.98	18.23	55.52	-37.29	AVG	P	
3	0.5415	26.23	10.07	36.30	56.00	-19.70	QP	P	
4 *	0.5415	16.63	10.07	26.70	46.00	-19.30	AVG	P	
5	1.2525	13.67	10.06	23.73	56.00	-32.27	QP	P	
6	1.2525	4.26	10.06	14.32	46.00	-31.68	AVG	P	
7	2.6745	12.79	10.06	22.85	56.00	-33.15	QP	P	
8	2.6745	3.51	10.06	13.57	46.00	-32.43	AVG	P	
9	16.7820	15.63	10.02	25.65	60.00	-34.35	QP	P	
10	16.7820	1.23	10.02	11.25	50.00	-38.75	AVG	P	
11	29.9355	10.84	10.24	21.08	60.00	-38.92	QP	P	
12	29.9355	4.03	10.24	14.27	50.00	-35.73	AVG	P	

6.2 20dB Bandwidth

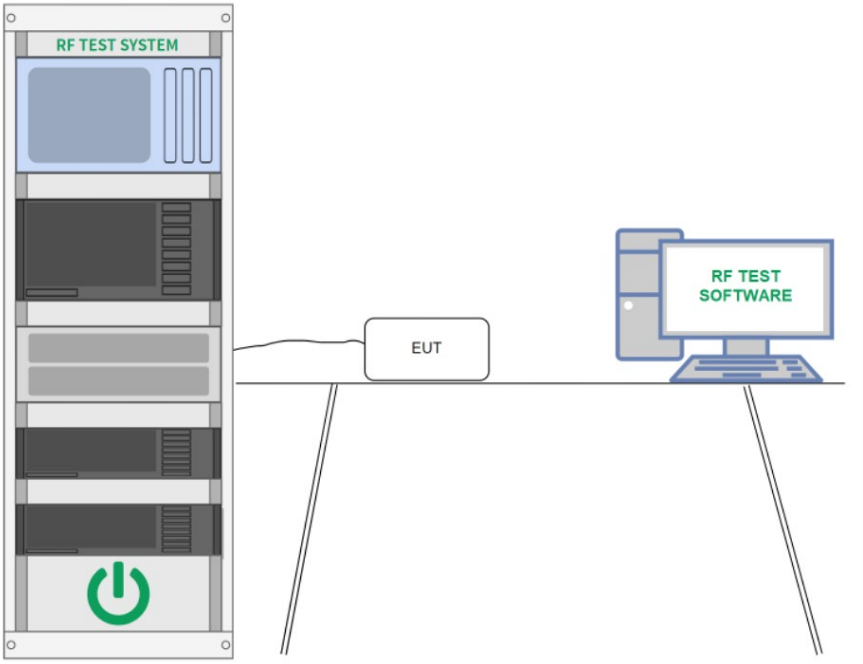
6.2.1 Test Specification

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Test Method:	ANSI C63.10-2020, section 7.8.6, For occupied bandwidth measurements, use the procedure in 6.9.3. Frequency hopping shall be disabled for this test. KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth: a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2. d) Step a) through step c) might require iteration to adjust within the specified range. e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.2.2 E.U.T. Operation

Pre test mode:	TM1, TM2
Final test mode:	TM1, TM2

6.2.3 Test Setup Diagram



6.2.4 Test Data

PASS.

Please refer to Annex D for details.

6.3 Maximum Conducted Output Power

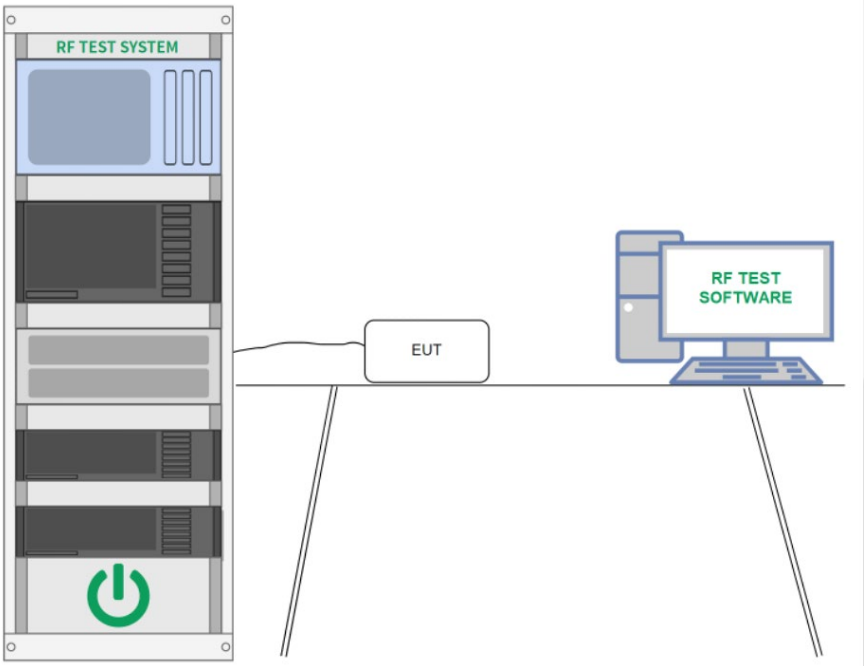
6.3.1 Test Specification

Test Requirement:	47 CFR 15.247(b)(1)
Test Limit:	Refer to 47 CFR 15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test Method:	ANSI C63.10-2020, section 7.8.5 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings: a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel. b) RBW > 20 dB bandwidth of the emission being measured. c) VBW ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow trace to stabilize. h) Use the marker-to-peak function to set the marker to the peak of the emission. i) The indicated level is the peak output power, after any corrections for external attenuators and cables. j) A spectral plot of the test results and setup description shall be included in the test report. NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

6.3.2 E.U.T. Operation

Pre test mode:	TM3, TM4
Final test mode:	TM3, TM4

6.3.3 Test Setup Diagram



6.3.4 Test Data

PASS.

Please refer to Annex D for details.

6.4 Channel Separation

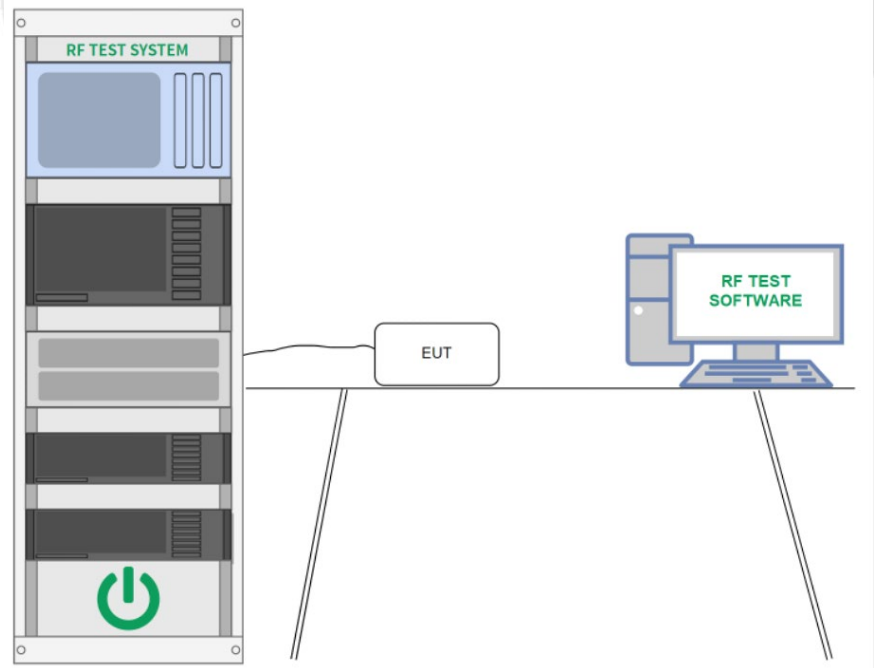
6.4.1 Test Specification

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Test Method:	ANSI C63.10-2020, section 7.8.2 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A spectral plot of the data shall be included in the test report.

6.4.2 E.U.T. Operation

Pre test mode:	TM3, TM4
Final test mode:	TM3, TM4

6.4.3 Test Setup Diagram



6.4.4 Test Data

PASS.

Please refer to Annex D for details.

Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com

6.5 Number of Hopping Frequencies

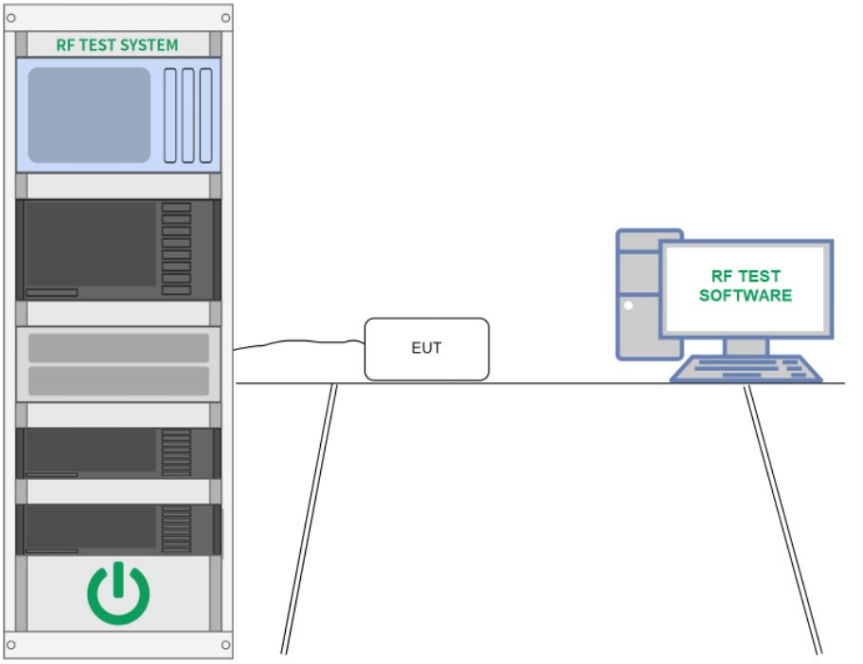
6.5.1 Test Specification

Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2020, section 7.8.3 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen. b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. c) VBW ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize. It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.

6.5.2 E.U.T. Operation

Pre test mode:	TM3, TM4
Final test mode:	TM3, TM4

6.5.3 Test Setup Diagram



6.5.4 Test Data

PASS.

Please refer to Annex D for details.

6.6 Dwell Time

6.6.1 Test Specification

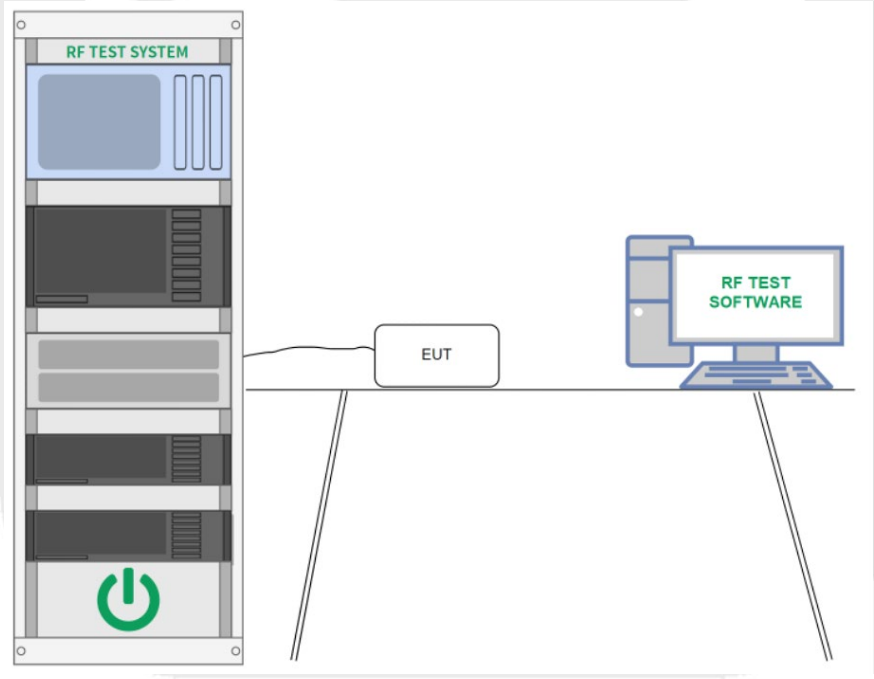
Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2020, section 7.8.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The dwell time per hop on a channel is the time from the start of the first transmission to the end of the last transmission for that hop. If the device has a single transmission per hop then the dwell time is the duration of that transmission. If the device has a multiple transmissions per hop then the dwell time is measured from the start of the first transmission to the end of the last transmission. The time of occupancy is the total time that the device dwells on a channel over an observation period specified in the regulatory requirement. To determine the time of occupancy the spectrum analyzer will be configured to measure both the dwell time per hop and the number of times the device transmits on a specific channel in a given period. The EUT shall have its hopping function enabled. Compliance with the requirements shall be made with the minimum and with the maximum number of channels enabled. If the dwell time per channel does not vary with the number of channels than compliance with the requirements may be based on the minimum number of channels. If the device supports different dwell times per channel (example Bluetooth devices can dwell on a channel for 1, 3 or 5 time slots) then measurements can be limited to the longest dwell time with the minimum number of channels. Use the following spectrum analyzer settings to determine the dwell time per hop: a) Span: Zero span, centered on a hopping channel. b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop. c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this. d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel. e) Detector function: Peak. f) Trace: Clear-write, single sweep. g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers. To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple

	hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time. The average number of hops on the same channel within the regulatory observation period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is 3 / 0.5 × 10, or 60 hops. The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

6.6.2 E.U.T. Operation

Pre test mode:	TM3, TM4
Final test mode:	TM3, TM4

6.6.3 Test Setup Diagram



6.6.4 Test Data

PASS.

Please refer to Annex D for details.

6.7 Emissions in non-restricted frequency bands

6.7.1 Test Specification

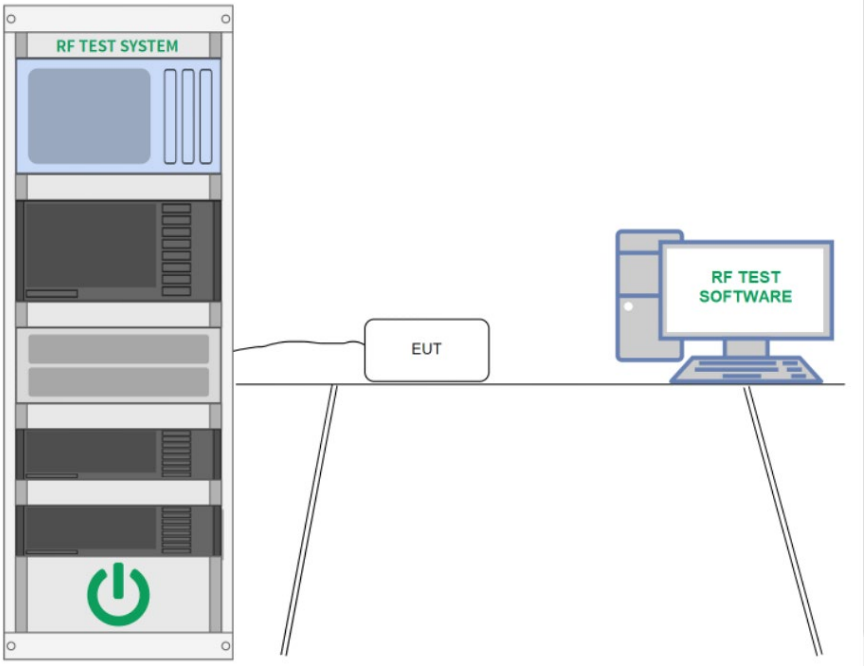
Test Requirement:	47 CFR 15.247(d)
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 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 C63.10-2020 section 7.8.7 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	7.8.7.1 General considerations To demonstrate compliance with the relative out-of-band emissions requirements conducted spurious emissions shall be measured for the transmit frequencies, per 5.5 and 5.6, and at the maximum transmit powers. Frequency hopping shall be disabled for this test with the exception of measurements at the allocated band-edges which shall be repeated with hopping enabled. Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The frequency range of testing shall span 30 MHz to 10 times the operating frequency and this may be done in a single sweep or, to aid resolution, across a number of sweeps. The resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. The limit is based on the highest in-band level across all channels measured using the same instrument settings (resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector). To help clearly demonstrate compliance a display line may be set at the required offset (typically 20 dB) below the highest in-band level. Where the highest in-band level is not clearly identified in the out-of-band measurements a separate spectral plot showing the in-band level shall be provided. When conducted measurements cannot be made (for example a device with integrated, non-removable antenna) radiated measurements shall be used. The reference level for determining the limit shall be established by maximizing the field strength from the highest power channel and measuring using the resolution and video bandwidth settings and peak detector as described above. The field strength limit for spurious emissions outside of restricted-bands shall then be set at the required offset (typically 20 dB) below the highest in-band level. Radiated measurements will follow the standards measurement procedures described in Clause 6 with the exception that the resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. Note that use of wider measurement bandwidths are acceptable for measuring the spurious emissions provided that the peak detector is used and that the measured value of spurious emissions are compared to the highest in-band level measured with the 100 kHz / 300 kHz bandwidth settings to determine compliance. 7.8.7.2 Band-edges Compliance with a relative limit at the band-edges (e.g., −20 dBc) shall be made

	on the lowest and on the highest channels with frequency hopping disabled and repeated with frequency hopping enabled. For the latter test the hopping sequence shall include the lowest and highest channels. For measurements with the hopping disabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of the allocated band-edge. For measurements with the hopping enabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of both of the allocated band-edges. This could require separate spectral plots for each band-edge.

6.7.2 E.U.T. Operation

Pre test mode:	TM1, TM2
Final test mode:	TM1, TM2

6.7.3 Test Setup Diagram



6.7.4 Test Data

PASS.

Please refer to Annex D for details.

6.8 Band edge emissions (Radiated)

6.8.1 Test Specification

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

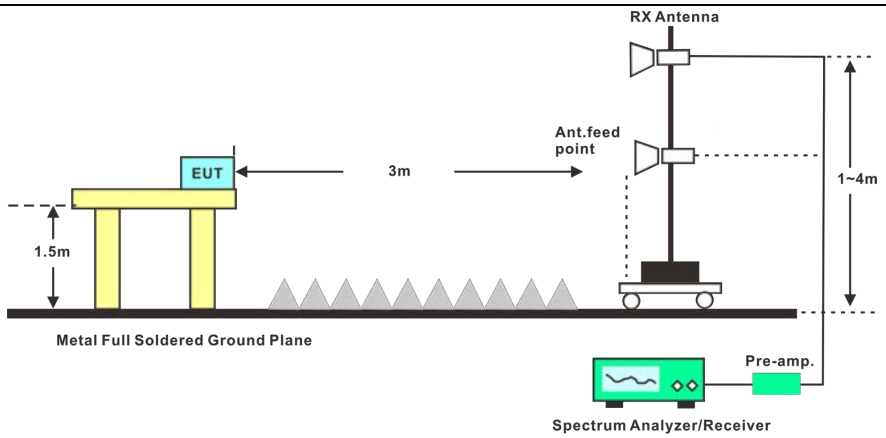
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this 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 C63.10-2020 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.10.5.2

6.8.2 E.U.T. Operation

Pre test mode:	TM1, TM2
Final test mode:	TM1, TM2

6.8.3 Test Setup Diagram



6.8.4 Test Data

PASS.

Please refer to the following pages.

Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com

Band Edge Emissions (Restricted frequency bands):

Test Mode: GFSK					CH Low: 2402 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
H	2310.00	42.92	-2.81	40.11	74.00	-33.89	PK	PASS
H	2390.00	48.28	-2.69	45.59	74.00	-28.41	PK	PASS
H	**2400.00	62.62	-2.68	59.94	74.00	-14.06	PK	PASS
V	2310.00	45.41	-2.81	42.60	74.00	-31.40	PK	PASS
V	2390.00	45.94	-2.69	43.25	74.00	-30.75	PK	PASS
V	**2400.00	62.11	-2.68	59.43	74.00	-14.57	PK	PASS
H	2310.00	32.48	-2.81	29.67	54.00	-24.33	AV	PASS
H	2390.00	36.49	-2.69	33.80	54.00	-20.20	AV	PASS
H	**2400.00	49.09	-2.68	46.41	54.00	-7.59	AV	PASS
V	2310.00	31.09	-2.81	28.28	54.00	-25.72	AV	PASS
V	2390.00	35.43	-2.69	32.74	54.00	-21.26	AV	PASS
V	**2400.00	49.30	-2.68	46.62	54.00	-7.38	AV	PASS

Test Mode: GFSK					CH High: 2480 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
H	**2483.50	47.79	-2.56	45.23	74.00	-28.77	PK	PASS
H	2500.00	48.84	-2.54	46.30	74.00	-27.70	PK	PASS
V	**2483.50	48.44	-2.56	45.88	74.00	-28.12	PK	PASS
V	2500.00	51.66	-2.54	49.12	74.00	-24.88	PK	PASS
H	**2483.50	36.41	-2.56	33.85	54.00	-20.15	AV	PASS
H	2500.00	39.39	-2.54	36.85	54.00	-17.15	AV	PASS
V	**2483.50	35.53	-2.56	32.97	54.00	-21.03	AV	PASS
V	2500.00	38.91	-2.54	36.37	54.00	-17.63	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.

Band Edge Emissions (Restricted frequency bands):

Test Mode: π/4DQPSK					CH Low: 2402 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
H	2310.00	42.98	-2.81	40.17	74.00	-33.83	PK	PASS
H	2390.00	46.48	-2.69	43.79	74.00	-30.21	PK	PASS
H	**2400.00	61.43	-2.68	58.75	74.00	-15.25	PK	PASS
V	2310.00	43.16	-2.81	40.35	74.00	-33.65	PK	PASS
V	2390.00	45.56	-2.69	42.87	74.00	-31.13	PK	PASS
V	**2400.00	61.83	-2.68	59.15	74.00	-14.85	PK	PASS
H	2310.00	31.59	-2.81	28.78	54.00	-25.22	AV	PASS
H	2390.00	37.85	-2.69	35.16	54.00	-18.84	AV	PASS
H	**2400.00	46.36	-2.68	43.68	54.00	-10.32	AV	PASS
V	2310.00	34.01	-2.81	31.20	54.00	-22.80	AV	PASS
V	2390.00	36.12	-2.69	33.43	54.00	-20.57	AV	PASS
V	**2400.00	46.73	-2.68	44.05	54.00	-9.95	AV	PASS

Test Mode: π/4DQPSK					CH High: 2480 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
H	**2483.50	45.95	-2.56	43.39	74.00	-30.61	PK	PASS
H	2500.00	48.92	-2.54	46.38	74.00	-27.62	PK	PASS
V	**2483.50	49.25	-2.56	46.69	74.00	-27.31	PK	PASS
V	2500.00	49.55	-2.54	47.01	74.00	-26.99	PK	PASS
H	**2483.50	38.51	-2.56	35.95	54.00	-18.05	AV	PASS
H	2500.00	40.09	-2.54	37.55	54.00	-16.45	AV	PASS
V	**2483.50	36.68	-2.56	34.12	54.00	-19.88	AV	PASS
V	2500.00	40.33	-2.54	37.79	54.00	-16.21	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.

6.9 Emissions in frequency bands (below 1GHz)

6.9.1 Test Specification

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

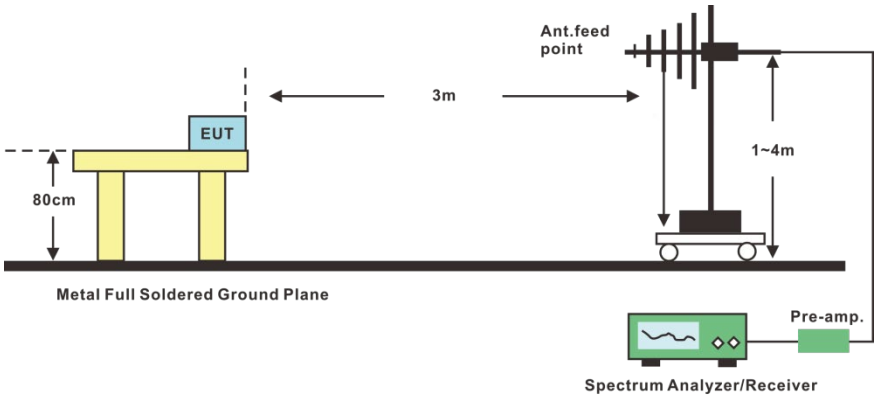
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this 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 C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.6.4

6.9.2 E.U.T. Operation

Pre test mode:	TM1, TM2
Final test mode:	TM1, TM2

6.9.3 Test Setup Diagram



6.9.4 Test Data

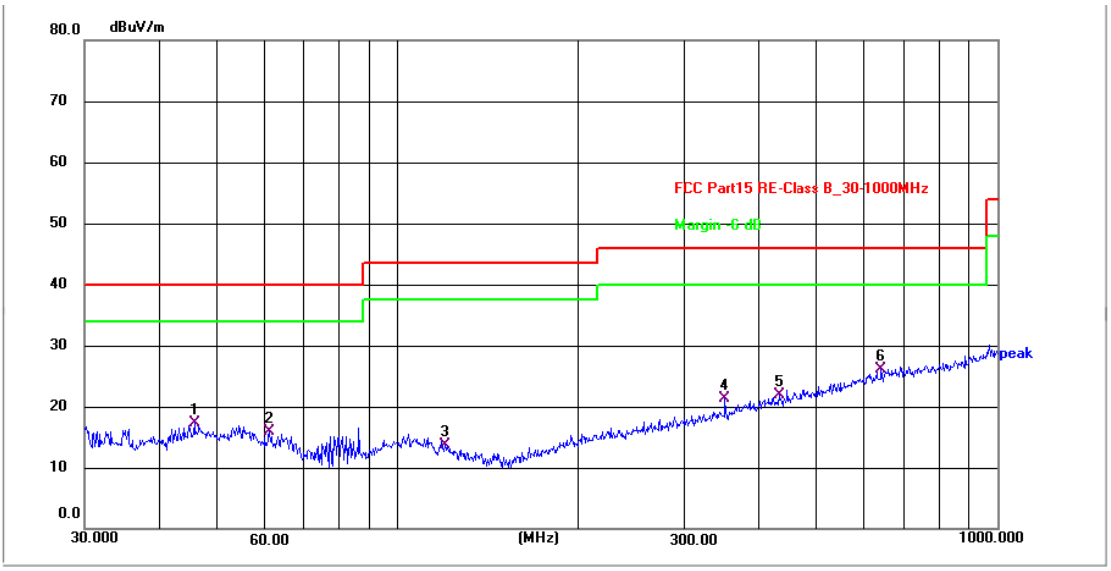
PASS.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, for 30MHz to 1000MHz, pre-scan all modulations, and found the GFSK modulation Low channel which is the worst case, only the worst case is recorded in the report.

Emissions in frequency bands (below 1GHz) Test Data

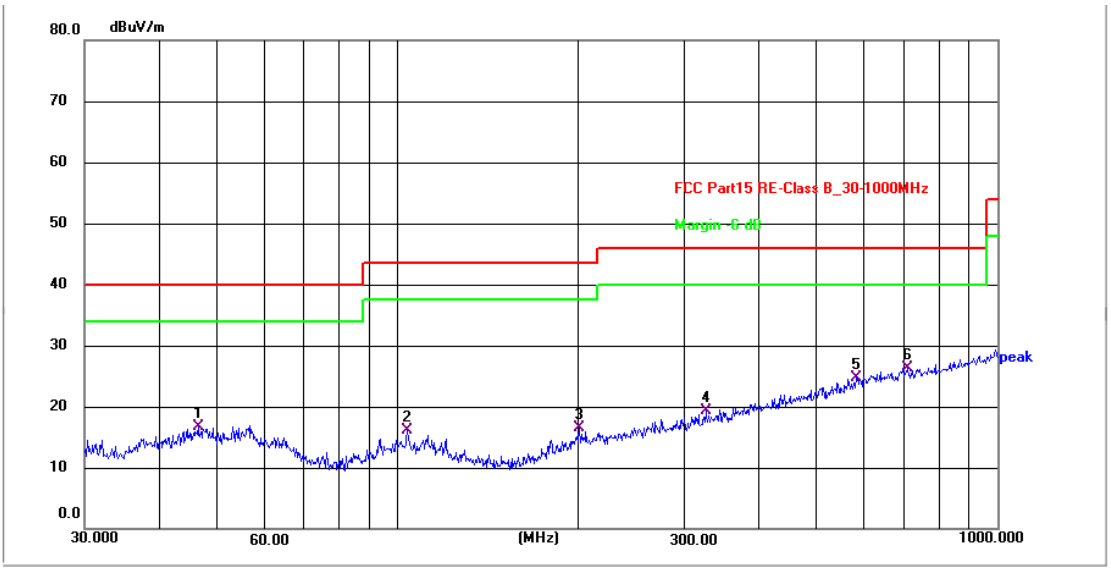
TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	45.6948	31.49	-14.23	17.26	40.00	-22.74	QP	P	
2	60.9176	31.40	-15.59	15.81	40.00	-24.19	QP	P	
3	119.8556	30.68	-16.91	13.77	43.50	-29.73	QP	P	
4	350.4768	32.23	-10.89	21.34	46.00	-24.66	QP	P	
5	431.0316	31.32	-9.44	21.88	46.00	-24.12	QP	P	
6 *	640.6110	31.87	-5.85	26.02	46.00	-19.98	QP	P	

Emissions in frequency bands (below 1GHz) Test Data

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



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	46.3402	30.94	-14.22	16.72	40.00	-23.28	QP	P	
2	103.8055	32.08	-15.96	16.12	43.50	-27.38	QP	P	
3	200.6881	31.53	-15.04	16.49	43.50	-27.01	QP	P	
4	325.5958	30.80	-11.42	19.38	46.00	-26.62	QP	P	
5	582.7425	31.38	-6.58	24.80	46.00	-21.20	QP	P	
6 *	709.1823	31.43	-5.03	26.40	46.00	-19.60	QP	P	

6.10 Emissions in frequency bands (above 1GHz)

6.10.1 Test Specification

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

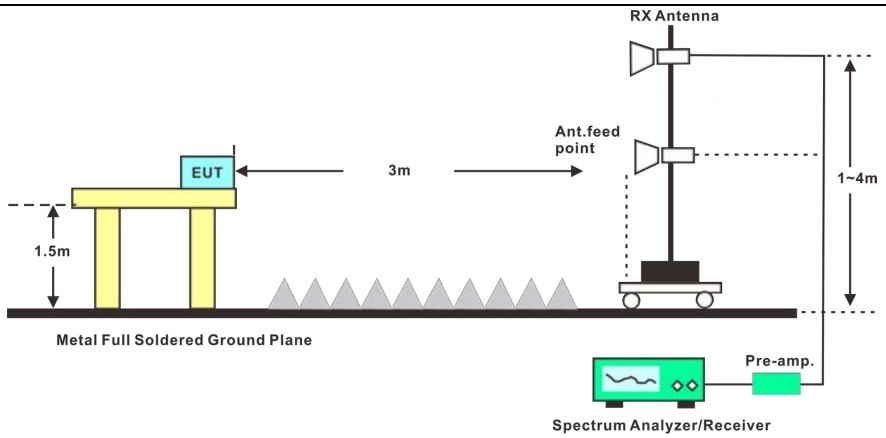
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this 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 C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.6.4

6.10.2 E.U.T. Operation

Pre test mode:	TM1, TM2
Final test mode:	TM1, TM2

6.10.3 Test Setup Diagram



6.10.4 Test Data

PASS.

During the test, for 1GHz- 25GHz, pre-scan all modulations, and found the GFSK modulation which is the worst case, only the worst case is recorded in the report.

Radiated Spurious Emission (1GHz-25GHz)

Test Mode: GFSK					CH Low: 2402 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
V	4804.96	40.25	4.68	44.93	74.00	-29.08	PK	PASS
V	7206.21	34.52	9.84	44.36	74.00	-29.65	PK	PASS
V	9608.72	29.77	13.17	42.94	74.00	-31.07	PK	PASS
V	12010.32	*	*	*	74.00	*	PK	PASS
V	14412.75	*	*	*	74.00	*	PK	PASS
V	16814.52	*	*	*	74.00	*	PK	PASS
H	4804.74	41.52	4.68	46.20	74.00	-27.81	PK	PASS
H	7206.05	35.34	9.84	45.18	74.00	-28.82	PK	PASS
H	9608.03	30.64	13.17	43.81	74.00	-30.19	PK	PASS
H	12010.73	*	*	*	74.00	*	PK	PASS
H	14412.25	*	*	*	74.00	*	PK	PASS
H	16814.79	*	*	*	74.00	*	PK	PASS
V	4804.20	31.92	4.68	36.60	54.00	-17.41	AV	PASS
V	7206.62	22.20	9.84	32.04	54.00	-21.96	AV	PASS
V	9608.93	18.40	13.17	31.57	54.00	-22.43	AV	PASS
V	12010.76	*	*	*	54.00	*	AV	PASS
V	14412.07	*	*	*	54.00	*	AV	PASS
V	16814.77	*	*	*	54.00	*	AV	PASS
H	4804.23	31.98	4.68	36.66	54.00	-17.34	AV	PASS
H	7206.05	23.48	9.84	33.32	54.00	-20.68	AV	PASS
H	9608.03	18.39	13.17	31.56	54.00	-22.44	AV	PASS
H	12010.73	*	*	*	54.00	*	AV	PASS
H	14412.25	*	*	*	54.00	*	AV	PASS
H	16814.79	*	*	*	54.00	*	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.

2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Spurious Emission (1GHz-25GHz)

Test Mode: GFSK					CH Middle: 2441 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
V	4882.81	40.39	4.92	45.31	74.00	-28.70	PK	PASS
V	7323.15	34.25	9.83	44.08	74.00	-29.93	PK	PASS
V	9764.13	30.24	13.22	43.46	74.00	-30.54	PK	PASS
V	12205.13	*	*	*	74.00	*	PK	PASS
V	14646.11	*	*	*	74.00	*	PK	PASS
V	17087.14	*	*	*	74.00	*	PK	PASS
H	4882.50	41.75	4.92	46.67	74.00	-27.34	PK	PASS
H	7323.60	35.96	9.83	45.79	74.00	-28.22	PK	PASS
H	9764.05	29.38	13.22	42.60	74.00	-31.40	PK	PASS
H	12205.83	*	*	*	74.00	*	PK	PASS
H	14646.95	*	*	*	74.00	*	PK	PASS
H	17087.04	*	*	*	74.00	*	PK	PASS
V	4882.78	30.88	4.92	35.80	54.00	-18.20	AV	PASS
V	7323.18	24.75	9.83	34.58	54.00	-19.43	AV	PASS
V	9764.48	18.31	13.22	31.53	54.00	-22.47	AV	PASS
V	12205.63	*	*	*	54.00	*	AV	PASS
V	14646.55	*	*	*	54.00	*	AV	PASS
V	17087.93	*	*	*	54.00	*	AV	PASS
H	4882.50	30.43	4.92	35.35	54.00	-18.65	AV	PASS
H	7323.60	23.04	9.83	32.87	54.00	-21.13	AV	PASS
H	9764.05	17.33	13.22	30.55	54.00	-23.46	AV	PASS
H	12205.83	*	*	*	54.00	*	AV	PASS
H	14646.95	*	*	*	54.00	*	AV	PASS
H	17087.04	*	*	*	54.00	*	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.

2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Spurious Emission (1GHz-25GHz)

Test Mode: GFSK					CH High: 2480 MHz			
Pol.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type	Result
V	4960.03	42.04	5.17	47.21	74.00	-26.79	PK	PASS
V	7440.41	34.16	9.83	43.99	74.00	-30.01	PK	PASS
V	9920.86	29.04	13.27	42.31	74.00	-31.70	PK	PASS
V	12400.05	*	*	*	74.00	*	PK	PASS
V	14880.99	*	*	*	74.00	*	PK	PASS
V	17360.68	*	*	*	74.00	*	PK	PASS
H	4960.93	42.99	5.17	48.16	74.00	-25.85	PK	PASS
H	7440.03	34.14	9.83	43.97	74.00	-30.03	PK	PASS
H	9920.60	28.03	13.27	41.30	74.00	-32.70	PK	PASS
H	12400.23	*	*	*	74.00	*	PK	PASS
H	14880.66	*	*	*	74.00	*	PK	PASS
H	17360.29	*	*	*	74.00	*	PK	PASS
V	4960.96	31.11	5.17	36.28	54.00	-17.72	AV	PASS
V	7440.78	23.50	9.83	33.33	54.00	-20.68	AV	PASS
V	9920.17	17.88	13.27	31.15	54.00	-22.85	AV	PASS
V	12400.39	*	*	*	54.00	*	AV	PASS
V	14880.03	*	*	*	54.00	*	AV	PASS
V	17360.41	*	*	*	54.00	*	AV	PASS
H	4960.93	32.86	5.17	38.03	54.00	-15.98	AV	PASS
H	7440.03	23.80	9.83	33.63	54.00	-20.37	AV	PASS
H	9920.60	18.96	13.27	32.23	54.00	-21.78	AV	PASS
H	12400.23	*	*	*	54.00	*	AV	PASS
H	14880.66	*	*	*	54.00	*	AV	PASS
H	17360.29	*	*	*	54.00	*	AV	PASS

Remark:

1. Emission Level = Reading + Factor, Margin= Emission Level – Limit.
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

ANNEX A TEST SETUP PHOTOS

Please refer to the document "8336EU122803W-ANNEX A.PDF"

ANNEX B EXTERNAL PHOTOS

Please refer to the document "8336EU122803W-ANNEX B.PDF"

ANNEX C INTERNAL PHOTOS

Please refer to the document "8336EU122803W-ANNEX C.PDF"

Address: 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China
Website: www.eu-test.com
Tel: (86)-755-2357-9714 Email: Service@eu-test.com

ANNEX D TEST DATA

1. Duty Cycle

1.1 Test Result

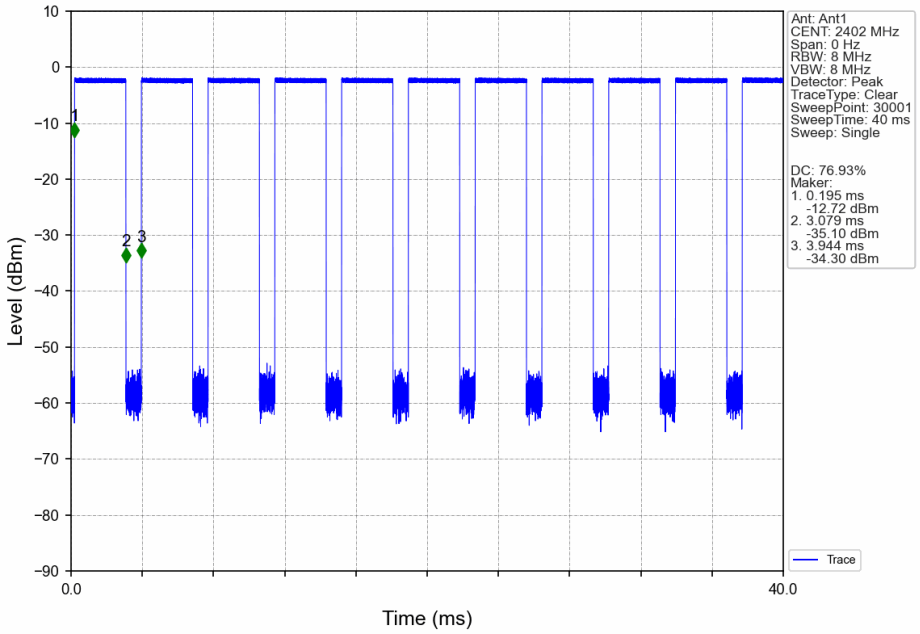
1.1.1 Ant1

Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.884	3.749	76.93	1.14	0.04
π/4DQPSK	SISO	2402	2DH5	2.895	3.751	77.18	1.12	0.03

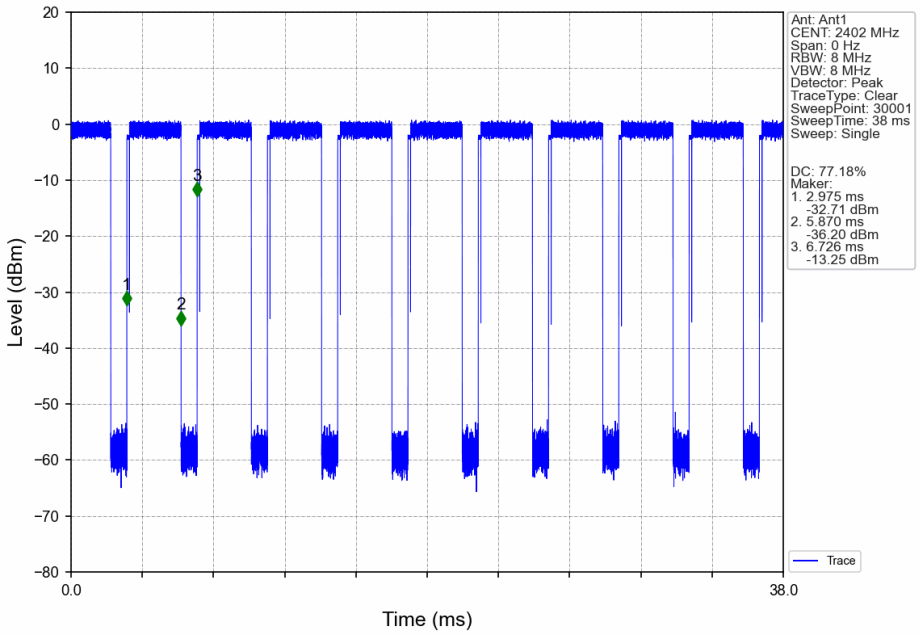
1.2 Test Graph

1.2.1 Ant1

GFSK_DH5_LCH_2402MHz_Ant1_NTNV



π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.827	/	Pass
		2441	DH5	1	0.834	/	Pass
		2480	DH5	1	0.829	/	Pass
π/4DQPSK	SISO	2402	2DH5	1	1.179	/	Pass
		2441	2DH5	1	1.180	/	Pass
		2480	2DH5	1	1.180	/	Pass

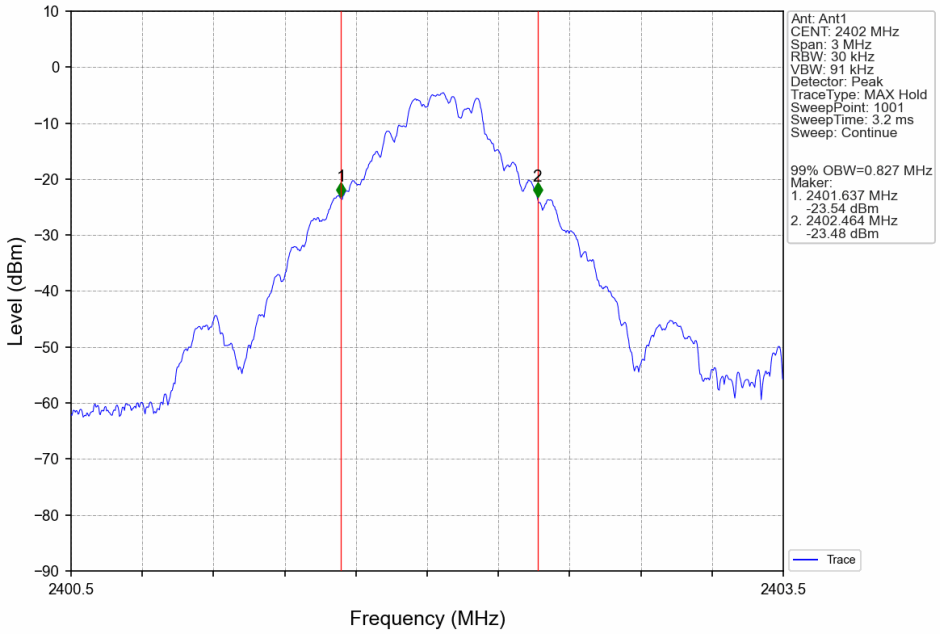
2.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.938	/	Pass
		2441	DH5	1	0.941	/	Pass
		2480	DH5	1	0.938	/	Pass
π/4DQPSK	SISO	2402	2DH5	1	1.297	/	Pass
		2441	2DH5	1	1.294	/	Pass
		2480	2DH5	1	1.292	/	Pass

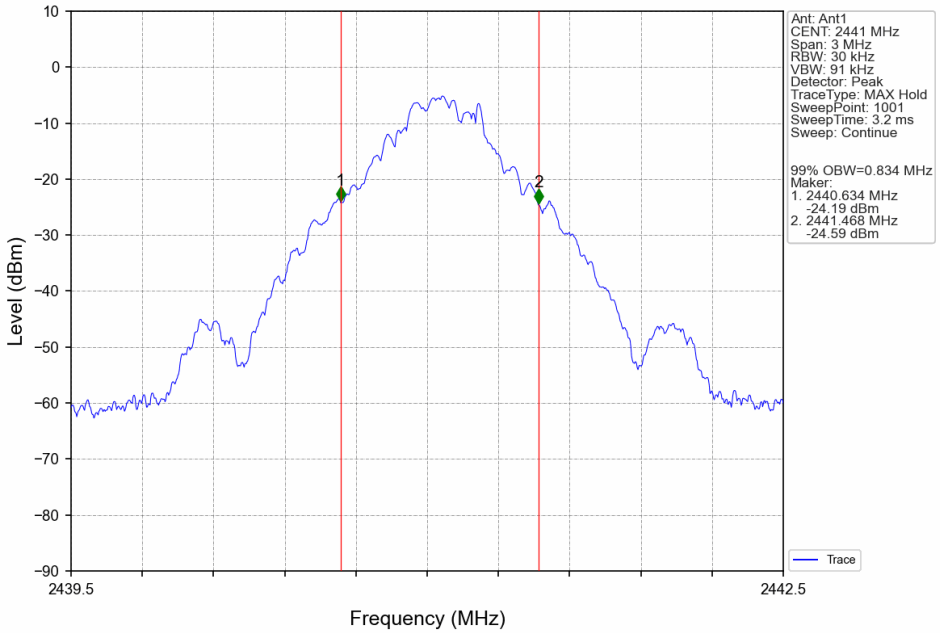
2.2 Test Graph

2.2.1 OBW

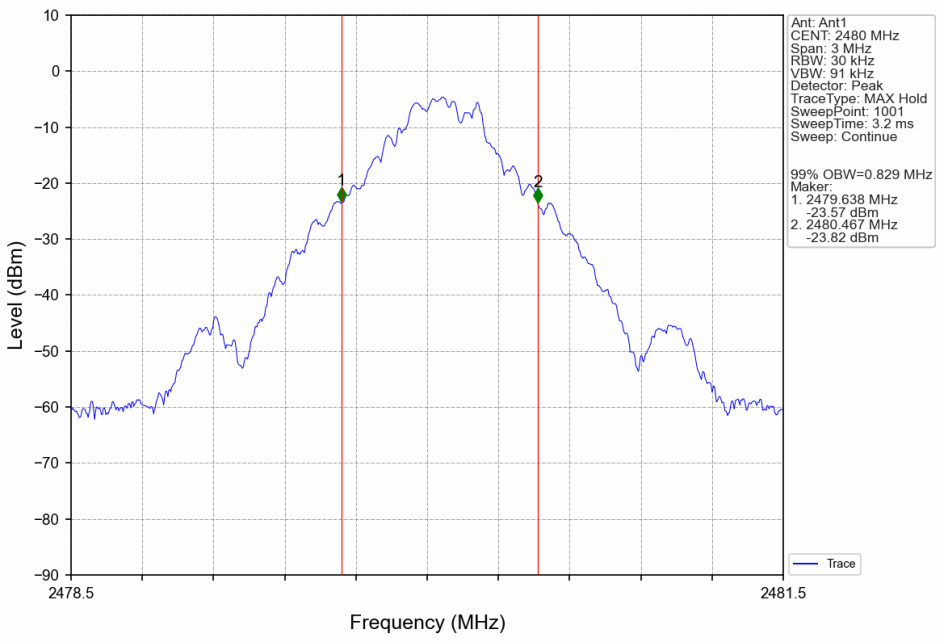
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



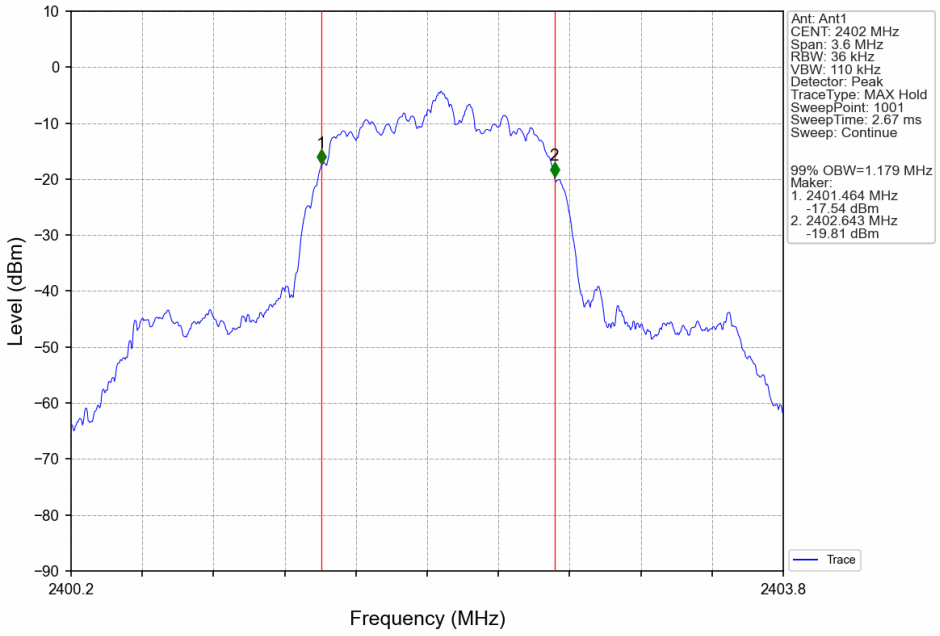
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



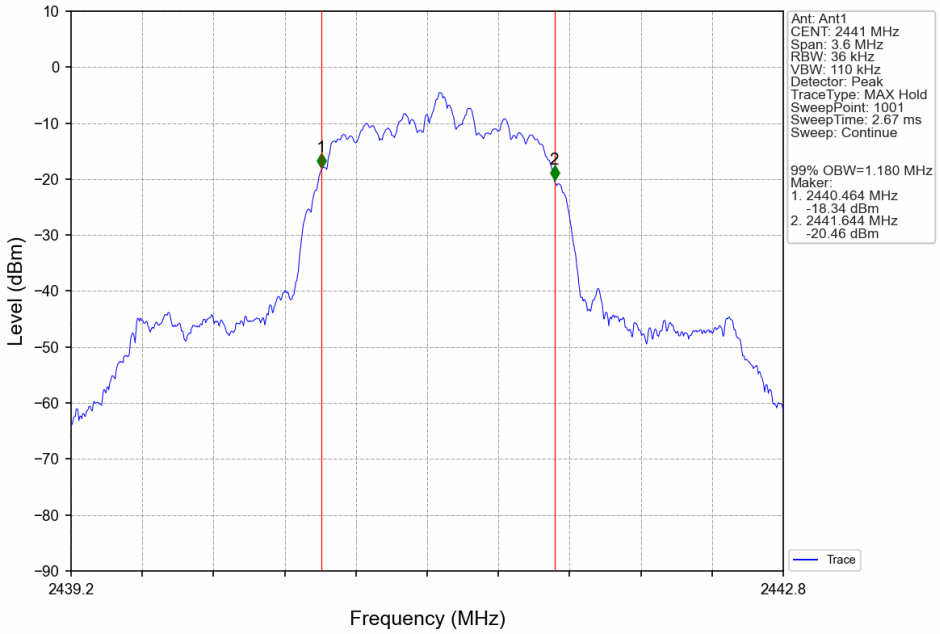
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



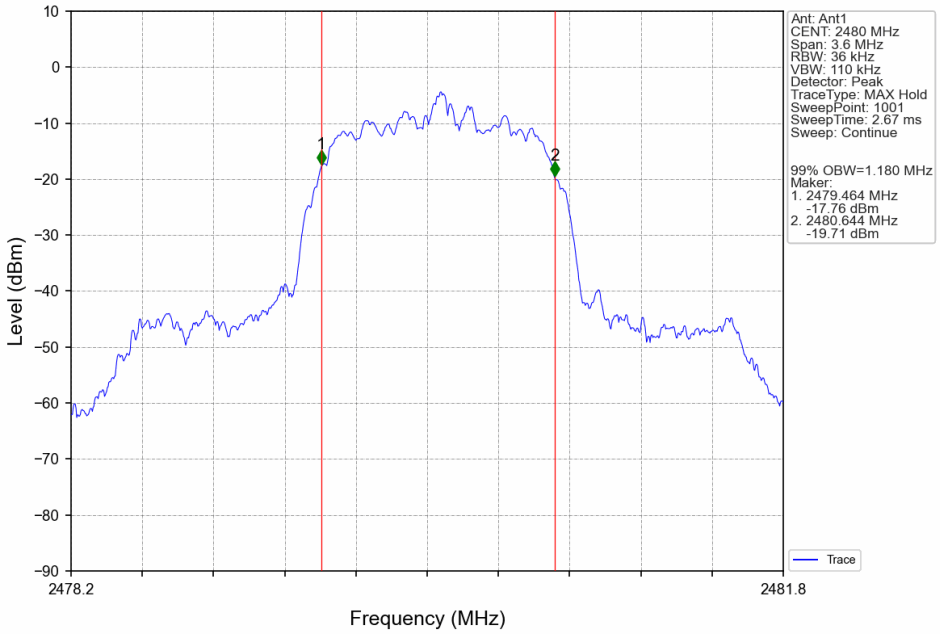
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

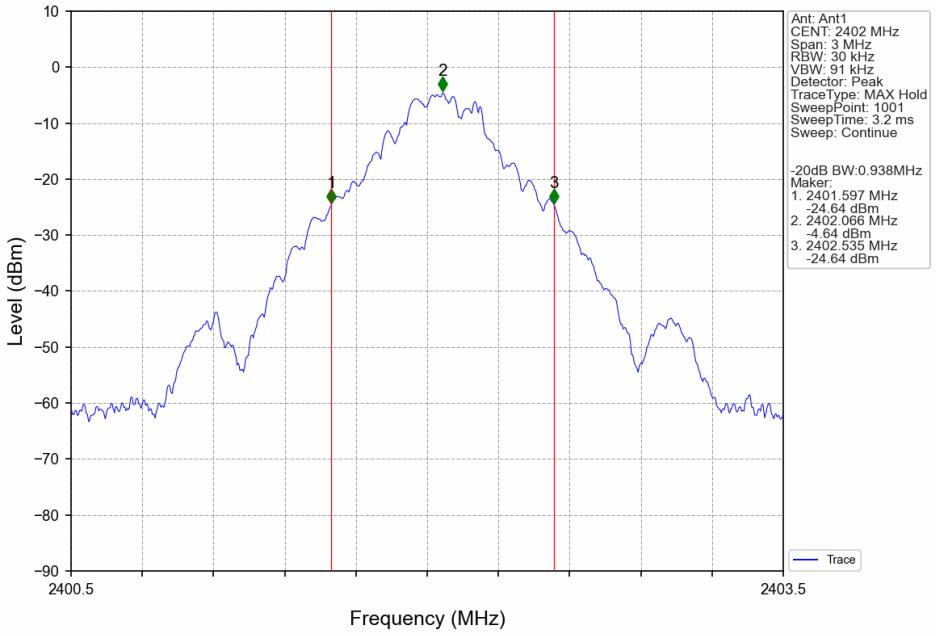


π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

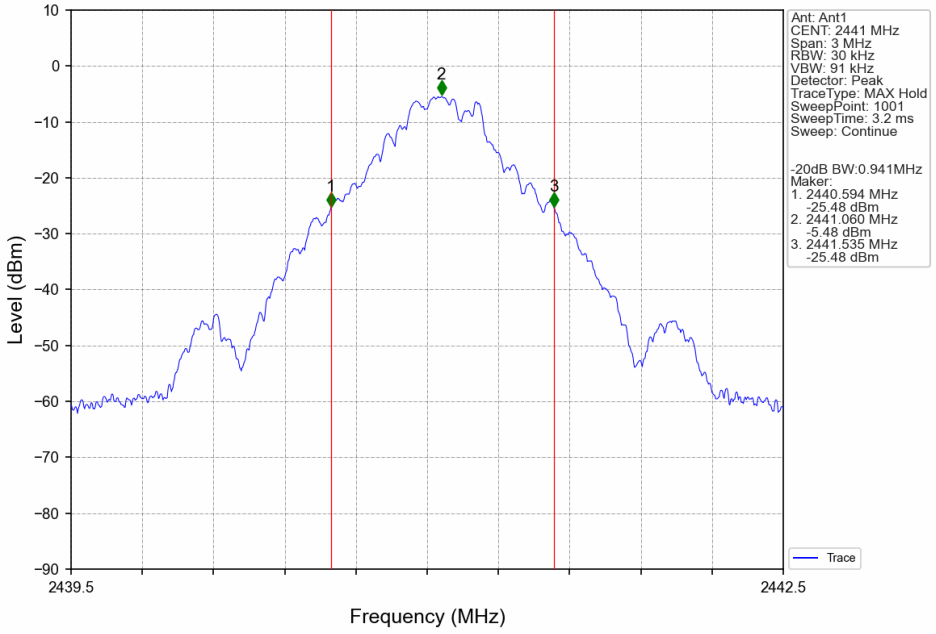


2.2.2 20dB BW

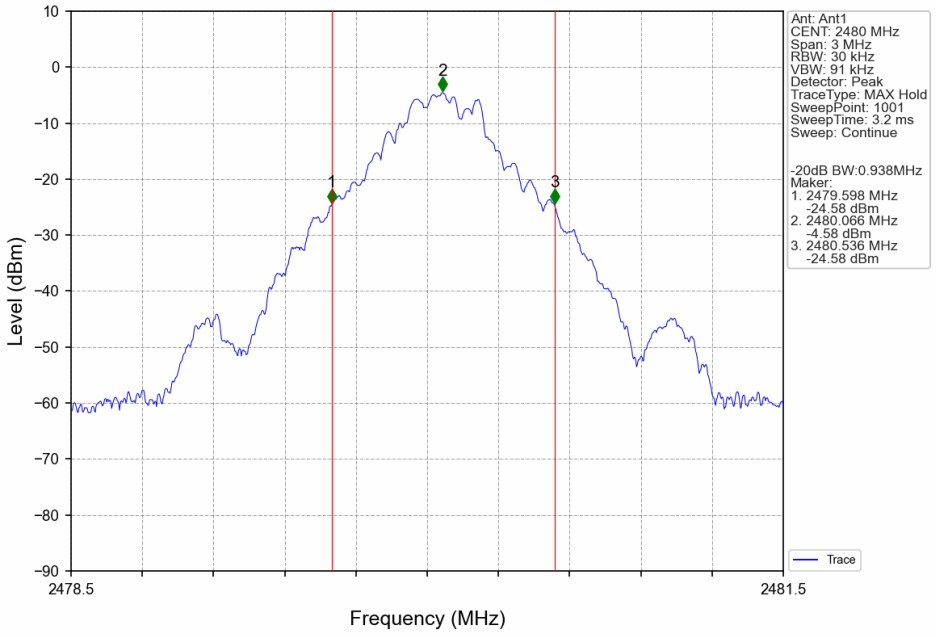
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



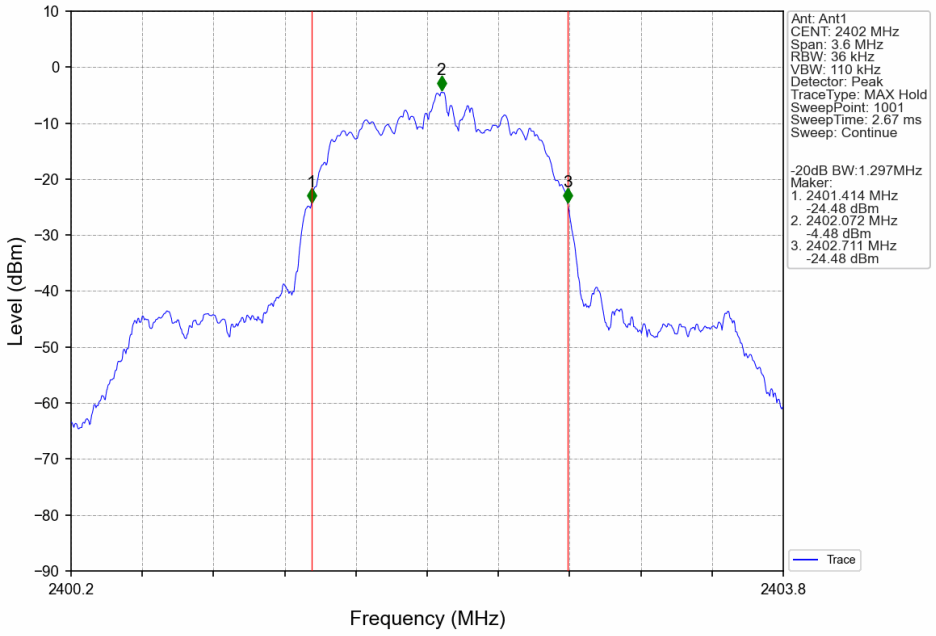
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



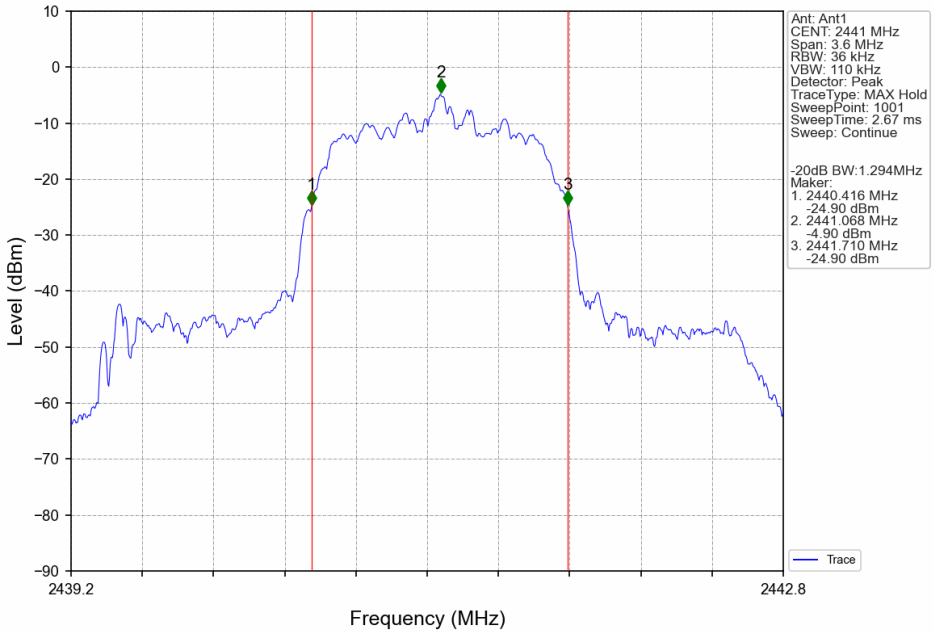
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



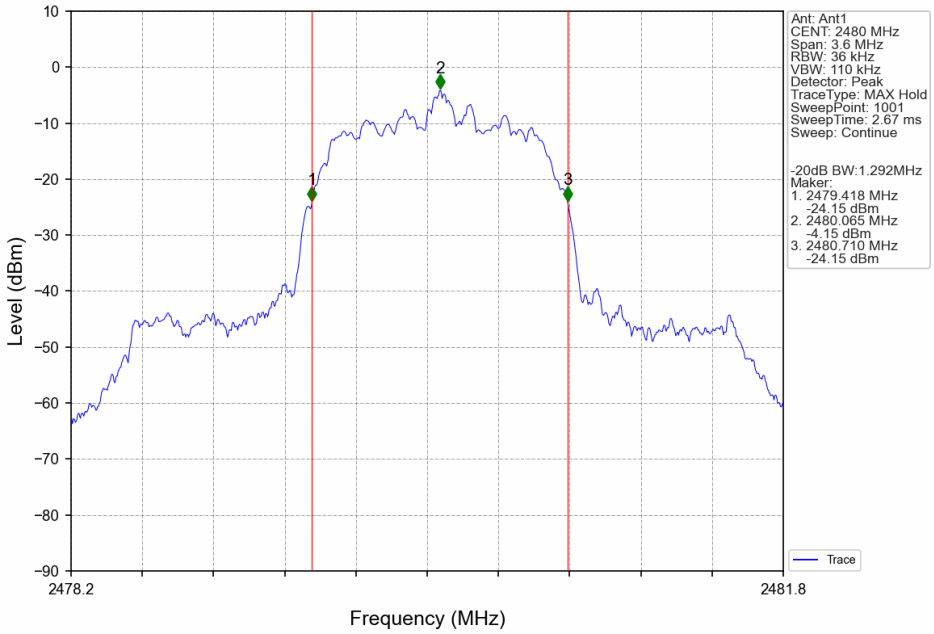
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

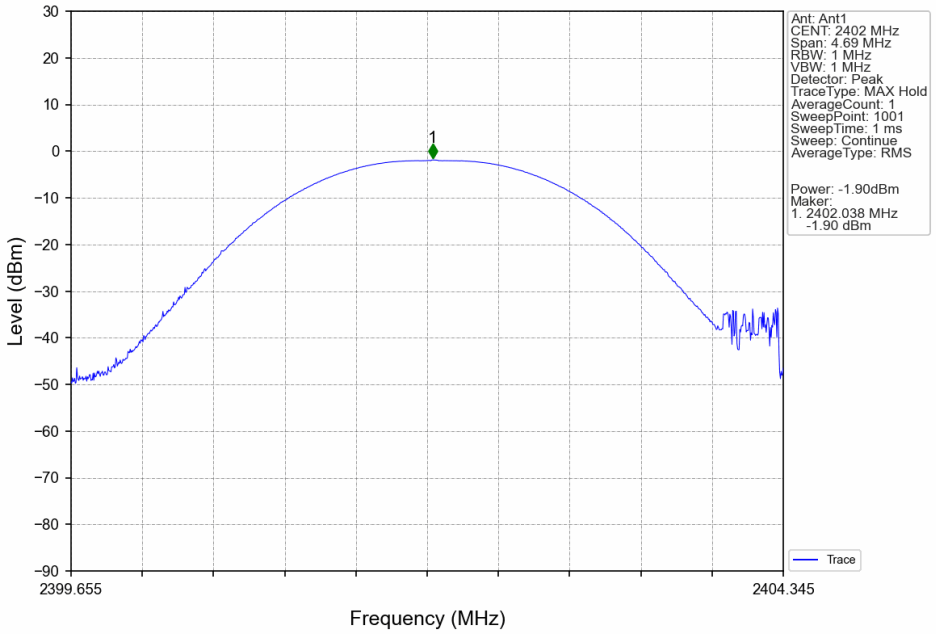
3.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.90	<=30	Pass
		2441	DH5	-2.62	<=30	Pass
		2480	DH5	-2.07	<=30	Pass
π/4DQPSK	SISO	2402	2DH5	0.51	<=20.97	Pass
		2441	2DH5	-0.11	<=20.97	Pass
		2480	2DH5	0.46	<=20.97	Pass
Note1: Antenna Gain: Ant1: 2.70dBi;						

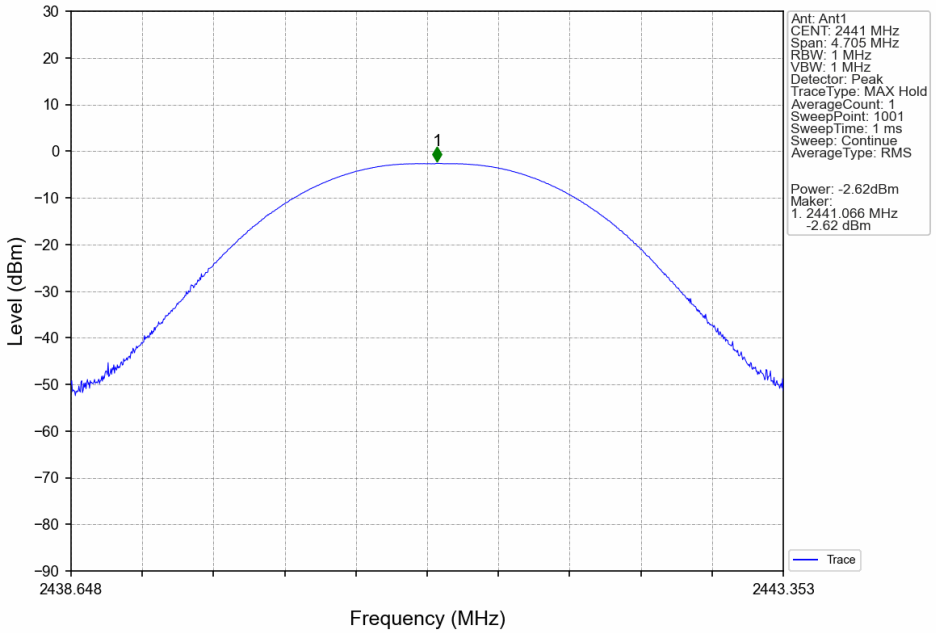
3.2 Test Graph

3.2.1 Power

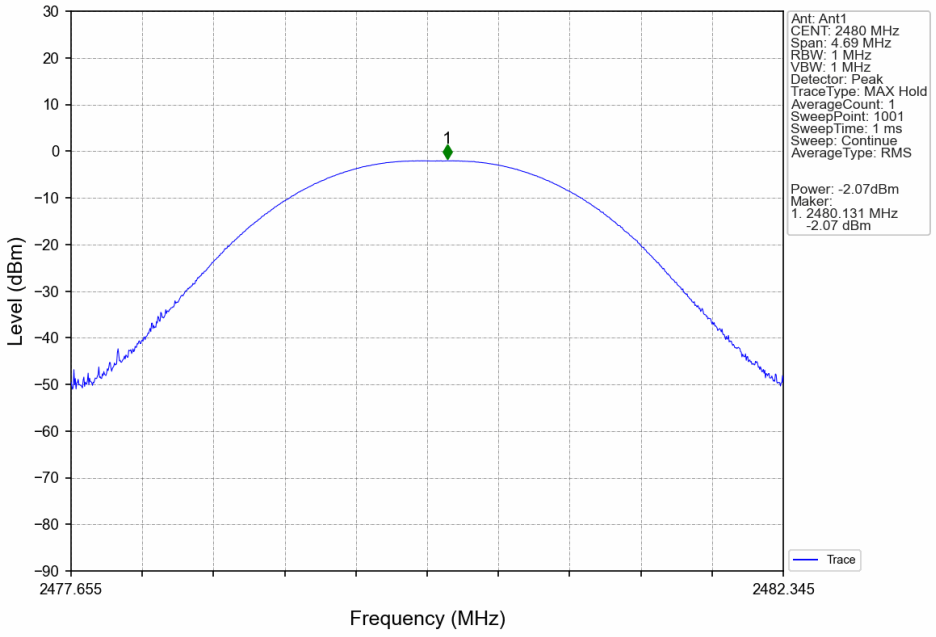
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



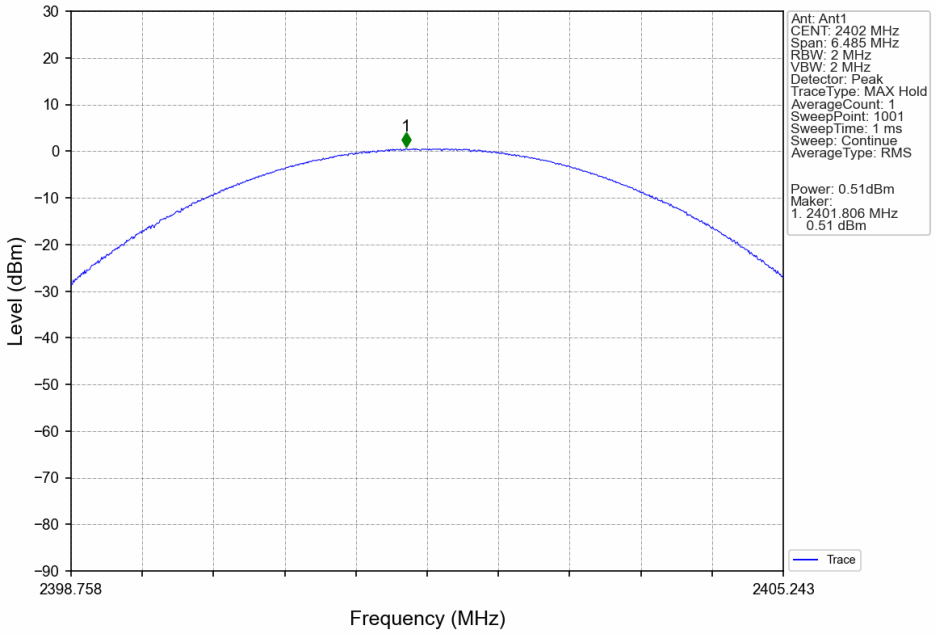
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



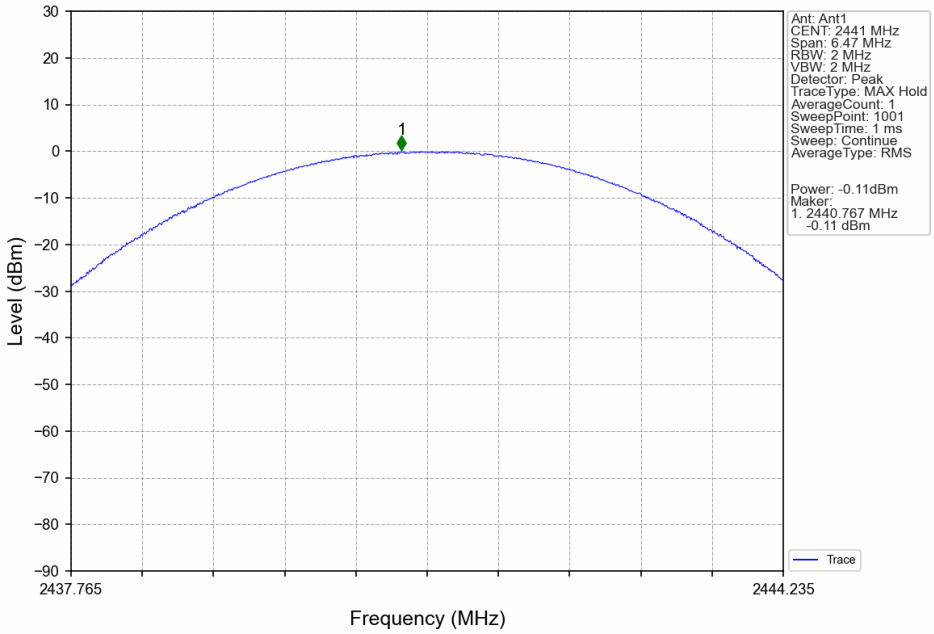
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



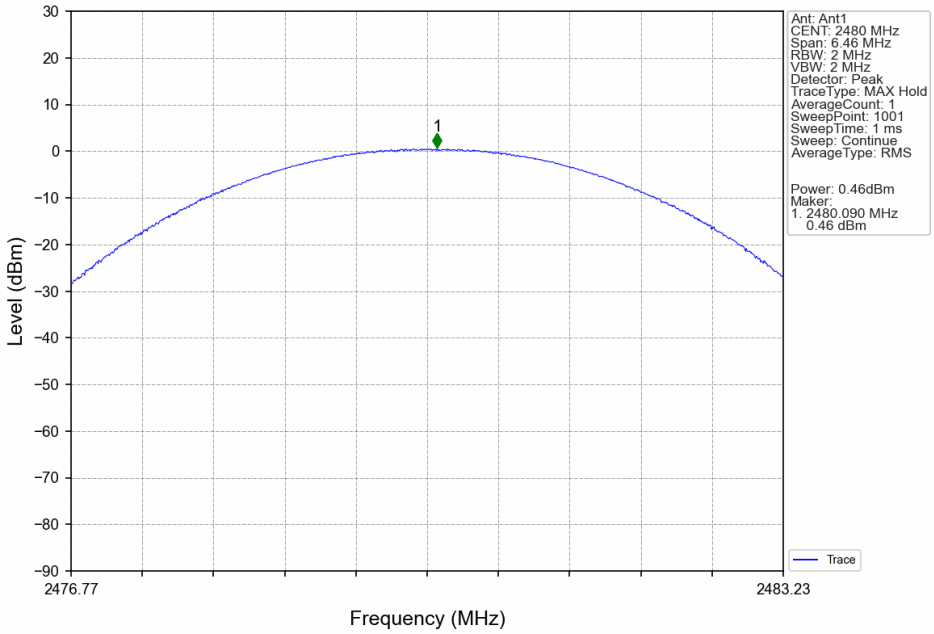
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



4. Carrier Frequency Separation

4.1 Test Result

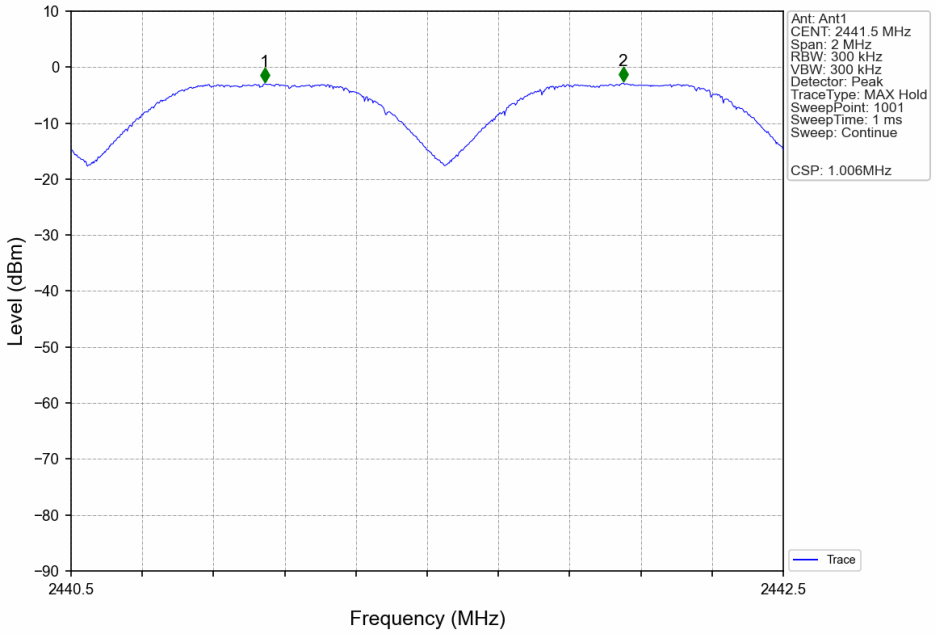
4.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.006	0.941	>=0.941	Pass
π/4DQPSK	SISO	HOPP	2DH5	1.018	1.297	>=0.865	Pass

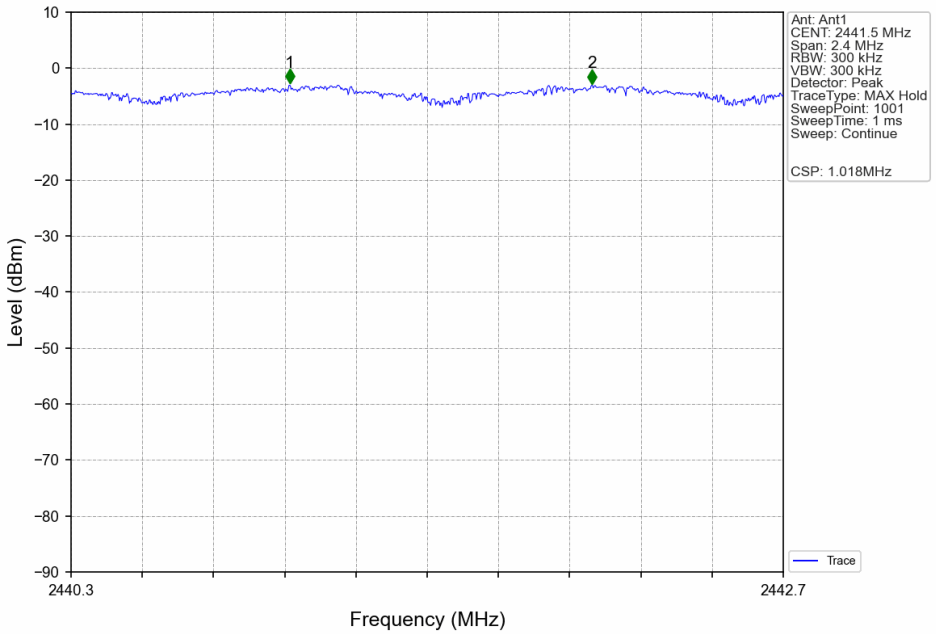
4.2 Test Graph

4.2.1 Ant1

GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



5. Number of Hopping Frequencies

5.1 Test Result

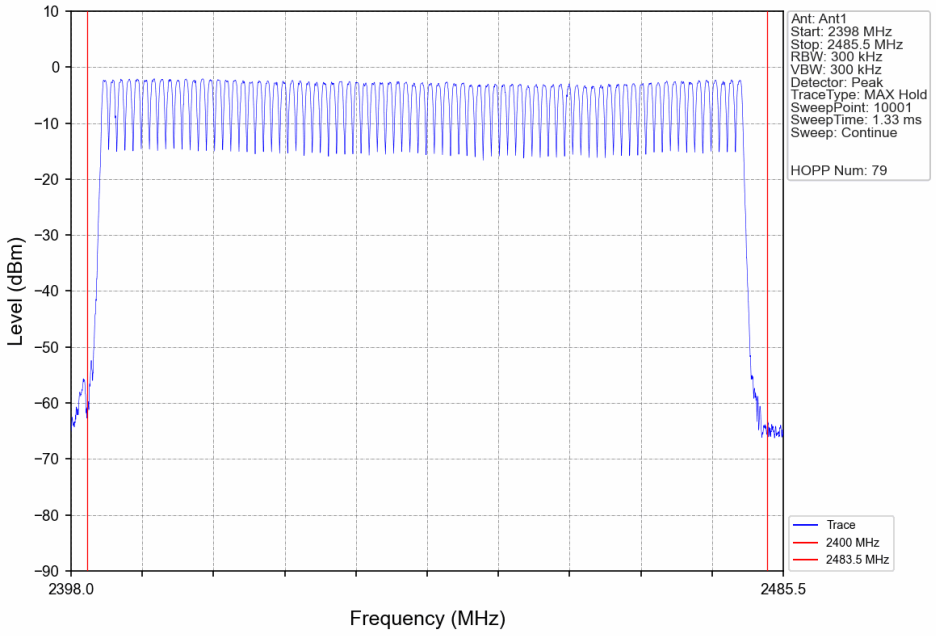
5.1.1 HoppNum

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
π/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass

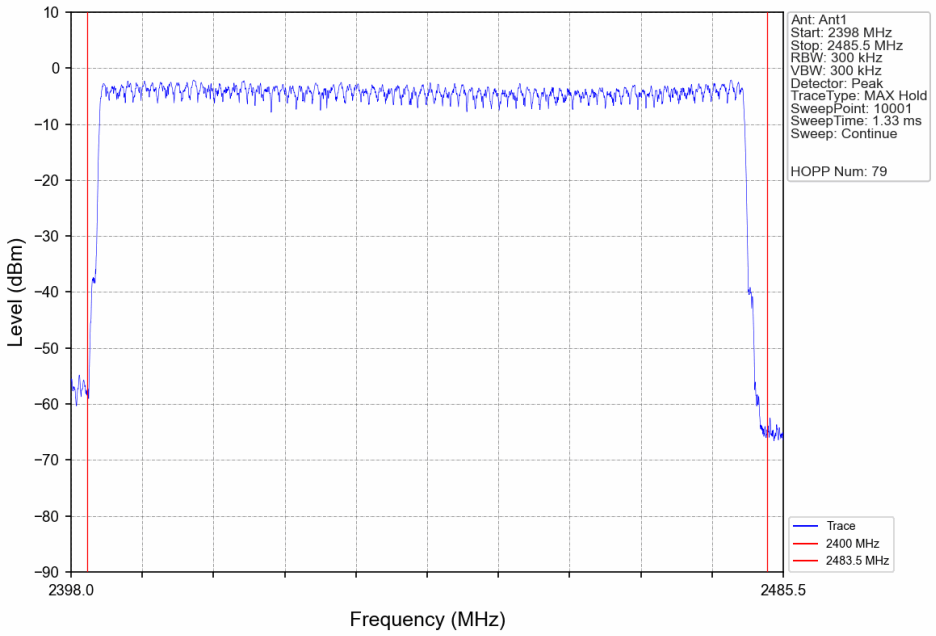
5.2 Test Graph

5.2.1 HoppNum

GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



6. Time of Occupancy (Dwell Time)

6.1 Test Result

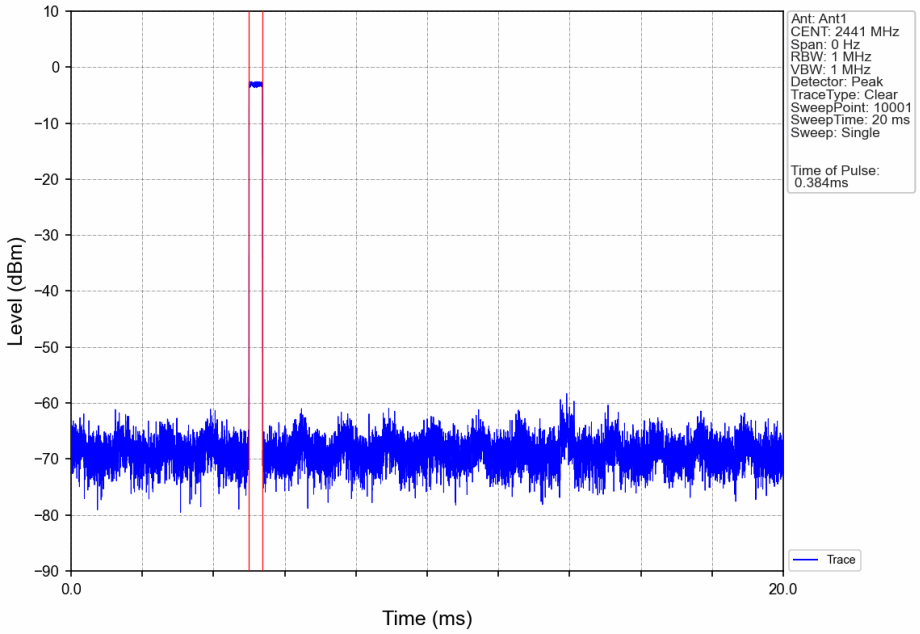
6.1.1 Ant1

Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.384	31.600	319	122.496	<=400	Pass
			DH3	1.638	31.600	158	258.804	<=400	Pass
			DH5	2.886	31.600	106	305.916	<=400	Pass
π /4DQPSK	SISO	HOPP	2DH1	0.398	31.600	320	127.360	<=400	Pass
			2DH3	1.648	31.600	170	280.160	<=400	Pass
			2DH5	2.898	31.600	101	292.698	<=400	Pass

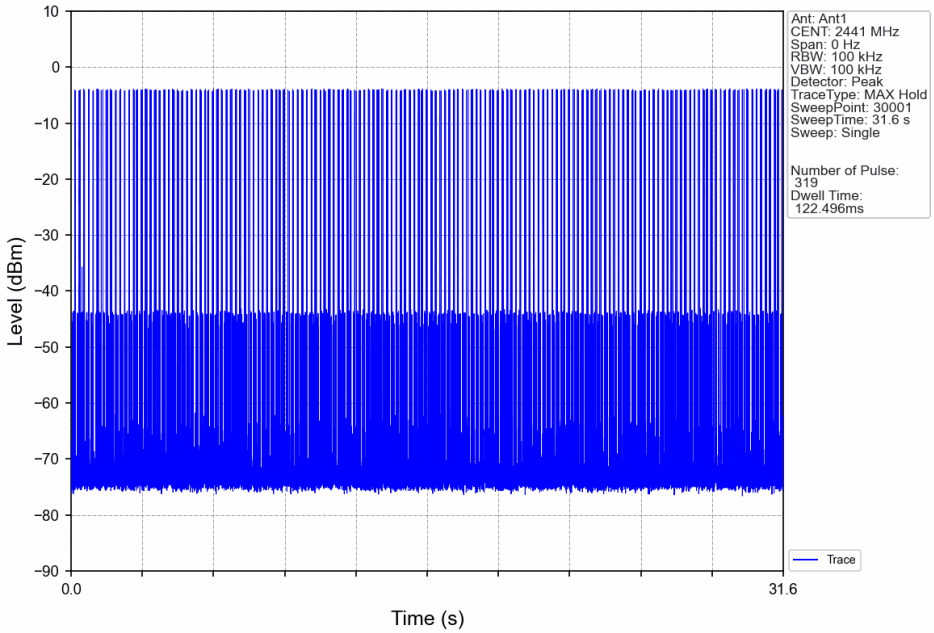
6.2 Test Graph

6.2.1 Ant1

GFSK_DH1_HOPP_Ant1_NTNV



GFSK_DH1_HOPP_Ant1_NTNV



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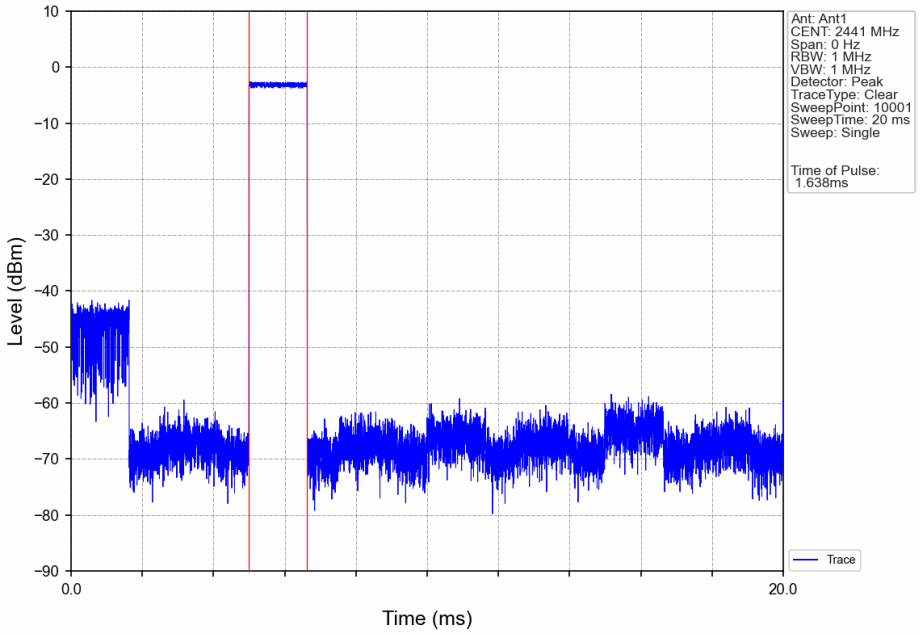

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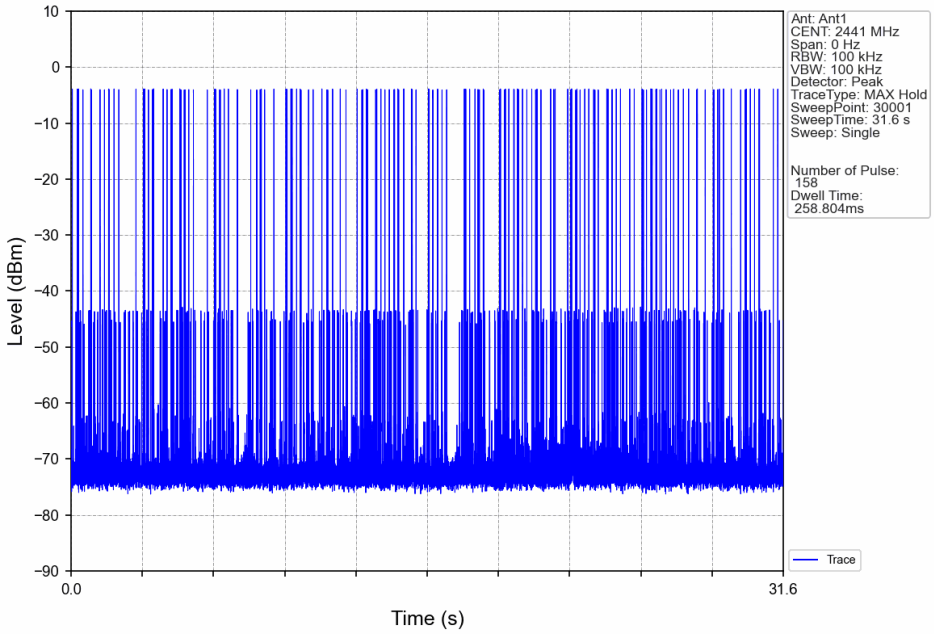
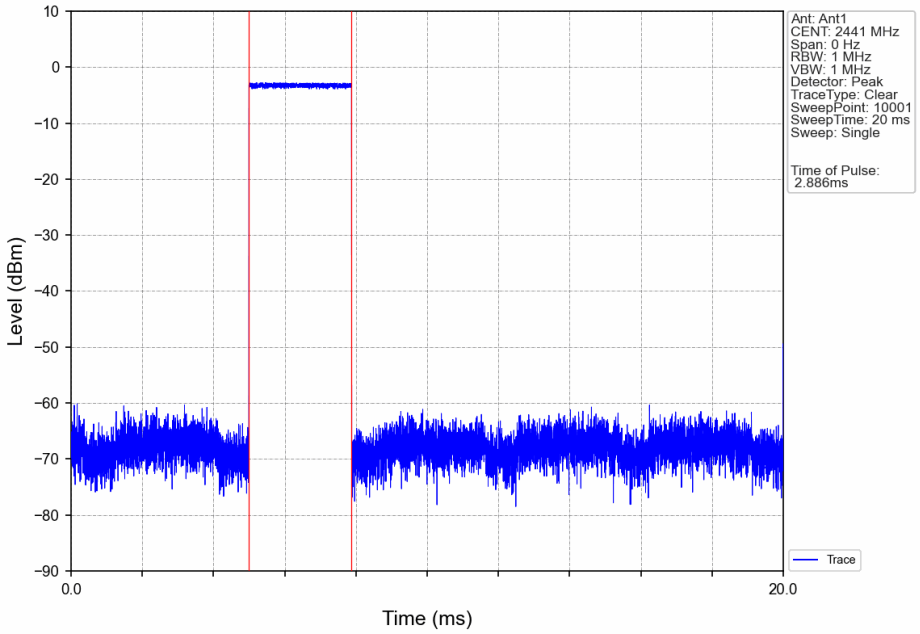
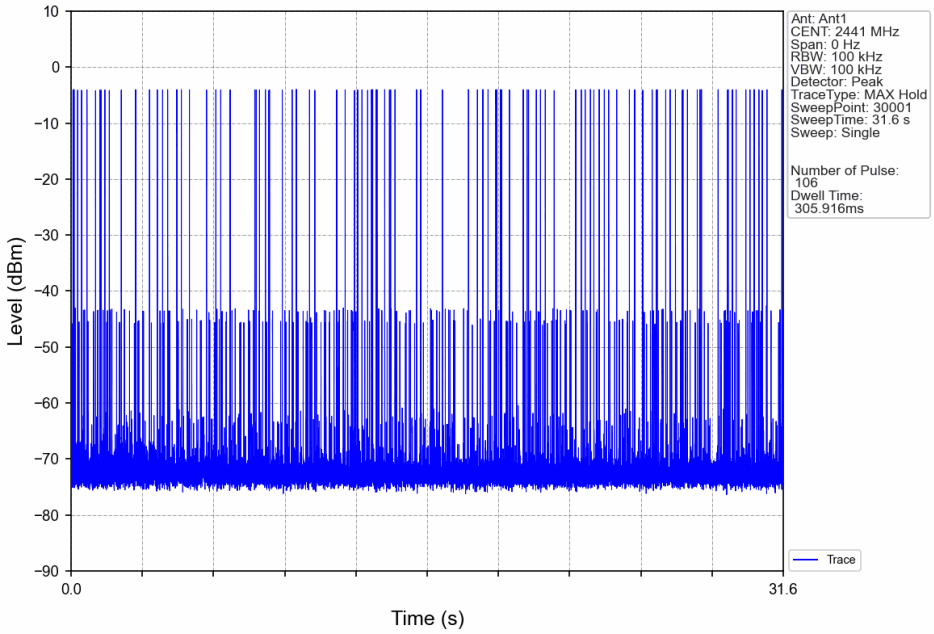


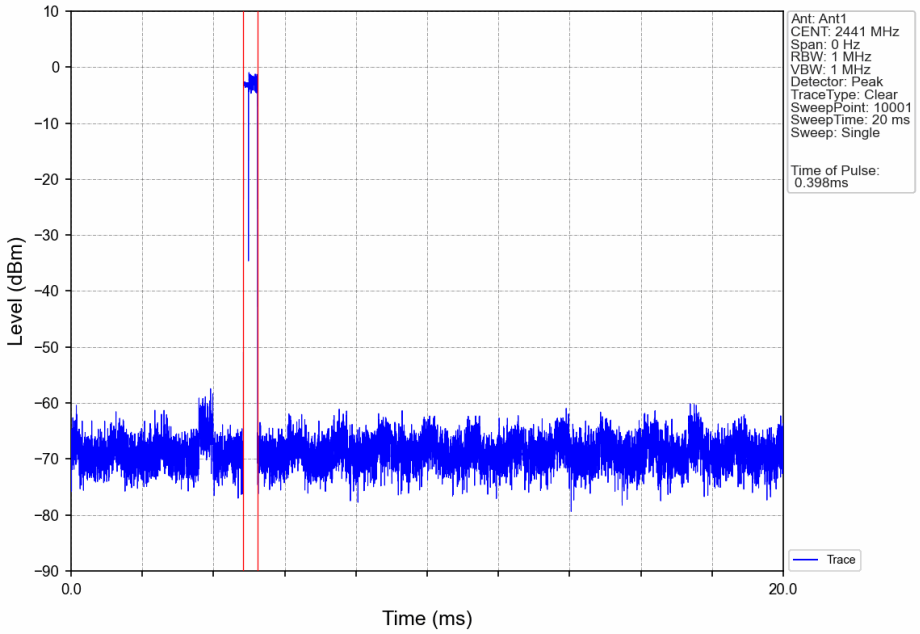
GFSK_DH5_HOPP_Ant1_NTNV



GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH1_HOPP_Ant1_NTNV



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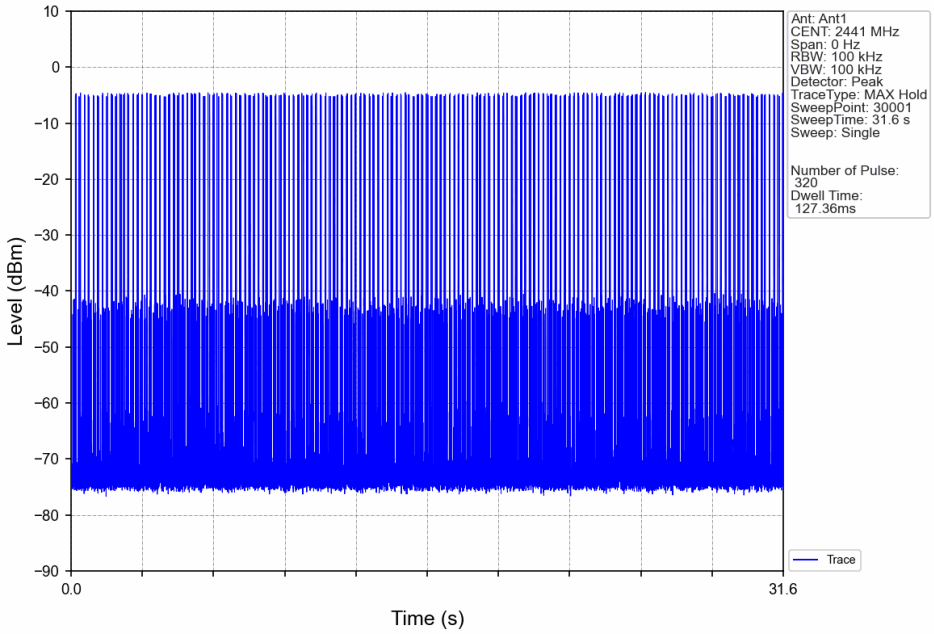

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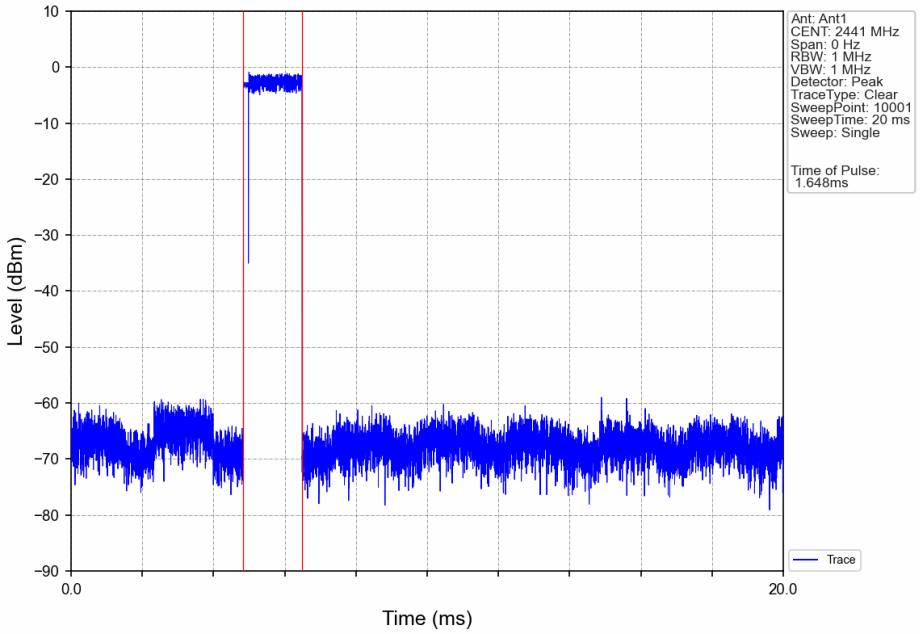

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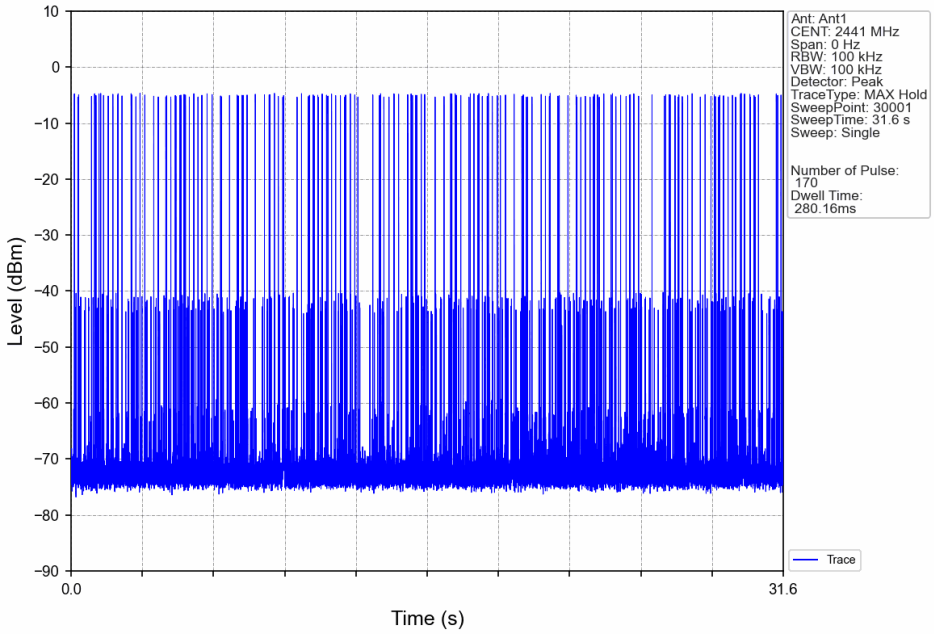
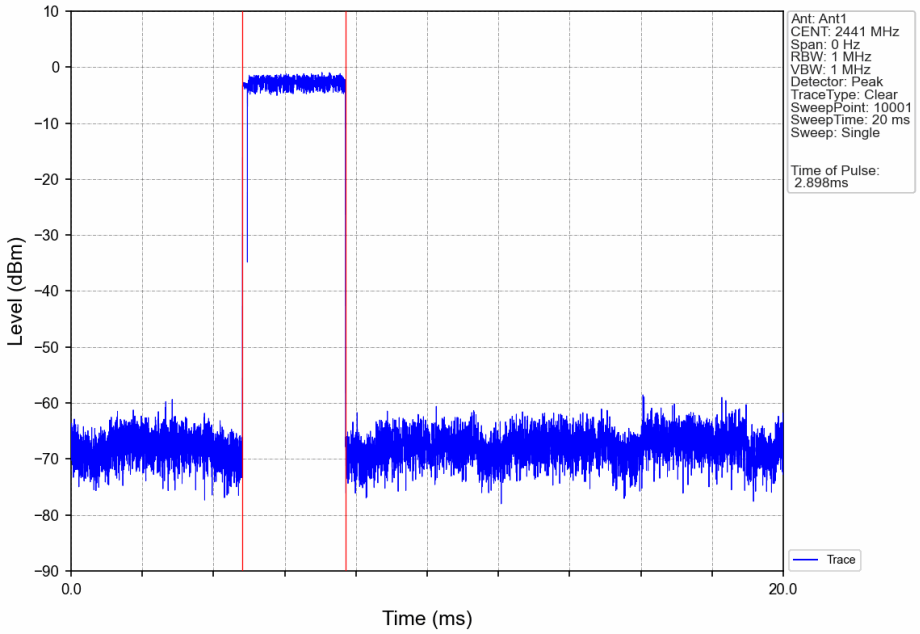
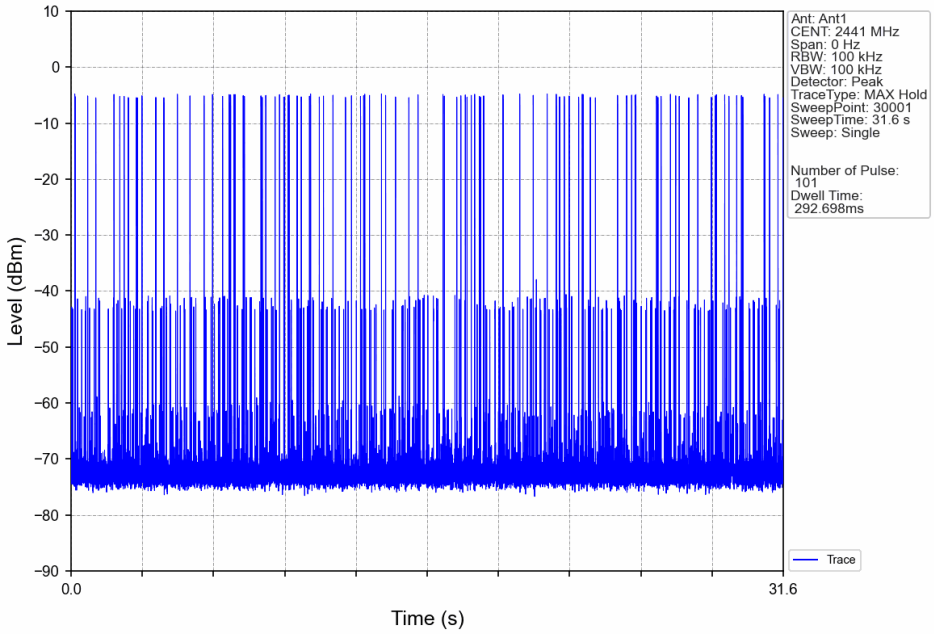


π/4DQPSK_2DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



7. Unwanted Emissions In Non-restricted Frequency Bands

7.1 Test Result

7.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-2.49
		2441	DH5	1	-3.41
		2480	DH5	1	-2.41
		HOPP	DH5	1	-2.60
					-2.60
π/4DQPSK	SISO	2402	2DH5	1	-2.37
		2441	2DH5	1	-3.17
		2480	2DH5	1	-2.65
		HOPP	2DH5	1	-2.45
					-2.45
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.					

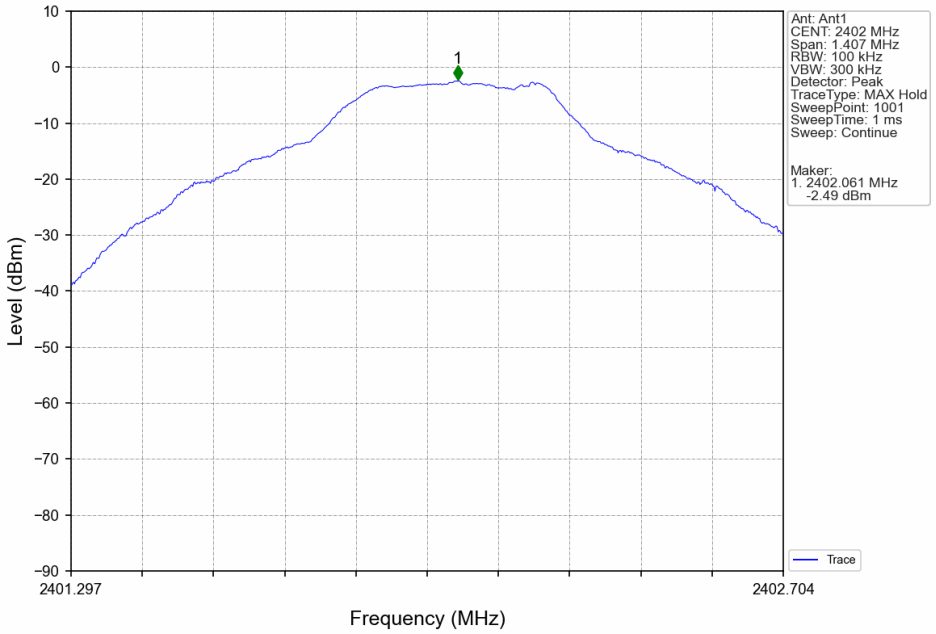
7.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-2.49	-22.49	Pass
		2441	DH5	1	-3.41	-23.41	Pass
		2480	DH5	1	-2.41	-22.41	Pass
		HOPP	DH5	1	-2.60	-22.60	Pass
					-2.60	-22.60	Pass
π/4DQPSK	SISO	2402	2DH5	1	-2.37	-22.37	Pass
		2441	2DH5	1	-3.17	-23.17	Pass
		2480	2DH5	1	-2.65	-22.65	Pass
		HOPP	2DH5	1	-2.45	-22.45	Pass
					-2.45	-22.45	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.							

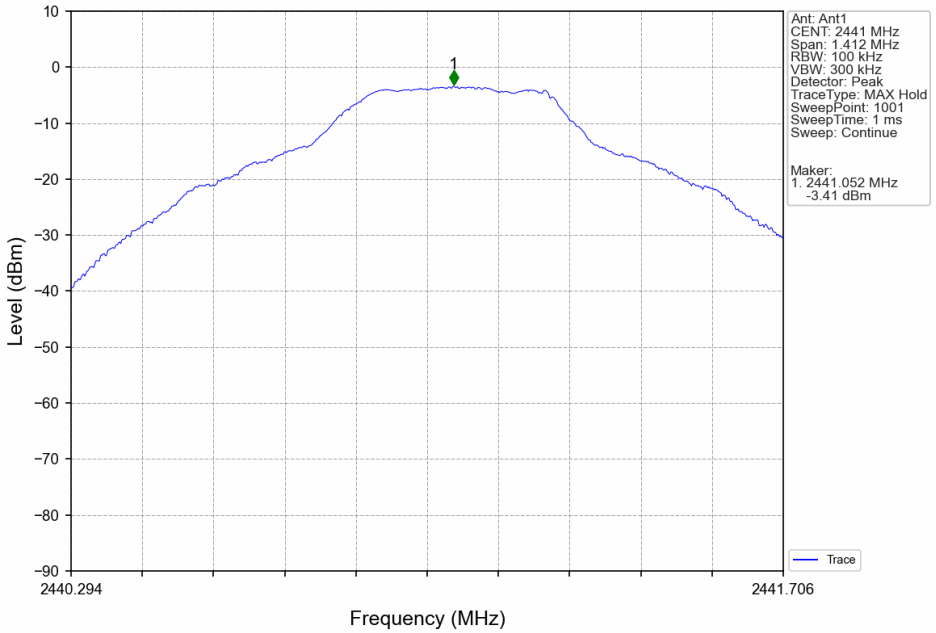
7.2 Test Graph

7.2.1 Ref

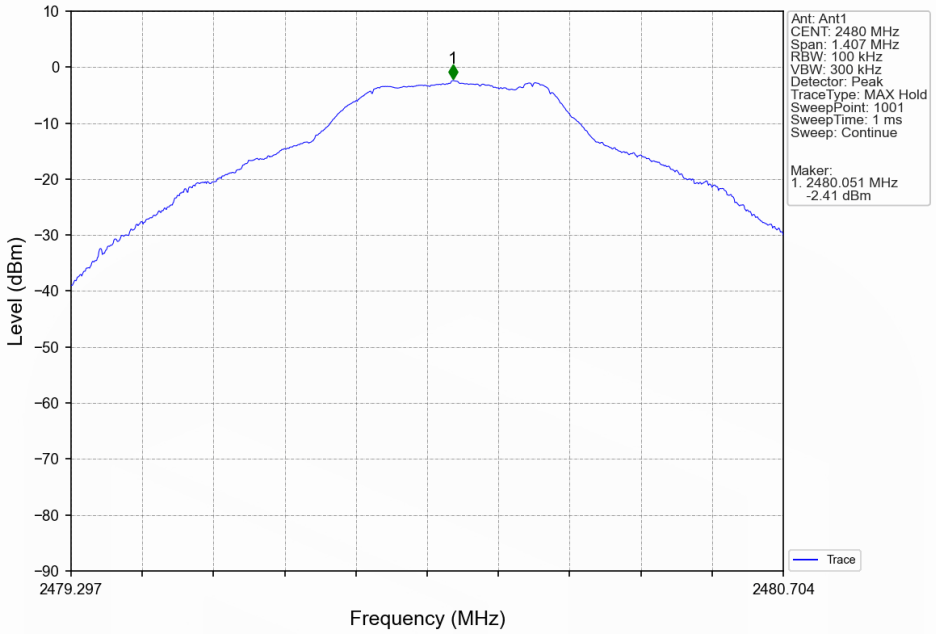
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



GFSK_DH5_MCH_2441MHz_Ant1_NTNV



GFSK_DH5_HCH_2480MHz_Ant1_NTNV



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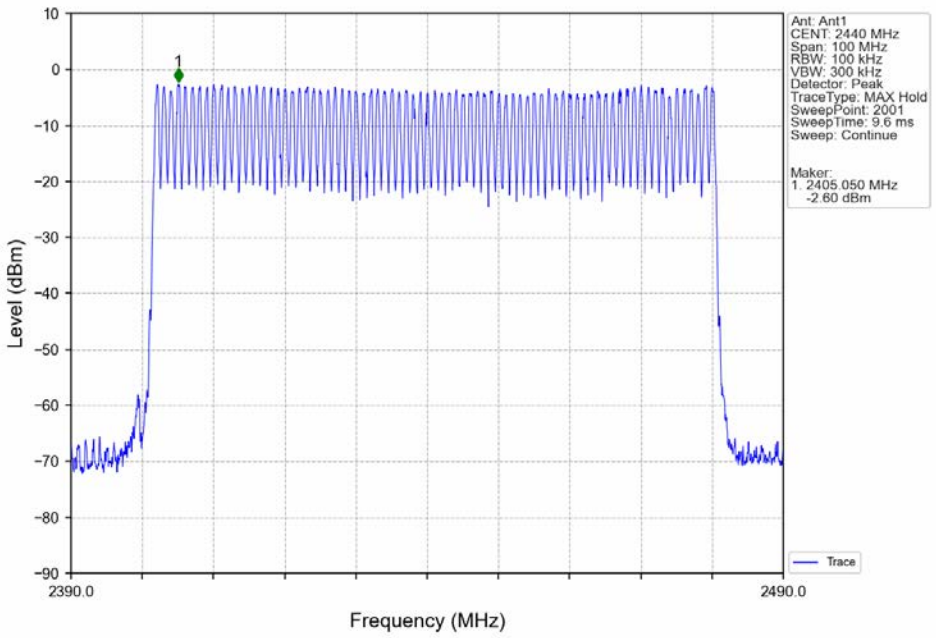
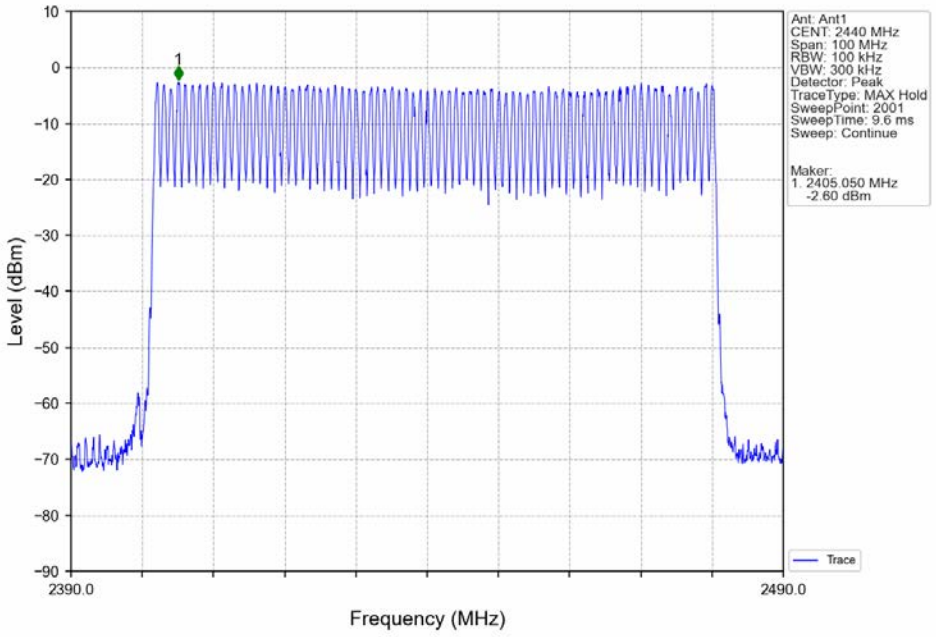
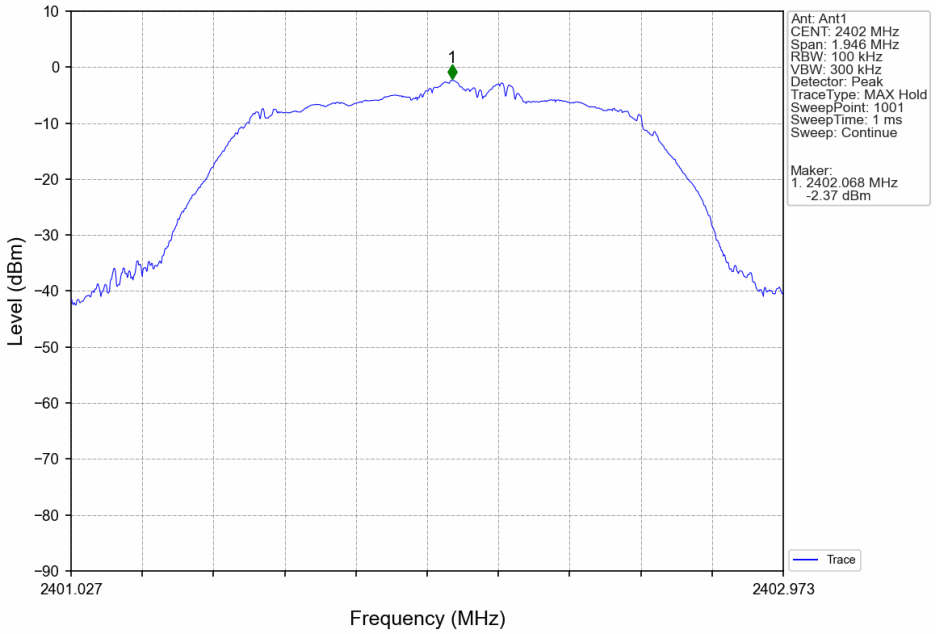


GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



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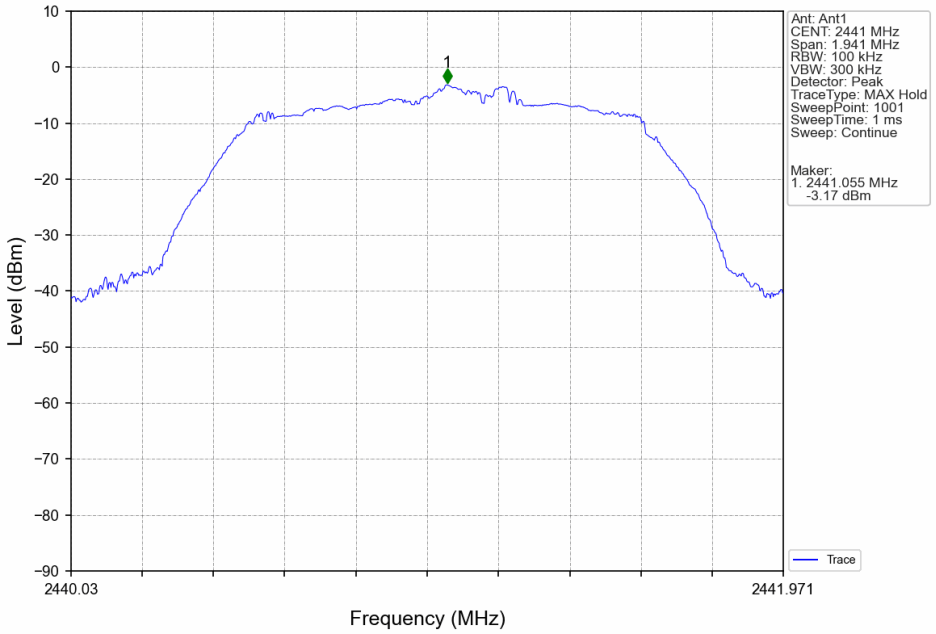

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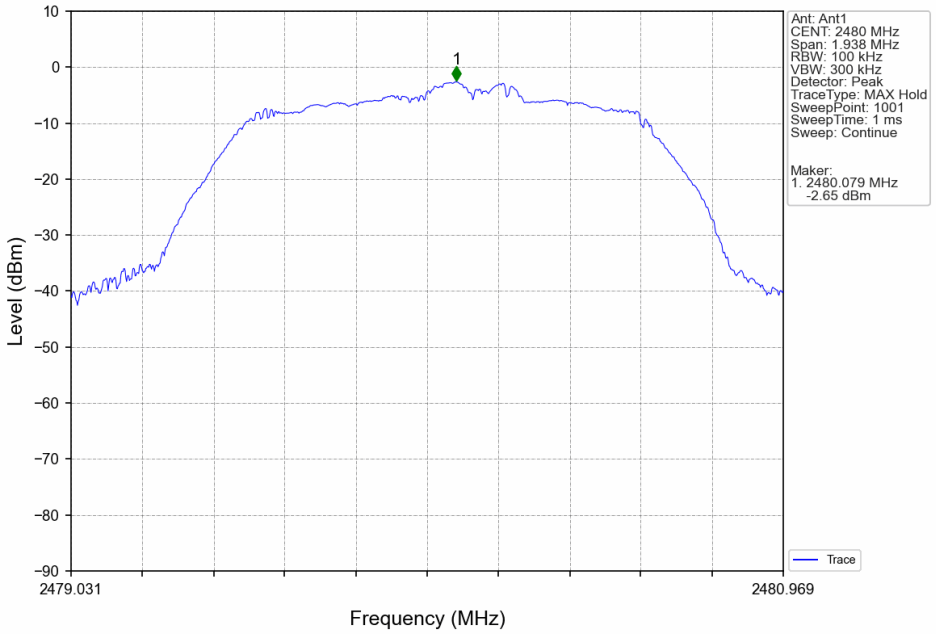

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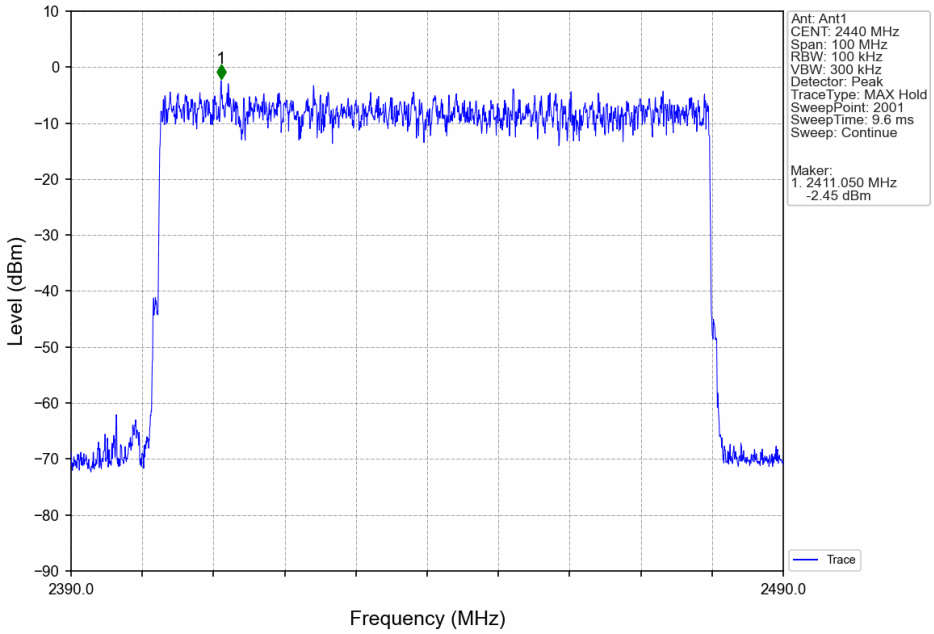

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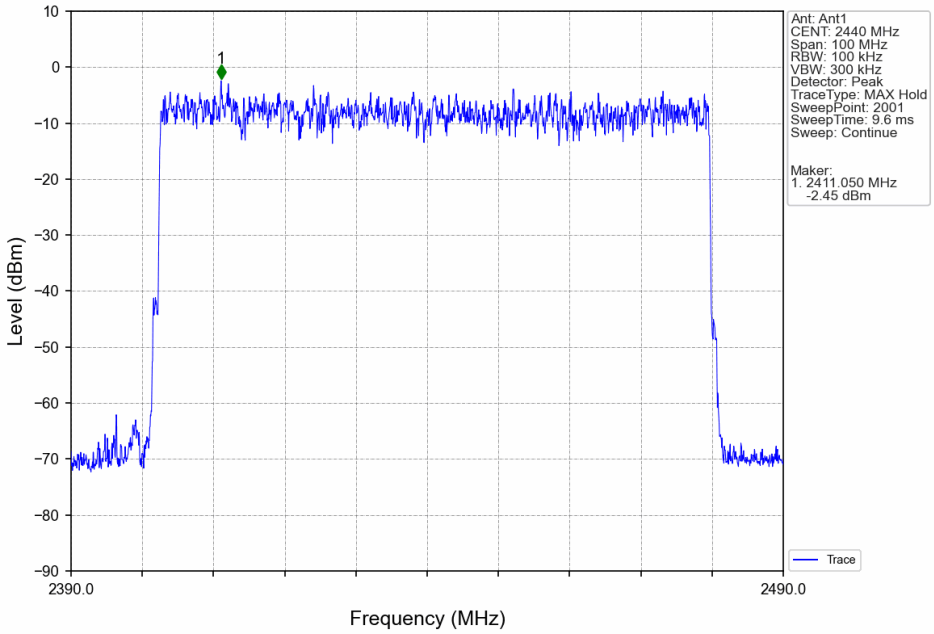
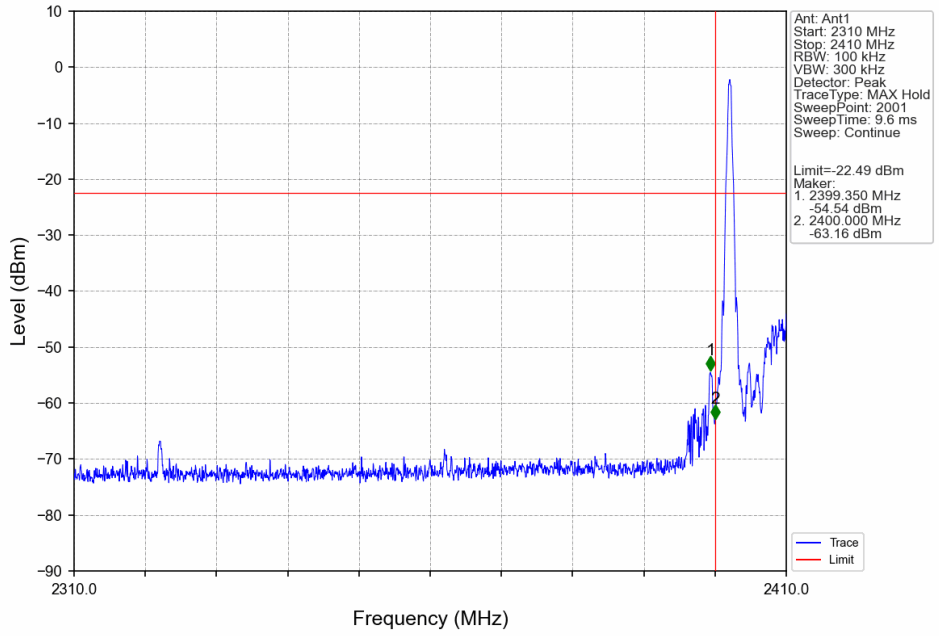
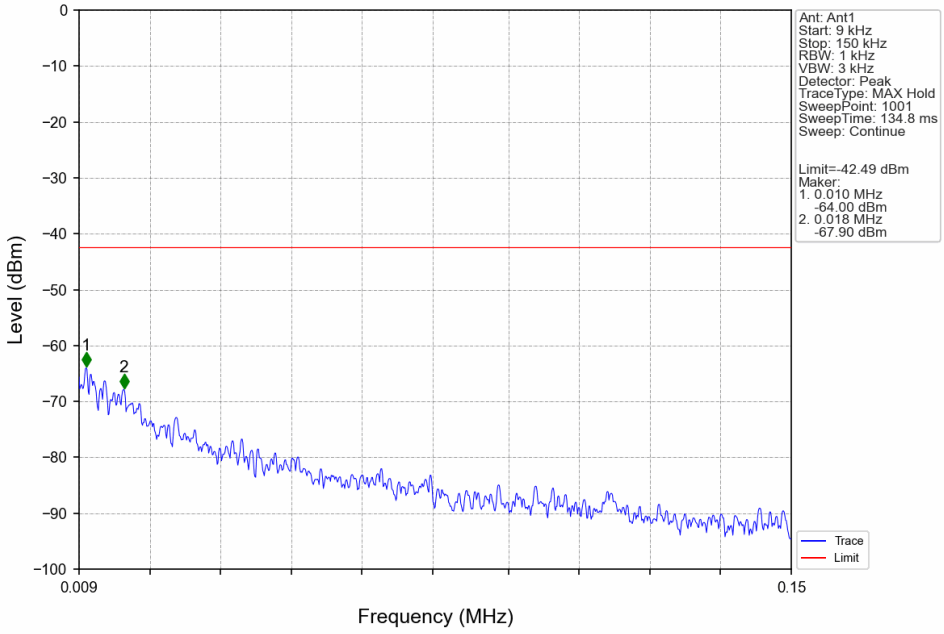


7.2.2 CSE

GFSK_DH5_LCH_2402MHz_Ant1_NTNV



GFSK_DH5_LCH_2402MHz_Ant1_NTNV



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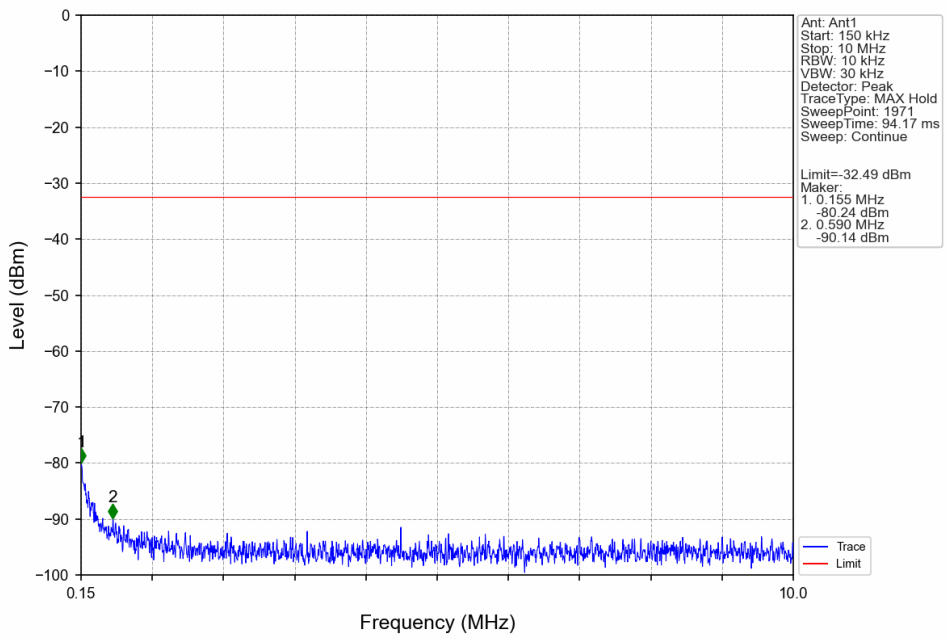

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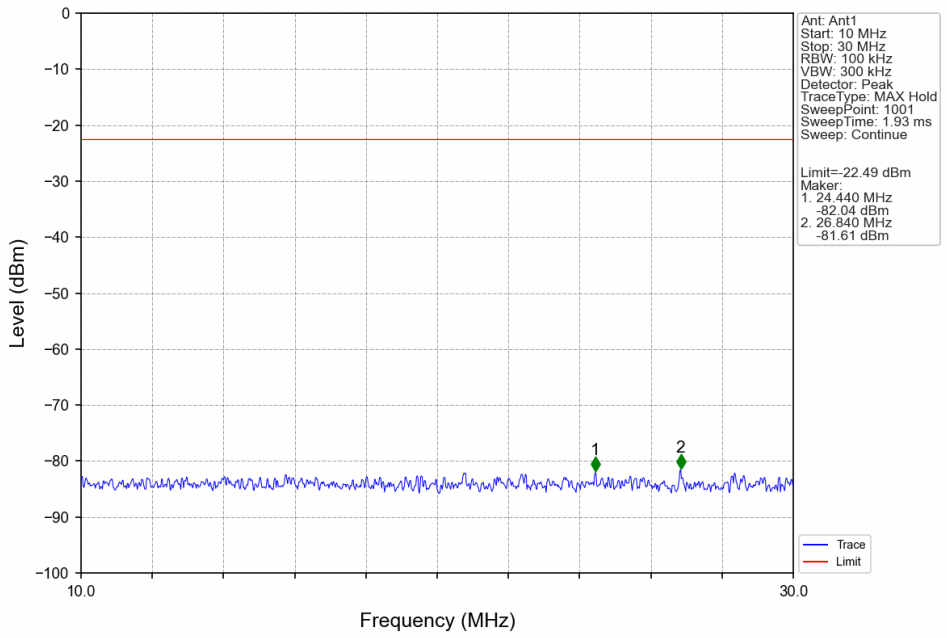

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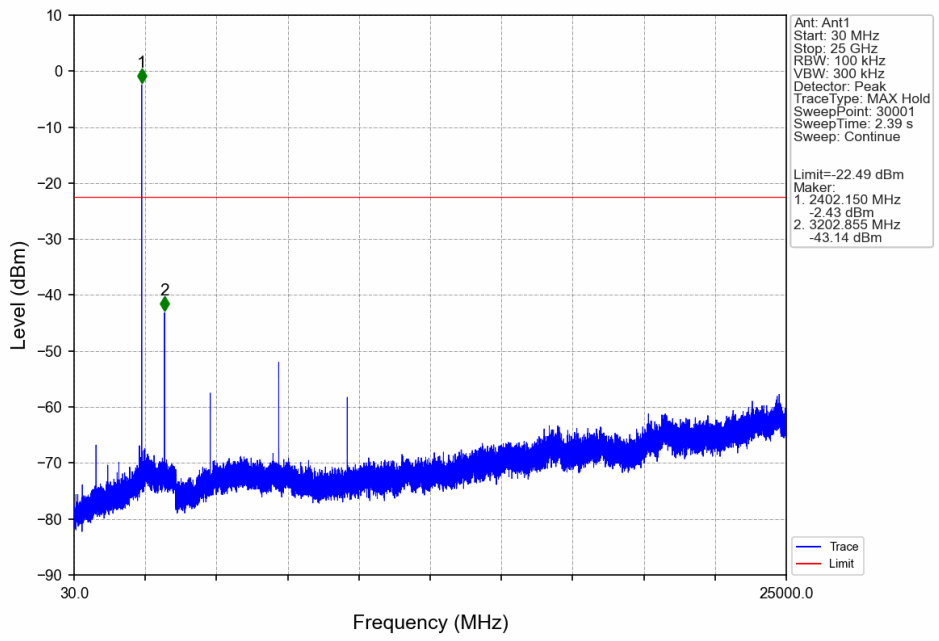

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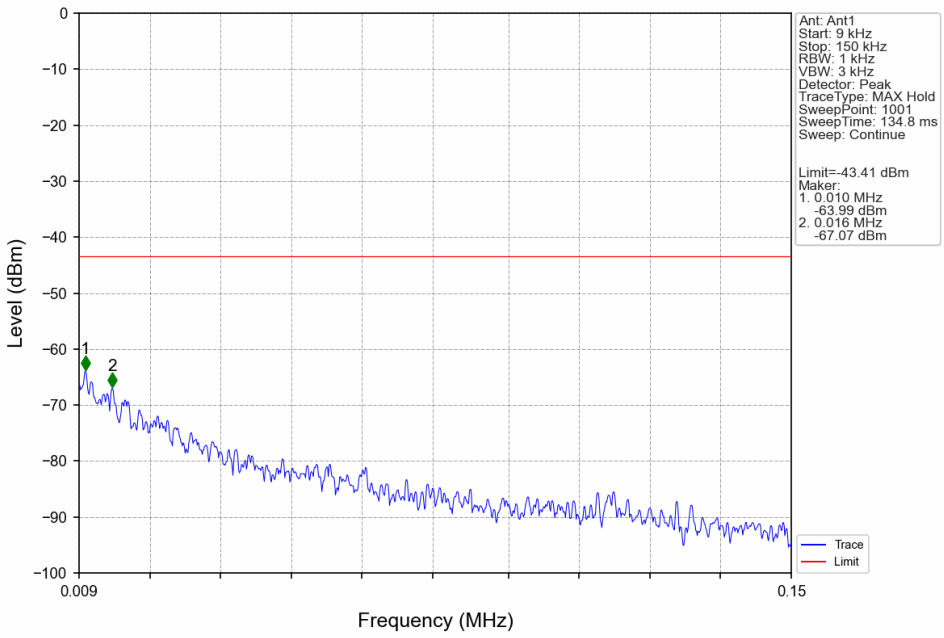

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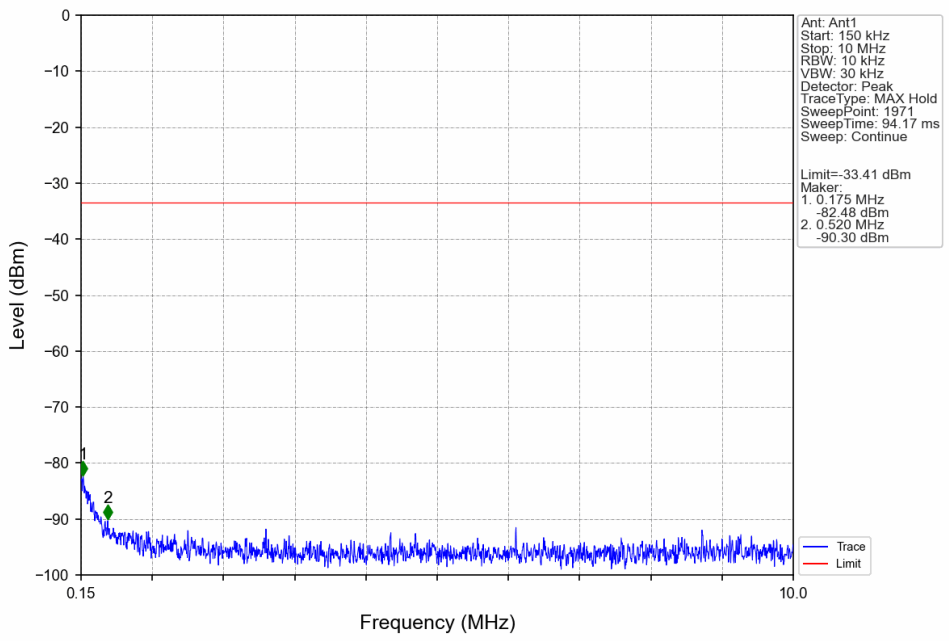

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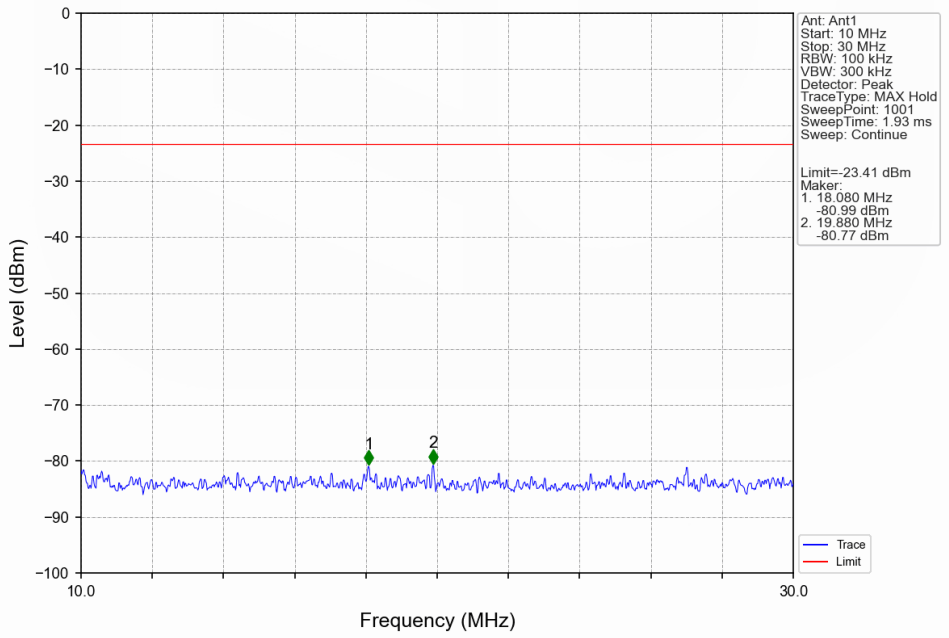

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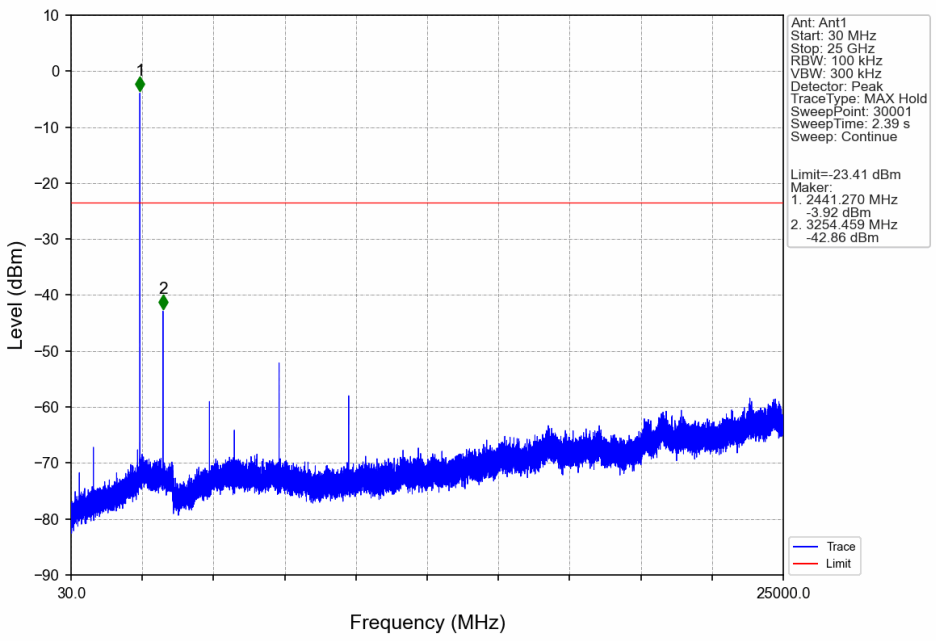
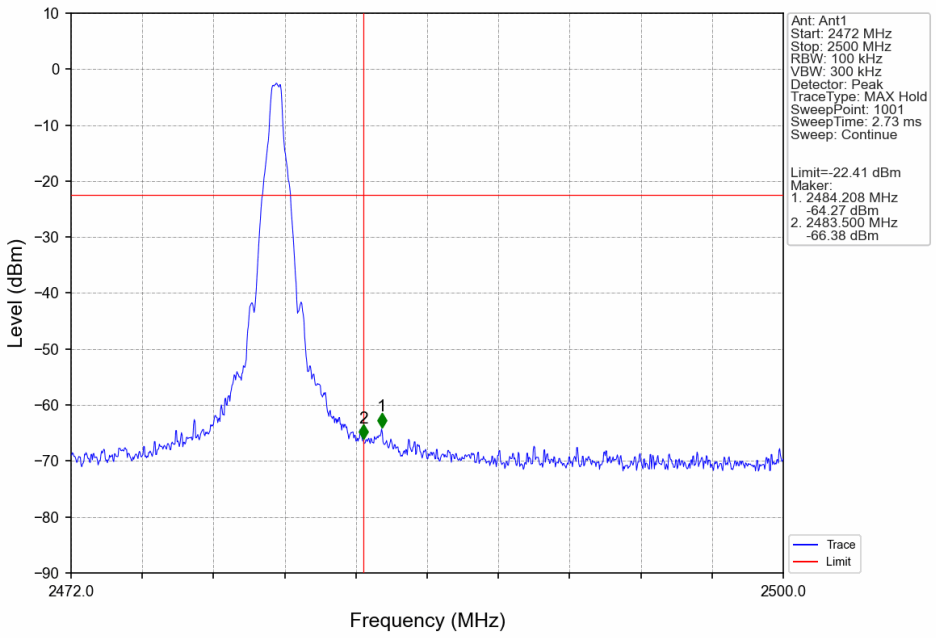


GFSK_DH5_HCH_2480MHz_Ant1_NTNV



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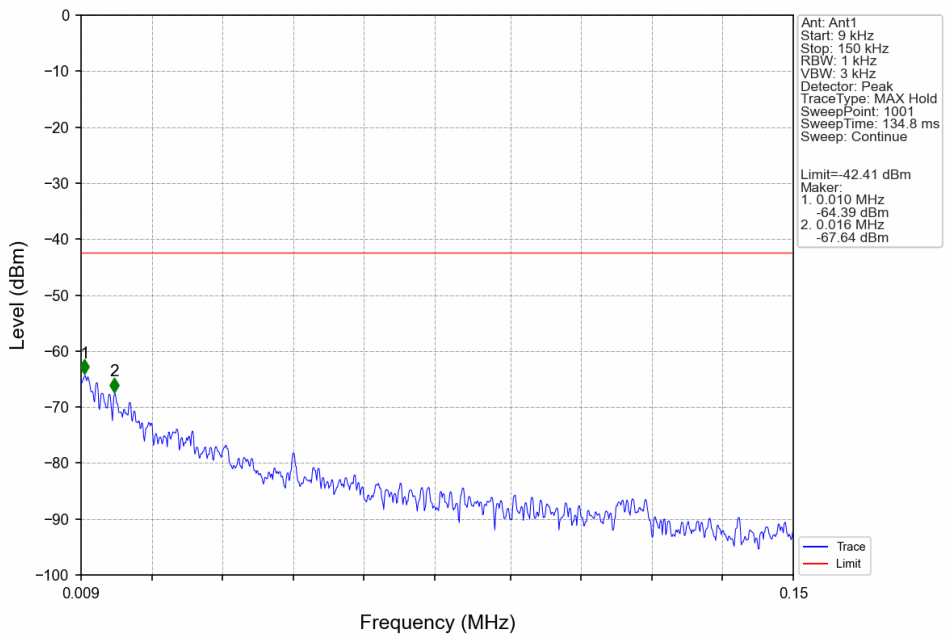

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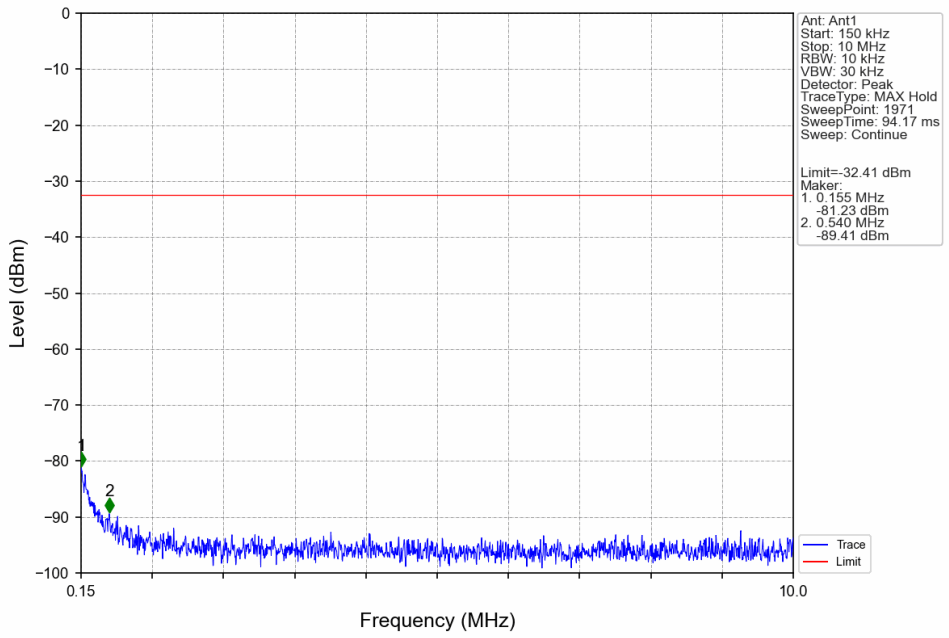

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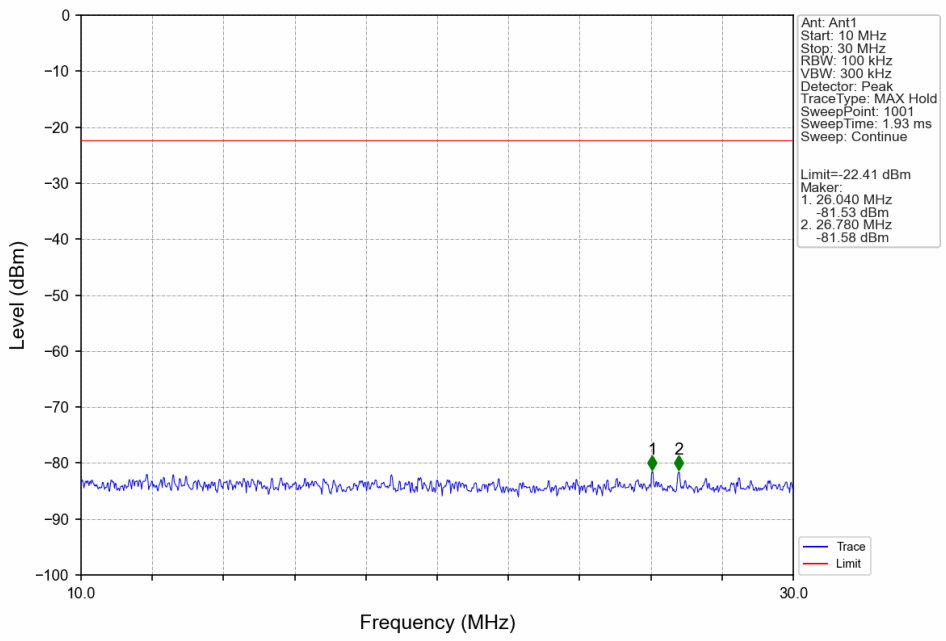

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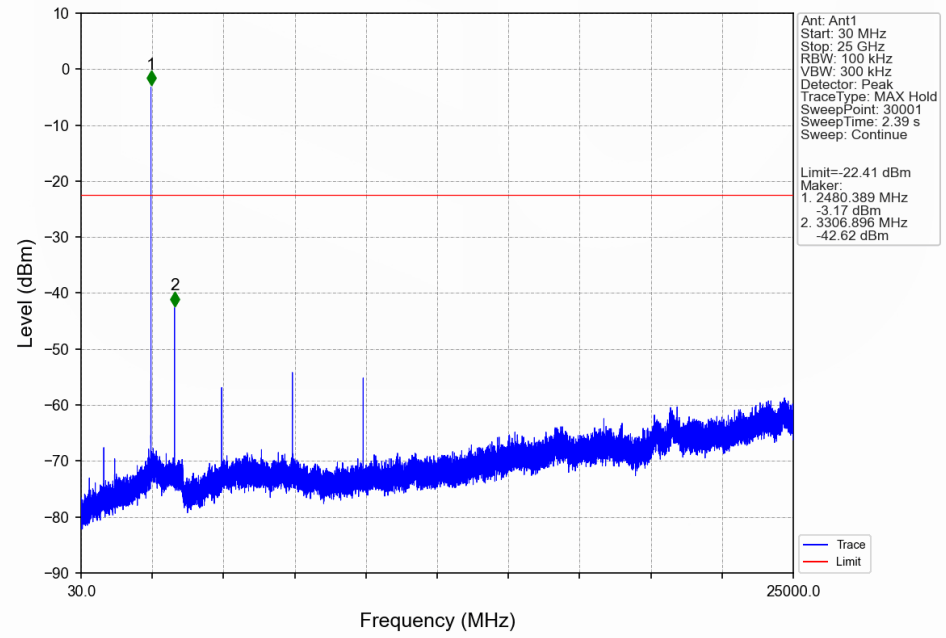

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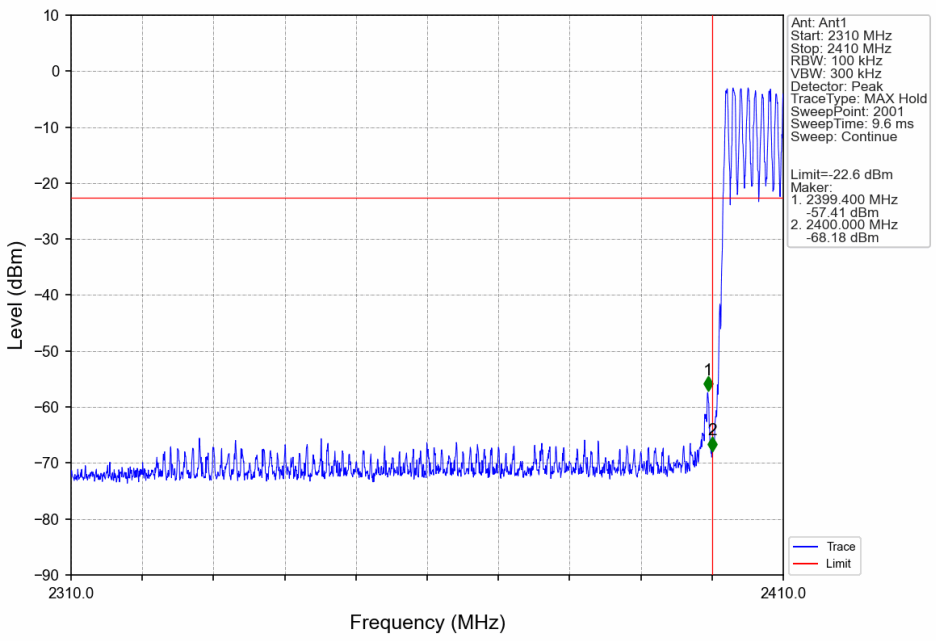

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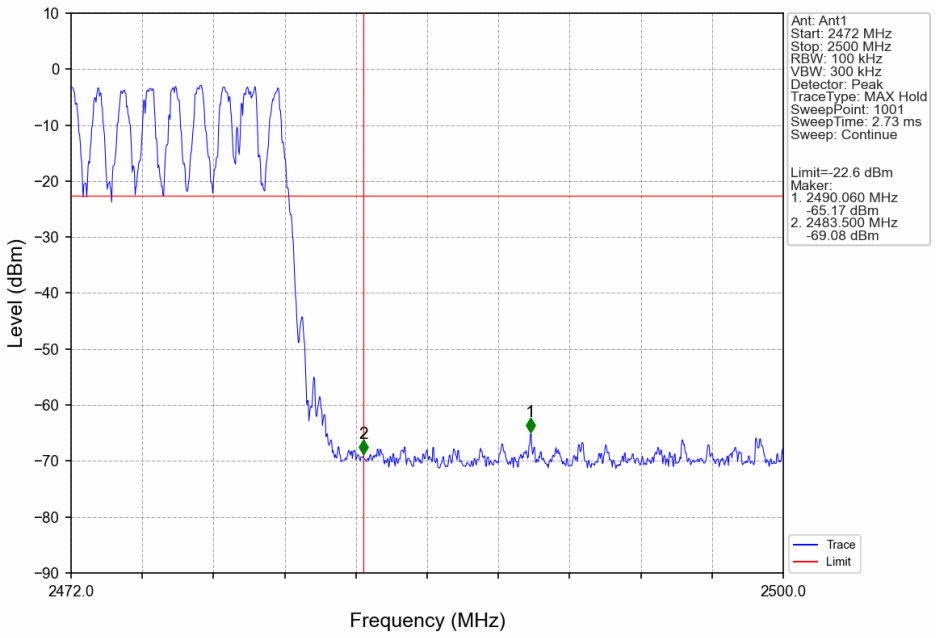

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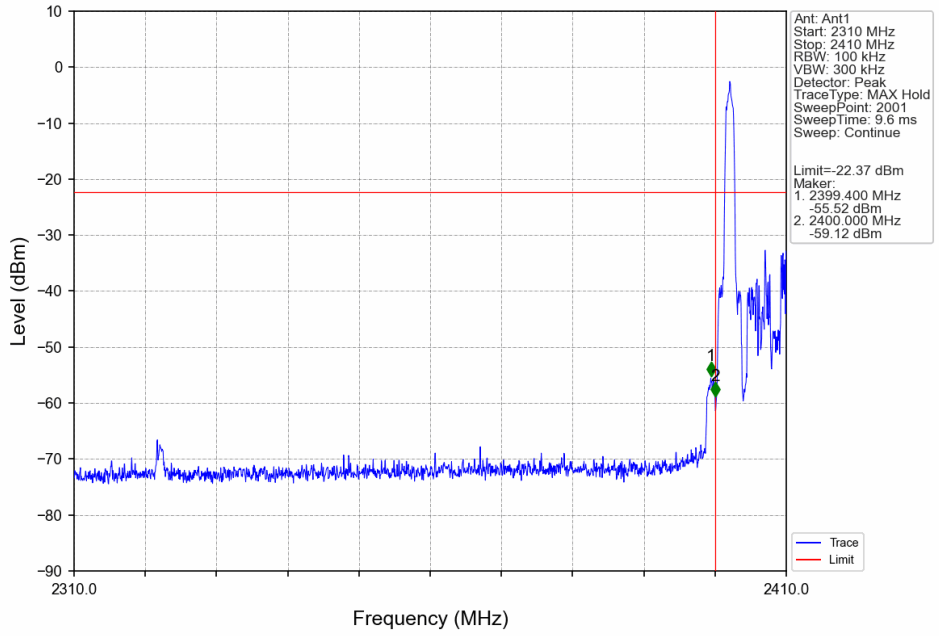

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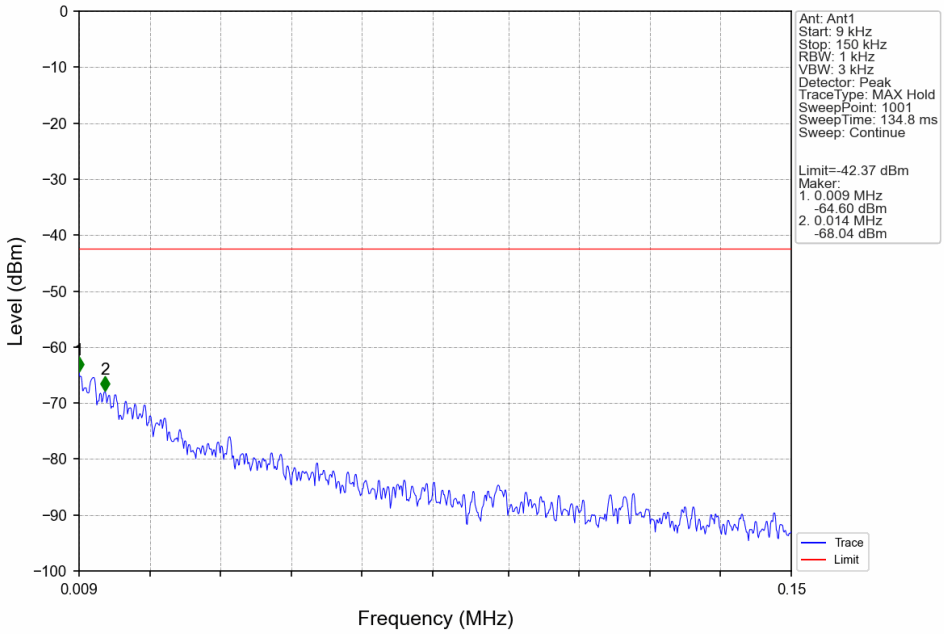

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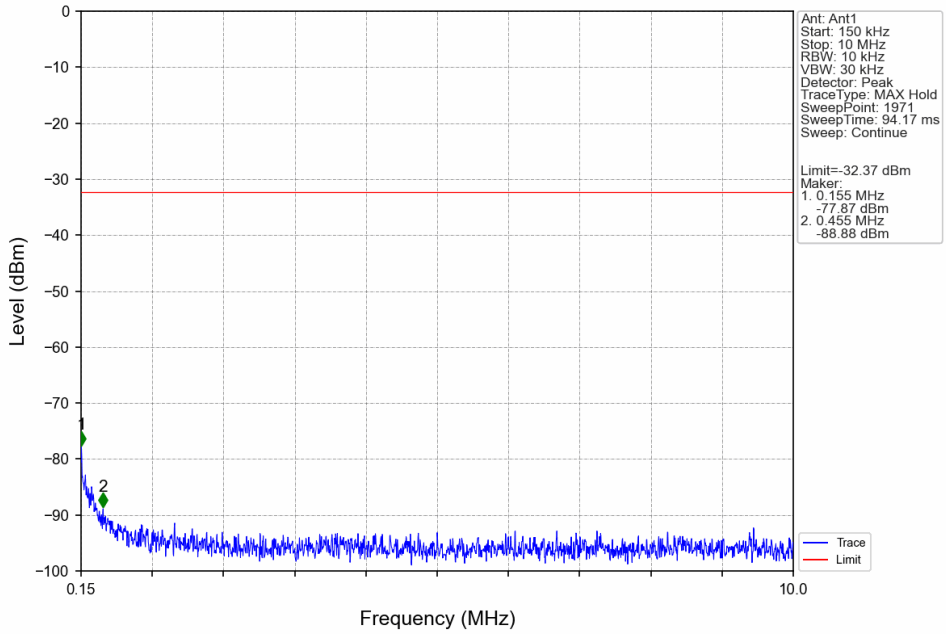

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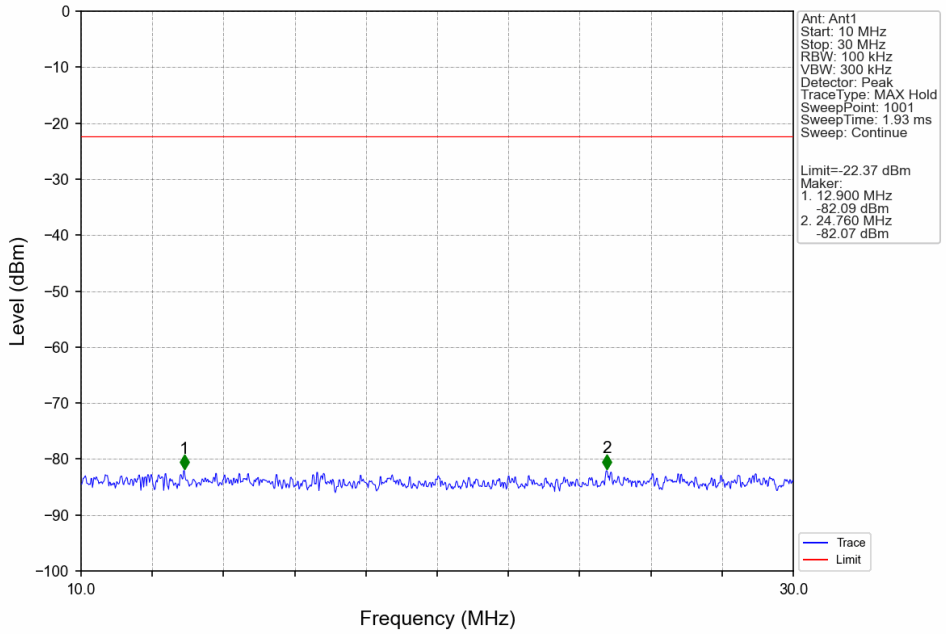

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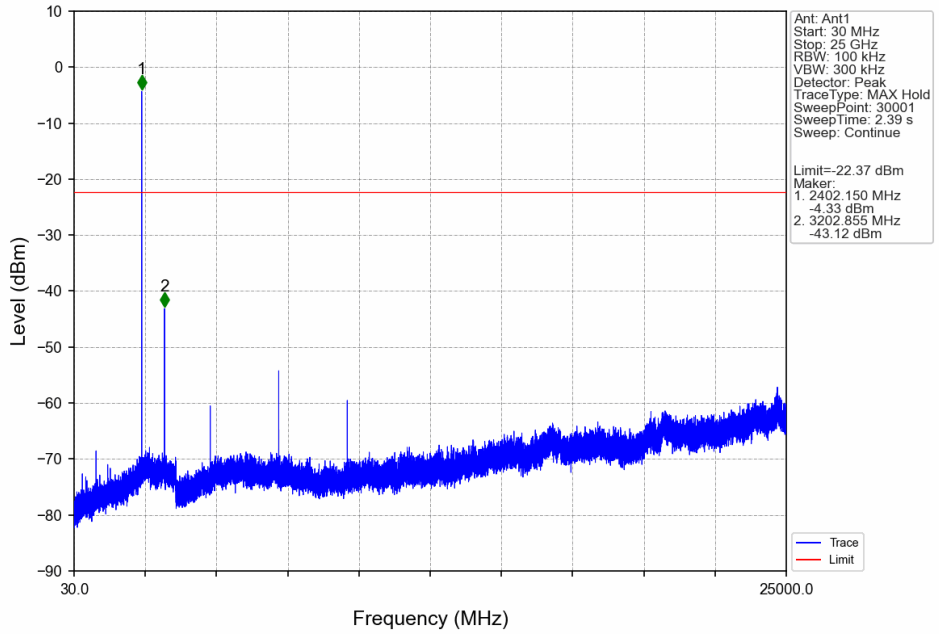

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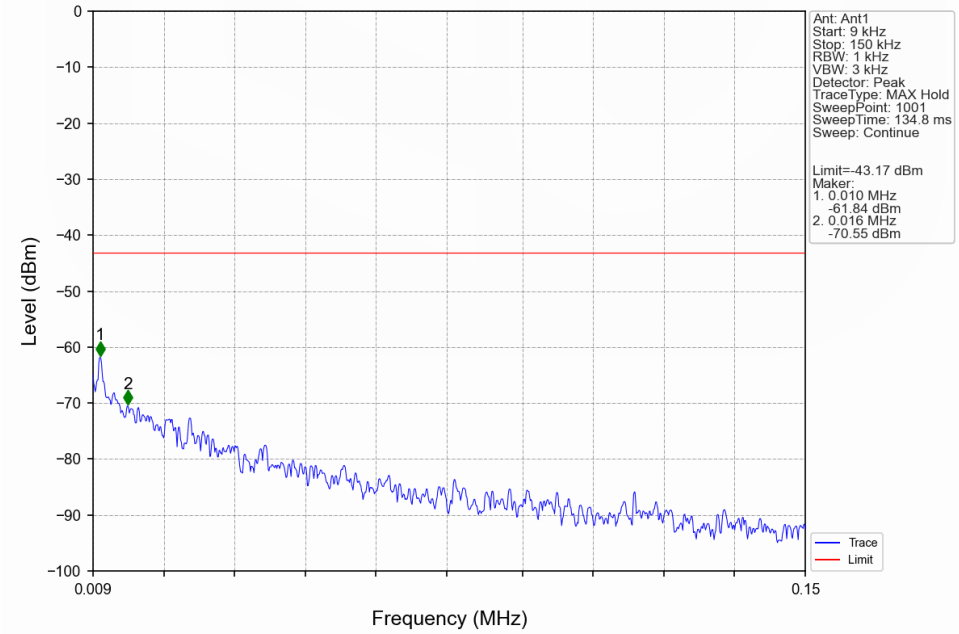

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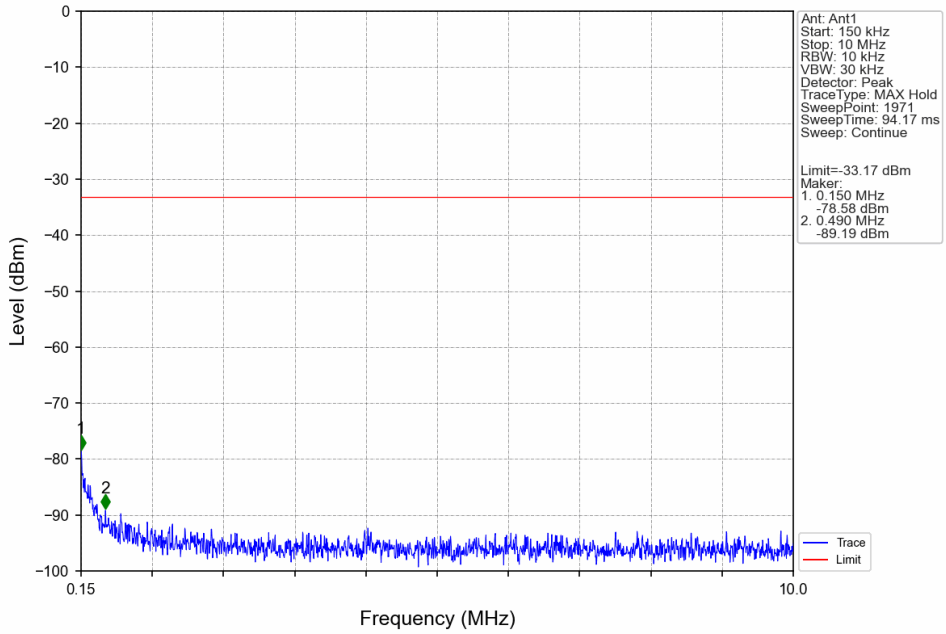

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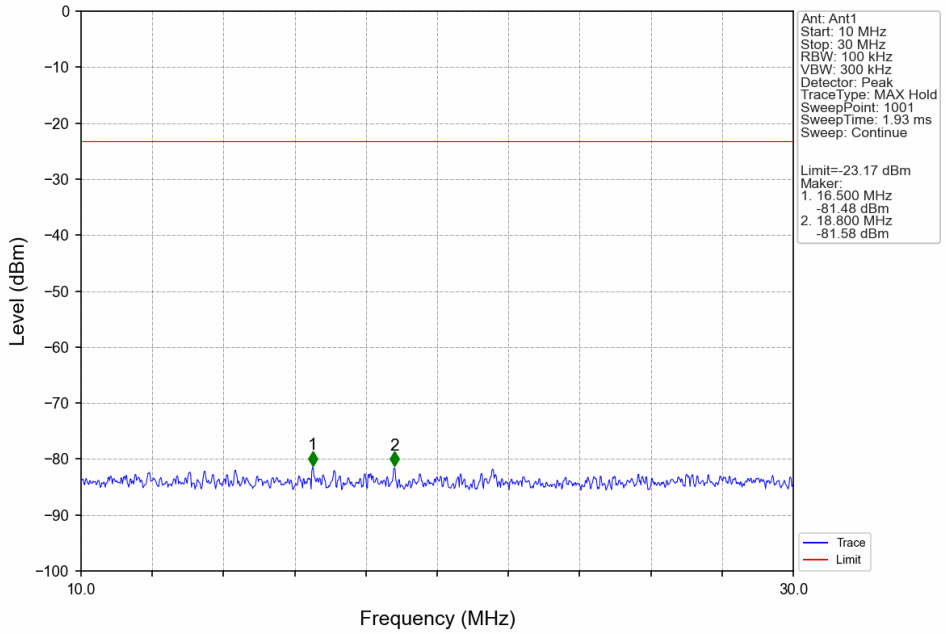

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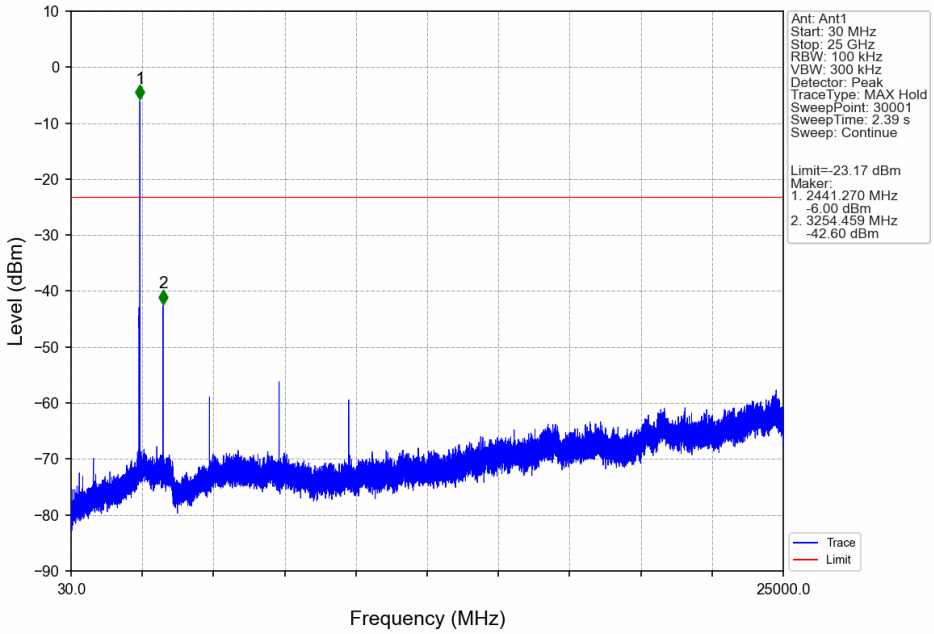

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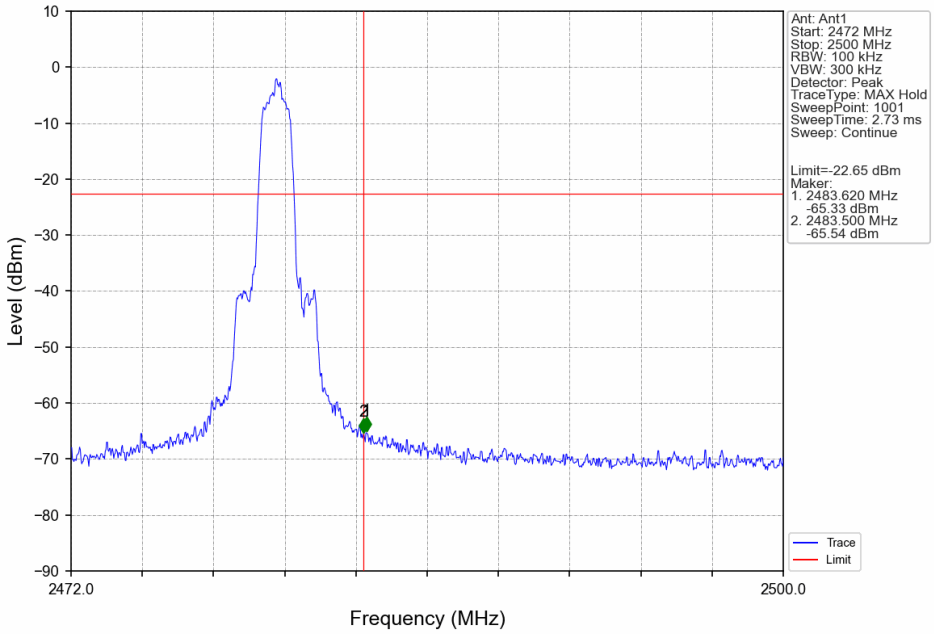

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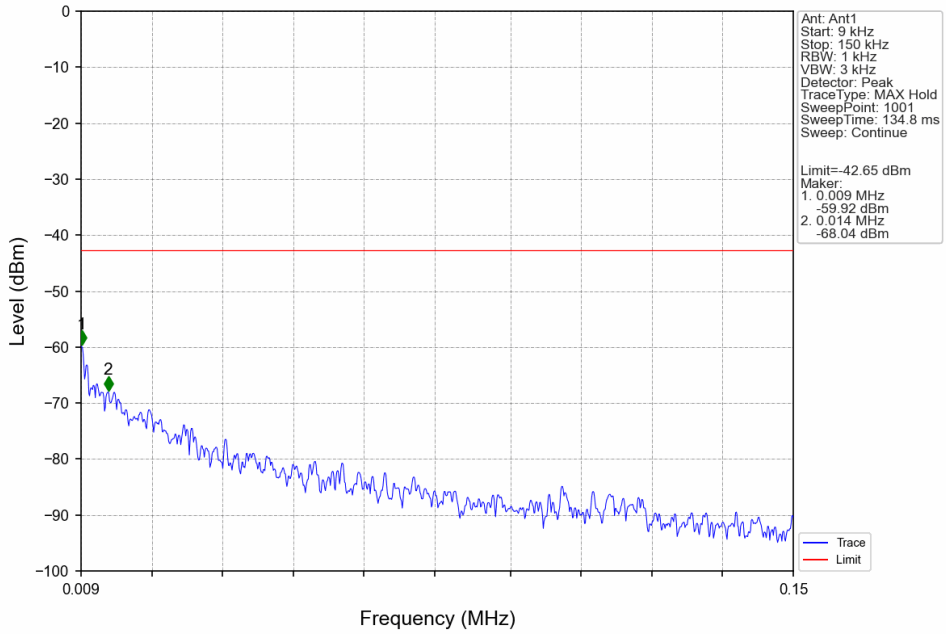

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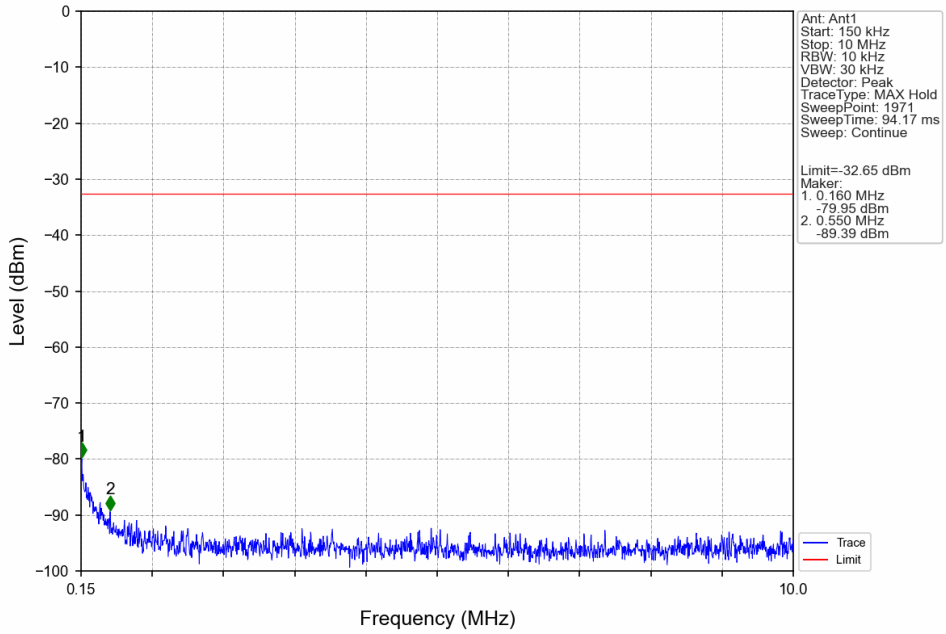

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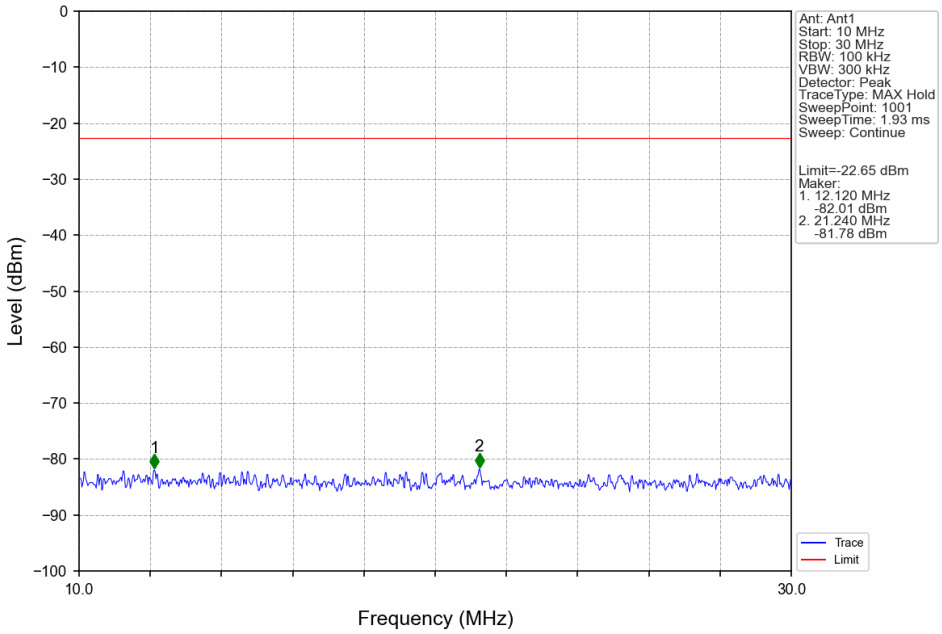

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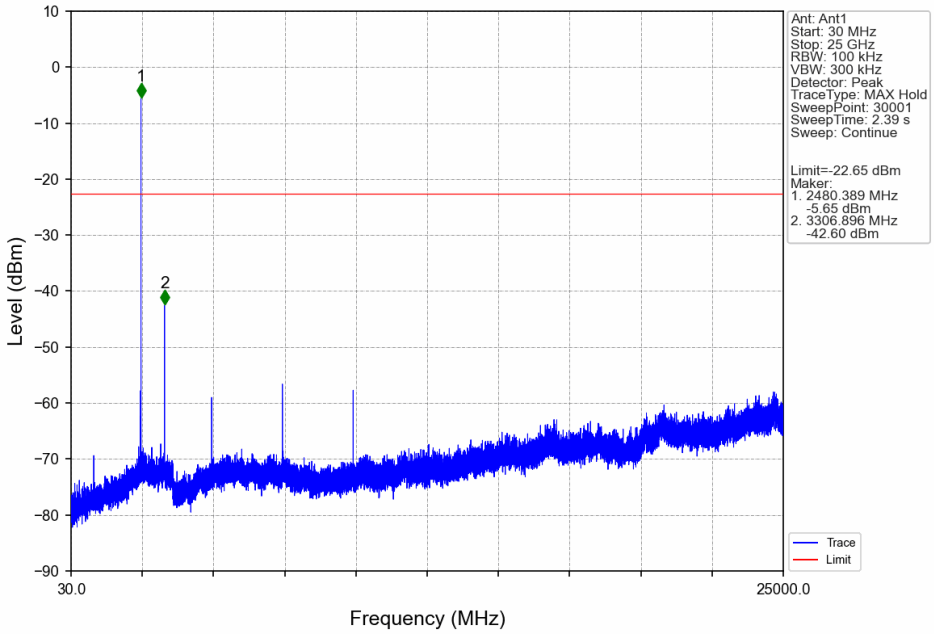

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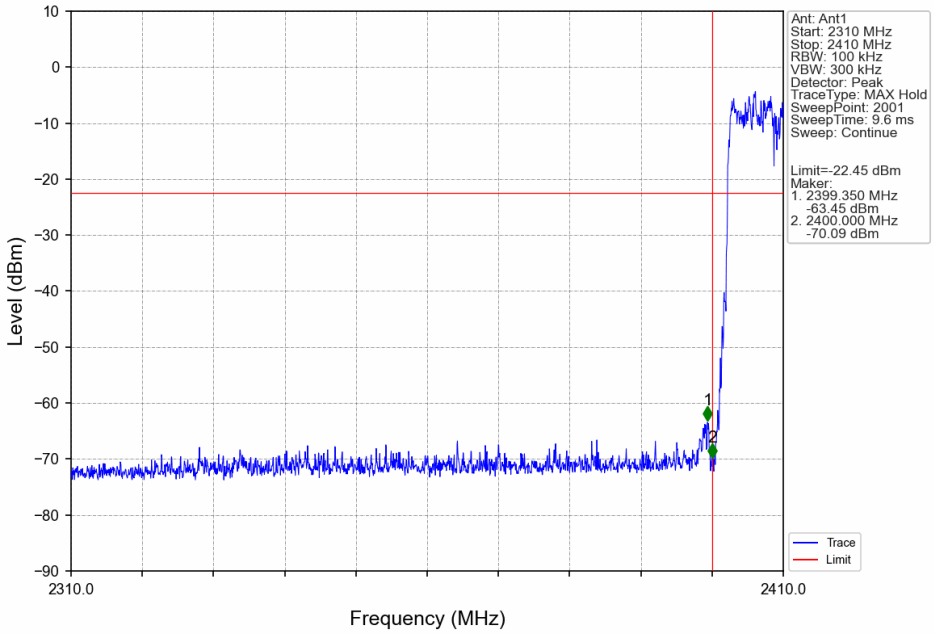

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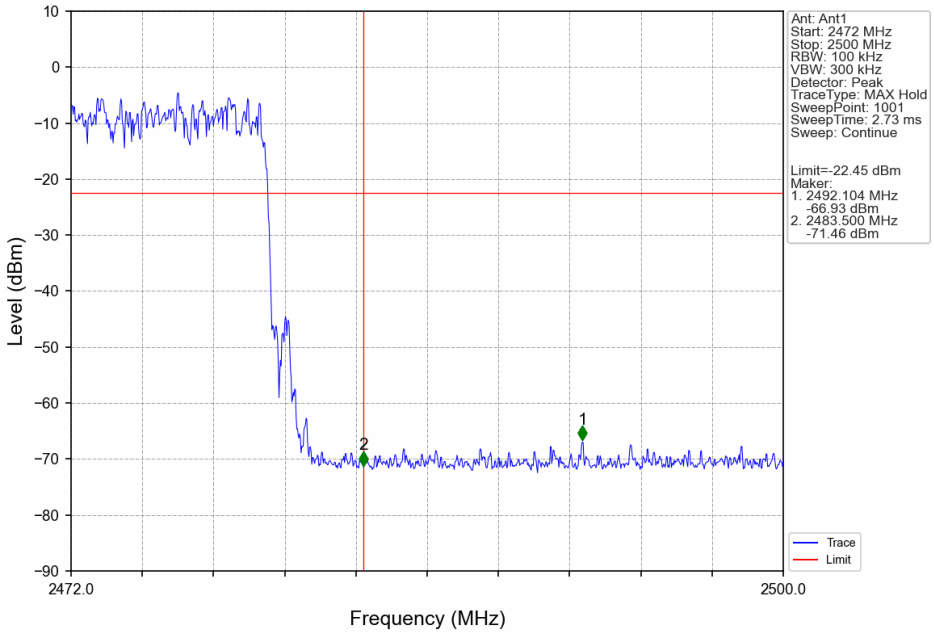

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