

FCC TEST REPORT

(Part 15, Subpart C)

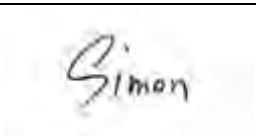
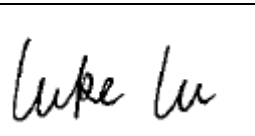
Applicant:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France

Manufacturer or Supplier:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France
Product:	telematics embedded system
Brand Name:	MUNIC
Model Name:	C4D-4G4USAA_V8+
FCC ID:	A6GC4D-4G4USV8
Date of tests:	Nov. 15, 2021 ~ Dec. 01, 2021

The tests have been carried out according to the requirements of the following standard:

- ☒ **FCC Part 15, Subpart C, Section 15.247**
- ☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: Dec. 02, 2021	 Date: Dec. 02, 2021

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Test Report No.: W7L-P21090018RF01

TABLE OF CONTENTS

RELEASE CONTROL RECORD	6
1 SUMMARY OF TEST RESULTS.....	7
1.1 MEASUREMENT UNCERTAINTY	8
2 GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF EUT	8
2.2 DESCRIPTION OF TEST MODES	10
2.2.1 CONFIGURATION OF SYSTEM UNDER TEST	11
2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	11
2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	13
2.4 DESCRIPTION OF SUPPORT UNITS.....	13
3 TEST TYPES AND RESULTS.....	14
3.1 CONDUCTED EMISSION MEASUREMENT	14
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	14
3.1.2 TEST INSTRUMENTS	15
3.1.3 TEST PROCEDURES	16
3.1.4 DEVIATION FROM TEST STANDARD	16
3.1.5 TEST SETUP	17
3.1.6 EUT OPERATING CONDITIONS	17
3.1.7 TEST RESULTS.....	18
3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT	20
3.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	20
3.2.2 TEST INSTRUMENTS	21
3.2.3 TEST PROCEDURES	22
3.2.4 DEVIATION FROM TEST STANDARD	22
3.2.5 TEST SETUP	23
3.2.6 EUT OPERATING CONDITIONS	24
3.2.7 TEST RESULTS.....	25
3.3 NUMBER OF HOPPING FREQUENCY USED	30
3.3.1 LIMIT OF HOPPING FREQUENCY USED	30
3.3.2 TEST SETUP	30
3.3.3 TEST INSTRUMENTS	30
3.3.4 TEST PROCEDURES	31
3.3.5 DEVIATION FROM TEST STANDARD	31
3.3.6 TEST RESULTS.....	31



Test Report No.: W7L-P21090018RF01

3.4 DWELL TIME ON EACH CHANNEL	32
3.4.1 LIMIT OF DWELL TIME USED	32
3.4.2 TEST SETUP	32
3.4.3 TEST INSTRUMENTS	32
3.4.4 TEST PROCEDURES	32
3.4.5 DEVIATION FROM TEST STANDARD	33
3.4.6 TEST RESULTS	33
3.5 CHANNEL BANDWIDTH	34
3.5.1 LIMITS OF CHANNEL BANDWIDTH	34
3.5.2 TEST SETUP	34
3.5.3 TEST INSTRUMENTS	34
3.5.4 TEST PROCEDURE	34
3.5.5 DEVIATION FROM TEST STANDARD	34
3.5.6 EUT OPERATING CONDITION	35
3.5.7 TEST RESULTS	35
3.6 HOPPING CHANNEL SEPARATION	36
3.6.1 LIMIT OF HOPPING CHANNEL SEPARATION	36
3.6.2 TEST SETUP	36
3.6.3 TEST INSTRUMENTS	36
3.6.4 TEST PROCEDURES	36
3.6.5 DEVIATION FROM TEST STANDARD	36
3.6.6 TEST RESULTS	37
3.7 MAXIMUM OUTPUT POWER	37
3.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	37
3.7.2 TEST SETUP	37
3.7.3 TEST INSTRUMENTS	37
3.7.4 TEST PROCEDURES	37
3.7.5 DEVIATION FROM TEST STANDARD	38
3.7.6 EUT OPERATING CONDITION	38
3.7.7 TEST RESULTS	39
3.7.8 MAXIMUM PEAK OUTPUT POWER	39
3.7.9 AVERAGE OUTPUT POWER (FOR REFERENCE)	40
3.8 OUT OF BAND MEASUREMENT	41
3.8.1 LIMITS OF OUT OF BAND MEASUREMENT	41
3.8.2 TEST INSTRUMENTS	41



Test Report No.: W7L-P21090018RF01

3.8.3	TEST PROCEDURE.....	41
3.8.4	DEVIATION FROM TEST STANDARD	41
3.8.5	EUT OPERATING CONDITION.....	41
3.8.6	TEST RESULTS.....	41
4	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	42
5	MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	43
	APPENDIX A:.....	43
	OBW_BANDWIDTH.....	43
	TEST RESULT	43
	TEST GRAPH	44
	20DB BW	50
	TEST RESULT	50
	TEST GRAPH	51
	MAXIMUM CONDUCTED OUTPUT POWER	57
	PEAK_POWER.....	57
	TEST RESULT	57
	AVERAGE_POWER	57
	TEST RESULT	57
	CARRIER FREQUENCY SEPARATION	64
	TEST RESULT	64
	TEST GRAPH	65
	NUMBER OF HOPPING FREQUENCIES.....	68
	HOPPNUM.....	68
	TEST RESULT	68
	TEST GRAPH	69
	TIME OF OCCUPANCY (DWEEL TIME)	72
	TEST RESULT	72
	TEST GRAPH	73
	UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS	83
	REF	83
	TEST RESULT	83
	TEST GRAPH	84
	CSE.....	90
	TEST RESULT	90



Test Report No.: W7L-P21090018RF01

TEST GRAPH 91



Test Report No.: W7L-P21090018RF01

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21090018RF01	Original release	Dec. 02, 2021



Test Report No.: W7L-P21090018RF01

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C		
STANDARD	TEST TYPE AND LIMIT	RESULT
15.207	Conducted Emission	Compliance
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Compliance
15.247(a)(1)(iii)	Dwell Time on Each Channel	Compliance
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Compliance
15.247(b)	Maximum Peak Output Power	Compliance
15.247(d)&15.209	Transmitter Radiated Emissions	Compliance
15.247(d)	Out of band Measurement	Compliance
15.203	Antenna Requirement	Compliance

NOTE: If the Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.

Test Lab Information Reference:

BV 7Layers Communications Technology (Shenzhen) Co. Ltd

Lab Address:

No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China

Accredited Test Lab Cert 3939.01

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	telematics embedded system
BRAND NAME	MUNIC
MODEL NAME	C4D-4G4USAA_V8+
NOMINAL VOLTAGE	DC13.7V
MODULATION TECHNOLOGY	FHSS
MODULATION TYPE	GFSK, 8DPSK, $\pi/4$ DQPSK
OPERATING FREQUENCY	2402MHz~2480MHz
NUMBER OF CHANNEL	79
MAX. OUTPUT POWER	11.53mW (Max. Measured)
ANTENNA TYPE	Fixed Internal Antenna with 2.7dBi gain
HW VERSION	HW.01
SW VERSION	SW.01
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. C4D-4G4USAA_V8+ have ESIM and SIM two modes, respectively corresponding to MFF2 SIM and 4FF SIM detail describe in PED , pre-scan two models. worst case mode MFF2 SIM is reflected in this report

List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery 1	Howell	Li-polymer 552535H	Capacity: Li-ion, 450mAh
Battery 2	Akkutronics	382530-PTL	Capacity: Li-ion, 450mAh

2.2 DESCRIPTION OF TEST MODES

79 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (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		

2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photograph of the test configuration for reference.

2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.

The worst case was found when positioned on X axis for radiated emission.

Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE 1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

RE 1G: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
-	0 to 78	78	FHSS	8DPSK	3DH5

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
-	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5



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Test Report No.: W7L-P21090018RF01

POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
-	0 to 78	78	FHSS	8DPSK	3DH5

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH1/DH3/DH5
0 to 78	0, 39, 78	FHSS	$\pi/4$ DQPSK	2DH1/2DH3/2DH5
0 to 78	0, 39, 78	FHSS	8DPSK	3DH1/3DH3/3DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	23deg. C, 70%RH	DC 13.7V	Carl xie
RE 1G	23deg. C, 70%RH	DC 13.7V	Carl xie
PLC	25deg. C, 52%RH	DC 13.7V	Chase Zhou
APCM	25deg. C, 60%RH	DC 13.7V	Chase Zhou



Test Report No.: W7L-P21090018RF01

2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. Section 15.247

ANSI C63.10-2013

- NOTE:**
1. All test items have been performed and recorded as per the above standards.
 2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

2.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC Source	Kikusui/JP	PMX18-5A	N/A	N/A
2	DC Cable	kistler	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 a CLASS B)

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

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 b CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

NOTE: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors

and apparatus connected thereto, shall not exceed the level of field strengths specified above.



Test Report No.: W7L-P21090018RF01

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 03,21	Mar. 02, 22
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 25,21	Feb. 24, 22

NOTE: 1. The test was performed in CE shielded room.

3.1.3 TEST PROCEDURES

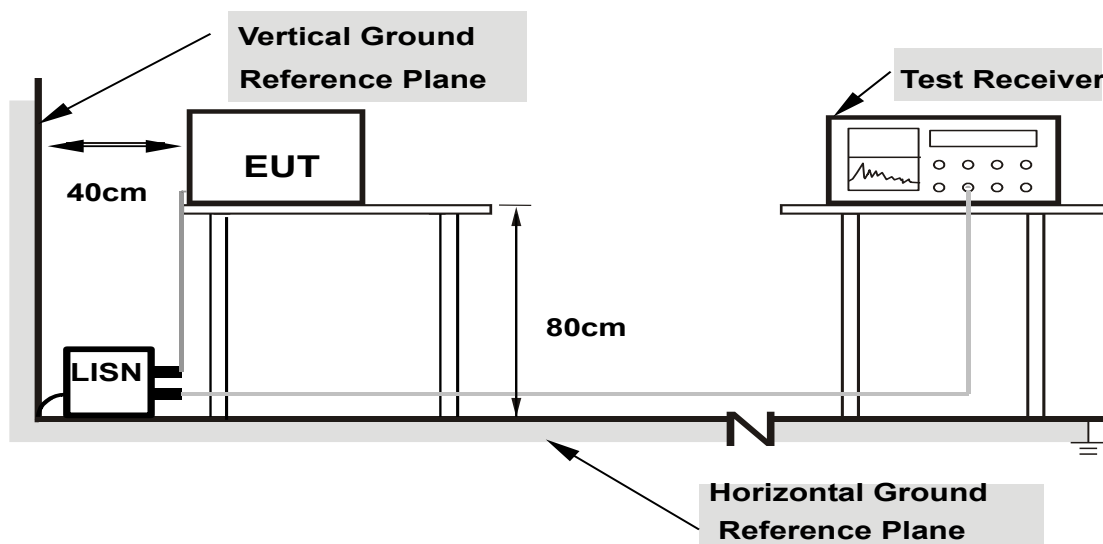
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.



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Test Report No.: W7L-P21090018RF01

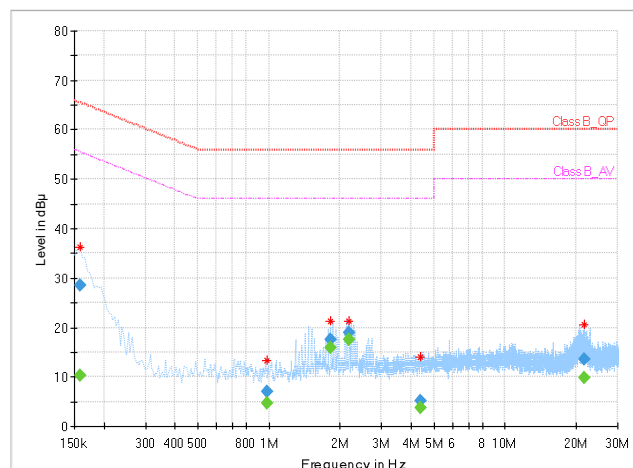
3.1.7 TEST RESULTS

TEST VOLTAGE	Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	---	10.20	55.57	45.37	L1	ON	9.7
0.158000	28.62	---	65.57	36.95	L1	ON	9.7
0.980000	---	4.66	46.00	41.34	L1	ON	9.7
0.980000	6.99	---	56.00	49.01	L1	ON	9.7
1.828000	---	15.96	46.00	30.04	L1	ON	9.7
1.828000	17.44	---	56.00	38.56	L1	ON	9.7
2.184000	---	17.46	46.00	28.54	L1	ON	9.7
2.184000	18.88	---	56.00	37.12	L1	ON	9.7
4.372000	---	3.80	46.00	42.20	L1	ON	9.7
4.372000	5.16	---	56.00	50.84	L1	ON	9.7
21.660000	---	9.81	50.00	40.19	L1	ON	9.8
21.660000	13.59	---	60.00	46.41	L1	ON	9.8

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum

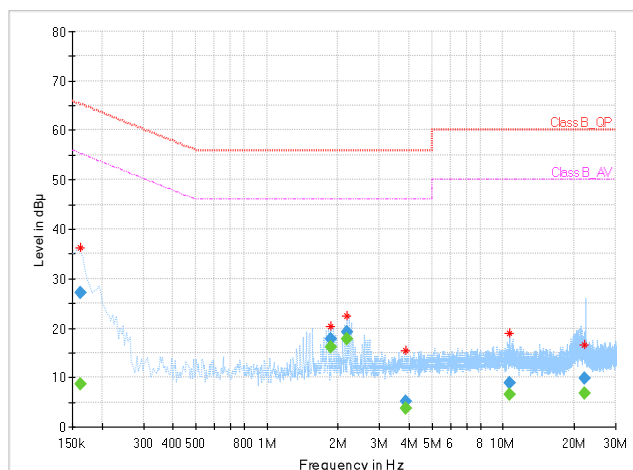


TEST VOLTAGE	Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	---	8.61	55.36	46.75	N	ON	9.7
0.162000	27.13	---	65.36	38.23	N	ON	9.7
1.872000	---	16.26	46.00	29.74	N	ON	9.8
1.872000	17.72	---	56.00	38.28	N	ON	9.8
2.184000	---	17.82	46.00	28.18	N	ON	9.8
2.184000	19.30	---	56.00	36.70	N	ON	9.8
3.880000	---	3.85	46.00	42.15	N	ON	9.8
3.880000	5.16	---	56.00	50.84	N	ON	9.8
10.608000	---	6.49	50.00	43.51	N	ON	9.8
10.608000	8.87	---	60.00	51.13	N	ON	9.8
22.236000	---	6.89	50.00	43.11	N	ON	9.9
22.236000	9.87	---	60.00	50.13	N	ON	9.9

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

FREQUENCIES (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



Test Report No.: W7L-P21090018RF01

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 02, 21	Apr. 01, 22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 27,21	Apr. 26,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 30,21	Apr. 29,22
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 25,21	Aug. 24,22

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Chamber.
 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

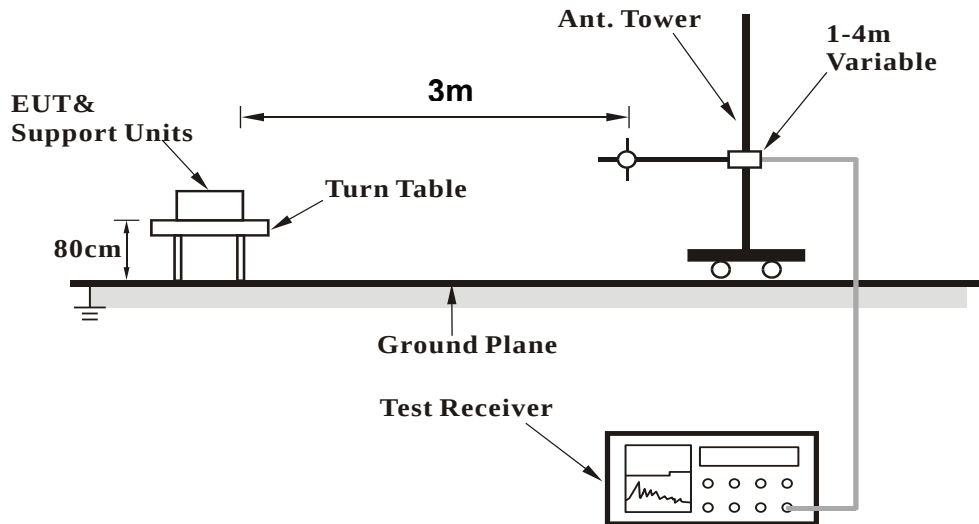
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 DEVIATION FROM TEST STANDARD

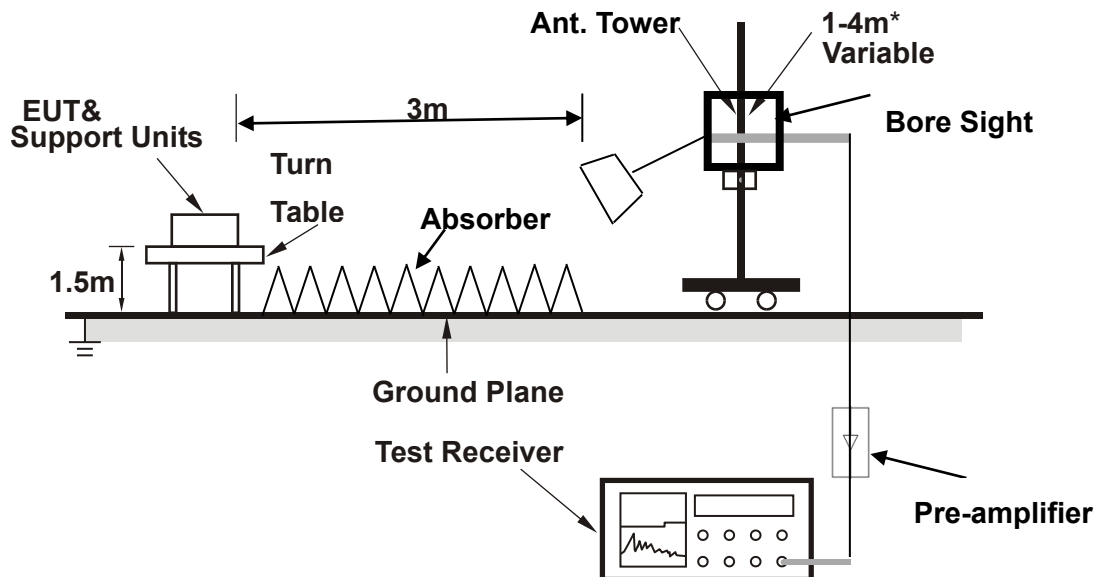
No deviation.

3.2.5 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.



Test Report No.: W7L-P21090018RF01

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.6 EUT OPERATING CONDITIONS

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



BUREAU
VERITAS

Test Report No.: W7L-P21090018RF01

3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

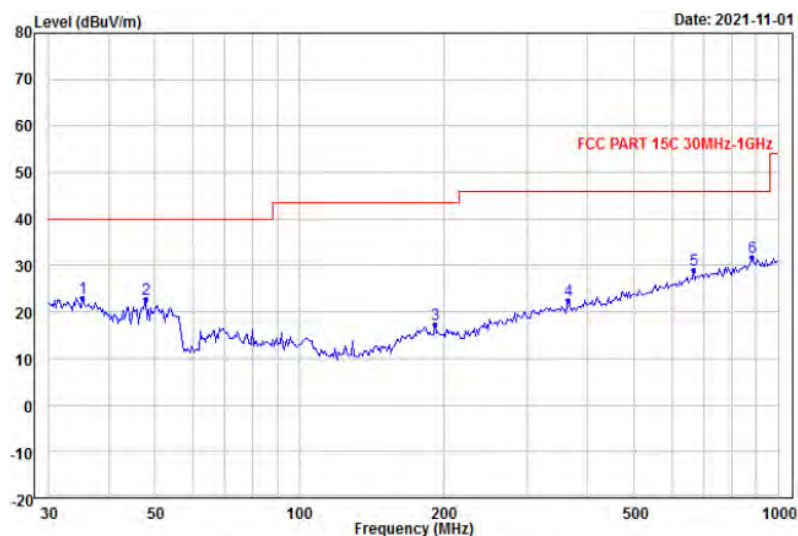
BT_8DPSK

CHANNEL	Channel 78	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
35.263	23.16	28.42	40	-16.84	22.79	0.76	28.81	300	0	Peak
47.703	22.79	35.93	40	-17.21	14.83	0.81	28.78	300	0	Peak
191.784	17.36	27.74	43.5	-26.14	16.48	1.40	28.26	300	0	Peak
33.523	22.39	27.61	43.5	-23.61	21.37	1.81	28.40	300	0	Peak
665.261	28.94	28.22	46	-17.06	27.78	2.34	29.40	300	0	Peak
881.184	31.65	27.73	46	-14.35	30.12	2.74	28.94	300	0	Peak

REMARKS:

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

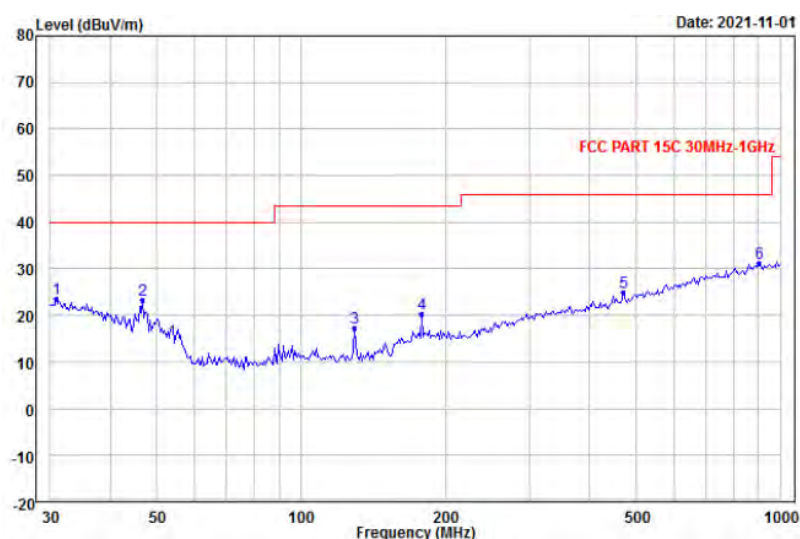


CHANNEL	Channel 78	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
30.855	23.58	28.19	40	-16.42	23.56	0.64	28.81	200	360	Peak
46.708	23.34	35.62	40	-16.66	15.69	0.82	28.79	200	360	Peak
129.392	17.37	33.26	43.5	-26.13	11.48	1.16	28.53	200	360	Peak
178.770	20.22	30.13	43.5	-23.28	17.05	1.35	28.31	200	360	Peak
471.467	25.10	28.69	46	-20.90	23.51	2.01	29.11	200	360	Peak
906.304	31.27	26.98	46	-14.73	30.35	2.81	28.87	200	360	Peak

REMARKS:

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





Test Report No.: W7L-P21090018RF01

ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	42.83	51.61	74	-31.17	32.35	6.90	48.03	135	120	Peak
2390	27.87	36.65	54	-26.13	32.35	6.90	48.03	135	120	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.70	56.01	74	-27.20	31.92	6.90	48.03	100	160	Peak
2390	30.35	39.56	54	-23.65	31.92	6.90	48.03	100	160	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2402MHz: Fundamental frequency.

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4882	42.18	45.00	74	-31.82	34.18	9.58	46.58	135	120	Peak
7323	44.93	43.67	74	-29.07	35.90	11.55	46.19	135	120	Peak
4882	28.13	30.95	54	-25.87	34.18	9.58	46.58	135	120	Average
7323	31.50	30.24	54	-22.50	35.90	11.55	46.19	135	120	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
4882	41.79	44.43	74	-32.21	34.36	9.58	46.58	100	160	Peak
7323	43.10	41.74	74	-30.90	36.00	11.55	46.19	100	160	Peak
4882	29.42	32.06	54	-24.58	34.36	9.58	46.58	100	160	Average
7323	31.55	30.19	54	-22.45	36.00	11.55	46.19	100	160	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2441MHz: Fundamental frequency.

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	50.66	59.24	74	-23.34	32.48	7.03	48.09	135	120	Peak
2483.5	45.80	54.38	54	-8.20	32.35	7.03	48.09	135	120	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2483.5	46.23	55.22	74	-27.77	32.07	7.03	48.09	100	160	Peak
2483.5	37.94	46.93	54	-16.06	32.07	7.03	48.09	100	160	Average

REMARKS:

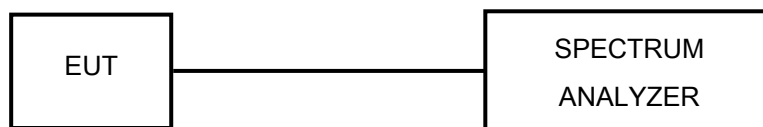
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2480MHz: Fundamental frequency.

3.3 NUMBER OF HOPPING FREQUENCY USED

3.3.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

3.3.2 TEST SETUP



3.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 25,21	Feb. 24,22
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Apr. 27,20	Apr. 26,21
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Feb. 25,21	Feb. 24,22
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 25,21	Feb. 24,22
CBT32 BLUETOOTH TESTER 4HU	Rohde&Schwarz	CBT32	101176	Mar. 09,21	Mar. 08,22
CBT32 BLUETOOTH TESTER 4HU	Rohde&Schwarz	CBT32	101176	Mar. 10,20	Mar. 09,21

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



Test Report No.: W7L-P21090018RF01

3.3.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- d. Set the SA on View mode and then plot the result on SA screen.
- e. Repeat above procedures until all frequencies measured were completed.

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

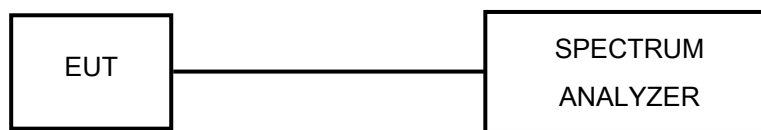
Please Refer to Appendix A Of this test report.

3.4 DWELL TIME ON EACH CHANNEL

3.4.1 LIMIT OF DWELL TIME USED

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.

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.4.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- e. Repeat above procedures until all different time-slot modes have been completed.



Test Report No.: W7L-P21090018RF01

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 TEST RESULTS

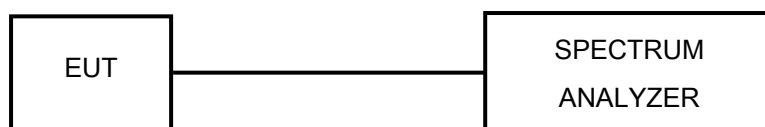
Please Refer to Appendix A Of this test report

3.5 CHANNEL BANDWIDTH

3.5.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.5.4 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.



Test Report No.: W7L-P21090018RF01

3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.5.7 TEST RESULTS

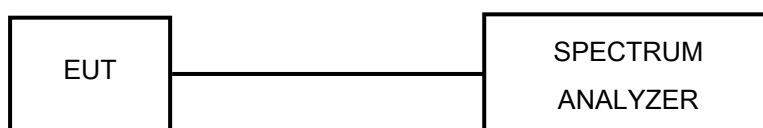
Please Refer to Appendix A Of this test report.

3.6 HOPPING CHANNEL SEPARATION

3.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.6.4 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 TEST RESULTS

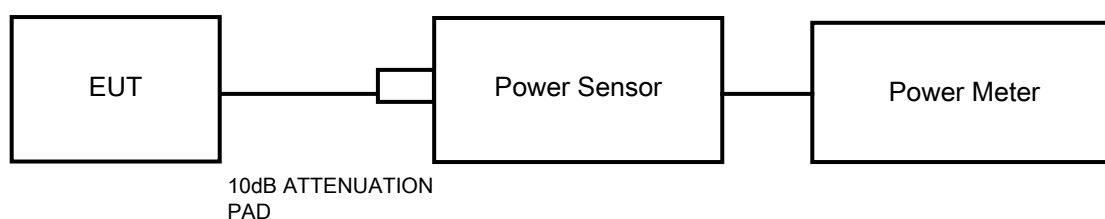
Please Refer to Appendix A Of this test report.

3.7 MAXIMUM OUTPUT POWER

3.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

3.7.2 TEST SETUP



3.7.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.7.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.



Test Report No.: W7L-P21090018RF01

3.7.5 DEVIATION FROM TEST STANDARD

No deviation.

3.7.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



Test Report No.: W7L-P21090018RF01

3.7.7 TEST RESULTS

3.7.8 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix A Of this test report.



Test Report No.: W7L-P21090018RF01

3.7.9 Average Output Power (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

Please Refer to Appendix A Of this test report.



Test Report No.: W7L-P21090018RF01

3.8 OUT OF BAND MEASUREMENT

3.8.1 LIMITS OF OUT OF BAND MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz RBW).

3.8.2 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

3.8.4 DEVIATION FROM TEST STANDARD

No deviation.

3.8.5 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.8.6 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix A Of this test report.



Test Report No.: W7L-P21090018RF01

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

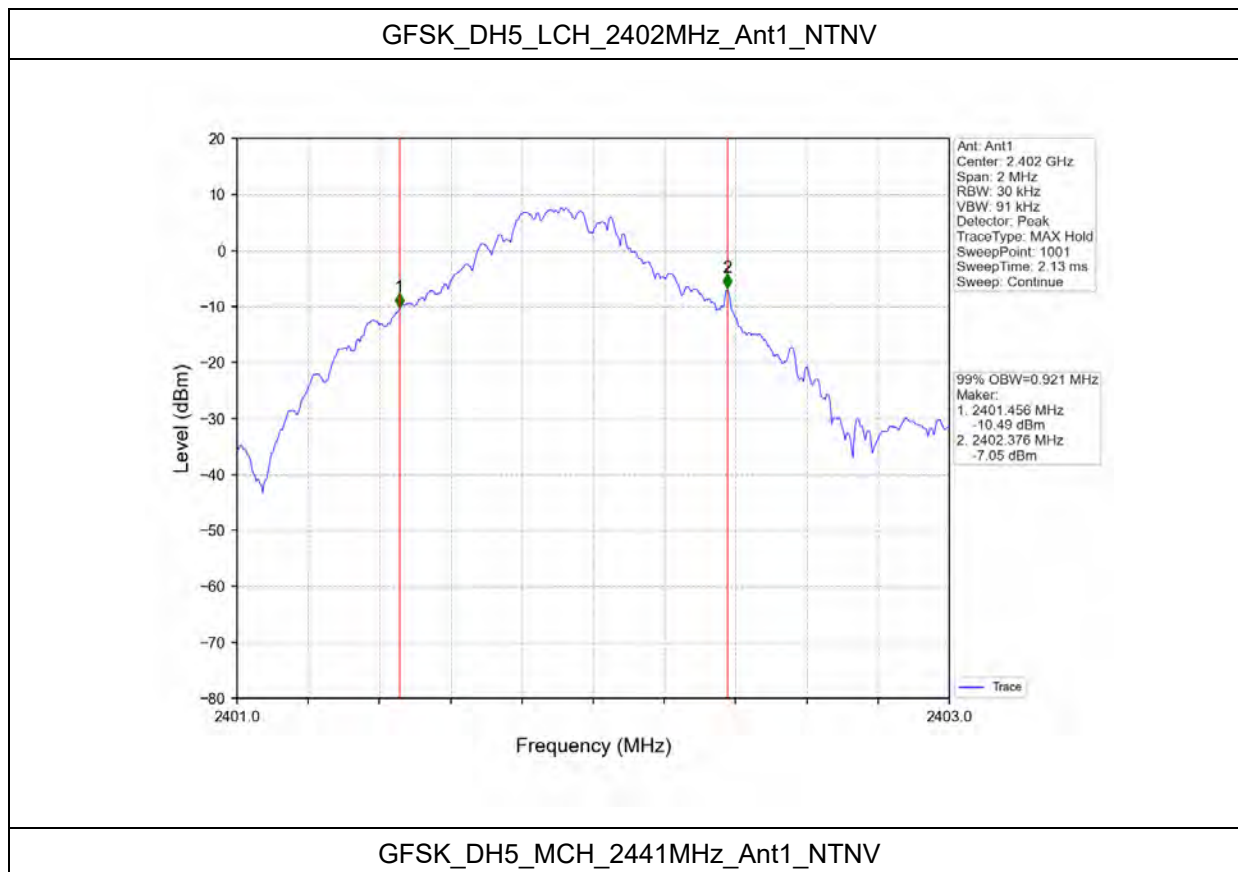
APPENDIX A:

OBW_BANDWIDTH

TEST RESULT

Mode	TX Type	Frequency (MHz)	Packet Type	Ant	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.921	Pass
		2441	DH5	1	0.924	Pass
		2480	DH5	1	0.955	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.189	Pass
		2441	2DH5	1	1.190	Pass
		2480	2DH5	1	1.238	Pass
8DPSK	SISO	2402	3DH5	1	1.232	Pass
		2441	3DH5	1	1.218	Pass
		2480	3DH5	1	1.201	Pass

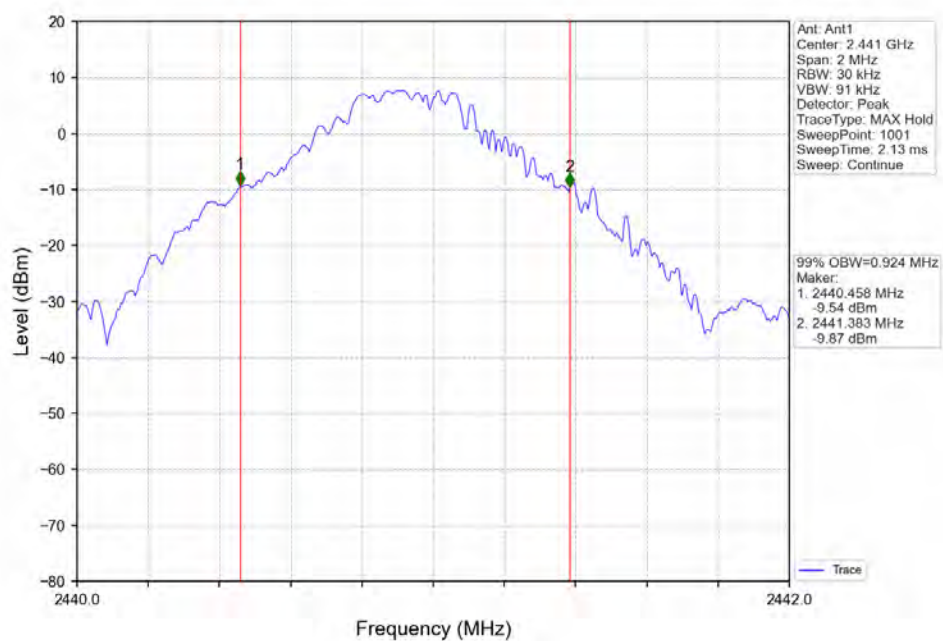
TEST GRAPH



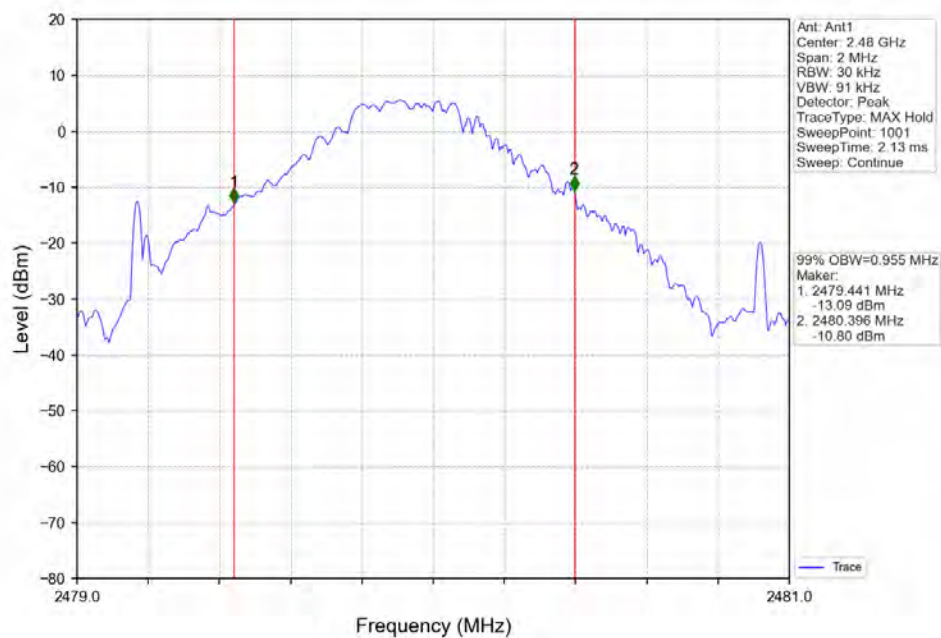


BUREAU
VERITAS

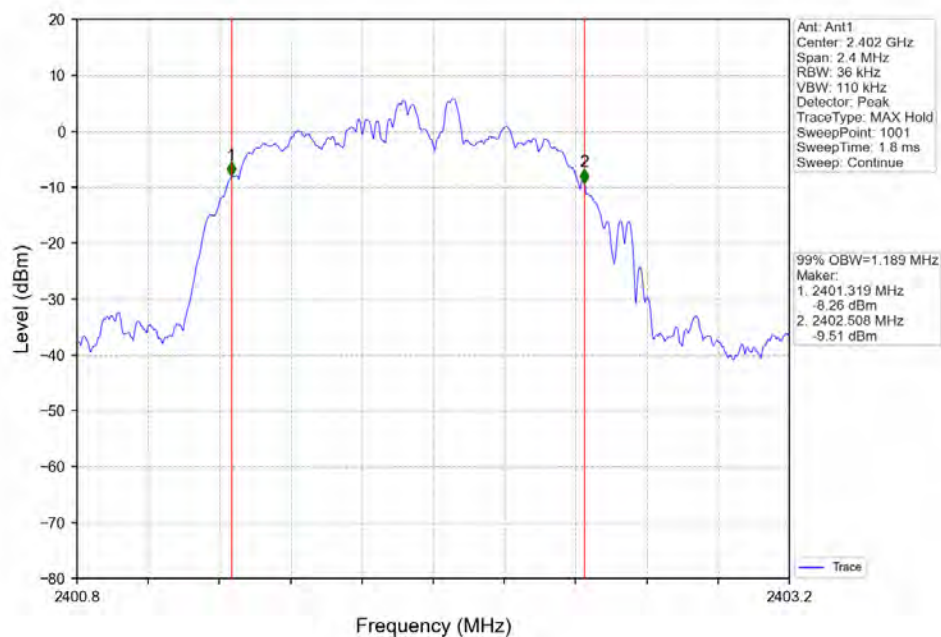
Test Report No.: W7L-P21090018RF01



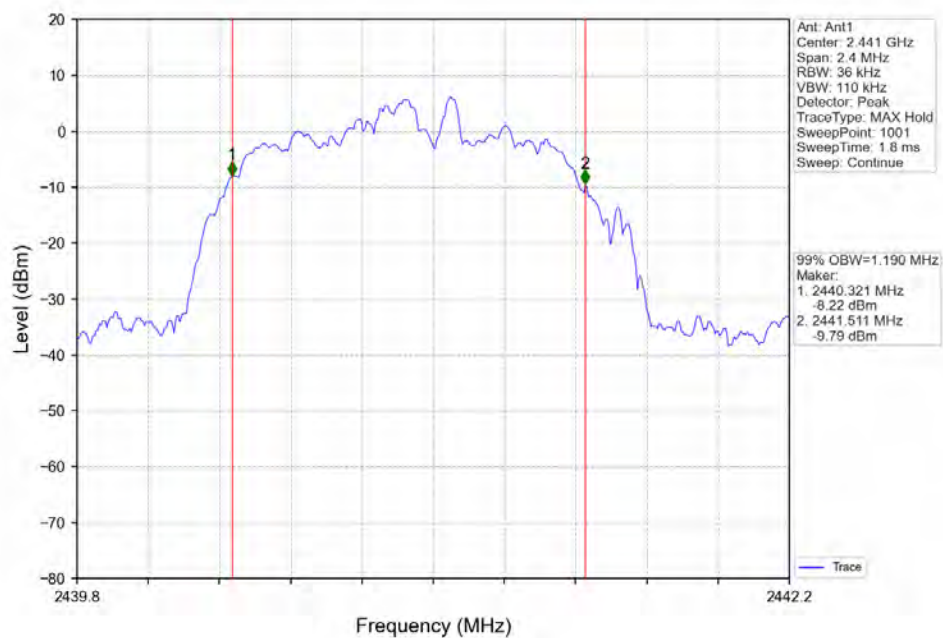
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



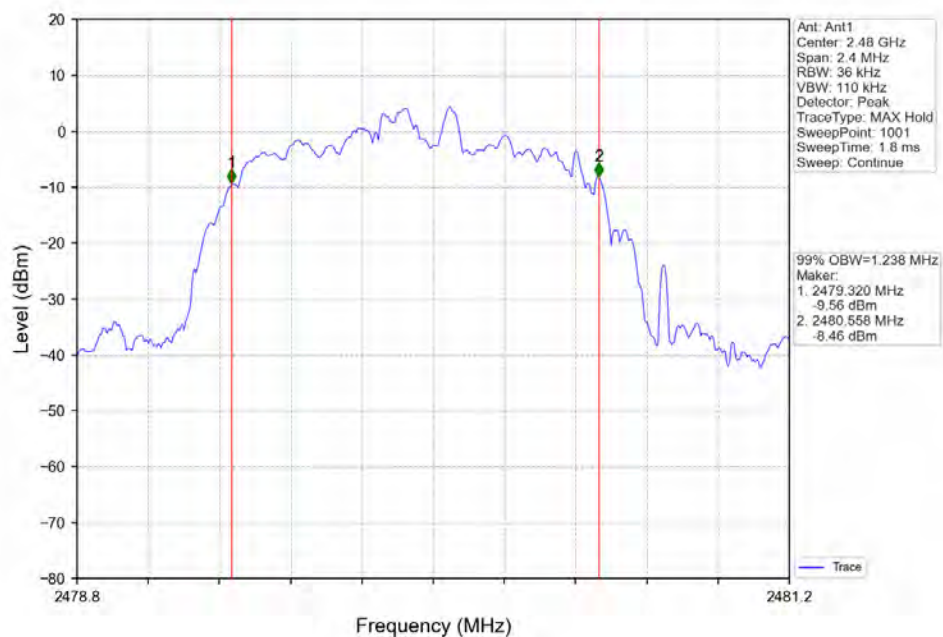
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



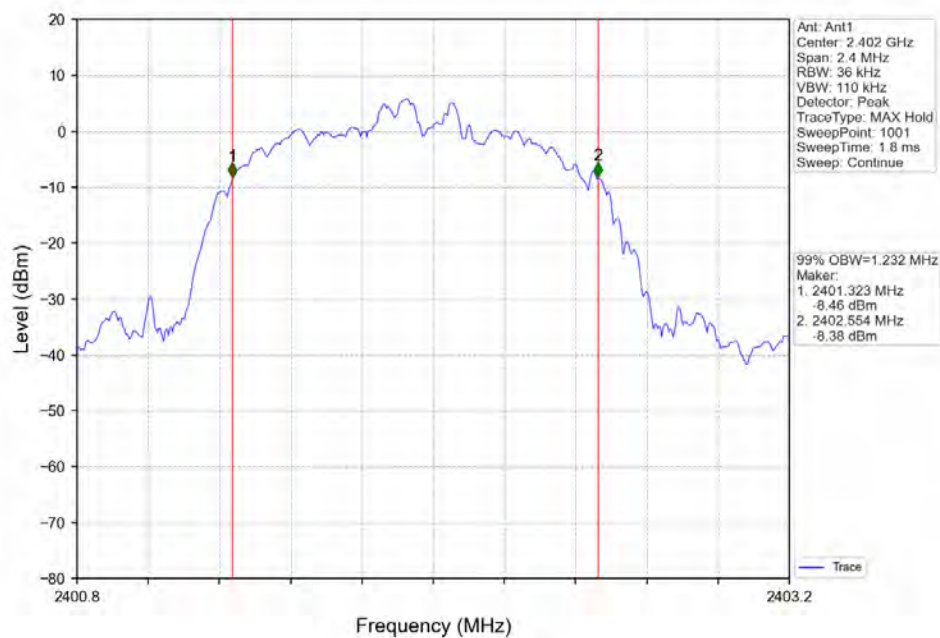
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



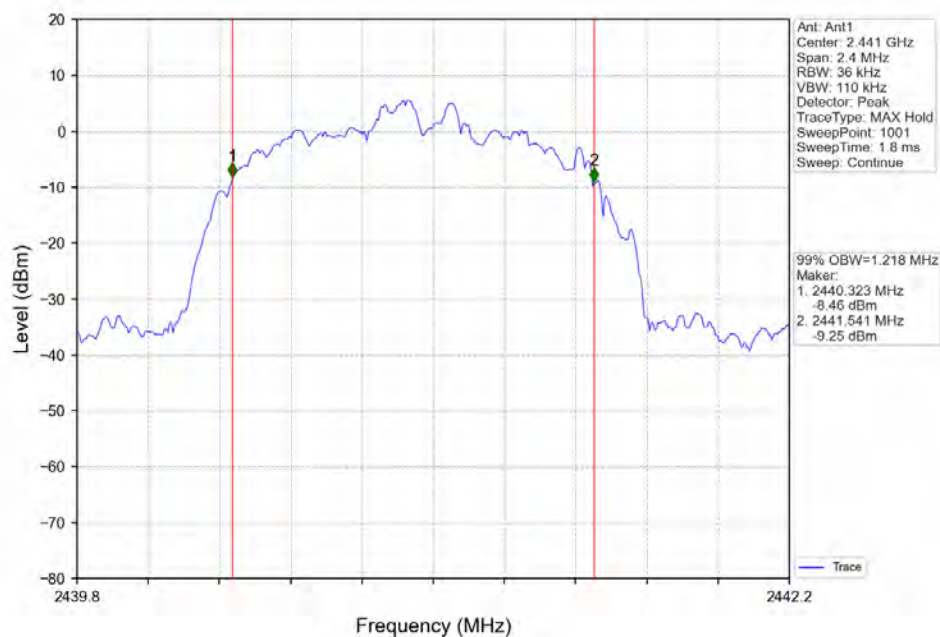
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



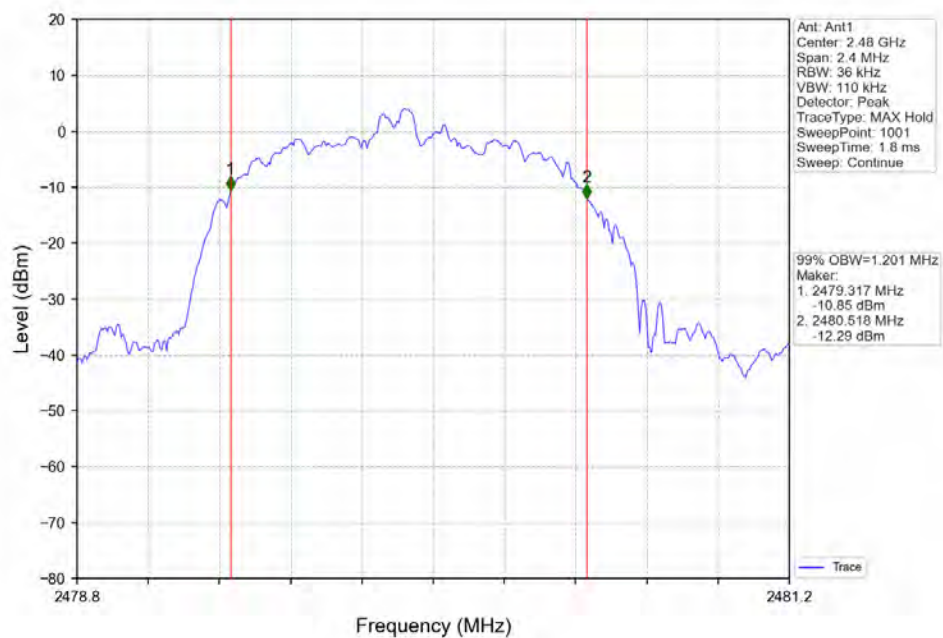
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

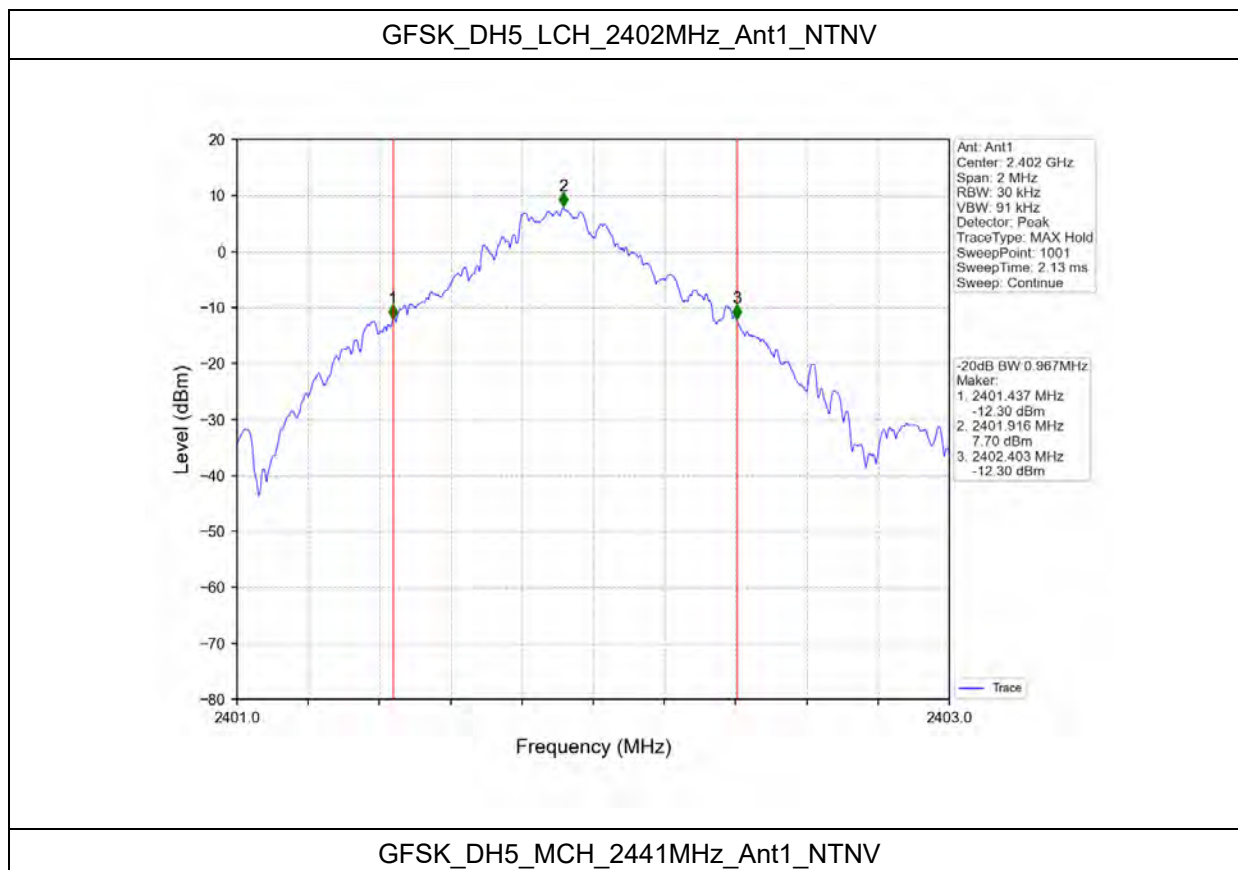


20DB BW

TEST RESULT

Mode	TX Type	Frequency (MHz)	Packet Type	Ant	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.967	Pass
		2441	DH5	1	0.972	Pass
		2480	DH5	1	1.054	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.282	Pass
		2441	2DH5	1	1.370	Pass
		2480	2DH5	1	1.423	Pass
8DPSK	SISO	2402	3DH5	1	1.394	Pass
		2441	3DH5	1	1.352	Pass
		2480	3DH5	1	1.396	Pass

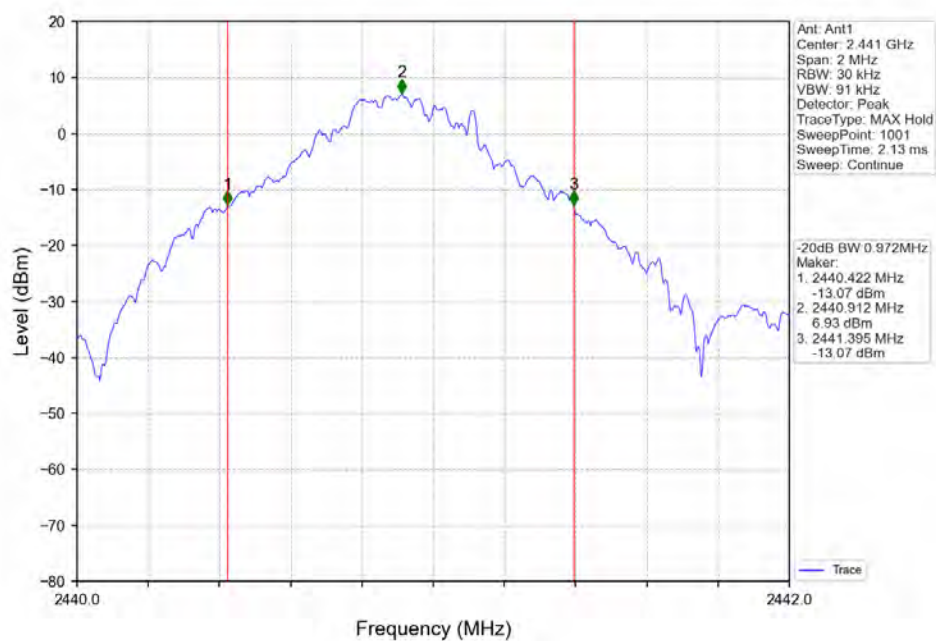
TEST GRAPH



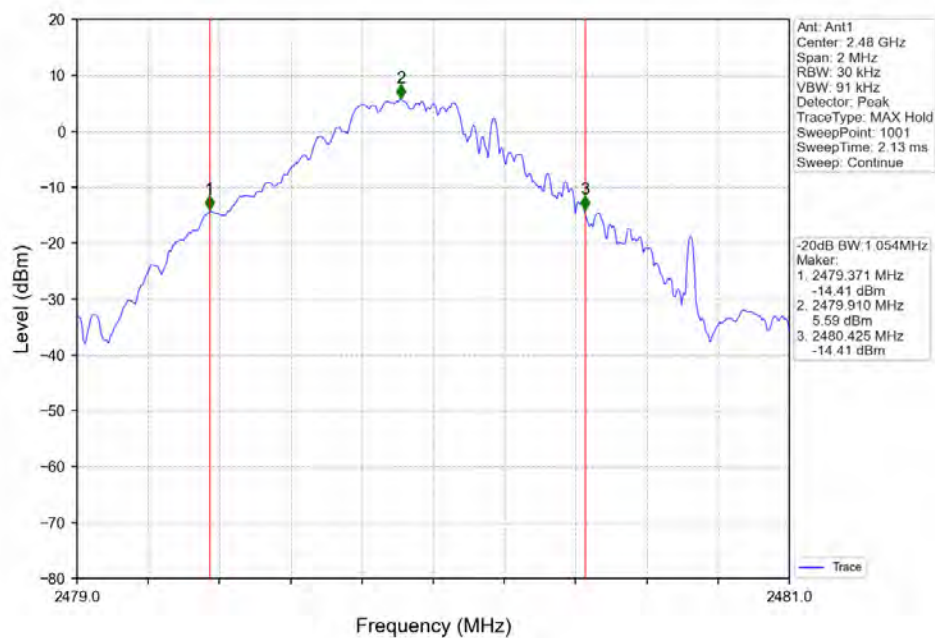


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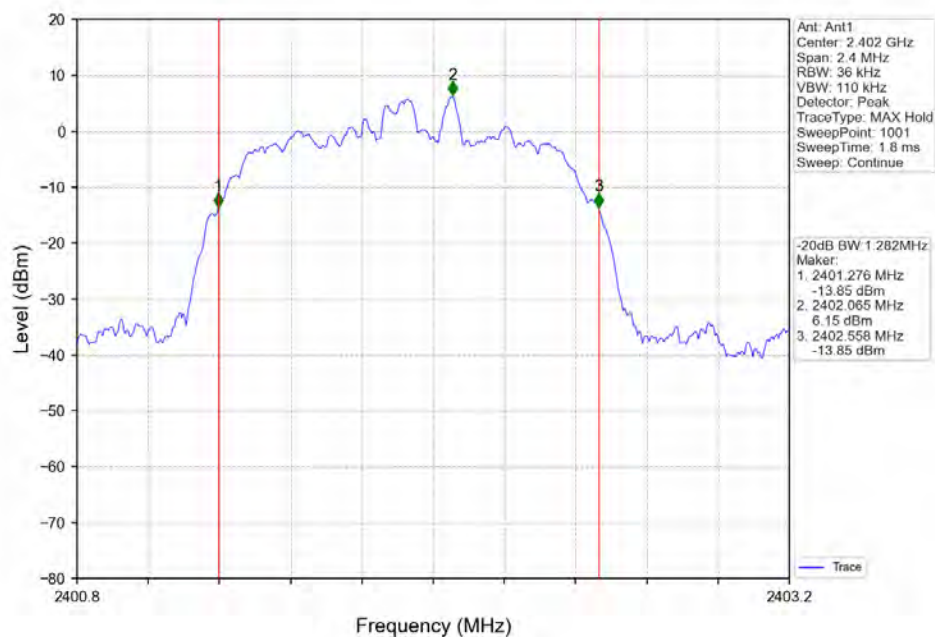
Test Report No.: W7L-P21090018RF01



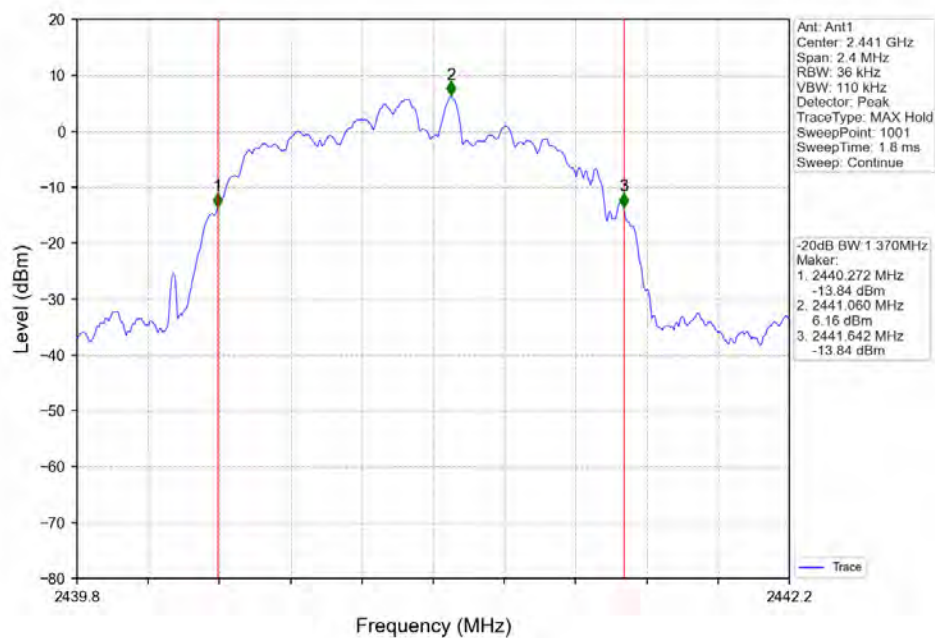
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



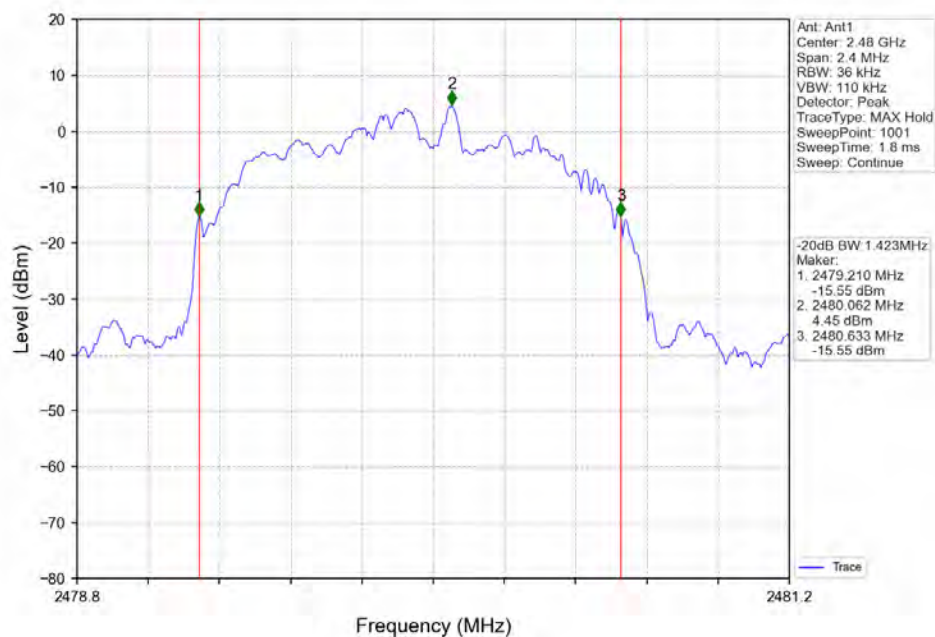
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



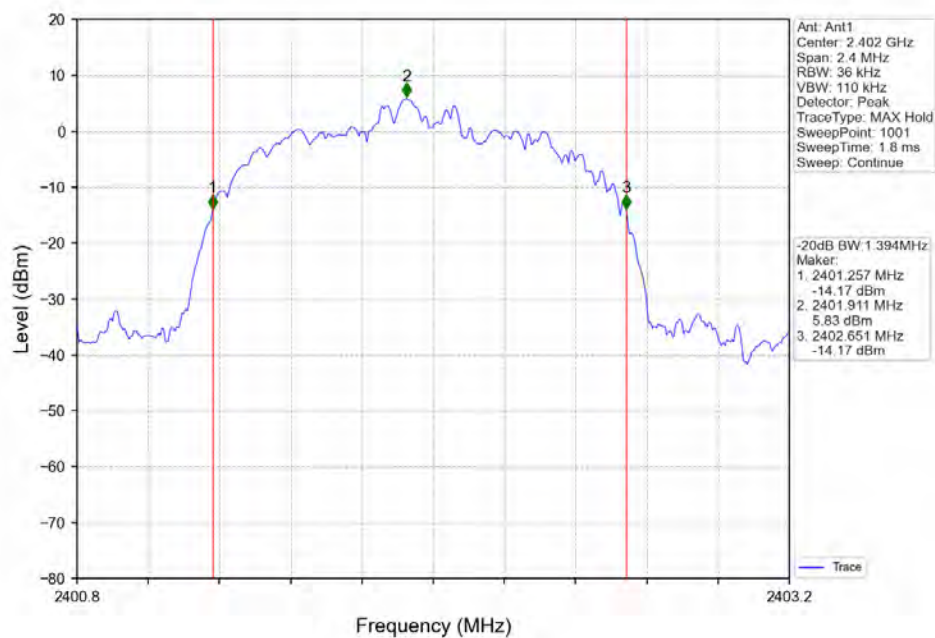
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



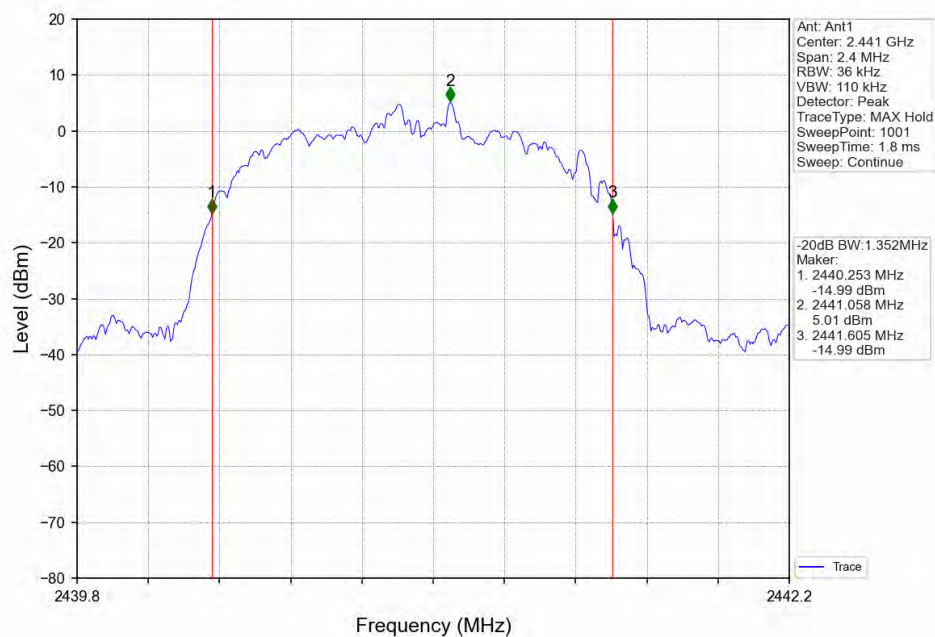
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



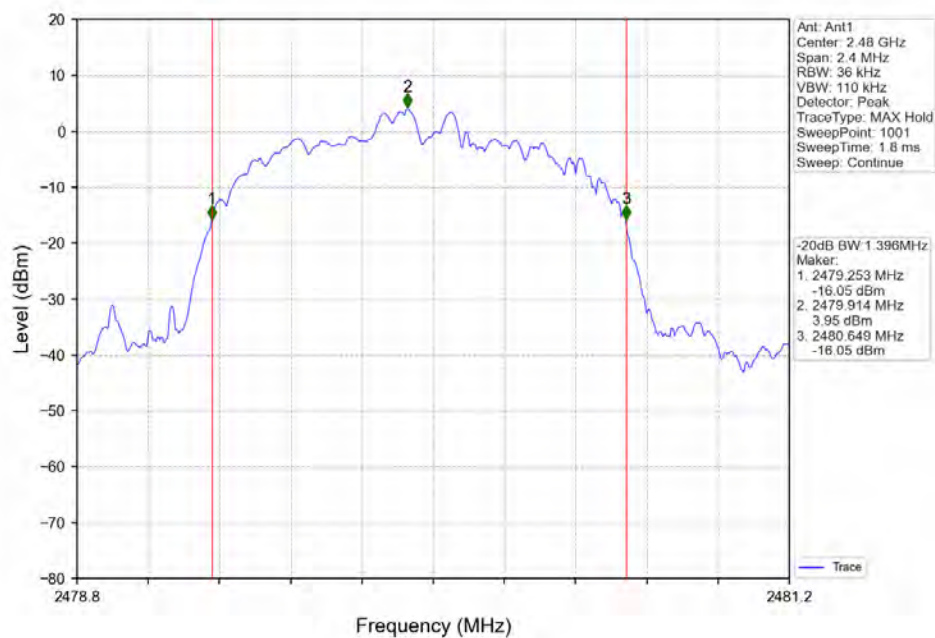
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



MAXIMUM CONDUCTED OUTPUT POWER

PEAK_POWER

TEST RESULT

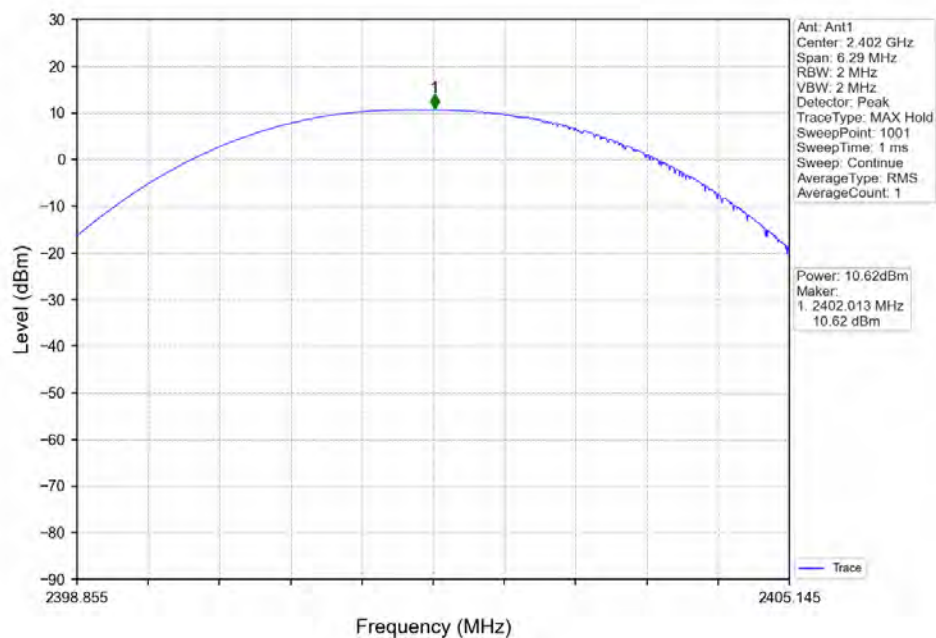
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power			Verdict
				Ant1 (dBm)	Ant1 (mw)	Limit(dBm)	
GFSK	SISO	2402	DH5	10.62	11.53	<=21	Pass
		2441	DH5	9.27	8.45	<=21	Pass
		2480	DH5	7.95	6.24	<=21	Pass
Pi/4DQPSK	SISO	2402	2DH5	8.96	7.87	<=21	Pass
		2441	2DH5	8.81	7.60	<=21	Pass
		2480	2DH5	7.29	5.36	<=21	Pass
8DPSK	SISO	2402	3DH5	9.36	8.63	<=21	Pass
		2441	3DH5	9.15	8.22	<=21	Pass
		2480	3DH5	7.66	5.83	<=21	Pass

AVERAGE_POWER

TEST RESULT

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Average Conducted Output Power		Verdict
				Ant1 (dBm)	Limit(dBm)	
GFSK	SISO	2402	DH5	8.86	21	Pass
		2441	DH5	8.60	21	Pass
		2480	DH5	6.98	21	Pass
Pi/4DQPSK	SISO	2402	2DH5	5.78	21	Pass
		2441	2DH5	5.69	21	Pass
		2480	2DH5	3.90	21	Pass
8DPSK	SISO	2402	3DH5	5.80	21	Pass
		2441	3DH5	5.72	21	Pass
		2480	3DH5	3.94	21	Pass

GFSK_DH5_LCH_2402MHz_Ant1_NTNV

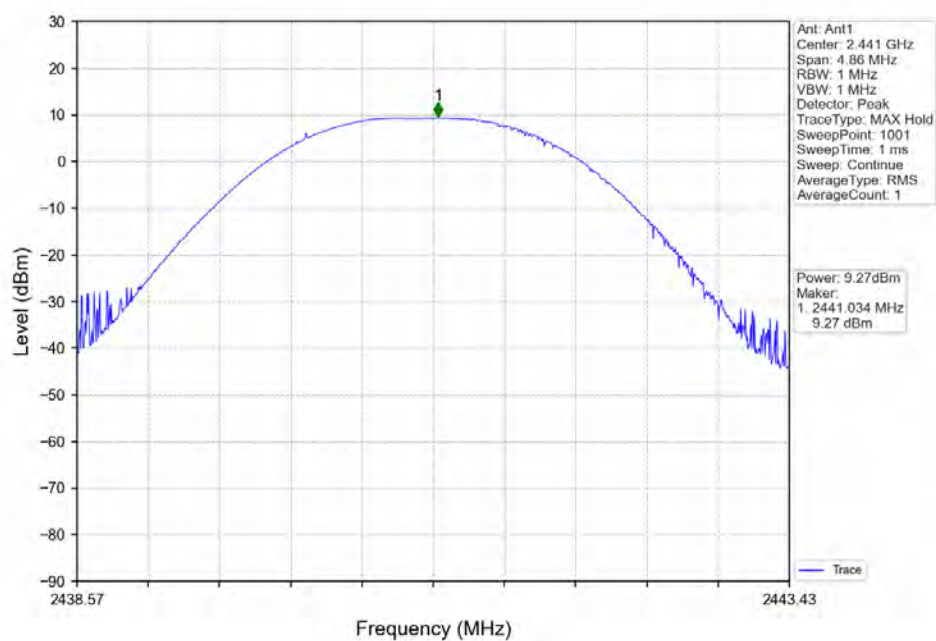


GFSK_DH5_MCH_2441MHz_Ant1_NTNV

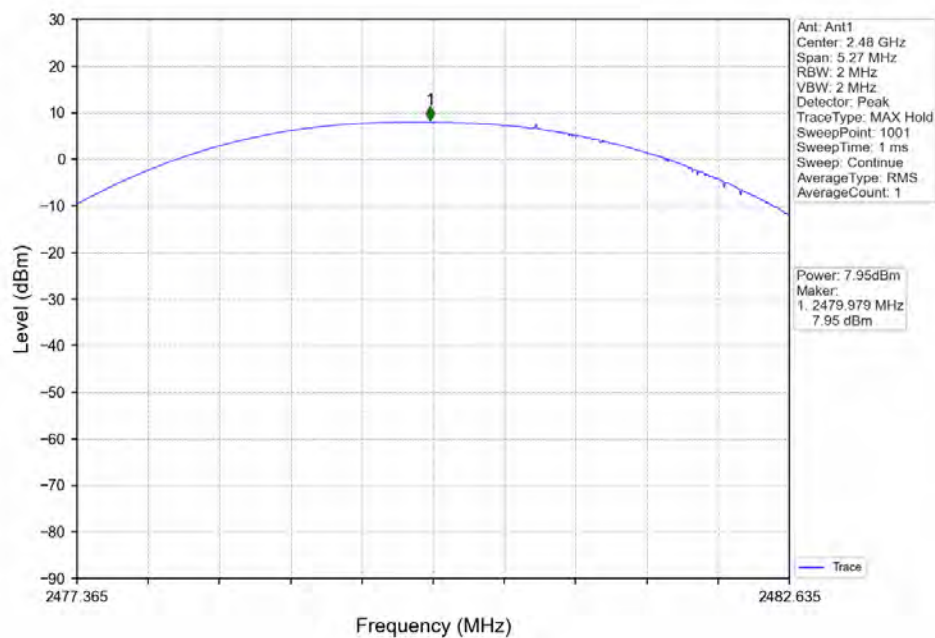


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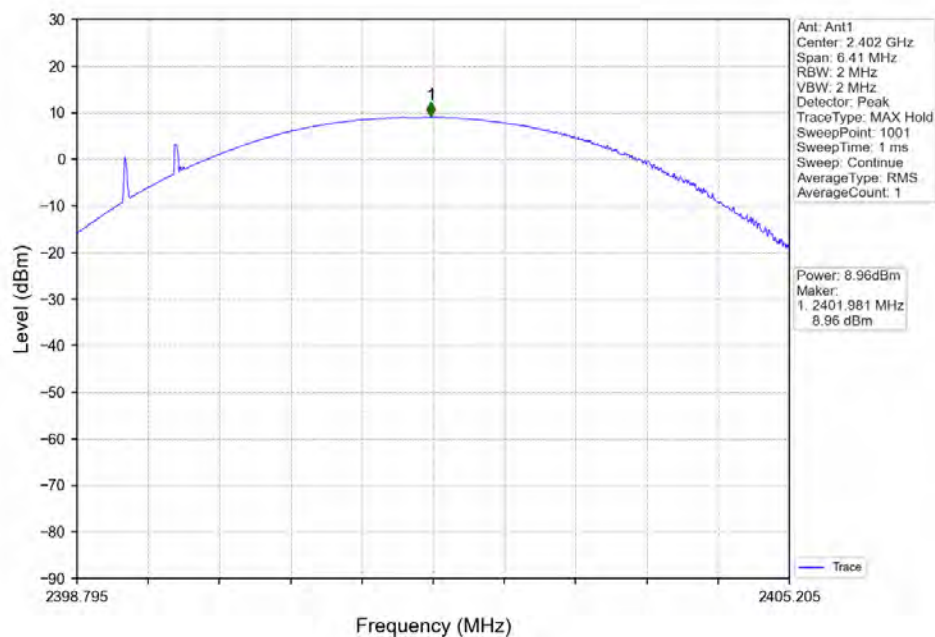
Test Report No.: W7L-P21090018RF01



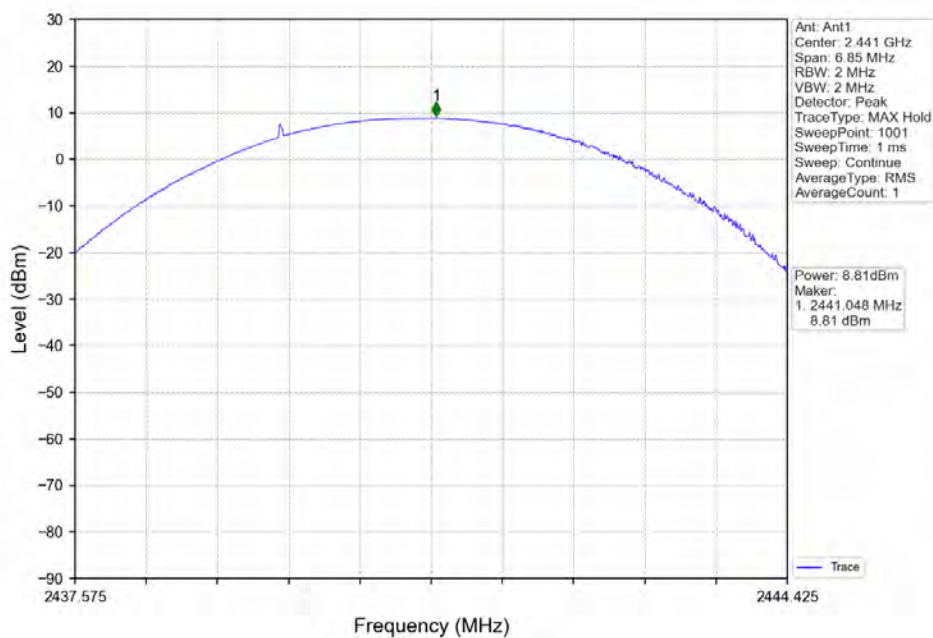
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



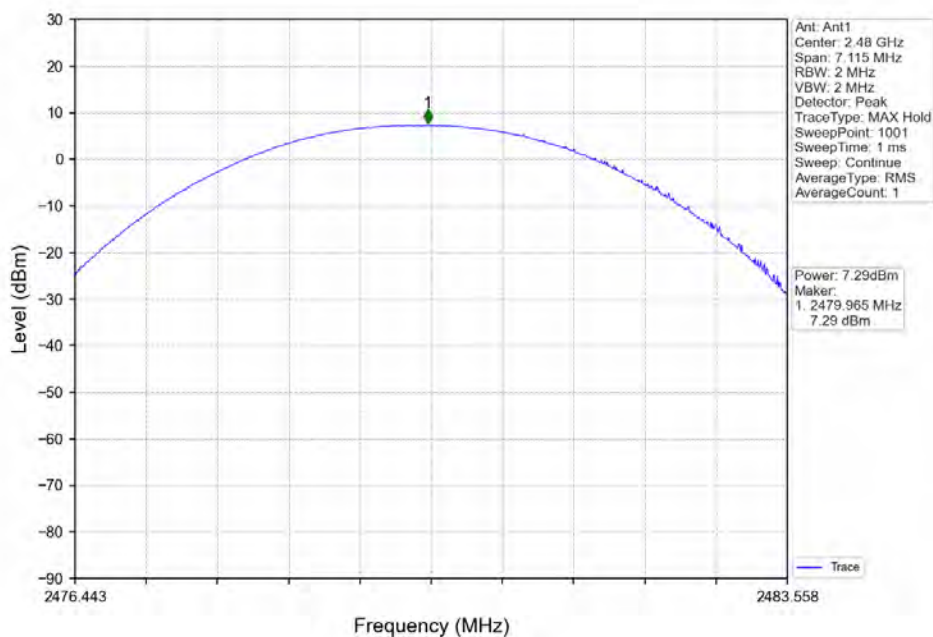
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



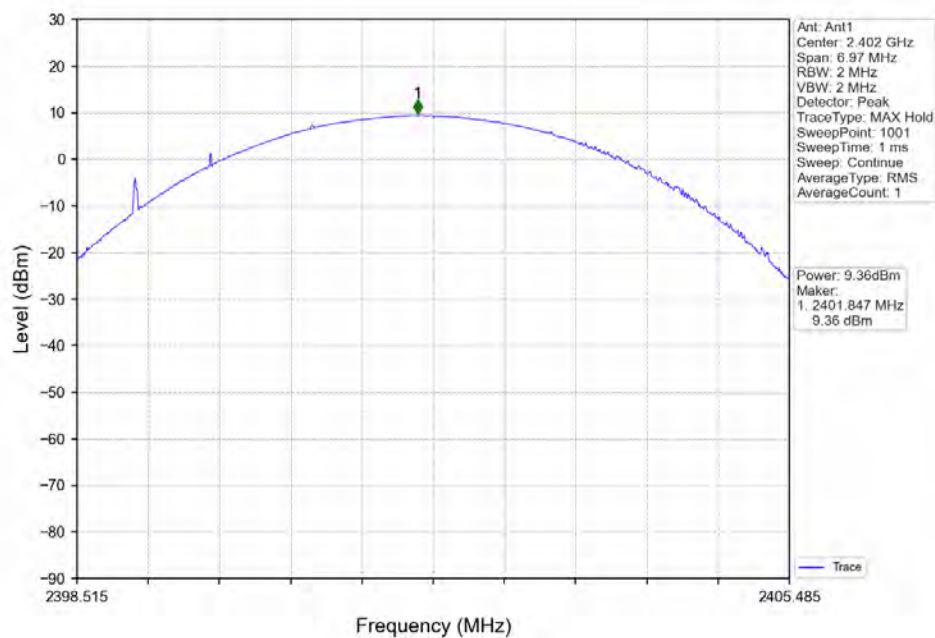
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



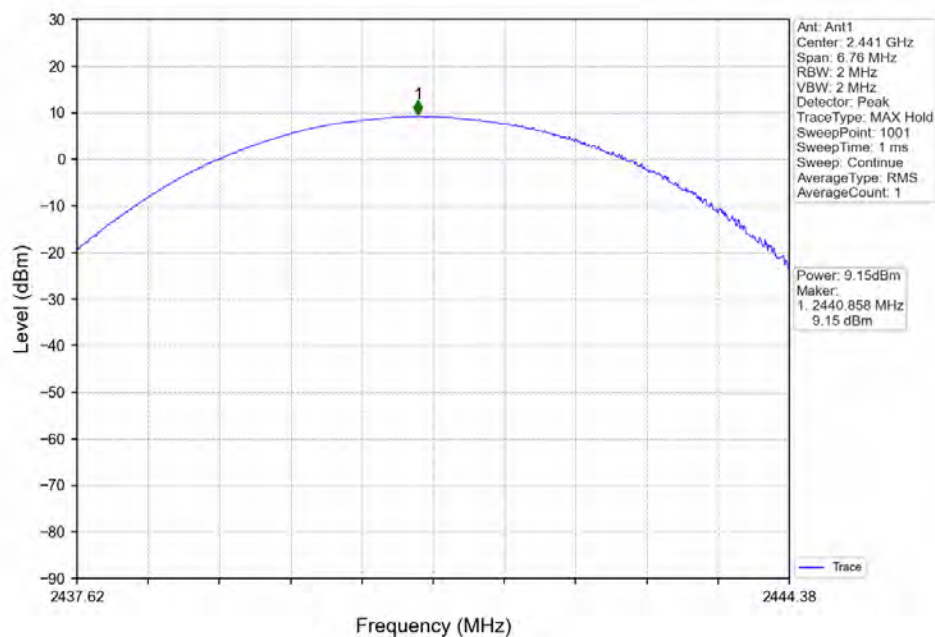
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



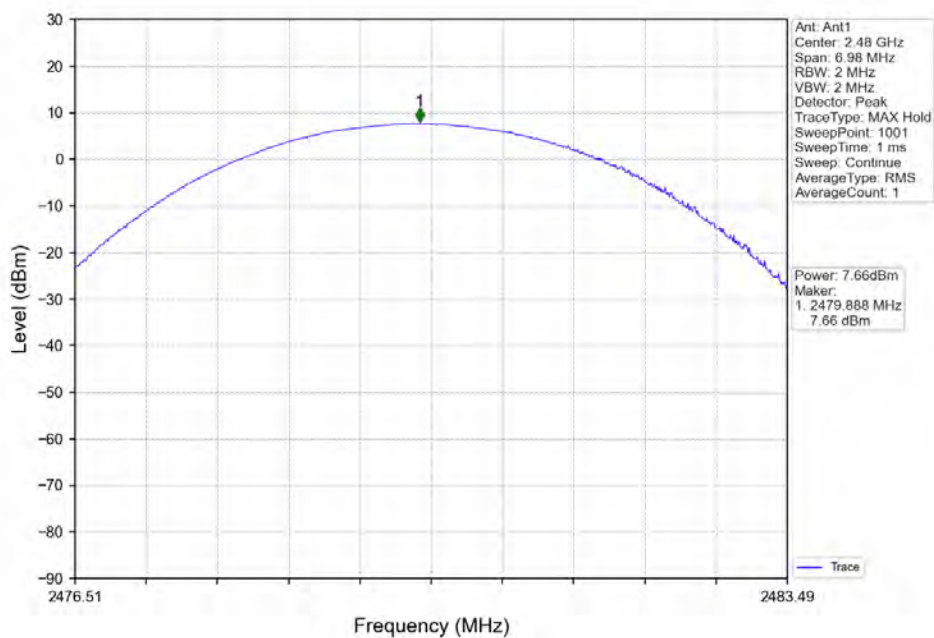
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV





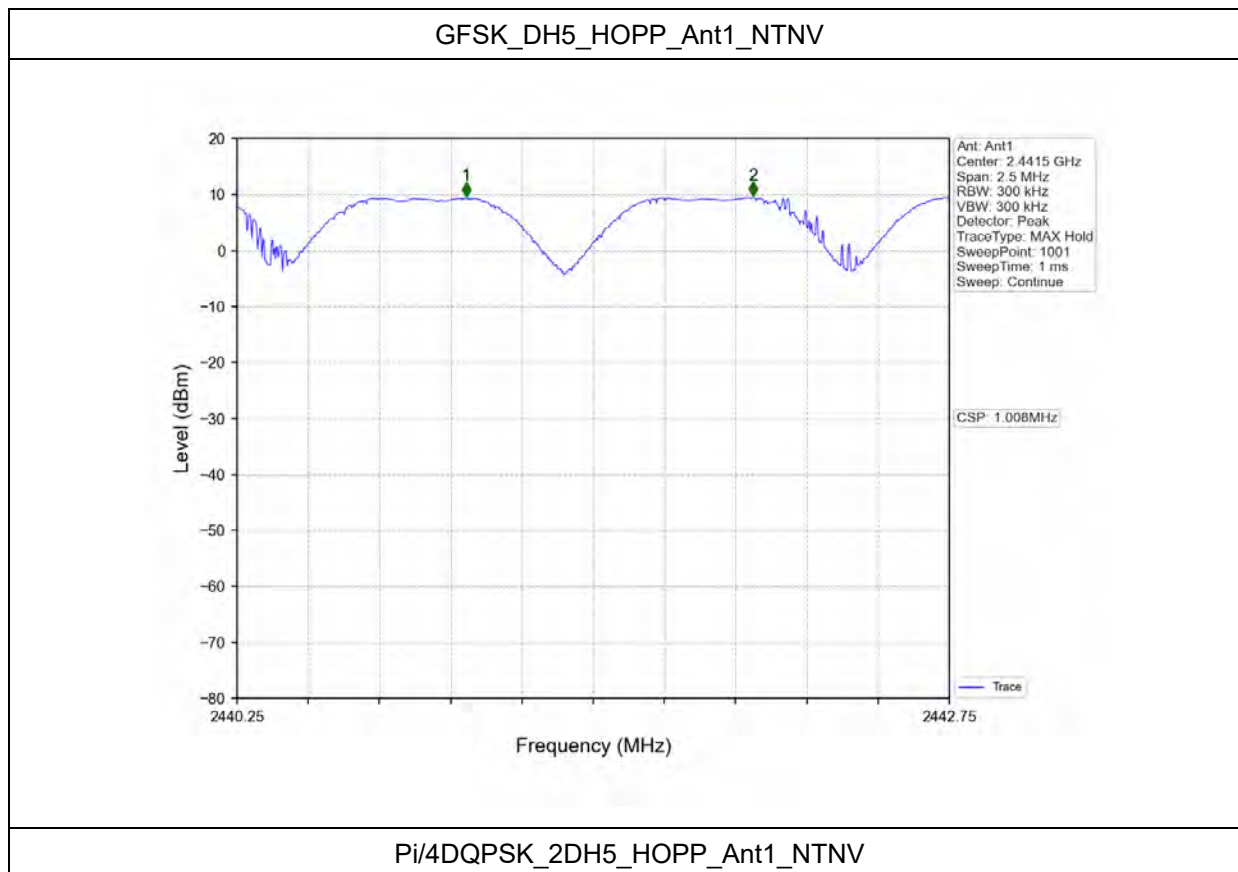
Test Report No.: W7L-P21090018RF01

CARRIER FREQUENCY SEPARATION

TEST RESULT

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.008	1.054	≥ 0.703	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.000	1.423	≥ 0.949	Pass
8DPSK	SISO	HOPP	3DH5	1.030	1.396	≥ 0.931	Pass

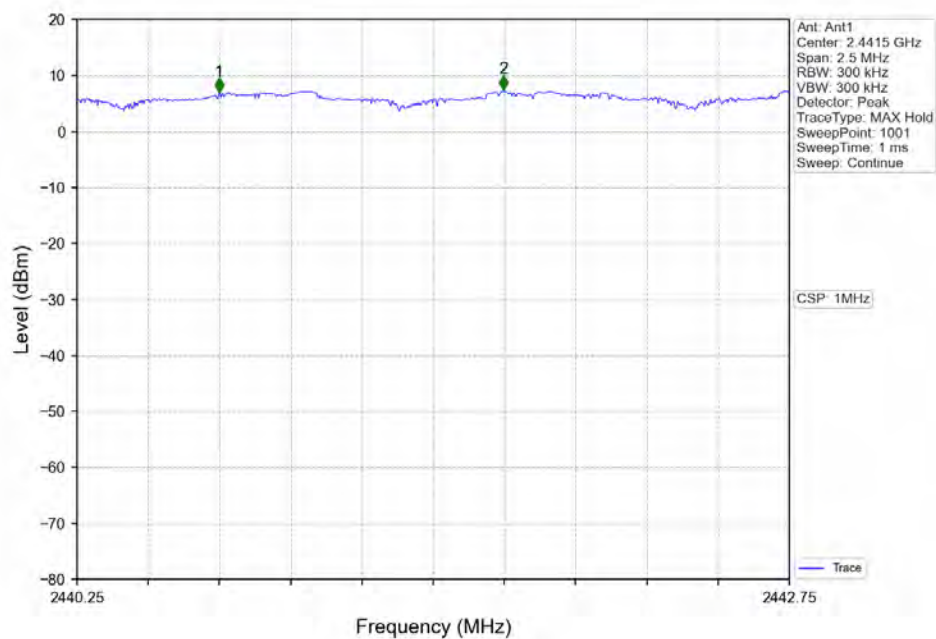
TEST GRAPH



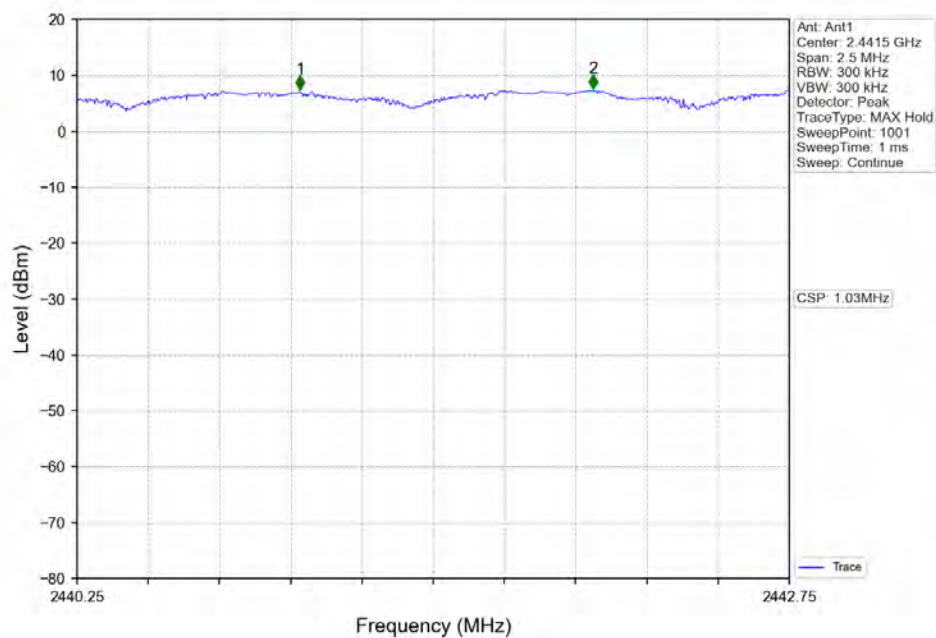


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Test Report No.: W7L-P21090018RF01



8DPSK_3DH5_HOPP_Ant1_NTNV





Test Report No.: W7L-P21090018RF01

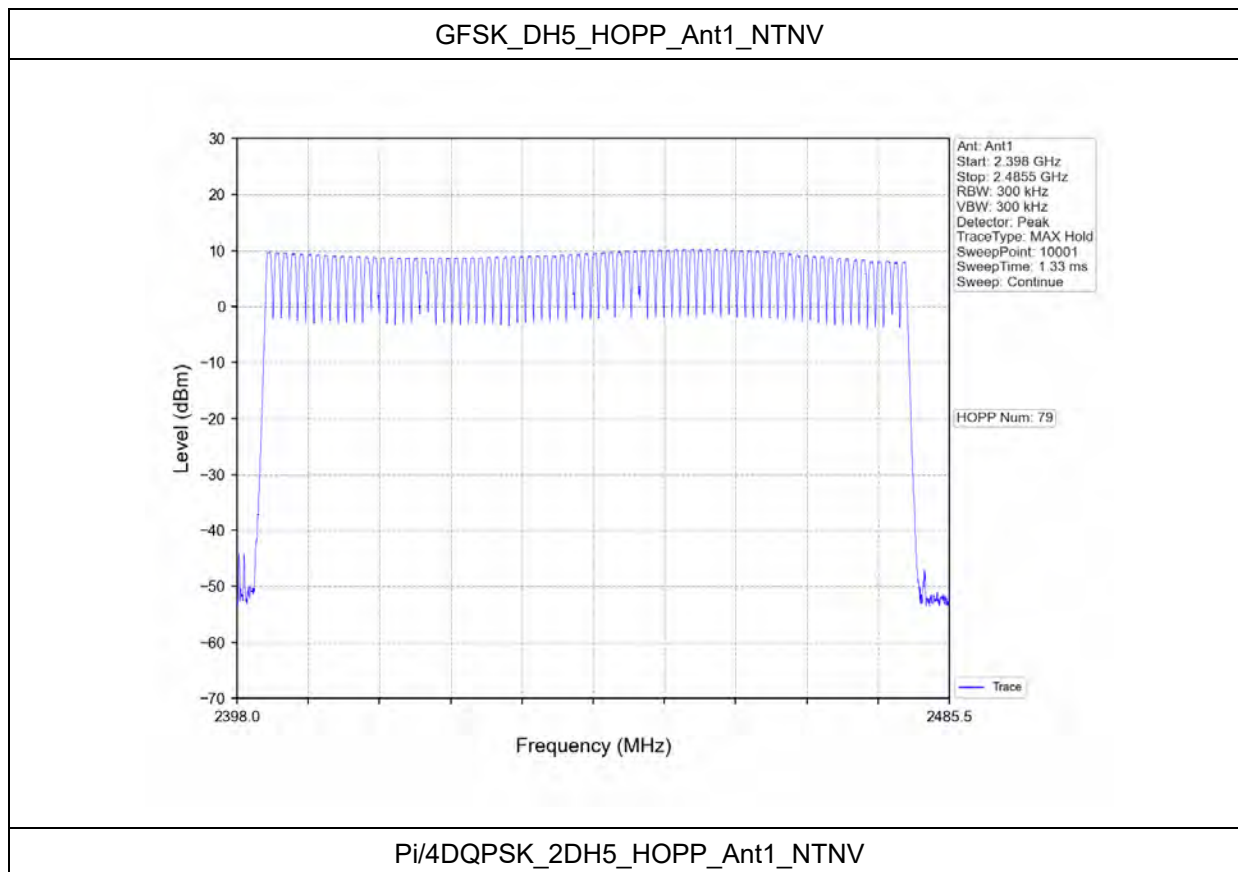
NUMBER OF HOPPING FREQUENCIES

HOPPNUM

TEST RESULT

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				Ant1	Limit	
GFSK	SISO	HOPP	DH5	79	≥ 15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	≥ 15	Pass
8DPSK	SISO	HOPP	3DH5	79	≥ 15	Pass

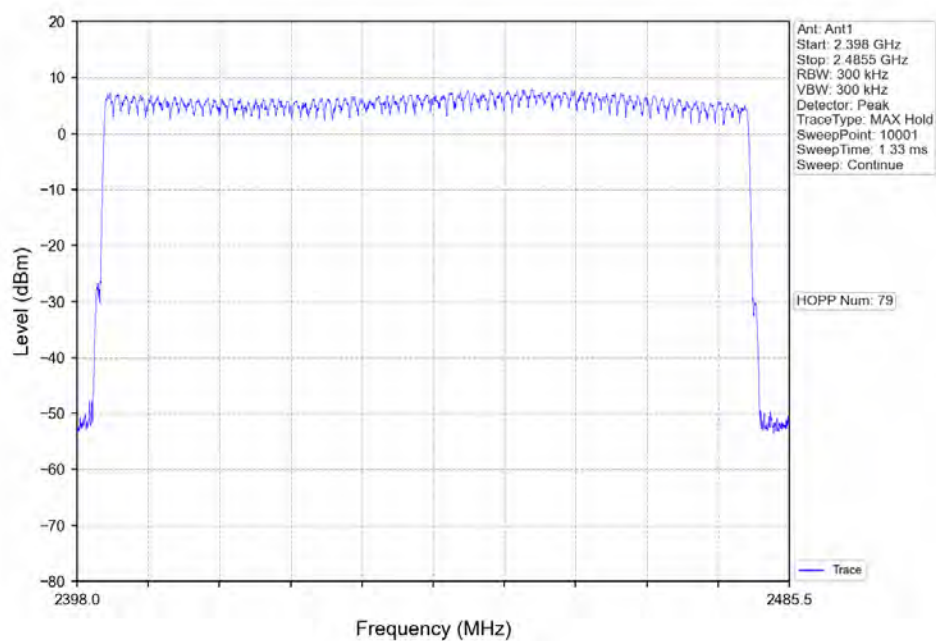
TEST GRAPH



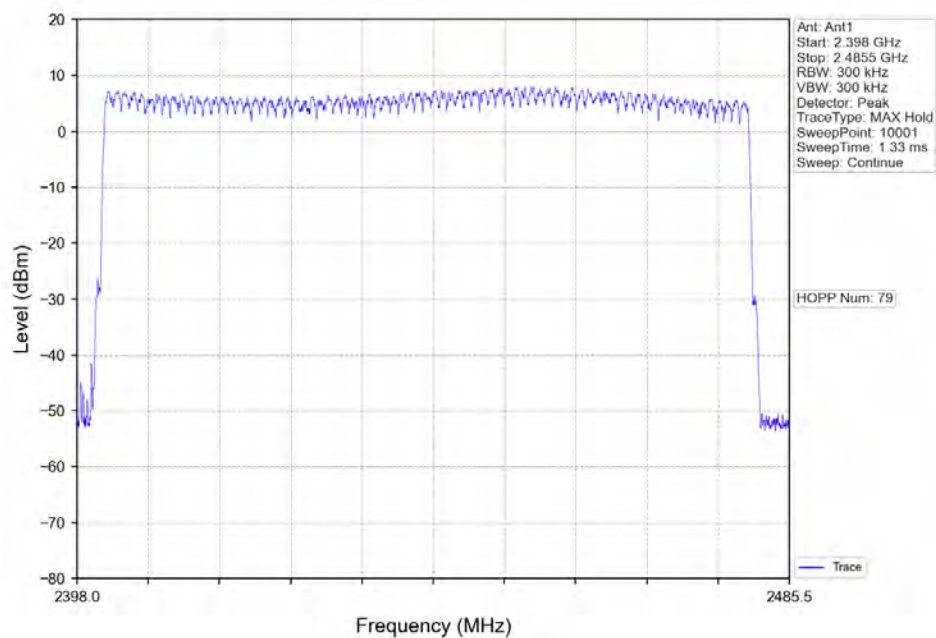


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Test Report No.: W7L-P21090018RF01



8DPSK_3DH5_HOPP_Ant1_NTNV

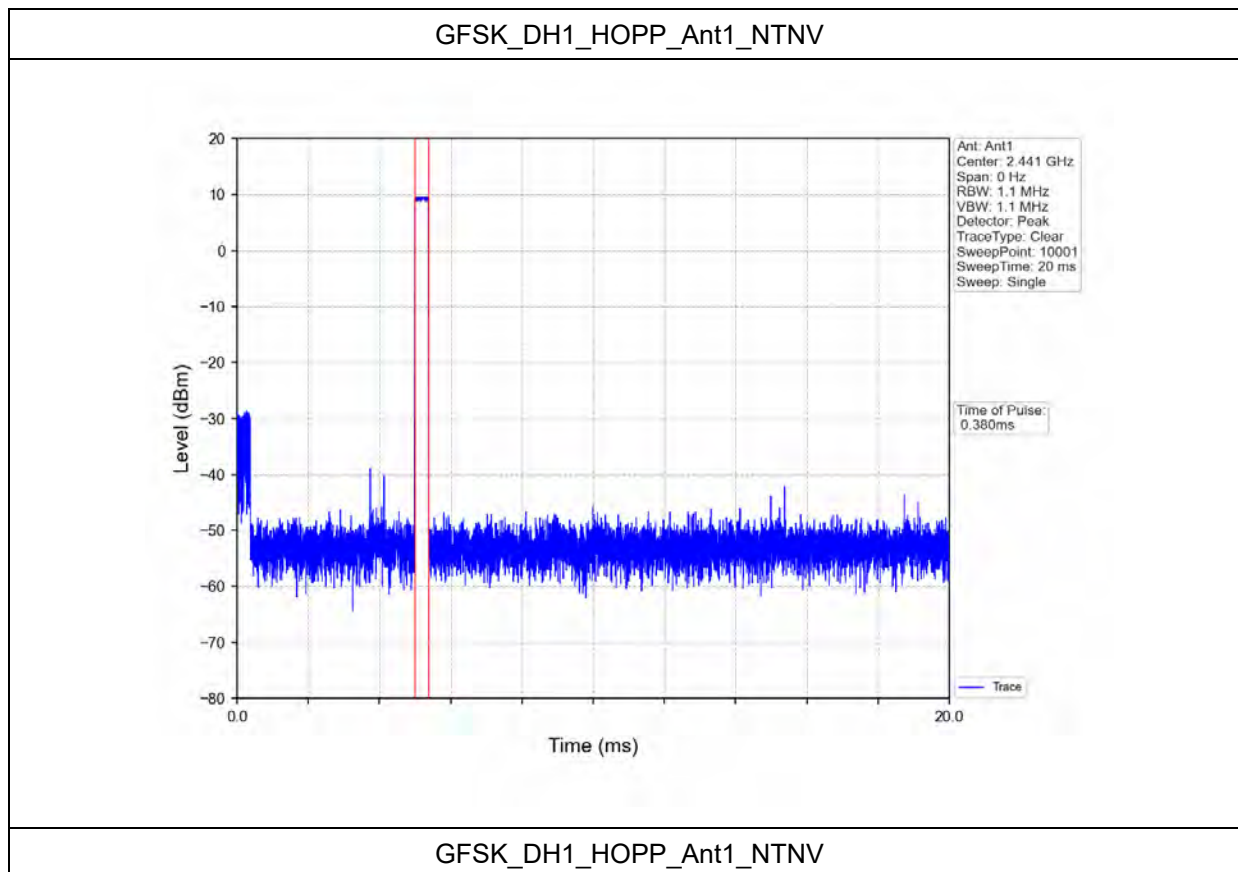


TIME OF OCCUPANCY (DWELL TIME)

TEST RESULT

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	0.380	31.600	320	121.600	<=400	Pass
			DH3	1.638	31.600	172	281.736	<=400	Pass
			DH5	2.886	31.600	99	285.714	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.388	31.600	321	124.548	<=400	Pass
			2DH3	1.640	31.600	168	275.520	<=400	Pass
			2DH5	2.888	31.600	111	320.568	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.388	31.600	320	124.160	<=400	Pass
			3DH3	1.640	31.600	155	254.200	<=400	Pass
			3DH5	2.890	31.600	100	289.000	<=400	Pass

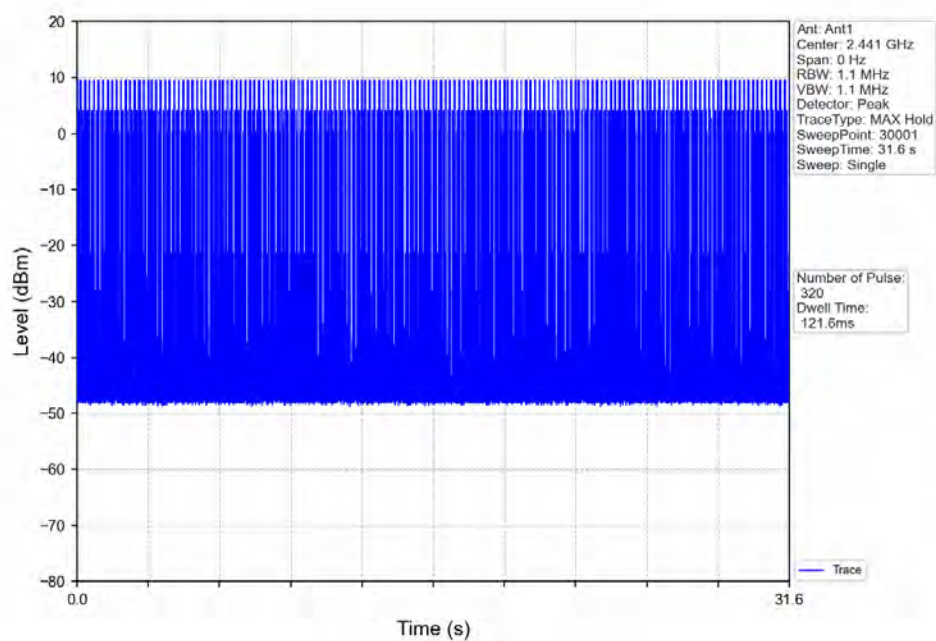
TEST GRAPH



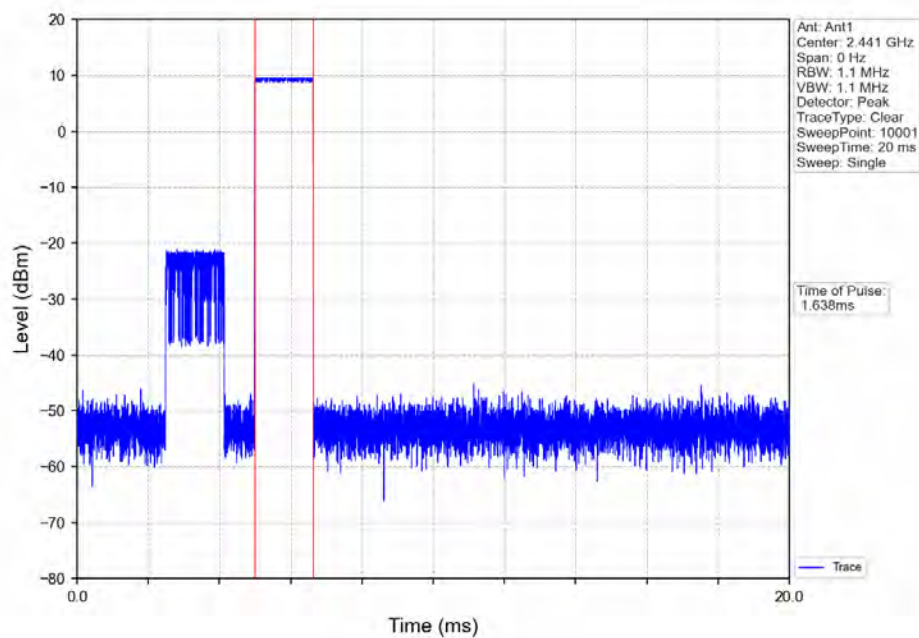


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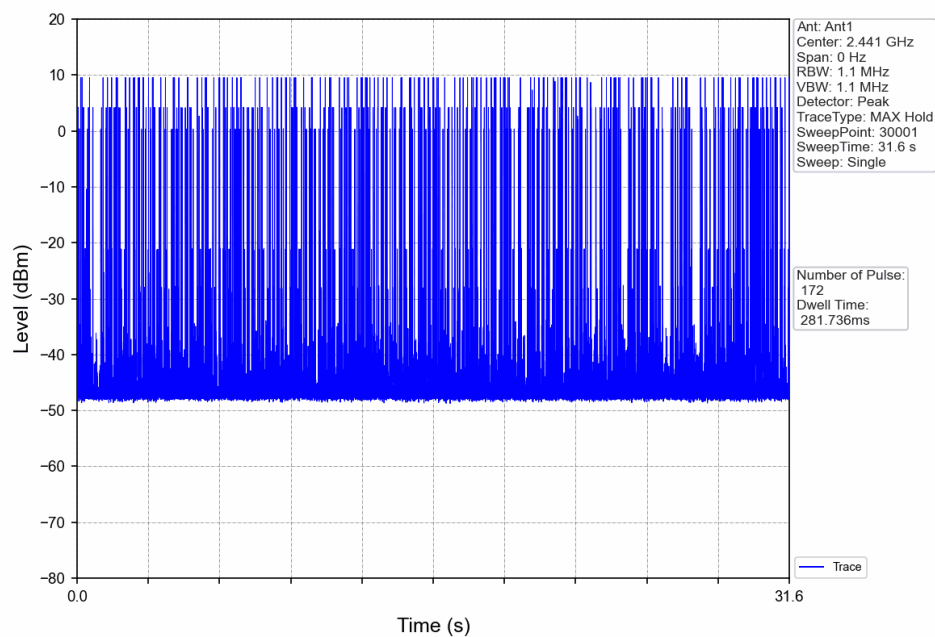
Test Report No.: W7L-P21090018RF01



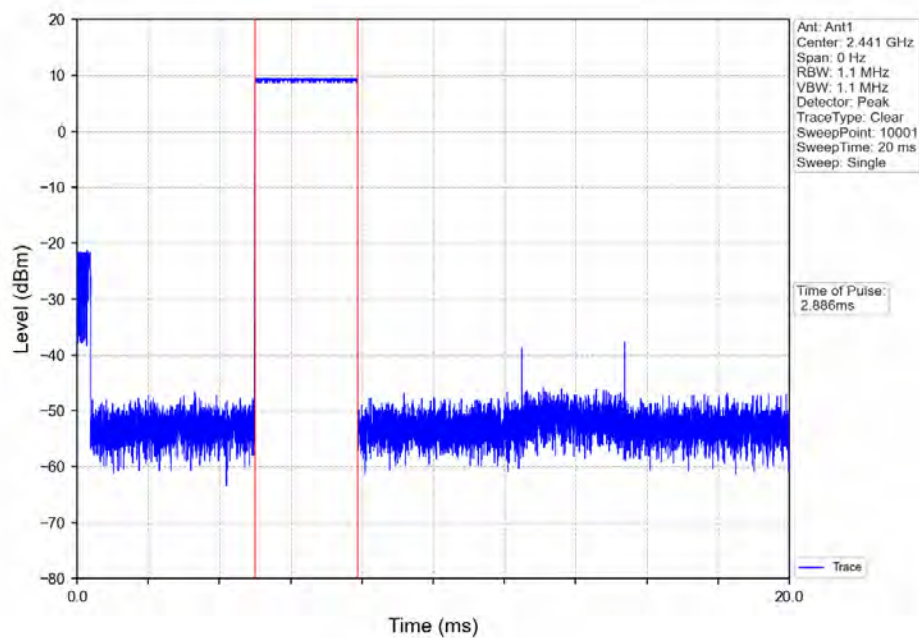
GFSK_DH3_HOPP_Ant1_NTNV



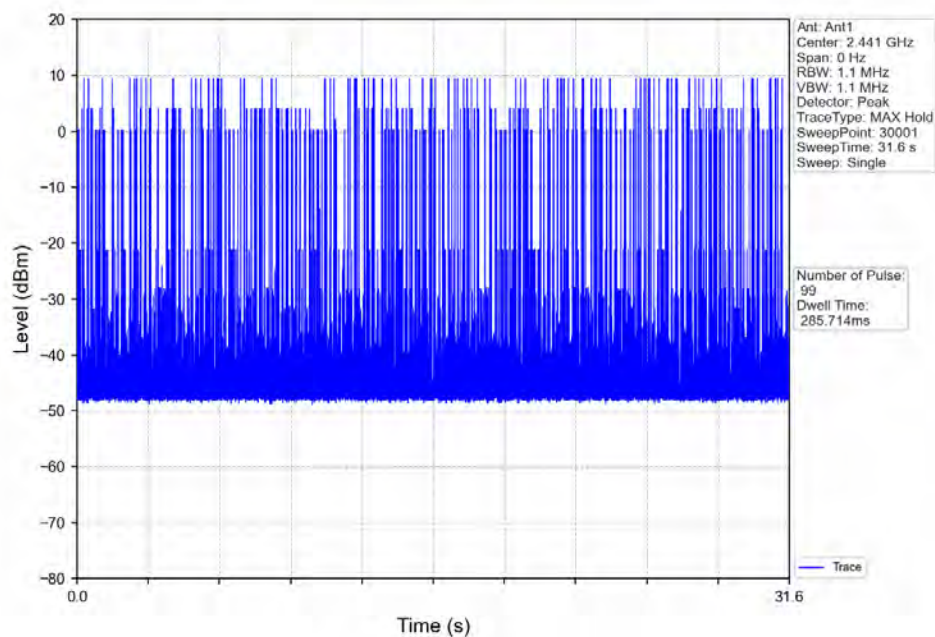
GFSK_DH3_HOPP_Ant1_NTNV



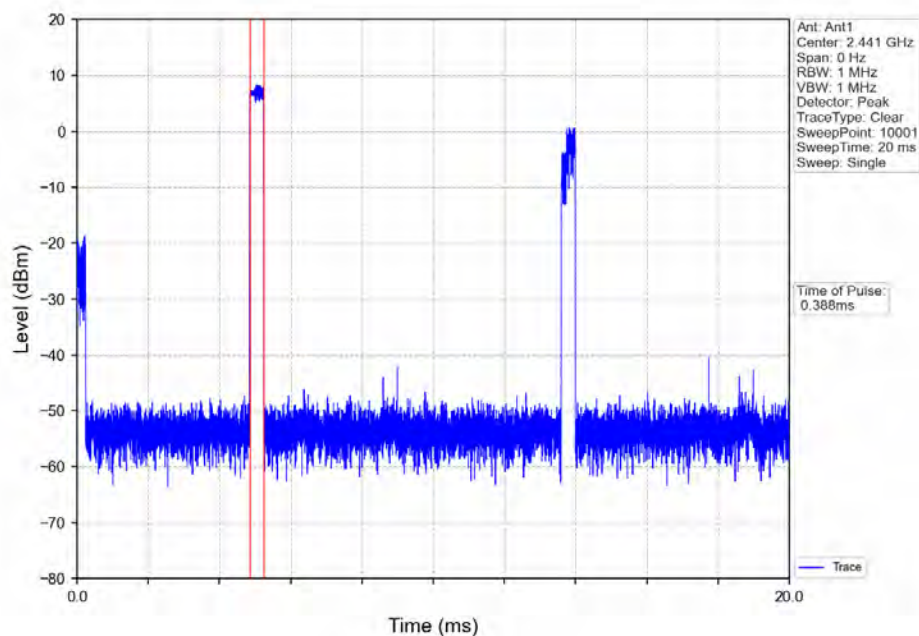
GFSK_DH5_HOPP_Ant1_NTNV



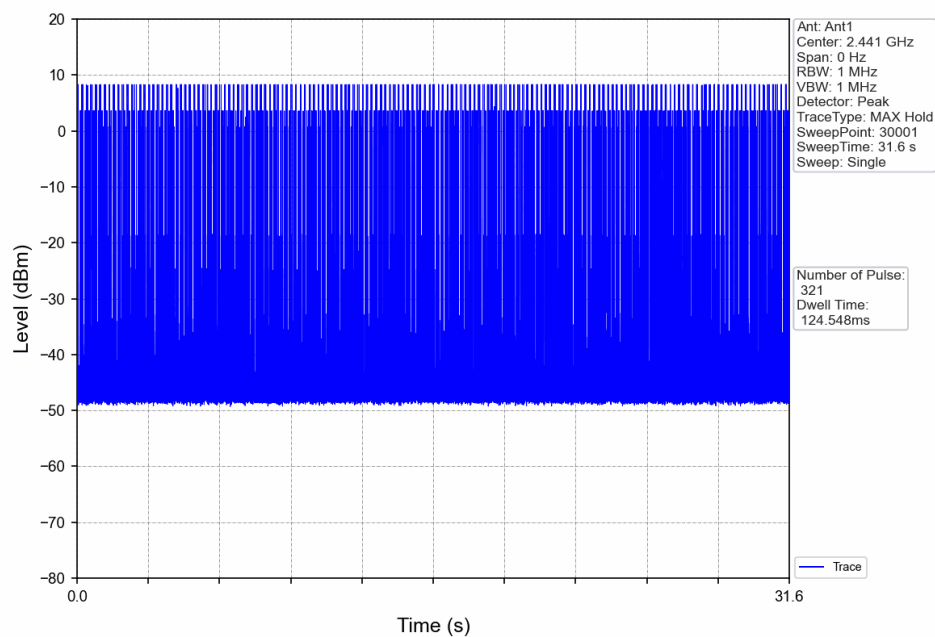
GFSK_DH5_HOPP_Ant1_NTNV



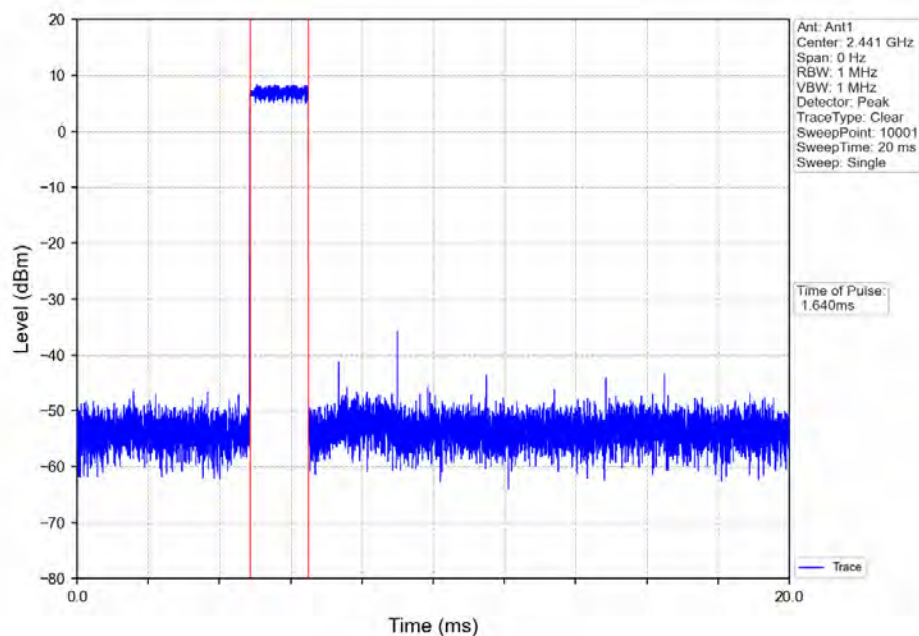
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



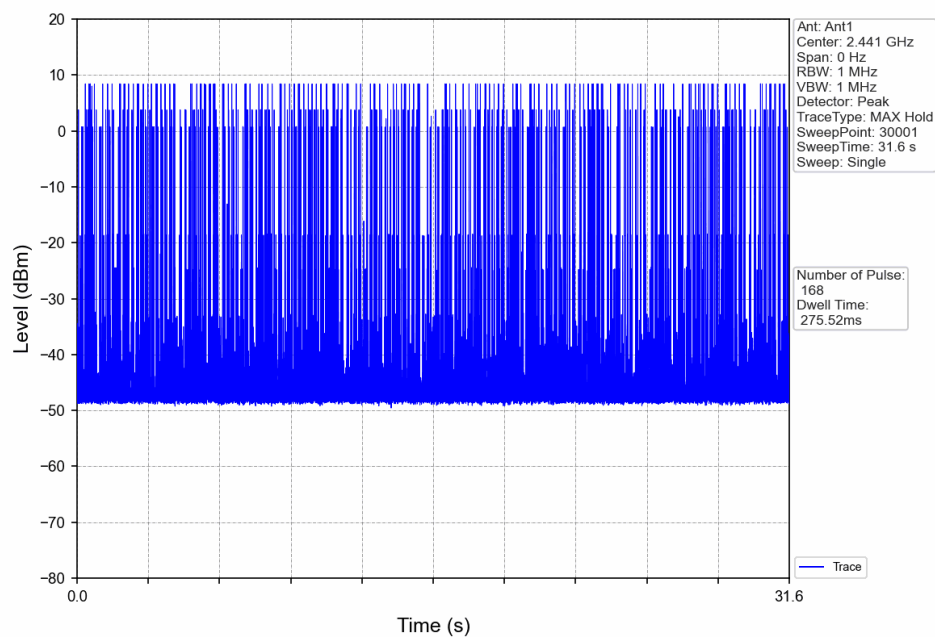
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



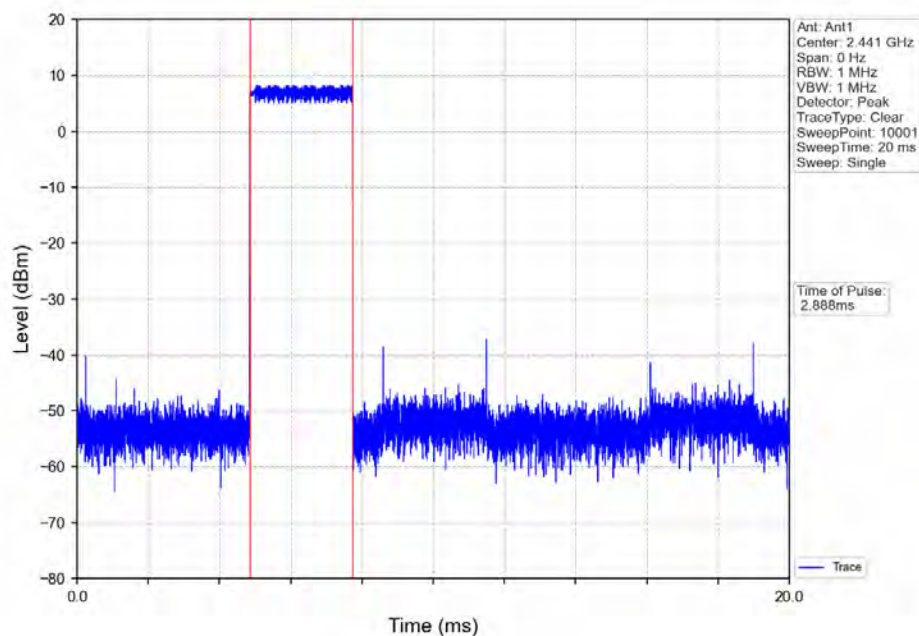
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



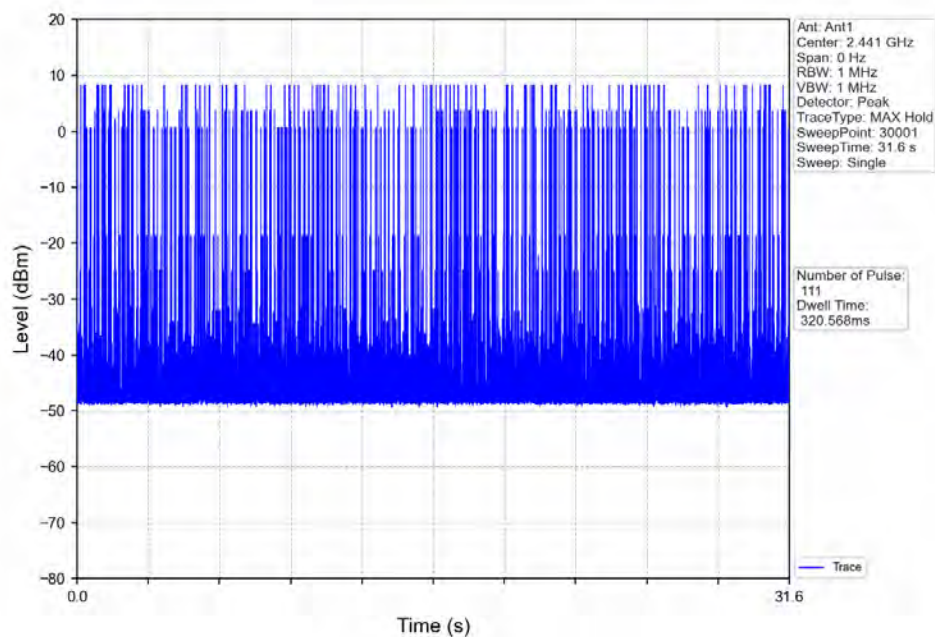
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



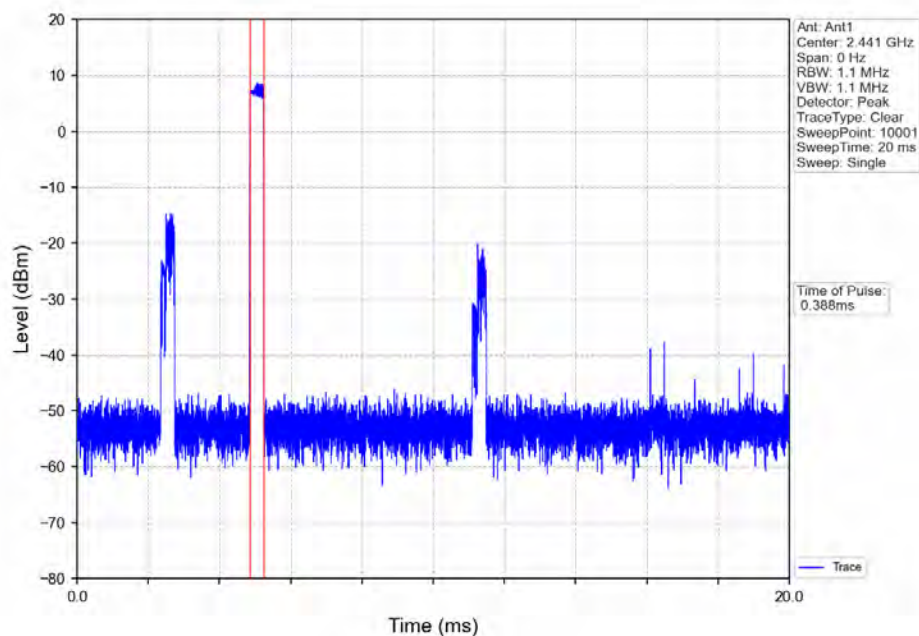
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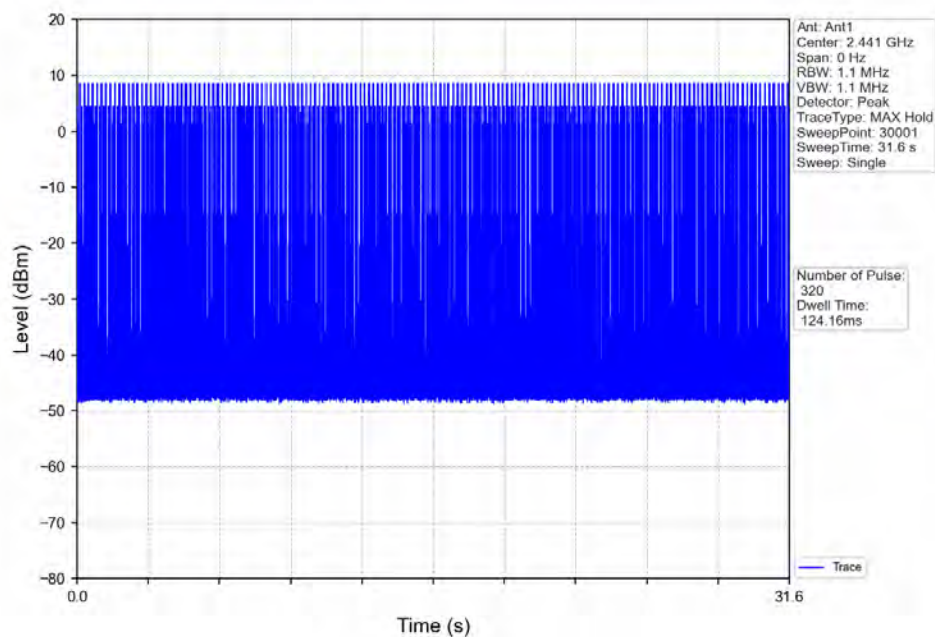
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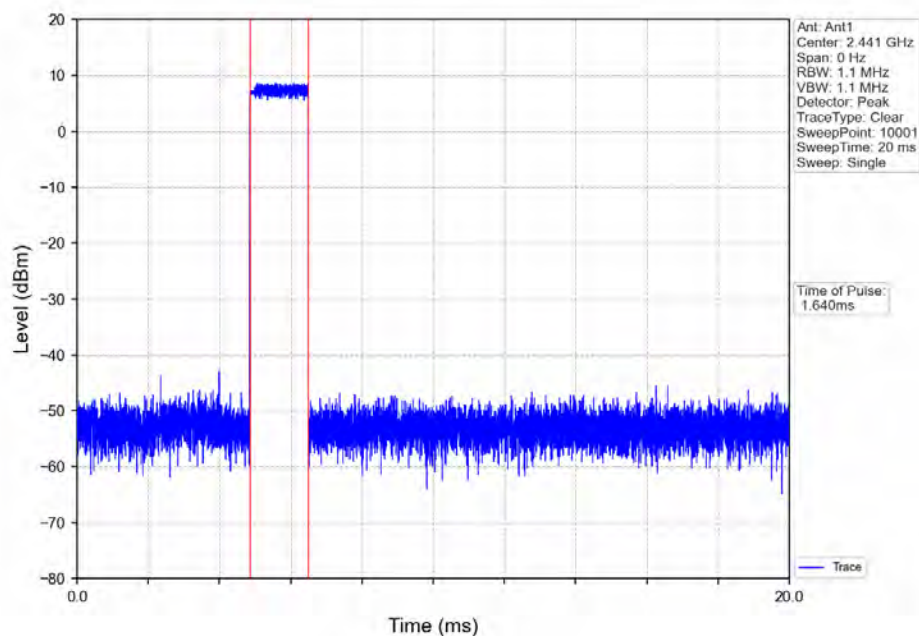
8DPSK_3DH1_HOPP_Ant1_NTNV



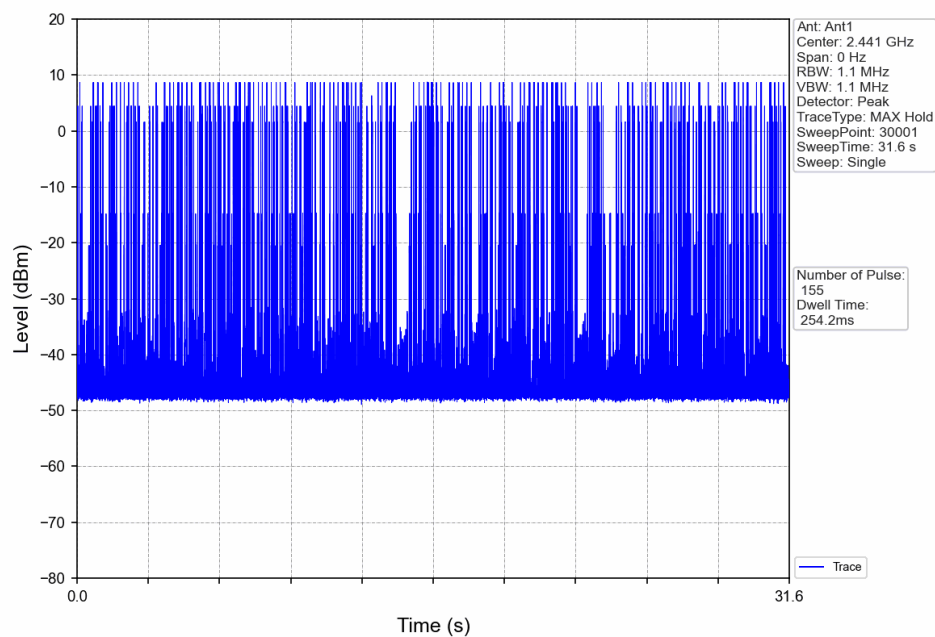
8DPSK_3DH1_HOPP_Ant1_NTNV



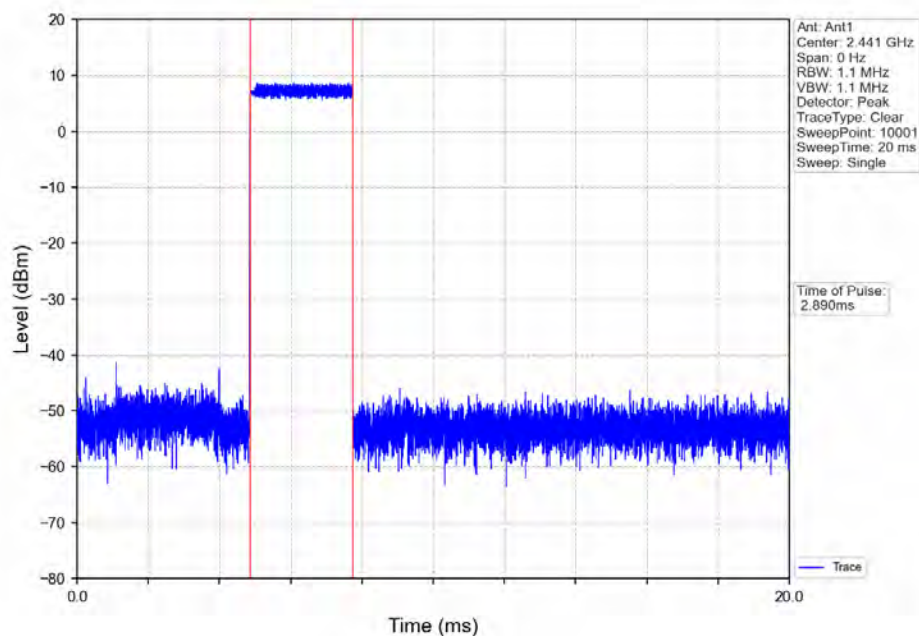
8DPSK_3DH3_HOPP_Ant1_NTNV



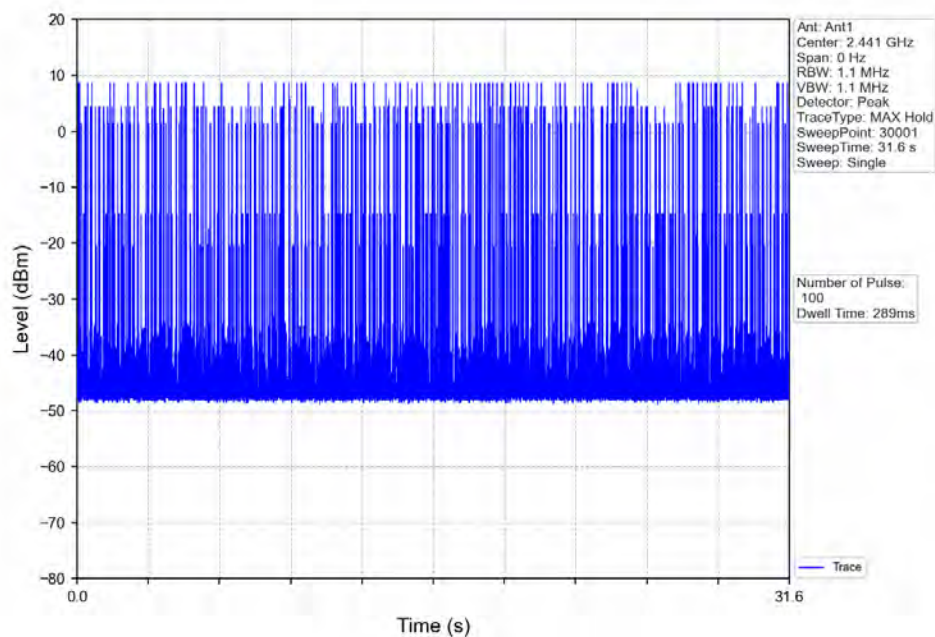
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



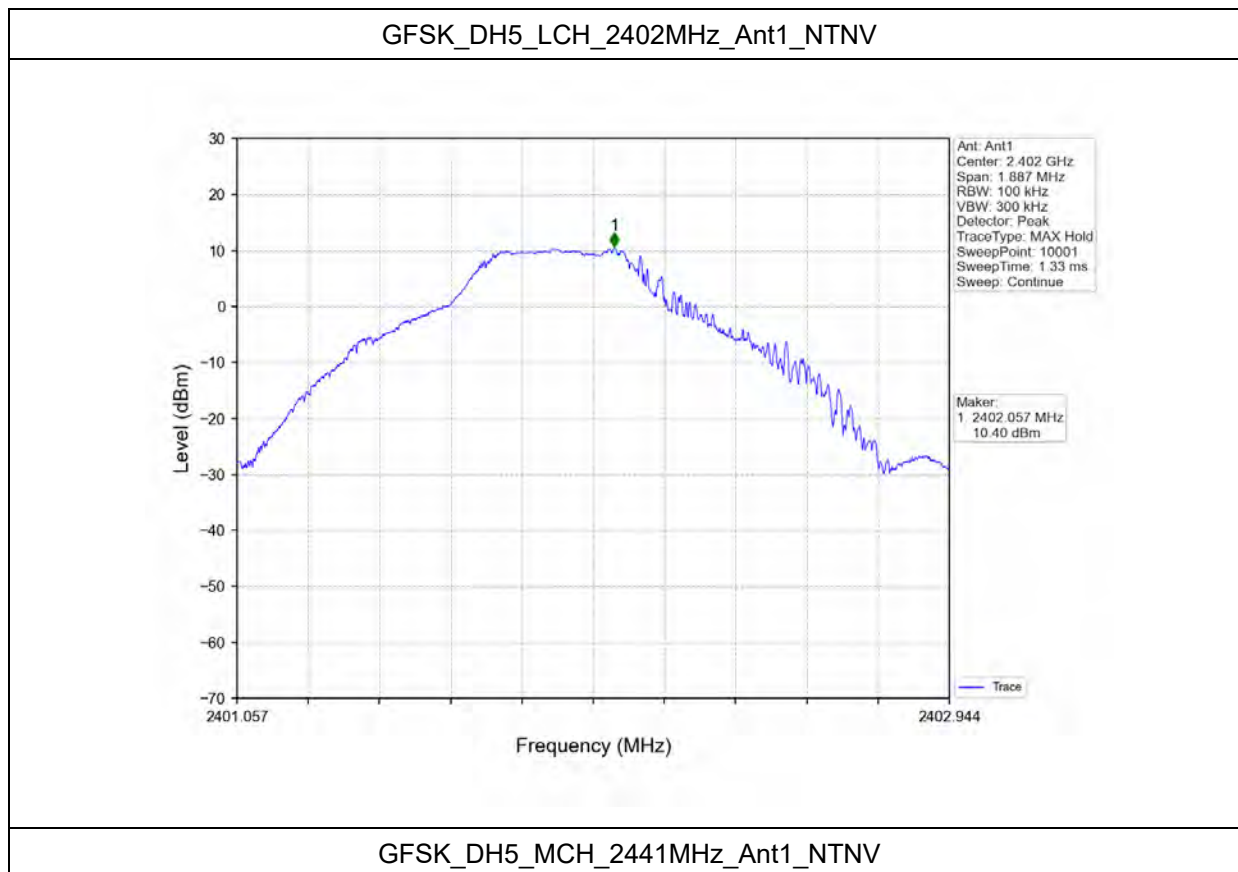
UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

REF

TEST RESULT

Mode	TX Type	Frequency (MHz)	Packet Type	Ant	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	10.40
		2441	DH5	1	9.03
		2480	DH5	1	7.69
Pi/4DQPSK	SISO	2402	2DH5	1	7.11
		2441	2DH5	1	7.09
		2480	2DH5	1	5.45
8DPSK	SISO	2402	3DH5	1	7.08
		2441	3DH5	1	7.05
		2480	3DH5	1	5.16
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.					

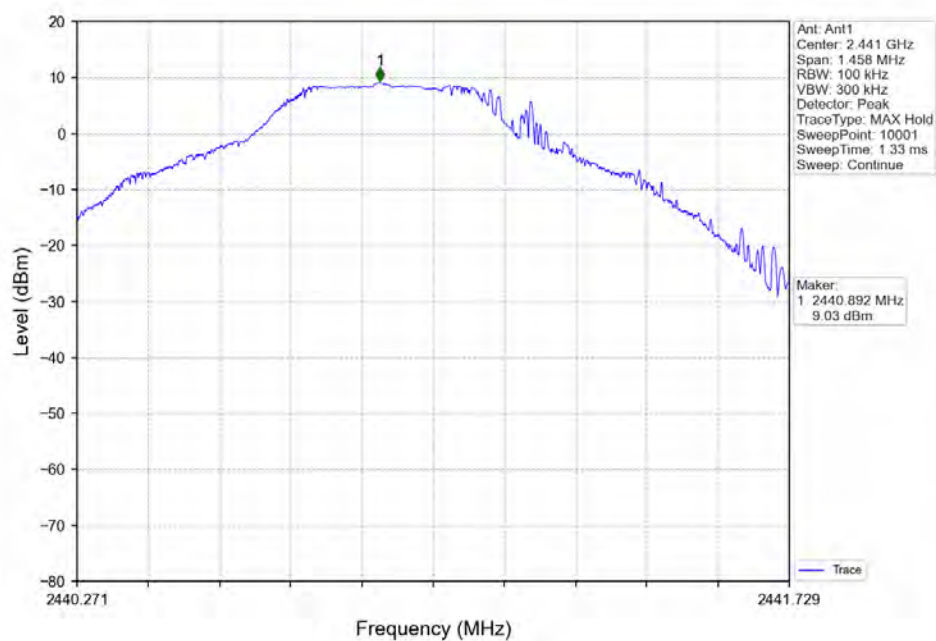
TEST GRAPH



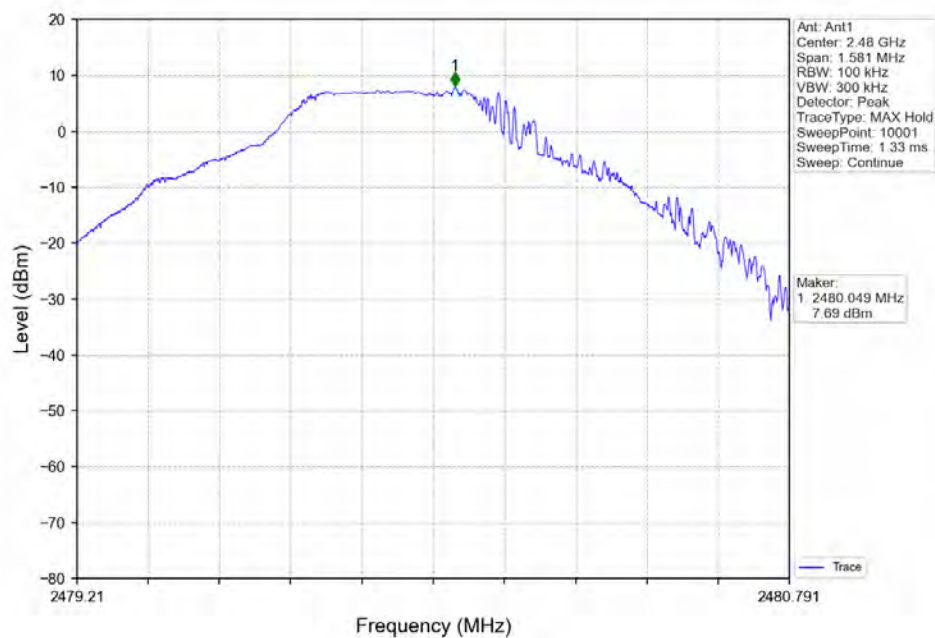


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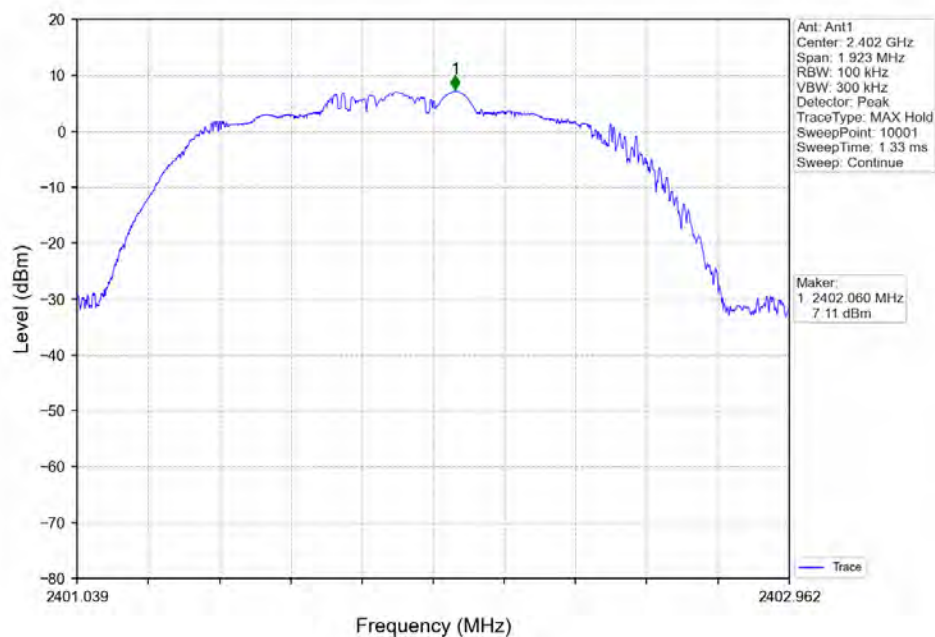
Test Report No.: W7L-P21090018RF01



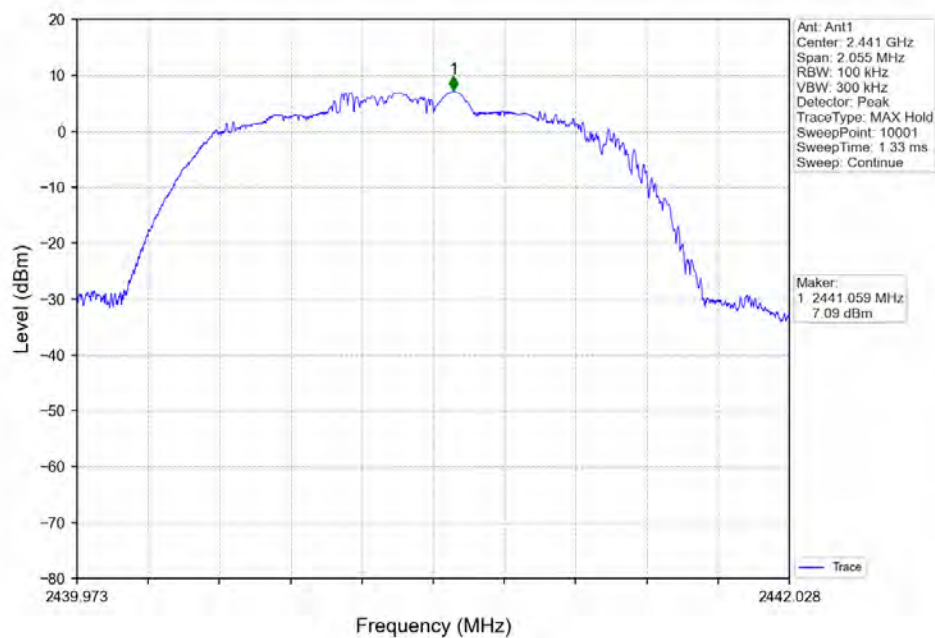
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



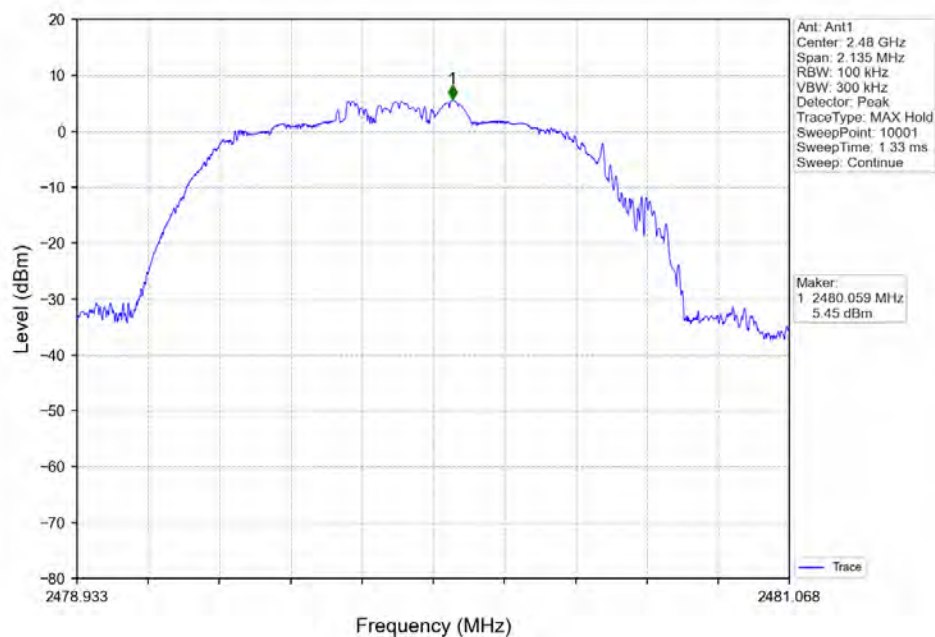
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



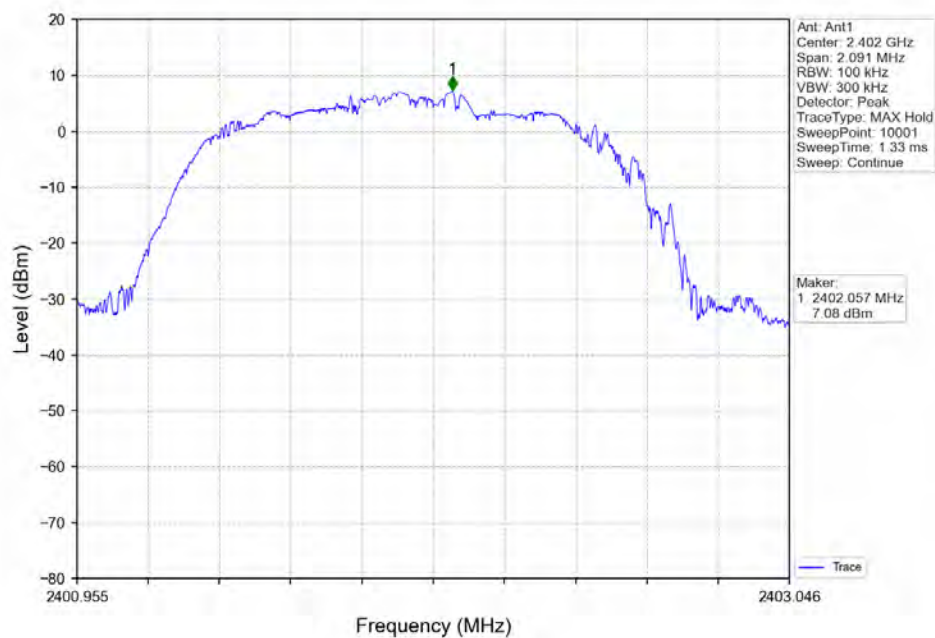
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



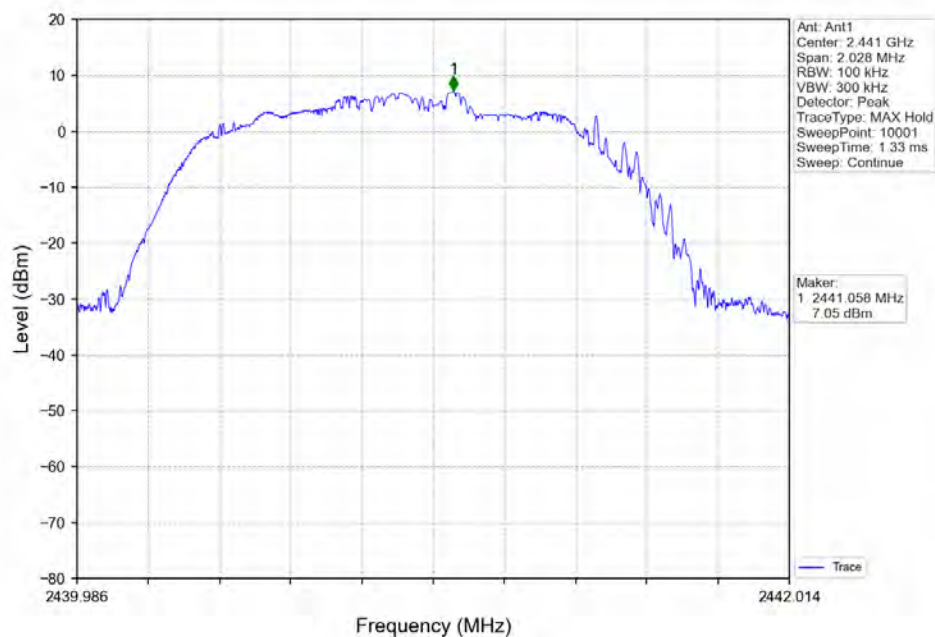
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



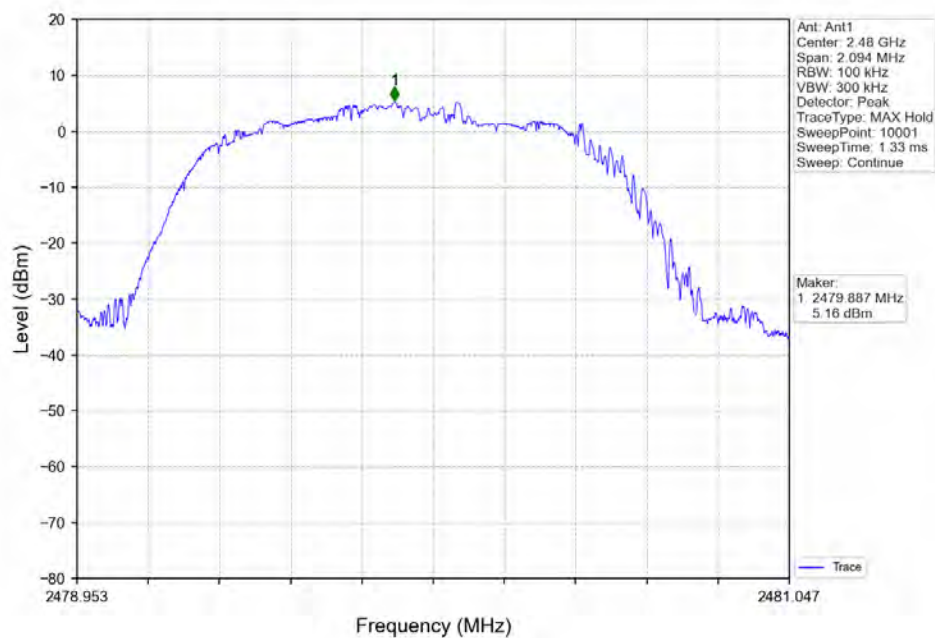
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

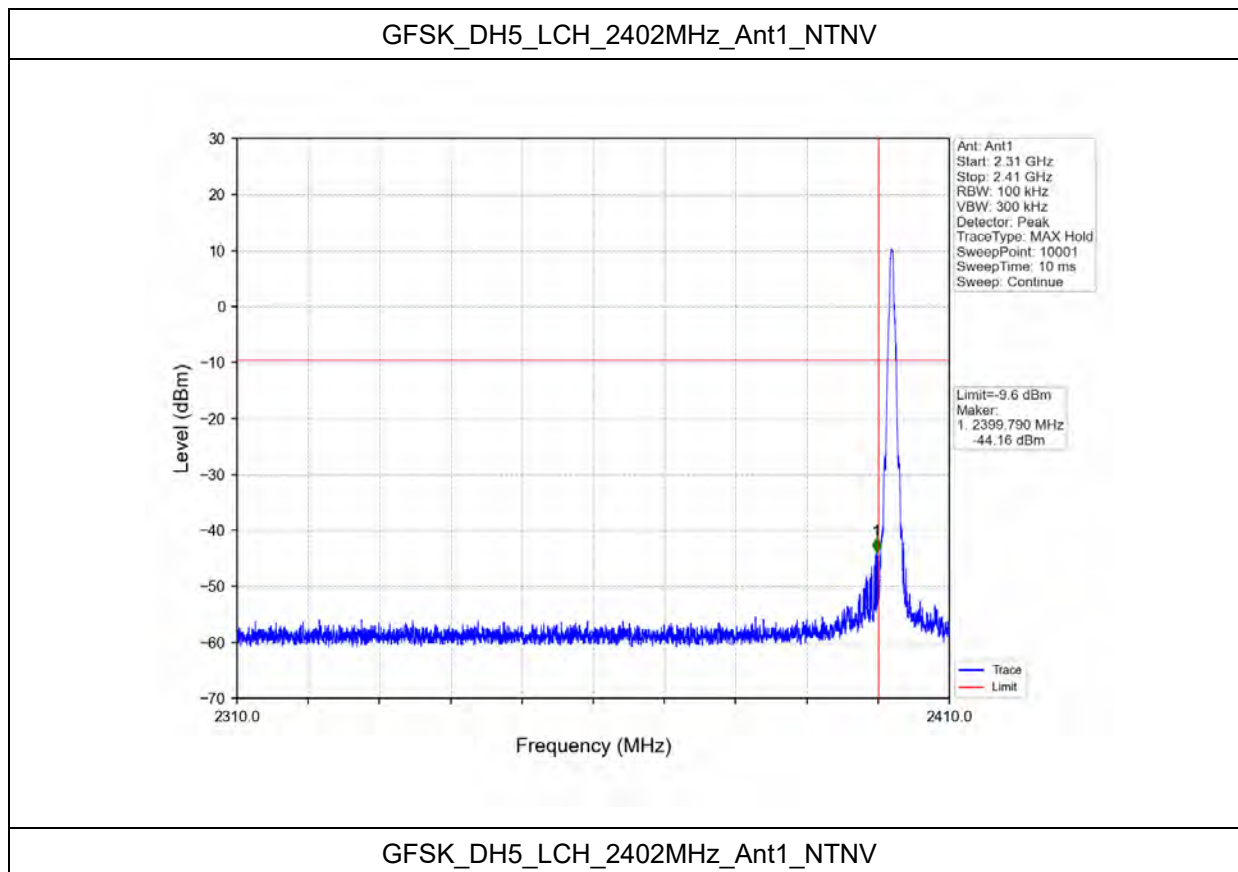


CSE

TEST RESULT

Mode	TX Type	Frequency (MHz)	Packet Type	Ant	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	10.40	-9.60	Pass
		2441	DH5	1	10.40	-9.60	Pass
		2480	DH5	1	10.40	-9.60	Pass
		HOPP	DH5	1	10.40	-9.60	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	7.11	-12.89	Pass
		2441	2DH5	1	7.11	-12.89	Pass
		2480	2DH5	1	7.11	-12.89	Pass
		HOPP	2DH5	1	7.11	-12.89	Pass
8DPSK	SISO	2402	3DH5	1	7.08	-12.92	Pass
		2441	3DH5	1	7.08	-12.92	Pass
		2480	3DH5	1	7.08	-12.92	Pass
		HOPP	3DH5	1	7.08	-12.92	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.							

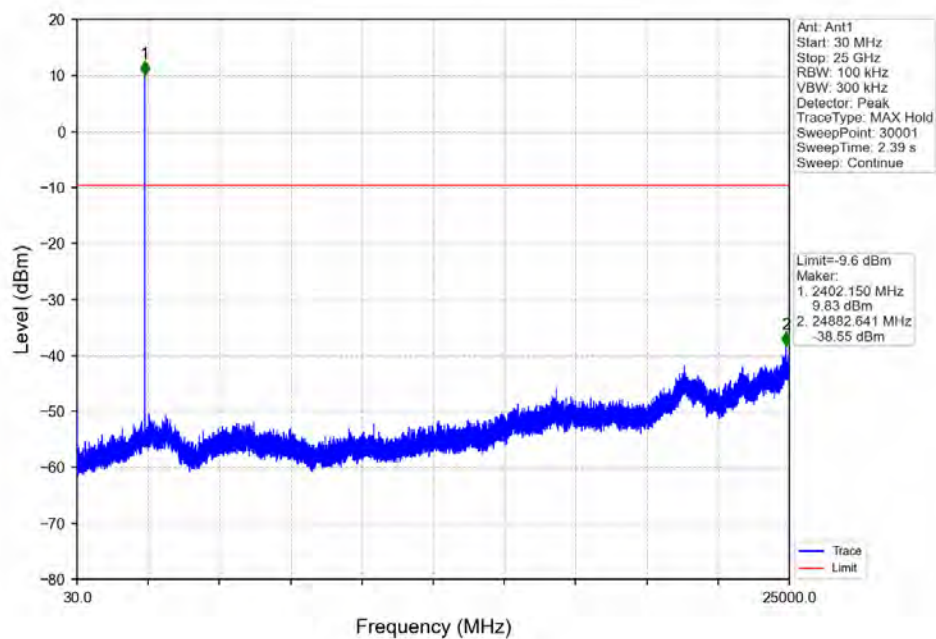
TEST GRAPH



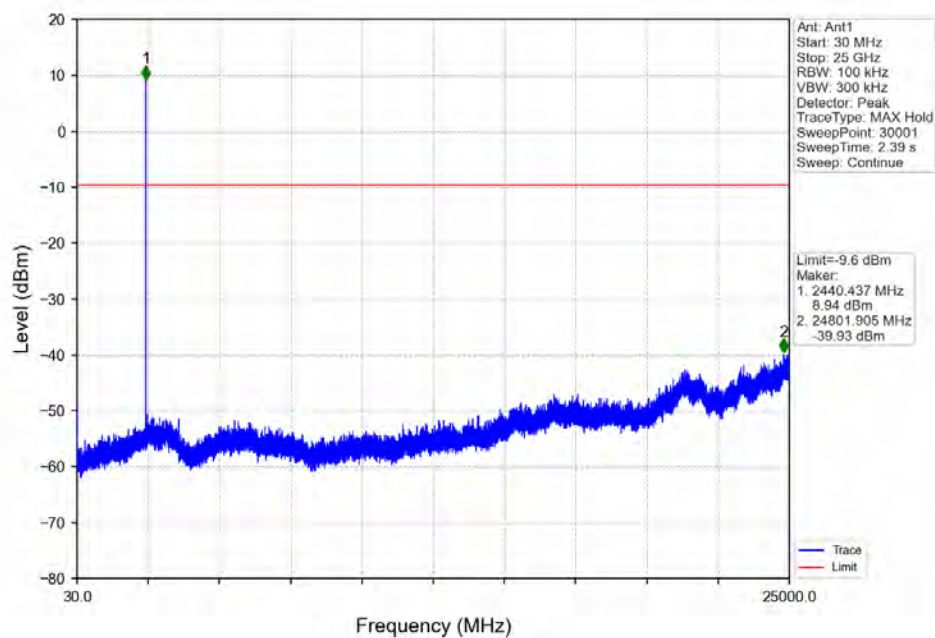


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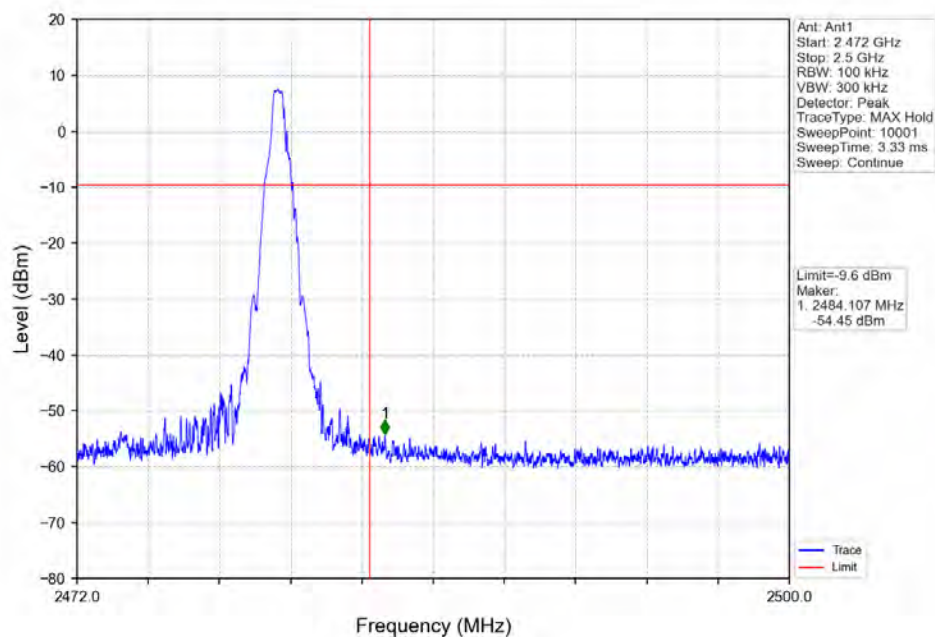
Test Report No.: W7L-P21090018RF01



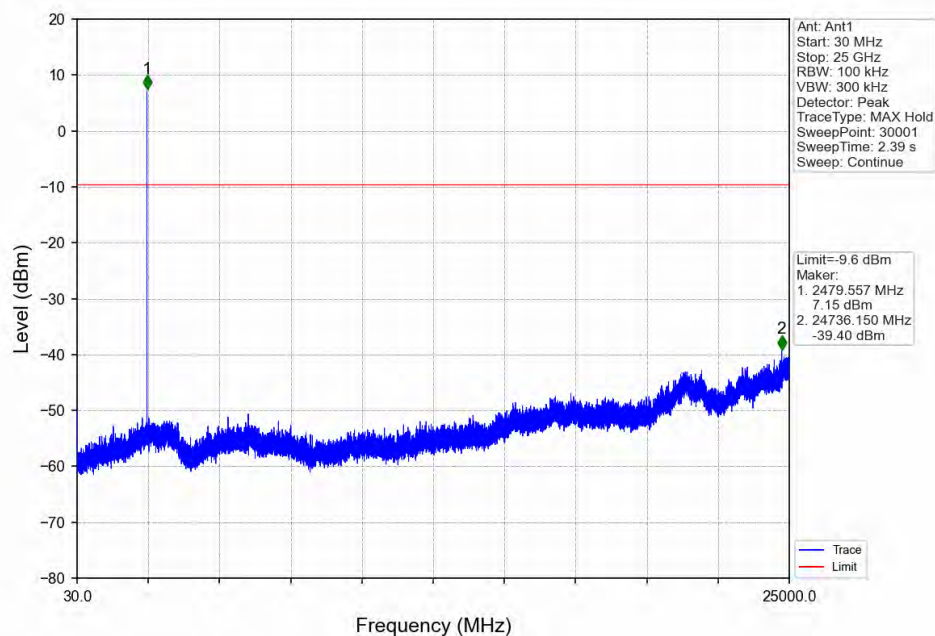
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



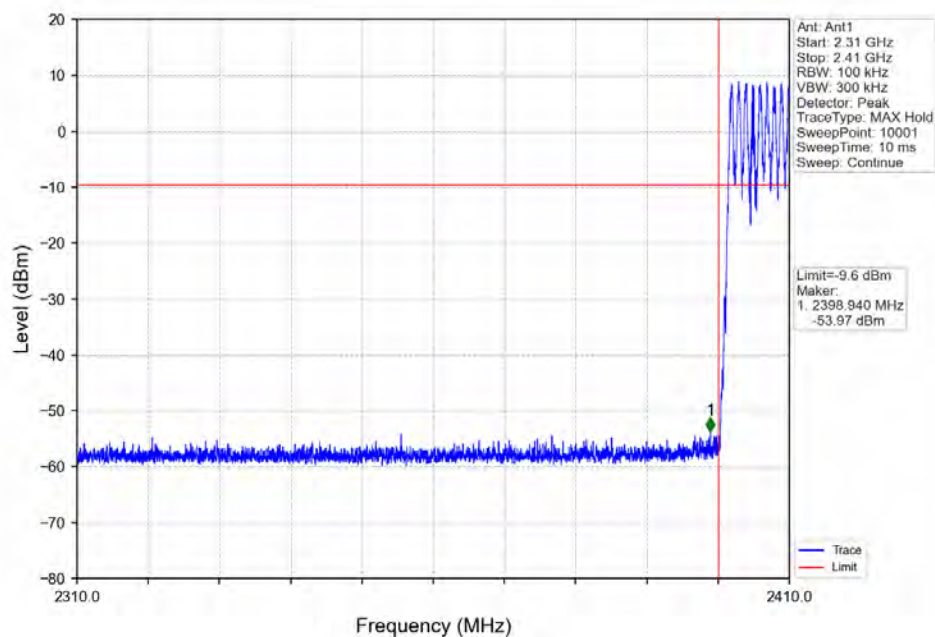
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



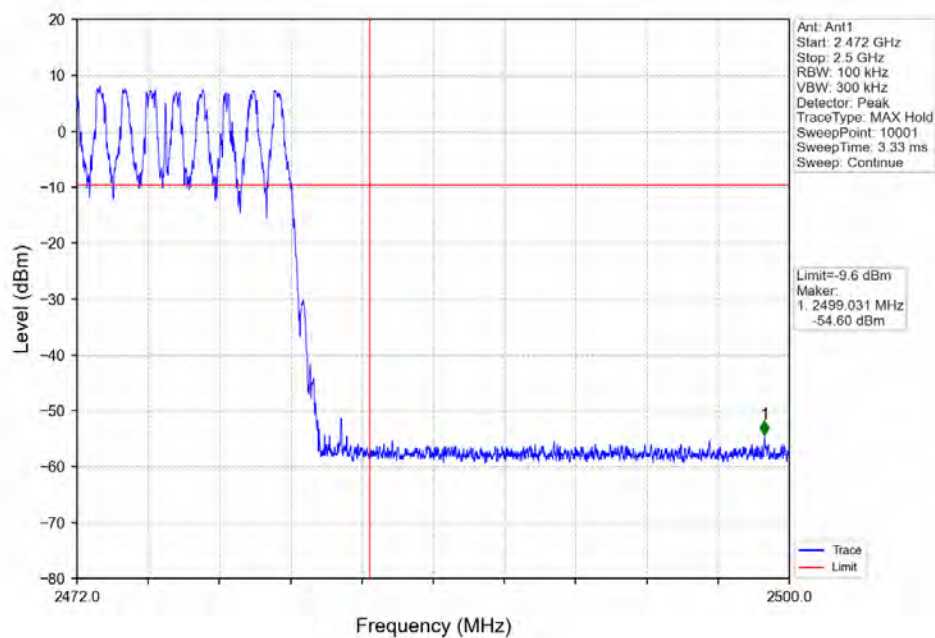
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



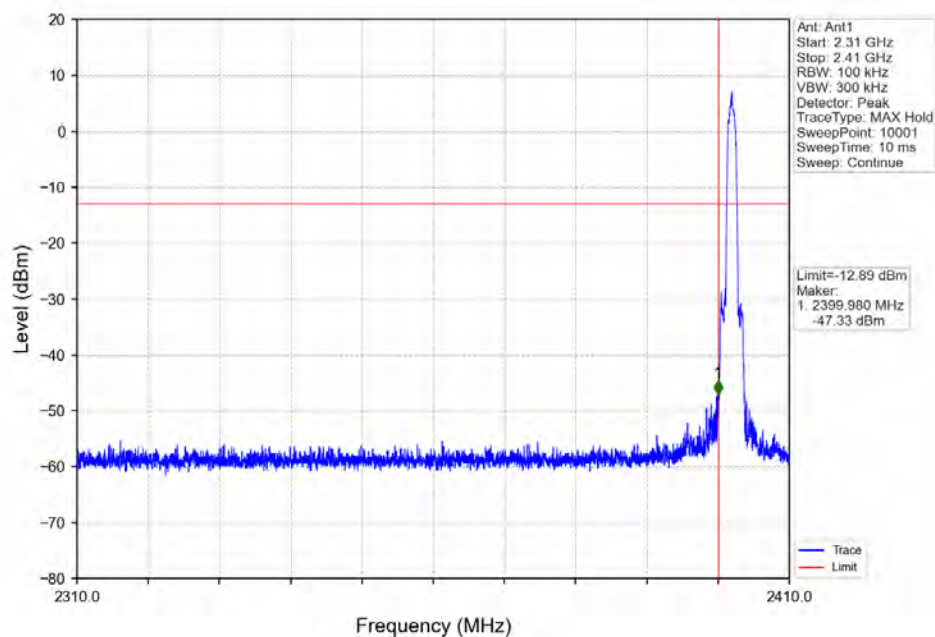
GFSK_DH5_HOPP_Ant1_NTNV



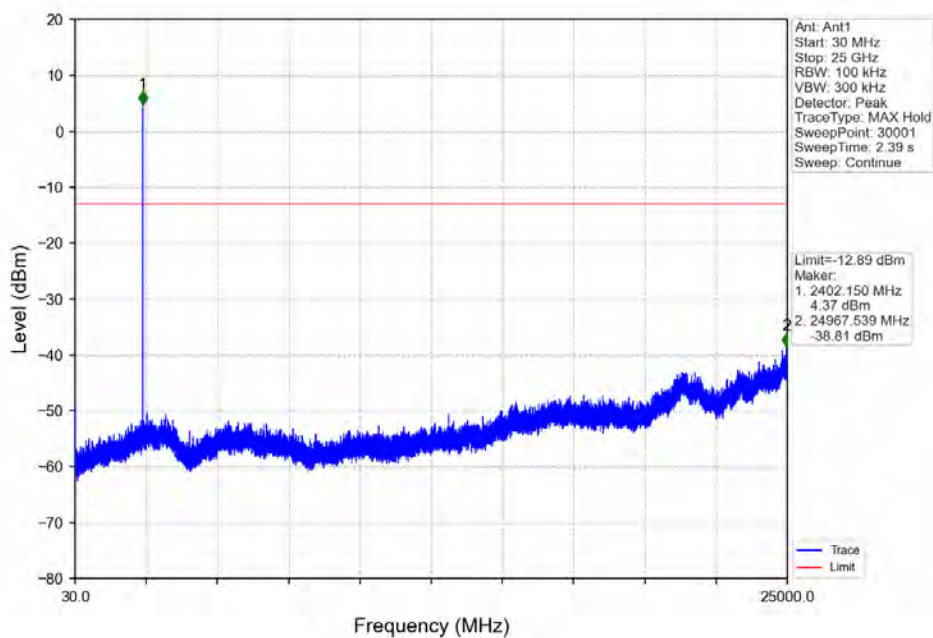
GFSK_DH5_HOPP_Ant1_NTNV



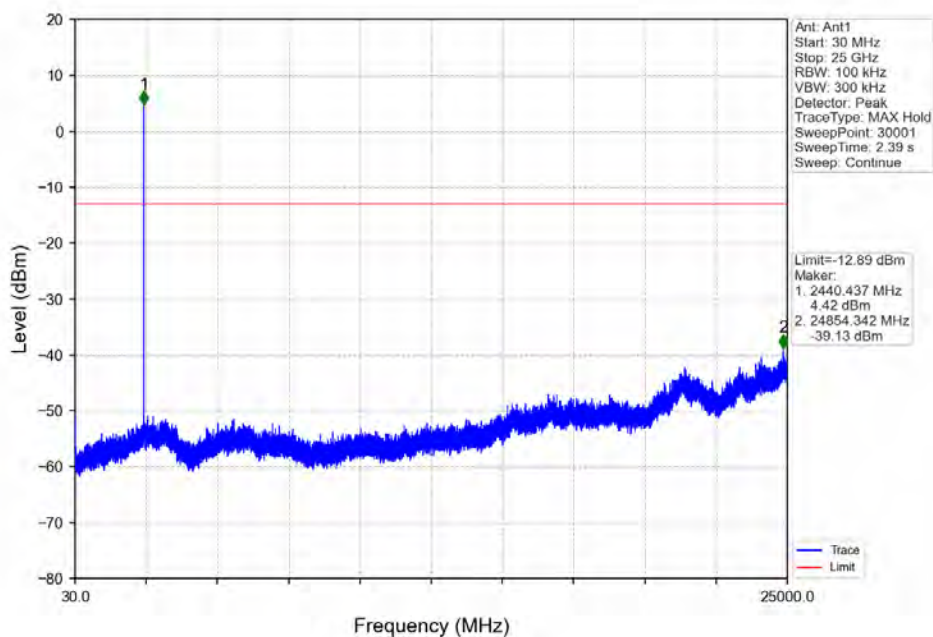
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



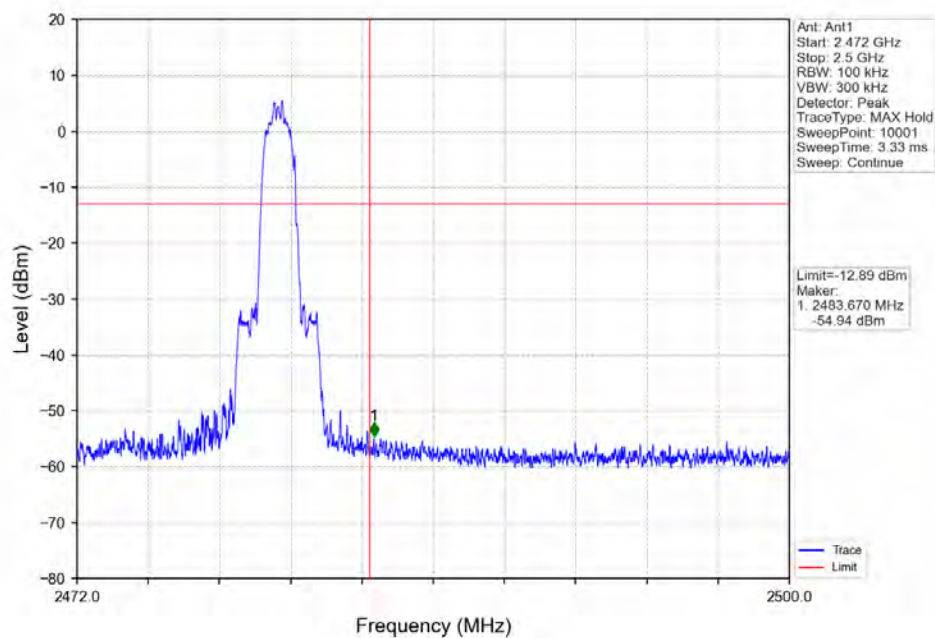
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



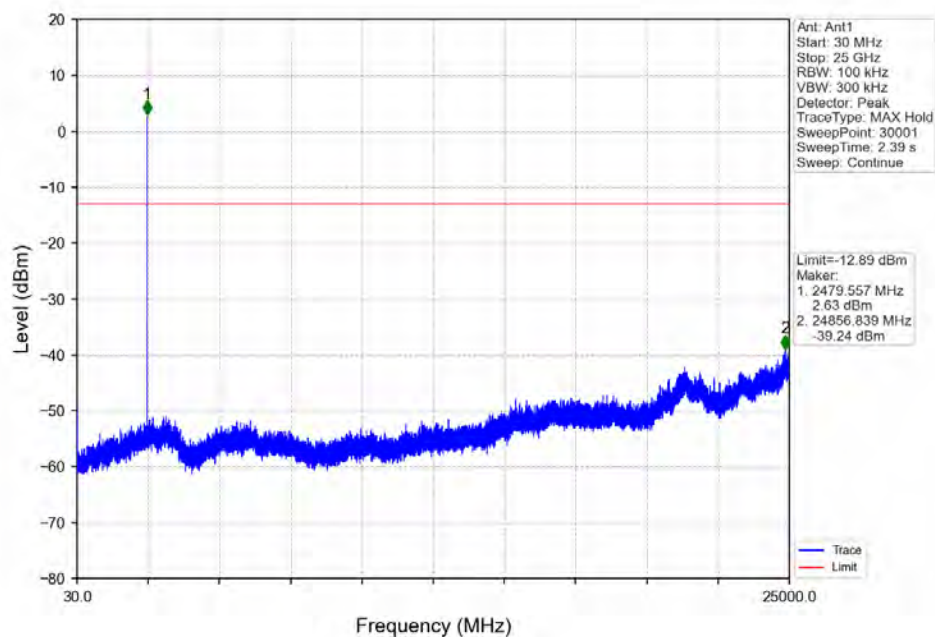
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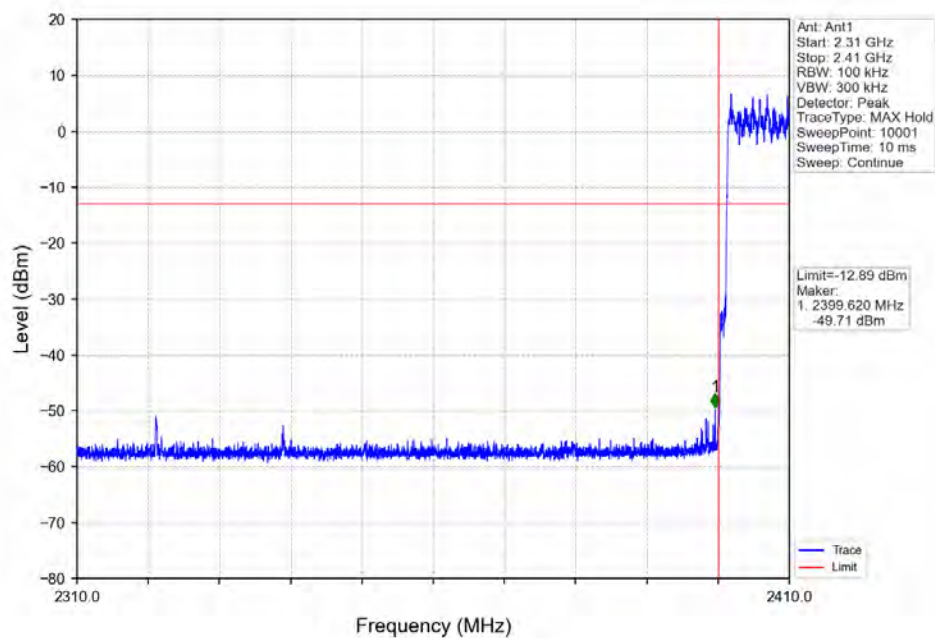
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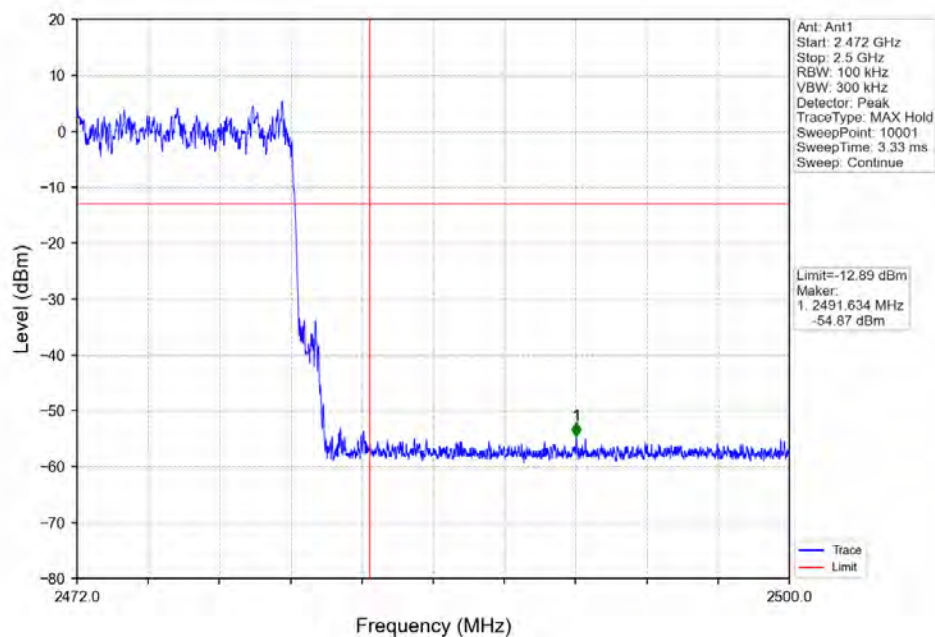
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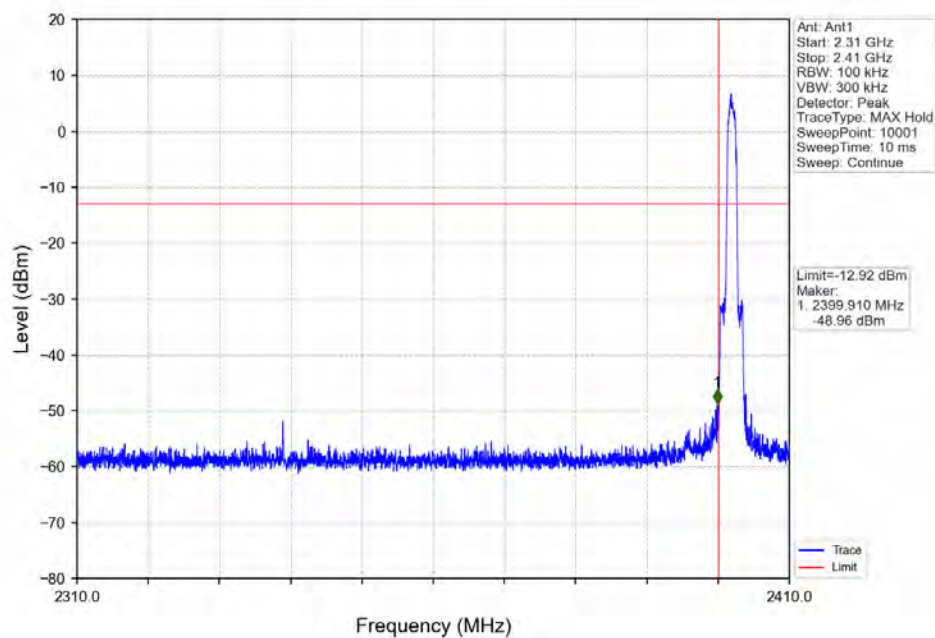
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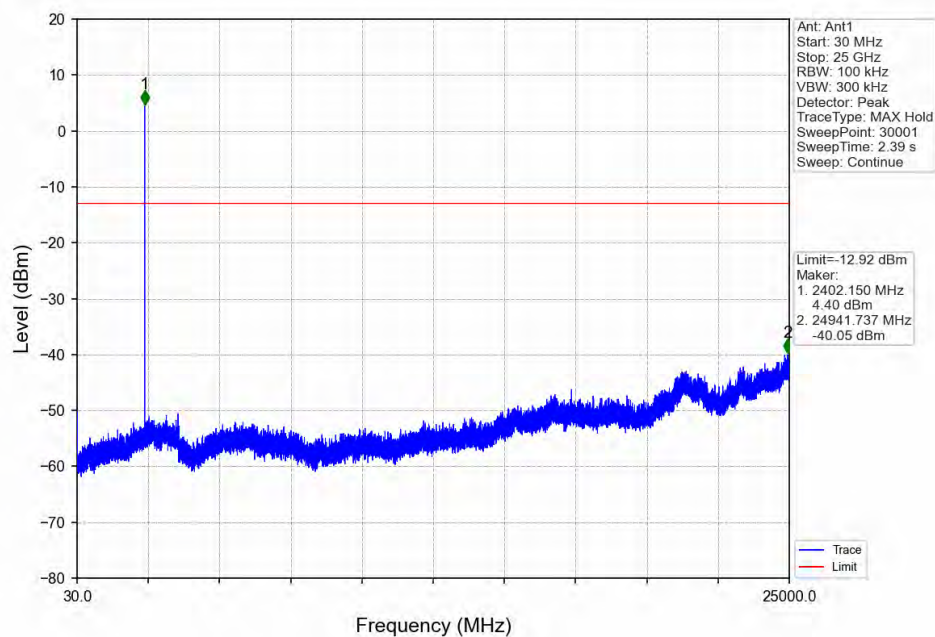
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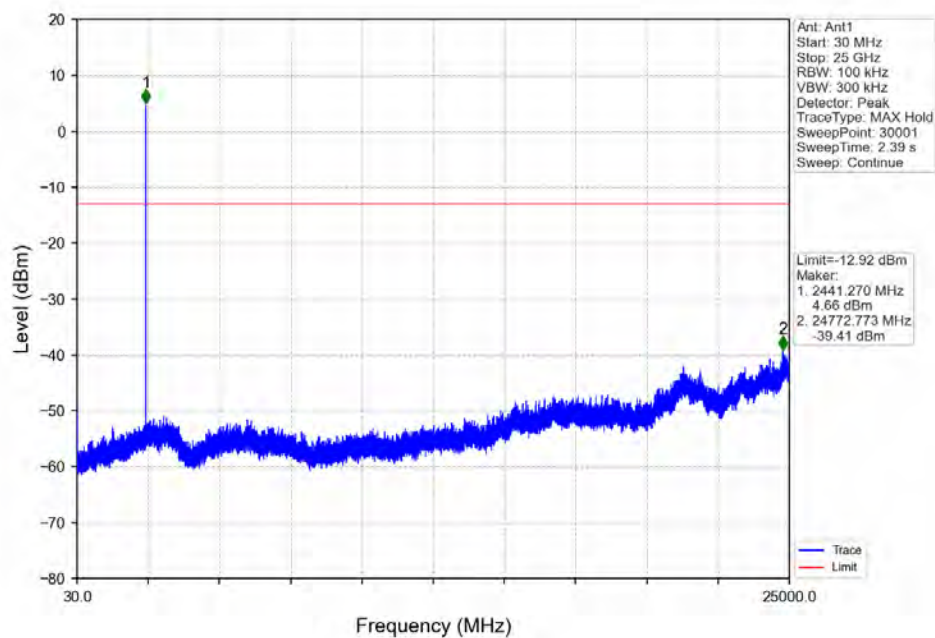
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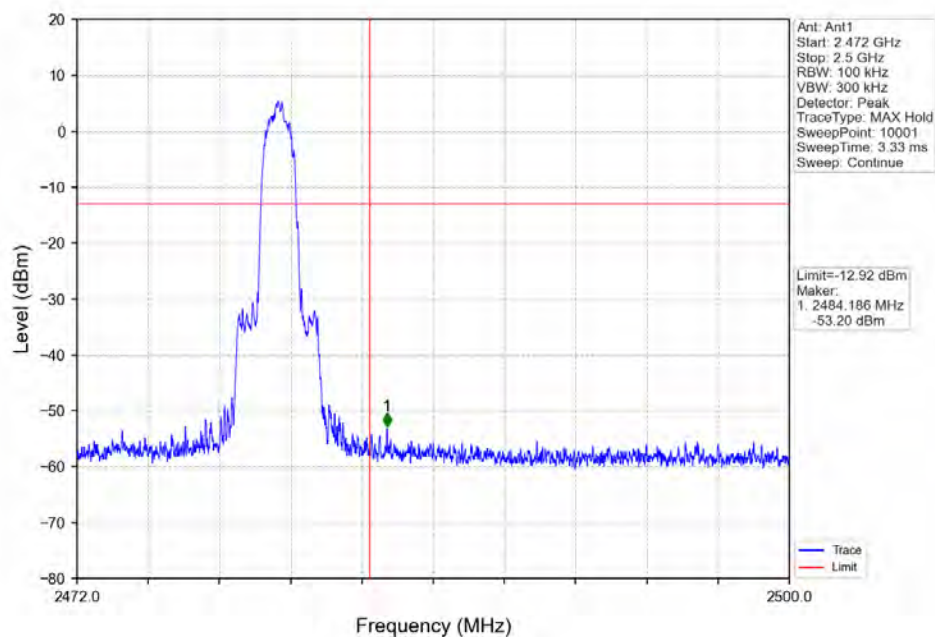
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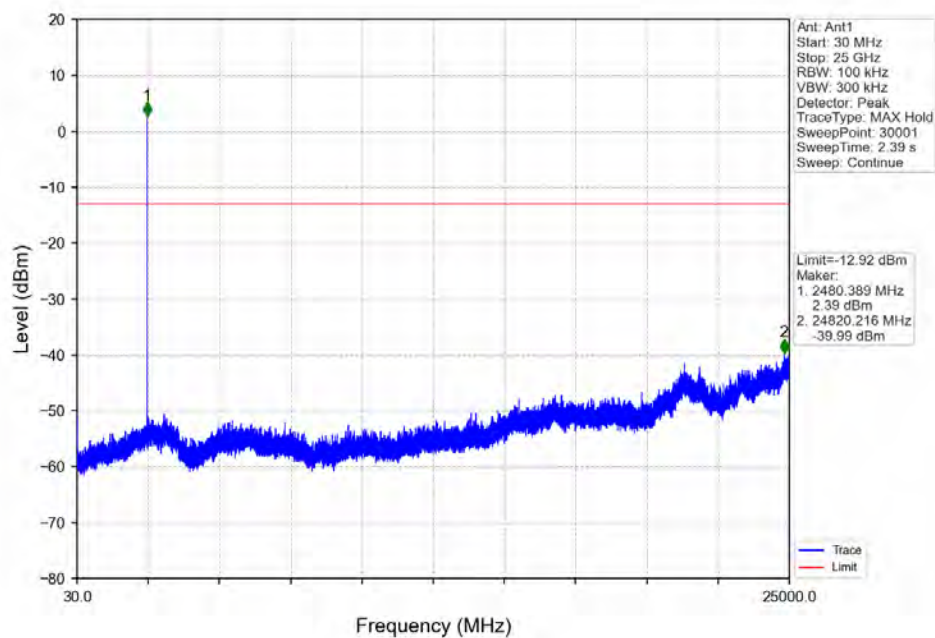
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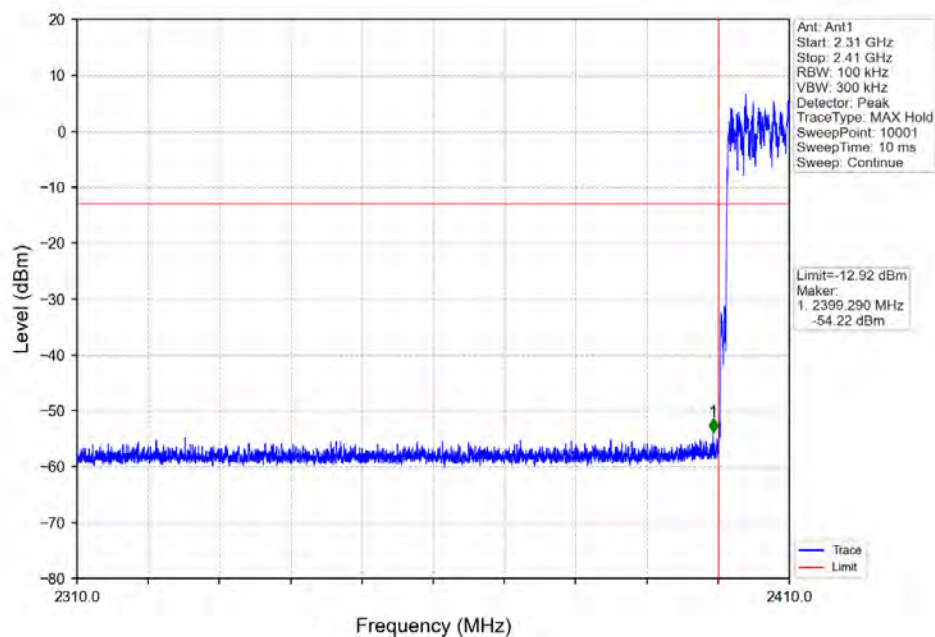
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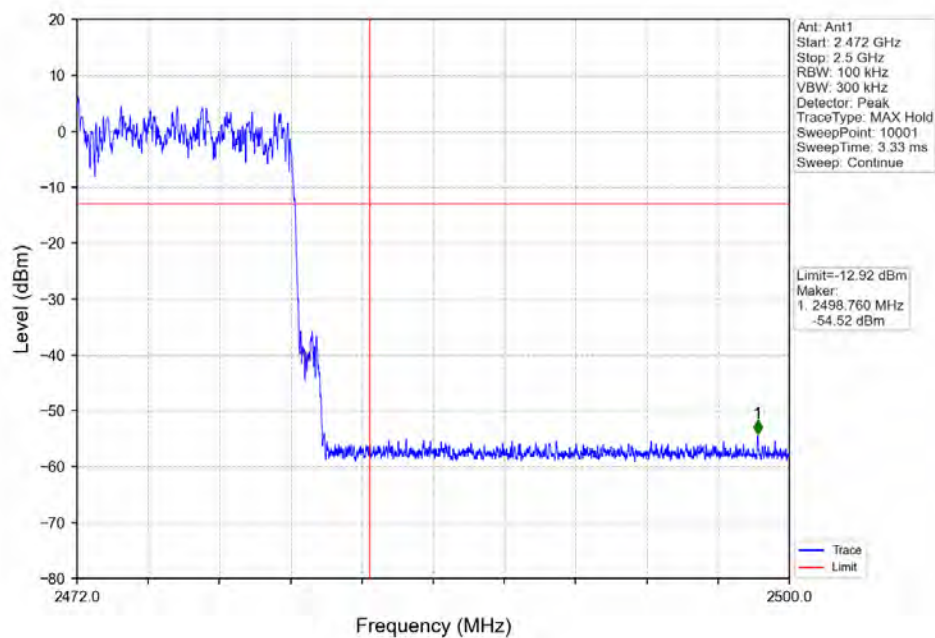
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8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



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