



Product Name: Smart Phone	Report No: FCC2022-06453RF1
Product Model: V Max	Security Classification: Open
Version: V1.0	Total Page: 108

TIRT Testing Report

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<i>Stone Tang</i>	<i>Randy Lv</i>	<i>Daniel Chen</i>	

RF TEST REPORT

FCC ID: 2AX4YVMAX

According to

47 CFR FCC Part 15, Subpart C(Section 15.247)

Equipment : Smart Phone
: V Max, S100Pro
Model No. : All models are with same schematic, The only differences are model no. V Max is main test model, S100Pro is the adding model. No other differences.
Trademark : DOOGEE
Product No. : 20221220021903
Applicant : Shenzhen DOOGEE Hengtong Technology CO.,LTD

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.
- Test Date: 2022.12.13-2023.1.8

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen
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Pingshan District, Shenzhen, China
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1. General Information

1.1 Applicant

Shenzhen DOOGEE Hengtong Technology CO.,LTD
B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District,
Shenzhen, China

1.2 Manufacturer

Shenzhen DOOGEE Hengtong Technology CO.,LTD
B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District,
Shenzhen, China

1.3 Basic Description of Equipment Under Test

Items	Description
Equipment Name	Smart Phone
Model Number	V Max
Sample ID	20221220021903
Product Code	N/A
Power Supply	Input: 100~240V, 50/60Hz
Adapter /Model /Description	Model: HJ-1203000-09 Input: 100-240V~50/60Hz, 0.8A Output: 5V=3A , 9V=3A, 12V=2.75A, 33.0W Max. PPS:5.0V-11.0V 3.0A 33.0W Max.
Operate temperature	0°C-45°C
EUT Stage	<input type="radio"/> Product Unit <input checked="" type="radio"/> Final-Sample
Operation Frequency	2402~2480MHz
Channel numbers	79
Channel separation	1MHz
Modulation technology	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Type	PIFA Antenna
Antenna gain	0.36dBi

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

The test frequencies are below:

Channel	Frequency (MHz)
Lowest:	2402
Middle:	2441
Highest:	2480

1.4 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain
1	N/A	N/A	PIFA	N/A	0.36 dBi

2. Summary of Test Results

2.1 Summary of Test Items

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Test item	FCC Clause	Results	Remarks
Antenna Requirement	§15.203/§15.247 (c)	Pass	Meet the requirement of the limit
AC Power Line Conducted Emission	§15.207	Pass	Meet the requirement of the limit
Conducted Peak Output Power	§15.247 (b)(1)	Pass	Meet the requirement of the limit
20dB Occupied Bandwidth	§15.247 (a)(1)	Pass	Meet the requirement of the limit
Carrier Frequencies Separation	§15.247 (a)(1)	Pass	Meet the requirement of the limit
Hopping Channel Number	§15.247 (a)(1)	Pass	Meet the requirement of the limit
Dwell Time	§15.247 (a)(1)	Pass	Meet the requirement of the limit
Radiated Emission	§15.205/§15.209	Pass	Meet the requirement of the limit

Note: NA denotes Not Applicable in this part

2.2 Application of Standard

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 v05r02

ANSI C63.10:2013

2.3 Test Instruments

No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
RF Output Power Test					
1	Power Collection Unit	Tonscend	JS0806-2	188060134	2023/11/08
2	Tonscend Test System	Tonscend	EN300328 V2.2.2	NA	NA
3	Temp&Humidity Chamber	ETOMA	NTH1100-3 0A	16080628	2023/11/08
4	Temp&Humidity Recorder	Anymetre	JR900	NA	2023/11/08
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence Test					
1	Spectrum Analyzer	Agilent	N9010A	MY52221119	2023/11/08
2	Power Collection Unit	Tonscend	JS0806-2	188060134	2023/11/08
3	Tonscend Test System	Tonscend	EN300328 V2.2.2	NA	NA
4	Temp&Humidity Recorder	Anymetre	JR900	NA	2023/11/08
Hopping Frequency Separation Test					
1	Spectrum Analyzer	Agilent	N9010A	MY52221119	2023/11/08
2	Power Collection Unit	Tonscend	JS0806-2	188060134	2023/11/08
3	Tonscend Test System	Tonscend	EN300328 V2.2.2	NA	NA
4	Temp&Humidity Recorder	Anymetre	JR900	NA	2023/11/08
Occupied Channel Bandwidth Test					
1	Spectrum Analyzer	Agilent	N9010A	MY52221119	2023/11/08
2	Power Collection Unit	Tonscend	JS0806-2	188060134	2023/11/08
3	Tonscend Test System	Tonscend	EN300328 V2.2.2	NA	NA
4	Temp&Humidity Recorder	Anymetre	JR900	NA	2023/11/08
Transmitter Unwanted Emissions In The Out of Band Domain					
1	Spectrum Analyzer	Agilent	N9010A	MY52221119	2023/11/08
2	Power Collection Unit	Tonscend	JS0806-2	188060134	2023/11/08
3	Tonscend Test System	Tonscend	EN300328 V2.2.2	NA	NA
4	Temp&Humidity	Anymetre	JR900	NA	2023/11/08

Recorder					
Transmitter Emissions In Spurious Domain					
1	Spectrum Analyzer	Rohde & Schwarz	FSV30	103741	2023/11/08
2	Integral antenna	SCHWARZBECK	VULB9163	9163-868	2023/11/08
3	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-123	2023/11/08
4	Broadband amplifier	SCHWARZBECK	BBV9745	9745#46	2023/11/08
5	Broadband amplifier	SCHWARZBECK	BBV9718	9718-284	2023/11/08
6	Temp&Humidity Recorder	Anymetre	JR900	NA	2023/11/08

2.4 Test Mode

Test mode:			
Transmitting mode:	Keep the EUT in transmitting mode with modulation.		
Operating Environment:			
Item	Normal condition	Extreme condition	
		HT	LT
Temperature	+15°C to + 35°C	+45°C	0°C
Humidity	20%-95%		
Atmospheric Pressure:	100.65 kPa		

Setting	Value
Modulation	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Adaptive	No
Antenna Gain	0.36 dBi
Nominal Channel Bandwidth	0.857MHz(1M),1.180MHz(2M),1.193MHz(3M)
DUT Frequency not configurable	No
Frequency Low	2402MHz
Frequency Mid	2441MHz
Frequency High	2480MHz

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Line Conducted Emission	24.6°C, 56 % RH	120V AC	Stone Tang
Conducted Peak Output Power	24.2°C, 55 % RH	120V AC	Stone Tang
20dB Occupied Bandwidth	24.6°C, 56 % RH	120V AC	Stone Tang
Carrier Frequencies Separation	24.6°C, 56 % RH	120V AC	Stone Tang
Hopping Channel Number	24.5°C, 56 % RH	120V AC	Stone Tang
Dwell Time	24.4°C, 56 % RH	120V AC	Stone Tang
Radiated Emission	24.4°C, 56 % RH	120V AC	Stone Tang

The applicant declare the operating environment of EUT as below:

Normal conditions: 120V AC ,15~35°C

2.6 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

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

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	± 142.12 KHz
RF power conducted	± 0.74 dB
RF power radiated	± 3.25 dB
Spurious emissions, conducted	± 1.78 dB
Spurious emissions, radiated (9KHz~30MHz)	± 2.56 dB
Spurious emissions, radiated (30MHz~1GHz)	± 4.6 dB
Spurious emissions, radiated (Above 1GHz)	± 4.9 dB
Conduction Emissions(150kHz~30MHz)	± 3.1 dB
Humidity	$\pm 4.6\%$
Temperature	$\pm 0.7^\circ\text{C}$
Time	$\pm 1.25\%$

2.7 Test Location

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6049.01
FCC Designation Number:	CN1309
Test Firm Registration Number:	825524
Telephone:	+86-0755-27087573

2.8 Deviation from Standards

None

2.9 Abnormalities from Standard Conditions

None

3. Test Procedure And Results

3.1 AC Power Line Conducted Emission

3.1.1 Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

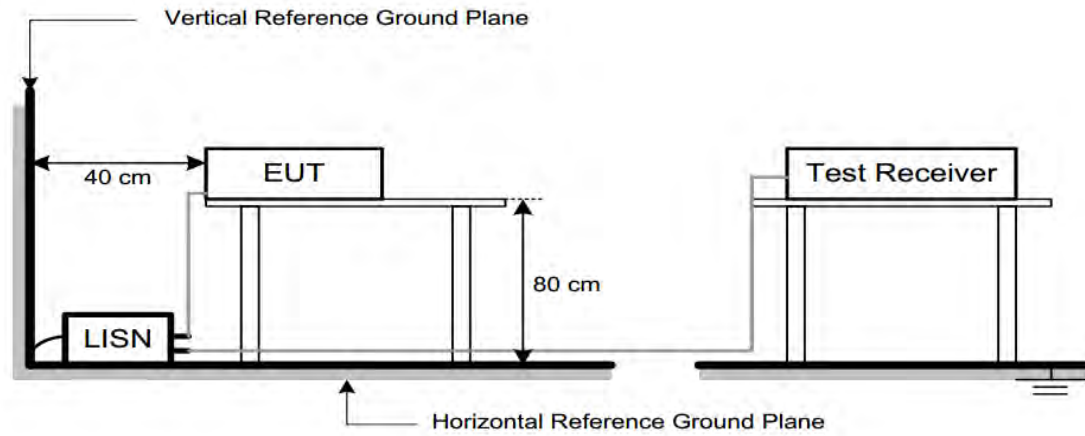
2. The lower limit shall apply at the transition frequencies.

3.1.2 Test Procedure

Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- 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 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

3.1.3 Test Setup



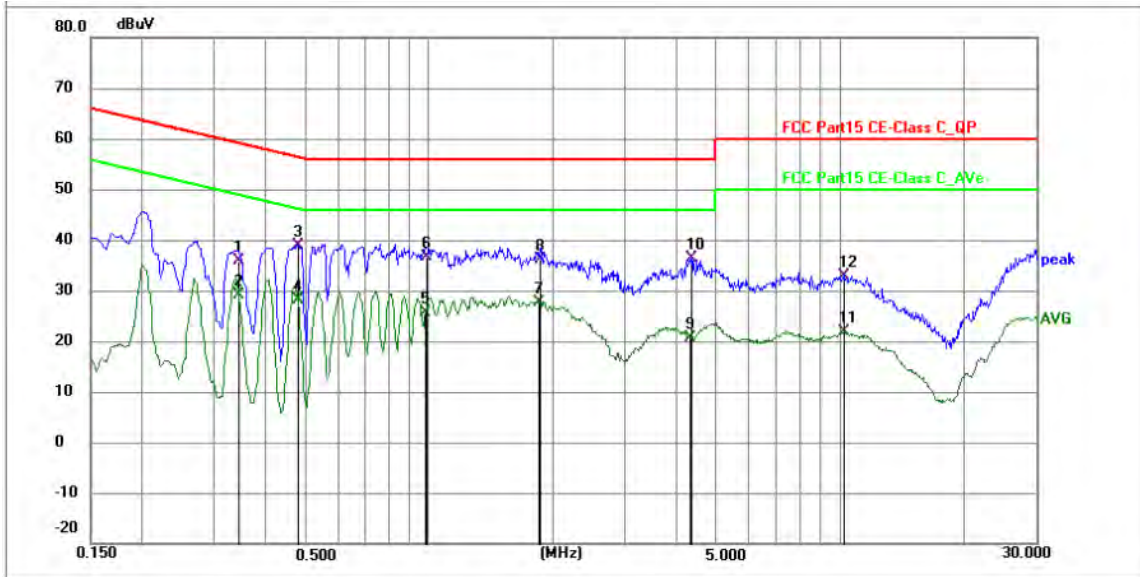
3.1.4 Test Result

Note:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement - Limit

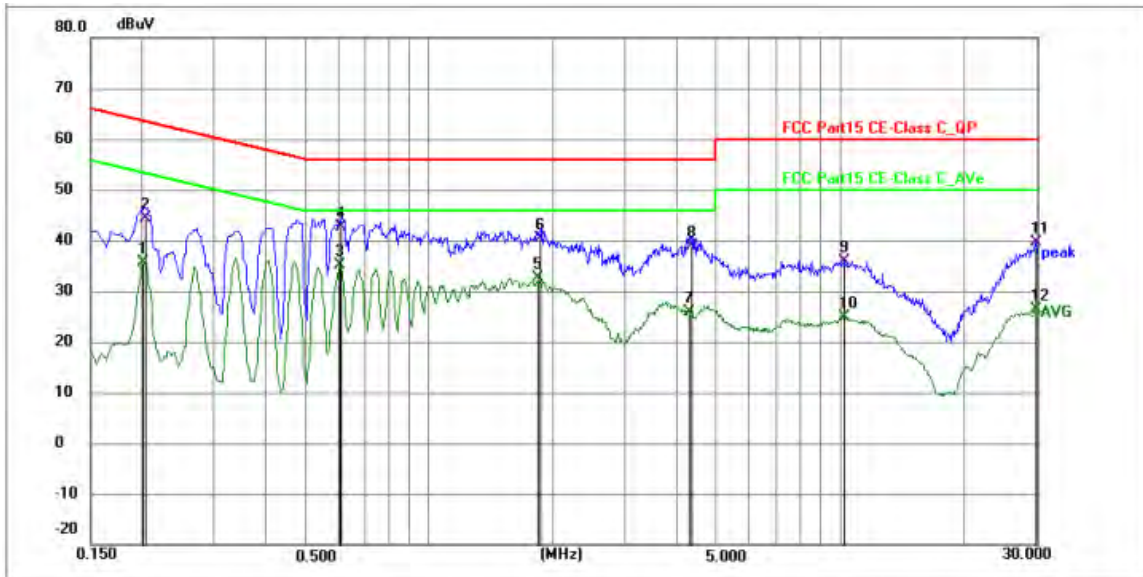
150kHz~30MHz Worst Case Operating Mode: Simultaneous transmission

Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3435	25.80	10.18	35.98	59.12	-23.14	QP	P	
2	0.3435	19.02	10.18	29.20	49.12	-19.92	AVG	P	
3 *	0.4785	28.64	10.25	38.89	56.37	-17.48	QP	P	
4	0.4785	17.81	10.25	28.06	46.37	-18.31	AVG	P	
5	0.9825	15.33	10.26	25.59	46.00	-20.41	AVG	P	
6	0.9870	26.34	10.26	36.60	56.00	-19.40	QP	P	
7	1.8555	17.23	10.29	27.52	46.00	-18.48	AVG	P	
8	1.8645	25.72	10.29	36.01	56.00	-19.99	QP	P	
9	4.3305	10.46	10.21	20.67	46.00	-25.33	AVG	P	
10	4.3530	26.23	10.21	36.44	56.00	-19.56	QP	P	
11	10.1850	11.44	10.39	21.83	50.00	-28.17	AVG	P	
12	10.2524	22.61	10.39	33.00	60.00	-27.00	QP	P	

Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2017	25.36	10.20	35.56	53.54	-17.98	AVG	P	
2	0.2040	34.27	10.20	44.47	63.45	-18.98	QP	P	
3 *	0.6045	24.76	10.26	35.02	46.00	-10.98	AVG	P	
4	0.6134	32.40	10.26	42.66	56.00	-13.34	QP	P	
5	1.8420	22.38	10.29	32.67	46.00	-13.33	AVG	P	
6	1.8645	30.07	10.29	40.36	56.00	-15.64	QP	P	
7	4.2765	15.58	10.21	25.79	46.00	-20.21	AVG	P	
8	4.3530	28.73	10.21	38.94	56.00	-17.06	QP	P	
9	10.2522	25.61	10.39	36.00	60.00	-24.00	QP	P	
10	10.2522	14.48	10.39	24.87	50.00	-25.13	AVG	P	
11	29.9940	29.84	9.87	39.71	60.00	-20.29	QP	P	
12	29.9940	16.63	9.87	26.50	50.00	-23.50	AVG	P	

3.2 Radiated Emission and Band Edge

3.2.1 Limit

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency (MHz)	Distance Meters(m)	Field Strength Limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 – 0.49	300	2400/F(kHz)	-
0.490 – 1.705	30	24000/F(kHz)	-
1.705 – 30	30	30	-
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note: (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V}/\text{m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2.2 Test Procedure

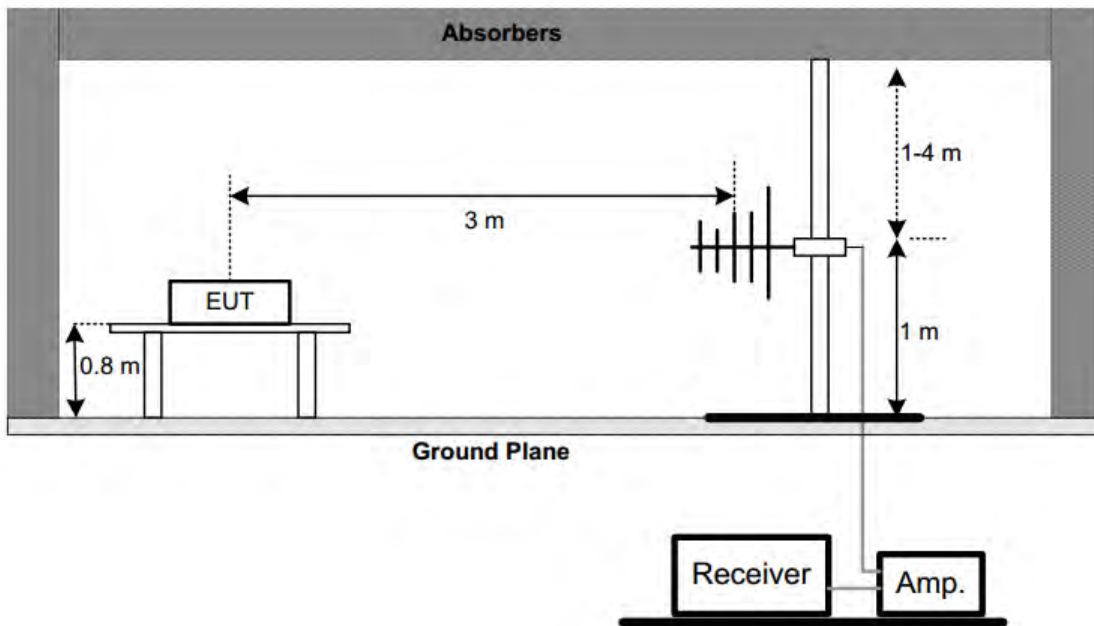
Test Method	
<input type="radio"/> Conducted Measurement	<input checked="" type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- a) The measuring distance of 3 m shall be used for measurements. The EUT was placed on the
- b) top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The
- c) table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- d) The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed
- e) on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber.
- f) The table was rotated 360 degrees to determine the position of the highest radiation.(above
- g) 1GHz)
- h) The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of

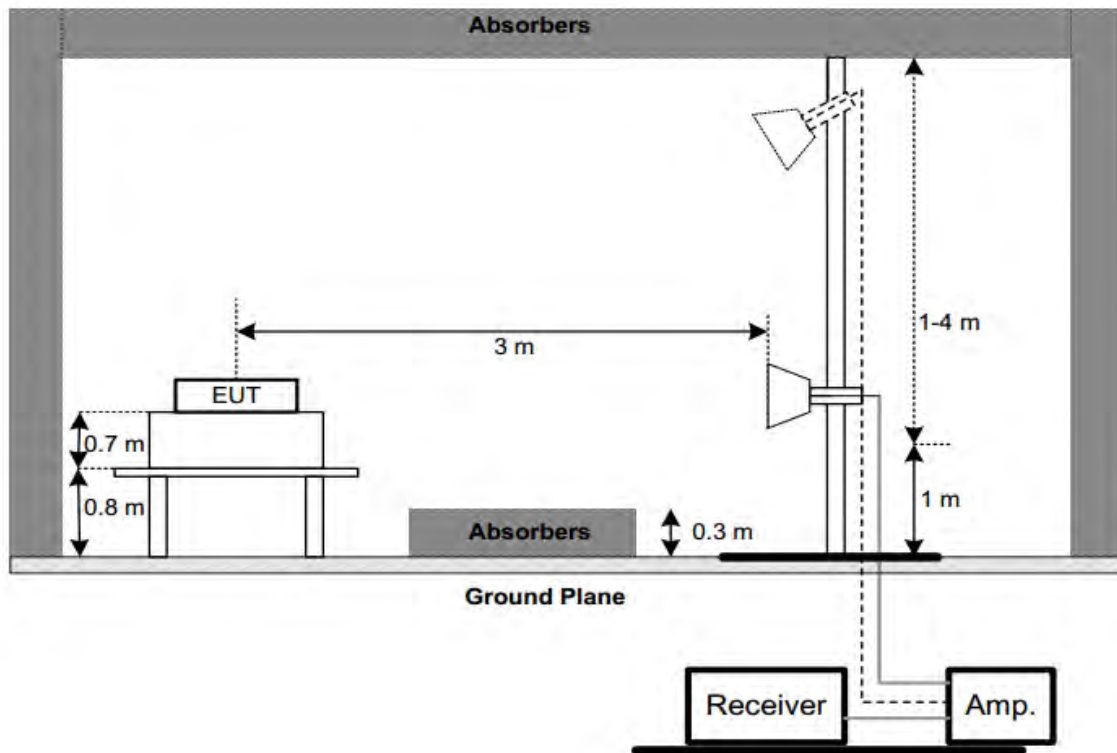
- i) the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of
- j) the antenna are set to make the measurement.
- k) For each suspected emission, the EUT was arranged to its worst case and then the antenna
- l) was tuned to heights find the maximum reading (used Bore sight function).
- m) The receiver system was set to peak and average detect function and specified bandwidth
- n) with maximum hold mode when the test frequency is above 1 GHz.
- o) The initial step in collecting radiated emission data is a receiver peak detector mode
- p) pre-scanning the measurement frequency range. Significant peaks are then marked and then
- q) Quasi Peak detector mode re-measured.
- r) All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the
- s) Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- t) (below 1 GHz)
- u) All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak
- v) Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT
- w) shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured,
- x) but AVG Mode didn't perform. (above 1 GHz)
- y) For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.2.3 Test Setup

(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.4 Test Result

1) Radiated emission: 9KHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

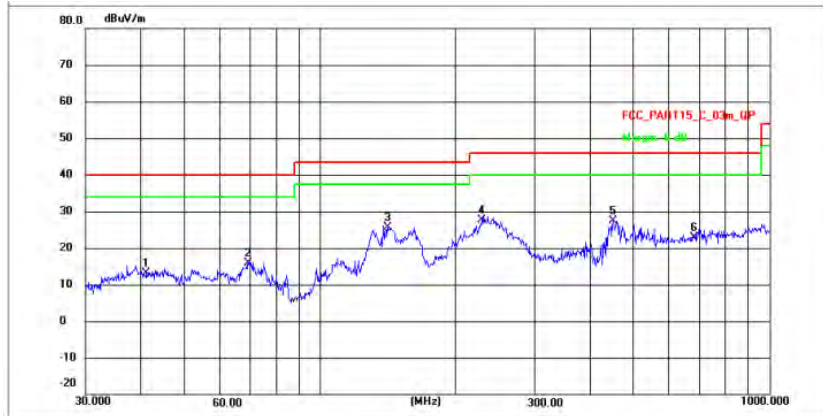
2) Radiated emission: 30MHz-1G

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

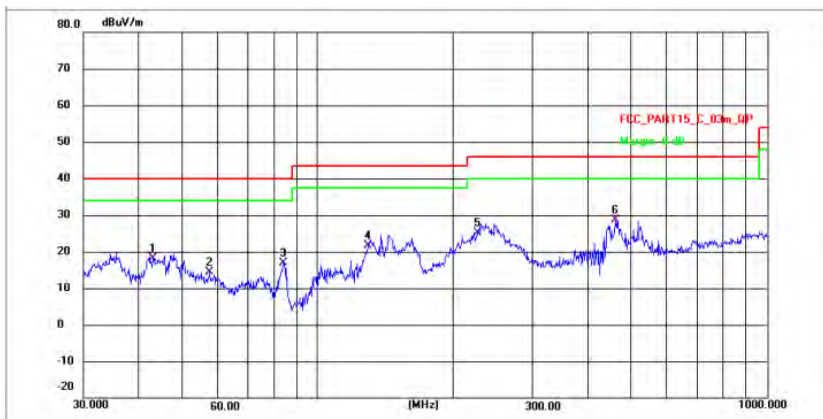
Below 1G (30MHz~1GHz)	Test mode: GFSK	Test Channel:0
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HORIZONTAL



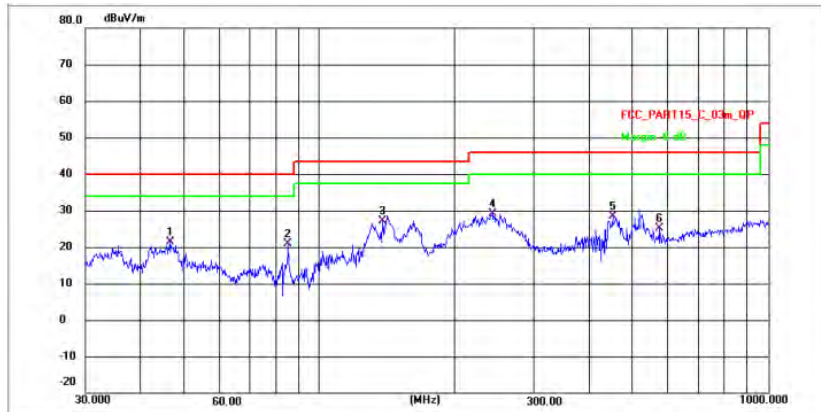
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	41.1320	41.19	-28.13	13.06	40.00	-26.94	QP	P
2	69.2352	43.68	-27.92	15.76	40.00	-24.24	QP	P
3 *	141.8262	52.80	-27.29	25.51	43.50	-17.99	QP	P
4	229.2930	54.50	-26.83	27.67	46.00	-18.33	QP	P
5	448.7683	52.86	-25.60	27.26	46.00	-18.74	QP	P
6	681.1530	47.85	-24.85	23.00	46.00	-23.00	QP	P

VERTICAL



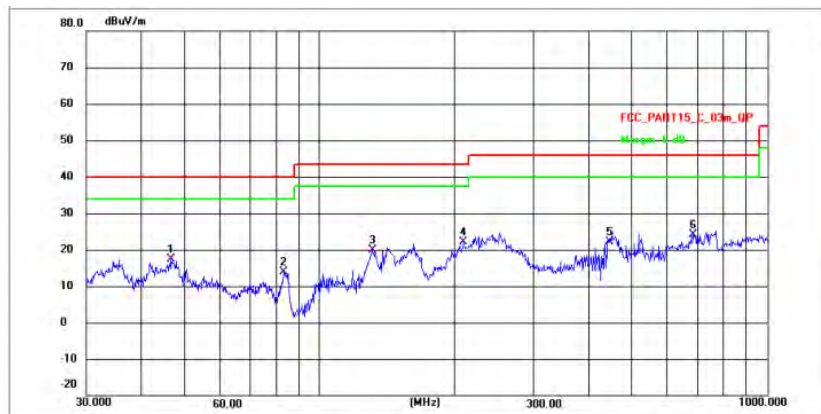
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	43.0504	46.32	-28.11	18.21	40.00	-21.79	QP	P
2	57.4930	42.46	-27.96	14.50	40.00	-25.50	QP	P
3	83.5220	44.86	-27.86	17.00	40.00	-23.00	QP	P
4	129.9225	49.14	-27.40	21.74	43.50	-21.76	QP	P
5	226.4961	52.06	-26.85	25.21	46.00	-20.79	QP	P
6 *	460.7271	54.27	-25.57	28.70	46.00	-17.30	QP	P

HORIZONTAL



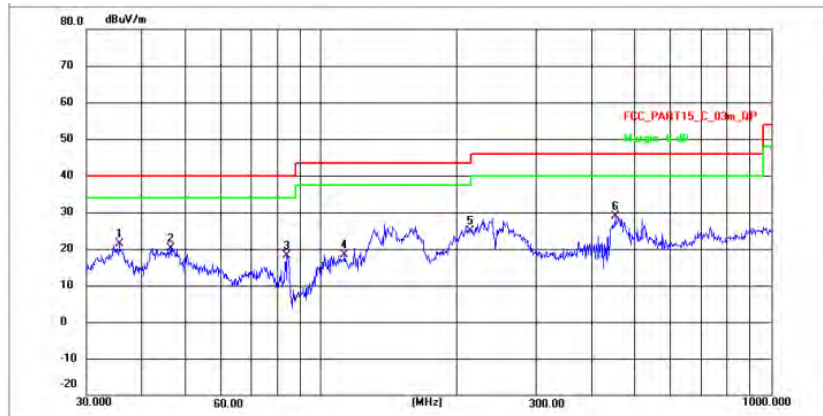
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	46.5846	49.37	-28.08	21.29	40.00	-18.71	QP	P
2	84.9993	48.73	-27.86	20.87	40.00	-19.13	QP	P
3 *	138.1450	54.46	-27.32	27.14	43.50	-16.36	QP	P
4	242.9507	55.93	-26.75	29.18	46.00	-16.82	QP	P
5	450.3446	53.94	-25.60	28.34	46.00	-17.66	QP	P
6	573.6191	50.33	-25.22	25.11	46.00	-20.89	QP	P

VERTICAL



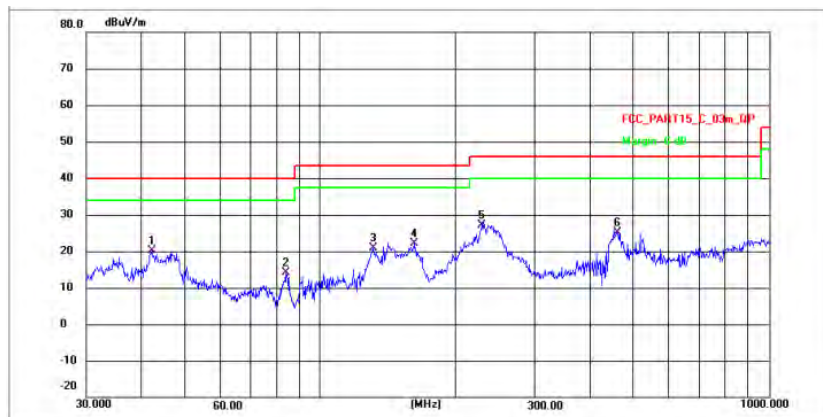
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	46.5846	45.37	-28.08	17.29	40.00	-22.71	QP	P
2	83.0840	41.72	-27.86	13.86	40.00	-26.14	QP	P
3	131.2965	47.39	-27.39	20.00	43.50	-23.50	QP	P
4 *	209.3130	49.07	-26.94	22.13	43.50	-21.37	QP	P
5	444.0720	47.68	-25.62	22.06	46.00	-23.94	QP	P
6	683.5457	48.94	-24.84	24.10	46.00	-21.90	QP	P

HORIZONTAL



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	35.6240	37.19	-15.77	21.42	40.00	-18.58	QP	P
2	46.3402	48.31	-28.08	20.23	40.00	-19.77	QP	P
3	84.1100	46.07	-27.86	18.21	40.00	-21.79	QP	P
4	112.5241	45.90	-27.59	18.31	43.50	-25.19	QP	P
5	215.2675	51.86	-26.91	24.95	43.50	-18.55	QP	P
6 *	450.3446	54.44	-25.60	28.84	46.00	-17.16	QP	P

VERTICAL



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	42.0803	48.22	-28.12	20.10	40.00	-19.90	QP	P
2	83.5220	41.99	-27.86	14.13	40.00	-25.87	QP	P
3	131.2965	48.39	-27.39	21.00	43.50	-22.50	QP	P
4	162.3257	49.20	-27.19	22.01	43.50	-21.49	QP	P
5 *	229.2930	54.00	-26.83	27.17	46.00	-18.83	QP	P
6	460.7271	50.77	-25.57	25.20	46.00	-20.80	QP	P

3) Radiated emission: Above 1G

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

Above 1G (1GHz~26.5GHz)	Test mode: GFSK	Test Channel:0
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1202.851	62.23	-30.52	31.71	74.00	-42.29	peak	P
2	1846.049	61.88	-31.74	30.14	74.00	-43.86	peak	P
3	3202.567	64.03	-29.89	34.14	74.00	-39.86	peak	P
4	4699.730	62.63	-29.48	33.15	74.00	-40.85	peak	P
5 *	6046.898	63.97	-26.63	37.34	74.00	-36.66	peak	P
6	8786.975	62.07	-25.54	36.53	74.00	-37.47	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1244.583	65.74	-30.76	34.98	74.00	-39.02	peak	P
2	2128.767	67.21	-31.42	35.79	74.00	-38.21	peak	P
3	3324.231	65.07	-29.90	35.17	74.00	-38.83	peak	P
4	5753.631	65.78	-27.14	38.64	74.00	-35.36	peak	P
5 *	8238.475	67.90	-25.97	41.93	74.00	-32.07	peak	P
6	9832.625	66.05	-24.56	41.49	74.00	-32.51	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: GFSK	Test Channel:39
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1221.066	64.56	-30.62	33.94	74.00	-40.06	peak	P
2	1816.409	61.59	-31.79	29.80	74.00	-44.20	peak	P
3	2709.056	62.09	-30.58	31.51	74.00	-42.49	peak	P
4	3855.553	63.33	-30.37	32.96	74.00	-41.04	peak	P
5	4775.039	64.56	-29.21	35.35	74.00	-38.65	peak	P
6 *	6193.718	67.09	-26.45	40.64	74.00	-33.36	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1323.614	63.08	-31.21	31.87	74.00	-42.13	peak	P
2	1808.029	63.20	-31.80	31.40	74.00	-42.60	peak	P
3	3052.535	62.20	-29.89	32.31	74.00	-41.69	peak	P
4	3935.493	63.22	-30.47	32.75	74.00	-41.25	peak	P
5	4969.351	62.59	-28.53	34.06	74.00	-39.94	peak	P
6 *	7062.213	66.80	-25.73	41.07	74.00	-32.93	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: GFSK	Test Channel:78
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1261.242	63.81	-30.85	32.96	74.00	-41.04	peak	P
2	1608.764	58.70	-32.06	26.64	74.00	-47.36	peak	P
3	2769.224	62.21	-30.43	31.78	74.00	-42.22	peak	P
4	3811.234	65.02	-30.31	34.71	74.00	-39.29	peak	P
5	5850.898	63.04	-26.96	36.08	74.00	-37.92	peak	P
6 *	9832.625	67.55	-24.56	42.99	74.00	-31.01	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1121.915	68.22	-30.06	38.16	74.00	-35.84	peak	P
2	1827.996	67.53	-31.77	35.76	74.00	-38.24	peak	P
3	2549.513	63.64	-30.95	32.69	74.00	-41.31	peak	P
4	3109.528	67.37	-29.89	37.48	74.00	-36.52	peak	P
5	3898.134	67.52	-30.43	37.09	74.00	-36.91	peak	P
6 *	6596.542	65.97	-25.99	39.98	74.00	-34.02	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: Pi/4DQPSK	Test Channel:0
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1025.465	68.93	-29.51	39.42	74.00	-34.58	peak	P
2	1446.015	66.37	-31.90	34.47	74.00	-39.53	peak	P
3	2110.999	68.82	-31.44	37.38	74.00	-36.62	peak	P
4	2969.858	65.92	-29.96	35.96	74.00	-38.04	peak	P
5	4536.893	65.08	-30.06	35.02	74.00	-38.98	peak	P
6 *	7508.489	69.17	-26.29	42.88	74.00	-31.12	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1304.246	64.95	-31.10	33.85	74.00	-40.15	peak	P
2	1827.996	67.53	-31.77	35.76	74.00	-38.24	peak	P
3	2723.187	65.69	-30.55	35.14	74.00	-38.86	peak	P
4	3732.739	66.36	-30.21	36.15	74.00	-37.85	peak	P
5	5680.921	67.91	-27.28	40.63	74.00	-33.37	peak	P
6 *	8708.594	70.22	-25.61	44.61	74.00	-29.39	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: Pi/4DQPSK	Test Channel:39
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1144.184	66.12	-30.19	35.93	74.00	-38.07	peak	P
2	1864.819	63.06	-31.72	31.34	74.00	-42.66	peak	P
3	2916.268	63.90	-30.08	33.82	74.00	-40.18	peak	P
4	3502.771	64.59	-29.90	34.69	74.00	-39.31	peak	P
5	5138.789	63.46	-28.20	35.26	74.00	-38.74	peak	P
6 *	9107.617	67.71	-25.17	42.54	74.00	-31.46	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1239.558	62.15	-30.73	31.42	74.00	-42.58	peak	P
2	1827.996	63.03	-31.77	31.26	74.00	-42.74	peak	P
3	2906.170	64.25	-30.11	34.14	74.00	-39.86	peak	P
4	3703.722	61.09	-30.17	30.92	74.00	-43.08	peak	P
5	5257.478	59.83	-28.01	31.82	74.00	-42.18	peak	P
6 *	7191.989	64.63	-25.90	38.73	74.00	-35.27	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: Pi/4DQPSK	Test Channel:78
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1181.146	63.15	-30.40	32.75	74.00	-41.25	peak	P
2	1855.142	63.76	-31.74	32.02	74.00	-41.98	peak	P
3	2923.019	65.28	-30.07	35.21	74.00	-38.79	peak	P
4	3351.244	67.98	-29.90	38.08	74.00	-35.92	peak	P
5	4953.576	63.29	-28.58	34.71	74.00	-39.29	peak	P
6 *	6788.027	66.02	-25.84	40.18	74.00	-33.82	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1132.994	66.76	-30.12	36.64	74.00	-37.36	peak	P
2	1901.834	64.28	-31.67	32.61	74.00	-41.39	peak	P
3	2736.601	59.55	-30.51	29.04	74.00	-44.96	peak	P
4	4185.395	62.34	-30.43	31.91	74.00	-42.09	peak	P
5	6320.309	64.02	-26.30	37.72	74.00	-36.28	peak	P
6 *	8920.040	67.93	-25.43	42.50	74.00	-31.50	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: 8DPSK	Test Channel:0
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1269.287	64.23	-30.90	33.33	74.00	-40.67	peak	P
2	2050.856	66.35	-31.49	34.86	74.00	-39.14	peak	P
3	3038.451	63.67	-29.89	33.78	74.00	-40.22	peak	P
4	4185.395	61.34	-30.43	30.91	74.00	-43.09	peak	P
5	6073.172	60.75	-26.59	34.16	74.00	-39.84	peak	P
6 *	10016.206	66.70	-24.63	42.07	74.00	-31.93	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1093.738	68.18	-29.90	38.28	74.00	-35.72	peak	P
2	1511.397	64.17	-32.19	31.98	74.00	-42.02	peak	P
3	2042.574	69.20	-31.50	37.70	74.00	-36.30	peak	P
4	2916.268	69.90	-30.08	39.82	74.00	-34.18	peak	P
5	4039.212	65.74	-30.53	35.21	74.00	-38.79	peak	P
6 *	6138.469	66.48	-26.51	39.97	74.00	-34.03	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: 8DPSK	Test Channel:39
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1278.862	64.07	-30.95	33.12	74.00	-40.88	peak	P
2	1851.393	65.27	-31.74	33.53	74.00	-40.47	peak	P
3	2861.163	64.51	-30.22	34.29	74.00	-39.71	peak	P
4	4391.107	67.48	-30.27	37.21	74.00	-36.79	peak	P
5	6498.138	66.47	-26.08	40.39	74.00	-33.61	peak	P
6 *	9052.504	67.94	-25.27	42.67	74.00	-31.33	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1248.908	63.13	-30.78	32.35	74.00	-41.65	peak	P
2	1886.504	63.18	-31.69	31.49	74.00	-42.51	peak	P
3	2861.163	65.01	-30.22	34.79	74.00	-39.21	peak	P
4	3862.246	65.08	-30.38	34.70	74.00	-39.30	peak	P
5	6073.172	65.25	-26.59	38.66	74.00	-35.34	peak	P
6 *	11034.556	72.96	-24.41	48.55	74.00	-25.45	peak	P

Above 1G (1GHz~26.5GHz)	Test mode: 8DPSK	Test Channel:78
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1207.030	64.84	-30.54	34.30	74.00	-39.70	peak	P
2	2042.574	65.70	-31.50	34.20	74.00	-39.80	peak	P
3	3161.182	64.73	-29.90	34.83	74.00	-39.17	peak	P
4	5269.649	64.60	-27.99	36.61	74.00	-37.39	peak	P
5	7062.213	68.30	-25.73	42.57	74.00	-31.43	peak	P
6 *	10945.613	72.47	-24.52	47.95	74.00	-26.05	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	1261.242	63.81	-30.85	32.96	74.00	-41.04	peak	P
2	1816.409	60.59	-31.79	28.80	74.00	-45.20	peak	P
3	2589.618	58.67	-30.86	27.81	74.00	-46.19	peak	P
4	3321.350	64.12	-29.90	34.22	74.00	-39.78	peak	P
5	4500.324	64.55	-30.19	34.36	74.00	-39.64	peak	P
6 *	7156.737	64.49	-25.85	38.64	74.00	-35.36	peak	P

4) Band Edge

Test mode:	GFSK	Test Channel:	0
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	41.51	-5.05	36.46	74.00	-37.54	peak	P
2	2390.000	42.59	-4.97	37.62	74.00	-36.38	peak	P
3 *	2400.000	56.67	-4.96	51.71	74.00	-22.29	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	38.01	-5.05	32.96	74.00	-41.04	peak	P
2	2390.000	40.59	-4.97	35.62	74.00	-38.38	peak	P
3 *	2400.000	58.17	-4.96	53.21	74.00	-20.79	peak	P

Test mode:	GFSK	Test Channel:	78
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	2483.500	53.20	-4.89	48.31	74.00	-25.69	peak	P
2	2500.000	40.58	-4.87	35.71	74.00	-38.29	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	2483.500	55.20	-4.89	50.31	74.00	-23.69	peak	P
2	2500.000	42.58	-4.87	37.71	74.00	-36.29	peak	P

Test mode:	Pi/4DQPSK	Test Channel:	0
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	42.21	-5.05	37.16	74.00	-36.84	peak	P
2	2390.000	42.89	-4.97	37.92	74.00	-36.08	peak	P
3 *	2400.000	55.32	-4.96	50.36	74.00	-23.64	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	39.21	-5.05	34.16	74.00	-39.84	peak	P
2	2390.000	39.89	-4.97	34.92	74.00	-39.08	peak	P
3 *	2400.000	53.32	-4.96	48.36	74.00	-25.64	peak	P

Test mode:	Pi/4DQPSK	Test Channel:	78
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	2483.500	54.09	-4.89	49.20	74.00	-24.80	peak	P
2	2500.000	41.71	-4.87	36.84	74.00	-37.16	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	2483.500	53.09	-4.89	48.20	74.00	-25.80	peak	P
2	2500.000	39.21	-4.87	34.34	74.00	-39.66	peak	P

Test mode:	8DPSK	Test Channel:	0
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	42.56	-5.05	37.51	74.00	-36.49	peak	P
2	2390.000	43.92	-4.97	38.95	74.00	-35.05	peak	P
3 *	2400.000	57.35	-4.96	52.39	74.00	-21.61	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	39.56	-5.05	34.51	74.00	-39.49	peak	P
2	2390.000	41.42	-4.97	36.45	74.00	-37.55	peak	P
3 *	2400.000	57.35	-4.96	52.39	74.00	-21.61	peak	P

Test mode:	8DPSK	Test Channel:	78
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HORIZONTAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	2483.500	53.87	-4.89	48.98	74.00	-25.02	peak	P
2	2500.000	42.07	-4.87	37.20	74.00	-36.80	peak	P

VERTICAL

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	2483.500	77.07	-31.09	45.98	74.00	-28.02	peak	P
2	2500.000	67.27	-31.07	36.20	74.00	-37.80	peak	P

3.3 Spurious Emission at Antenna Port

3.3.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output 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 Section 15.209(a) is not required. In addition, 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) (see Section 15.205(c)).

3.3.2 Test Procedure

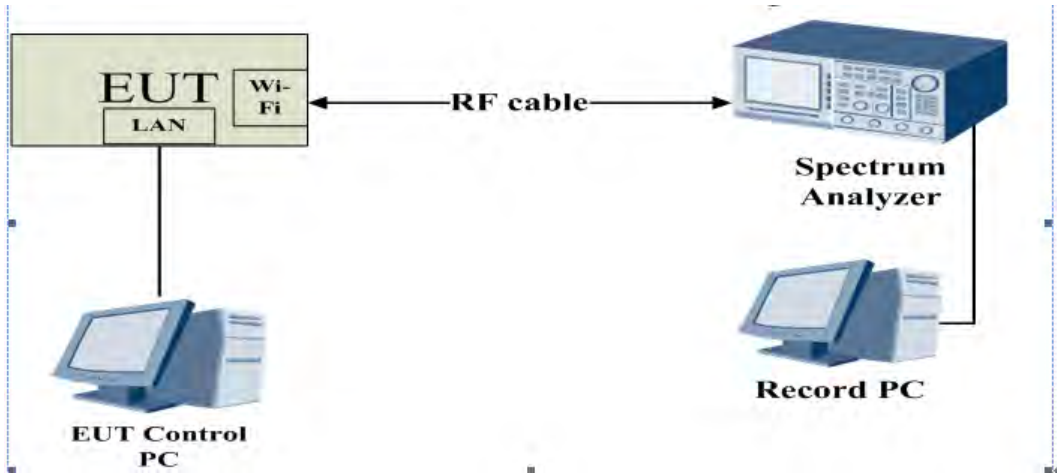
Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in
 b) the block diagram below.
 c) Spectrum Setting as below:

Centre Frequency	The centre frequency of the channel under test
RBW	100 kHz
VBW	300 kHz
Frequency span	2 x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

- d) Allow trace to full stabilize.
 e) Use the peak marker function to determine the maximum power level in any 100kHz band segment within the fundamental EBW.

3.3.3 Test Setup



3.3.4 The Result

3.3.4.1 Conducted Spurious Emission

Please Refer to Appendix for Details.

3.3.4.2 Band edge measurements

Please Refer to Appendix for Details.

3.4 20dB Occupy Bandwidth

3.4.1 Limit

N/A

3.4.2 Test Procedure

Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

a) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

c) Set to the maximum power setting and enable the EUT transmit continuously.

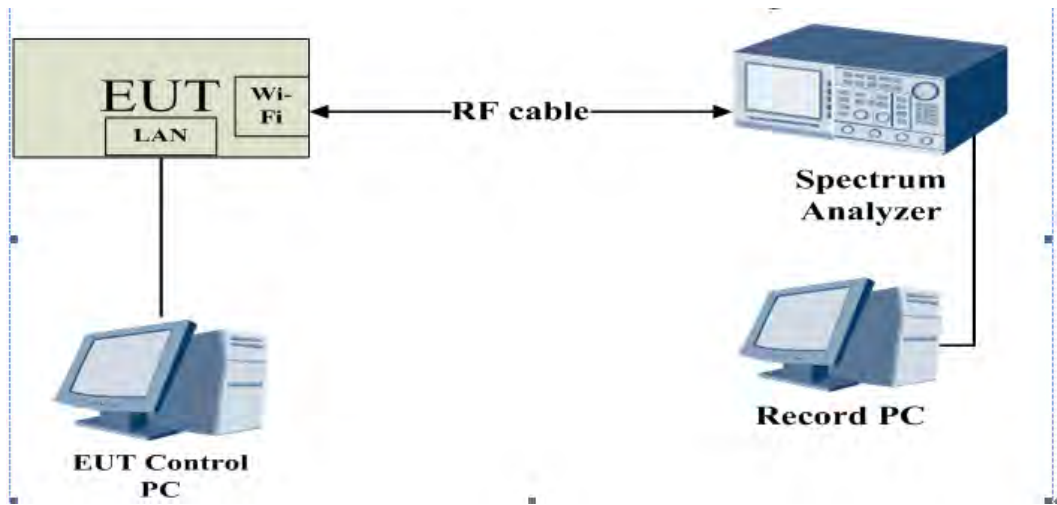
d) Use the following spectrum analyzer settings for 20dB Bandwidth measurement.

Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel; $1\% \leq RBW \leq 5\%$ of the 20 dB bandwidth; $VBW \geq 3RBW$;

Sweep = auto; Detector function = peak; Trace = max hold.

e) Measure and record the results in the test report.

3.4.3 Test Setup



3.4.4 Test Result

Please Refer to Appendix for Details.

3.5 Maximum conducted (average) output power

3.5.1 Limit

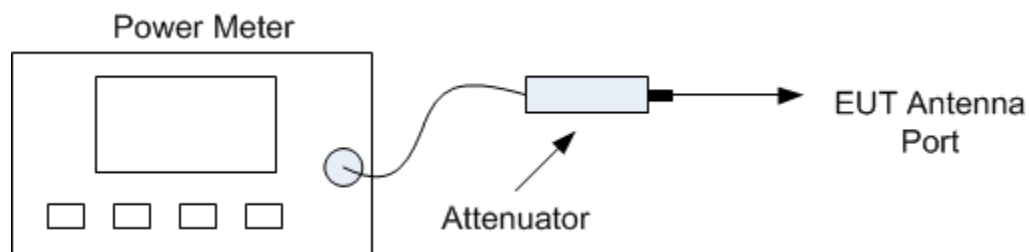
For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

3.5.2 Test Procedure

Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- The maximum output power was performed in accordance with method 11.9.2.3 of ANSI C63.10.

3.5.3 Test Setup



3.5.4 The Result

Please Refer to Appendix for Details.

3.6 Carrier Frequencies Separation

3.6.1 Limit

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. Test Peripherals

3.6.2 Test Procedure

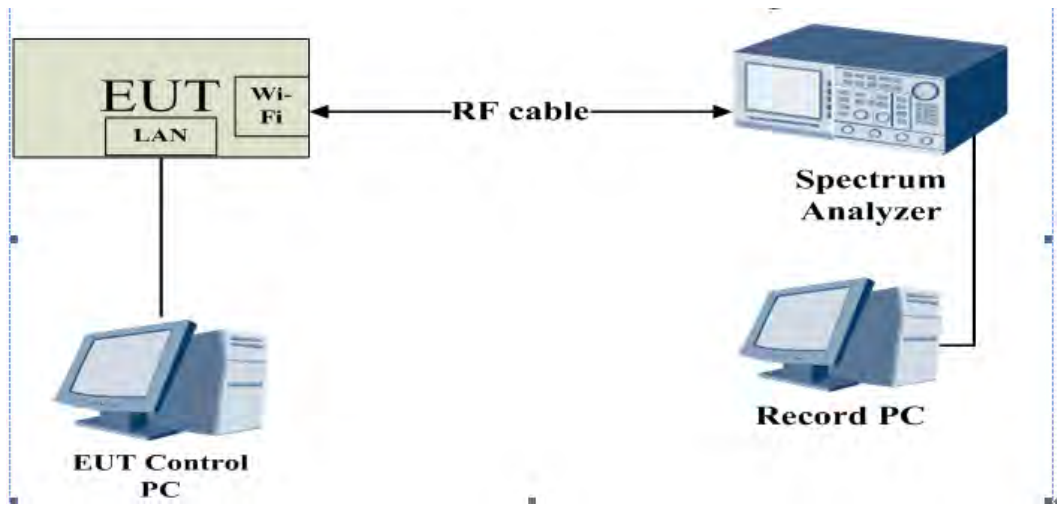
Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in
 b) the block diagram below. Spectrum analyser settings as following:

RBW	30% of the channel space
VBW	$VBW \geq RBW$
Detector Mode	RMS
Trace Mode	Max Hold
Sweep Time	Auto

- c) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
 d) Set to the maximum power setting and enable the EUT transmit continuously.
 e) Enable the EUT hopping function.
 f) Use the following spectrum analyzer settings:
 Span = wide enough to capture the peaks of two adjacent channels; RBW is set to approximately 30% of the channel spacing, adjust as necessary to best identify the center of each individual channel; $VBW \geq RBW$; Sweep = auto;
 Detector function = peak; Trace = max hold.
 g) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Record the value in report.

3.6.3 Test Setup



3.6.4 The Result

Please Refer to Appendix for Details.

3.7 Hopping Channel Number

3.3.5 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

3.3.6 Test Procedure

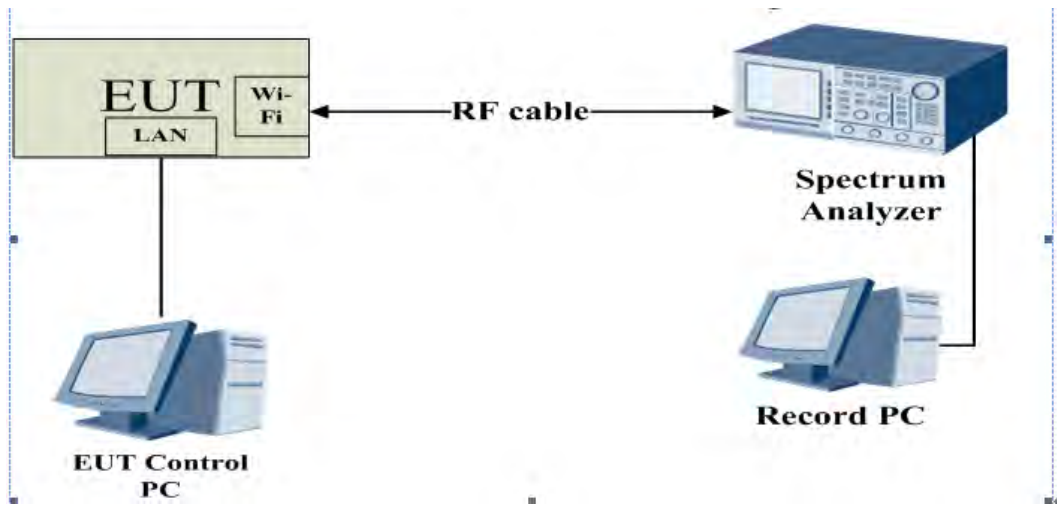
Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in
 b) the block diagram below. Spectrum analyser settings as following:

RBW	30% of the channel space
VBW	$VBW \geq RBW$
Detector Mode	RMS
Trace Mode	Max Hold
Sweep Time	Auto

- c) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- d) Set to the maximum power setting and enable the EUT transmit continuously.
- e) Enable the EUT hopping function.
- f) Use the following spectrum analyzer settings: Span = the frequency band of operation; set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
- g) The number of hopping frequency used is defined as the number of total channel.
- h) Record the measurement data in report.

3.3.7 Test Setup



3.3.8 The Result

Please Refer to Appendix for Details.

3.8 Dwell Time

3.8.1 Limit

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.

3.8.2 Test Procedure

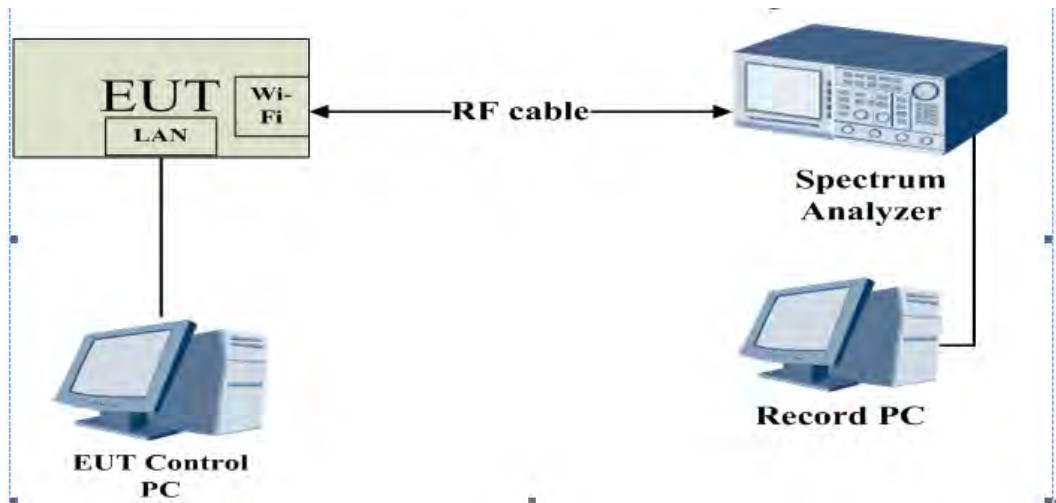
Test Method	
<input checked="" type="radio"/> Conducted Measurement	<input type="radio"/> Radiated Measurement
Test Channels	
<input checked="" type="radio"/> Lowest, Middle and Highest Channel	<input type="radio"/> Lowest and Highest Channel
Environmental conditions	
<input checked="" type="radio"/> Normal	<input type="radio"/> Normal and Extreme
Note: ● : Test ○ : No Test	

- a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in
- b) the block diagram below. Spectrum analyser settings as following:

RBW	\leq channel spacing and where possible RBW should be set $\gg 1 / T$
VBW	$VBW \geq RBW$
Detector Mode	RMS
Trace Mode	Max Hold
Sweep Time	Auto

- c) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- d) Set to the maximum power setting and enable the EUT transmit continuously.
- e) Enable the EUT hopping function.
- f) Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW shall be \leq channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel; $VBW \geq RBW$; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
- g) Measure and record the results in the test report.

3.8.3 Test Setup

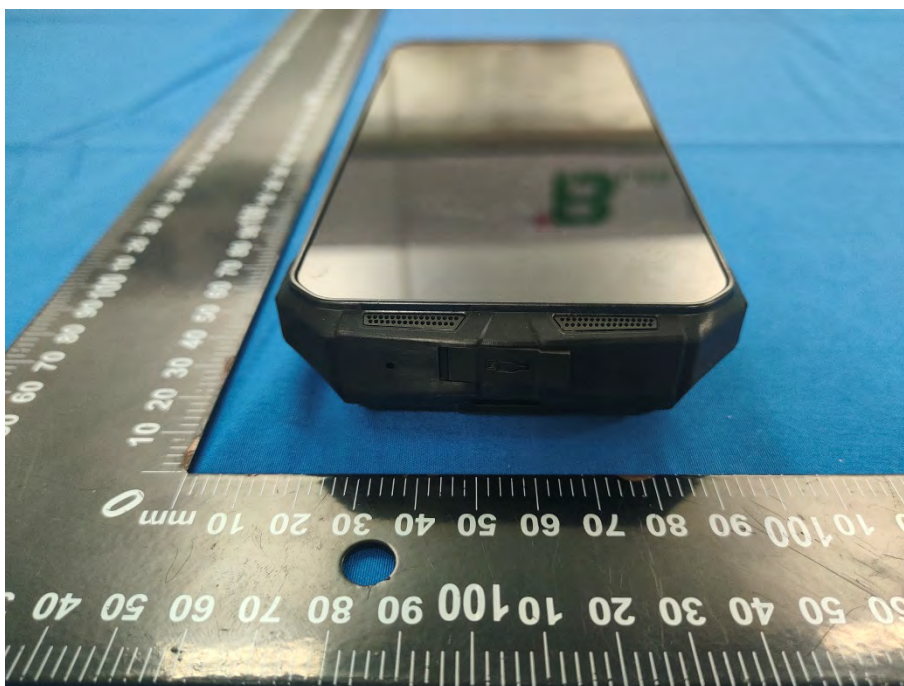


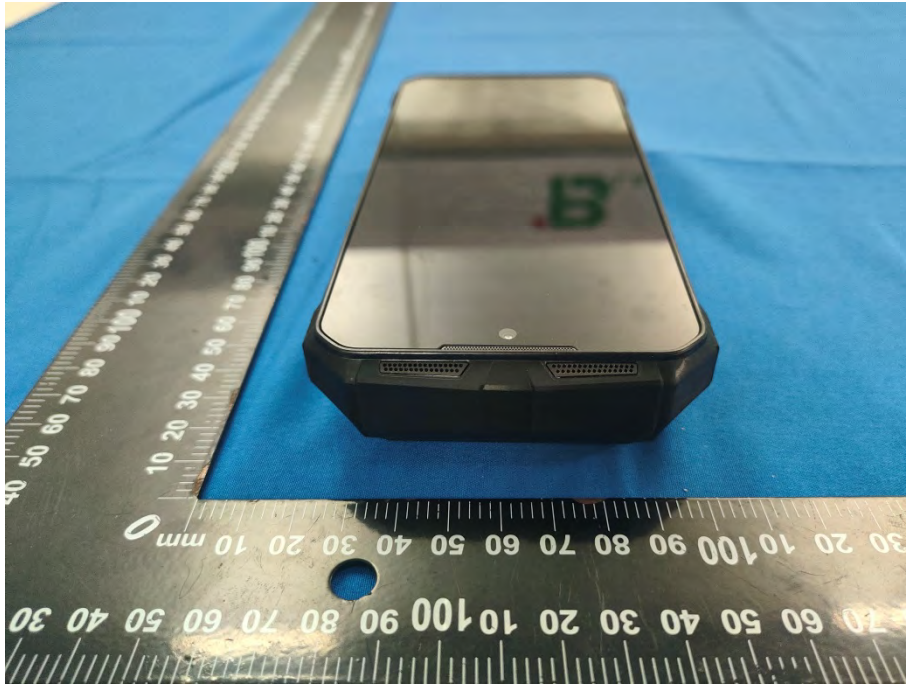
3.8.4 The Result

Please Refer to Appendix for Details.

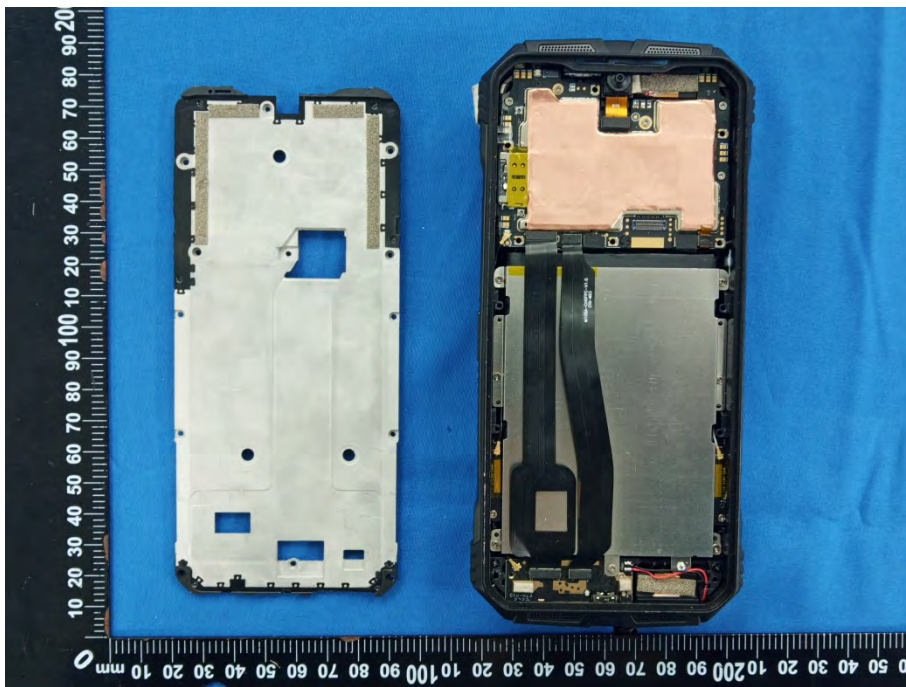
4. Photographs of EUT

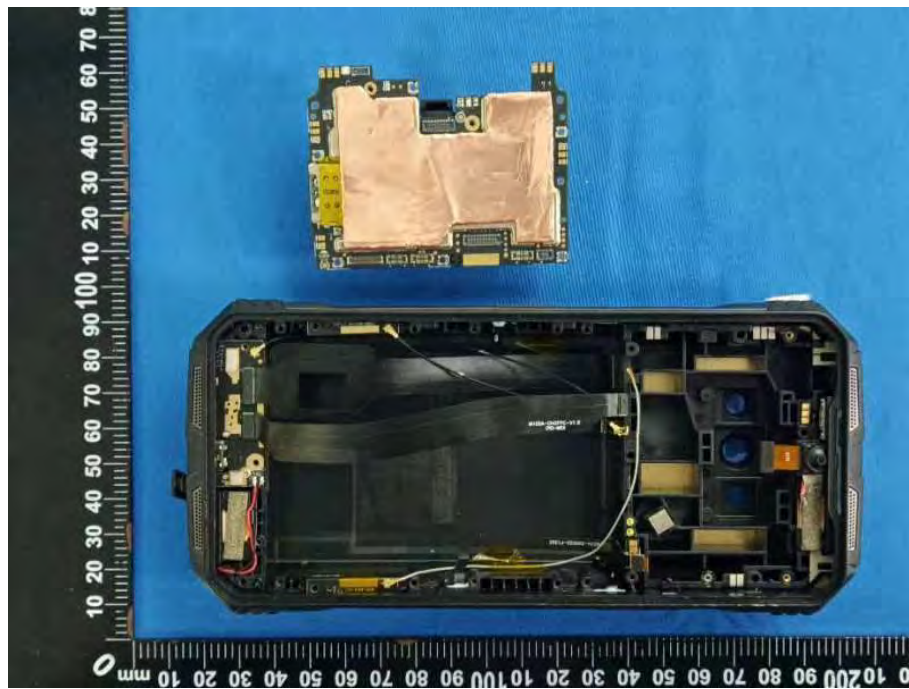
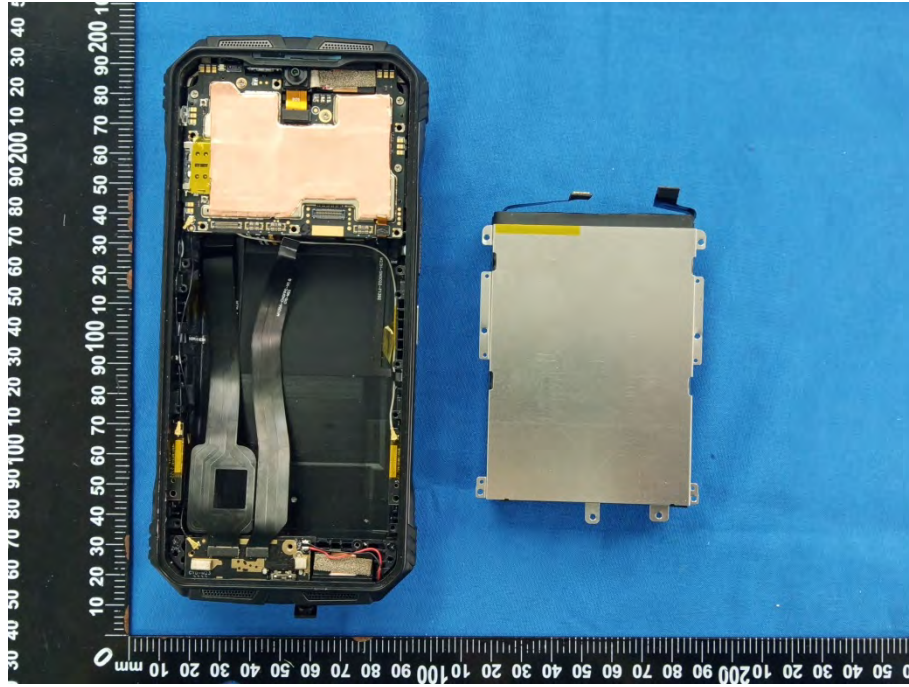


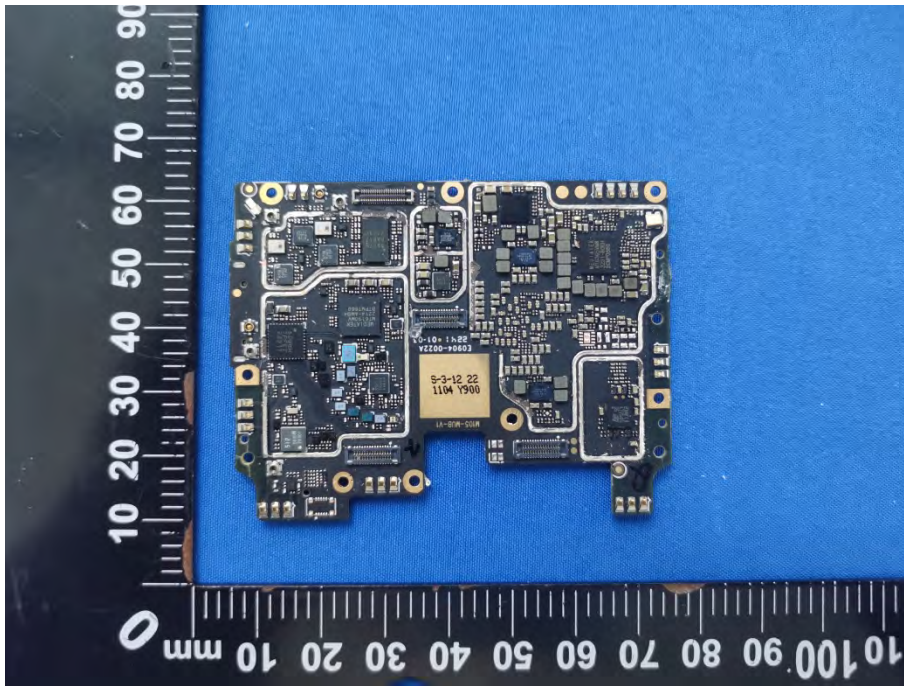
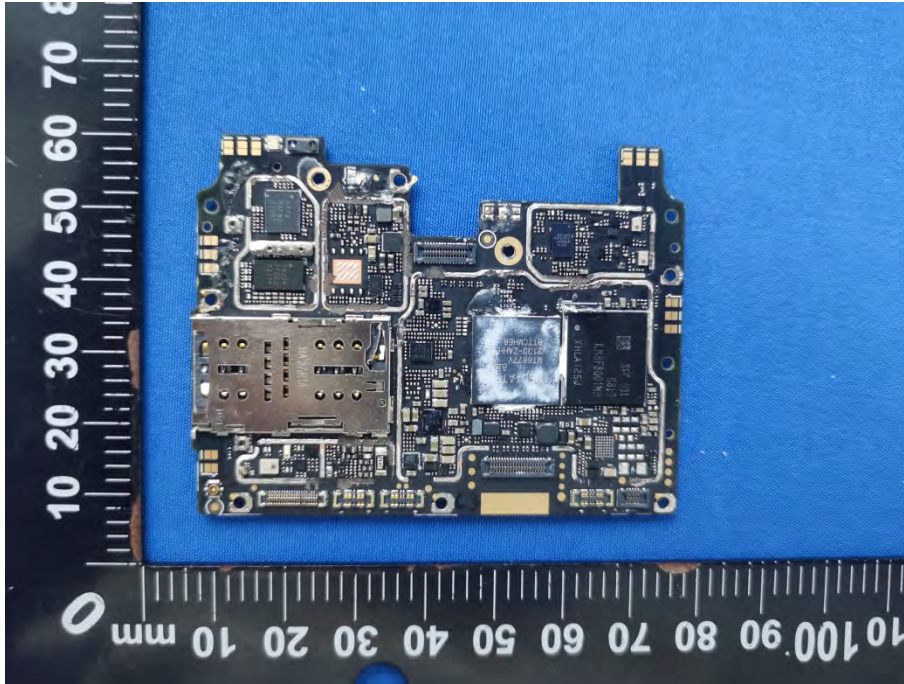


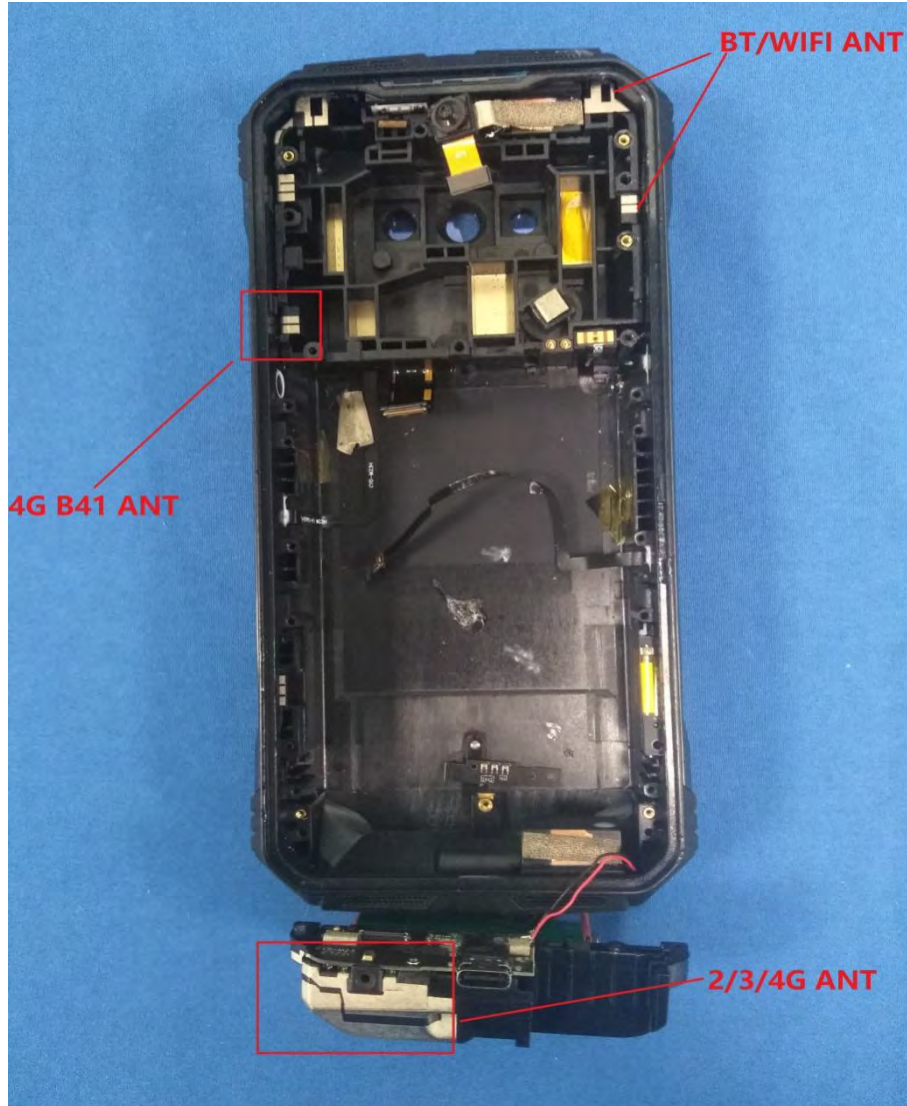




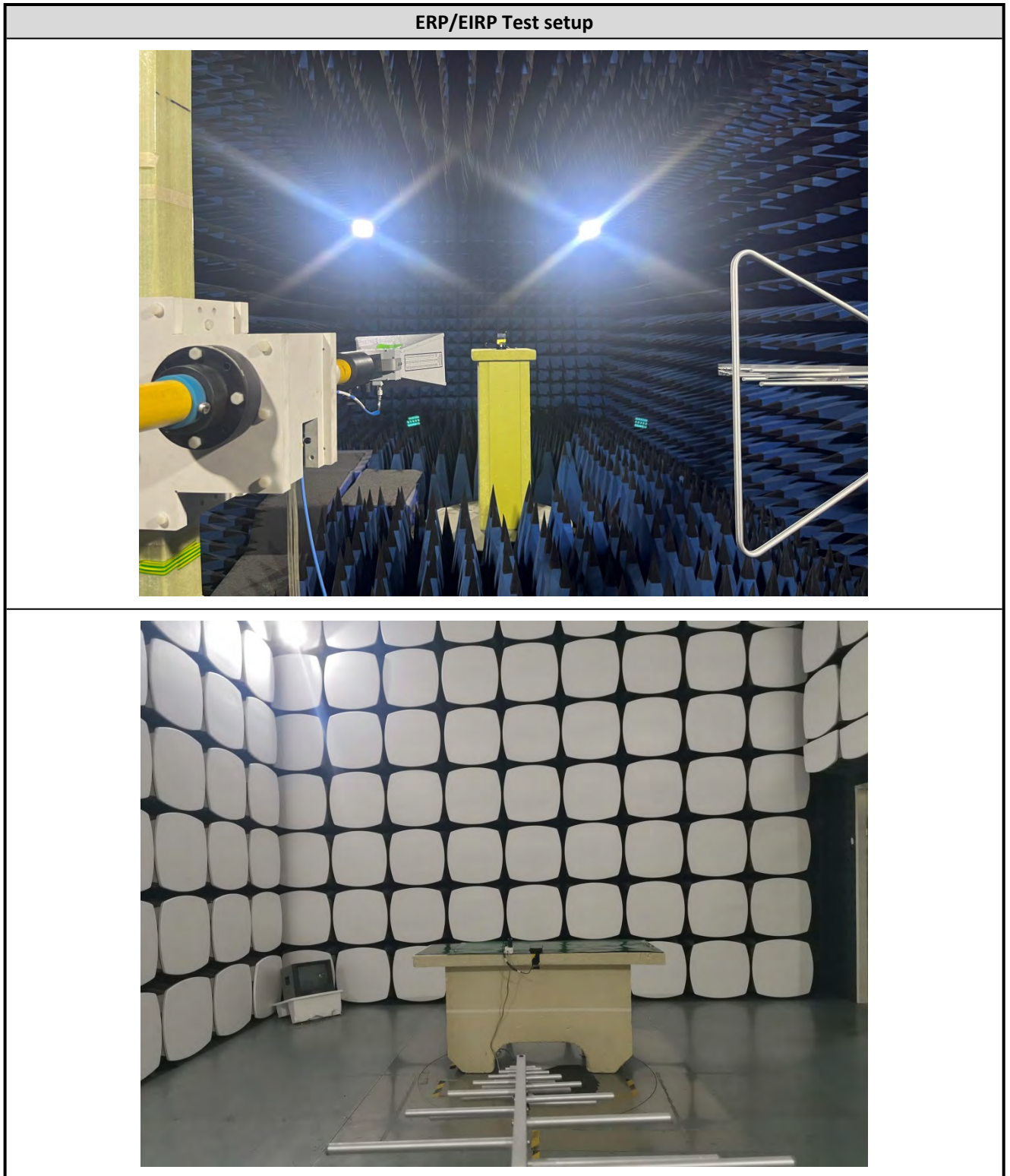








5. Photographs of Test Set-up



CE



Appendix

1. Bandwidth

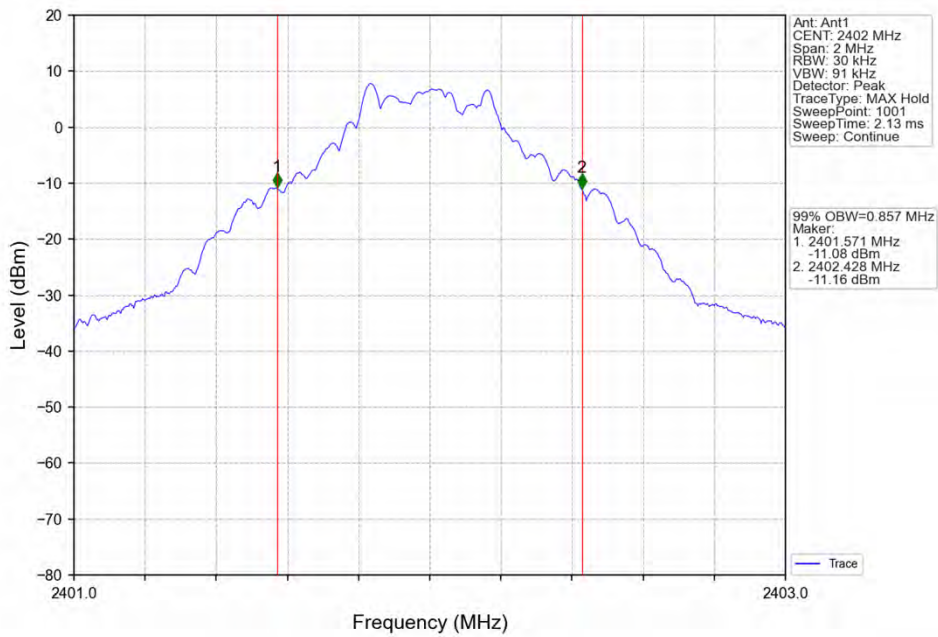
1.1 OBW

1.1.1 Test Result

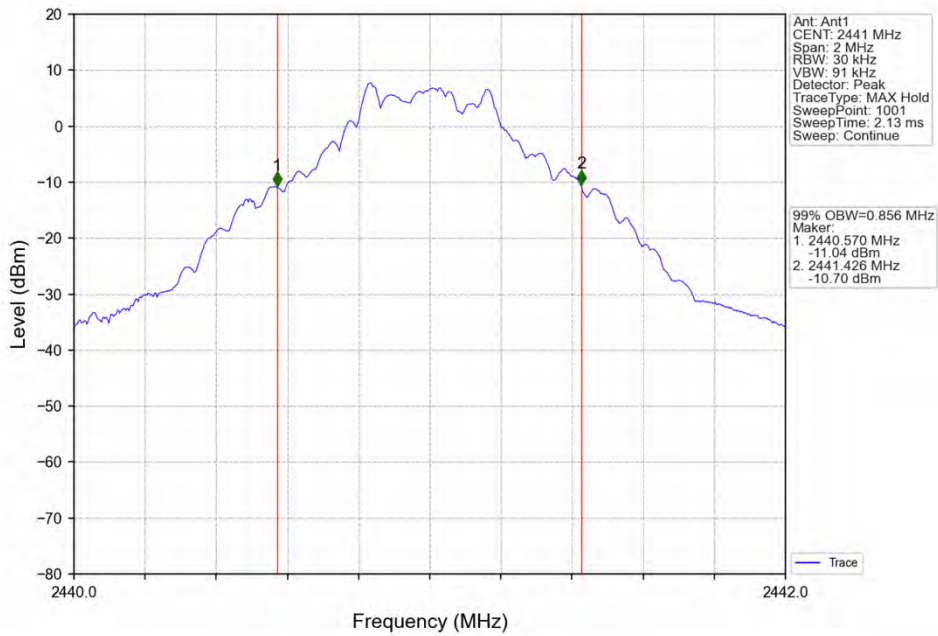
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	
					Result	Verdict
GFSK	SISO	2402	DH5	1	0.857	Pass
		2441	DH5	1	0.856	Pass
		2480	DH5	1	0.855	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.178	Pass
		2441	2DH5	1	1.180	Pass
		2480	2DH5	1	1.177	Pass
8DPSK	SISO	2402	3DH5	1	1.193	Pass
		2441	3DH5	1	1.191	Pass
		2480	3DH5	1	1.180	Pass

1.1.2 Test Graph

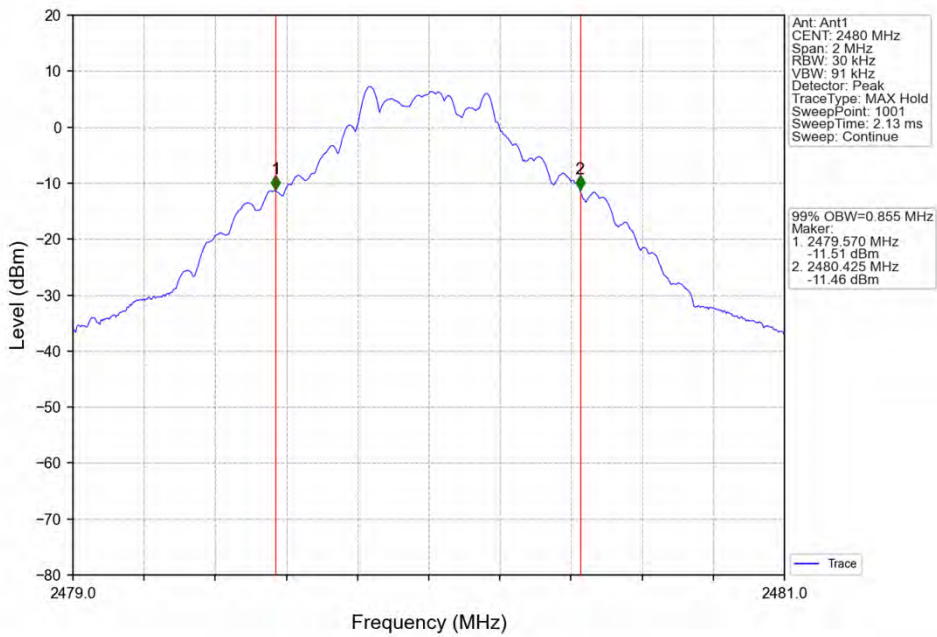
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



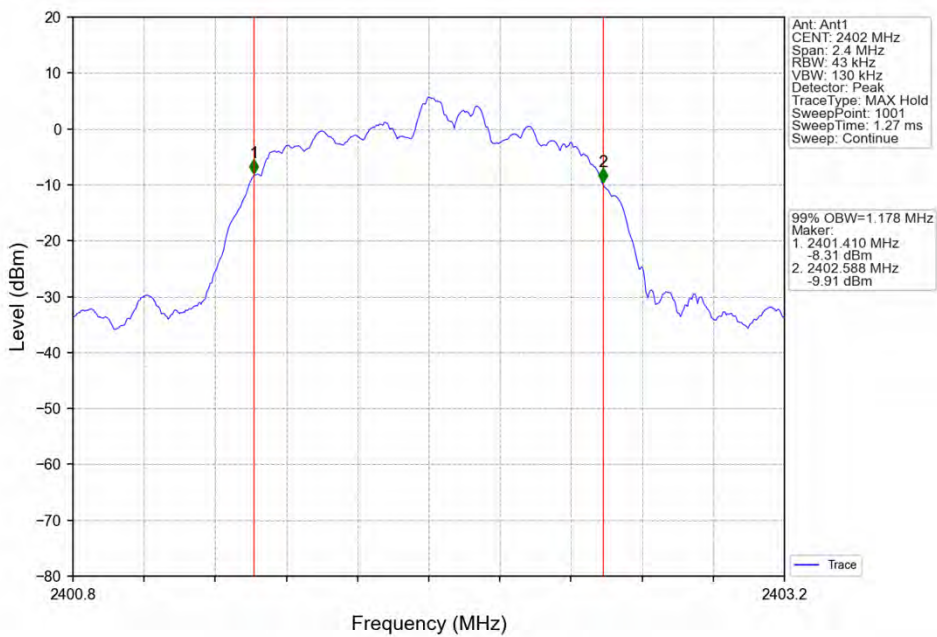
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



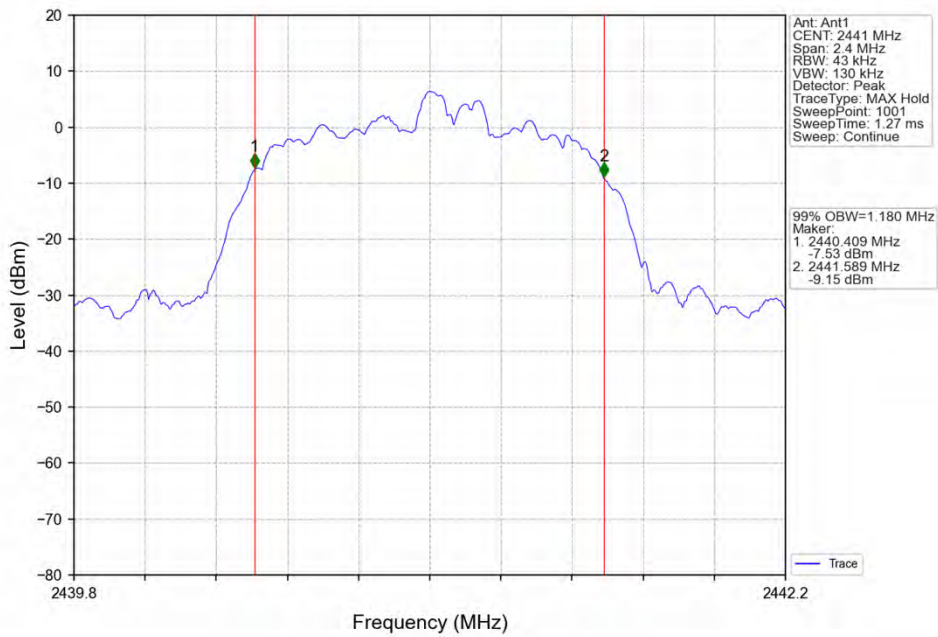
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



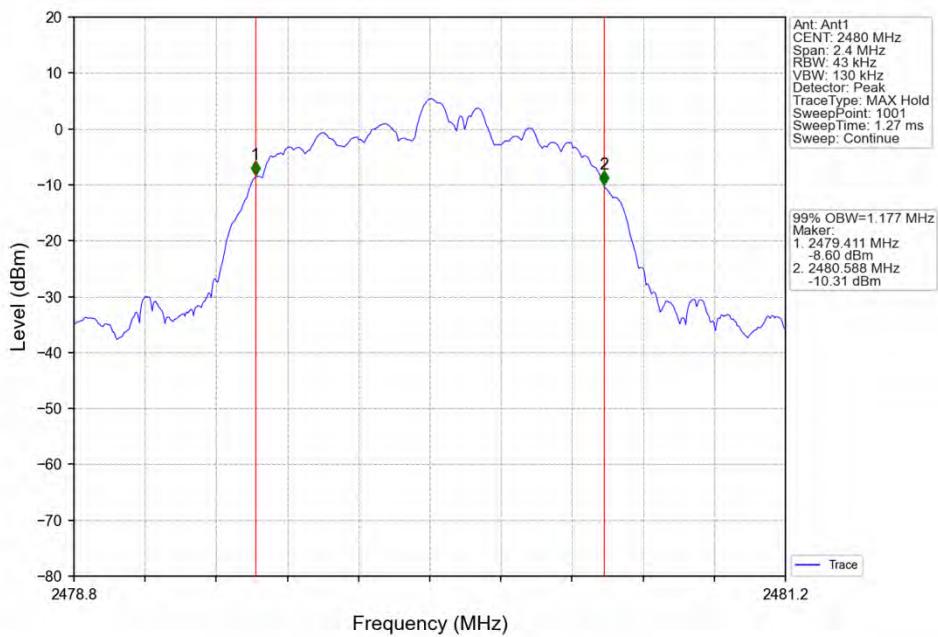
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



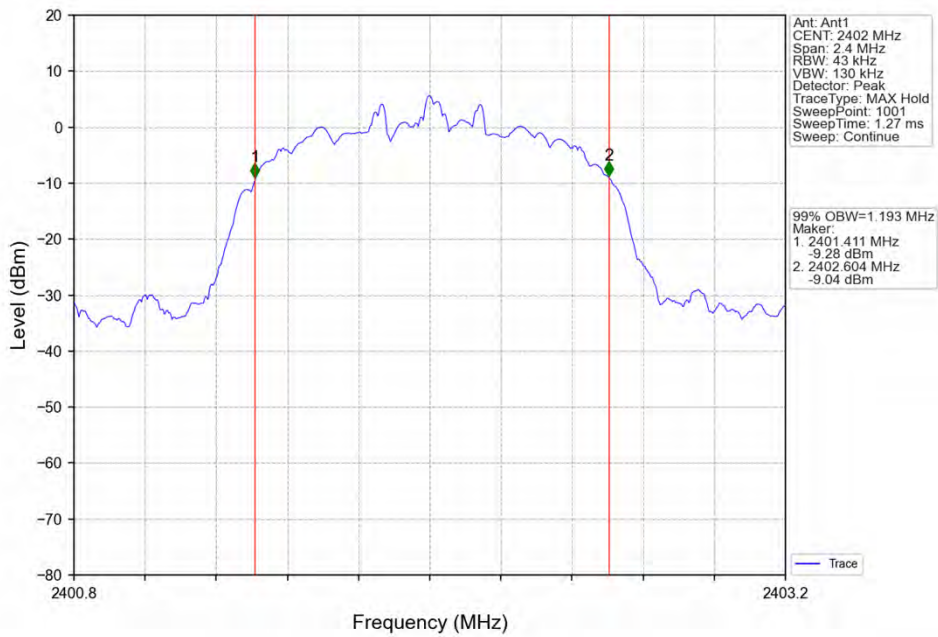
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



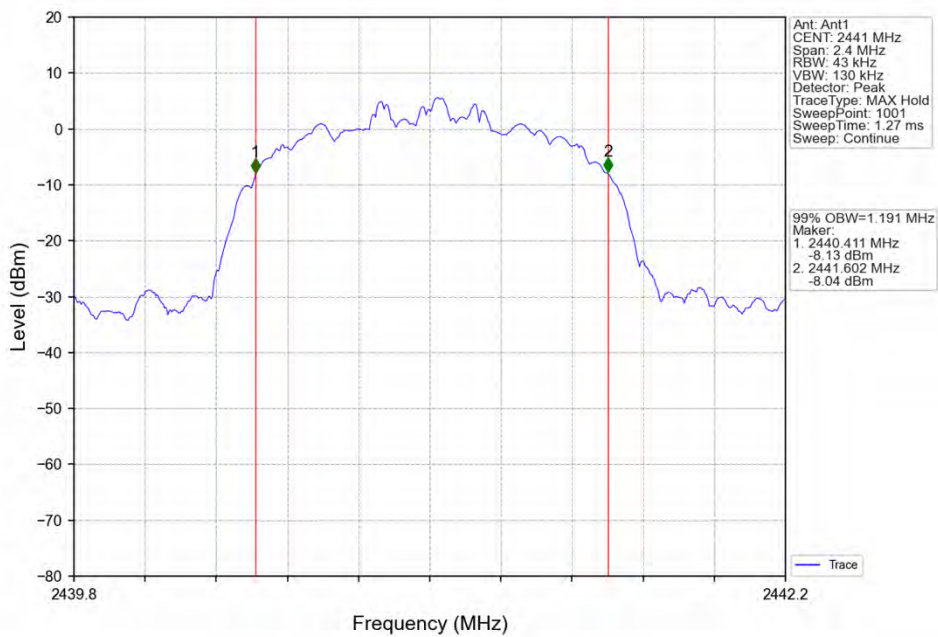
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



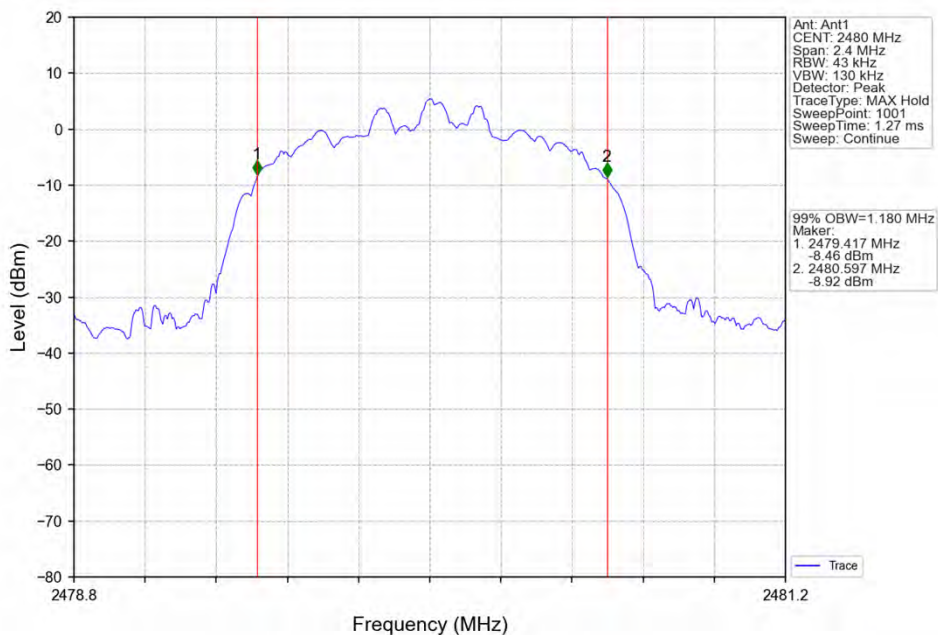
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



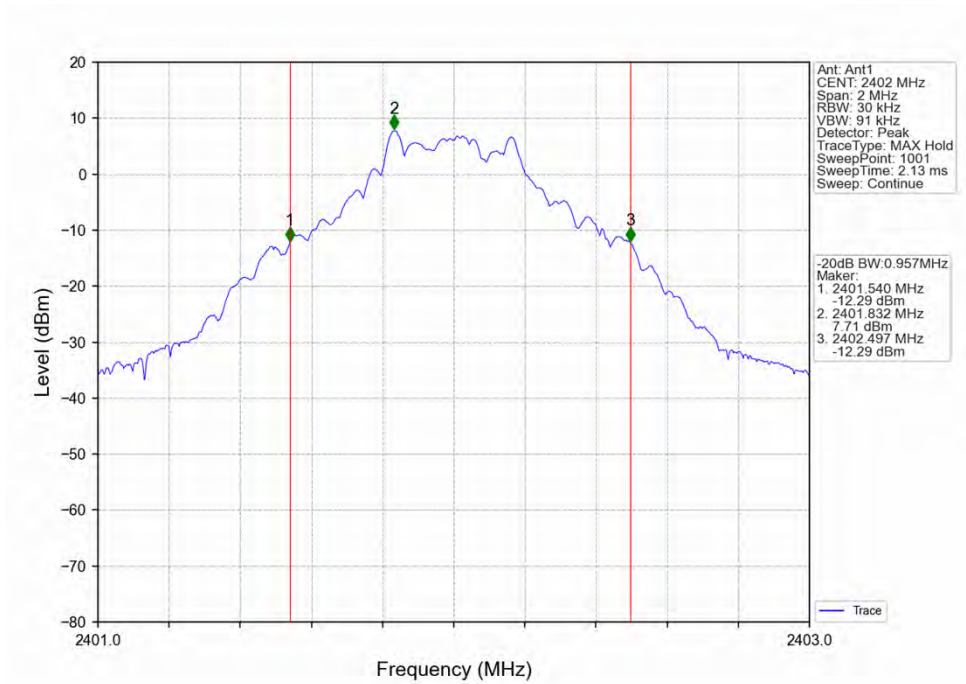
1.2 20dB BW

1.2.1 Test Result

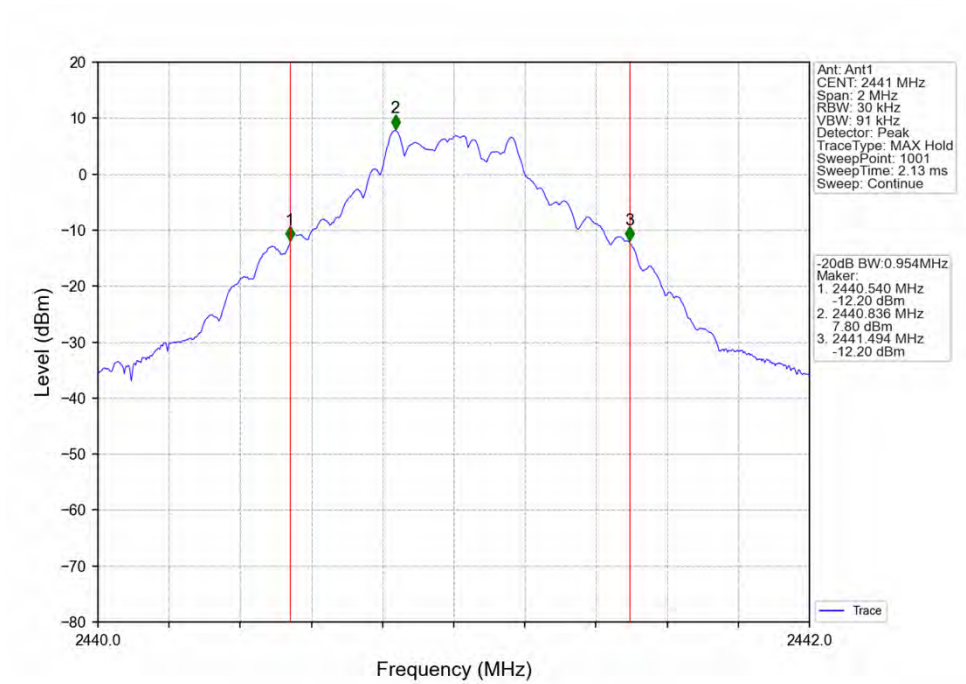
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.957	Pass
		2441	DH5	1	0.954	Pass
		2480	DH5	1	0.954	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.293	Pass
		2441	2DH5	1	1.299	Pass
		2480	2DH5	1	1.291	Pass
8DPSK	SISO	2402	3DH5	1	1.315	Pass
		2441	3DH5	1	1.310	Pass
		2480	3DH5	1	1.310	Pass

1.2.2 Test Graph

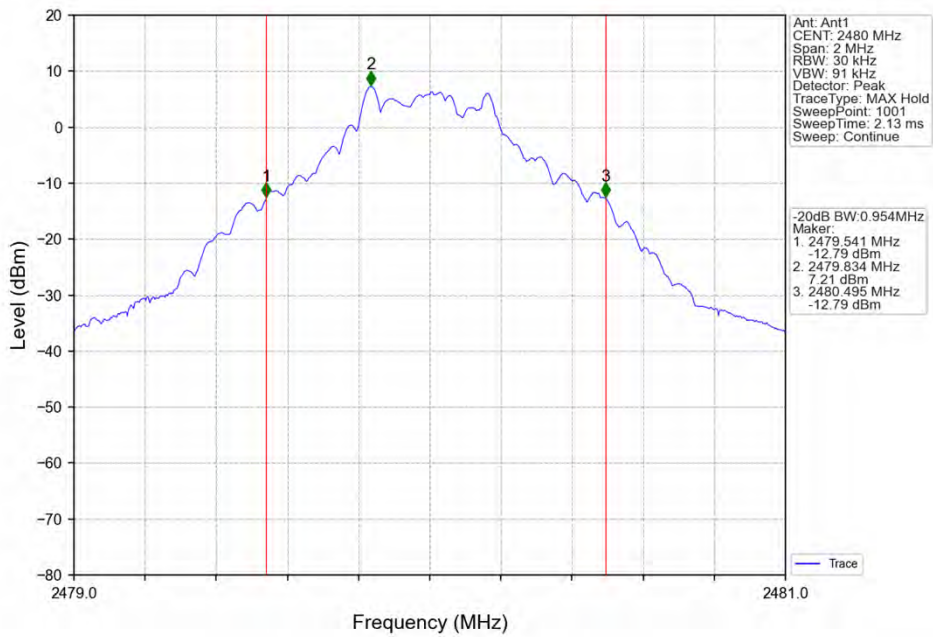
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



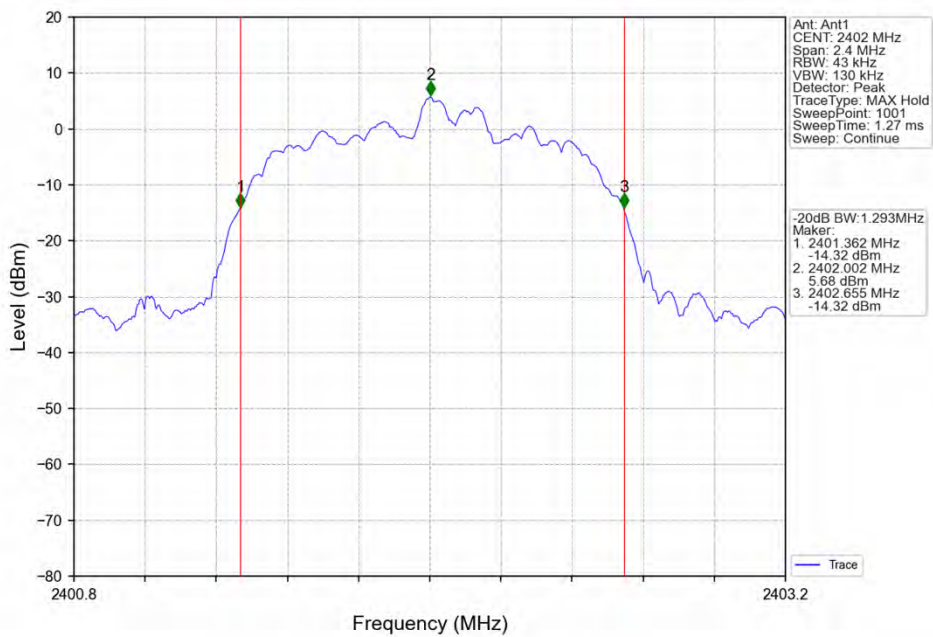
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



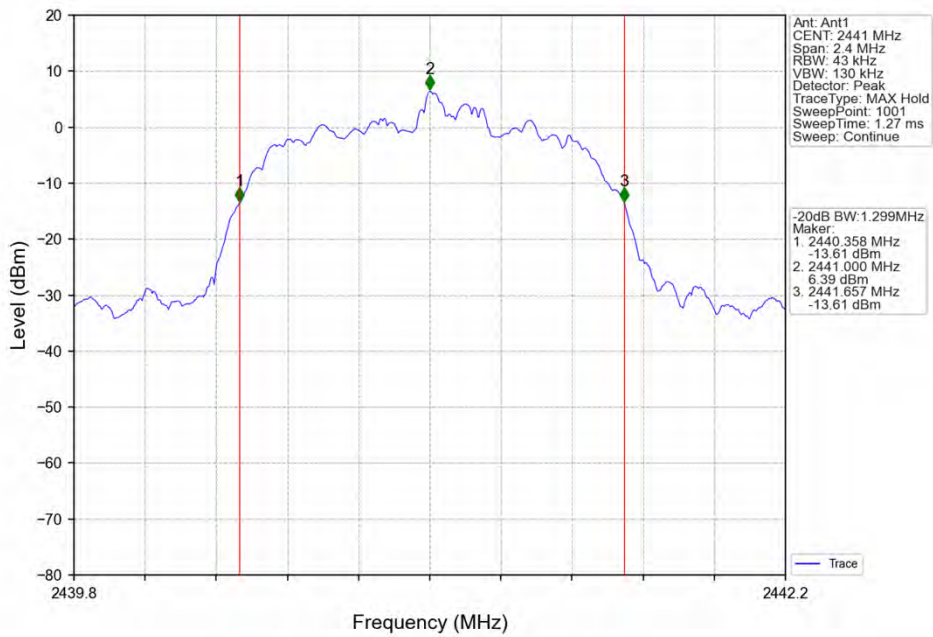
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



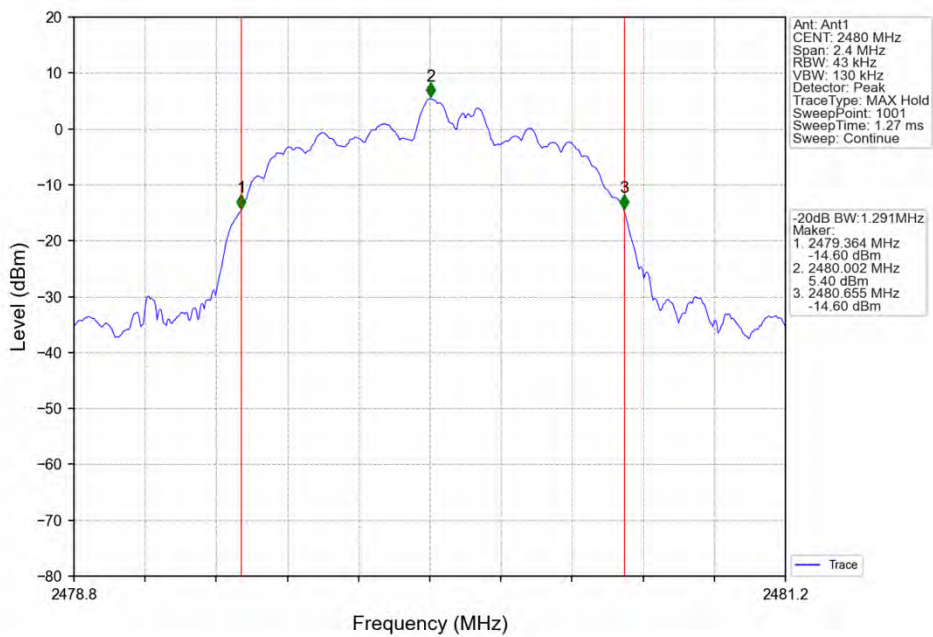
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



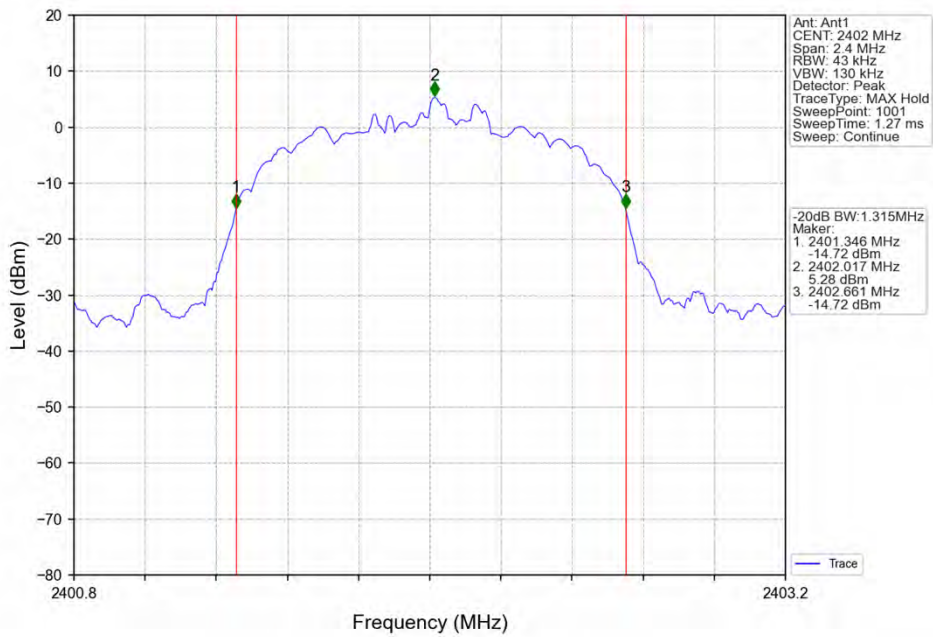
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



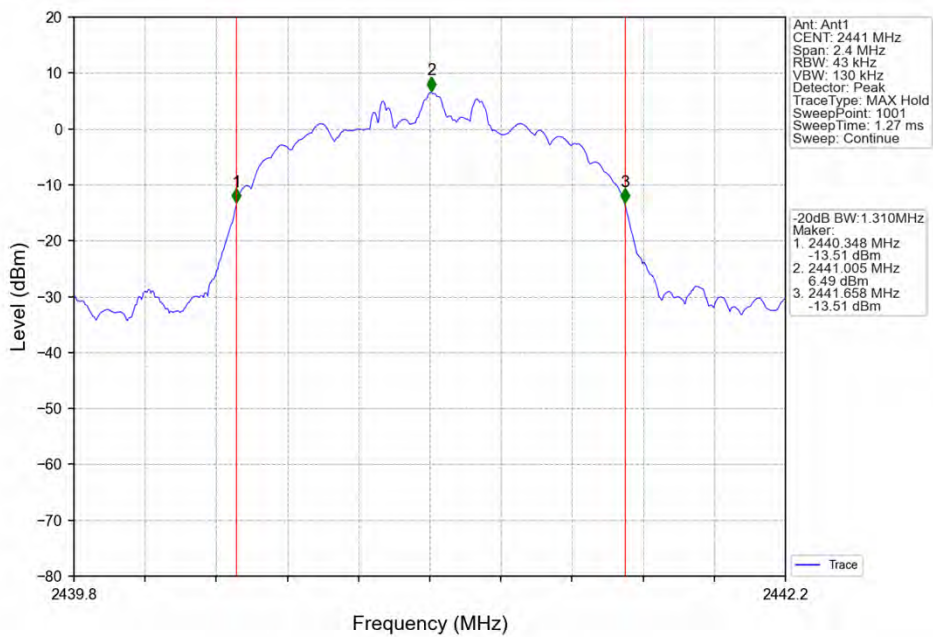
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



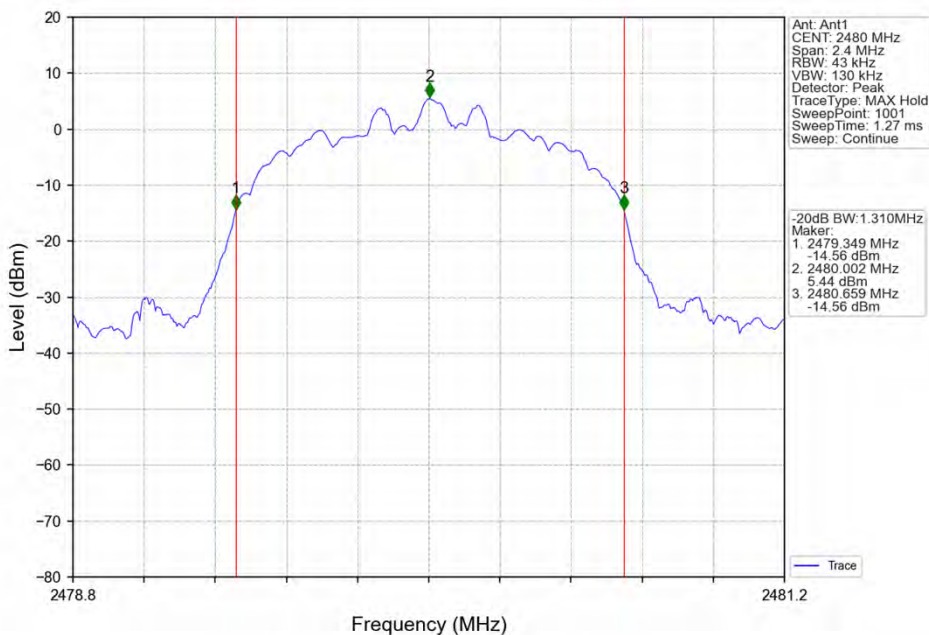
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



2. Maximum Conducted Output Power

2.1 Power

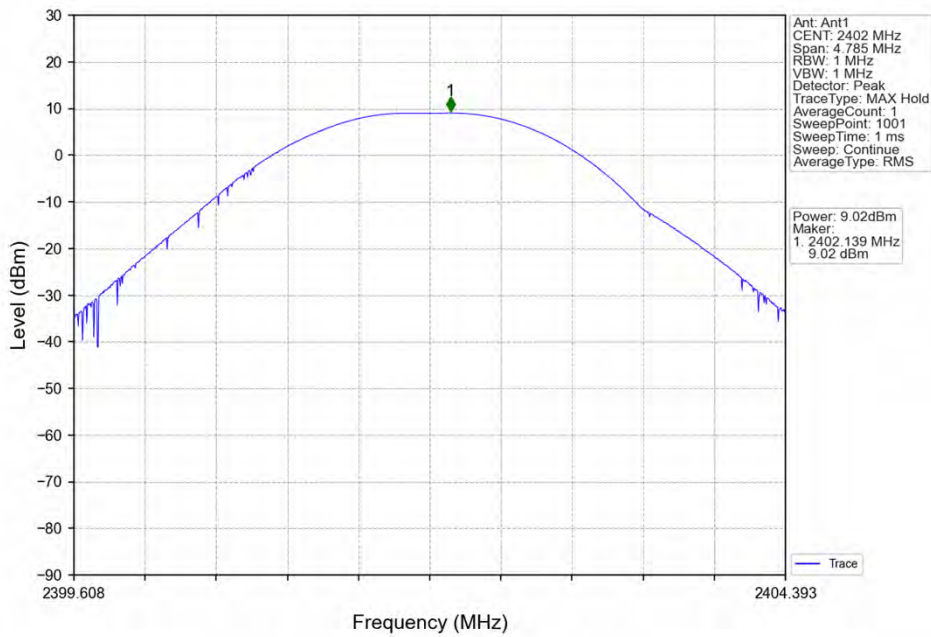
2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	9.02	<=30	Pass
		2441	DH5	8.97	<=30	Pass
		2480	DH5	8.43	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	7.62	<=20.97	Pass
		2441	2DH5	8.31	<=20.97	Pass
		2480	2DH5	7.40	<=20.97	Pass
8DPSK	SISO	2402	3DH5	7.80	<=20.97	Pass
		2441	3DH5	8.52	<=20.97	Pass
		2480	3DH5	7.63	<=20.97	Pass

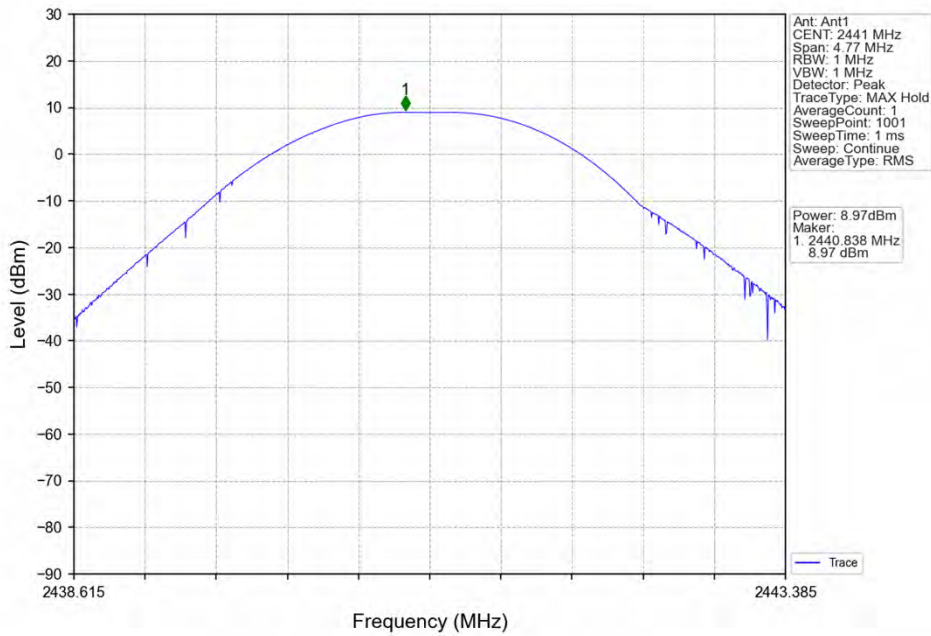
Note1: Antenna Gain: Ant1: 0.36dBi;

2.1.2 Test Graph

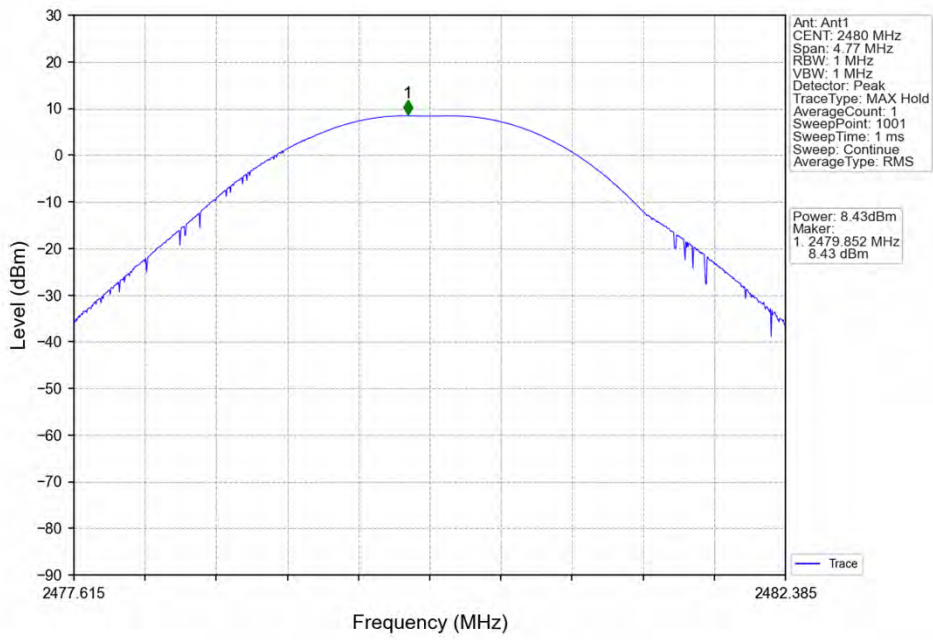
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



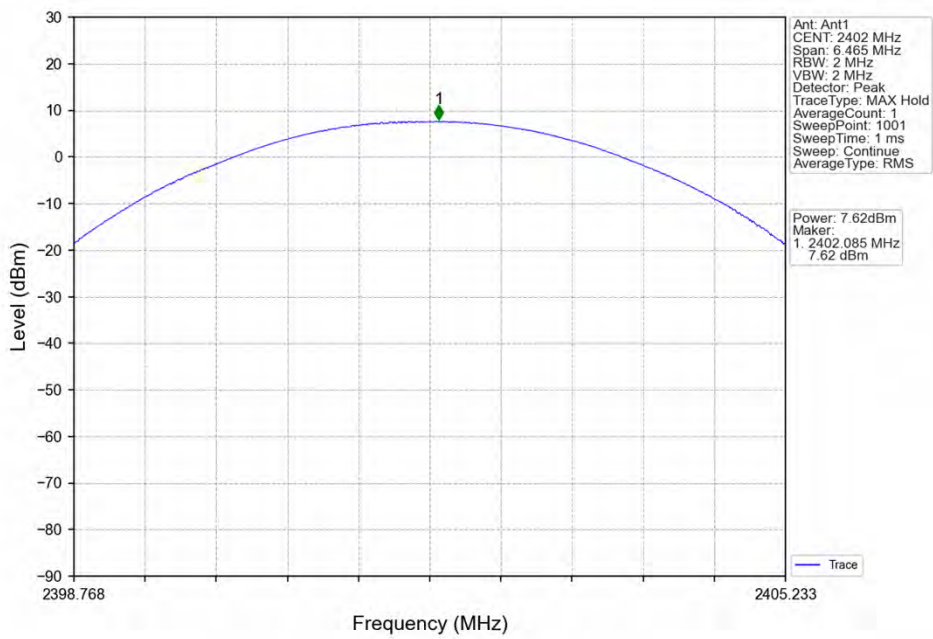
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



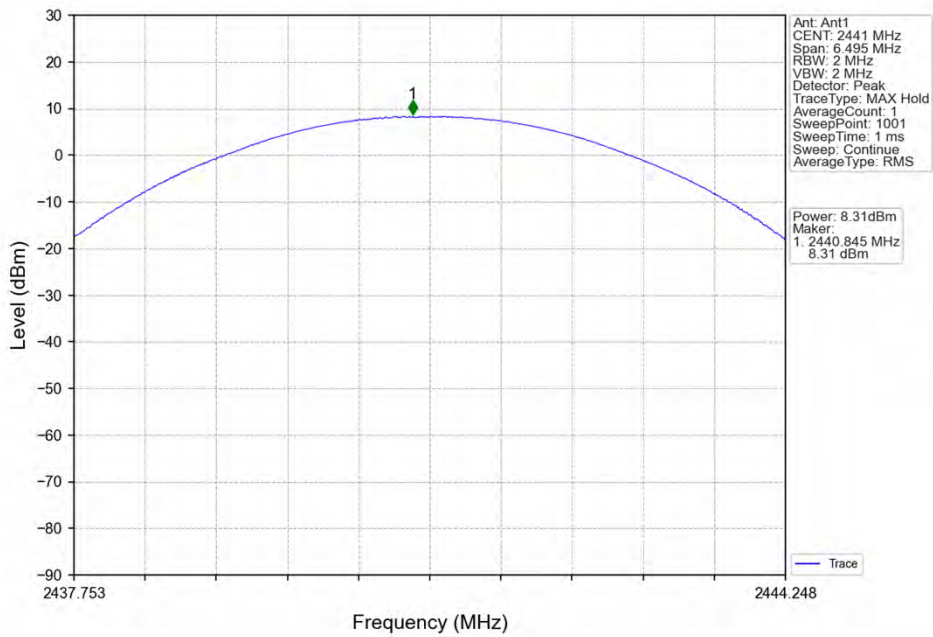
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



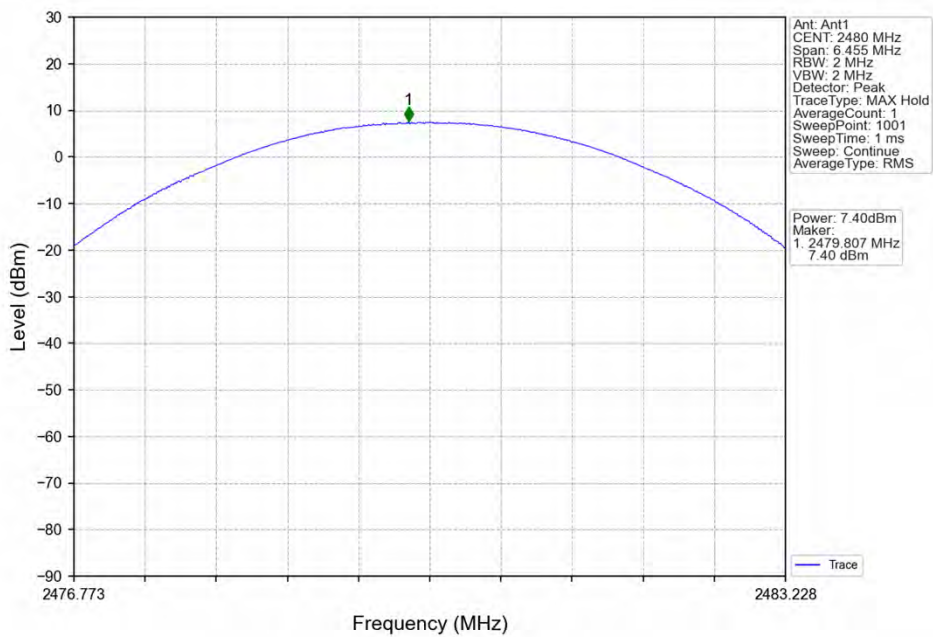
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



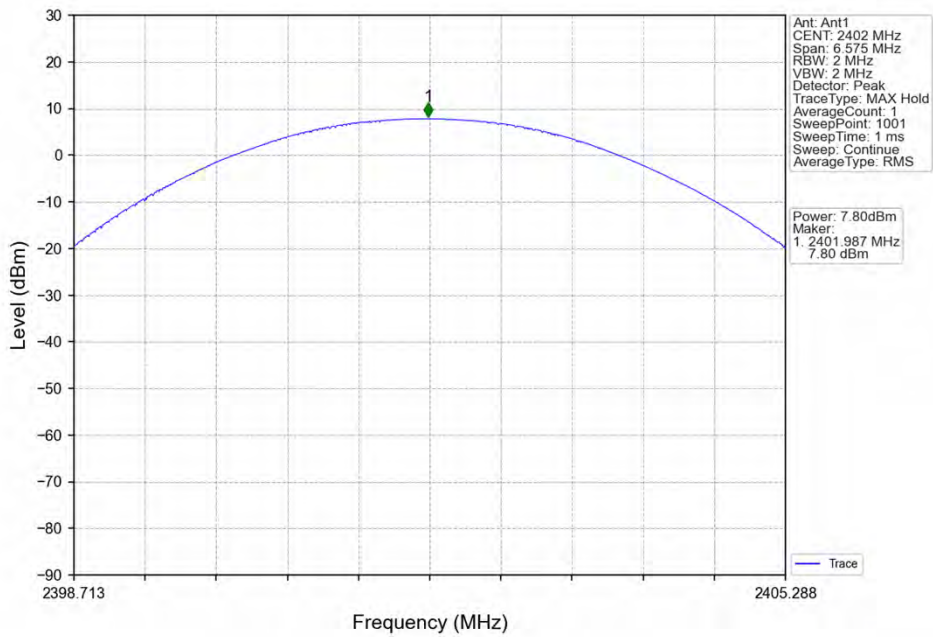
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



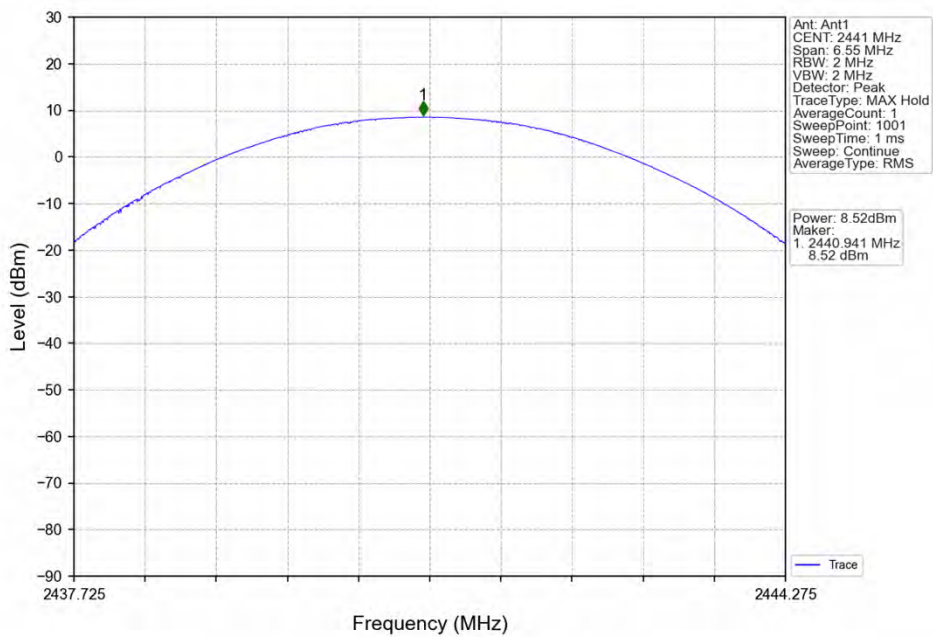
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



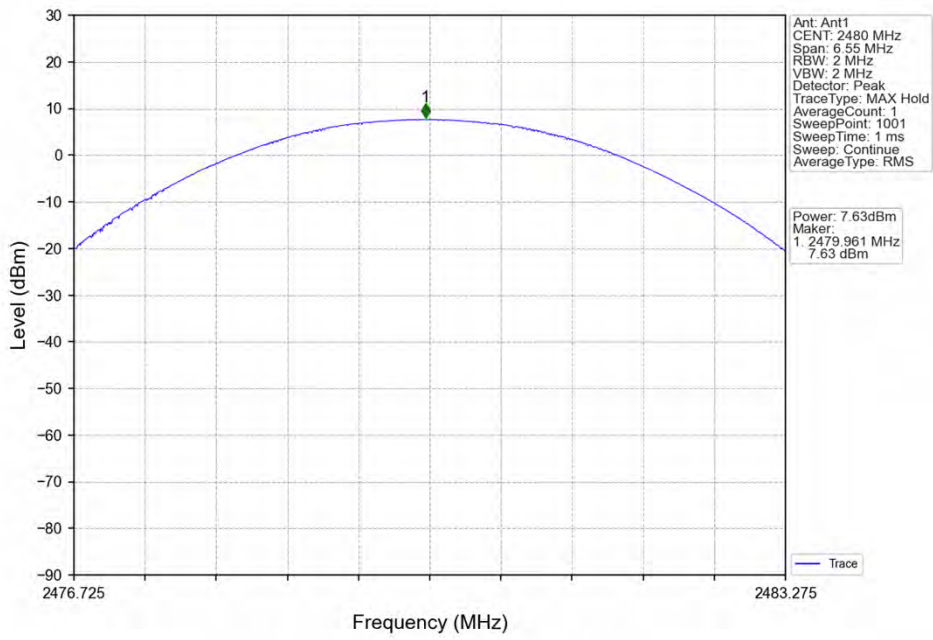
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



3. Carrier Frequency Separation

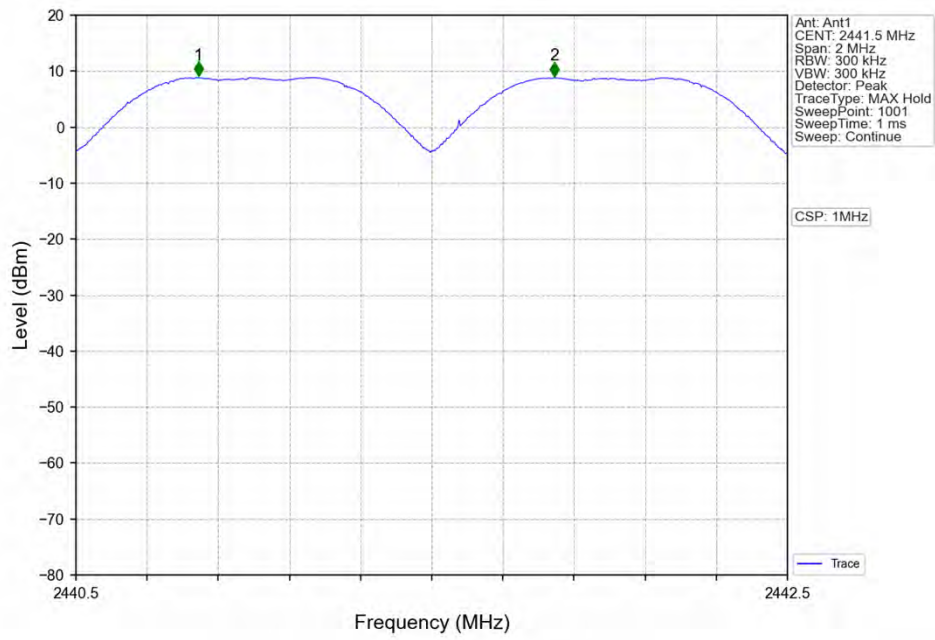
3.1 Ant1

3.1.1 Test Result

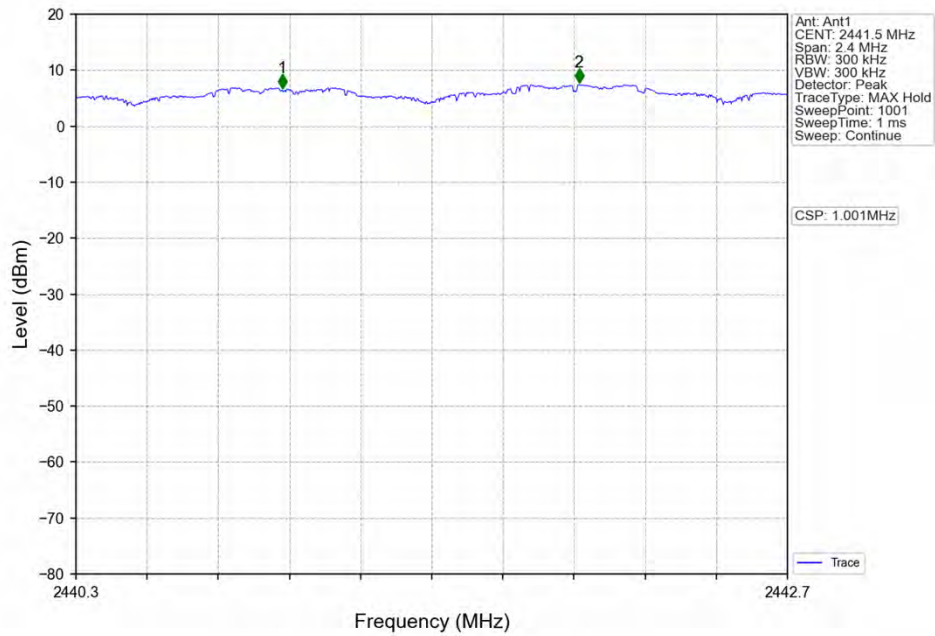
Mode	TX Type	Frequency (MHz)	Packet Type	Ant1			Verdict
				Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	
GFSK	SISO	HOPP	DH5	1.000	0.957	≥ 0.957	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.299	≥ 0.866	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.315	≥ 0.877	Pass

3.1.2 Test Graph

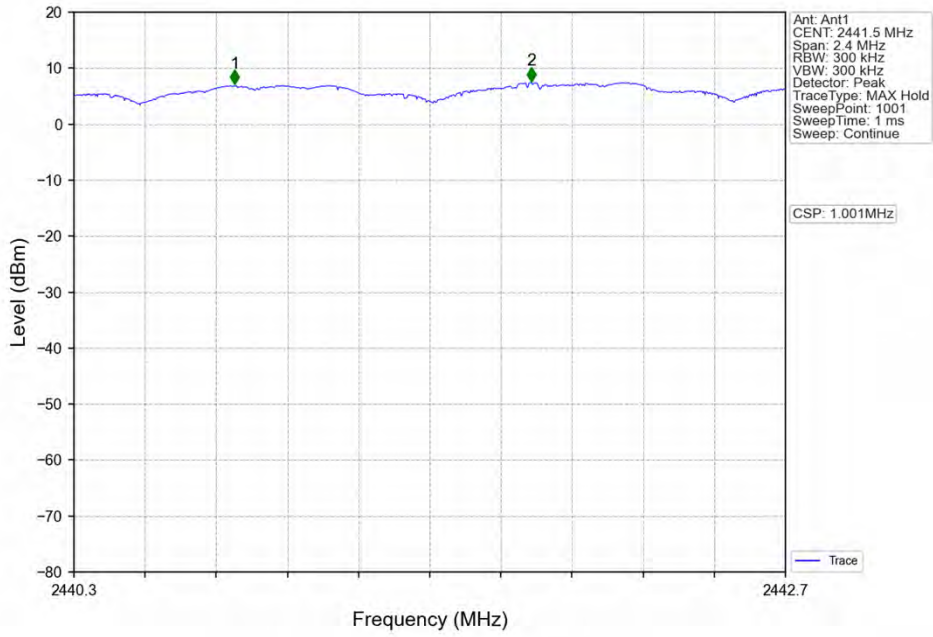
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



4. Number of Hopping Frequencies

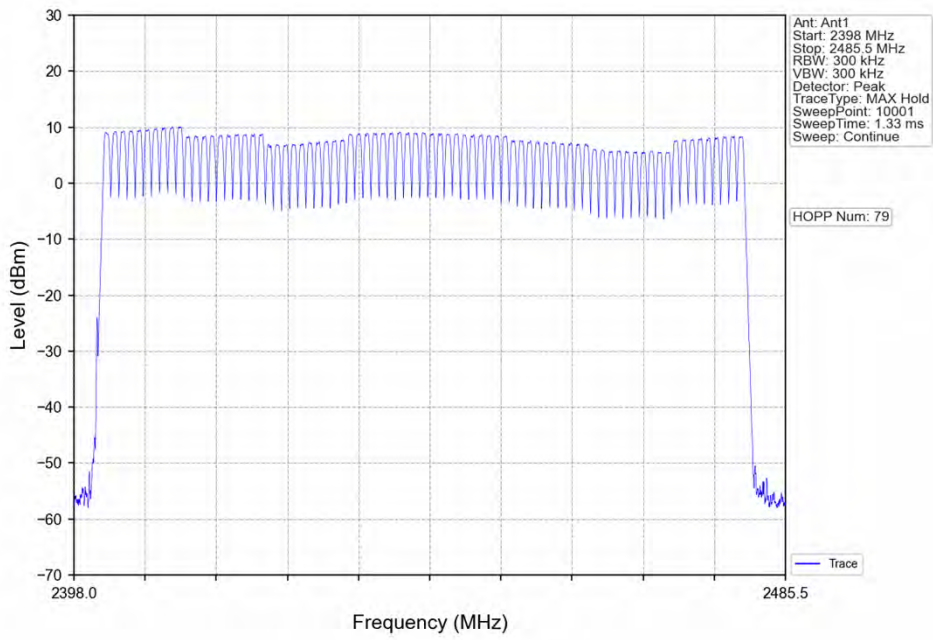
4.1 HoppNum

4.1.1 Test Result

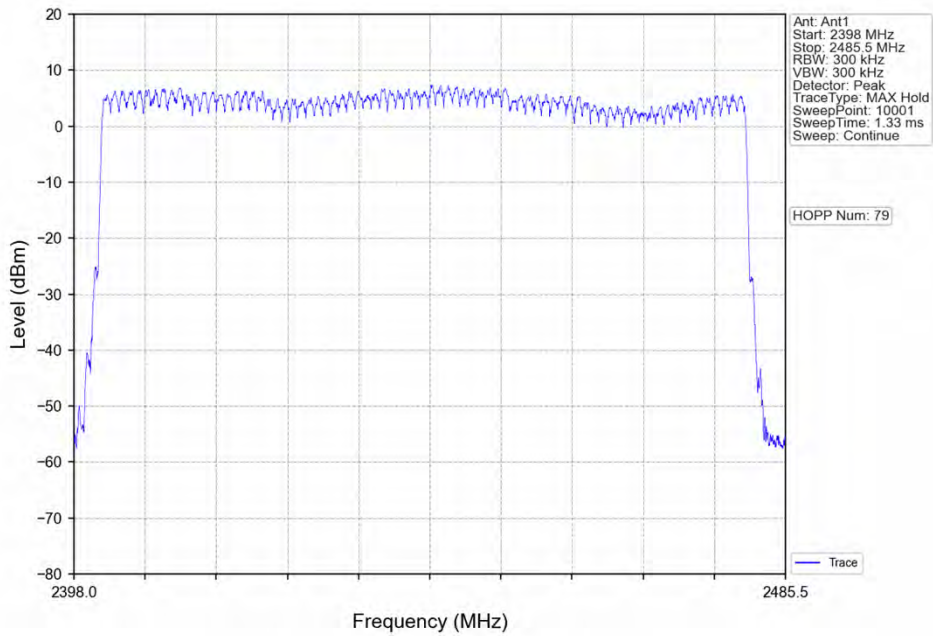
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

4.1.2 Test Graph

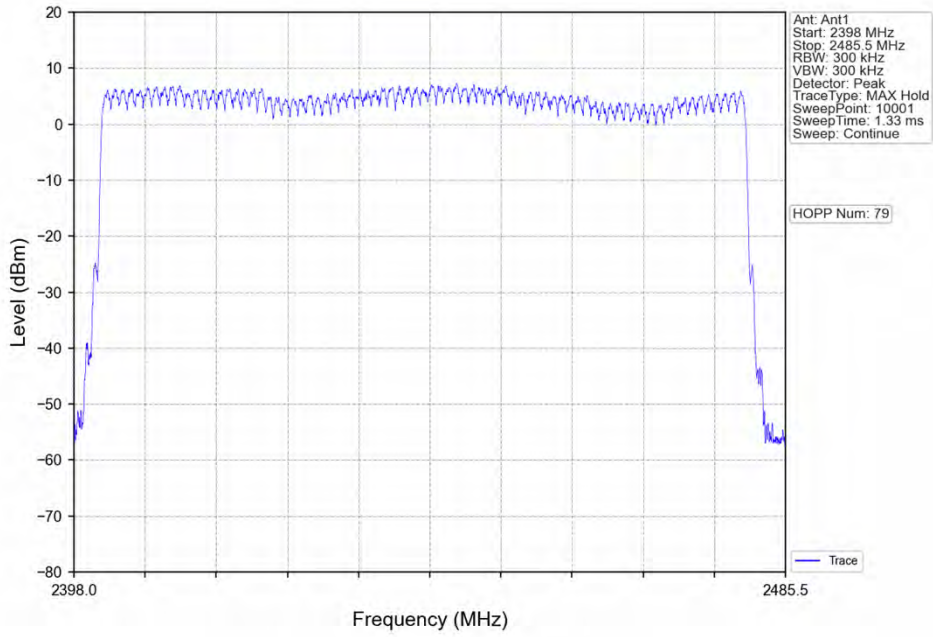
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



5. Time of Occupancy (Dwell Time)

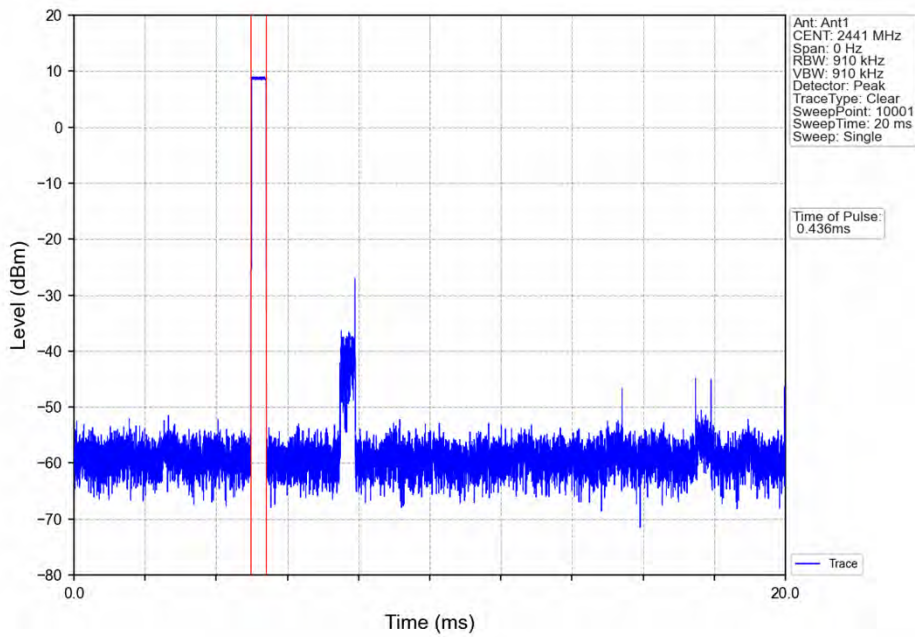
5.1 Ant1

5.1.1 Test Result

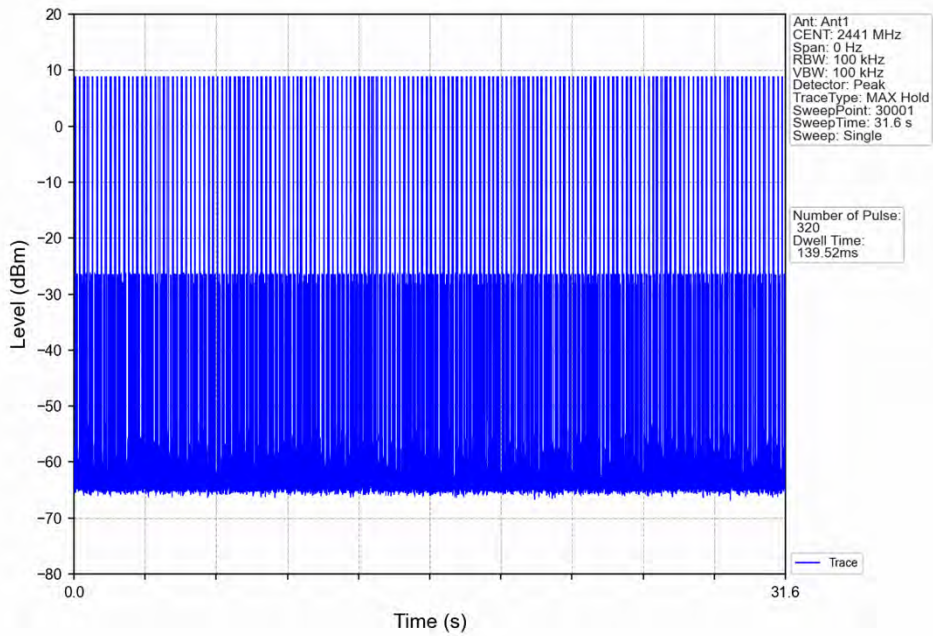
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.436	31.600	320	139.520	<=400	Pass
			DH3	1.690	31.600	161	272.090	<=400	Pass
			DH5	2.942	31.600	101	297.142	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.402	31.600	320	128.640	<=400	Pass
			2DH3	1.654	31.600	157	259.678	<=400	Pass
			2DH5	2.932	31.600	106	310.792	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.428	31.600	318	136.104	<=400	Pass
			3DH3	1.650	31.600	162	267.300	<=400	Pass
			3DH5	2.930	31.600	104	304.720	<=400	Pass

5.1.2 Test Graph

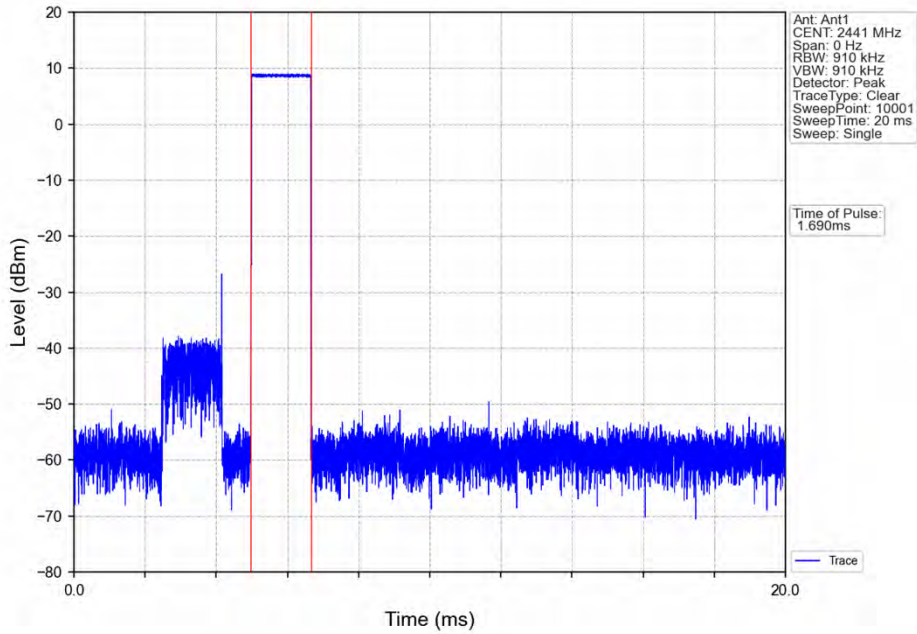
GFSK_DH1_HOPP_Ant1_NTNV



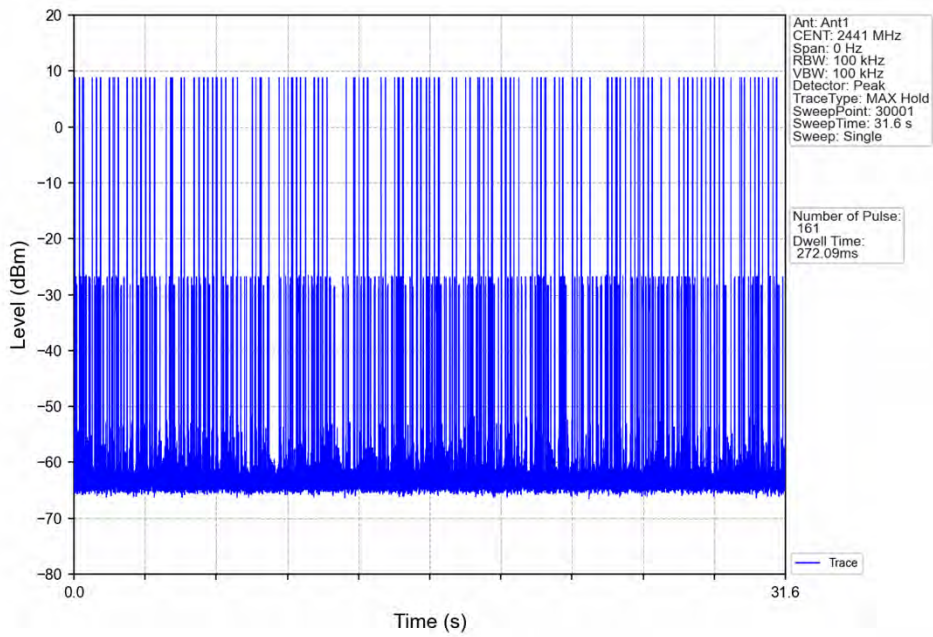
GFSK_DH1_HOPP_Ant1_NTNV



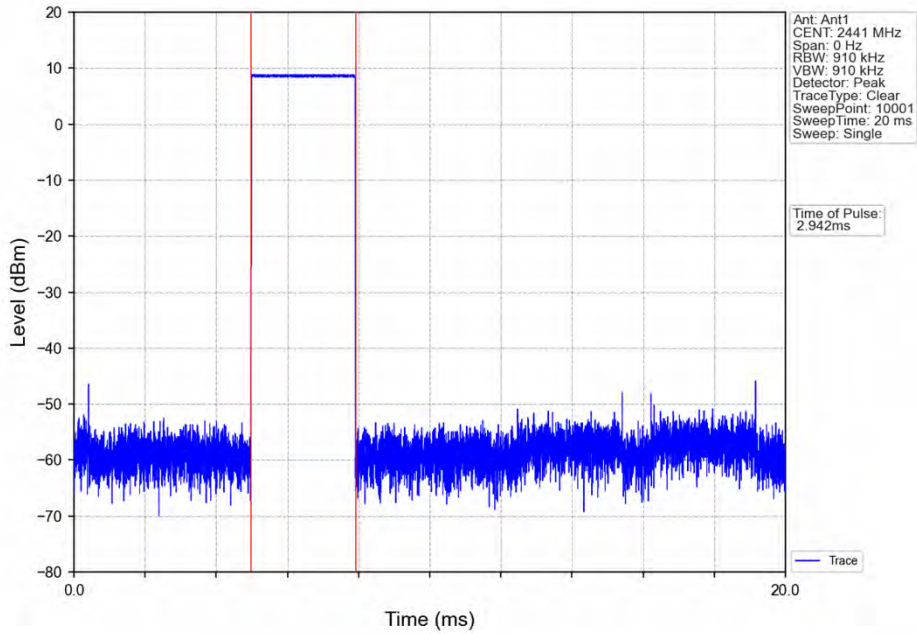
GFSK_DH3_HOPP_Ant1_NTNV



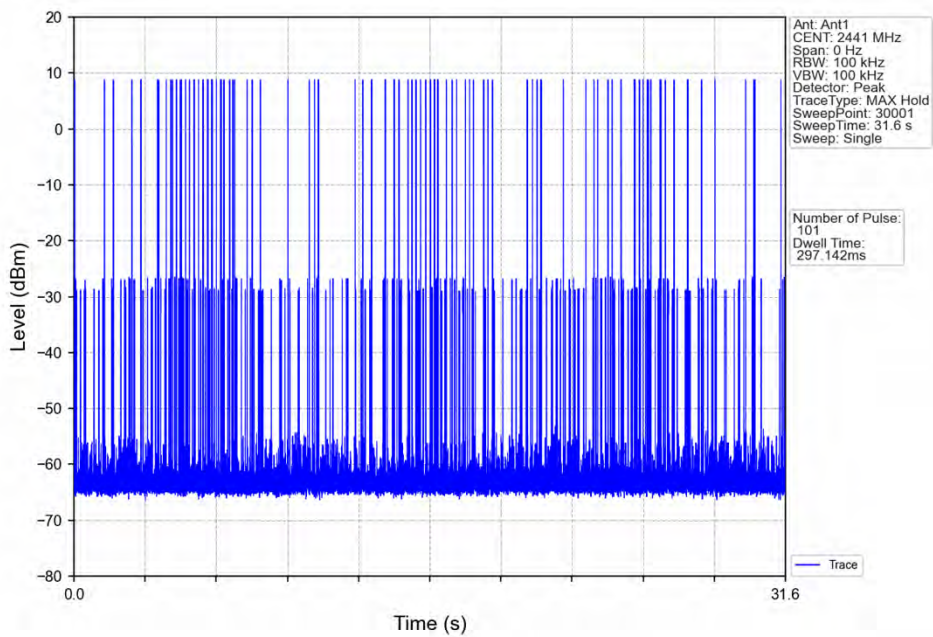
GFSK_DH3_HOPP_Ant1_NTNV



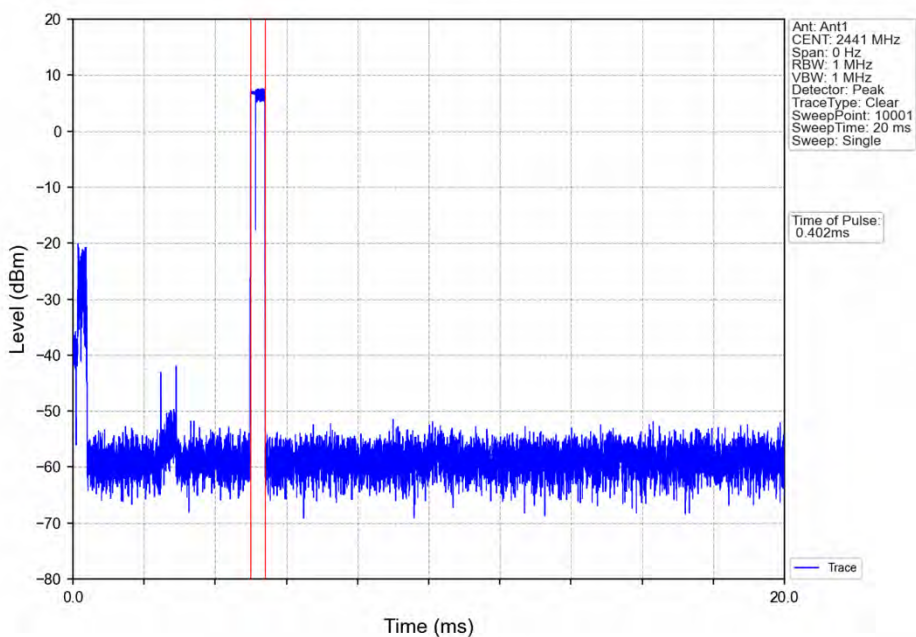
GFSK_DH5_HOPP_Ant1_NTNV



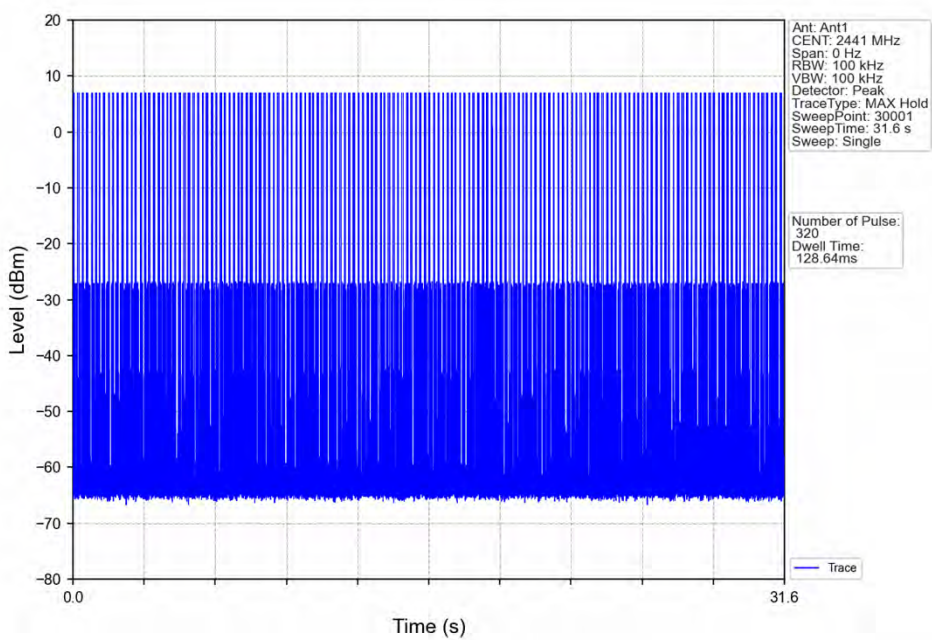
GFSK_DH5_HOPP_Ant1_NTNV



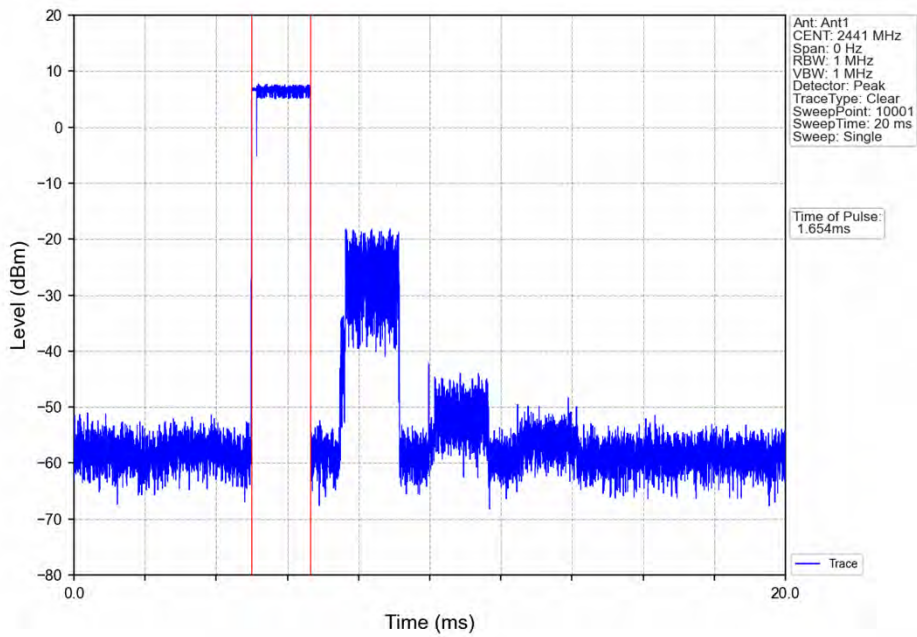
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



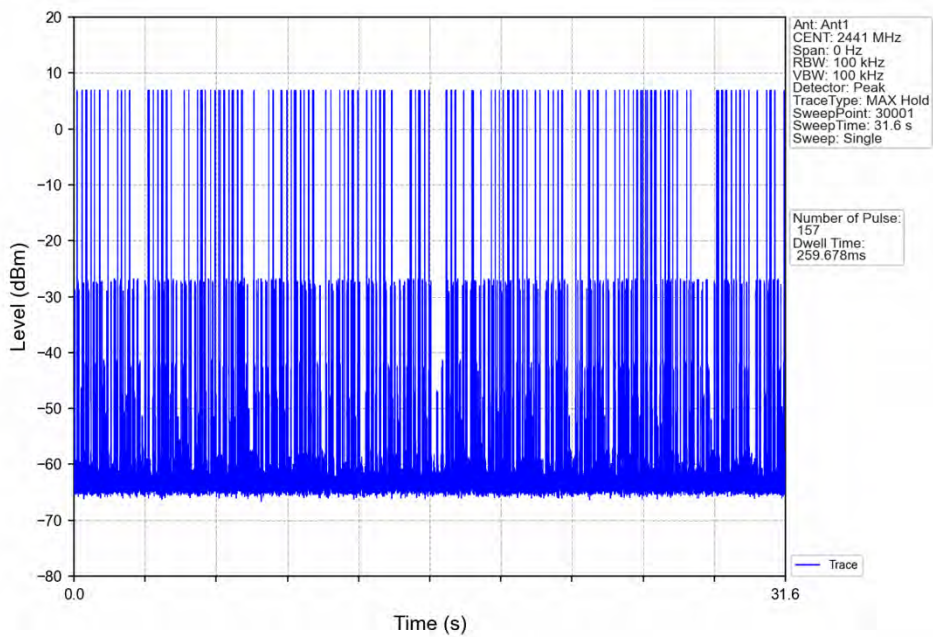
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



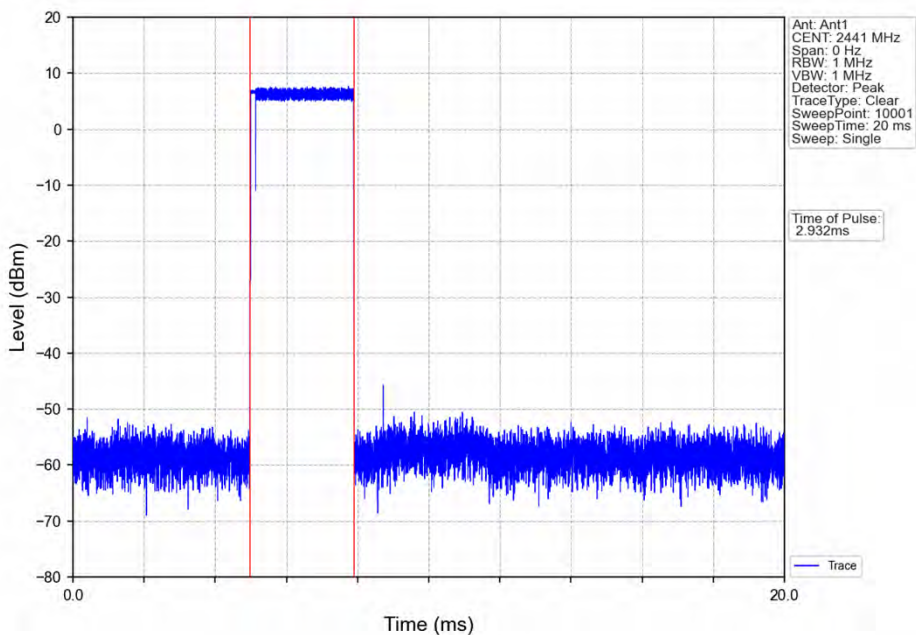
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



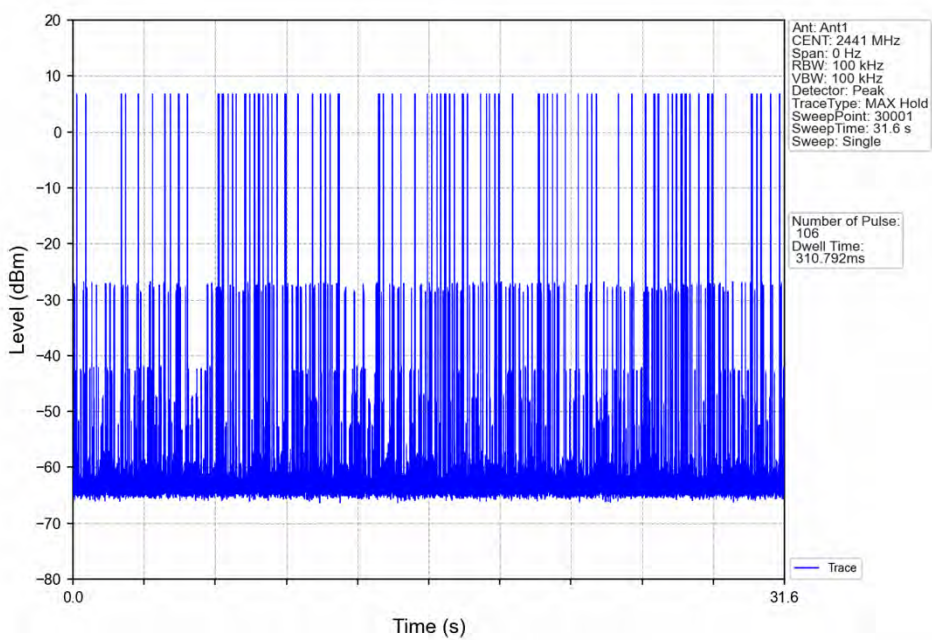
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



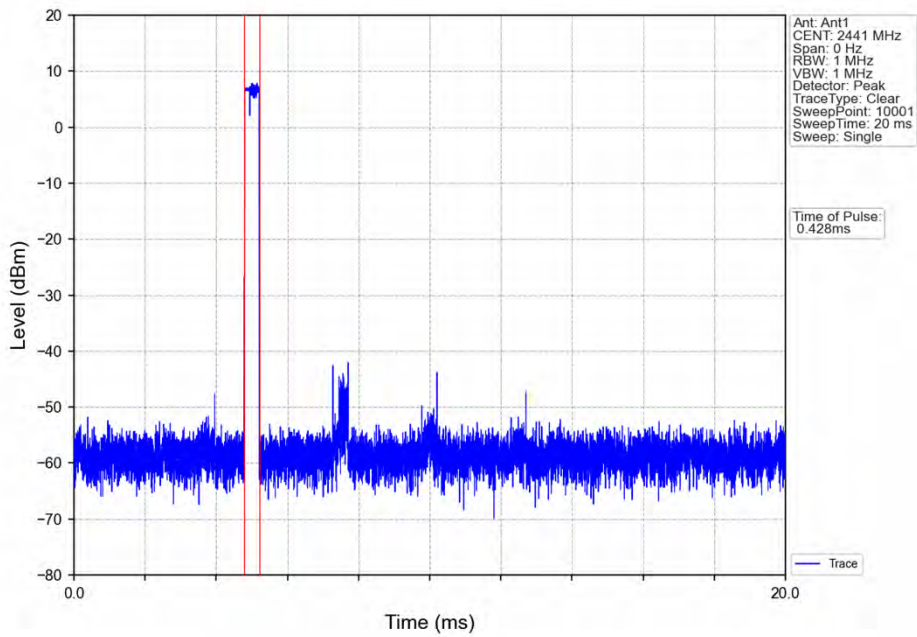
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



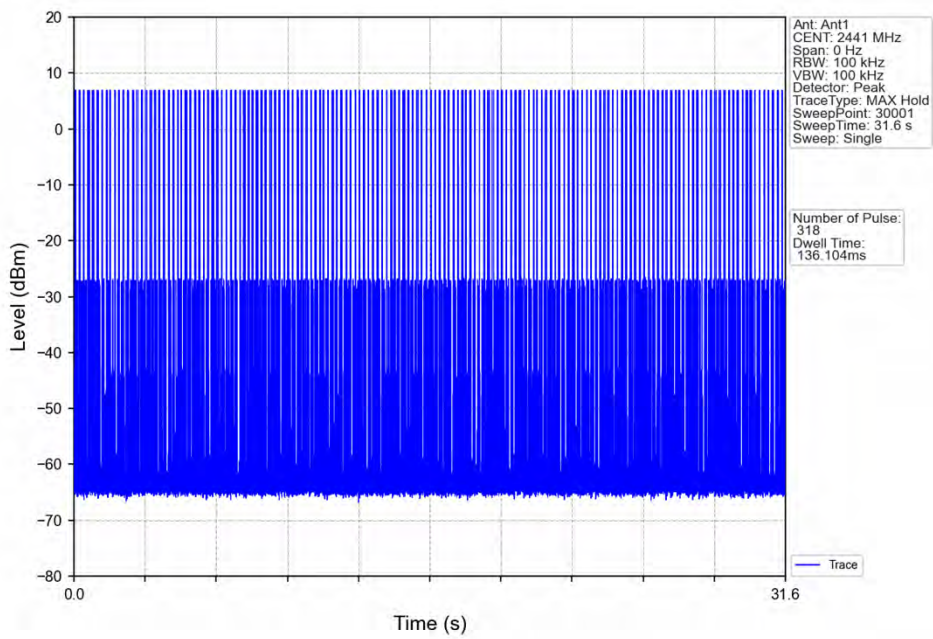
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



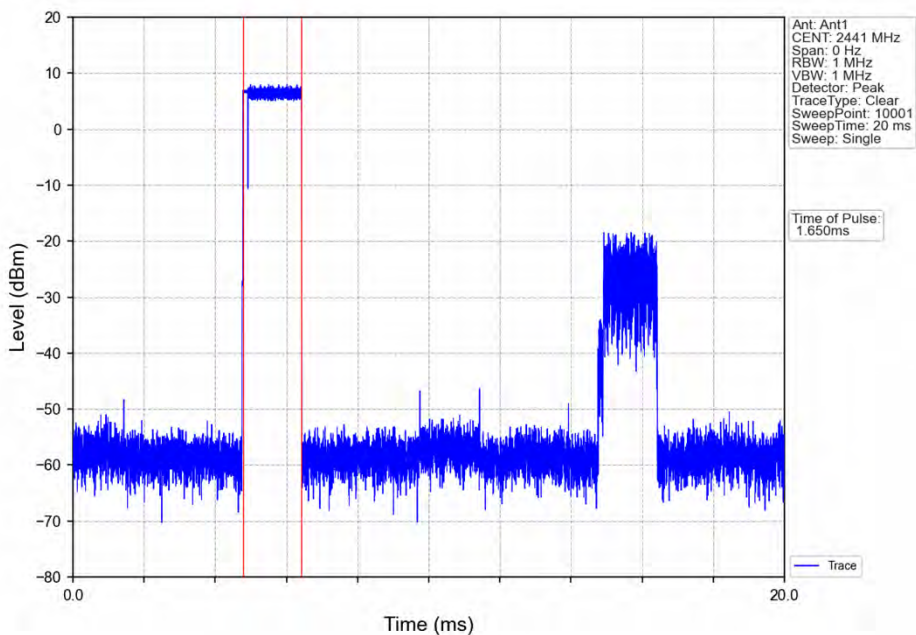
8DPSK_3DH1_HOPP_Ant1_NTNV



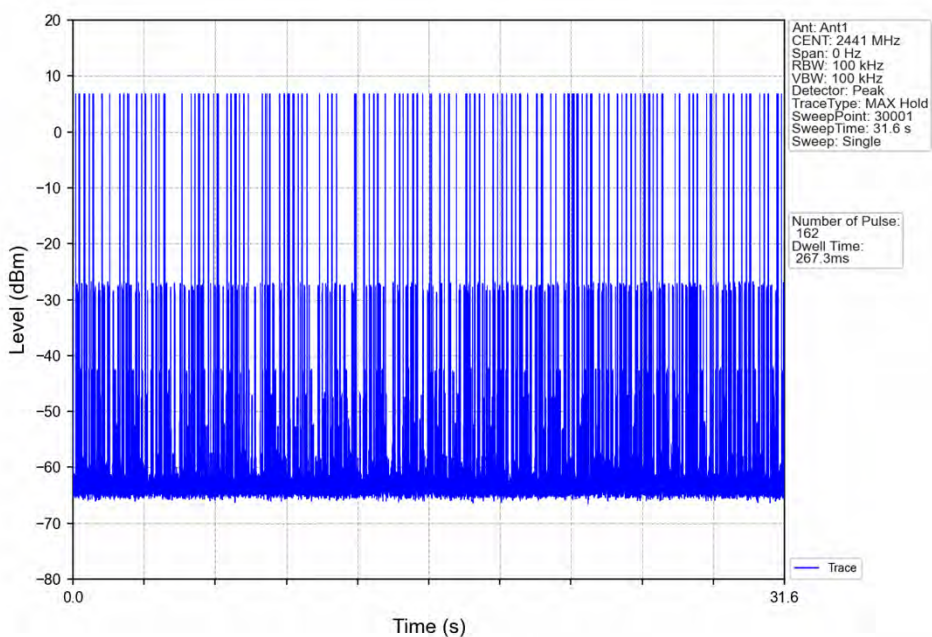
8DPSK_3DH1_HOPP_Ant1_NTNV



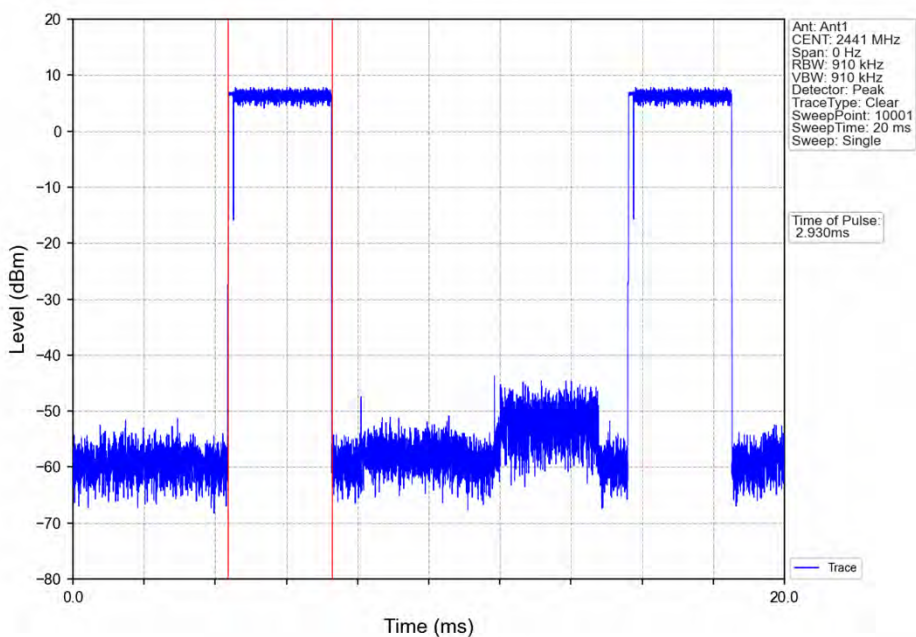
8DPSK_3DH3_HOPP_Ant1_NTNV



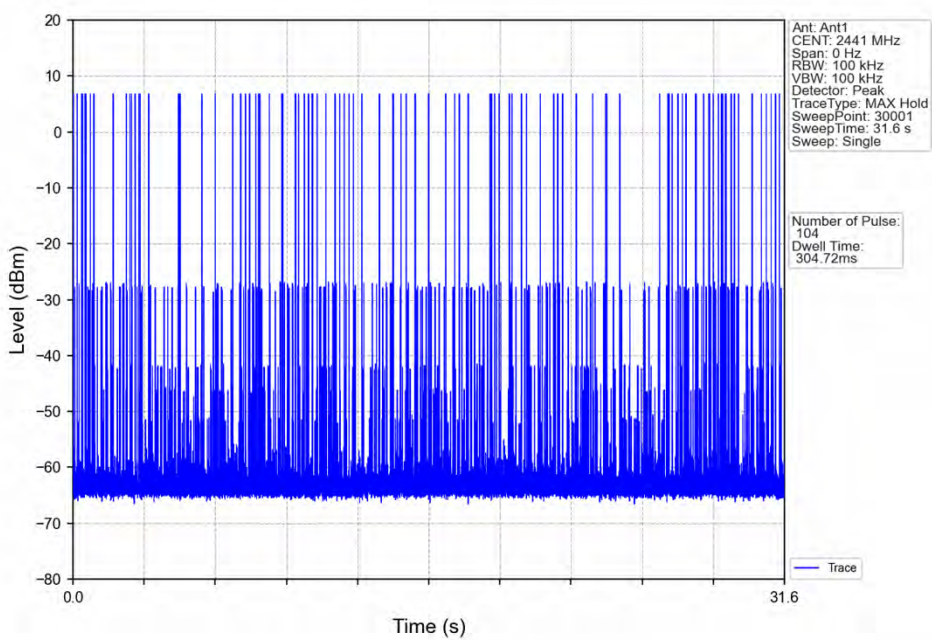
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Unwanted Emissions In Non-restricted Frequency Bands

6.1 Ref

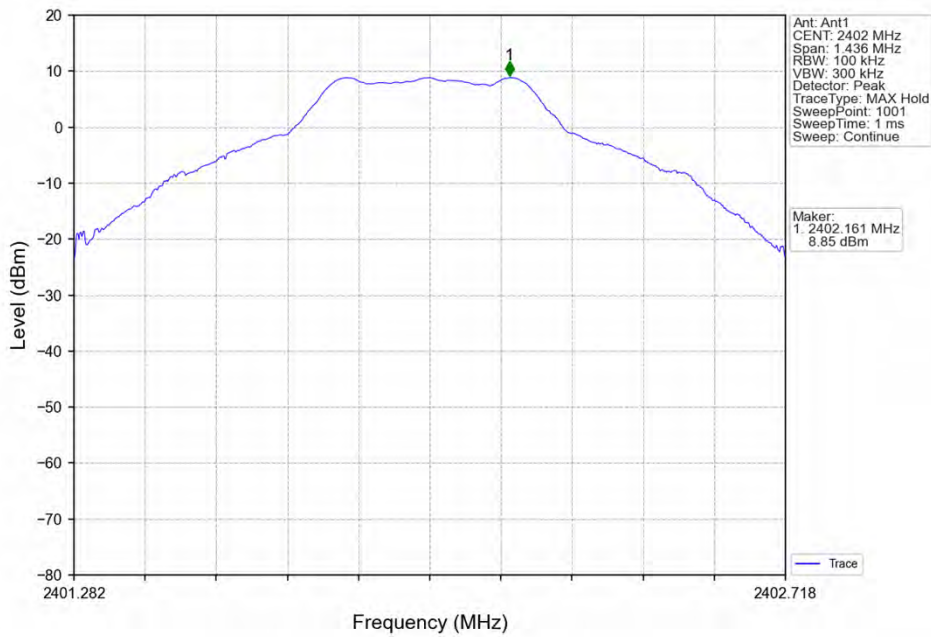
6.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	8.85
		2441	DH5	1	8.82
		2480	DH5	1	8.26
		2402	2DH5	1	6.07
Pi/4DQPSK	SISO	2441	2DH5	1	6.77
		2480	2DH5	1	5.79
		2402	3DH5	1	6.11
8DPSK	SISO	2441	3DH5	1	6.88
		2480	3DH5	1	5.73

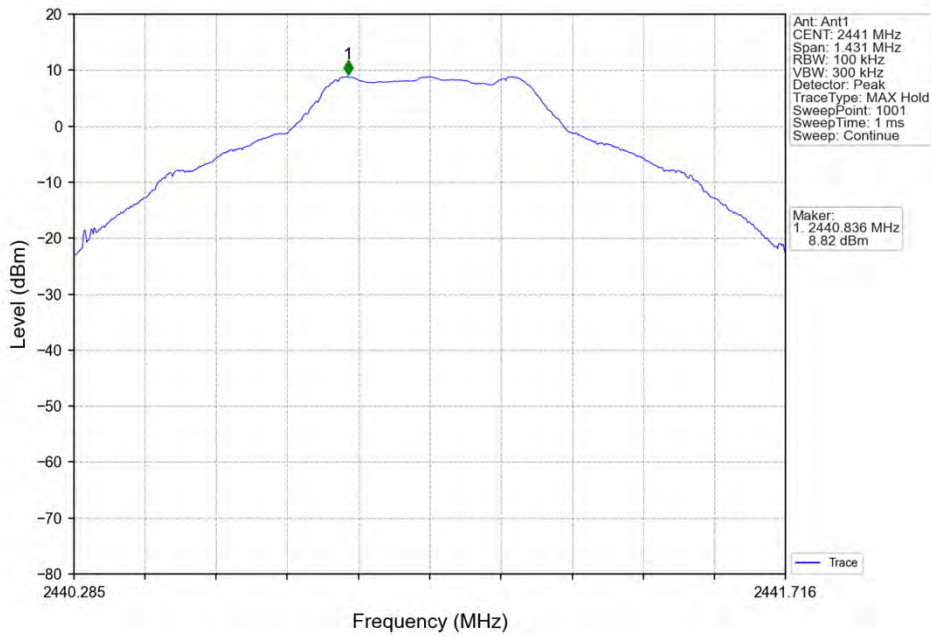
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

6.1.2 Test Graph

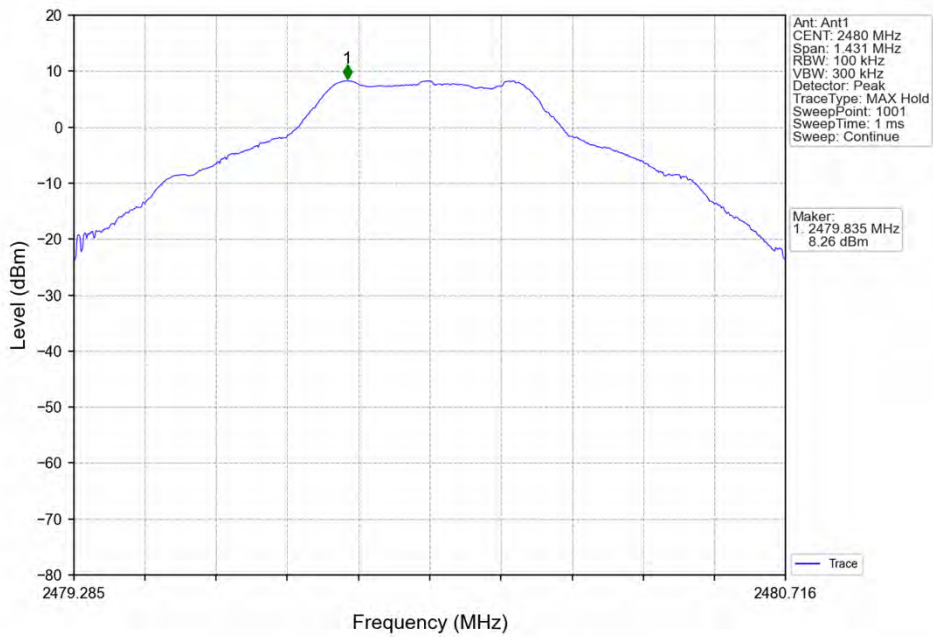
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



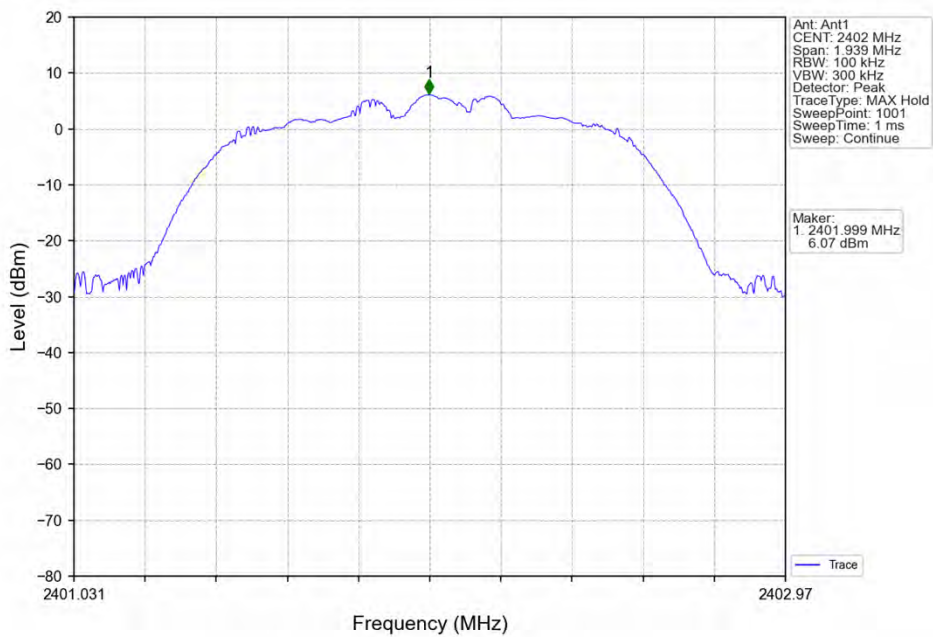
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



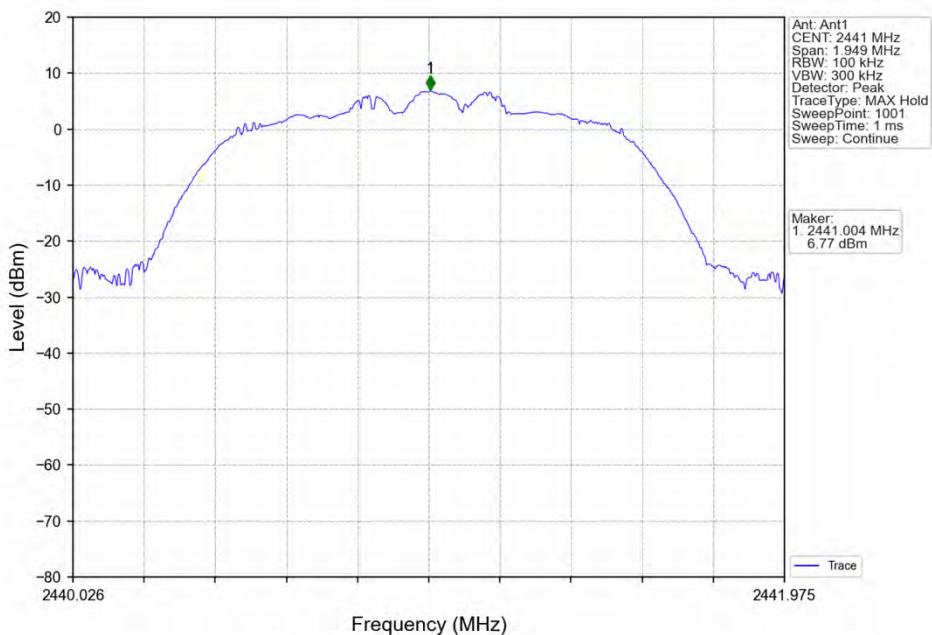
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



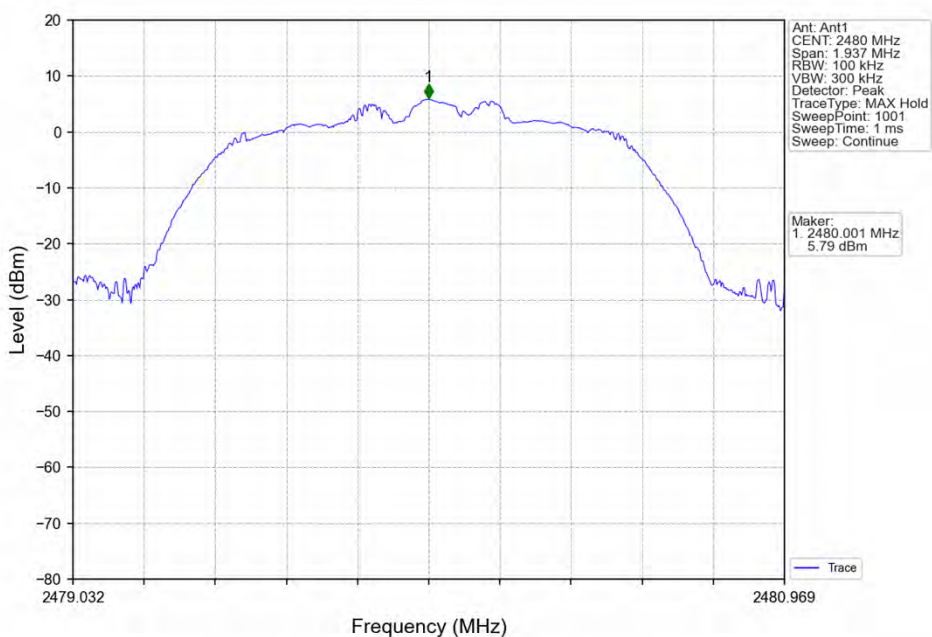
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



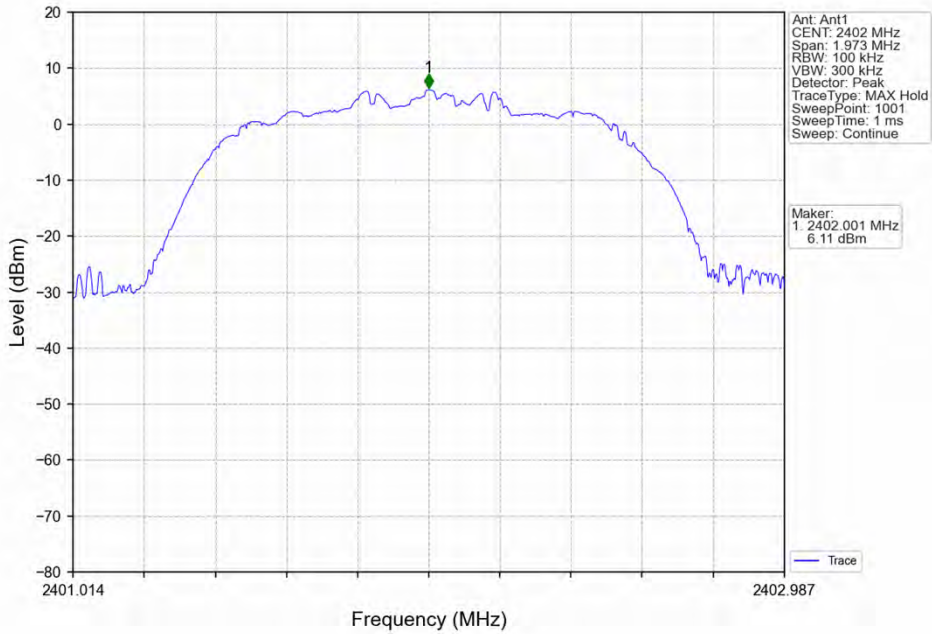
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



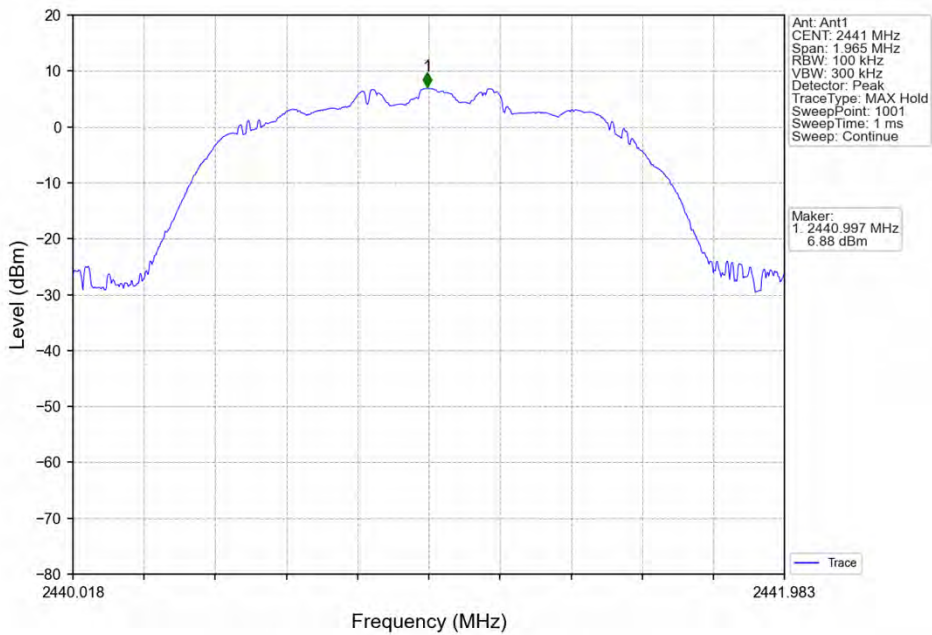
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



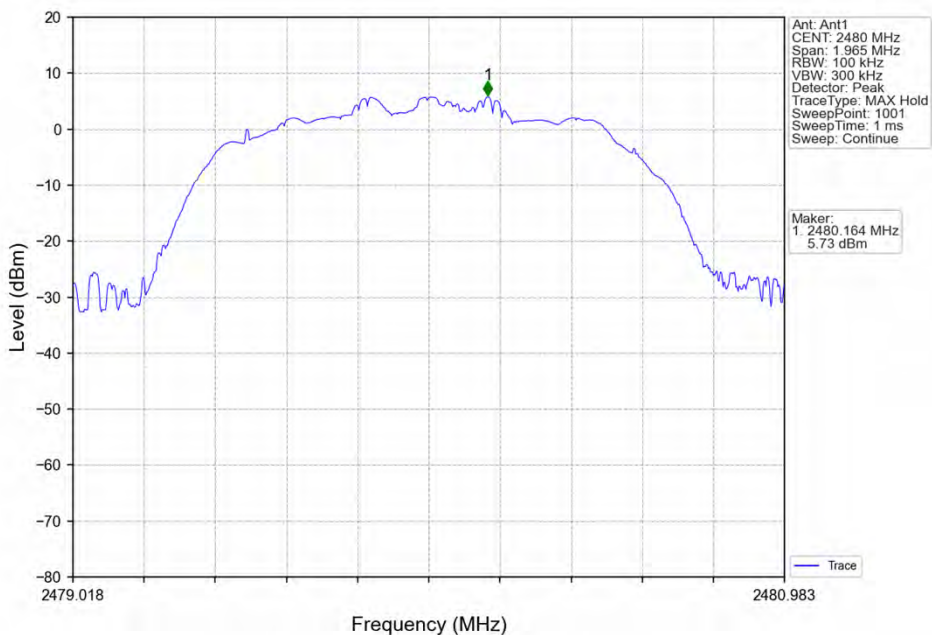
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



6.2 CSE

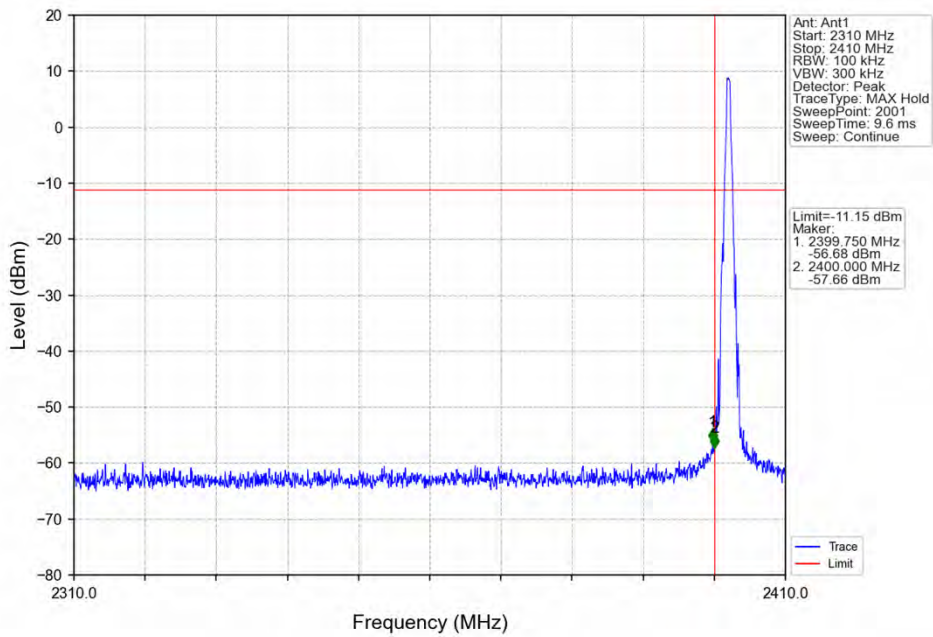
6.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	8.85	-11.15	Pass
		2441	DH5	1	8.85	-11.15	Pass
		2480	DH5	1	8.85	-11.15	Pass
		HOPP	DH5	1	8.85	-11.15	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	6.77	-13.23	Pass
		2441	2DH5	1	6.77	-13.23	Pass
		2480	2DH5	1	6.77	-13.23	Pass
		HOPP	2DH5	1	6.77	-13.23	Pass
8DPSK	SISO	2402	3DH5	1	6.88	-13.12	Pass
		2441	3DH5	1	6.88	-13.12	Pass
		2480	3DH5	1	6.88	-13.12	Pass
		HOPP	3DH5	1	6.88	-13.12	Pass

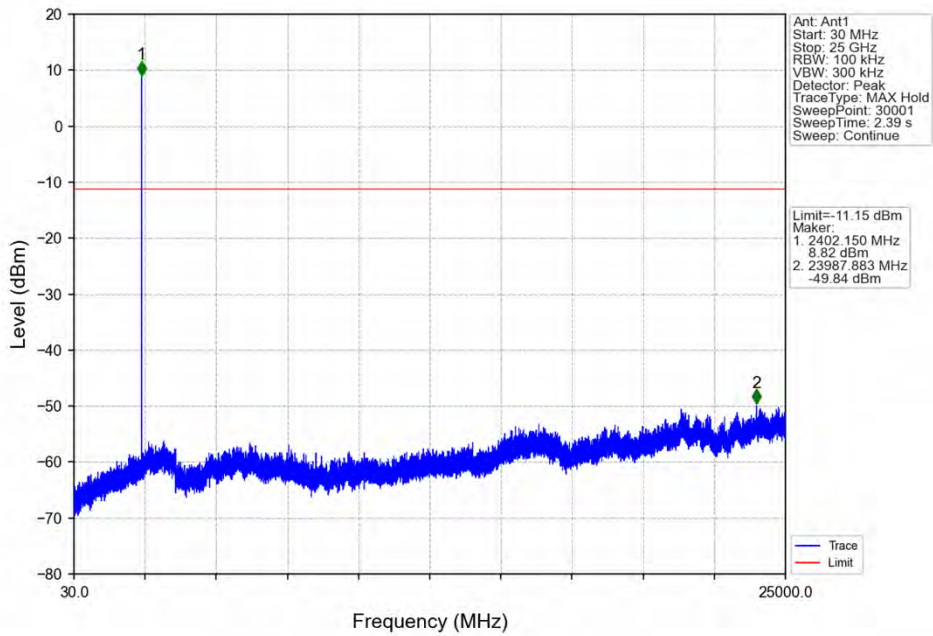
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

6.2.2 Test Graph

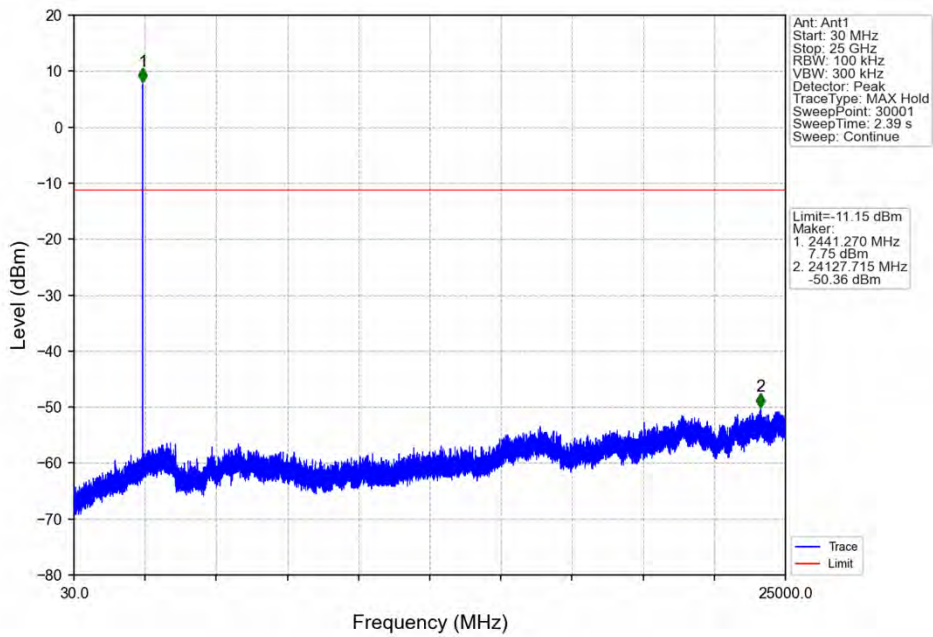
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



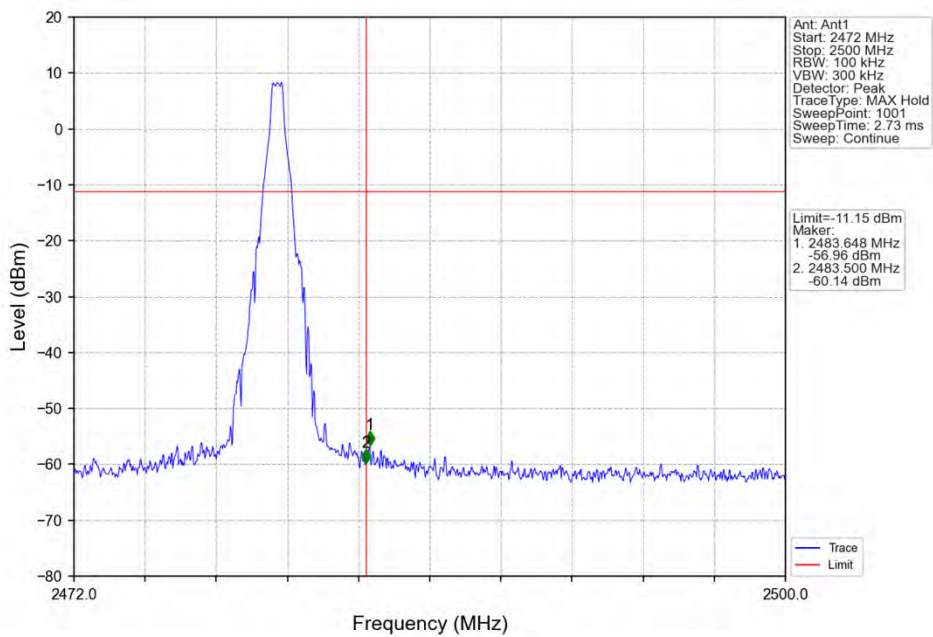
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



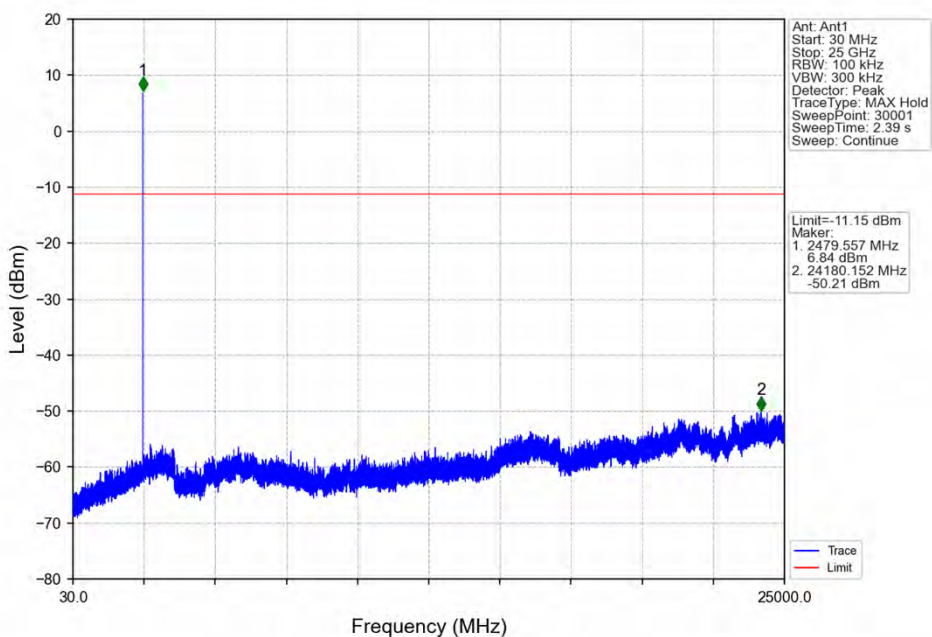
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



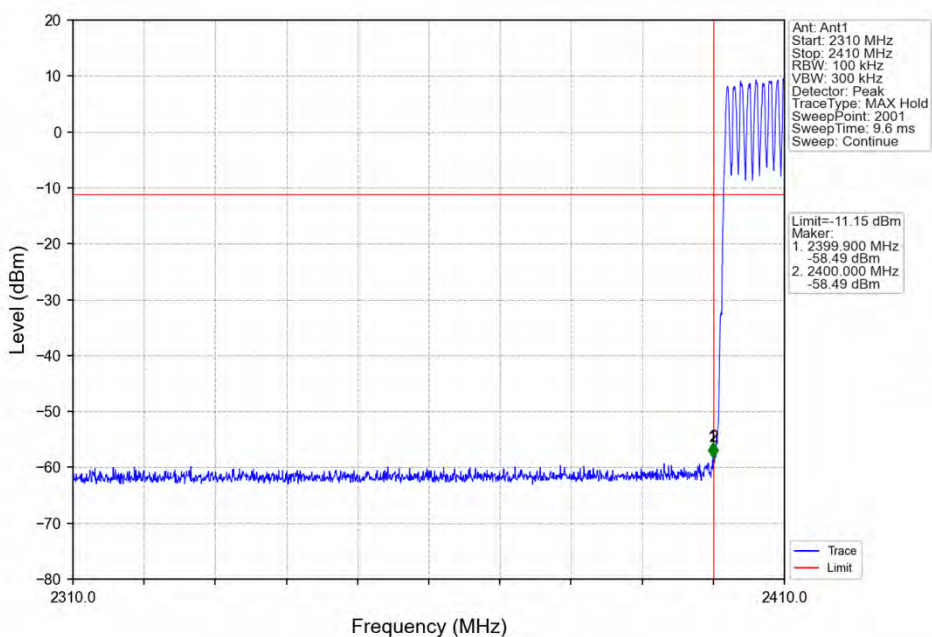
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



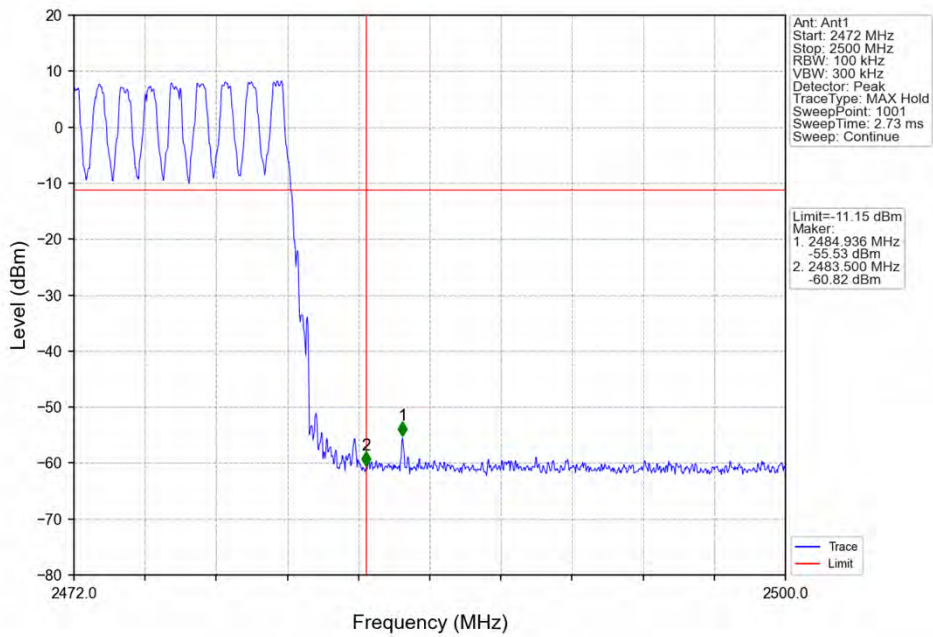
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



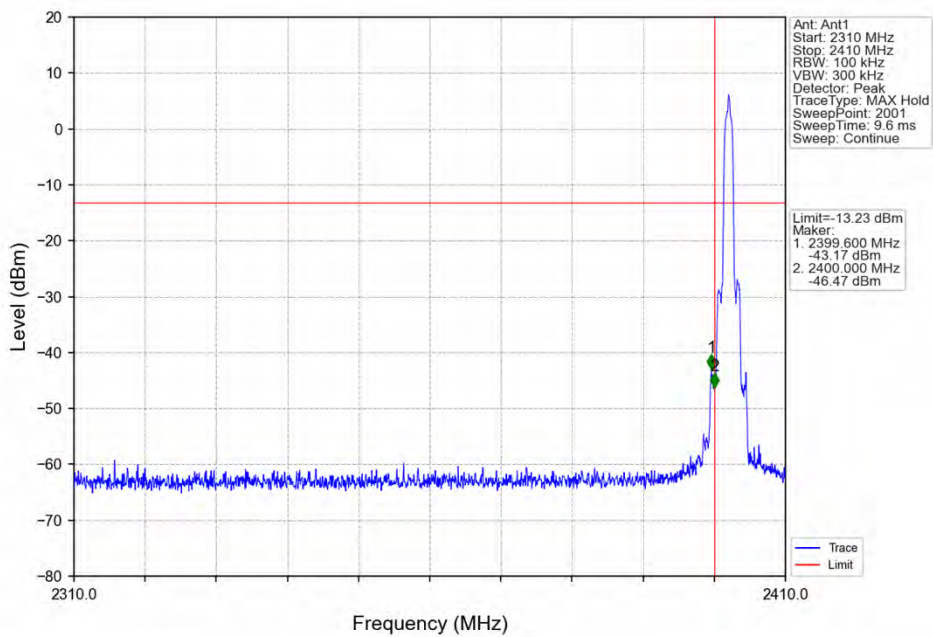
GFSK_DH5_HOPP_2410MHz_Ant1_NTNV



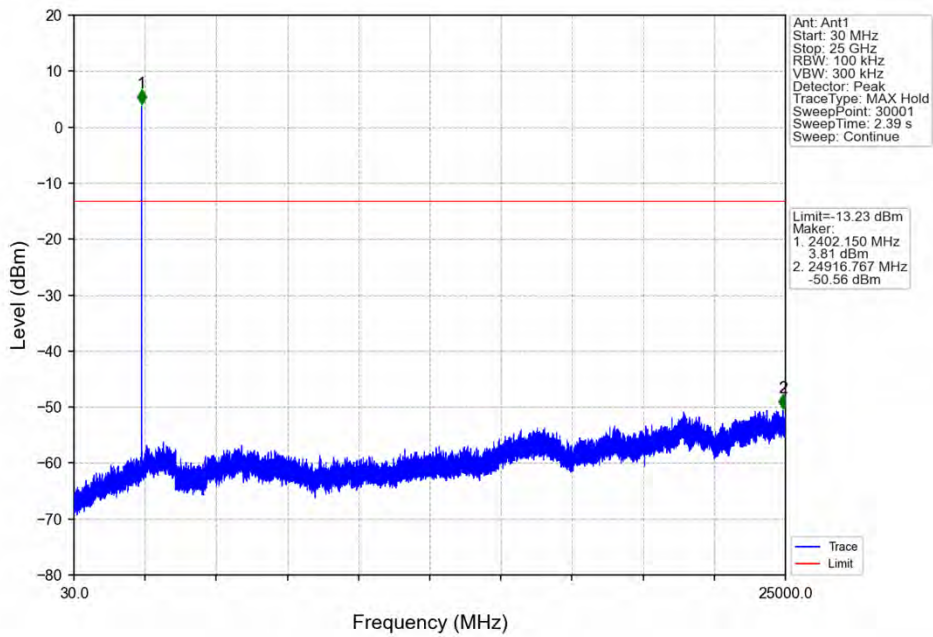
GFSK_DH5_HOPP_Ant1_NTNV



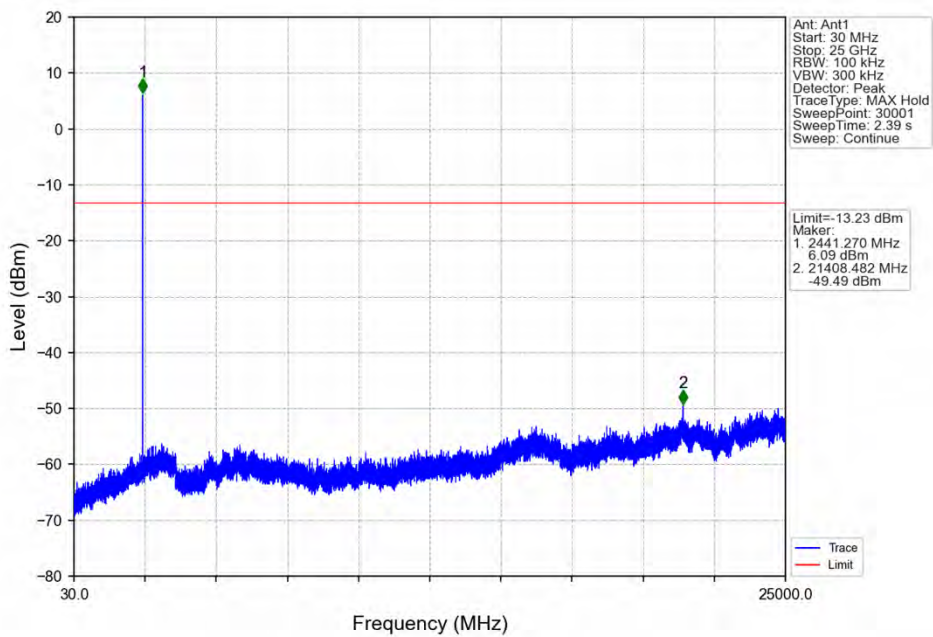
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



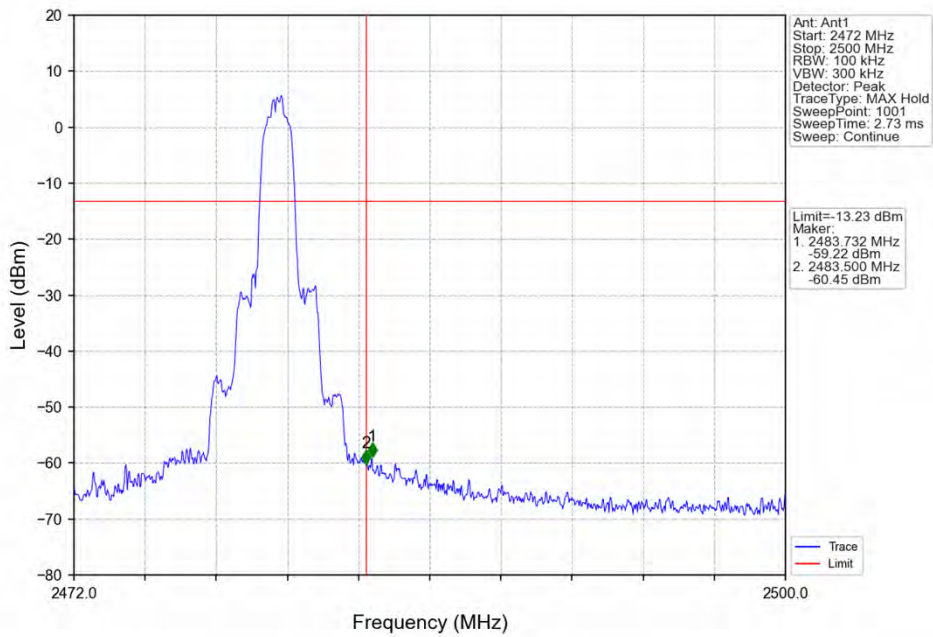
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



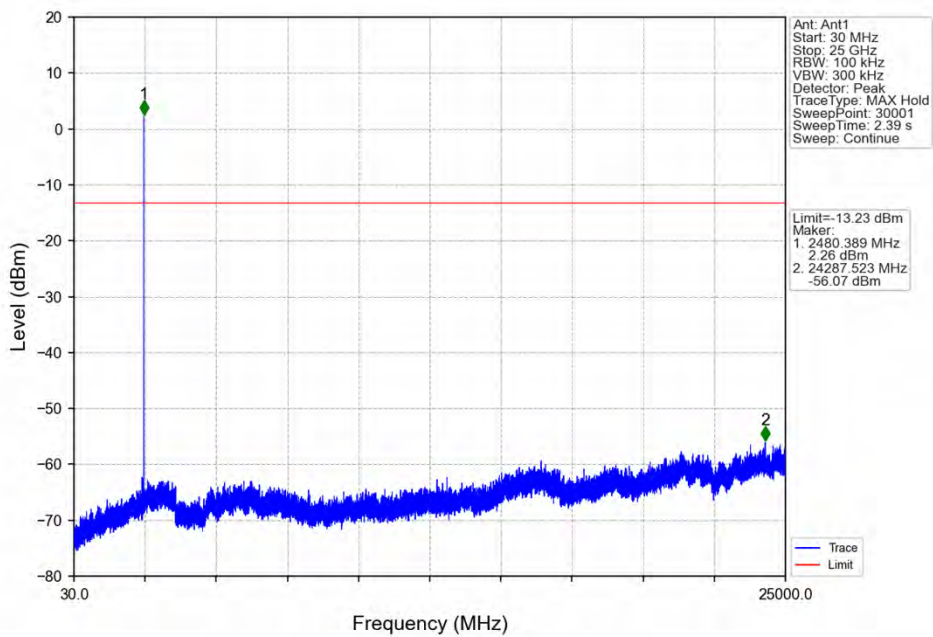
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



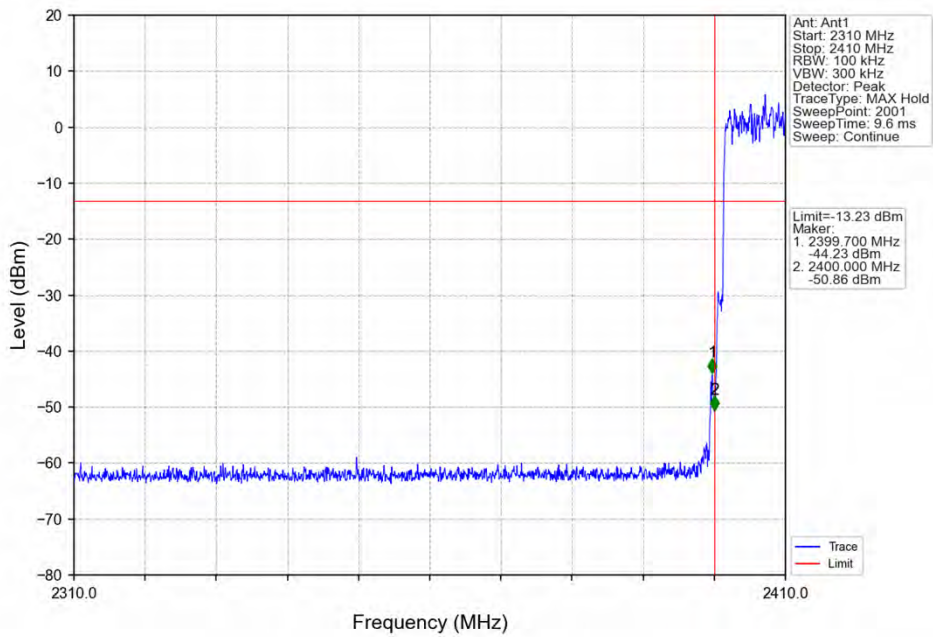
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



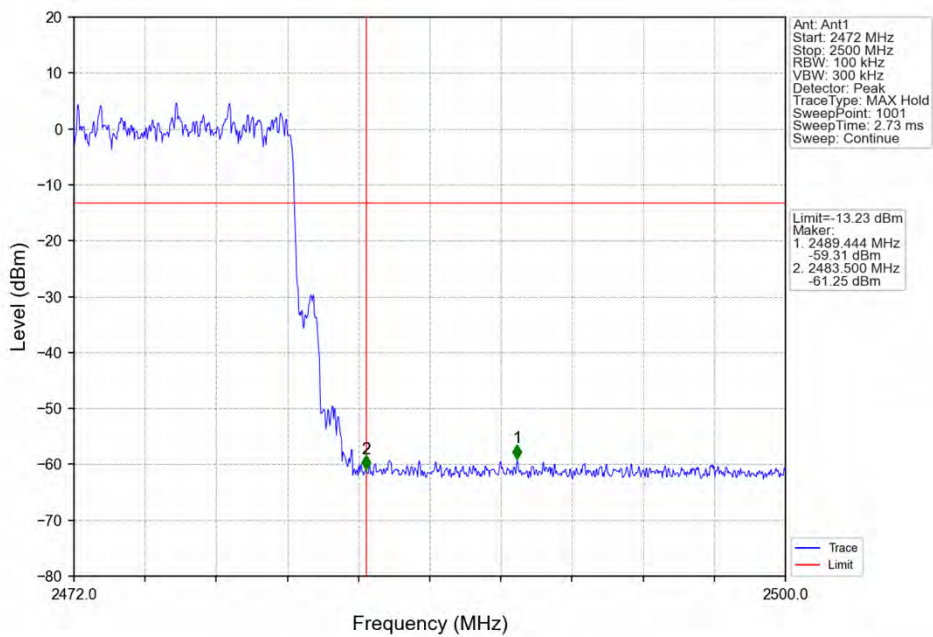
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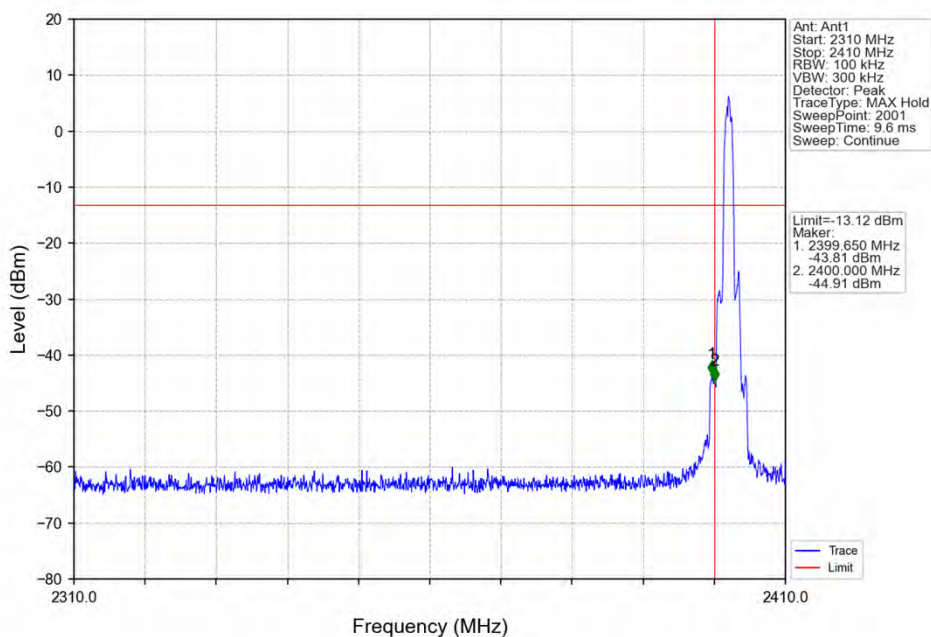
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



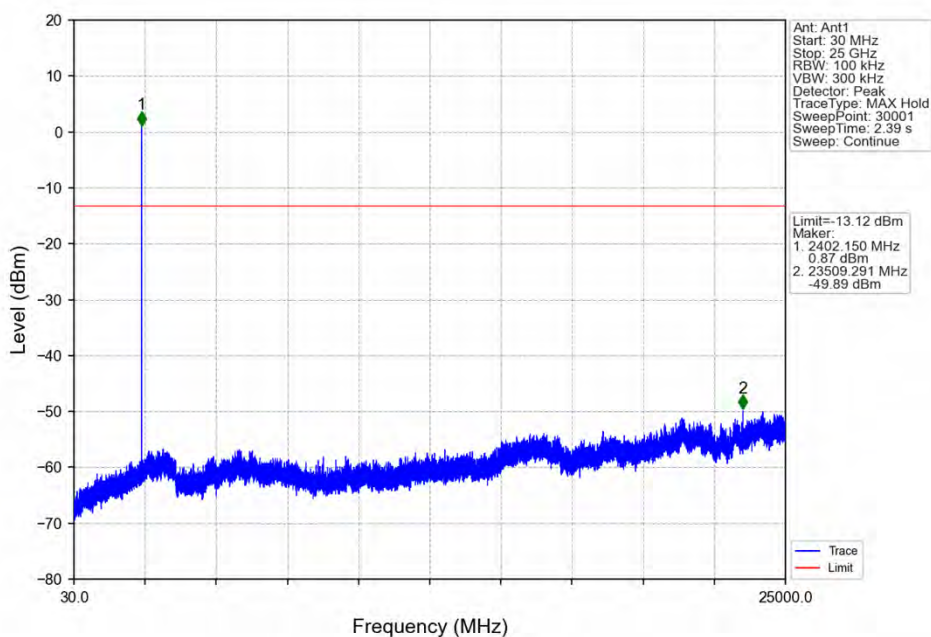
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



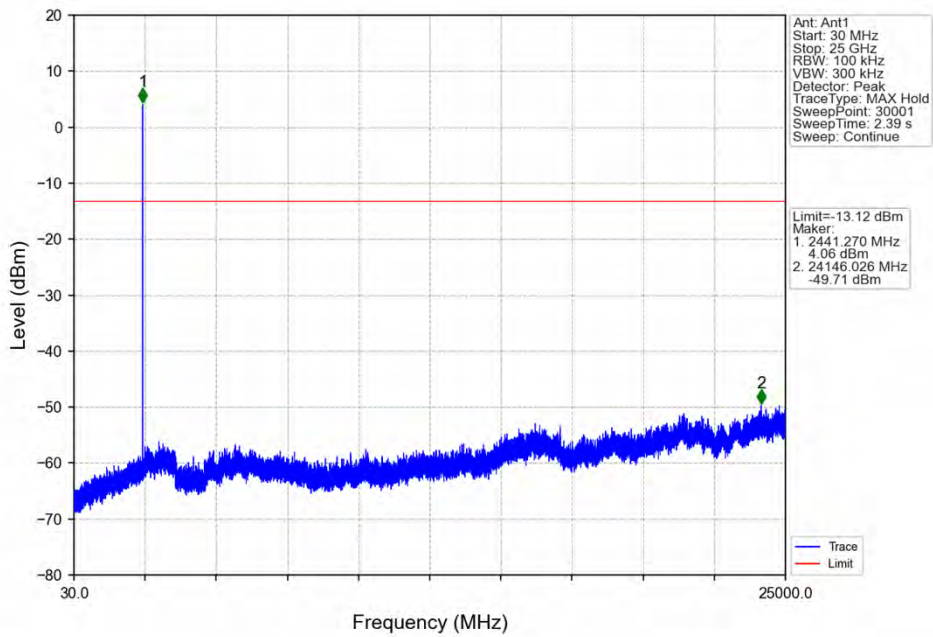
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



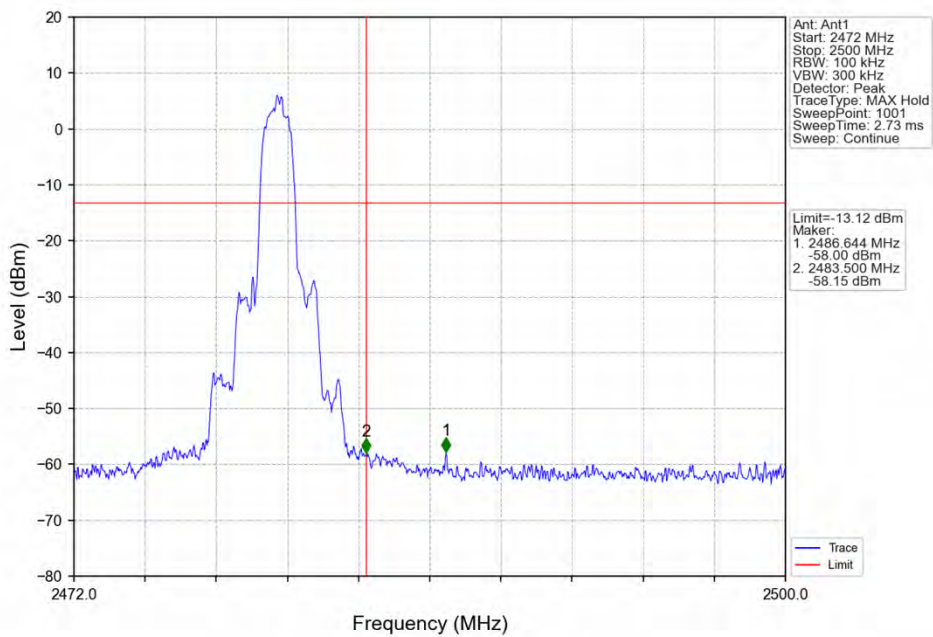
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



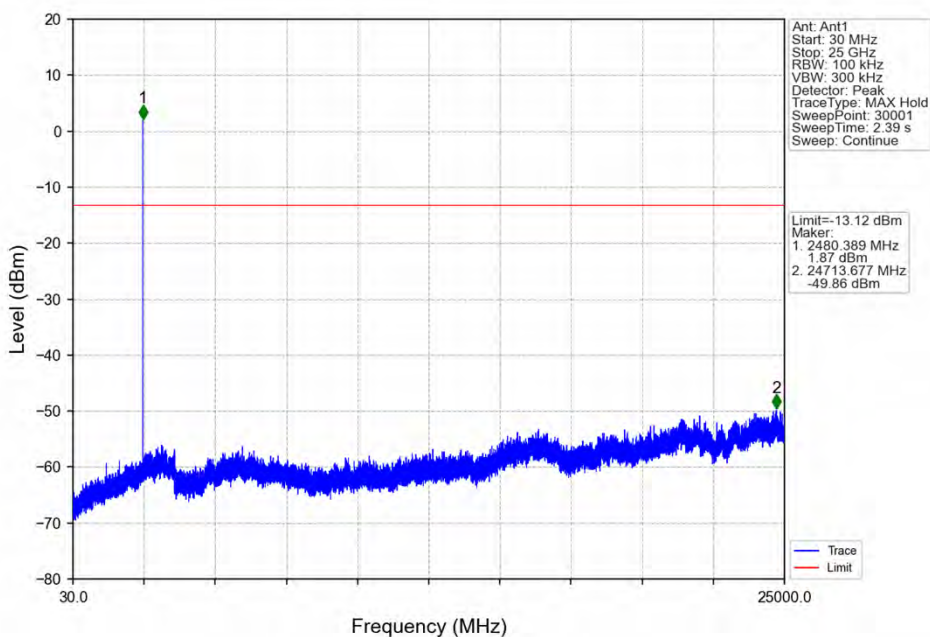
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



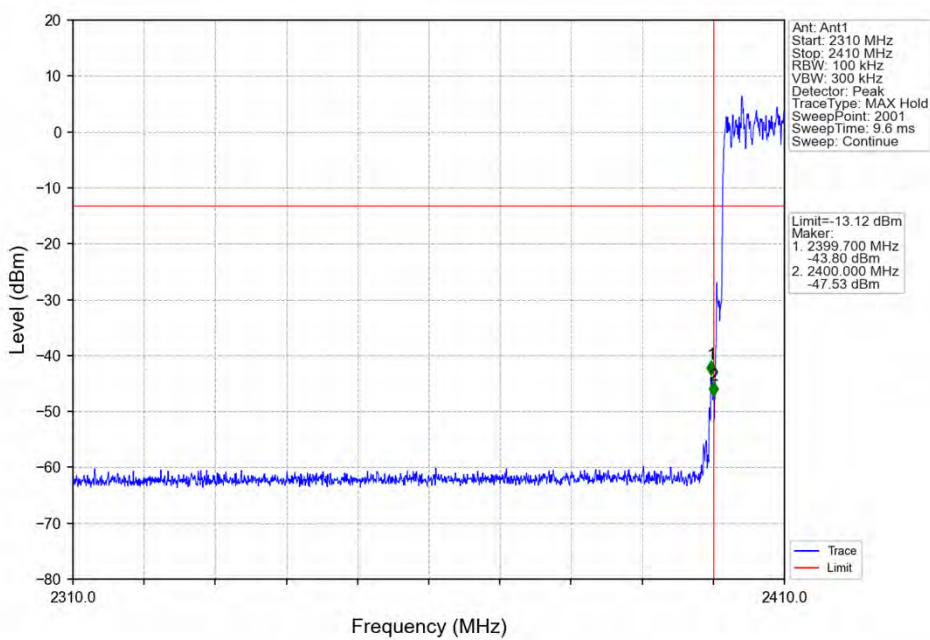
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



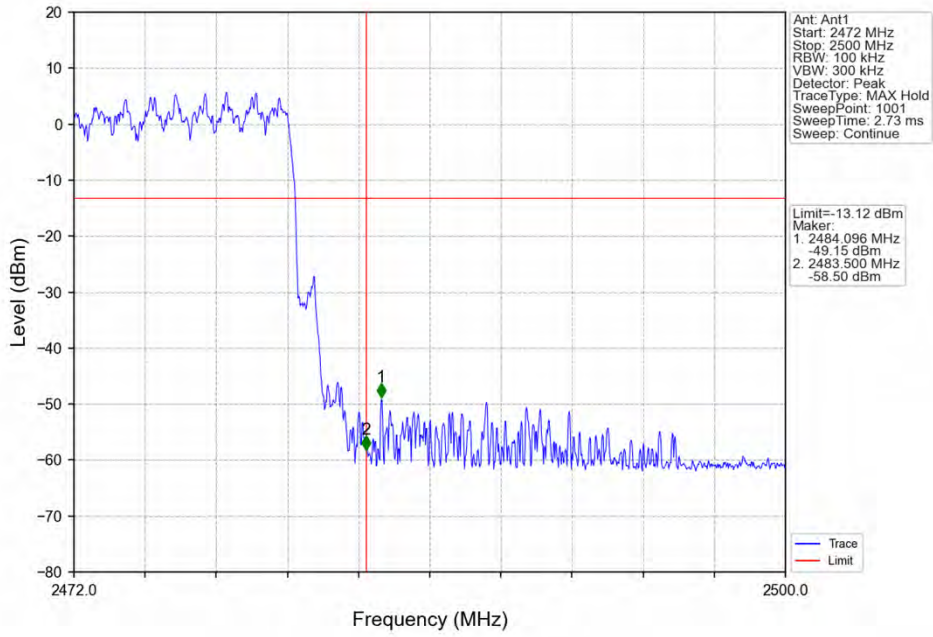
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



7. Form731

7.1 Form731

7.1.1 Test Result

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0080	9.02

(END OF REPORT)