

TEST REPORT

Application No.: KSCR2505001155AT
FCC ID: 2AW2R-RV101203
Applicant: Hangzhou Lingban Technology Co., Ltd.
Address of Applicant: Room 101, Building 8, No.1288, Liangmu Road, Cangqian Street, Yuhang District, Hangzhou, Zhejiang, China
Manufacturer: Hangzhou Lingban Technology Co., Ltd.
Address of Manufacturer: Room 101, Building 8, No.1288, Liangmu Road, Cangqian Street, Yuhang District, Hangzhou, Zhejiang, China
Factory: Lens Technology (XiangTan) Co., Ltd.
Address of Factory: NO.16 Baishi West Road, Xiangtan Economic and Technological Development Zone, Xiangtan City, Hunan Province, P.R. China
Equipment Under Test (EUT):
EUT Name: Rokid Ai Glasses/Rokid Glasses
Model No.: RV203, RV101, RV102 ♣
♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: Rokid
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2025-05-30
Date of Test: 2025-06-24 to 2025-07-30
Date of Issue: 2025-08-01

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

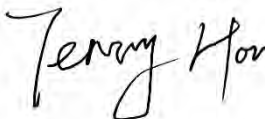
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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



Revision Record			
Version	Description	Date	Remark
00	Original	2025-08-01	/

Authorized for issue by:			
Tested By			
		Eric_Liu/Project Engineer	
Approved By			
		Terry Hou /Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement					
Item	Standard	Method	FCC Requirement	Result	Test Lab
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass	A
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence		N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass	A

N/A: Not applicable

Radio Spectrum Matter Part					
Item	Standard	Method	FCC Requirement	Result	Test Lab
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2020) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass	A
20dB Bandwidth		ANSI C63.10 (2020) Section 6.9.2	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass	A
Carrier Frequencies Separation		ANSI C63.10 (2020) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass	A
Hopping Channel Number		ANSI C63.10 (2020) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass	A
Dwell Time		ANSI C63.10 (2020) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass	A
Conducted Band Edges Measurement		ANSI C63.10 (2020) Section 7.8.7.2	47 CFR Part 15, Subpart C 15.247(d)	Pass	A
Conducted Spurious Emissions		ANSI C63.10 (2020) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(d)	Pass	A
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2020) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B
Radiated Spurious Emissions		ANSI C63.10 (2020) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B

Note: There are series models mentioned in this report, and they are the identical in electrical and electronic characters. Only the model RV203 was tested since their differences were the model number and lens.

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4 General Information

4.1 Details of E.U.T.

Test Voltage:	Pre-test AC 120V/50-60Hz&AC 240V/50-60Hz then choose the AC 120/60Hz as worst case
Power supply:	DC 3.92V by battery
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum (FHSS)
Antenna Type:	Ceramic Chip Loop Antenna
Antenna Gain:	0.41dBi (Provided by the manufacturer)

4.2 Power level setting using in test

Channel	DH	2DH	3DH
	Ant 1	Ant 1	Ant 1
00	8	8	8
39	8	8	8
78	8	8	8

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Notebook	LENOVO	K27	EB24537645

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%
Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

4.5 Test Location

All tests were performed at:

Test Lab: A

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

Test Lab: B

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu)
Pilot Free Trade Zone

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.6 Test Facility

Test Lab: A

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

- **VCCI**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

Test Lab: B

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

- **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Test Lab: A

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESCI	KS301196	08/01/2024	07/31/2025
2	LISN	R&S	ENV216	KS301197	01/15/2025	01/14/2026
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/15/2025	01/14/2026
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	12/05/2024	12/04/2025
5	CE test Cable	Thermax	/	CZ301102	01/14/2025	01/13/2026
6	Test Software	Farad	EZ-EMC	/	N.C.R	N.C.R
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	08/01/2024	07/31/2025
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	08/01/2024	07/31/2025
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/15/2025	01/14/2026
4	Signal Generator	R&S	SMBV100B	KSEM032	02/19/2025	02/18/2026
5	Signal Generator	R&S	SMW200A	KSEM020-1	08/02/2024	08/01/2025
6	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/01/2024	07/31/2025
7	Signal Generator	Agilent	E8257C	KS301066	08/06/2024	08/05/2025
8	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/01/2024	07/31/2025
9	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	02/19/2025	02/18/2026
10	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	08/13/2024	08/12/2025
11	Switcher	TST	FY562	KUS2001M001-4	01/15/2025	01/14/2026
12	Conducted Test Cable	Thermax	RF01-RF04	CZ301111- CZ301120	01/14/2025	01/13/2026
13	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KSES104904	08/26/2024	08/25/2025
14	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	02/26/2025	02/25/2026
15	Software	BST	TST-PASS	/	NCR	NCR

Test Lab: B

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	6/3/2023	6/2/2026
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2/13/2025	2/12/2026
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/20/2025	1/19/2026
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-07	11/21/2024	11/20/2025
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9168	SUWI-01-11-04	8/22/2024	8/21/2026
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	5/7/2025	5/6/2027
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	5/7/2025	5/6/2027
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	5/7/2025	5/6/2027
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	1/15/2025	1/14/2026
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	1/15/2025	1/14/2026
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	1/20/2025	1/19/2026
Measurement Software	Tonscend	JS32-RE	SUWI-02-09-04	NCR	NCR
		V4.0.0.0			
Measurement Software	Tonscend	JS32-RSE	SUWI-02-09-06	NCR	NCR
		4.0.0.1			
Router	PLANET	FSD-803	SUWI-03-14-01	NCR	NCR

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Ceramic Chip Loop Antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 0.41dBi.

Antenna location: Refer to internal photo.

6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

> Length of pseudo-random sequence: $2^9 - 1 = 511$ bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2020) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

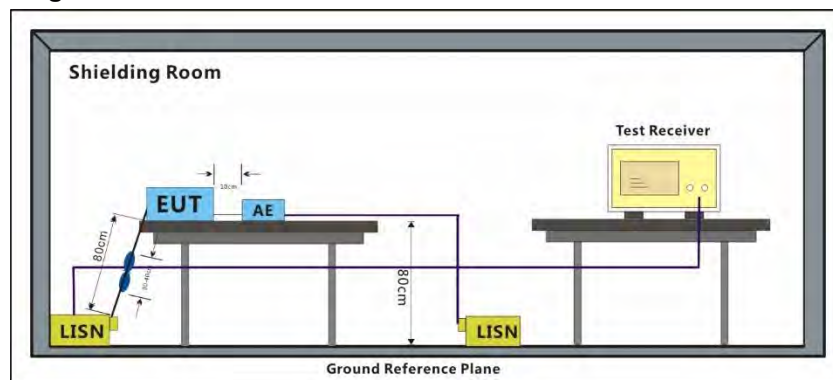
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



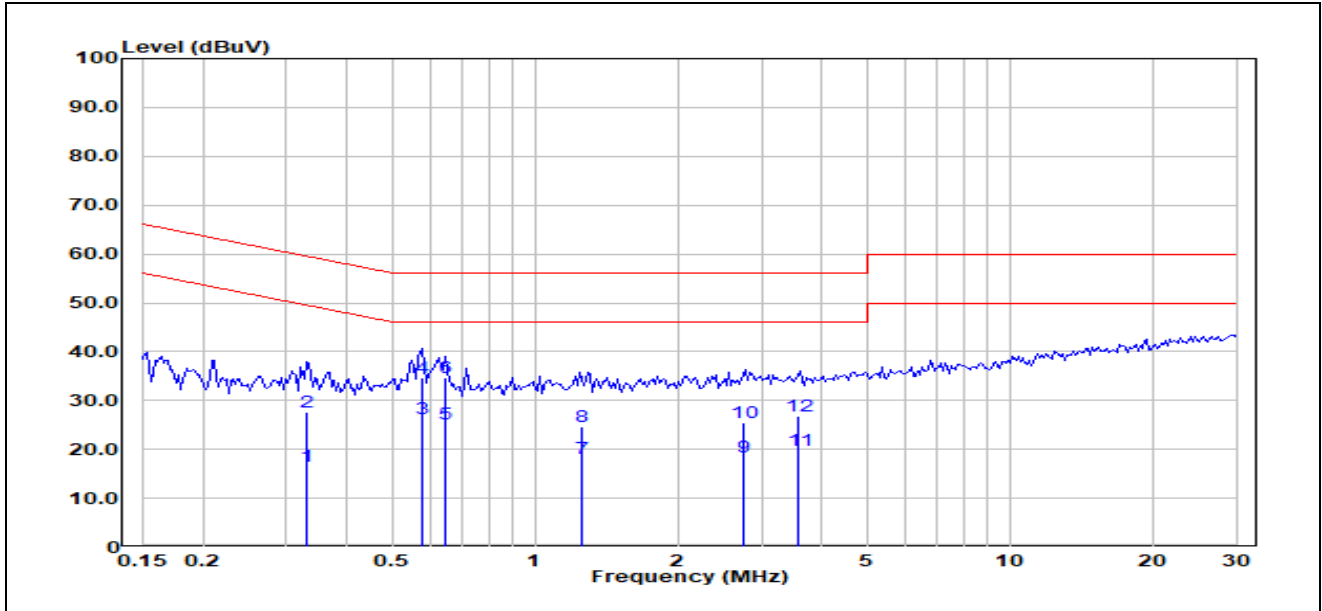
7.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark : Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 01; Line: Live line

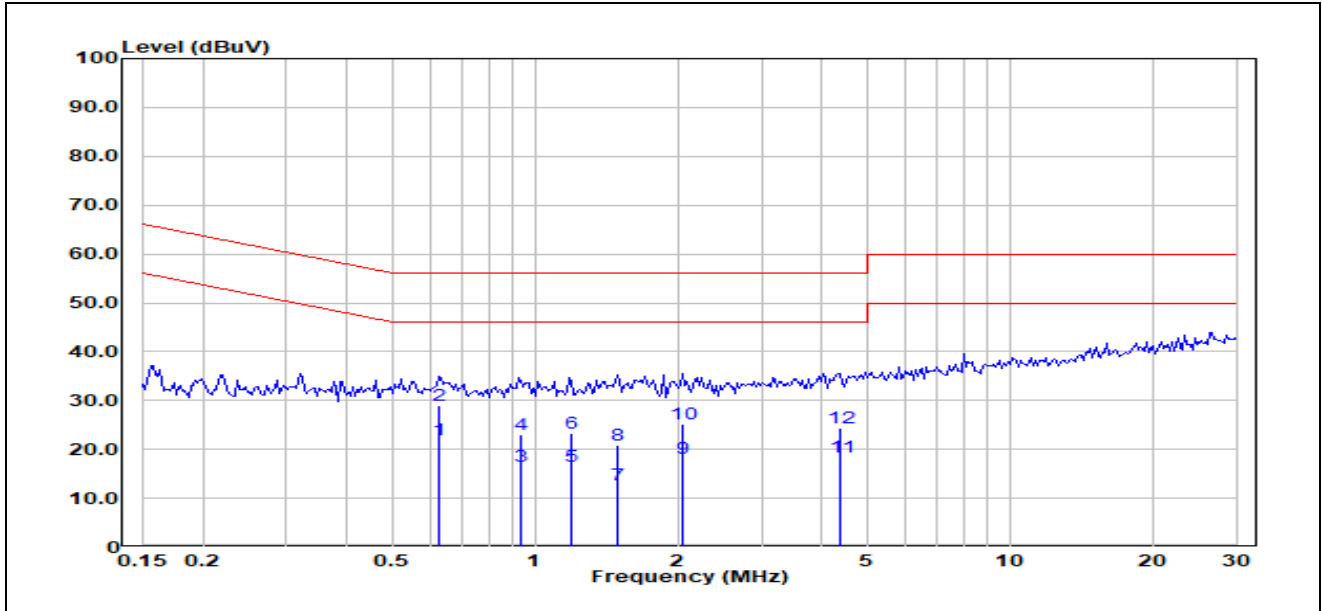
Test Data :



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3315	-3.61	20.12	16.51	49.41	-32.90	Average
2	0.3315	7.60	20.12	27.72	59.41	-31.69	QP
3	0.5769	6.24	20.07	26.31	46.00	-19.69	Average
4	0.5769	14.60	20.07	34.67	56.00	-21.33	QP
5	0.6454	5.21	20.06	25.27	46.00	-20.73	Average
6	0.6454	14.59	20.06	34.65	56.00	-21.35	QP
7	1.2510	-1.85	20.10	18.25	46.00	-27.75	Average
8	1.2510	4.64	20.10	24.74	56.00	-31.26	QP
9	2.7570	-1.85	20.40	18.55	46.00	-27.45	Average
10	2.7570	5.01	20.40	25.41	56.00	-30.59	QP
11	3.6010	-0.99	20.67	19.68	46.00	-26.32	Average
12	3.6010	6.18	20.67	26.85	56.00	-29.15	QP

Test Mode: 01; Line: Neutral Line

Test Data :



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.6306	1.82	20.02	21.84	46.00	-24.16	Average
2	0.6306	9.06	20.02	29.08	56.00	-26.92	QP
3	0.9301	-3.53	19.99	16.46	46.00	-29.54	Average
4	0.9301	3.18	19.99	23.17	56.00	-32.83	QP
5	1.1900	-3.38	20.03	16.65	46.00	-29.35	Average
6	1.1900	3.22	20.03	23.25	56.00	-32.75	QP
7	1.5000	-7.29	20.11	12.82	46.00	-33.18	Average
8	1.5000	0.69	20.11	20.80	56.00	-35.20	QP
9	2.0510	-1.97	20.22	18.25	46.00	-27.75	Average
10	2.0510	5.07	20.22	25.29	56.00	-30.71	QP
11	4.4040	-2.58	21.12	18.54	46.00	-27.46	Average
12	4.4040	3.39	21.12	24.51	56.00	-31.49	QP

7.2 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2020) Section 6.10.5

Measurement Distance: 3M

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C

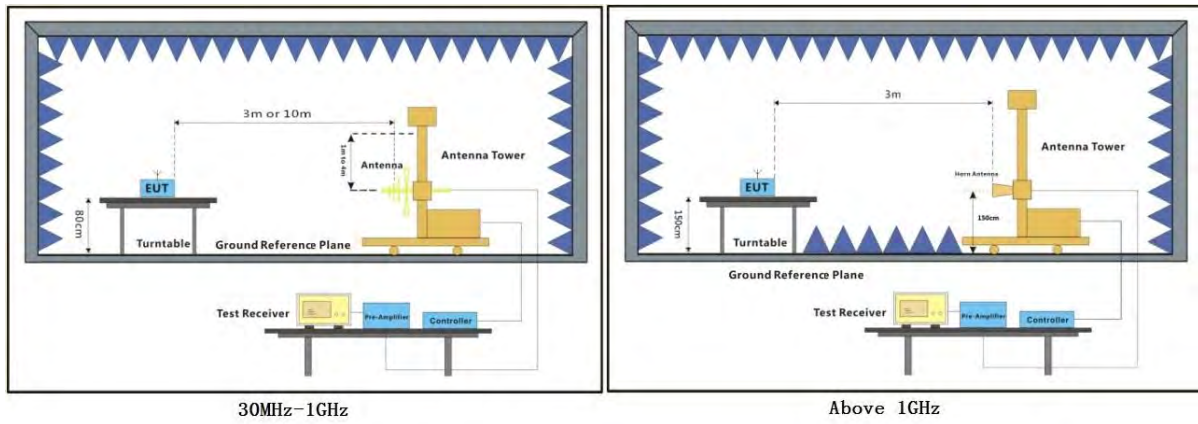
Humidity: 50.6 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

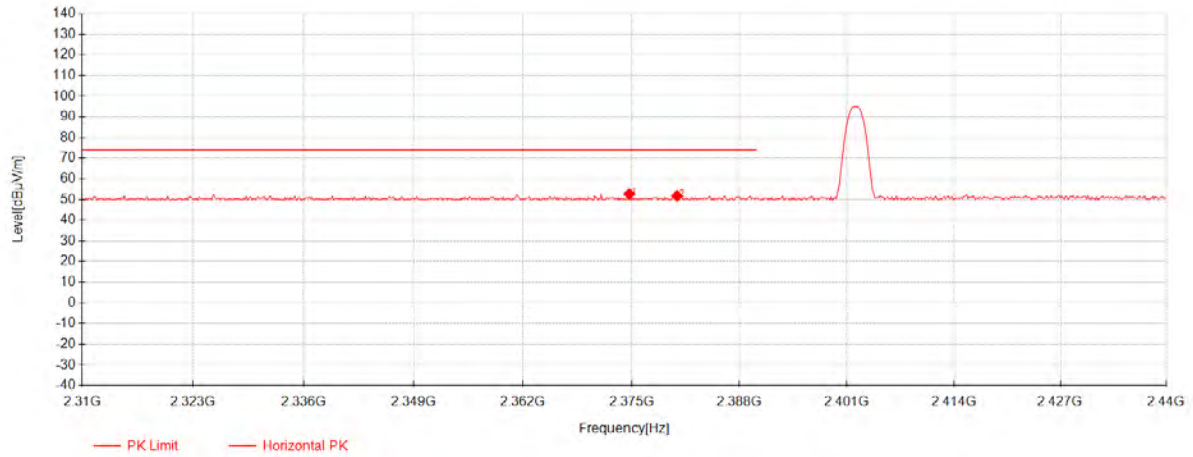
Remark 1: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

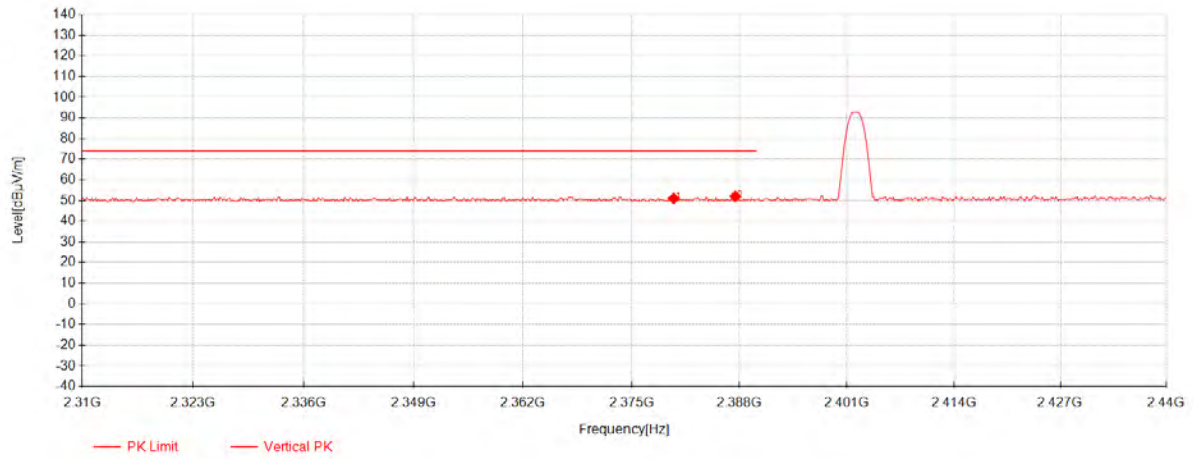
Remark 4: For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

GFSK Channel 00 Peak



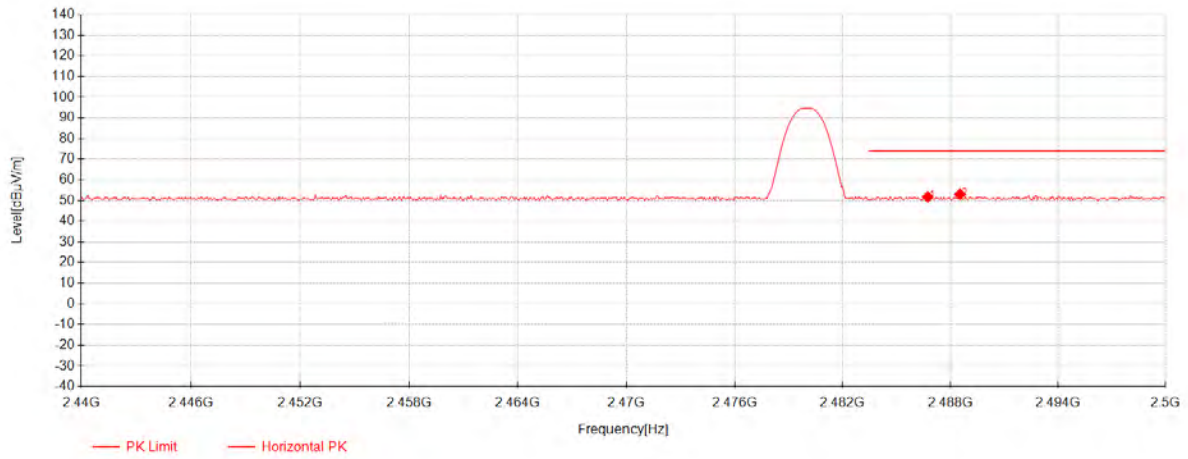
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2374.74	48.89	27.12	-23.30	52.71	74.00	21.29	Horizontal
2	2380.46	47.95	27.14	-23.31	51.78	74.00	22.22	Horizontal

GFSK Channel 00 Peak



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2380.07	47.17	27.14	-23.31	51.00	74.00	23.00	Vertical
2	2387.48	48.16	27.15	-23.31	52.00	74.00	22.00	Vertical

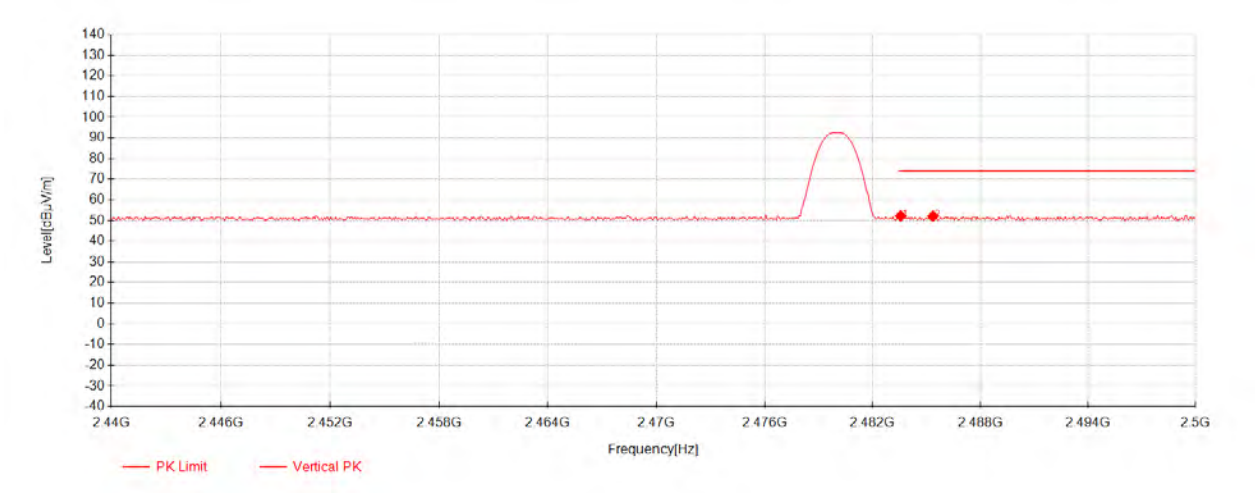
GFSK Channel 78 Peak



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2486.74	47.66	27.37	-23.27	51.76	74.00	22.24	Horizontal
2	2488.54	48.89	27.37	-23.27	53.00	74.00	21.00	Horizontal



GFSK Channel 78 Peak



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.56	48.13	27.36	-23.27	52.22	74.00	21.78	Vertical
2	2485.36	48.02	27.37	-23.27	52.12	74.00	21.88	Vertical

7.3 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2020) Section 6.4,6.5

Measurement Distance: 3M

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C

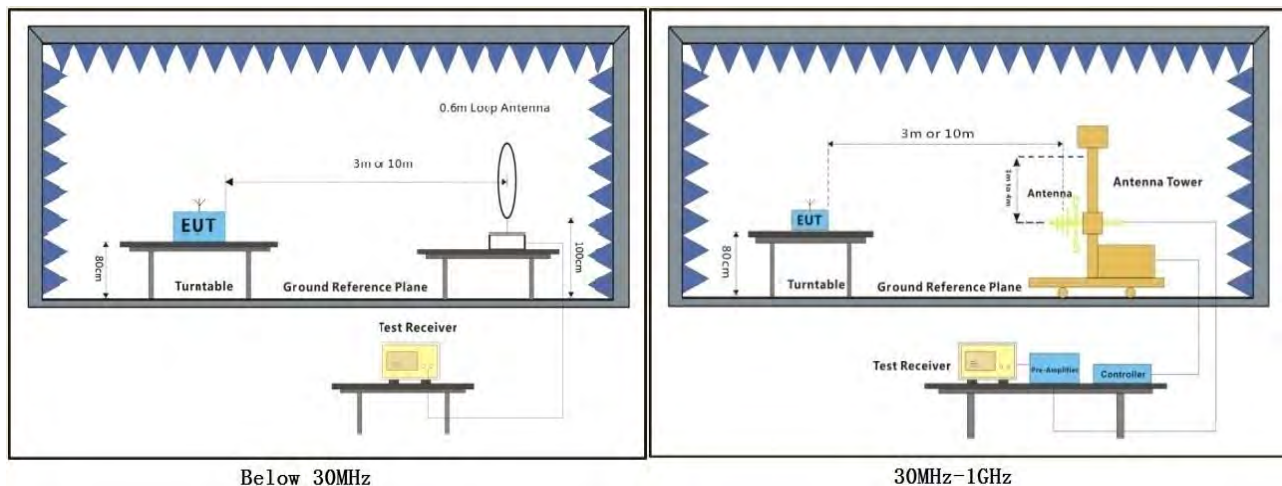
Humidity: 50.6 % RH

Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

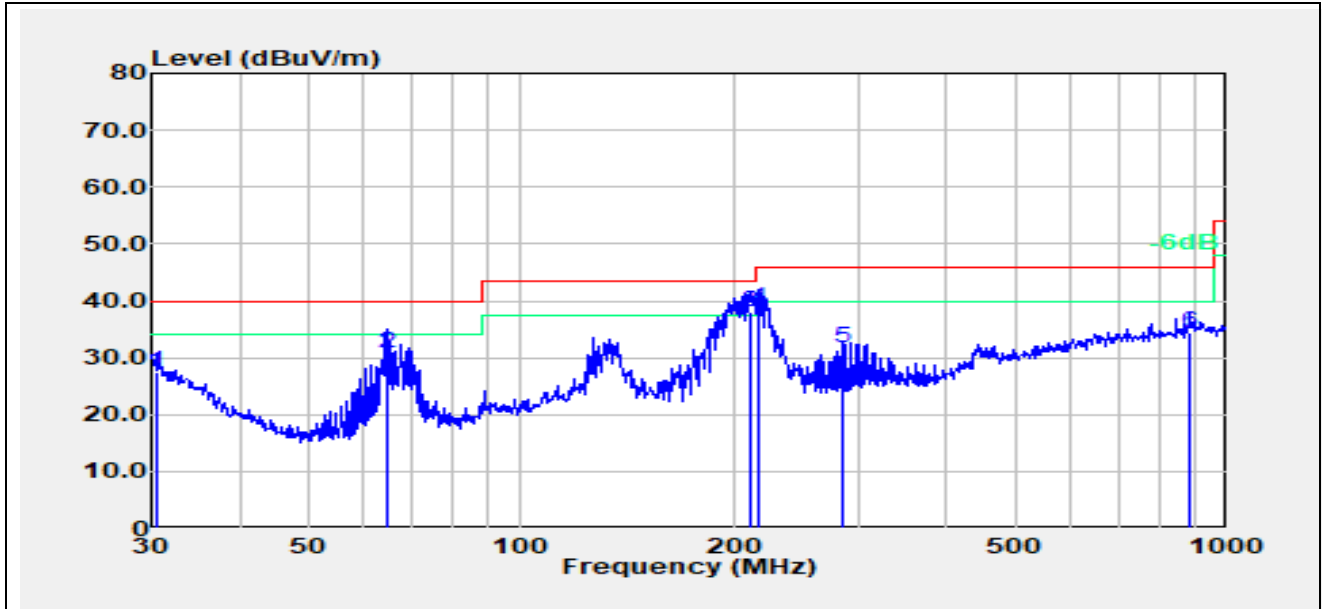
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test Mode: 01; Polarity: Horizontal

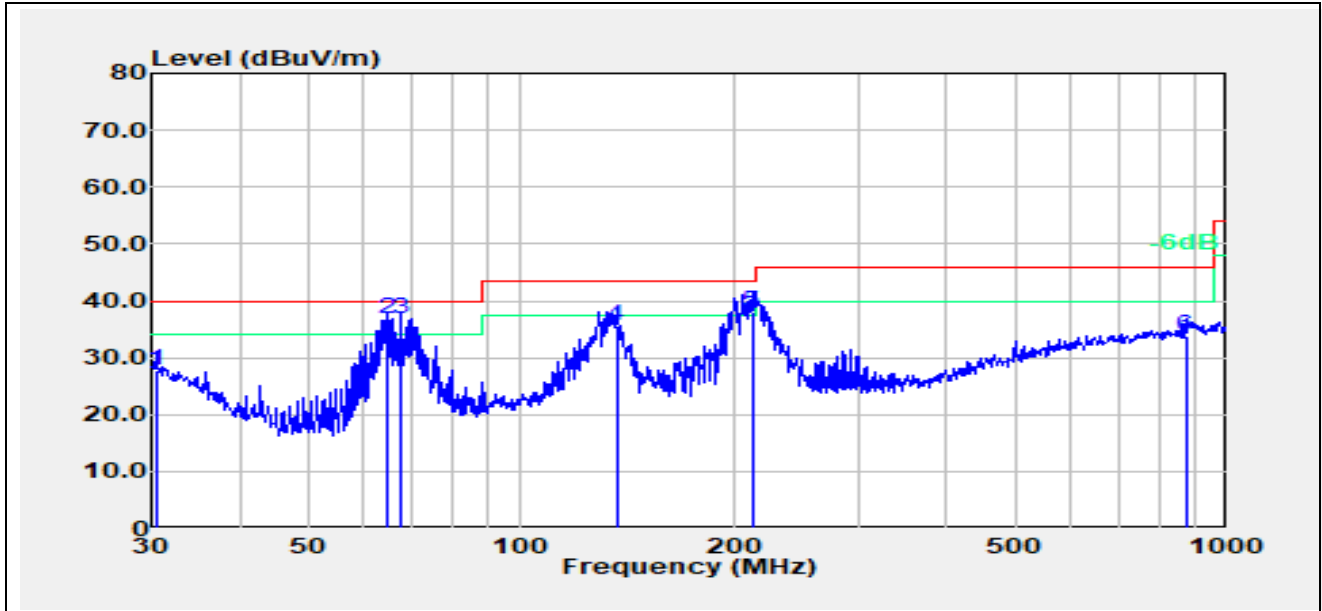
Test Data :



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	30.424	2.69	24.78	27.47	40.00	-12.53	100	207	QP
2	64.433	18.54	12.22	30.76	40.00	-9.24	200	25	QP
3	210.786	20.17	18.02	38.19	43.50	-5.31	100	348	QP
4	217.544	20.45	18.24	38.69	46.00	-7.31	200	13	QP
5	284.977	10.46	21.34	31.80	46.00	-14.20	200	179	QP
6	884.503	3.21	31.28	34.49	46.00	-11.51	100	40	QP

Test Mode: 01; Polarity: Vertical

Test Data :



No.	Frequency (MHz)	Reading (dBUV)	Correct Factor(dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	30.424	2.95	24.78	27.73	40.00	-12.27	100	360	QP
2	64.433	24.46	12.22	36.68	40.00	-3.32	100	82	QP
3	67.438	24.17	12.60	36.77	40.00	-3.23	100	110	QP
4	136.460	15.26	20.21	35.47	43.50	-8.03	100	230	QP
5	212.270	20.04	18.09	38.13	43.50	-5.37	100	0	QP
6	872.183	2.69	31.01	33.70	46.00	-12.31	100	144	QP

7.4 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2020) Section 6.6

Measurement Distance: 3M

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C

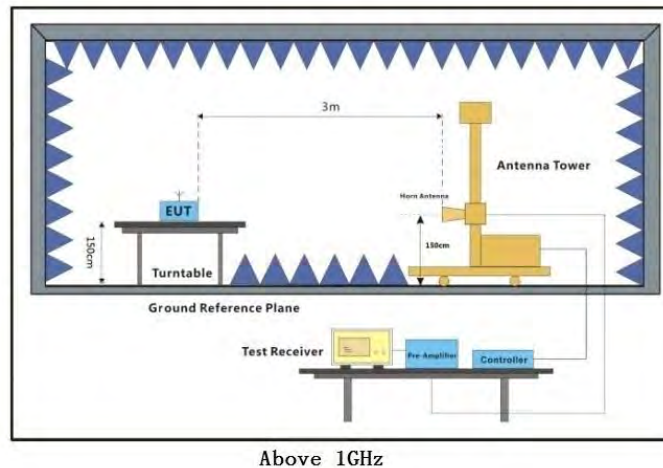
Humidity: 50.6 % RH

Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

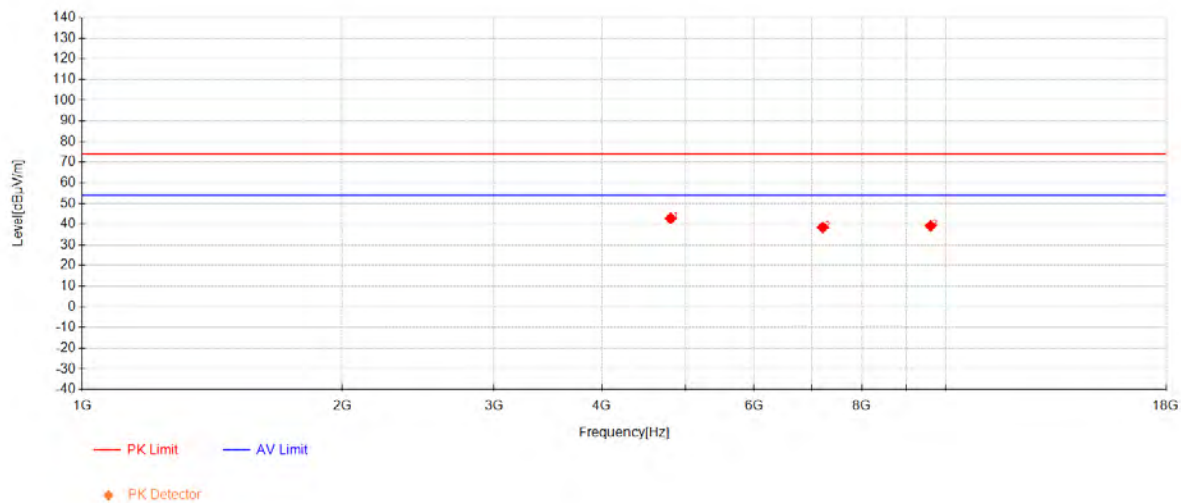
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.
- 5:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle<98%) or 10Hz (Duty cycle $\geq$ 98%) for Average detection (AV) at frequency above 1GHz.



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GFSK Channel 00

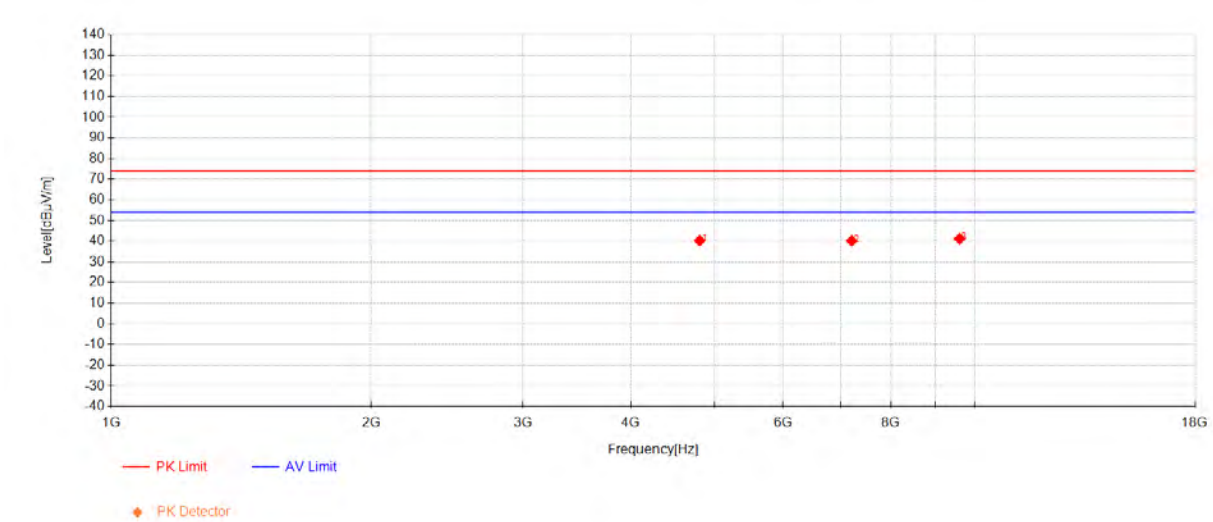


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4804	51.57	32.77	-41.49	42.85	74.00	31.15	Horizontal
2	7206	40.21	36.25	-38.02	38.44	74.00	35.56	Horizontal
3	9608	34.84	37.78	-33.45	39.17	74.00	34.83	Horizontal

BT_DH5_TX_CH_00_Horizontal



GFSK Channel 00



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4804	48.99	32.77	-41.49	40.27	74.00	33.73	Vertical
2	7206	41.98	36.25	-38.02	40.21	74.00	33.79	Vertical
3	9608	36.84	37.78	-33.45	41.17	74.00	32.83	Vertical

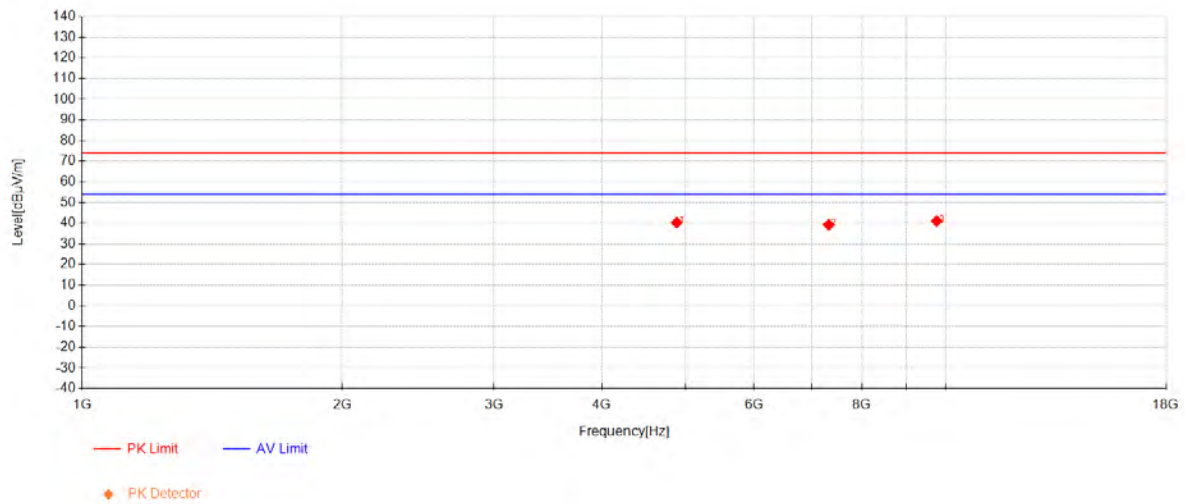
BT_DH5_TX_CH_00_Vertical



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GFSK Channel 39



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4882	48.58	32.94	-41.25	40.27	74.00	33.73	Horizontal
2	7323	40.30	36.39	-37.48	39.21	74.00	34.79	Horizontal
3	9764	36.27	37.83	-33.07	41.03	74.00	32.97	Horizontal

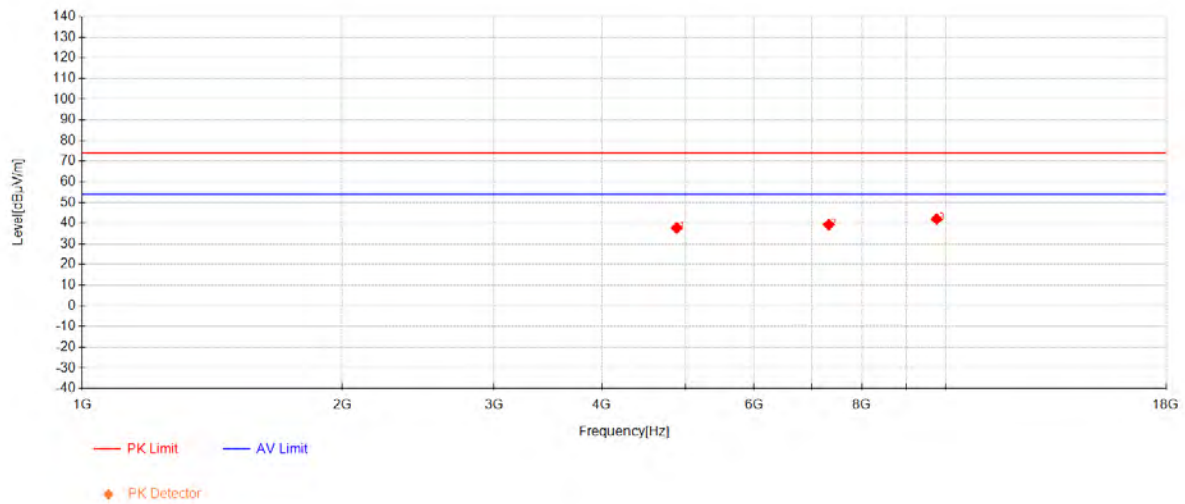
BT_DH5_TX_CH_39_Horizontal



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GFSK Channel 39

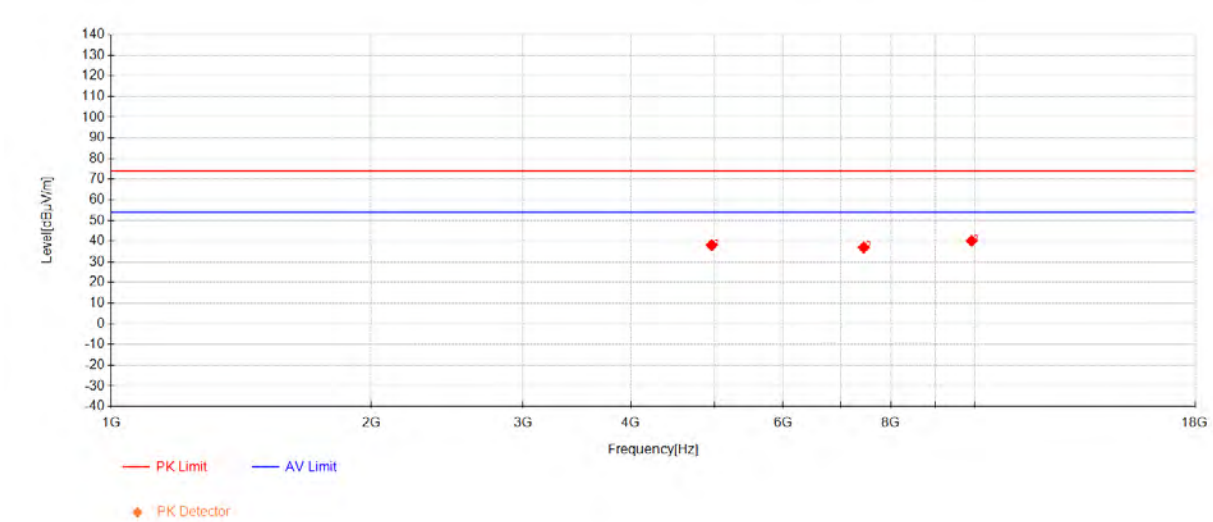


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4882	45.97	32.94	-41.25	37.66	74.00	36.34	Vertical
2	7323	40.36	36.39	-37.48	39.27	74.00	34.73	Vertical
3	9764	37.27	37.83	-33.07	42.03	74.00	31.97	Vertical

BT_DH5_TX_CH_39_Vertical



GFSK Channel 78



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4960	46.30	33.11	-41.36	38.05	74.00	35.95	Horizontal
2	7440	38.25	36.53	-37.85	36.93	74.00	37.07	Horizontal
3	9920	34.78	37.88	-32.55	40.11	74.00	33.89	Horizontal

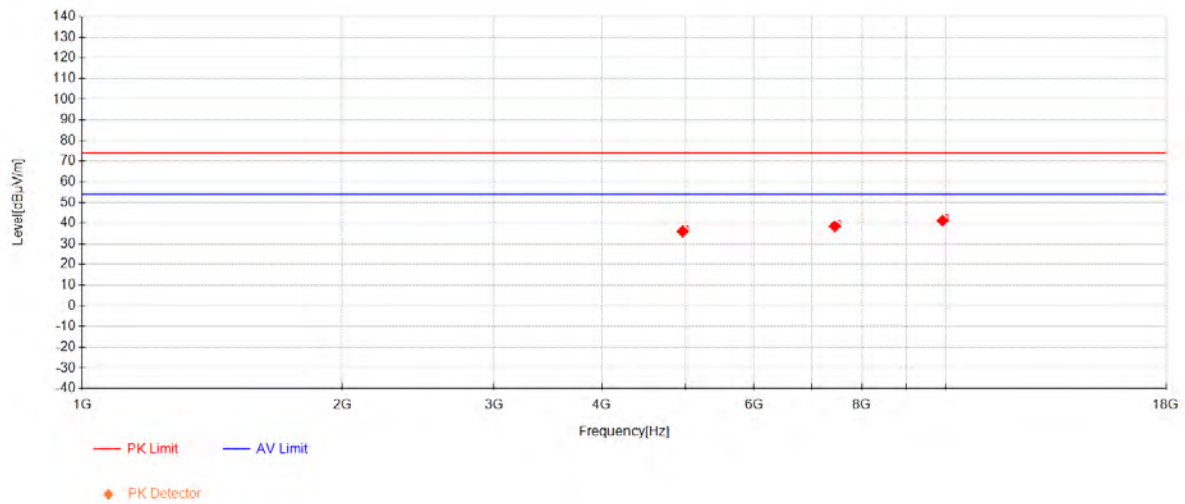
BT_DH5_TX_CH_78_Horizontal



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GFSK Channel 78



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4960	44.22	33.11	-41.36	35.97	74.00	38.03	Vertical
2	7440	39.80	36.53	-37.85	38.48	74.00	35.52	Vertical
3	9920	35.88	37.88	-32.55	41.21	74.00	32.79	Vertical

BT_DH5_TX_CH_78_Vertical

7.5 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)

Test Method: ANSI C63.10 (2020) Section 7.8.5

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

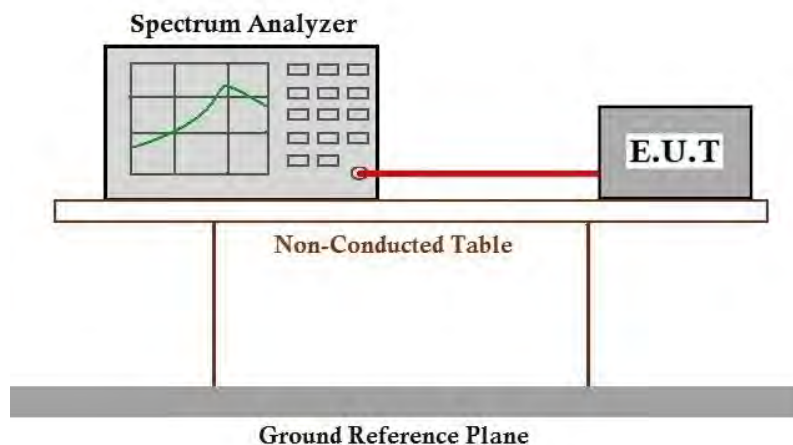
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram





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7.5.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

7.6 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)

Test Method: ANSI C63.10 (2020) Section 7.8.7

Limit:

20 dB bandwidth of the hopping channel	Hopping frequencies	Average time of occupancy
less than 250 kHz	least 50 hopping frequencies	shall not be greater than 0.4 seconds within a 20 second period
250 kHz to 500kHz	least 25 hopping frequencies	shall not be greater than 0.4 seconds within a 10 second period.

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

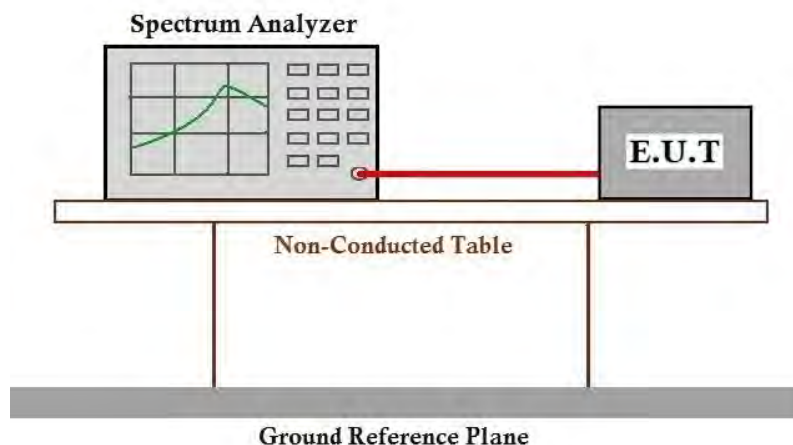
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)

Test Method: ANSI C63.10 (2020) Section 7.8.2

Limit:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

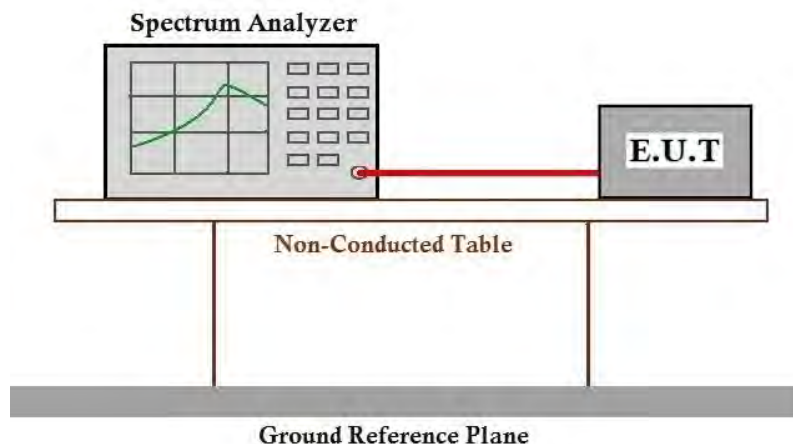
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2020) Section 7.8.3

Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

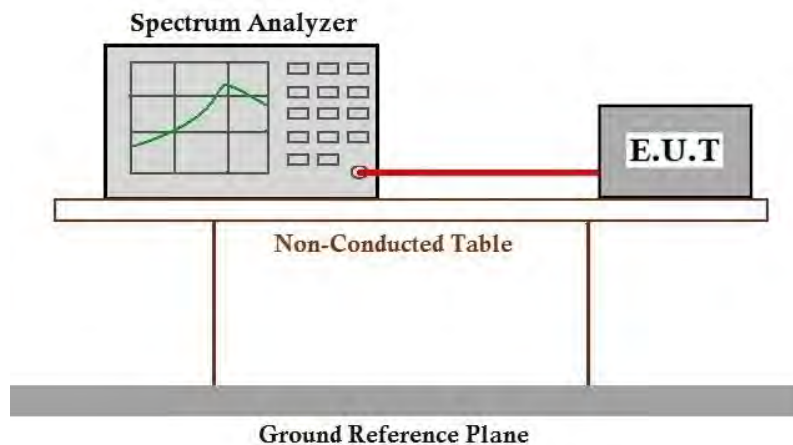
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.9 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2020) Section 7.8.4

Limit:

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

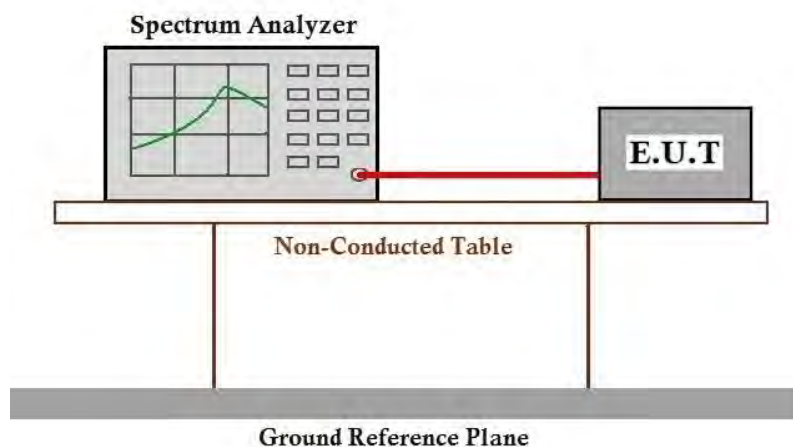
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.10 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2020) Section 7.8.6

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.10.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

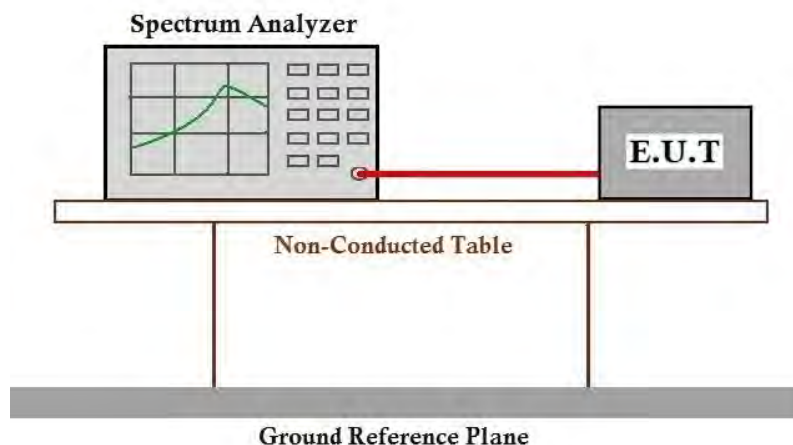
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram





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7.10.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.11 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2020) Section 7.8.8

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.11.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

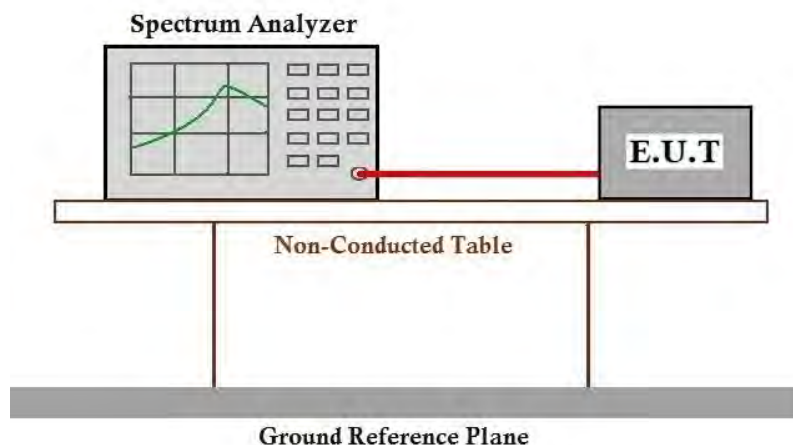
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.11.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.11.3 Test Setup Diagram





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7.11.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2505001155AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix_Photographs of EUT Constructional Details for KSCR2505001155AT



10 Appendix

1. Duty Cycle

1.1 Test Result

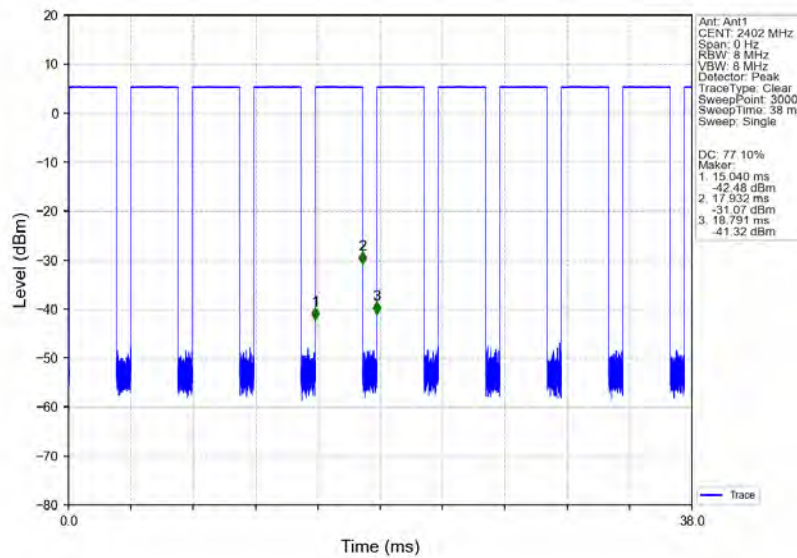
1.1.1 Ant1

Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.892	3.751	77.10	1.13	0.03
		2441	DH5	2.892	3.750	77.12	1.13	0.03
		2480	DH5	2.891	3.749	77.11	1.13	0.04
Pi/4DQPSK	SISO	2402	2DH5	2.891	3.750	77.09	1.13	0.03
		2441	2DH5	2.890	3.749	77.09	1.13	0.04
		2480	2DH5	2.892	3.751	77.10	1.13	0.03
8DPSK	SISO	2402	3DH5	2.893	3.750	77.15	1.13	0.03
		2441	3DH5	2.893	3.749	77.17	1.13	0.03
		2480	3DH5	2.893	3.750	77.15	1.13	0.04

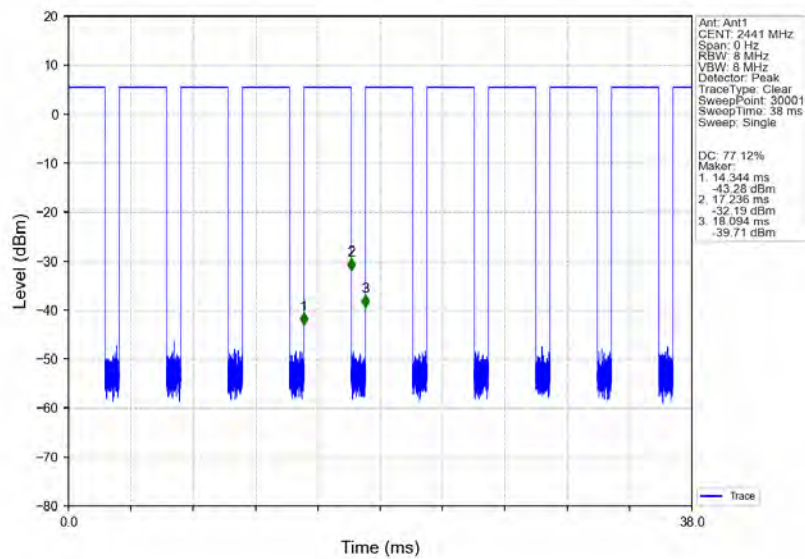
1.2 Test Graph

1.2.1 Ant1

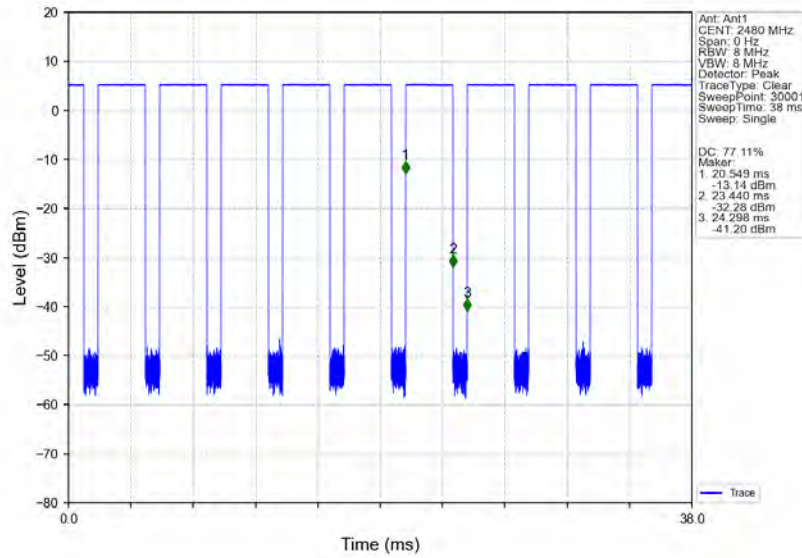
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



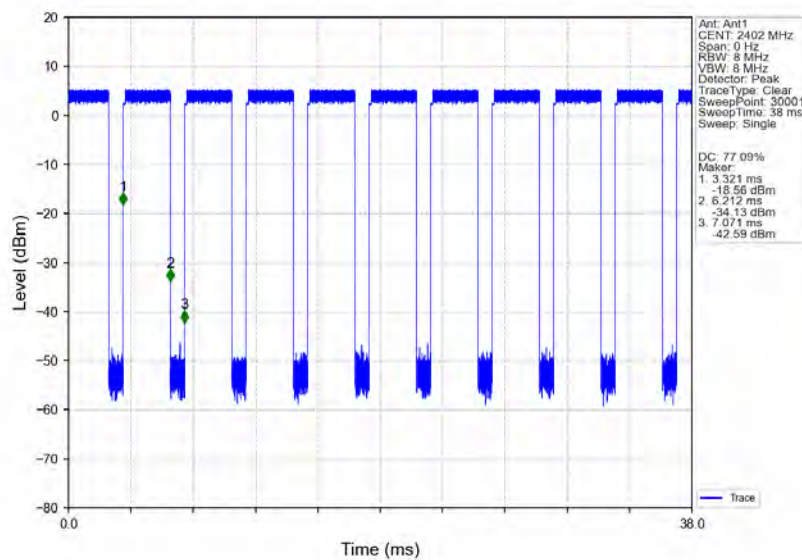
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



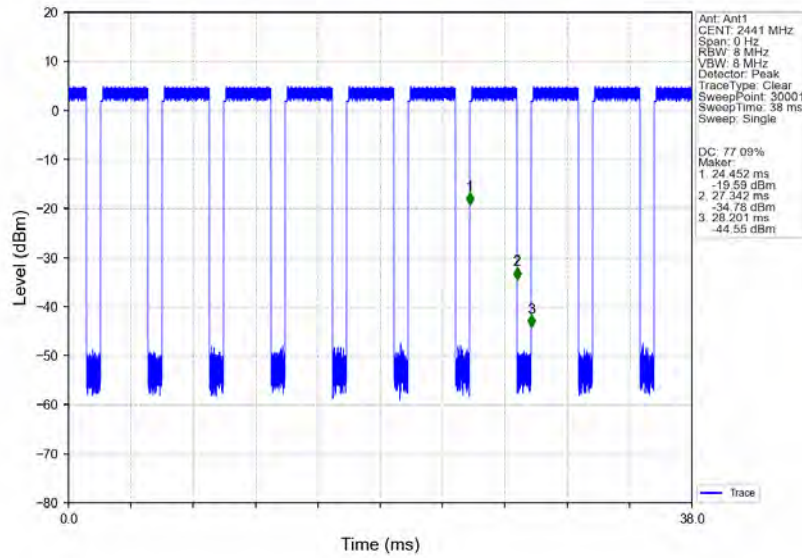
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



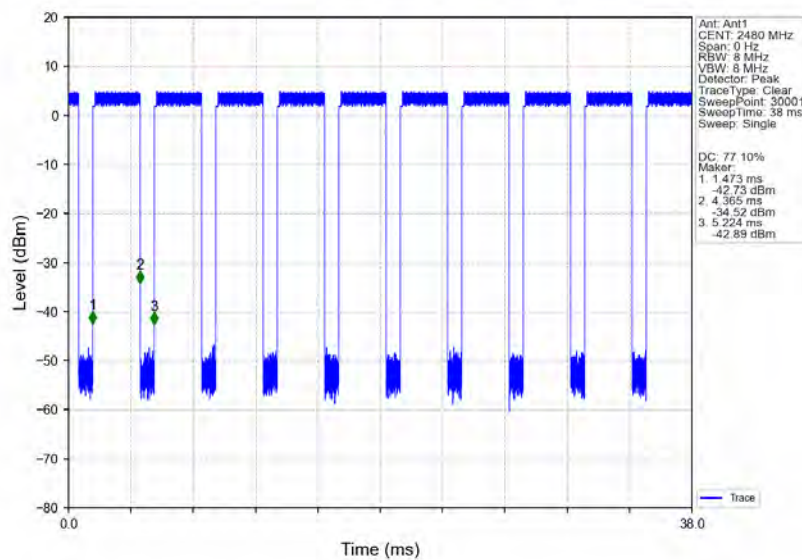
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



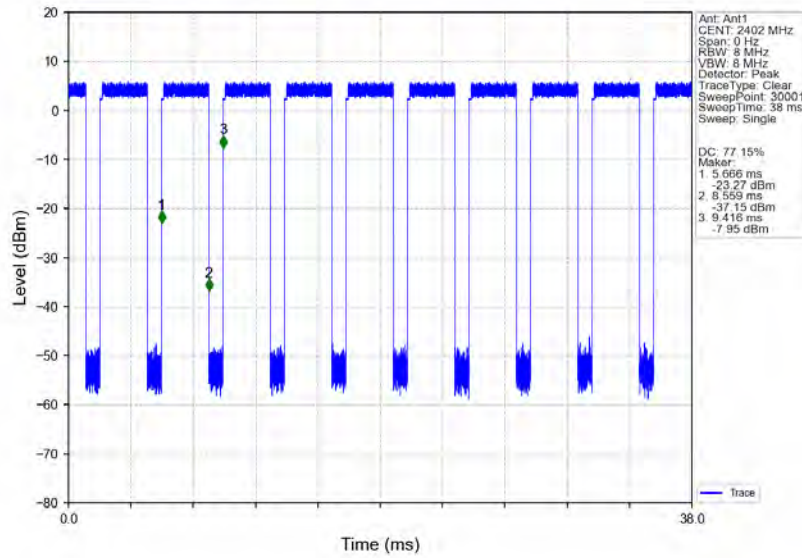
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



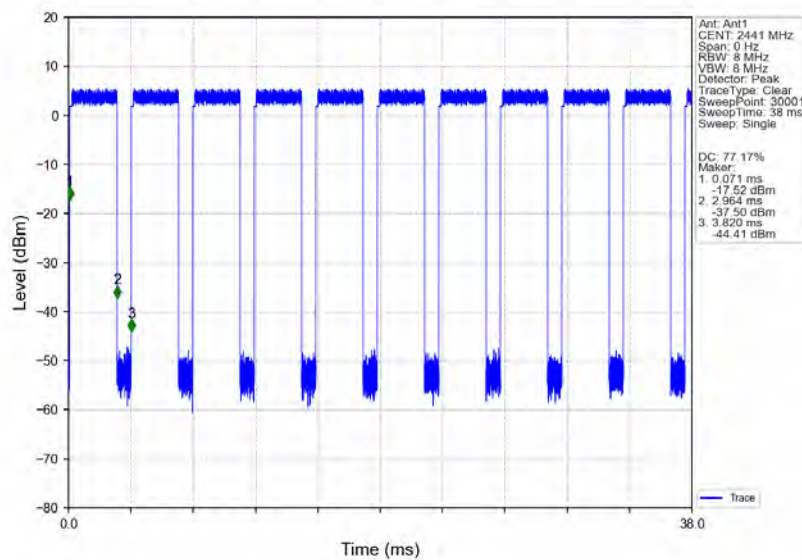
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



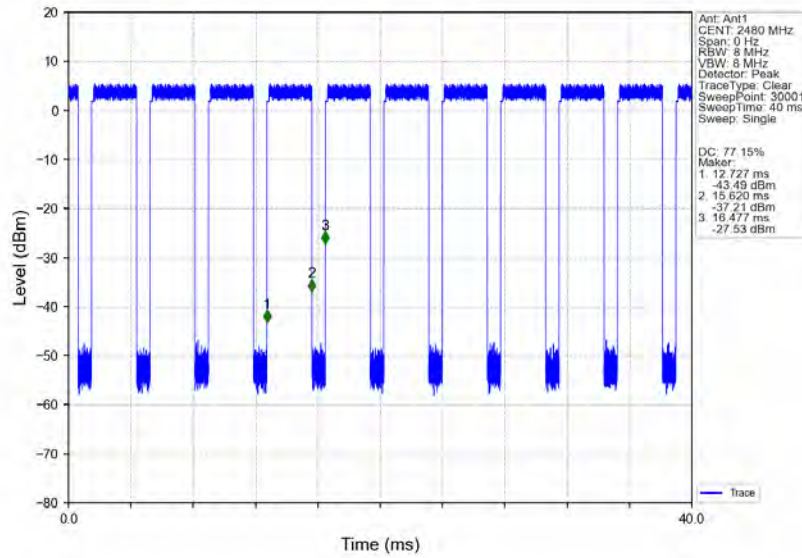
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.844	/	Pass
		2441	DH5	1	0.847	/	Pass
		2480	DH5	1	0.846	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.182	/	Pass
		2441	2DH5	1	1.185	/	Pass
		2480	2DH5	1	1.184	/	Pass
8DPSK	SISO	2402	3DH5	1	1.187	/	Pass
		2441	3DH5	1	1.191	/	Pass
		2480	3DH5	1	1.187	/	Pass

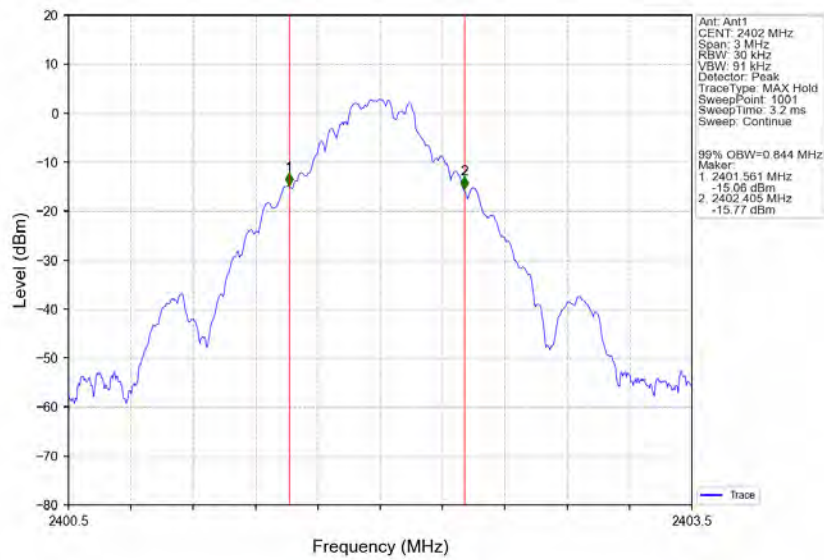
2.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.954	/	Pass
		2441	DH5	1	0.952	/	Pass
		2480	DH5	1	0.954	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.330	/	Pass
		2441	2DH5	1	1.332	/	Pass
		2480	2DH5	1	1.333	/	Pass
8DPSK	SISO	2402	3DH5	1	1.317	/	Pass
		2441	3DH5	1	1.316	/	Pass
		2480	3DH5	1	1.317	/	Pass

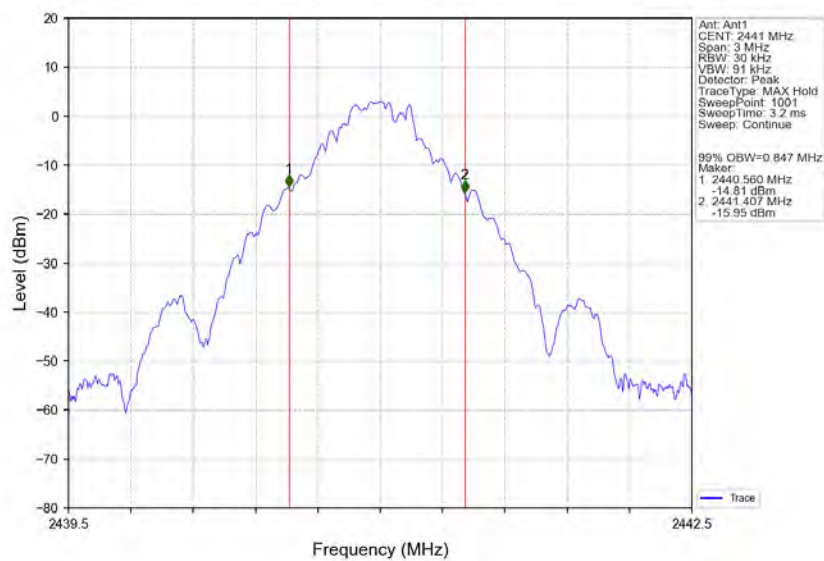
2.2 Test Graph

2.2.1 OBW

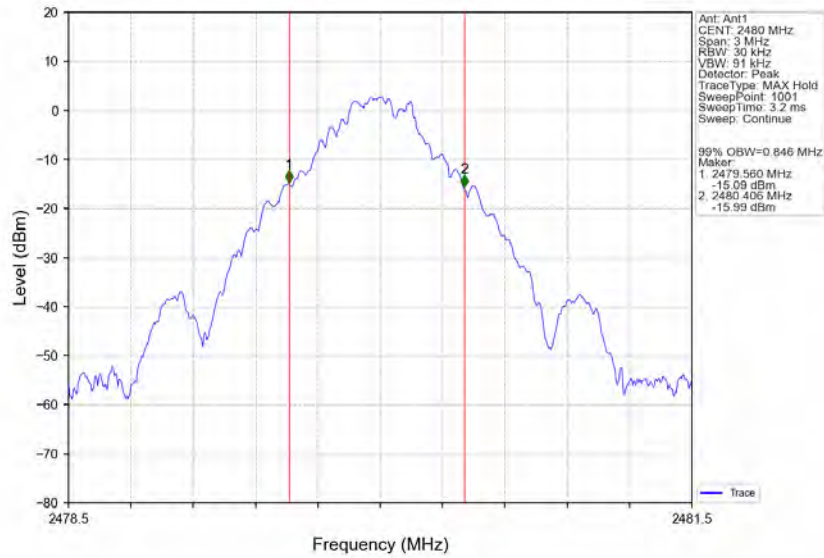
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



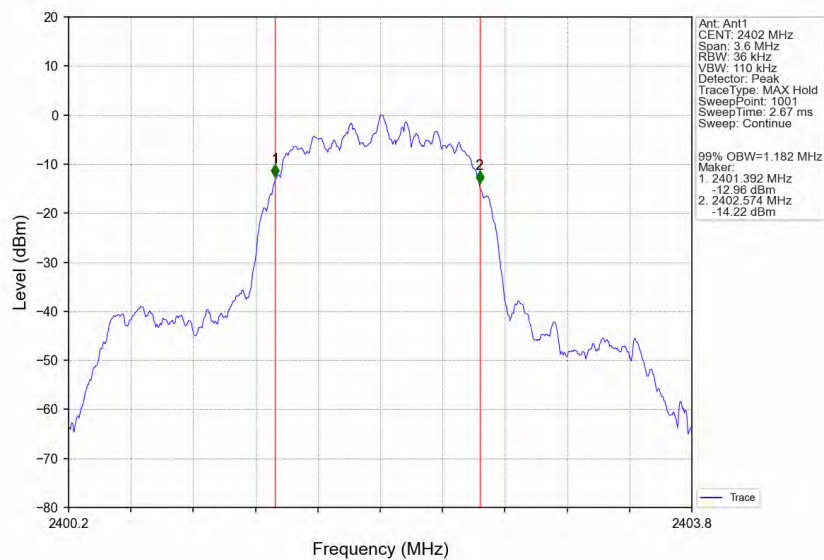
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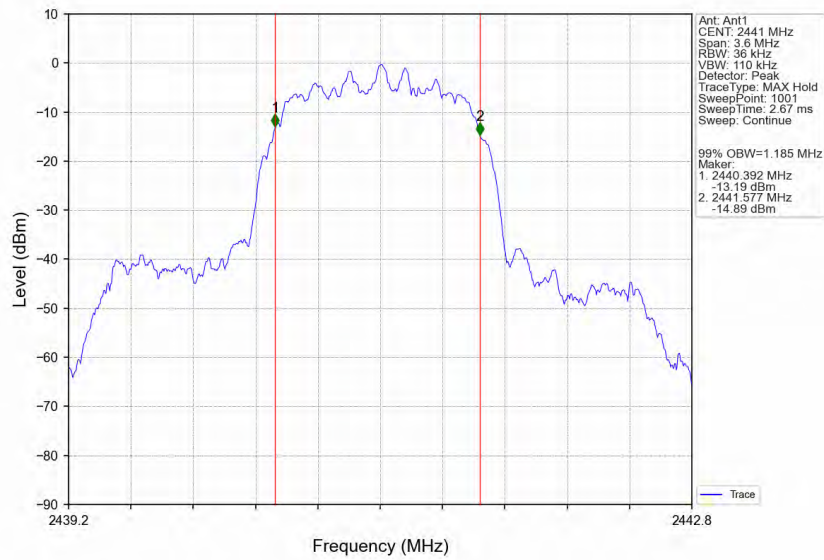
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



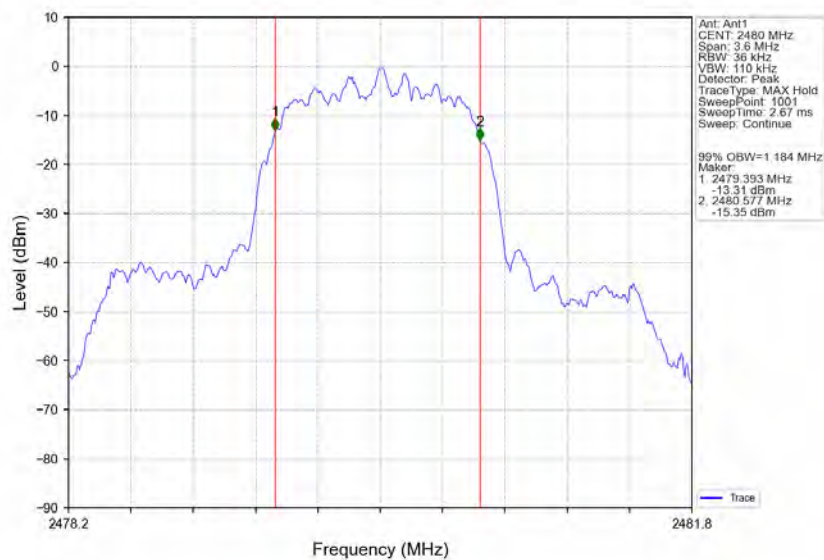
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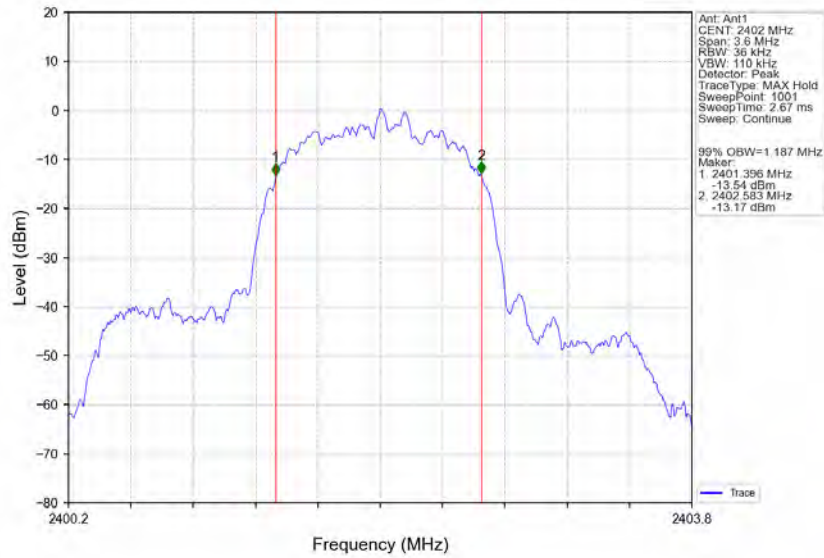
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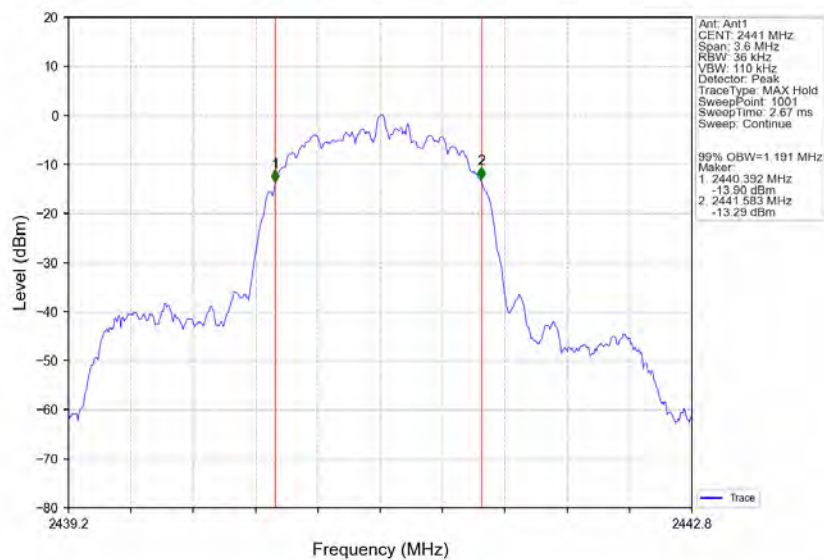
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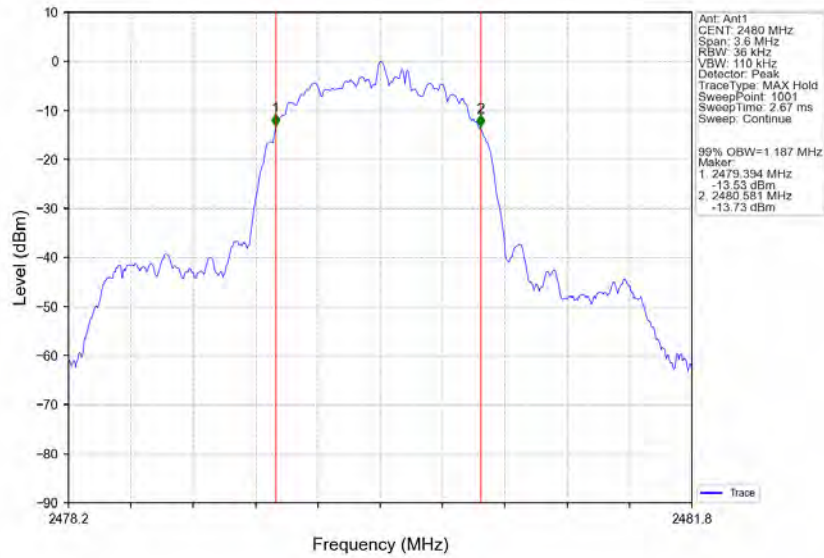
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8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

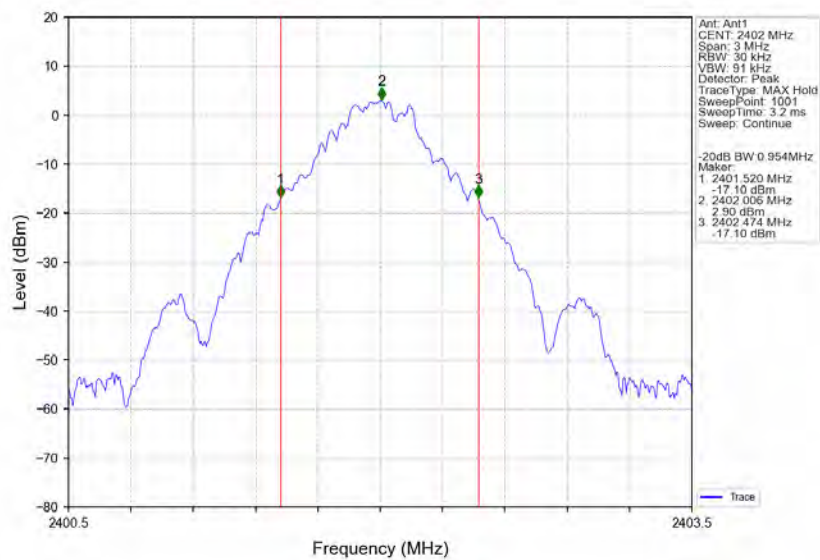


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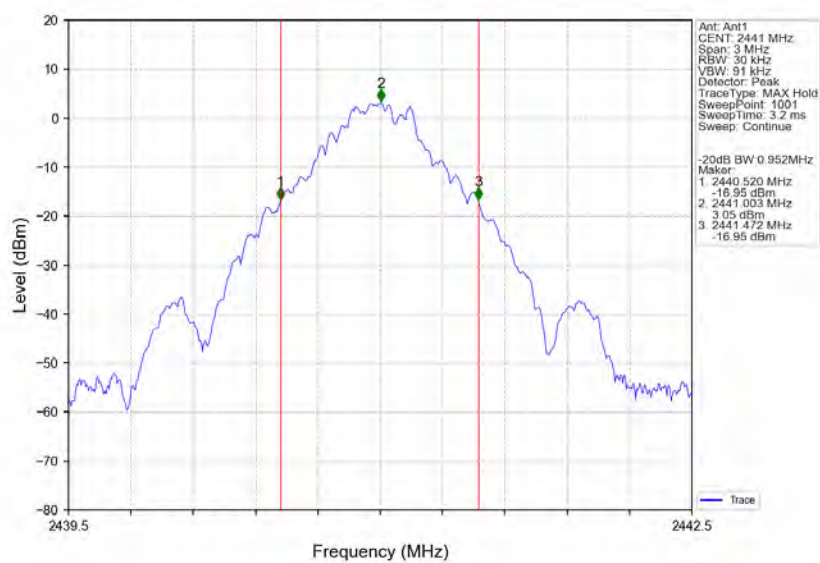


2.2.2 20dB BW

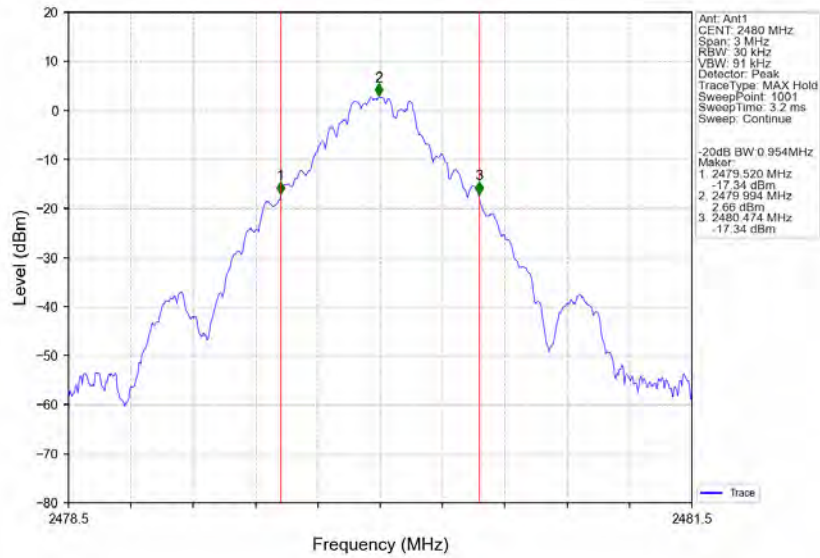
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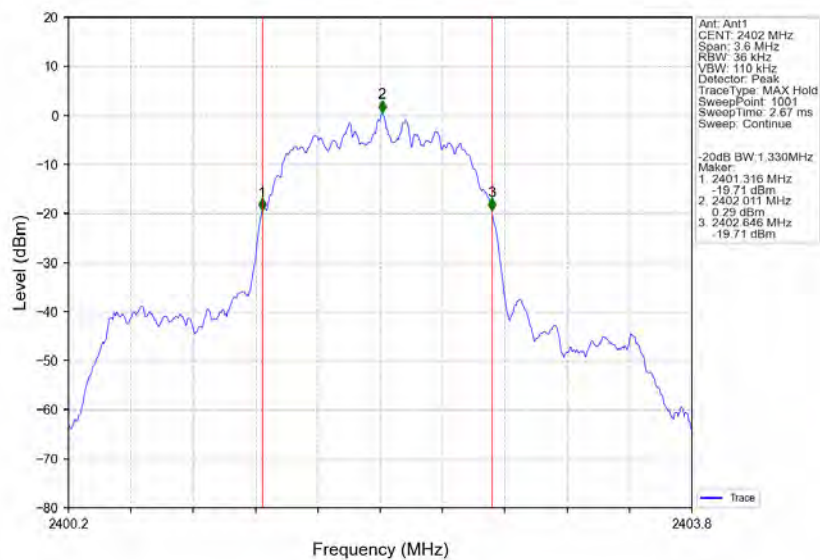
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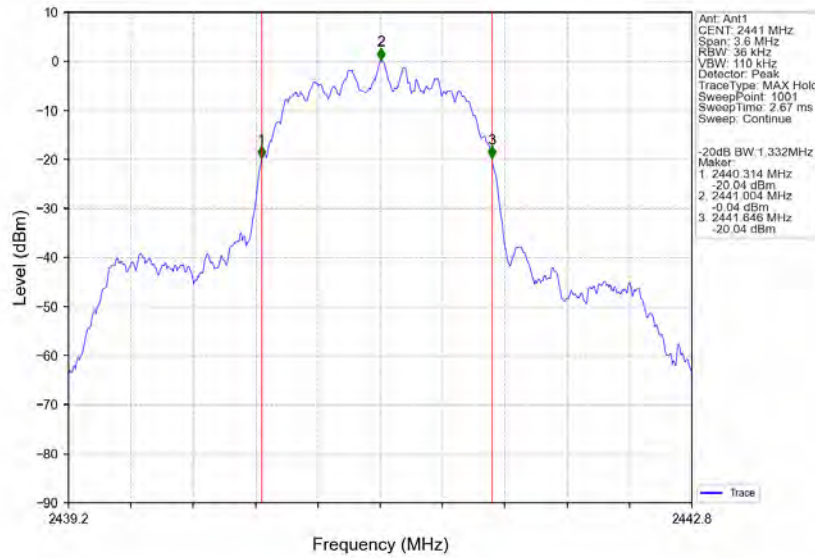
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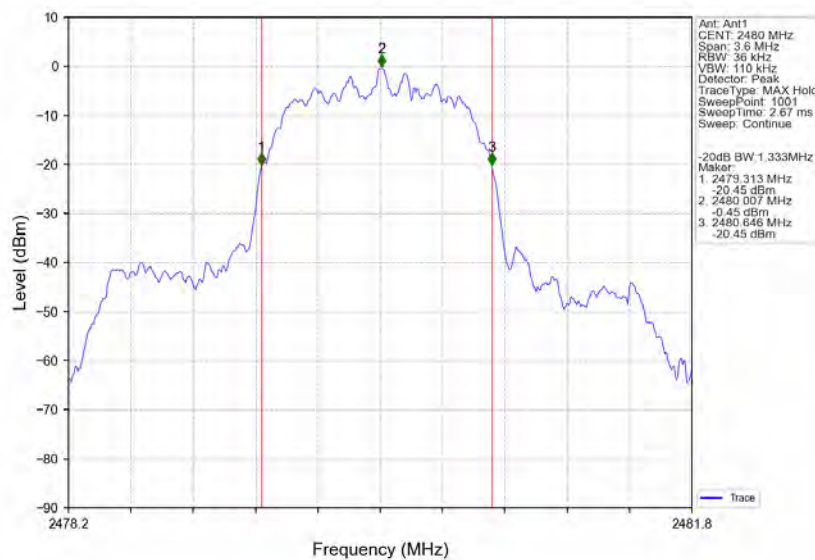
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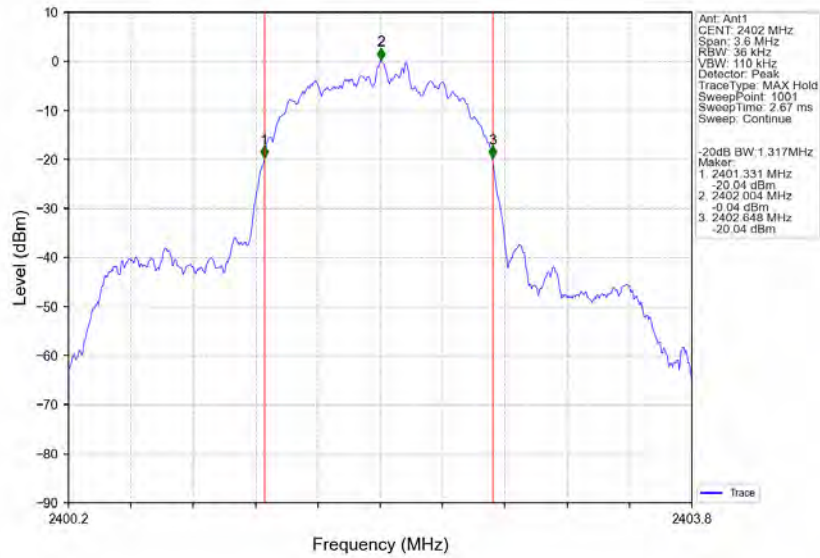
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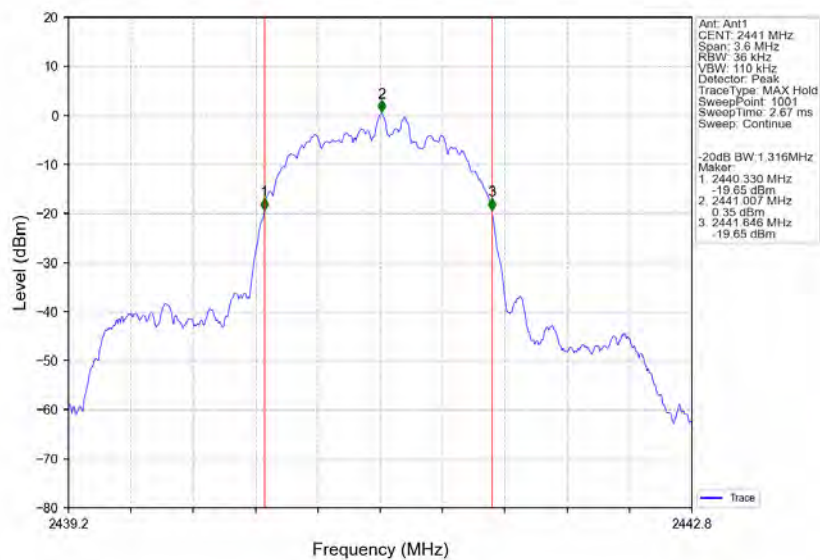
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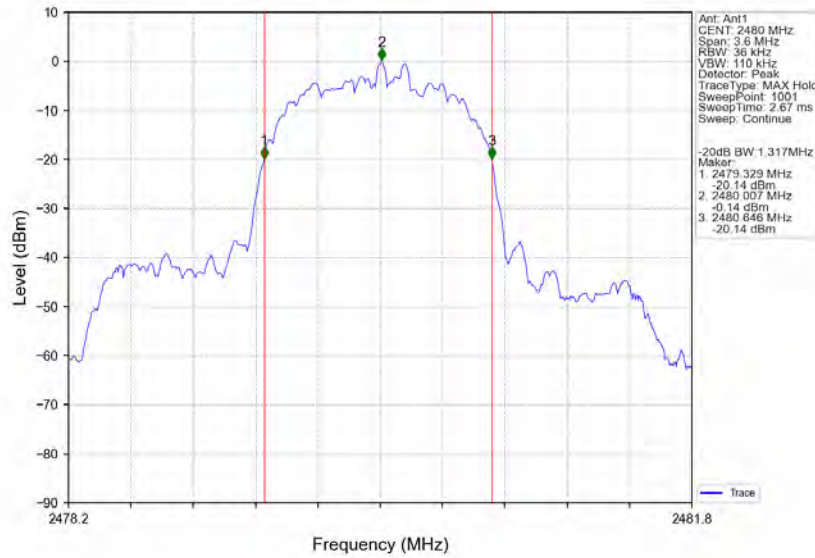
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	5.43	≤ 30	Pass
		2441	DH5	5.57	≤ 30	Pass
		2480	DH5	5.25	≤ 30	Pass
Pi/4DQPSK	SISO	2402	2DH5	5.12	≤ 20.97	Pass
		2441	2DH5	5.12	≤ 20.97	Pass
		2480	2DH5	4.71	≤ 20.97	Pass
8DPSK	SISO	2402	3DH5	5.68	≤ 20.97	Pass
		2441	3DH5	5.65	≤ 20.97	Pass
		2480	3DH5	5.22	≤ 20.97	Pass

Note1: Antenna Gain: Ant1: 0.41dBi;

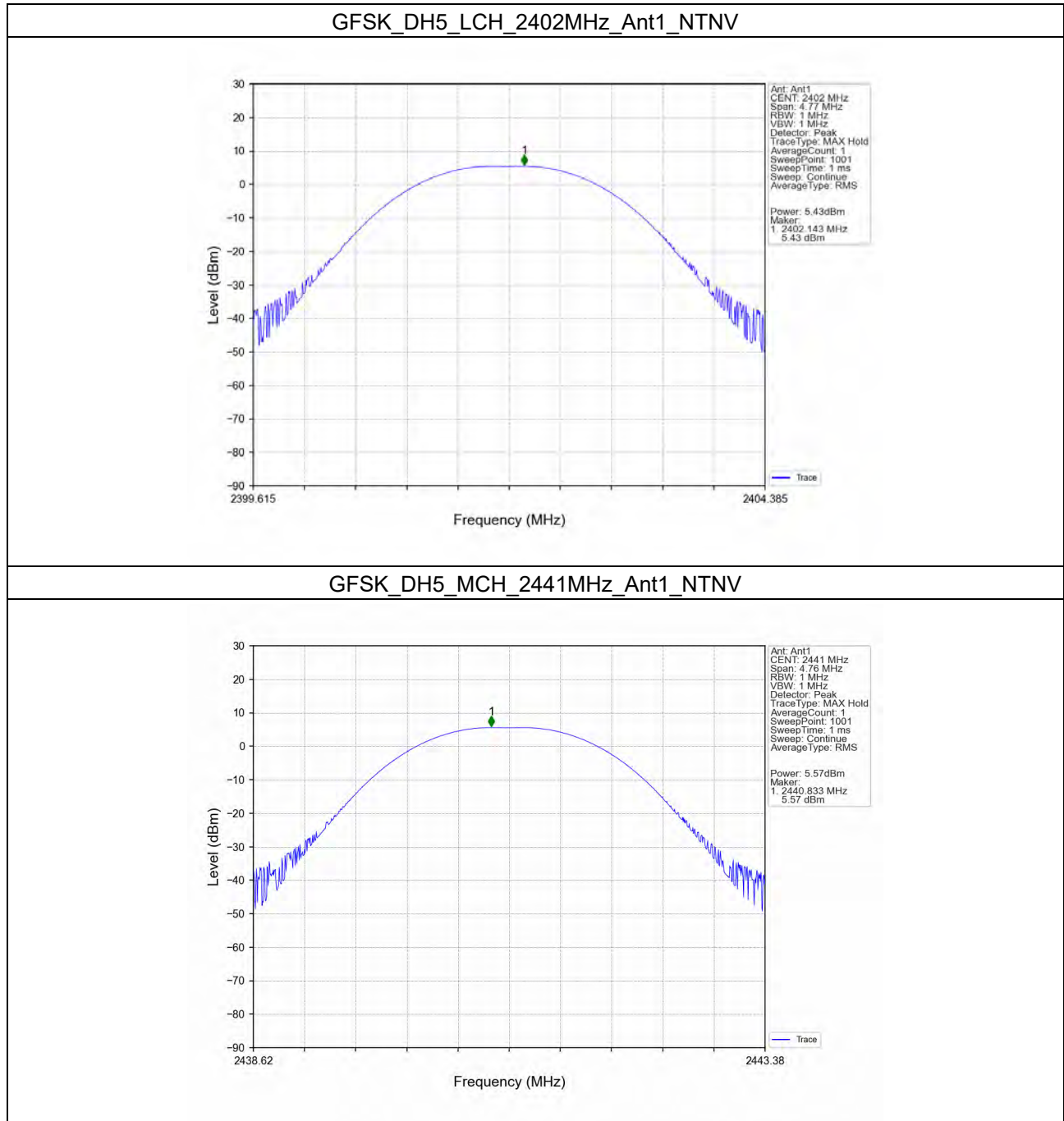
3.1.2 EIRP

Mode	TX Type	Frequency (MHz)	Packet Type	E.I.R.P (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	5.84	≤ 36.02	Pass
		2441	DH5	5.98	≤ 36.02	Pass
		2480	DH5	5.66	≤ 36.02	Pass
Pi/4DQPSK	SISO	2402	2DH5	5.53	≤ 36.02	Pass
		2441	2DH5	5.53	≤ 36.02	Pass
		2480	2DH5	5.12	≤ 36.02	Pass
8DPSK	SISO	2402	3DH5	6.09	≤ 36.02	Pass
		2441	3DH5	6.06	≤ 36.02	Pass
		2480	3DH5	5.63	≤ 36.02	Pass

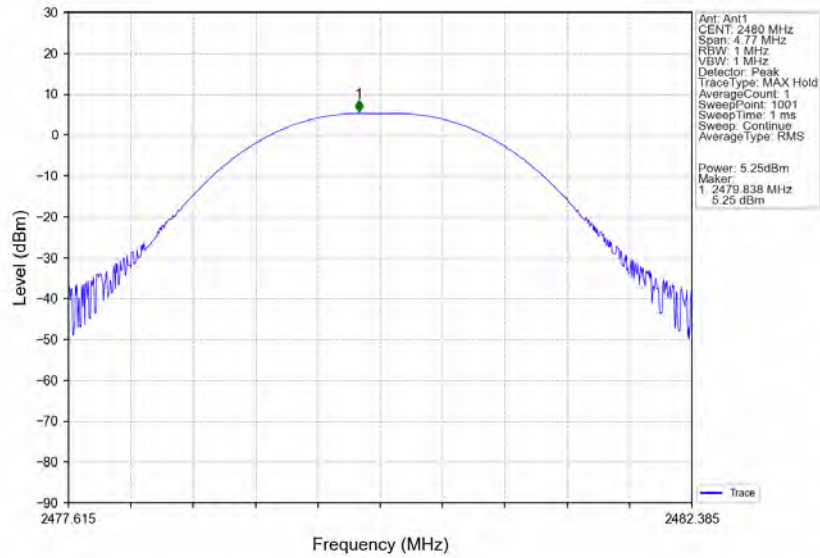
Note1: Antenna Gain: Ant1: 0.41dBi;
Note2: E.I.R.P = Measured Power + Antenna Gain

3.2 Test Graph

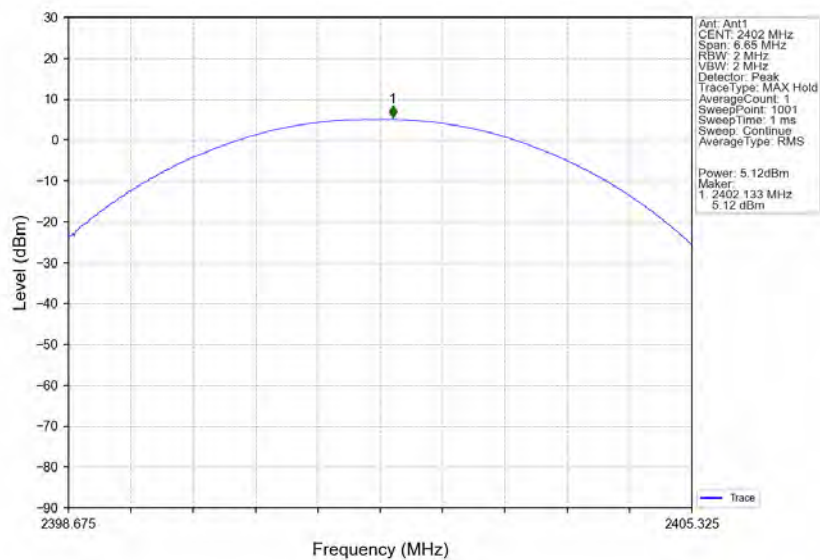
3.2.1 Power



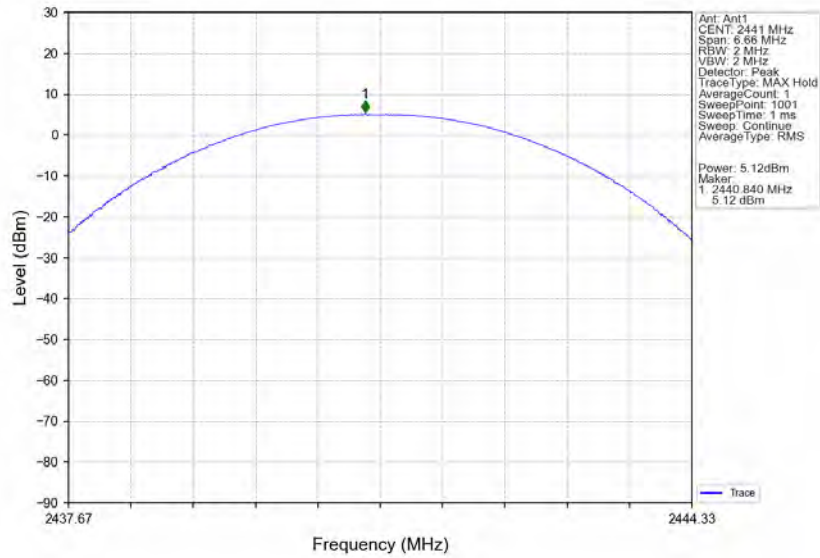
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



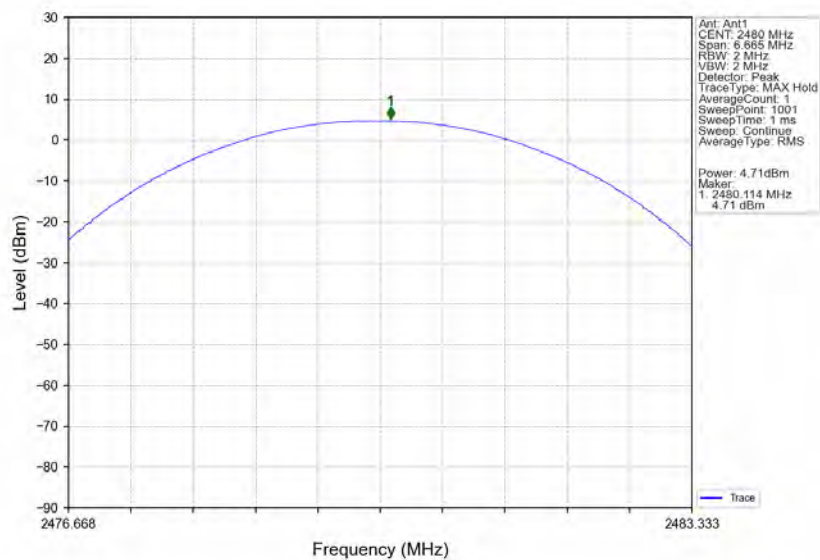
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



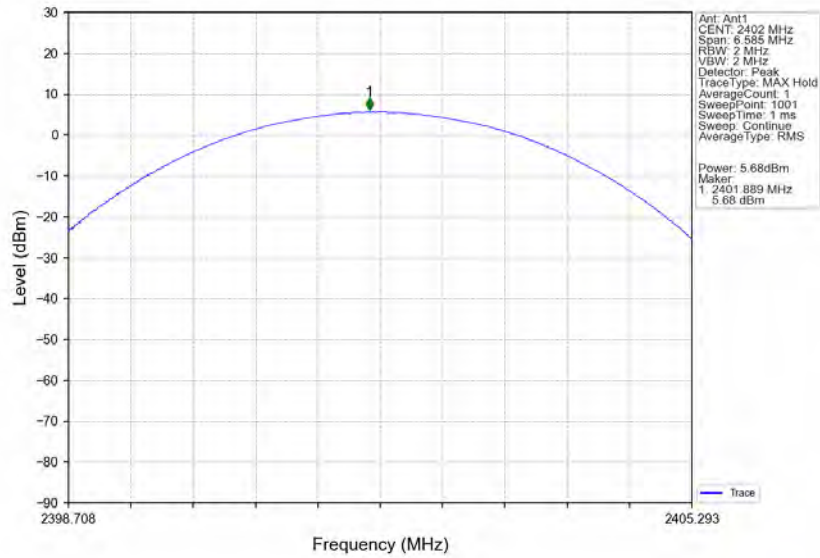
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



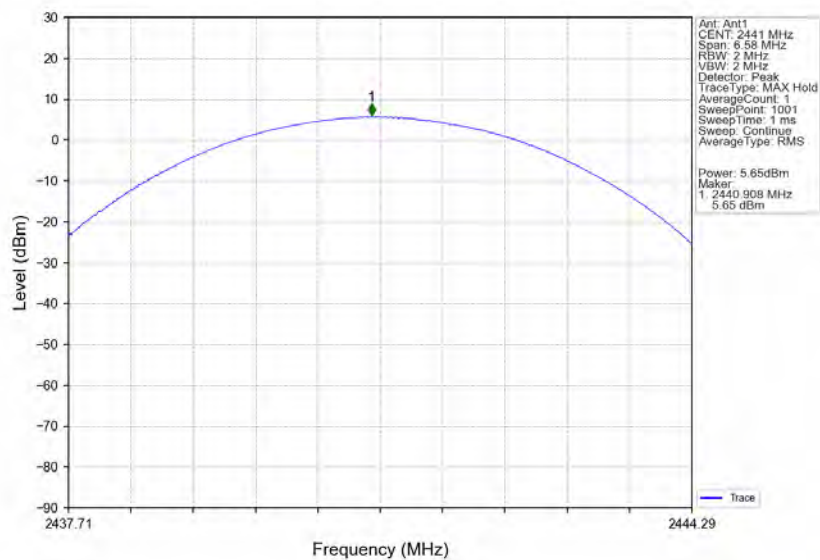
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



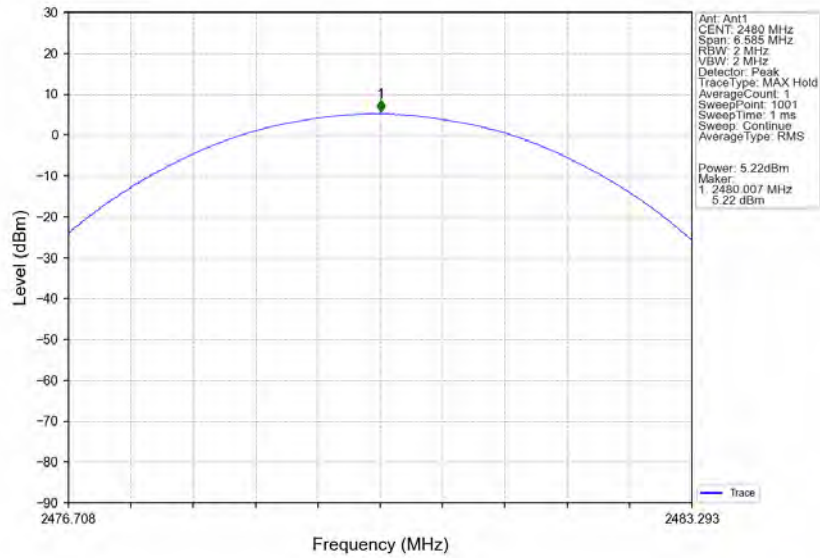
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV





4. Carrier Frequency Separation

4.1 Test Result

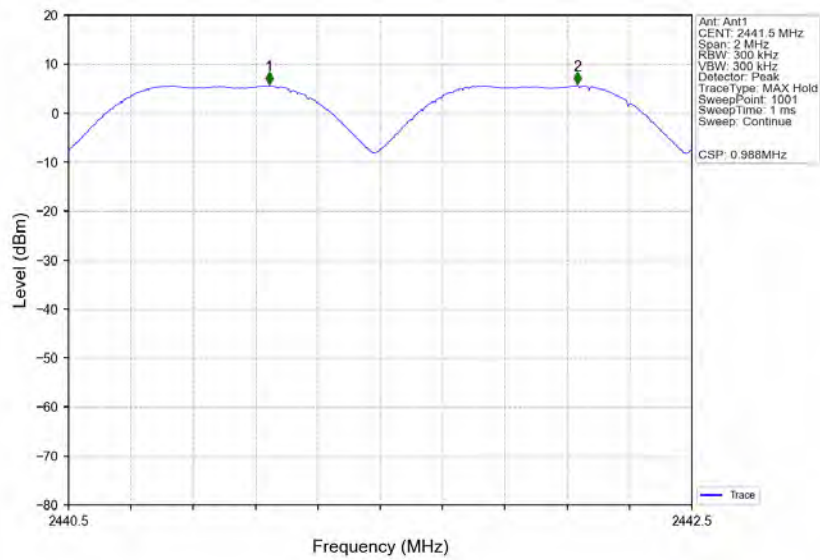
4.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.988	0.954	≥ 0.954	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.333	≥ 0.889	Pass
8DPSK	SISO	HOPP	3DH5	0.979	1.317	≥ 0.878	Pass

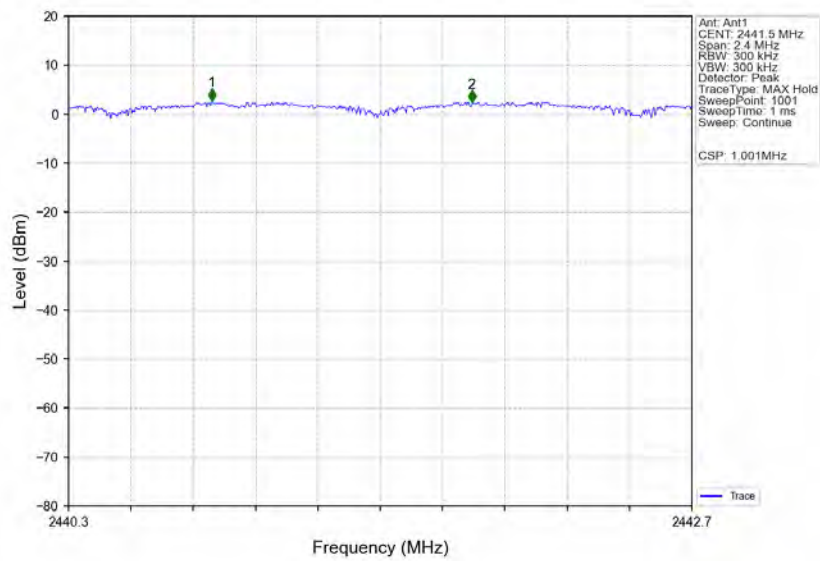
4.2 Test Graph

4.2.1 Ant1

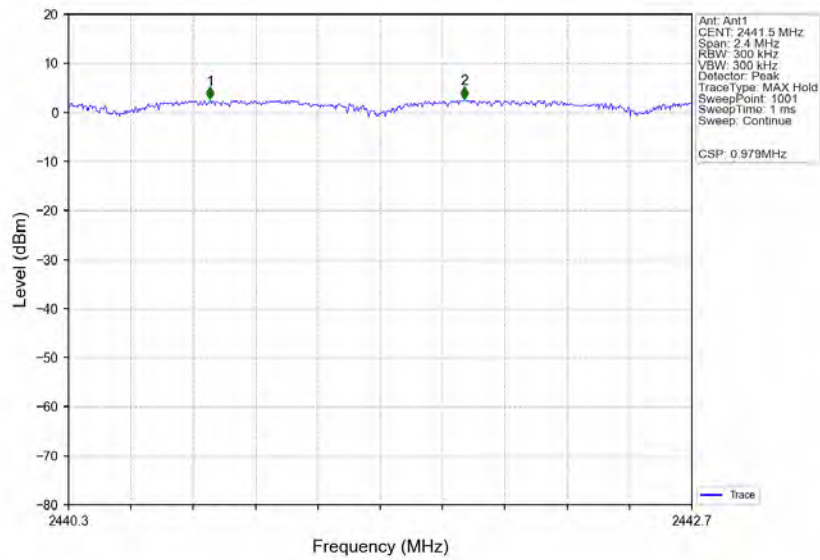
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV





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5. Number of Hopping Frequencies

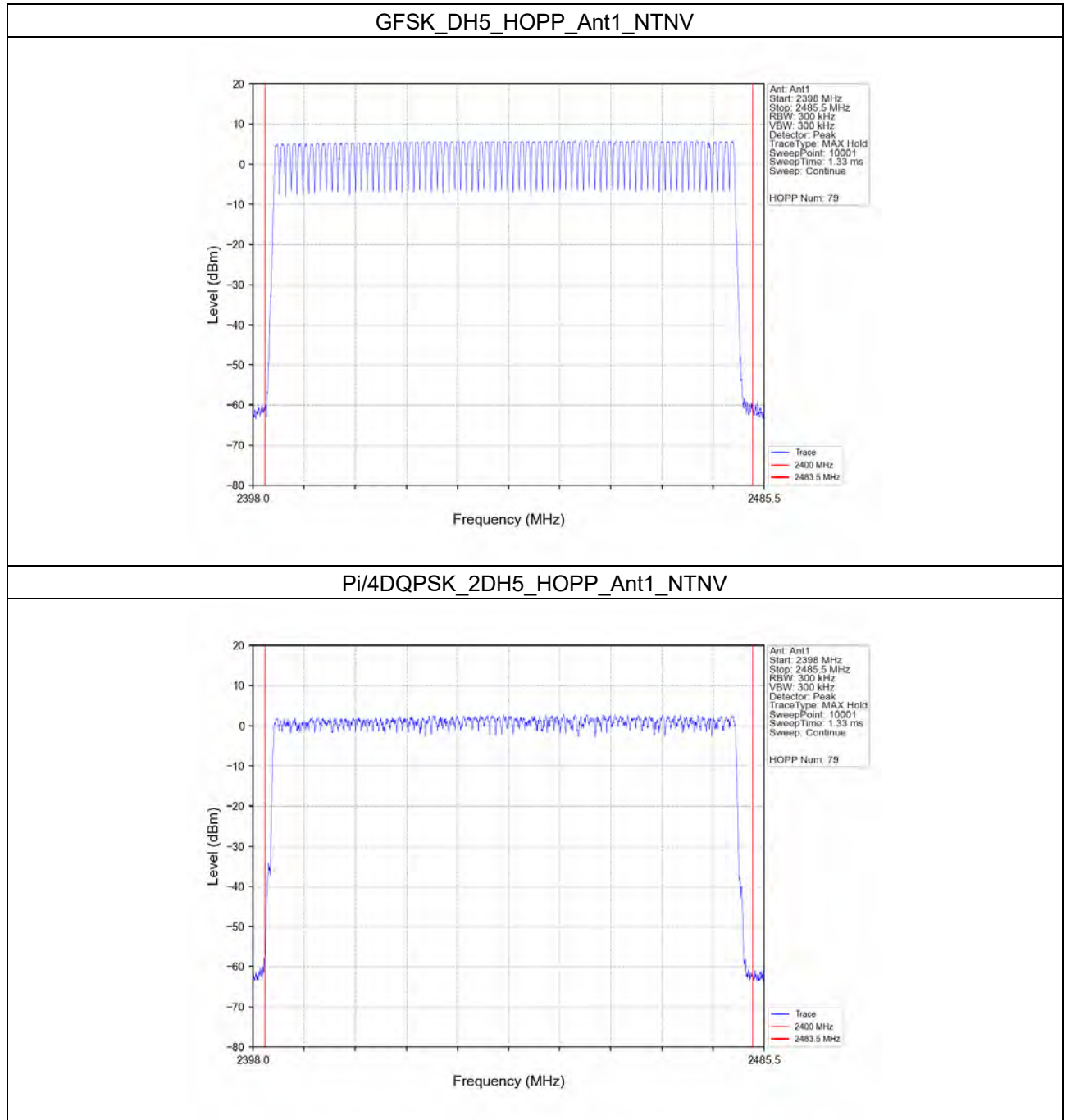
5.1 Test Result

5.1.1 HoppNum

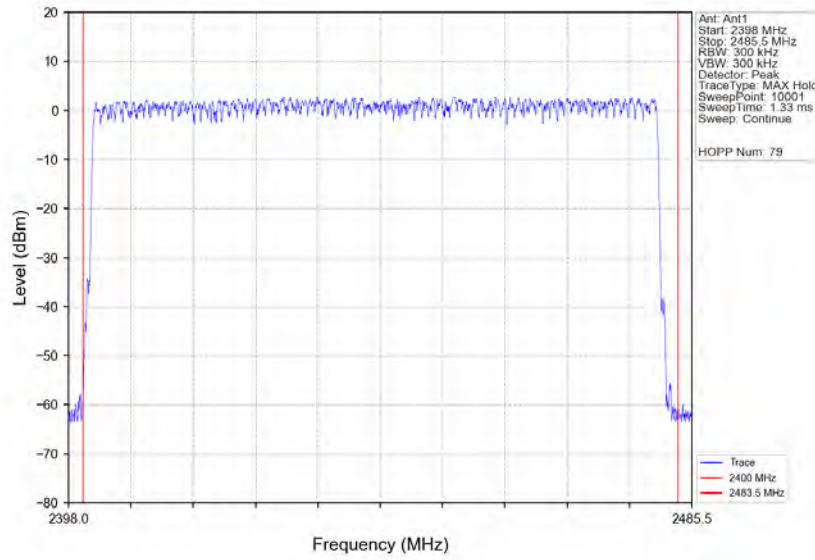
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	≥ 15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	≥ 15	Pass
8DPSK	SISO	HOPP	3DH5	79	≥ 15	Pass

5.2 Test Graph

5.2.1 HoppNum



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Time of Occupancy (Dwell Time)

6.1 Test Result

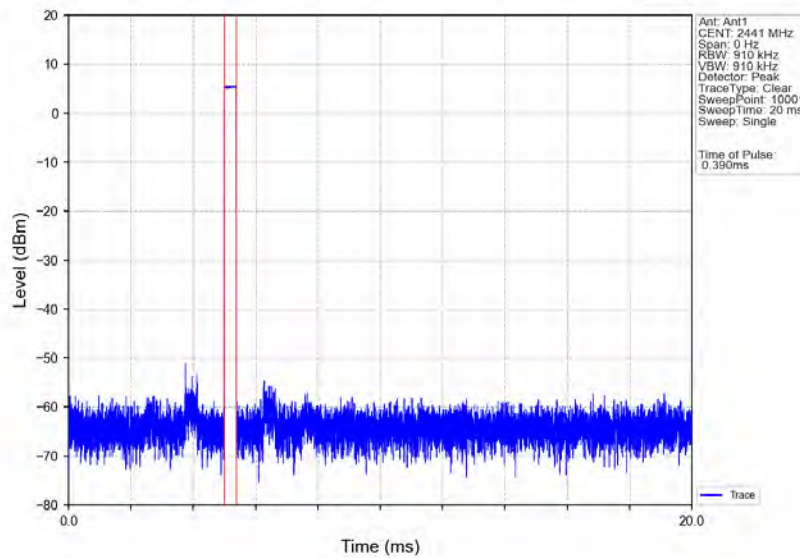
6.1.1 Ant1

Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.390	31.600	320	124.800	<=400	Pass
			DH3	1.646	31.600	168	276.528	<=400	Pass
			DH5	2.894	31.600	115	332.810	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.392	31.600	318	124.656	<=400	Pass
			2DH3	1.648	31.600	150	247.200	<=400	Pass
			2DH5	2.896	31.600	116	335.936	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.394	31.600	320	126.080	<=400	Pass
			3DH3	1.642	31.600	157	257.794	<=400	Pass
			3DH5	2.898	31.600	106	307.188	<=400	Pass

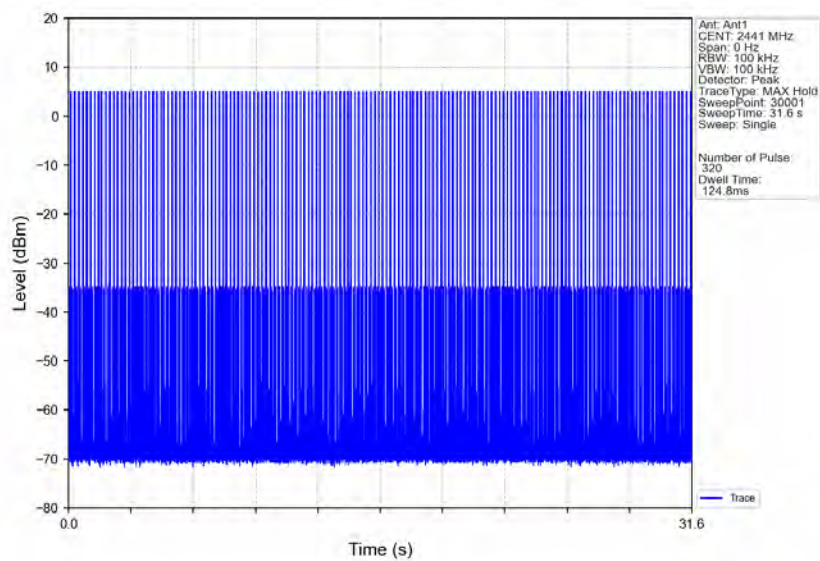
6.2 Test Graph

6.2.1 Ant1

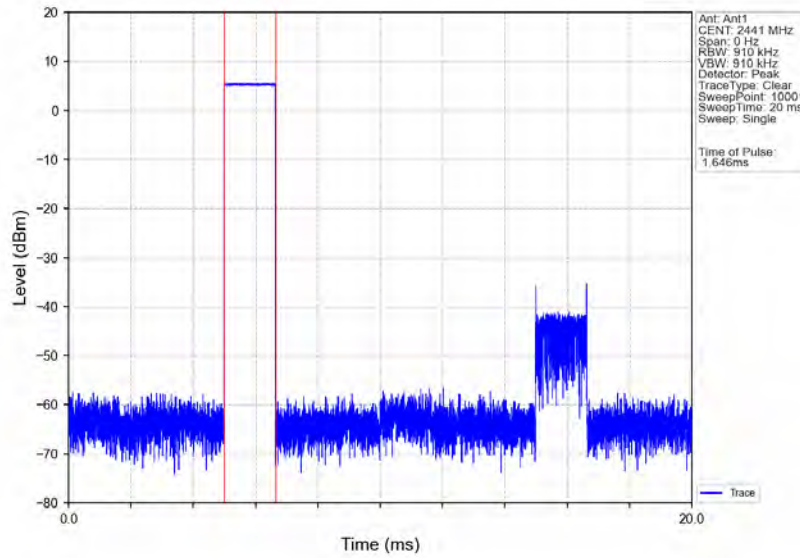
GFSK_DH1_HOPP_Ant1_NTNV



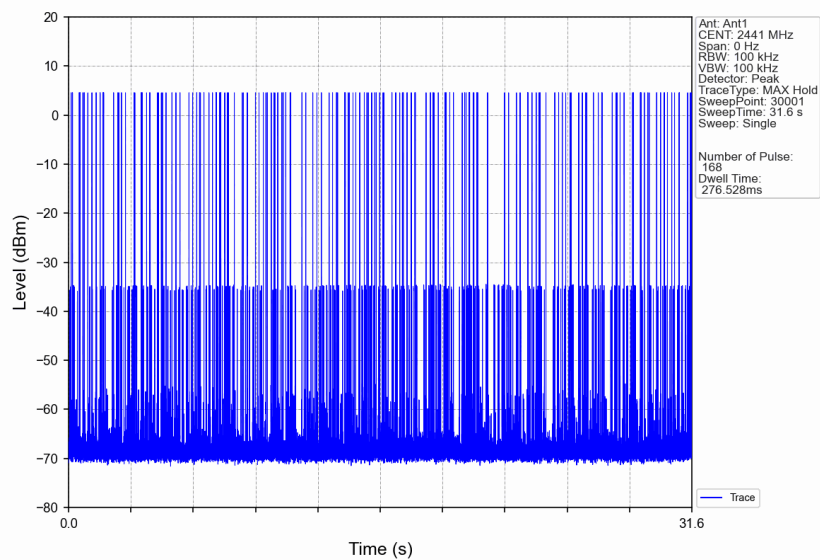
GFSK_DH1_HOPP_Ant1_NTNV



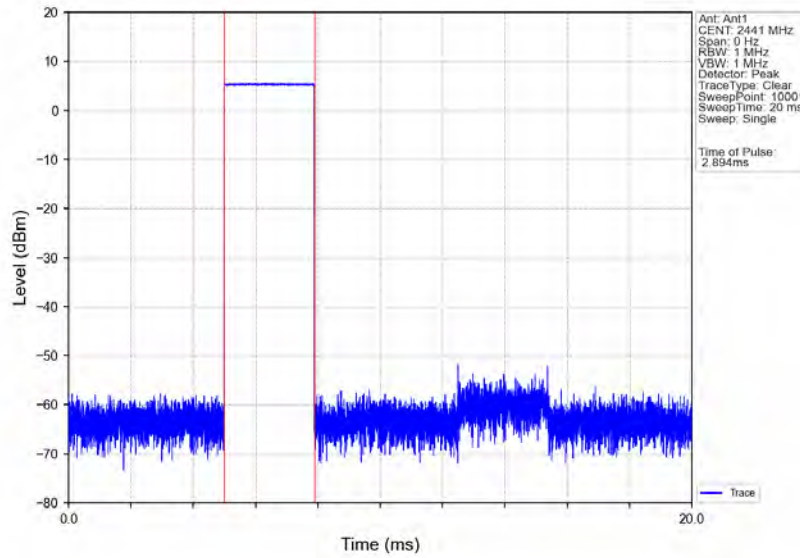
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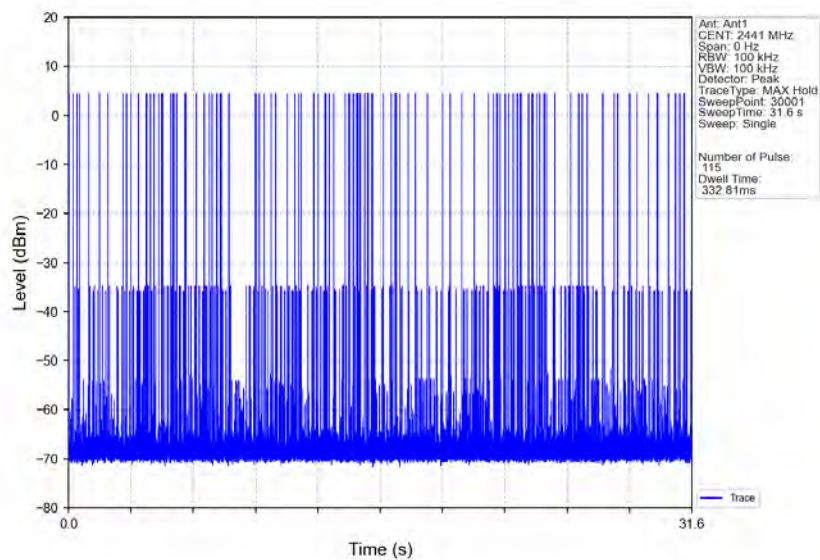
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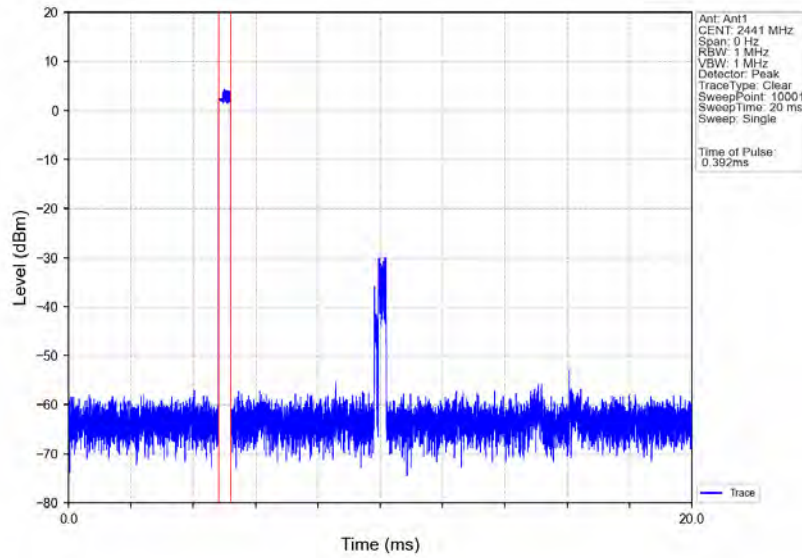
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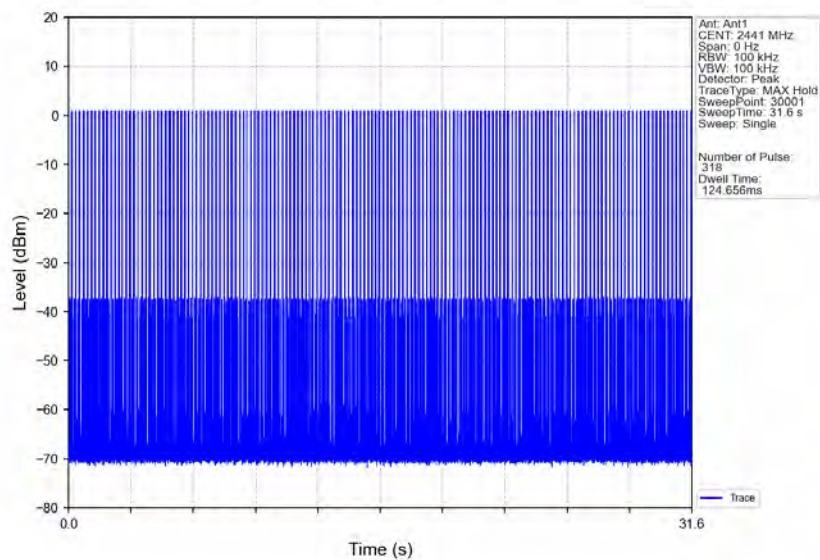
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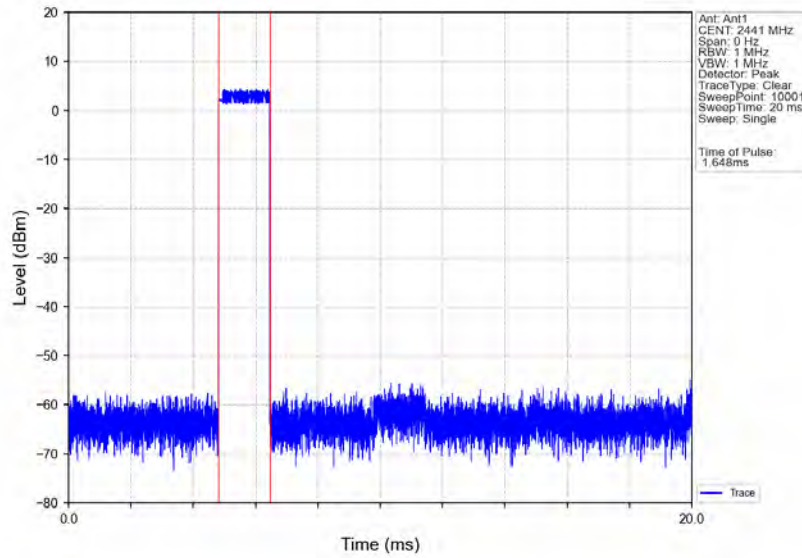
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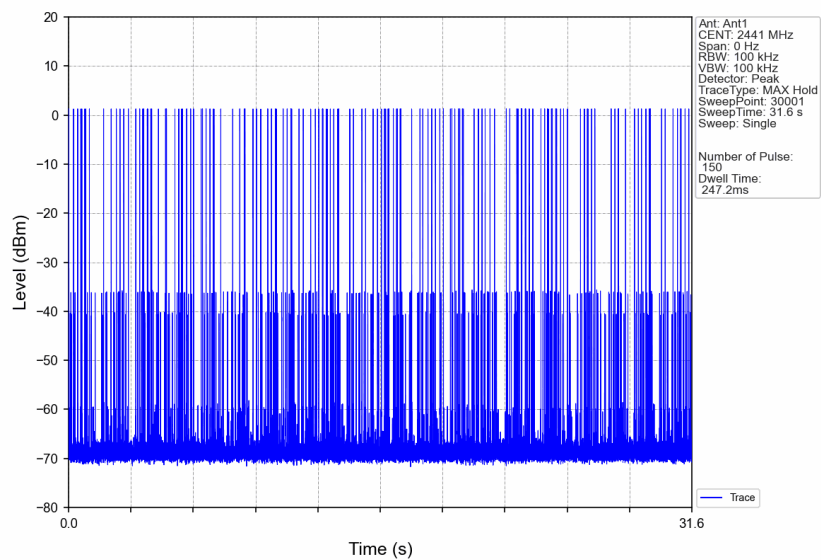
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



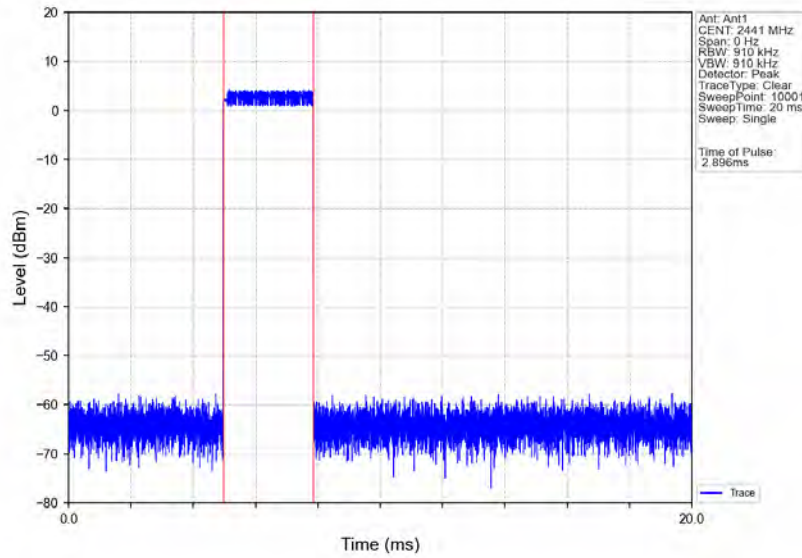
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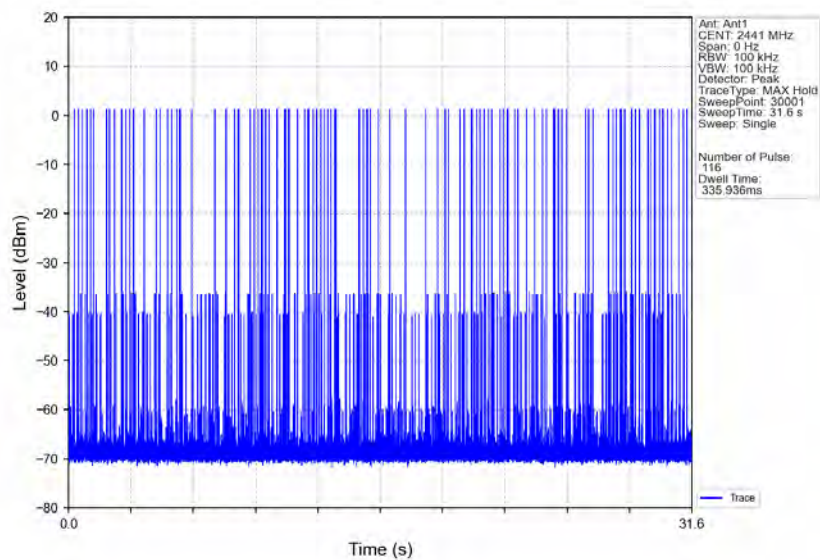
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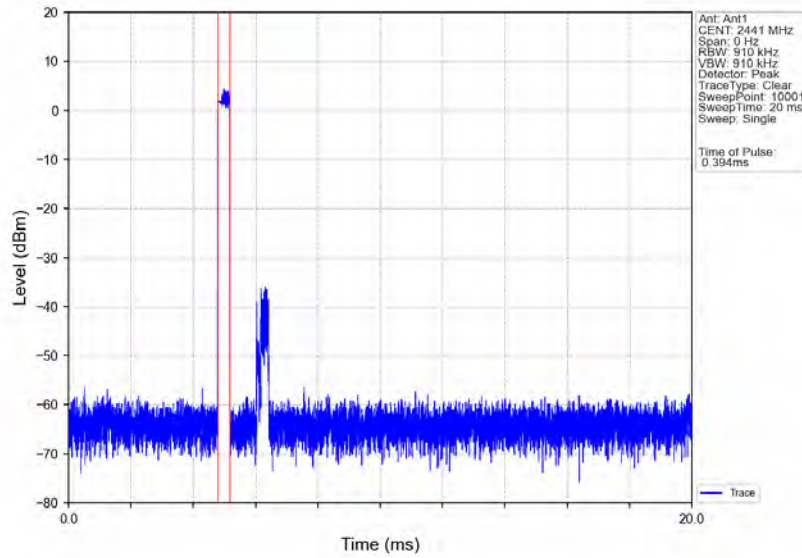
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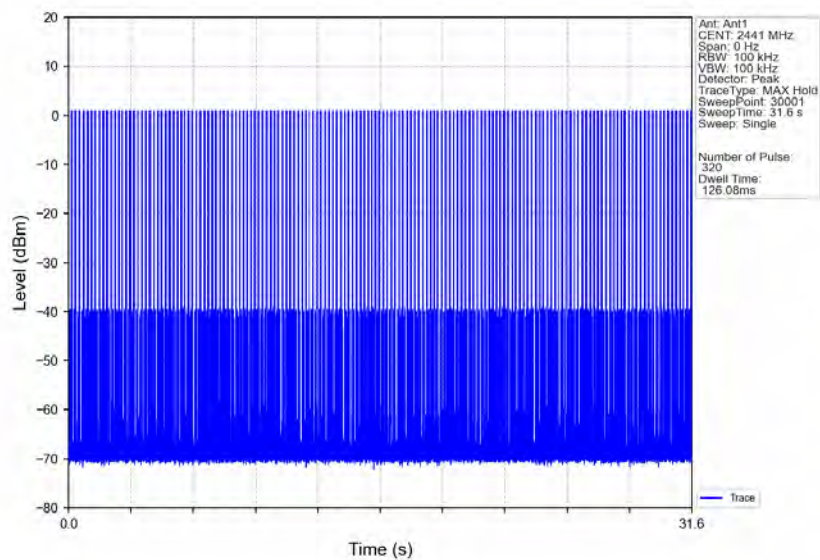
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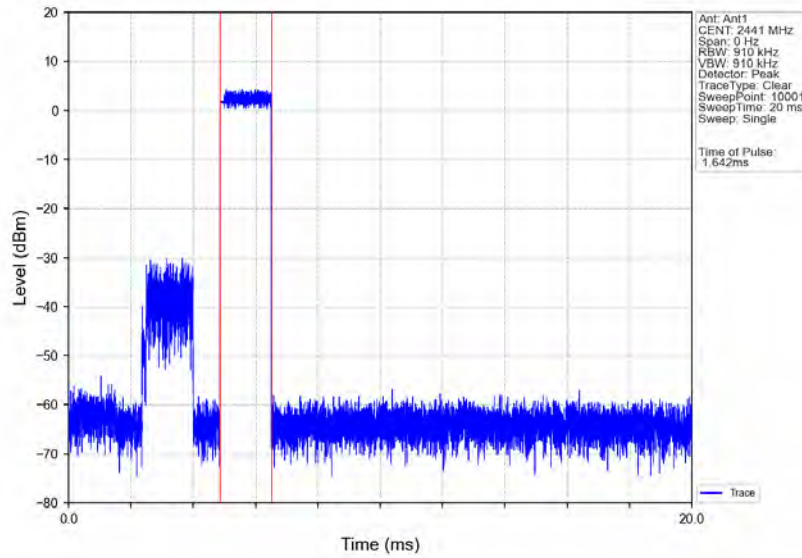
8DPSK_3DH1_HOPP_Ant1_NTNV



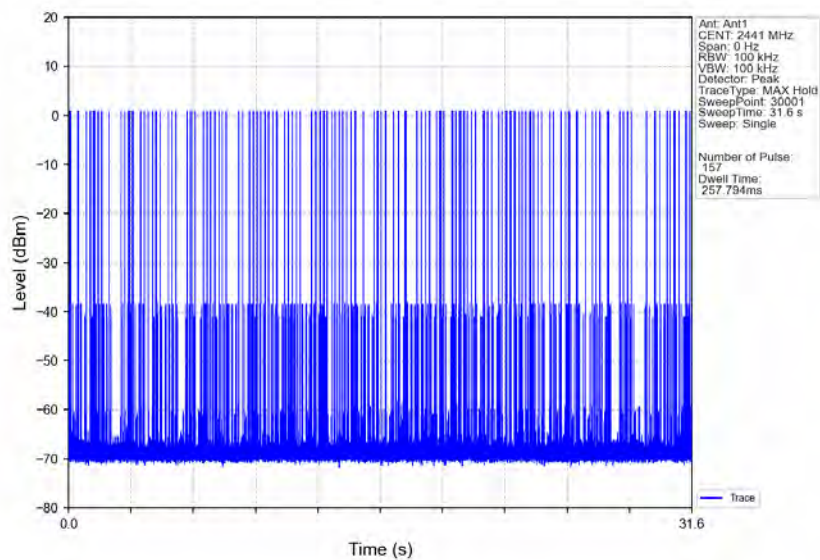
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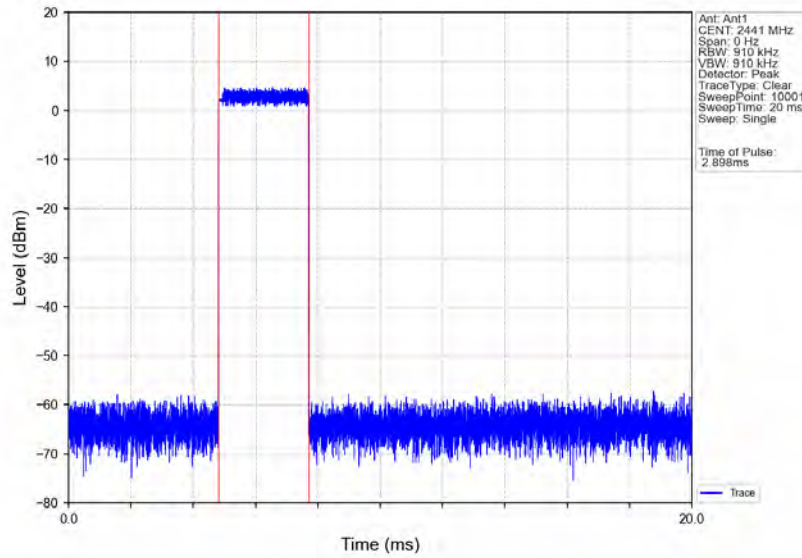
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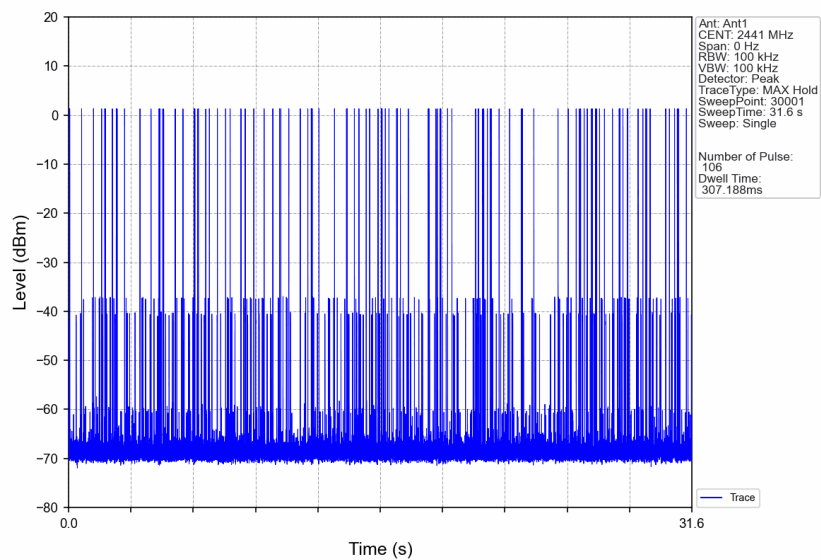
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



7. Unwanted Emissions In Non-restricted Frequency Bands

7.1 Test Result

7.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	5.08
		2441	DH5	1	5.30
		2480	DH5	1	5.01
Pi/4DQPSK	SISO	2402	2DH5	1	1.65
		2441	2DH5	1	2.01
		2480	2DH5	1	1.64
8DPSK	SISO	2402	3DH5	1	1.84
		2441	3DH5	1	1.78
		2480	3DH5	1	1.72

Note1: Refer to RSS-247 Issue 3 section 5.5 and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

7.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	5.30	-14.70	Pass
		2441	DH5	1	5.30	-14.70	Pass
		2480	DH5	1	5.30	-14.70	Pass
		HOPP	DH5	1	5.30	-14.70	Pass
					5.30	-14.70	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	2.01	-17.99	Pass
		2441	2DH5	1	2.01	-17.99	Pass
		2480	2DH5	1	2.01	-17.99	Pass
		HOPP	2DH5	1	2.01	-17.99	Pass
					2.01	-17.99	Pass
8DPSK	SISO	2402	3DH5	1	1.84	-18.16	Pass
		2441	3DH5	1	1.84	-18.16	Pass
		2480	3DH5	1	1.84	-18.16	Pass
		HOPP	3DH5	1	1.84	-18.16	Pass
					1.84	-18.16	Pass

Note1: Refer to RSS-247 Issue 3 section 5.5 and ANSI C63.10-2013, the channel contains the maximum



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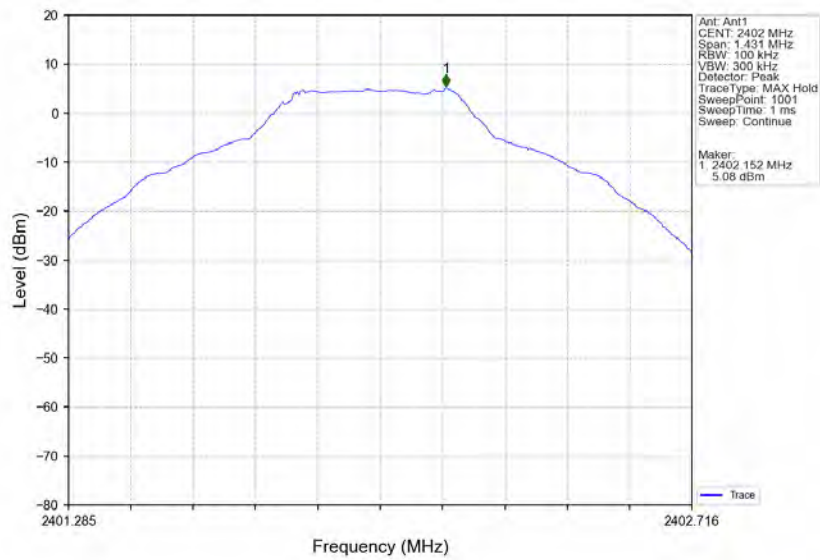
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PSD level was used to establish the reference level.
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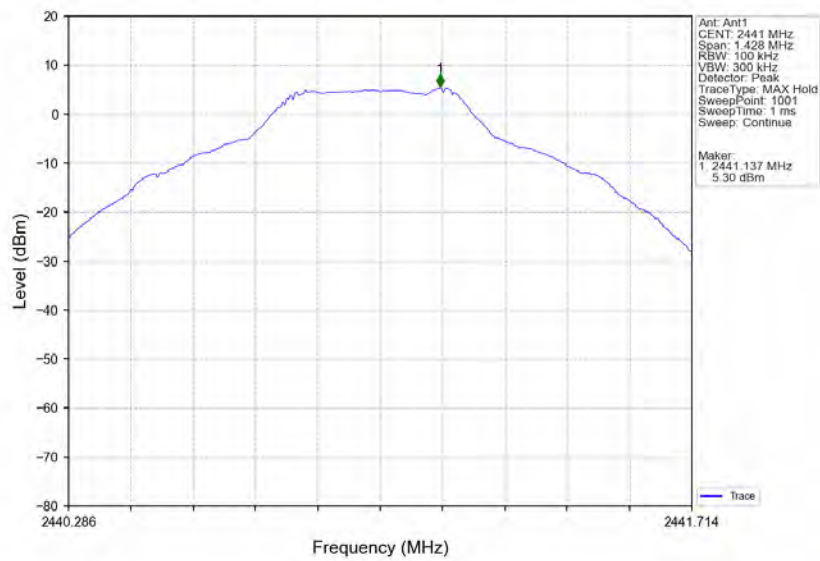
7.2 Test Graph

7.2.1 Ref

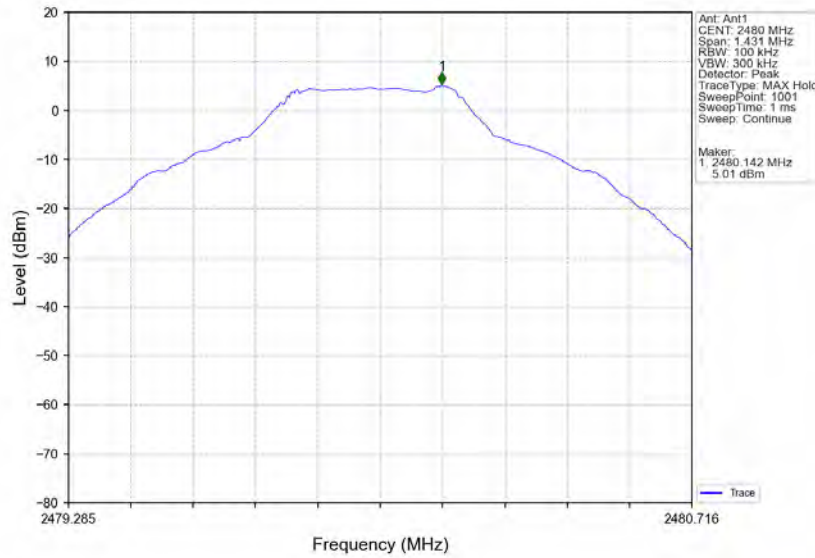
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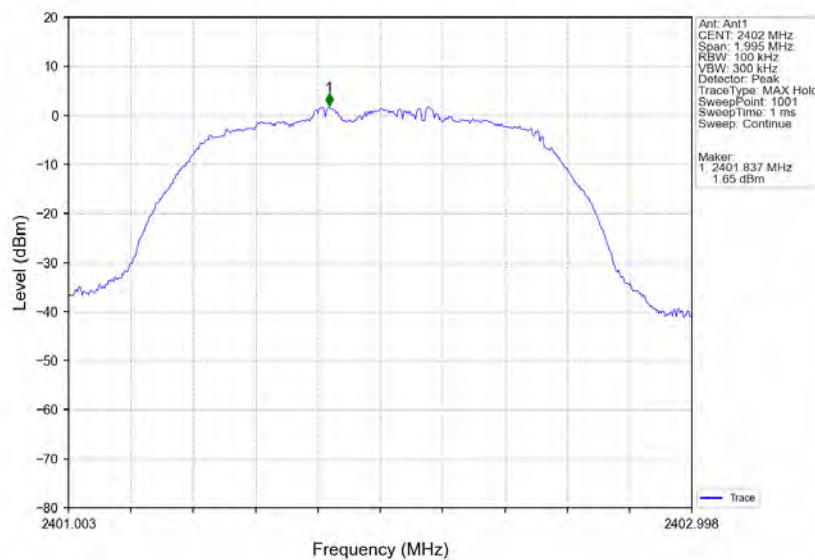
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



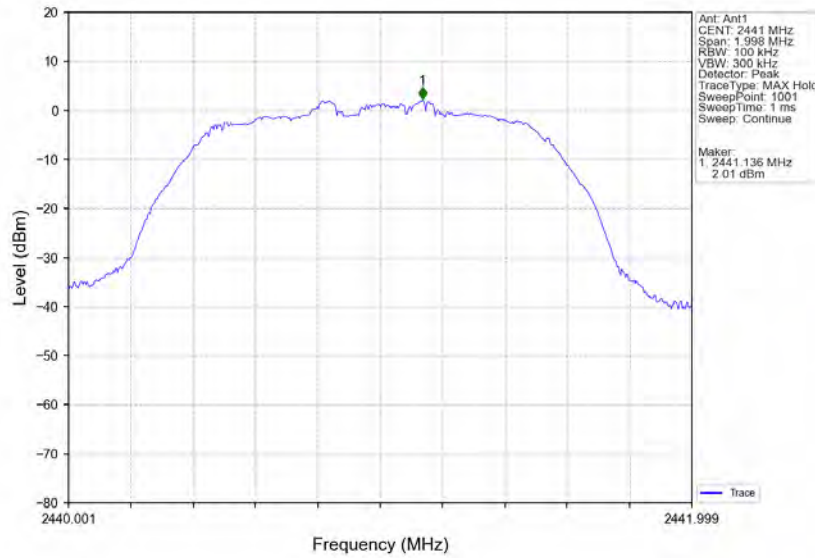
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



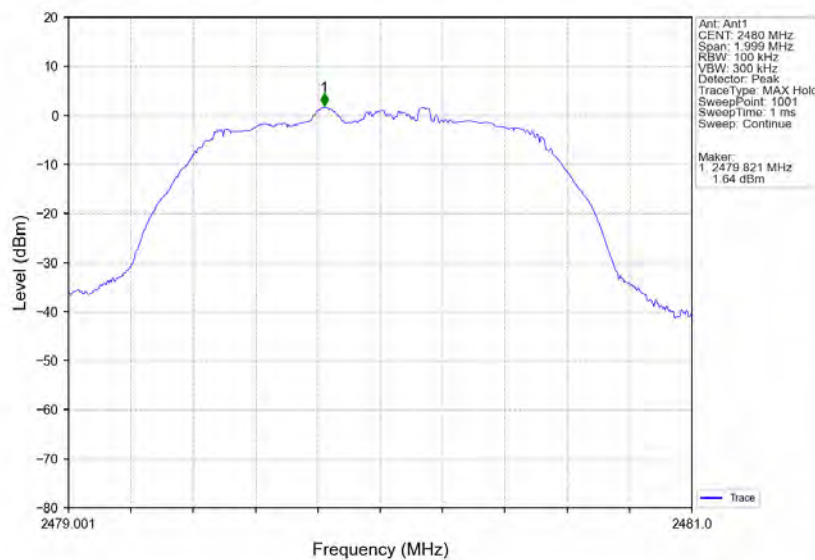
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



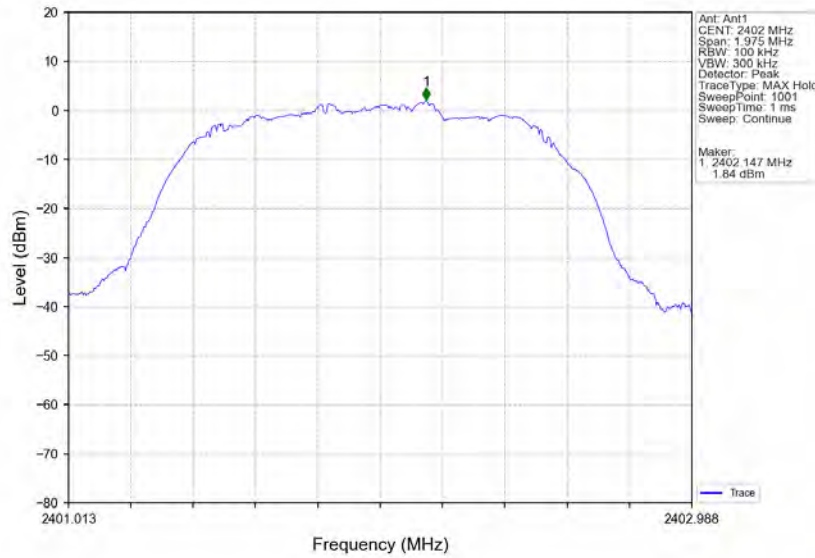
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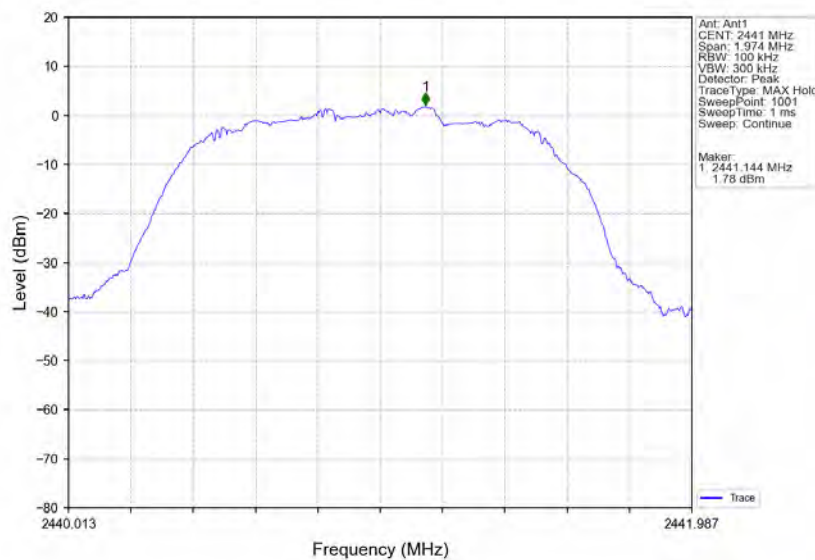
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



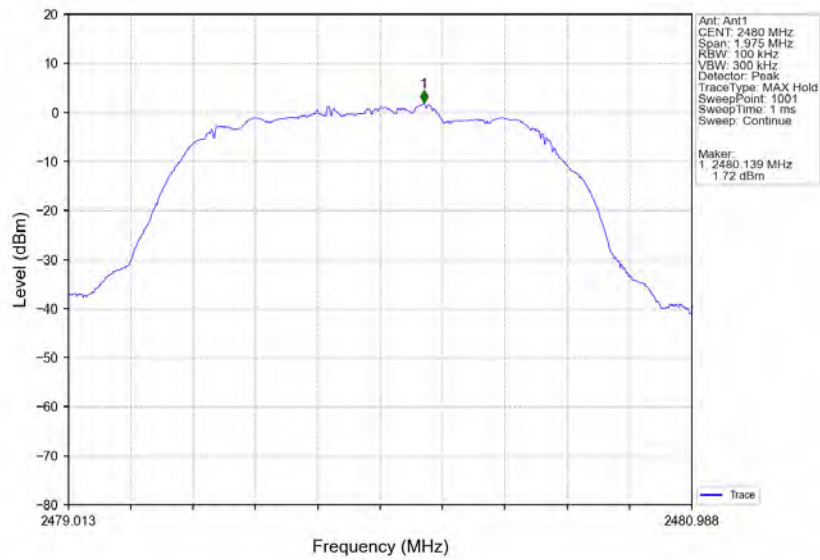
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

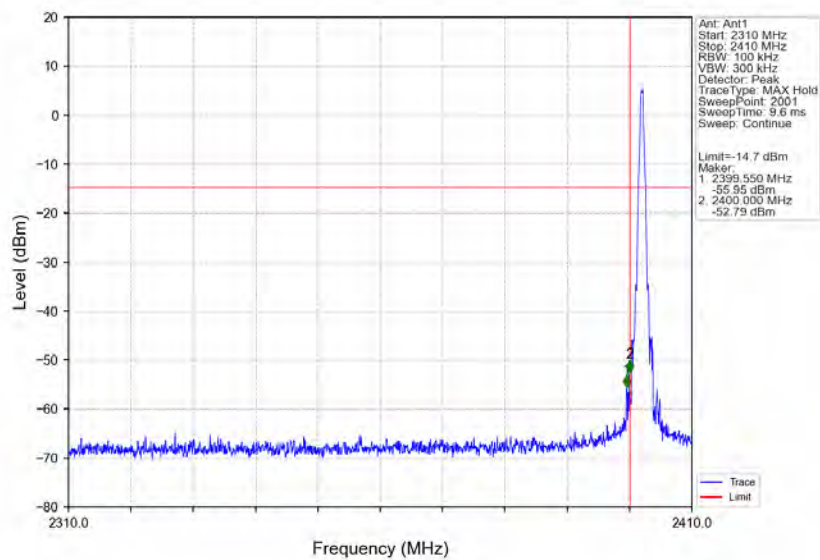


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

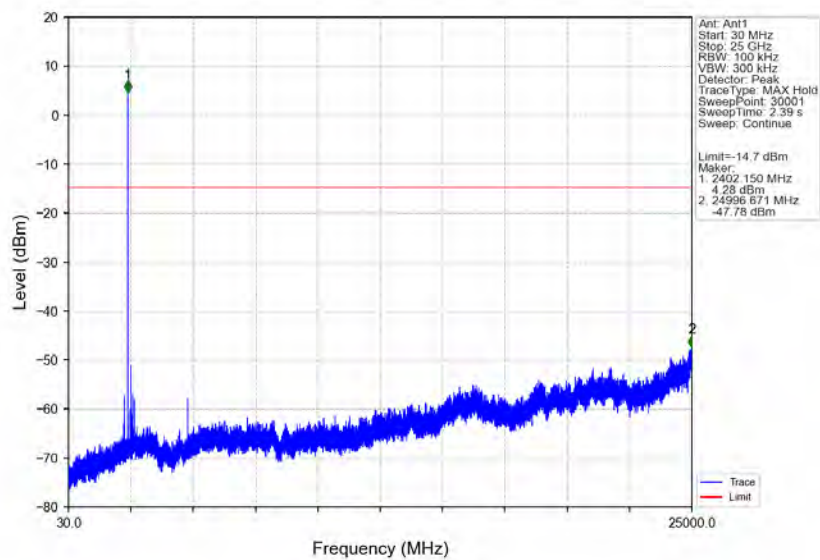


7.2.2 CSE

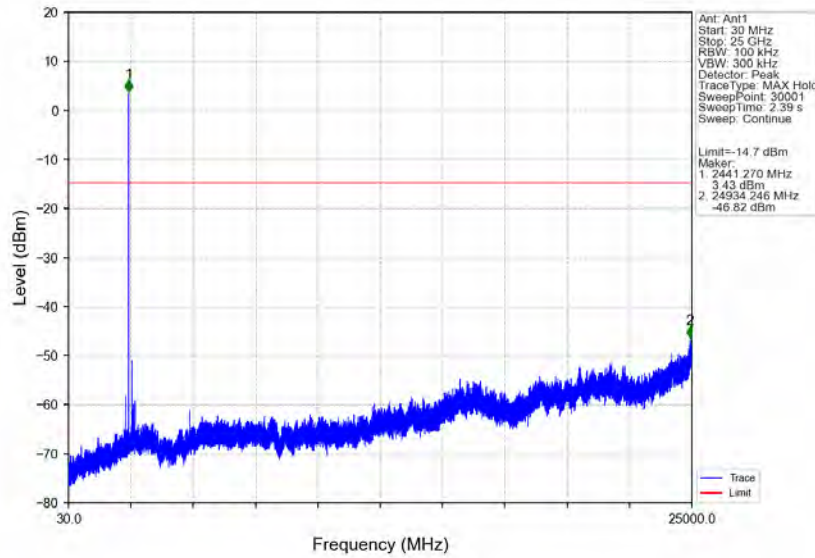
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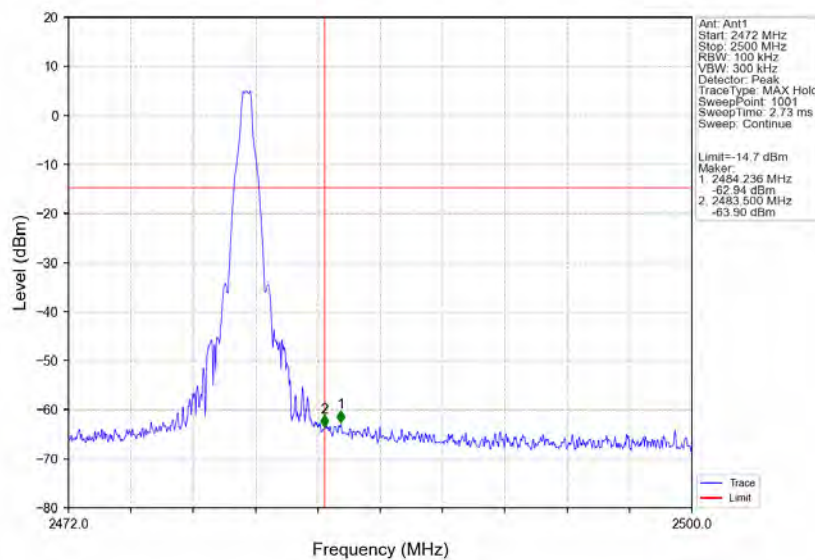
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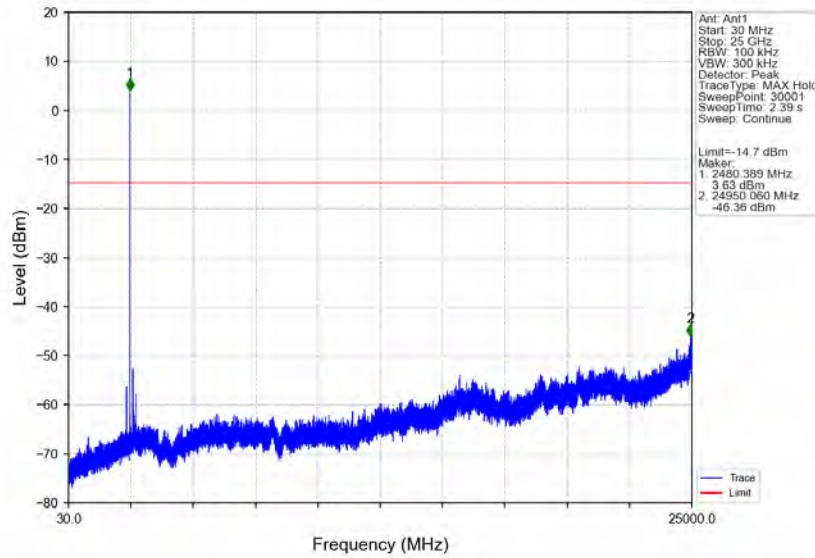
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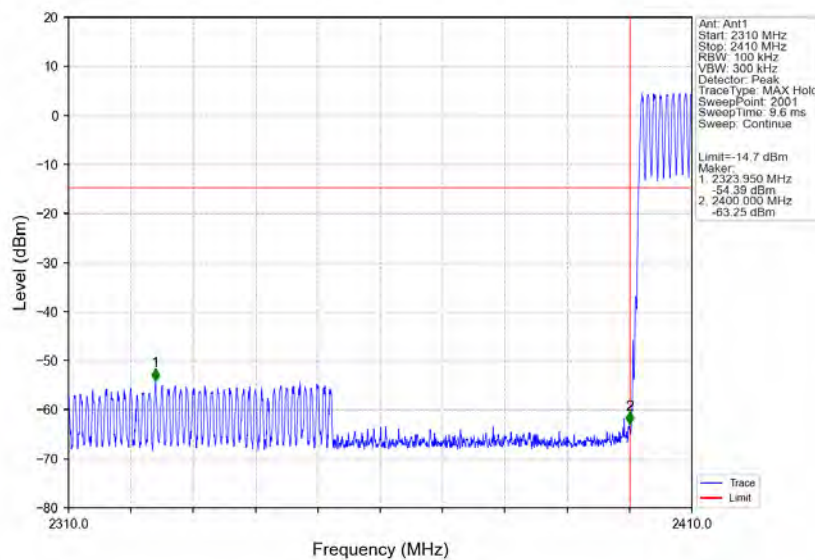
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



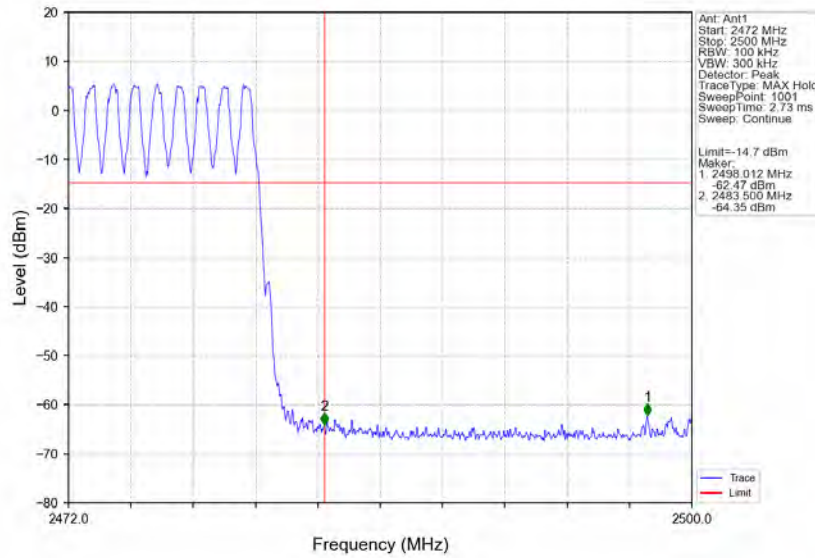
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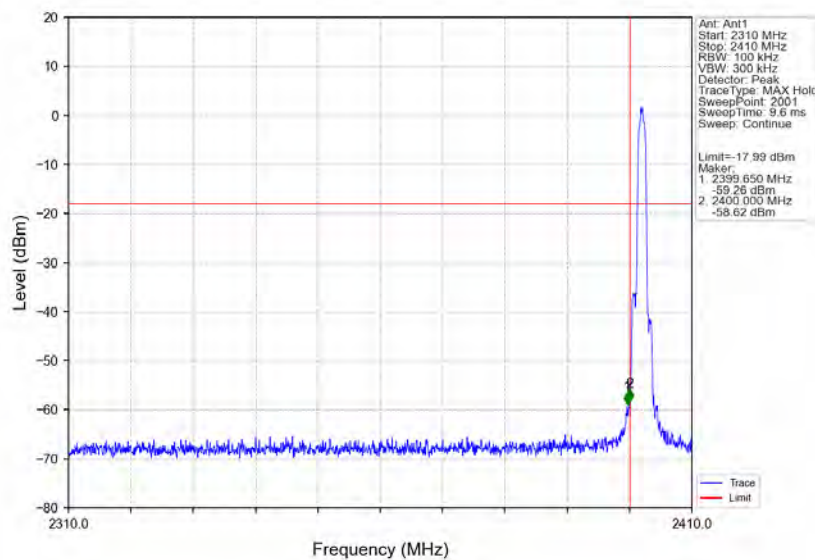
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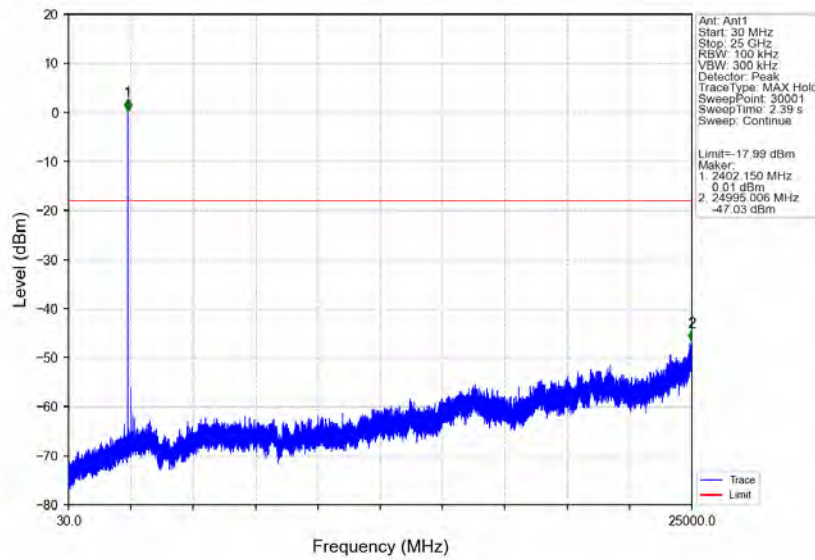
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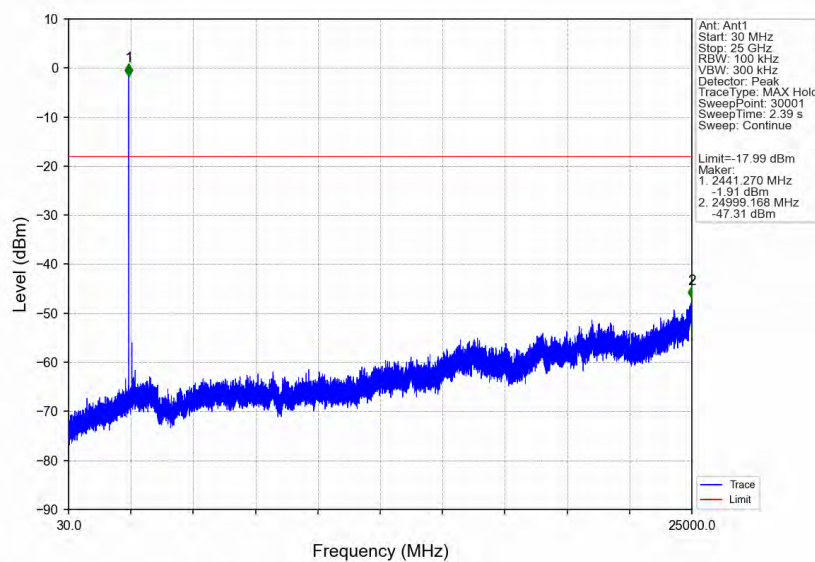
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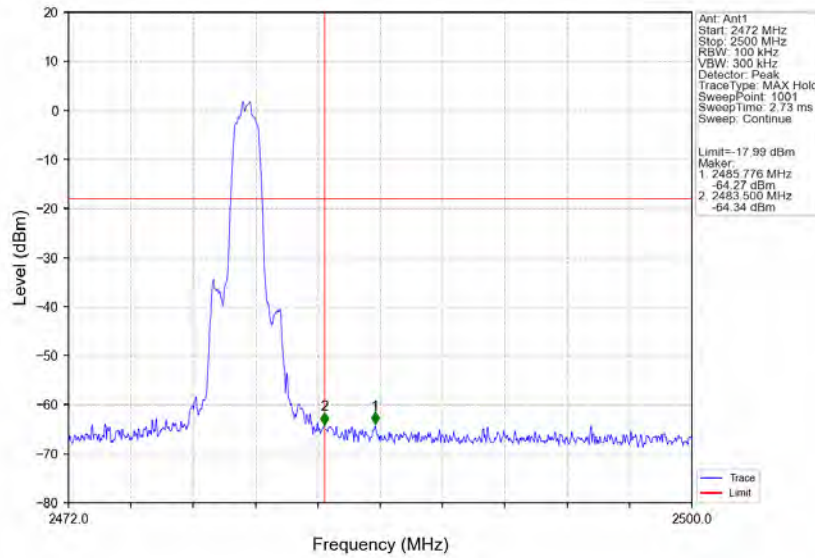
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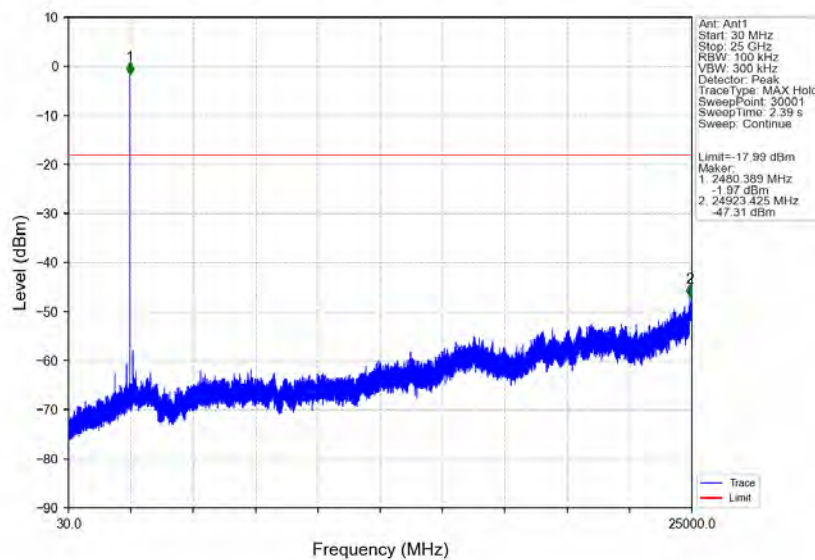
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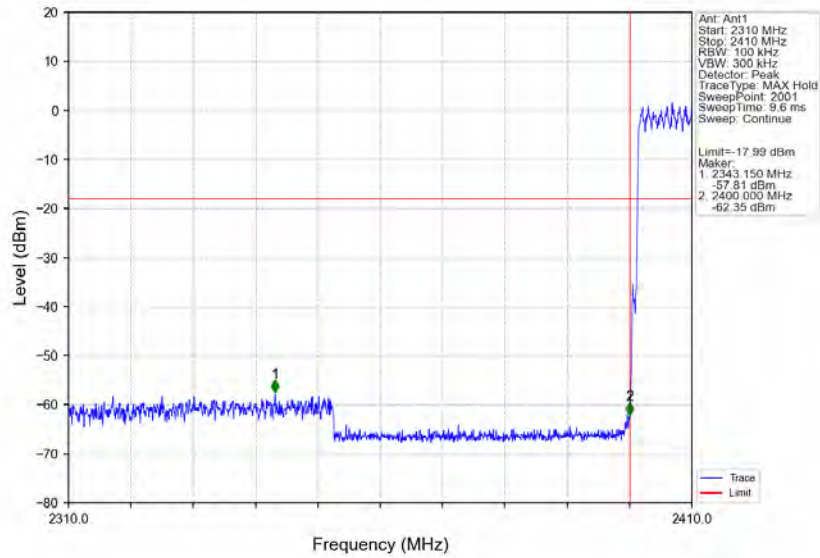
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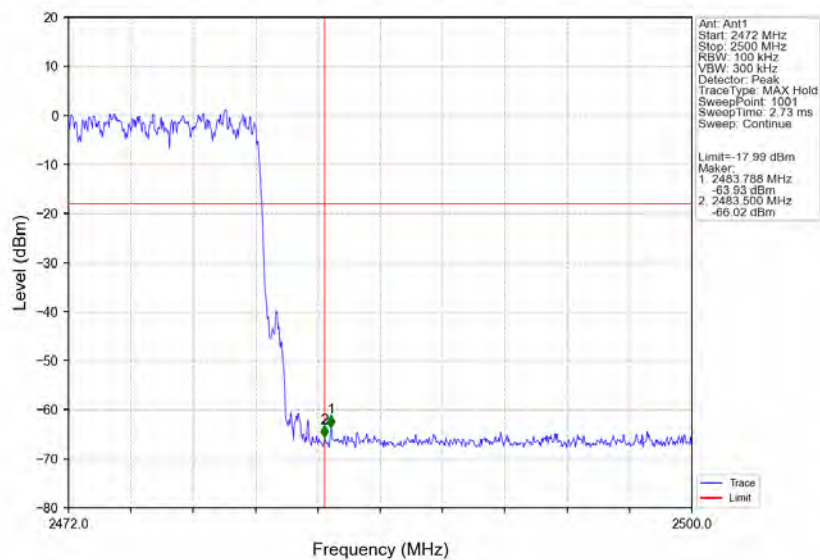
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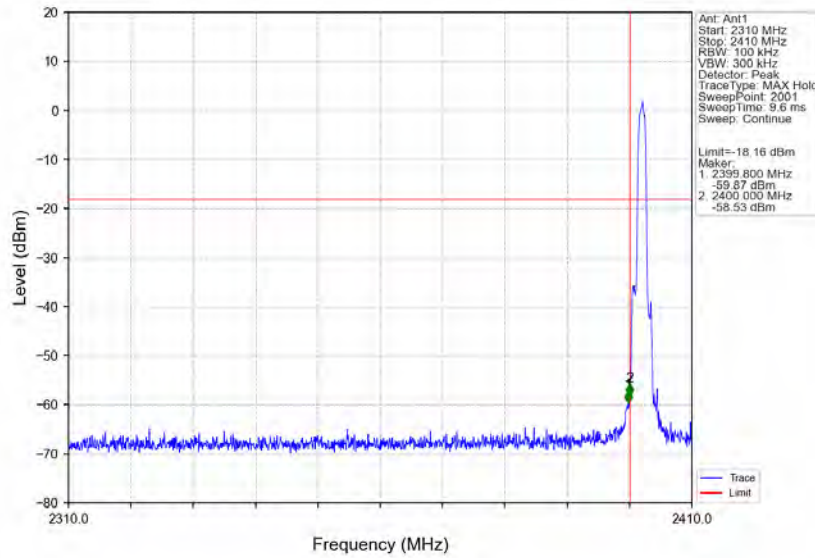
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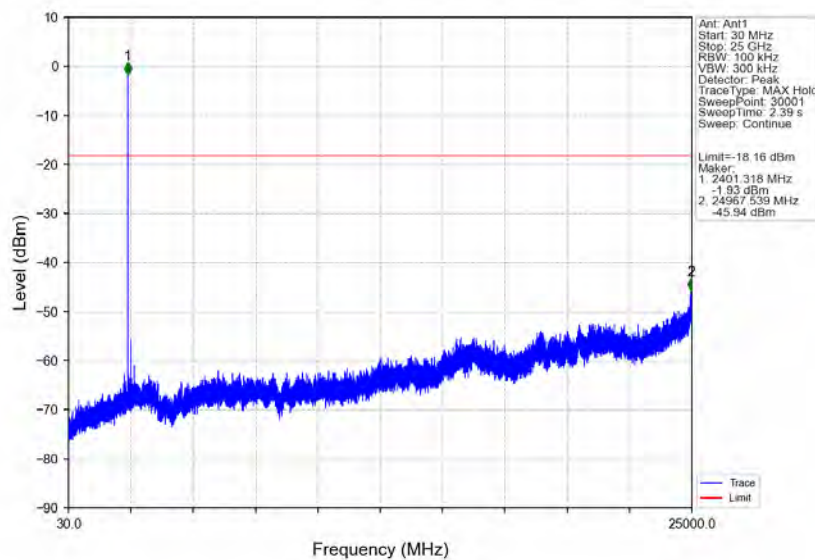
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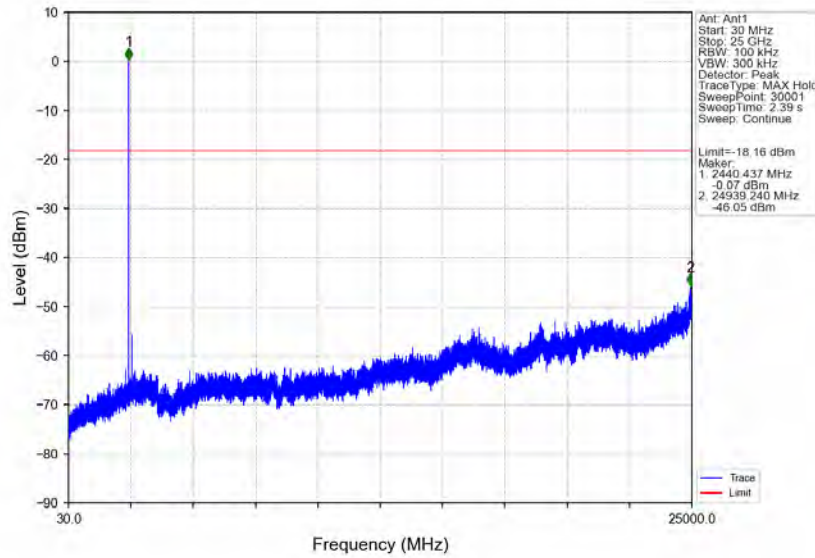
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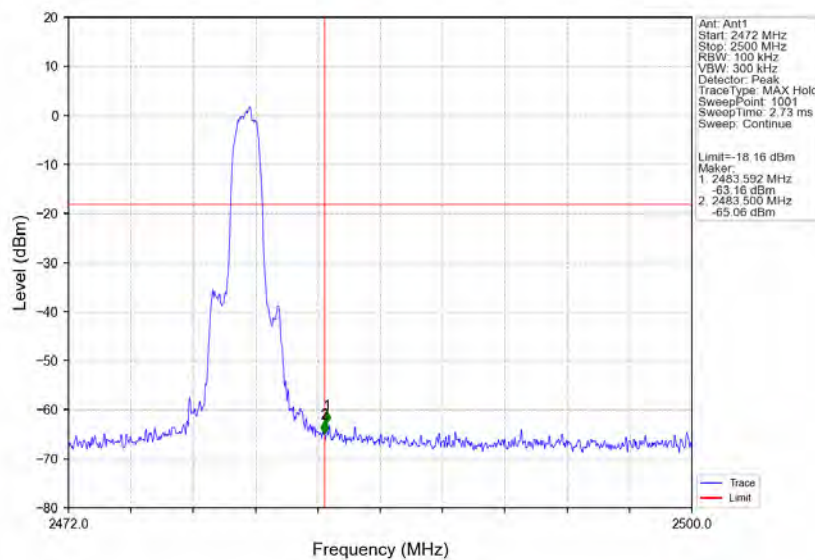
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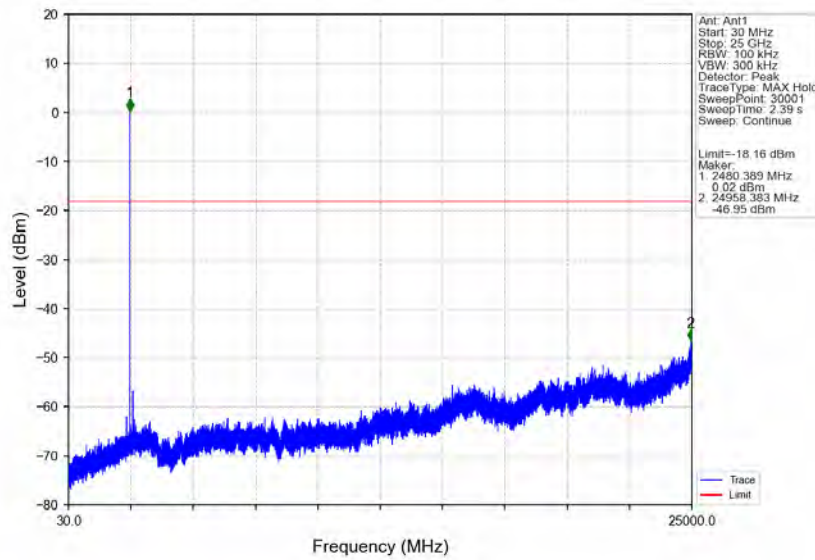
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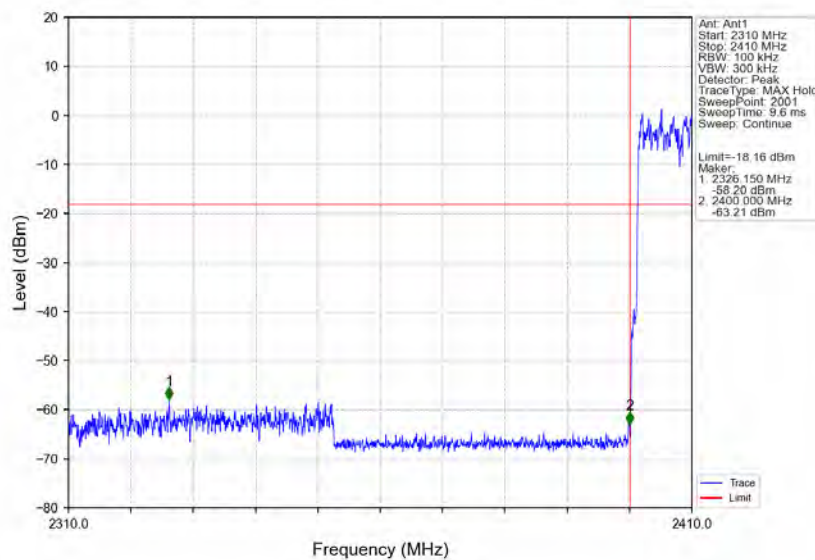
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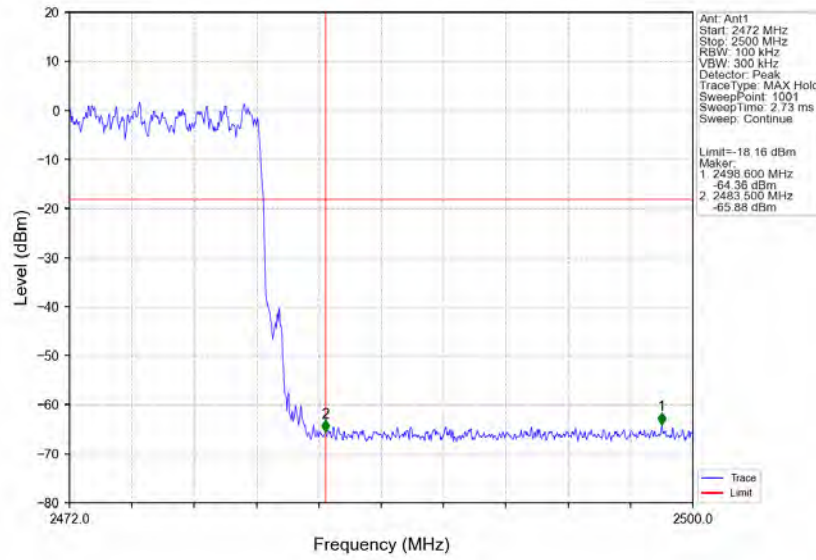
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8. Frequency Error

8.1 Test Result

8.1.1 Ant1

Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	Temperature (°C)	Voltage (VAC)	Measured Frequency (MHz)	Limit (MHz)	Verdict
GFSK	SISO	2402	DH5	20	102	2401.982	2401.662 to 2402.338	Pass
					120	2401.984	2401.662 to 2402.338	Pass
					138	2401.983	2401.662 to 2402.338	Pass
				-20	120	2401.983	2401.662 to 2402.338	Pass
				50	120	2401.983	2401.662 to 2402.338	Pass
		2441	DH5	20	102	2440.982	2440.661 to 2441.339	Pass
					120	2440.983	2440.661 to 2441.339	Pass
					138	2440.983	2440.661 to 2441.339	Pass
				-20	120	2440.981	2440.661 to 2441.339	Pass
				50	120	2440.984	2440.661 to 2441.339	Pass
		2480	DH5	20	102	2479.984	2479.662 to 2480.338	Pass
					120	2479.982	2479.662 to 2480.338	Pass
					138	2479.982	2479.662 to 2480.338	Pass
				-20	120	2479.981	2479.662 to 2480.338	Pass
				50	120	2479.982	2479.662 to 2480.338	Pass
Pi/4DQPSK	SISO	2402	2DH5	20	102	2401.980	2401.527 to 2402.473	Pass
					120	2401.980	2401.527 to 2402.473	Pass
					138	2401.978	2401.527 to 2402.473	Pass
				-20	120	2401.982	2401.527 to 2402.473	Pass
				50	120	2401.984	2401.527 to 2402.473	Pass
		2441	2DH5	20	102	2440.978	2440.526 to 2441.474	Pass
					120	2440.981	2440.526 to 2441.474	Pass
					138	2440.983	2440.526 to 2441.474	Pass
				-20	120	2440.982	2440.526 to 2441.474	Pass
				50	120	2440.978	2440.526 to 2441.474	Pass
		2480	2DH5	20	102	2479.978	2479.526 to 2480.474	Pass
					120	2479.982	2479.526 to 2480.474	Pass
					138	2479.981	2479.526 to 2480.474	Pass
				-20	120	2479.977	2479.526 to 2480.474	Pass
				50	120	2479.978	2479.526 to 2480.474	Pass
8DPSK	SISO	2402	3DH5	20	102	2401.977	2401.525 to 2402.475	Pass
					120	2401.980	2401.525 to 2402.475	Pass
					138	2401.978	2401.525 to 2402.475	Pass
				-20	120	2401.984	2401.525 to 2402.475	Pass
				50	120	2401.978	2401.525 to 2402.475	Pass

		2441	3DH5	20	102	2440.980	2440.524 to 2441.476	Pass
					120	2440.980	2440.524 to 2441.476	Pass
					138	2440.980	2440.524 to 2441.476	Pass
				-20	120	2440.981	2440.524 to 2441.476	Pass
				50	120	2440.972	2440.524 to 2441.476	Pass
		2480	3DH5	20	102	2479.978	2479.525 to 2480.475	Pass
					120	2479.978	2479.525 to 2480.475	Pass
					138	2479.980	2479.525 to 2480.475	Pass
				-20	120	2479.977	2479.525 to 2480.475	Pass
				50	120	2479.978	2479.525 to 2480.475	Pass

- End of the Report -