



SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

EMC-TRF-01 Rev 2.1

Report No.: GZCR260100026502

Page: 1 of 88

FCC ID: 2BBKO-LEDDMMB

TEST REPORT

Application No.: GZCR2601000265LM
Applicant: Shenzhen Bojia Electronic Technology Co., LTD
Address of Applicant: 2nd Floor, Building 5, Tongfuyu Xufa Science Park, Shangcun Village, Gongming Street, Guangming District, Shenzhen City, Guangdong, China
Manufacturer: Shenzhen Bojia Electronic Technology Co., LTD
Address of Manufacturer: 2nd Floor, Building 5, Tongfuyu Xufa Science Park, Shangcun Village, Gongming Street, Guangming District, Shenzhen City, Guangdong, China
Factory: Shenzhen Bojia Electronic Technology Co., LTD
Address of Factory: 2nd Floor, Building 5, Tongfuyu Xufa Science Park, Shangcun Village, Gongming Street, Guangming District, Shenzhen City, Guangdong, China
Product Name: Audio With LED Lights
Model No.: LED-MM-B
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2026-01-30
Date of Test: 2026-02-10 to 2026-04-22
Date of Issue: 2026-04-24

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



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Guangzhou Branch Calibration Laboratory

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Revision Record			
Version	Report No.	Date	Remark
01	GZCR260100026502	2026-04-24	Original

Authorized for issue by:			
		Key Liang	
		Key Liang/Project Engineer	
Approved By		Vico Cui	
		Vico Cui/Reviewer	



2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2020) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2020) Section 6.10.5 & 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2020) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2020) Section 6.6 & 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Maximum Conducted Output Power		ANSI C63.10 (2020) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2020) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectral Density		ANSI C63.10 (2020) Section 11.10.3	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2020) Section 6.10.4	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2020) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V DC 3V = 2 x 1.5V with size of "AAA" batteries for IR remote controller.
Cable(s):	0.8m unscreened USB cable.
Minimum internal source:	32MHz
Test voltage:	AC 120V 60Hz powered by AC/DC adapter refer to section 4.2
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 BLE
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	0 dBi according to antenna specification
Antenna Number:	2

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Note Book Computer	LENOVO	ThinkPad T490	PF1D1MVJ
AC/DC Adapter	HUAWEI	Model:HW-110600C02; Input:AC 100-240V,1.8A Max.50/60Hz; Output:DC 5V/2A, 10V/4A, 11V/6A Max.	JL28L4NBM03275



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4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	±3.22dB
Radiated Emissions which fall in the restricted bands	±5.14dB (3m); ±4.90dB (10m); ±4.88dB (1GHz-6GHz); ±5.06dB (6GHz-18GHz); ±5.30dB (18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	±3.08dB (9kHz to 150kHz); ±3.19dB(150kHz to 30MHz); ±5.14dB (30MHz-1GHz) (3m); ±4.90dB (30MHz-1GHz) (10m)
Radiated Spurious Emissions Above 1GHz	±4.88dB (1GHz-6GHz); ±5.06dB (6GHz-18GHz); ±5.30dB (18GHz-40GHz)
Maximum Conducted Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 0.274%
Power Spectral Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Remark: The U_{lab} (lab Uncertainty) is less than U_{CISPR} (CISPR Uncertainty) or U_{ETSI} (ETSI Uncertainty). Emission decision rule: – Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit, marked as Pass in the report. – Non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit, marked as Fail in the report.	

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou,
Guangdong, China 510663

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No tests were sub-contracted.



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4.5 Test Facility

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

● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

● SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

● ISED (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

● CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Coaxial Cable	HangTianXing	BL03-NMNM-6.00M	EMC0107	2025-08-12	2026-08-11
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	2025-08-14	2028-08-13
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2025-08-13	2026-08-12
EMI Test Receiver (9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2025-11-18	2026-11-17
Test Software E3r	Audix	Ver.6.191211	GZE100-77	N/A	N/A

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
1-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2025-08-11	2026-08-10
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2025-08-11	2026-08-10
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2024-08-19	2026-08-18
Horn Antenna (1-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2025-05-13	2027-05-12
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2025-08-12	2026-08-11
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2025-08-11	2026-08-10
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-23	2026-12-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A



Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2025-08-13	2028-08-12
Coaxial cable	Mirco-COAX UTIFLEX	311A	EMC0540	2024-08-19	2026-08-18
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2025-11-25	2026-11-24
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2026-03-28	2028-03-27
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR7	EMC2220	2025-11-18	2026-11-17
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-2GHz)	Schwarzbeck Mess-Elektronik	VULB 9168	EMC2174	2025-04-21	2027-04-20

Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
1-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2025-08-11	2026-08-10
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2025-08-11	2026-08-10
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2024-08-19	2026-08-18
Horn Antenna (1-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2025-05-13	2027-05-12
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2025-08-12	2026-08-11
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2025-08-12	2026-08-11
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2025-08-11	2026-08-10
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-23	2026-12-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

RF Conducted Test					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2136	2025-11-02	2026-11-01
4X4 Power sensor Unit	TST	TSPS2023R	EMC2257	2025-08-12	2026-08-11
Test Software	TST	V2.0	GZE100-82	N/A	N/A
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2025-11-25	2026-11-24



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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2025-06-03	2026-06-02



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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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0 dBi.

Antenna location: Refer to internal photo.



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

Test Engineer: Sunny Yang

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: 24.0 °C

Humidity: 53.3 % RH

Atmospheric Pressure: 1024 mbar

7.1.2 Test Mode Description

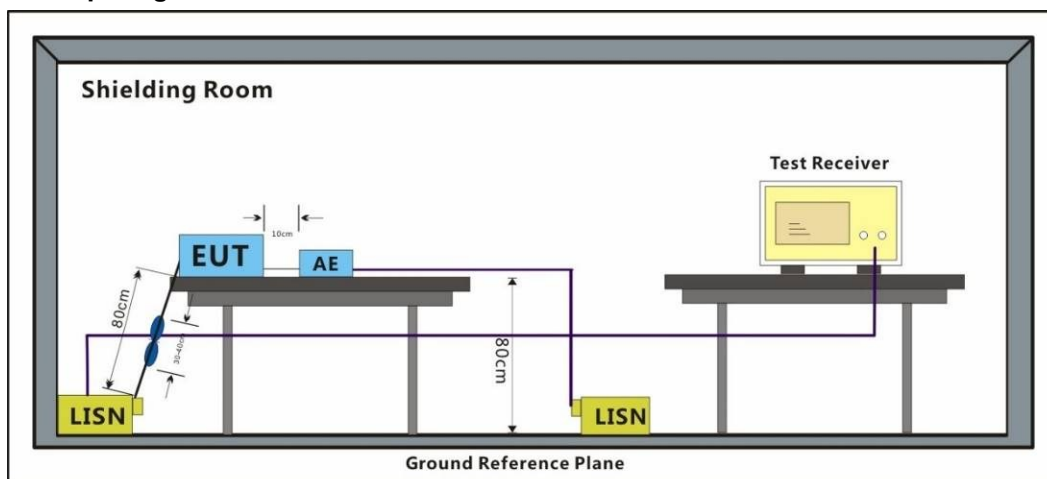
Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test	01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.



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7.1.3 Test Setup Diagram

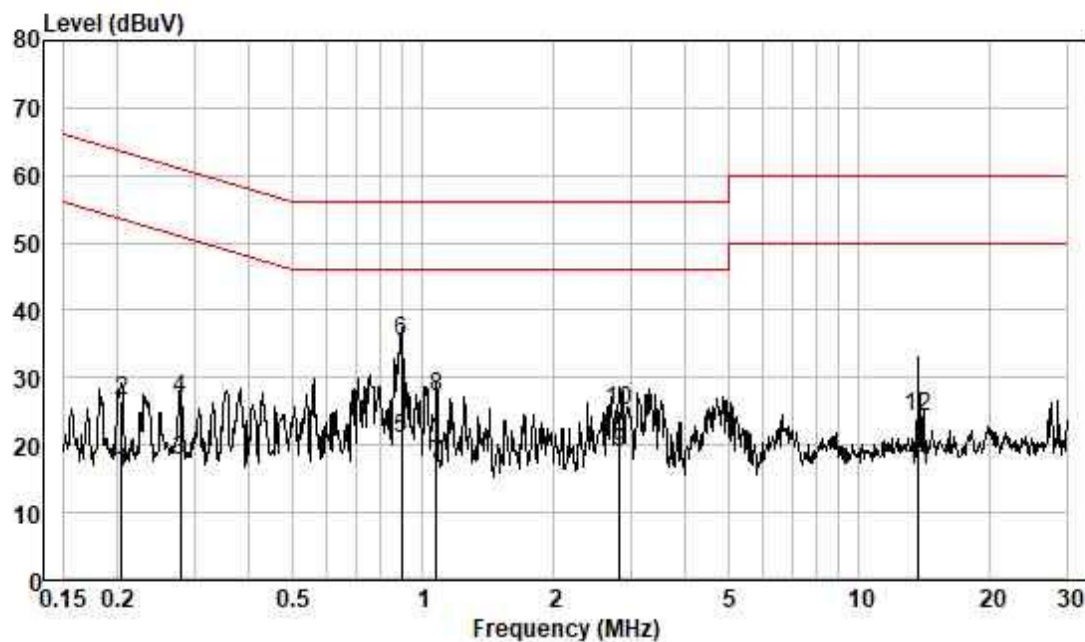


7.1.4 Measurement Procedure and Data

- 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: 00; Line: Live line

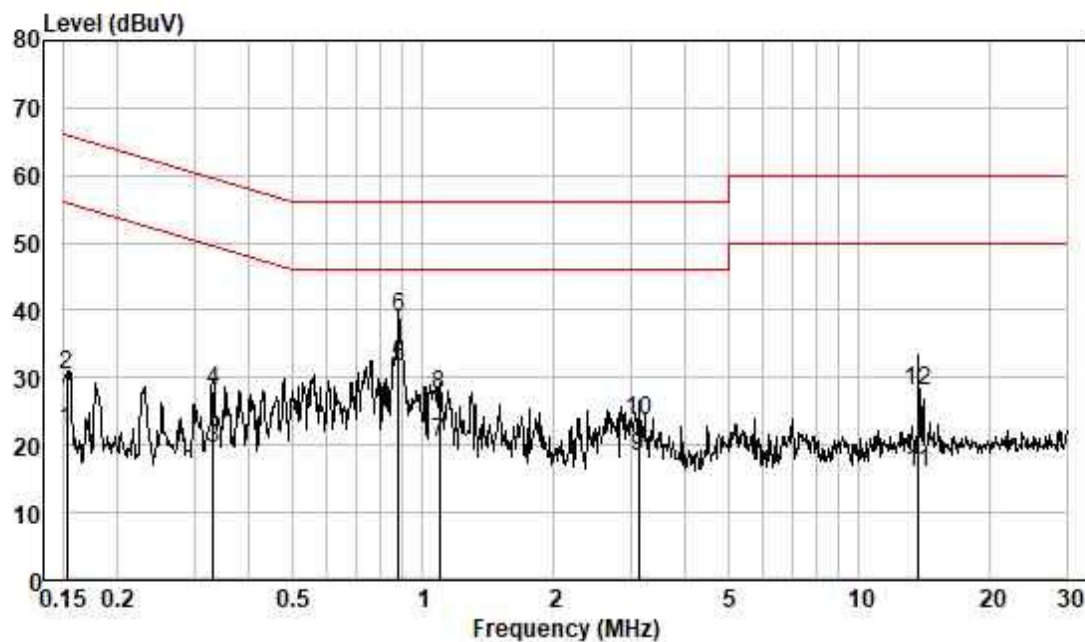


Pol :LINE
Mode :
Model :
Power :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.204	6.45	0.04	9.53	16.02	53.45	-37.43	Average
2	0.204	17.04	0.04	9.53	26.61	63.45	-36.84	QP
3	0.277	8.14	0.04	9.54	17.72	50.90	-33.18	Average
4	0.277	17.26	0.04	9.54	26.84	60.90	-34.06	QP
5	0.894	11.22	0.07	9.59	20.88	46.00	-25.12	Average
6	0.894	25.64	0.07	9.59	35.30	56.00	-20.70	QP
7	1.071	7.51	0.08	9.58	17.17	46.00	-28.83	Average
8	1.071	17.41	0.08	9.58	27.07	56.00	-28.93	QP
9	2.824	9.17	0.15	9.61	18.93	46.00	-27.07	Average
10	2.824	15.42	0.15	9.61	25.18	56.00	-30.82	QP
11	13.695	6.05	0.31	9.82	16.18	50.00	-33.82	Average
12	13.695	14.15	0.31	9.82	24.28	60.00	-35.72	QP



Test Mode: 00; Line: Neutral Line



Pol : NEUTRAL
Mode :
Model :
Power :

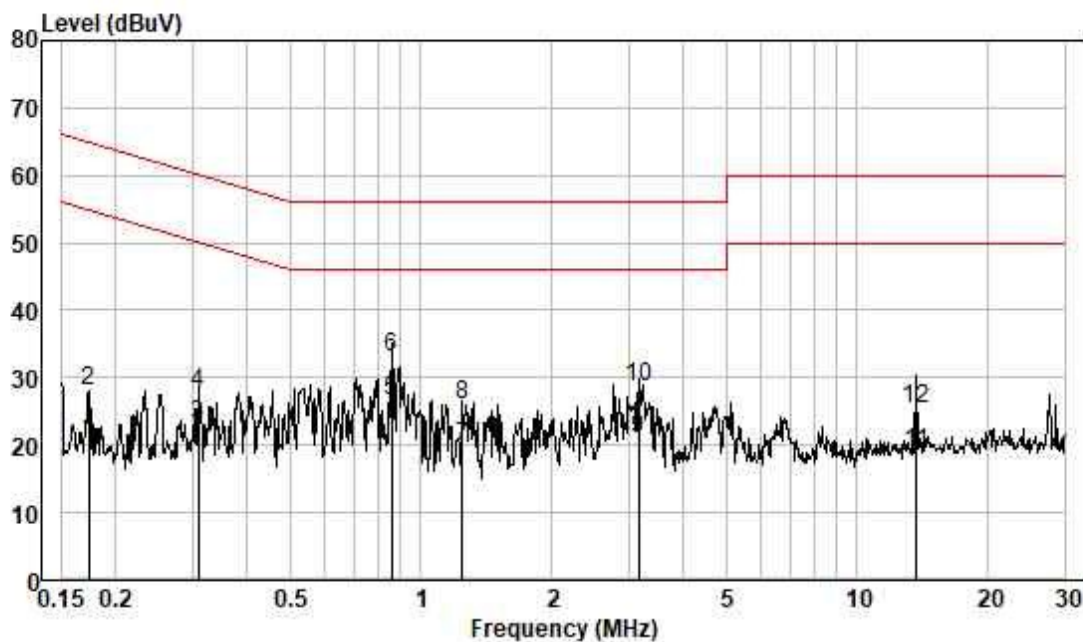
	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.152	12.62	0.04	9.50	22.16	55.87	-33.71	Average
2	0.152	21.01	0.04	9.50	30.55	65.87	-35.32	QP
3	0.330	10.03	0.04	9.55	19.62	49.44	-29.82	Average
4	0.330	18.48	0.04	9.55	28.07	59.44	-31.37	QP
5	0.880	22.07	0.07	9.55	31.69	46.00	-14.31	Average
6	0.880	29.28	0.07	9.55	38.90	56.00	-17.10	QP
7	1.088	10.72	0.08	9.56	20.36	46.00	-25.64	Average
8	1.088	17.68	0.08	9.56	27.32	56.00	-28.68	QP
9	3.123	8.57	0.16	9.56	18.29	46.00	-27.71	Average
10	3.123	13.79	0.16	9.56	23.51	56.00	-32.49	QP
11	13.695	5.67	0.31	9.89	15.87	50.00	-34.13	Average
12	13.695	17.73	0.31	9.89	27.93	60.00	-32.07	QP



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Test Mode: 01; Line: Live line

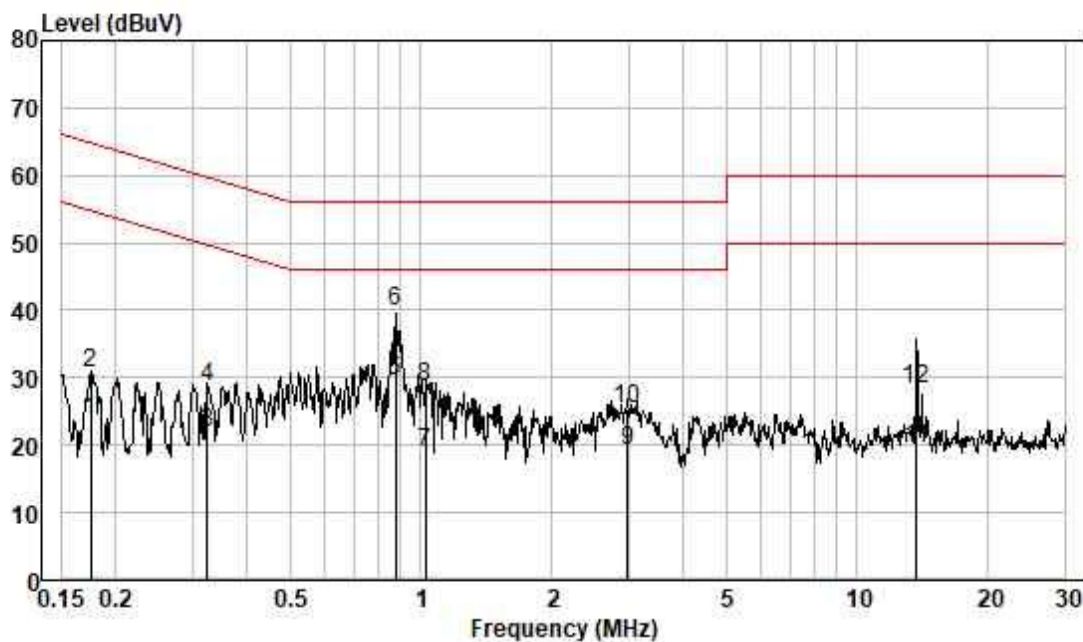


Pol :LINE
Mode :
Model :
Power :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.173	11.01	0.04	9.52	20.57	54.81	-34.24	Average
2	0.173	18.45	0.04	9.52	28.01	64.81	-36.80	QP
3	0.308	13.39	0.04	9.56	22.99	50.02	-27.03	Average
4	0.308	18.19	0.04	9.56	27.79	60.02	-32.23	QP
5	0.857	16.83	0.07	9.58	26.48	46.00	-19.52	Average
6	0.857	23.39	0.07	9.58	33.04	56.00	-22.96	QP
7	1.242	10.16	0.09	9.59	19.84	46.00	-26.16	Average
8	1.242	16.38	0.09	9.59	26.06	56.00	-29.94	QP
9	3.156	11.28	0.16	9.63	21.07	46.00	-24.93	Average
10	3.156	18.89	0.16	9.63	28.68	56.00	-27.32	QP
11	13.695	8.73	0.31	9.82	18.86	50.00	-31.14	Average
12	13.695	15.23	0.31	9.82	25.36	60.00	-34.64	QP



Test Mode: 01; Line: Neutral Line



Pol :NEUTRAL
Mode :
Model :
Power :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.175	14.06	0.04	9.52	23.62	54.72	-31.10	Average
2	0.175	21.11	0.04	9.52	30.67	64.72	-34.05	QP
3	0.323	12.33	0.04	9.54	21.91	49.62	-27.71	Average
4	0.323	19.12	0.04	9.54	28.70	59.62	-30.92	QP
5	0.876	19.88	0.07	9.56	29.51	46.00	-16.49	Average
6	0.876	30.29	0.07	9.56	39.92	56.00	-16.08	QP
7	1.027	9.28	0.07	9.56	18.91	46.00	-27.09	Average
8	1.027	18.91	0.07	9.56	28.54	56.00	-27.46	QP
9	2.978	9.34	0.16	9.55	19.05	46.00	-26.95	Average
10	2.978	15.53	0.16	9.55	25.24	56.00	-30.76	QP
11	13.695	9.17	0.31	9.89	19.37	50.00	-30.63	Average
12	13.695	18.27	0.31	9.89	28.47	60.00	-31.53	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 & 11.12

Test Engineer: Lily Kuang

Limit:

Test Distance: 3 m

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: 24.3 °C

Humidity: 51.4 % RH

Atmospheric Pressure: 1007 mbar

7.2.2 Test Mode Description

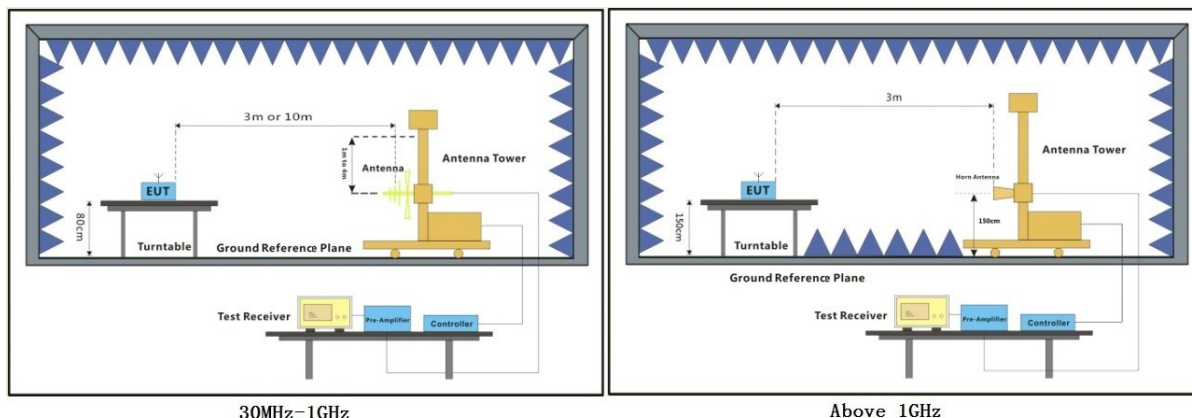
Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test 01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.



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7.2.3 Test Setup Diagram



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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 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: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

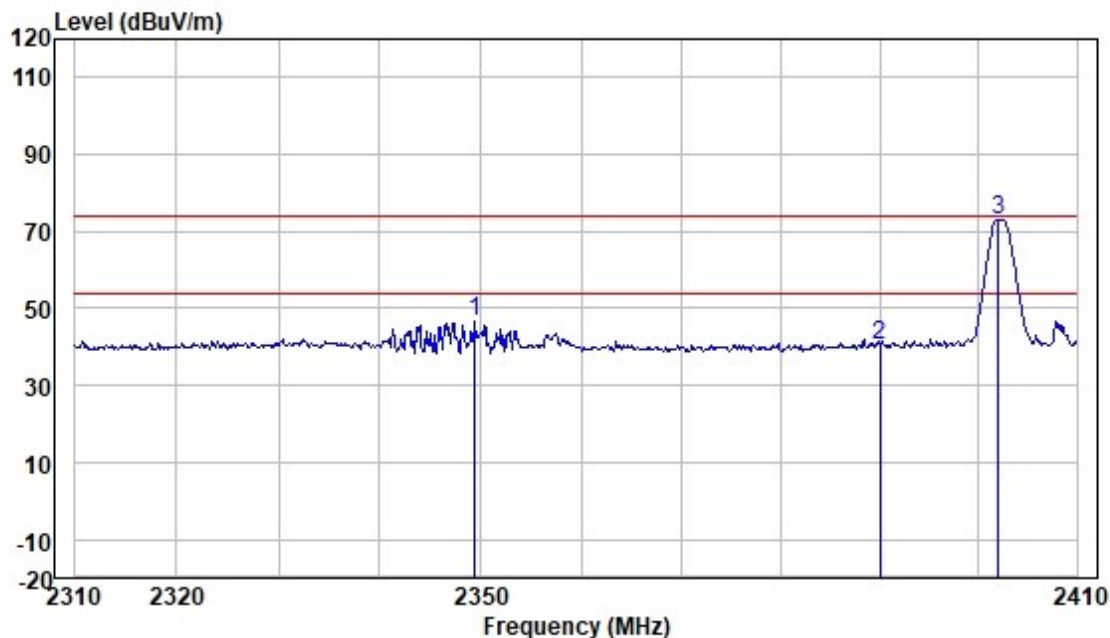
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level 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 $\leq 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.



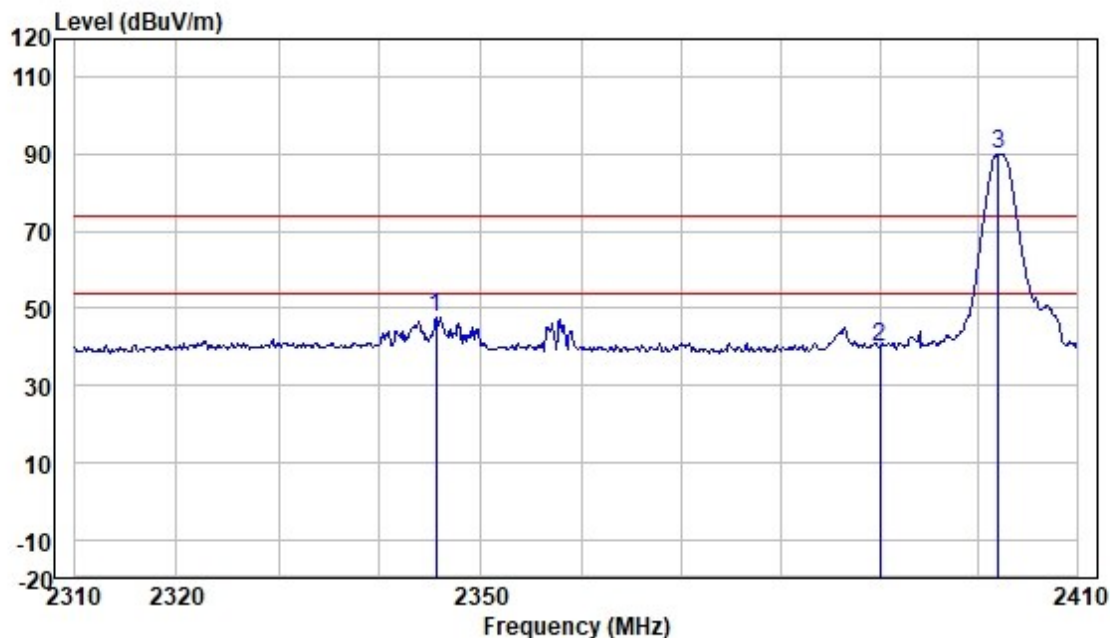
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2349.39	53.40	27.57	3.42	37.77	46.62	74.00	-27.38	VERTICAL	peak
2	2390.00	46.98	27.63	3.44	37.77	40.28	74.00	-33.72	VERTICAL	peak
3	2402.00	79.70	27.65	3.45	37.77	73.03	74.00	-0.97	VERTICAL	peak



Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



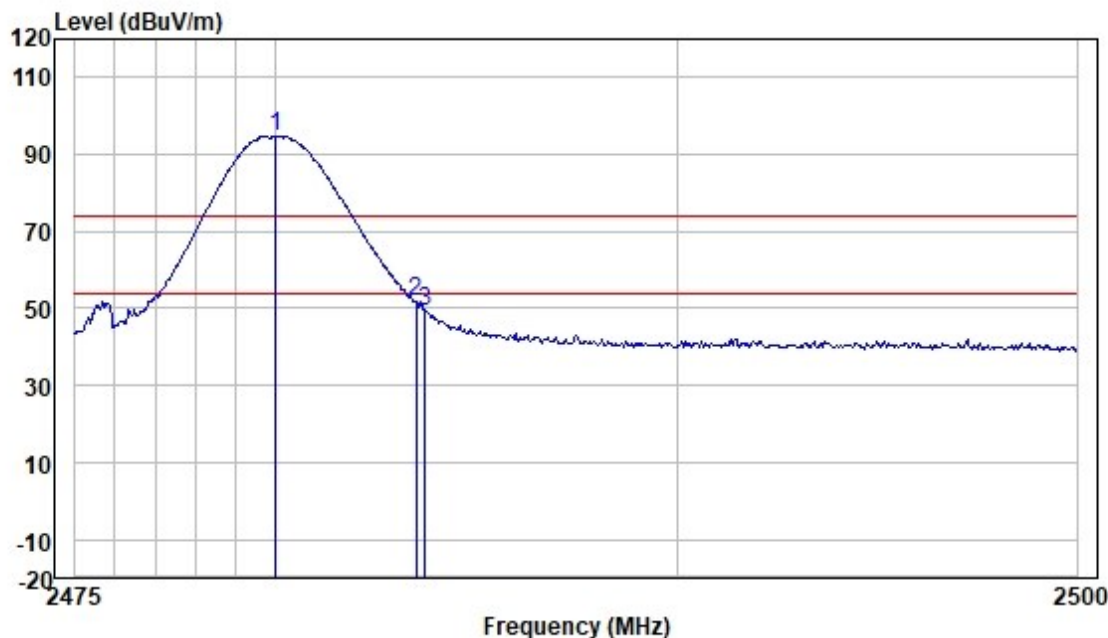
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2345.61	54.42	27.56	3.42	37.77	47.63	74.00	-26.37	HORIZONTAL	peak
2	2390.00	46.64	27.63	3.44	37.77	39.94	74.00	-34.06	HORIZONTAL	peak
3*	2402.00	96.55	27.65	3.45	37.77	89.88	74.00	15.88	HORIZONTAL	peak



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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



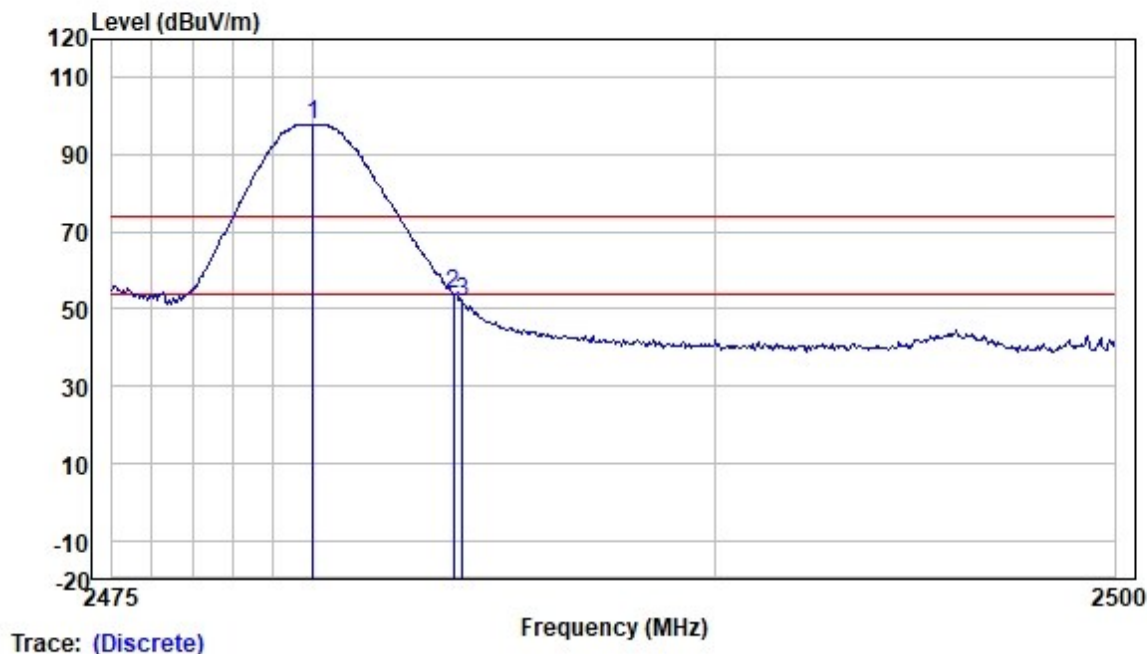
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1*	2480.00	101.02	27.75	3.48	37.76	94.49	74.00	20.49	VERTICAL	peak
2	2483.50	58.47	27.76	3.49	37.76	51.96	74.00	-22.04	VERTICAL	peak
3	2483.72	55.81	27.76	3.49	37.76	49.30	74.00	-24.70	VERTICAL	peak



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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



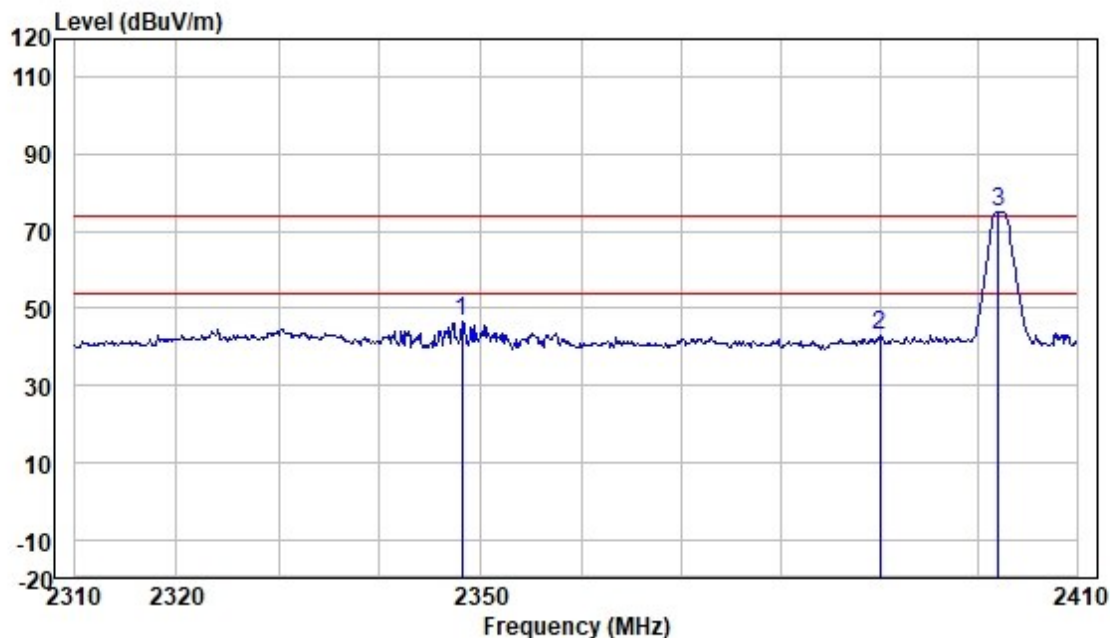
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1*	2480.00	104.40	27.75	3.48	37.76	97.87	74.00	23.87	HORIZONTAL	peak
2	2483.50	60.36	27.76	3.49	37.76	53.85	74.00	-20.15	HORIZONTAL	peak
3	2483.72	58.12	27.76	3.49	37.76	51.61	74.00	-22.39	HORIZONTAL	peak



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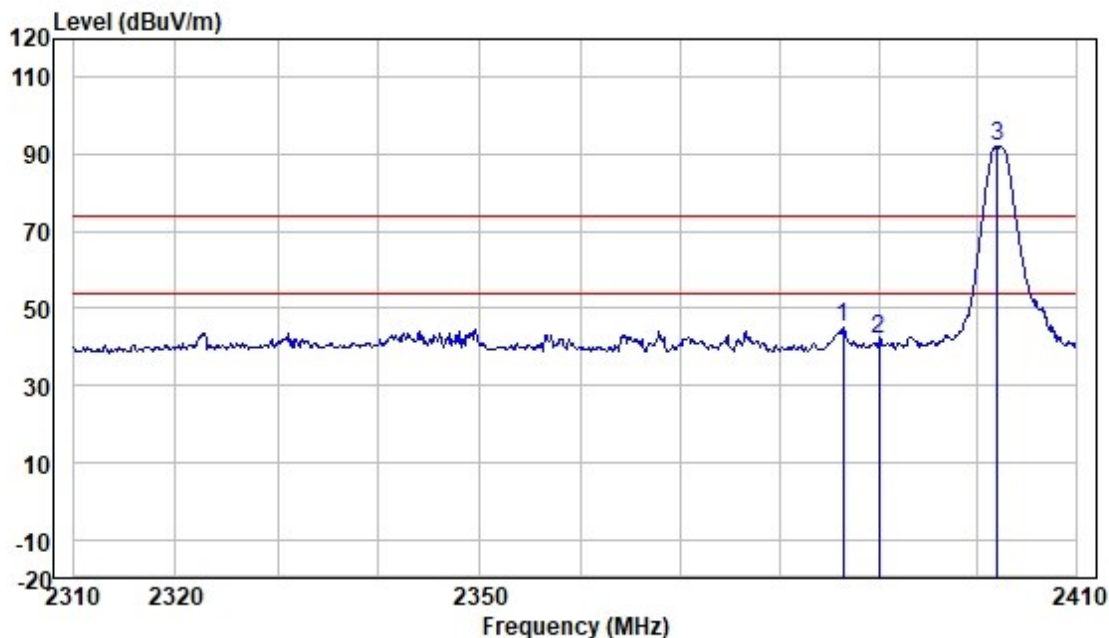
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2348.10	53.22	27.56	3.42	37.75	46.45	74.00	-27.55	VERTICAL	Peak
2	2390.00	49.95	27.63	3.44	37.74	43.28	74.00	-30.72	VERTICAL	Peak
3*	2402.00	81.67	27.65	3.45	37.74	75.03	74.00	1.03	VERTICAL	Peak



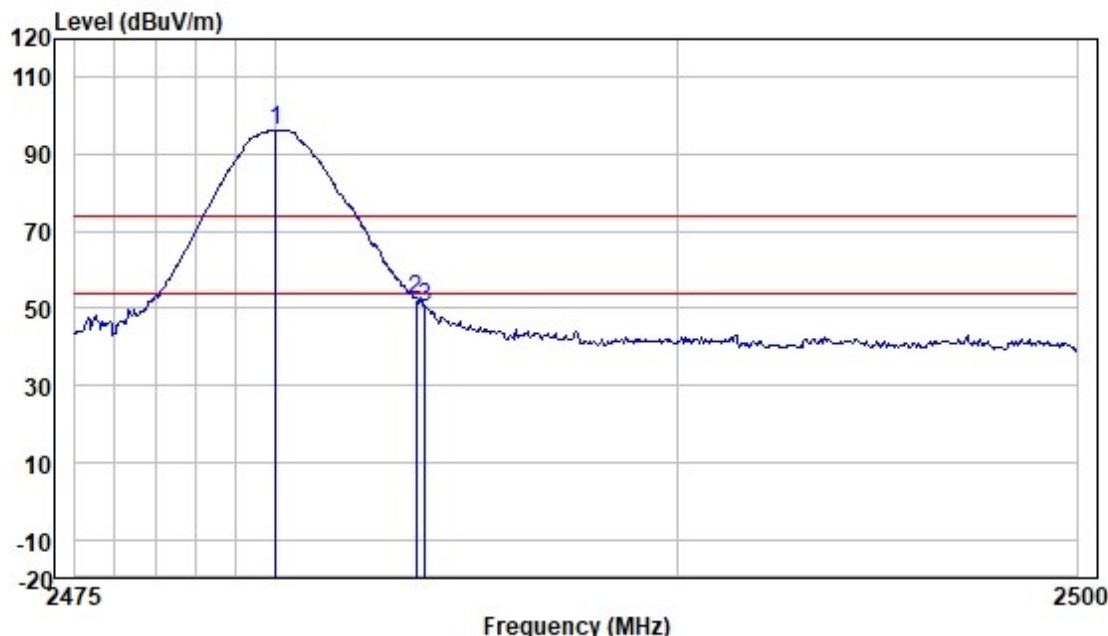
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2386.32	51.53	27.63	3.44	37.74	44.86	74.00	-29.14	HORIZONTAL	Peak
2	2389.96	48.61	27.63	3.44	37.74	41.94	74.00	-32.06	HORIZONTAL	Peak
3*	2402.00	98.52	27.65	3.45	37.74	91.88	74.00	17.88	HORIZONTAL	Peak



Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



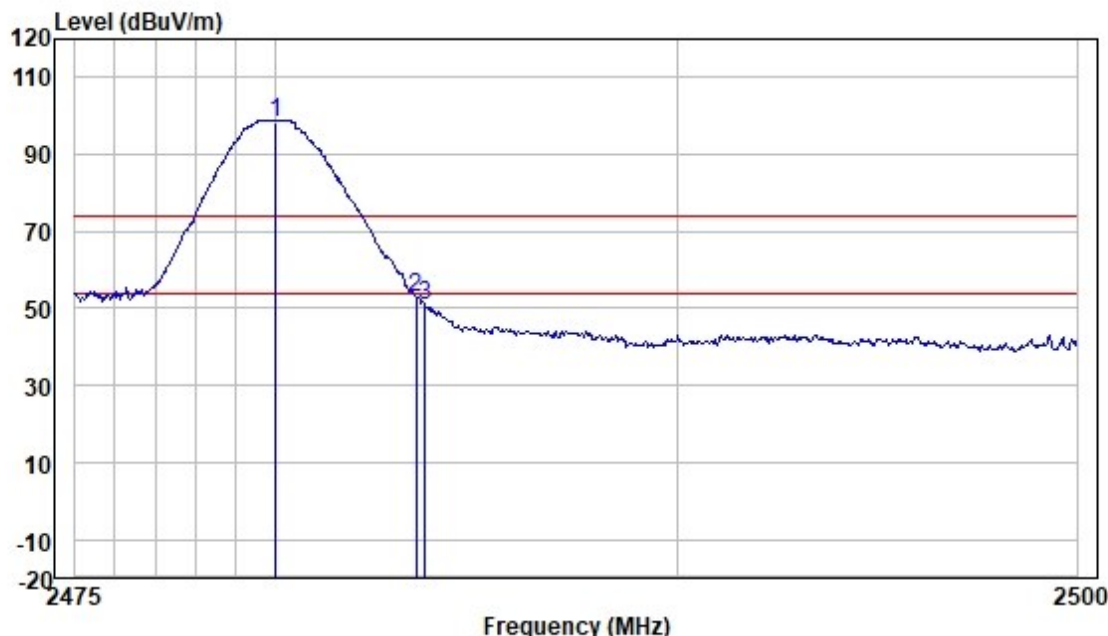
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1*	2480.00	102.81	27.75	3.48	37.73	96.31	74.00	22.31	VERTICAL	peak
2	2483.50	58.84	27.76	3.49	37.73	52.36	74.00	-21.64	VERTICAL	peak
3	2483.70	56.52	27.76	3.49	37.73	50.04	74.00	-23.96	VERTICAL	peak



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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1*	2480.00	104.92	27.75	3.48	37.73	98.42	74.00	24.42	HORIZONTAL	peak
2	2483.50	59.41	27.76	3.49	37.73	52.93	74.00	-21.07	HORIZONTAL	peak
3	2483.70	57.30	27.76	3.49	37.73	50.82	74.00	-23.18	HORIZONTAL	peak



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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

Test Engineer: Bob Qu

Limit:

Test Distance: 3m

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

Note

1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.7 °C

Humidity: 55.2 % RH

Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

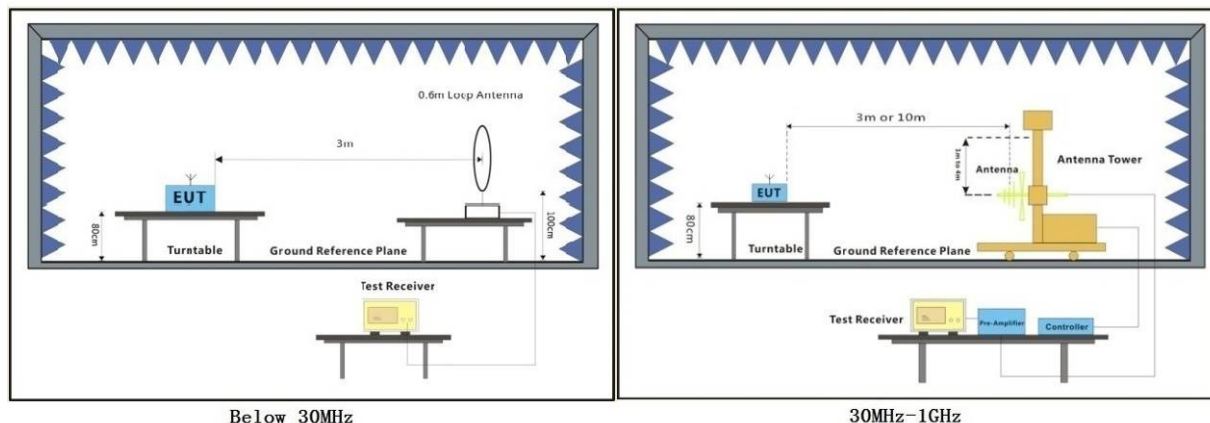
Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test	01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.



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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 0.8m above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3m or 10m away from the interference-receiving antenna, which was mounted on the variable-height antenna tower.
- c. The antenna height is varied from 1m to 4m 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 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1m) 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. At frequencies below 1GHz, measurements may be performed at a distance different to specified in the regulations.

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Below 30MHz, Aux Factor = 40 dB/decade of distance, the aux factor is $40\log(3/300) = -80\text{dB}$ (for 3m test distance).

EX. Above 30MHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(10/3) = 10.46\text{dB}$ (for 10m test distance).

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

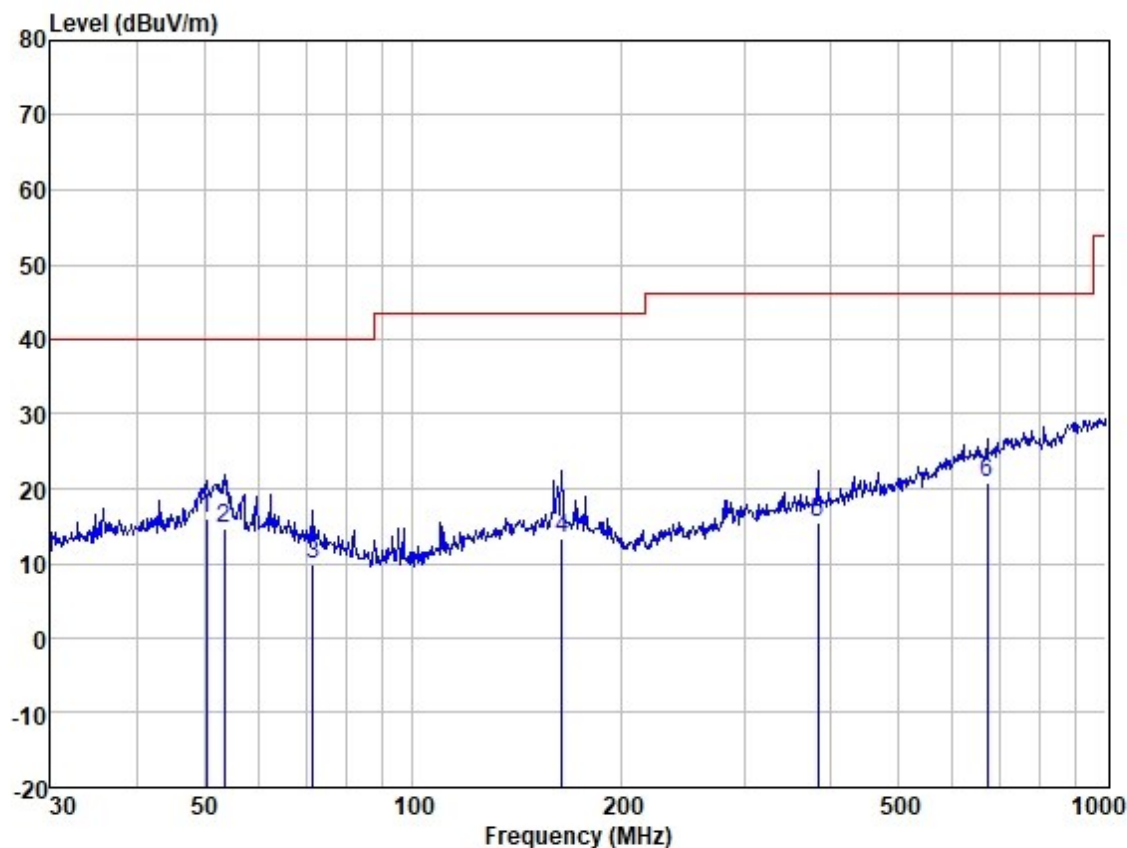
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the worst-case test curve is displayed.



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Test Mode: 00; Polarity: Horizontal

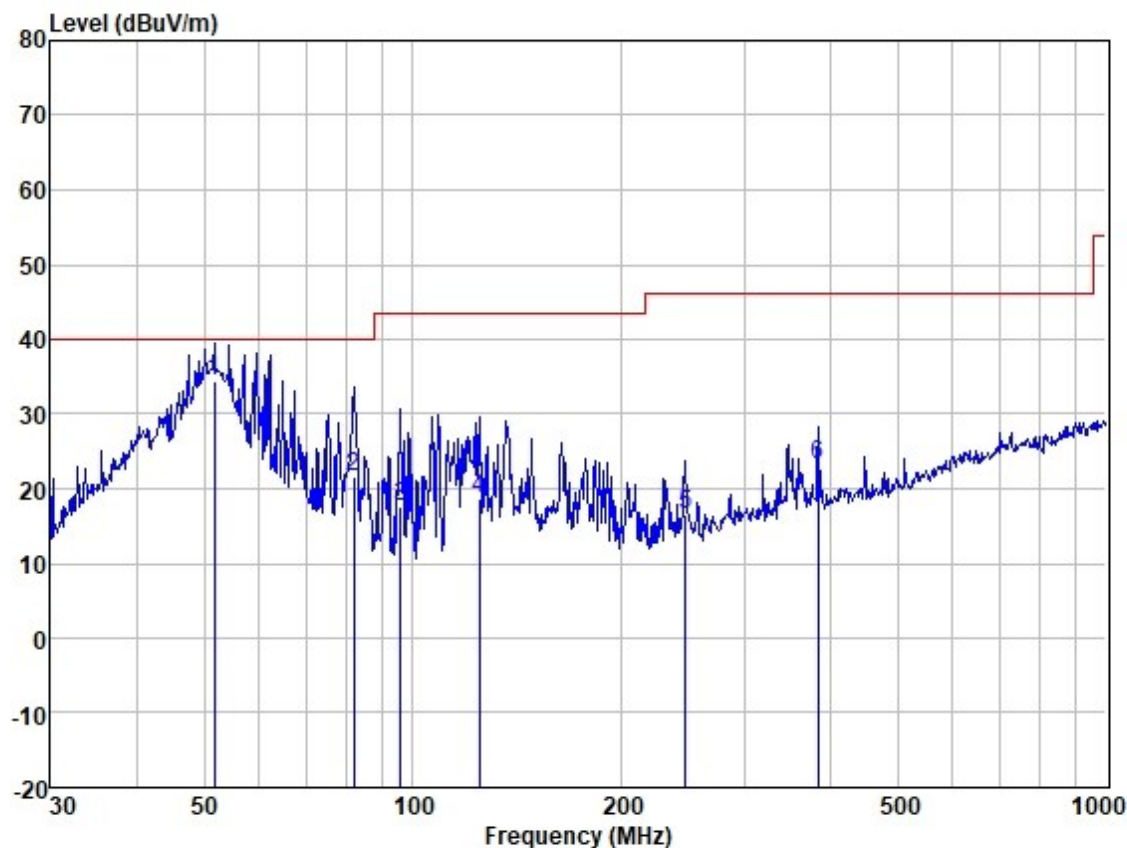


Site : SGS
Model :
Power :
Test Mode : TX

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	50.409	29.28	13.93	0.75	27.98	15.98	40.00	-24.02	HORIZONTAL	QP
2	53.505	28.18	13.83	0.76	27.98	14.79	40.00	-25.21	HORIZONTAL	QP
3	71.832	25.79	11.31	0.80	27.93	9.97	40.00	-30.03	HORIZONTAL	QP
4	163.755	26.79	13.39	1.03	27.77	13.44	43.52	-30.08	HORIZONTAL	QP
5	383.932	25.86	15.35	1.81	27.61	15.41	46.02	-30.61	HORIZONTAL	QP
6	672.845	26.59	20.39	2.20	28.46	20.72	46.02	-25.30	HORIZONTAL	QP



Test Mode: 00; Polarity: Vertical



Site : SGS
Model :
Power :
Test Mode : TX

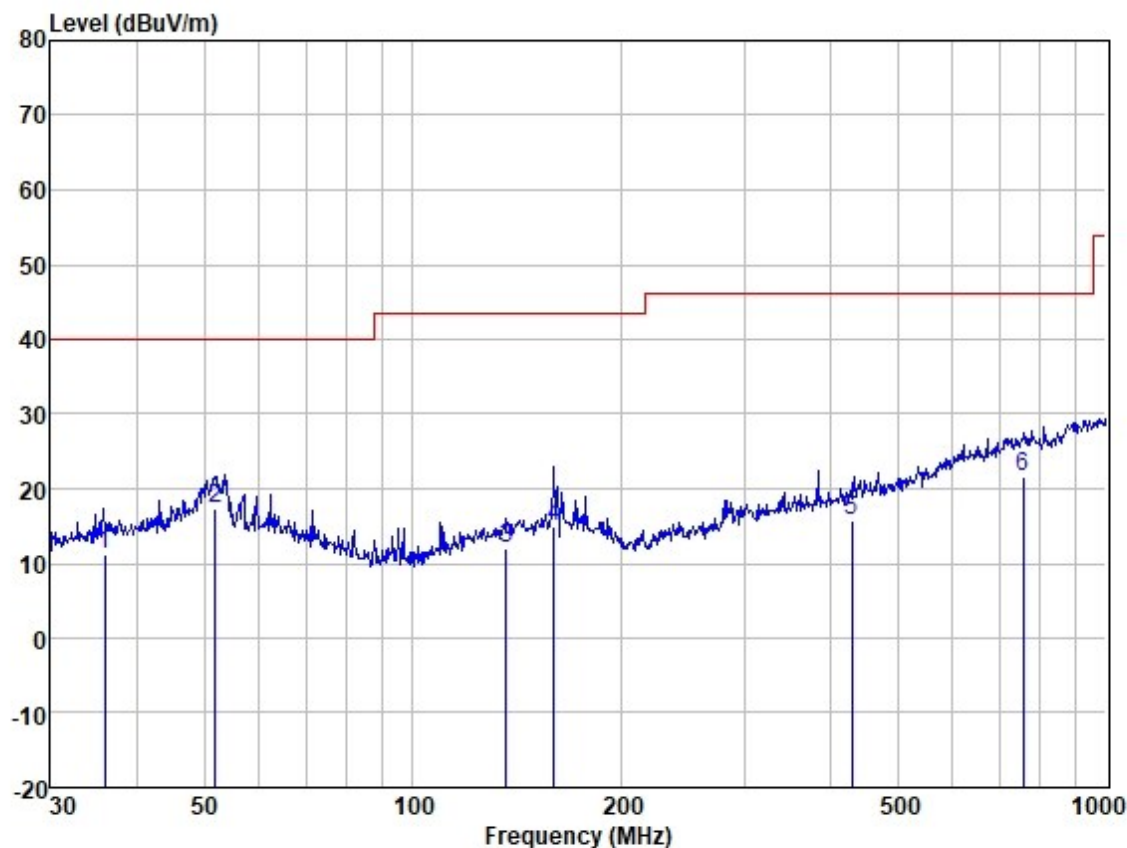
	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	51.662	47.68	13.90	0.75	27.98	34.35	40.00	-5.65	VERTICAL	QP
2	82.071	40.09	8.73	0.82	27.92	21.72	40.00	-18.28	VERTICAL	QP
3	96.099	36.36	8.41	0.84	27.90	17.71	43.52	-25.81	VERTICAL	QP
4	124.569	33.94	11.69	0.91	27.86	18.68	43.52	-24.84	VERTICAL	QP
5	246.815	30.45	11.93	1.53	27.29	16.62	46.02	-29.40	VERTICAL	QP
6	383.932	33.67	15.35	1.81	27.61	23.22	46.02	-22.80	VERTICAL	QP



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Test Mode: 01; Polarity: Horizontal

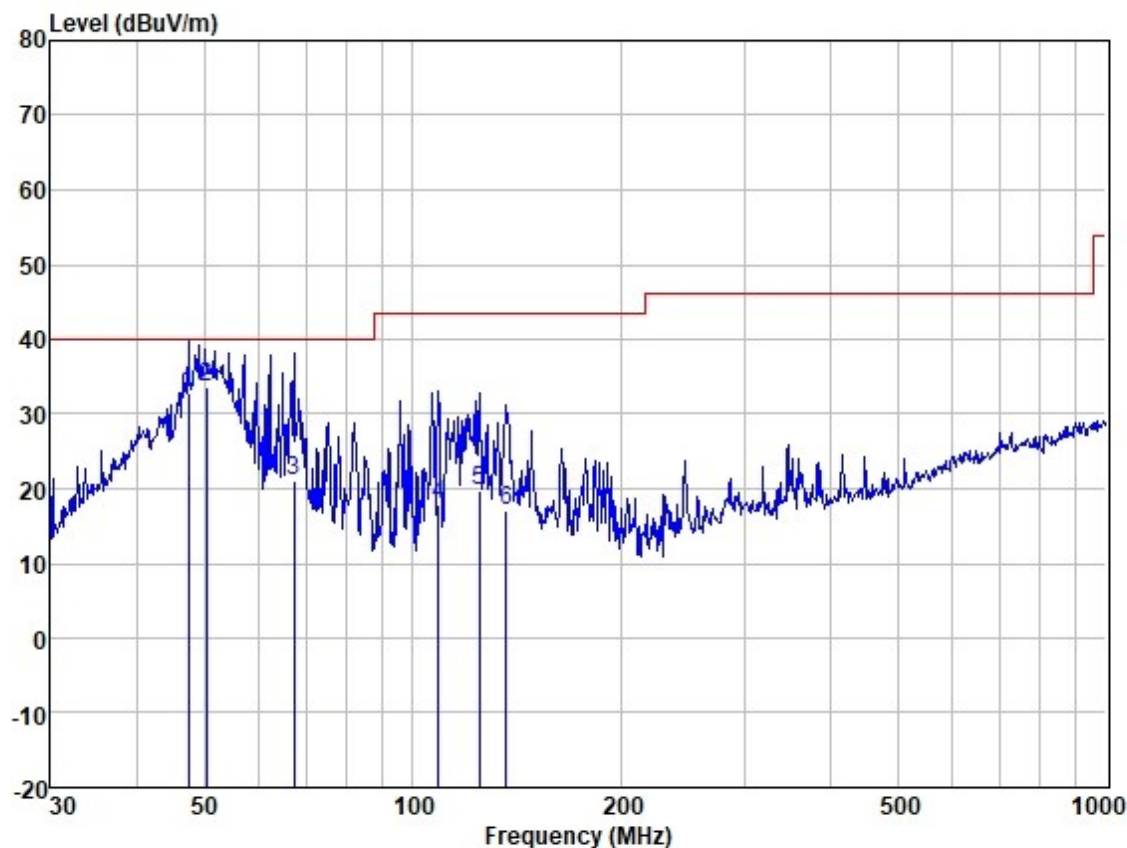


Site : SGS
Model :
Power :
Test Mode : TX

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	35.875	25.44	13.06	0.64	28.00	11.14	40.00	-28.86	HORIZONTAL	QP
2	51.843	30.82	13.86	0.75	27.98	17.45	40.00	-22.55	HORIZONTAL	QP
3	136.460	26.06	12.90	0.95	27.84	12.07	43.52	-31.45	HORIZONTAL	QP
4	159.784	28.40	13.40	1.02	27.79	15.03	43.52	-28.49	HORIZONTAL	QP
5	429.523	25.48	16.69	1.84	28.30	15.71	46.02	-30.31	HORIZONTAL	QP
6	758.041	25.13	22.52	2.45	28.41	21.69	46.02	-24.33	HORIZONTAL	QP



Test Mode: 01; Polarity: Vertical



Site : SGS
Model :
Power :
Test Mode : TX

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	47.492	46.14	13.93	0.73	27.98	32.82	40.00	-7.18	VERTICAL	QP
2	50.409	46.87	13.93	0.75	27.98	33.57	40.00	-6.43	VERTICAL	QP
3	67.438	36.27	11.89	0.80	27.94	21.02	40.00	-18.98	VERTICAL	QP
4	108.647	34.74	10.29	0.86	27.89	18.00	43.52	-25.52	VERTICAL	QP
5	124.569	34.94	11.69	0.91	27.86	19.68	43.52	-23.84	VERTICAL	QP
6	136.460	30.97	12.90	0.95	27.84	16.98	43.52	-26.54	VERTICAL	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 & 11.12

Test Engineer: Lily Kuang

Limit:

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

Note:

At Above 18GHz, measurements may be performed at a distance shorter than that specified in the regulations

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Above 18GHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(1/3) = -9.54\text{dB}$ (for 1m test distance).

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24.3 °C

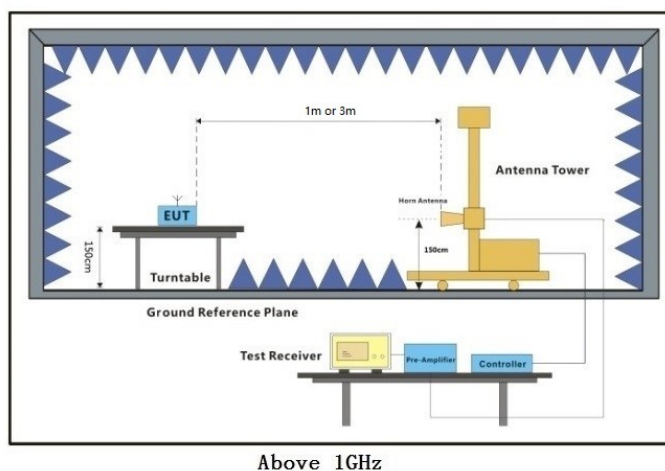
Humidity: 51.4 % RH

Atmospheric Pressure: 1007 mbar

7.4.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test 01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.

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 1.5m above the ground at a 3m fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3m away from the interference-receiving antenna from 1GHz to 18GHz, and 1m away from the interference-receiving antenna above 18GHz.
- b. The interference-receiving antenna was mounted on the variable-height antenna tower, with its boresight facing the EUT throughout the test.
- c. The antenna height is varied from 1m to 4m 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 1m to 4m 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. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- g. 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.
- h. Repeat above procedures until all frequencies measured was complete.

Remark:

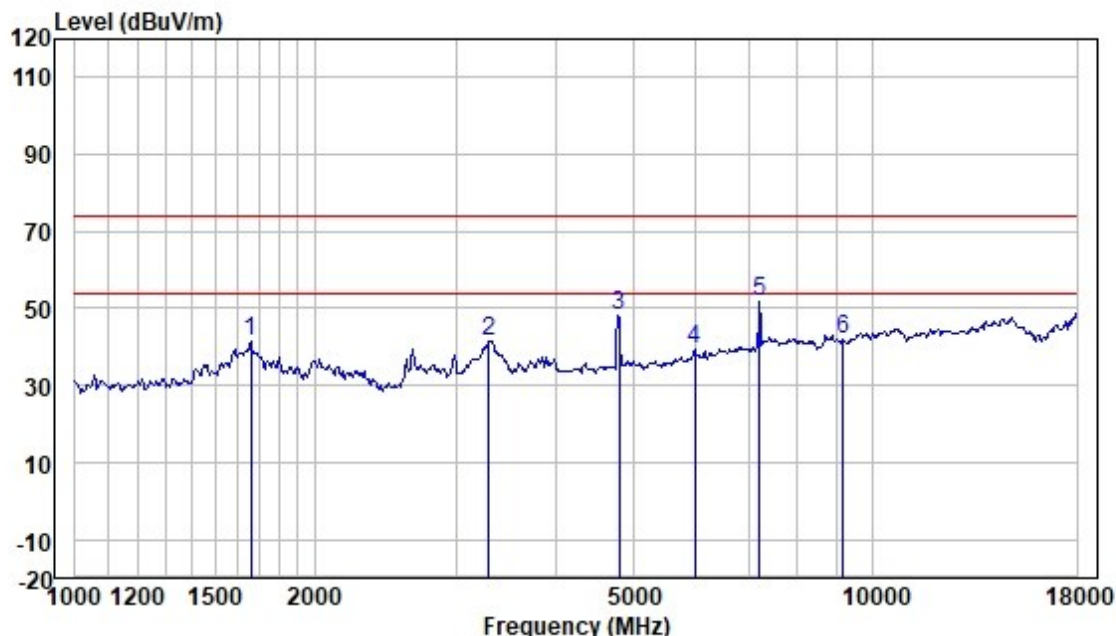
1. Scan from 1GHz to 10th harmonic of the highest frequency or 40 GHz, whichever is lower.
2. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits 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.
3. For the frequency above 18GHz, testing had been executed under all test modes, only the worst-case test curve is displayed in the report.
4. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s). Only the worst-case mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum) is recorded in the test report.



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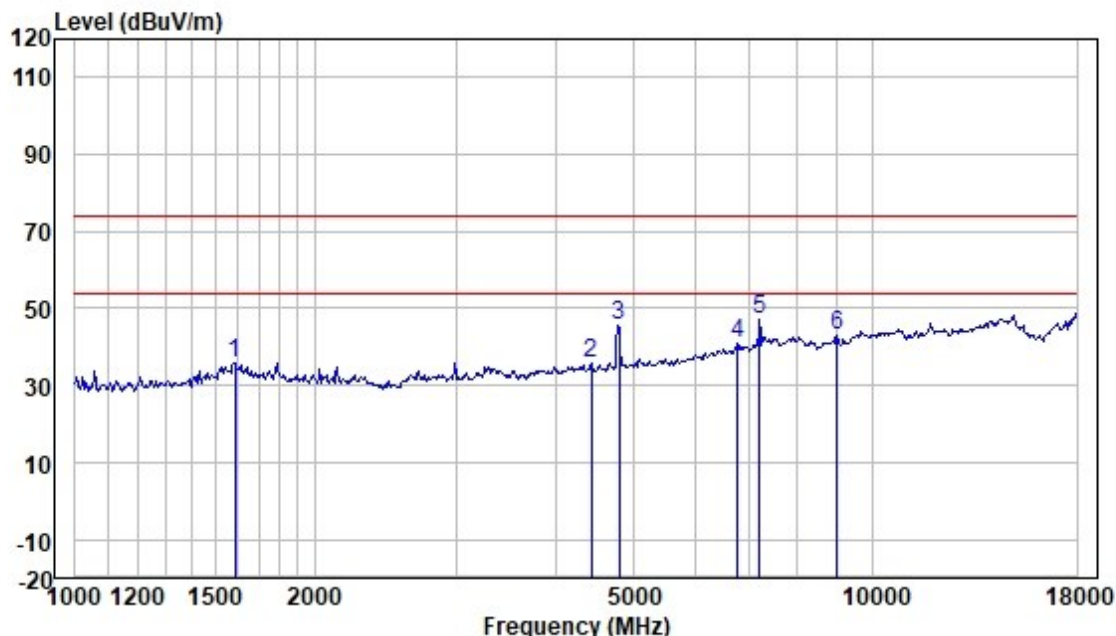
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.14	67.39	26.10	2.81	54.73	41.57	74.00	-32.43	VERTICAL	Peak
2	3299.34	63.53	28.89	4.01	54.79	41.64	74.00	-32.36	VERTICAL	Peak
3	4804.00	65.72	31.51	4.81	53.86	48.18	74.00	-25.82	VERTICAL	Peak
4	5984.31	54.30	32.80	5.43	53.21	39.32	74.00	-34.68	VERTICAL	Peak
5	7206.00	63.56	35.80	5.93	53.23	52.06	74.00	-21.94	VERTICAL	Peak
6	9152.48	50.86	37.86	6.68	53.49	41.91	74.00	-32.09	VERTICAL	Peak



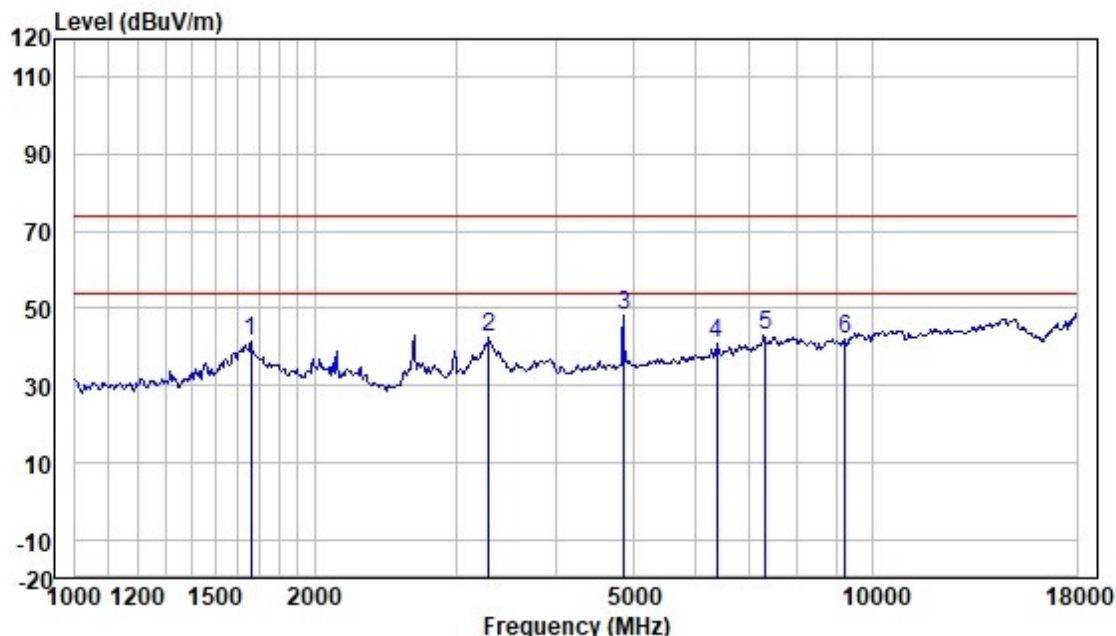
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1587.98	62.00	25.99	2.75	54.71	36.03	74.00	-37.97	HORIZONTAL	Peak
2	4430.63	54.37	30.83	4.61	54.15	35.66	74.00	-38.34	HORIZONTAL	Peak
3	4804.00	63.33	31.51	4.81	53.86	45.79	74.00	-28.21	HORIZONTAL	Peak
4	6756.71	53.87	34.77	5.77	53.20	41.21	74.00	-32.79	HORIZONTAL	Peak
5	7206.00	58.58	35.80	5.93	53.23	47.08	74.00	-26.92	HORIZONTAL	Peak
6	8995.12	52.22	37.60	6.57	53.50	42.89	74.00	-31.11	HORIZONTAL	Peak



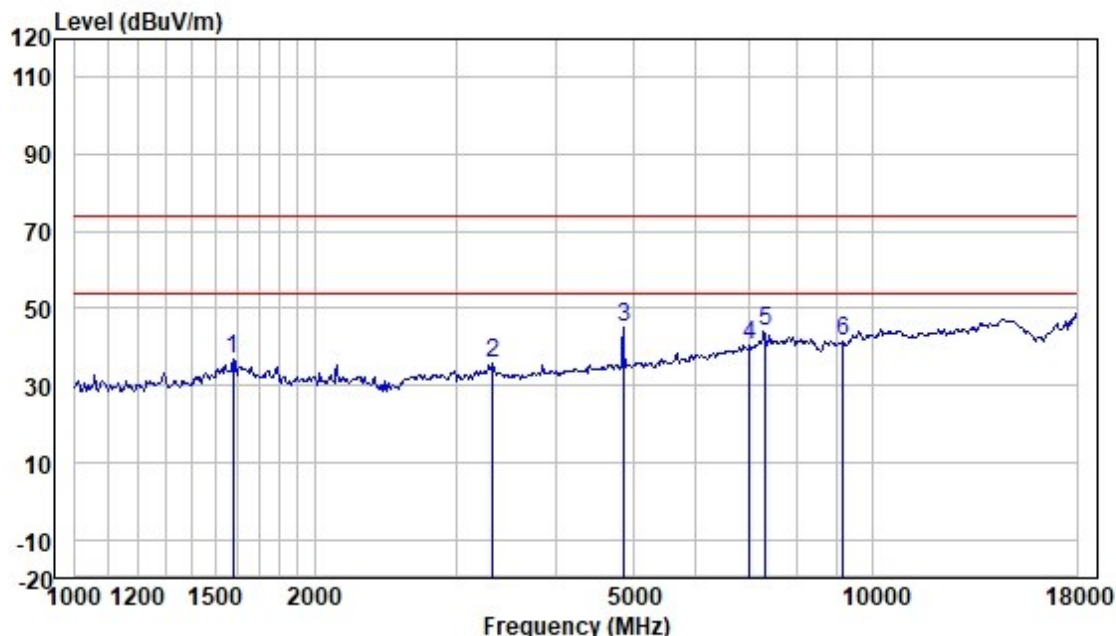
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.14	67.38	26.10	2.81	54.73	41.56	74.00	-32.44	VERTICAL	Peak
2	3299.34	64.41	28.89	4.01	54.79	42.52	74.00	-31.48	VERTICAL	Peak
3	4880.00	65.71	31.63	4.85	53.84	48.35	74.00	-25.65	VERTICAL	Peak
4	6358.79	54.86	33.87	5.60	53.20	41.13	74.00	-32.87	VERTICAL	Peak
5	7320.00	54.08	36.29	5.98	53.26	43.09	74.00	-30.91	VERTICAL	Peak
6	9205.54	50.53	37.97	6.73	53.48	41.75	74.00	-32.25	VERTICAL	Peak



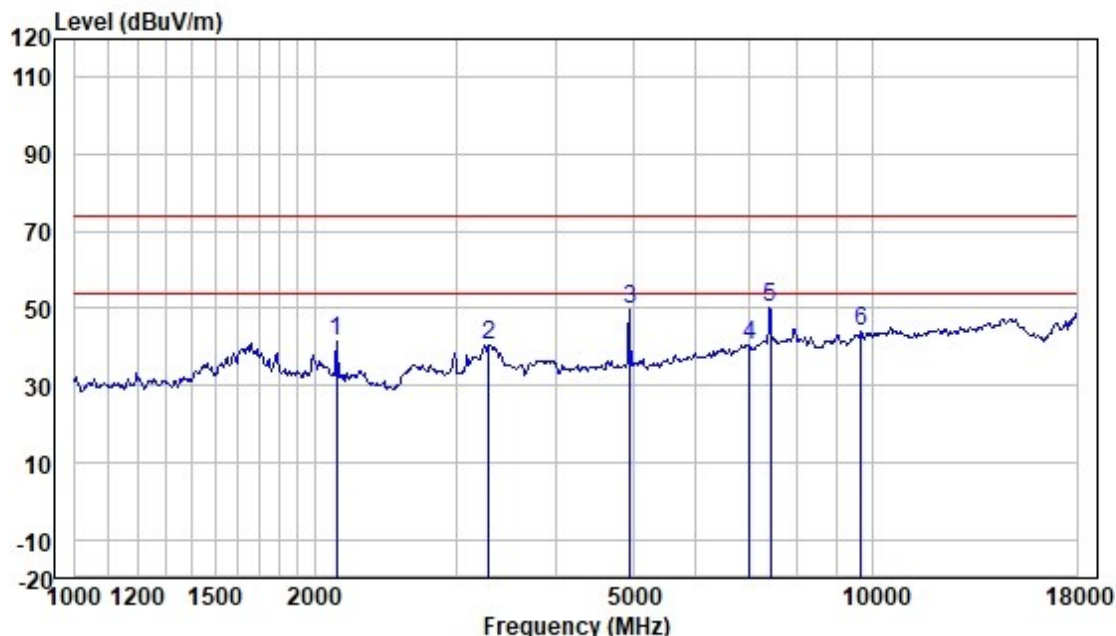
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1578.82	63.03	25.98	2.74	54.70	37.05	74.00	-36.95	HORIZONTAL	peak
2	3337.71	57.63	28.91	4.03	54.77	35.80	74.00	-38.20	HORIZONTAL	peak
3	4880.00	62.59	31.63	4.85	53.84	45.23	74.00	-28.77	HORIZONTAL	peak
4	6995.17	52.37	35.23	5.87	53.20	40.27	74.00	-33.73	HORIZONTAL	peak
5	7320.00	55.11	36.29	5.98	53.26	44.12	74.00	-29.88	HORIZONTAL	peak
6	9152.48	50.62	37.86	6.68	53.49	41.67	74.00	-32.33	HORIZONTAL	peak



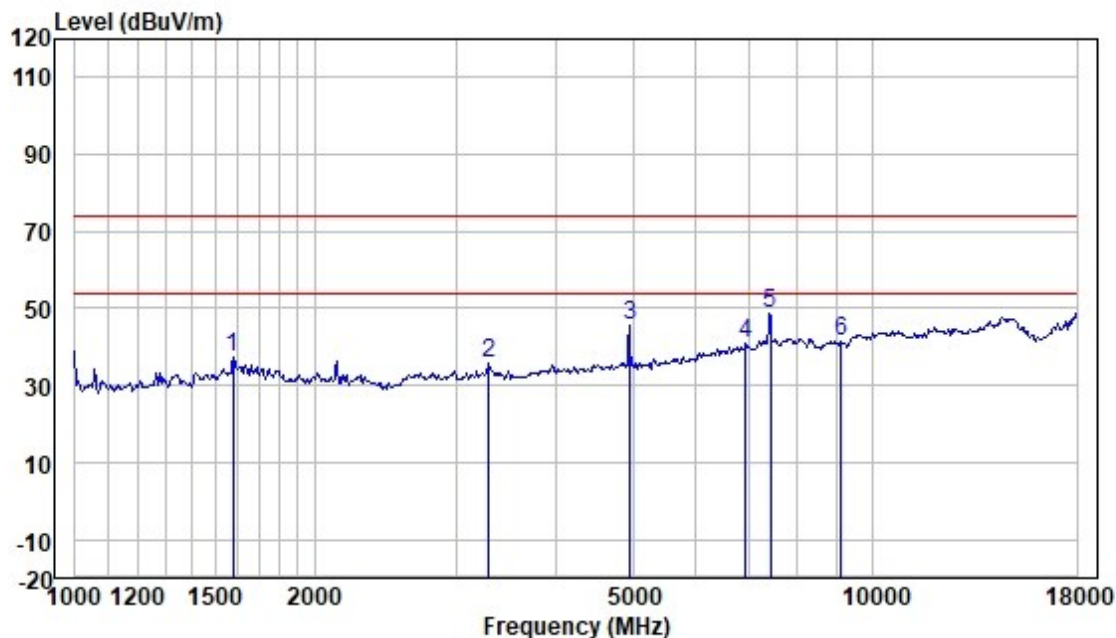
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2126.31	66.44	26.86	3.19	54.81	41.68	74.00	-32.32	VERTICAL	Peak
2	3299.34	62.41	28.89	4.01	54.79	40.52	74.00	-33.48	VERTICAL	Peak
3	4960.00	66.69	31.74	4.89	53.81	49.51	74.00	-24.49	VERTICAL	Peak
4	6995.17	52.67	35.23	5.87	53.20	40.57	74.00	-33.43	VERTICAL	Peak
5	7440.00	61.13	36.57	6.02	53.28	50.44	74.00	-23.56	VERTICAL	Peak
6	9641.26	51.86	38.73	7.05	53.43	44.21	74.00	-29.79	VERTICAL	Peak



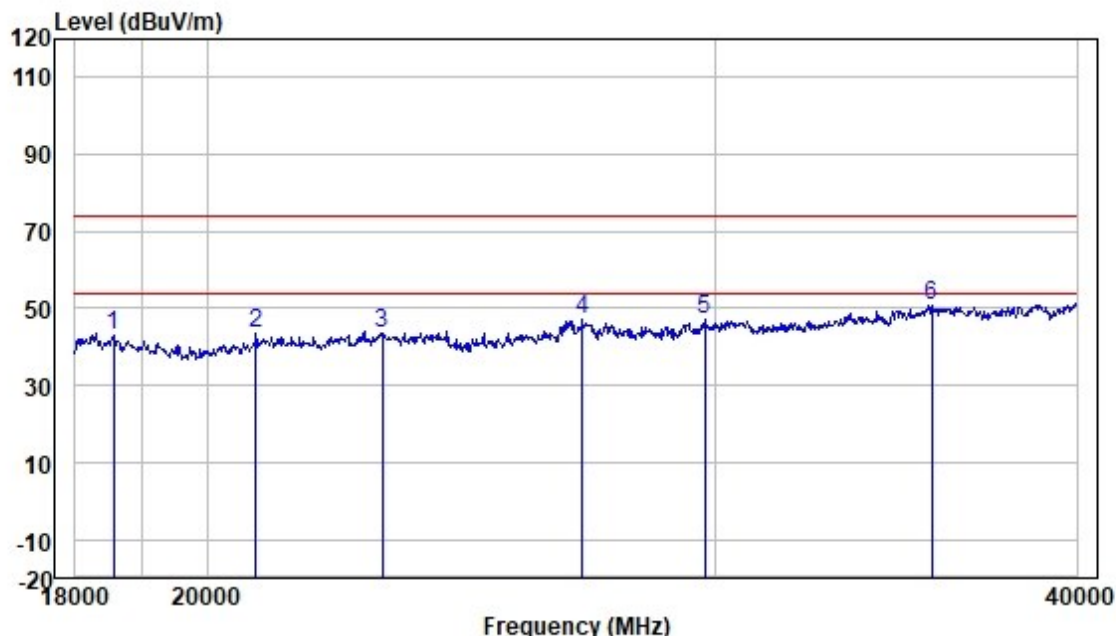
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1578.82	63.07	25.98	2.74	54.70	37.09	74.00	-36.91	HORIZONTAL	peak
2	3299.34	57.47	28.89	4.01	54.79	35.58	74.00	-38.42	HORIZONTAL	peak
3	4960.00	63.05	31.74	4.89	53.81	45.87	74.00	-28.13	HORIZONTAL	peak
4	6914.76	53.06	35.11	5.84	53.20	40.81	74.00	-33.19	HORIZONTAL	peak
5	7440.00	59.61	36.57	6.02	53.28	48.92	74.00	-25.08	HORIZONTAL	peak
6	9099.72	50.35	37.76	6.64	53.49	41.26	74.00	-32.74	HORIZONTAL	peak



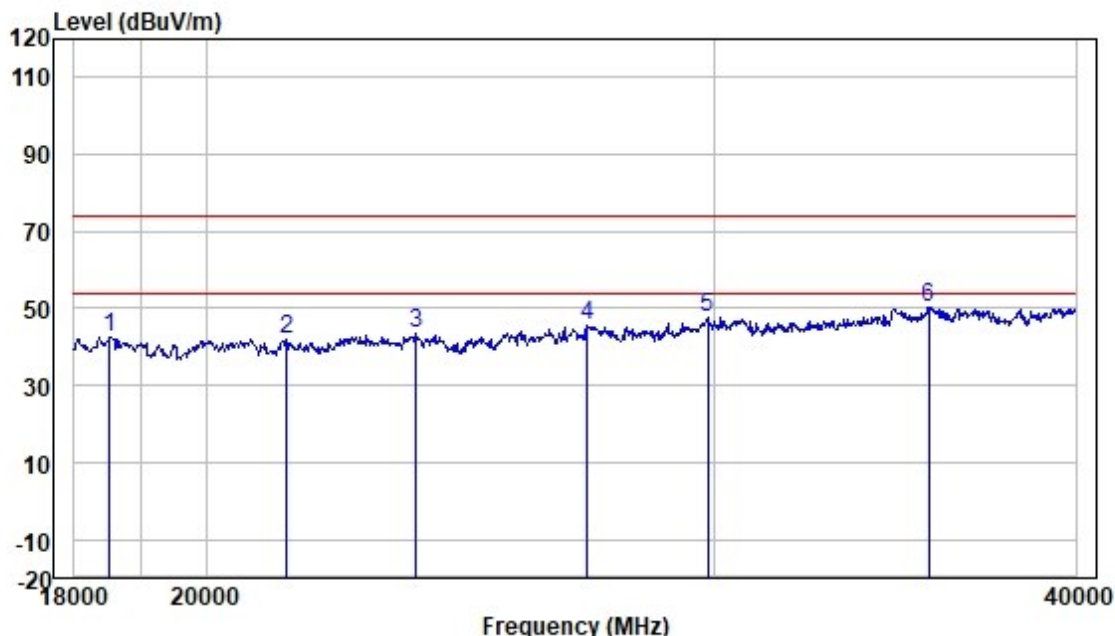
Test Mode: 00; Polarity: Vertical; Modulation:GFSK;



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	18569.37	42.08	36.92	3.14	39.24	42.90	74.00	-31.10	VERTICAL	Peak
2	20798.93	41.48	37.56	3.19	38.94	43.29	74.00	-30.71	VERTICAL	Peak
3	23000.45	40.12	38.50	3.33	38.18	43.77	74.00	-30.23	VERTICAL	Peak
4	26961.68	41.96	39.18	3.89	37.94	47.09	74.00	-26.91	VERTICAL	Peak
5	29744.17	40.94	39.60	4.20	37.71	47.03	74.00	-26.97	VERTICAL	Peak
6	35626.72	40.95	41.34	5.81	37.46	50.64	74.00	-23.36	VERTICAL	Peak



Test Mode: 00; Polarity: Horizontal; Modulation:GFSK;



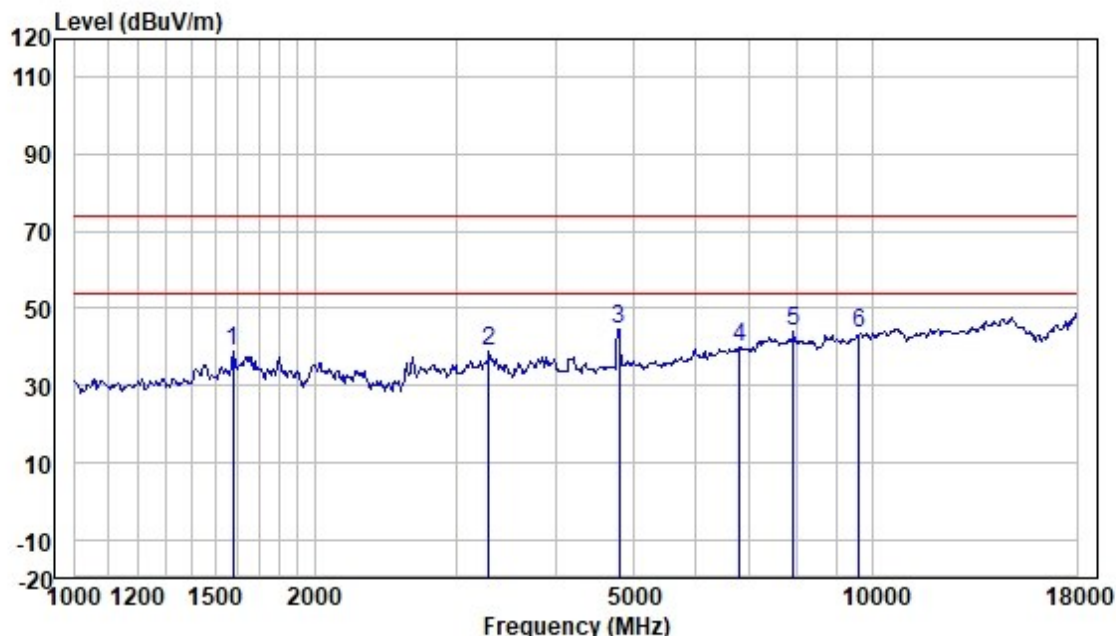
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	18524.94	41.84	36.90	3.12	39.22	42.64	74.00	-31.36	HORIZONTAL	Peak
2	21337.24	40.09	37.63	3.26	39.04	41.94	74.00	-32.06	HORIZONTAL	Peak
3	23652.32	39.44	38.63	3.42	37.90	43.59	74.00	-30.41	HORIZONTAL	Peak
4	27091.17	40.34	39.20	3.88	37.98	45.44	74.00	-28.56	HORIZONTAL	Peak
5	29815.51	41.37	39.66	4.20	37.66	47.57	74.00	-26.43	HORIZONTAL	Peak
6	35569.87	40.87	41.32	5.91	37.60	50.50	74.00	-23.50	HORIZONTAL	Peak



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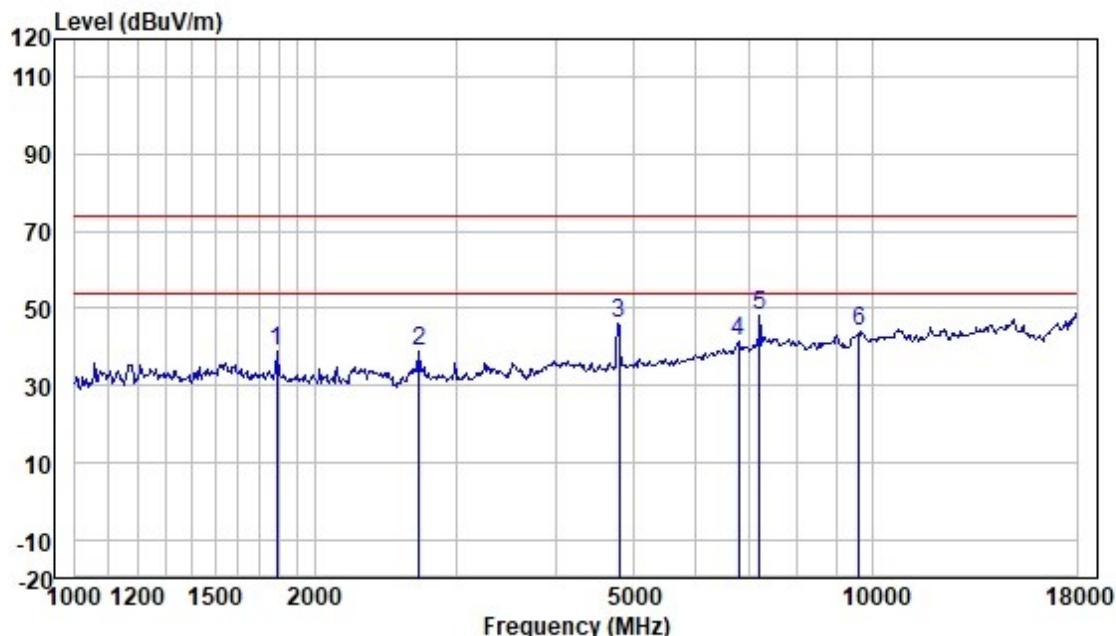
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1578.82	64.84	25.98	2.74	54.70	38.86	74.00	-35.14	VERTICAL	Peak
2	3299.34	60.53	28.89	4.01	54.79	38.64	74.00	-35.36	VERTICAL	Peak
3	4804.00	62.29	31.51	4.81	53.86	44.75	74.00	-29.25	VERTICAL	Peak
4	6795.88	52.41	34.87	5.79	53.20	39.87	74.00	-34.13	VERTICAL	Peak
5	7943.84	54.23	37.19	6.19	53.39	44.22	74.00	-29.78	VERTICAL	Peak
6	9608.00	51.28	38.70	7.04	53.43	43.59	74.00	-30.41	VERTICAL	Peak



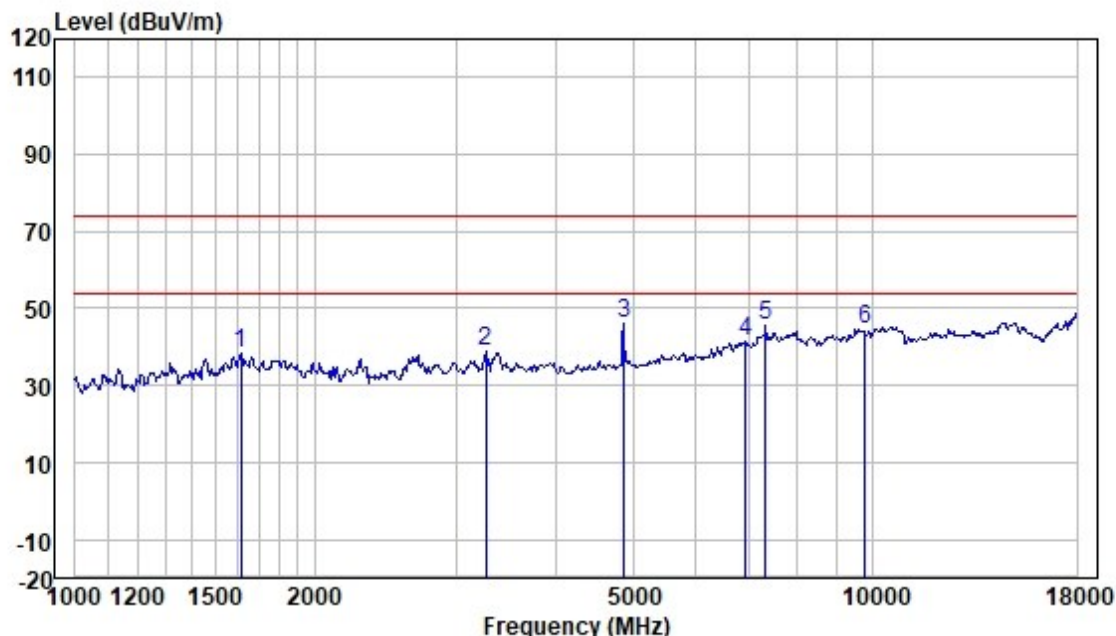
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1792.94	63.99	26.44	3.00	54.77	38.66	74.00	-35.34	HORIZONTAL	Peak
2	2702.80	62.05	28.12	3.61	54.89	38.89	74.00	-35.11	HORIZONTAL	Peak
3	4804.00	63.81	31.51	4.81	53.86	46.27	74.00	-27.73	HORIZONTAL	Peak
4	6776.27	53.84	34.82	5.78	53.20	41.24	74.00	-32.76	HORIZONTAL	Peak
5	7206.00	59.58	35.80	5.93	53.23	48.08	74.00	-25.92	HORIZONTAL	Peak
6	9608.00	51.52	38.70	7.04	53.43	43.83	74.00	-30.17	HORIZONTAL	Peak



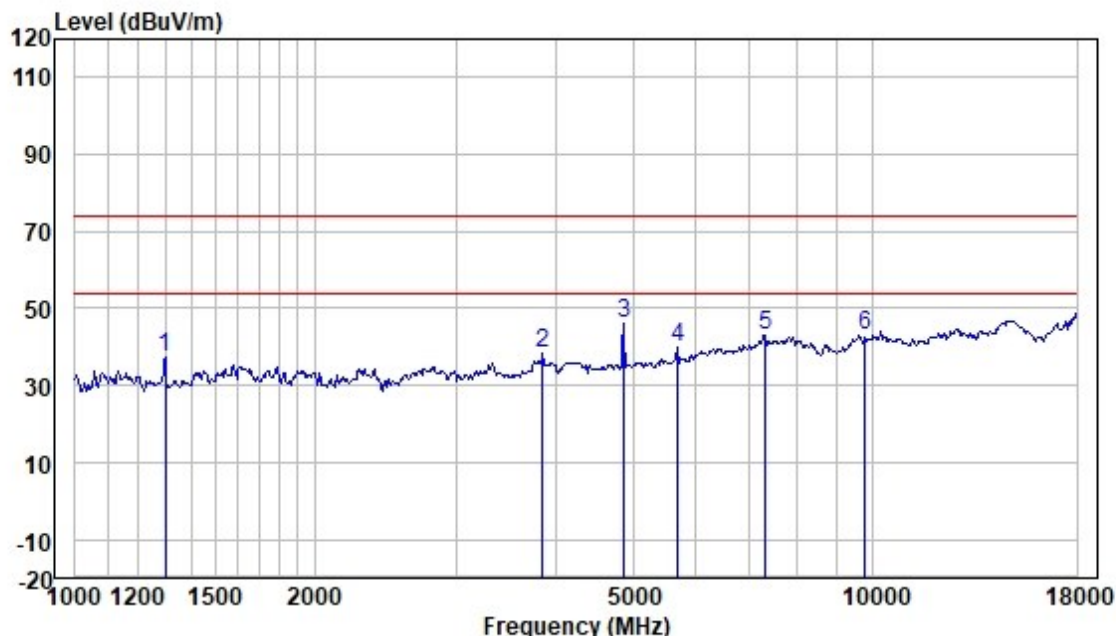
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1615.75	64.19	26.03	2.77	54.72	38.27	74.00	-35.73	VERTICAL	peak
2	3270.86	60.63	28.87	3.99	54.80	38.69	74.00	-35.31	VERTICAL	peak
3	4880.00	63.71	31.63	4.85	53.84	46.35	74.00	-27.65	VERTICAL	peak
4	6914.76	53.48	35.11	5.84	53.20	41.23	74.00	-32.77	VERTICAL	peak
5	7320.00	56.50	36.29	5.98	53.26	45.51	74.00	-28.49	VERTICAL	peak
6	9760.00	52.18	38.87	7.11	53.42	44.74	74.00	-29.26	VERTICAL	peak



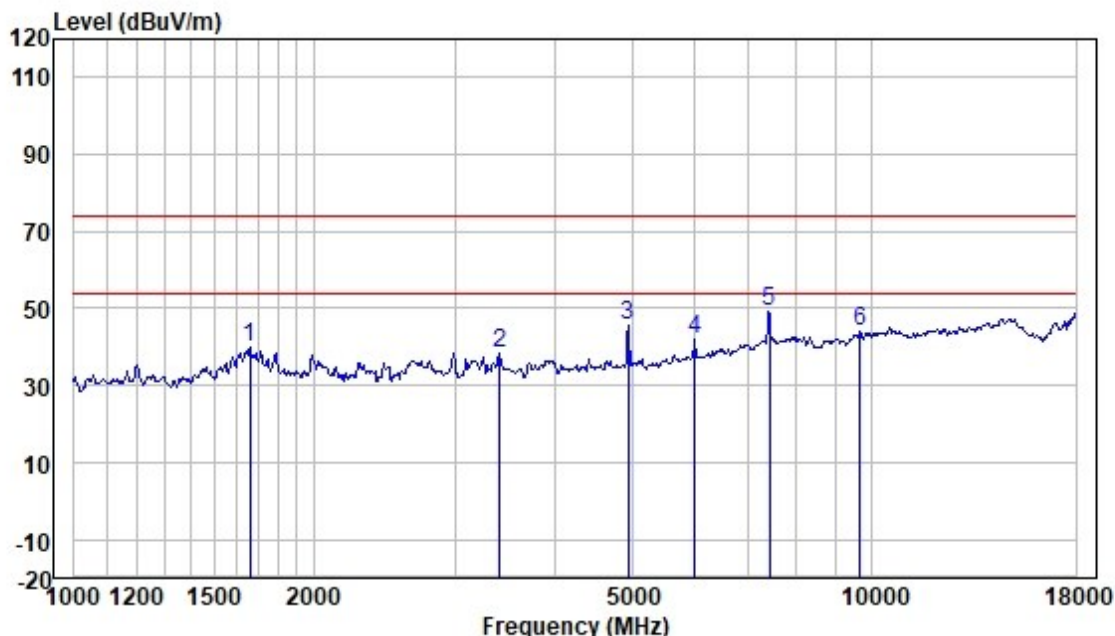
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1300.86	63.33	25.60	2.59	54.42	37.10	74.00	-36.90	HORIZONTAL	Peak
2	3856.67	58.36	29.80	4.42	54.43	38.15	74.00	-35.85	HORIZONTAL	Peak
3	4880.00	63.59	31.63	4.85	53.84	46.23	74.00	-27.77	HORIZONTAL	Peak
4	5697.37	55.83	32.36	5.26	53.32	40.13	74.00	-33.87	HORIZONTAL	Peak
5	7320.00	54.14	36.29	5.98	53.26	43.15	74.00	-30.85	HORIZONTAL	Peak
6	9760.00	50.30	38.87	7.11	53.42	42.86	74.00	-31.14	HORIZONTAL	Peak



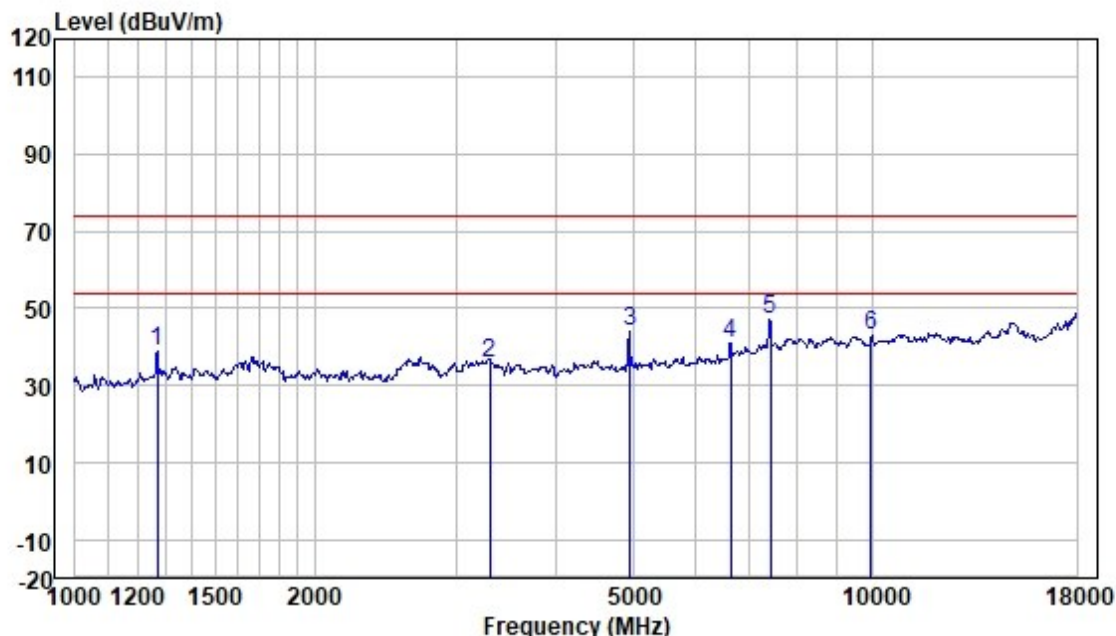
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.14	65.80	26.10	2.81	54.73	39.98	74.00	-34.02	VERTICAL	Peak
2	3415.79	59.88	28.94	4.06	54.71	38.17	74.00	-35.83	VERTICAL	Peak
3	4944.99	62.73	31.72	4.88	53.82	45.51	74.00	-28.49	VERTICAL	Peak
4	6001.63	56.86	32.82	5.44	53.20	41.92	74.00	-32.08	VERTICAL	Peak
5	7440.00	60.13	36.57	6.02	53.28	49.44	74.00	-24.56	VERTICAL	Peak
6	9641.26	51.86	38.73	7.05	53.43	44.21	74.00	-29.79	VERTICAL	Peak



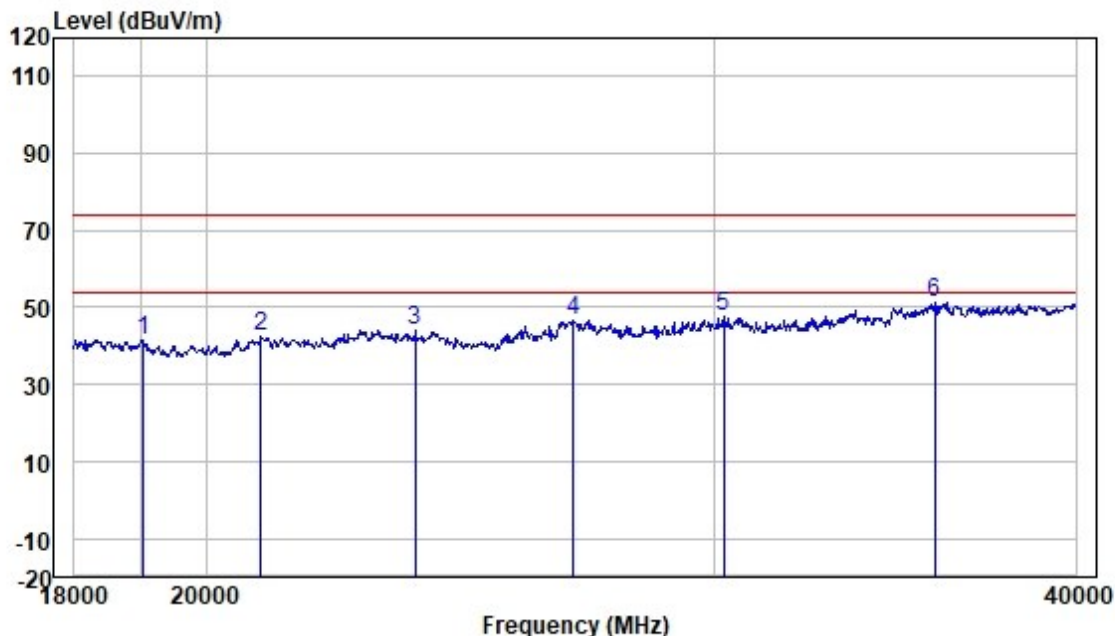
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1271.12	65.14	25.50	2.55	54.40	38.79	74.00	-35.21	HORIZONTAL	Peak
2	3308.89	57.68	28.89	4.01	54.78	35.80	74.00	-38.20	HORIZONTAL	Peak
3	4960.00	61.05	31.74	4.89	53.81	43.87	74.00	-30.13	HORIZONTAL	Peak
4	6621.38	54.20	34.39	5.69	53.20	41.08	74.00	-32.92	HORIZONTAL	Peak
5	7440.00	57.61	36.57	6.02	53.28	46.92	74.00	-27.08	HORIZONTAL	Peak
6	9920.00	49.92	39.07	7.19	53.41	42.77	74.00	-31.23	HORIZONTAL	Peak



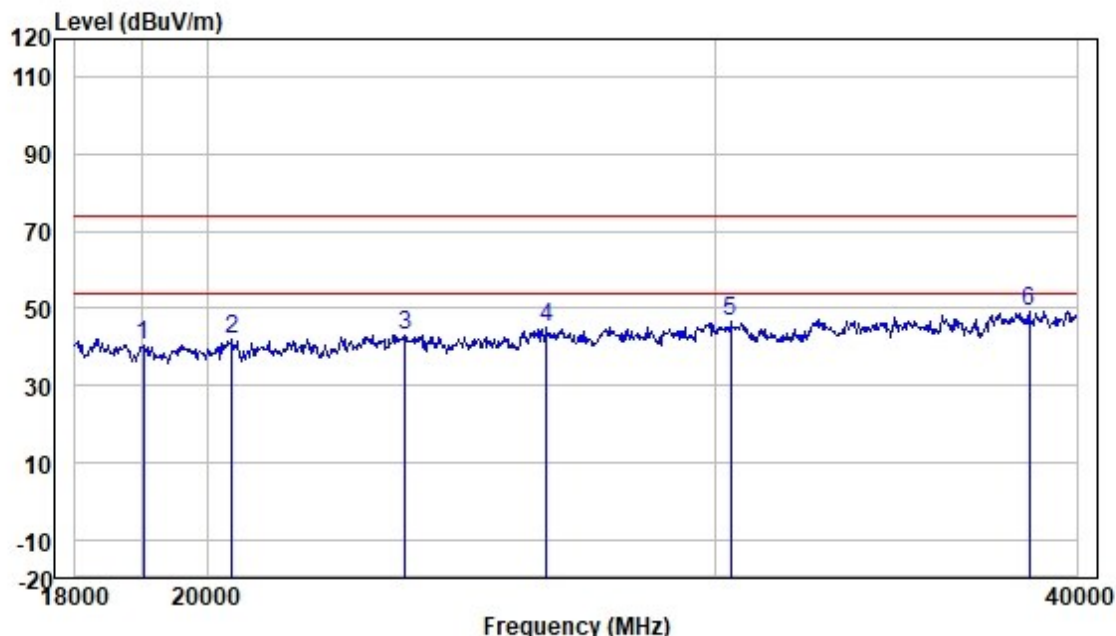
Test Mode: 01; Polarity: Vertical; Modulation:GFSK;



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	19034.77	40.68	37.09	3.21	39.33	41.65	74.00	-32.35	VERTICAL	Peak
2	20898.82	40.26	37.64	3.21	38.83	42.28	74.00	-31.72	VERTICAL	Peak
3	23633.45	39.76	38.62	3.41	37.90	43.89	74.00	-30.11	VERTICAL	Peak
4	26811.40	41.68	39.06	3.87	37.94	46.67	74.00	-27.33	VERTICAL	Peak
5	30198.88	40.70	40.07	4.37	37.68	47.46	74.00	-26.54	VERTICAL	Peak
6	35740.69	41.17	41.38	5.81	37.24	51.12	74.00	-22.88	VERTICAL	Peak



Test Mode: 01; Polarity: Horizontal; Modulation:GFSK;



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	19019.58	39.37	37.09	3.22	39.32	40.36	74.00	-33.64	HORIZONTAL	Peak
2	20404.13	41.53	37.27	3.10	39.85	42.05	74.00	-31.95	HORIZONTAL	Peak
3	23426.77	39.18	38.59	3.38	38.04	43.11	74.00	-30.89	HORIZONTAL	Peak
4	26218.60	40.33	38.91	3.73	37.93	45.04	74.00	-28.96	HORIZONTAL	Peak
5	30343.91	39.68	40.39	4.44	37.79	46.72	74.00	-27.28	HORIZONTAL	Peak
6	38495.88	37.82	42.70	5.16	36.22	49.46	74.00	-24.54	HORIZONTAL	Peak



7.5 Maximum Conducted Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2020) Section 11.9.1

Test Engineer: Banna Ban

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: 23.2 °C

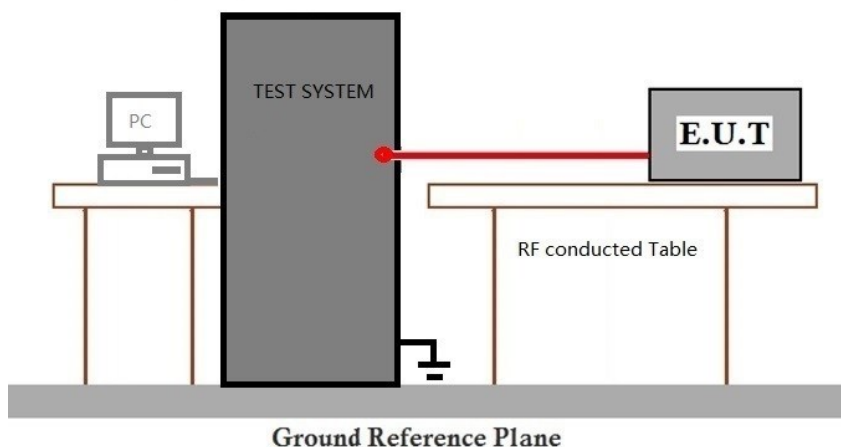
Humidity: 50.0 % RH

Atmospheric Pressure: 1007 mbar

7.5.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test 01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.

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



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7.6 Minimum 6dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2020) Section 11.8.1
Test Engineer:	Banna Ban
Limit:	≥500 kHz

7.6.1 E.U.T. Operation

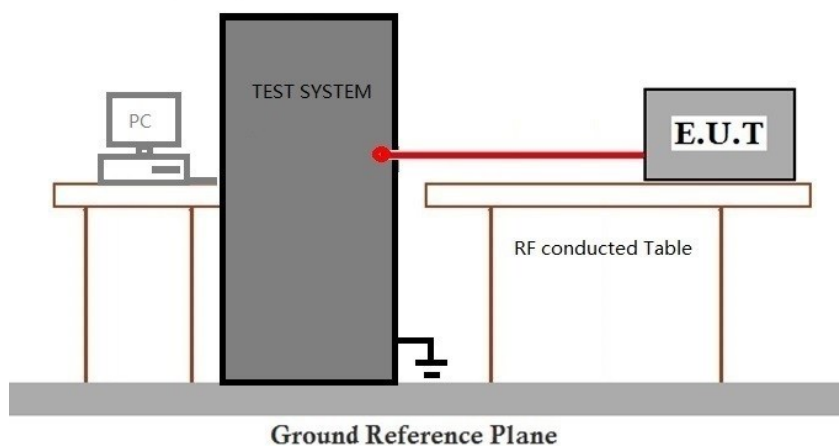
Operating Environment:

Temperature: 23.2 °C Humidity: 50.0 % RH Atmospheric Pressure: 1007 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test	01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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7.7 Power Spectral Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
 Test Method: ANSI C63.10 (2020) Section 11.10.3
 Test Engineer: Banna Ban
 Limit:
 ≤8dBm in any 3 kHz band during any time interval of continuous transmission

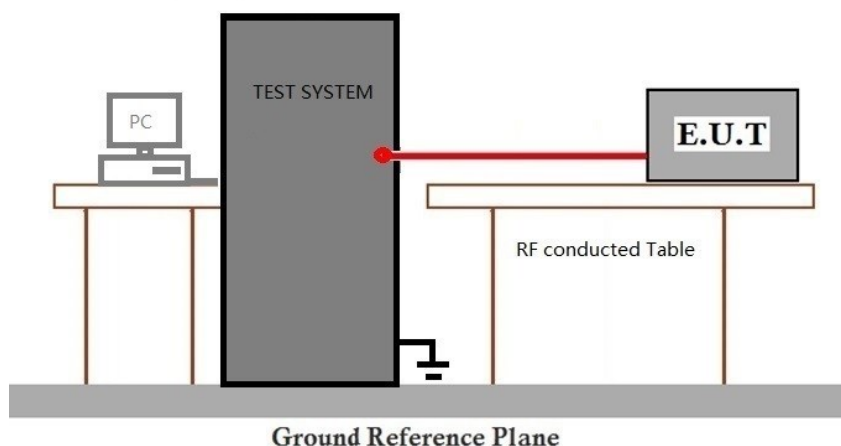
7.7.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.2 °C Humidity: 50.0 % RH Atmospheric Pressure: 1007 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test	01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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7.8 Conducted Band Edges Measurement

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

Test Method: ANSI C63.10 (2020) Section 6.10.4

Test Engineer: Banna Ban

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).

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23.2 °C Humidity: 50.0 % RH Atmospheric Pressure: 1007 mbar

7.8.2 Test Mode Description

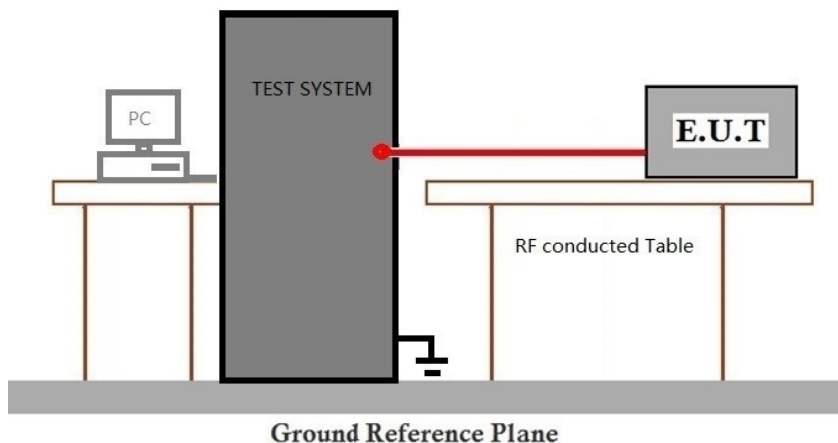
Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test	01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.



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7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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7.9 Conducted Spurious Emissions

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

Test Method: ANSI C63.10 (2020) Section 11.11

Test Engineer: Banna Ban

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).

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 23.2 °C

Humidity: 50.0 % RH

Atmospheric Pressure: 1007 mbar

7.9.2 Test Mode Description

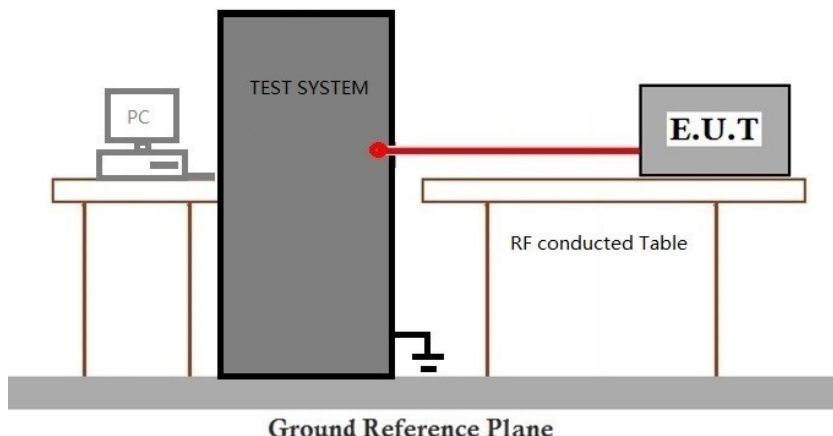
Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 1.
Final test	01	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for Module 2.



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7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Test Setup Photo for GZCR260100026502



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9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2601000265LM



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10 Appendix

For Module 1

1. Duty Cycle

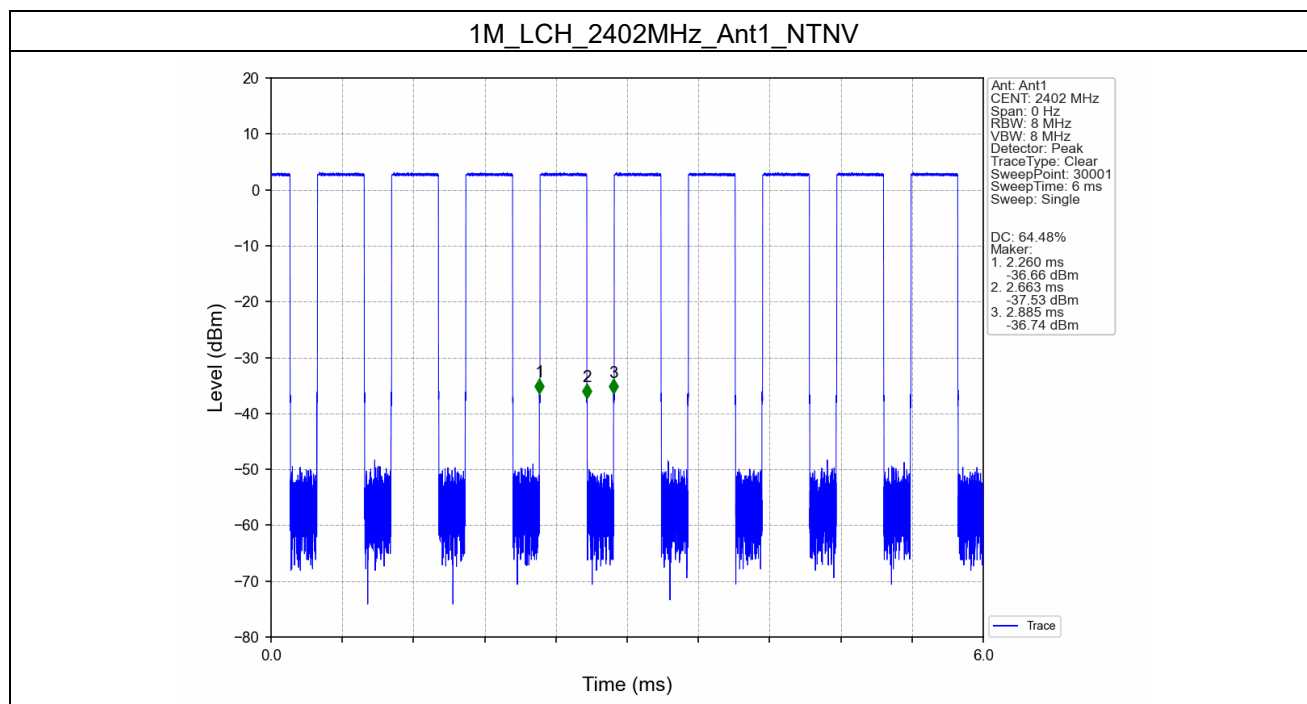
1.1 Test Result

1.1.1 Ant1

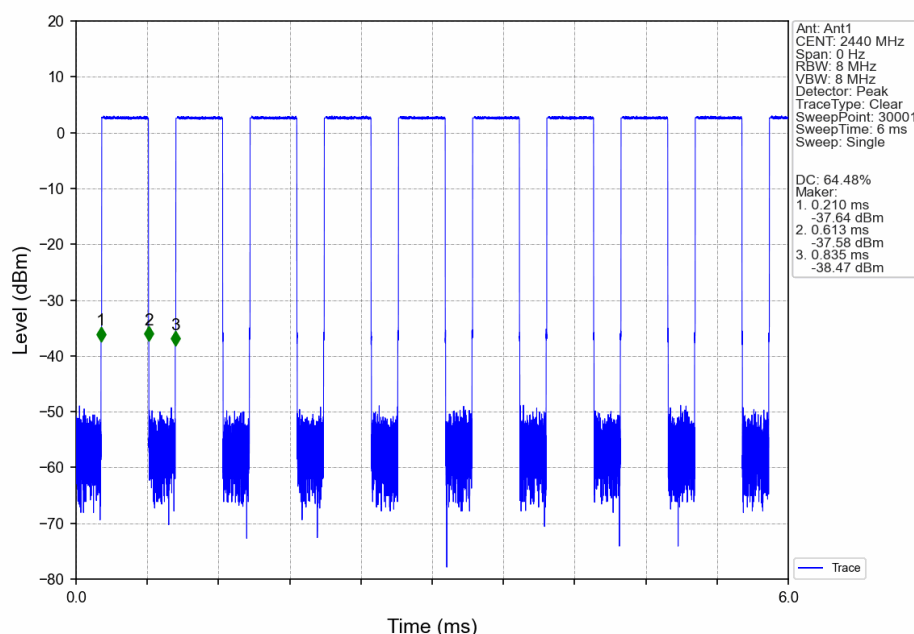
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	0.403	0.625	64.48	1.91	0.05
		2440	0.403	0.625	64.48	1.91	0.00
		2480	0.403	0.625	64.48	1.91	0.00

1.2 Test Graph

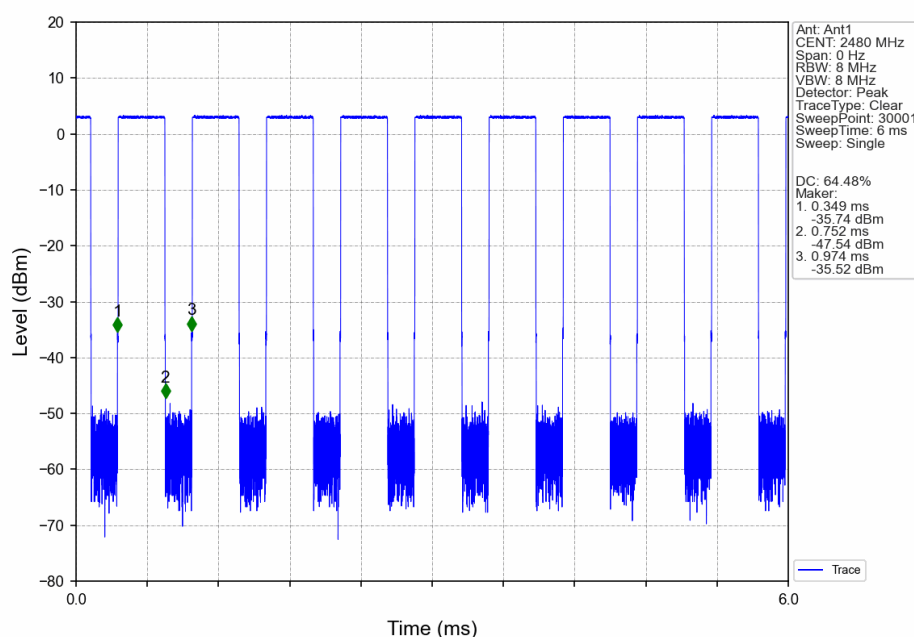
1.2.1 Ant1



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



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2. Bandwidth

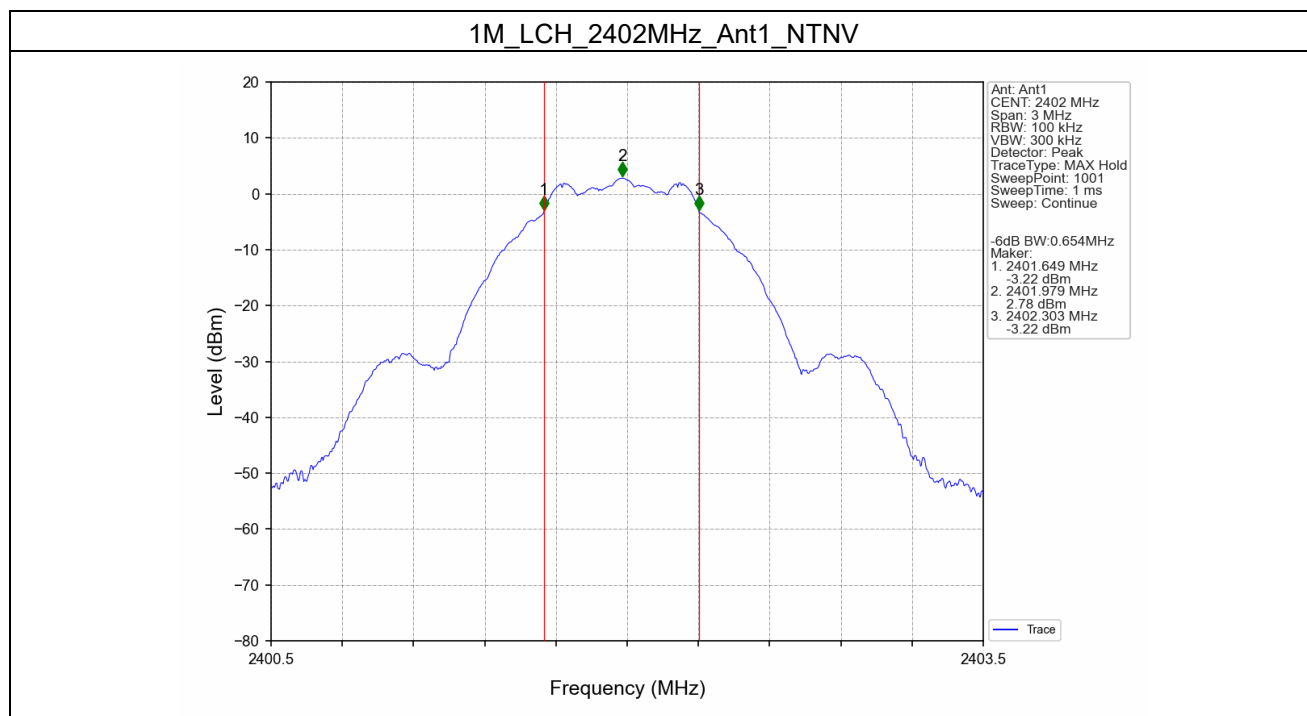
2.1 Test Result

2.1.1 6dB BW

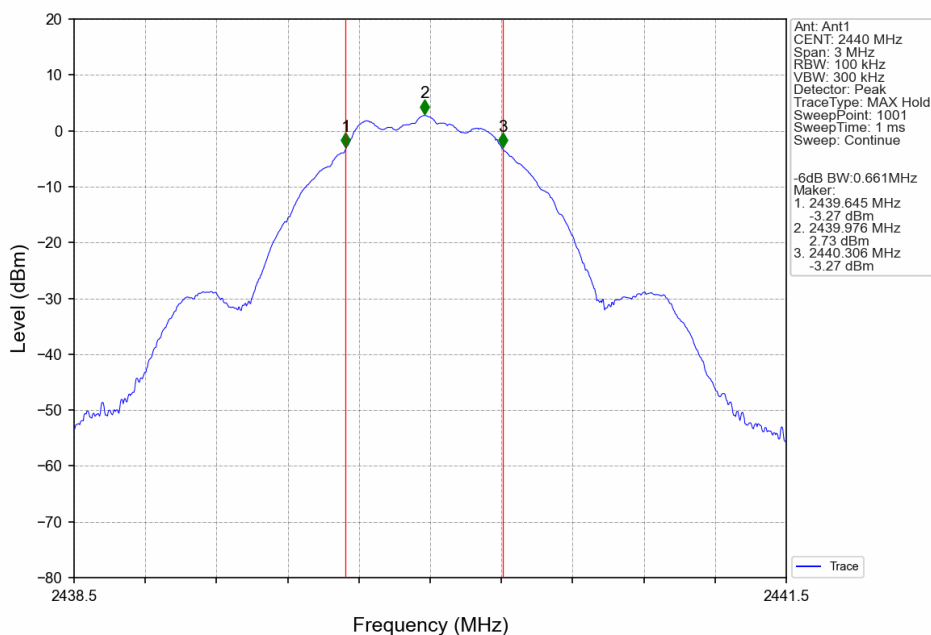
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.654	≥ 0.5	Pass
		2440	1	0.661	≥ 0.5	Pass
		2480	1	0.661	≥ 0.5	Pass

2.2 Test Graph

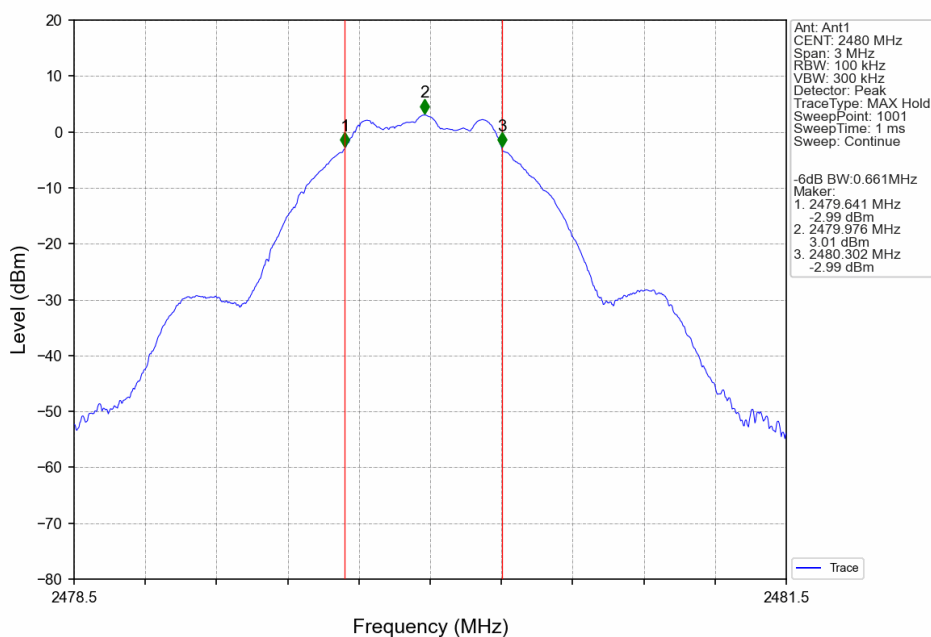
2.2.1 6dB BW



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	2.96	<=30	Pass
		2440	2.89	<=30	Pass
		2480	3.23	<=30	Pass



4. Maximum Power Spectral Density

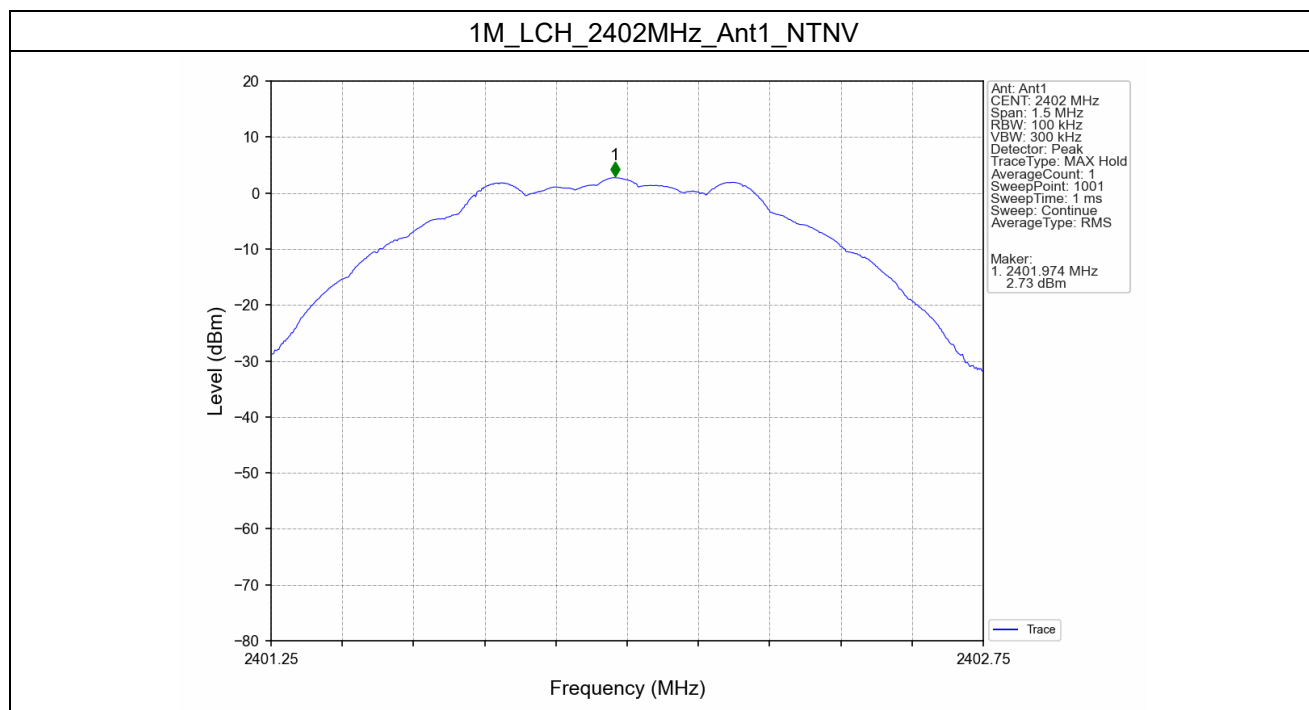
4.1 Test Result

4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	2.73	<=8	Pass
		2440	2.67	<=8	Pass
		2480	2.98	<=8	Pass

4.2 Test Graph

4.2.1 PSD



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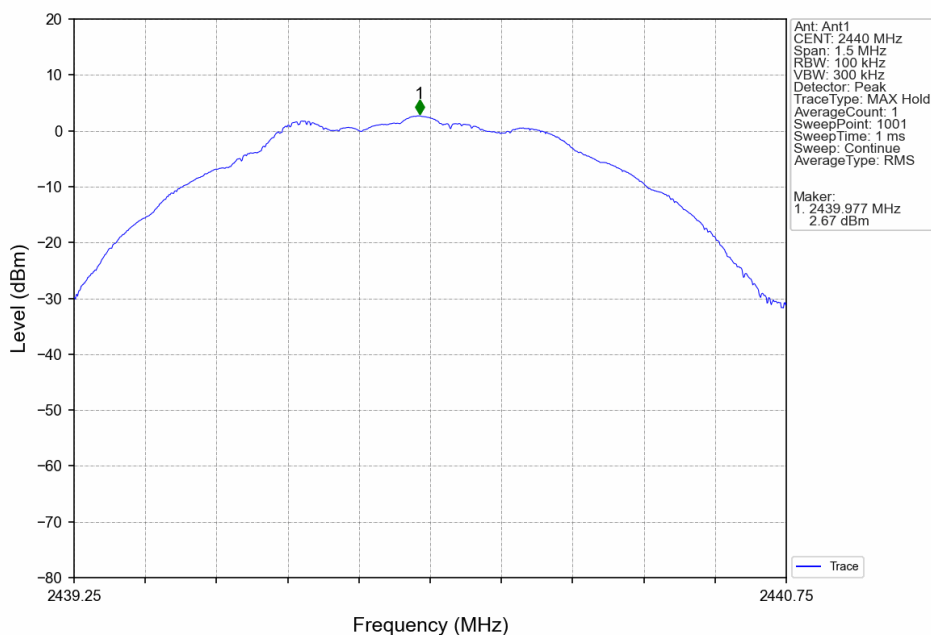
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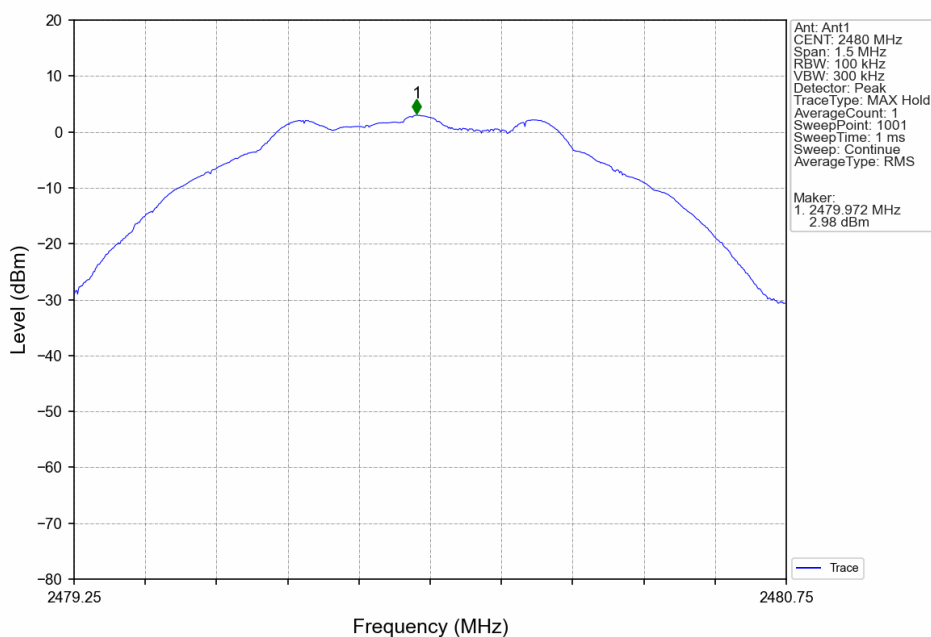
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1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



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5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	2.71
		2440	1	3.17
		2480	1	3.01

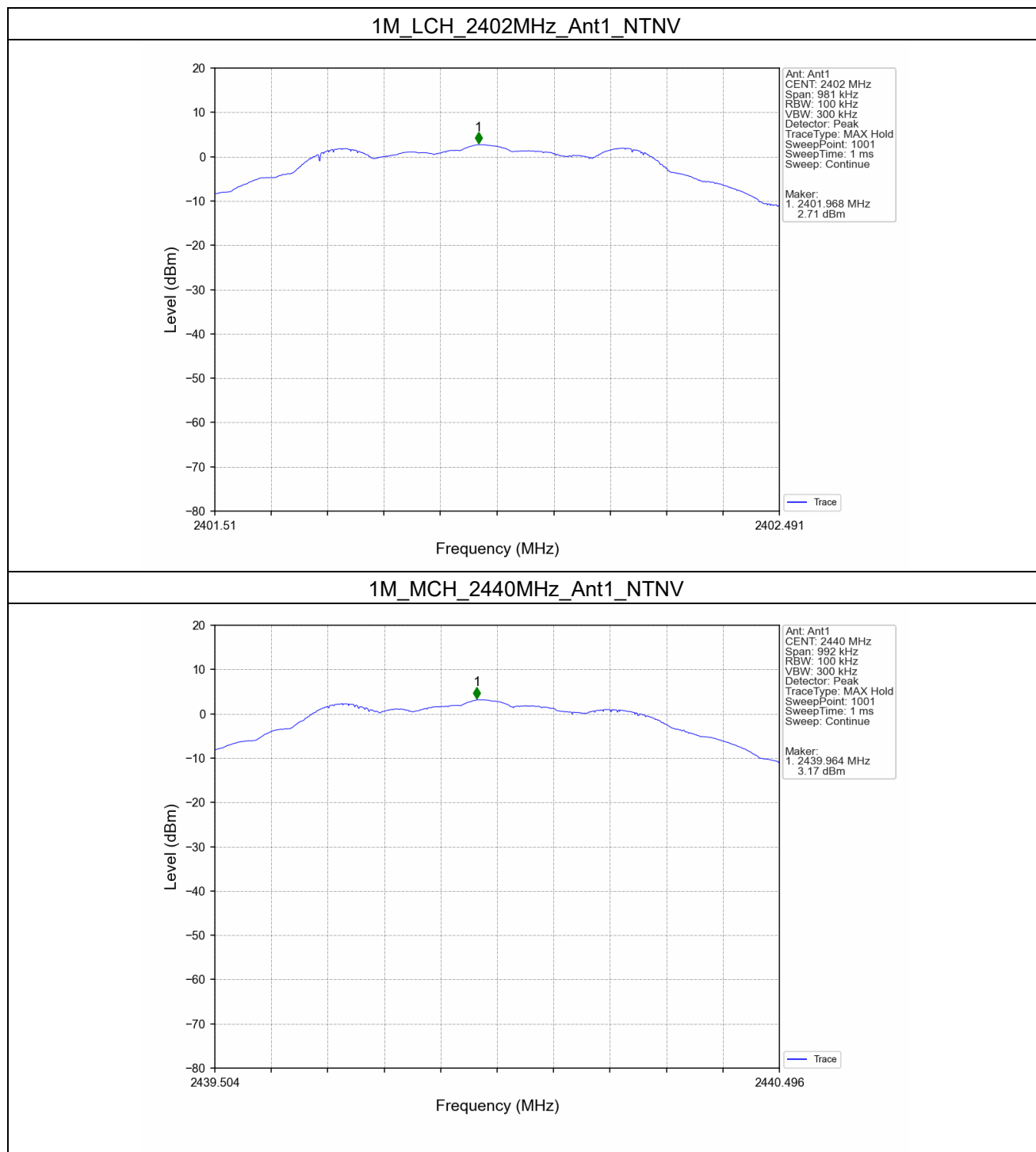
5.1.2 CSE and Band Edges

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	3.17	-16.83	Pass
		2440	1	3.17	-16.83	Pass
		2480	1	3.17	-16.83	Pass



5.2 Test Graph

5.2.1 Ref



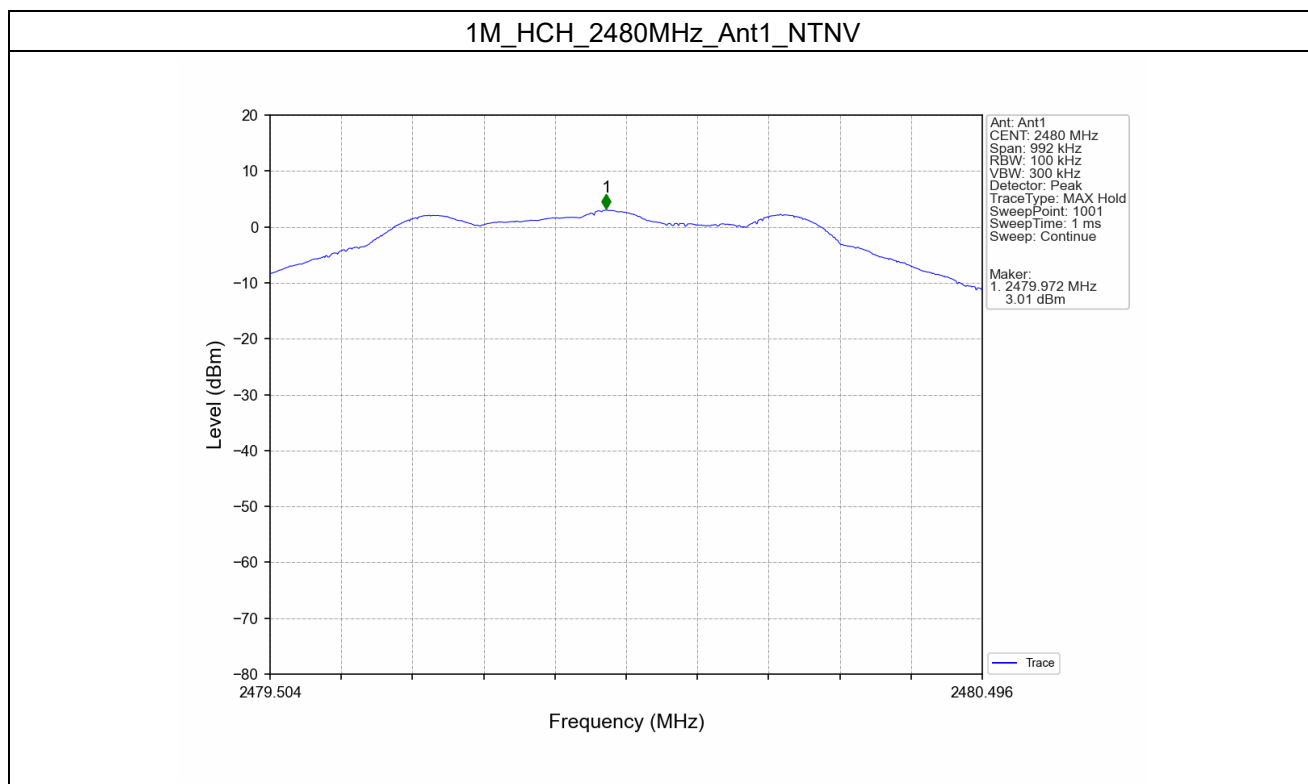
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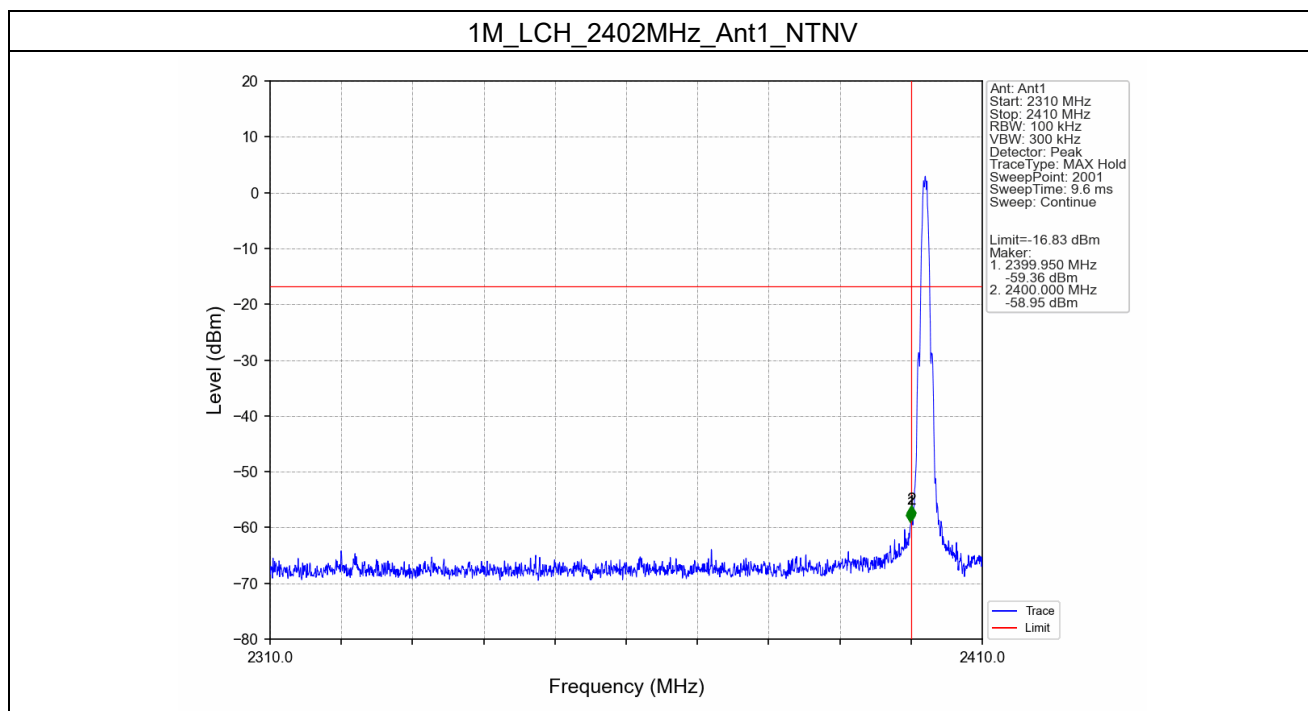
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5.2.2 CSE and Band Edges



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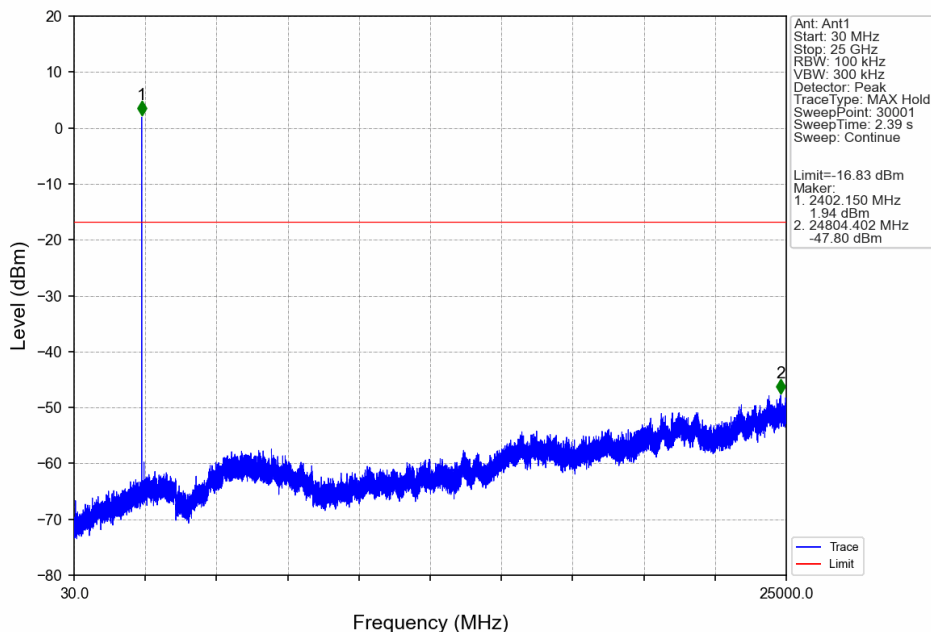
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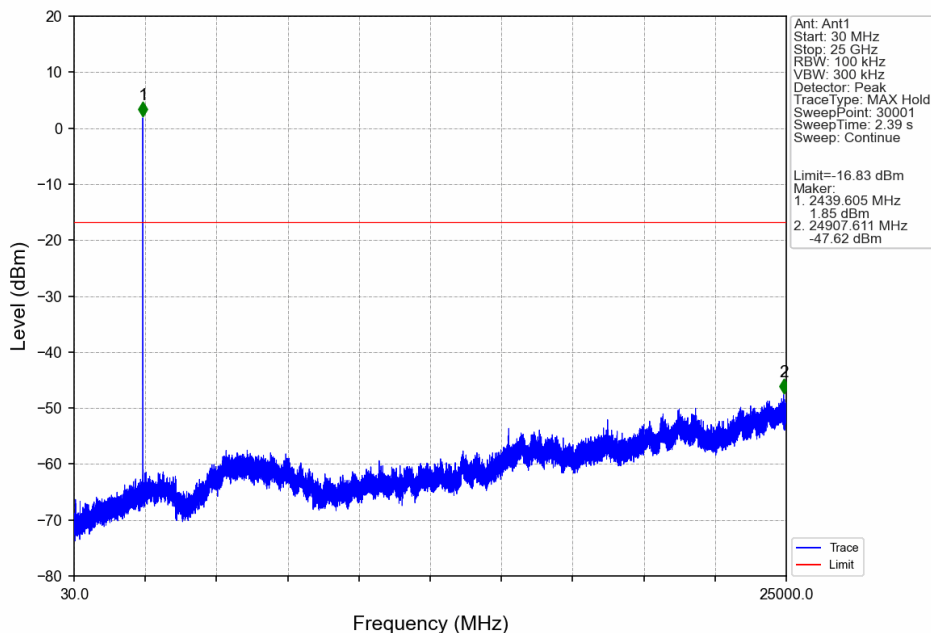
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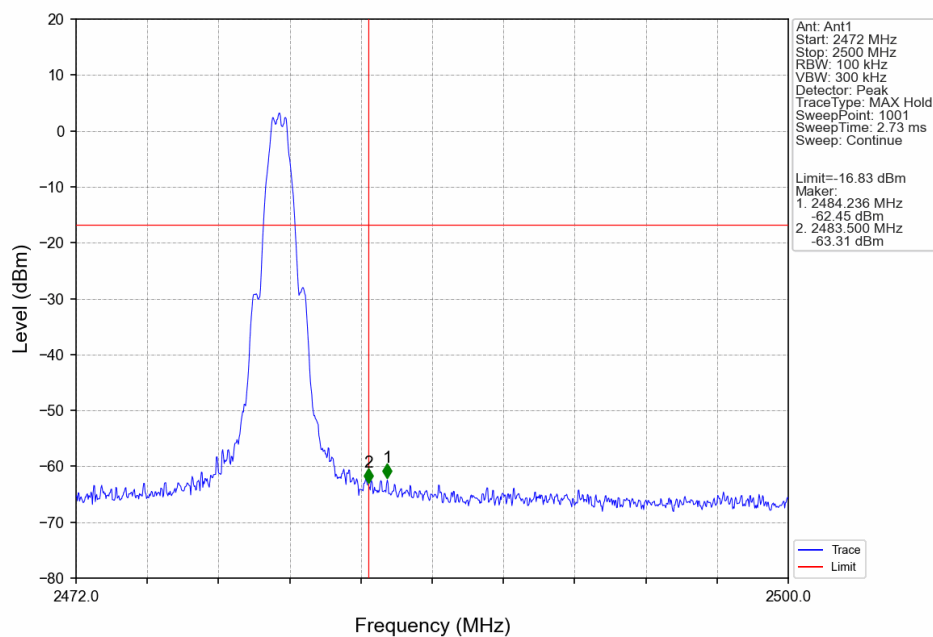
1M_LCH_2402MHz_Ant1_NTNV



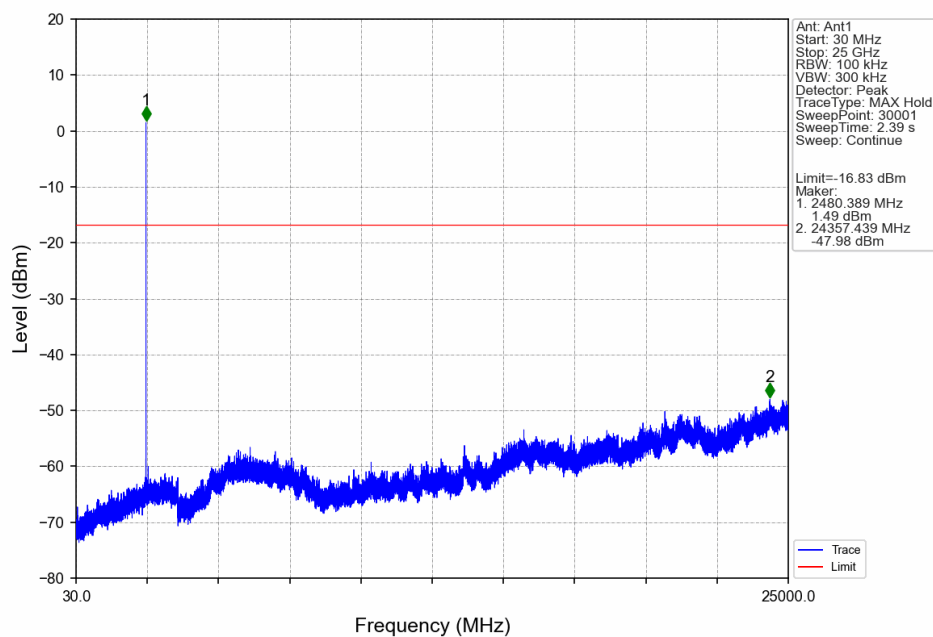
1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



For Module 2

1. Duty Cycle

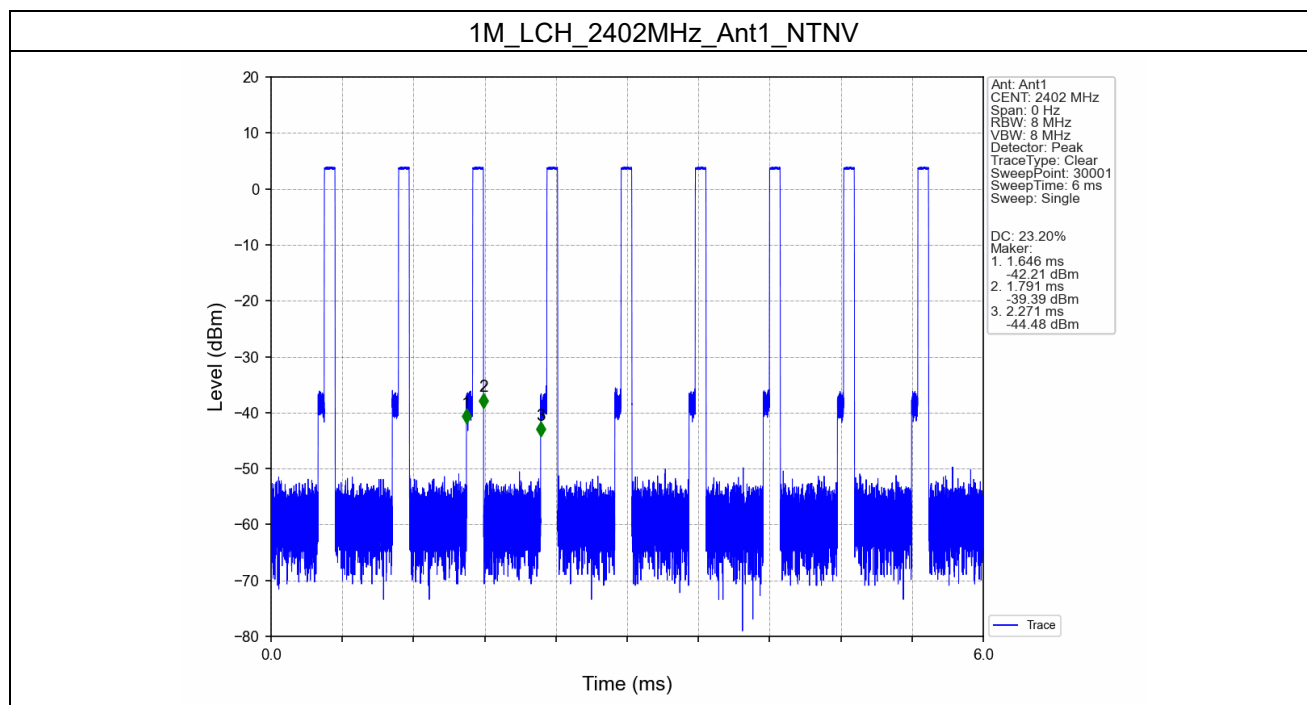
1.1 Test Result

1.1.1 Ant1

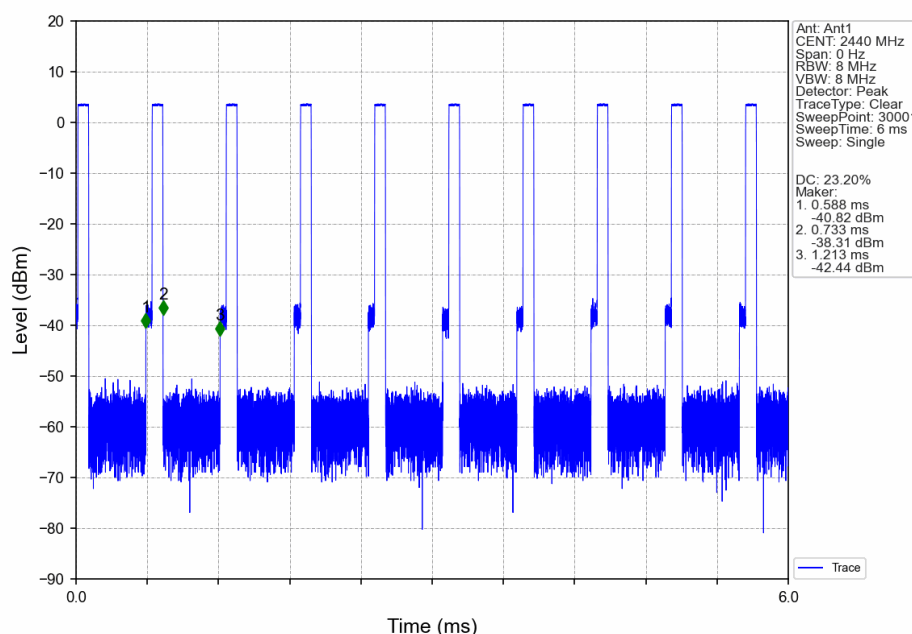
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	0.145	0.625	23.20	6.35	0.03
		2440	0.145	0.625	23.20	6.35	0.03
		2480	0.145	0.625	23.20	6.35	0.00

1.2 Test Graph

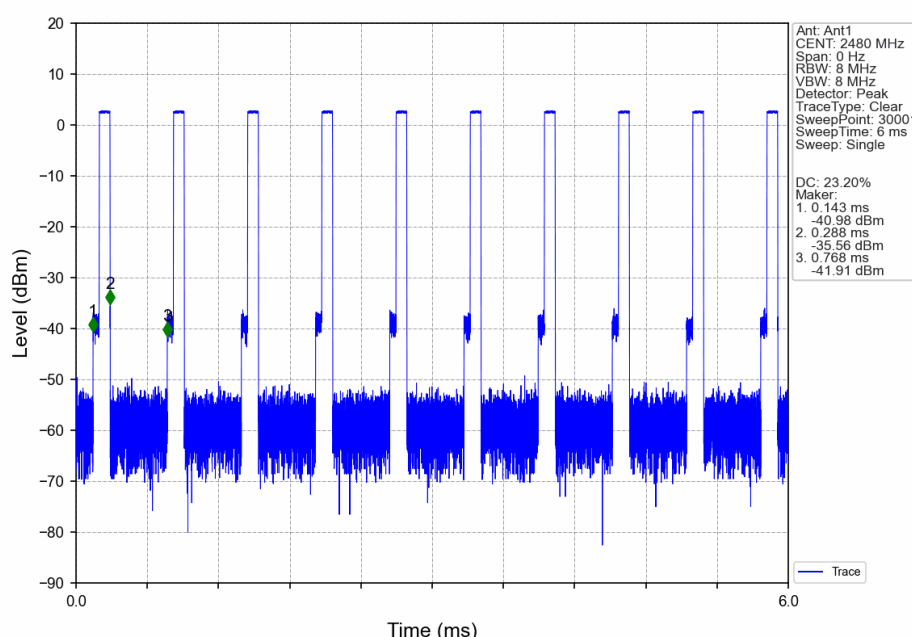
1.2.1 Ant1



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

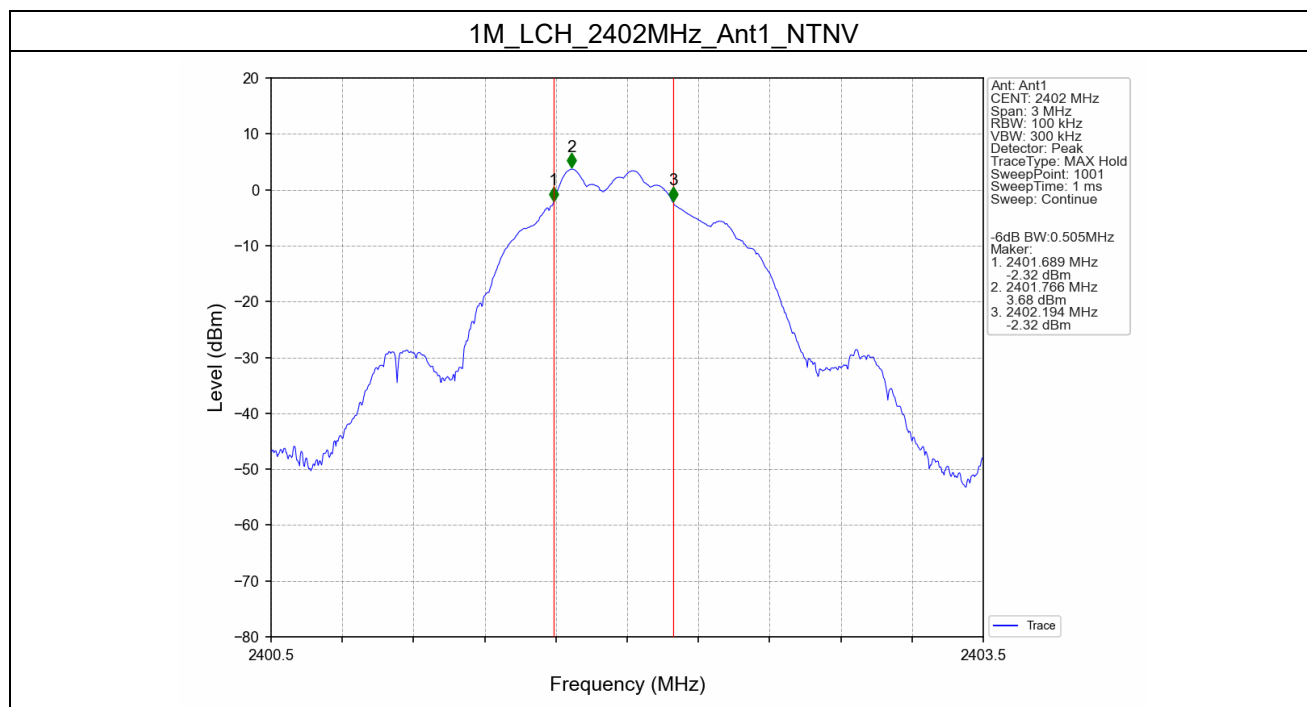
2.1 Test Result

2.1.1 6dB BW

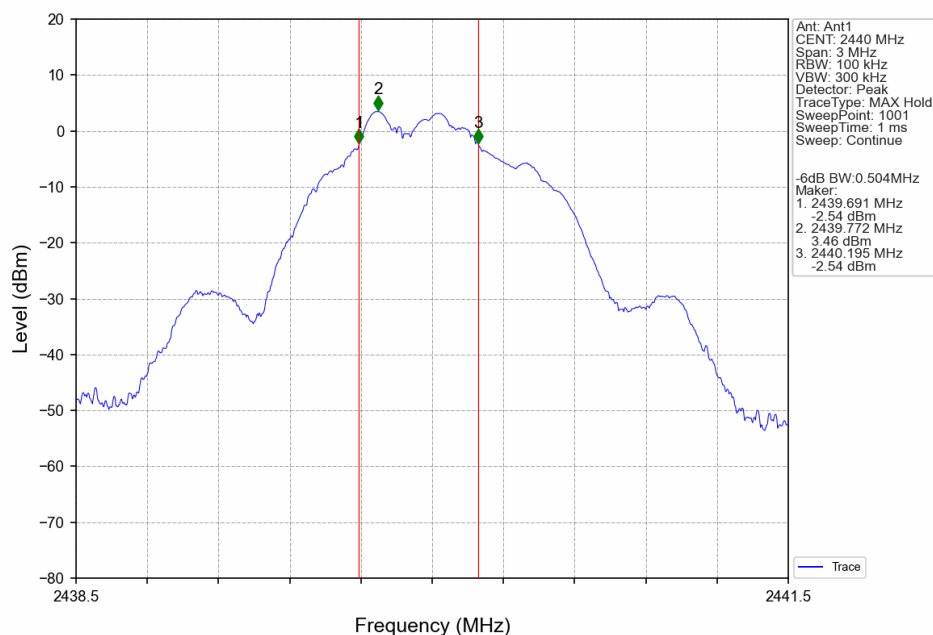
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.505	≥ 0.5	Pass
		2440	1	0.504	≥ 0.5	Pass
		2480	1	0.502	≥ 0.5	Pass

2.2 Test Graph

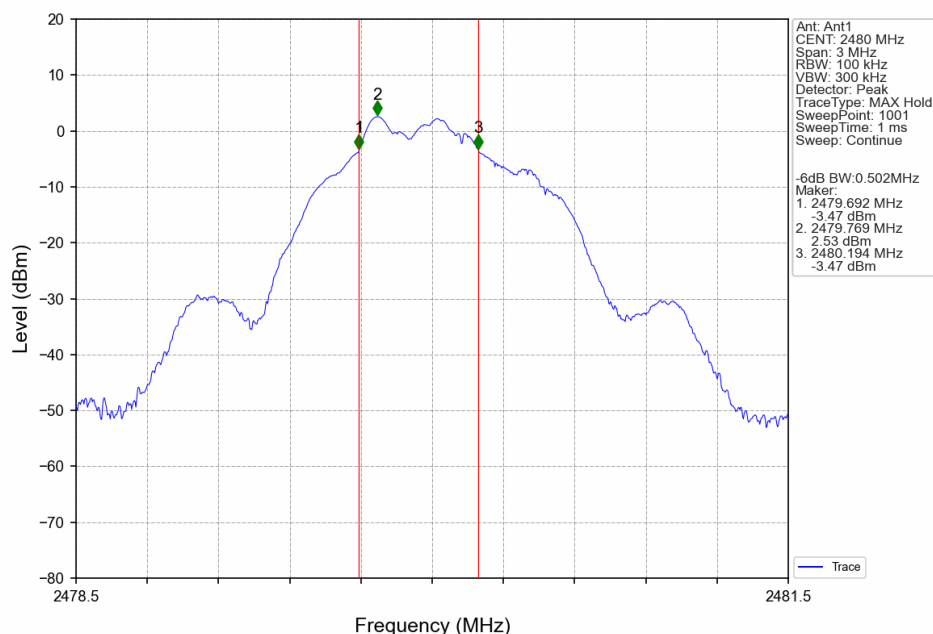
2.2.1 6dB BW



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	3.72	<=30	Pass
		2440	3.51	<=30	Pass
		2480	2.56	<=30	Pass



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4. Maximum Power Spectral Density

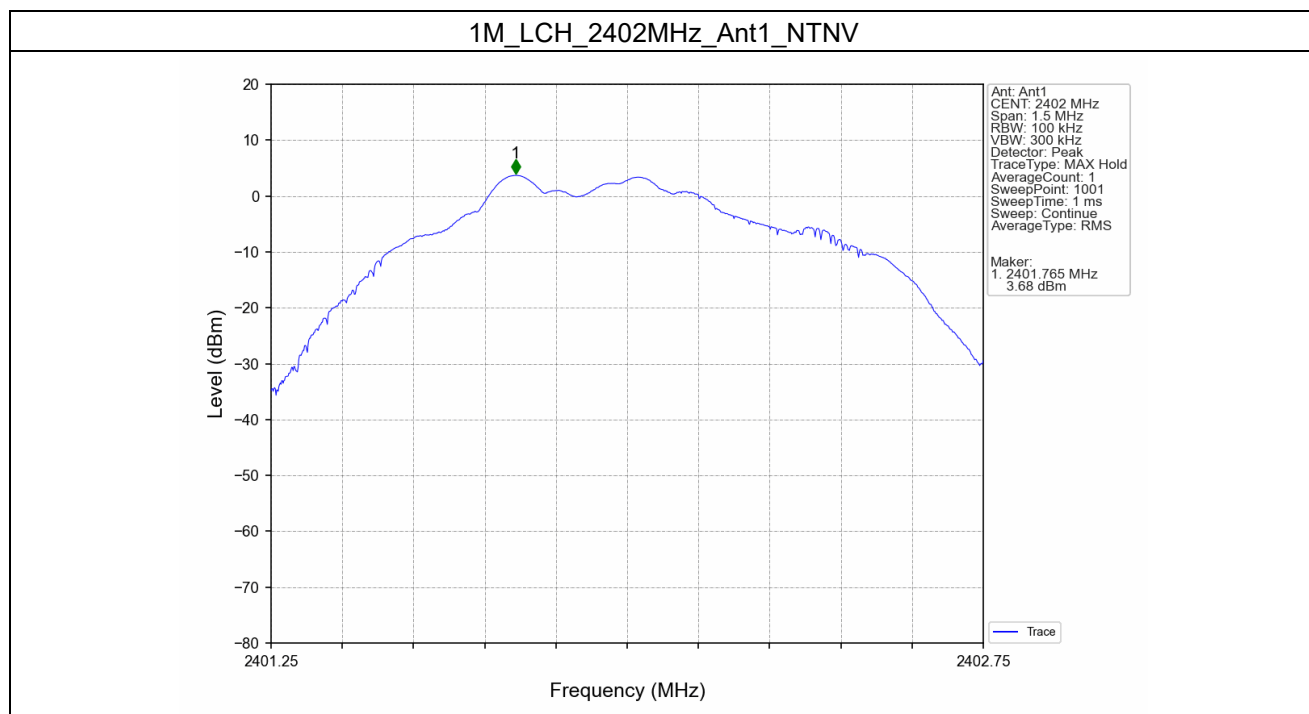
4.1 Test Result

4.1.1 PSD

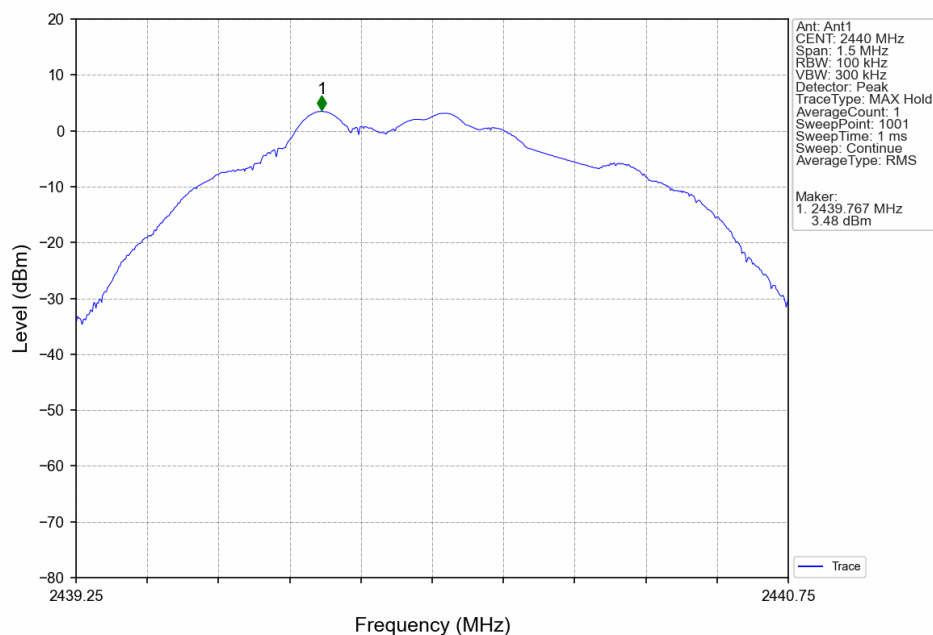
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	3.68	<=8	Pass
		2440	3.48	<=8	Pass
		2480	2.52	<=8	Pass

4.2 Test Graph

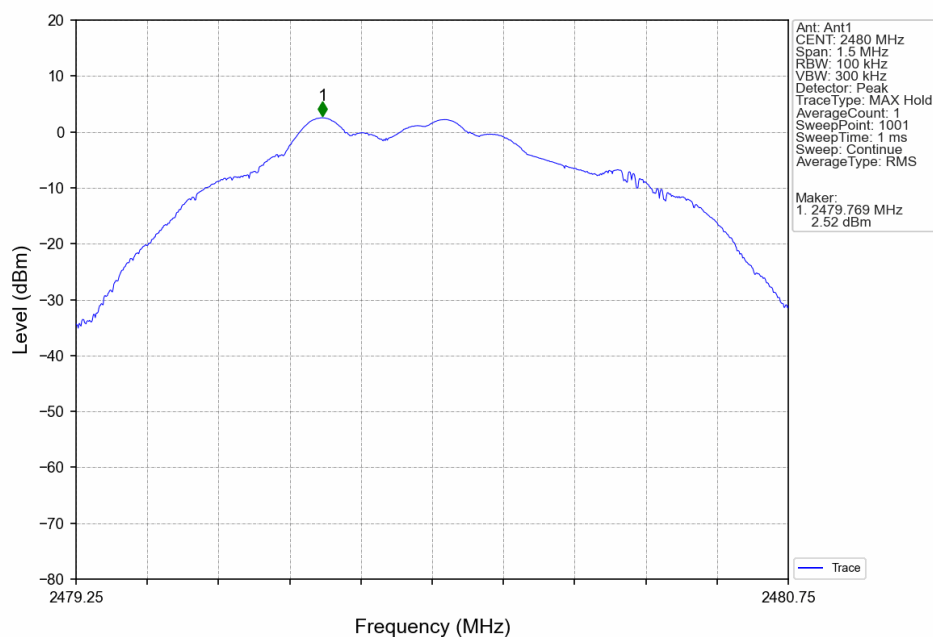
4.2.1 PSD



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	3.68
		2440	1	3.48
		2480	1	2.51

5.1.2 CSE and Band Edges

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	3.68	-16.32	Pass
		2440	1	3.68	-16.32	Pass
		2480	1	3.68	-16.32	Pass



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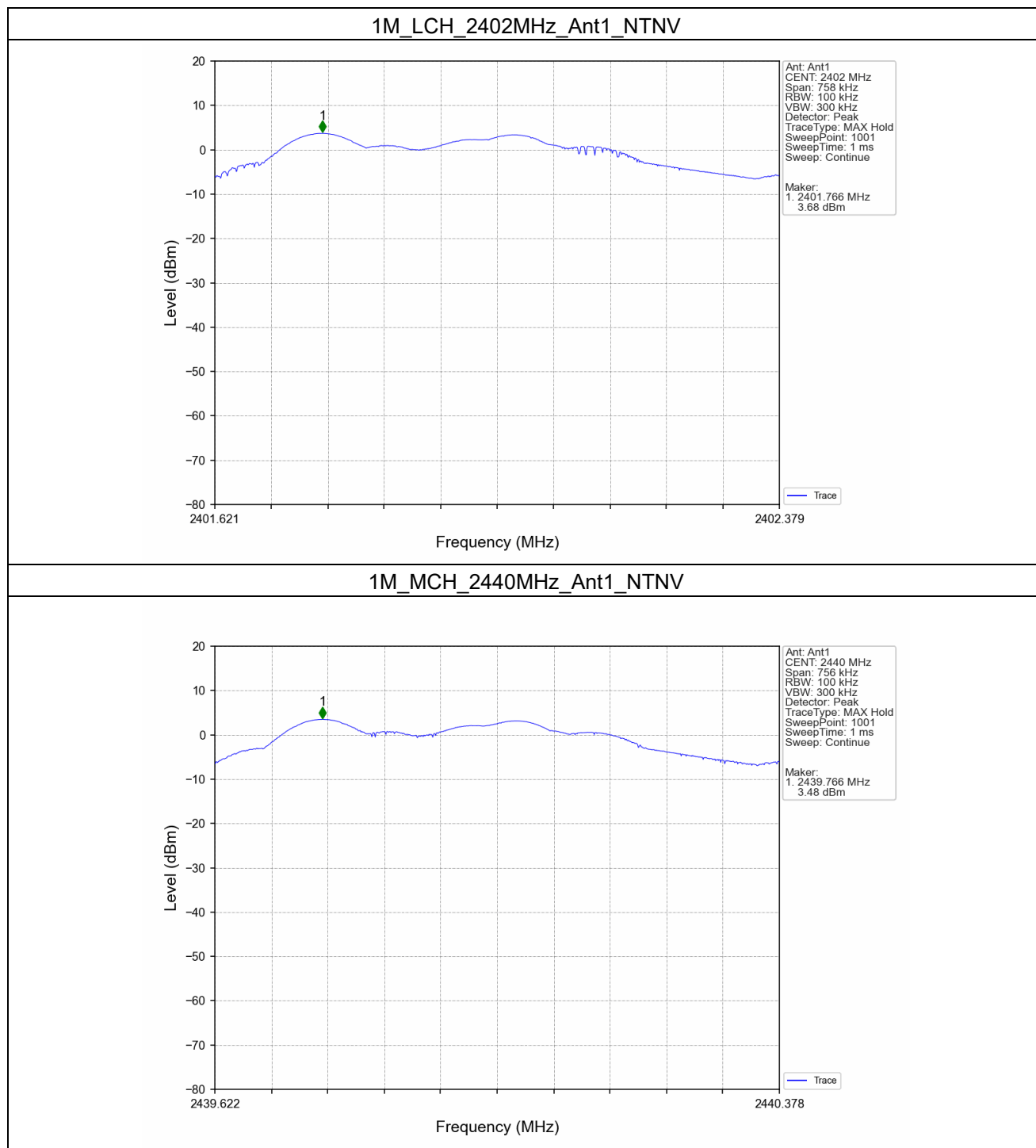
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5.2 Test Graph

5.2.1 Ref



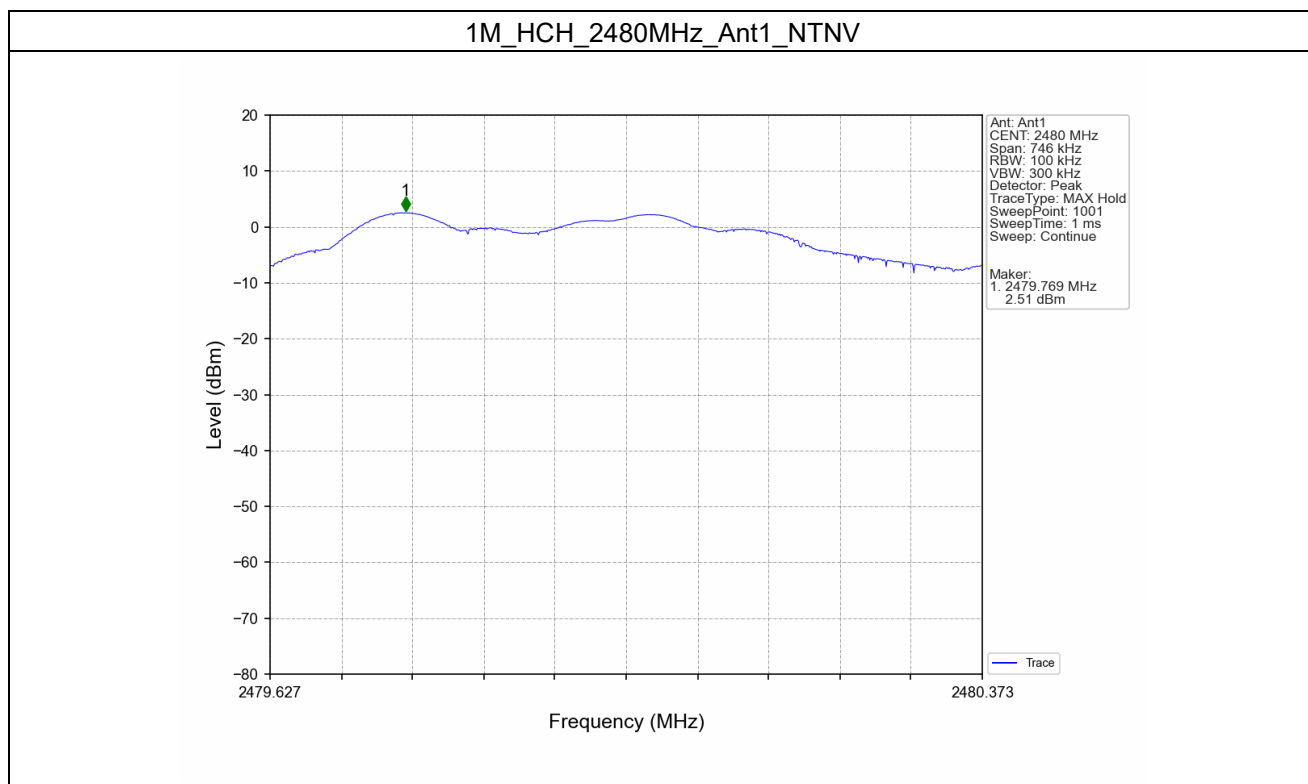
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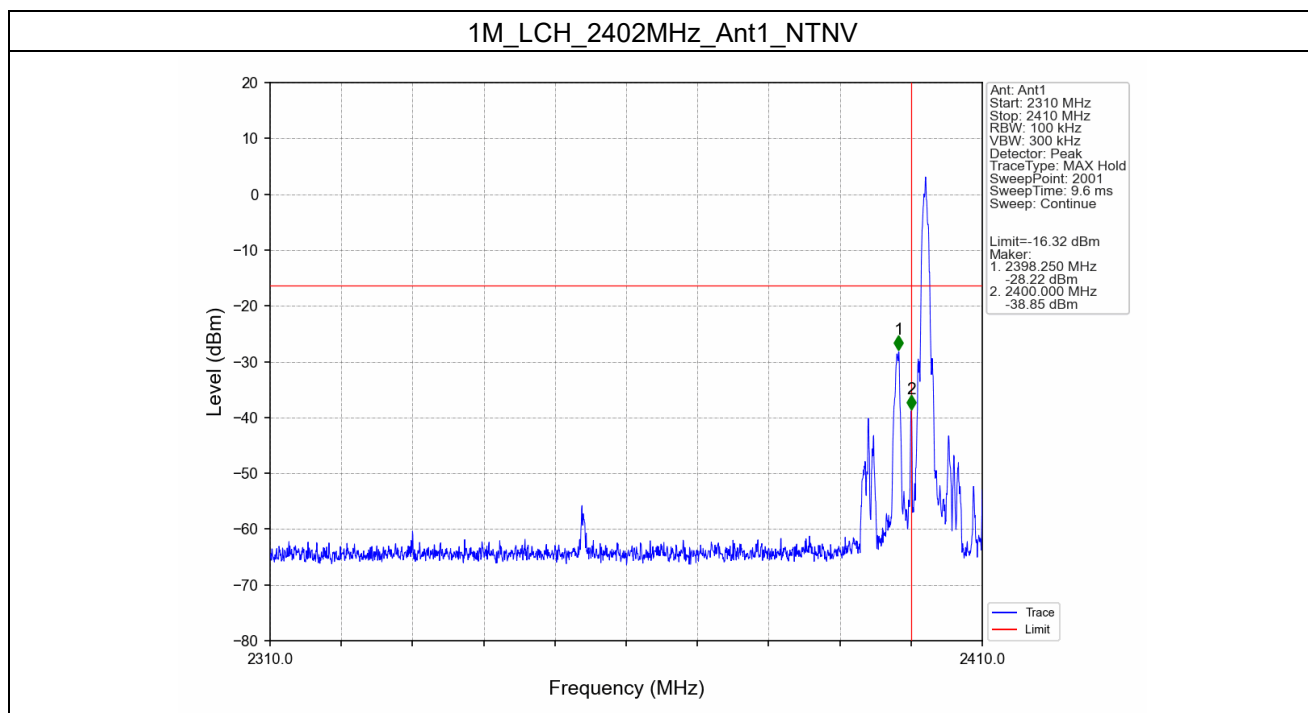
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5.2.2 CSE and Band Edges



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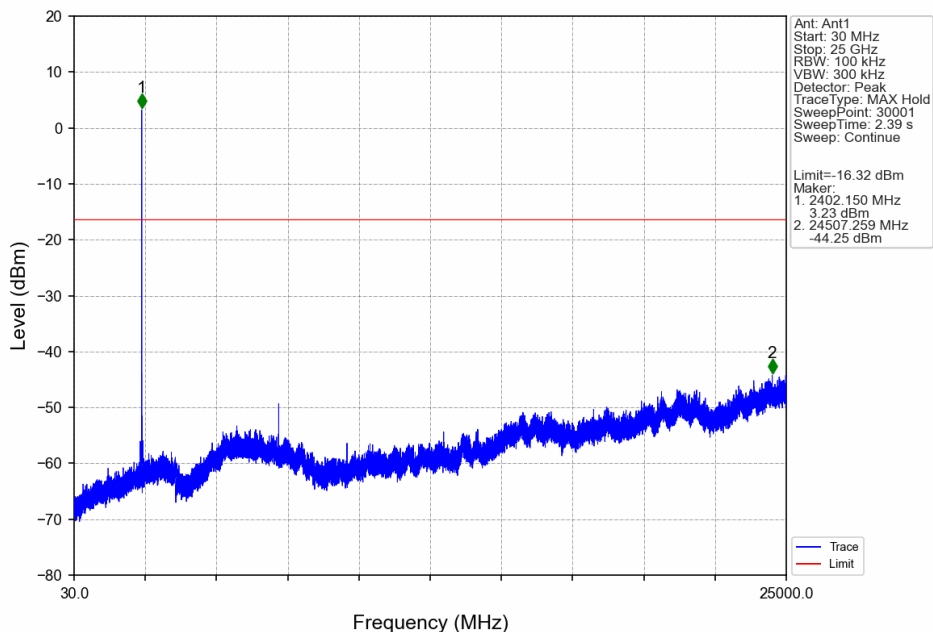
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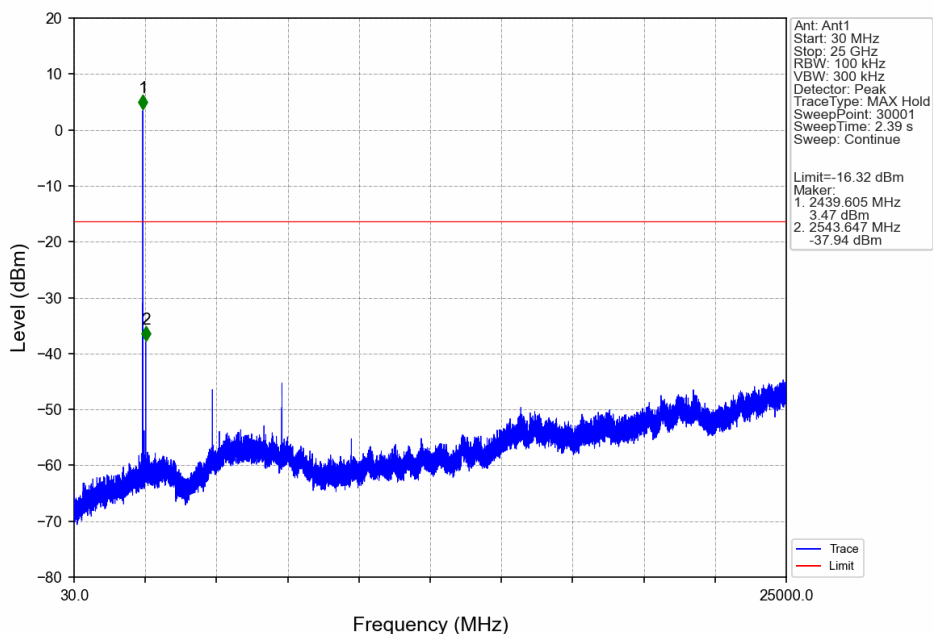
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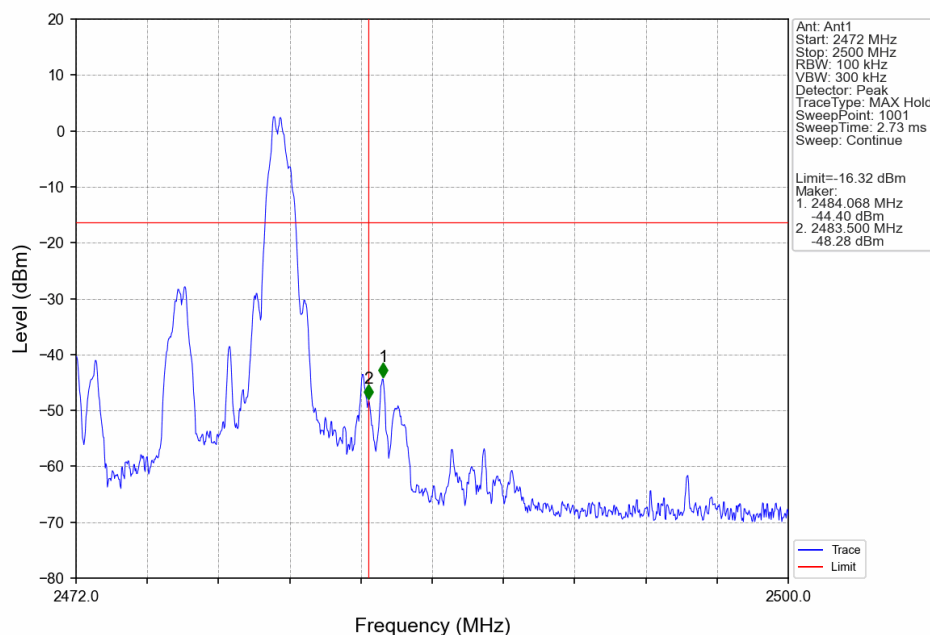
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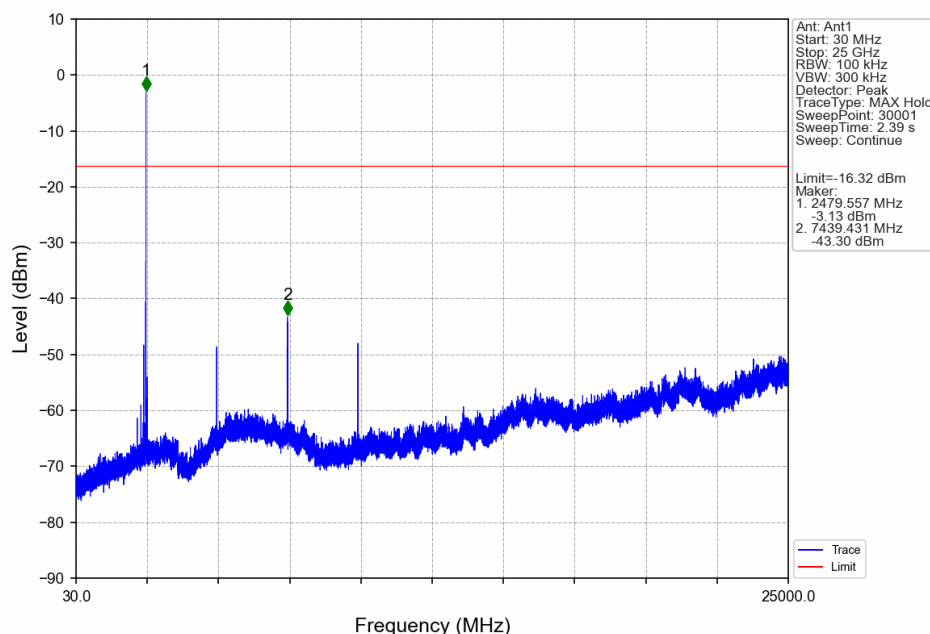
1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



- End of the Report -



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