TEST REPORT

Application No.:	GZCR2405000513AT
Applicant:	Guilin Gemred Sensor Technology Co., LTD
Address of Applicant:	No.D-08, Information Industrial Park, Chaoyang Road Qixing District, Guilin City, Guangxi zhuang Autonomous Region
Manufacturer:	Guilin Gemred Sensor Technology Co., LTD
Address of Manufacturer:	No.D-08, Information Industrial Park, Chaoyang Road Qixing District, Guilin City, Guangxi zhuang Autonomous Region
Factory:	Guilin Gemred Sensor Technology Co., LTD
Address of Factory:	No.D-08, Information Industrial Park, Chaoyang Road Qixing District, Guilin City, Guangxi zhuang Autonomous Region
Product Name:	Machine leveler ML200
Model No.:	82427
Trade Mark:	Gemred
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2024-05-20
Date of Test:	2024-05-27 to 2024-06-05
Date of Issue:	2024-07-04
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Ricky Liu
Manager

Revision Record			
Version	**Report No.**	**Date**	**Remark**
01	GZCR240500051302	2024-07-04	Original

Authorized for issue by				
		Key Liang **Key Liang/Project Engineer**		
		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**
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) 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.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Battery operation: DC 4.5V = 3 x 1.5V with size of "AAA" batteries. Test voltage: DC 4.5V
Cable(s):	None.
Antenna Number:	2 (one for BLE and the other for 2.4GHz Proprietary)
BLE:	
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	Integral Antenna
Antenna Gain:	0.89 dBi according to the antenna specification
2.4GHz Proprietary:	
Operation Frequency:	2420MHz to 2465MHz
Modulation Type:	GFSK
Number of Channels:	46
Antenna Type:	Integral Antenna
Antenna Gain:	0.89 dBi according to the antenna specification
Channel Spacing:	1MHz

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

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Radiated Emissions which fall in the restricted bands	±5.00dB (30MHz-1GHz; 3m);±4.38dB (30MHz-1GHz; 10m);± 5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	±5.00dB (3m); ±4.38dB (10m)
Radiated Spurious Emissions Above 1GHz	±5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Remark: The U_{lab} (lab Uncertainty) is less than $U_{cispr/etsi}$ (CISPR/ETSI Uncertainty), so the test results – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.	

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

Tel: +86 20 82155555

No tests were sub-contracted.

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

Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2023-11-10	2024-11-09
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2023-12-15	2024-12-14
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2023-10-20	2024-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
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**
966 Anechoic Chamber	Shenzhen C.R.T	CRTSGSSAC966	EMC2230	2022-04-12	2025-04-11
EMI Test Receiver(1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2229	2024-02-19	2025-02-18
Amplifier(9k-1000MHz)	SONOMA	310	EMC2237	2024-03-22	2025-03-21
TRILOG Broadband Antenna（25M-2GHz)	SCHWRZBECK	VULB 9168	EMC2238	2022-04-20	2025-04-19
Coaxial Cable	Mirco-COAX UTIFLEX ve	LA2-C125-8000	EMC2239	2023-06-14	2025-06-13
Test Software E3	Audix	Ver.6.191211	GZE100-81	N/A	N/A
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2024-04-08	2026-04-07

Radiated Spurious Emissions Above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2023-11-10	2024-11-09
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2023-12-15	2024-12-14
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2023-11-10	2024-11-09
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2023-10-20	2024-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
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	EMC2137	2023-11-02	2025-11-01
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2023-08-23	2024-08-22
Test Software	TST	V2.0	GZE100-78	N/A	N/A
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-08-23	2024-08-22

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2024-06-13	2025-06-12

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 0.89 dBi for BLE antenna and 0.89 dBi for 2.4GHz Proprietary antenna.

Antenna location: Refer to internal photo.

7 Radio Spectrum Matter Test Results

7.1 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 (2013) Section 11.12

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.		

7.1.1 E.U.T. Operation

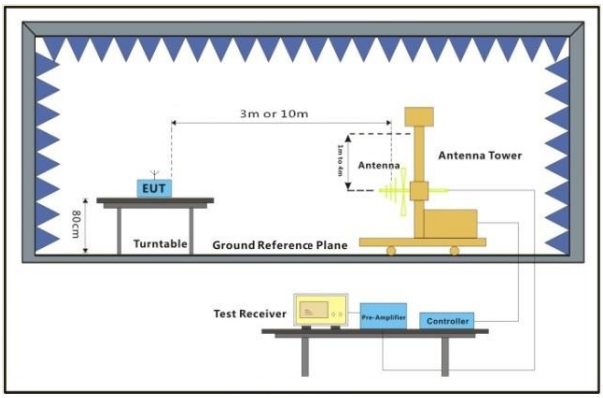
Operating Environment:

Temperature: 25.0 °C Humidity: 55.8 % RH Atmospheric Pressure: 1003 mbar

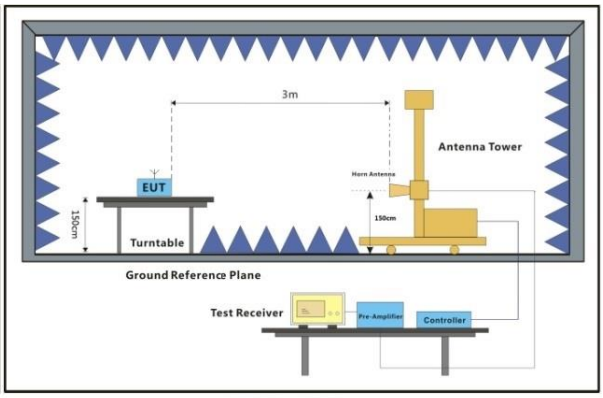
7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.1.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.1.4 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.

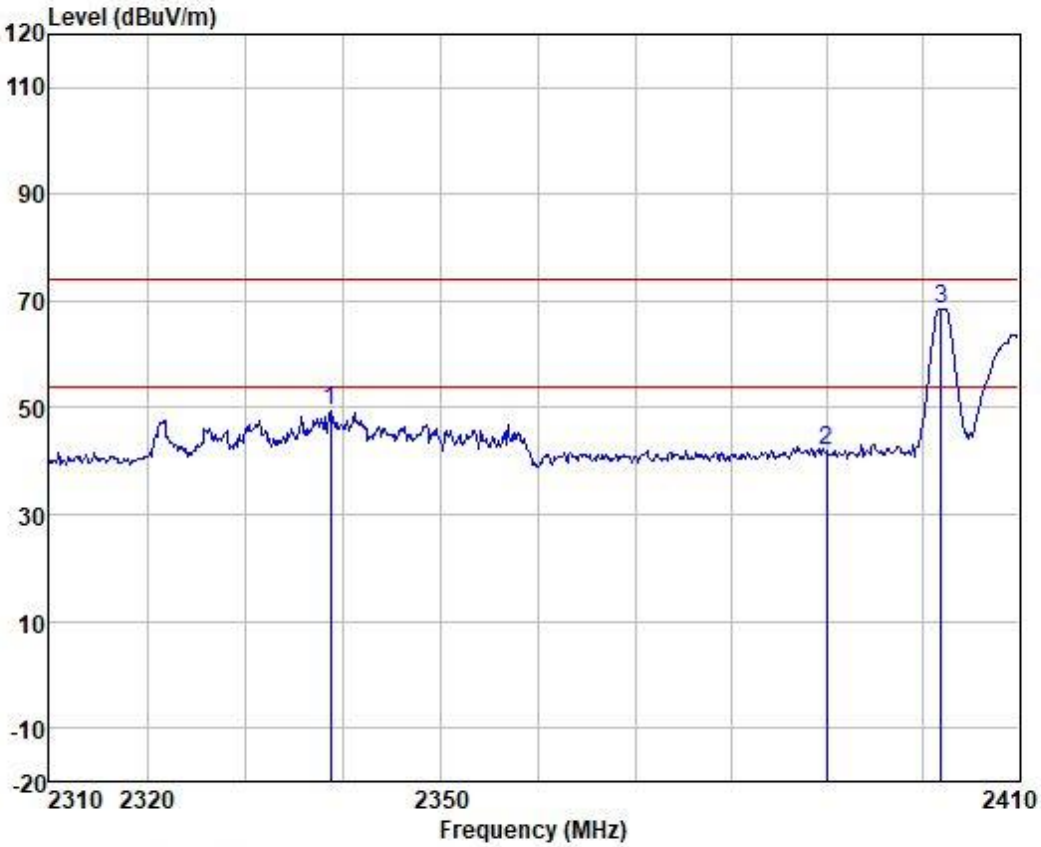
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

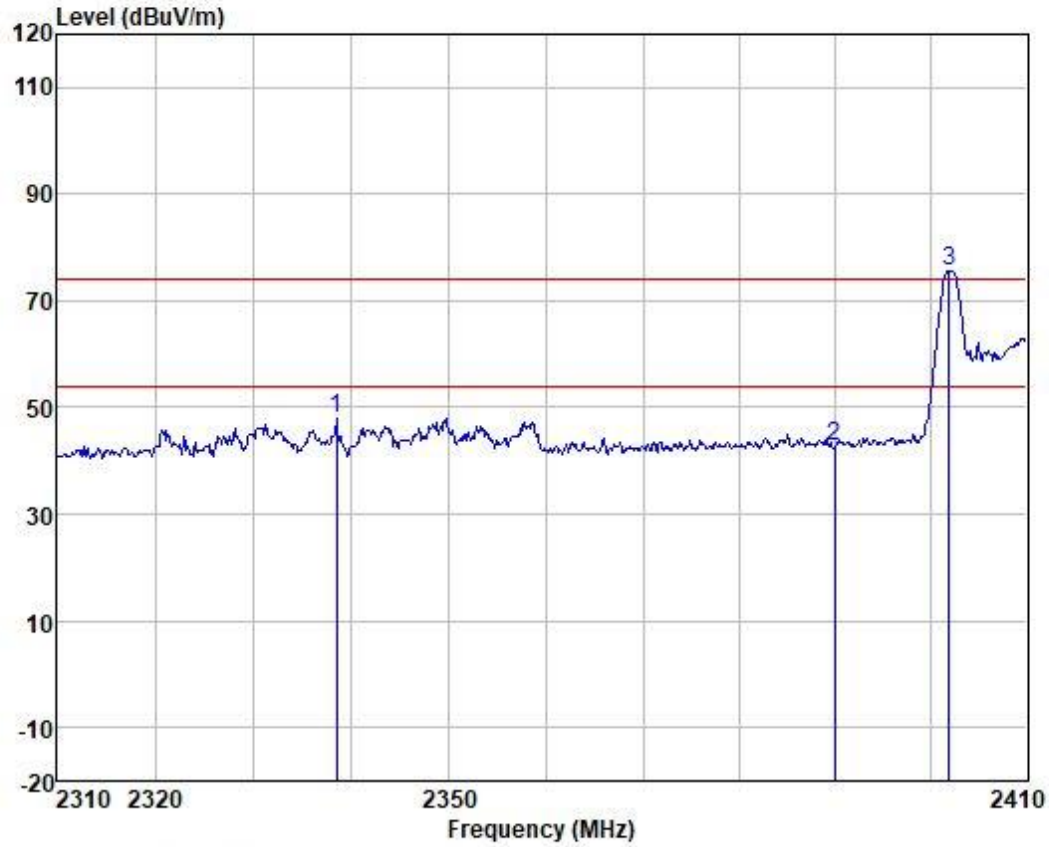
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level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

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



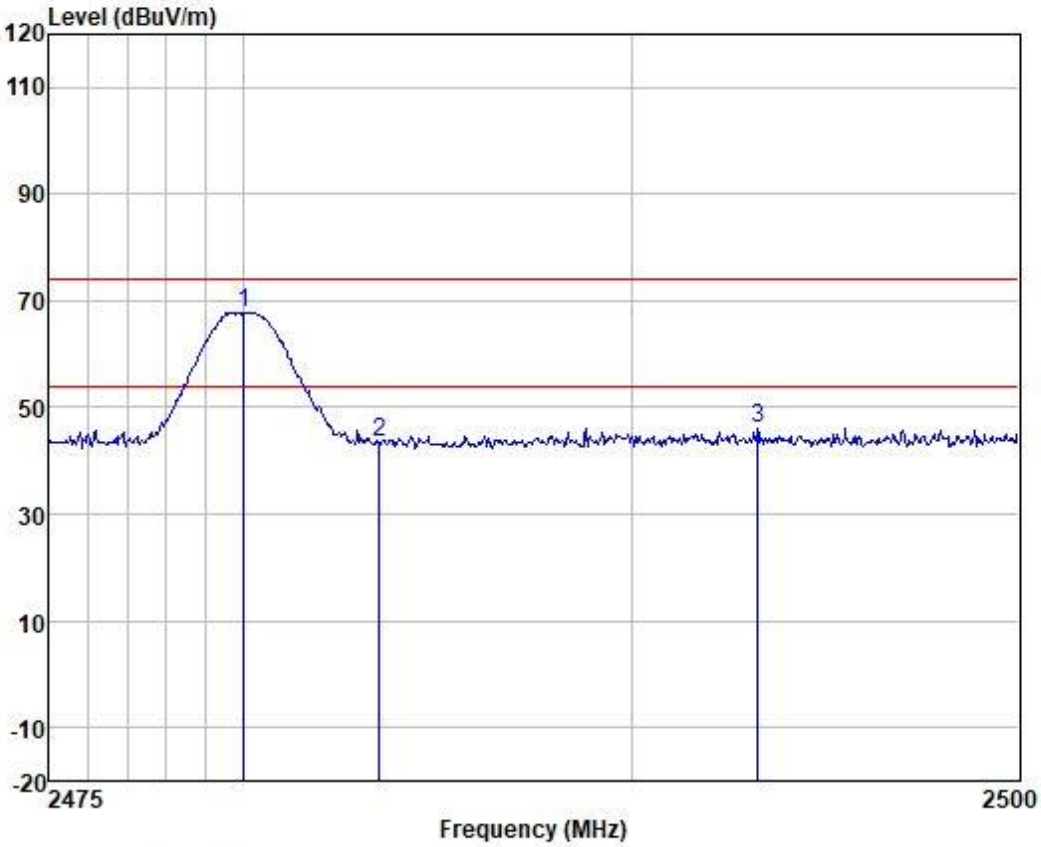
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2338.664	55.34	27.57	3.73	37.23	49.41	74.00	-24.59	VERTICAL	peak
2	2390.000	47.68	27.68	3.77	37.21	41.92	74.00	-32.08	VERTICAL	peak
3	2402.000	74.34	27.71	3.78	37.21	68.62	74.00	-5.38	VERTICAL	peak

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



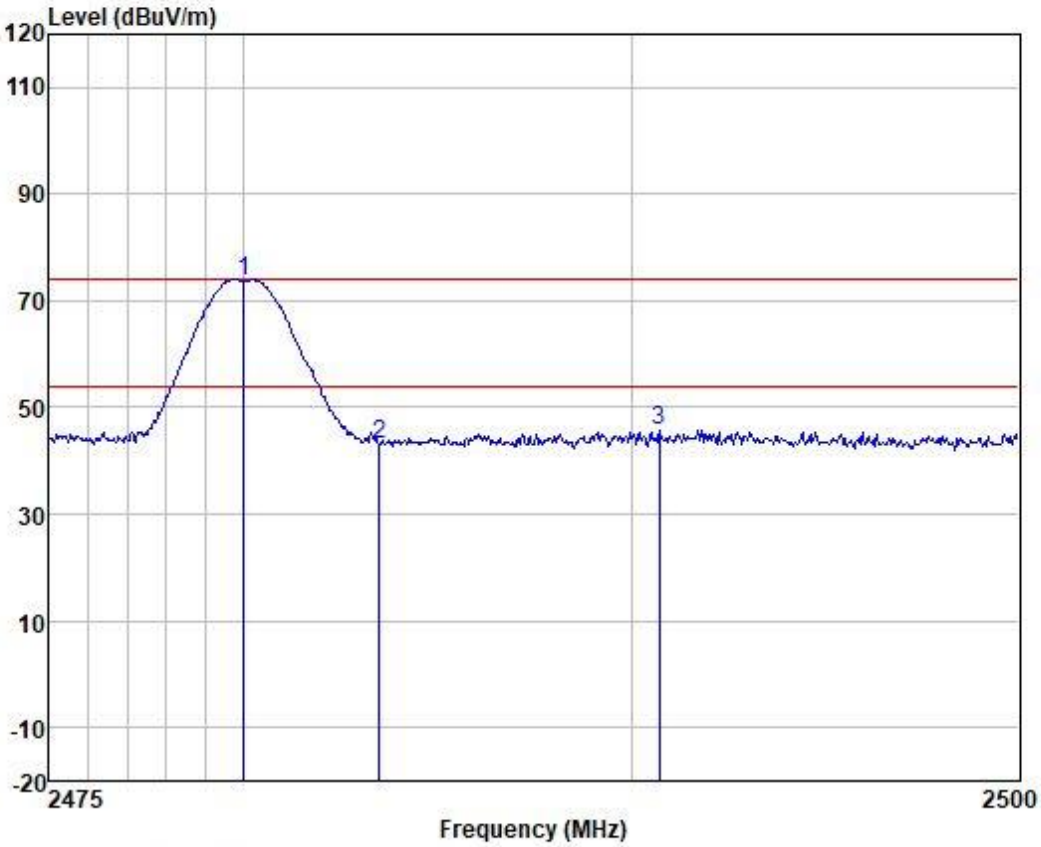
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2338.466	53.79	27.57	3.73	37.23	47.86	74.00	-26.14	HORIZONTAL	peak
2	2390.000	48.42	27.68	3.77	37.21	42.66	74.00	-31.34	HORIZONTAL	peak
3 *	2402.000	81.18	27.71	3.78	37.21	75.46	74.00	1.46	HORIZONTAL	peak

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



	Freq	ReadAntenna 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	2480.000	73.09	27.84	3.82	37.19	67.56	74.00	-6.44	VERTICAL	peak
2	2483.500	48.85	27.85	3.82	37.19	43.33	74.00	-30.67	VERTICAL	peak
3	2493.275	51.66	27.86	3.83	37.18	46.17	74.00	-27.83	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	2480.000	79.41	27.84	3.82	37.19	73.88	74.00	-0.12	HORIZONTAL	peak
2	2483.500	48.61	27.85	3.82	37.19	43.09	74.00	-30.91	HORIZONTAL	peak
3	2490.721	51.31	27.86	3.83	37.19	45.81	74.00	-28.19	HORIZONTAL	peak

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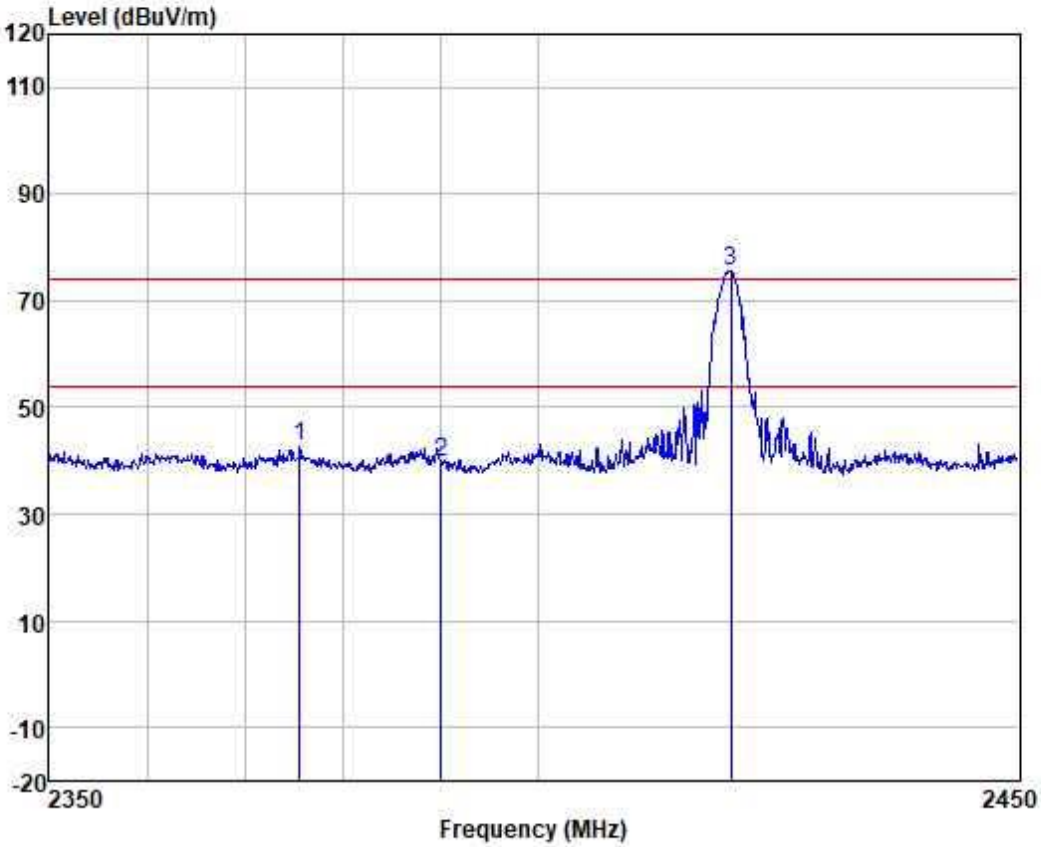
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



	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	2375.501	48.93	27.66	3.52	37.22	42.89	74.00	-31.11	VERTICAL	peak
2	2390.000	45.78	27.68	3.54	37.21	39.79	74.00	-34.21	VERTICAL	peak
3 *	2420.000	81.29	27.75	3.60	37.21	75.43	74.00	1.43	VERTICAL	peak

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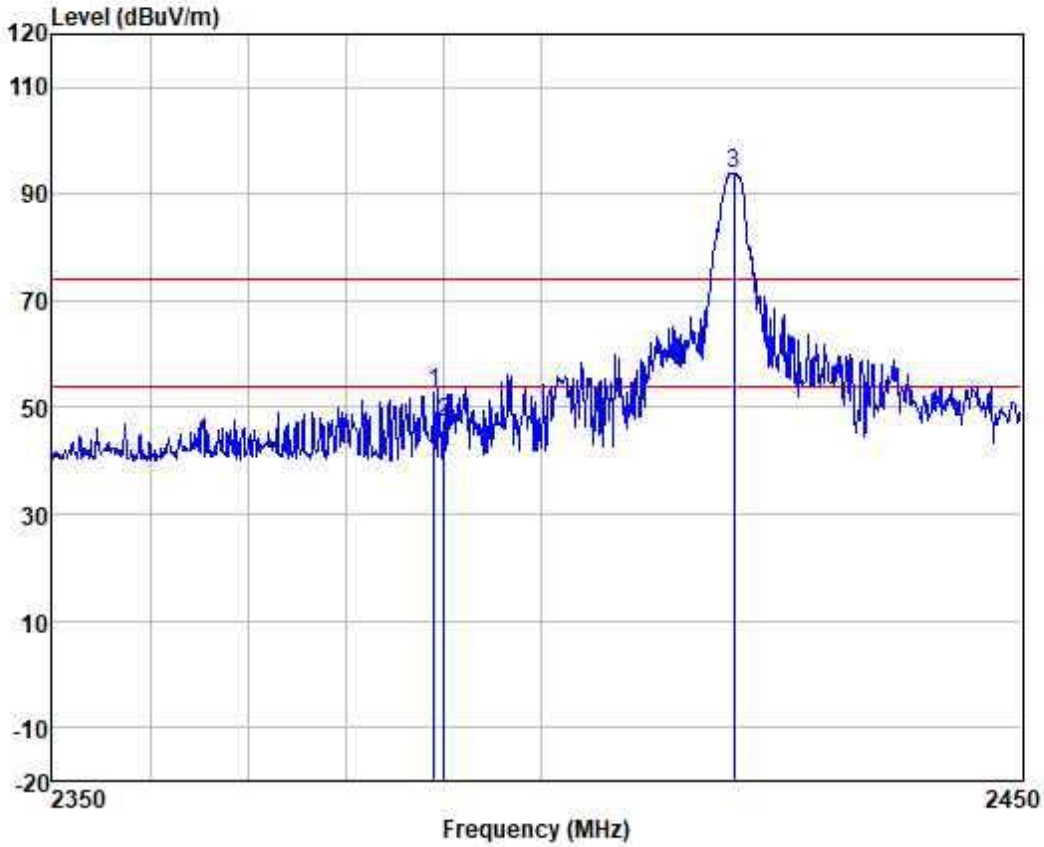
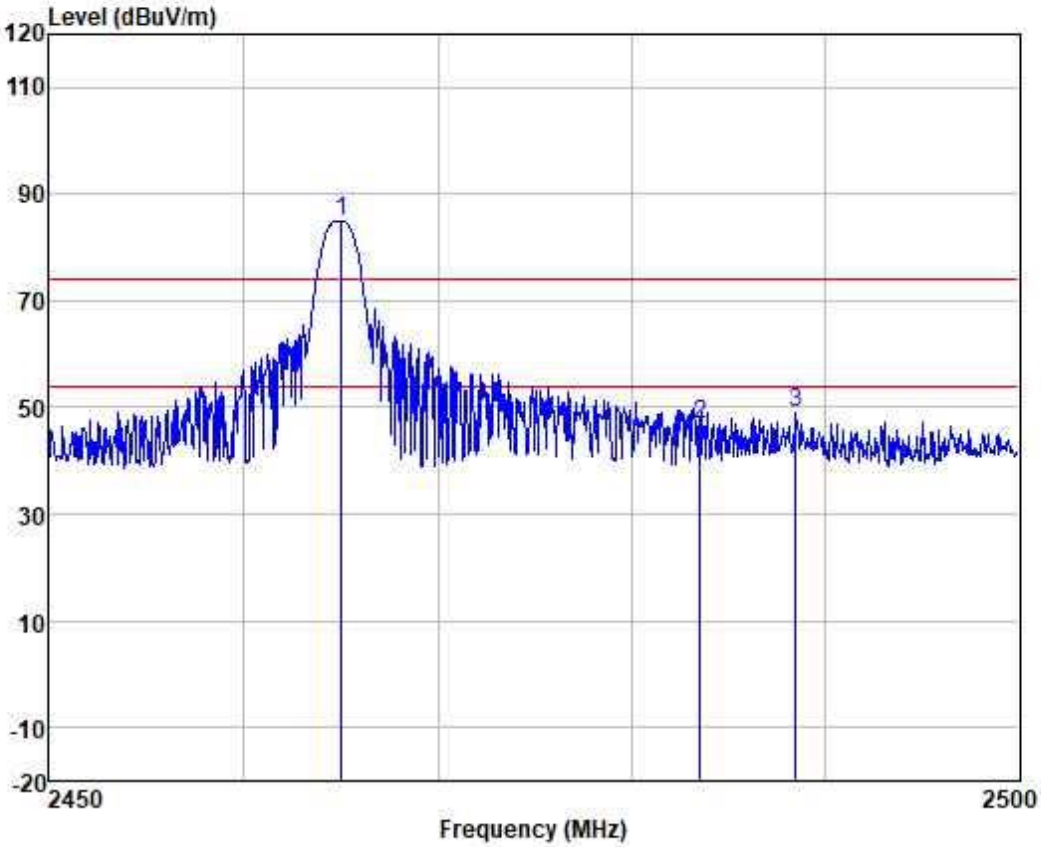
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



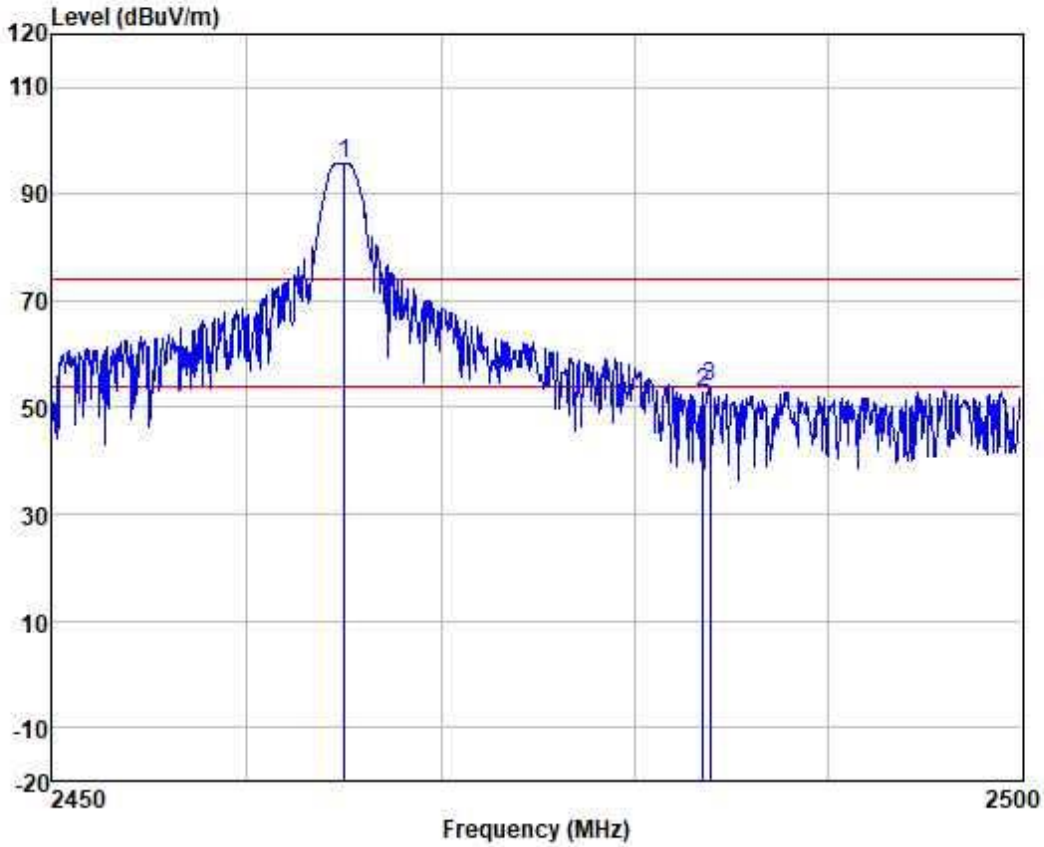
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2389.003	58.88	27.68	3.54	37.22	52.88	74.00	-21.12	HORIZONTAL	peak
2	2390.000	53.26	27.68	3.54	37.21	47.27	74.00	-26.73	HORIZONTAL	peak
3 *	2420.000	99.84	27.75	3.60	37.21	93.98	74.00	19.98	HORIZONTAL	peak

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



		Freq	ReadAntenna 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	*	2465.000	90.56	27.82	3.69	37.20	84.87	74.00	10.87	VERTICAL	peak
2		2483.500	52.38	27.85	3.74	37.19	46.78	74.00	-27.22	VERTICAL	peak
3		2488.461	54.76	27.85	3.74	37.19	49.16	74.00	-24.84	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 *	2465.000	101.60	27.82	3.69	37.20	95.91	74.00	21.91	HORIZONTAL	peak
2	2483.500	58.46	27.85	3.74	37.19	52.86	74.00	-21.14	HORIZONTAL	peak
3	2483.840	59.58	27.85	3.74	37.19	53.98	74.00	-20.02	HORIZONTAL	peak

7.2 Radiated Spurious Emissions Below 1GHz

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

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

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
960-1000	500	3

7.2.1 E.U.T. Operation

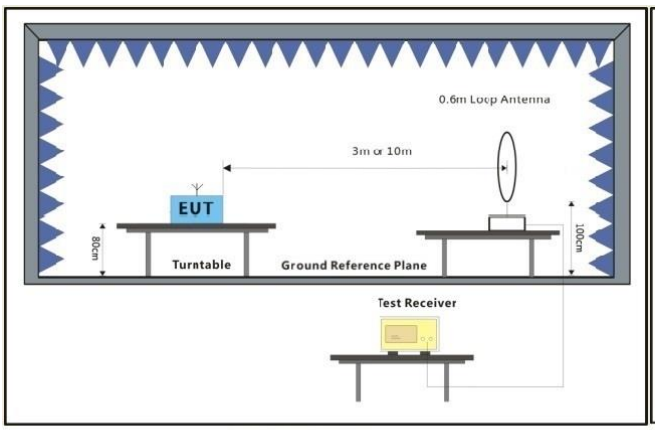
Operating Environment:

Temperature: 22.4 °C Humidity: 52.7 % RH Atmospheric Pressure: 1008 mbar

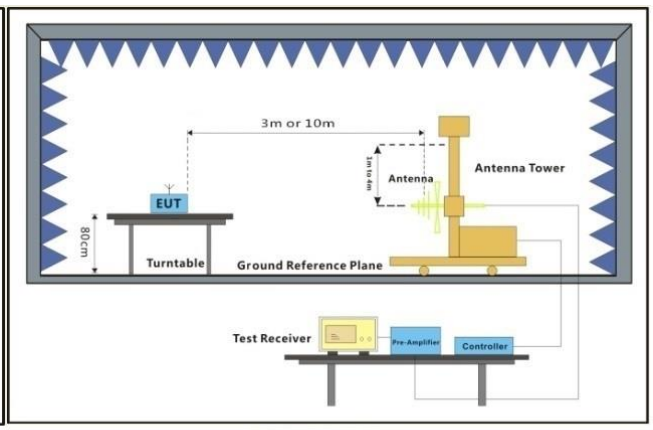
7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.2.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

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. 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.

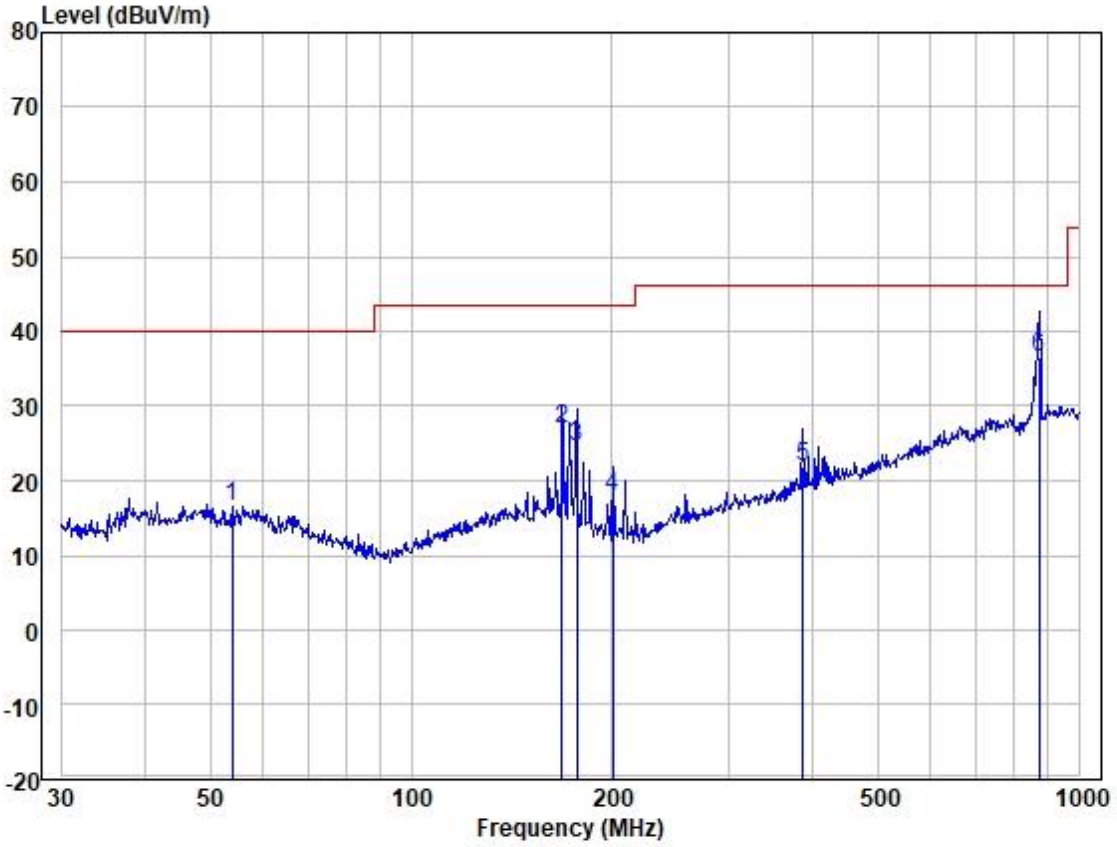
i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- 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.

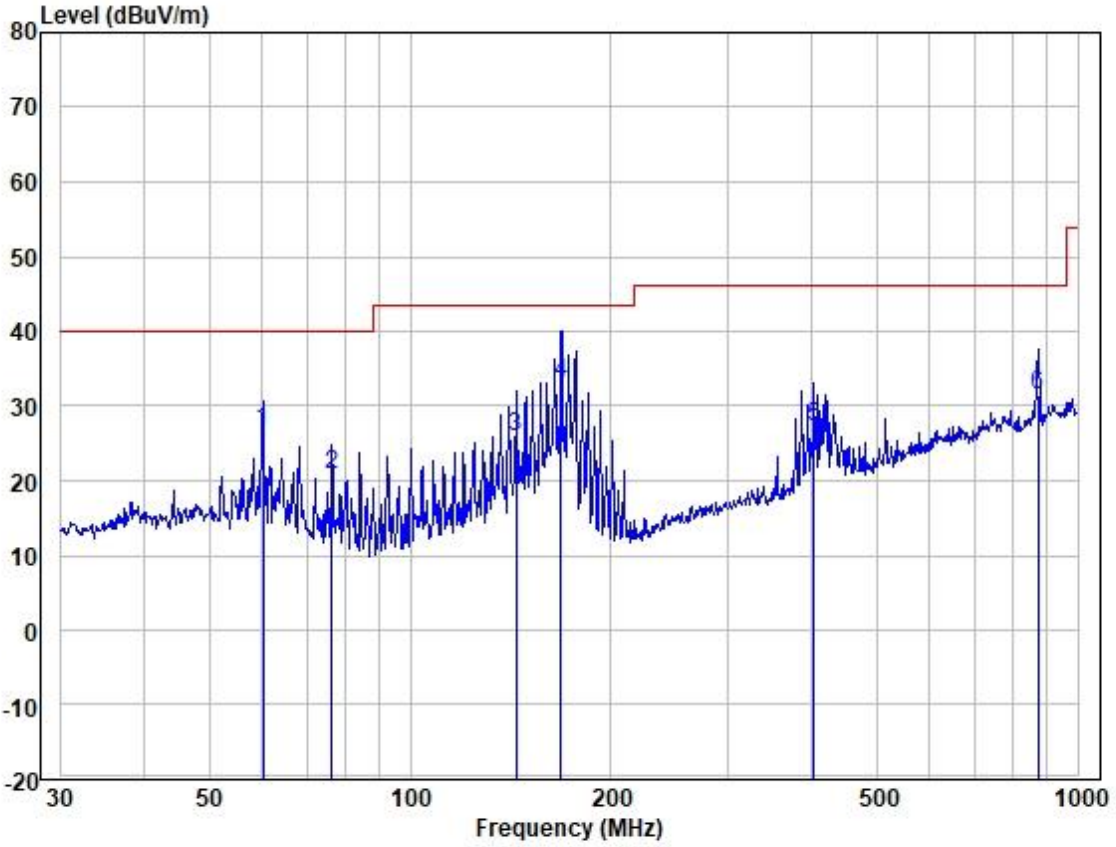
Test Mode: 00; Polarity: Horizontal



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	54.071	29.74	19.33	0.40	32.88	16.59	40.00	-23.41	HORIZONTAL	QP
2	168.414	40.16	18.82	0.72	32.83	26.87	43.52	-16.65	HORIZONTAL	QP
3	176.888	38.63	18.09	0.74	32.83	24.63	43.52	-18.89	HORIZONTAL	QP
4	200.688	34.21	15.79	0.79	32.84	17.95	43.52	-25.57	HORIZONTAL	QP
5	386.634	32.49	21.23	1.15	32.92	21.95	46.02	-24.07	HORIZONTAL	QP
6	872.183	38.10	29.04	1.74	32.25	36.63	46.02	-9.39	HORIZONTAL	QP

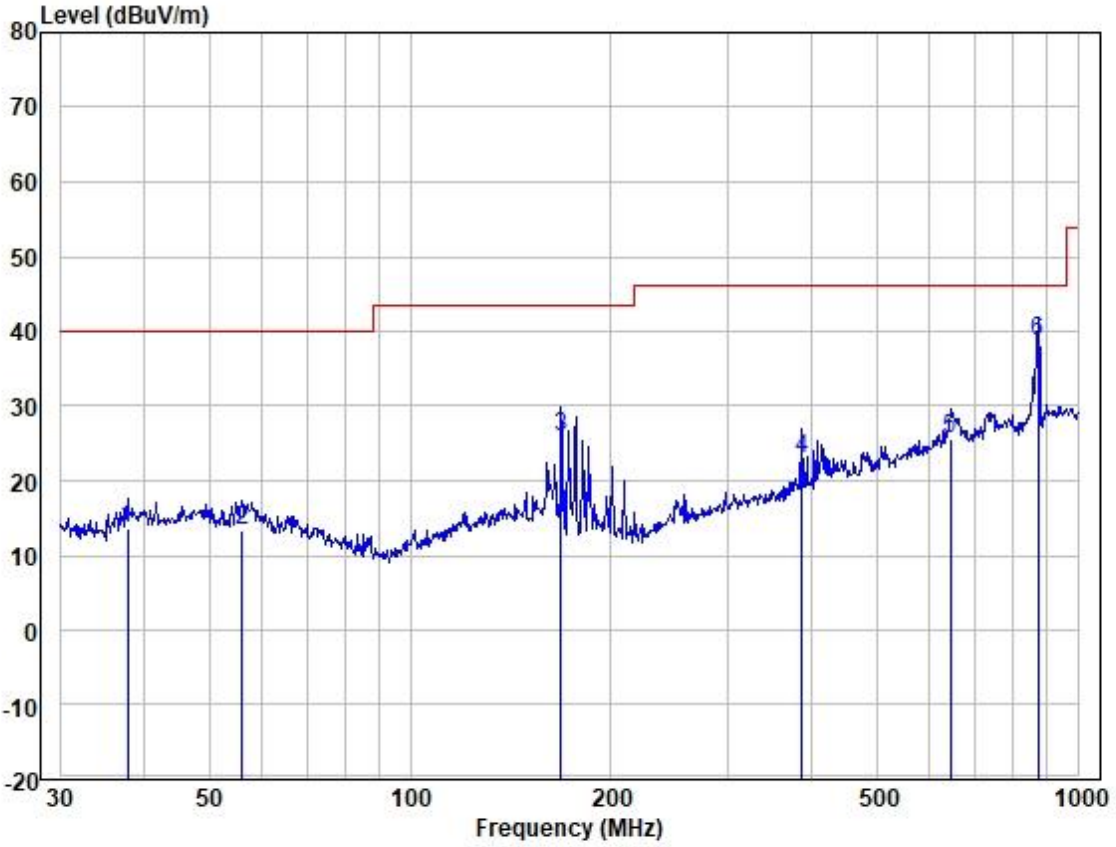
Test Mode: 00; Polarity: Vertical



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	60.280	40.22	18.79	0.41	32.87	26.55	40.00	-13.45	VERTICAL	QP
2	76.244	37.16	15.89	0.48	32.84	20.69	40.00	-19.31	VERTICAL	QP
3	144.335	39.36	18.80	0.65	32.81	26.00	43.52	-17.52	VERTICAL	QP
4	168.414	46.28	18.82	0.72	32.83	32.99	43.52	-10.53	VERTICAL	QP
5	401.839	37.32	21.61	1.16	32.94	27.15	46.02	-18.87	VERTICAL	QP
6	872.183	33.02	29.04	1.74	32.25	31.55	46.02	-14.47	VERTICAL	QP

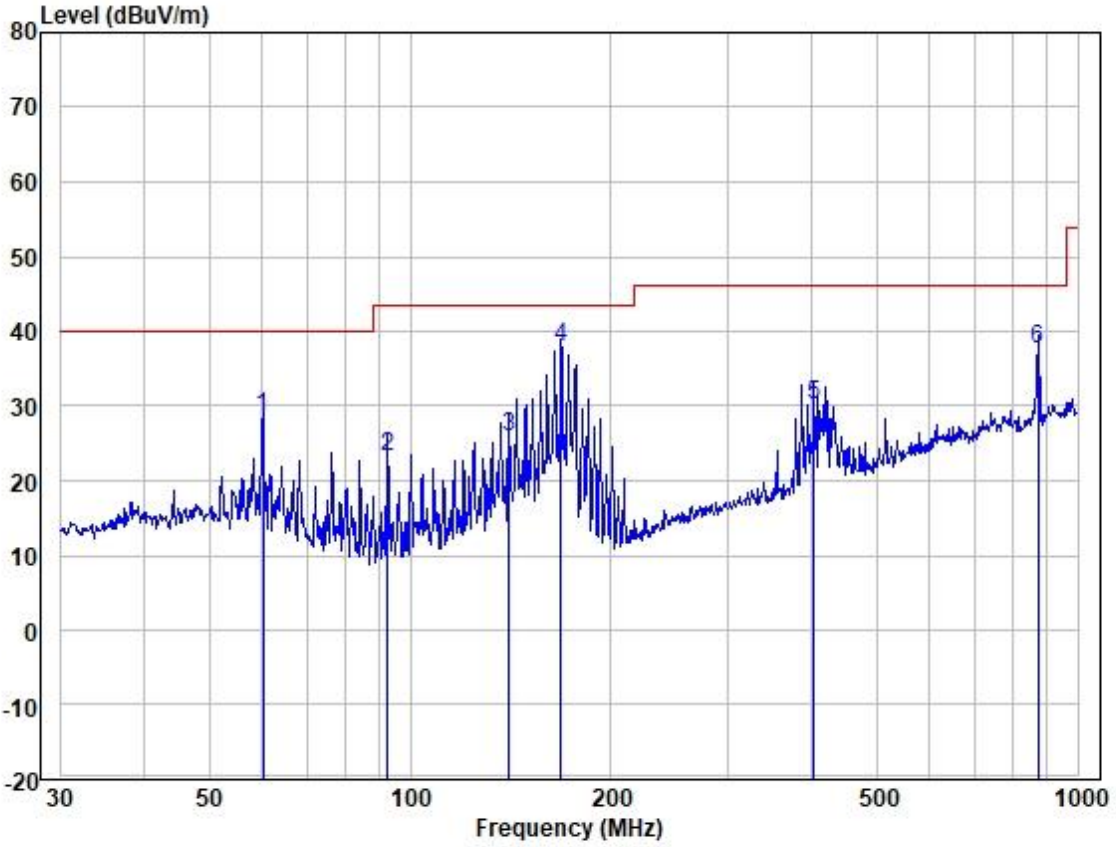
Test Mode: 01; Polarity: Horizontal



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	37.812	27.32	18.73	0.34	32.86	13.53	40.00	-26.47	HORIZONTAL	QP
2	56.001	26.73	19.18	0.40	32.87	13.44	40.00	-26.56	HORIZONTAL	QP
3	168.349	39.16	18.82	0.72	32.83	25.87	43.52	-17.65	HORIZONTAL	QP
4	386.634	33.49	21.23	1.15	32.92	22.95	46.02	-23.07	HORIZONTAL	QP
5	645.120	30.15	26.63	1.47	32.75	25.50	46.02	-20.52	HORIZONTAL	QP
6	872.245	40.10	29.04	1.74	32.25	38.63	46.02	-7.39	HORIZONTAL	QP

Test Mode: 01; Polarity: Vertical



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	60.280	42.22	18.79	0.41	32.87	28.55	40.00	-11.45	VERTICAL	QP
2	92.462	41.72	13.76	0.52	32.81	23.19	43.52	-20.33	VERTICAL	QP
3	140.835	39.42	18.67	0.64	32.81	25.92	43.52	-17.60	VERTICAL	QP
4	168.402	51.28	18.82	0.72	32.83	37.99	43.52	-5.53	VERTICAL	QP
5	401.839	40.32	21.61	1.16	32.94	30.15	46.02	-15.87	VERTICAL	QP
6	872.162	39.02	29.04	1.74	32.25	37.55	46.02	-8.47	VERTICAL	QP

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7.3 Radiated Spurious Emissions Above 1GHz

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

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

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

7.3.1 E.U.T. Operation

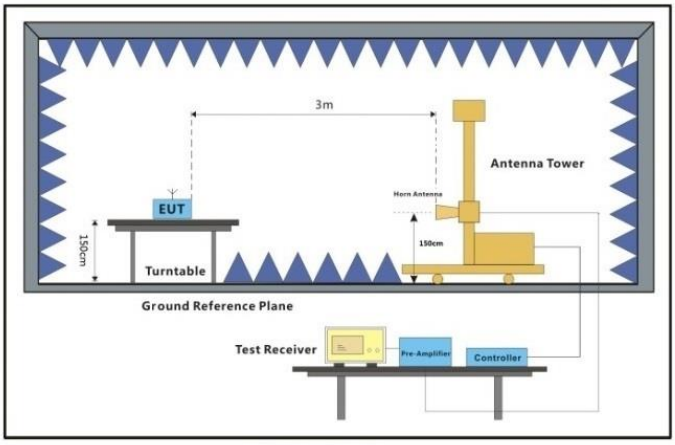
Operating Environment:

Temperature: 25.0 °C Humidity: 55.8 % RH Atmospheric Pressure: 1003 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.3.3 Test Setup Diagram



Above 1GHz

7.3.4 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.

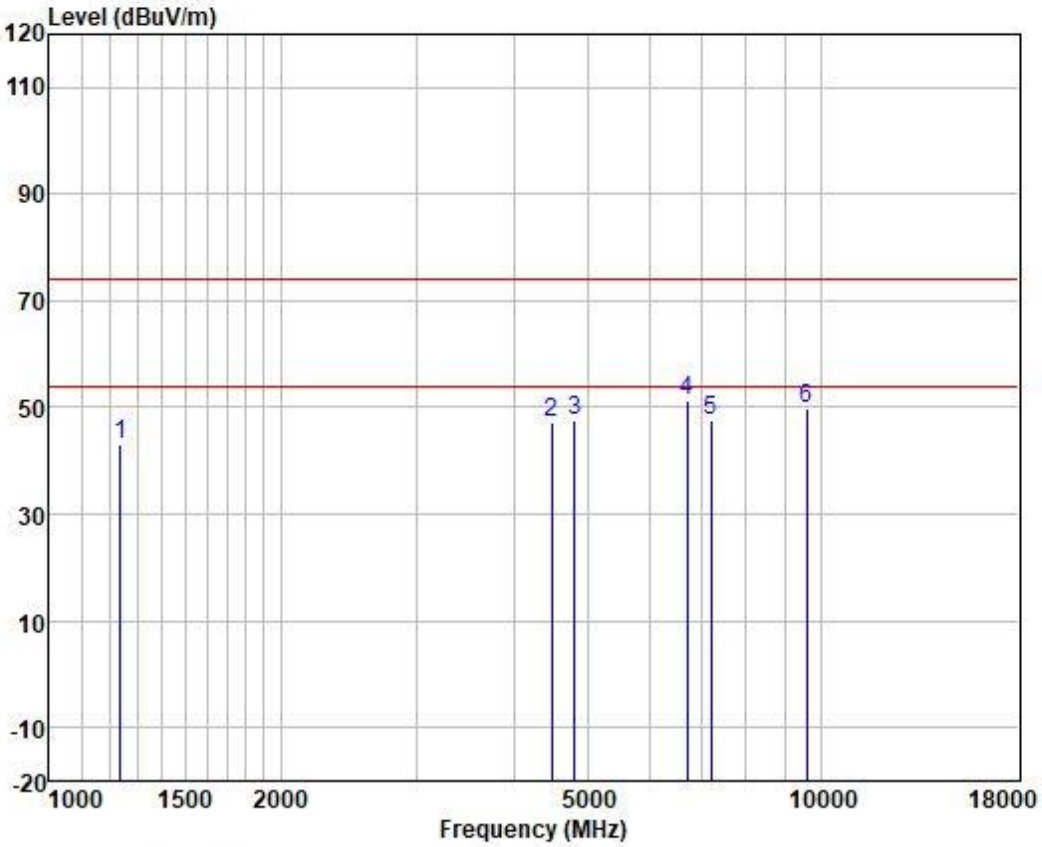
Remark:

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.

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	1238.483	54.38	23.59	2.68	37.64	43.01	74.00	-30.99	VERTICAL	peak
2	4482.150	44.91	34.12	4.78	36.63	47.18	74.00	-26.82	VERTICAL	peak
3	4804.000	44.94	34.16	5.15	36.66	47.59	74.00	-26.41	VERTICAL	peak
4	6717.762	46.69	34.42	6.87	36.85	51.13	74.00	-22.87	VERTICAL	peak
5	7206.000	41.80	35.63	6.96	36.93	47.46	74.00	-26.54	VERTICAL	peak
6	9608.000	40.27	38.68	7.65	36.82	49.78	74.00	-24.22	VERTICAL	peak

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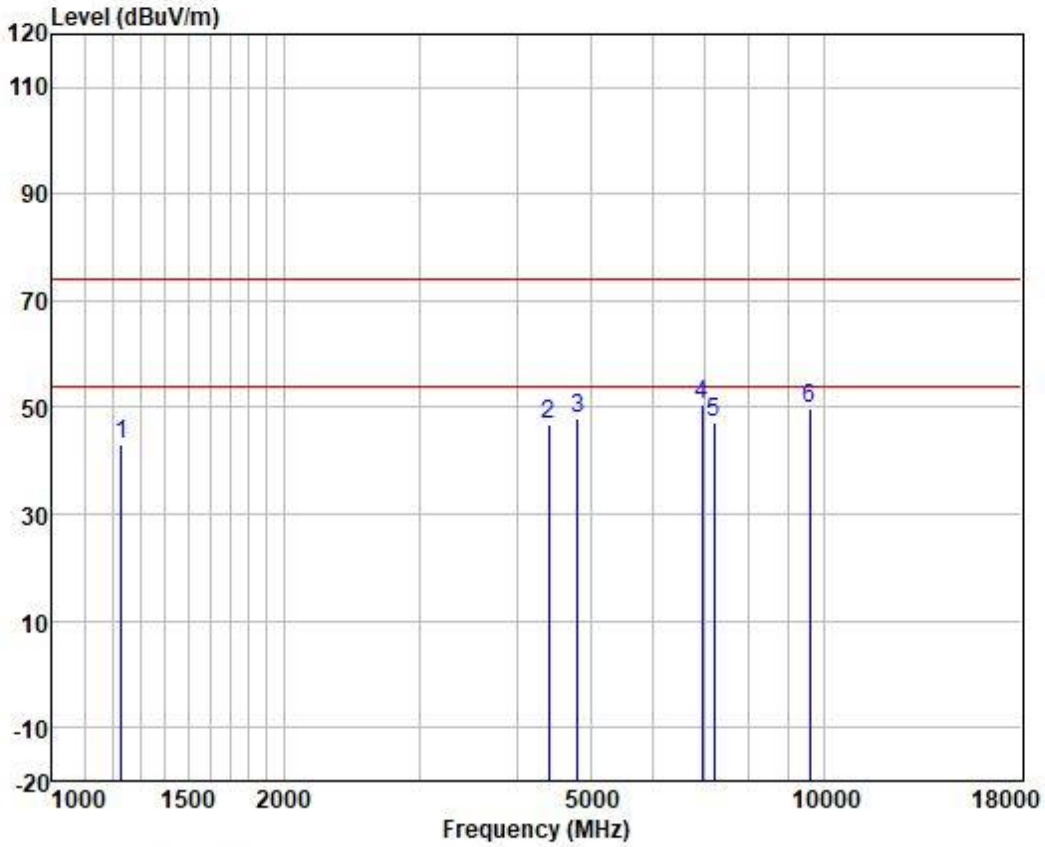
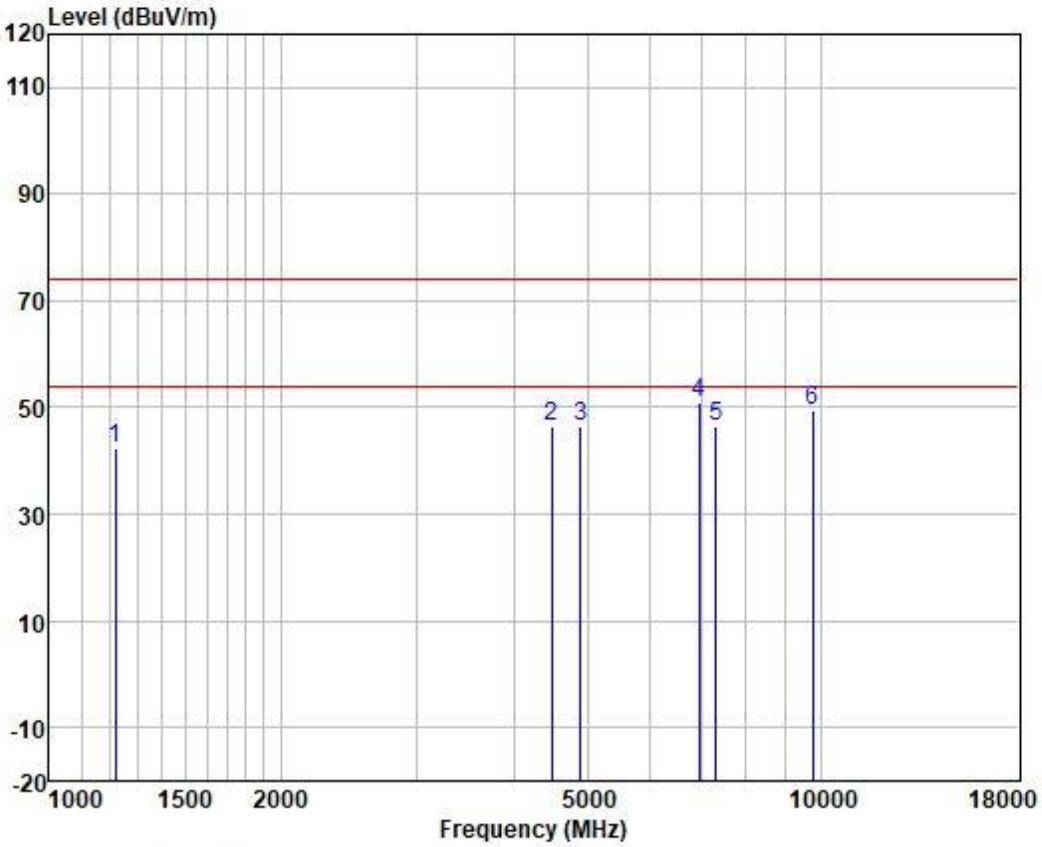
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



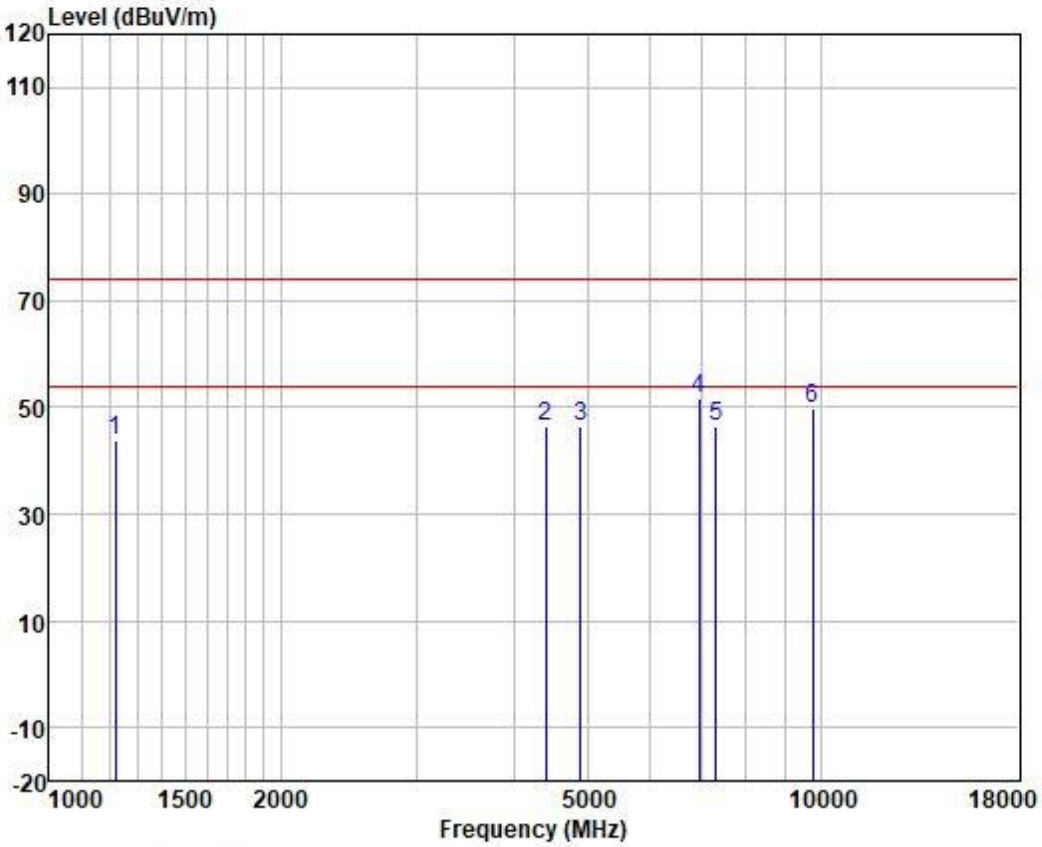
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1231.345	54.62	23.51	2.66	37.64	43.15	74.00	-30.85	HORIZONTAL	peak
2	4405.090	44.86	33.74	4.79	36.62	46.77	74.00	-27.23	HORIZONTAL	peak
3	4804.000	45.12	34.16	5.15	36.66	47.77	74.00	-26.23	HORIZONTAL	peak
4	6954.852	45.25	35.04	7.10	36.89	50.50	74.00	-23.50	HORIZONTAL	peak
5	7206.000	41.64	35.63	6.96	36.93	47.30	74.00	-26.70	HORIZONTAL	peak
6	9608.000	40.19	38.68	7.65	36.82	49.70	74.00	-24.30	HORIZONTAL	peak

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



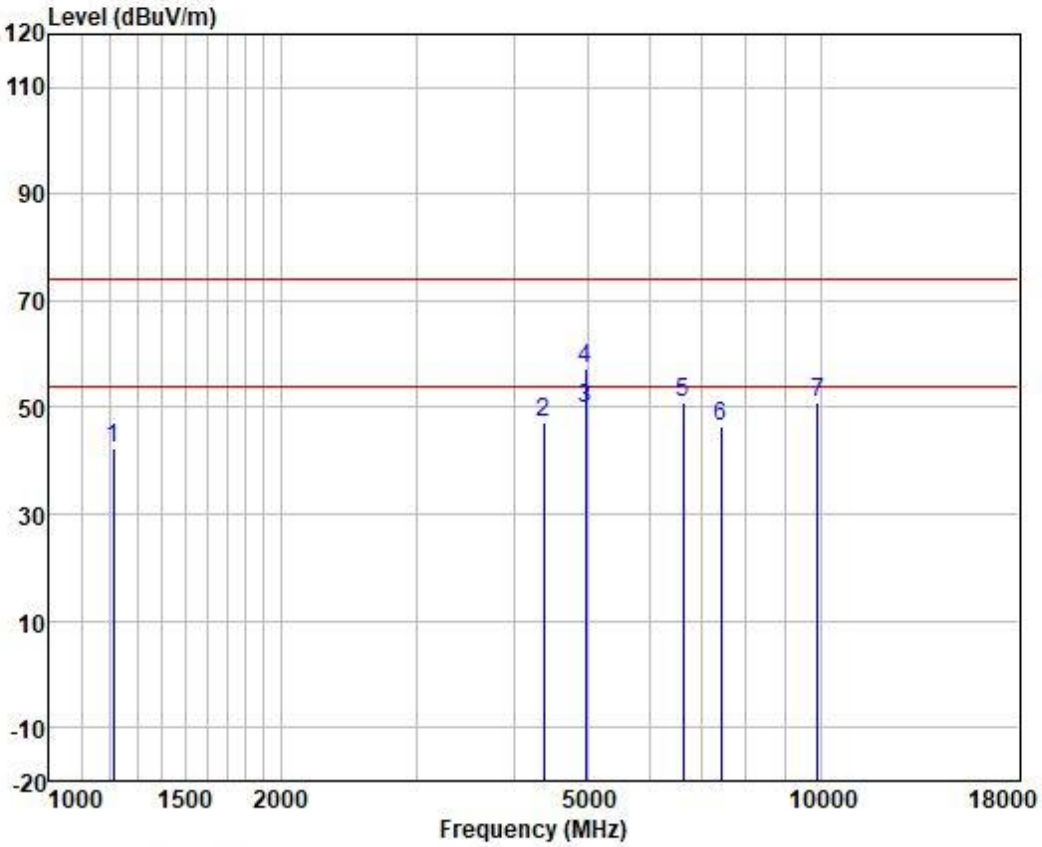
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1217.190	54.09	23.34	2.61	37.64	42.40	74.00	-31.60	VERTICAL	peak
2	4482.150	44.12	34.12	4.78	36.63	46.39	74.00	-27.61	VERTICAL	peak
3	4880.000	43.88	34.15	5.22	36.67	46.58	74.00	-27.42	VERTICAL	peak
4	6954.852	45.64	35.04	7.10	36.89	50.89	74.00	-23.11	VERTICAL	peak
5	7320.000	40.34	36.07	6.81	36.95	46.27	74.00	-27.73	VERTICAL	peak
6	9760.000	39.70	38.81	7.65	36.81	49.35	74.00	-24.65	VERTICAL	peak

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



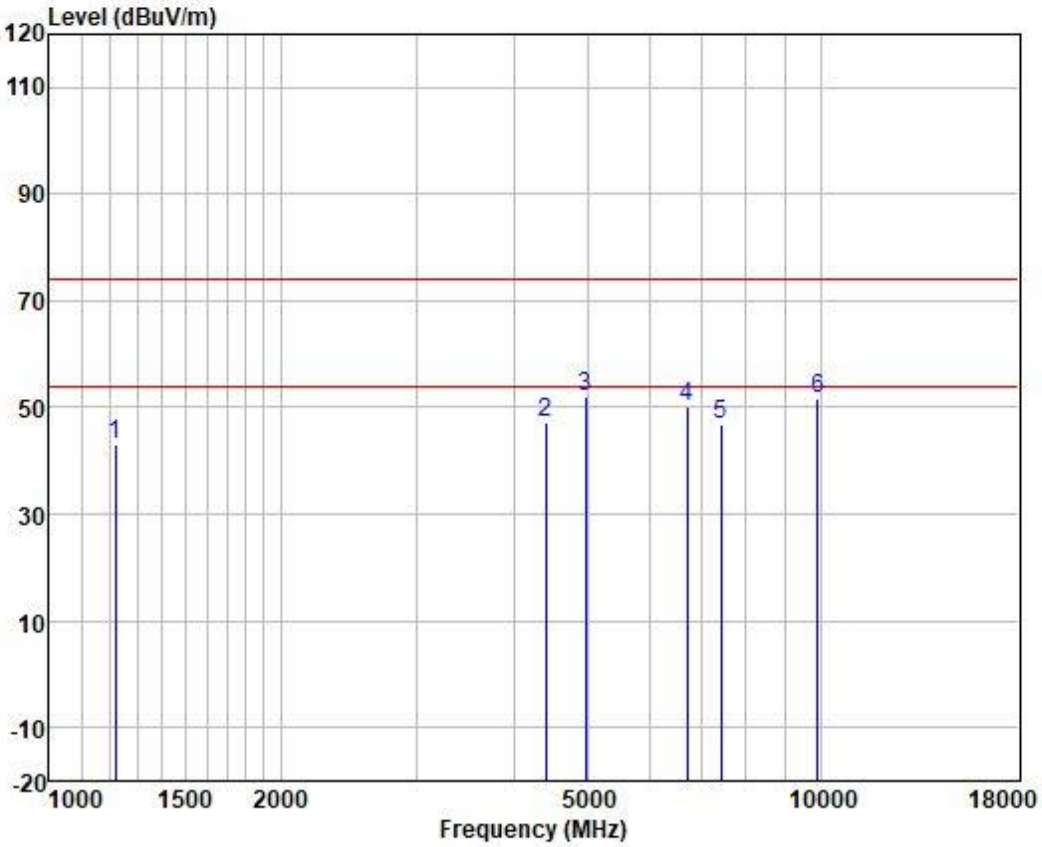
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1217.190	55.71	23.34	2.61	37.64	44.02	74.00	-29.98	HORIZONTAL	peak
2	4405.090	44.66	33.74	4.79	36.62	46.57	74.00	-27.43	HORIZONTAL	peak
3	4880.000	43.88	34.15	5.22	36.67	46.58	74.00	-27.42	HORIZONTAL	peak
4	6954.852	46.35	35.04	7.10	36.89	51.60	74.00	-22.40	HORIZONTAL	peak
5	7320.000	40.59	36.07	6.81	36.95	46.52	74.00	-27.48	HORIZONTAL	peak
6	9760.000	40.15	38.81	7.65	36.81	49.80	74.00	-24.20	HORIZONTAL	peak

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



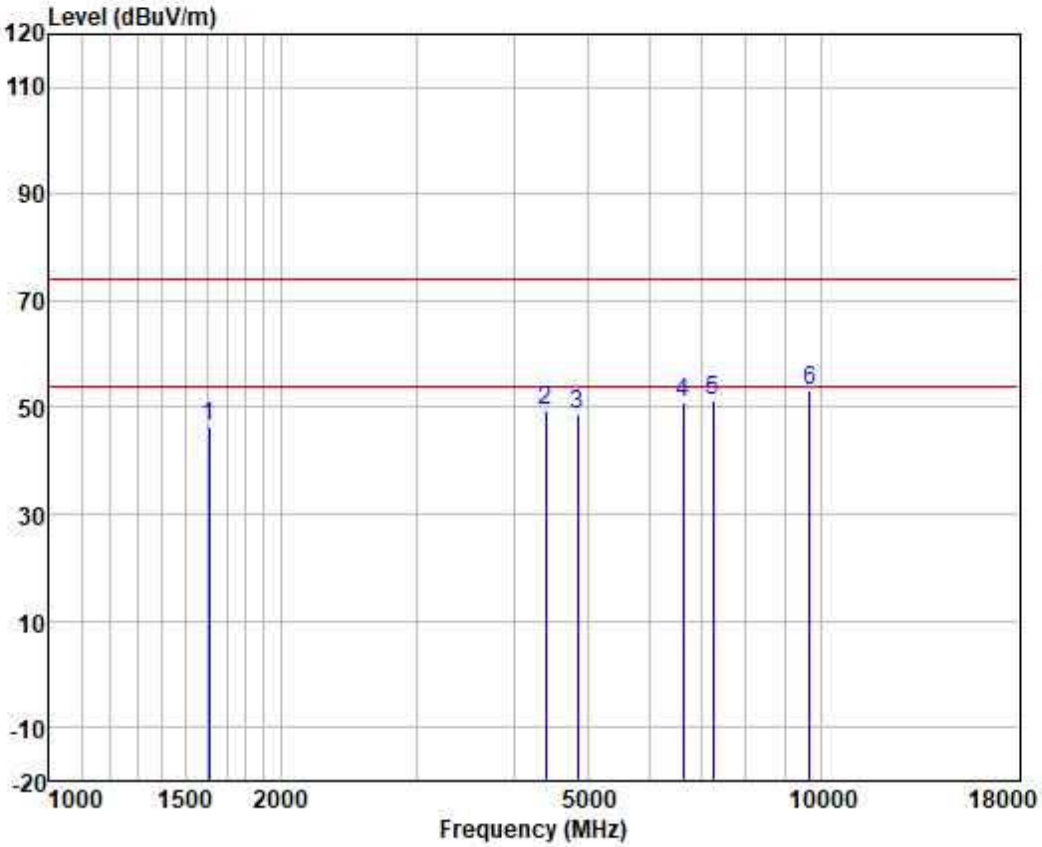
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1210.174	54.16	23.26	2.59	37.64	42.37	74.00	-31.63	VERTICAL	peak
2	4379.699	45.56	33.59	4.80	36.62	47.33	74.00	-26.67	VERTICAL	peak
3	4960.000	47.21	34.15	5.28	36.69	49.95	54.00	-4.05	VERTICAL	Average
4	4960.000	54.64	34.15	5.28	36.69	57.38	74.00	-16.62	VERTICAL	peak
5	6640.542	46.65	34.17	6.77	36.84	50.75	74.00	-23.25	VERTICAL	peak
6	7440.000	40.34	36.33	6.72	36.96	46.43	74.00	-27.57	VERTICAL	peak
7	9920.000	41.29	38.95	7.67	36.80	51.11	74.00	-22.89	VERTICAL	peak

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



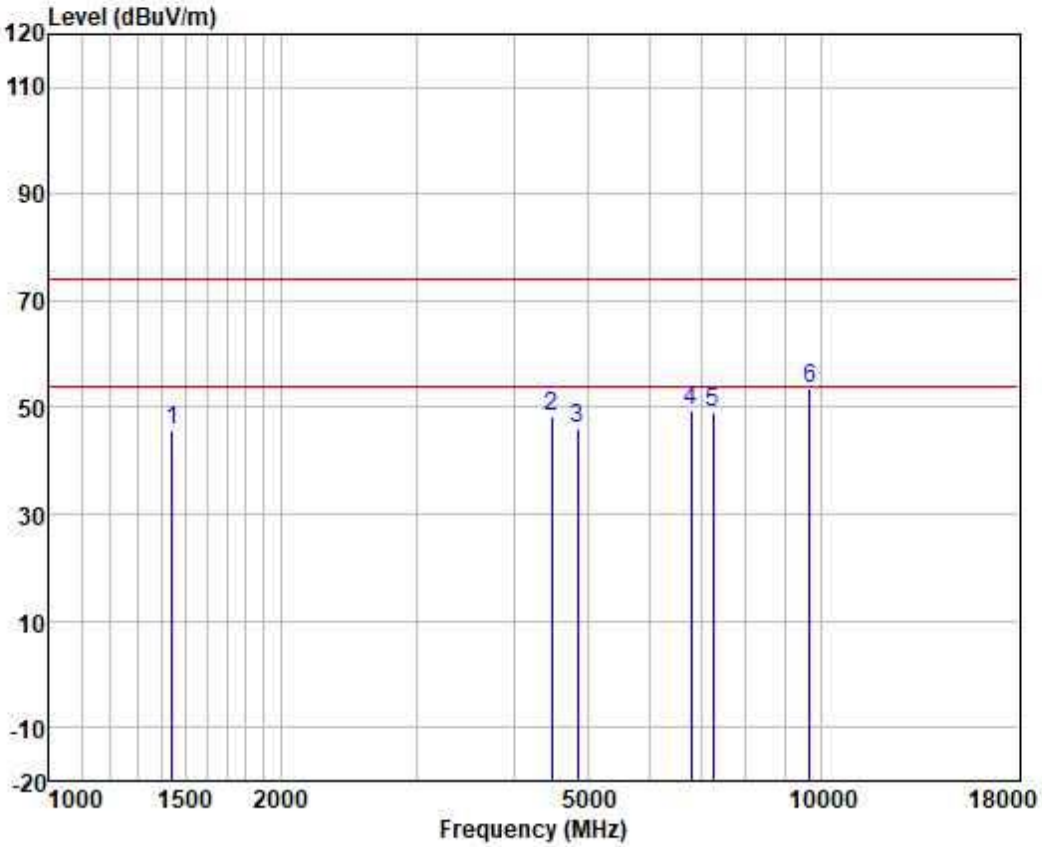
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1217.190	54.90	23.34	2.61	37.64	43.21	74.00	-30.79	HORIZONTAL	peak
2	4405.090	45.45	33.74	4.79	36.62	47.36	74.00	-26.64	HORIZONTAL	peak
3	4960.000	49.44	34.15	5.28	36.69	52.18	74.00	-21.82	HORIZONTAL	peak
4	6717.762	45.91	34.42	6.87	36.85	50.35	74.00	-23.65	HORIZONTAL	peak
5	7440.000	40.75	36.33	6.72	36.96	46.84	74.00	-27.16	HORIZONTAL	peak
6	9920.000	41.73	38.95	7.67	36.80	51.55	74.00	-22.45	HORIZONTAL	peak

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



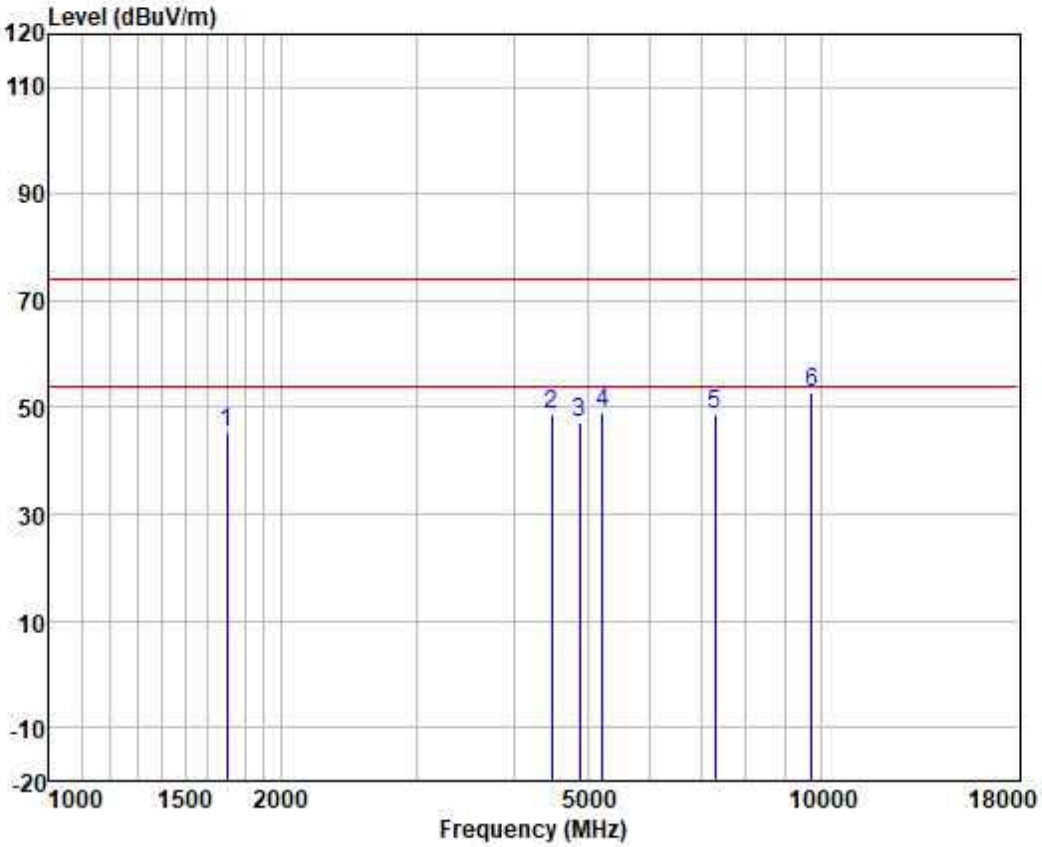
	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1611.091	56.07	24.72	3.13	37.44	46.48	74.00	-27.52	VERTICAL	peak
2	4405.090	46.68	33.74	5.78	36.62	49.58	74.00	-24.42	VERTICAL	peak
3	4840.000	45.18	34.15	5.85	36.67	48.51	74.00	-25.49	VERTICAL	peak
4	6640.542	46.41	34.17	7.32	36.84	51.06	74.00	-22.94	VERTICAL	peak
5	7260.000	44.82	35.86	7.54	36.94	51.28	74.00	-22.72	VERTICAL	peak
6	9680.000	43.01	38.73	8.13	36.82	53.05	74.00	-20.95	VERTICAL	peak

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



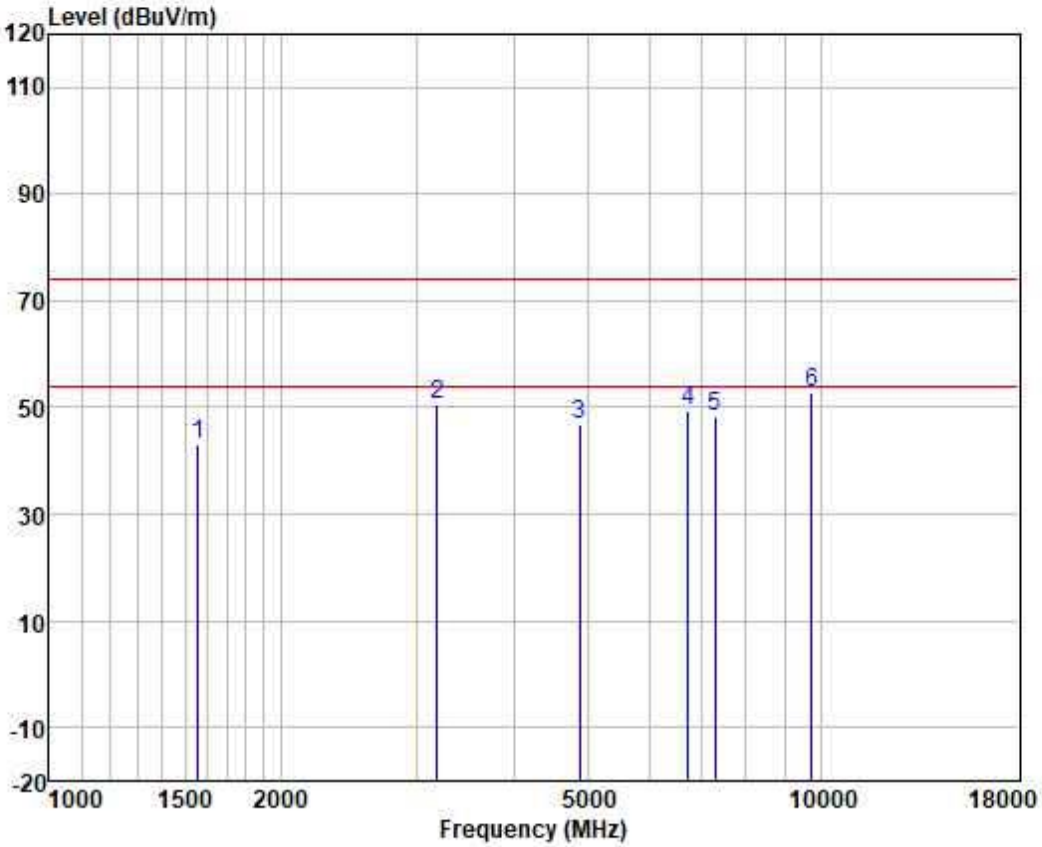
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1443.509	56.12	24.34	2.94	37.55	45.85	74.00	-28.15	HORIZONTAL	peak
2	4482.150	45.10	34.12	5.80	36.63	48.39	74.00	-25.61	HORIZONTAL	peak
3	4840.000	42.73	34.15	5.85	36.67	46.06	74.00	-27.94	HORIZONTAL	peak
4	6795.879	44.00	34.69	7.42	36.86	49.25	74.00	-24.75	HORIZONTAL	peak
5	7260.000	42.47	35.86	7.54	36.94	48.93	74.00	-25.07	HORIZONTAL	peak
6	9680.000	43.49	38.73	8.13	36.82	53.53	74.00	-20.47	HORIZONTAL	peak

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



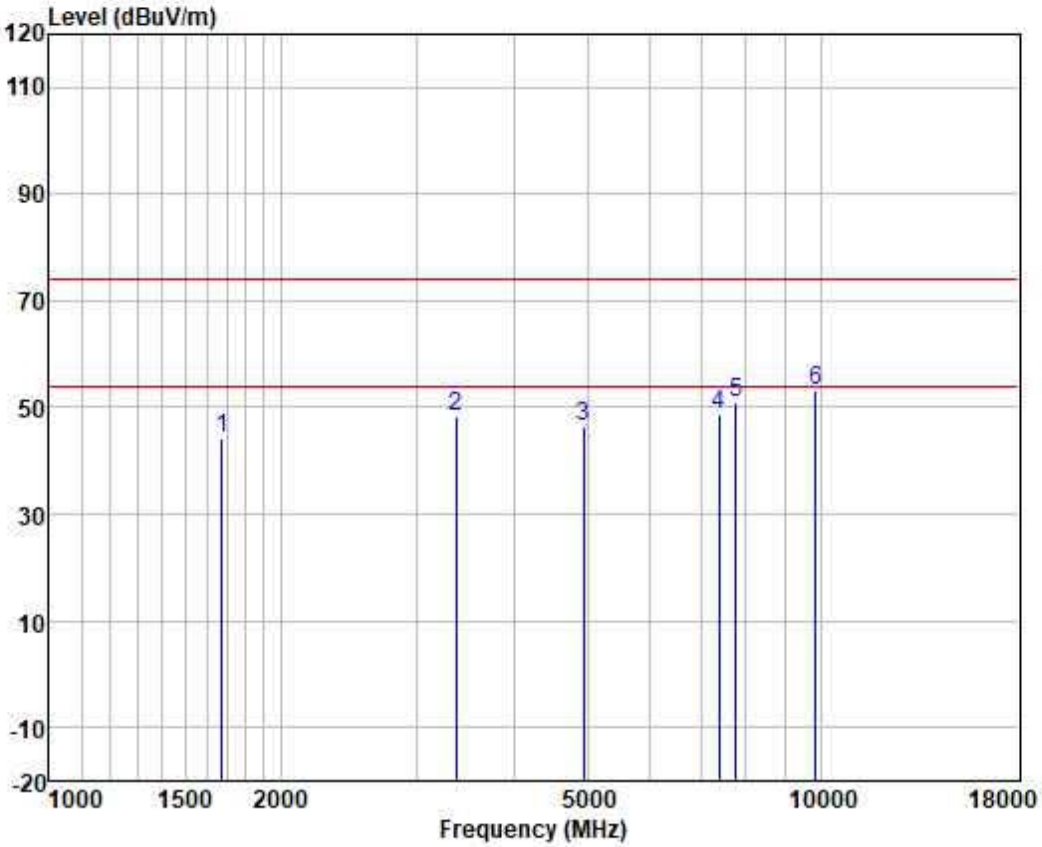
	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1702.042	54.43	25.15	3.18	37.39	45.37	74.00	-28.63	VERTICAL	peak
2	4482.150	45.32	34.12	5.80	36.63	48.61	74.00	-25.39	VERTICAL	peak
3	4866.000	43.87	34.15	5.85	36.67	47.20	74.00	-26.80	VERTICAL	peak
4	5209.075	46.16	33.58	6.00	36.74	49.00	74.00	-25.00	VERTICAL	peak
5	7299.000	42.19	36.00	7.55	36.95	48.79	74.00	-25.21	VERTICAL	peak
6	9732.000	42.86	38.78	8.15	36.82	52.97	74.00	-21.03	VERTICAL	peak

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



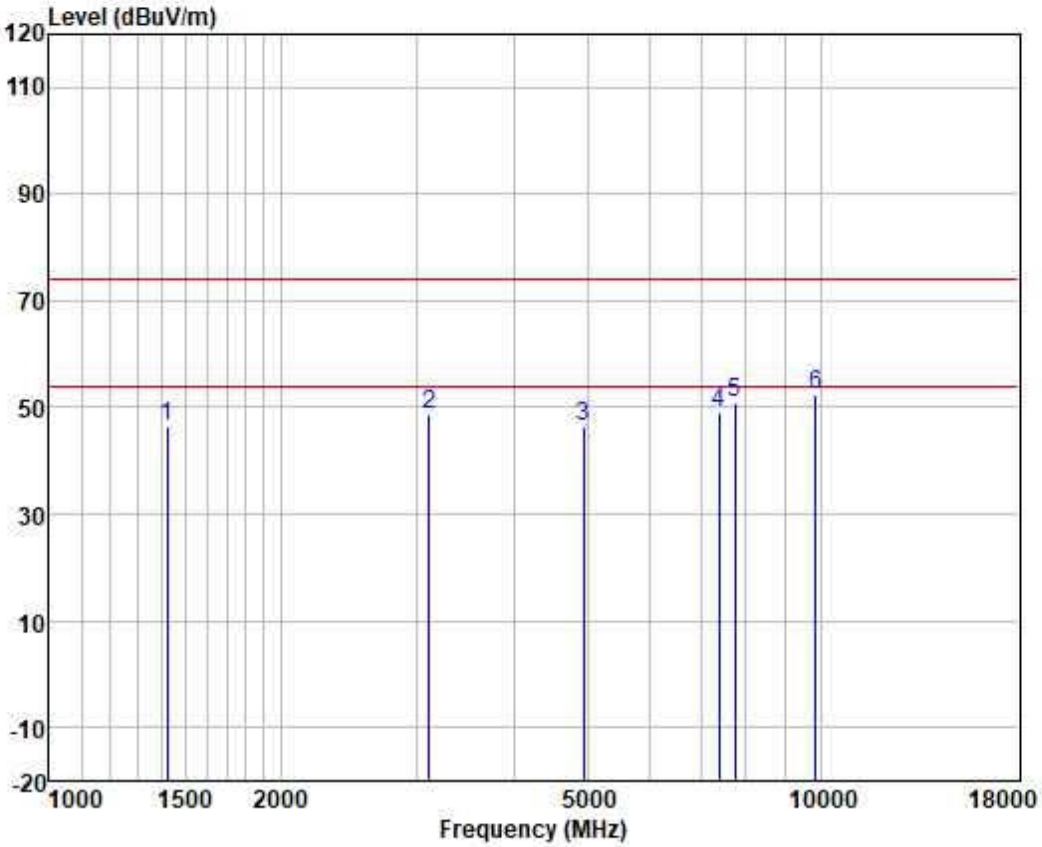
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1560.673	52.84	24.57	3.09	37.47	43.03	74.00	-30.97	HORIZONTAL	peak
2	3186.869	54.34	28.80	4.25	36.82	50.57	74.00	-23.43	HORIZONTAL	peak
3	4866.000	43.56	34.15	5.85	36.67	46.89	74.00	-27.11	HORIZONTAL	peak
4	6737.207	44.50	34.49	7.39	36.85	49.53	74.00	-24.47	HORIZONTAL	peak
5	7299.000	41.78	36.00	7.55	36.95	48.38	74.00	-25.62	HORIZONTAL	peak
6	9732.000	42.82	38.78	8.15	36.82	52.93	74.00	-21.07	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	1677.621	53.30	25.00	3.17	37.40	44.07	74.00	-29.93	VERTICAL	peak
2	3366.778	51.41	28.97	4.57	36.75	48.20	74.00	-25.80	VERTICAL	peak
3	4930.000	43.30	34.15	5.86	36.68	46.63	74.00	-27.37	VERTICAL	peak
4	7395.000	41.96	36.23	7.57	36.96	48.80	74.00	-25.20	VERTICAL	peak
5	7762.260	43.50	36.84	7.65	36.99	51.00	74.00	-23.00	VERTICAL	peak
6	9860.000	43.01	38.91	8.21	36.81	53.32	74.00	-20.68	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	1422.798	56.74	24.31	2.88	37.55	46.38	74.00	-27.62	HORIZONTAL	peak
2	3105.037	52.69	28.74	4.16	36.86	48.73	74.00	-25.27	HORIZONTAL	peak
3	4930.000	43.07	34.15	5.86	36.68	46.40	74.00	-27.60	HORIZONTAL	peak
4	7395.000	42.37	36.23	7.57	36.96	49.21	74.00	-24.79	HORIZONTAL	peak
5	7739.857	43.58	36.79	7.64	36.98	51.03	74.00	-22.97	HORIZONTAL	peak
6	9860.000	42.29	38.91	8.21	36.81	52.60	74.00	-21.40	HORIZONTAL	peak

7.4 Conducted Peak Output Power

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

Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ 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

7.4.1 E.U.T. Operation

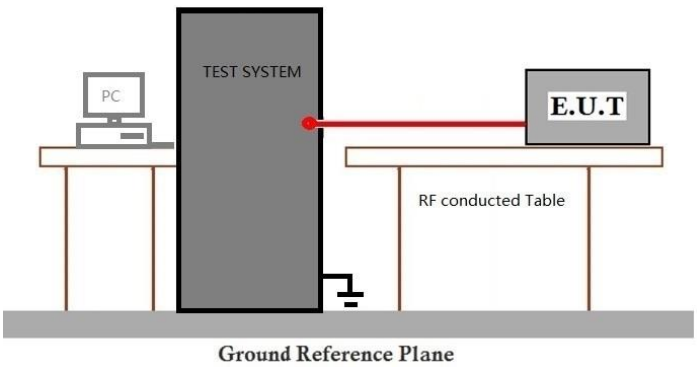
Operating Environment:

Temperature: 22.4 °C Humidity: 58.2 % RH Atmospheric Pressure: 1008 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.4.3 Test Setup Diagram



7.4.4 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

7.5 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥500 kHz

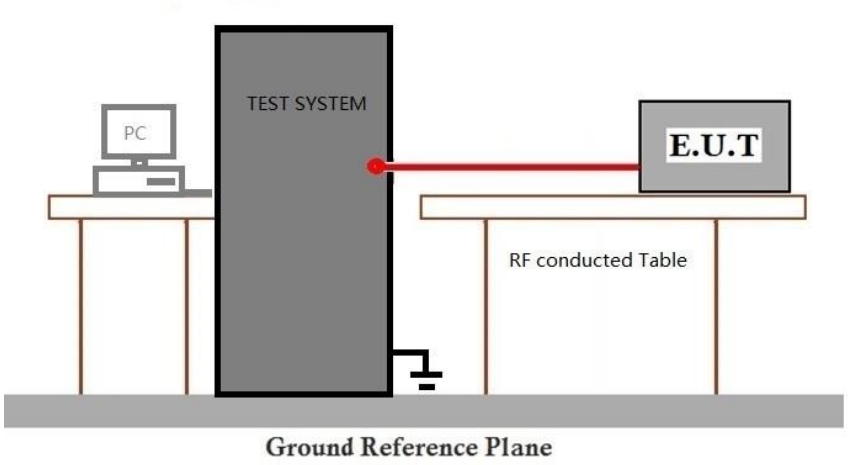
7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 22.4 °C Humidity: 58.2 % RH Atmospheric Pressure: 1008 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

7.6.1 E.U.T. Operation

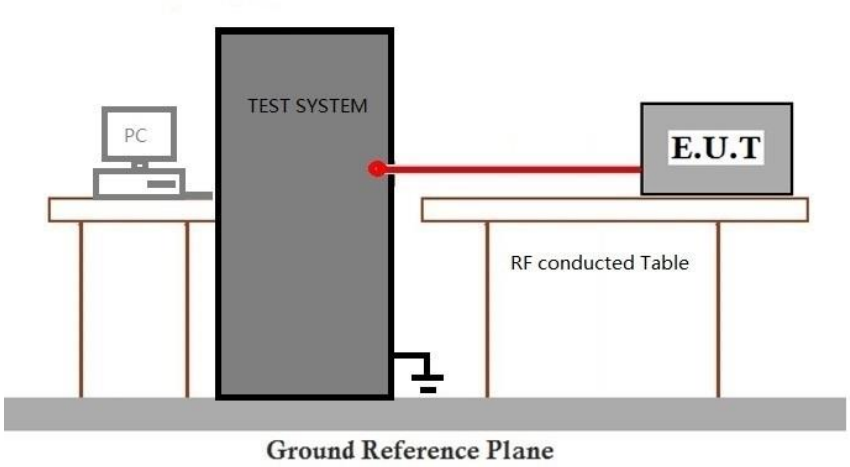
Operating Environment:

Temperature: 22.4 °C Humidity: 58.2 % RH Atmospheric Pressure: 1008 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Conducted Band Edges Measurement

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

Test Method: ANSI C63.10 (2013) Section 11.13.3.2

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).

7.7.1 E.U.T. Operation

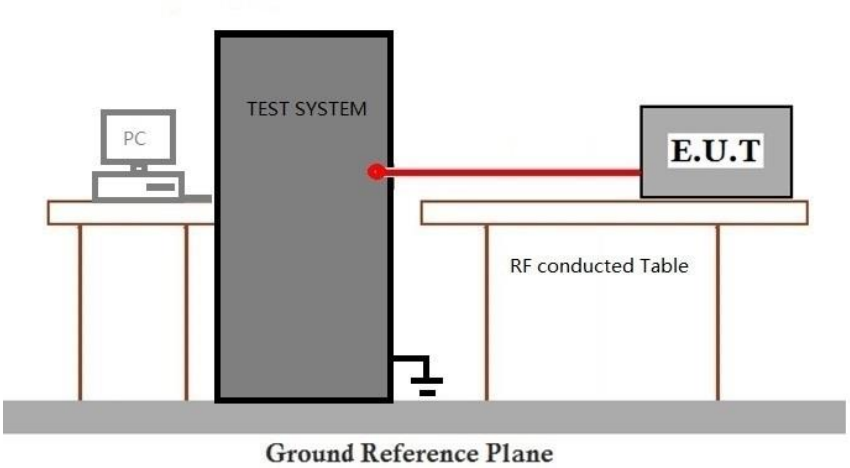
Operating Environment:

Temperature: 22.4 °C Humidity: 58.2 % RH Atmospheric Pressure: 1008 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Conducted Spurious Emissions

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

Test Method: ANSI C63.10 (2013) Section 11.11

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

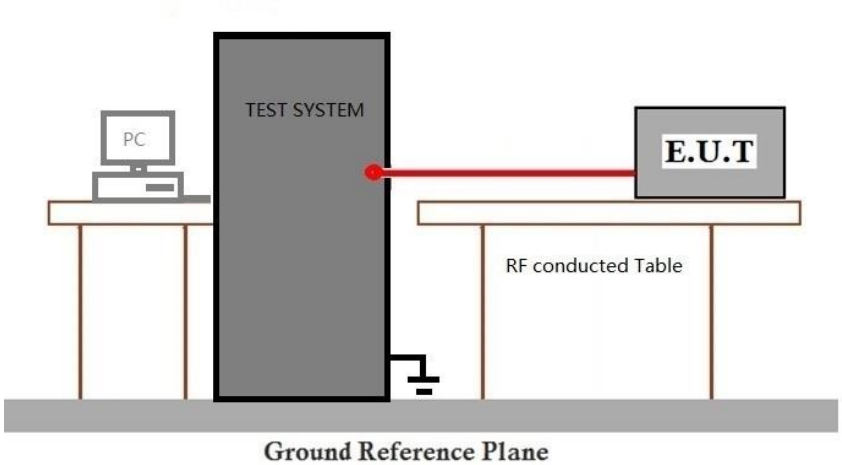
Operating Environment:

Temperature: 22.4 °C Humidity: 58.2 % RH Atmospheric Pressure: 1008 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode_Keep the EUT in transmitting with modulation mode.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR240500051302

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2405000513AT

10 Appendix

For BT(BLE):

1. Duty Cycle

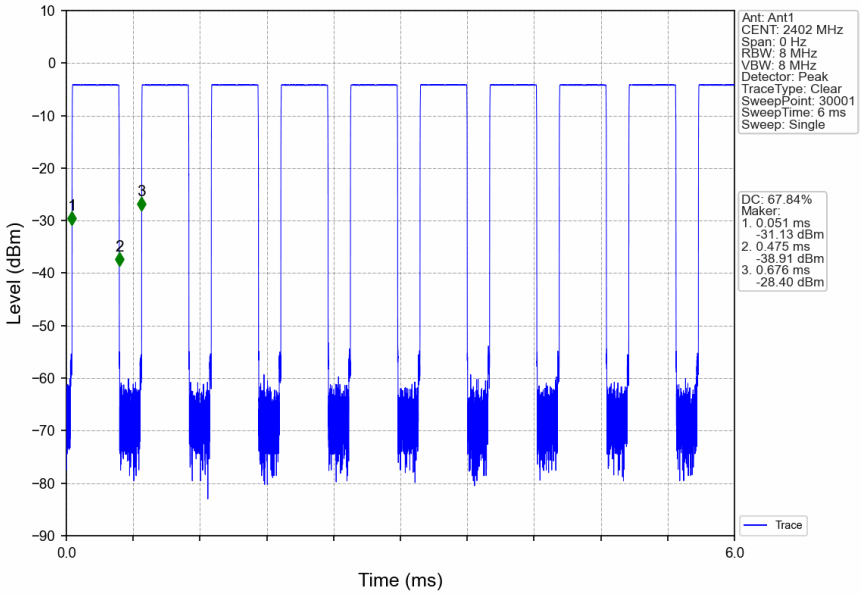
1.1 Ant1

1.1.1 Test Result

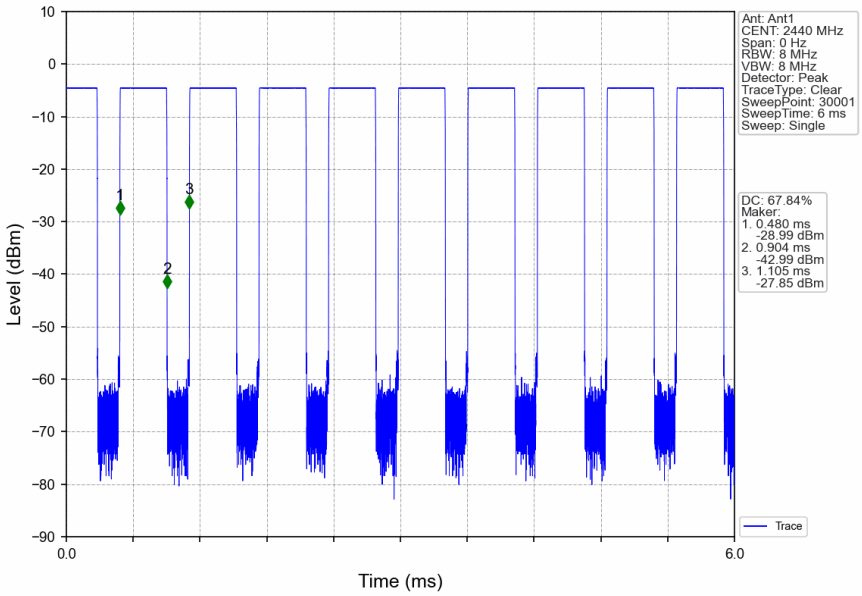
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	0.424	0.625	67.84	1.69	0.00
		2440	0.424	0.625	67.84	1.69	0.03
		2480	0.424	0.625	67.84	1.69	0.03

1.1.2 Test Graph

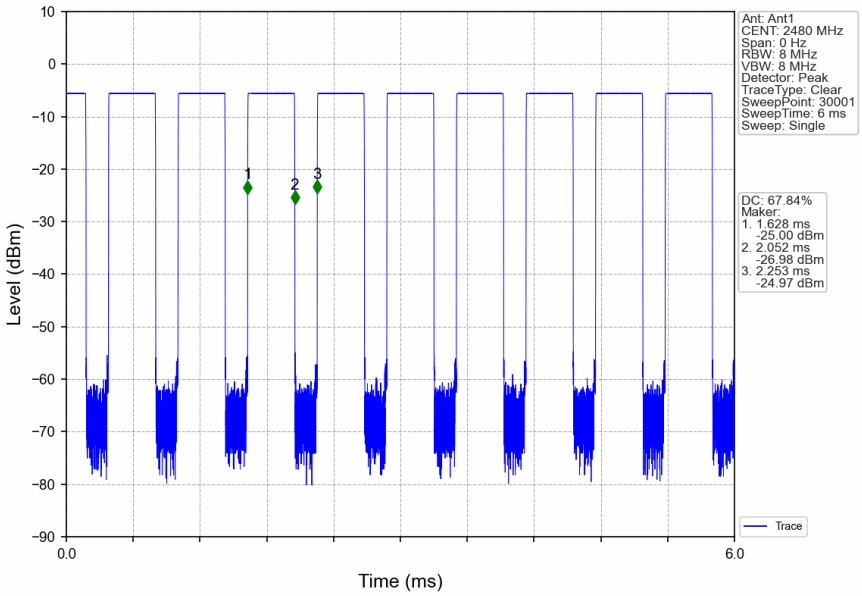
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

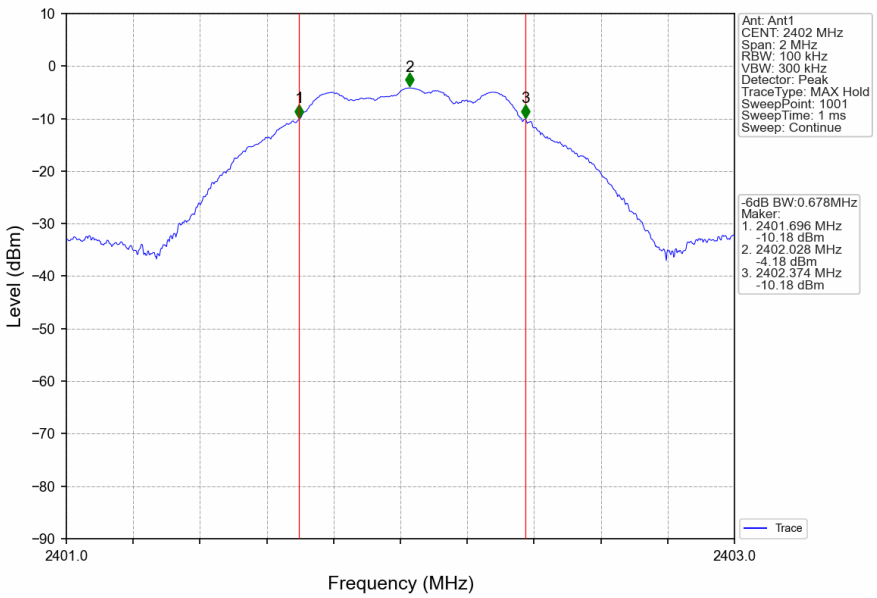
2.1 6dB BW

2.1.1 Test Result

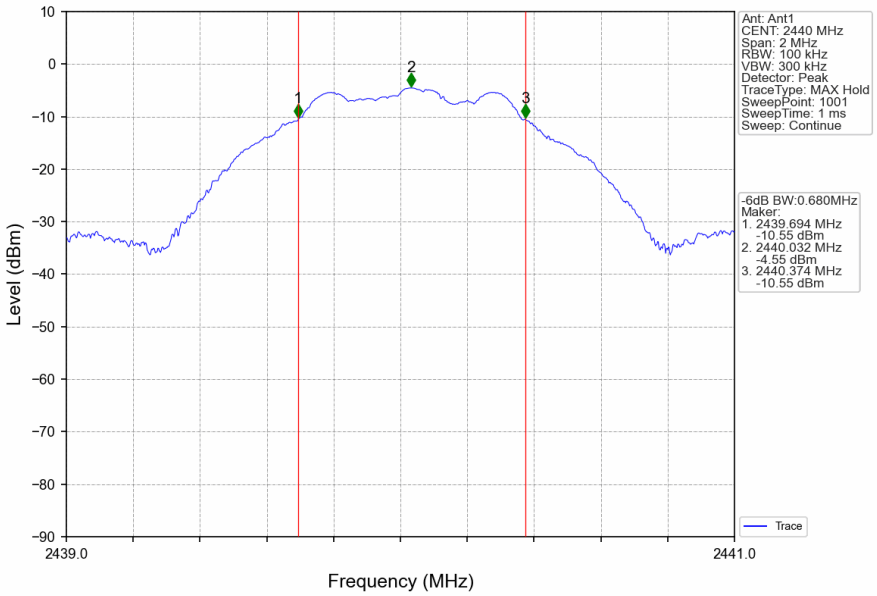
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.678	>=0.5	Pass
		2440	1	0.680	>=0.5	Pass
		2480	1	0.663	>=0.5	Pass

2.2.2 Test Graph

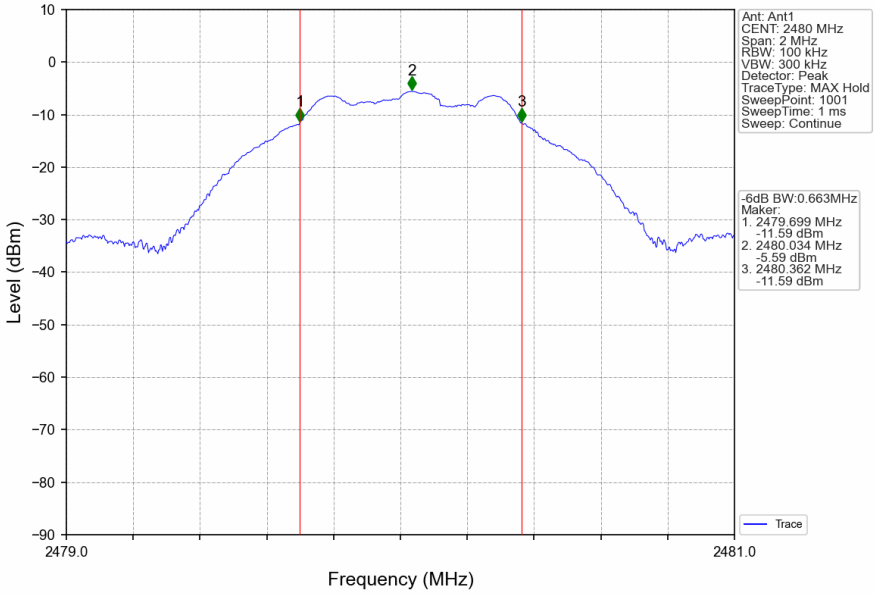
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	-4.16	<=30	Pass
		2440	-4.53	<=30	Pass
		2480	-5.58	<=30	Pass
Note1: Antenna Gain: Ant1: 0.89 dBi;					

4. Maximum Power Spectral Density

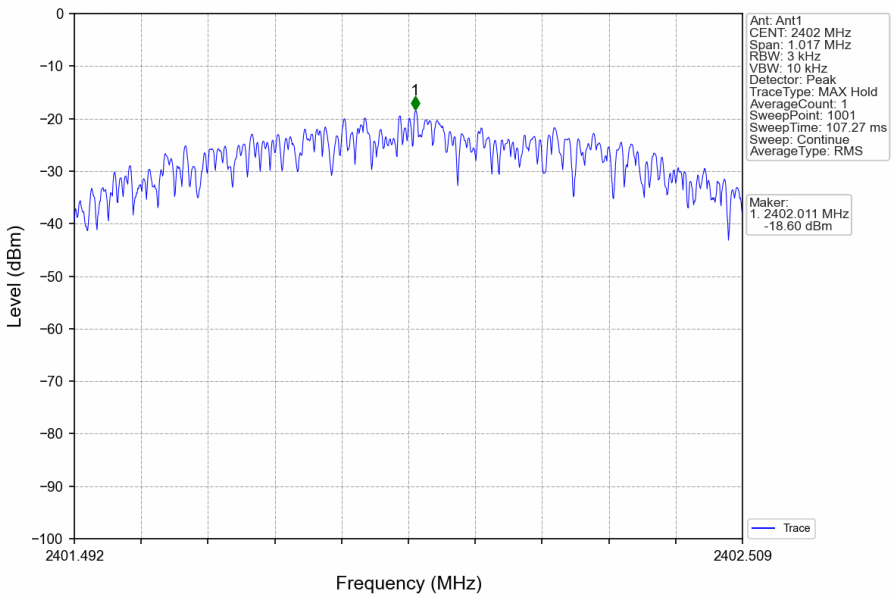
4.1 PSD

4.1.1 Test Result

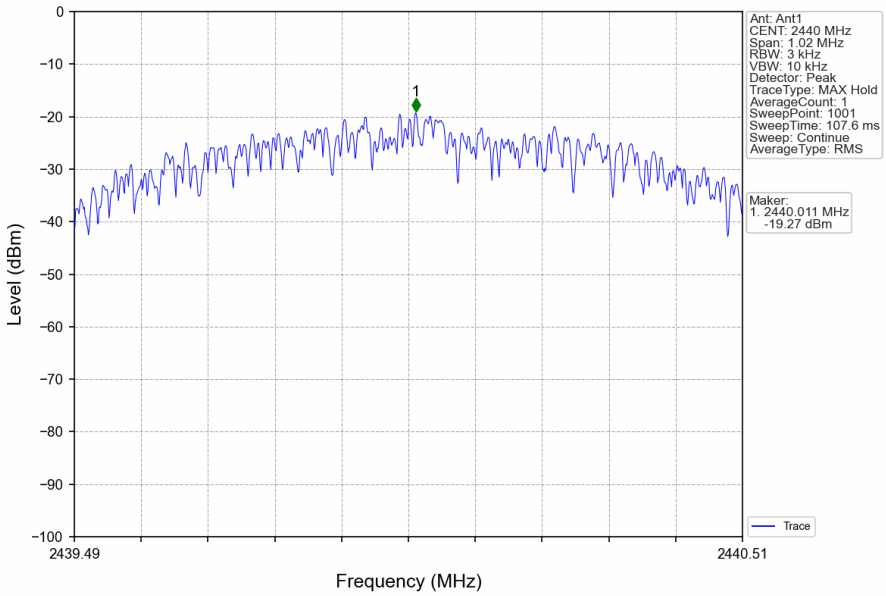
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-18.60	<=8	Pass
		2440	-19.27	<=8	Pass
		2480	-20.13	<=8	Pass
Note1: Antenna Gain: Ant1: 0.89 dBi;					

4.1.2 Test Graph

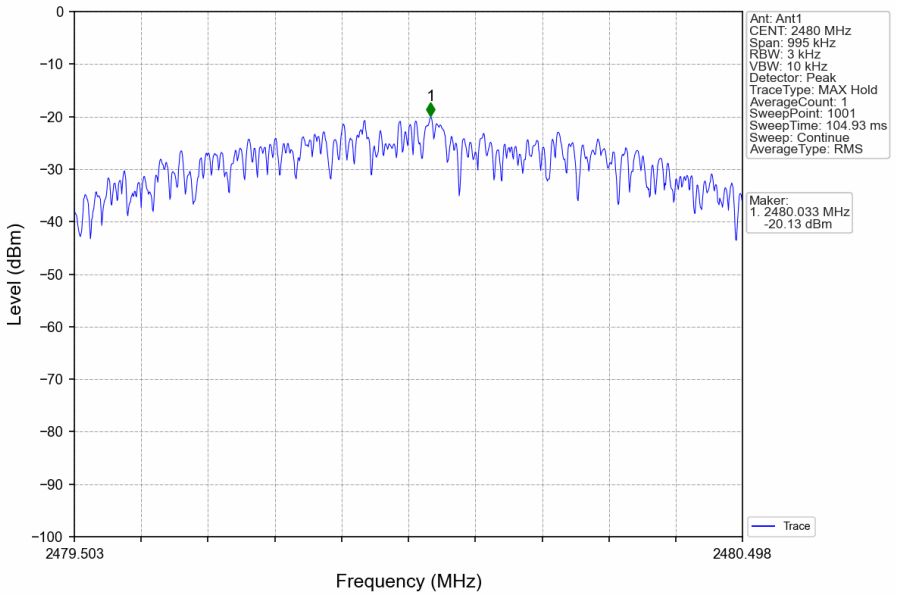
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

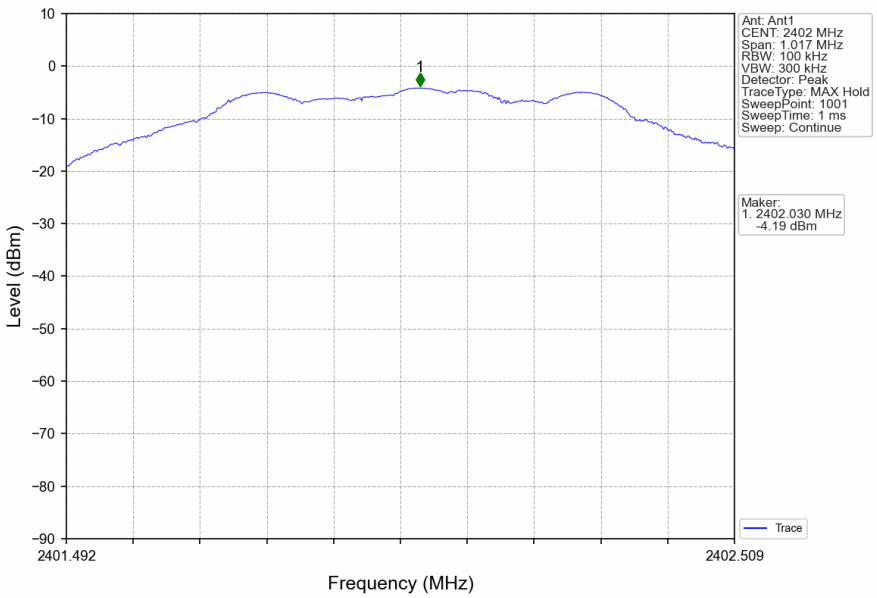
5.1 Ref

5.1.1 Test Result

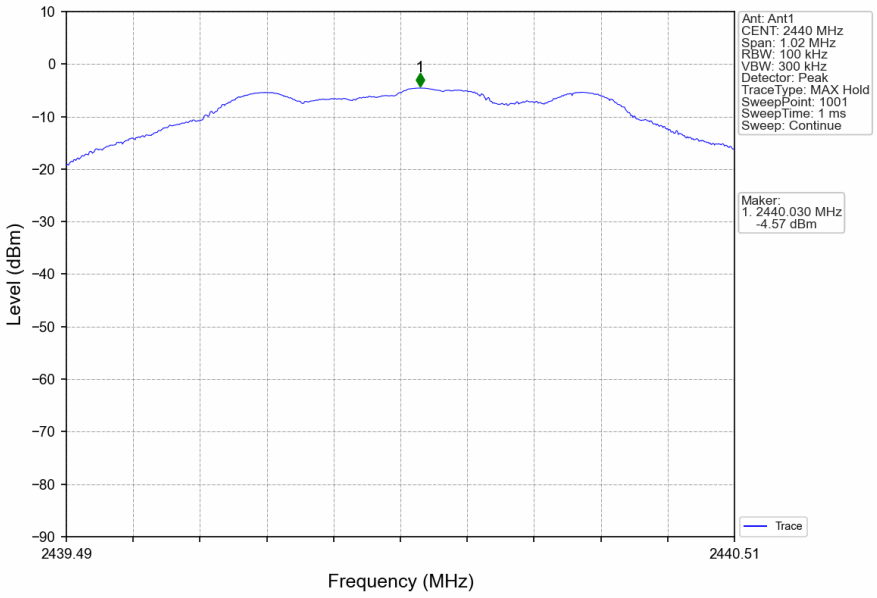
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	-4.19
		2440	1	-4.57
		2480	1	-5.60
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

5.1.2 Test Graph

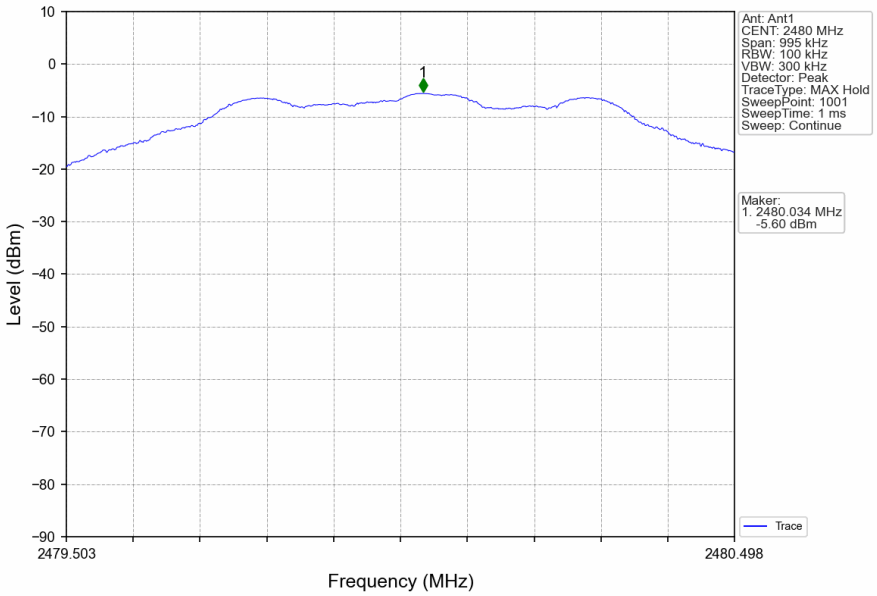
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



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中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

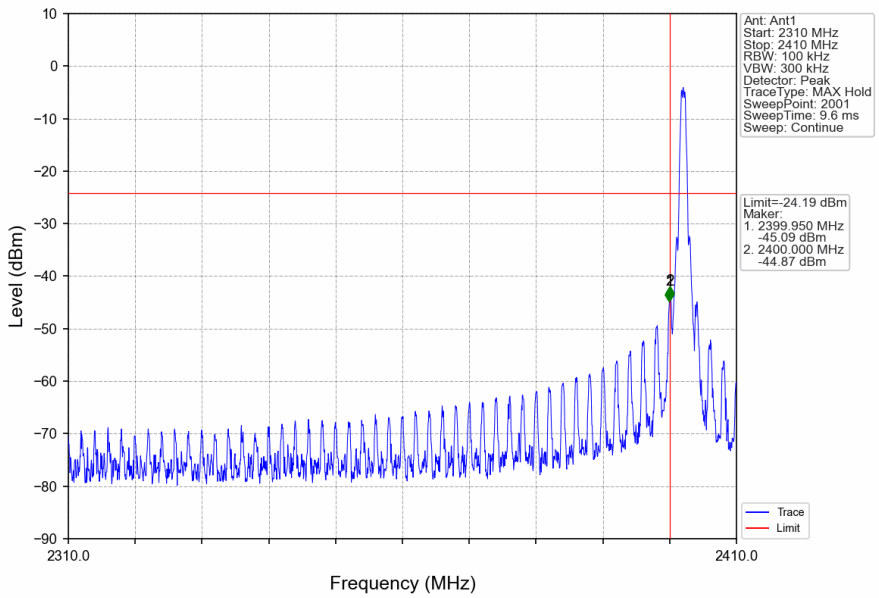
5.2 CSE and Band Edges

5.2.1 Test Result

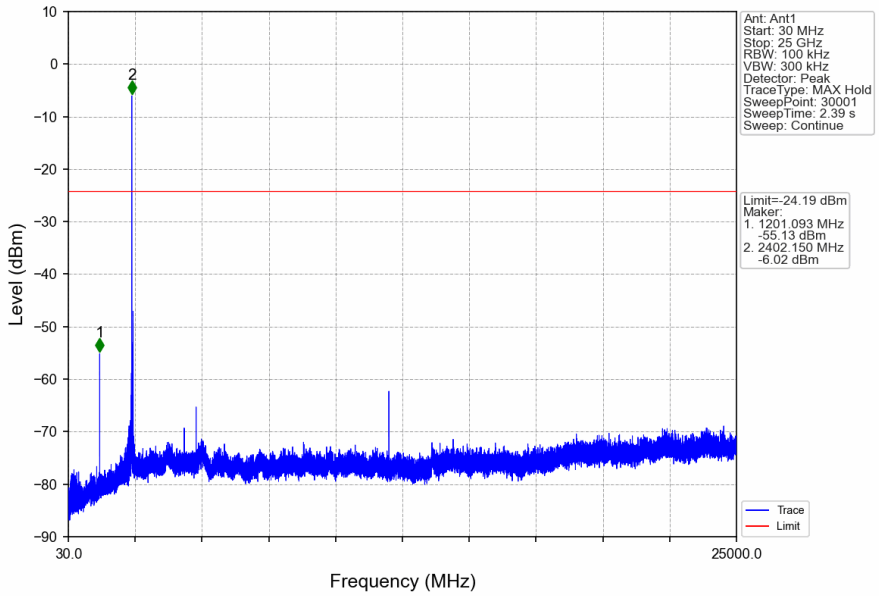
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-4.19	-24.19	Pass
		2440	1	-4.19	-24.19	Pass
		2480	1	-4.19	-24.19	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

5.2.2 Test Graph

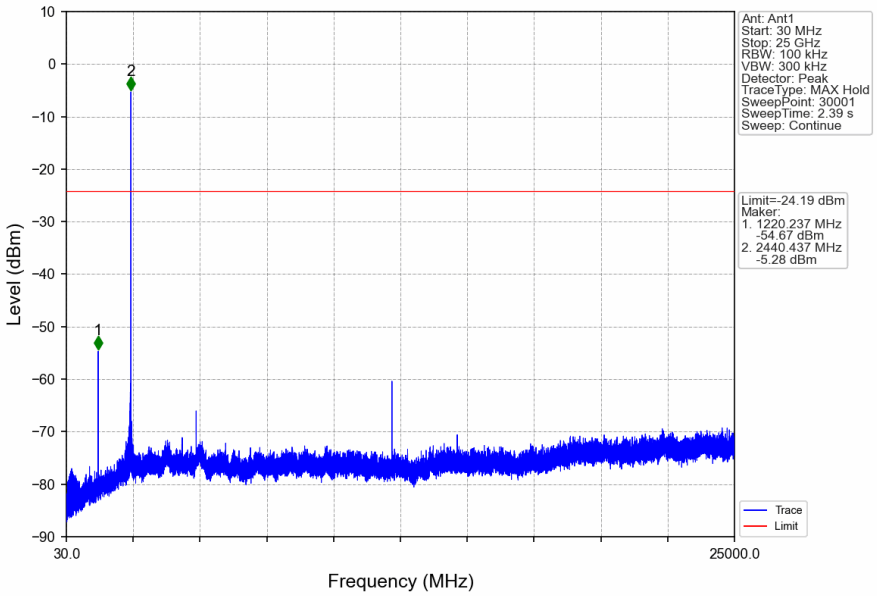
1M_LCH_2402MHz_Ant1_NTNV



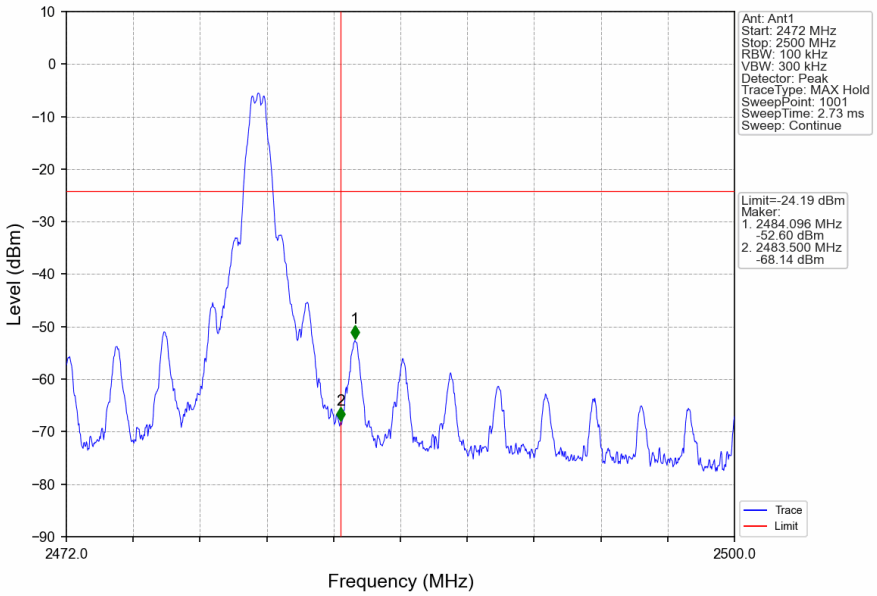
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



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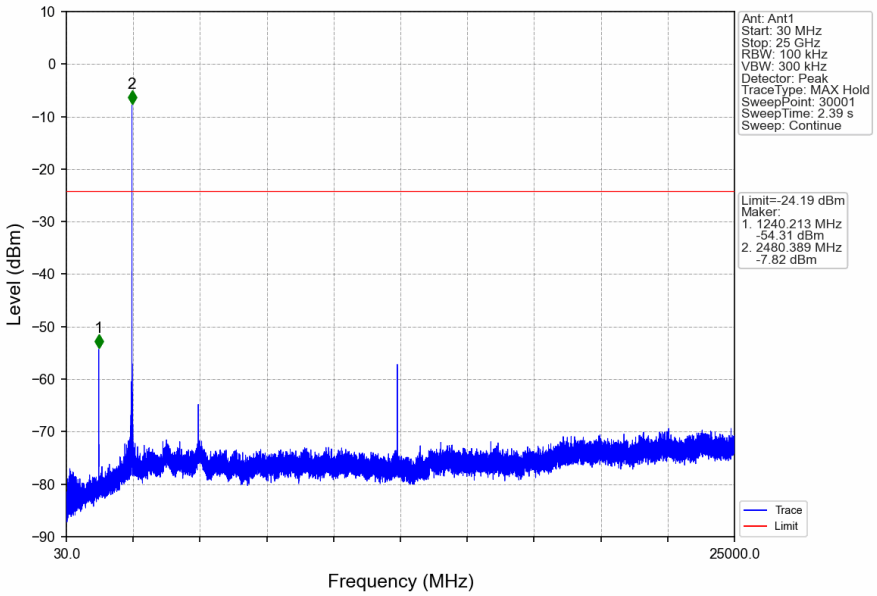
1M_HCH_2480MHz_Ant1_NTNV



For 2.4g Proprietary:

1. Duty Cycle

1.1 Test Result

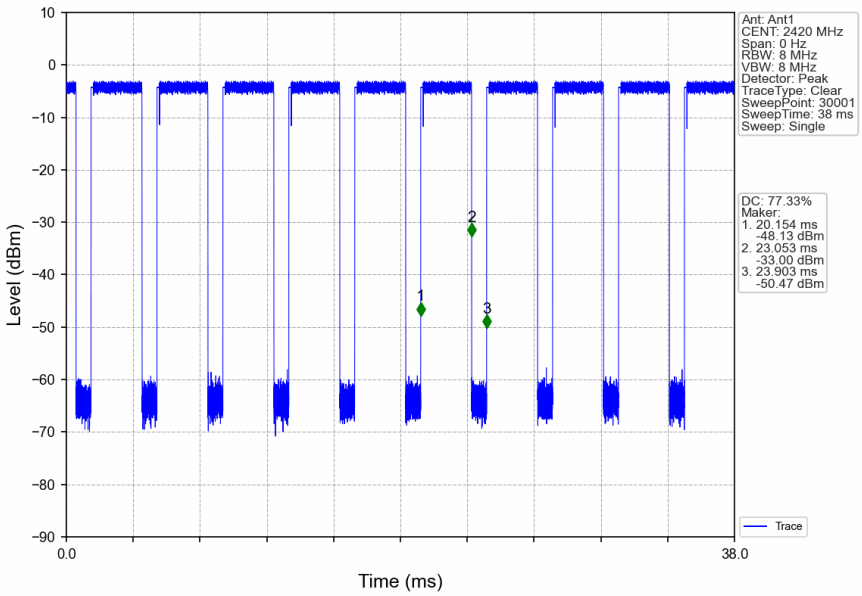
1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
2.4g Proprietary	SISO	2420	2.899	3.749	77.33	1.12	0.03
		2440	0.092	0.625	14.72	8.32	0.00
		2465	2.900	3.749	77.35	1.12	0.01

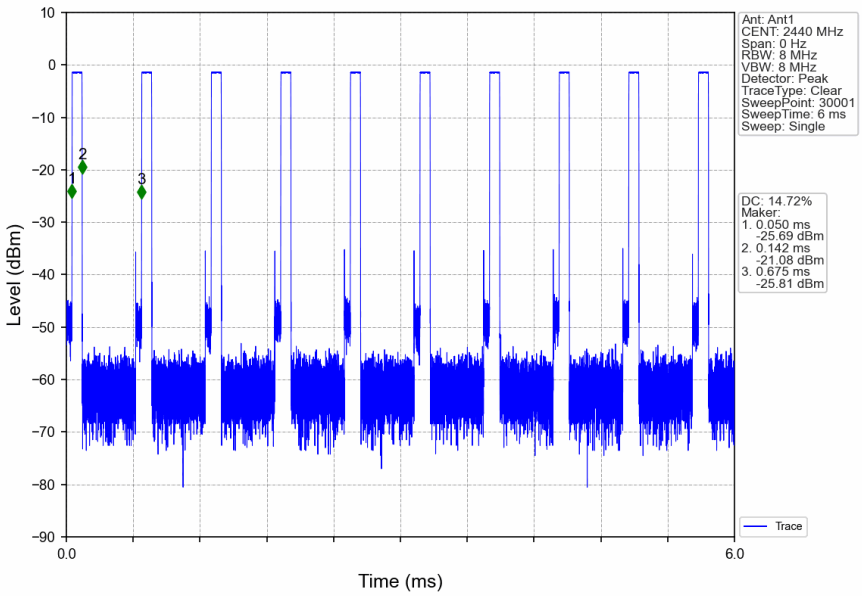
1.2 Test Graph

1.2.1 Ant1

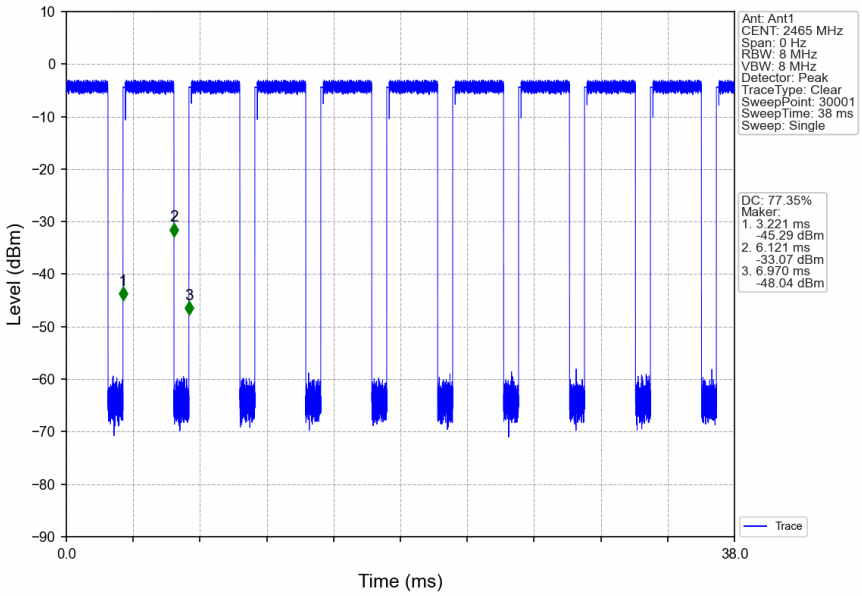
2.4g Proprietary_LCH_2420MHz_Ant1_NTNV



2.4g Proprietary_MCH_2440MHz_Ant1_NTNV



2.4g Proprietary_HCH_2465MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

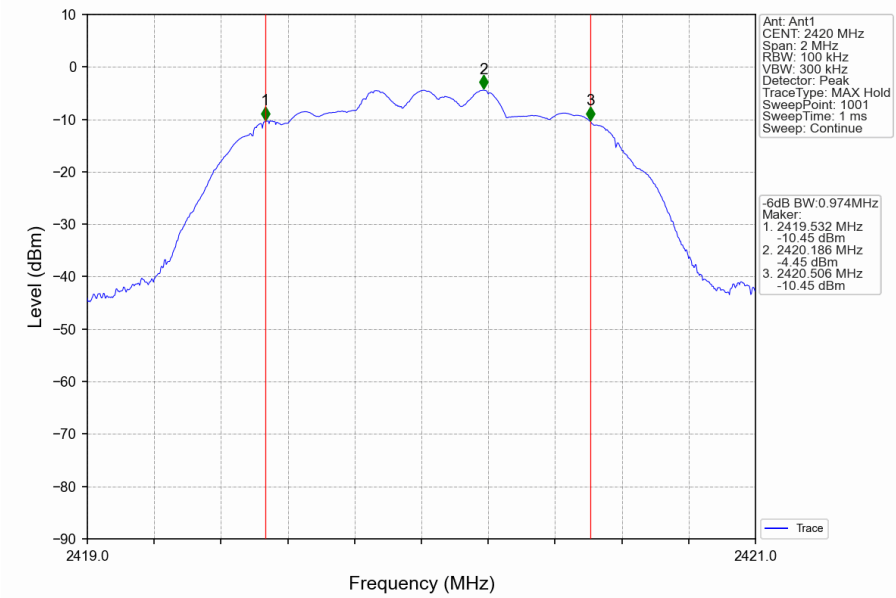
2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
2.4g Proprietary	SISO	2420	1	0.974	>=0.5	Pass
		2440	1	0.503	>=0.5	Pass
		2465	1	0.979	>=0.5	Pass

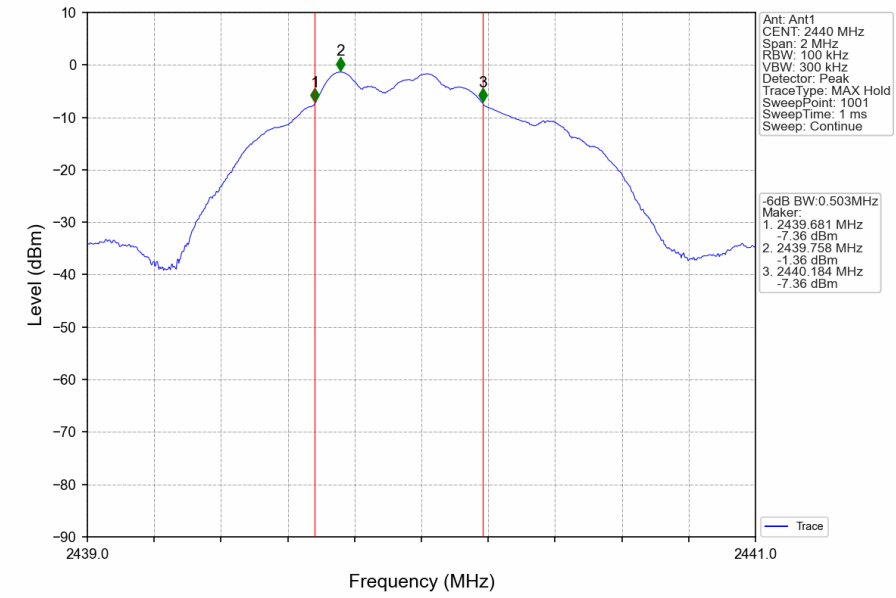
2.2 Test Graph

2.2.1 6dB BW

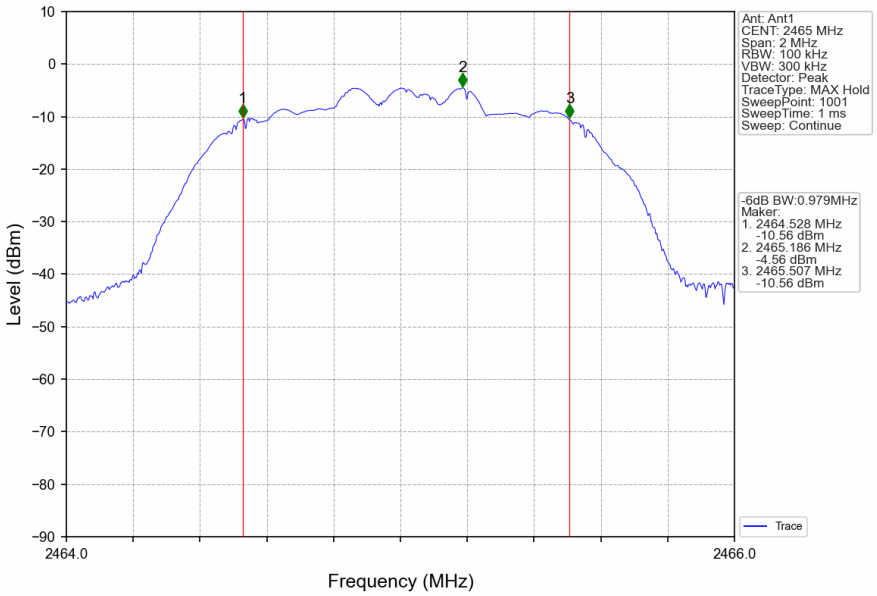
2.4g Proprietary_LCH_2420MHz_Ant1_NTNV



2.4g Proprietary_MCH_2440MHz_Ant1_NTNV



2.4g Proprietary_HCH_2465MHz_Ant1_NTNV



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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	
2.4g Proprietary	SISO	2420	-3.55	<=30	Pass
		2440	-1.37	<=30	Pass
		2465	-3.55	<=30	Pass
Note1: Antenna Gain: Ant1: 0.89 dBi;					

4. Maximum Power Spectral Density

4.1 Test Result

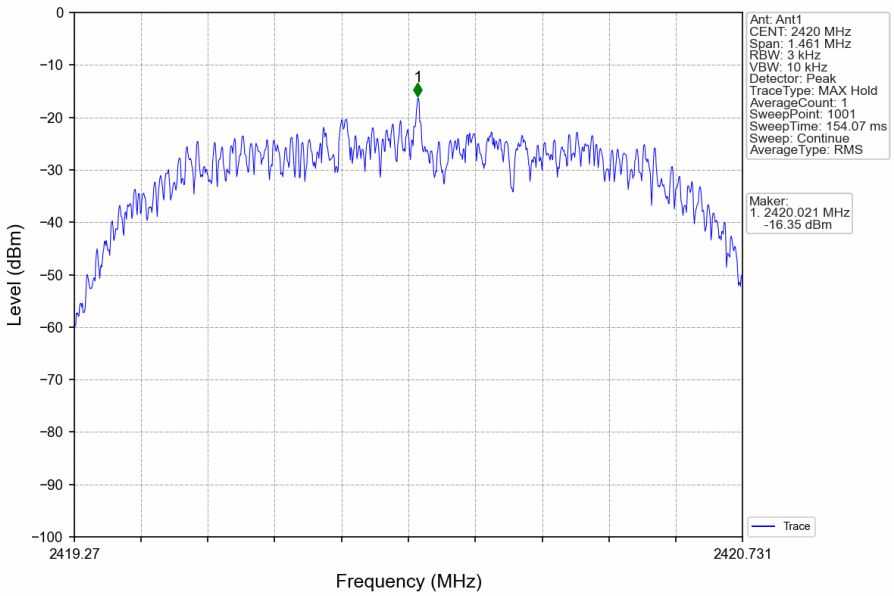
4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
2.4g Proprietary	SISO	2420	-16.35	<=8	Pass
		2440	-19.74	<=8	Pass
		2465	-16.31	<=8	Pass
Note1: Antenna Gain: Ant1: 0.89dBi;					

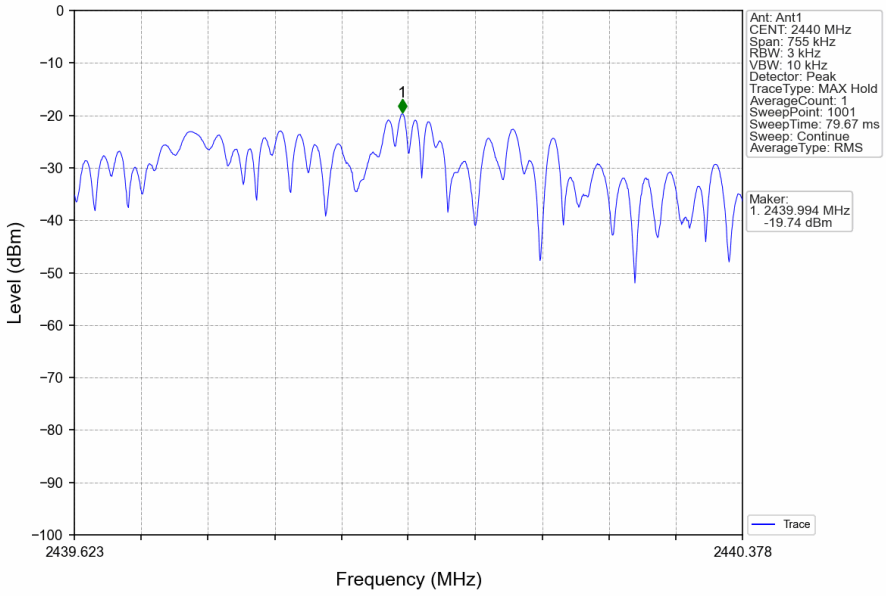
4.2 Test Graph

4.2.1 PSD

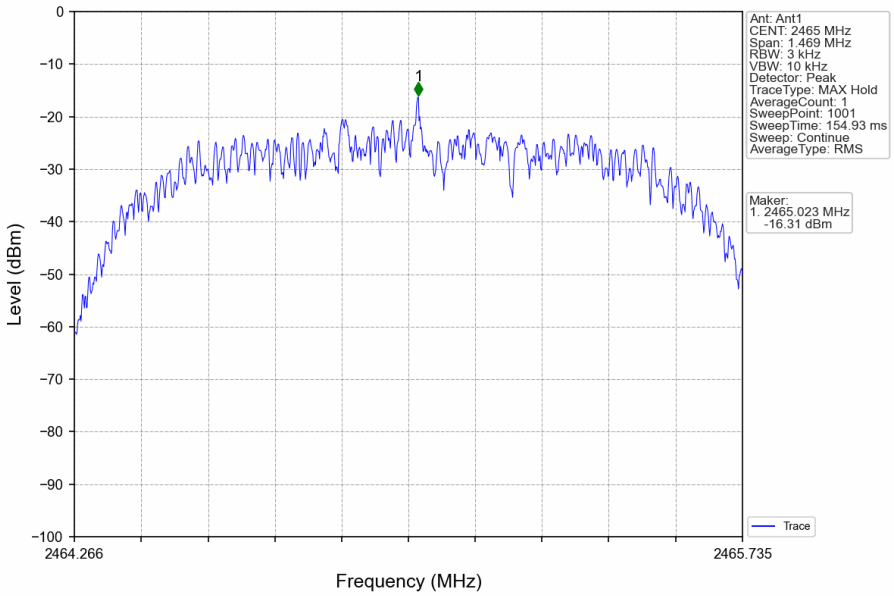
2.4g Proprietary_LCH_2420MHz_Ant1_NTNV



2.4g Proprietary_MCH_2440MHz_Ant1_NTNV



2.4g Proprietary_HCH_2465MHz_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)
2.4g Proprietary	SISO	2420	1	-4.47
		2440	1	-1.38
		2465	1	-4.54
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

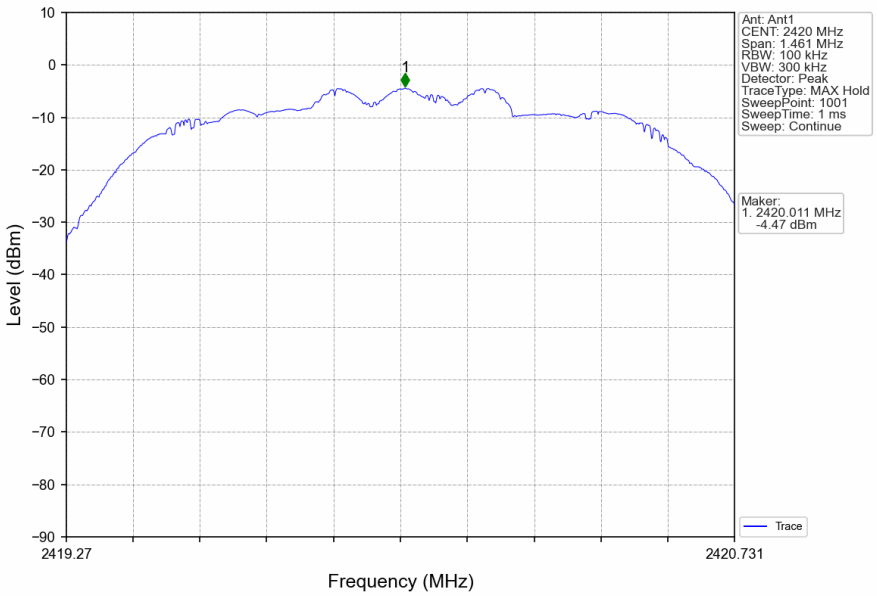
5.1.2 CSE and Band Edges

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
2.4g Proprietary	SISO	2420	1	-1.38	-21.38	Pass
		2440	1	-1.38	-21.38	Pass
		2465	1	-1.38	-21.38	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

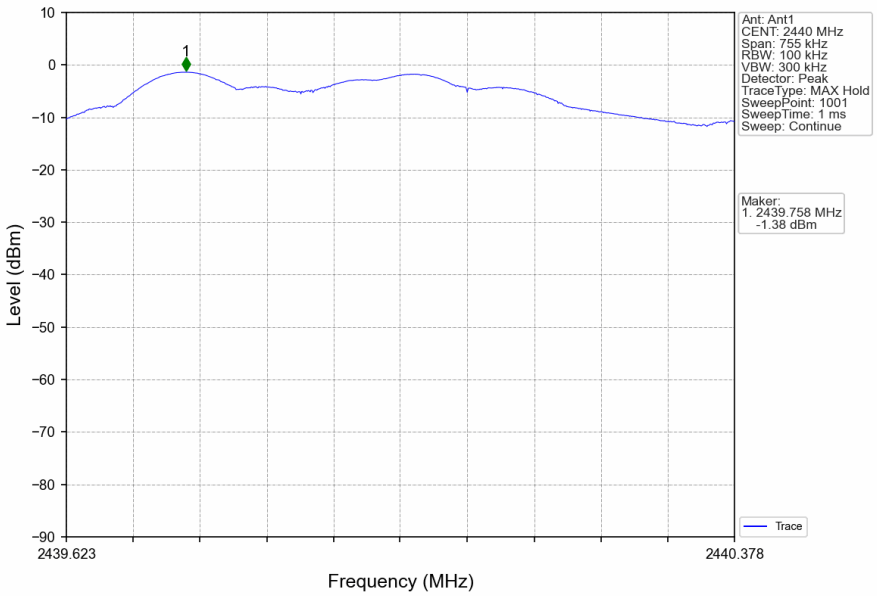
5.2 Test Graph

5.2.1 Ref

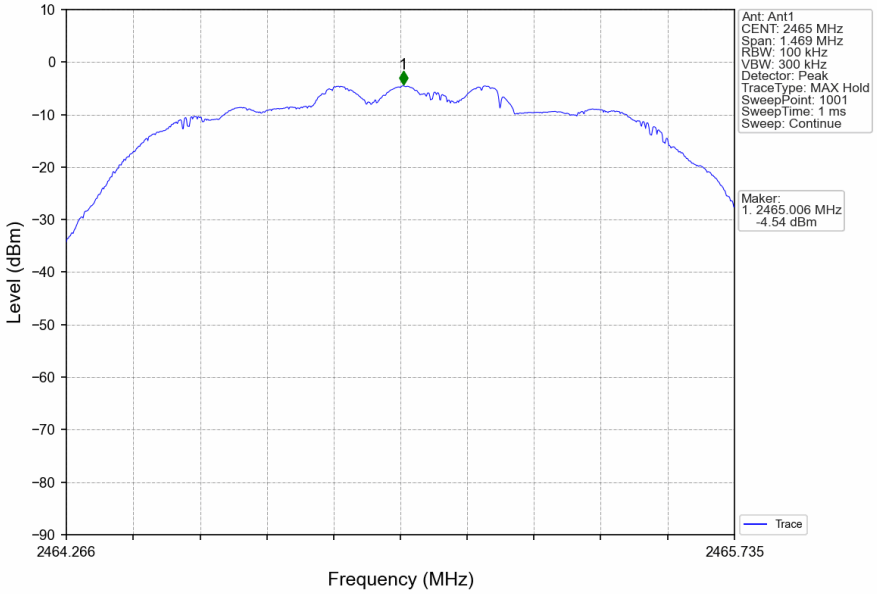
2.4g Proprietary_LCH_2420MHz_Ant1_NTNV



2.4g Proprietary_MCH_2440MHz_Ant1_NTNV

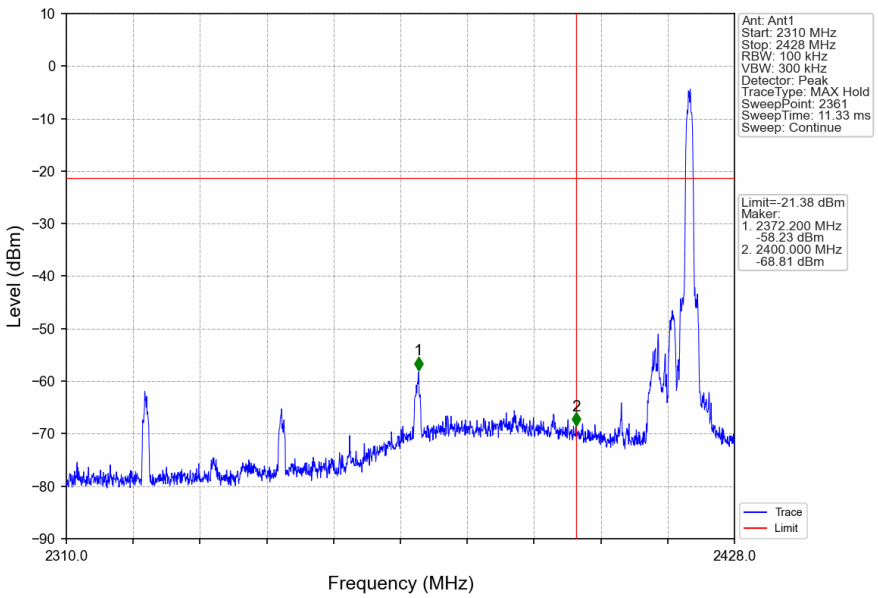


2.4g Proprietary_HCH_2465MHz_Ant1_NTNV

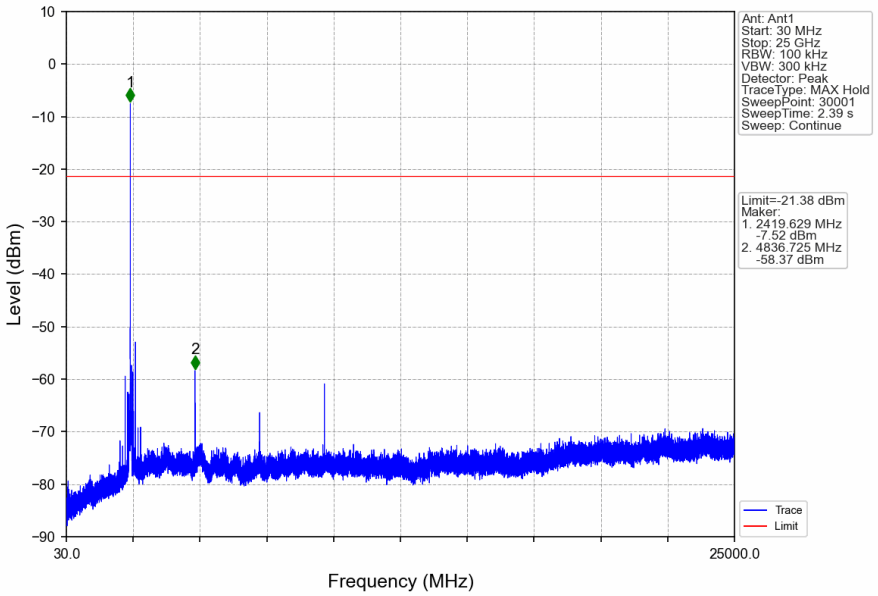


5.2.2 CSE and Band Edges

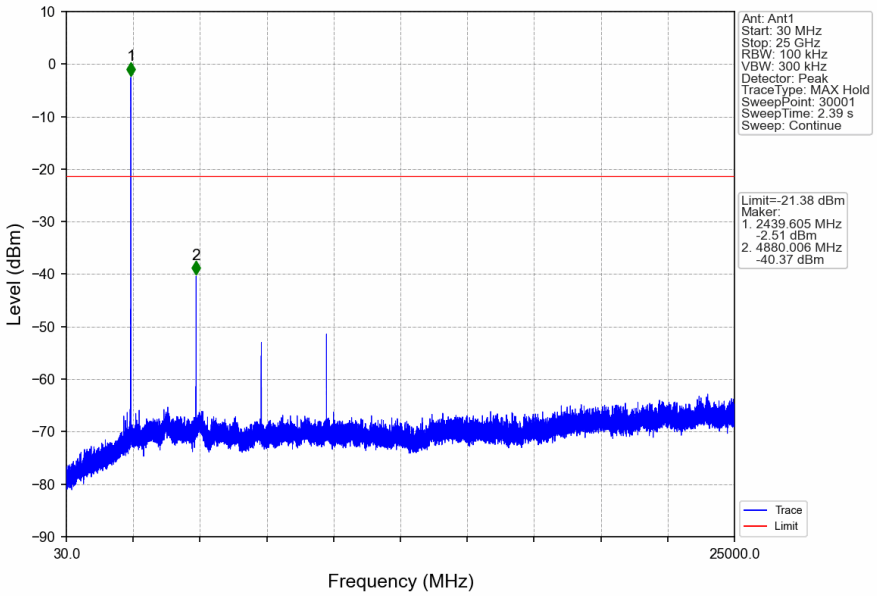
2.4g Proprietary_LCH_2420MHz_Ant1_NTNV



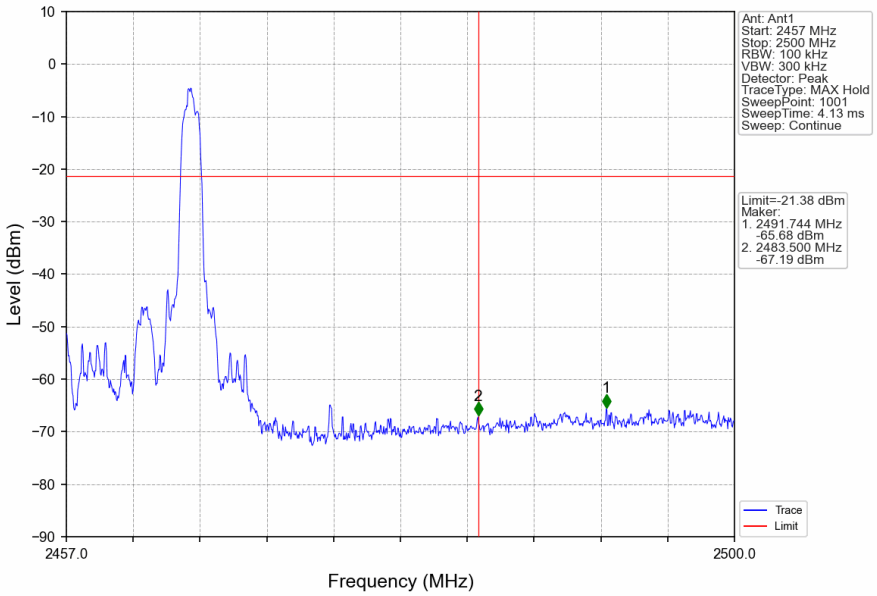
2.4g Proprietary_LCH_2420MHz_Ant1_NTNV



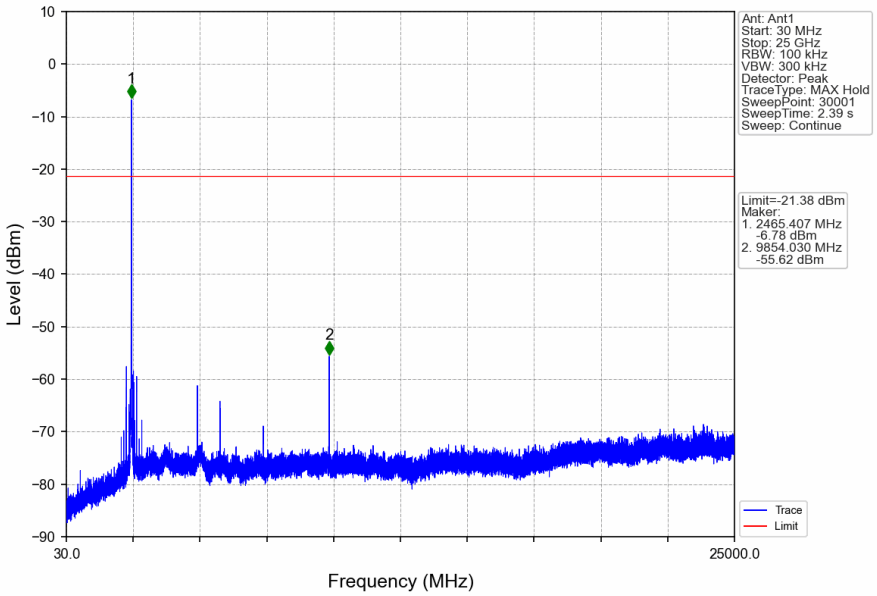
2.4g Proprietary_MCH_2440MHz_Ant1_NTNV



2.4g Proprietary_HCH_2465MHz_Ant1_NTNV



2.4g Proprietary_HCH_2465MHz_Ant1_NTNV



- End of the Report -

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