TEST REPORT

Application No.:	GZCR2110021195AT
Applicant:	Sinocare Inc.
Address of Applicant:	No.265 Guyuan Road, Hi-tech Zone, Changsha, China.
Manufacturer:	Sinocare Inc.
Address of Manufacturer:	No.265 Guyuan Road, Hi-tech Zone, Changsha, China.
Factory:	Sinocare Inc.
Address of Factory:	No.265 Guyuan Road, Hi-tech Zone, Changsha, China.
Equipment Under Test (EUT):	
EUT Name:	Continuous Glucose Monitoring System
Model No.:	i3, H3 ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2021-10-11
Date of Test:	2021-10-11 to 2021-10-18
Date of Issue:	2021-10-19
Test Result:	**Pass***

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

Kobe Jian
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		*2021-10-19*		*Original*

Authorized for issue by				
		Curry Wu/Project Engineer		
		Ricky Liu/Reviewer		

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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 Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1.3	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
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Below 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Above 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	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.

Declaration of EUT Family Grouping:

Model No.: i3, H3

Only the model i3 was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on Intended use(i3 is for patient, H3 is for medical personnel).

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3 Contents

Page

1 Cover Page 1

2 Test Summary 3

3 Contents 4

4 General Information 6

4.1 Details of E.U.T. 6
4.2 Description of Support Units 6
4.3 Measurement Uncertainty 6
4.4 Test Location 7
4.5 Test Facility 7
4.6 Deviation from Standards 8
4.7 Abnormalities from Standard Conditions 8

5 Equipment List 9

6 Radio Spectrum Technical Requirement 12

6.1 Antenna Requirement 12
6.1.1 Test Requirement: 12
6.1.2 Conclusion 12

7 Radio Spectrum Matter Test Results 13

7.1 Conducted Peak Output Power 13
7.1.1 E.U.T. Operation 13
7.1.2 Test Mode Description 13
7.1.3 Test Setup Diagram 13
7.1.4 Measurement Procedure and Data 13
7.2 Minimum 6dB Bandwidth 14
7.2.1 E.U.T. Operation 14
7.2.2 Test Mode Description 14
7.2.3 Test Setup Diagram 14
7.2.4 Measurement Procedure and Data 14
7.3 Power Spectrum Density 15
7.3.1 E.U.T. Operation 15
7.3.2 Test Mode Description 15
7.3.3 Test Setup Diagram 15
7.3.4 Measurement Procedure and Data 15
7.4 Conducted Band Edges Measurement 16
7.4.1 E.U.T. Operation 16
7.4.2 Test Mode Description 16
7.4.3 Test Setup Diagram 16
7.4.4 Measurement Procedure and Data 16
7.5 Conducted Spurious Emissions 17
7.5.1 E.U.T. Operation 17
7.5.2 Test Mode Description 17
7.5.3 Test Setup Diagram 17
7.5.4 Measurement Procedure and Data 17

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7.6 Radiated Emissions which fall in the restricted bands 18
7.6.1 E.U.T. Operation 18
7.6.2 Test Mode Description 18
7.6.3 Test Setup Diagram 18
7.6.4 Measurement Procedure and Data 19
7.7 Radiated Spurious Emissions (Below 1GHz) 24
7.7.1 E.U.T. Operation 24
7.7.2 Test Mode Description 24
7.7.3 Test Setup Diagram 24
7.7.4 Measurement Procedure and Data 25
7.8 Radiated Spurious Emissions (Above 1GHz) 28
7.8.1 E.U.T. Operation 28
7.8.2 Test Mode Description 28
7.8.3 Test Setup Diagram 29
7.8.4 Measurement Procedure and Data 30

8 Test Setup Photo 37

9 EUT Constructional Details (EUT Photos) 37

10 Appendix 38

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.0V
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 LE
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Date Rate:	1Mbps
Antenna Type:	Ceramic Antenna
Antenna Gain:	0.5dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--
The EUT has been tested as an independent unit.			

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
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
Radiated Emissions which fall in the restricted bands	±5.08dB (1GHz-6GHz);±5.14dB(above 6GHz)
Radiated Spurious Emissions (Below 1GHz)	±5.06dB (3m); ±4.46dB (10m)
Radiated Spurious Emissions (Above 1GHz)	±5.08dB (1GHz-6GHz);±5.14dB(above 6GHz)
Remark: The U_{lab} (lab Uncertainty) is less than U_{cispr} (CISPR 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.	

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4.4 Test Location

All tests were performed at:

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198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.5 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **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.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **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.

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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Conducted Peak Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2021-05-19	2022-05-18
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Minimum 6dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2020-09-17	2021-09-16
				2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Power Spectrum Density					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2020-09-17	2021-09-16
				2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Conducted Band Edges Measurement					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2020-09-17	2021-09-16
				2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Conducted Spurious Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2020-09-17	2021-09-16
				2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

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Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver(20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-01-08	2022-01-07
Chamber cable(Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna(1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
				2021-09-16	2022-09-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2021-07-29	2022-07-28
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2020-09-09	2021-09-08
				2021-09-08	2022-09-07

Radiated Spurious Emissions (Below 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Trilog Broadband Antenna(25MHz-1GHz)-Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2021-05-19	2022-05-18
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2019-12-27	2021-12-26
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
EMI Test Receiver(1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2021-05-26	2022-05-25

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Radiated Spurious Emissions (Above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver(20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-01-08	2022-01-07
Chamber cable(Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna(1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
				2021-09-16	2022-09-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2021-07-29	2022-07-28
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2020-09-09	2021-09-08
				2021-09-08	2022-09-07

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05
DMM	Fluke	73	EMC0007	2021-07-05	2022-07-05

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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

15.203 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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of 15.211, 15.213, 15.217, 15.219, 15.221, or 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

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 0.5 dBi.

Antenna location: Refer to internal photo.

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7 Radio Spectrum Matter Test Results

7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1.3
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

7.1.1 E.U.T. Operation

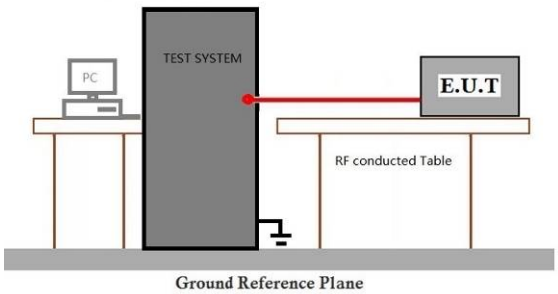
Operating Environment:

Temperature: 21.5 °C Humidity: 52.1 % RH Atmospheric Pressure: 1005 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.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details

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7.2 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

7.2.1 E.U.T. Operation

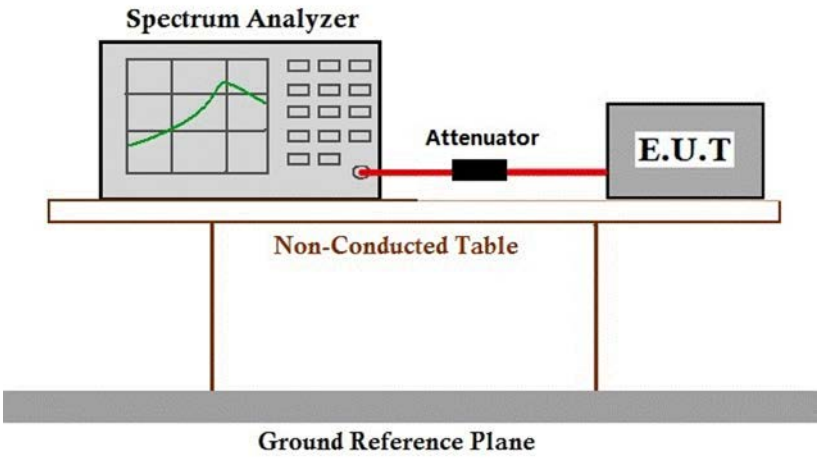
Operating Environment:

Temperature: 21.5 °C Humidity: 52.1 % RH Atmospheric Pressure: 1005 mbar

7.2.2 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.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

cable loss=0.9dB

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7.3 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

7.3.1 E.U.T. Operation

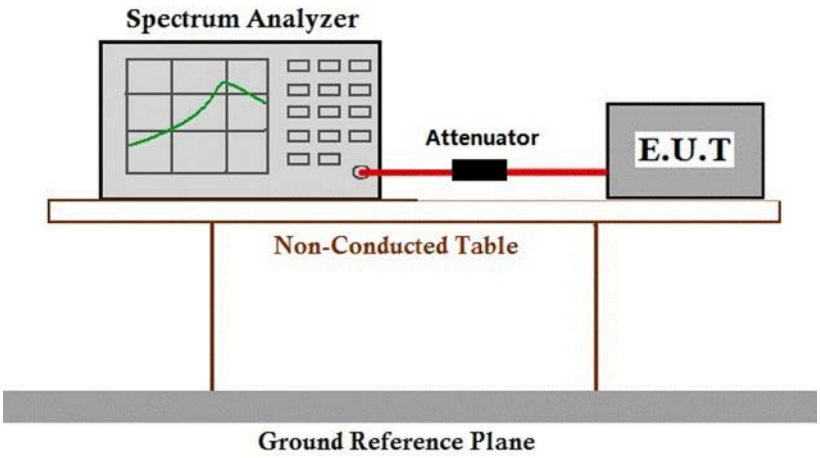
Operating Environment:

Temperature: 21.5 °C Humidity: 52.1 % RH Atmospheric Pressure: 1005 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.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

cable loss=0.9dB

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7.4 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).

7.4.1 E.U.T. Operation

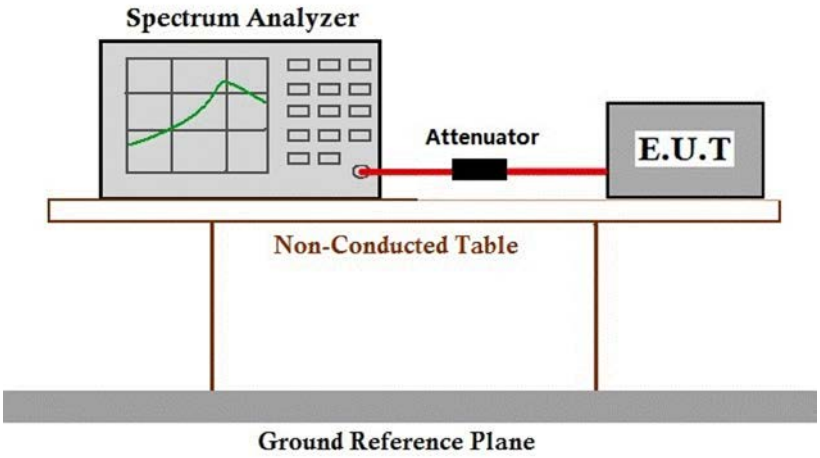
Operating Environment:

Temperature: 21.5 °C Humidity: 52.1 % RH Atmospheric Pressure: 1005 mbar

7.4.2 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.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

cable loss=0.9dB

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7.5 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).

7.5.1 E.U.T. Operation

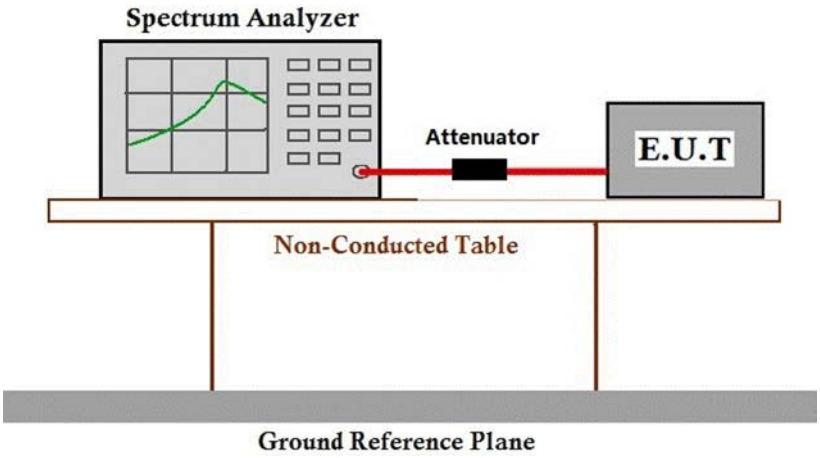
Operating Environment:

Temperature: 21.5 °C Humidity: 52.1 % RH Atmospheric Pressure: 1005 mbar

7.5.2 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.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

cable loss=0.9dB

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7.6 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 6.10.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.6.1 E.U.T. Operation

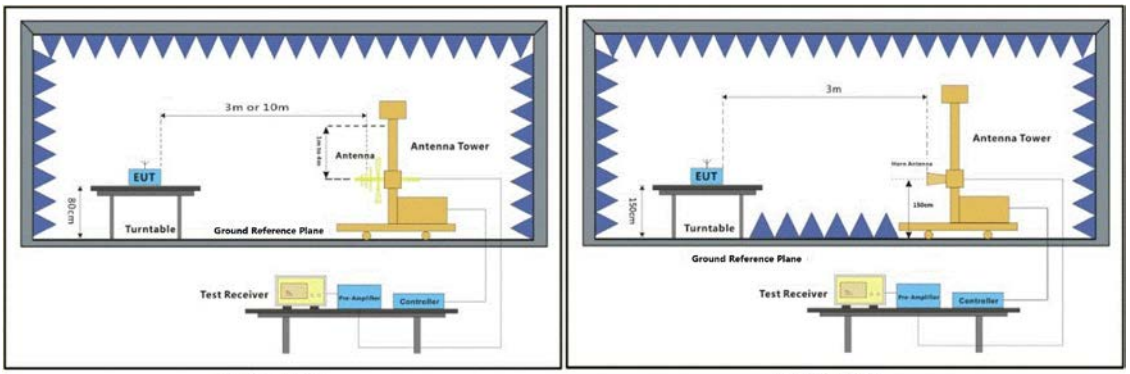
Operating Environment:

Temperature: 22.1 °C Humidity: 53.2 % RH Atmospheric Pressure: 1005 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.

7.6.3 Test Setup Diagram



30MHz-1GHz Above 1GHz

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7.6.4 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.

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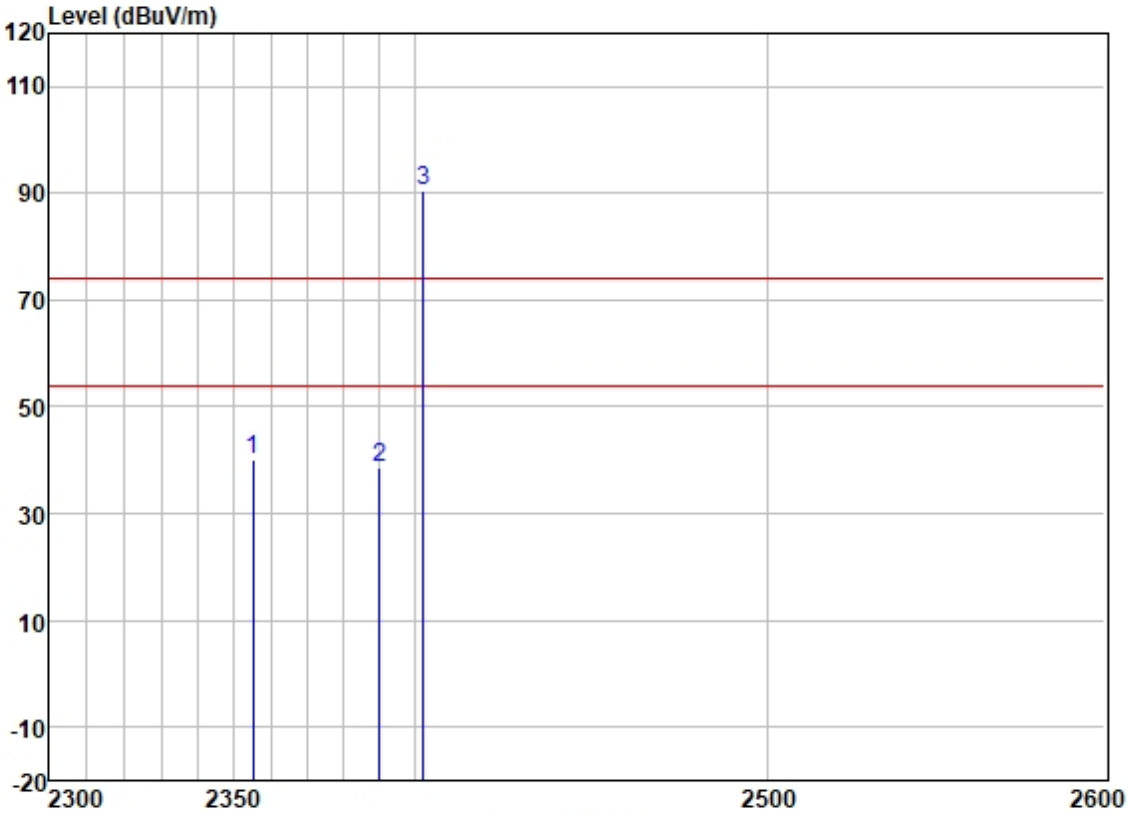
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low



race: (Discrete)

		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		2355.175	46.94	27.25	3.40	37.61	39.98	74.00	-34.02	HORIZONTAL	Peak
2		2390.000	45.28	27.33	3.48	37.59	38.50	74.00	-35.50	HORIZONTAL	Peak
3	*	2402.000	97.07	27.35	3.50	37.59	90.33	74.00	16.33	HORIZONTAL	Peak

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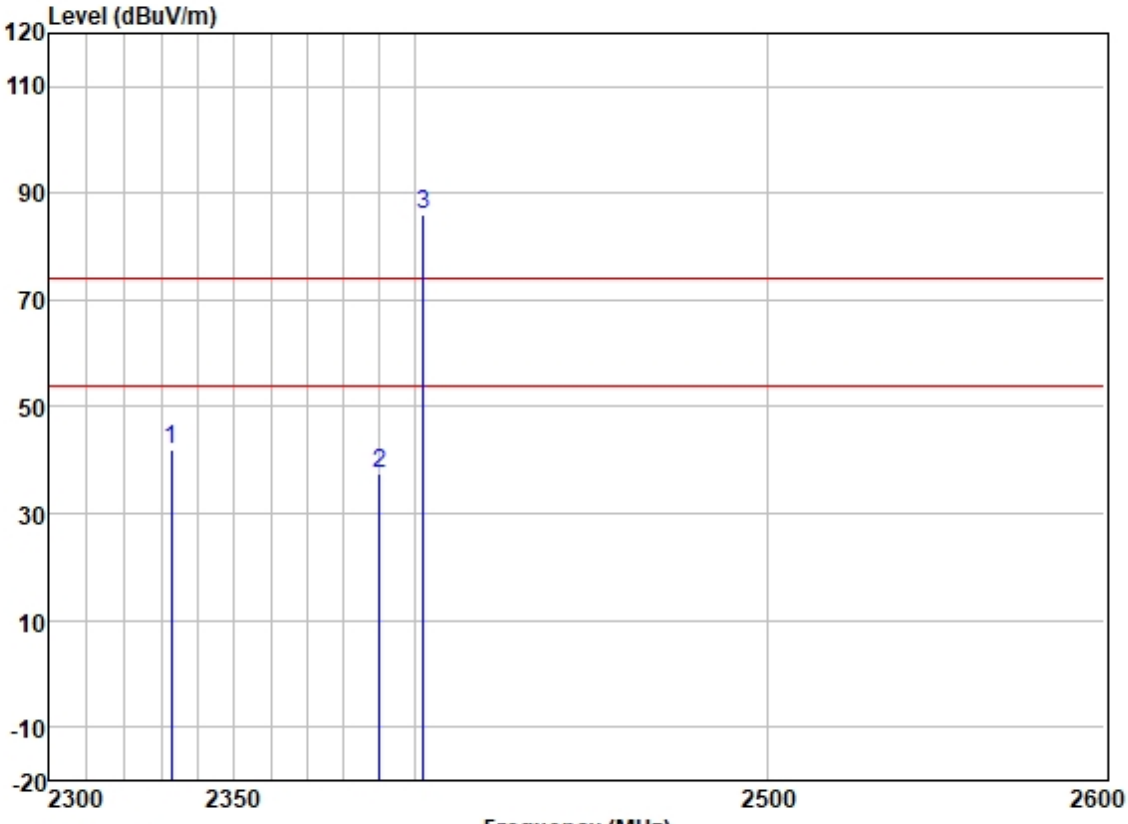
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



race: (Discrete)

		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		2332.923	48.91	27.20	3.36	37.62	41.85	74.00	-32.15	VERTICAL	Peak
2		2390.000	44.15	27.33	3.48	37.59	37.37	74.00	-36.63	VERTICAL	Peak
3	*	2402.000	92.77	27.35	3.50	37.59	86.03	74.00	12.03	VERTICAL	Peak

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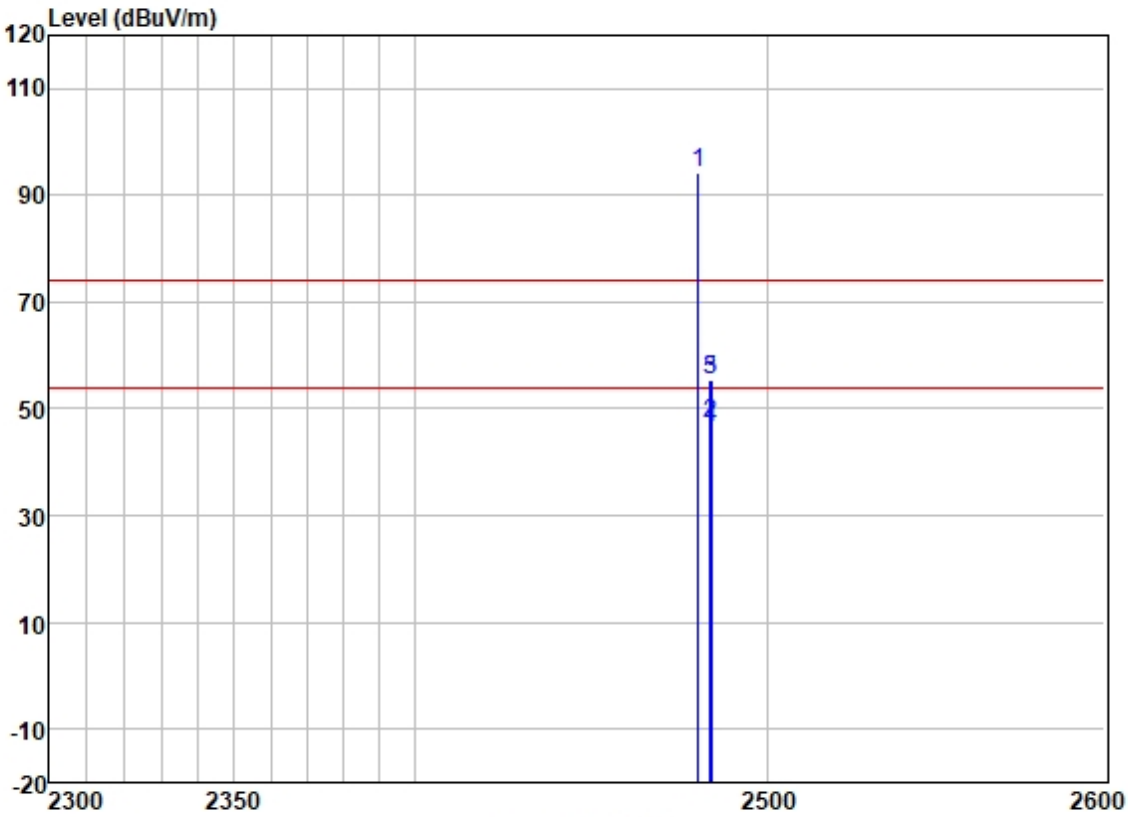
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



race: (Discrete)

		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	100.65	27.47	3.60	37.57	94.15	74.00	20.15	HORIZONTAL	Peak
2		2483.500	53.84	27.48	3.53	37.57	47.28	54.00	-6.72	HORIZONTAL	Average
3		2483.500	62.08	27.48	3.53	37.57	55.52	74.00	-18.48	HORIZONTAL	Peak
4		2483.821	52.87	27.48	3.53	37.57	46.31	54.00	-7.69	HORIZONTAL	Average
5		2483.821	61.89	27.48	3.53	37.57	55.33	74.00	-18.67	HORIZONTAL	Peak

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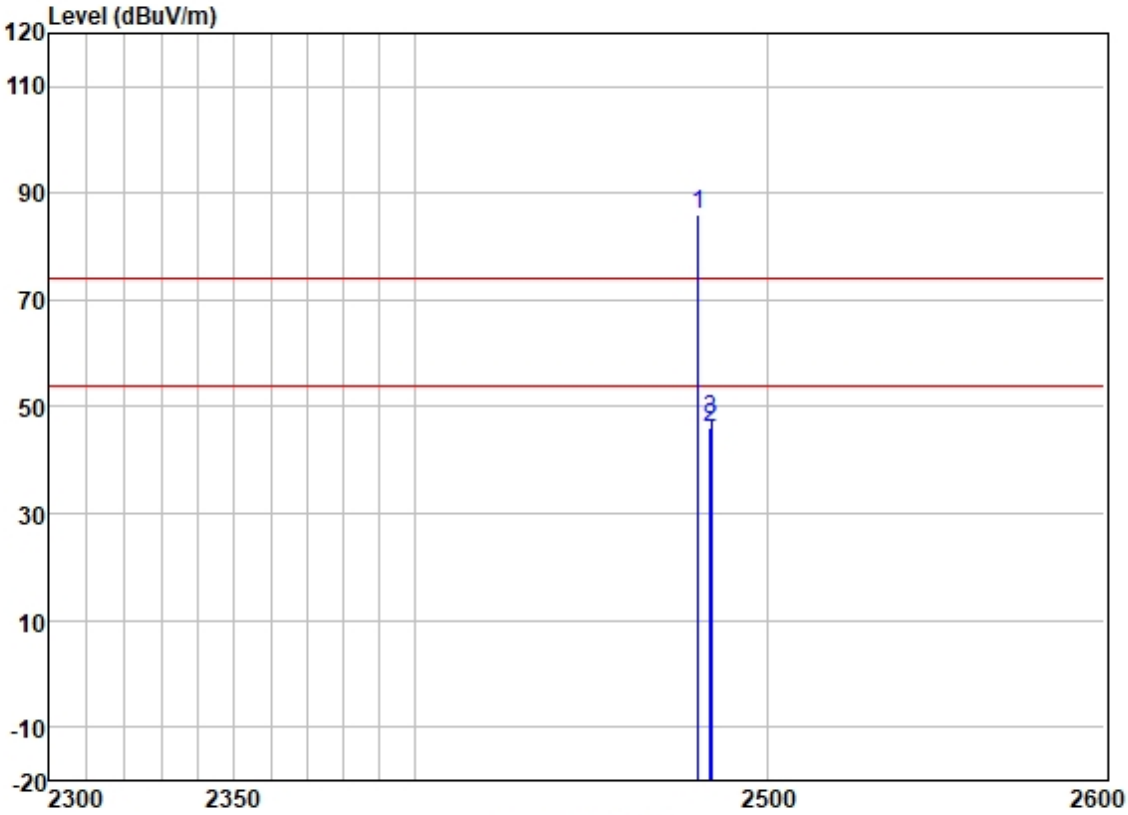
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; ; Channel:High



race: (Discrete)

		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	92.65	27.47	3.60	37.57	86.15	74.00	12.15	VERTICAL	Peak
2		2483.500	52.54	27.48	3.53	37.57	45.98	74.00	-28.02	VERTICAL	Peak
3		2483.846	54.13	27.48	3.53	37.57	47.57	74.00	-26.43	VERTICAL	Peak

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7.7 Radiated Spurious Emissions (Below 1GHz)

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

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.7.1 E.U.T. Operation

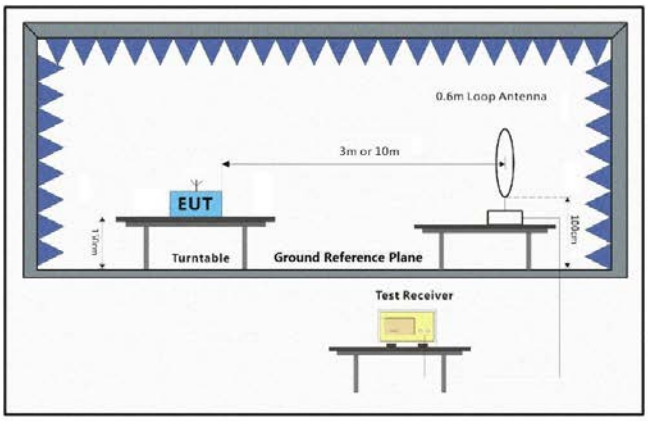
Operating Environment:

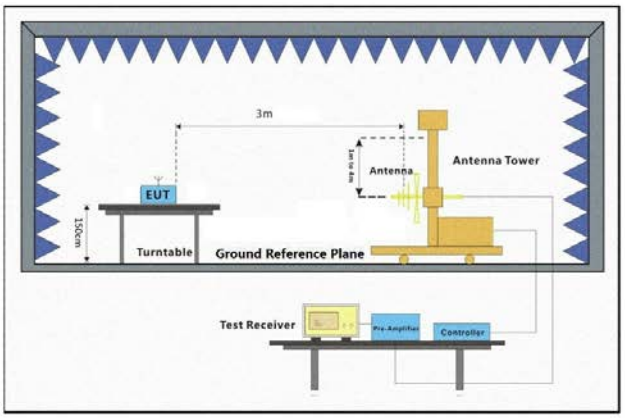
Temperature: 22.3 °C Humidity: 53.6 % RH Atmospheric Pressure: 1005 mbar

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.

7.7.3 Test Setup Diagram





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7.7.4 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 peak, quasi-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) Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

3) Scan from 9kHz to 1 GHz, 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.

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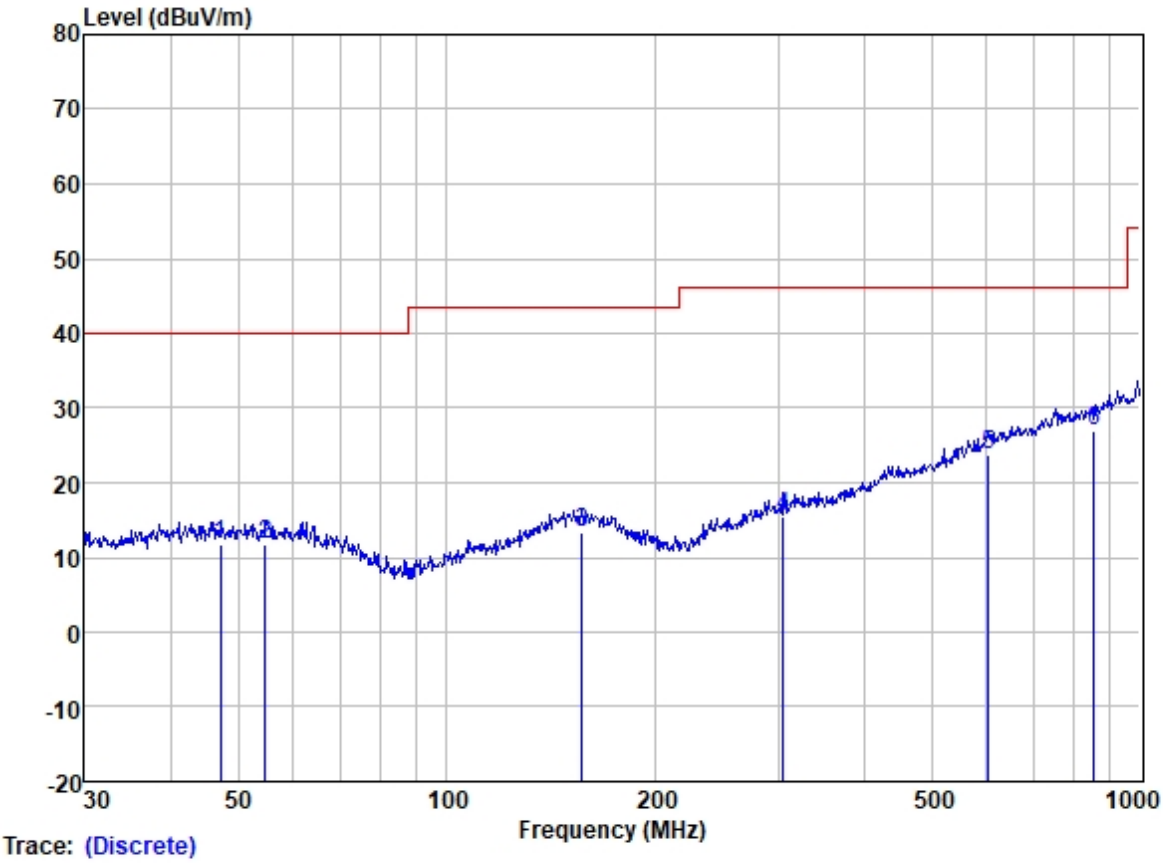
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low



Site : SGS
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	47.16	23.83	13.96	1.13	27.17	11.75	40.00	-28.25	HORIZONTAL	QP
2	54.64	24.02	13.77	1.19	27.16	11.82	40.00	-28.18	HORIZONTAL	QP
3	156.46	24.17	13.70	2.30	26.81	13.36	43.50	-30.14	HORIZONTAL	QP
4	305.68	25.21	13.73	3.21	26.58	15.57	46.00	-30.43	HORIZONTAL	QP
5	603.54	26.63	20.10	5.18	28.21	23.70	46.00	-22.30	HORIZONTAL	QP
6	857.02	25.29	22.93	6.63	27.91	26.94	46.00	-19.06	HORIZONTAL	QP

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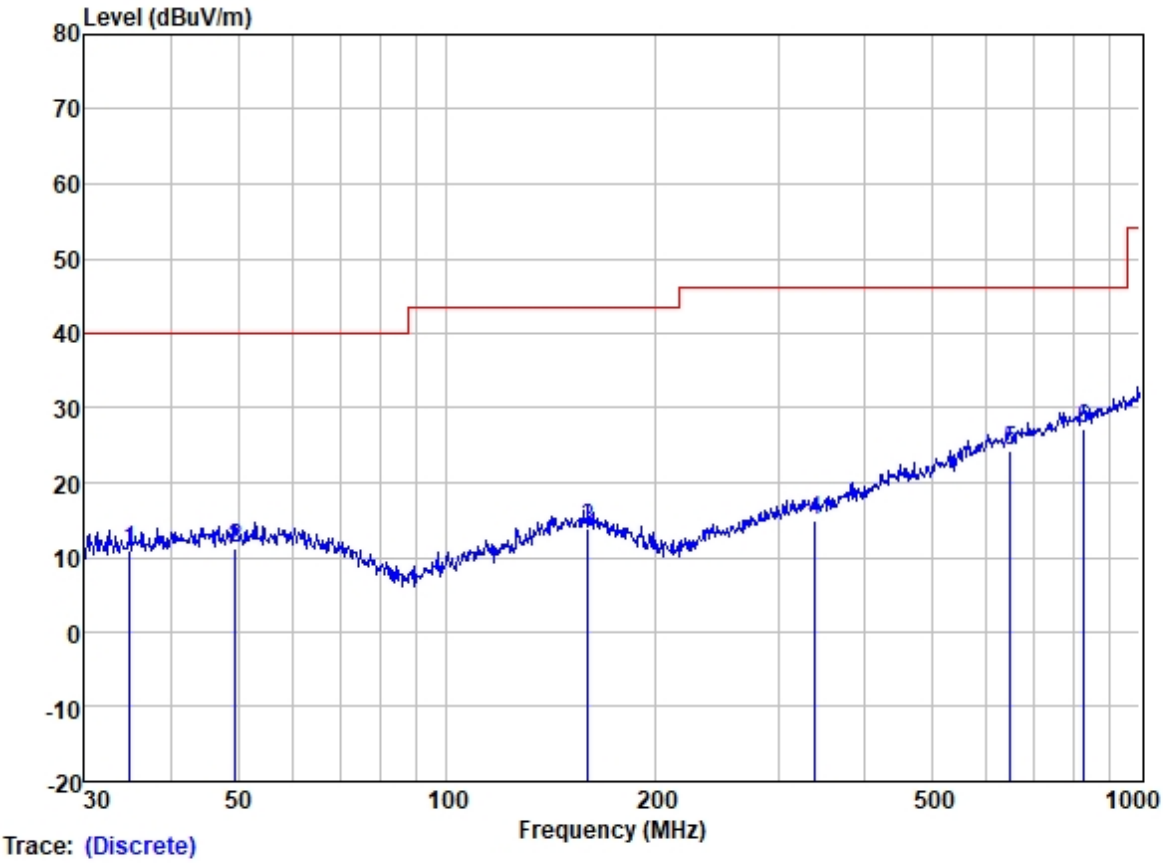
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



Site : SGS
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	dBuV		
1	34.88	24.14	12.88	1.07	27.18	10.91	40.00	-29.09	VERTICAL	QP
2	49.53	23.42	13.92	1.14	27.17	11.31	40.00	-28.69	VERTICAL	QP
3	159.78	24.72	13.60	2.33	26.80	13.85	43.50	-29.65	VERTICAL	QP
4	339.59	23.67	14.50	3.50	26.84	14.83	46.00	-31.17	VERTICAL	QP
5	649.66	26.44	20.50	5.51	28.18	24.27	46.00	-21.73	VERTICAL	QP
6	830.40	26.00	22.70	6.38	27.99	27.09	46.00	-18.91	VERTICAL	QP

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7.8 Radiated Spurious Emissions (Above 1GHz)

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

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23.1 °C Humidity: 52.4 % RH Atmospheric Pressure: 1005 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.

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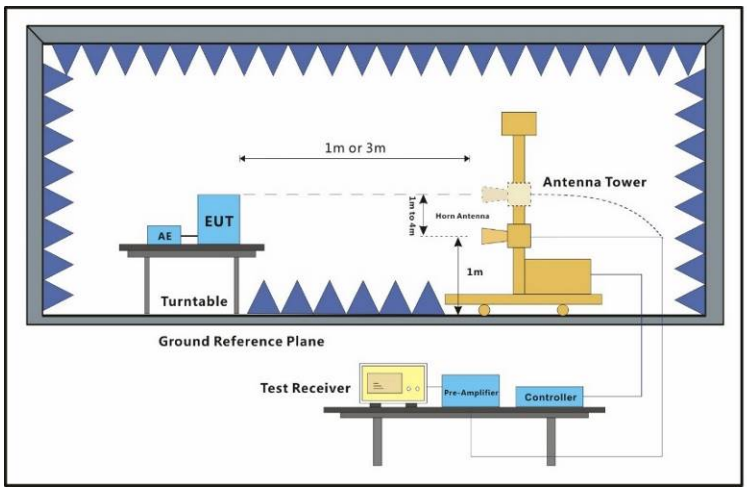
7.8.3 Test Setup Diagram



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7.8.4 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 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, quasi-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) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier 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) 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.

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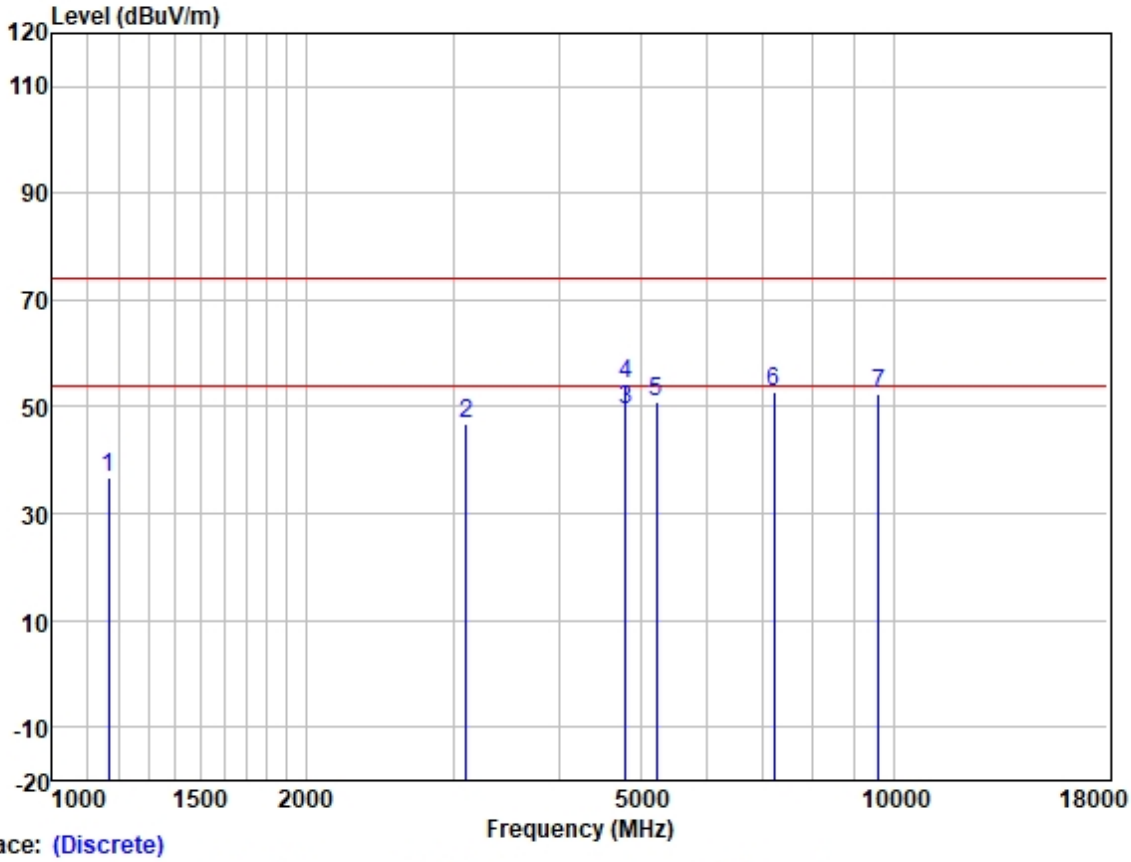
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	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	1167.162	48.12	24.54	2.39	38.40	36.65	74.00	-37.35	HORIZONTAL	Peak
2	3104.655	51.70	28.48	3.91	37.16	46.93	74.00	-27.07	HORIZONTAL	Peak
3	4804.000	49.63	31.42	5.40	36.83	49.62	54.00	-4.38	HORIZONTAL	Average
4	4804.000	54.22	31.42	5.40	36.83	54.21	74.00	-19.79	HORIZONTAL	Peak
5	5233.401	50.23	31.75	5.74	36.87	50.85	74.00	-23.15	HORIZONTAL	Peak
6	7206.000	48.53	35.54	5.98	37.38	52.67	74.00	-21.33	HORIZONTAL	Peak
7	9608.000	44.30	38.37	7.07	37.42	52.32	74.00	-21.68	HORIZONTAL	Peak

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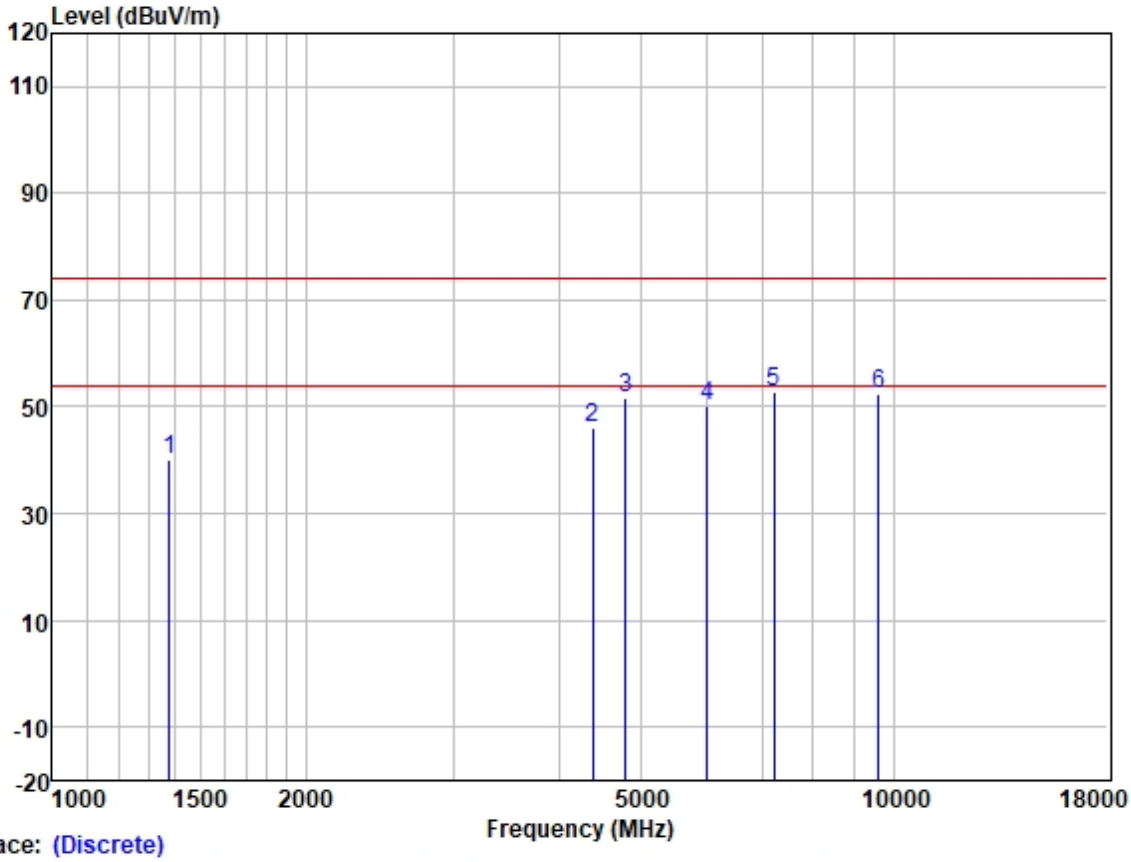
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	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	1378.149	50.33	25.36	2.60	38.25	40.04	74.00	-33.96	VERTICAL	Peak
2	4387.375	47.67	30.66	4.70	36.81	46.22	74.00	-27.78	VERTICAL	Peak
3	4804.110	51.71	31.42	5.40	36.83	51.70	74.00	-22.30	VERTICAL	Peak
4	6006.216	48.57	32.40	6.20	36.90	50.27	74.00	-23.73	VERTICAL	Peak
5	7206.000	48.77	35.54	5.98	37.38	52.91	74.00	-21.09	VERTICAL	Peak
6	9608.000	44.40	38.37	7.07	37.42	52.42	74.00	-21.58	VERTICAL	Peak

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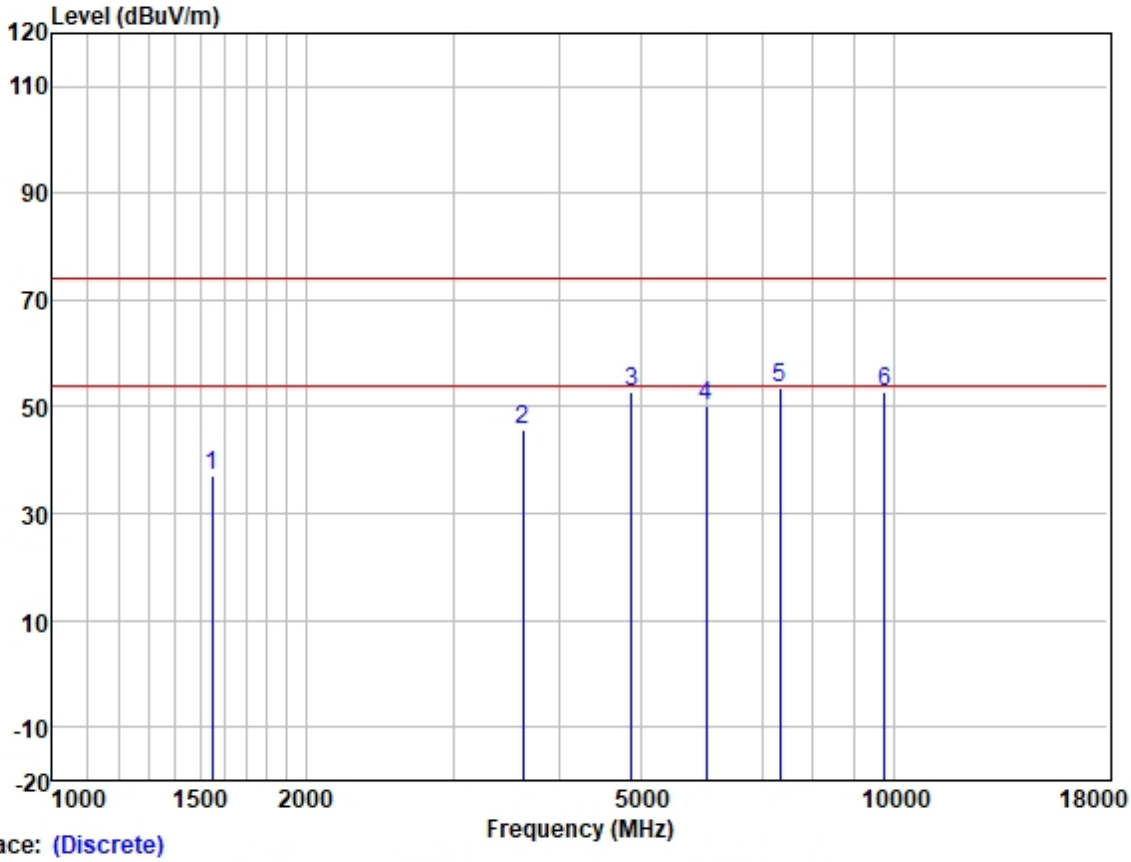
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	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	1547.388	46.70	25.53	2.80	38.03	37.00	74.00	-37.00	HORIZONTAL	Peak
2	3624.510	48.97	29.09	4.51	36.90	45.67	74.00	-28.33	HORIZONTAL	Peak
3	4880.000	52.73	31.54	5.50	36.84	52.93	74.00	-21.07	HORIZONTAL	Peak
4	5988.362	48.52	32.39	6.15	36.90	50.16	74.00	-23.84	HORIZONTAL	Peak
5	7320.000	48.91	36.00	6.13	37.43	53.61	74.00	-20.39	HORIZONTAL	Peak
6	9760.000	44.87	38.50	7.02	37.41	52.98	74.00	-21.02	HORIZONTAL	Peak

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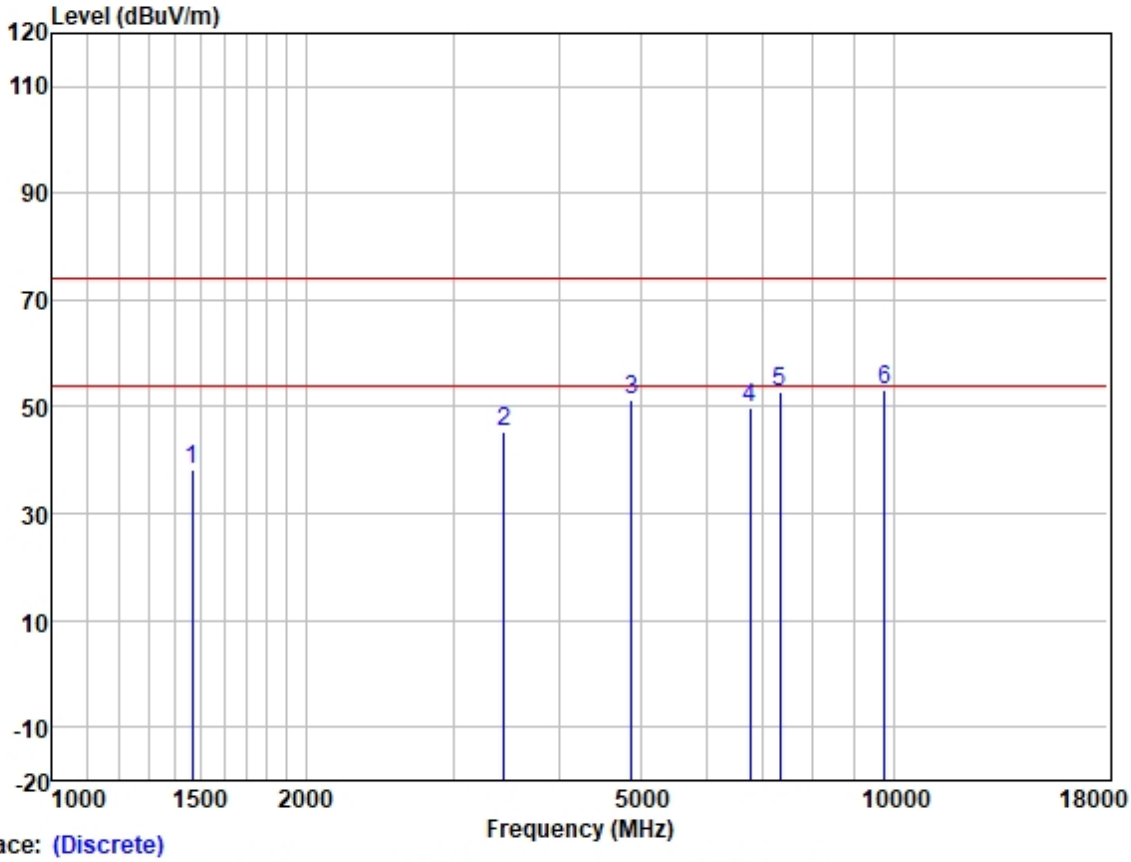
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	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	1466.713	48.12	25.47	2.75	38.13	38.21	74.00	-35.79	VERTICAL	Peak
2	3446.878	49.33	28.87	4.18	36.96	45.42	74.00	-28.58	VERTICAL	Peak
3	4880.000	50.96	31.54	5.50	36.84	51.16	74.00	-22.84	VERTICAL	Peak
4	6750.113	46.65	34.56	5.82	37.10	49.93	74.00	-24.07	VERTICAL	Peak
5	7320.000	48.08	36.00	6.13	37.43	52.78	74.00	-21.22	VERTICAL	Peak
6	9760.000	45.22	38.50	7.02	37.41	53.33	74.00	-20.67	VERTICAL	Peak

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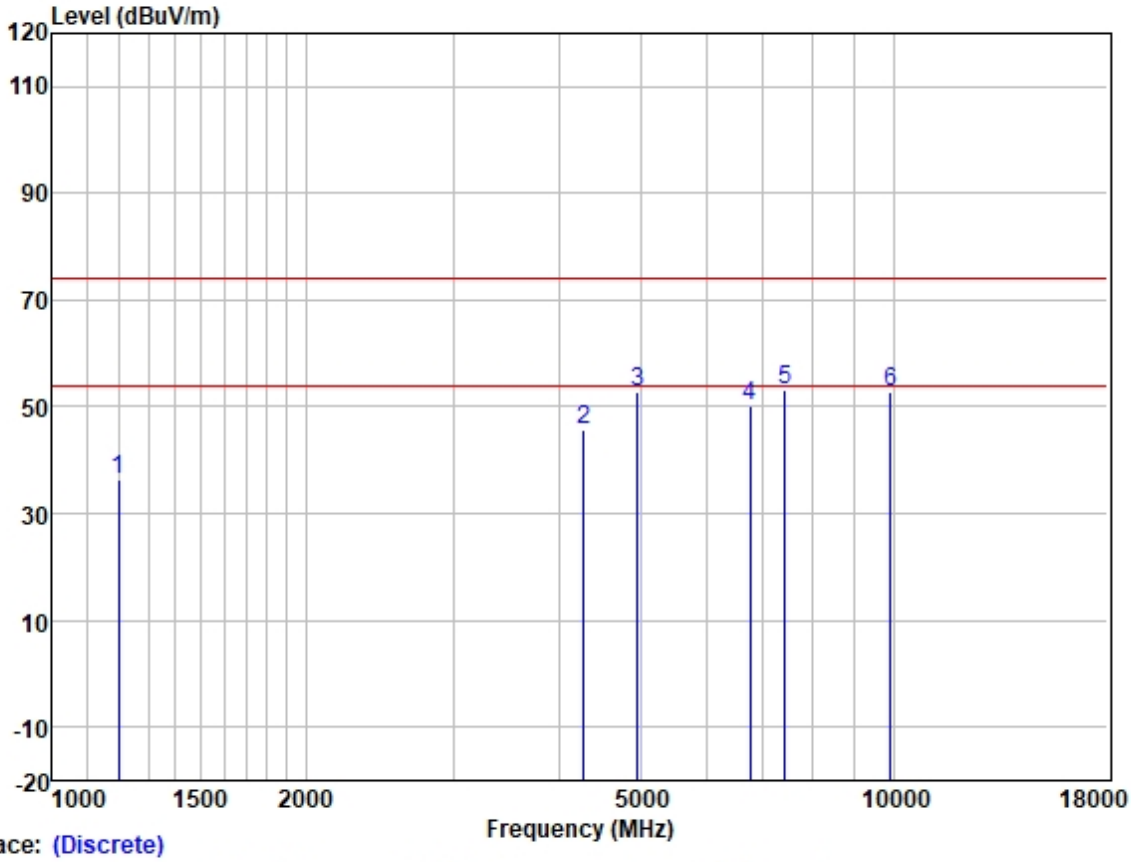
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



race: (Discrete)

	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	1199.723	47.58	24.68	2.34	38.39	36.21	74.00	-37.79	HORIZONTAL	Peak
2	4284.404	47.35	30.42	4.63	36.81	45.59	74.00	-28.41	HORIZONTAL	Peak
3	4960.000	52.51	31.65	5.65	36.84	52.97	74.00	-21.03	HORIZONTAL	Peak
4	6759.068	46.73	34.56	5.82	37.10	50.01	74.00	-23.99	HORIZONTAL	Peak
5	7440.000	48.30	36.27	6.22	37.47	53.32	74.00	-20.68	HORIZONTAL	Peak
6	9920.000	44.52	38.65	6.96	37.40	52.73	74.00	-21.27	HORIZONTAL	Peak

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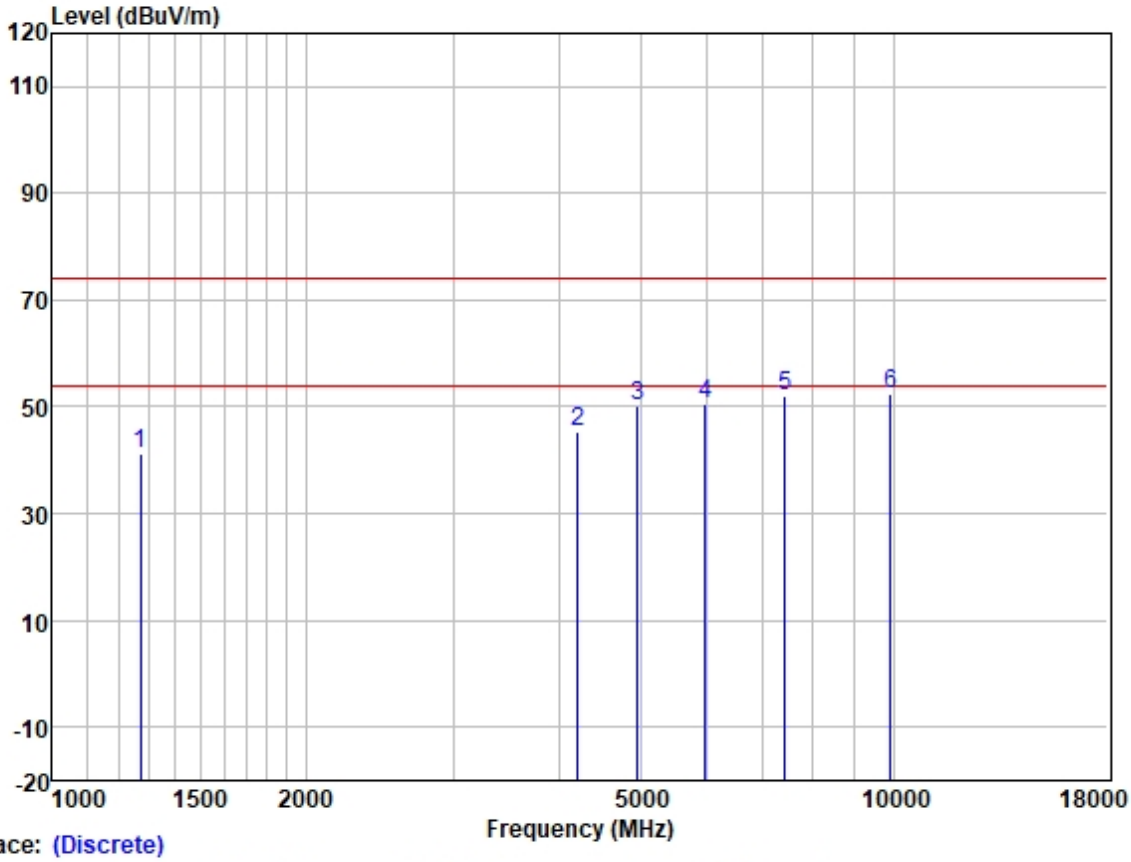
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; ; Channel:High



race: (Discrete)

	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	1274.346	51.80	25.12	2.48	38.33	41.07	74.00	-32.93	VERTICAL	Peak
2	4209.765	47.41	30.18	4.60	36.81	45.38	74.00	-28.62	VERTICAL	Peak
3	4960.000	49.87	31.65	5.65	36.84	50.33	74.00	-23.67	VERTICAL	Peak
4	5969.628	48.86	32.37	6.10	36.90	50.43	74.00	-23.57	VERTICAL	Peak
5	7440.000	46.98	36.27	6.22	37.47	52.00	74.00	-22.00	VERTICAL	Peak
6	9920.000	44.40	38.65	6.96	37.40	52.61	74.00	-21.39	VERTICAL	Peak

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8 Test Setup Photo

Refer to Appendix –Setup Photos for GZCR2110021195AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for GZCR2110021195AT

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10 Appendix

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	0.391	0.625	62.56	2.04	0.00
		2440	0.391	0.625	62.56	2.04	0.00
		2480	0.391	0.625	62.56	2.04	0.00

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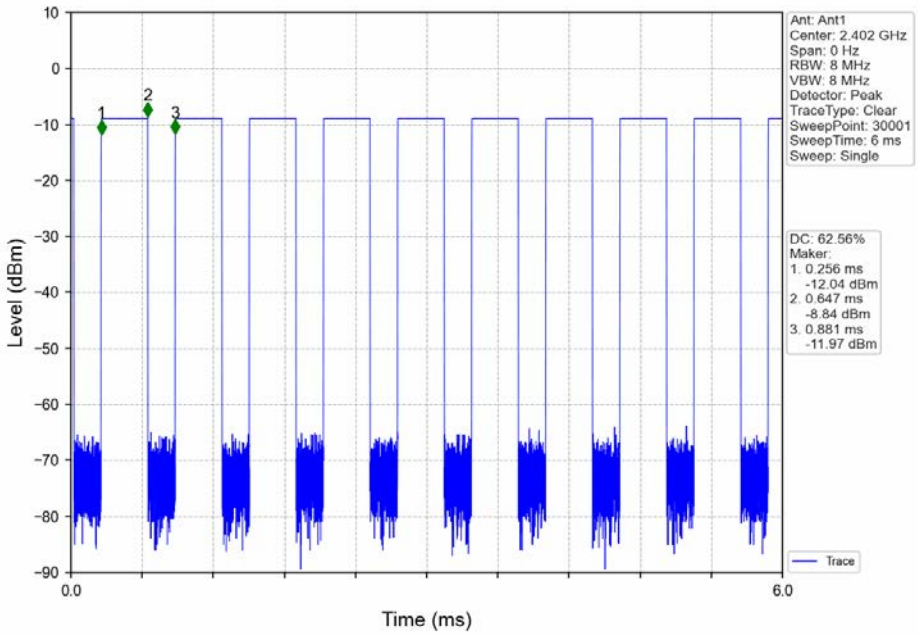
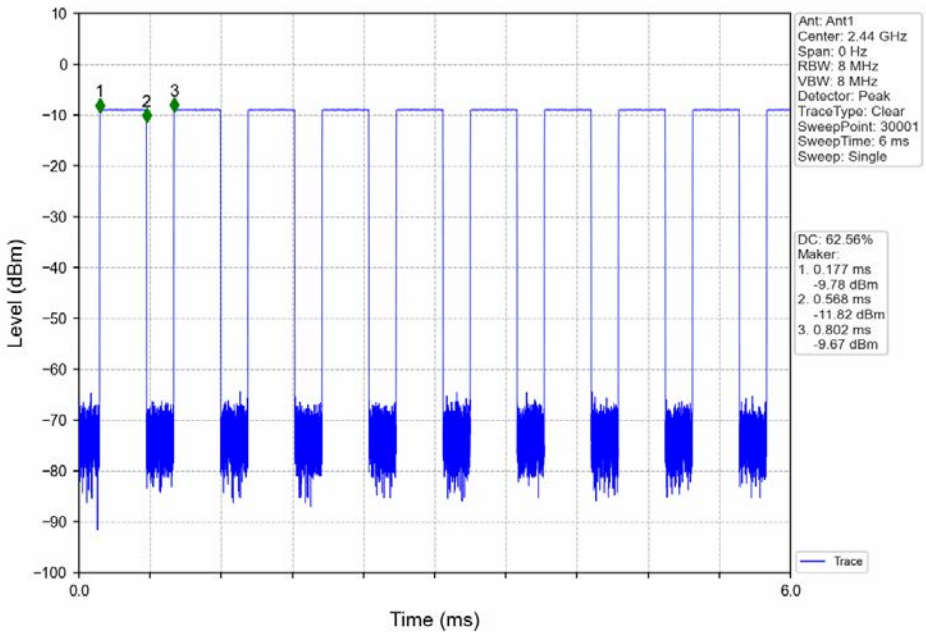
1.1.2 Test Graph

1M_LCH_2402MHz_DataRate=_Ant1_NTNV



1M_MCH_2440MHz_DataRate=_Ant1_NTNV



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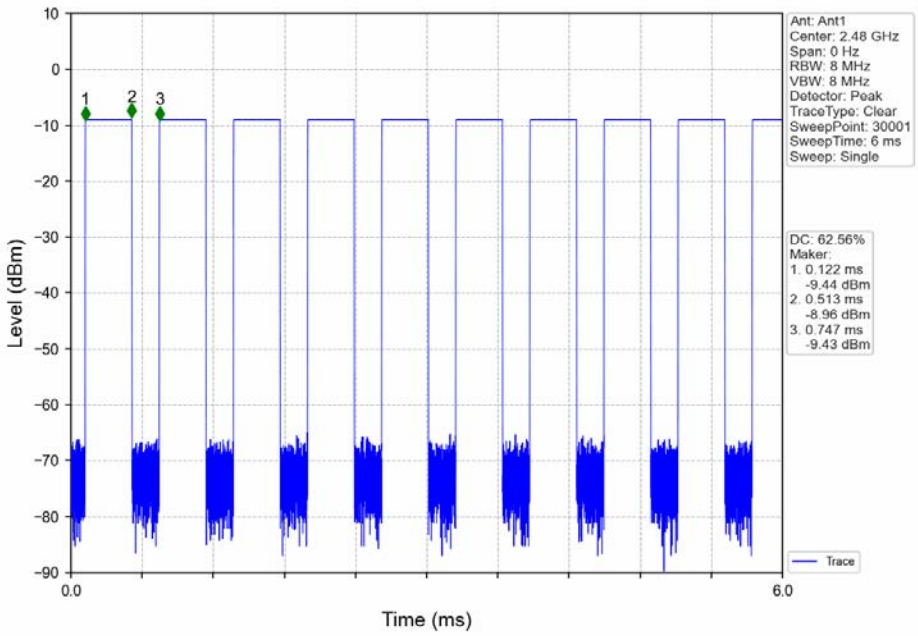
1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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2. Bandwidth

2.1 OBW

2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz)	Verdict
				Result	
1M	SISO	2402	1	1.048	Pass
		2440	1	1.051	Pass
		2480	1	1.052	Pass

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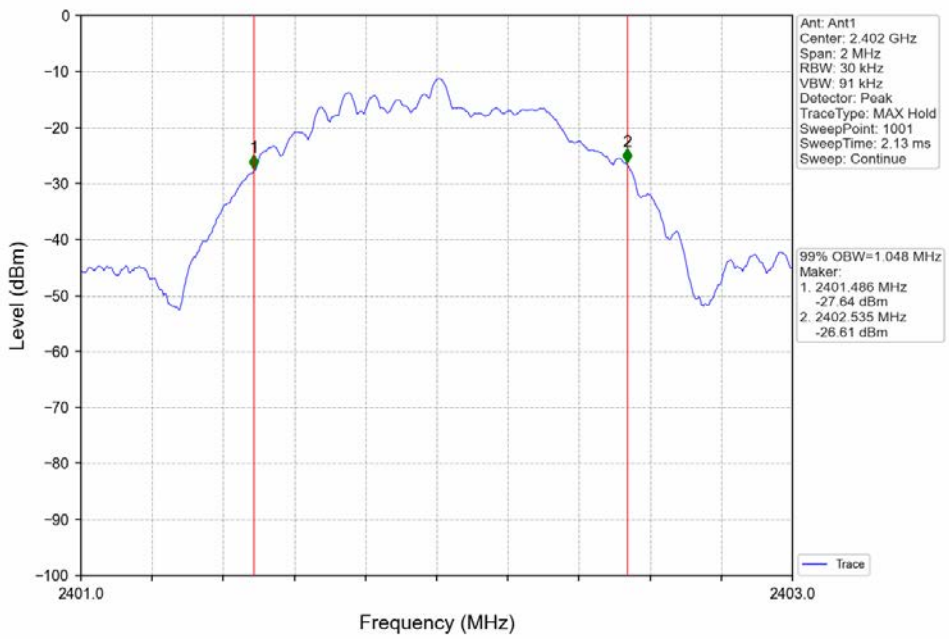
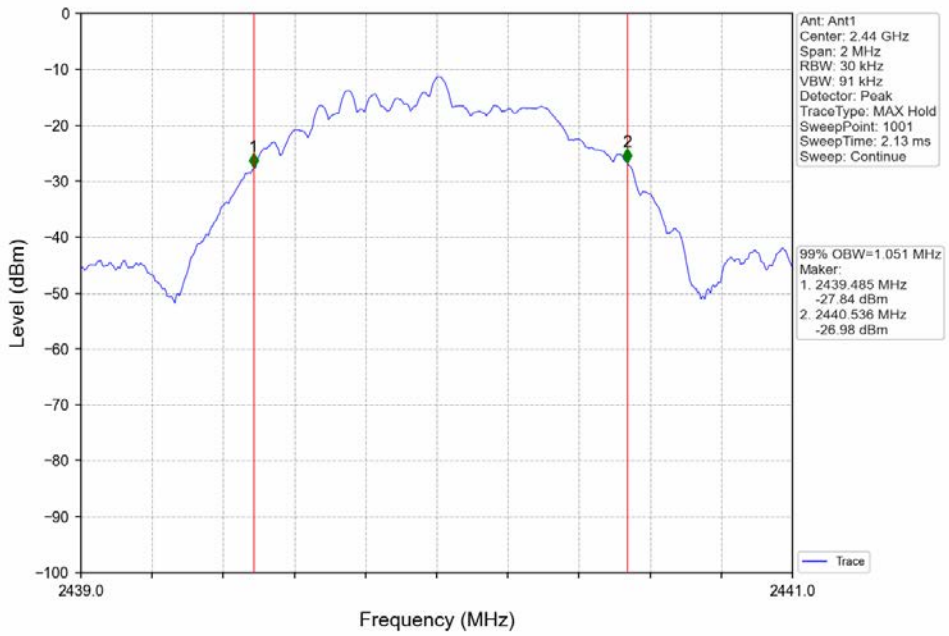
2.1.2 Test Graph

1M_LCH_2402MHz_DataRate=_Ant1_NTNV



1M_MCH_2440MHz_DataRate=_Ant1_NTNV



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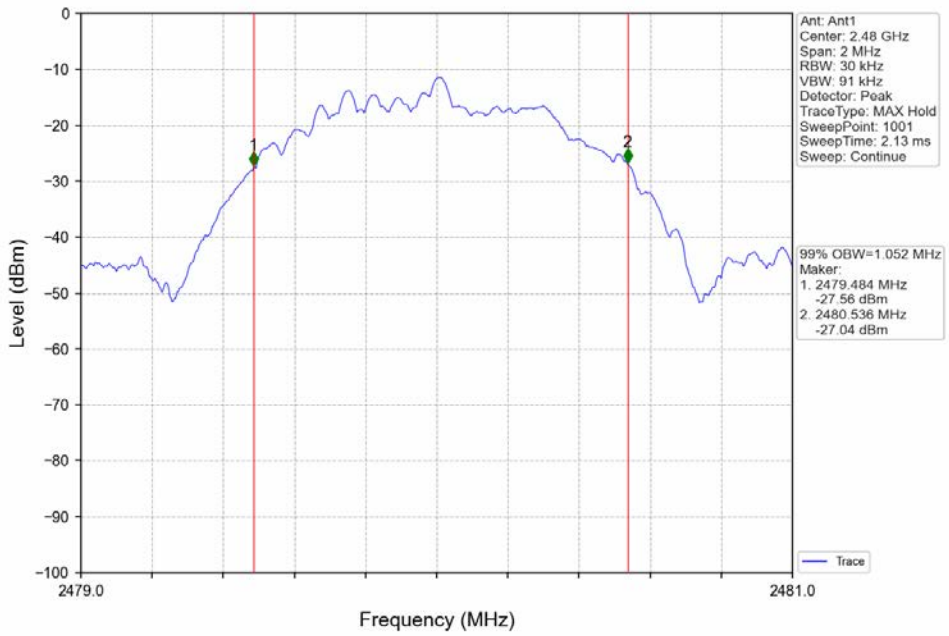
1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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2.2 6dB BW

2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.692	>=0.5	Pass
		2440	1	0.695	>=0.5	Pass
		2480	1	0.698	>=0.5	Pass

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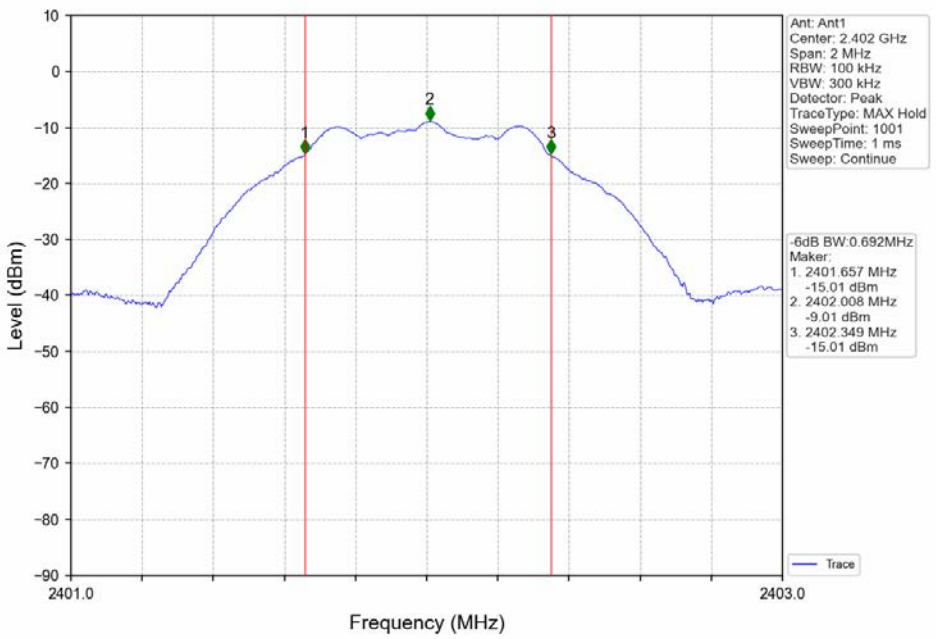
2.2.2 Test Graph

1M_LCH_2402MHz_DataRate=_Ant1_NTNV



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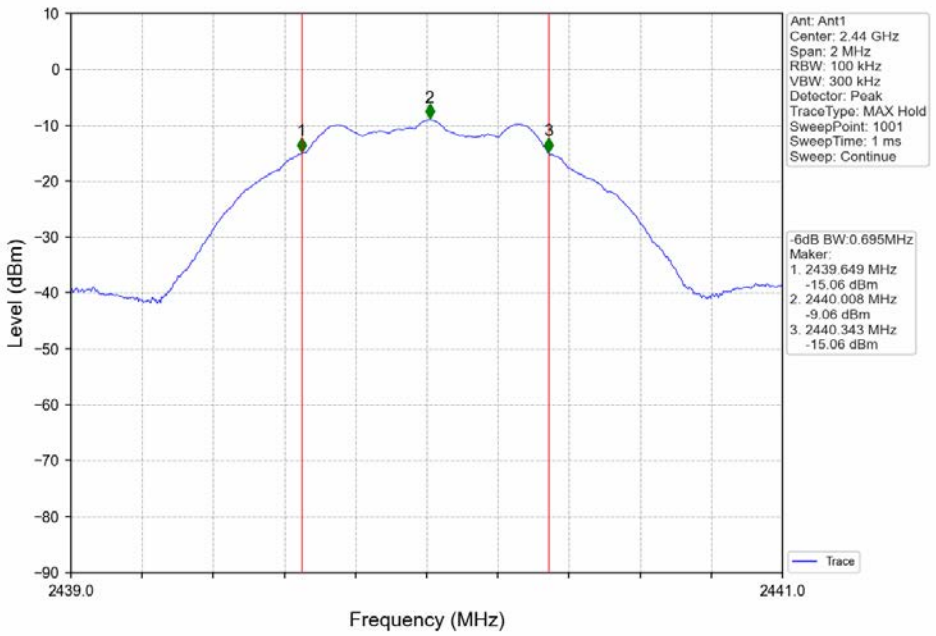

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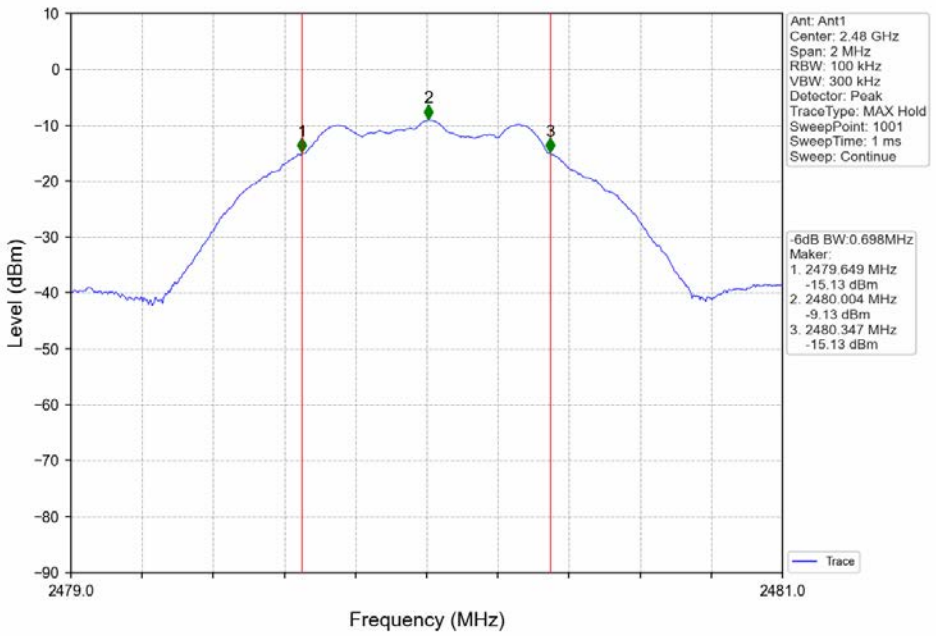
1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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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	-8.89	<=30	Pass
		2440	-8.95	<=30	Pass
		2480	-9.01	<=30	Pass

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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	-24.28	<=8	Pass
		2440	-24.32	<=8	Pass
		2480	-24.44	<=8	Pass

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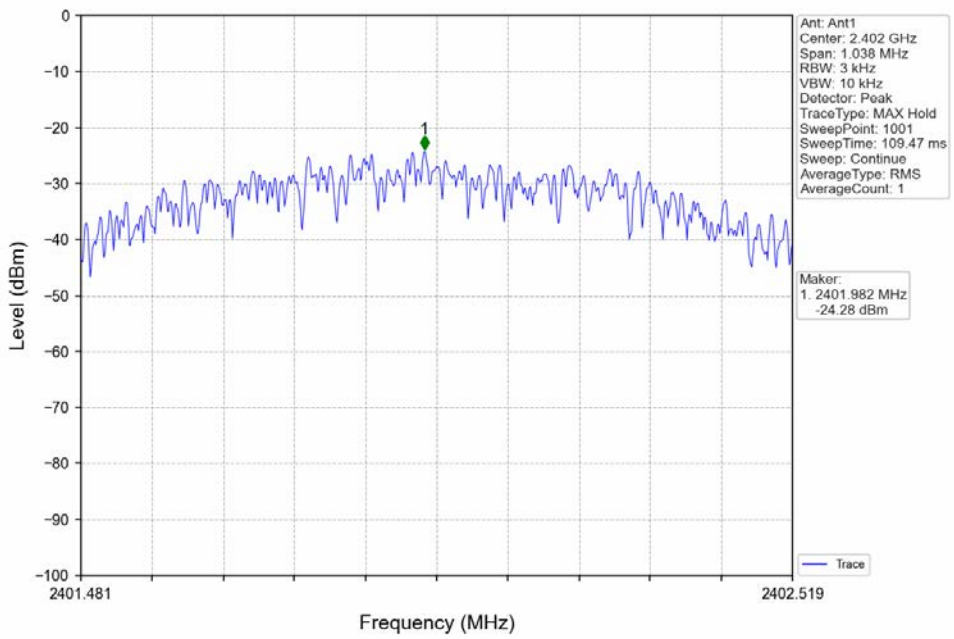
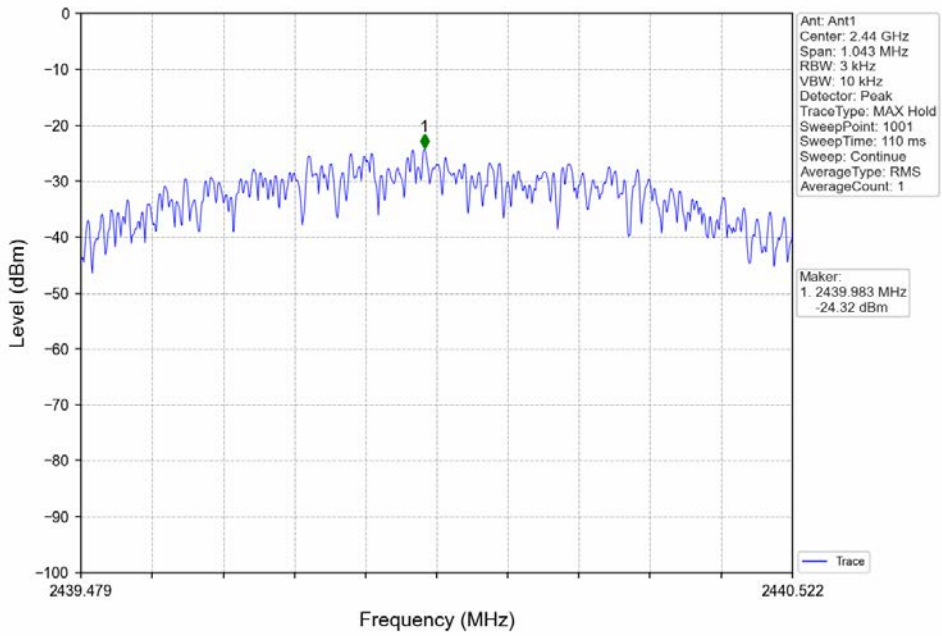
4.1.2 Test Graph

1M_LCH_2402MHz_DataRate=_Ant1_NTNV



1M_MCH_2440MHz_DataRate=_Ant1_NTNV



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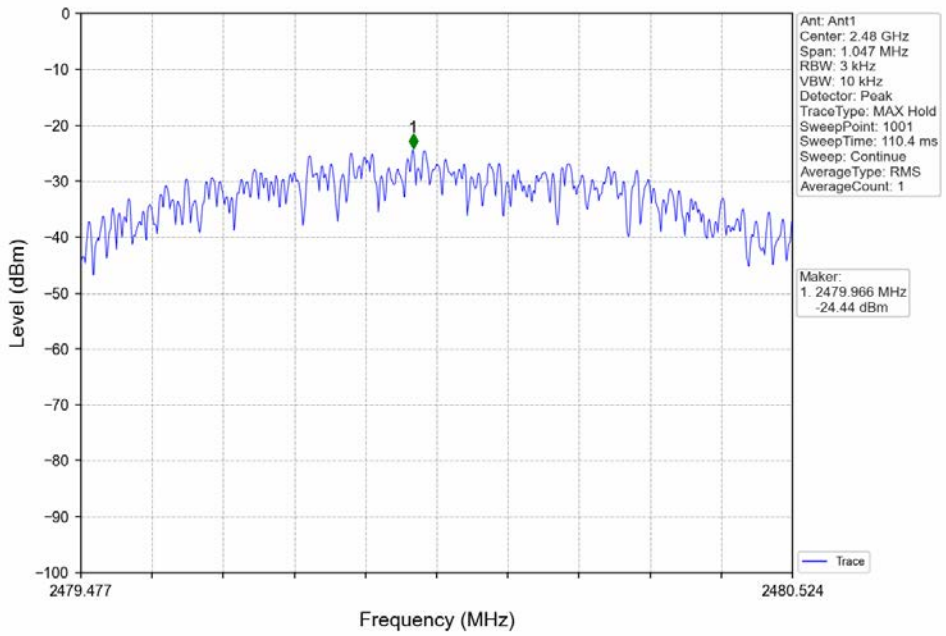
1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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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	-9.03
		2440	1	-9.06
		2480	1	-9.14
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.				

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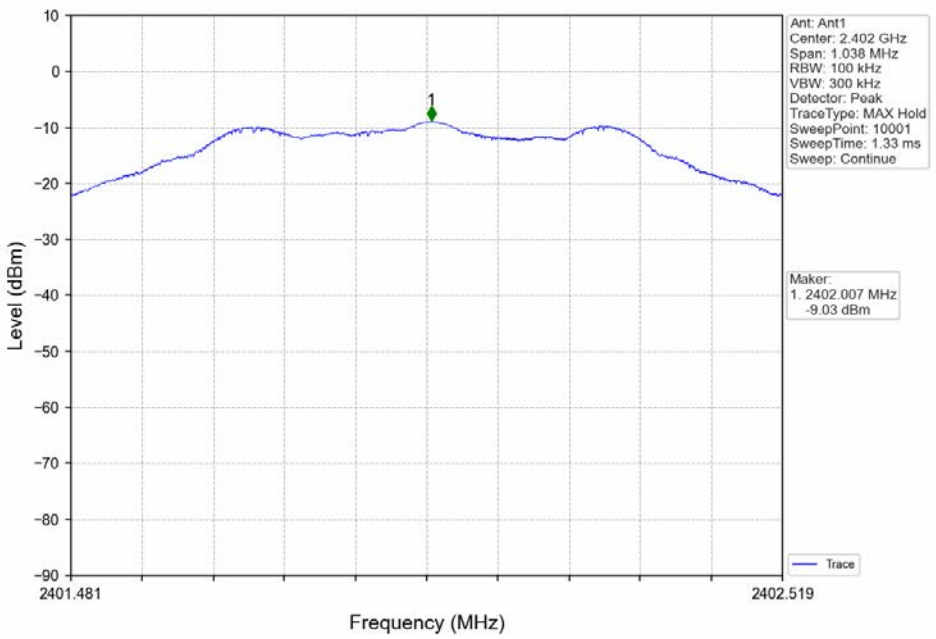
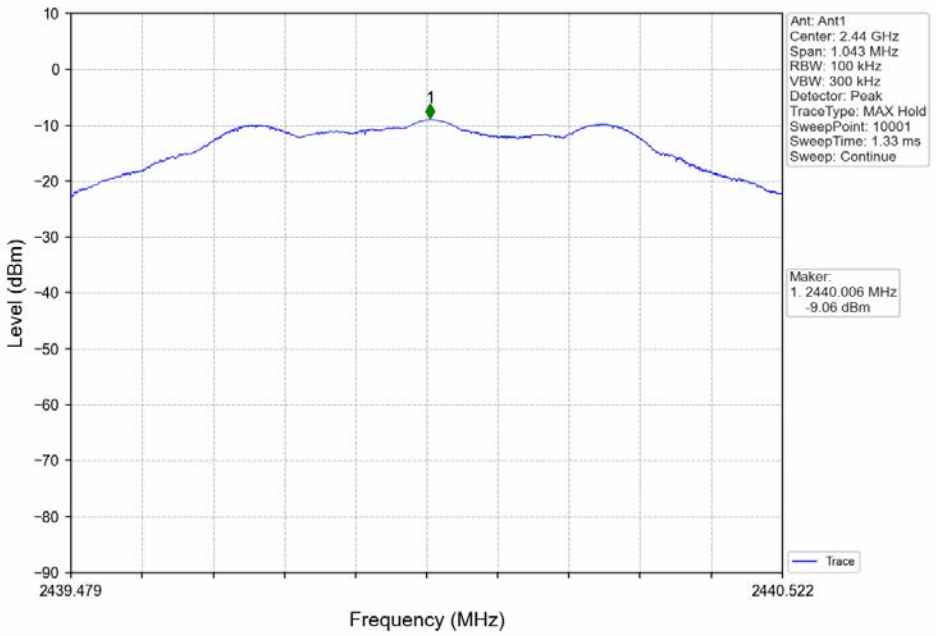
5.1.2 Test Graph

1M_LCH_2402MHz_DataRate=_Ant1_NTNV



1M_MCH_2440MHz_DataRate=_Ant1_NTNV



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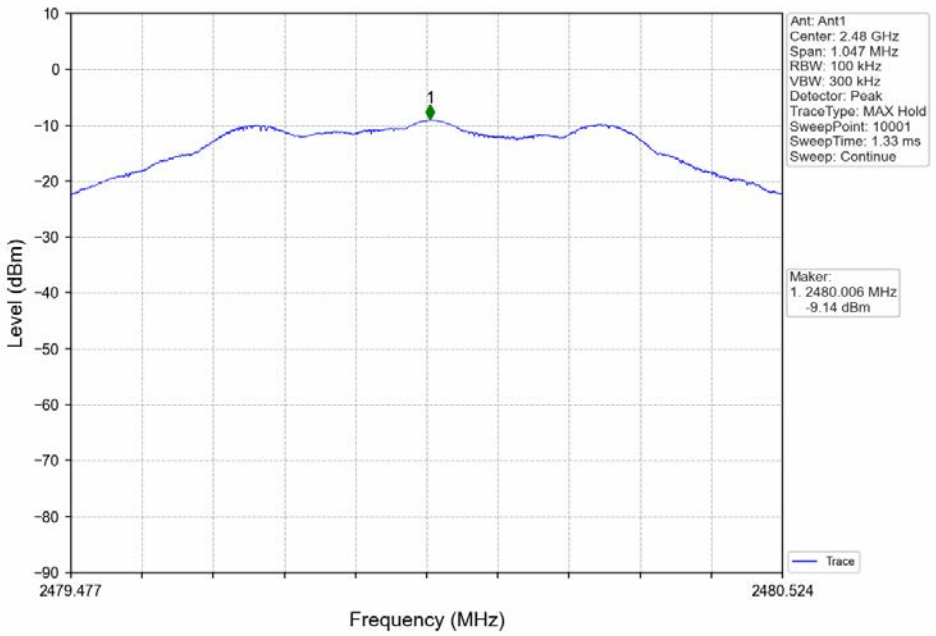
1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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5.2 CSE

5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-9.03	-29.03	Pass
		2440	1	-9.03	-29.03	Pass
		2480	1	-9.03	-29.03	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.						

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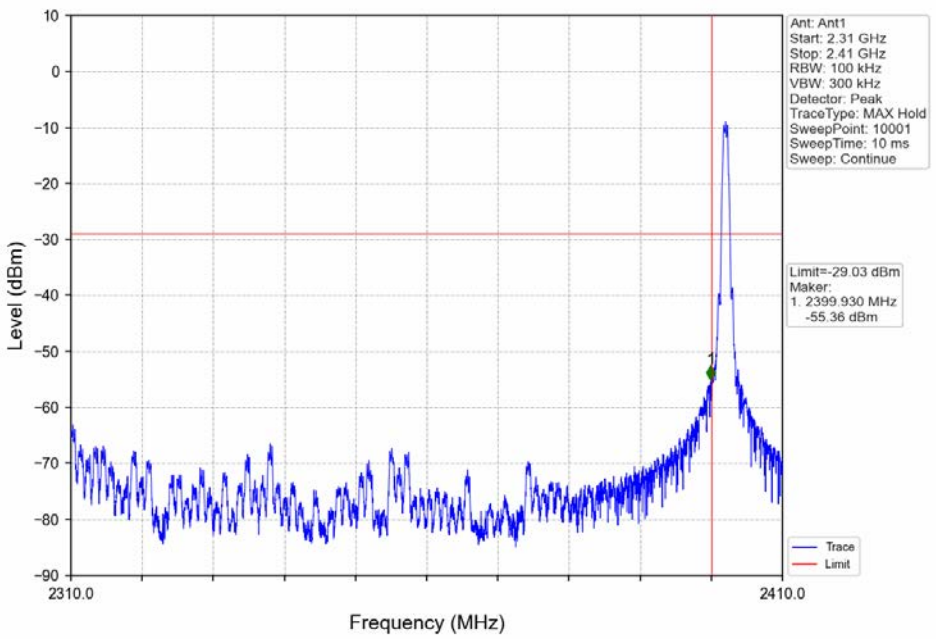
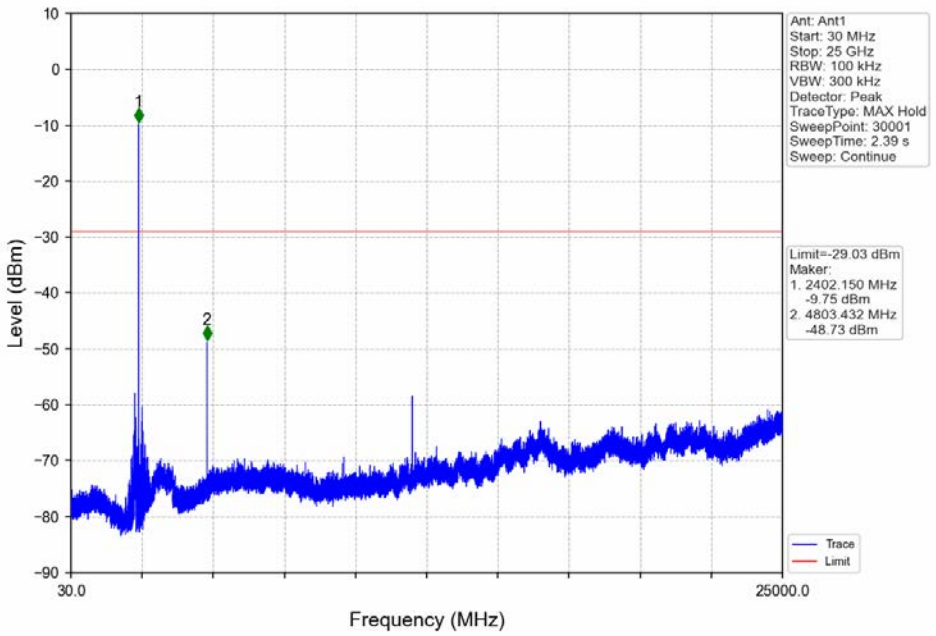
5.2.2 Test Graph

1M_LCH_2402MHz_DataRate=_Ant1_NTNV



1M_LCH_2402MHz_DataRate=_Ant1_NTNV



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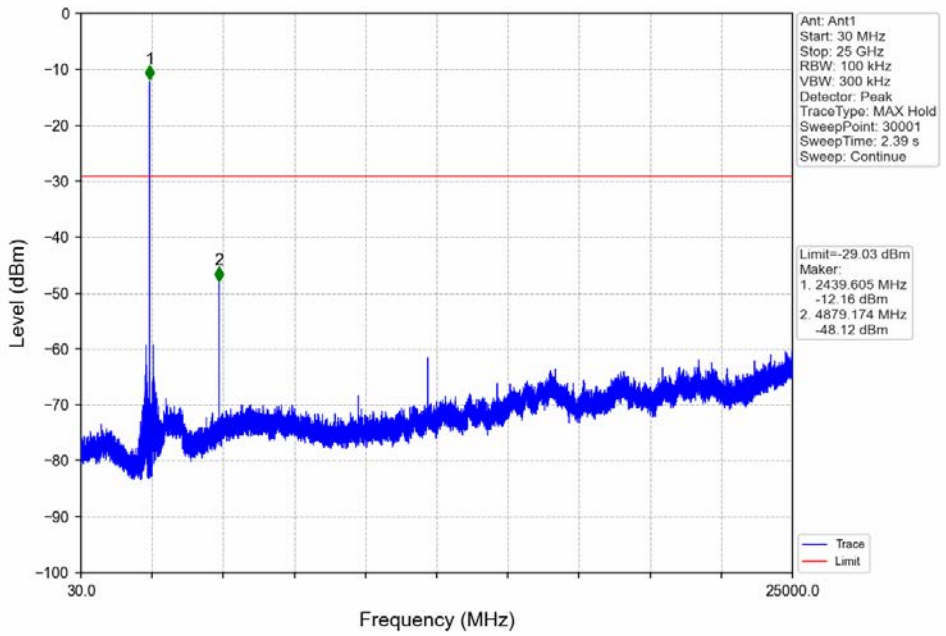
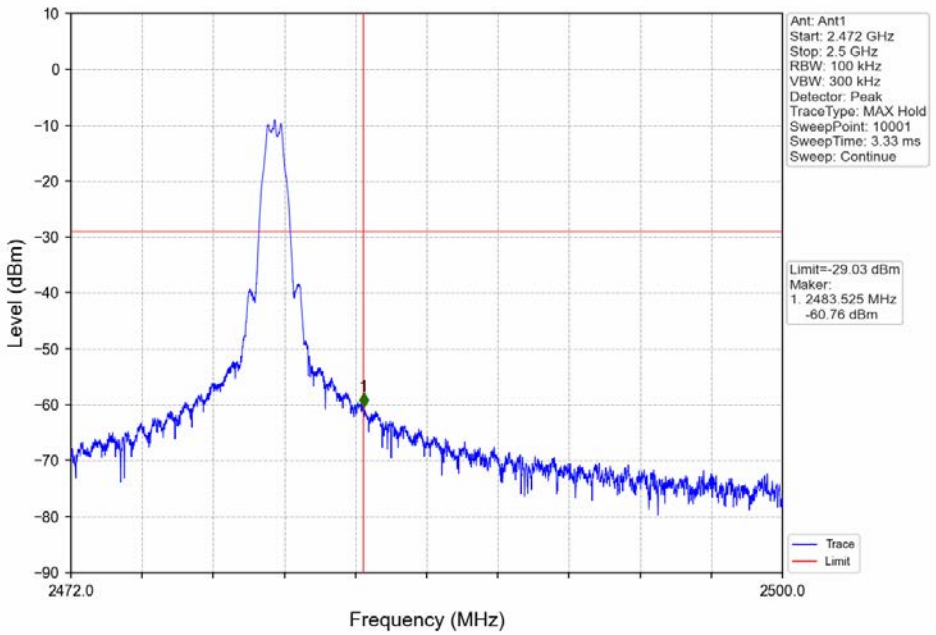
1M_MCH_2440MHz_DataRate=_Ant1_NTNV



1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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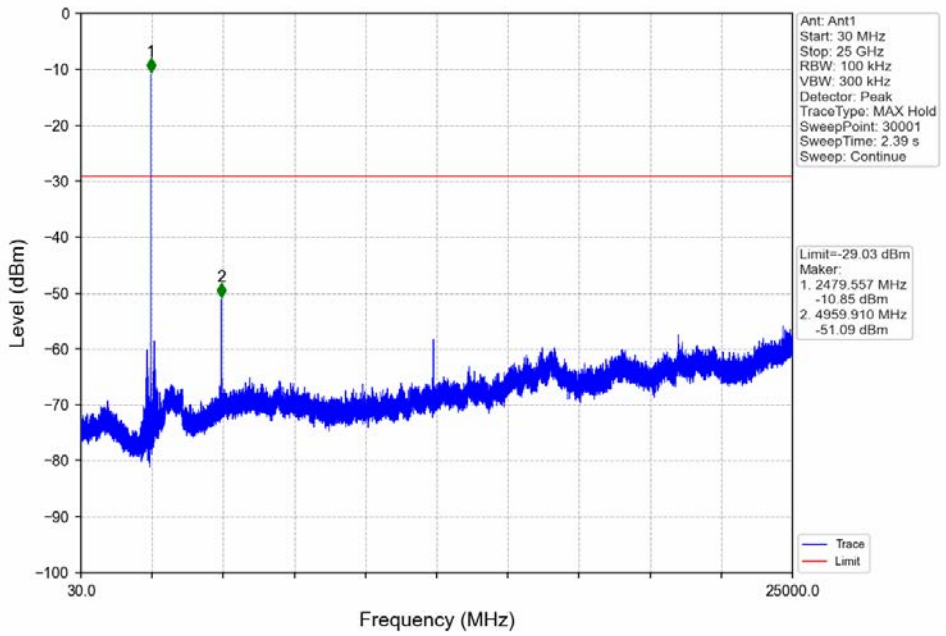
1M_HCH_2480MHz_DataRate=_Ant1_NTNV



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