

TEST REPORT

Application No.: GZCR2306000577HS
Applicant: Dometic (Shenzhen) Electronics Co., Ltd.
Address of Applicant: 39, Fangkeng Lu, Pinghu, Longgang District, 518111, Shenzhen, Guangdong, China
Manufacturer: Dometic (Shenzhen) Electronics Co., Ltd.
Address of Manufacturer: 39, Fangkeng Lu, Pinghu, Longgang District, 518111, Shenzhen, Guangdong, China
Factory: Dometic (Shenzhen) Electronics Co., Ltd.
Address of Factory: 39, Fangkeng Lu, Pinghu, Longgang District, 518111, Shenzhen, Guangdong, China

Equipment Under Test (EUT):

EUT Name: Automotive Cooler
Model No.: Console Cooler - XX
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2023-06-13
Date of Test: 2023-06-19 to 2023-07-10
Date of Issue: 2023-12-04

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

This report GZCR230600057705 supersedes the previous report GZCR230600057702, issued on 2023-07-20, which is hereby deemed null and void.



Ricky Liu
Manager

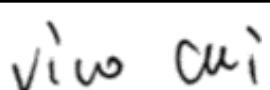


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Revision Record			
Version	Report No.	Date	Remark
01	GZCR230600057702	2023-07-20	Original (null)
02	GZCR230600057705	2023-12-04	Amendment report: Updated EUT name and deleted trade mark.

Authorized for issue by:			
		 Kevin Zhang	
		Kevin Zhang/Project Engineer	
		 Vico Cui	
		Vico Cui/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	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 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
Frequency Stability	Required by applicant	ANSI C63.10 (2013) Section 6.8	Required by manufacture	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.

Remark for amendment report GZCR230600057705

This report GZCR230600057705 supersedes the previous report GZCR230600057702, only updated EUT name and deleted trade mark.

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Guangzhou Branch, Testing Center, EEC Laboratory

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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	7
4.7 Abnormalities from Standard Conditions	7
5 Equipment List	8
6 Radio Spectrum Technical Requirement.....	11
6.1 Antenna Requirement.....	11
6.1.1 Test Requirement:.....	11
6.1.2 Conclusion	11
7 Radio Spectrum Matter Test Results	12
7.1 Conducted Peak Output Power.....	12
7.1.1 E.U.T. Operation	12
7.1.2 Test Mode Description	12
7.1.3 Test Setup Diagram	12
7.1.4 Measurement Procedure and Data	12
7.2 Minimum 6dB Bandwidth.....	13
7.2.1 E.U.T. Operation	13
7.2.2 Test Mode Description	13
7.2.3 Test Setup Diagram	13
7.2.4 Measurement Procedure and Data	13
7.3 Power Spectrum Density	14
7.3.1 E.U.T. Operation	14
7.3.2 Test Mode Description	14
7.3.3 Test Setup Diagram	14
7.3.4 Measurement Procedure and Data	14
7.4 Conducted Band Edges Measurement.....	15
7.4.1 E.U.T. Operation	15
7.4.2 Test Mode Description	15
7.4.3 Test Setup Diagram	15
7.4.4 Measurement Procedure and Data	15
7.5 Conducted Spurious Emissions.....	16
7.5.1 E.U.T. Operation	16
7.5.2 Test Mode Description	16
7.5.3 Test Setup Diagram	16



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7.5.4	Measurement Procedure and Data	16
7.6	Radiated Emissions which fall in the restricted bands	17
7.6.1	E.U.T. Operation	17
7.6.2	Test Mode Description	17
7.6.3	Test Setup Diagram	17
7.6.4	Measurement Procedure and Data	18
7.7	Radiated Spurious Emissions Below 1GHz	23
7.7.1	E.U.T. Operation	23
7.7.2	Test Mode Description	23
7.7.3	Test Setup Diagram	23
7.7.4	Measurement Procedure and Data	24
7.8	Radiated Spurious Emissions Above 1GHz	27
7.8.1	E.U.T. Operation	27
7.8.2	Test Mode Description	27
7.8.3	Test Setup Diagram	27
7.8.4	Measurement Procedure and Data	28
7.9	Frequency Stability	35
7.9.1	E.U.T. Operation	35
7.9.2	Test Mode Description	35
7.9.3	Test Setup Diagram	35
7.9.4	Measurement Procedure and Data	35
8	Test Setup Photo.....	36
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 12 V
Cable(s):	DC input ports
Test Voltage:	DC 12 V
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1.29 dBi
Antenna Number:	1

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC Power Supply	XANTRAX	XFR-6020 (Input: AC180-240V, 50Hz; Output: DC Max. 60V, 20A)	RE02

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	±5.00dB (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)
Frequency Stability	± 7.25 x 10 ⁻⁸

Remark:

The U_{lab} (lab Uncertainty) is less than U_{ETSI} (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.



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4.4 Test Location

All tests were performed at:

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

- **ACMA**

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

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

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

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

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

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

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

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

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

- **CBTL (Lab Code: TL129)**

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

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2022-08-24	2023-08-23
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2022-08-24	2023-08-23
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Power Spectrum Density					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2022-08-24	2023-08-23
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2022-08-24	2023-08-23
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Conducted Spurious Emissions					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2022-08-24	2023-08-23
Test Software	TST	V2.0	GZE100-78	N/A	N/A

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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	2022-12-16	2023-12-15
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2022-12-16	2023-12-15
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	2022-09-08	2023-09-07
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2022-10-21	2023-10-20
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
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	2023-02-20	2024-02-19
Amplifier(9k-1000MHz)	SONOMA	310	EMC2237	2023-04-13	2024-04-12
TRILOG Broadband Antenna (25M-2GHz)	SCHWRZBECK	VULB 9168	EMC2238	2022-04-20	2025-04-19
Coaxial Cable	Times Microwave	BL03-NMNM-6	EMC2239	2022-05-18	2024-05-17
Test Software E3	Audix	Ver.6.191211	GZE100-81	N/A	N/A
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05

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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	2022-12-16	2023-12-15
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2022-12-16	2023-12-15
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	2022-12-16	2023-12-15
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2022-10-21	2023-10-20
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Frequency Stability

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2022-08-24	2023-08-23
Test Software	TST	V2.0	GZE100-78	N/A	N/A
Temperature Chamber	GZ GongWen Co.Ltd.	GDJW-100	EMC0039	2023-06-29	2024-06-28

General used equipment

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2023-06-11	2024-06-10



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

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

6.1.2 Conclusion

Standard Requirement:

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

15.247(b) (4) requirement:

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

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.29 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

Limit:

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

7.1.1 E.U.T. Operation

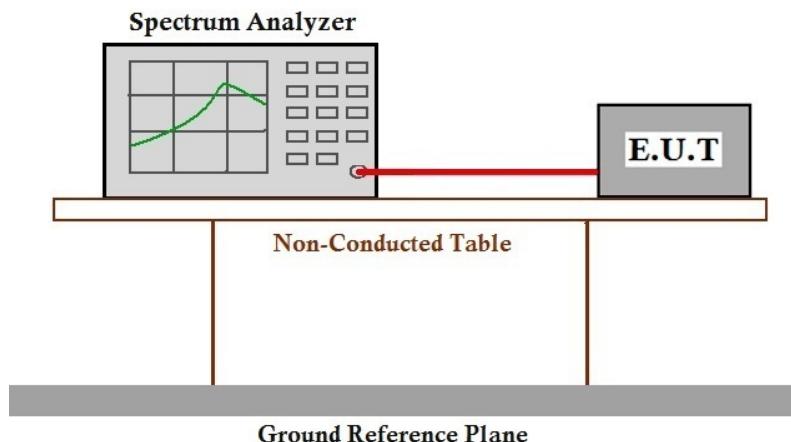
Operating Environment:

Temperature: 24.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 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.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

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

Please Refer to Appendix for Details



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7.2 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

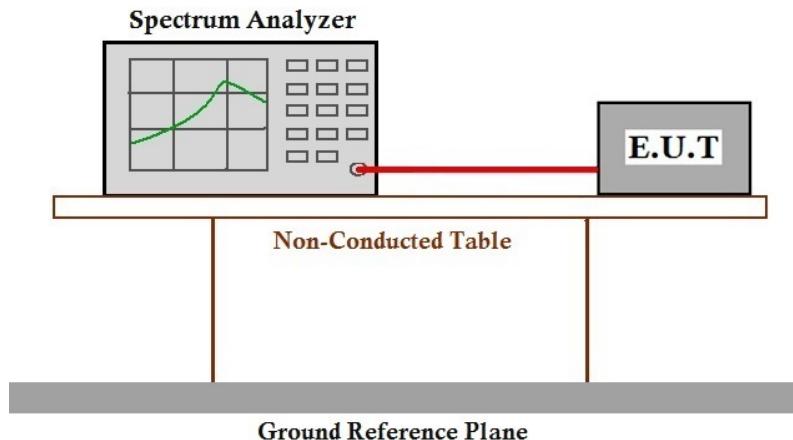
Operating Environment:

Temperature: 24.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 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.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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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

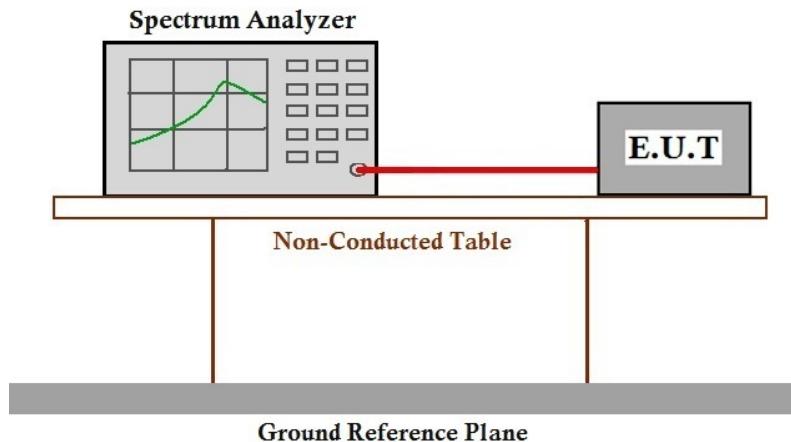
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 24.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 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.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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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

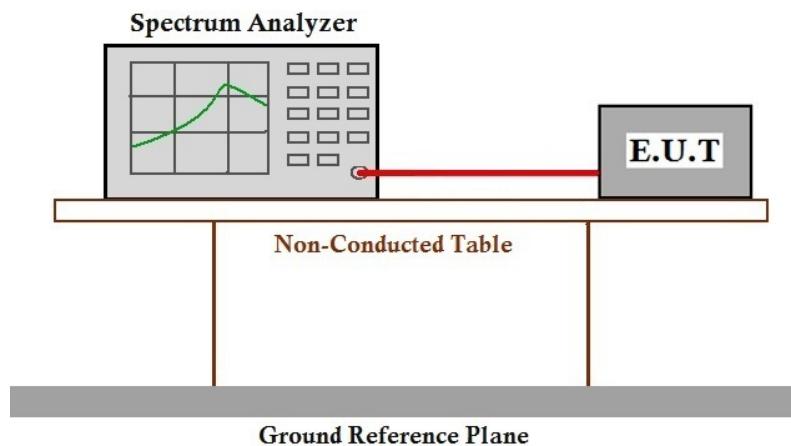
Operating Environment:

Temperature: 24.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 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.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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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

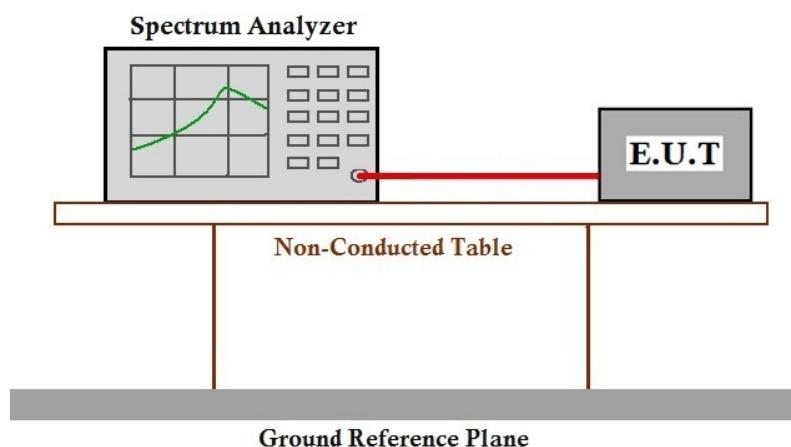
Operating Environment:

Temperature: 24.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 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.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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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 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.

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24.1 °C

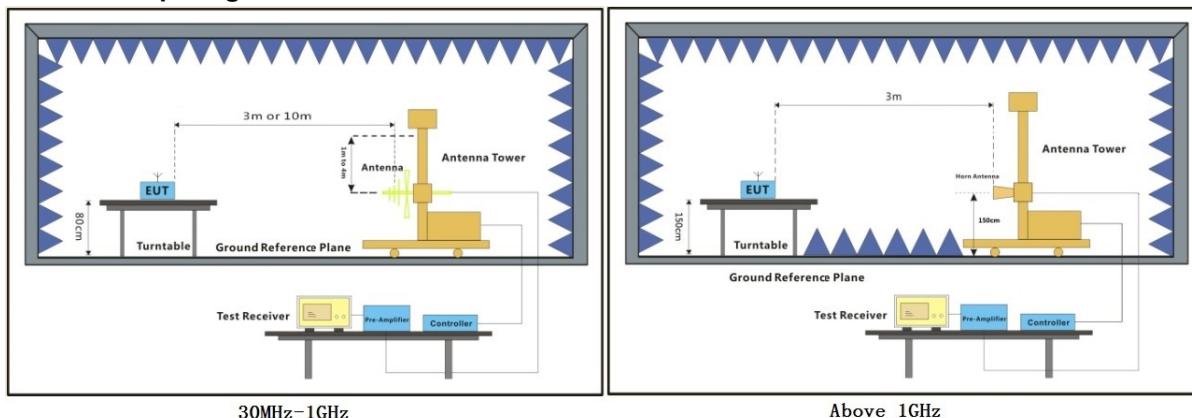
Humidity: 56.7 % RH

Atmospheric Pressure: 1000 mbar

7.6.2 Test Mode Description

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

7.6.3 Test Setup Diagram



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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

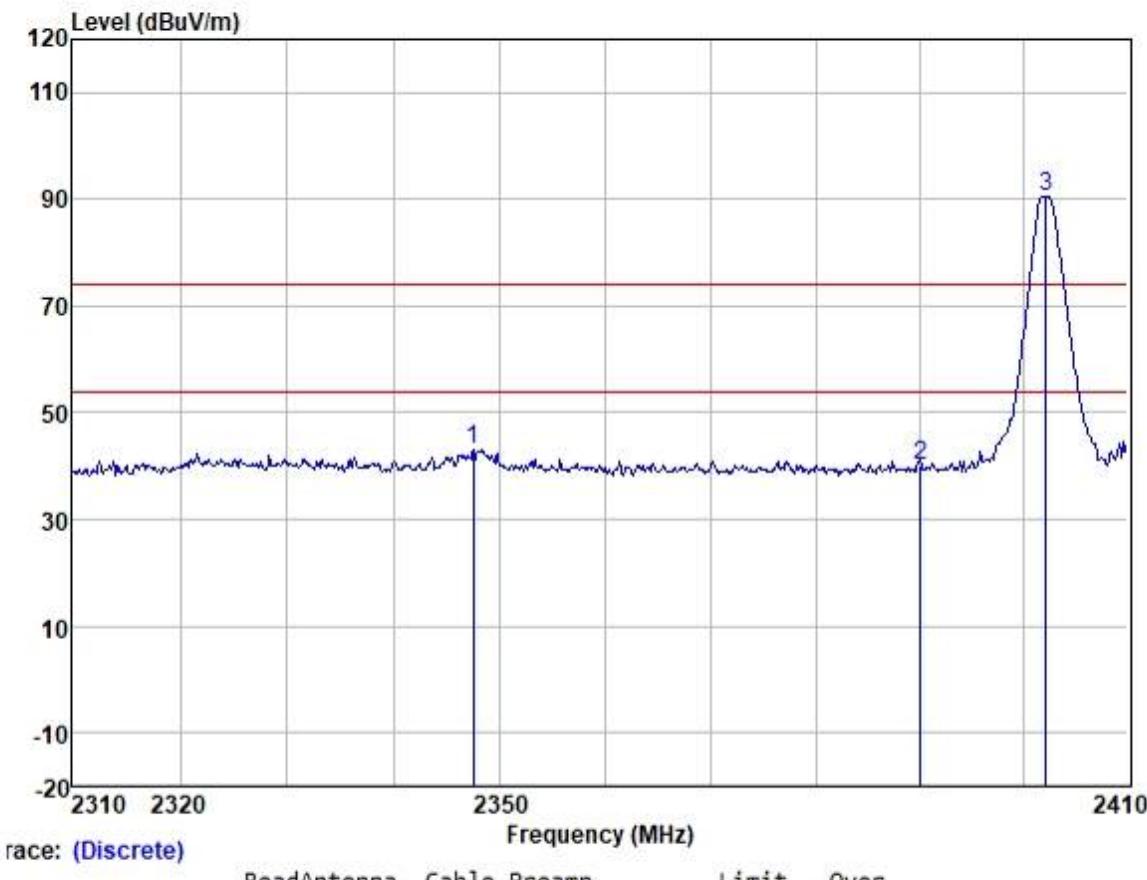
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level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



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



Race: (Discrete)

Freq	ReadAntenna Level	Cable Loss	Preamp Factor	Limit		Over Line Limit	Over Pol/Phase	Remark		
				MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2347.502	48.68	27.59	4.60	37.78	43.09	74.00	-30.91	VERTICAL	Peak
2	2390.000	46.14	27.68	4.22	37.76	40.28	74.00	-33.72	VERTICAL	Peak
3 *	2402.041	96.60	27.71	4.11	37.76	90.66	74.00	16.66	VERTICAL	Peak

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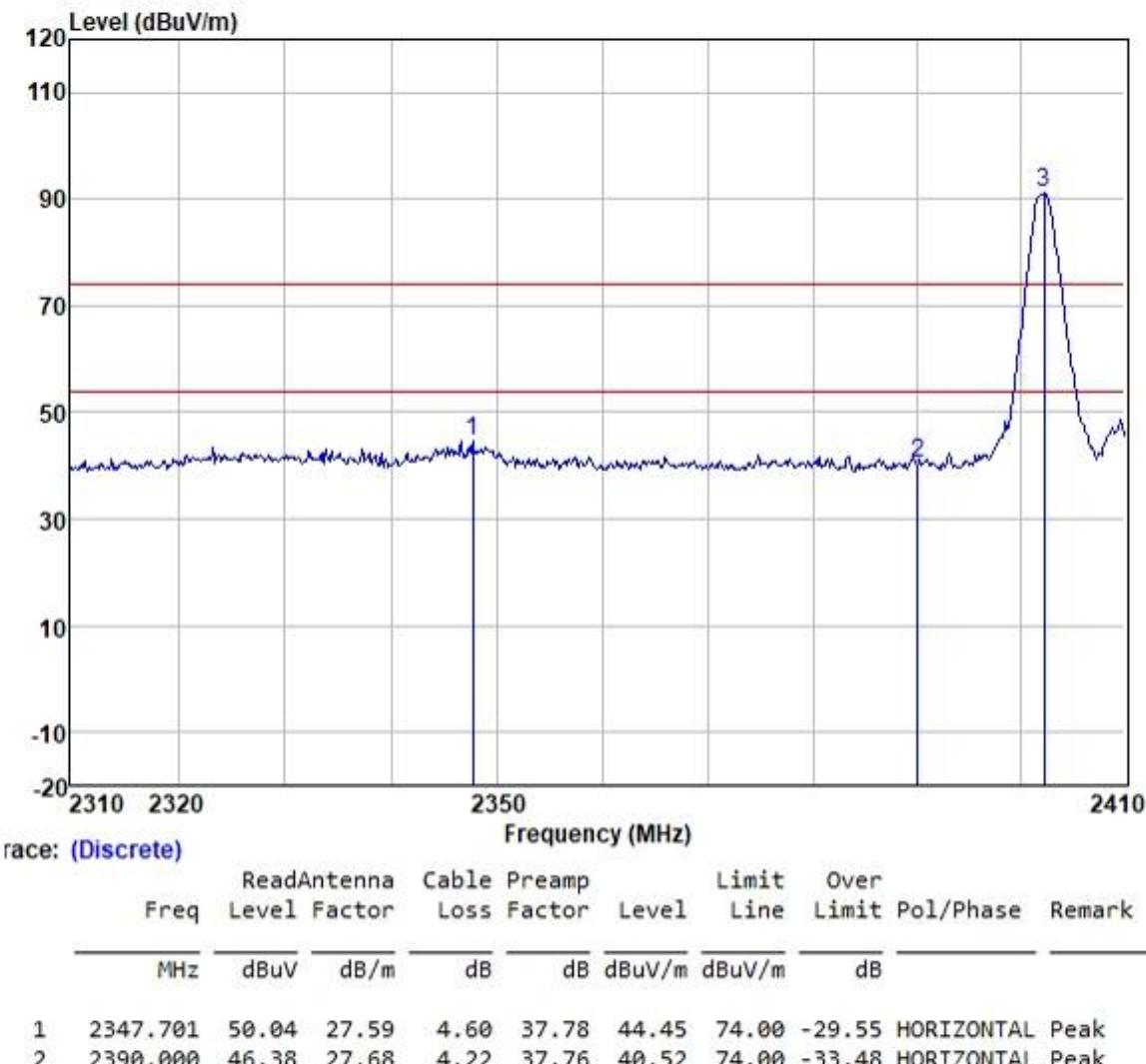
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中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编: 510663

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



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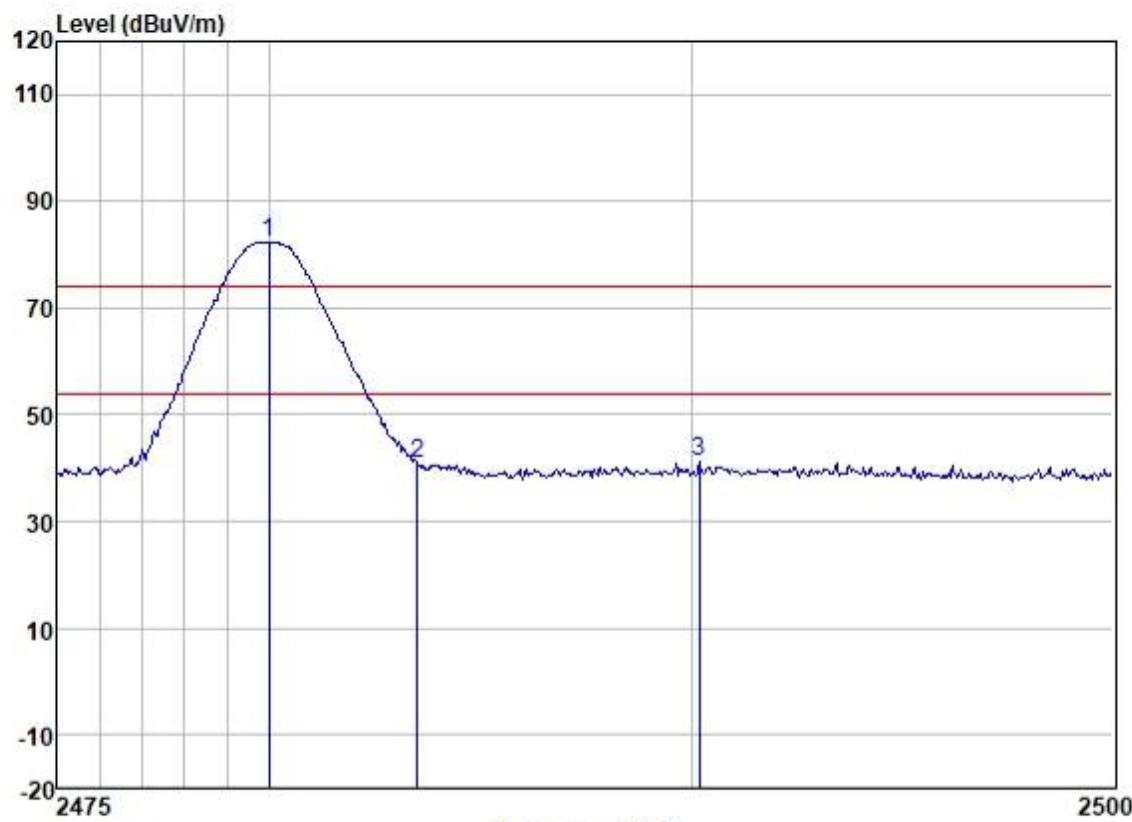
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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



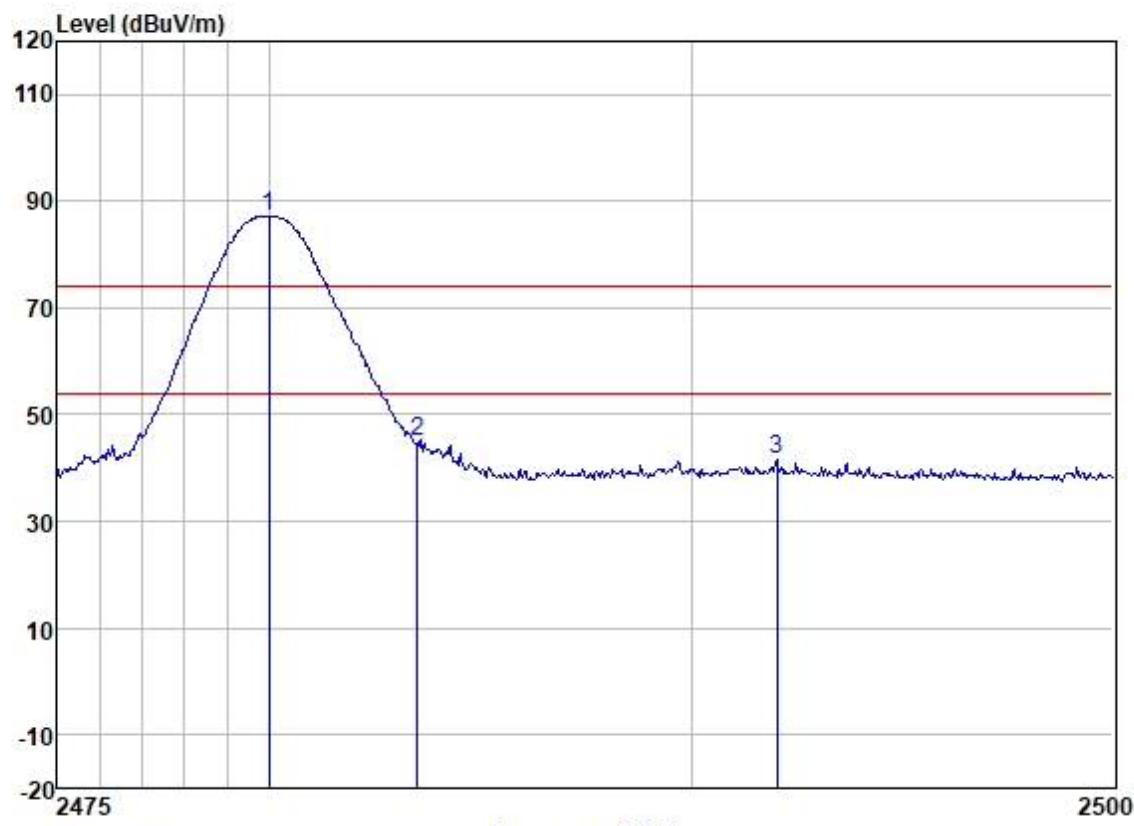
Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Over	Pol/Phase	Remark
	Level	Factor	Loss	Factor						
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dB		
1 * 2480.000	88.64	27.84	3.50	37.73	82.25	74.00	8.25	VERTICAL	Peak	
2 2483.500	47.19	27.85	3.42	37.73	40.73	74.00	-33.27	VERTICAL	Peak	
3 2490.170	47.67	27.86	3.33	37.73	41.13	74.00	-32.87	VERTICAL	Peak	

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



Freq	Read	Antenna	Cable	Preamp	Limit	Over	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB					
1 * 2480.000	93.45	27.84	3.50	37.73	87.06	74.00	13.06	HORIZONTAL	Peak
2 2483.500	51.46	27.85	3.42	37.73	45.00	74.00	-29.00	HORIZONTAL	Peak
3 2492.023	47.96	27.86	3.33	37.72	41.43	74.00	-32.57	HORIZONTAL	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

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

7.7.1 E.U.T. Operation

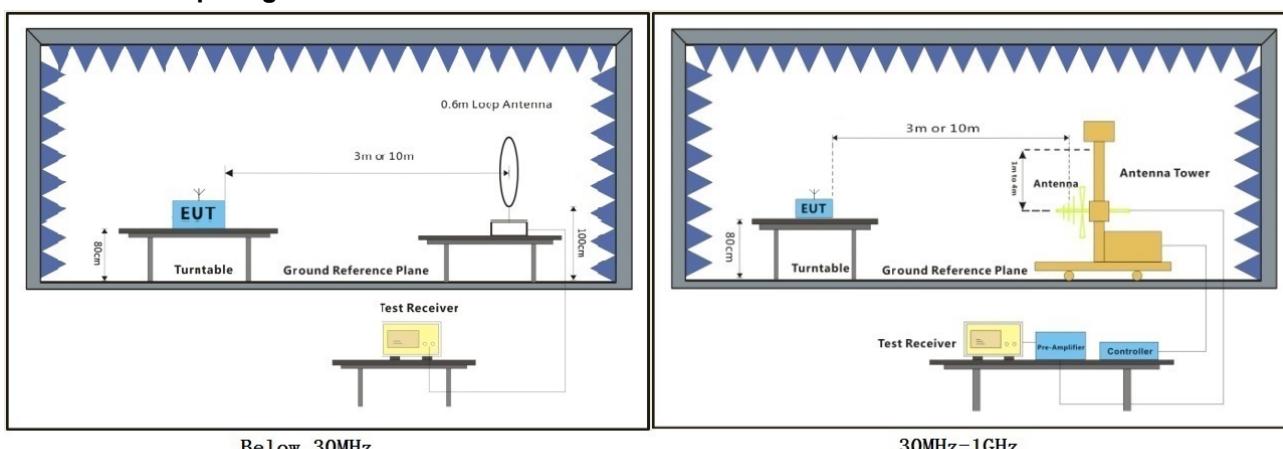
Operating Environment:

Temperature: 23.6 °C Humidity: 56.3 % RH Atmospheric Pressure: 1000 mbar

7.7.2 Test Mode Description

Pre-scan / Mode Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_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 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:

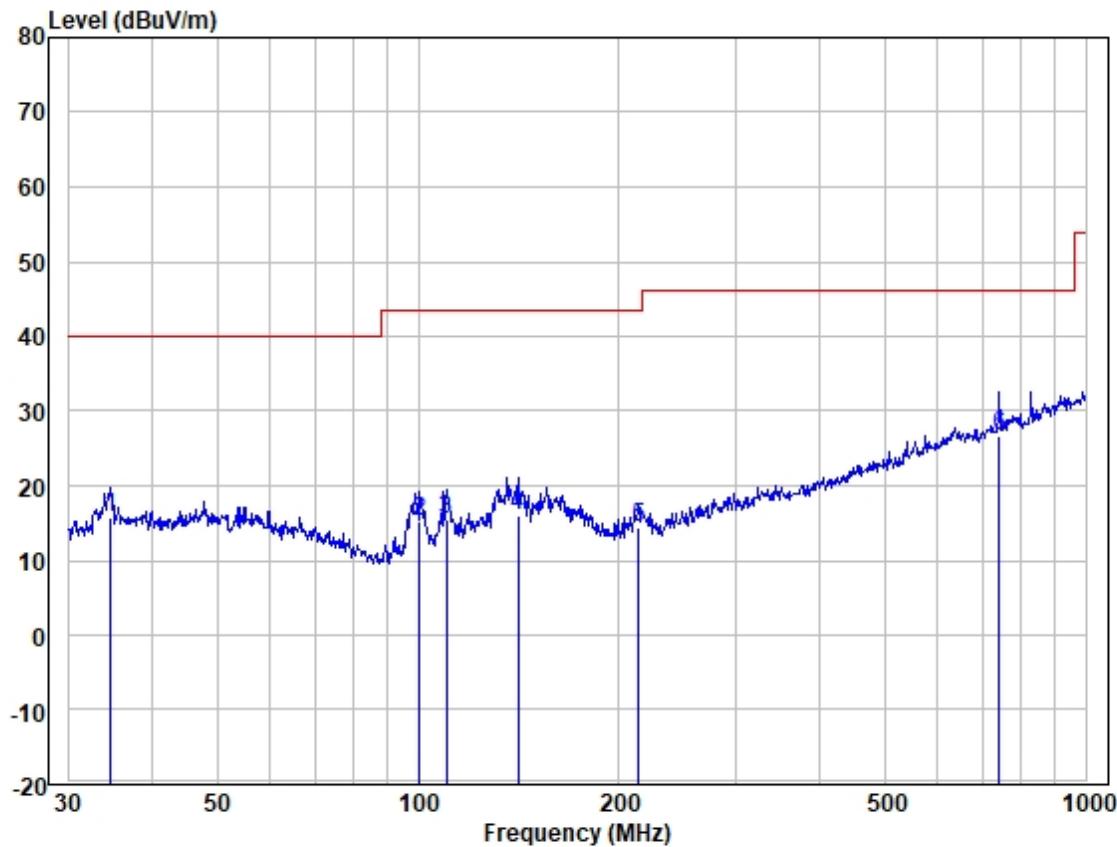
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from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



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Test Mode: 00; Polarity: Horizontal



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

Freq	Read	Antena	Cable	Preamp	Measured	Limit	Over	Pol/	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	Phase	
1 34.639	29.63	18.23	0.70	32.95	15.61	40.00	-24.39	HORIZONTAL	QP
2 100.581	32.45	14.71	1.11	33.00	15.27	43.52	-28.25	HORIZONTAL	QP
3 110.182	31.01	16.18	1.15	33.00	15.34	43.52	-28.18	HORIZONTAL	QP
4 141.330	28.91	18.70	1.34	33.00	15.95	43.52	-27.57	HORIZONTAL	QP
5 213.763	29.96	15.65	1.90	33.01	14.50	43.52	-29.02	HORIZONTAL	QP
6 742.259	28.50	27.81	3.45	33.13	26.63	46.02	-19.39	HORIZONTAL	QP

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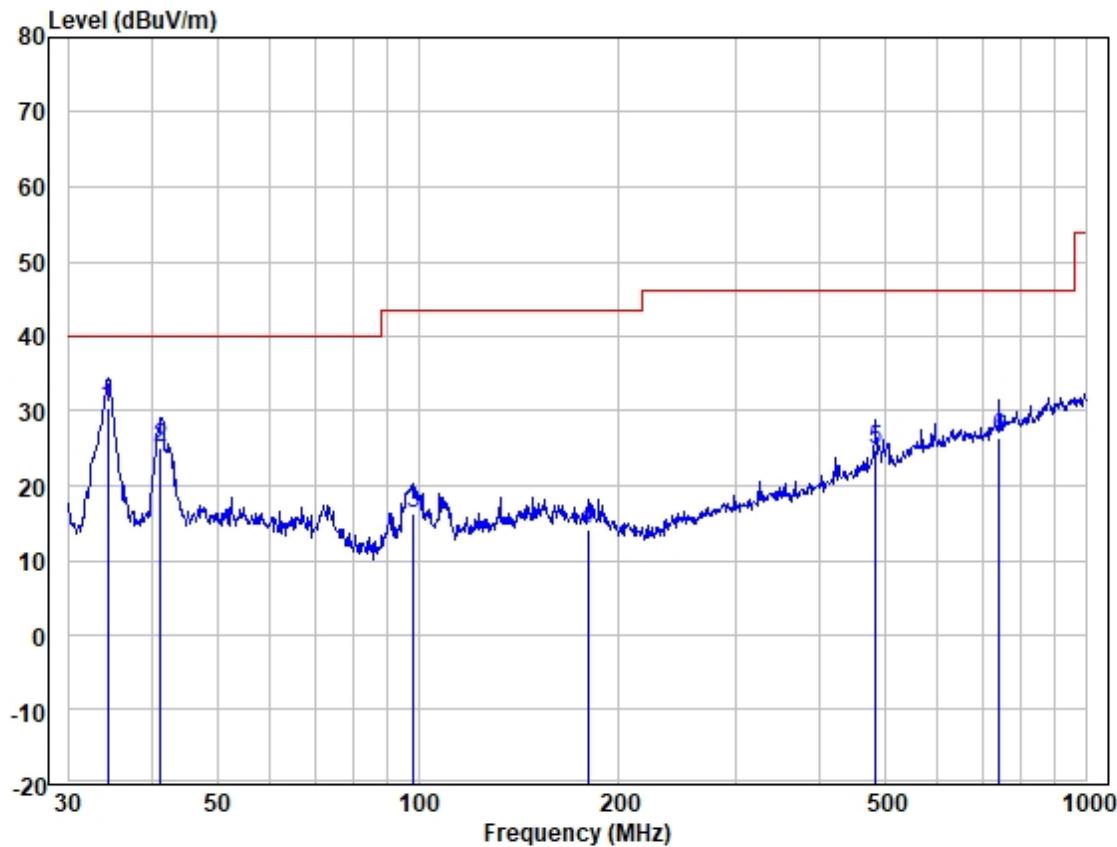


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Test Mode: 00; Polarity: Vertical



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

Freq	Read	Antena	Cable	Preamp	Measured	Limit	Over	Pol/	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	Phase	
1	34.276	44.72	17.99	0.70	32.95	30.46	40.00	-9.54	VERTICAL QP
2	41.132	38.32	19.16	0.67	32.97	25.18	40.00	-14.82	VERTICAL QP
3	98.487	33.86	14.41	1.06	33.00	16.33	43.52	-27.19	VERTICAL QP
4	179.386	27.70	17.75	1.69	33.00	14.14	43.52	-29.38	VERTICAL QP
5	483.910	31.88	23.17	2.98	33.28	24.75	46.02	-21.27	VERTICAL QP
6	742.259	28.23	27.81	3.45	33.13	26.36	46.02	-19.66	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 6.6

Limit:

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

7.8.1 E.U.T. Operation

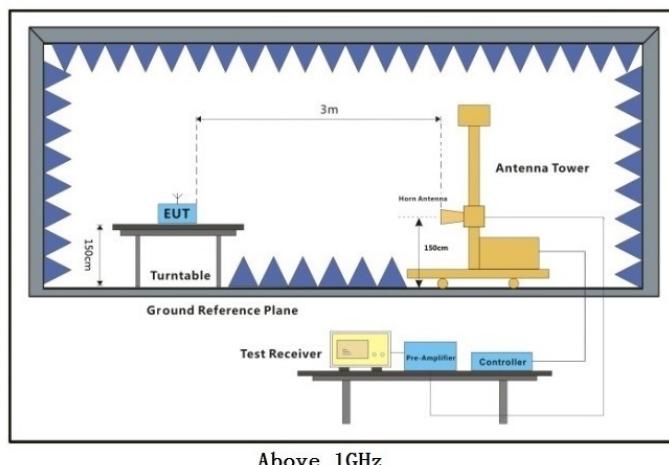
Operating Environment:

Temperature: 26.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 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.

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 (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:

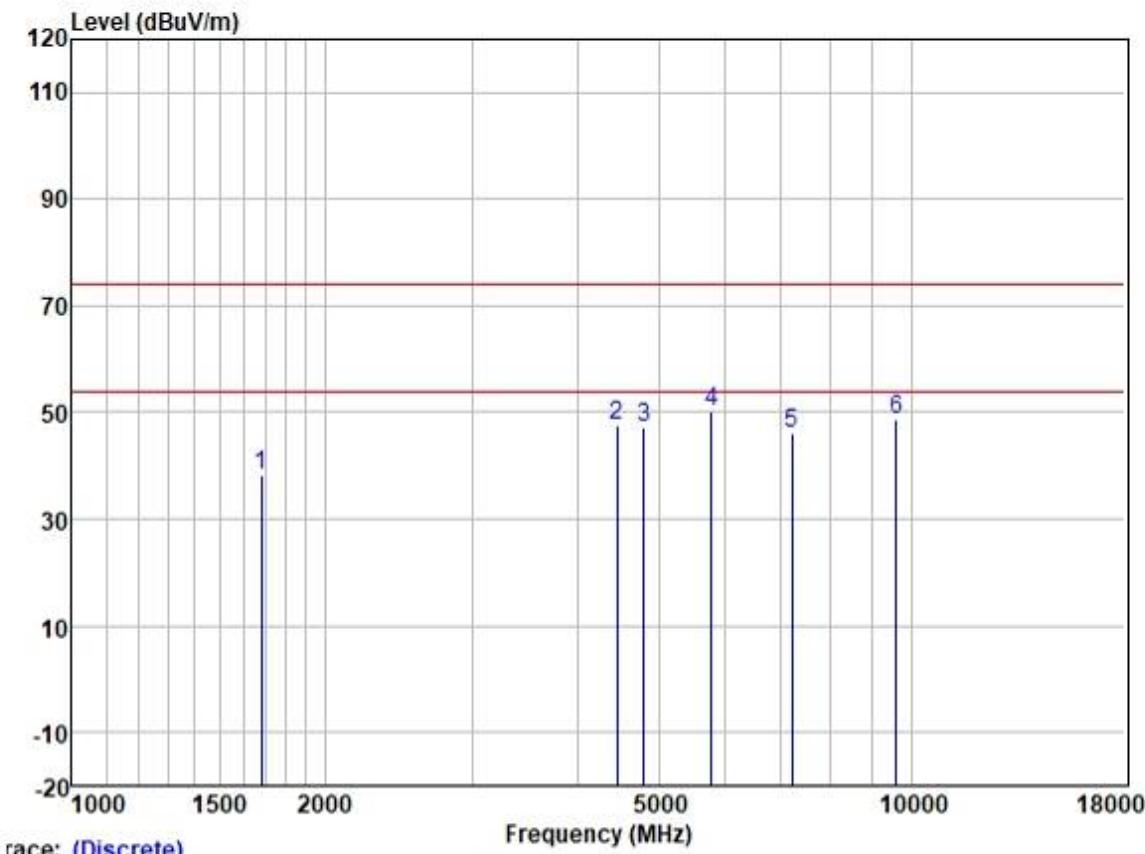
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from 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.



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



Race: (Discrete)

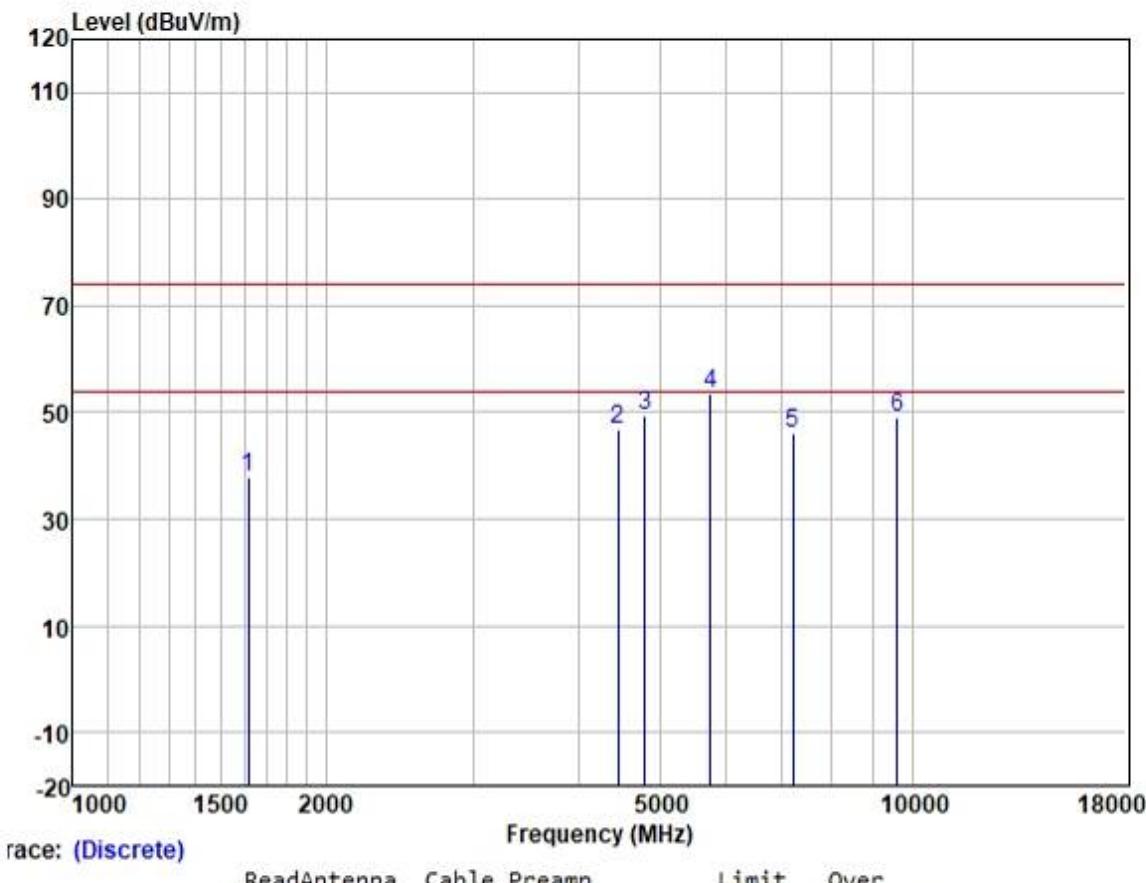
Freq	ReadAntenna		Cable		Preamp		Limit	Over	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	Level					
1	1682.477	47.70	25.03	3.25	37.93	38.05	74.00	-35.95	VERTICAL	peak	
2	4456.315	45.08	34.00	5.35	36.83	47.60	74.00	-26.40	VERTICAL	peak	
3	4804.000	44.29	34.16	5.46	36.86	47.05	74.00	-26.95	VERTICAL	peak	
4	5780.300	48.95	32.66	5.68	36.99	50.30	74.00	-23.70	VERTICAL	peak	
5	7206.000	41.28	35.63	6.36	37.13	46.14	74.00	-27.86	VERTICAL	peak	
6	9608.000	39.18	38.68	7.99	37.02	48.83	74.00	-25.17	VERTICAL	peak	

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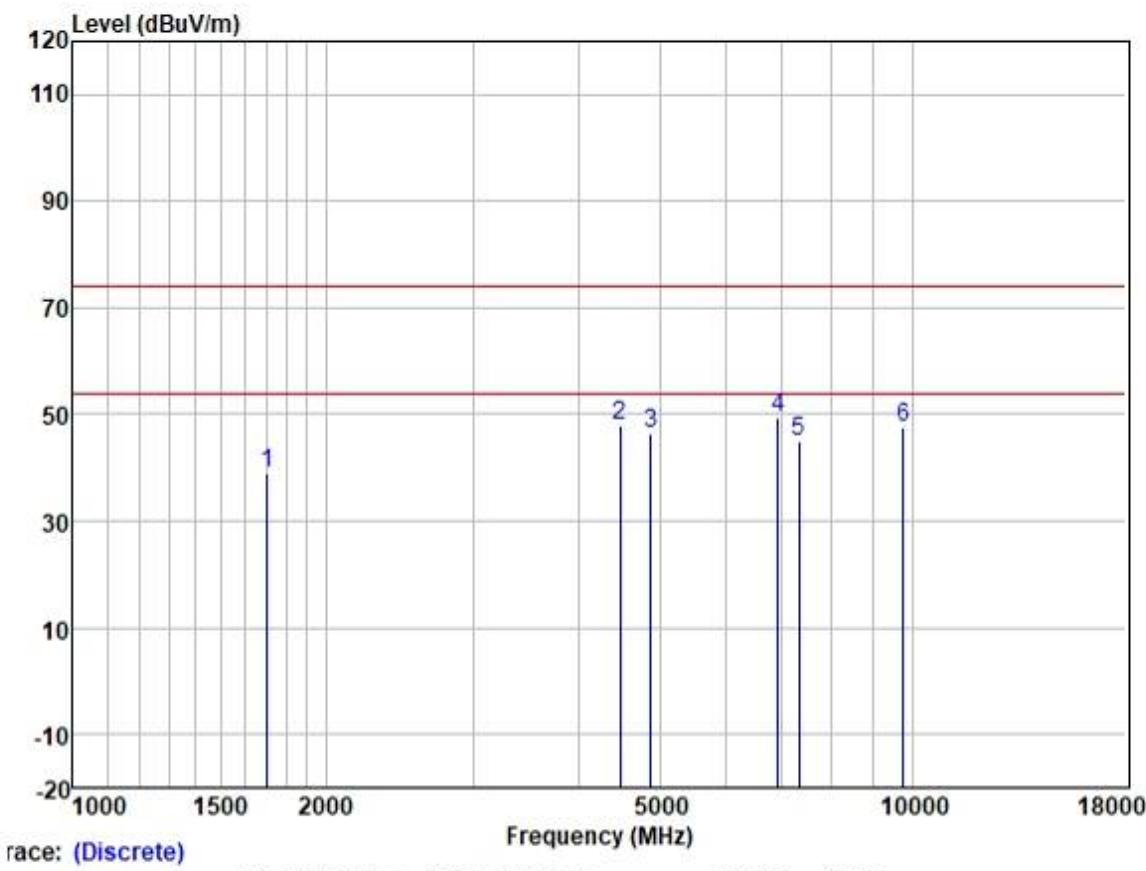
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



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



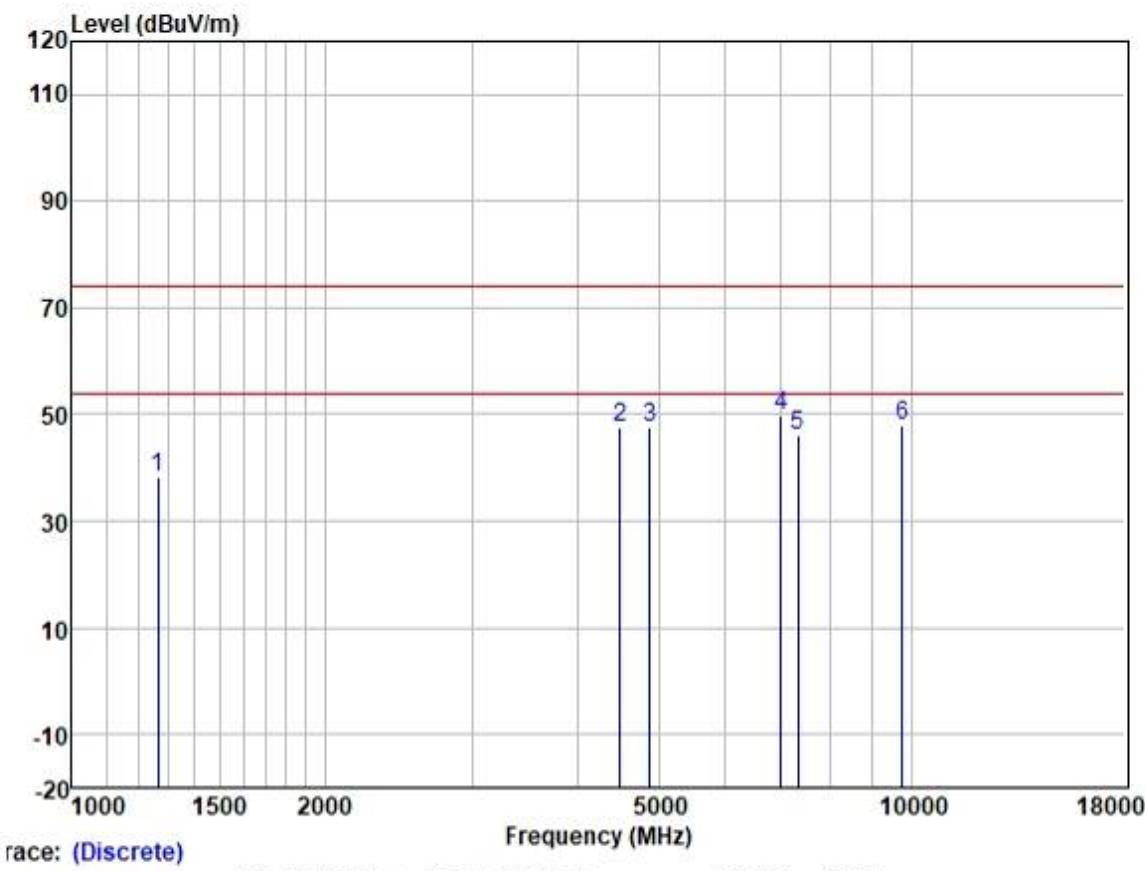
Freq	ReadAntenna		Cable		Preamp		Limit	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	Level				
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1702.042	48.22	25.15	3.36	37.92	38.81	74.00	-35.19	VERTICAL	peak
2	4482.150	45.13	34.12	5.34	36.83	47.76	74.00	-26.24	VERTICAL	peak
3	4880.000	43.81	34.15	5.49	36.87	46.58	74.00	-27.42	VERTICAL	peak
4	6914.763	44.97	34.97	6.39	37.08	49.25	74.00	-24.75	VERTICAL	peak
5	7320.000	39.67	36.07	6.32	37.15	44.91	74.00	-29.09	VERTICAL	peak
6	9760.000	38.53	38.81	7.43	37.01	47.76	74.00	-26.24	VERTICAL	peak

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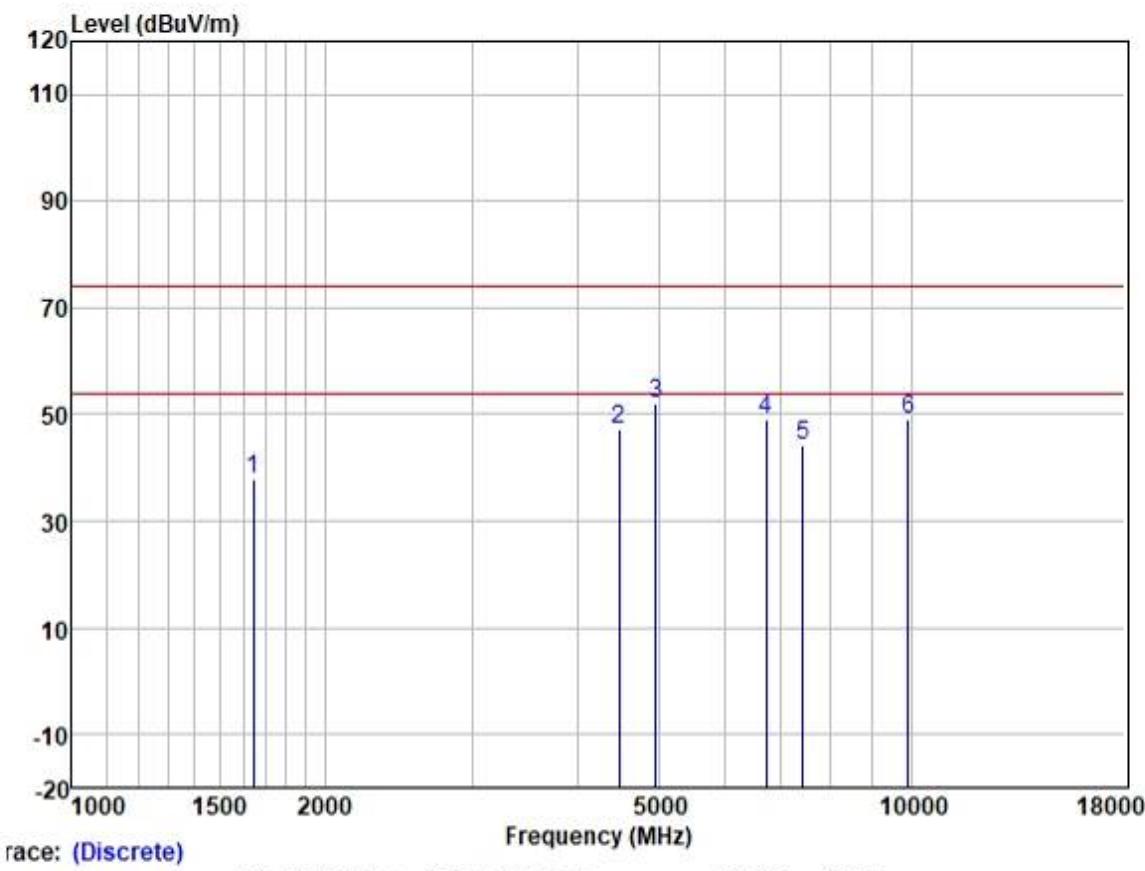
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:middle



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



race: (Discrete)

Freq	ReadAntenna		Cable		Preamp		Limit	Over	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	1644.019	47.71	24.84	3.11	37.93	37.73	74.00	-36.27	VERTICAL	peak	
2	4482.150	44.74	34.12	5.34	36.83	47.37	74.00	-26.63	VERTICAL	peak	
3	4960.000	49.33	34.15	5.53	36.89	52.12	74.00	-21.88	VERTICAL	peak	
4	6717.762	45.42	34.42	6.29	37.05	49.08	74.00	-24.92	VERTICAL	peak	
5	7440.000	38.92	36.33	6.29	37.16	44.38	74.00	-29.62	VERTICAL	peak	
6	9920.000	40.29	38.95	6.77	37.00	49.01	74.00	-24.99	VERTICAL	peak	

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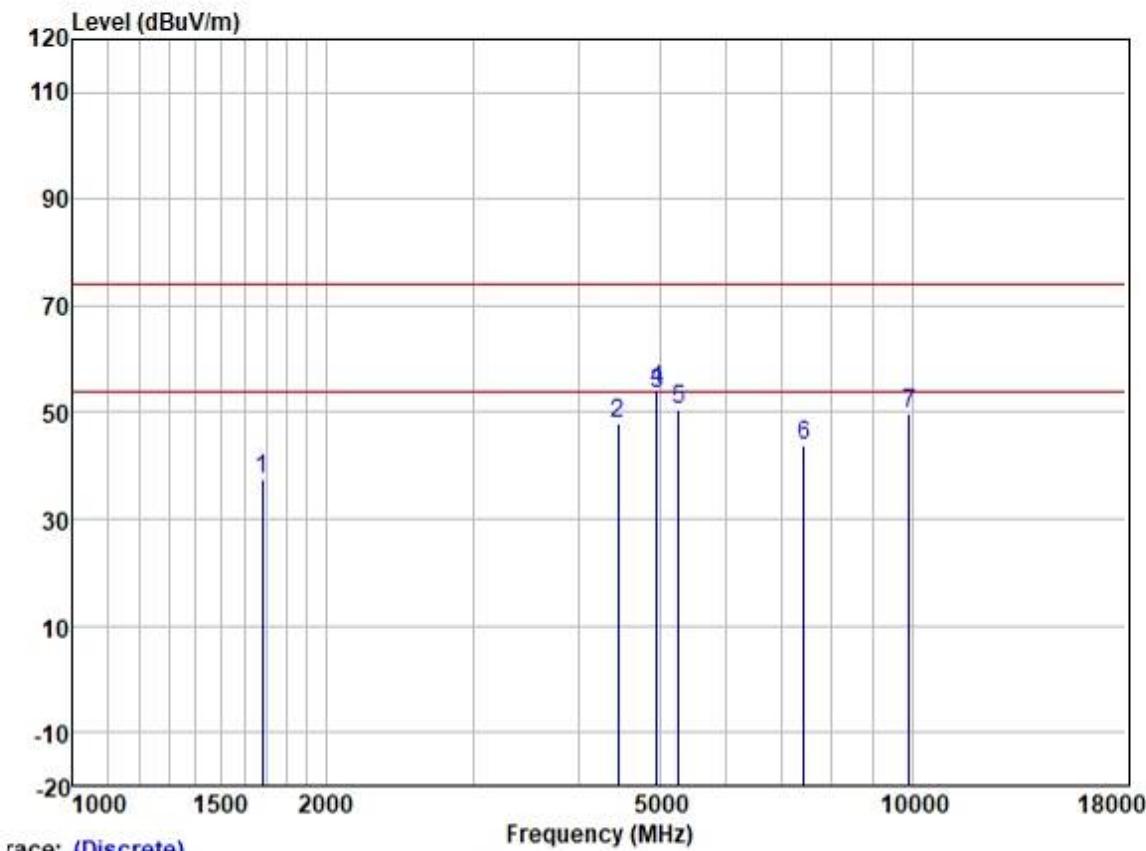
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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



Race: (Discrete)	Freq	ReadAntenna		Cable		Preamp		Limit	Over	Pol/Phase	Remark
		Level	Factor	Loss	Factor	Level	dBuV/m				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	1682.477	47.26	25.03	3.25	37.93	37.61	74.00	-36.39	HORIZONTAL	peak	
2	4456.315	45.45	34.00	5.35	36.83	47.97	74.00	-26.03	HORIZONTAL	peak	
3	4960.993	50.91	34.15	5.53	36.89	53.70	54.00	-0.30	HORIZONTAL	Average	
4	4960.993	51.57	34.15	5.53	36.89	54.36	74.00	-19.64	HORIZONTAL	Peak	
5	5269.649	48.74	33.30	5.42	36.94	50.52	74.00	-23.48	HORIZONTAL	peak	
6	7440.000	38.47	36.33	6.29	37.16	43.93	74.00	-30.07	HORIZONTAL	peak	
7	9920.000	40.97	38.95	6.77	37.00	49.69	74.00	-24.31	HORIZONTAL	peak	

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7.9 Frequency Stability

Test Requirement Required by manufacture
Test Method: ANSI C63.10 (2013) Section 6.8

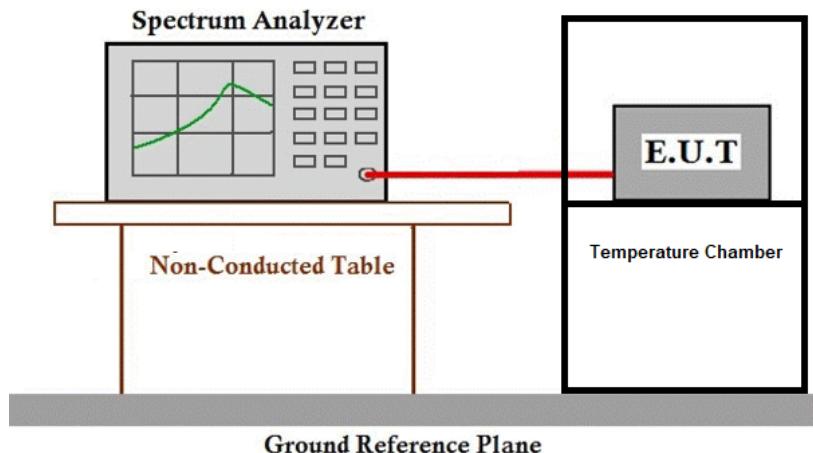
7.9.1 E.U.T. Operation

Operating Environment:
Temperature: 24.5 °C Humidity: 58.8 % RH Atmospheric Pressure: 1006 mbar

7.9.2 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.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR230600057702



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9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2306000577HS



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10 Appendix

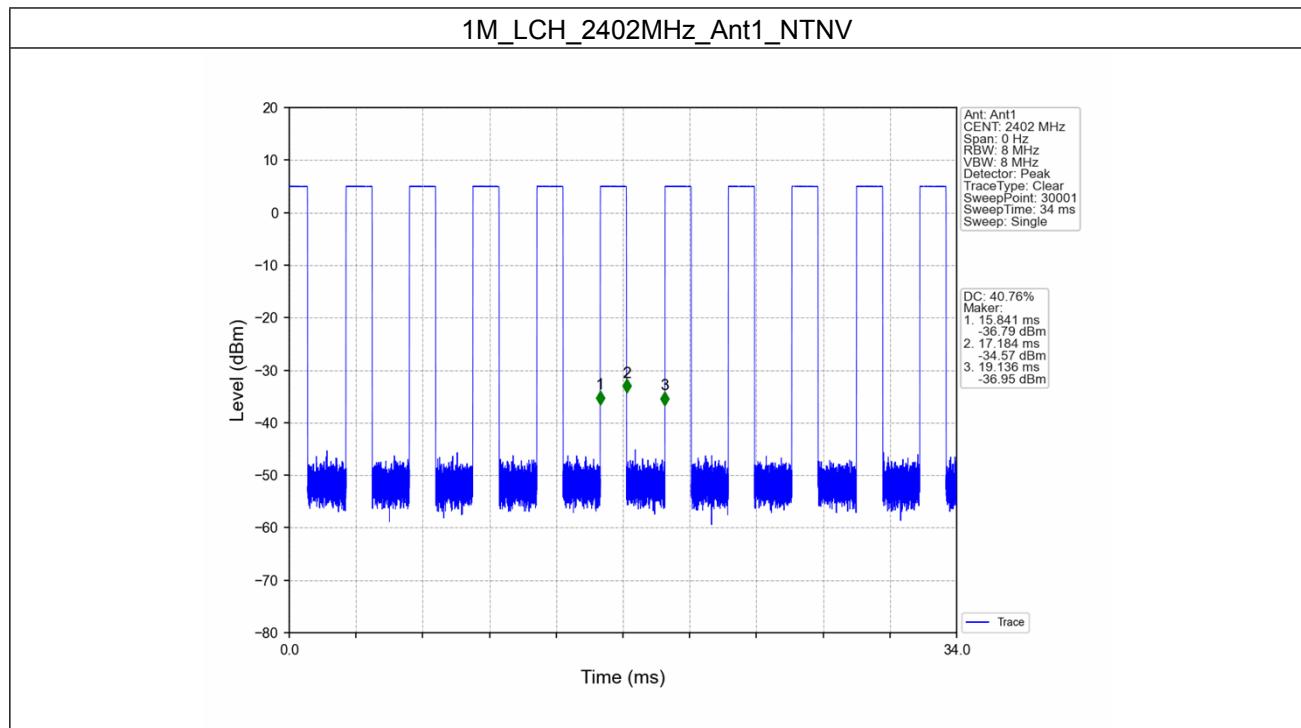
1. Duty Cycle

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	1.343	3.295	40.76	3.90	0.83
		2440	0.403	0.625	64.48	1.91	0.00
		2480	1.340	3.296	40.66	3.91	0.83

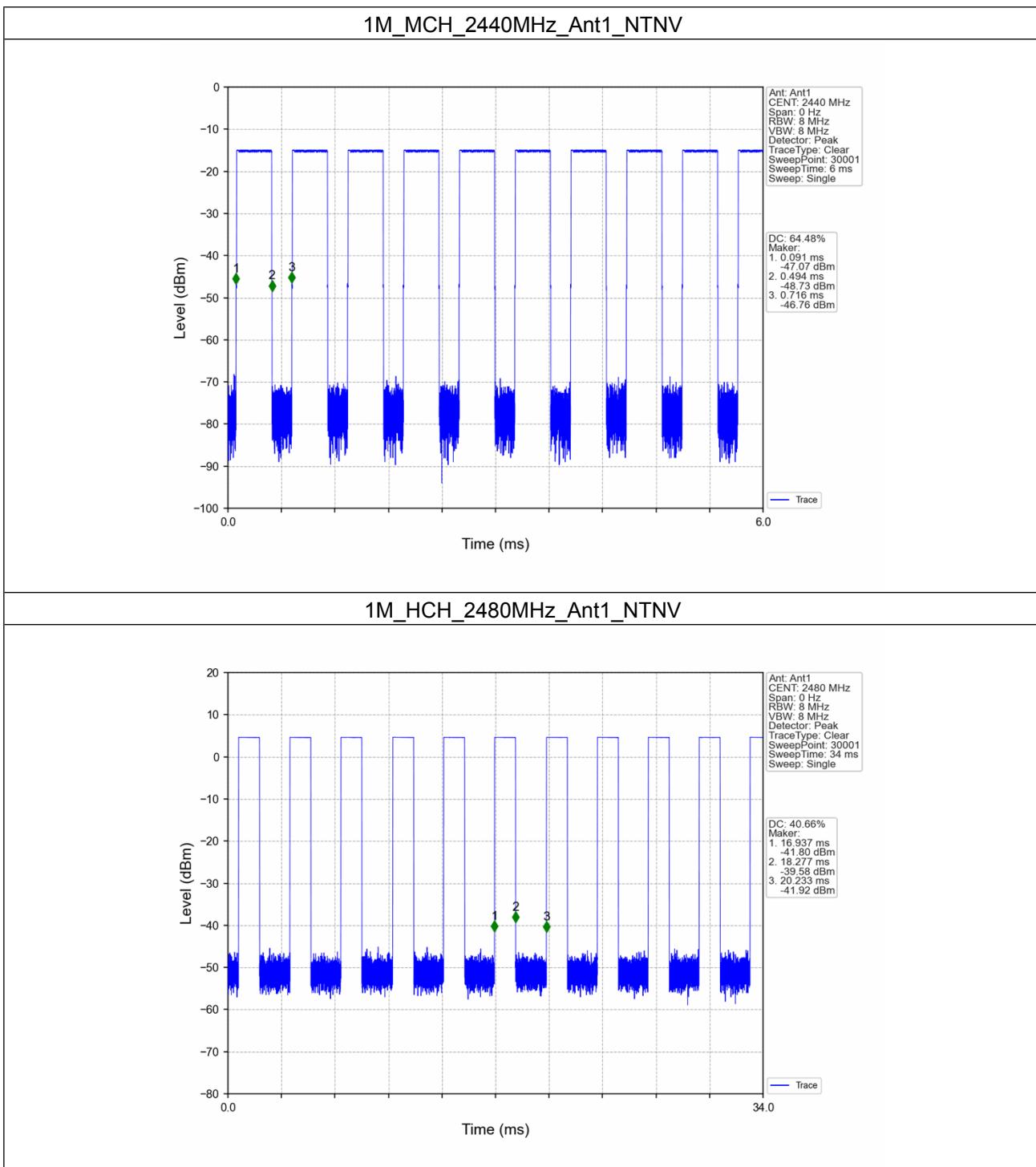
1.1.2 Test Graph



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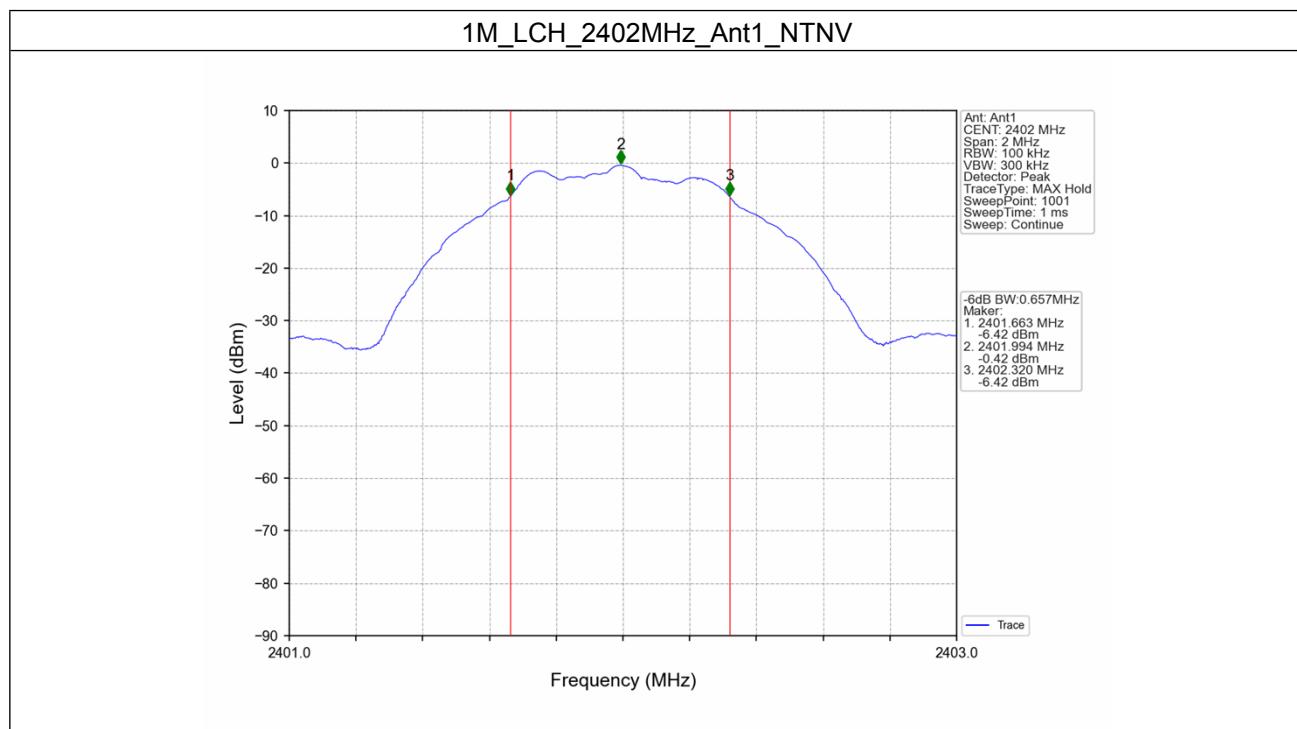
2. Bandwidth

2.1 6dB BW

2.1.1 Test Result

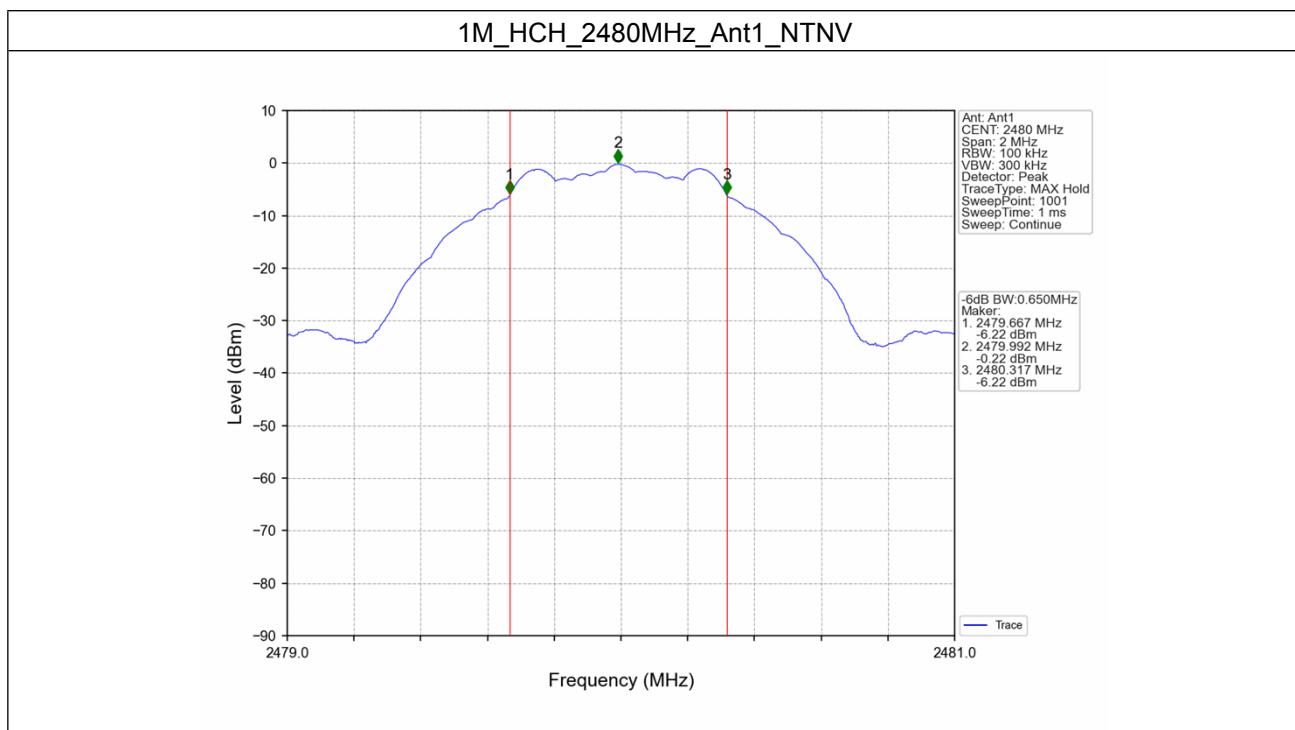
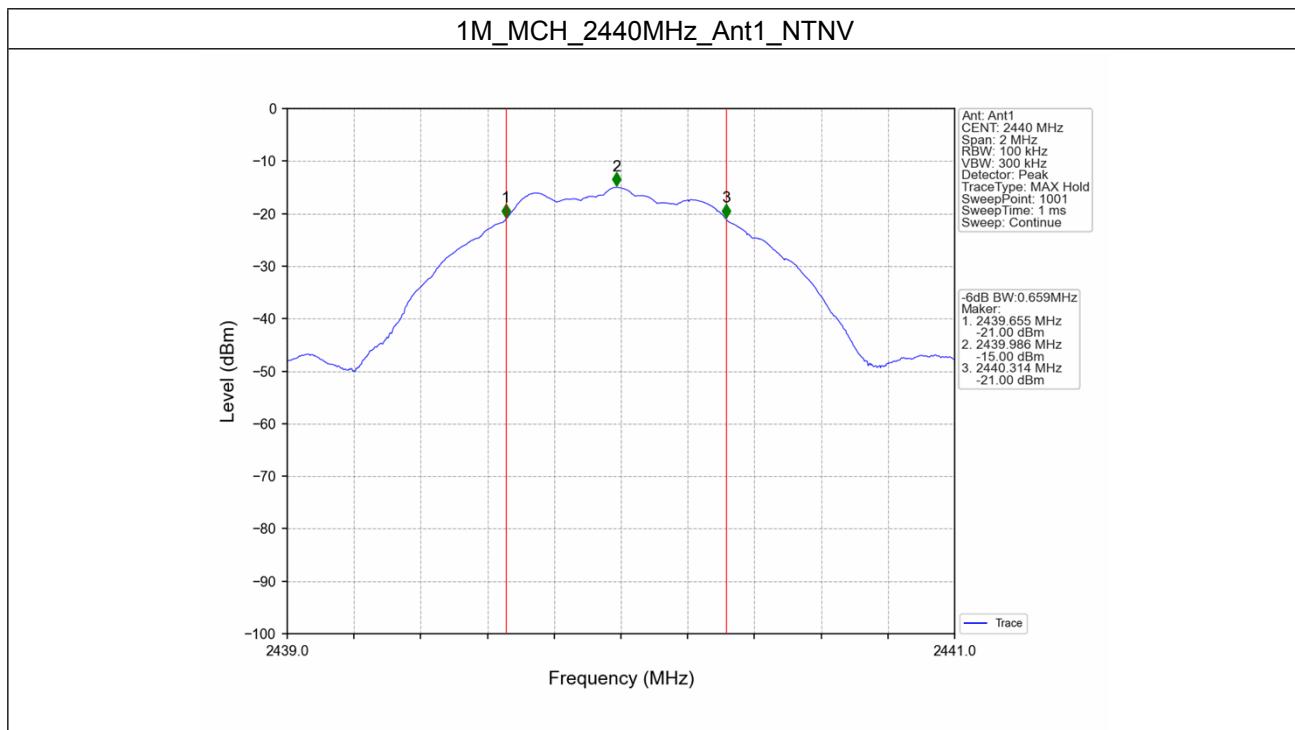
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.657	>=0.5	Pass
		2440	1	0.659	>=0.5	Pass
		2480	1	0.650	>=0.5	Pass

2.2.2 Test Graph



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3. Maximum Conducted Output Power

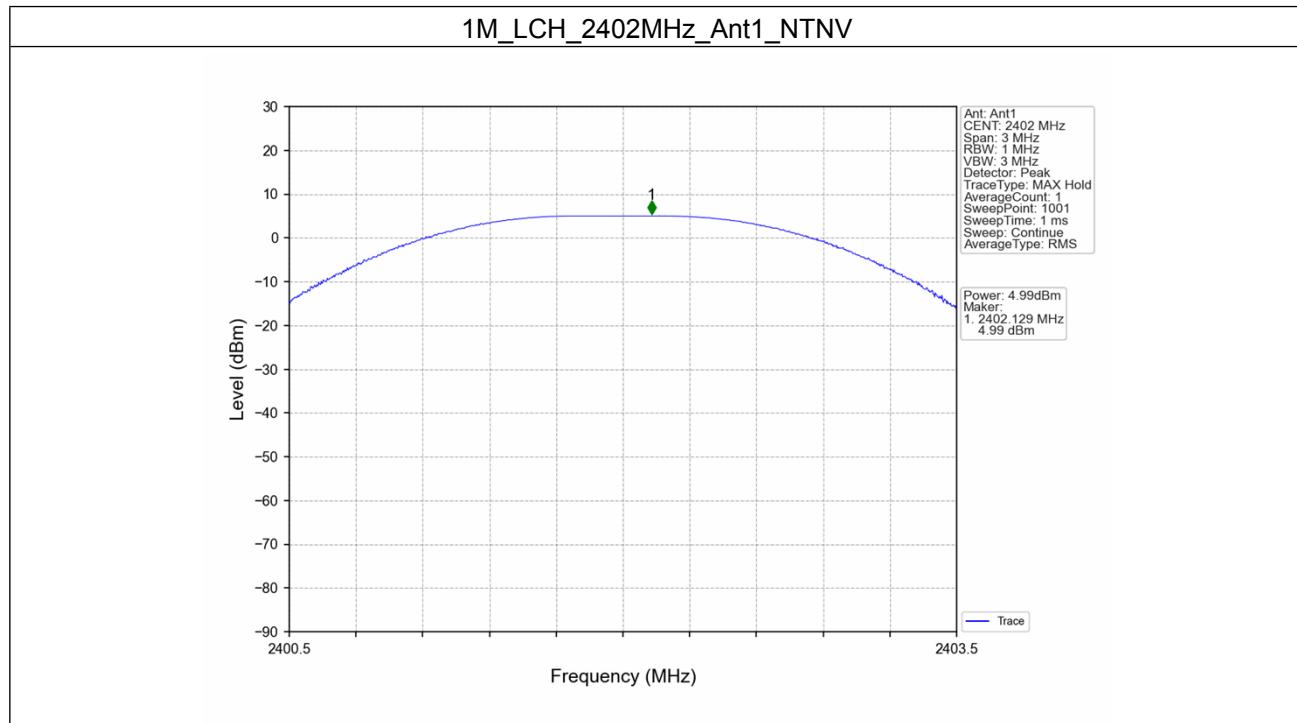
3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	4.99	<=30	Pass
		2440	-14.97	<=30	Pass
		2480	4.63	<=30	Pass

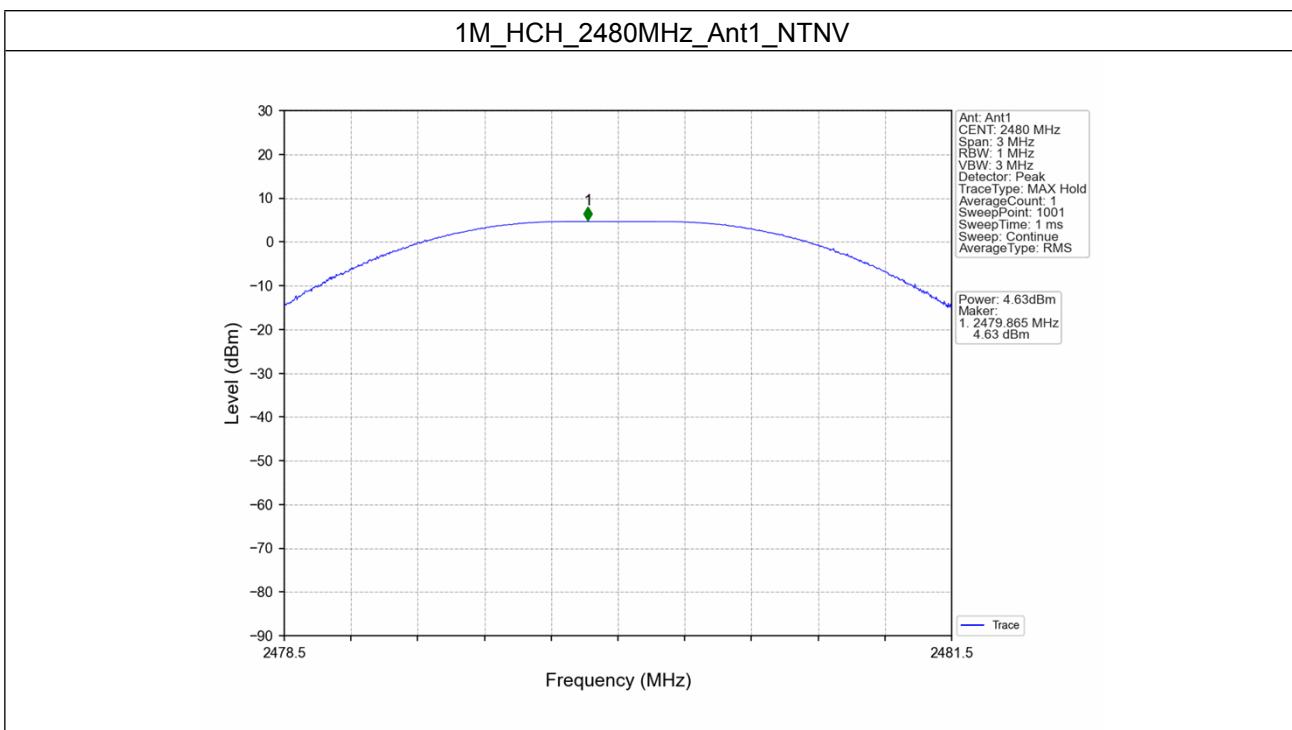
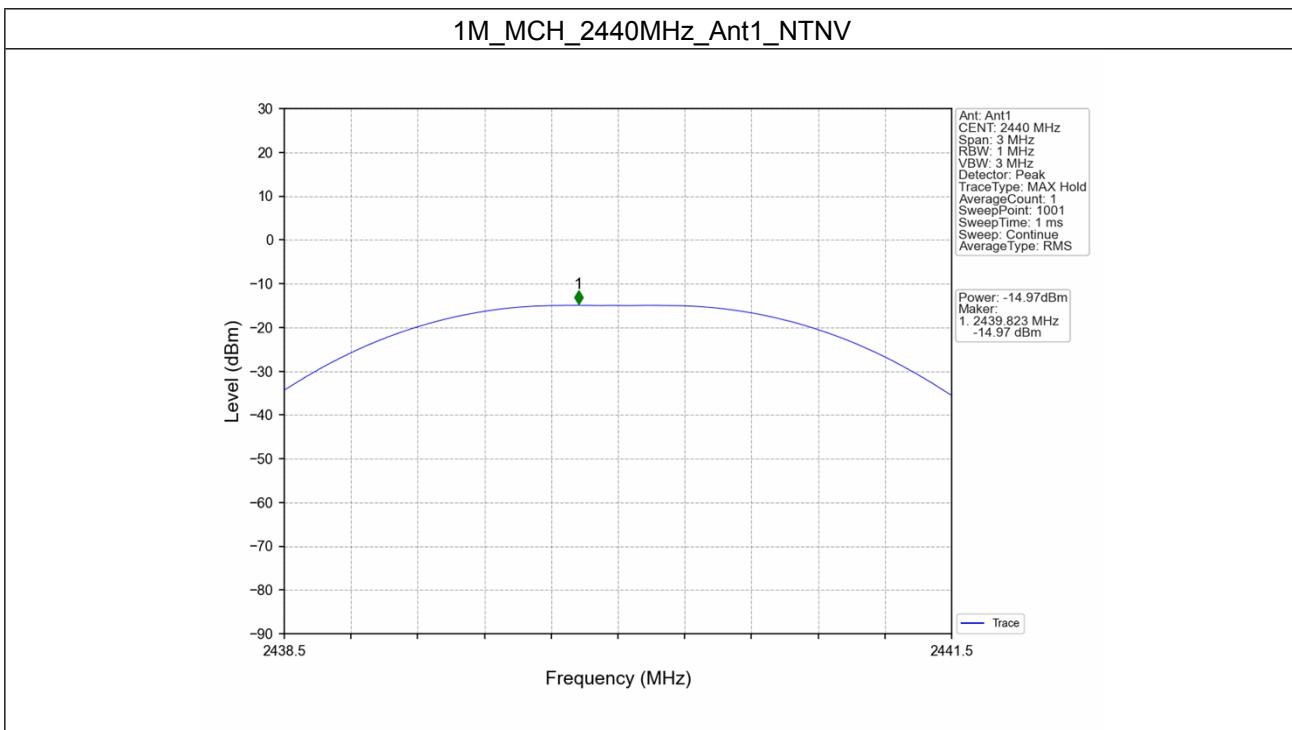
Note1: Antenna Gain: Ant1: 1.29dBi;

3.1.2 Test Graph



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4. Maximum Power Spectral Density

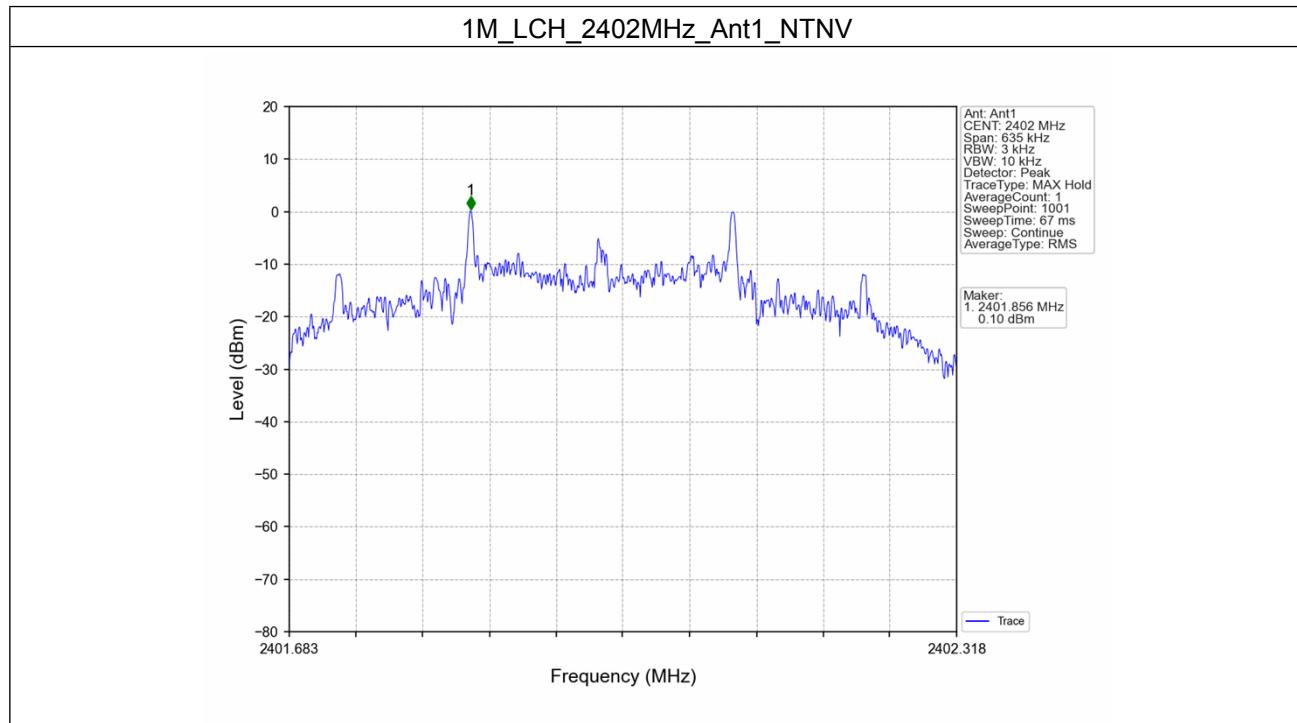
4.1 PSD

4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	0.10	<=8	Pass
		2440	-29.42	<=8	Pass
		2480	1.11	<=8	Pass

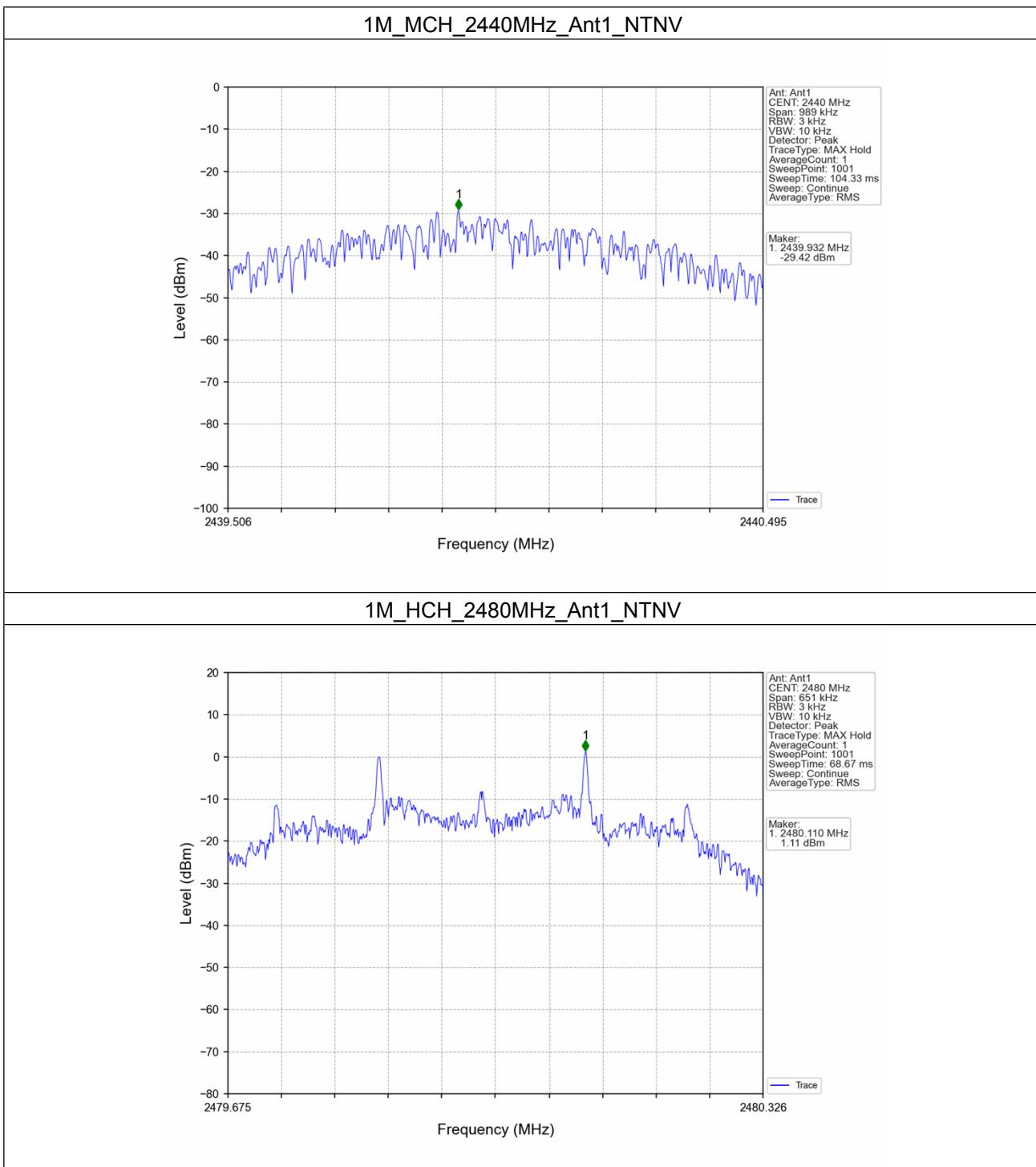
Note1: Antenna Gain: Ant1: 1.29dBi;

4.1.2 Test Graph



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5. Unwanted Emissions In Non-restricted Frequency Bands

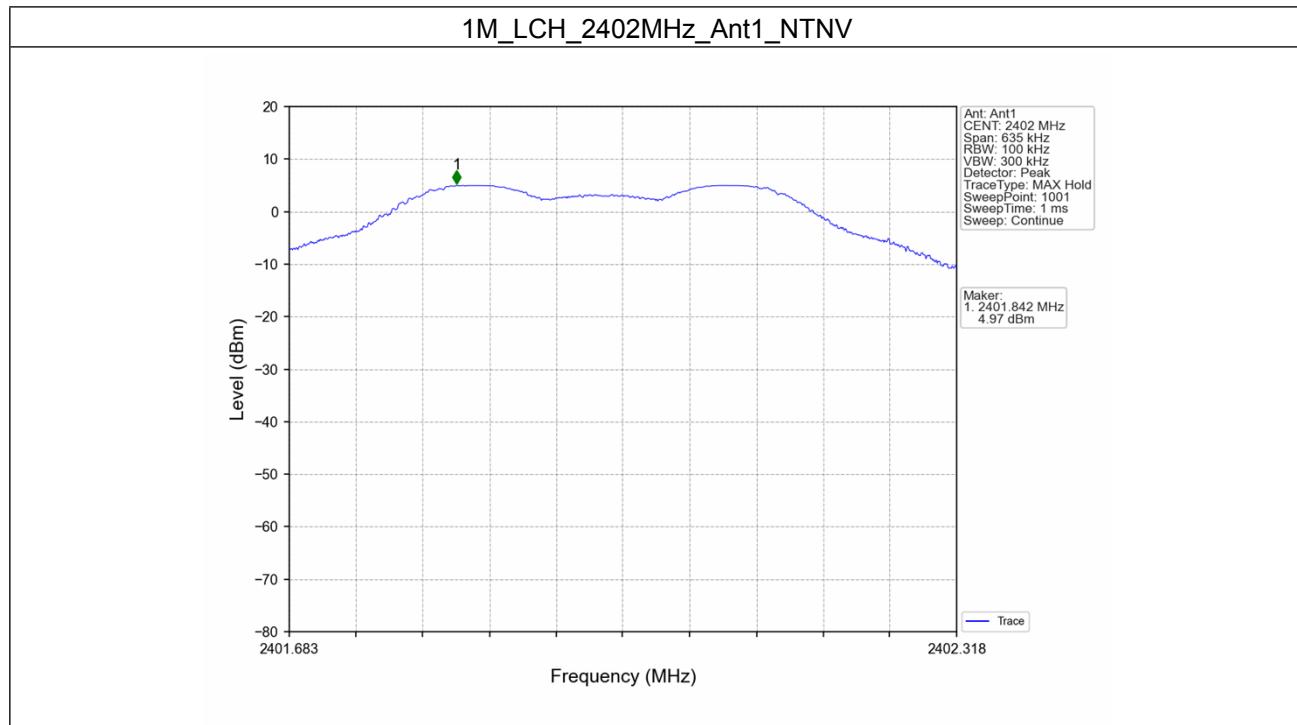
5.1 Ref

5.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	4.97
		2440	1	0.48
		2480	1	4.62

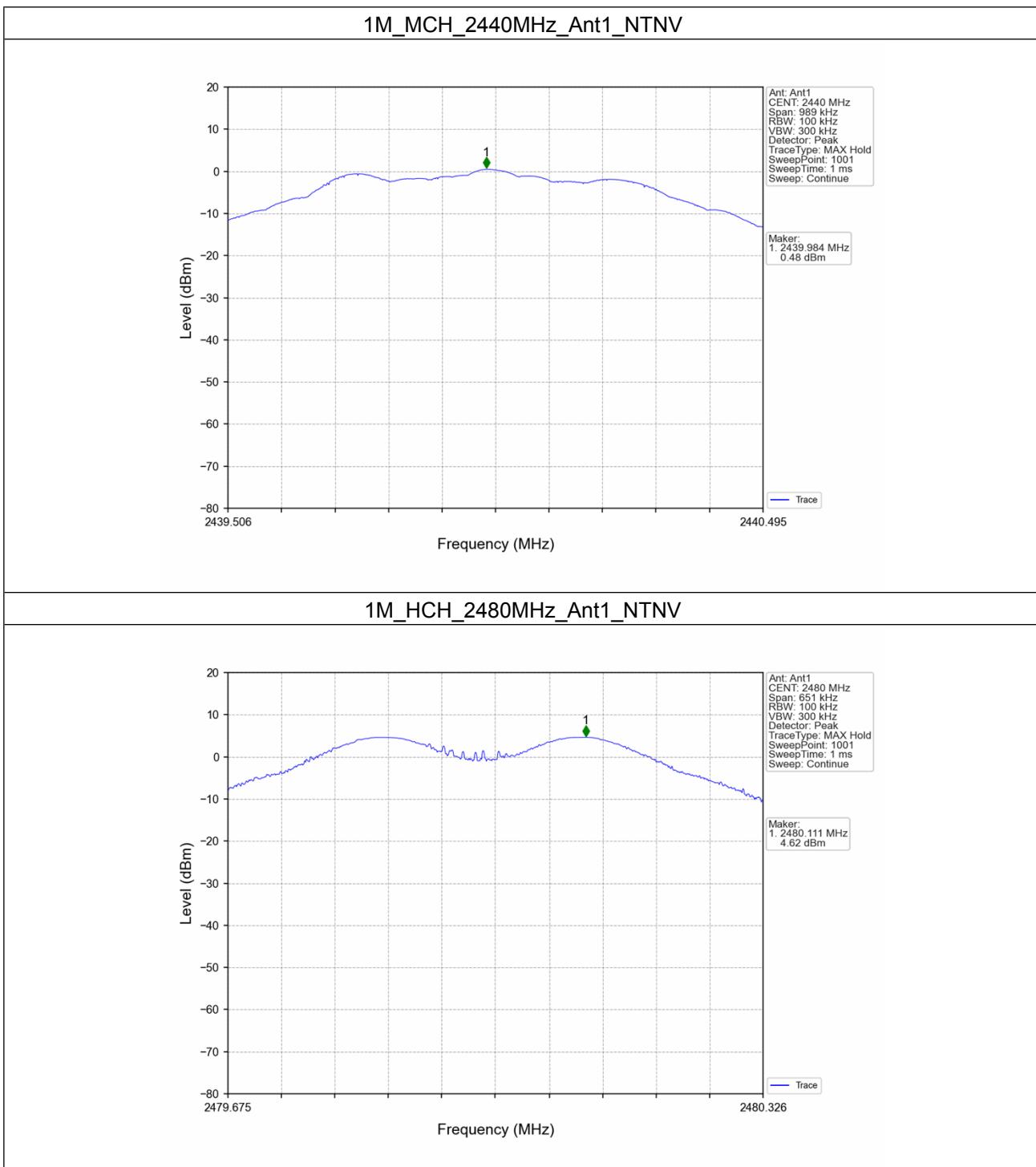
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

5.1.2 Test Graph



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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	4.97	-15.03	Pass
		2440	1	4.97	-25.03	Pass
		2480	1	4.97	-15.03	Pass

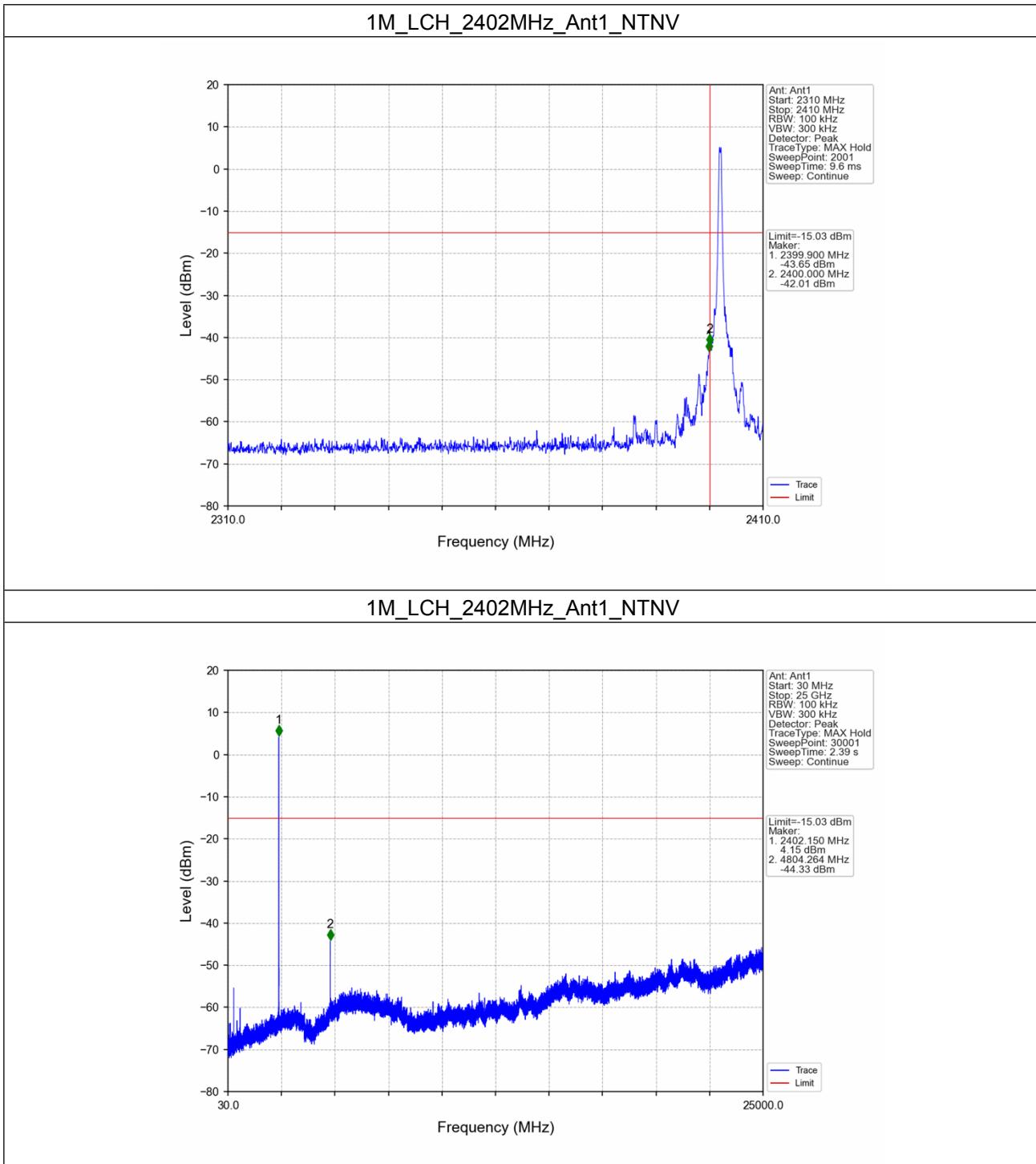
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



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5.2.2 Test Graph



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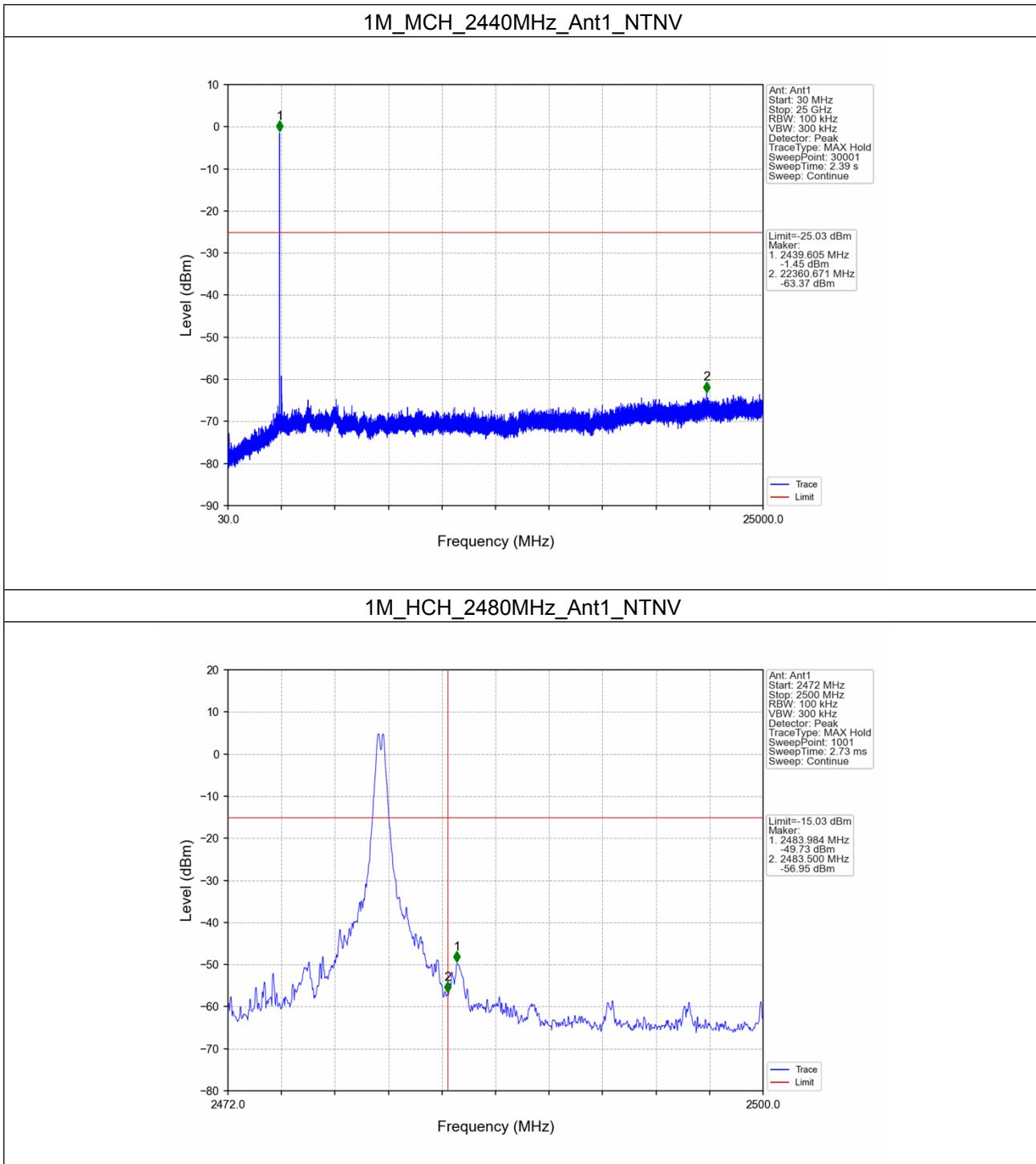
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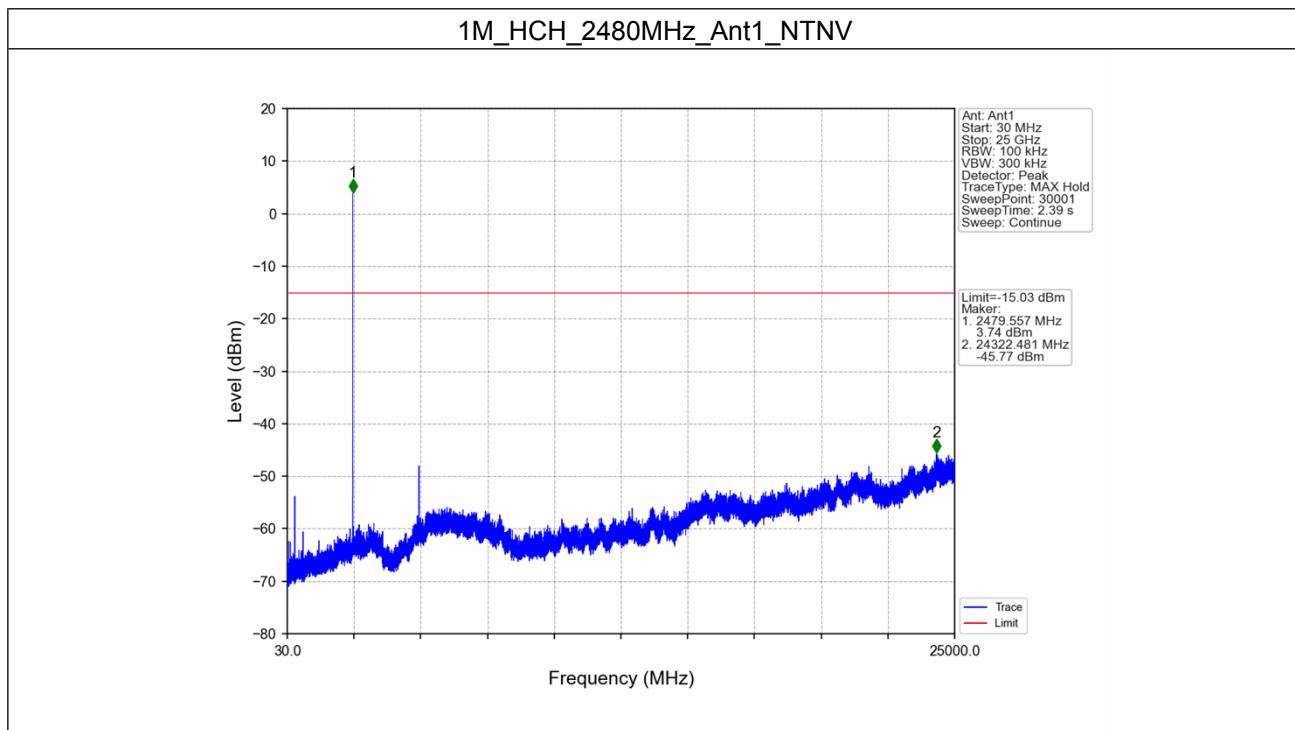
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6. Frequency Stability

6.1 Ant1

6.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VDC)	Measured Frequency (MHz)	Limit (MHz)	Verdict
CW	SISO	2402	20	8.9	2401.982	2400 to 2483.5	Pass
				13.5	2401.979		Pass
				17.6	2401.979		Pass
			-10	13.5	2401.978		Pass
			0	13.5	2401.977		Pass
			10	13.5	2401.969		Pass
			30	13.5	2401.975		Pass
			40	13.5	2401.976		Pass
			50	13.5	2401.977		Pass
		2440	20	8.9	2439.978		Pass
				13.5	2439.977		Pass
				17.6	2439.978		Pass
			-10	13.5	2439.975		Pass
			0	13.5	2439.973		Pass
			10	13.5	2439.978		Pass
			30	13.5	2439.975		Pass
		2480	20	8.9	2479.977		Pass
				13.5	2479.977		Pass
				17.6	2479.976		Pass
			-10	13.5	2479.976		Pass
			0	13.5	2479.972		Pass
			10	13.5	2479.976		Pass
			30	13.5	2479.978		Pass
			40	13.5	2479.979		Pass
			50	13.5	2479.976		Pass

- End of the Report -

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