TEST REPORT

Application No.:	SZEM2007006436CR
Applicant:	Skullcandy Inc.
Address of Applicant:	6301 N Landmark Dr, Park City, Utah 84098, United States
Manufacturer:	Skullcandy Inc.
Address of Manufacturer:	6301 N Landmark Dr, Park City, Utah 84098, United States
Equipment Under Test (EUT):	
EUT Name:	Hesh ANC
Model No.:	S6HHW
Trade mark:	Skullcandy
FCC ID:	Y22-S6HHW
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2020-07-14
Date of Test:	2020-07-16 to 2020-08-01
Date of Issue:	2020-08-01
Test Result:	**Pass***

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

Keny Xu
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020-08-01		Original

Authorized for issue by:				
		Benson Wang **Benson/Project Engineer**		
		Eric Fu **Eric Fu/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	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	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	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

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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 CABLE 6
4.3 DESCRIPTION OF SUPPORT UNITS 6
4.4 MEASUREMENT UNCERTAINTY 6
4.5 TEST LOCATION 7
4.6 TEST FACILITY 7
4.7 DEVIATION FROM STANDARDS 7
4.8 ABNORMALITIES FROM STANDARD CONDITIONS 7

5 EQUIPMENT LIST 8

6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10

6.1 ANTENNA REQUIREMENT 10
6.1.1 Test Requirement: 10
6.1.2 Conclusion 10

7 RADIO SPECTRUM MATTER TEST RESULTS 11

7.1 CONDUCTED PEAK OUTPUT POWER 11
7.1.1 E.U.T. Operation 11
7.1.2 Test Mode Description 11
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 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 18

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7.5.4 Measurement Procedure and Data....18
7.6 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS 19
7.6.1 E.U.T. Operation....19
7.6.2 Test Mode Description....19
7.6.3 Test Setup Diagram....19
7.6.4 Measurement Procedure and Data....20
7.7 RADIATED SPURIOUS EMISSIONS 25
7.7.1 E.U.T. Operation....25
7.7.2 Test Mode Description....25
7.7.3 Test Setup Diagram....26
7.7.4 Measurement Procedure and Data....27

8 TEST SETUP PHOTO....37

9 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS) 37

10 APPENDIX....38

10.1 APPENDIX 15.247 38-50

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4 General Information

4.1 Details of E.U.T.

Battery:	Rechargeable battery: 3.7V 500mAh (Charged by adapter)
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Data Rate:	Only support 1M/bit
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	4.89dBi

4.2 Cable

Cable	Length	Shielding	Core
Type-C cable	58cm	Unshielded	Non-Core
Aux in cable	125cm	Unshielded	Non-Core

4.3 Description of Support Units

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

4.4 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	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)
Radiated Spurious Emissions	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)
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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4.5 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

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5 Equipment List

Radiated Emissions and Radiated Emission which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-09	2021-07-08
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2020-04-01	2021-03-31
Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020-04-01	2021-03-31
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

Radiated Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30
EMI Test Receiver (9kHz-7GHz)	Rohde&Schwarz	ESR	SEM004-03	2020-03-24	2021-03-23
Trilog-Broadband Antenna(25MHz-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2019-08-08	2022-08-07
Pre-amplifier (9kHz-1GHz)	Sonoma Instrument Co	310N	SEM005-04	2020-04-09	2021-04-08
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2020-07-10	2021-07-09

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RF conducted					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2020-03-24	2021-03-23
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2019-09-24	2020-09-23
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23
Electric and Magnetic Field Analyzer	Narda	EHP-50F	SEM022-05	2019-11-28	2020-11-27
Electric Field Probe	WANDEL & GOLTERMANN	EMR-20	EMC0907	2020-05-20	2021-05-19
EMF Tester	Narda	ELT-400	SZE039-4	2020-07-07	2021-07-06

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-07	2021-04-06
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247

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 4.89dBi.

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

Limit:

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

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.9 °C Humidity: 54.1 % RH Atmospheric Pressure: 1005 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

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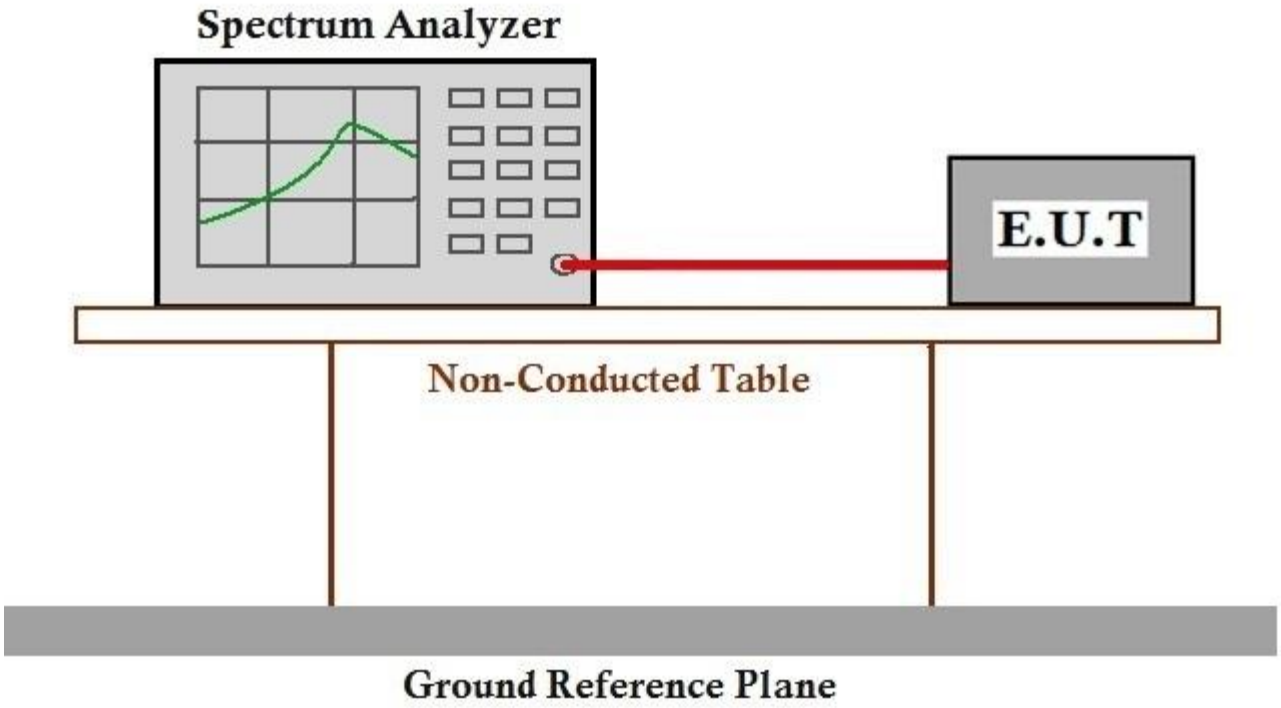
7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

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7.2 Minimum 6dB Bandwidth

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

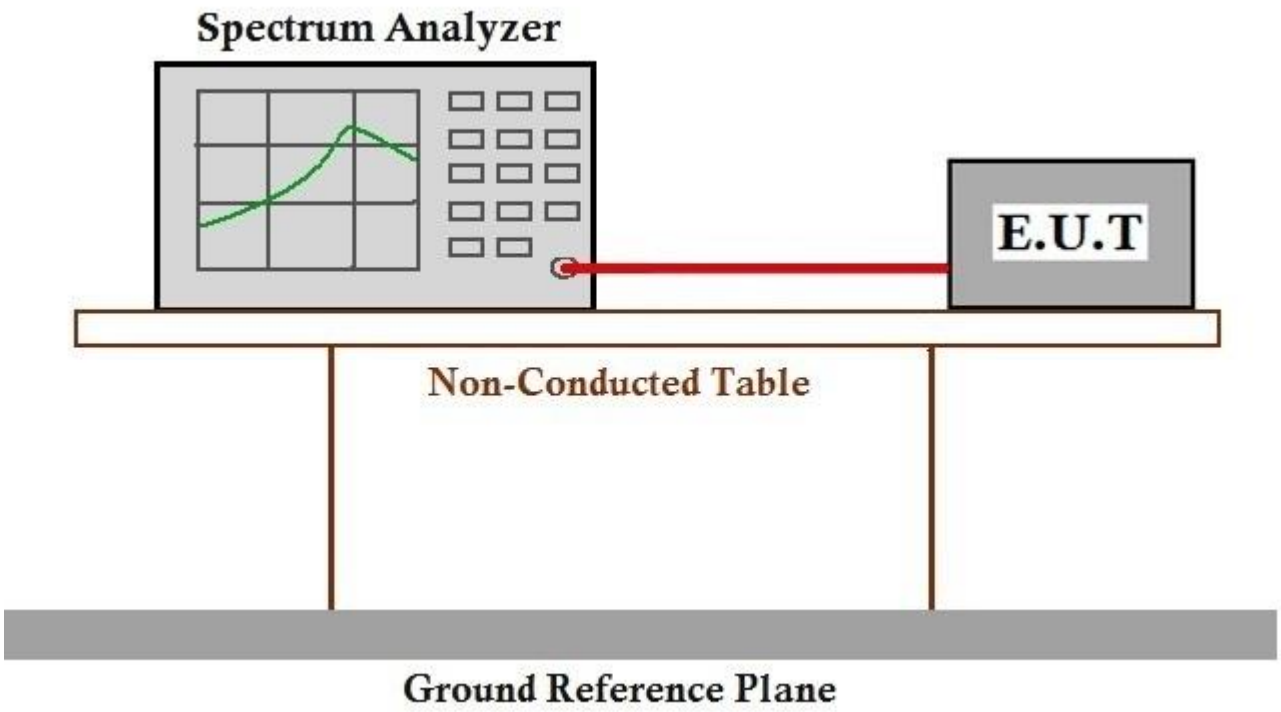
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 22.9 °C Humidity: 54.1 % RH Atmospheric Pressure: 1005 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	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

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7.3 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247

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

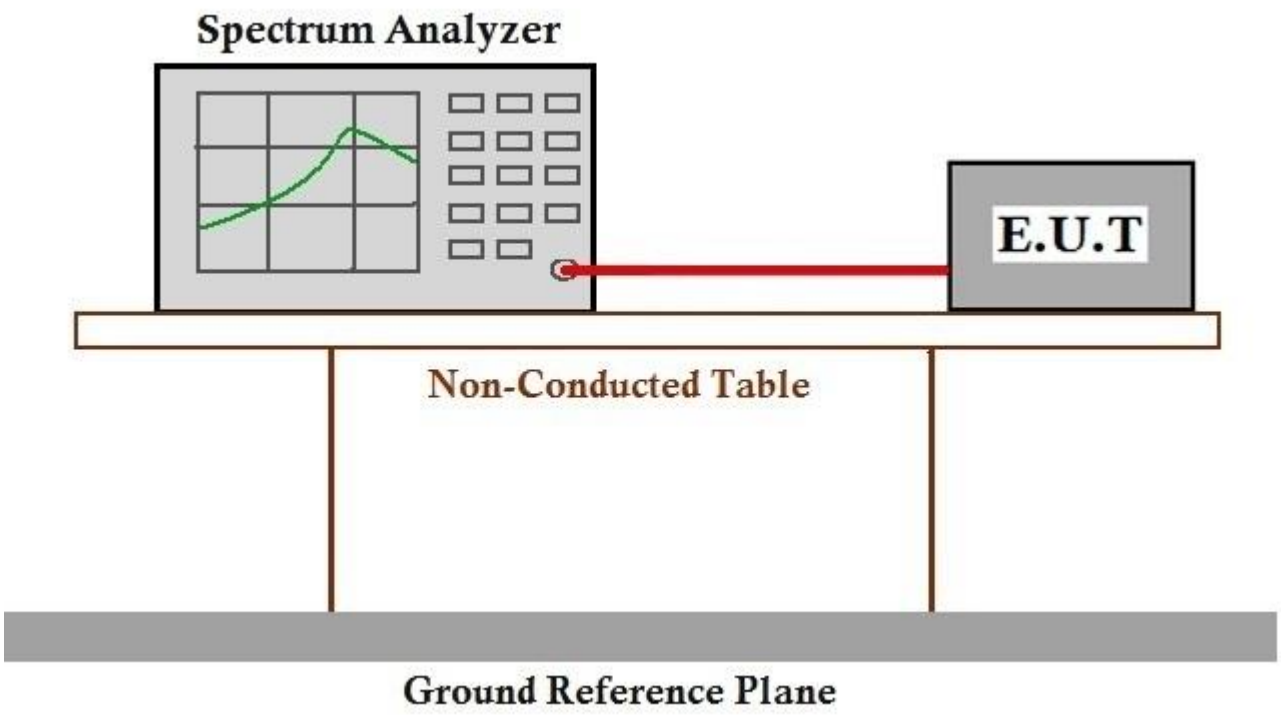
Operating Environment:

Temperature: 22.9 °C Humidity: 54.1 % RH Atmospheric Pressure: 1005 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	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

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7.4 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247
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: 22.9 °C Humidity: 54.1 % RH Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

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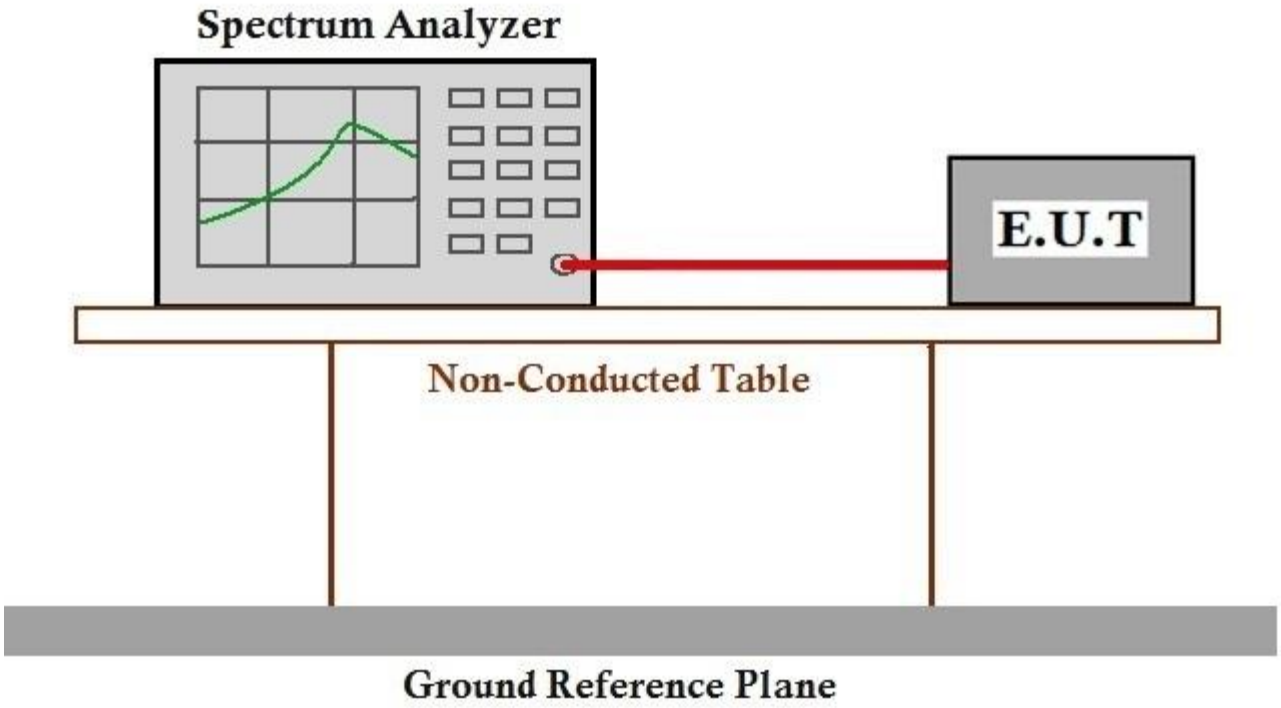
7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

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7.5 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247
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: 22.9 °C Humidity: 54.1 % RH Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

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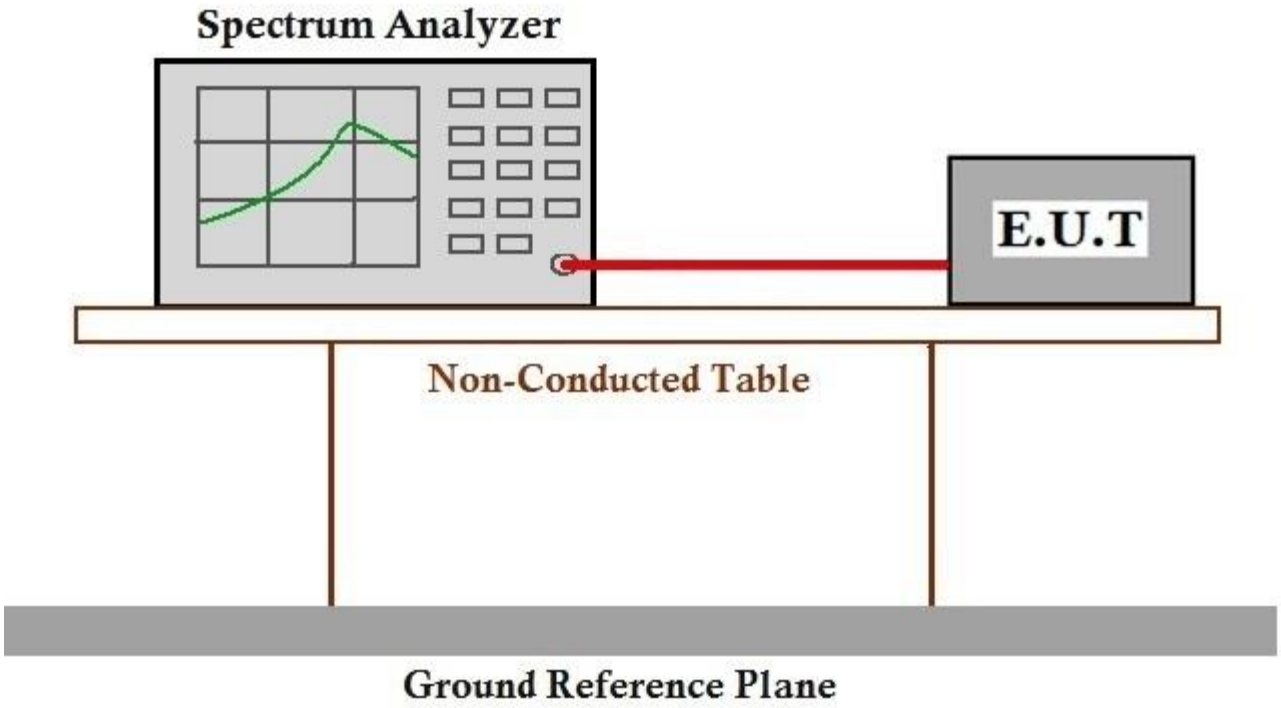
7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

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7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.247
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

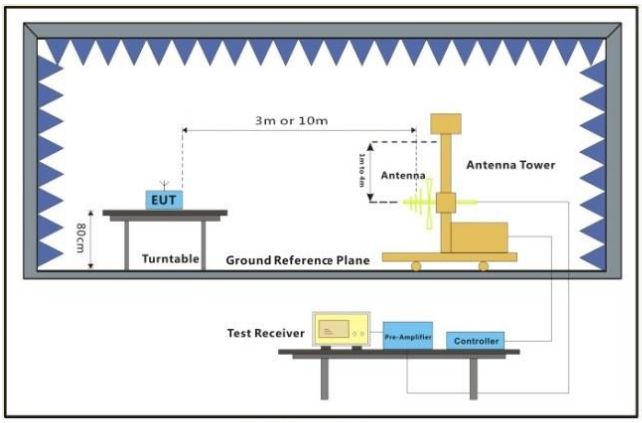
Operating Environment:

Temperature: 22.8 °C Humidity: 58.9 % RH Atmospheric Pressure: 1005 mbar

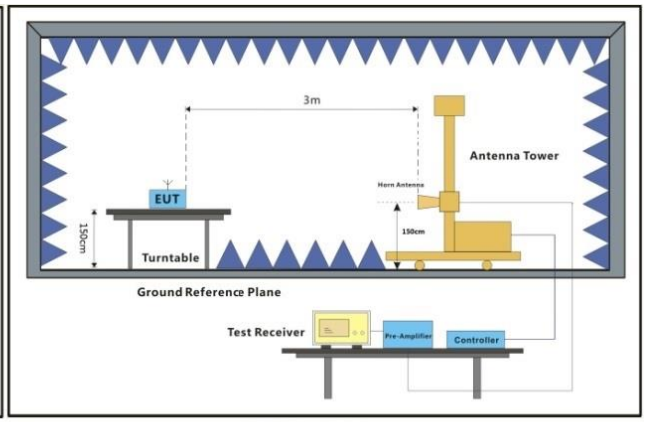
7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	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 middle channel, the Highest channel.

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

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

Remark 1: 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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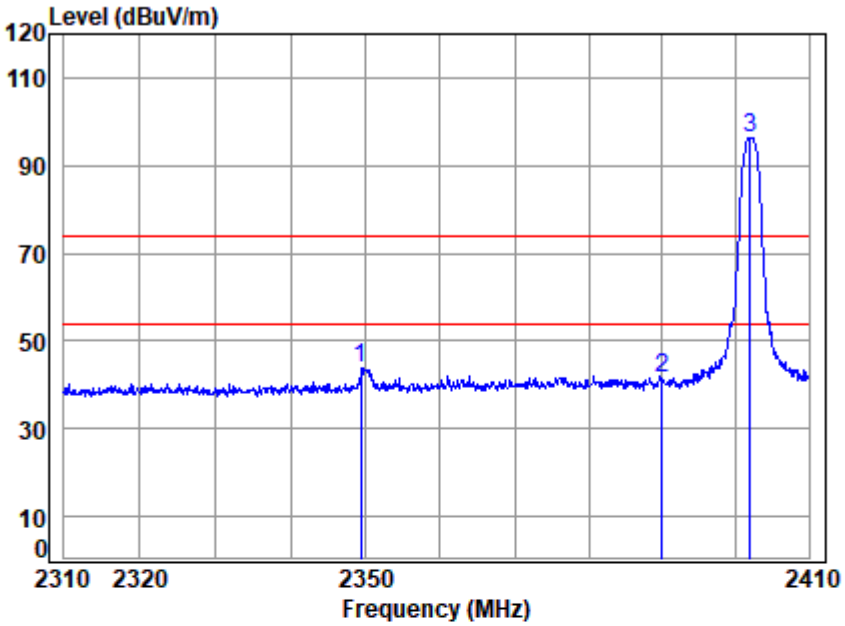
Mode: 04; Polarization: Horizontal; Channel: Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 06436CR/06437CR
Mode : 2402 Band edge
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2349.393	4.28	28.45	40.96	51.95	43.72	74.00	-30.28	peak
2	2390.000	4.34	28.52	40.97	49.45	41.34	74.00	-32.66	peak
3 *	2402.000	4.36	28.54	40.98	104.43	96.35	74.00	22.35	peak

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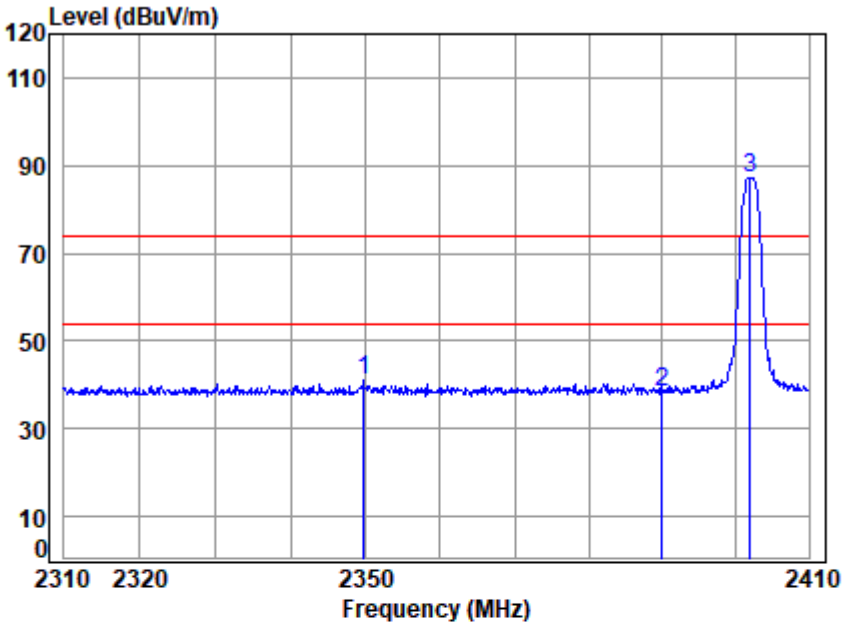
Mode :04; Polarization: Vertical; Channel: Low



Site : chamber
Condition: 3m VERTICAL
Job No : 06436CR/06437CR
Mode : 2402 Band edge
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2349.691	4.28	28.45	40.96	49.21	40.98	74.00	-33.02	peak
2	2390.000	4.34	28.52	40.97	46.37	38.26	74.00	-35.74	peak
3 *	2402.000	4.36	28.54	40.98	95.44	87.36	74.00	13.36	peak

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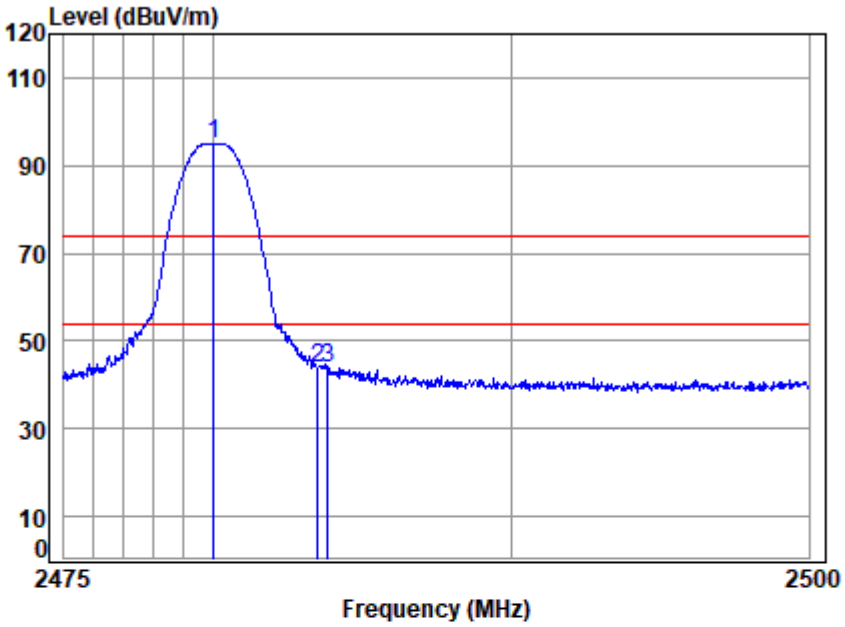
Mode: 04; Polarization: Horizontal; Channel: High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 06436CR/06437CR
Mode : 2480 Band edge
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2480.000	4.49	28.67	41.01	102.85	95.00	74.00	21.00	peak
2	2483.500	4.49	28.67	41.01	51.88	44.03	74.00	-29.97	peak
3	2483.821	4.49	28.67	41.01	51.83	43.98	74.00	-30.02	peak

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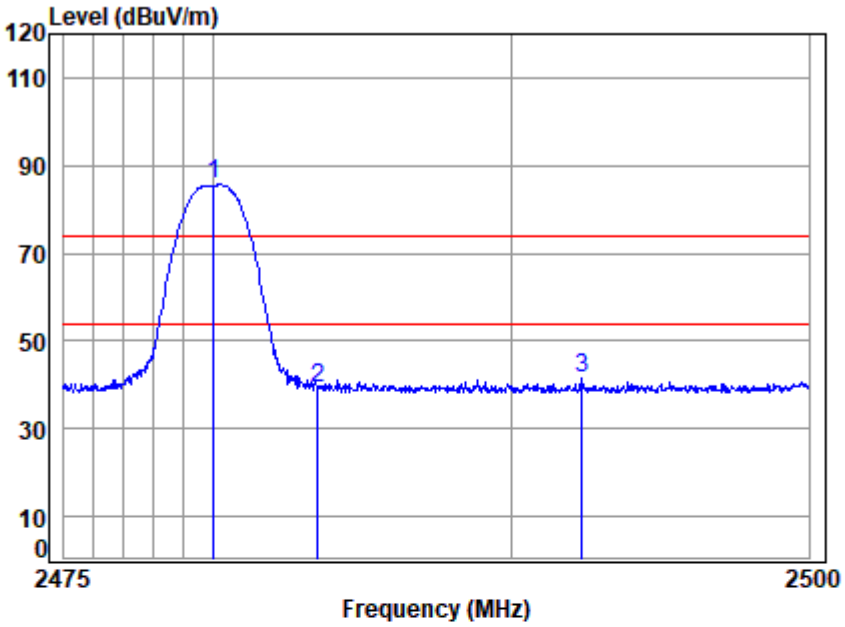
Mode :04; Polarization: Vertical; Channel: High



Site : chamber
Condition: 3m VERTICAL
Job No : 06436CR/06437CR
Mode : 2480 Band edge
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2480.000	4.49	28.67	41.01	93.48	85.63	74.00	11.63	peak
2	2483.500	4.49	28.67	41.01	47.16	39.31	74.00	-34.69	peak
3	2492.373	4.51	28.69	41.01	49.53	41.72	74.00	-32.28	peak

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7.7 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247
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: 25 °C Humidity: 45 % RH Atmospheric Pressure: 1005 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

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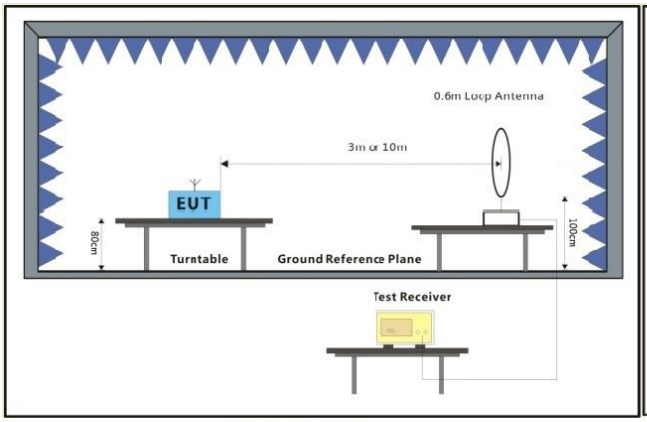
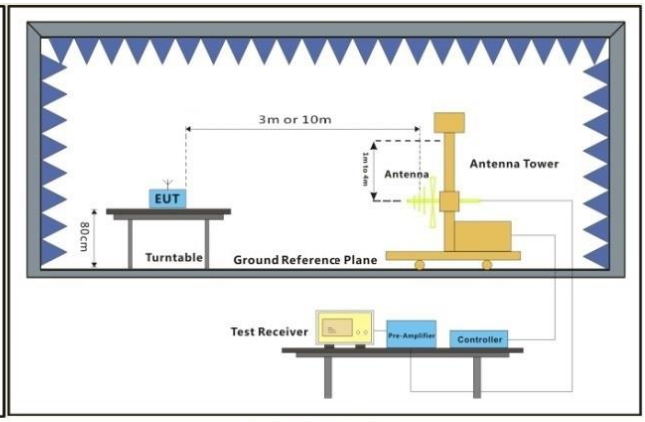
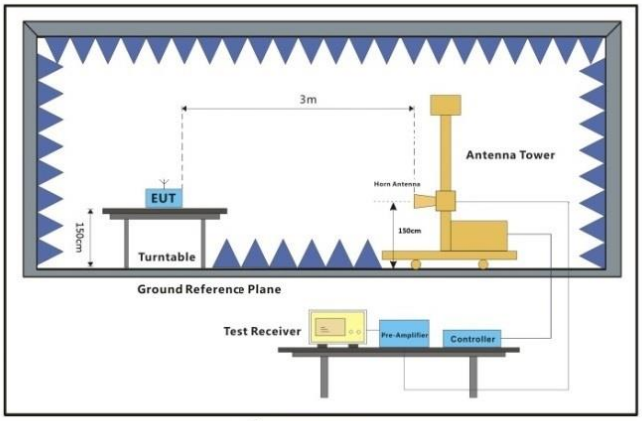
7.7.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

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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. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

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

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

Remark:

1) For emission below 1GHz, 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 25GHz, the disturbance above 18GHz and 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.

4) 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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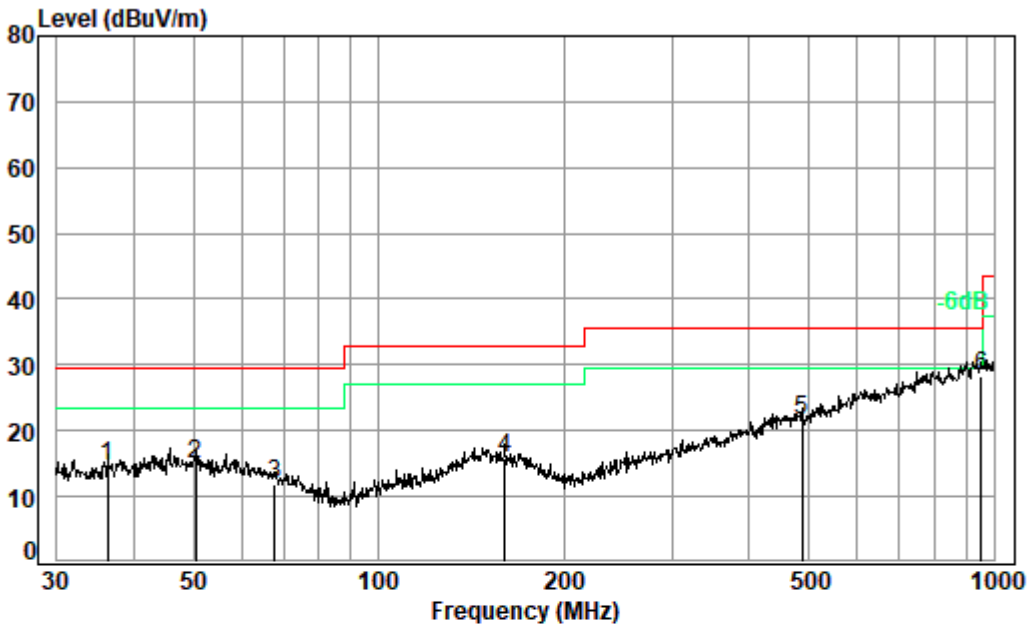
30MHz~1GHz

QP value:

Mode: 04; Polarization: Horizontal;



Condition: 10m HORIZONTAL
Job No. : 06436CR
Test Mode: 04

	Freq	Ant Factor	Preamp Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	36.254	19.57	32.41	0.90	26.41	14.47	29.50	-15.03	QP
2	50.409	20.22	32.46	0.99	26.14	14.89	29.50	-14.61	QP
3	67.913	17.92	32.39	1.07	25.13	11.73	29.50	-17.77	QP
4	160.346	19.78	32.30	1.50	26.89	15.87	33.00	-17.13	QP
5	487.315	23.85	32.43	2.87	27.21	21.50	35.60	-14.10	QP
6 pp	952.094	29.86	31.24	3.50	26.27	28.39	35.60	-7.21	QP

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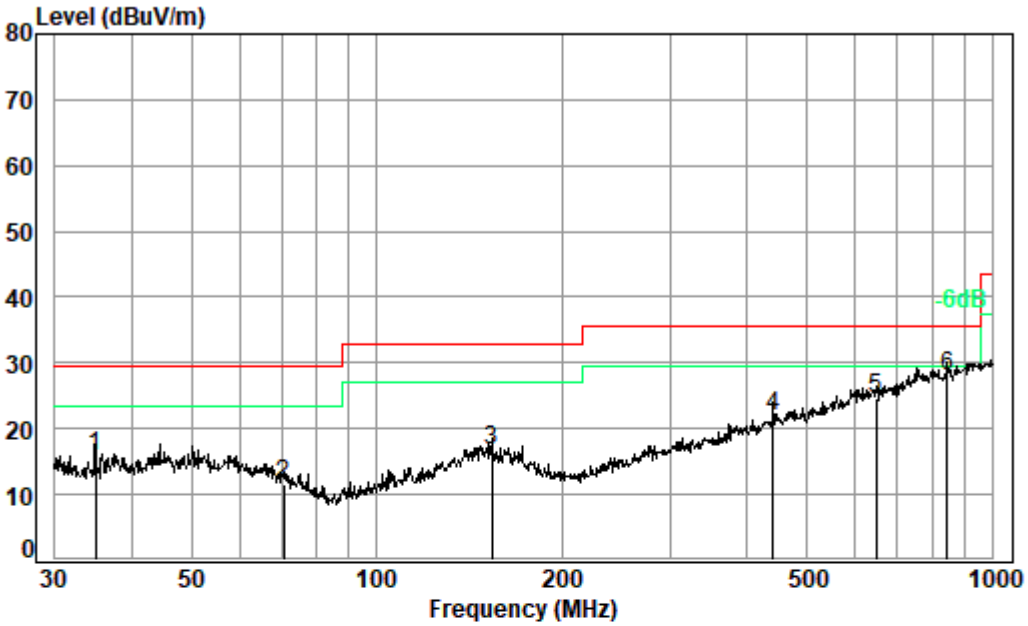
Mode :04; Polarization: Vertical



Condition: 10m VERTICAL
Job No. : 06436CR
Test Mode: 04

	Freq	Ant Factor	Preamp Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	34.882	19.44	32.40	0.89	27.83	15.76	29.50	-13.74	QP
2	70.584	17.39	32.39	1.08	25.37	11.45	29.50	-18.05	QP
3	153.739	20.05	32.30	1.48	27.37	16.60	33.00	-16.40	QP
4	440.196	23.01	32.25	2.67	28.46	21.89	35.60	-13.71	QP
5	647.386	26.45	32.14	3.20	27.08	24.59	35.60	-11.01	QP
6 pp	845.088	28.65	31.73	3.39	27.66	27.97	35.60	-7.63	QP

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The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$L_3 / L_{10} = D_{10} / D_3$

Note:

L_3: Level @ 3m distance. Unit: uV/m;

L_{10}: Level @ 10m distance. Unit: uV/m;

D_3: 3m distance. Unit: m

D_{10}: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
34.882	15.76	6.14	20.46	26.22	40.00	-13.78	V
70.584	11.45	3.74	12.46	21.91	40.00	-18.09	V
153.739	16.60	6.76	22.54	27.06	43.50	-16.44	V
440.196	21.89	12.43	41.44	32.35	46.00	-13.65	V
647.386	24.59	16.96	56.54	35.05	46.00	-10.95	V
845.088	27.97	25.03	83.44	38.43	46.00	-7.57	V
36.254	14.47	5.29	17.64	24.93	40.00	-15.07	H
50.409	14.89	5.55	18.51	25.35	40.00	-14.65	H
67.913	11.73	3.86	12.86	22.19	40.00	-17.81	H
160.346	15.87	6.22	20.72	26.33	43.50	-17.17	H
487.315	21.50	11.89	39.62	31.96	46.00	-14.04	H
952.094	28.39	26.27	87.57	38.85	46.00	-7.15	H

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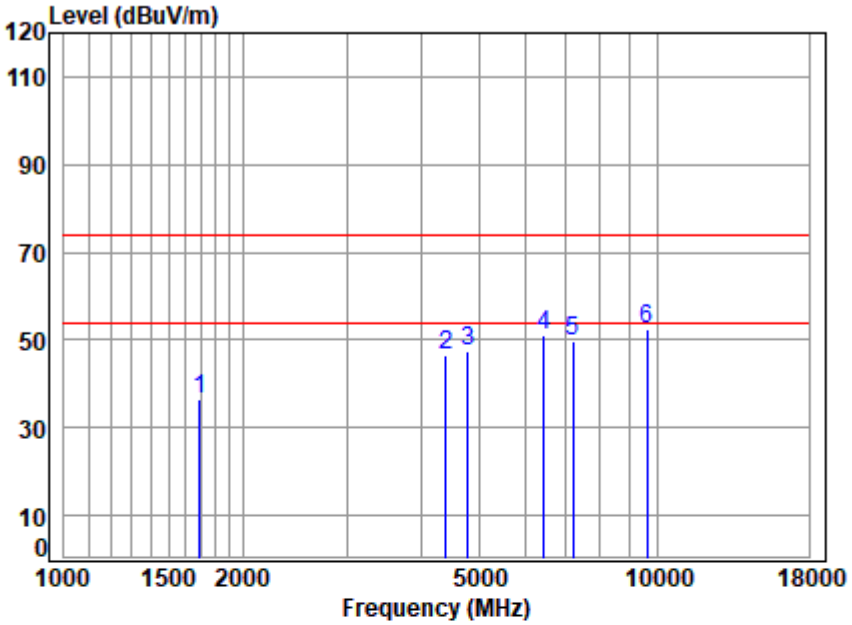
Above 1GHz

Mode: 04; Polarization: Horizontal; Channel: Low



Site : chamber
Condition: 3m Horizontal
Job No : 06436CR/06437CR
Mode : 2402 TX SE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1692.231	3.42	26.64	40.63	47.03	36.46	74.00	-37.54	peak
2	4405.090	6.67	33.44	42.48	48.87	46.50	74.00	-27.50	peak
3	4804.000	7.10	33.97	42.77	49.00	47.30	74.00	-26.70	peak
4	6432.732	8.28	35.54	41.99	49.49	51.32	74.00	-22.68	peak
5	7206.000	8.74	36.07	41.58	46.56	49.79	74.00	-24.21	peak
6	9608.000	10.81	37.67	38.57	42.61	52.52	74.00	-21.48	peak

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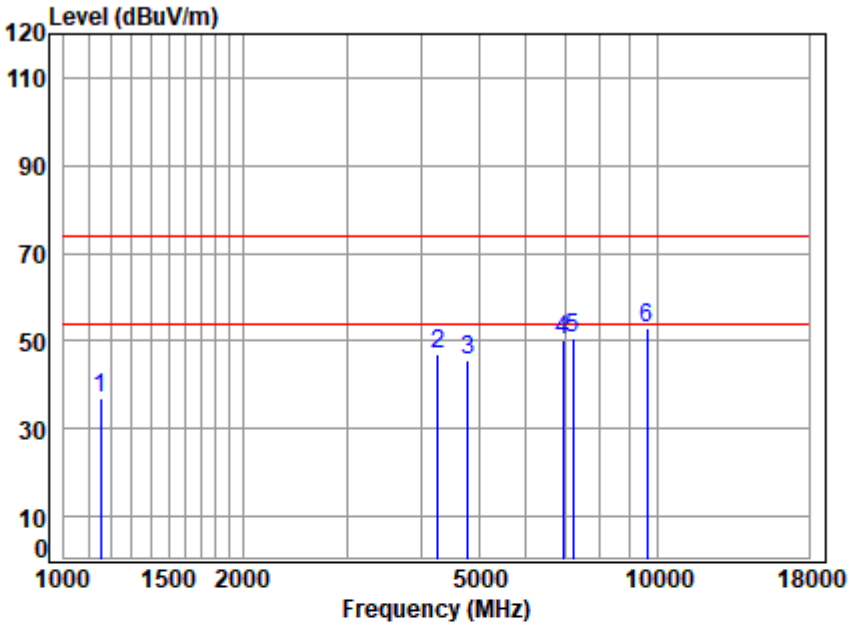
Mode :04; Polarization: Vertical; Channel: Low



Site : chamber
Condition: 3m VERTICAL
Job No : 06436CR/06437CR
Mode : 2402 TX SE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1152.148	2.67	24.37	40.24	50.08	36.88	74.00	-37.12	peak
2	4267.237	6.54	33.19	42.37	49.65	47.01	74.00	-26.99	peak
3	4804.000	7.10	33.97	42.77	47.38	45.68	74.00	-28.32	peak
4	6934.778	8.51	35.86	41.72	47.66	50.31	74.00	-23.69	peak
5	7206.000	8.74	36.07	41.58	47.42	50.65	74.00	-23.35	peak
6	9608.000	10.81	37.67	38.57	42.82	52.73	74.00	-21.27	peak

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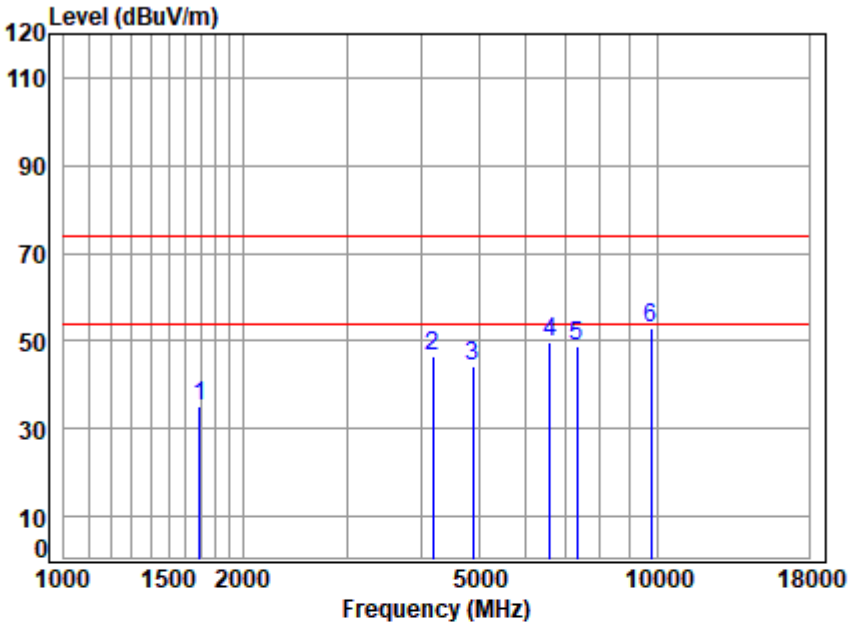
Mode: 04; Polarization: Horizontal; Channel: middle



Site : chamber
Condition: 3m HORIZONTAL
Job No : 06436CR/06437CR
Mode : 2440 TX SE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1692.231	3.42	26.64	40.63	45.93	35.36	74.00	-38.64	peak
2	4181.768	6.46	33.04	42.31	49.29	46.48	74.00	-27.52	peak
3	4880.000	7.18	34.06	42.82	46.06	44.48	74.00	-29.52	peak
4	6583.209	8.32	35.65	41.91	47.63	49.69	74.00	-24.31	peak
5	7323.000	8.85	36.16	41.52	45.30	48.79	74.00	-25.21	peak
6	9764.000	10.76	37.76	38.34	42.95	53.13	74.00	-20.87	peak

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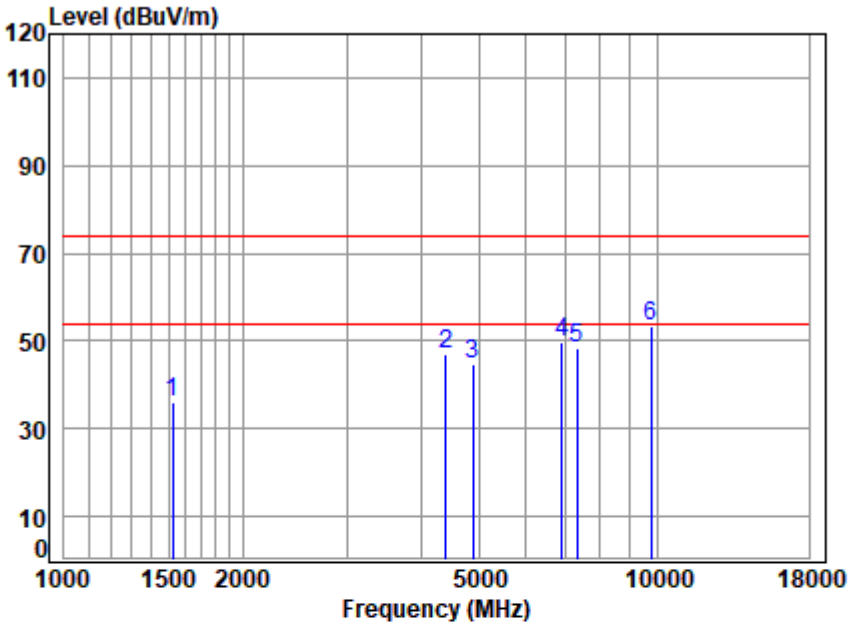
Mode :04; Polarization: Vertical; Channel: middle



Site : chamber
Condition: 3m VERTICAL
Job No : 06436CR/06437CR
Mode : 2440 TX SE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1525.000	3.28	25.91	40.52	47.44	36.11	74.00	-37.89	peak
2	4405.090	6.67	33.44	42.48	49.21	46.84	74.00	-27.16	peak
3	4880.000	7.18	34.06	42.82	46.41	44.83	74.00	-29.17	peak
4	6914.763	8.50	35.85	41.73	47.27	49.89	74.00	-24.11	peak
5	7323.000	8.85	36.16	41.52	44.78	48.27	74.00	-25.73	peak
6	9764.000	10.76	37.76	38.34	43.34	53.52	74.00	-20.48	peak

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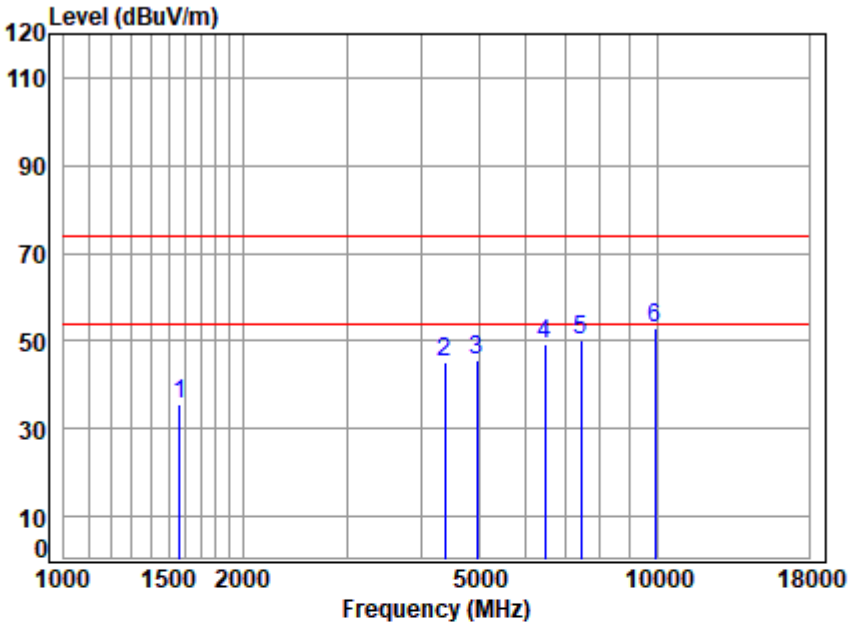
Mode: 04; Polarization: Horizontal; Channel: High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 06436CR/06437CR
Mode : 2480 TX SE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1565.191	3.32	26.10	40.55	46.68	35.55	74.00	-38.45	peak
2	4379.699	6.65	33.39	42.46	47.76	45.34	74.00	-28.66	peak
3	4960.000	7.26	34.15	42.87	47.26	45.80	74.00	-28.20	peak
4	6470.026	8.28	35.57	41.97	47.54	49.42	74.00	-24.58	peak
5	7440.000	8.96	36.25	41.46	46.42	50.17	74.00	-23.83	peak
6	9920.000	10.71	37.85	38.12	42.60	53.04	74.00	-20.96	peak

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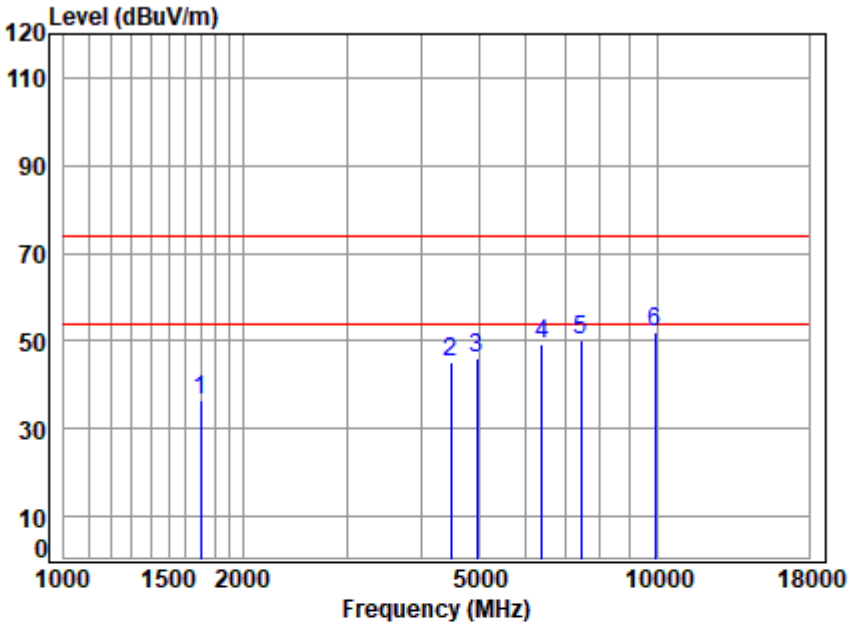
Mode :04; Polarization: Vertical; Channel: High



Site : chamber
Condition: 3m VERTICAL
Job No : 06436CR/06437CR
Mode : 2480 TX SE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1697.129	3.43	26.66	40.63	47.20	36.66	74.00	-37.34	peak
2	4495.125	6.76	33.59	42.55	47.19	44.99	74.00	-29.01	peak
3	4960.000	7.26	34.15	42.87	47.51	46.05	74.00	-27.95	peak
4	6395.654	8.28	35.50	42.01	47.59	49.36	74.00	-24.64	peak
5	7440.000	8.96	36.25	41.46	46.55	50.30	74.00	-23.70	peak
6	9920.000	10.71	37.85	38.12	41.77	52.21	74.00	-21.79	peak

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8 Test Setup Photo

Please refer to setup photo

9 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details

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10 Appendix

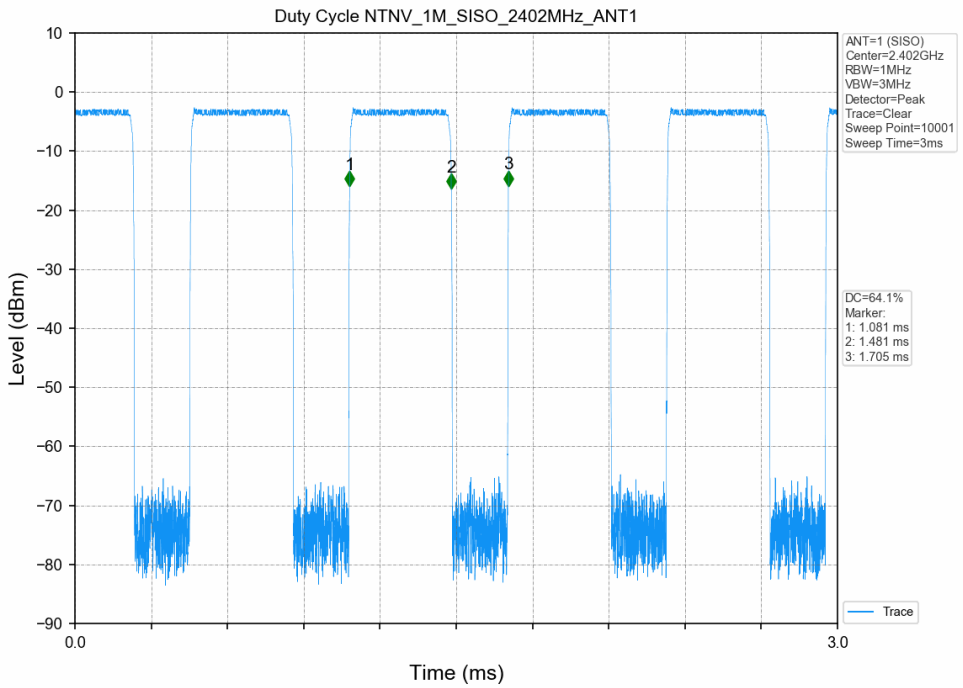
10.1 Appendix 15.247

1. Duty Cycle

1.1 Test Result

Test Mode	Channel Frequency(MHz)	TX Type	ANT No.	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1M	2402	SISO	1	0.400	0.624	64.10	1.93
	2440	SISO	1	0.400	0.625	64.00	1.94
	2480	SISO	1	0.401	0.626	64.06	1.93

1.2 Test Graph



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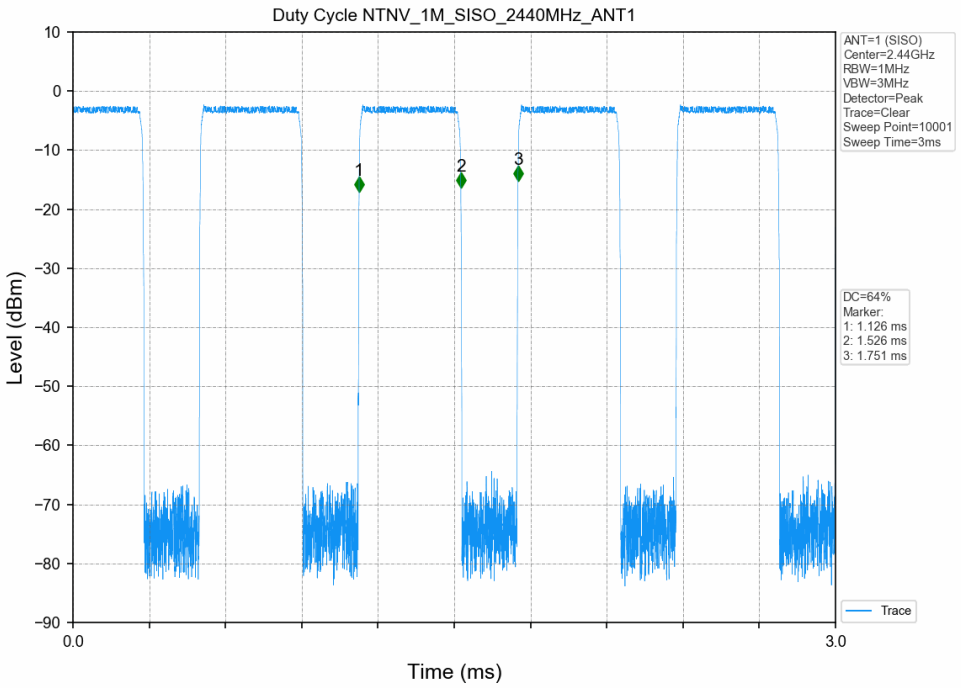

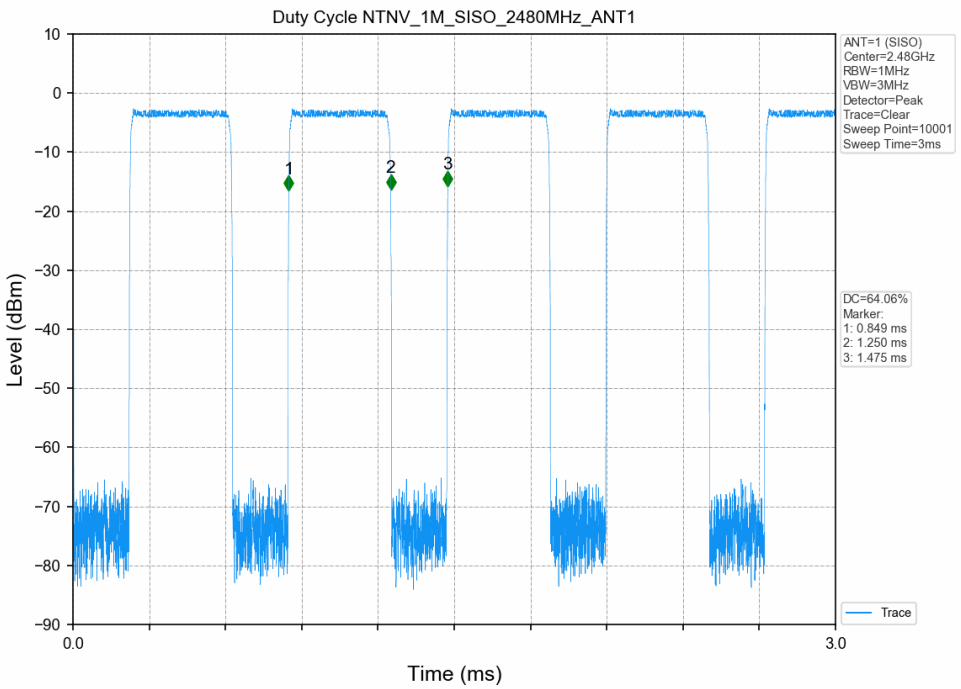

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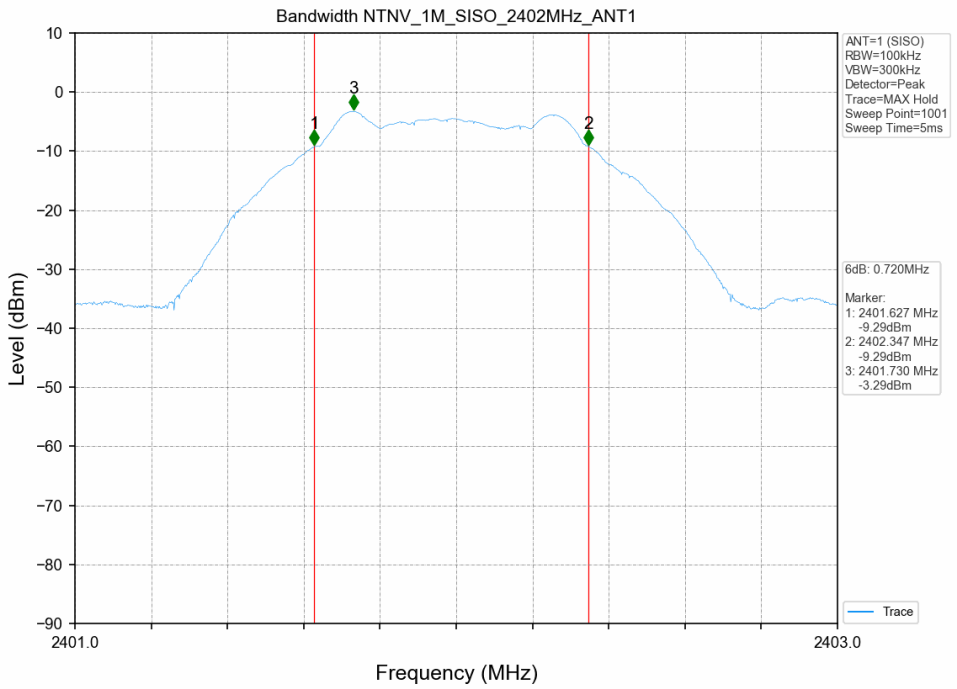
2. Bandwidth

2.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT No.	6dB Bandwidth	Verdict
				Test Result (MHz)	
1M	2402	SISO	1	0.720	PASS
	2440	SISO	1	0.711	PASS
	2480	SISO	1	0.713	PASS

Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth	
				Test Result (MHz)	
1M	2402	SISO	1	1.024	Only for Report Use
	2440	SISO	1	1.024	Only for Report Use
	2480	SISO	1	1.025	Only for Report Use

2.2 Test Graph - 6dB Bandwidth



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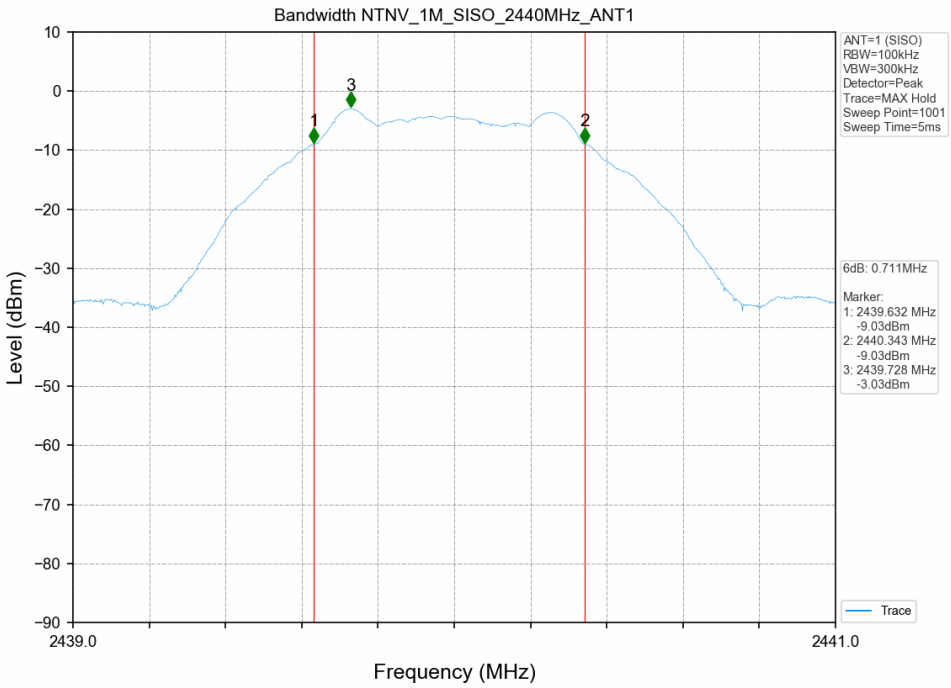

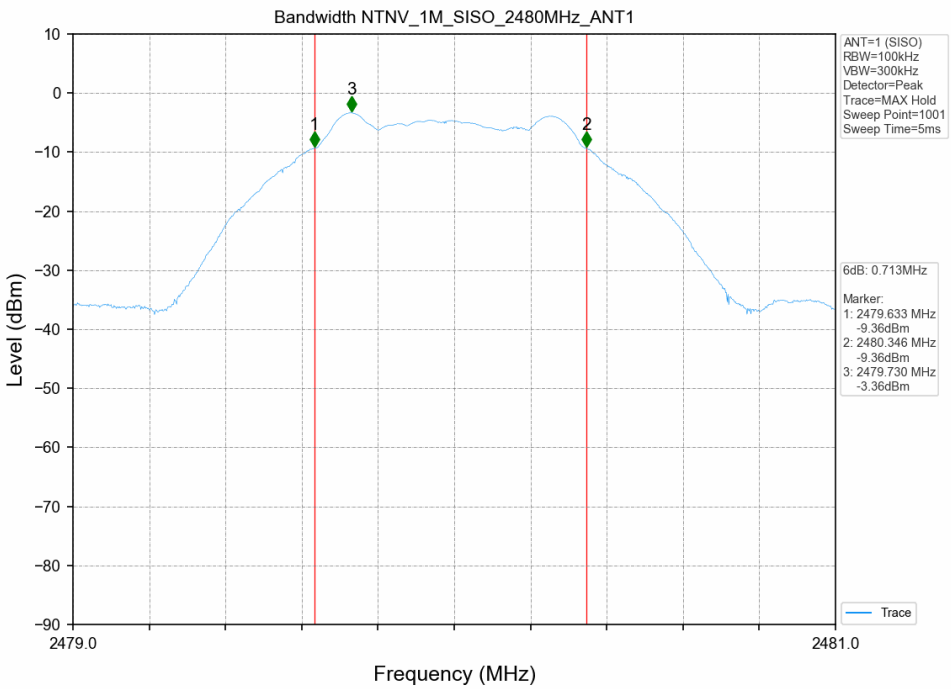

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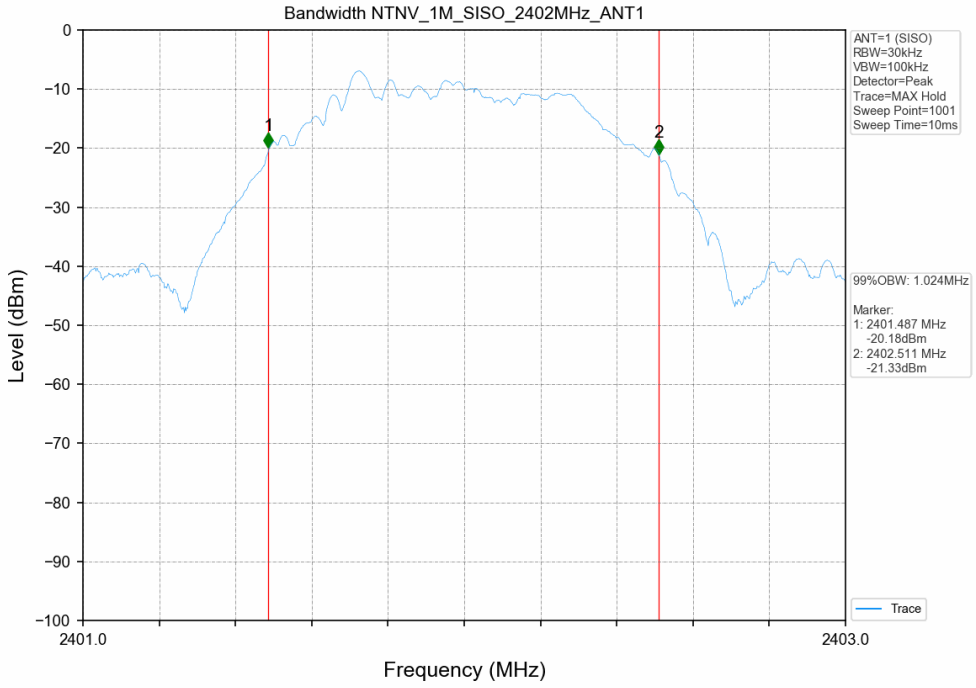
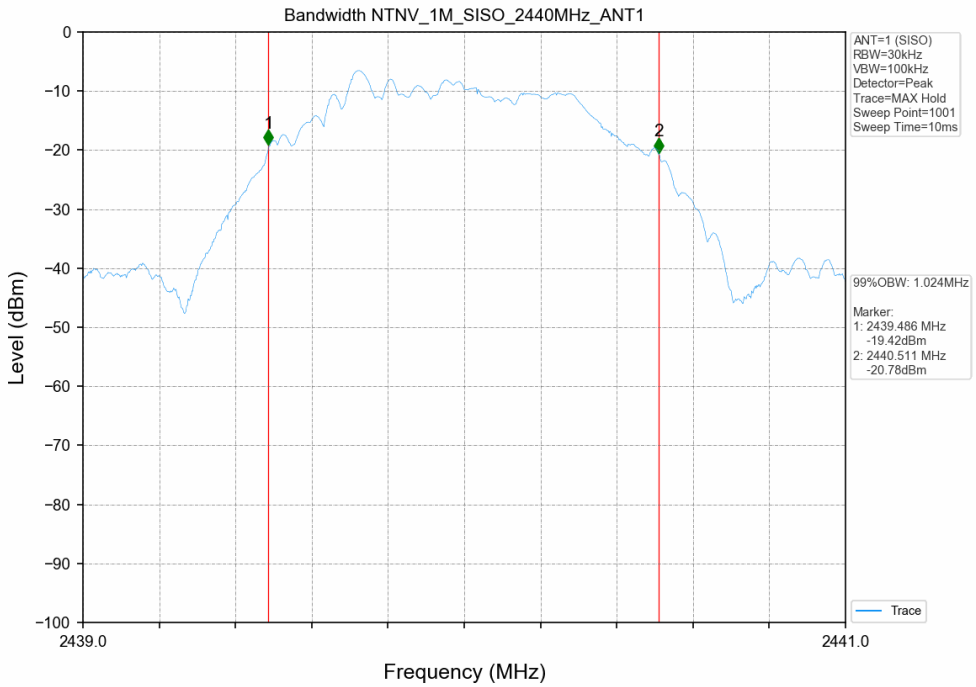
2.3 Test Graph - 99% Occupied Bandwidth





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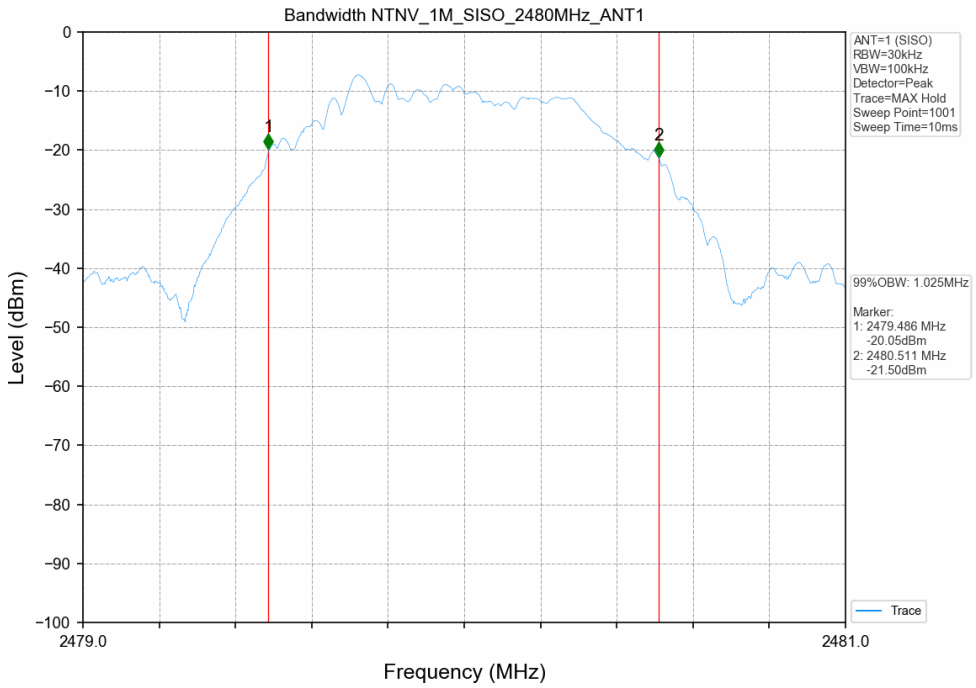

3. Maximum Conducted Output Power

3.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
1M	2402	SISO	-2.50	30	PASS
	2440	SISO	-2.27	30	PASS
	2480	SISO	-2.54	30	PASS

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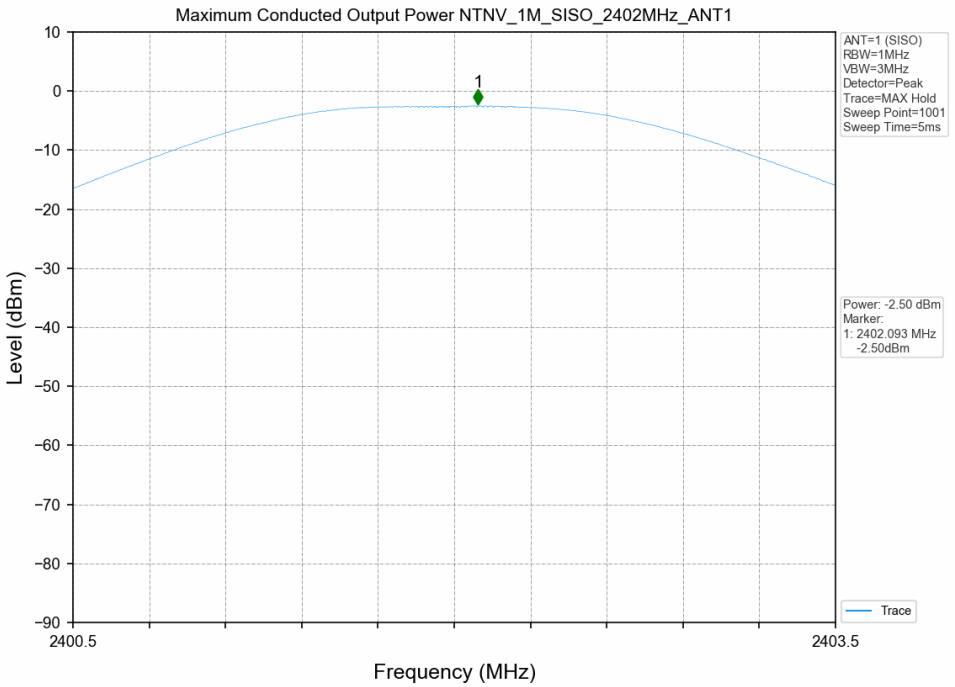
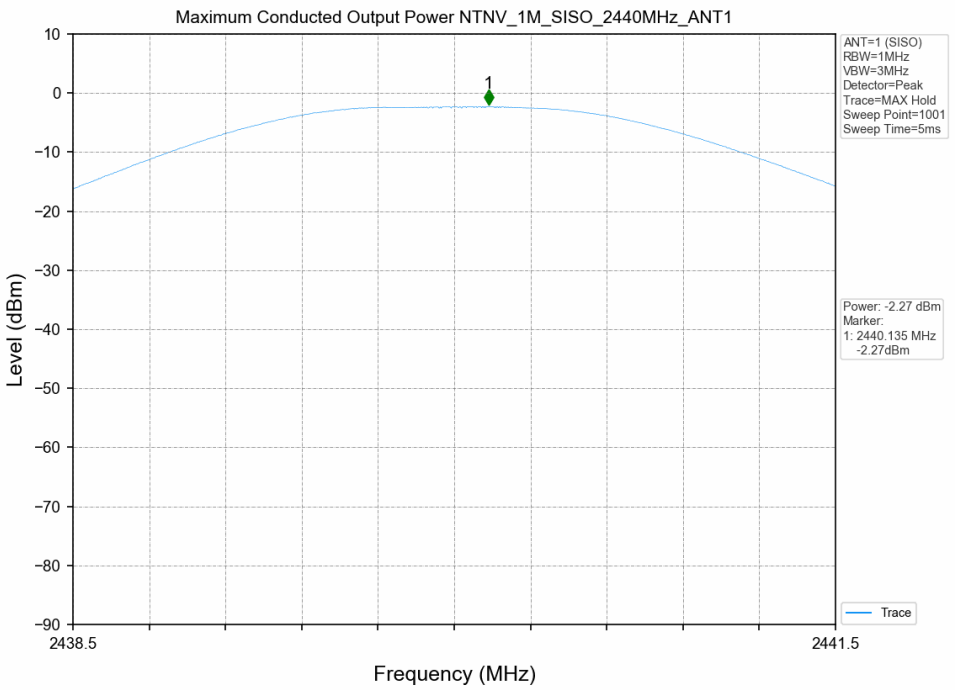
3.2 Test Graph





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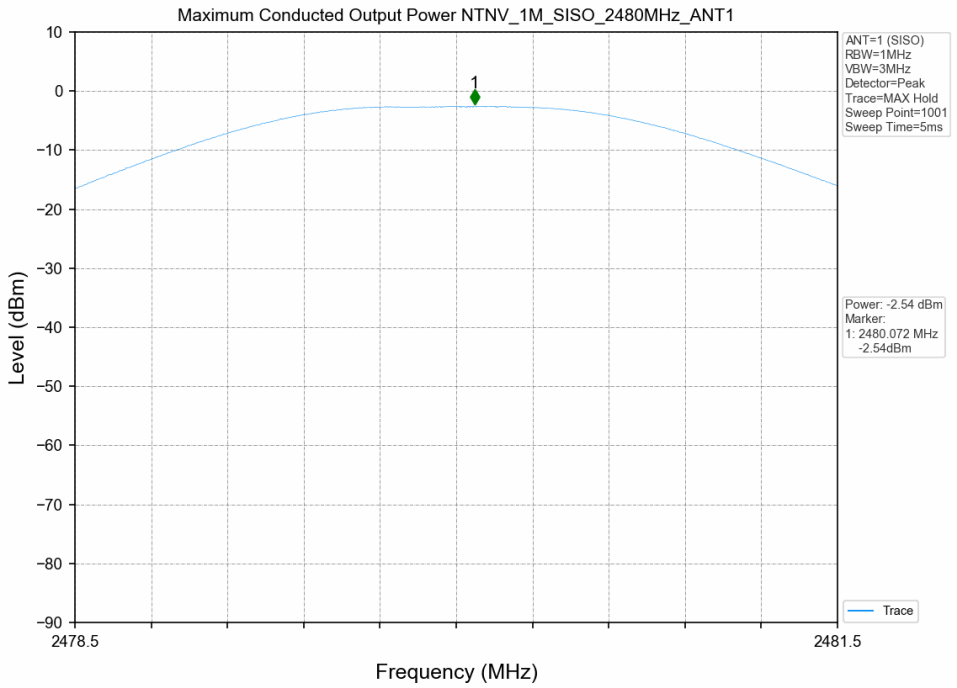

4. Maximum Power Spectral Density (PSD)

4.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
1M	2402	SISO	-18.07	≤8	PASS
	2440	SISO	-18.18	≤8	PASS
	2480	SISO	-18.20	≤8	PASS

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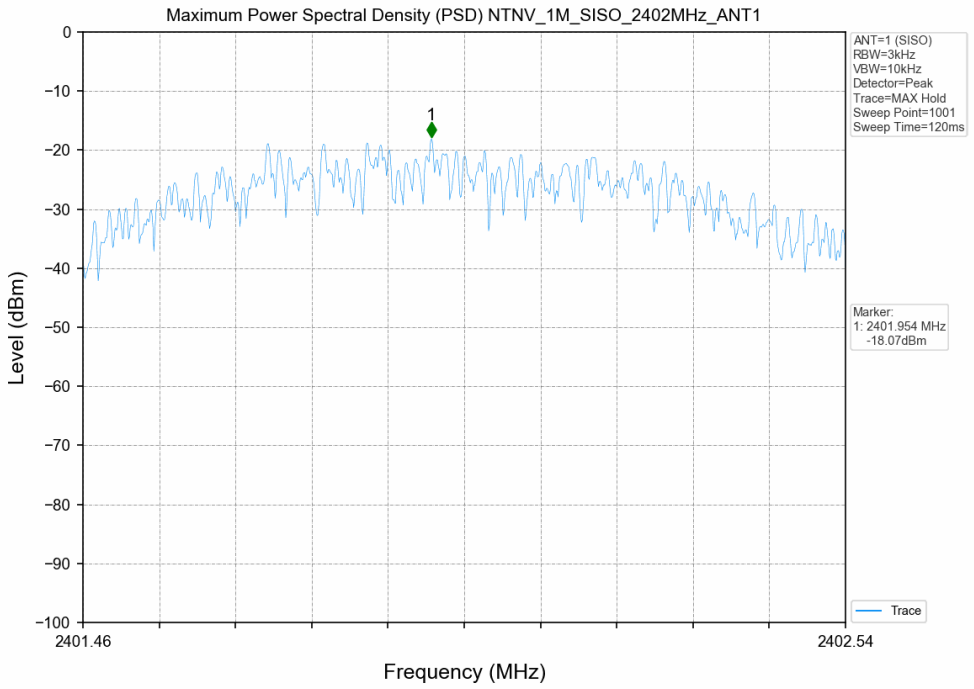
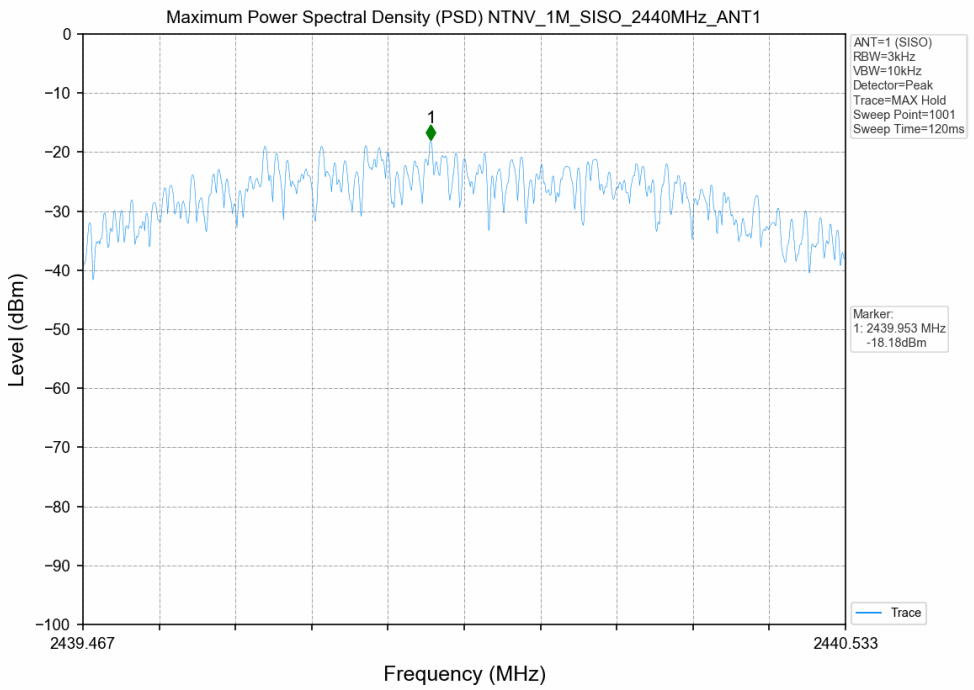
4.2 Test Graph





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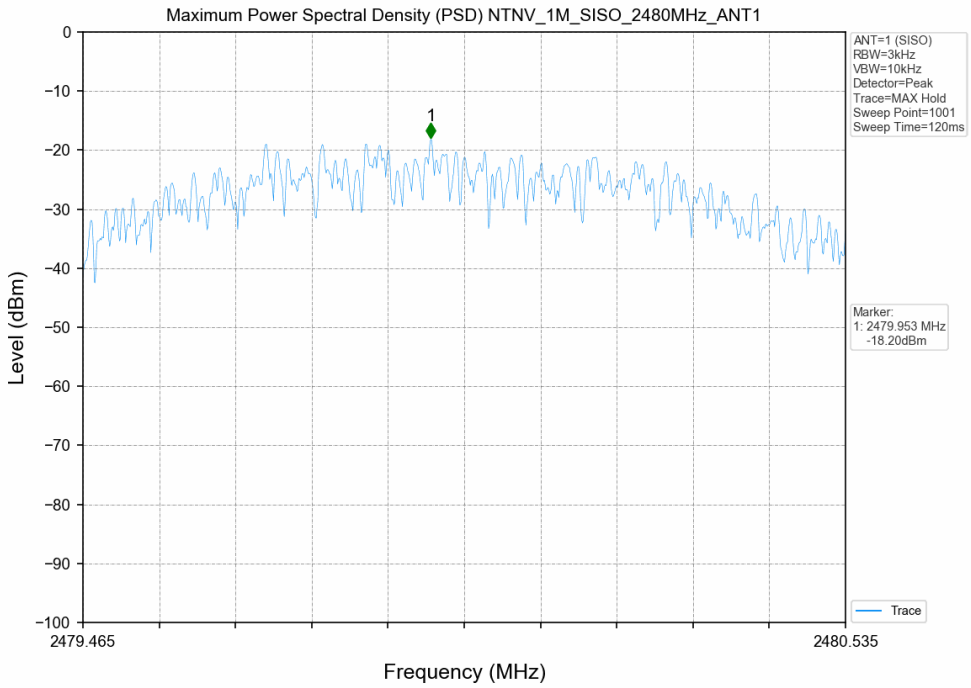

5. Unwanted Emissions in Non-restricted Frequency Bands

5.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
1M	2402	SISO	1	Refer to test graph	-23.29	PASS
	2440	SISO	1	Refer to test graph	-23.29	PASS
	2480	SISO	1	Refer to test graph	-23.29	PASS

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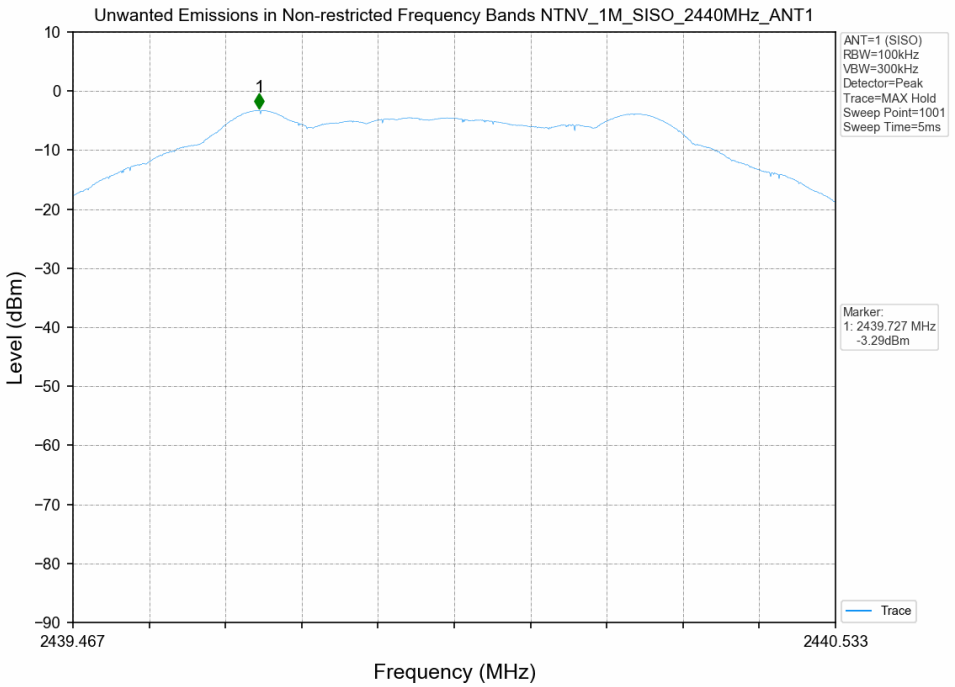
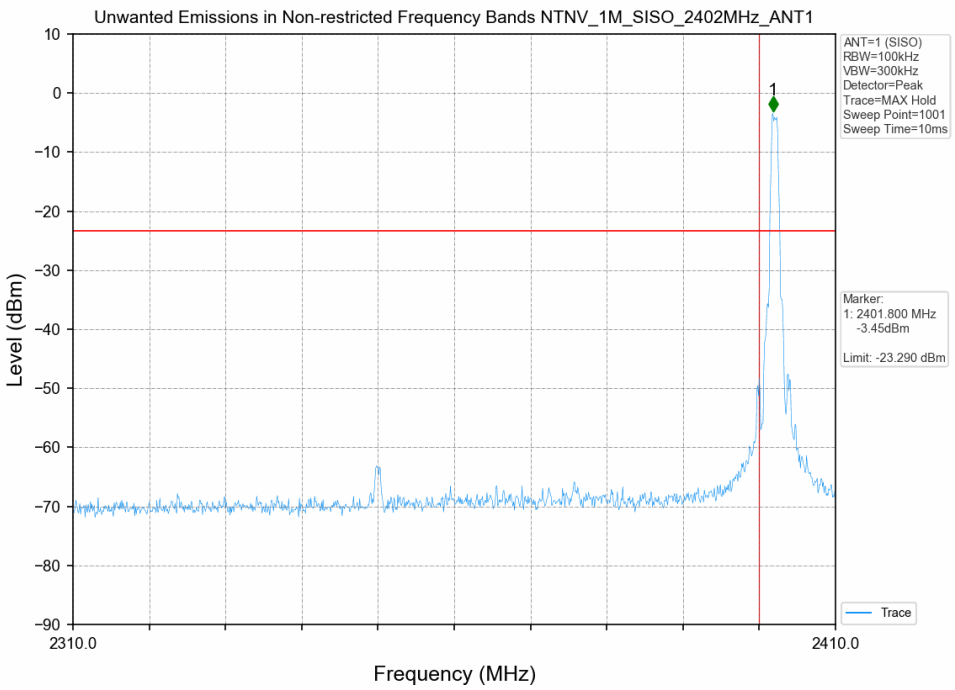
5.2 Test Graph





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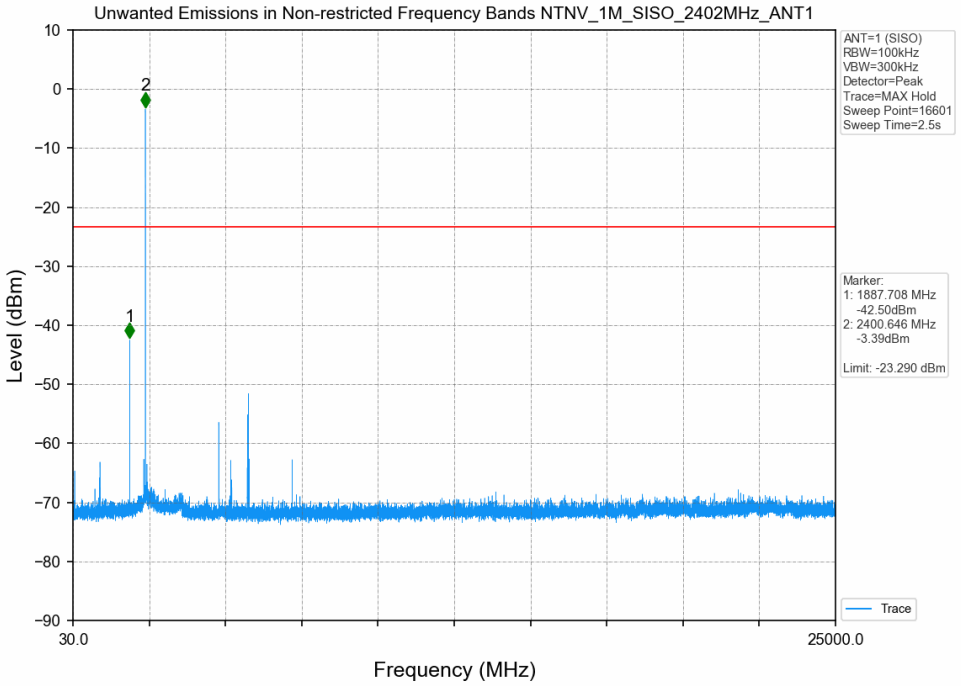

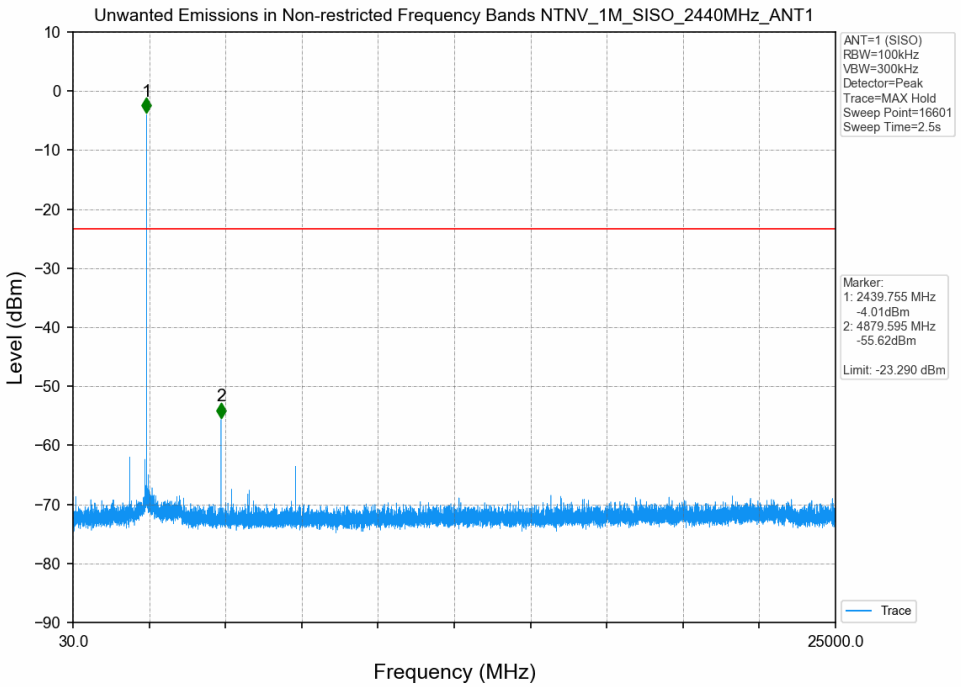

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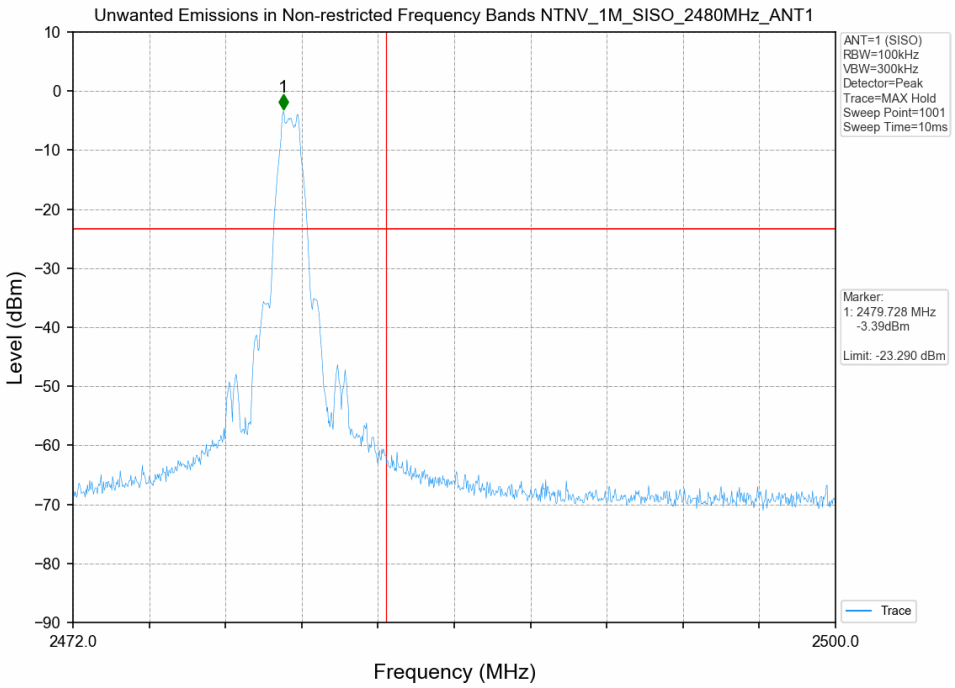

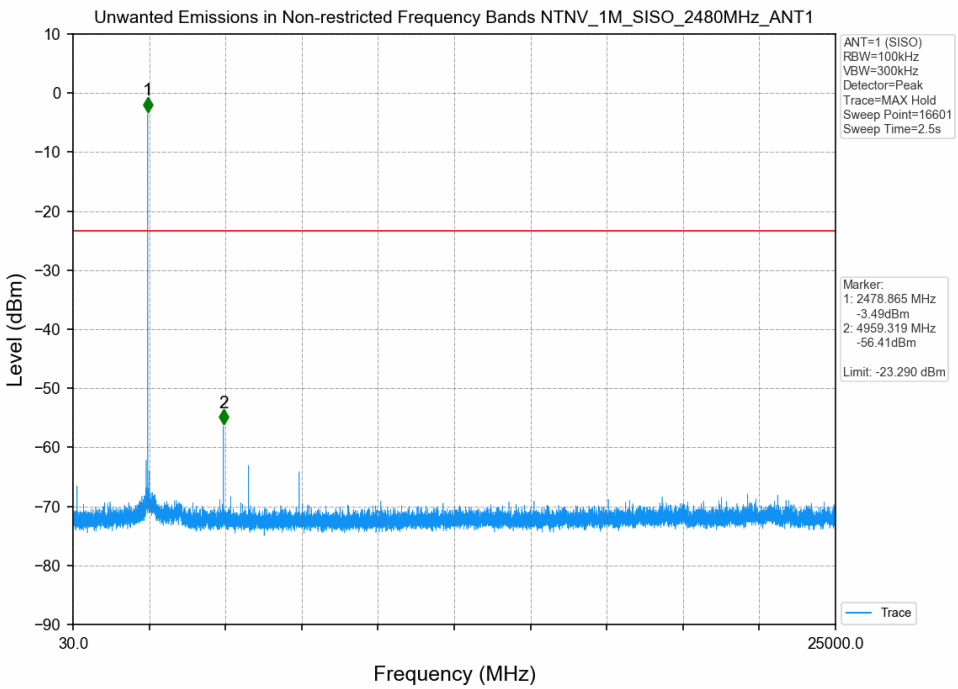

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