



Garmin International, Inc.
1200 East 151st Street
Olathe, Kansas 66062
P: 913-397-8200 F: 913-397-8282

13-Feb-26

Manufacturer: Garmin International, Inc.
Address: 1200 E. 151st St.
Olathe, KS 66062-3426
U.S.A.
Chile Representative: Matías Rodríguez Correa
La Pastora 170, Las Condes Santiago
Province CP 7550083, Chile
Contact Email: matias.rodriguez@garmin.com
Subject: SUBTEL, Chile (Resolution 737) Certification Compliance 2026
Commercial Name: Index S2 Smart Scale

	Información (Information)
Tipo de equipo (Equipment type)	Portable Digital Transceiver
Marca (Brand)	Garmin 
Modelo (Model)	C37408
Tecnología o modulación (Technology or modulation)	GFSK for ANT/ GFSK for BLE / DSSS for 802.11b / OFDM for 802.11g/n
Frecuencias (Frequencies)	2402-2480 MHz / 2402-2480 MHz / 2412-2462 MHz
Ganancia de antena (dBi) (Antenna gain (dBi))	ANT -2.35 dBi / BLE -2.35 dBi / 802.11b/g/n -3.78 dBi
P.i.r.e. (E.I R P.)	0.94 dBm, 1.24 mW / 2.86 dBm, 1.93 mW / 10.36 dBm, 10.86 mW
Módulos (Modules)	ANT, BLE, WiFi

Declaration of Conformity Statement: the equipment previously identified complies with the provisions established in the Technical Standard for Small Range Equipment, approved by Exempt Resolution No.1,985 of 2017, of the Undersecretary of Telecommunications.

Declaración de conformidad: El equipo anteriormente identificado cumple con las disposiciones establecidas en la Norma Técnica para Equipos de Corto Alcance, aprobada mediante la Resolución Exenta N° 1.985 de 2017, de la Subsecretaría de Telecomunicaciones.

TEST REPORT

Application No.: SZEM2005004343CR
Applicant: Garmin International Inc
Address of Applicant: 1200 E. 151st. Street, Olathe, Kansas 66062, United States
Manufacturer: Measurement Ltd
Address of Manufacturer: Block A, 19/F., Prince Industrial building, 106 King Fuk Street, San Po Kong, Kowloon, Hong Kong
Factory: Display Electronics(Shenzhen)Co., Ltd
Address of Factory: No.1, Fifth Road, Yangyong Industrial Park, Shapu Community Songgang, Baoan District, Shenzhen,Guangdong Province,China

Equipment Under Test (EUT):
EUT Name: Smart Scale
Model No.: Index™ S2
Trade Mark: Garmin
FCC ID: IPH-37408
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2020-05-28
Date of Test: 2020-05-29 to 2020-06-22
Date of Issue: 2020-06-22

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

Keny Xu
EMC Laboratory Manager



<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2020-06-22		Original

Authorized for issue by:			
			
		<hr/> Calvin Weng /Project Engineer	
			
		<hr/> 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
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
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
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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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC6V by 1.5V AAA battery*4
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	5.0
Data rate:	1Mbps
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Gain:	Integral antenna
Antenna Type:	-2.35dBi

4.2 Description of Support Units

The EUT has been tested as an independent unit.



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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.75\text{dB}$
5	RF power density	$\pm 2.84\text{dB}$
6	Conducted Spurious emissions	$\pm 0.75\text{dB}$
7	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
8	Temperature test	$\pm 1\text{ }^\circ\text{C}$
9	Humidity test	$\pm 3\%$
10	Supply voltages	$\pm 1\%$
11	Time	$\pm 3\%$



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4.4 Test Location

All tests were performed at:

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

Address 1: No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

No tests were sub-contracted.

4.5 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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Minimum 6dB Bandwidth					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Conducted Peak Output Power					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Power Spectrum Density					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	N/A	N/A



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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

Conducted Band Edges Measurement

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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Conducted Spurious Emissions

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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Radiated Emissions 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	2019-07-11	2020-07-10



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EXA Spectrum Analyzer	Agilent Technologies 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 Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31
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	2019-07-11	2020-07-10
EXA Spectrum Analyzer	Agilent Technologies 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



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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	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 15.203 & 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 -2.35dBi.

Antenna location: Refer to internal photo.



7 Radio Spectrum Matter Test Results

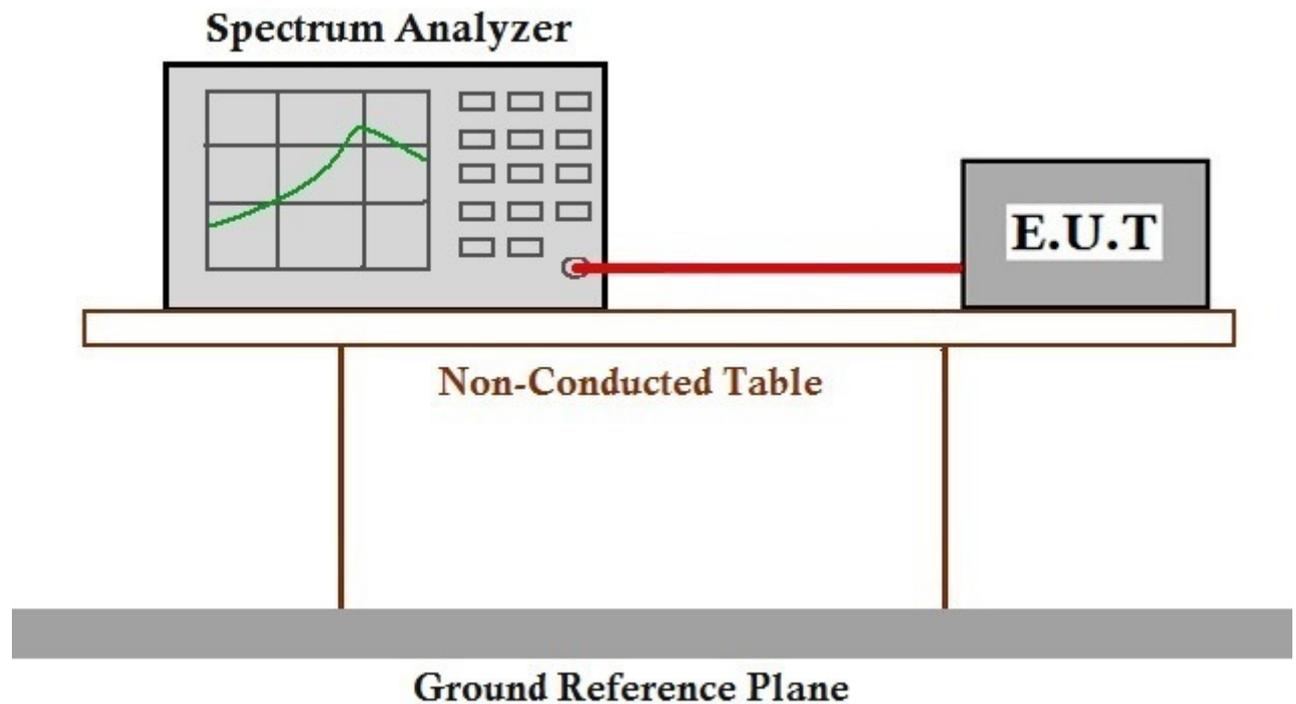
7.1 Minimum 6dB Bandwidth

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

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 25.2 °C Humidity: 44.3 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.2 Conducted Peak Output Power

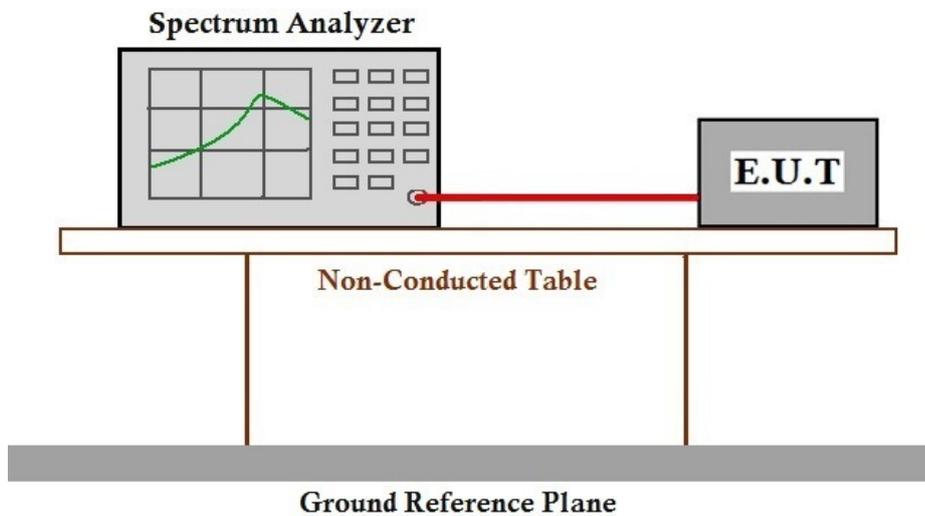
Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1
Limit:

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

7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 25.2 °C Humidity: 44.3 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



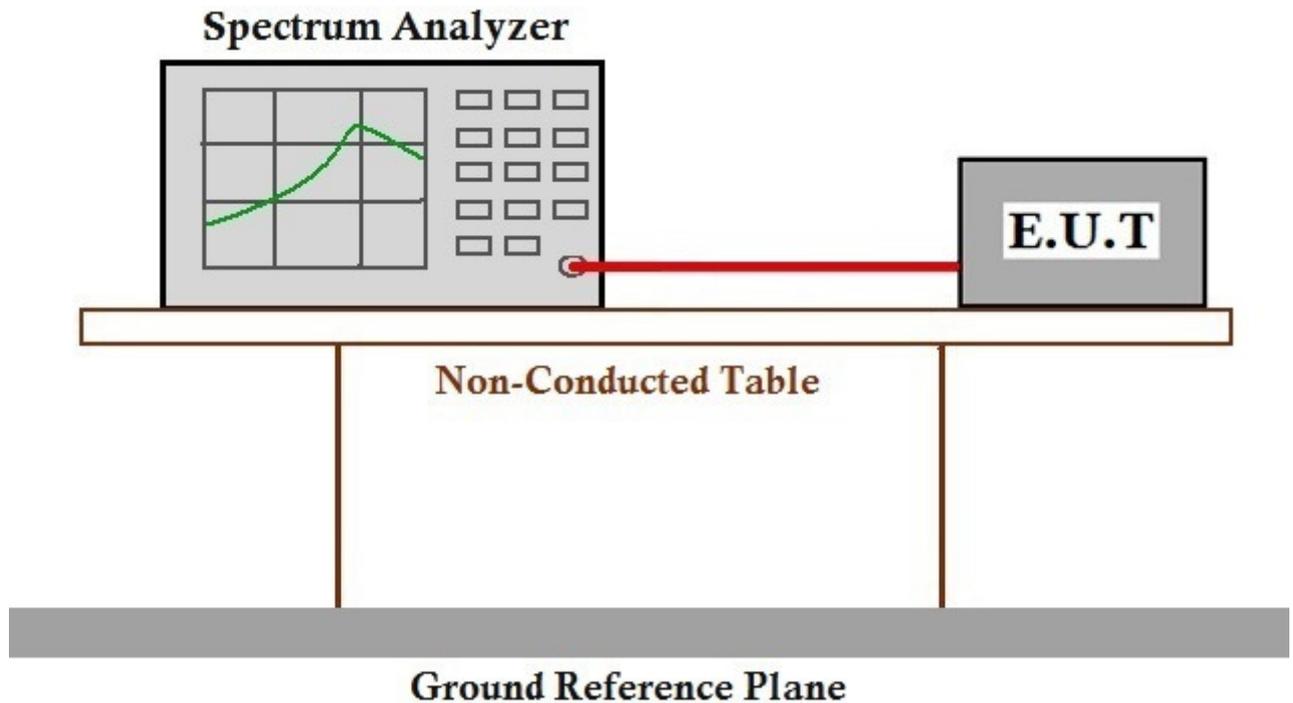
7.3 Power Spectrum Density

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

7.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 25.2 °C Humidity: 44.3 % RH Atmospheric Pressure: 1010 mbar
 Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



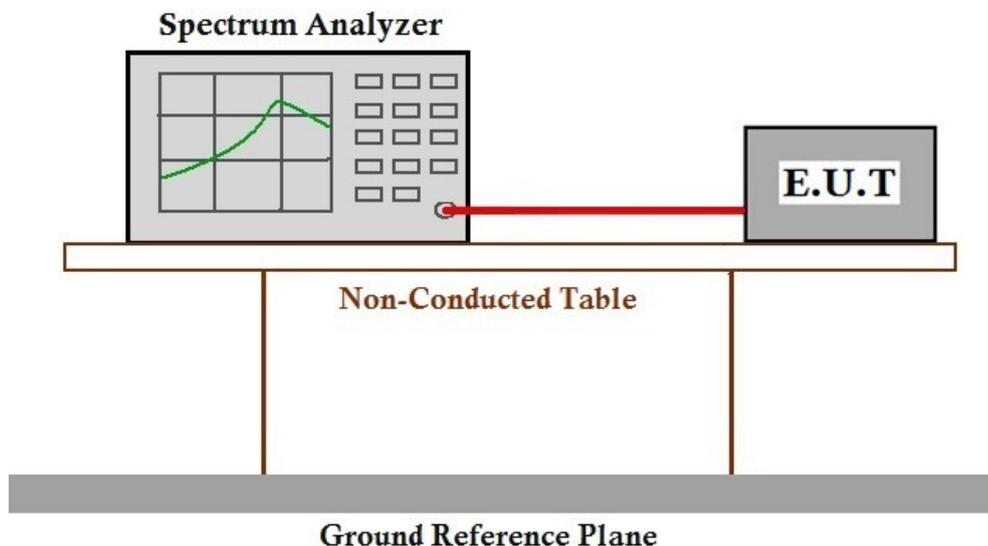
7.4 Conducted Band Edges Measurement

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: 25.2 °C Humidity: 44.2 % RH Atmospheric Pressure: 1010 mbar
 Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



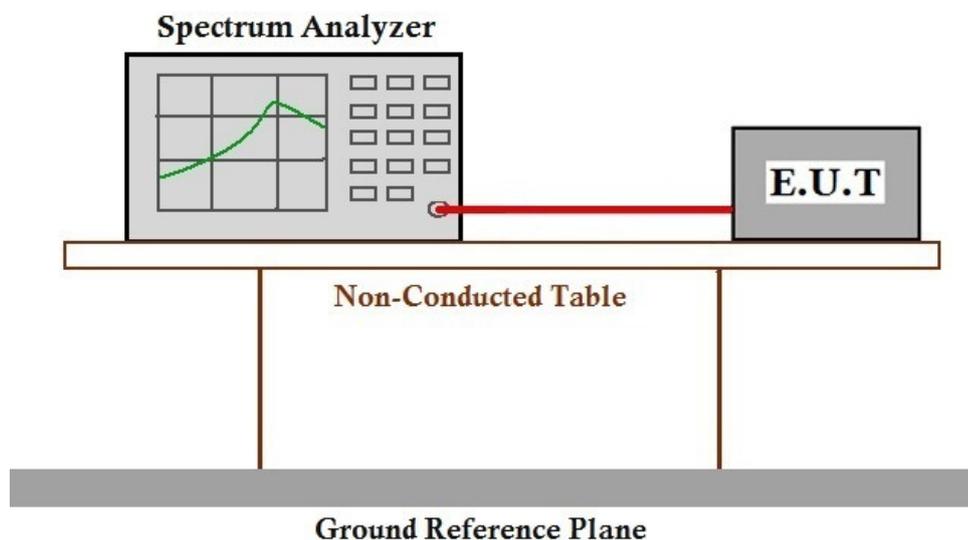
7.5 Conducted Spurious Emissions

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: 25.2 °C Humidity: 44.2 % RH Atmospheric Pressure: 1010 mbar
 Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2013) Section 6.10.5
 Measurement Distance: 3m
 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

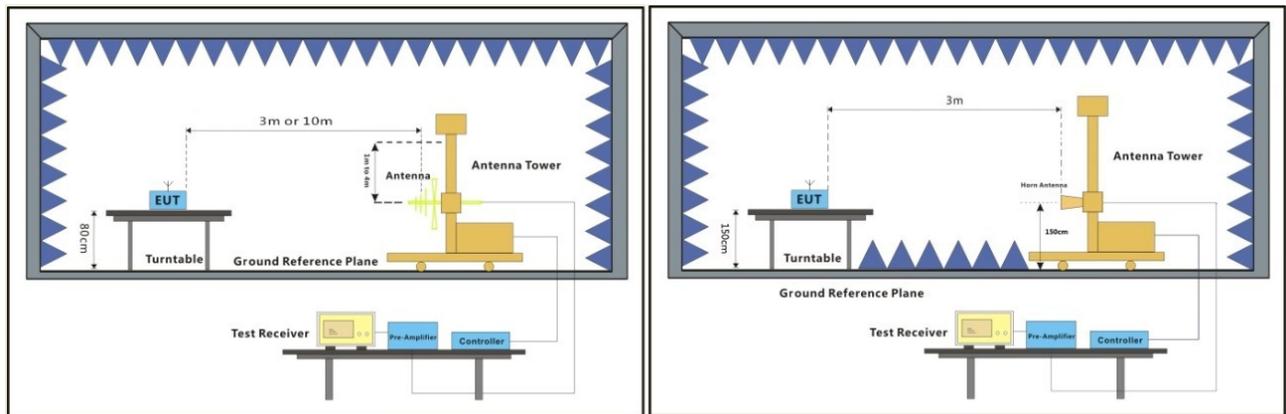
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field 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: 22.6 °C Humidity: 57.9 % RH Atmospheric Pressure: 1005 mbar
 Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.6.2 Test Setup Diagram



30MHz-1GHz

Above 1GHz



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7.6.3 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.

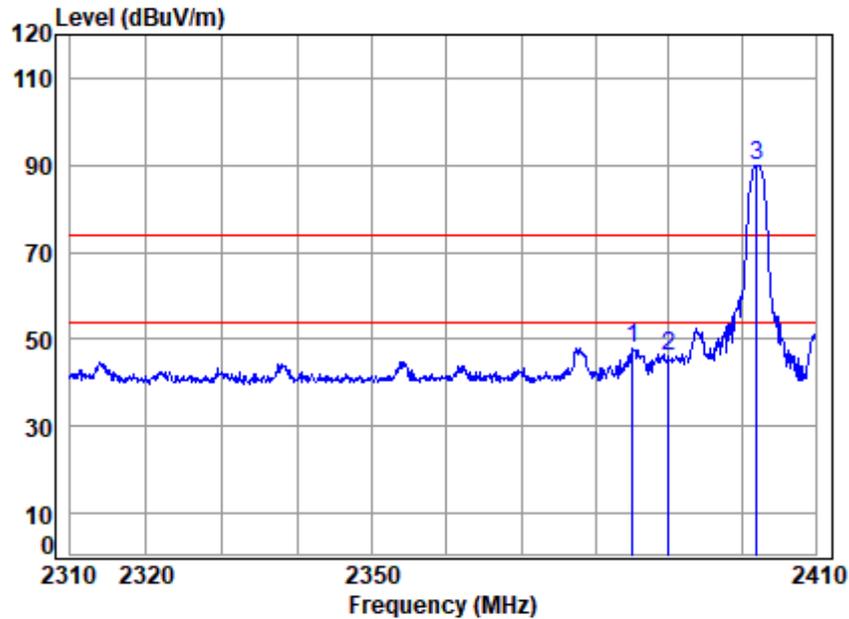
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



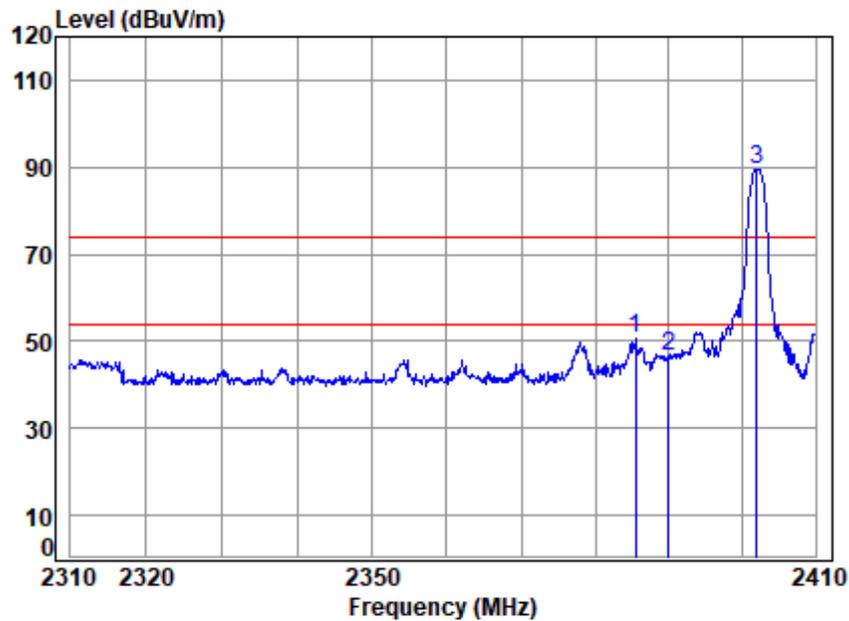
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2402 Band edge
Note : BLE

	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	2385.107	4.34	28.51	40.97	56.22	48.10	74.00	-25.90	peak
2	2390.000	4.34	28.52	40.97	54.19	46.08	74.00	-27.92	peak
3 *	2402.000	4.36	28.54	40.98	97.93	89.85	74.00	15.85	peak



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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



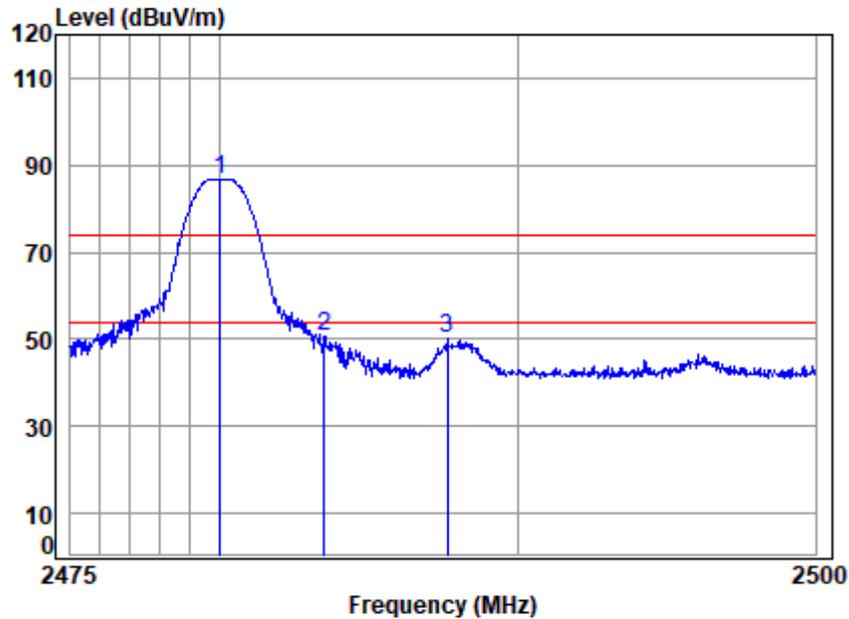
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2402 Band edge
Note : BLE

	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	2385.410	4.34	28.51	40.97	58.79	50.67	74.00	-23.33	peak
2	2390.000	4.34	28.52	40.97	54.45	46.34	74.00	-27.66	peak
3 *	2402.000	4.36	28.54	40.98	97.40	89.32	74.00	15.32	peak



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Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



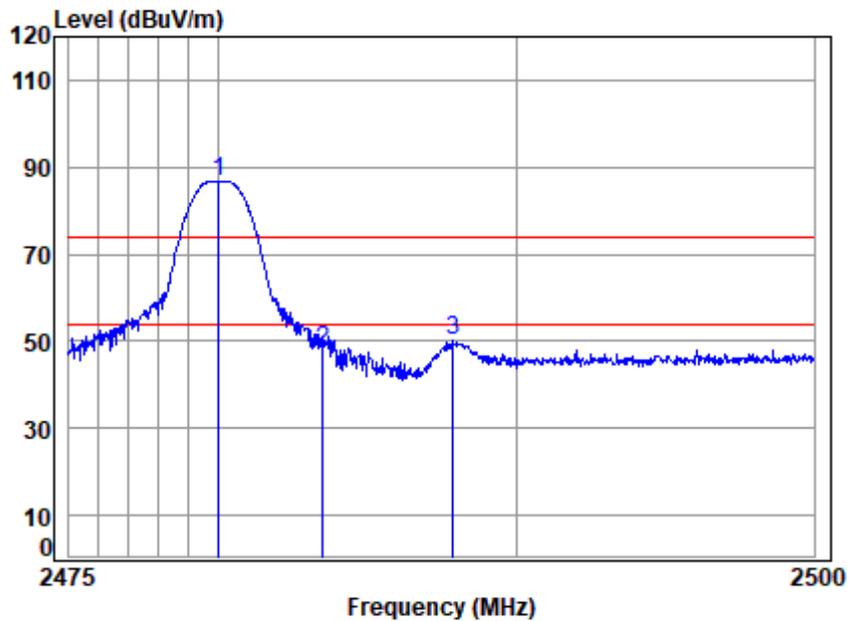
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2480 Band edge
Note : BLE

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 2480.000	4.49	28.67	41.01	94.66	86.81	74.00	12.81	peak
2 2483.500	4.49	28.67	41.01	58.36	50.51	74.00	-23.49	peak
3 2487.619	4.50	28.68	41.01	57.83	50.00	74.00	-24.00	peak



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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2480 Band edge
Note : BLE

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	4.49	28.67	41.01	94.58	86.73	74.00	12.73 peak
2	4.49	28.67	41.01	55.72	47.87	74.00	-26.13 peak
3	4.50	28.68	41.01	57.94	50.11	74.00	-23.89 peak



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7.7 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6
Measurement Distance: 3m
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.



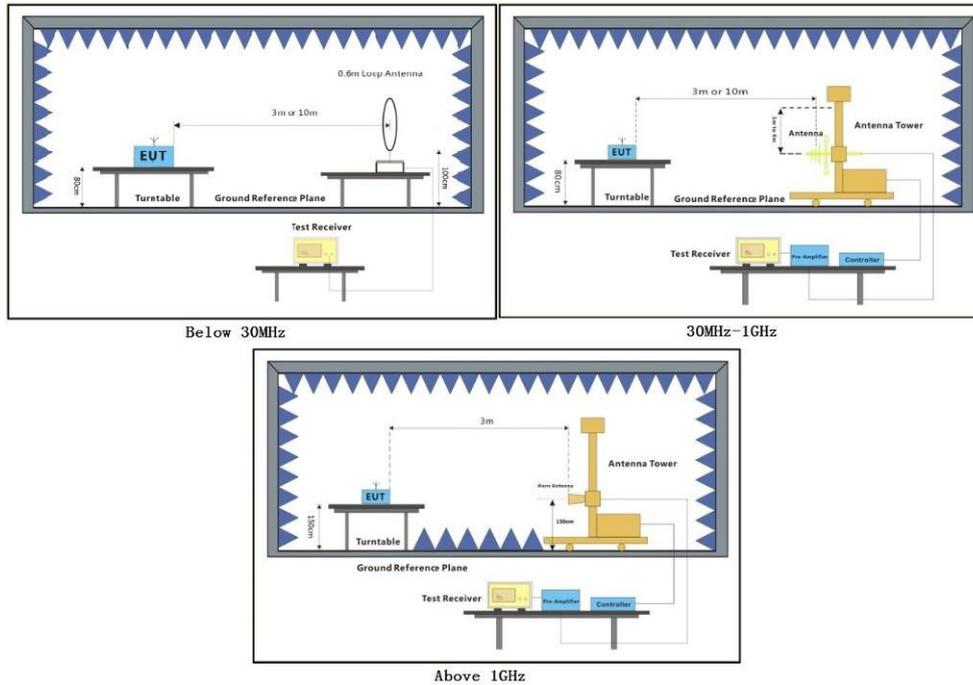
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.9 °C Humidity: 62.5 % RH Atmospheric Pressure: 1010 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.7.2 Test Setup Diagram



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7.7.3 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.

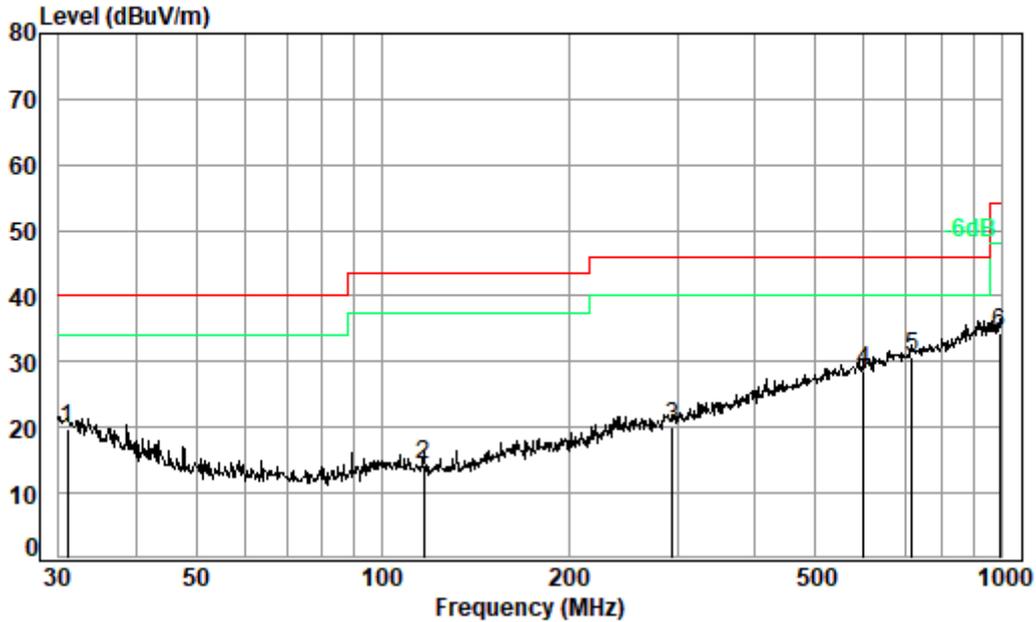


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Radiated Emission below 1GHz

30MHz~1GHz (QP)

Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Condition: 3m HORIZONTAL

Job No. : 04343CR

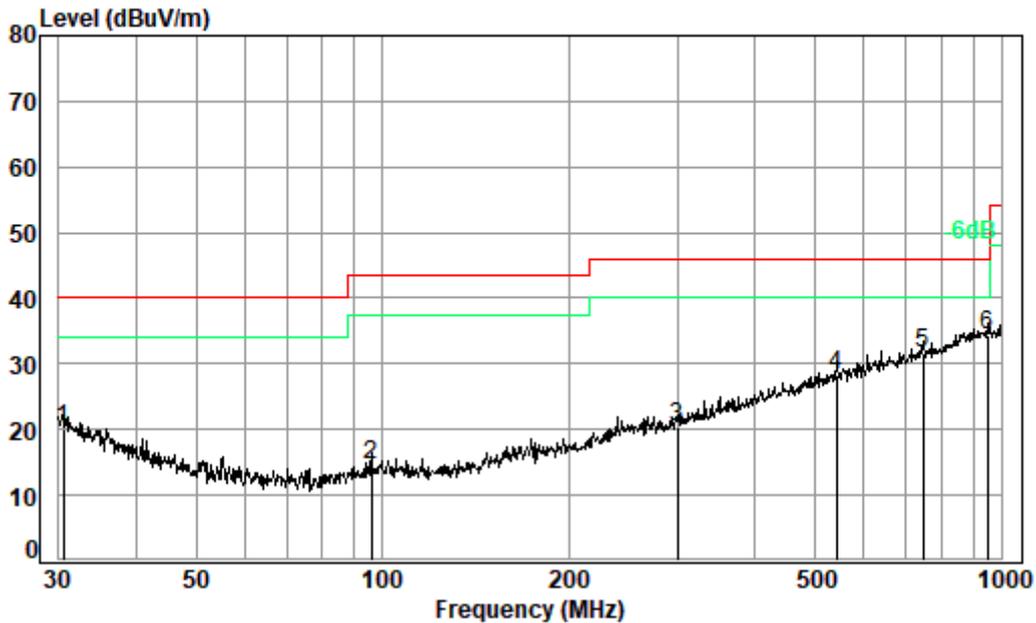
Test Mode: a

	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	30.96	0.60	21.95	27.73	24.93	19.75	40.00	-20.25	QP
2	116.54	1.24	13.24	27.51	27.46	14.43	43.50	-29.07	QP
3	294.11	1.87	19.37	26.88	25.63	19.99	46.00	-26.01	QP
4	599.32	2.70	26.59	28.13	27.35	28.51	46.00	-17.49	QP
5 pp	716.68	2.96	28.01	27.88	27.57	30.66	46.00	-15.34	QP
6	993.01	3.69	30.27	26.69	27.09	34.36	54.00	-19.64	QP



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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Condition: 3m VERTICAL
Job No. : 04343CR
Test Mode: a

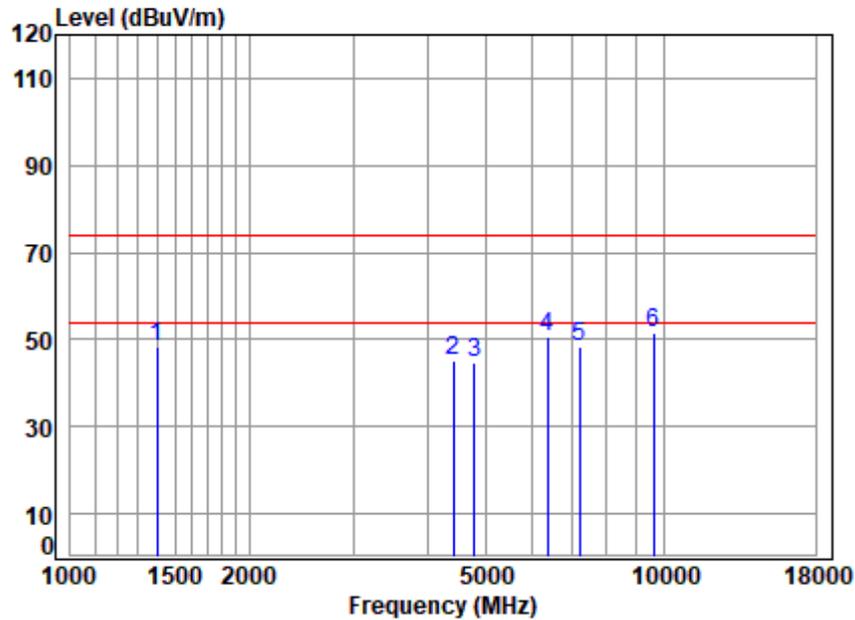
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.53	0.60	22.20	27.73	25.11	20.18	40.00	-19.82	QP
2	96.10	1.16	13.66	27.61	27.24	14.45	43.50	-29.05	QP
3	299.32	1.90	19.57	26.87	25.65	20.25	46.00	-25.75	QP
4	541.37	2.64	25.47	27.94	28.20	28.37	46.00	-17.63	QP
5	747.48	3.05	28.19	27.82	28.10	31.52	46.00	-14.48	QP
6	948.76	3.65	30.05	26.91	27.52	34.31	46.00	-11.69	QP



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Transmitter emission above 1GHz

Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



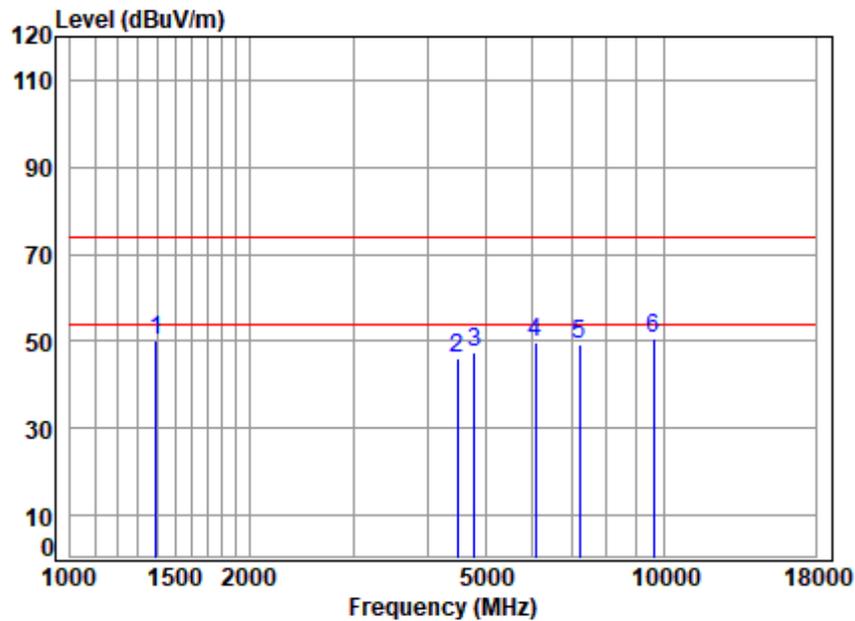
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2402 TX RSE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	60.13	48.21	74.00	-25.79	peak
2	4417.841	6.68	33.46	42.49	47.64	45.29	74.00	-28.71	peak
3	4804.000	7.10	33.97	42.77	46.36	44.66	74.00	-29.34	peak
4	6377.195	8.28	35.48	42.02	48.69	50.43	74.00	-23.57	peak
5	7206.000	8.74	36.07	41.58	45.32	48.55	74.00	-25.45	peak
6	9608.000	10.81	37.67	38.57	41.46	51.37	74.00	-22.63	peak



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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



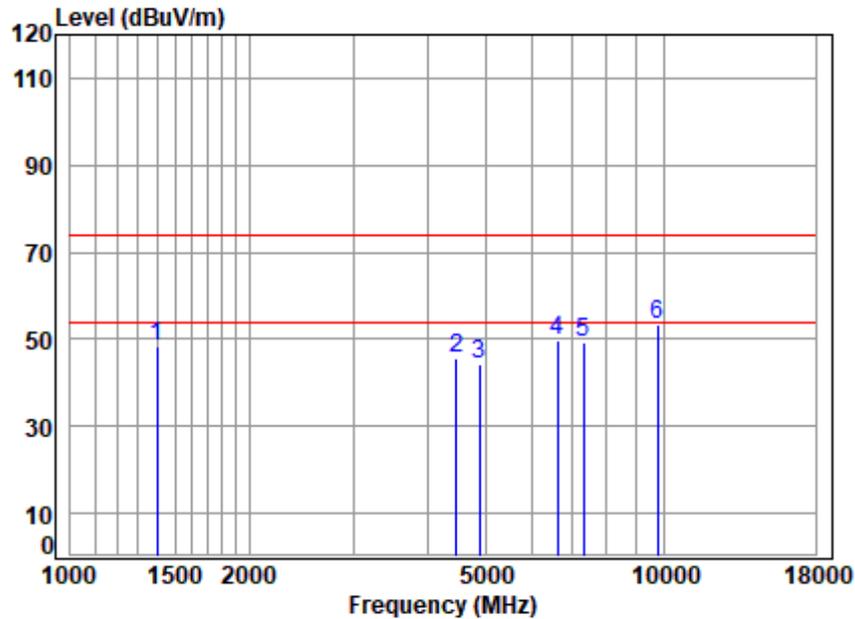
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2402 TX RSE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBUV/m	dBUV/m	dB	
1	1394.300	3.10	25.40	40.43	61.95	50.02	74.00	-23.98	peak
2	4495.125	6.76	33.59	42.55	48.15	45.95	74.00	-28.05	peak
3	4804.000	7.10	33.97	42.77	49.00	47.30	74.00	-26.70	peak
4	6071.417	8.26	35.17	42.20	48.31	49.54	74.00	-24.46	peak
5	7206.000	8.74	36.07	41.58	46.21	49.44	74.00	-24.56	peak
6	9608.000	10.81	37.67	38.57	40.91	50.82	74.00	-23.18	peak



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Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



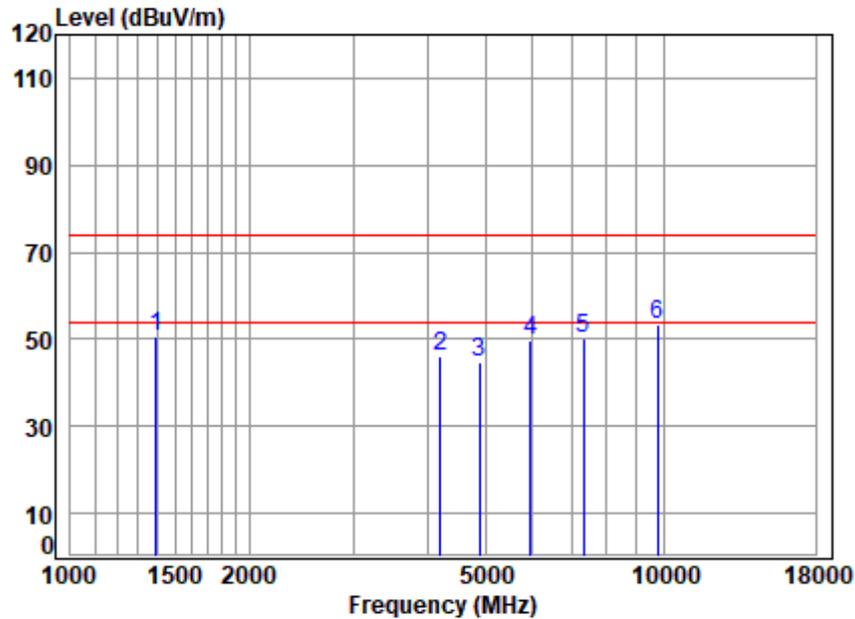
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2440 TX RSE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	60.28	48.36	74.00	-25.64	peak
2	4469.214	6.73	33.55	42.53	47.81	45.56	74.00	-28.44	peak
3	4880.000	7.18	34.06	42.82	45.97	44.39	74.00	-29.61	peak
4	6621.375	8.34	35.67	41.88	47.44	49.57	74.00	-24.43	peak
5	7323.000	8.85	36.16	41.52	45.62	49.11	74.00	-24.89	peak
6	9764.000	10.76	37.76	38.34	43.26	53.44	74.00	-20.56	peak



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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



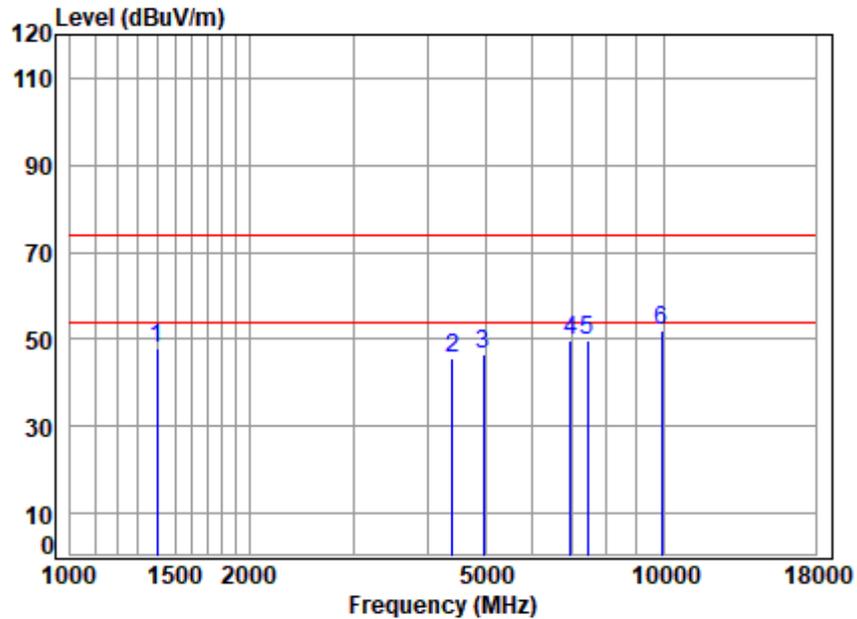
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2440 TX RSE
Note : BLE

	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	1394.300	3.10	25.40	40.43	62.55	50.62	74.00	-23.38	peak
2	4193.872	6.47	33.06	42.31	48.81	46.03	74.00	-27.97	peak
3	4880.000	7.18	34.06	42.82	46.18	44.60	74.00	-29.40	peak
4	5949.811	8.25	35.05	42.27	48.70	49.73	74.00	-24.27	peak
5	7323.000	8.85	36.16	41.52	46.74	50.23	74.00	-23.77	peak
6	9764.000	10.76	37.76	38.34	43.05	53.23	74.00	-20.77	peak



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Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



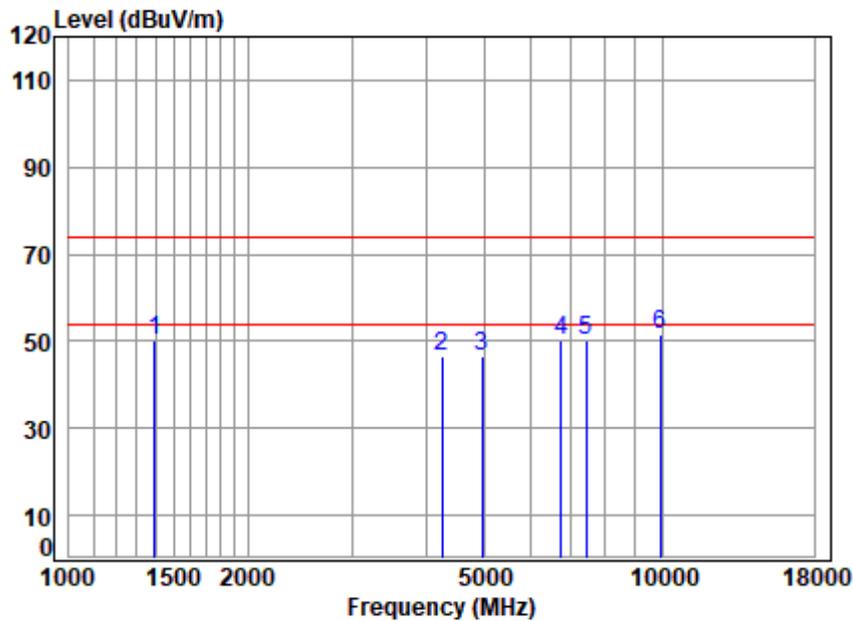
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2480 TX RSE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	59.88	47.96	74.00	-26.04	peak
2	4405.090	6.67	33.44	42.48	48.05	45.68	74.00	-28.32	peak
3	4960.000	7.26	34.15	42.87	48.16	46.70	74.00	-27.30	peak
4	6954.852	8.52	35.87	41.71	46.98	49.66	74.00	-24.34	peak
5	7440.000	8.96	36.25	41.46	45.78	49.53	74.00	-24.47	peak
6	9920.000	10.71	37.85	38.12	41.74	52.18	74.00	-21.82	peak



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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2480 TX RSE
Note : BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1394.300	3.10	25.40	40.43	61.96	50.03	74.00	-23.97	peak
2	4254.921	6.53	33.17	42.36	49.18	46.52	74.00	-27.48	peak
3	4960.000	7.26	34.15	42.87	48.20	46.74	74.00	-27.26	peak
4	6756.708	8.42	35.76	41.81	47.81	50.18	74.00	-23.82	peak
5	7440.000	8.96	36.25	41.46	46.40	50.15	74.00	-23.85	peak
6	9920.000	10.71	37.85	38.12	41.26	51.70	74.00	-22.30	peak



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8 Photographs

8.1 Test Setup

Refer to test setup photos.

8.2 EUT Constructional Details (EUT Photos)

Refer to external and internal photos.



9 Appendix

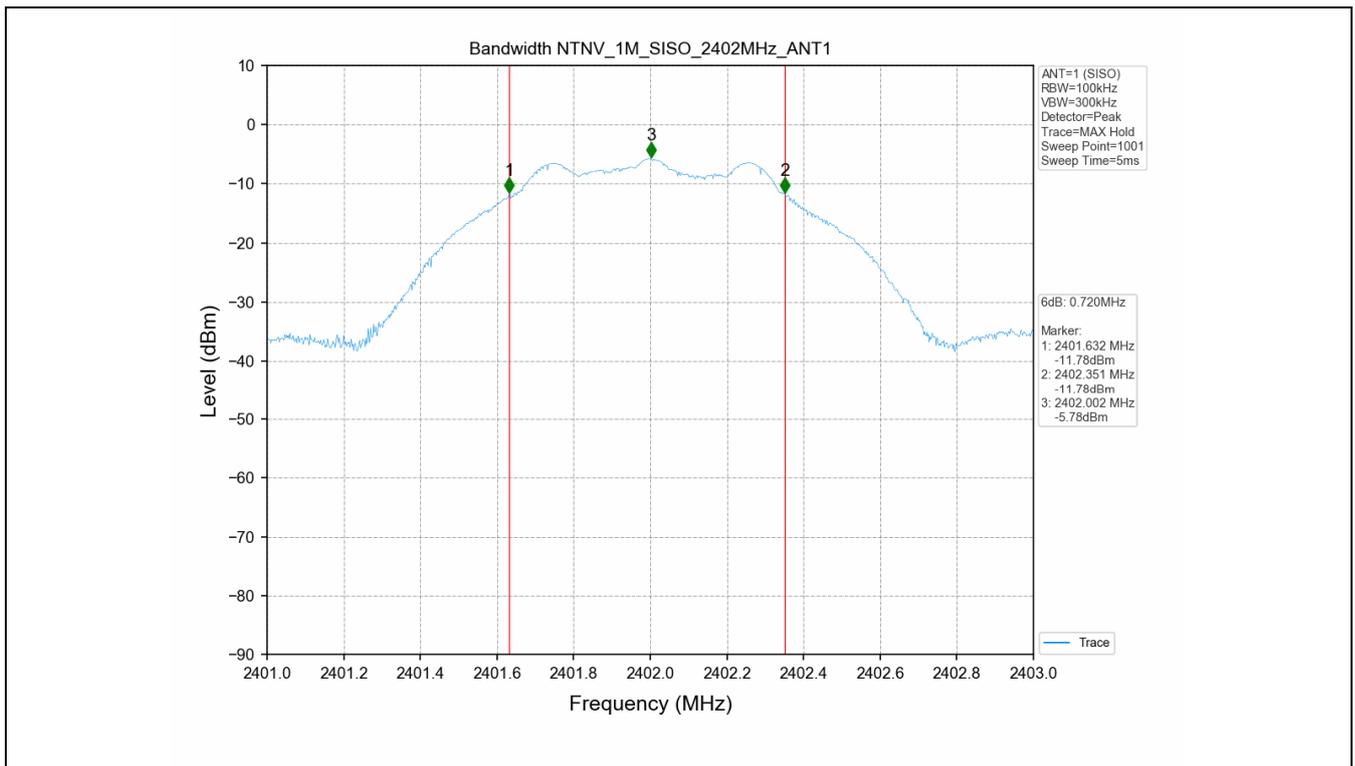
Appendix 15.247

1. Bandwidth

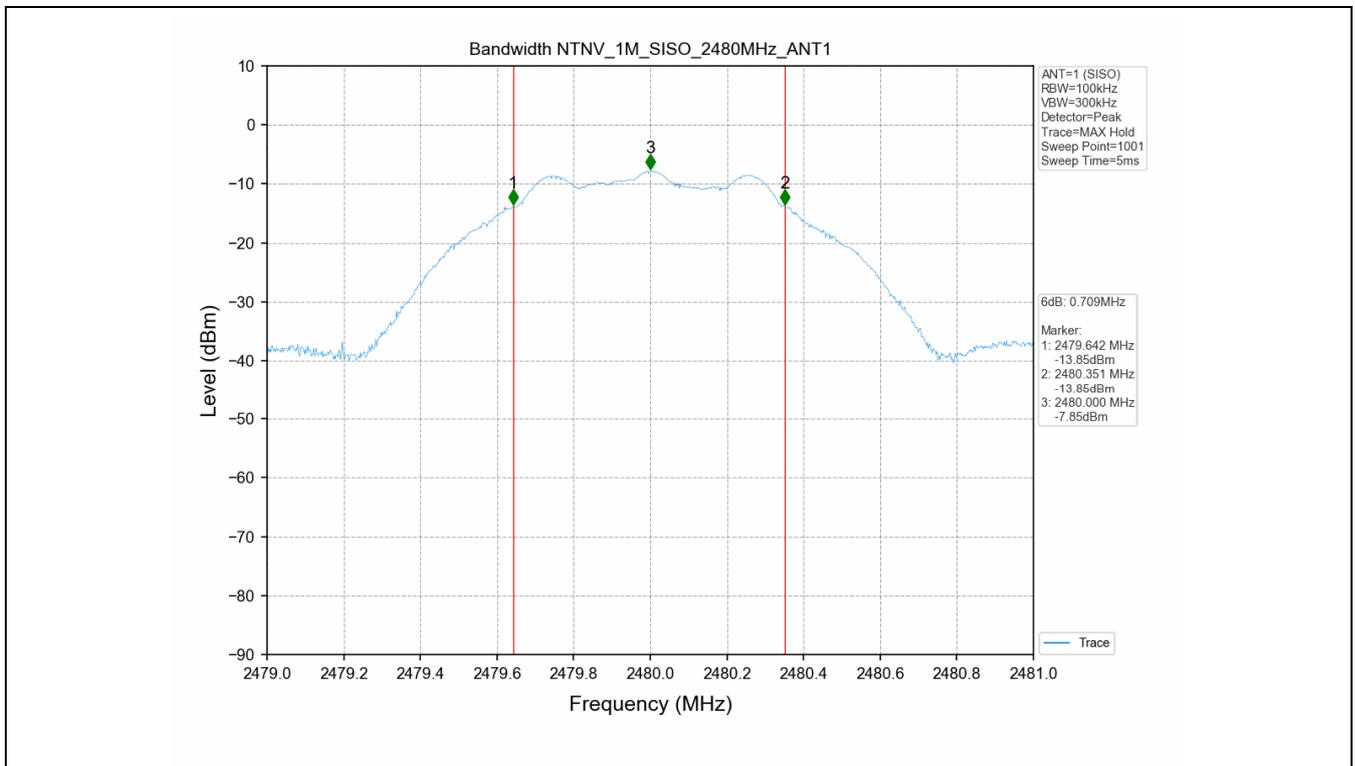
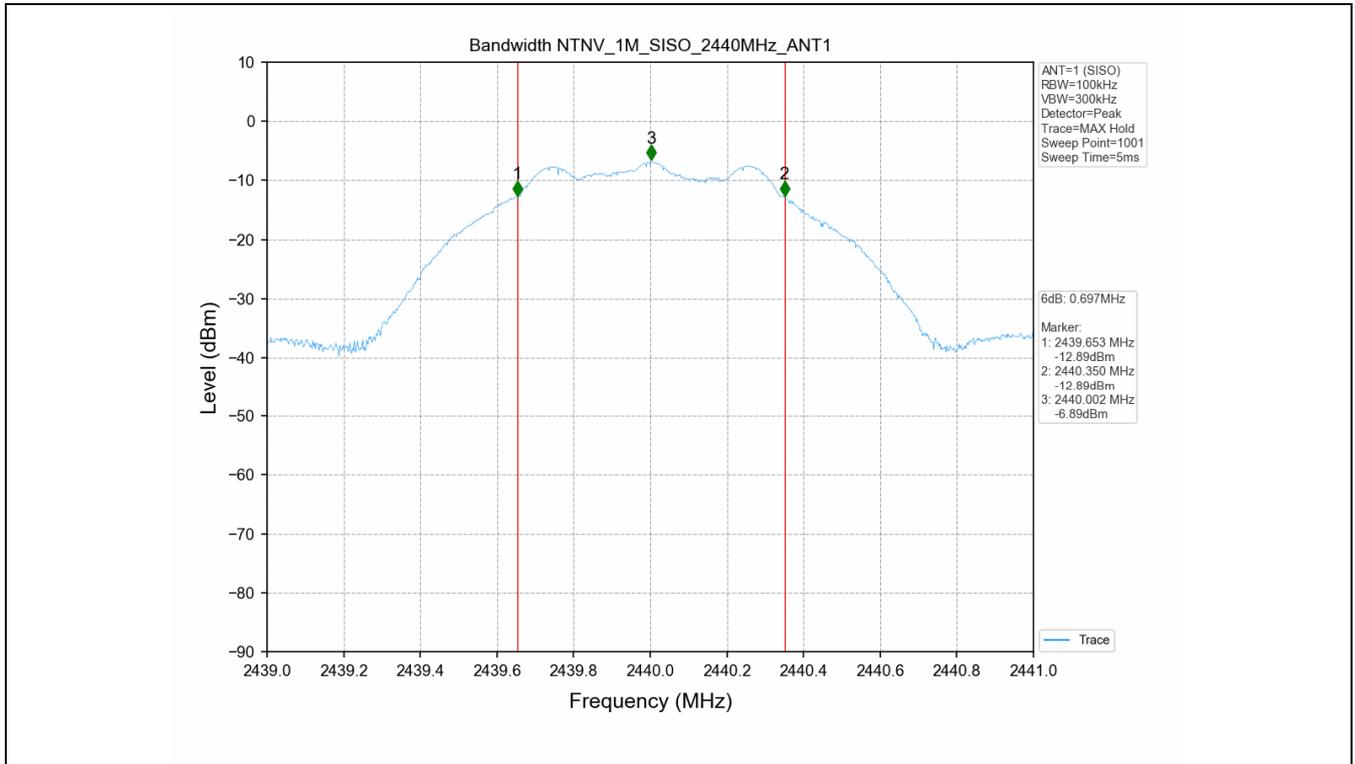
1.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT No.	6dB Bandwidth	Verdict
				Test Result (MHz)	
1M	2402	SISO	1	0.720	PASS
	2440	SISO	1	0.697	PASS
	2480	SISO	1	0.709	PASS

1.2 Test Graph - 6dB Bandwidth



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2. Maximum Conducted Output Power

2.1 Test Result

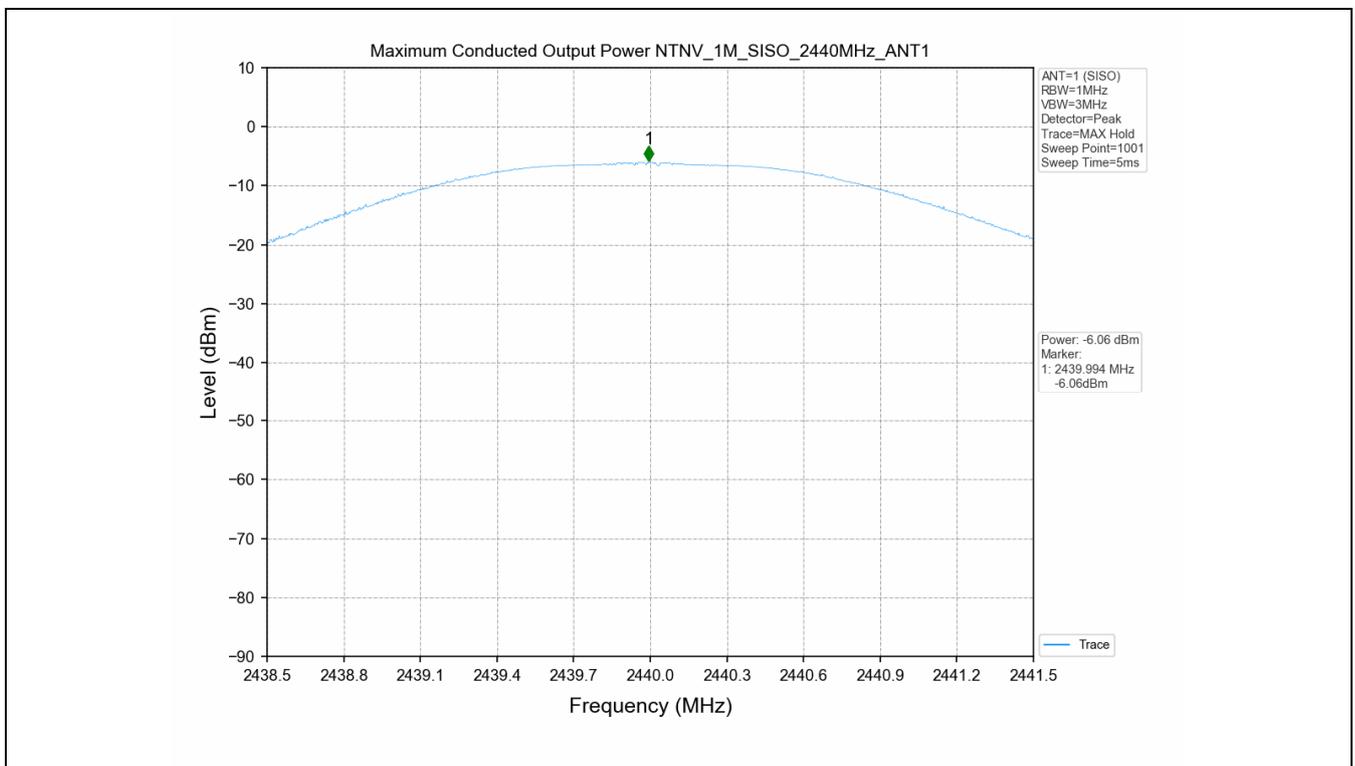
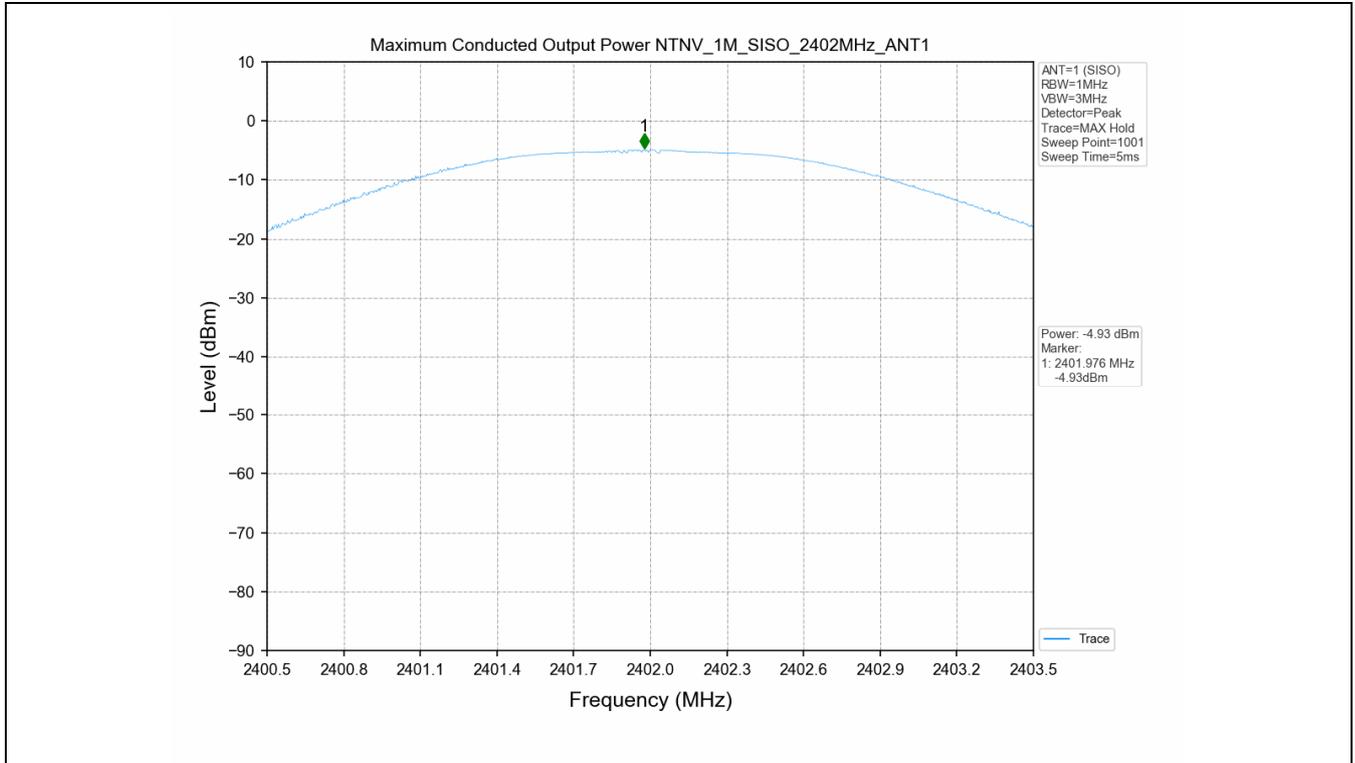
Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Measured Average Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1	Ant 1		
1M	2402	SISO	-4.93	-5.21	30	PASS
	2440	SISO	-6.06	-6.37	30	PASS
	2480	SISO	-6.97	-7.26	30	PASS

Remark: Average power is for RF exposure evaluation only.

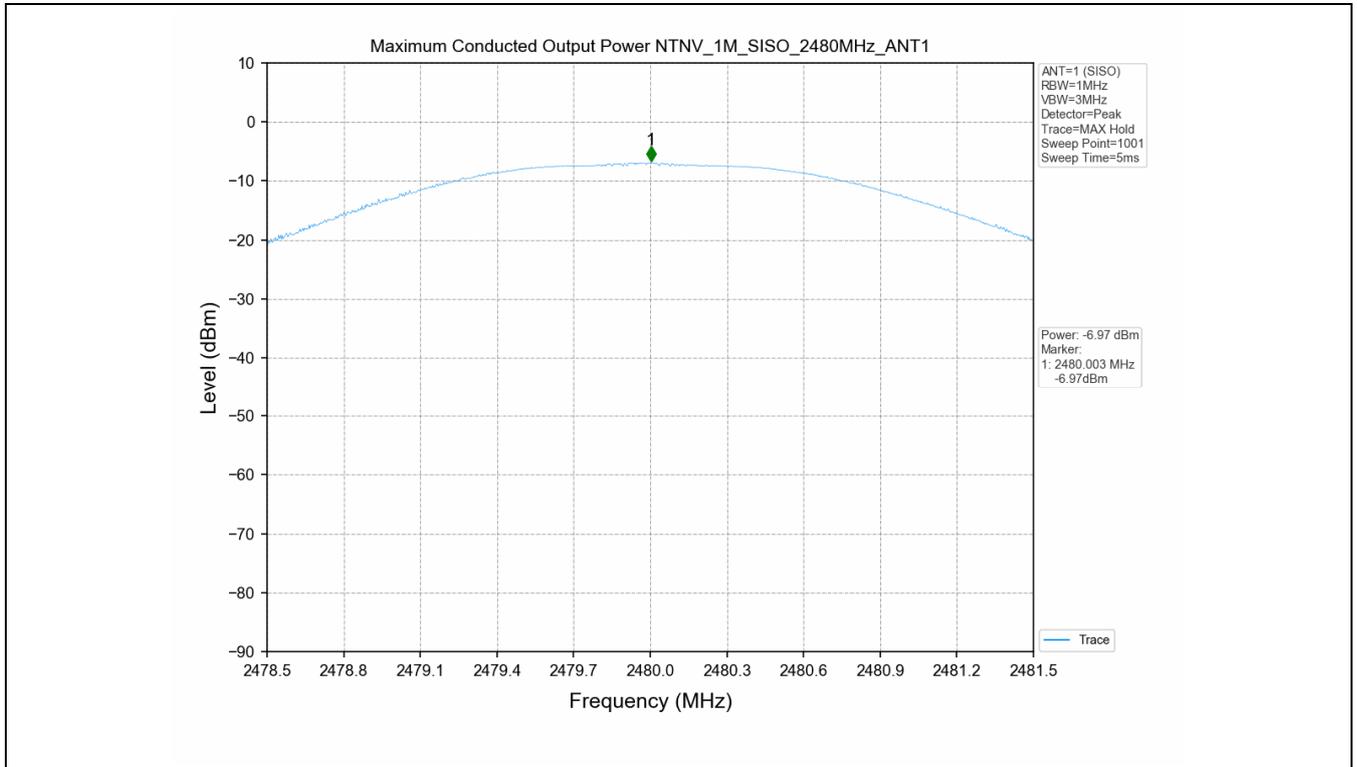


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2.2 Test Graph



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3. Maximum Power Spectral Density (PSD)

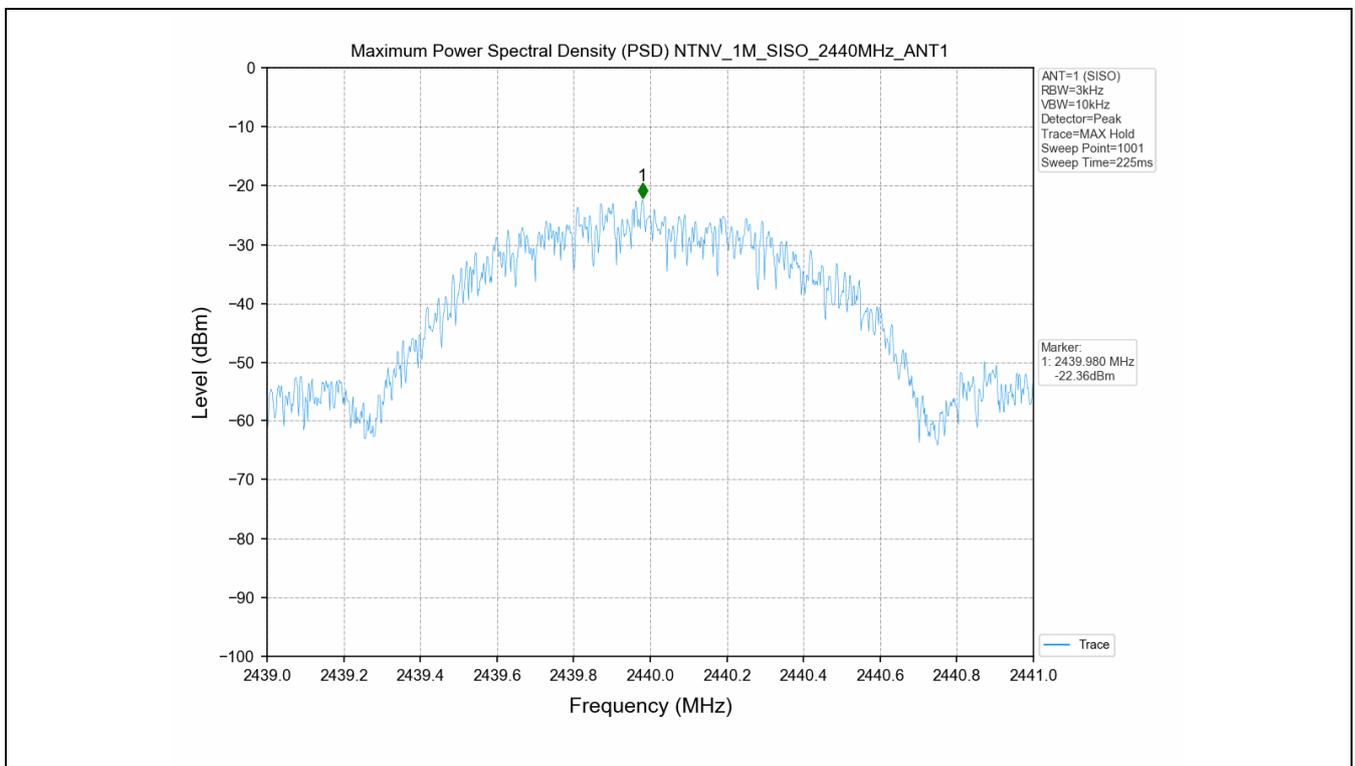
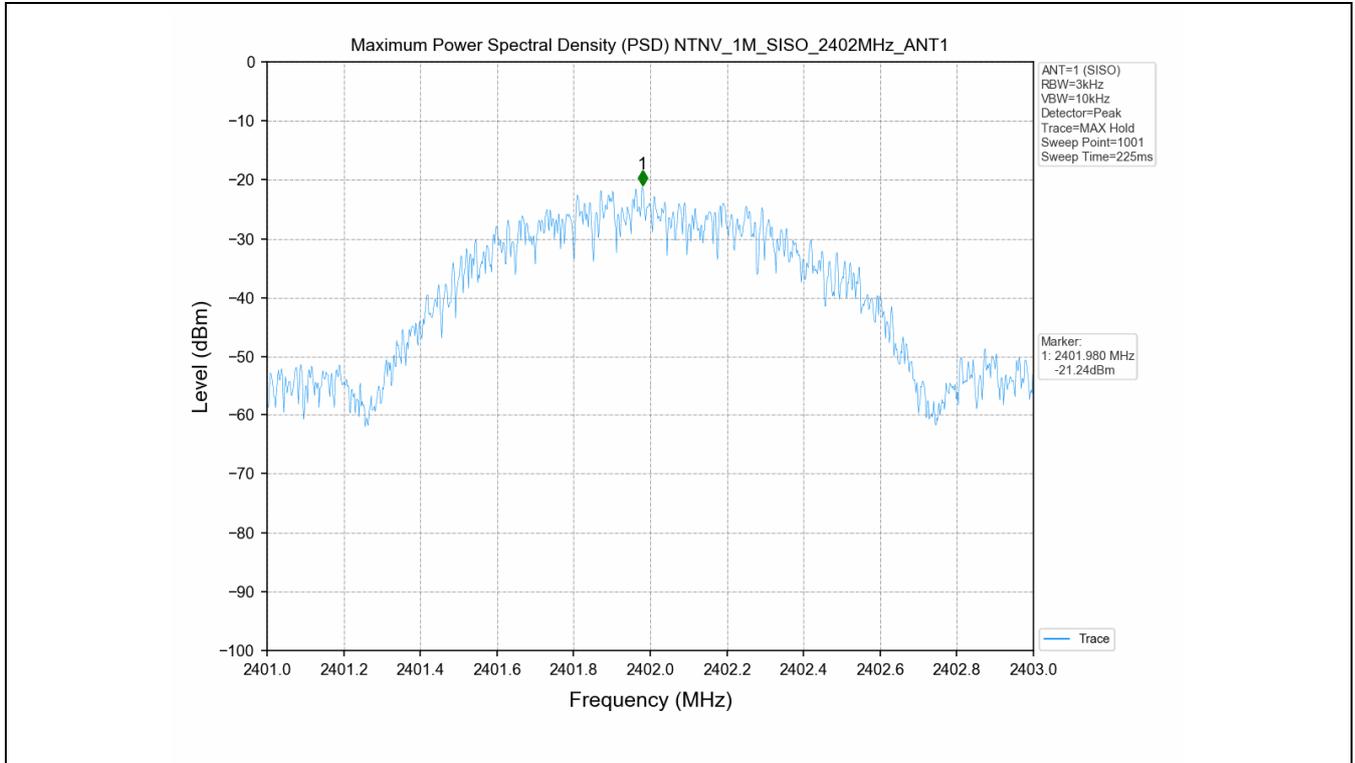
3.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
1M	2402	SISO	-21.24	≤8	PASS
	2440	SISO	-22.36	≤8	PASS
	2480	SISO	-23.40	≤8	PASS



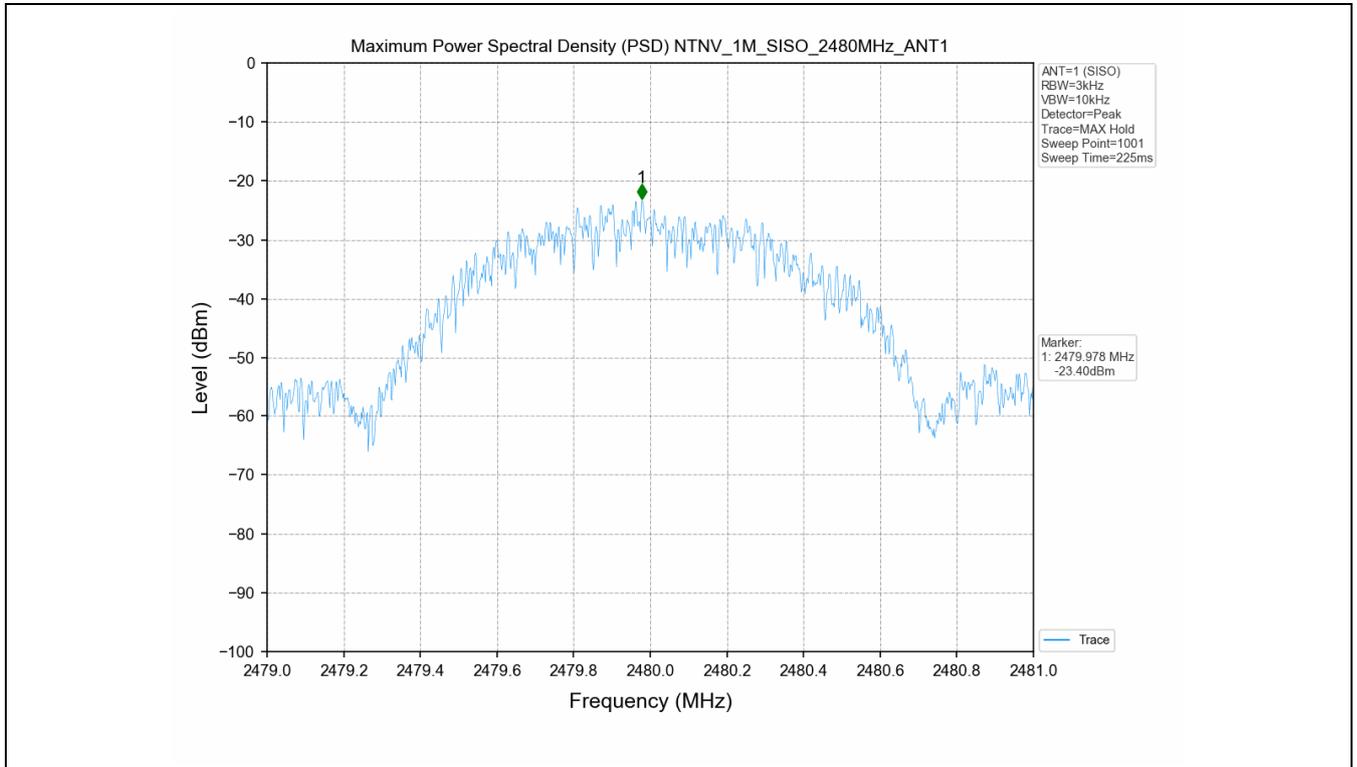
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3.2 Test Graph



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4. Unwanted Emissions in Non-restricted Frequency Bands

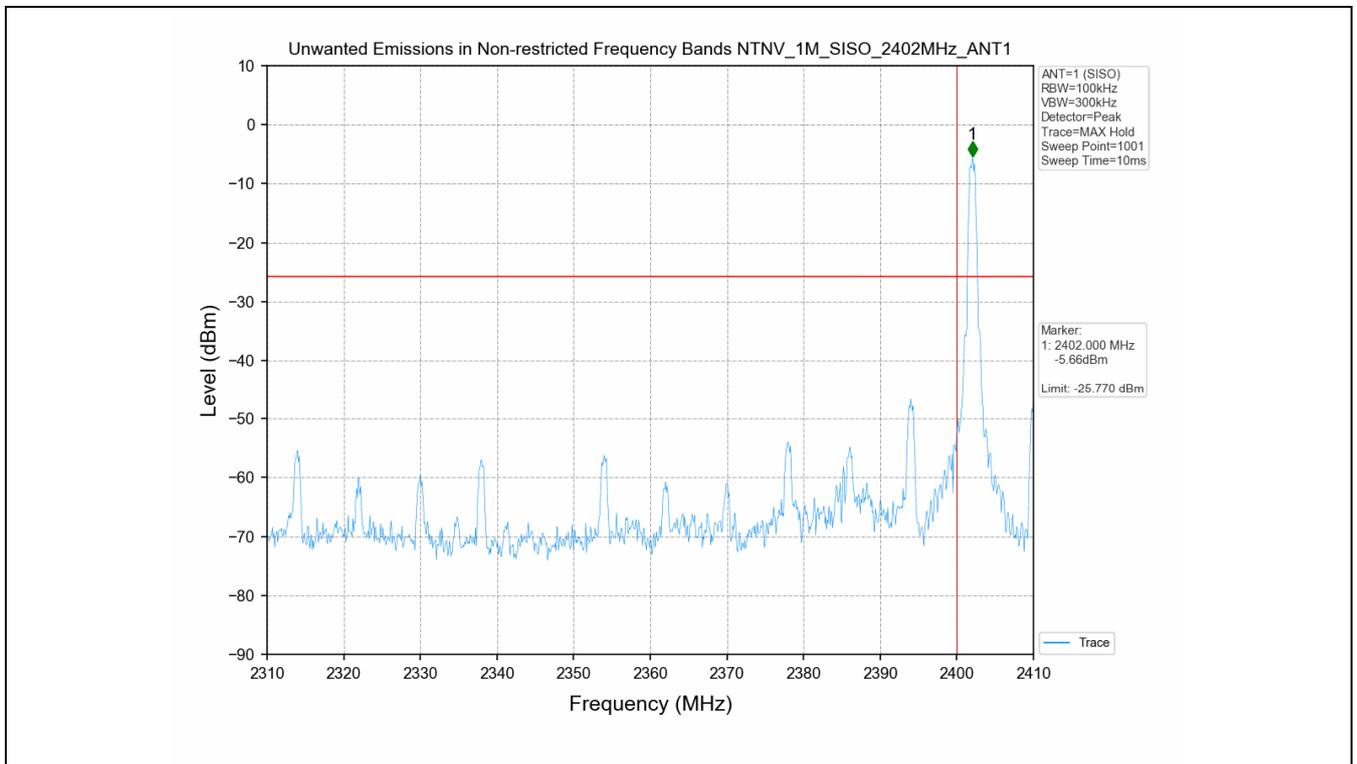
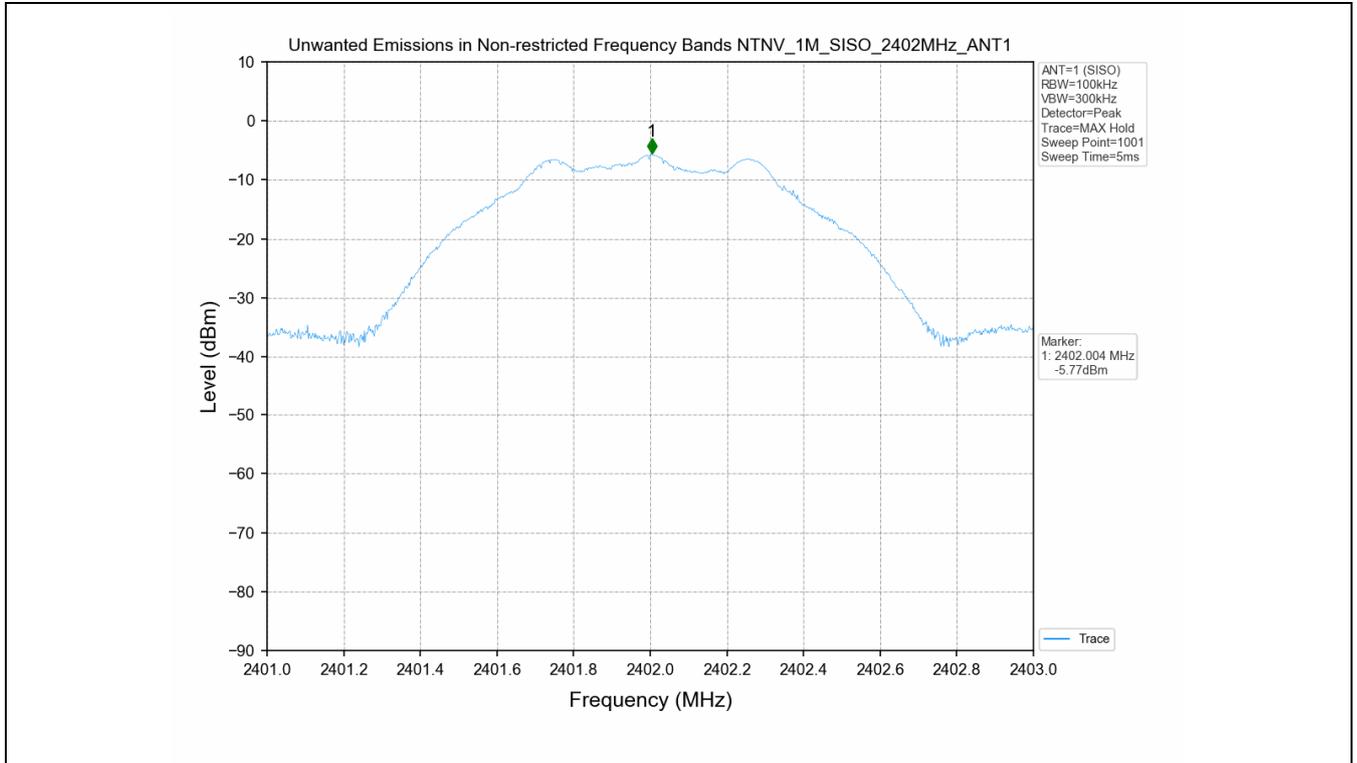
4.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
1M	2402	SISO	1	Refer to test graph	-25.77	PASS
	2440	SISO	1	Refer to test graph	-25.77	PASS
	2480	SISO	1	Refer to test graph	-25.77	PASS

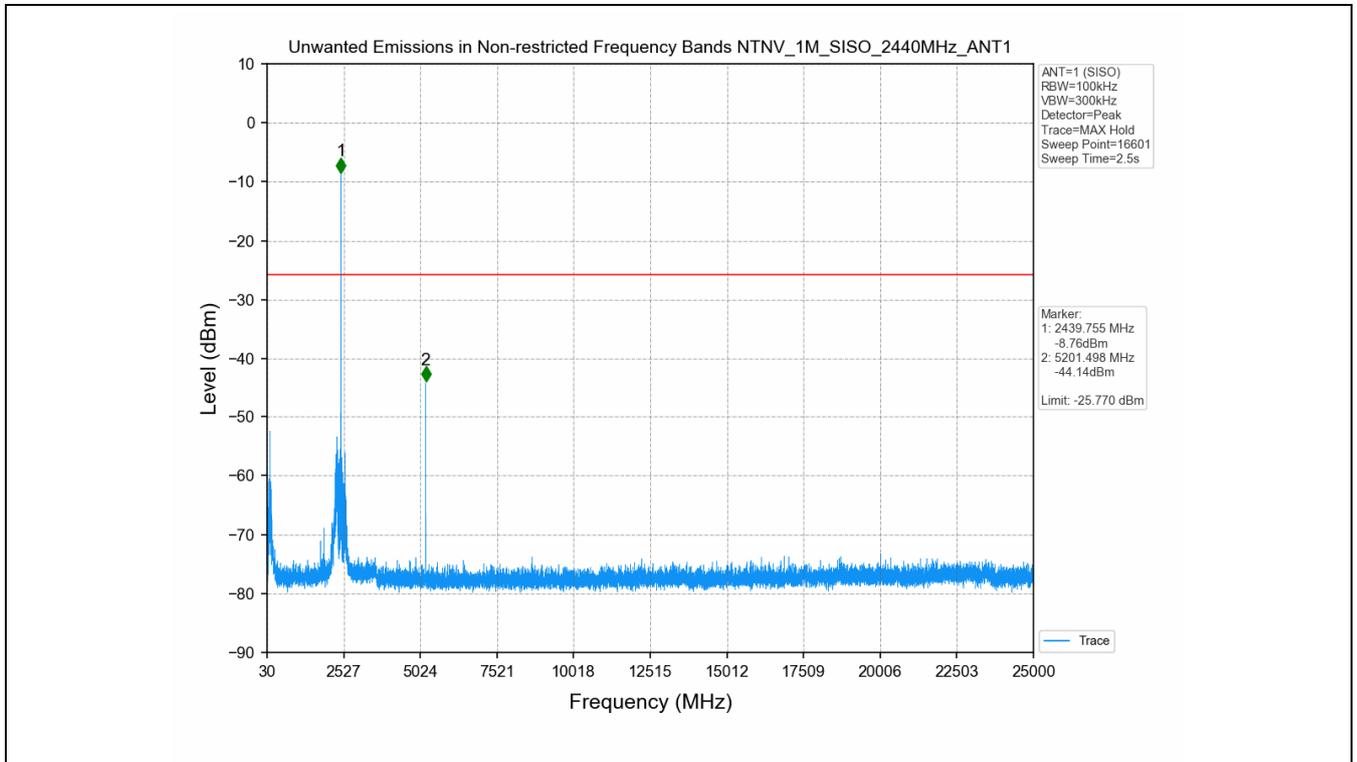
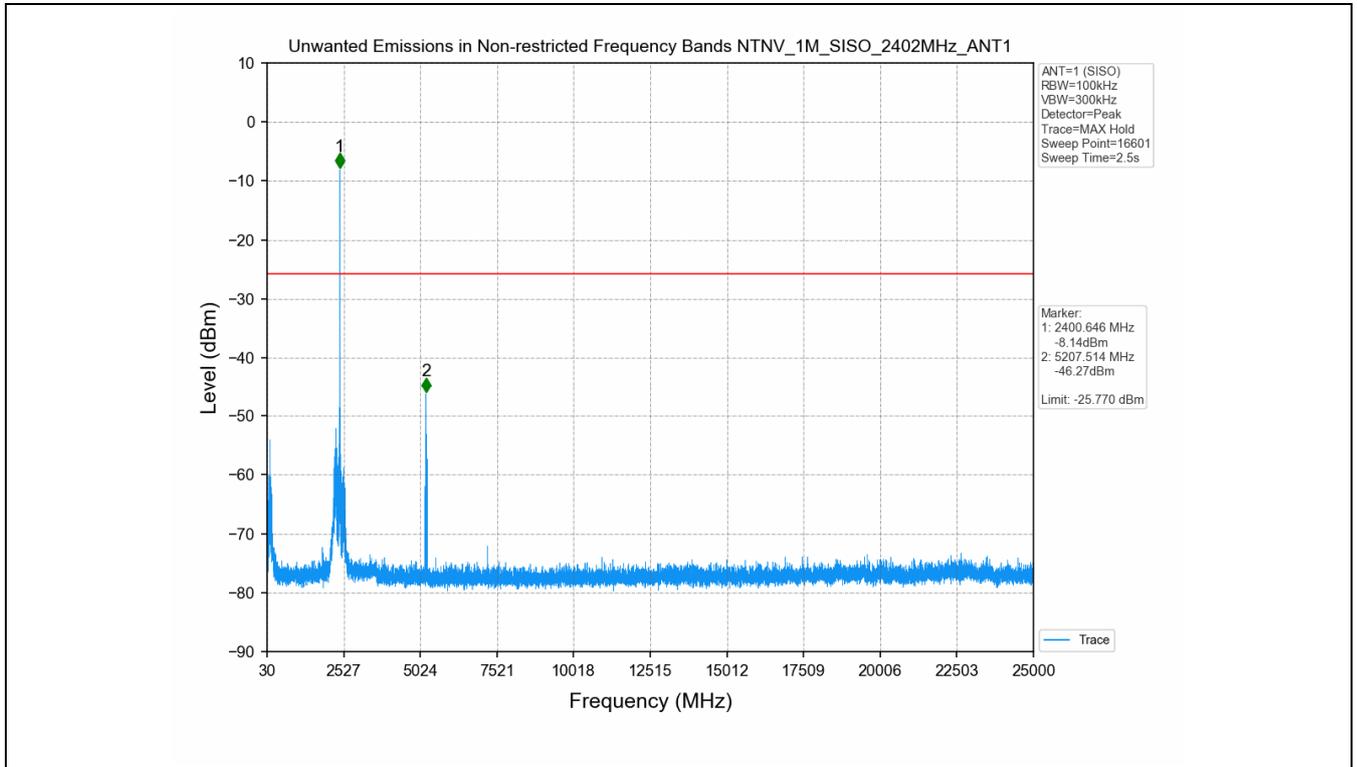


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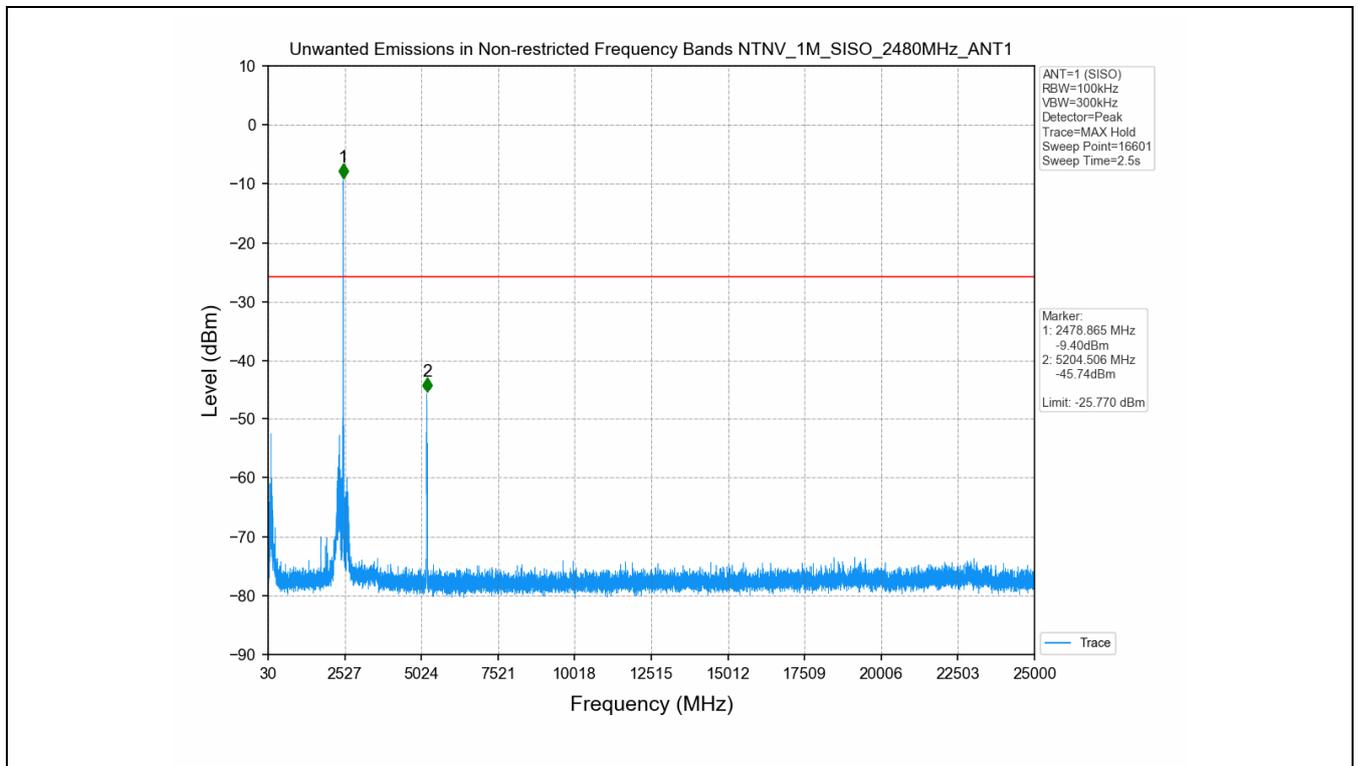
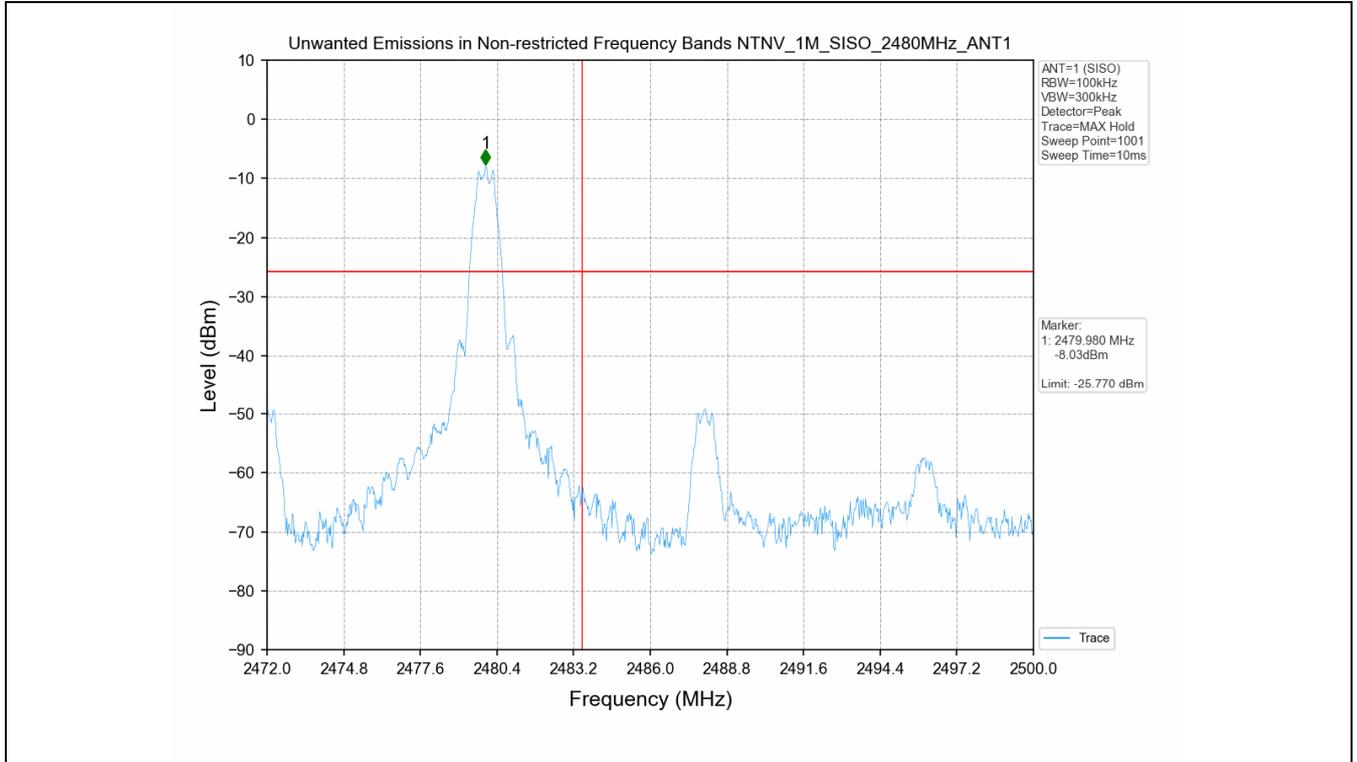
4.2 Test Graph



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- End of the Report -



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TEST REPORT

Application No.: SZEM2005004343CR
Applicant: Garmin International Inc
Address of Applicant: 1200 E. 151st. Street, Olathe, Kansas 66062, United States
Manufacturer: Measurement Ltd
Address of Manufacturer: Block A, 19/F., Prince Industrial building, 106 King Fuk Street, San Po Kong, Kowloon, Hong Kong
Factory: Display Electronics(Shenzhen)Co., Ltd
Address of Factory: No.1, Fifth Road, Yangyong Industrial Park, Shapu Community Songgang, Baoan District, Shenzhen,Guangdong Province,China

Equipment Under Test (EUT):
EUT Name: Smart Scale
Model No.: Index™ S2
Trade Mark: Garmin
FCC ID: IPH-37408
Standard(s) : 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2020-05-28
Date of Test: 2020-05-29 to 2020-06-22
Date of Issue: 2020-06-22

Test Result:

Pass*

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

Keny Xu
EMC Laboratory Manager



<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2020-06-22		Original

Authorized for issue by:			
			
		<hr/> Calvin Weng /Project Engineer	
			
		<hr/> Eric Fu /Reviewer	



2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass



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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC6V by 1.5V AAA battery*4
Antenna Gain:	-2.35dBi
Antenna Type:	Integral antenna
Modulation Type:	GFSK
Number of Channels:	1
Operation Frequency:	2466MHz

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	Conducted Spurious emissions	$\pm 0.75\text{dB}$
5	RF Radiated power	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
6	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
7	Temperature test	$\pm 1^\circ\text{C}$
8	Humidity test	$\pm 3\%$
9	Supply voltages	$\pm 1\%$
11	Time	$\pm 3\%$



4.4 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch
Address 1: No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen,
Guangdong, China. 518057.
No tests were sub-contracted.

4.5 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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



5 Equipment List

20dB Bandwidth					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50- 1	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

Field Strength of the Fundamental Signal (15.249(a))					
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	2019-07-11	2020-07-10
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

Restricted Band Around Fundamental Frequency					
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	2019-07-11	2020-07-10
EXA Spectrum Analyzer	Agilent Technologies 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
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31
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	2019-07-11	2020-07-10
EXA Spectrum Analyzer	Agilent Technologies 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



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Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
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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	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 15.203

Limit:

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

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.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -2.35dBi.

Antenna location: Refer to internal photo.



7 Radio Spectrum Matter Test Results

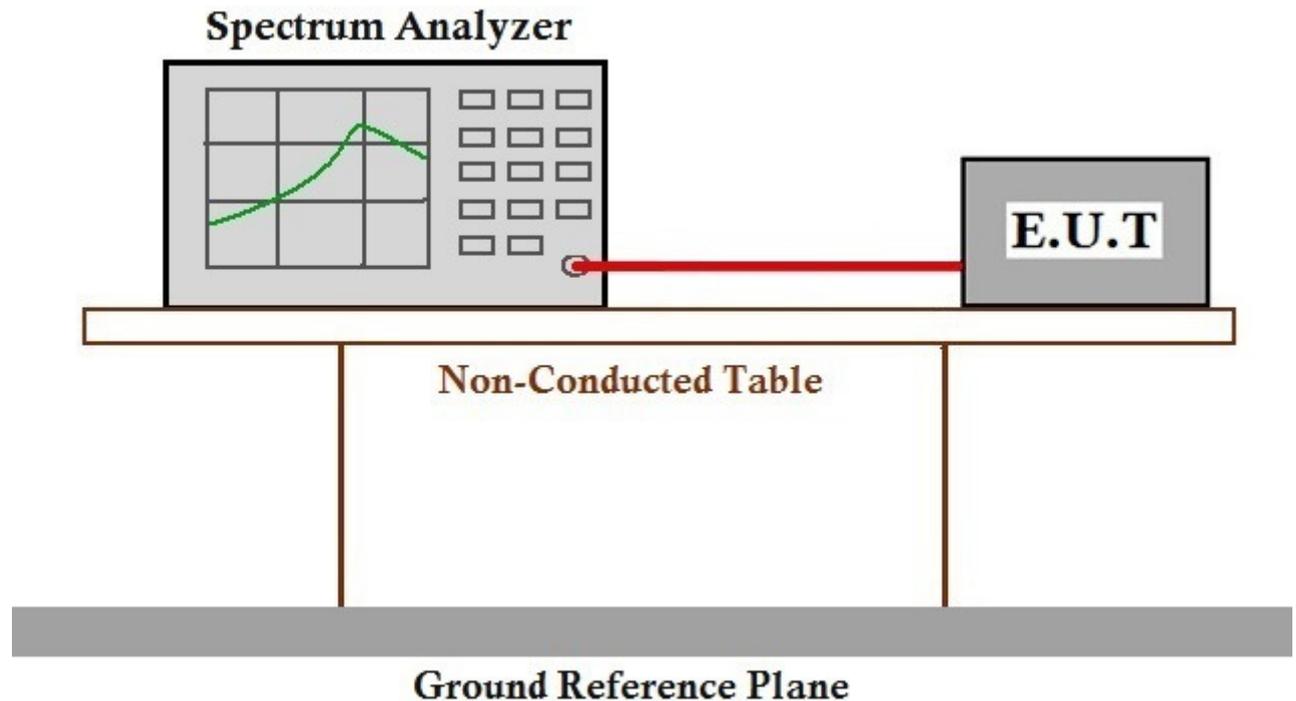
7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9
Limit: N/A

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 25.2 °C Humidity: 44 % RH Atmospheric Pressure: 1010 mbar
Test mode c:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram

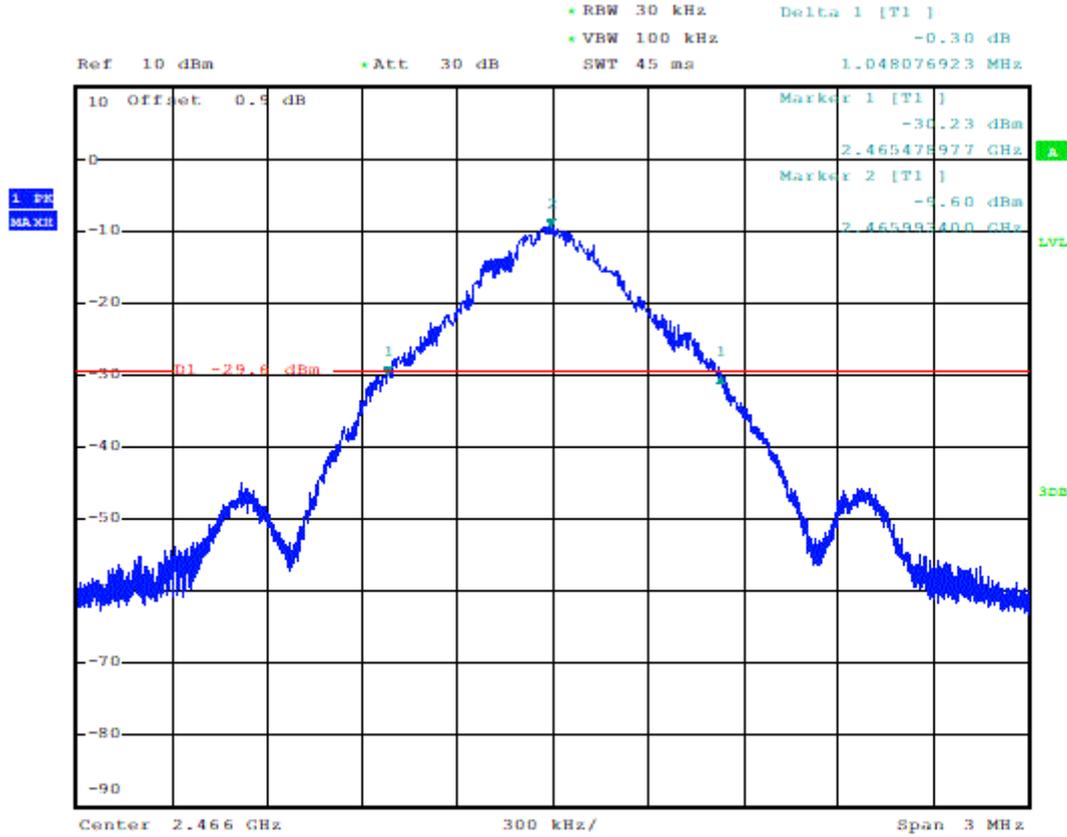


7.1.3 Measurement Procedure and Data



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Mode:c;



Date: 2 JUN 2020 19:22:42



7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)
 Test Method: ANSI C63.10 (2013) Section 6.5&6.6
 Measurement Distance: 3m
 Limit:

Fundamental frequency(MHz)	Field strength of fundamental(millivolts/meter)	Field strength of harmonics(microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Remark: The frequencies above 1000MHz 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.

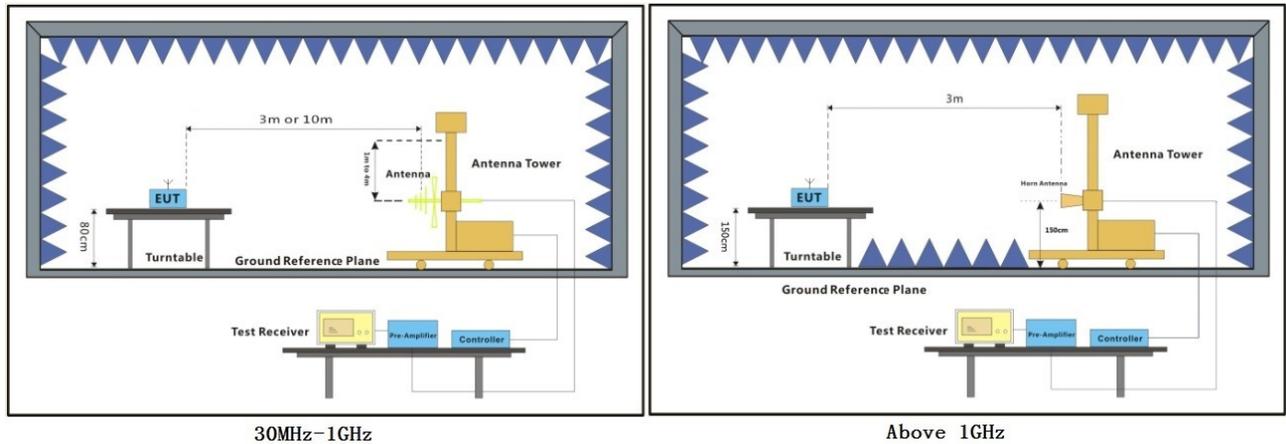
For fundamental frequency in "902-928MHz", the field strength of fundamental is based on Quasi-Peak.

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.9 °C Humidity: 62.8 % RH Atmospheric Pressure: 1010 mbar
 Test mode c:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



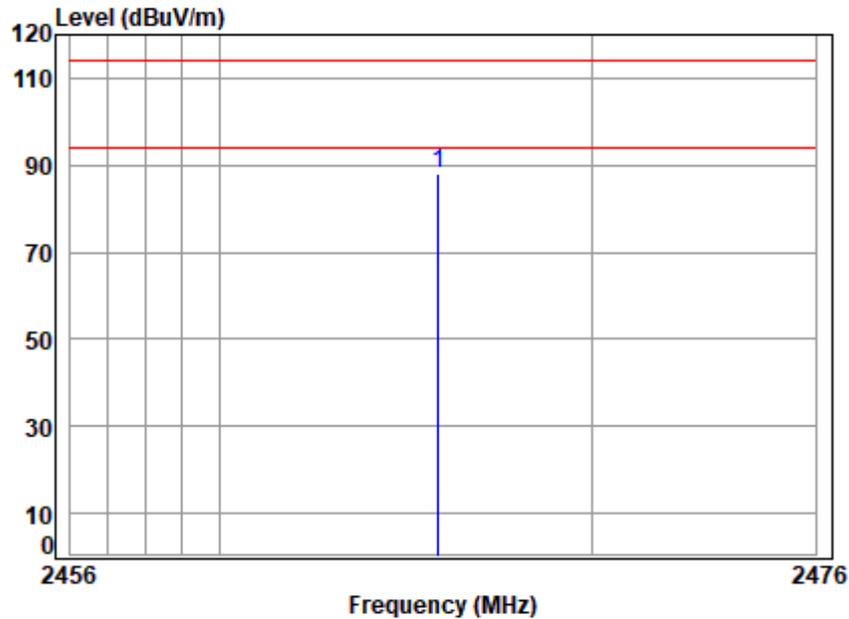
7.2.3 Measurement Procedure and Data

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



Mode:c; Polarization:Horizontal; Modulation:GFSK;



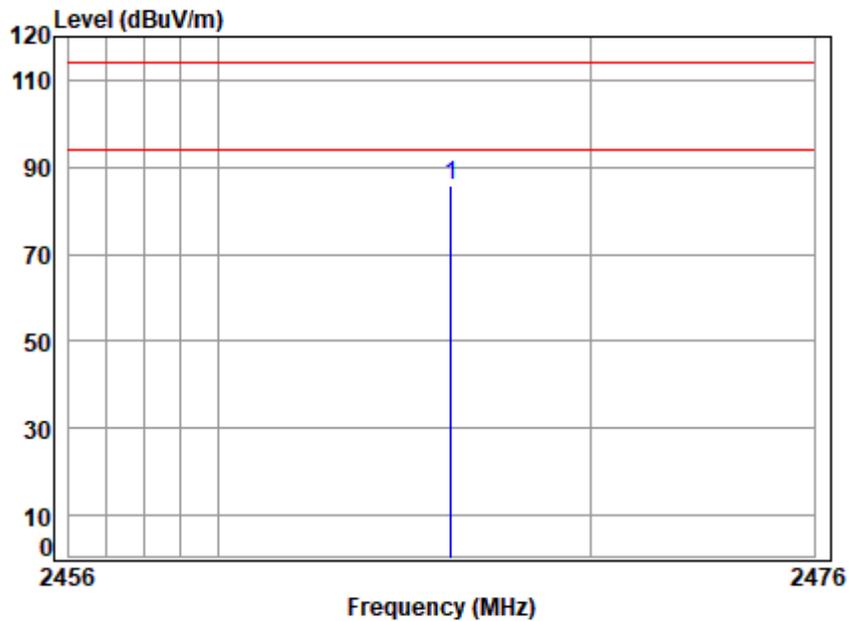
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2466 Field strength
: ANT+

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2465.852	4.47	28.64	41.00	96.17	88.28	114.00	-25.72 peak



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Mode:c; Polarization:Vertical; Modulation:GFSK;



Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2466 Field strength
: ANT+

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2466.241	4.47	28.65	41.00	93.51	85.63	114.00 -28.37 peak



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7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209
 Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
 Measurement Distance: 3m
 Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.



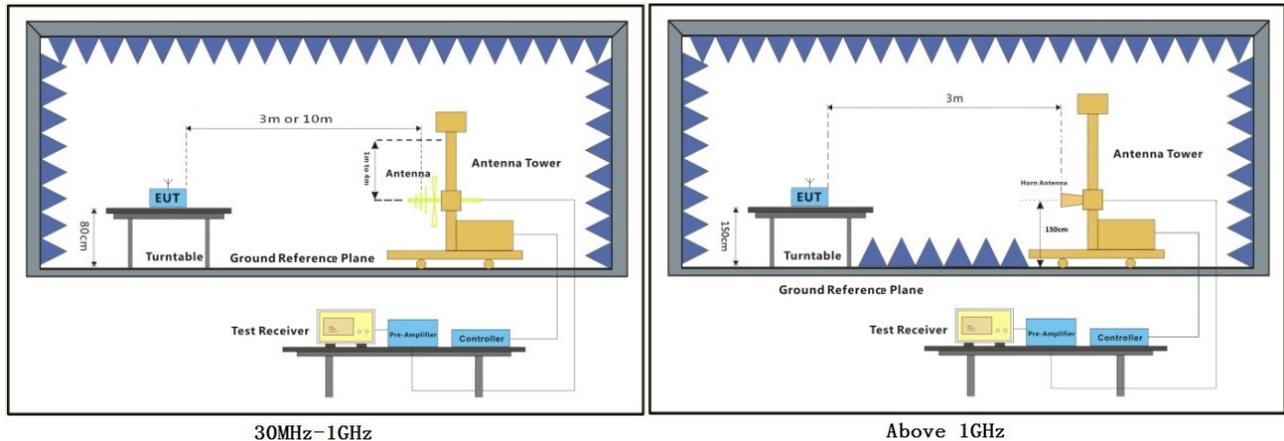
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7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 60.8 % RH Atmospheric Pressure: 1005 mbar
Test mode c:TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

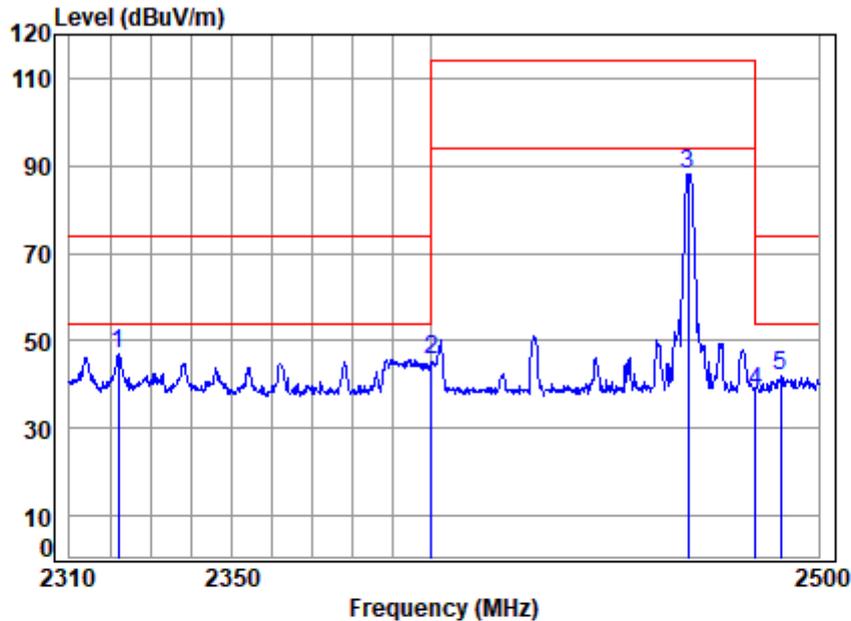
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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Mode:c; Polarization:Horizontal; Modulation:GFSK;



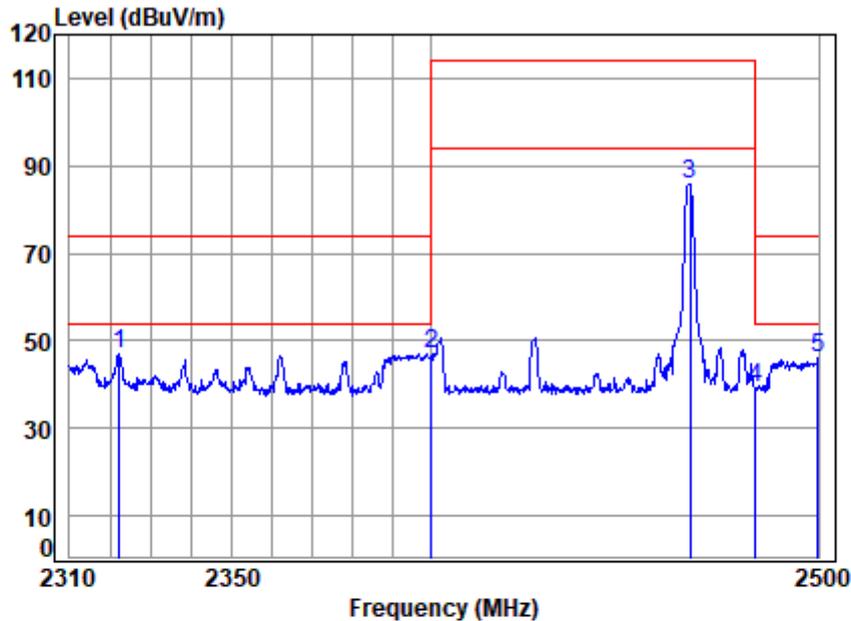
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2466 Band edge
: ANT+

		Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2321.899	4.23	28.40	40.94	55.48	47.17	74.00	-26.83	Peak
2	2400.000	4.35	28.53	40.97	53.88	45.79	74.00	-28.21	peak
3	2465.852	4.47	28.64	41.00	96.17	88.28	114.00	-25.72	peak
4	2483.500	4.49	28.67	41.01	46.29	38.44	114.00	-75.56	peak
5	2490.139	4.50	28.68	41.01	49.60	41.77	74.00	-32.23	peak



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Mode:c; Polarization:Vertical; Modulation:GFSK;



Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2466 Band edge
: ANT+

		Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2322.083	4.23	28.40	40.94	55.16	46.85	74.00	-27.15	Peak
2	2400.000	4.36	28.53	40.98	55.21	47.12	74.00	-26.88	peak
3	2466.241	4.47	28.65	41.00	93.51	85.63	114.00	-28.37	peak
4	2483.500	4.49	28.67	41.01	47.17	39.32	114.00	-74.68	peak
5	2499.802	4.52	28.70	41.02	53.73	45.93	74.00	-28.07	peak



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7.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3



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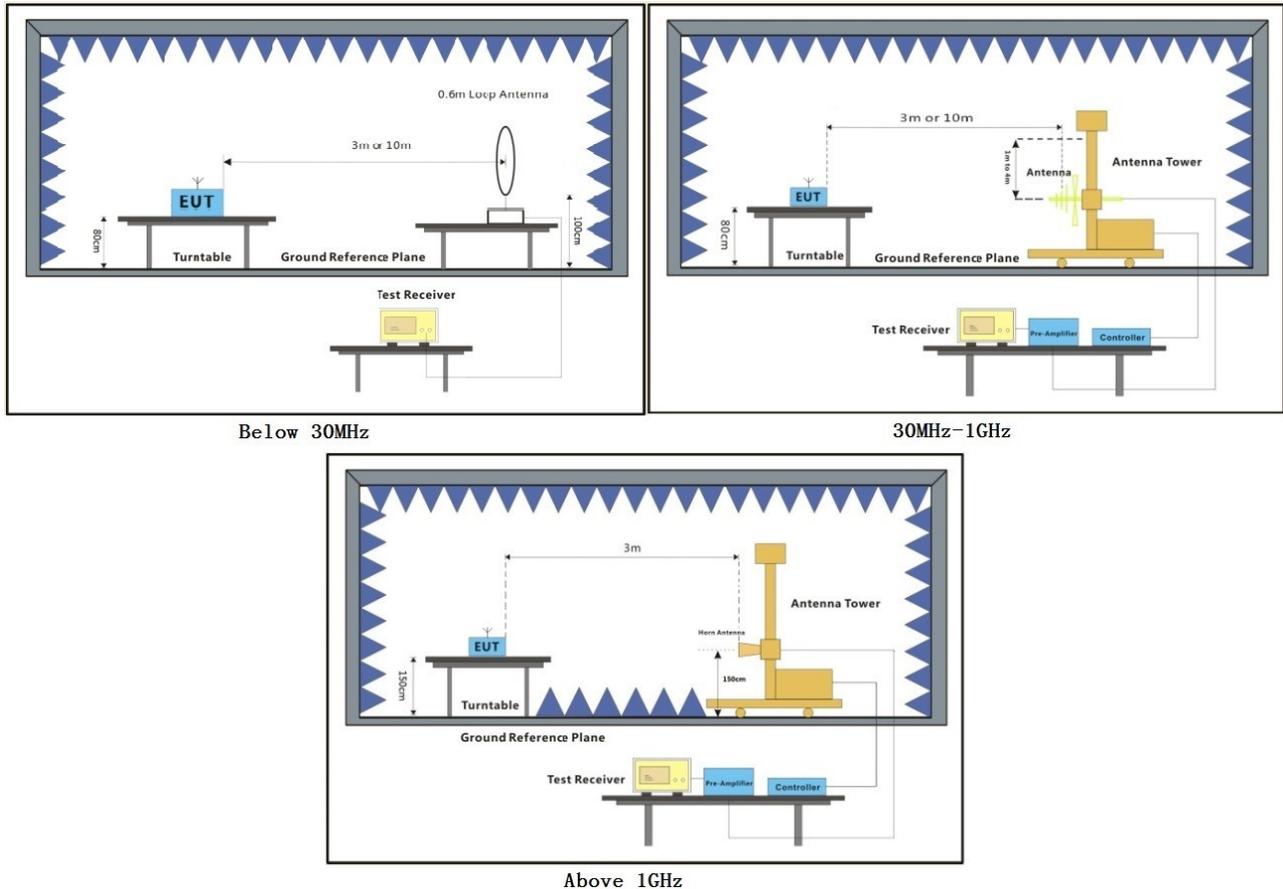
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.9 °C Humidity: 62.9 % RH Atmospheric Pressure: 1010 mbar

Test mode c:TX mode_Keep the EUT in transmitting with modulation mode.

7.4.2 Test Setup Diagram



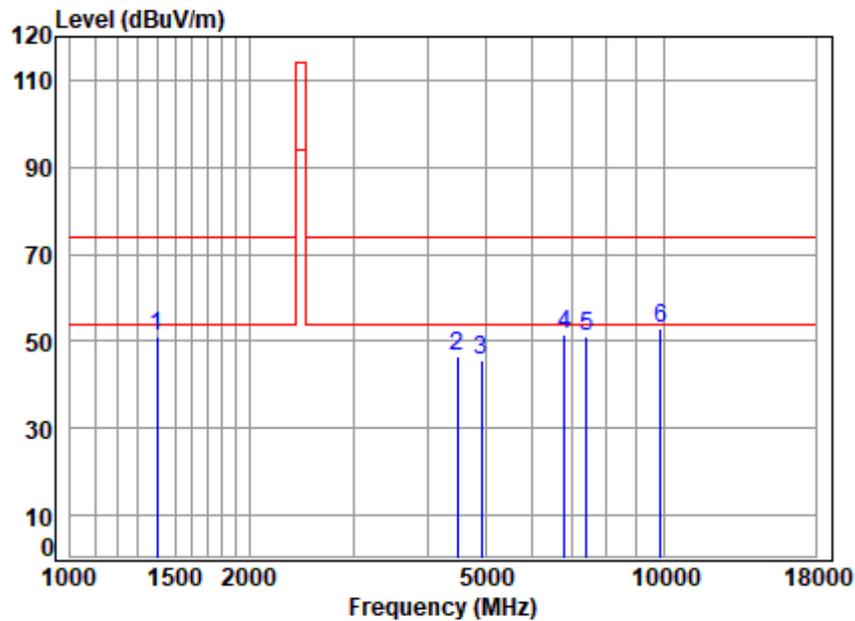
7.4.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



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Mode:c; Polarization:Horizontal; Modulation:GFSK;



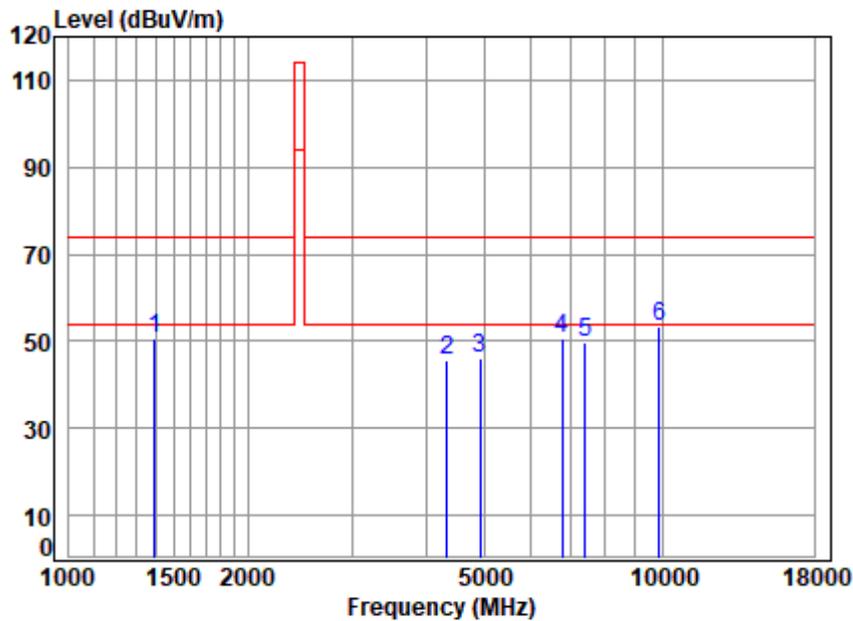
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2466 TX RSE
: ANT+

	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	1398.336	3.10	25.42	40.44	62.88	50.96	74.00	-23.04	peak
2	4482.150	6.74	33.57	42.54	48.62	46.39	74.00	-27.61	peak
3	4932.000	7.23	34.12	42.85	47.04	45.54	74.00	-28.46	peak
4	6795.879	8.44	35.78	41.79	49.07	51.50	74.00	-22.50	peak
5	7398.000	8.92	36.22	41.48	47.28	50.94	74.00	-23.06	peak
6	9864.000	10.73	37.82	38.20	42.67	53.02	74.00	-20.98	peak



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Mode:c; Polarization:Vertical; Modulation:GFSK;



Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2466 TX RSE
: ANT+

	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	1394.300	3.10	25.40	40.43	62.41	50.48	74.00	-23.52	peak
2	4329.354	6.60	33.30	42.42	48.36	45.84	74.00	-28.16	peak
3	4932.000	7.23	34.12	42.85	47.57	46.07	74.00	-27.93	peak
4	6776.265	8.43	35.77	41.80	48.14	50.54	74.00	-23.46	peak
5	7398.000	8.92	36.22	41.48	46.30	49.96	74.00	-24.04	peak
6	9864.000	10.73	37.82	38.20	43.24	53.59	74.00	-20.41	peak



8 Photographs

8.1 Test Setup

Refer to test setup photos.

8.2 EUT Constructional Details (EUT Photos)

Refer to external and internal photos.

- End of the Report -



TEST REPORT

Application No.: SZEM2005004343CR
Applicant: Garmin International Inc
Address of Applicant: 1200 E. 151st. Street, Olathe, Kansas 66062, United States
Manufacturer: Measurement Ltd
Address of Manufacturer: Block A, 19/F., Prince Industrial building, 106 King Fuk Street, San Po Kong, Kowloon, Hong Kong
Factory: Display Electronics(Shenzhen)Co., Ltd
Address of Factory: No.1, Fifth Road, Yangyong Industrial Park, Shapu Community Songgang, Baoan District, Shenzhen,Guangdong Province,China
Equipment Under Test (EUT):
EUT Name: Smart Scale
Model No.: Index™ S2
Trade Mark: Garmin
FCC ID: IPH-37408
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2020-05-28
Date of Test: 2020-05-29 to 2020-06-22
Date of Issue: 2020-06-22

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		2020-06-22		Original

Authorized for issue by:			
			
		<hr/> Calvin Weng /Project Engineer	
			
		<hr/> 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
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
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
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 15.209 & 15.247(d)	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 15.209 & 15.247(d)	Pass



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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC6V by 1.5V AAA battery*4
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Channel Spacing:	5MHz
Antenna Gain:	-3.78dBi
Antenna Type:	Integral antenna

4.2 Description of Support Units

The EUT has been tested as an independent unit.



4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.75\text{dB}$
5	RF power density	$\pm 2.84\text{dB}$
6	Conducted Spurious emissions	$\pm 0.75\text{dB}$
7	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
8	Temperature test	$\pm 1^\circ\text{C}$
9	Humidity test	$\pm 3\%$
10	Supply voltages	$\pm 1\%$
11	Time	$\pm 3\%$



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4.4 Test Location

All tests were performed at:

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

Address 1: No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

No tests were sub-contracted.

4.5 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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



5 Equipment List

Minimum 6dB Bandwidth					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Conducted Peak Output Power					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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
Power Sensor	KEYSIGHT	U2021XA	SEM009-13	2020-03-23	2021-03-22
Electric and Magnetic Field Analyzer	Narda	EHP-50F	SEM022-05	2019-11-28	2020-11-27

Power Spectrum Density					
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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10



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Attenuator	Huber+Suhner	6620_SMA-50-1	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

Conducted Band Edges Measurement

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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Conducted Spurious Emissions

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	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Huber+Suhner	6620_SMA-50-1	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

Radiated Emissions 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



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Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10
EXA Spectrum Analyzer	Agilent Technologies 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 Spurious Emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31
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	2019-07-11	2020-07-10
EXA Spectrum Analyzer	Agilent Technologies 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



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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	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 15.203 & 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 -3.78dBi.

Antenna location: Refer to internal photo.



7 Radio Spectrum Matter Test Results

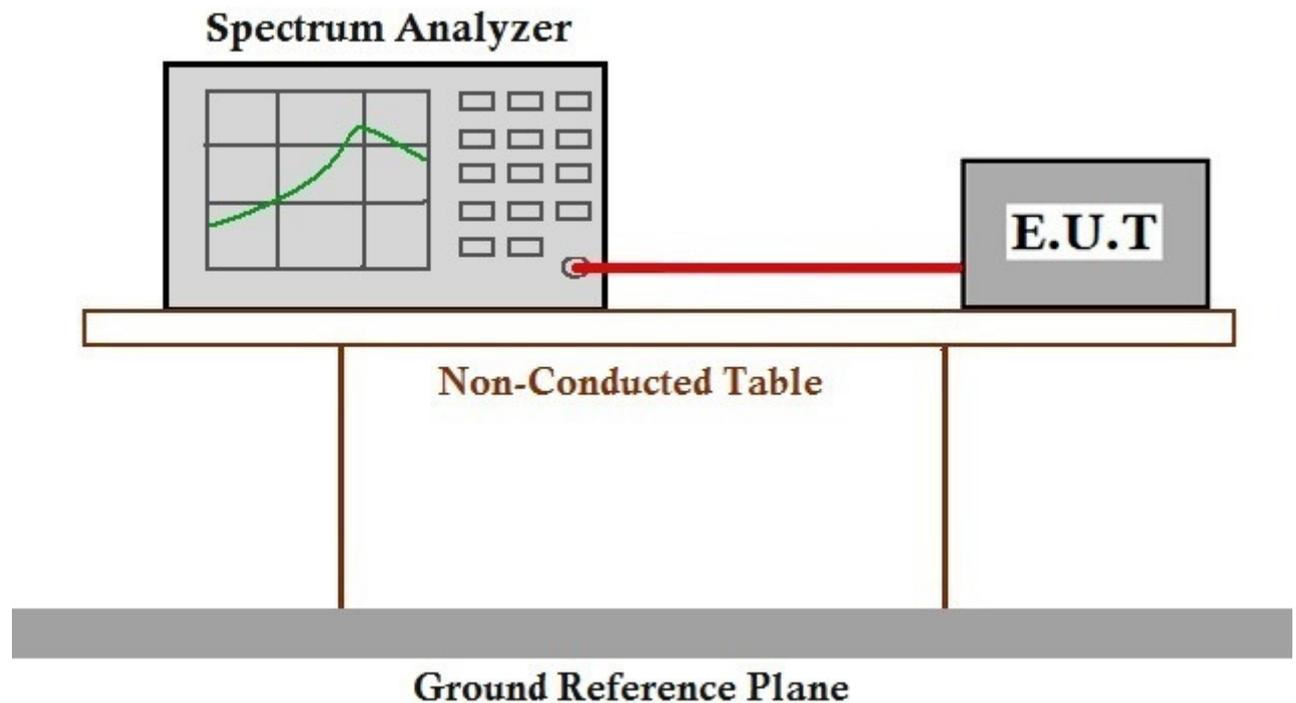
7.1 Minimum 6dB Bandwidth

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

7.1.1 E.U.T. Operation

Operating Environment:
 Temperature: 25.2 °C Humidity: 44.1 % RH Atmospheric Pressure: 1010 mbar
 Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.2 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

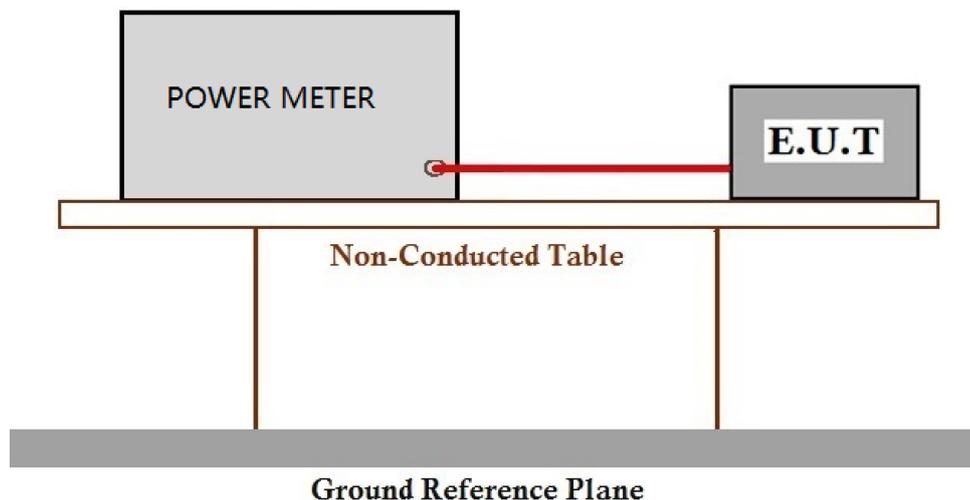
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.2 °C Humidity: 44.1 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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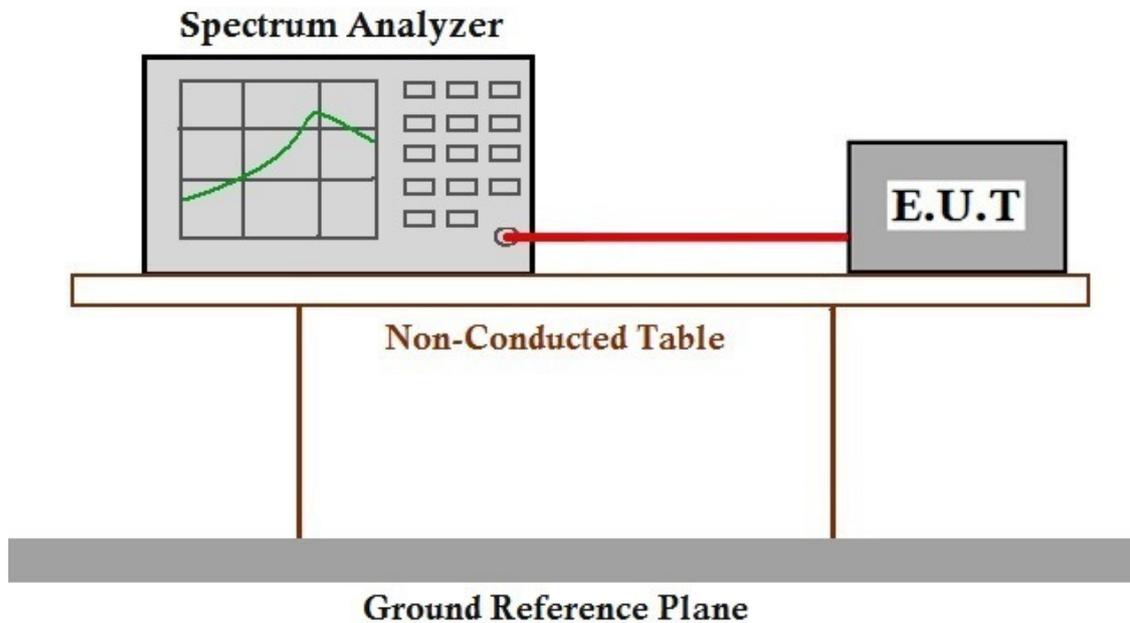
7.3 Power Spectrum Density

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

7.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 25.2 °C Humidity: 44.1 % RH Atmospheric Pressure: 1010 mbar
 Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



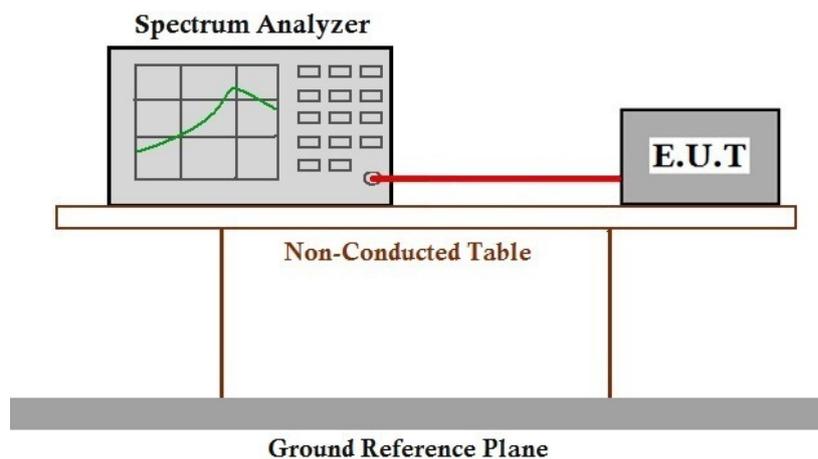
7.4 Conducted Band Edges Measurement

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:	25.2 °C Humidity: 44 % RH Atmospheric Pressure: 1010 mbar
Test mode	b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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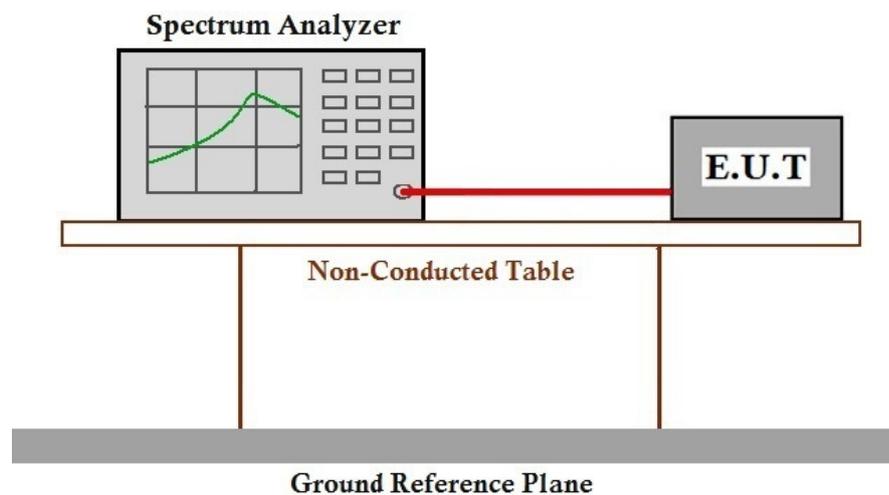
7.5 Conducted Spurious Emissions

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: 25.2 °C Humidity: 44 % RH Atmospheric Pressure: 1010 mbar
Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)
 Test Method: ANSI C63.10 (2013) Section 6.10.5
 Measurement Distance: 3m
 Limit:

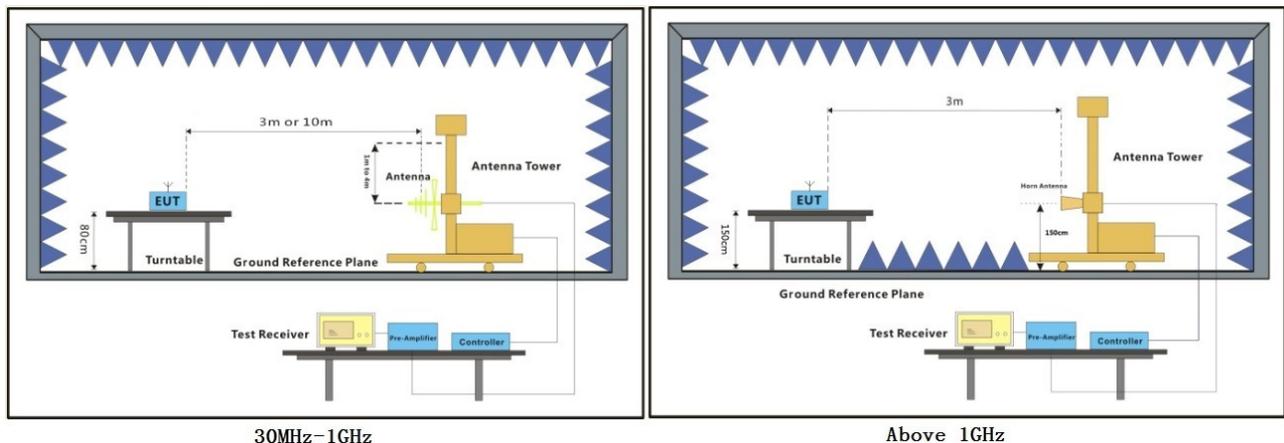
Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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: 56.3 % RH Atmospheric Pressure: 1005 mbar
 Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram



7.6.3 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.

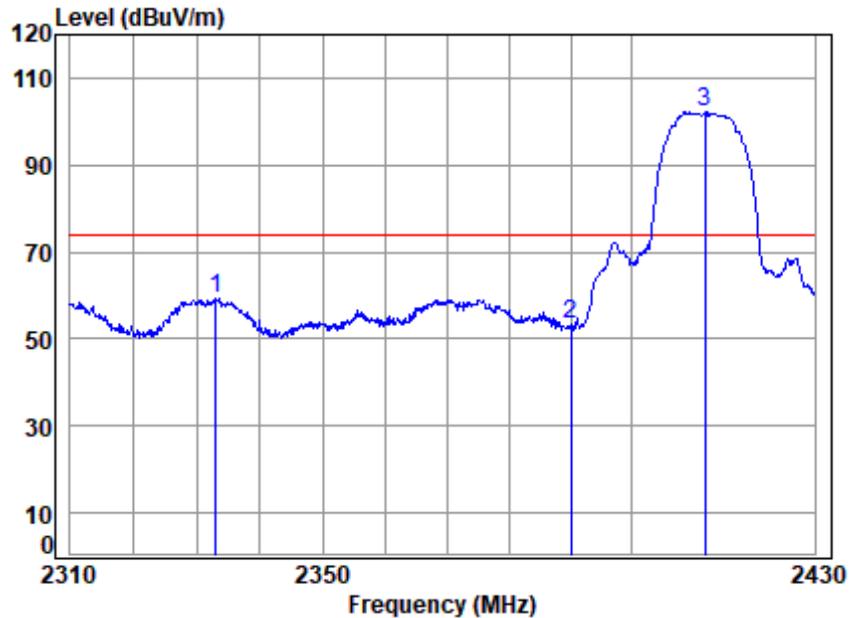
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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:b; Polarization:Horizontal; Modulation:802.11b; ; Channel:Low



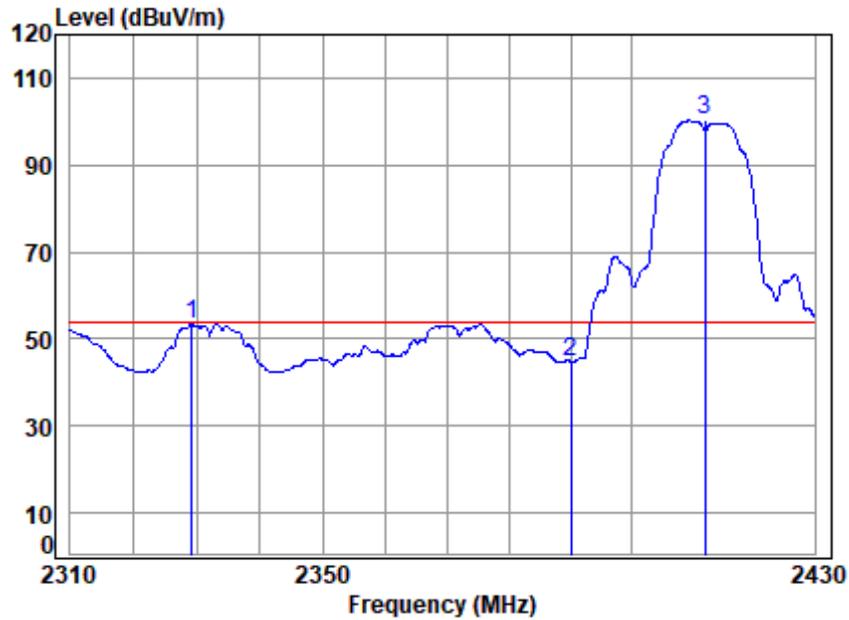
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

	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	2333.044	4.25	28.42	40.95	67.75	59.47	74.00	-14.53	peak
2	2390.000	4.34	28.52	40.97	61.52	53.41	74.00	-20.59	peak
3 *	2412.000	4.38	28.56	40.98	110.17	102.13	74.00	28.13	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11b; ; Channel:Low



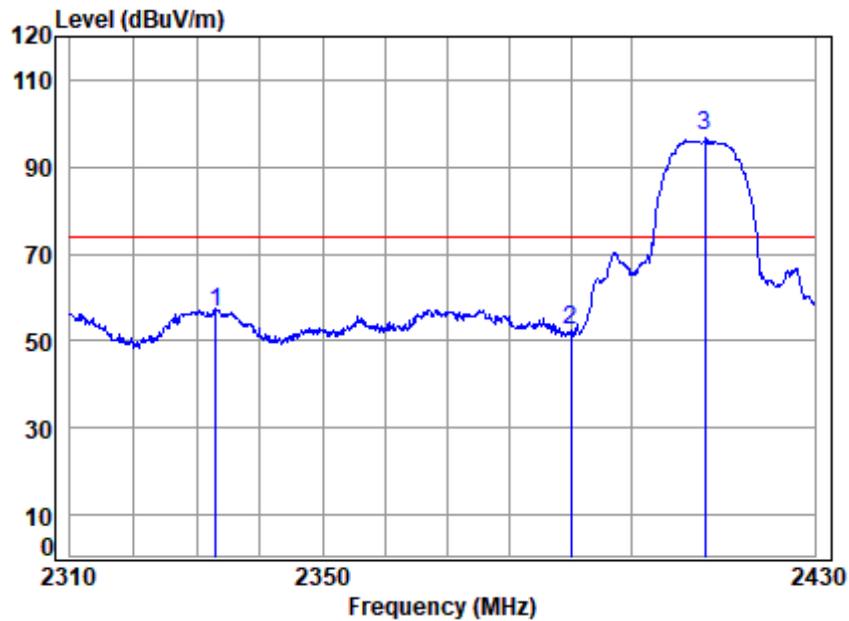
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

	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	2329.266	4.24	28.41	40.95	61.73	53.43	54.00	-0.57	Average
2	2390.000	4.34	28.52	40.97	52.90	44.79	54.00	-9.21	Average
3 *	2412.000	4.38	28.56	40.98	108.20	100.16	54.00	46.16	Average



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Mode:b; Polarization:Vertical; Modulation:802.11b; ; Channel:Low



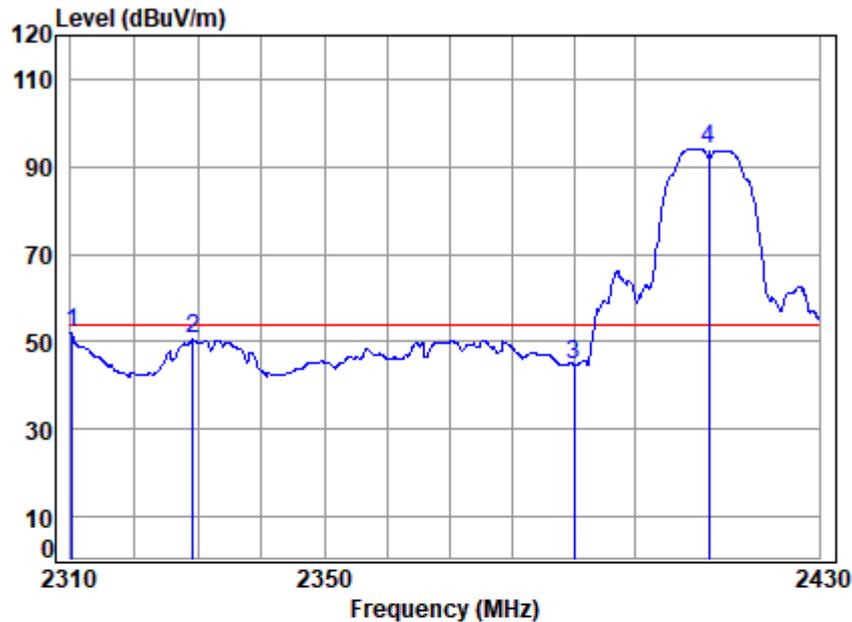
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

	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	2333.044	4.25	28.42	40.95	64.73	56.45	74.00	-17.55	peak
2	2390.000	4.34	28.52	40.97	60.50	52.39	74.00	-21.61	peak
3 *	2412.000	4.38	28.56	40.98	105.17	97.13	74.00	23.13	peak



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Mode:b; Polarization:Vertical; Modulation:802.11b; ; Channel:Low



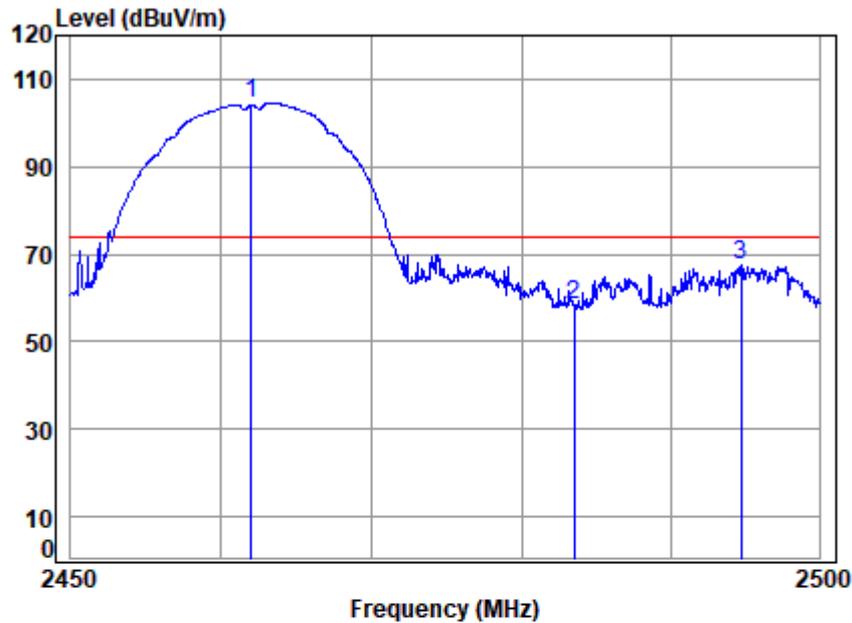
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2310.234	4.21	28.38	40.94	60.15	51.80	54.00	-2.20	Average
2	2329.266	4.24	28.41	40.95	58.73	50.43	54.00	-3.57	Average
3	2390.000	4.34	28.52	40.97	52.90	44.79	54.00	-9.21	Average
4 *	2412.000	4.38	28.56	40.98	102.20	94.16	54.00	40.16	Average



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Mode:b; Polarization:Horizontal; Modulation:802.11b; ; Channel:High



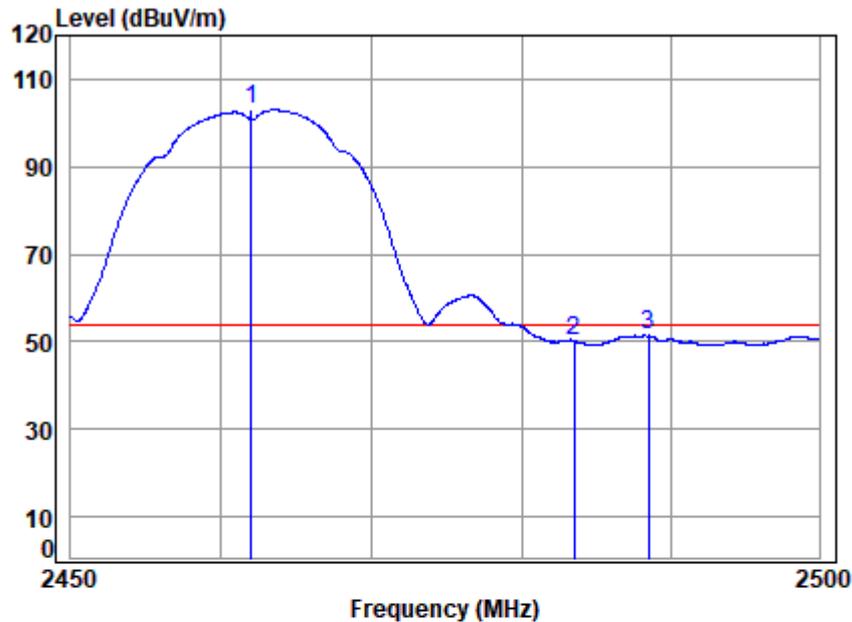
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4GWIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	3.91	28.64	41.00	112.99	104.54	74.00	30.54 peak
2	2483.500	4.01	28.67	41.01	66.73	58.40	74.00	-15.60 peak
3	2494.753	4.06	28.69	41.02	75.64	67.37	74.00	-6.63 Peak



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Mode:b; Polarization:Horizontal; Modulation:802.11b; ; Channel:High



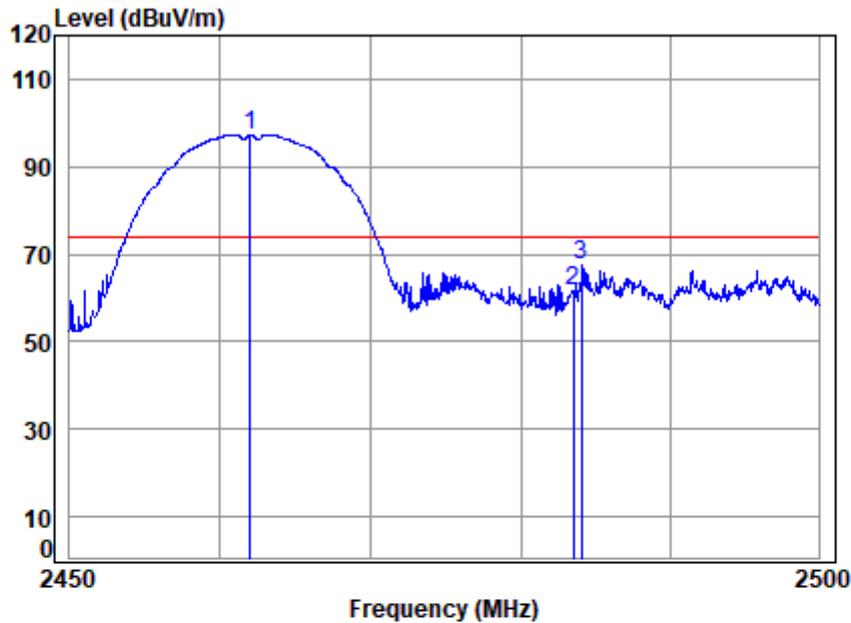
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4GWIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	3.91	28.64	41.00	111.38	102.93	54.00	48.93 Average
2	2483.500	4.01	28.67	41.01	58.53	50.20	54.00	-3.80 Average
3	2488.511	4.03	28.68	41.01	59.66	51.36	54.00	-2.64 Average



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Mode:b; Polarization:Vertical; Modulation:802.11b; ; Channel:High



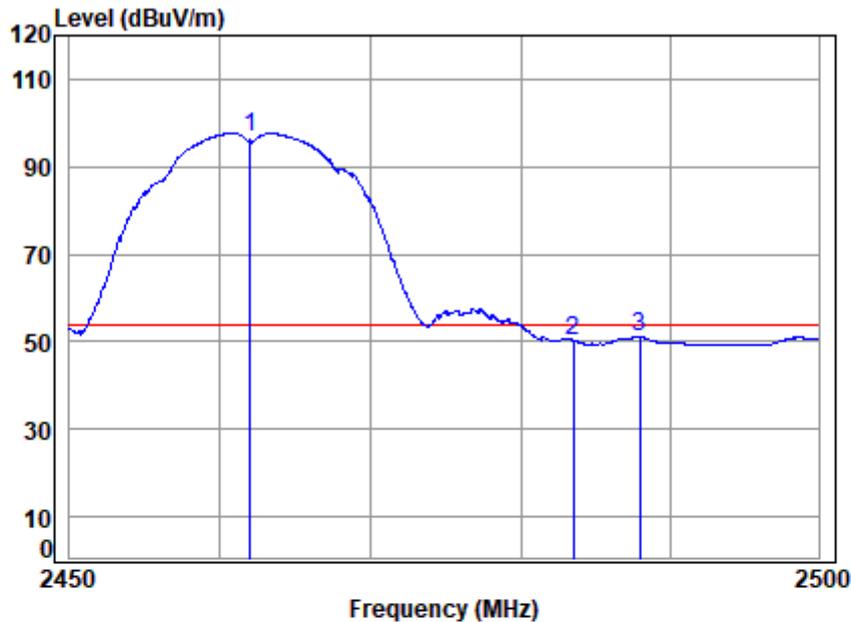
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4GWIFI 11B

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 * 2462.000	3.91	28.64	41.00	105.77	97.32	74.00	23.32	Peak
2 2483.500	4.01	28.67	41.01	69.86	61.53	74.00	-12.47	Peak
3 2484.091	4.01	28.67	41.01	75.85	67.52	74.00	-6.48	Peak



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Mode:b; Polarization:Vertical; Modulation:802.11b; ; Channel:High



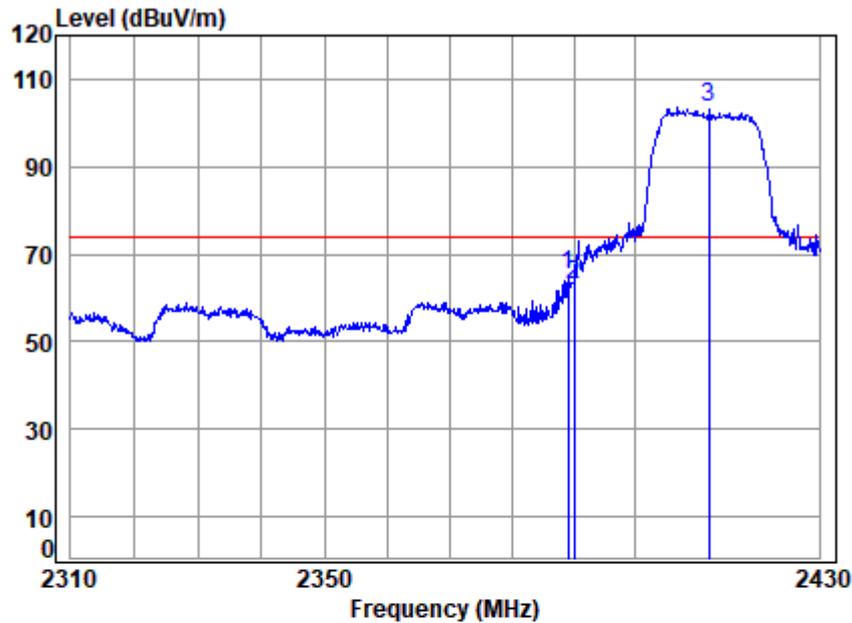
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4GWIFI 11B

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	3.91	28.64	41.00	105.04	96.59	54.00	42.59 Average
2	2483.500	4.01	28.67	41.01	58.64	50.31	54.00	-3.69 Average
3	2487.958	4.03	28.68	41.01	59.43	51.13	54.00	-2.87 Average



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Mode:b; Polarization:Horizontal; Modulation:802.11g; ; Channel:Low



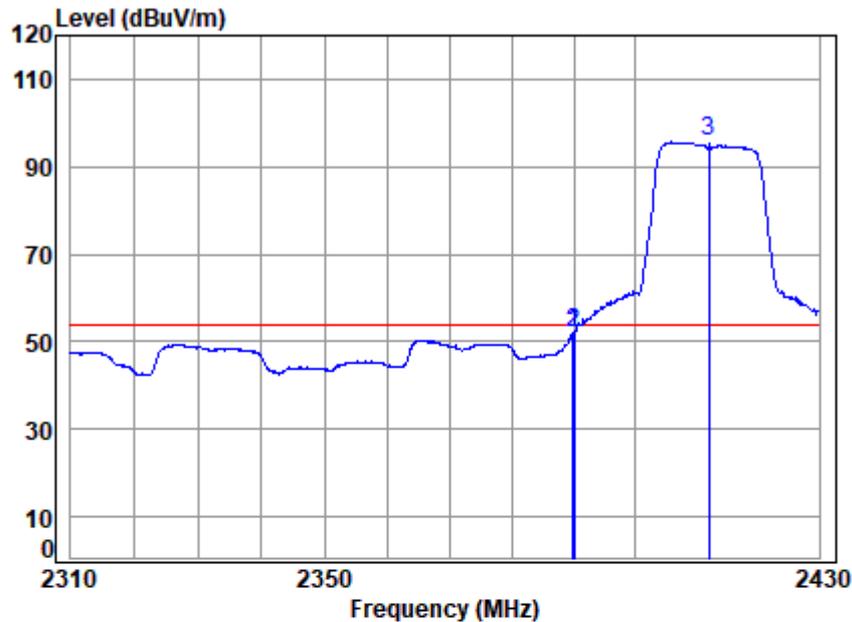
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.121	4.34	28.52	40.97	73.41	65.30	74.00	-8.70 peak
2	2390.000	4.34	28.52	40.97	71.03	62.92	74.00	-11.08 peak
3 *	2412.000	4.38	28.56	40.98	111.67	103.63	74.00	29.63 peak



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Mode:b; Polarization:Horizontal; Modulation:802.11g; ; Channel:Low



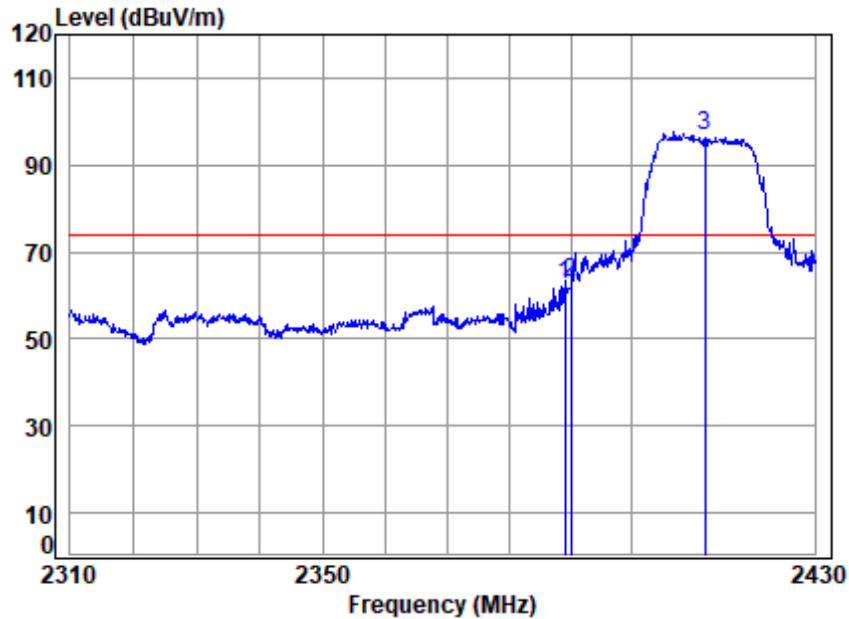
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.847	4.34	28.52	40.97	59.99	51.88	54.00	-2.12	Average
2	2390.000	4.34	28.52	40.97	59.92	51.81	54.00	-2.19	Average
3 *	2412.000	4.38	28.56	40.98	103.64	95.60	54.00	41.60	Average



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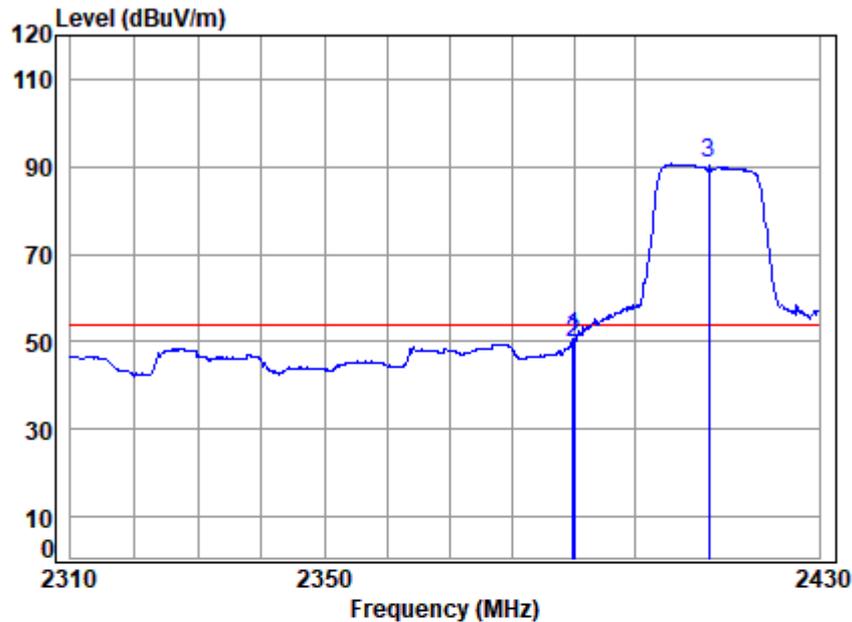
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

	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	2389.121	4.34	28.52	40.97	70.44	62.33	74.00	-11.67	peak
2	2390.000	4.34	28.52	40.97	71.00	62.89	74.00	-11.11	peak
3 *	2412.000	4.38	28.56	40.98	104.67	96.63	74.00	22.63	peak



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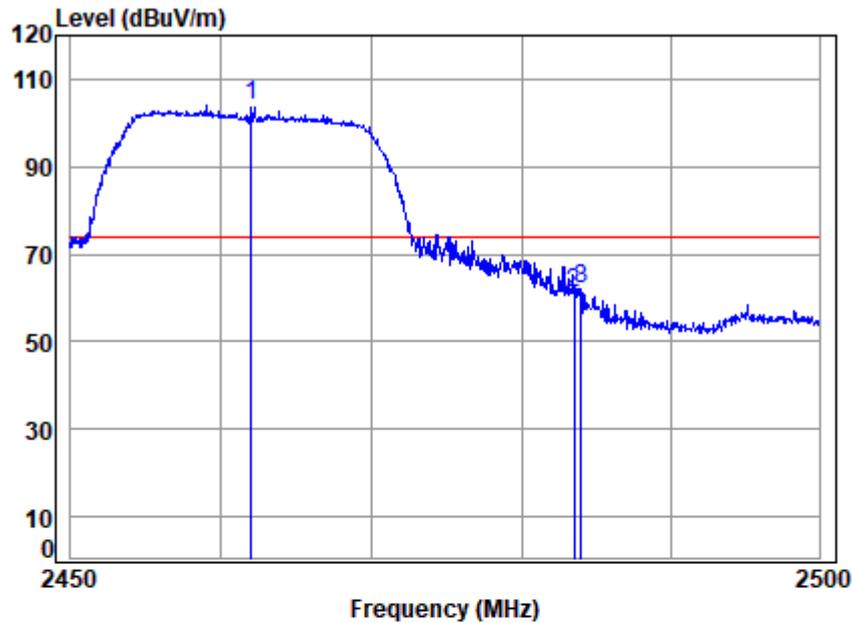
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.847	4.34	28.52	40.97	58.99	50.88	54.00	-3.12	Average
2	2390.000	4.34	28.52	40.97	57.92	49.81	54.00	-4.19	Average
3 *	2412.000	4.38	28.56	40.98	98.64	90.60	54.00	36.60	Average



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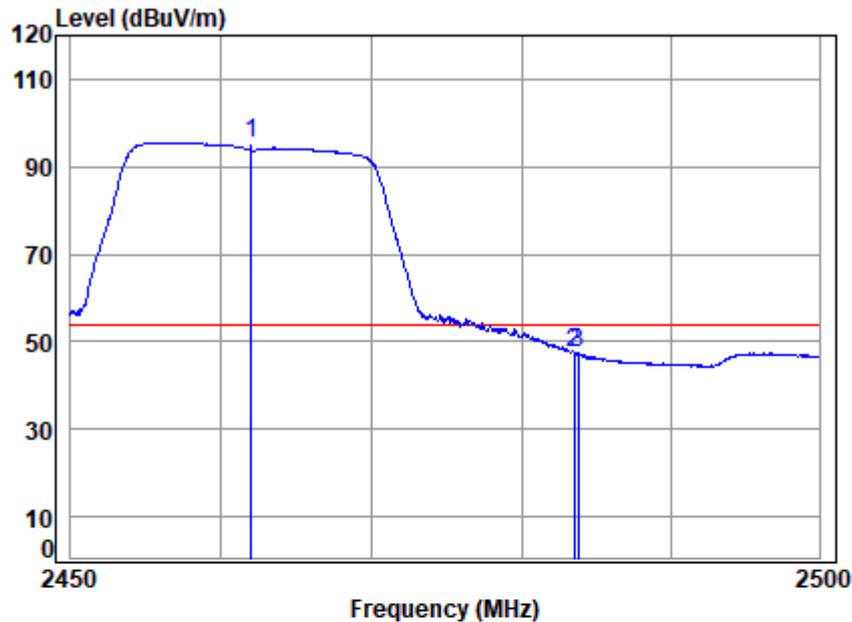
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	4.46	28.64	41.00	111.83	103.93	74.00	29.93 peak
2	2483.500	4.49	28.67	41.01	69.06	61.21	74.00	-12.79 peak
3	2483.990	4.49	28.67	41.01	69.83	61.98	74.00	-12.02 peak



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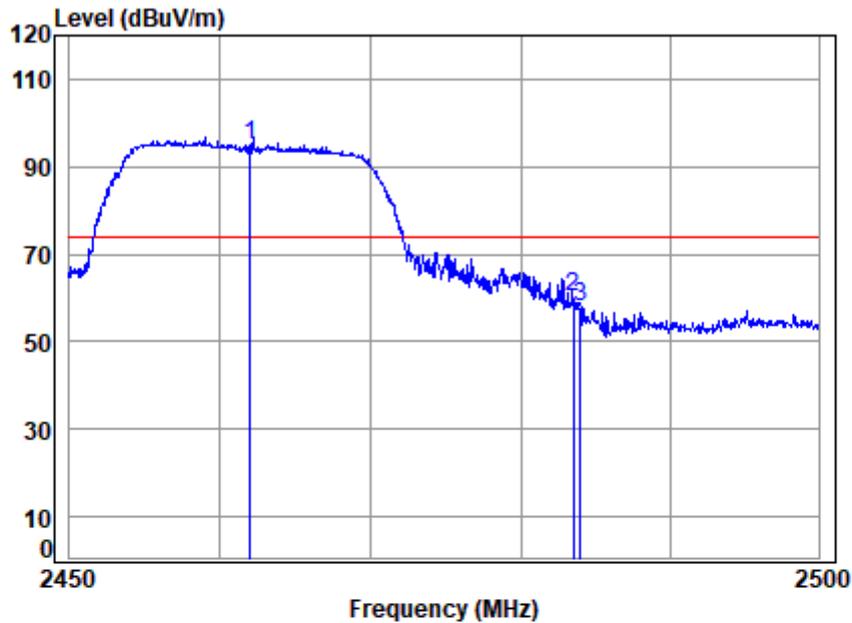
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	4.46	28.64	41.00	103.41	95.51	54.00	41.51	Average
2	2483.500	4.49	28.67	41.01	55.51	47.66	54.00	-6.34	Average
3	2483.790	4.49	28.67	41.01	55.24	47.39	54.00	-6.61	Average



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Mode:b; Polarization:Vertical; Modulation:802.11g; ; Channel:High



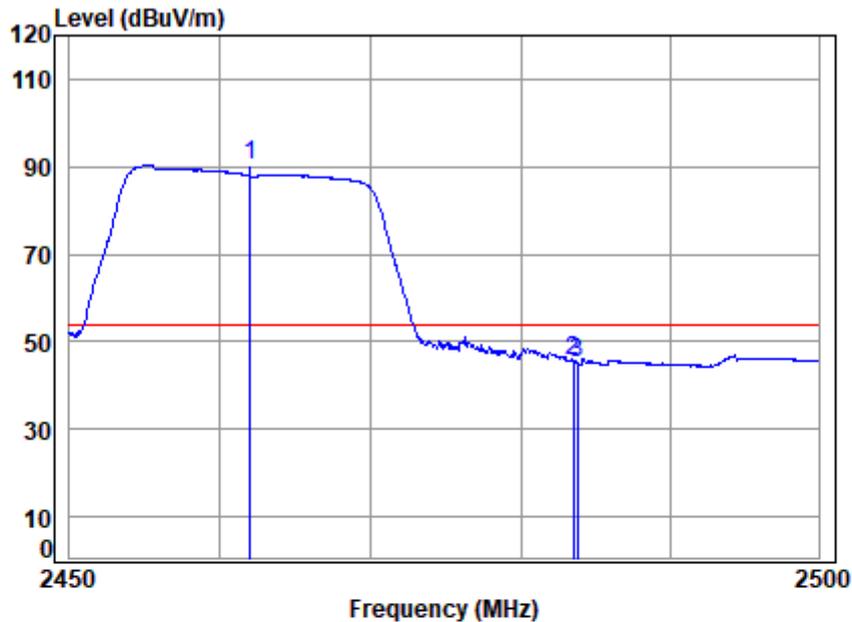
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

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 * 2462.000	4.46	28.64	41.00	102.83	94.93	74.00	20.93	peak
2 2483.500	4.49	28.67	41.01	68.06	60.21	74.00	-13.79	peak
3 2483.990	4.49	28.67	41.01	65.83	57.98	74.00	-16.02	peak



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Mode:b; Polarization:Vertical; Modulation:802.11g; ; Channel:High



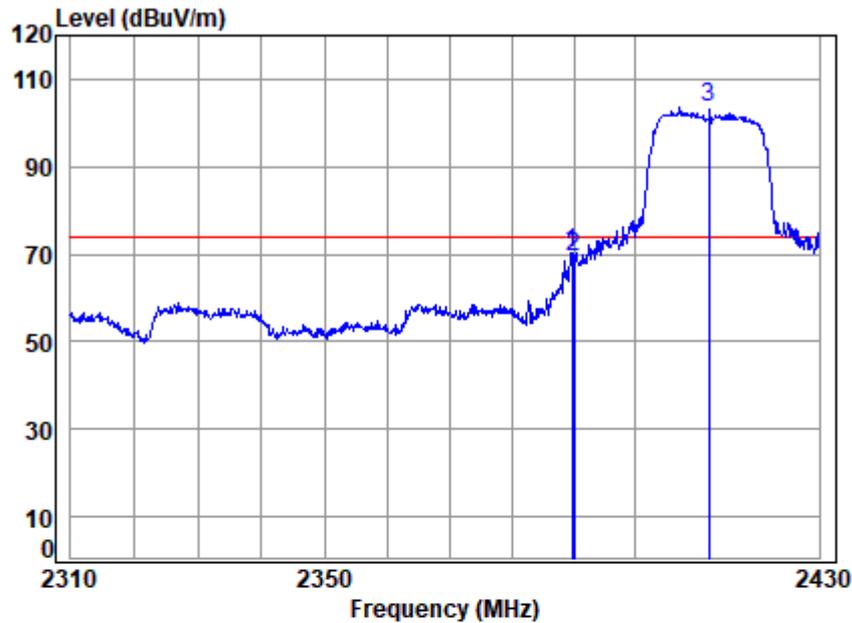
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	4.46	28.64	41.00	98.41	90.51	54.00	36.51 Average
2	2483.500	4.49	28.67	41.01	53.51	45.66	54.00	-8.34 Average
3	2483.790	4.49	28.67	41.01	53.24	45.39	54.00	-8.61 Average



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Mode:b; Polarization:Horizontal; Modulation:802.11n20; ; Channel:Low



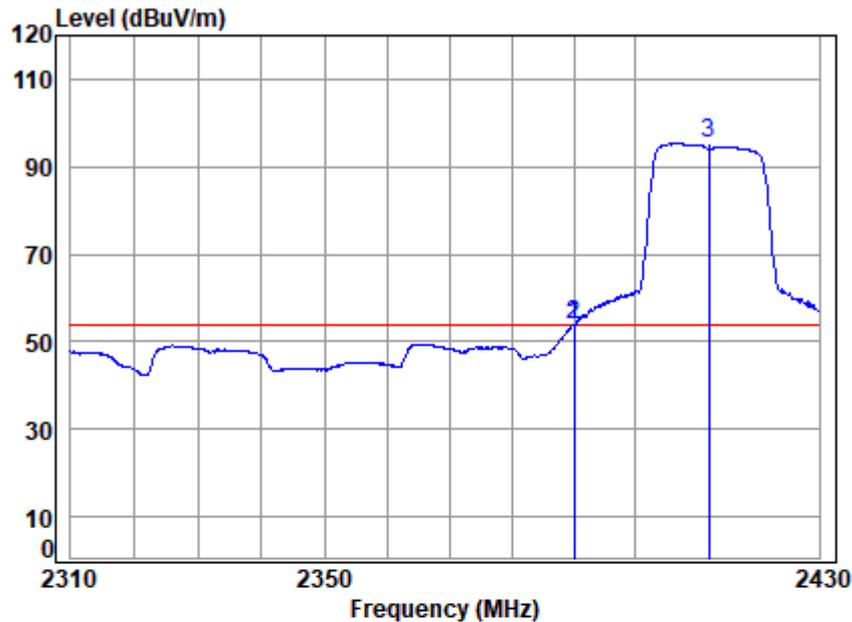
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.726	4.34	28.52	40.97	78.28	70.17	74.00	-3.83	peak
2	2390.000	4.34	28.52	40.97	77.25	69.14	74.00	-4.86	peak
3 *	2412.000	4.38	28.56	40.98	111.39	103.35	74.00	29.35	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11n20; ; Channel:Low



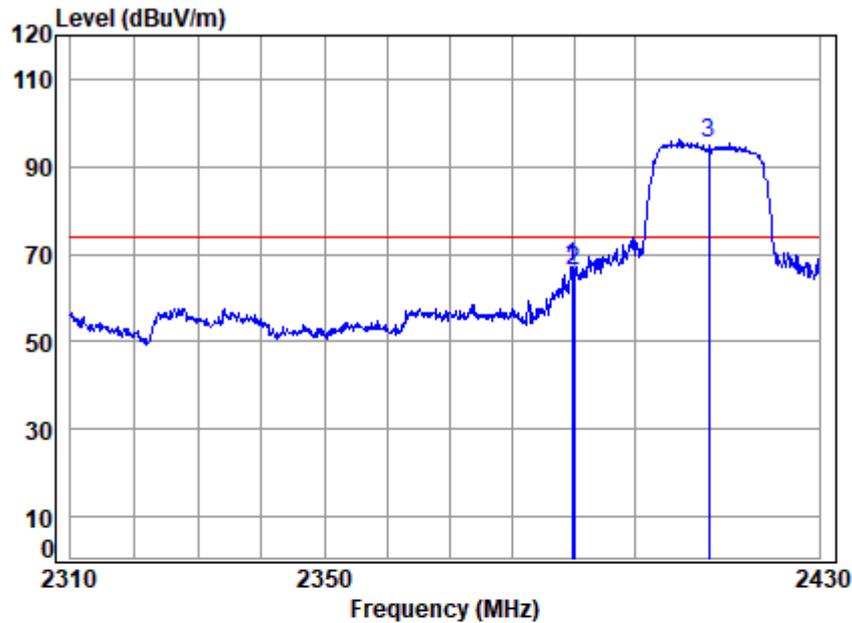
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.968	4.34	28.52	40.97	62.00	53.89	54.00	-0.11	Average
2	2390.000	4.34	28.52	40.97	62.00	53.89	54.00	-0.11	Average
3 *	2412.000	4.38	28.56	40.98	103.37	95.33	54.00	41.33	Average



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Mode:b; Polarization:Vertical; Modulation:802.11n20; ; Channel:Low



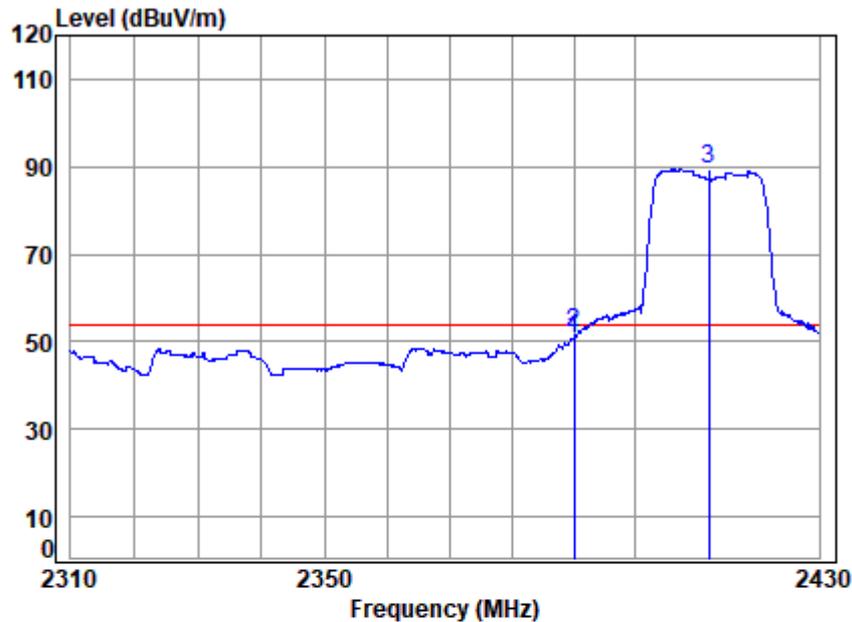
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

		Cable	Ant	Preamp	Read	Limit	Over		
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.726	4.34	28.52	40.97	75.28	67.17	74.00	-6.83	peak
2	2390.000	4.34	28.52	40.97	74.25	66.14	74.00	-7.86	peak
3 *	2412.000	4.38	28.56	40.98	103.39	95.35	74.00	21.35	peak



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Mode:b; Polarization:Vertical; Modulation:802.11n20; ; Channel:Low



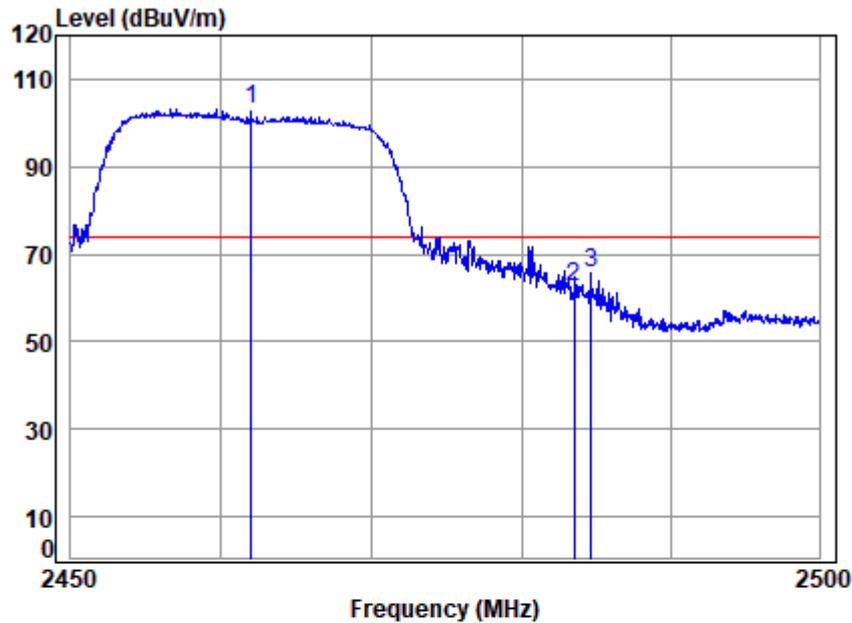
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2412 Band edge
Note : 2.4G WIFI 11N20

	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	2389.968	4.34	28.52	40.97	58.93	50.82	54.00	-3.18	Average
2	2390.000	4.34	28.52	40.97	59.98	51.87	54.00	-2.13	Average
3 *	2412.000	4.38	28.56	40.98	97.37	89.33	54.00	35.33	Average



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Mode:b; Polarization:Horizontal; Modulation:802.11n20; ; Channel:High



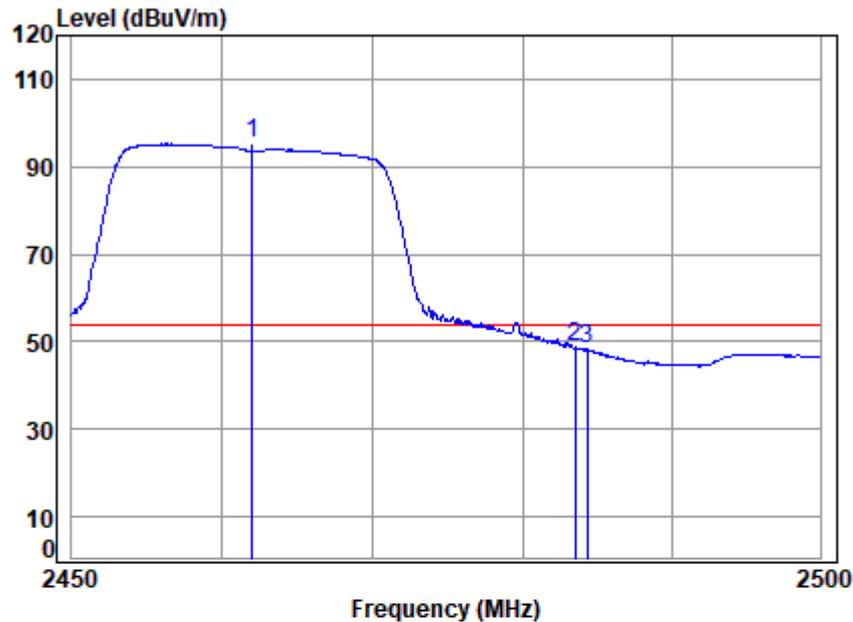
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	4.46	28.64	41.00	111.02	103.12	74.00	29.12 peak
2	2483.500	4.49	28.67	41.01	70.19	62.34	74.00	-11.66 peak
3	2484.643	4.50	28.68	41.01	73.46	65.63	74.00	-8.37 peak



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Mode:b; Polarization:Horizontal; Modulation:802.11n20; ; Channel:High



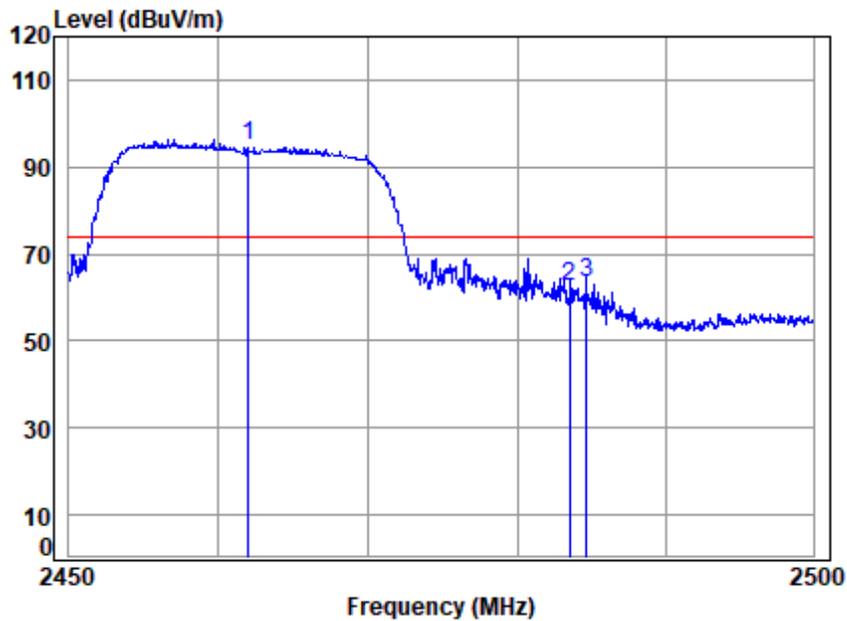
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2462.000	4.46	28.64	41.00	103.09	95.19	54.00	41.19	Average
2	2483.500	4.49	28.67	41.01	56.54	48.69	54.00	-5.31	Average
3	2484.342	4.50	28.67	41.01	56.19	48.35	54.00	-5.65	Average



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Mode:b; Polarization:Vertical; Modulation:802.11n20; ; Channel:High



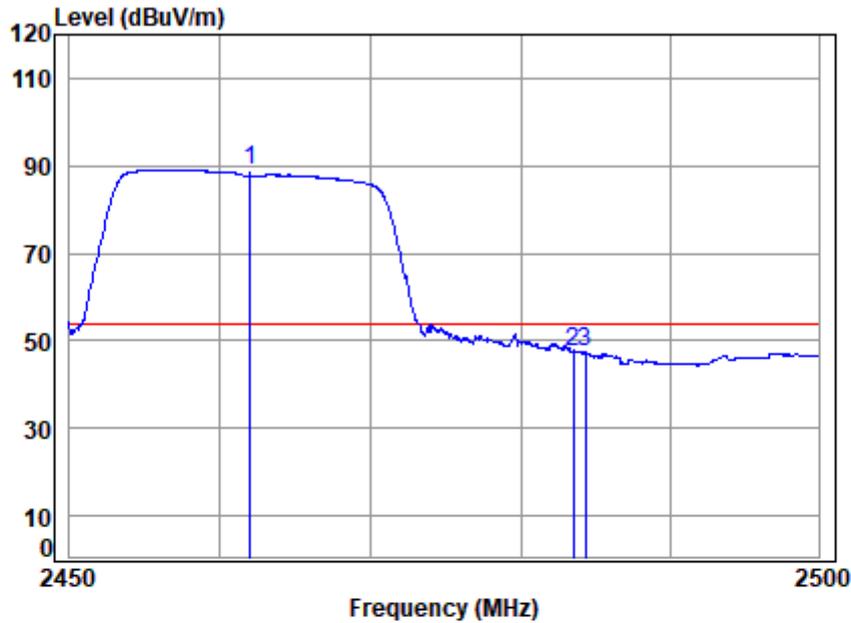
Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	4.46	28.64	41.00	103.02	95.12	74.00	21.12 peak
2	2483.500	4.49	28.67	41.01	70.16	62.31	74.00	-11.69 peak
3	2484.643	4.50	28.68	41.01	71.45	63.62	74.00	-10.38 peak



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Mode:b; Polarization:Vertical; Modulation:802.11n20; ; Channel:High



Site : chamber
Condition: 3m Vertical
Job No : 04343CR
Mode : 2462 Band edge
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 2462.000	4.46	28.64	41.00	97.09	89.19	54.00	35.19	Average
2 2483.500	4.49	28.67	41.01	55.51	47.66	54.00	-6.34	Average
3 2484.342	4.50	28.67	41.01	55.17	47.33	54.00	-6.67	Average



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7.7 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)
 Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6
 Measurement Distance: 3m
 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.



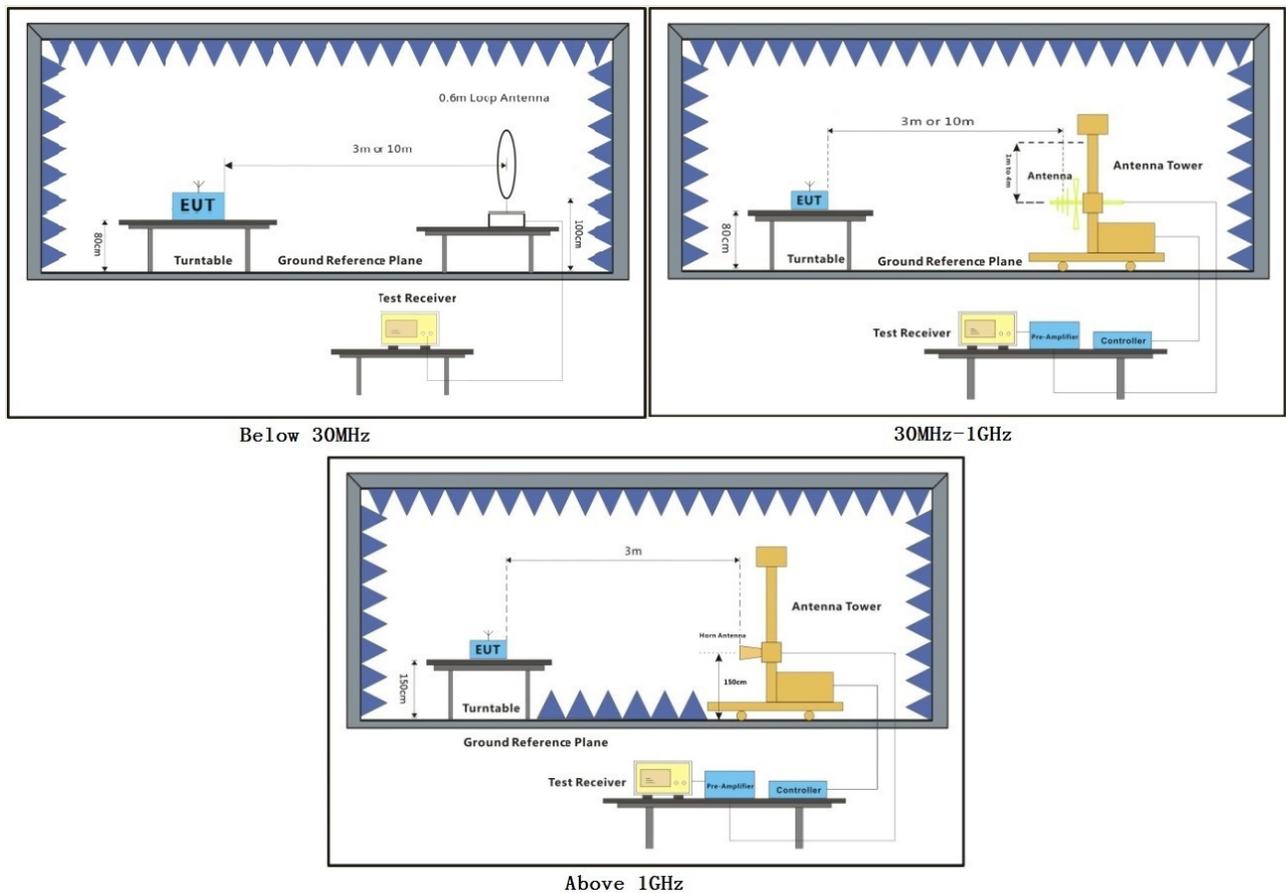
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.9 °C Humidity: 62.7 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

7.7.2 Test Setup Diagram



Below 30MHz

30MHz-1GHz

Above 1GHz



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7.7.3 Measurement Procedure and Data

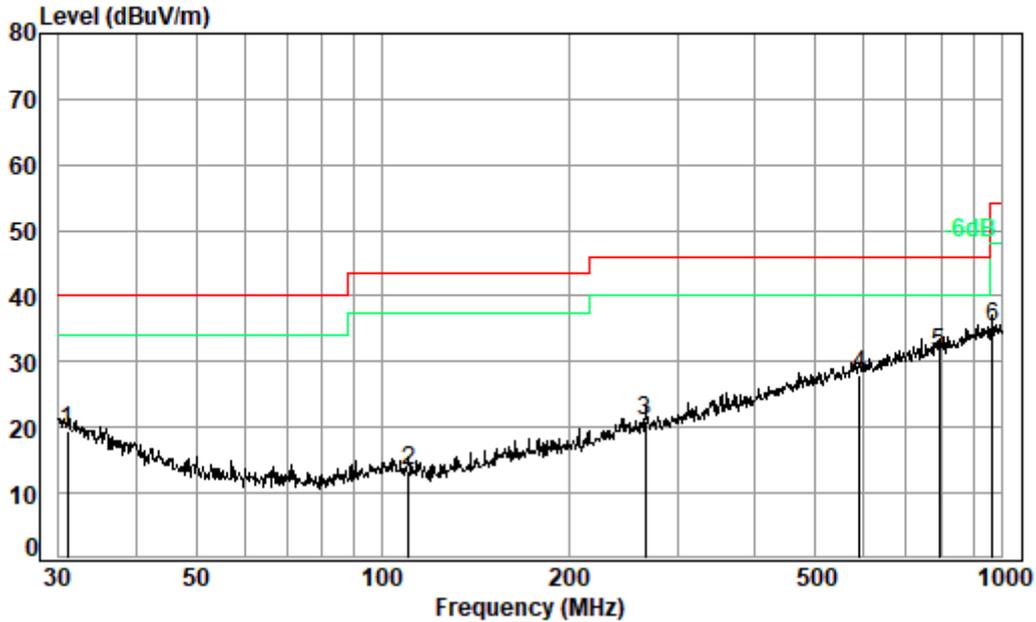
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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.



Radiated Emission below 1GHz
30MHz~1GHz (QP)
Polarization:Horizontal;



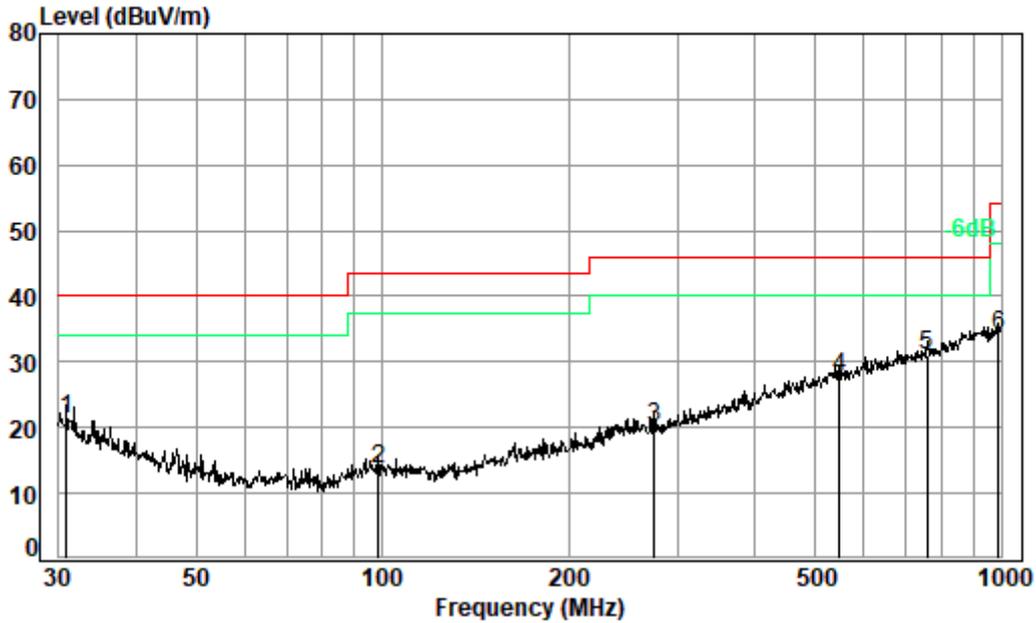
Condition: 3m HORIZONTAL
Job No. : 04343CR
Test Mode: b

	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	30.96	0.60	21.95	27.73	24.68	19.50	40.00	-20.50	QP
2	110.18	1.23	13.52	27.54	26.18	13.39	43.50	-30.11	QP
3	265.68	1.75	19.01	26.95	27.19	21.00	46.00	-25.00	QP
4	590.97	2.69	26.43	28.10	26.87	27.89	46.00	-18.11	QP
5 pp	793.40	3.18	28.46	27.74	27.57	31.47	46.00	-14.53	QP
6	968.93	3.67	30.15	26.81	28.15	35.16	54.00	-18.84	QP



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Polarization: Vertical;



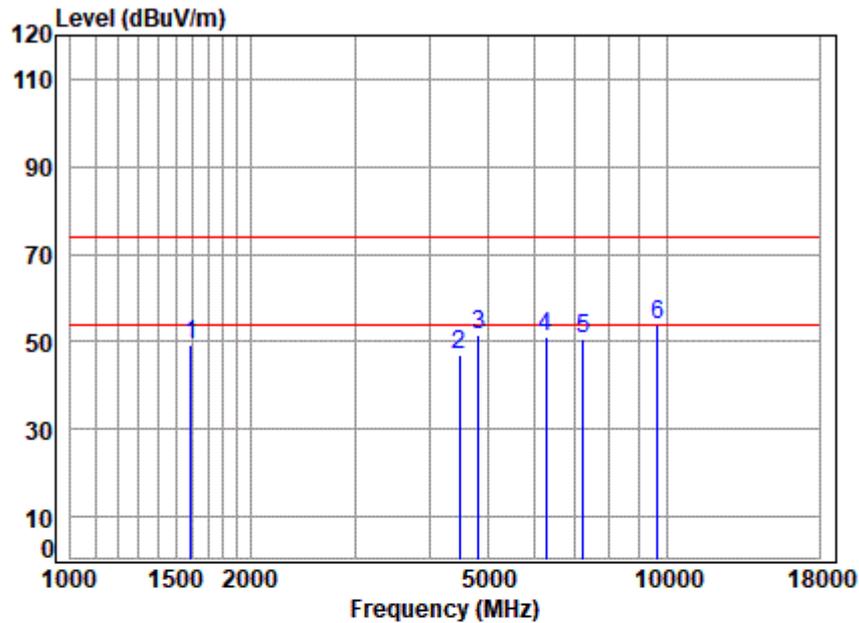
Condition: 3m VERTICAL
Job No. : 04343CR
Test Mode: b

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	0.60	22.01	27.73	26.45	21.33	40.00	-18.67	QP
2	1.19	13.87	27.61	26.17	13.62	43.50	-29.88	QP
3	1.79	18.87	26.93	26.44	20.17	46.00	-25.83	QP
4	2.65	25.59	27.96	27.36	27.64	46.00	-18.36	QP
5 pp	3.08	28.26	27.80	27.63	31.17	46.00	-14.83	QP
6	3.69	30.25	26.71	26.77	34.00	54.00	-20.00	QP



Transmitter emission above 1GHz

Mode:b; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low



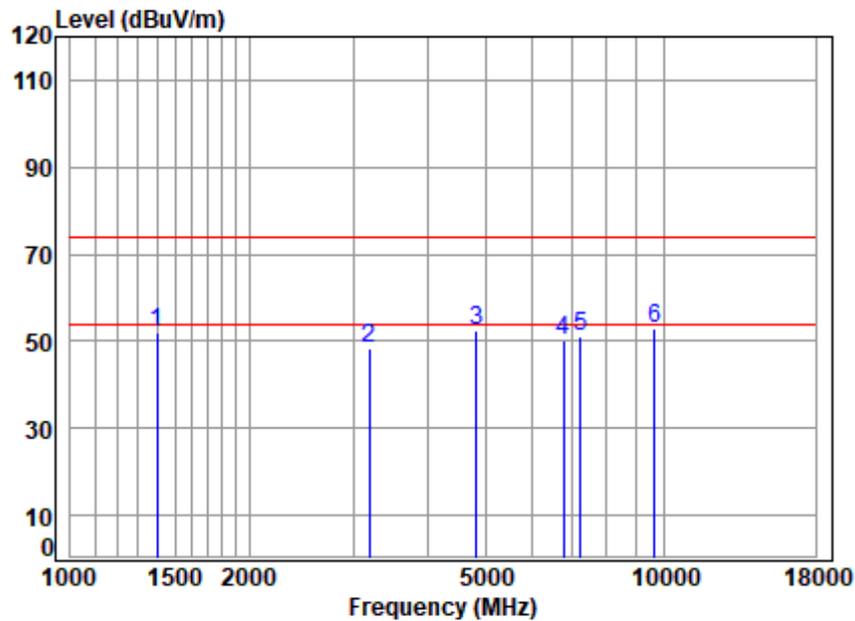
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1592.571	3.34	26.22	40.57	60.48	49.47	74.00	-24.53 peak
2	4482.150	6.74	33.57	42.54	49.24	47.01	74.00	-26.99 peak
3	4824.000	7.12	34.00	42.78	53.07	51.41	74.00	-22.59 peak
4	6267.553	8.27	35.37	42.08	49.73	51.29	74.00	-22.71 peak
5	7236.000	8.77	36.09	41.56	47.56	50.86	74.00	-23.14 peak
6	9648.000	10.79	37.69	38.51	43.93	53.90	74.00	-20.10 peak



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Mode:b; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low



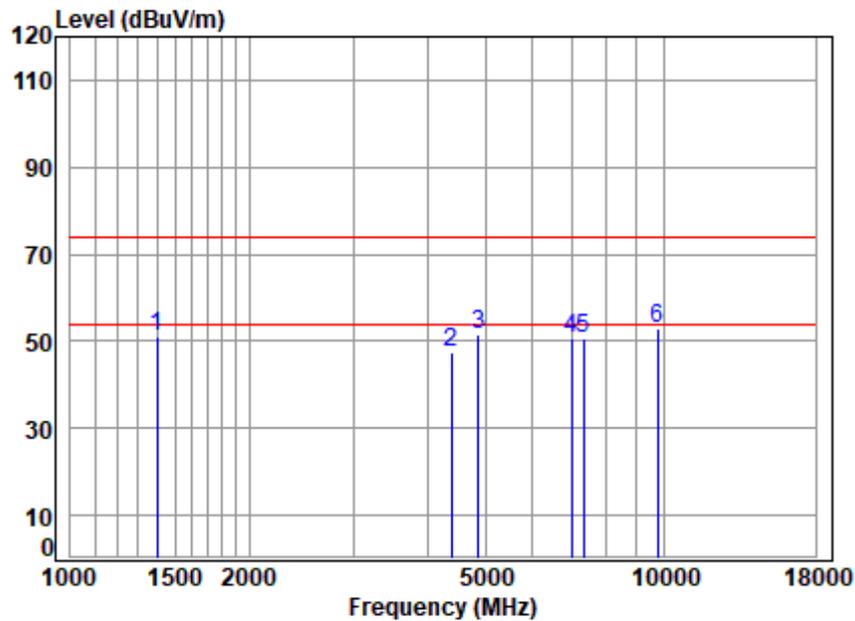
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11B

	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	1398.336	3.10	25.42	40.44	64.16	52.24	74.00	-21.76	peak
2	3186.869	5.12	31.21	41.40	53.35	48.28	74.00	-25.72	peak
3	4824.000	7.12	34.00	42.78	54.31	52.65	74.00	-21.35	peak
4	6776.265	8.43	35.77	41.80	47.71	50.11	74.00	-23.89	peak
5	7236.000	8.77	36.09	41.56	47.61	50.91	74.00	-23.09	peak
6	9648.000	10.79	37.69	38.51	43.08	53.05	74.00	-20.95	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:middle



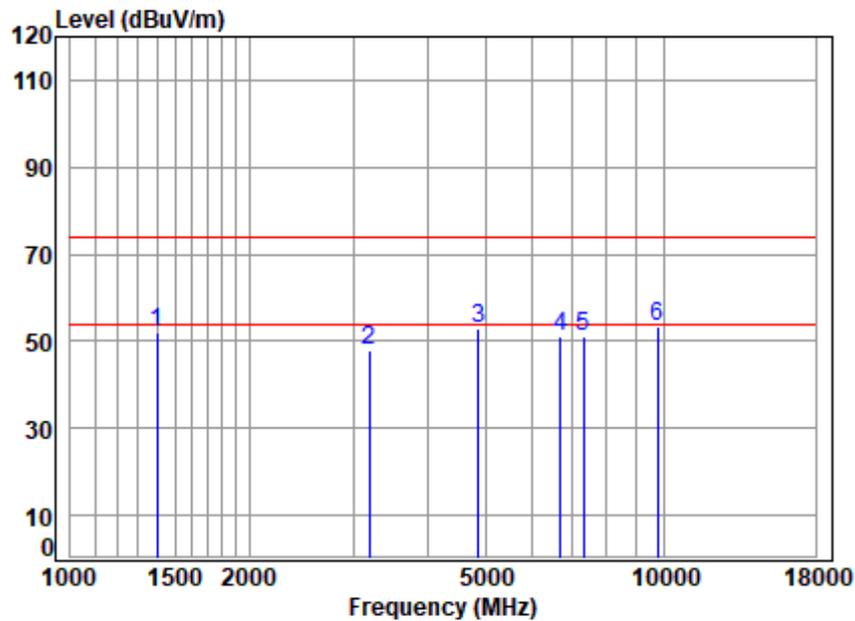
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	62.81	50.89	74.00	-23.11	peak
2	4392.376	6.66	33.42	42.47	49.82	47.43	74.00	-26.57	peak
3	4874.000	7.17	34.05	42.82	53.38	51.78	74.00	-22.22	peak
4	6995.172	8.54	35.90	41.69	47.99	50.74	74.00	-23.26	peak
5	7311.000	8.84	36.15	41.53	47.22	50.68	74.00	-23.32	peak
6	9748.000	10.76	37.75	38.37	42.66	52.80	74.00	-21.20	peak



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Mode:b; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:middle



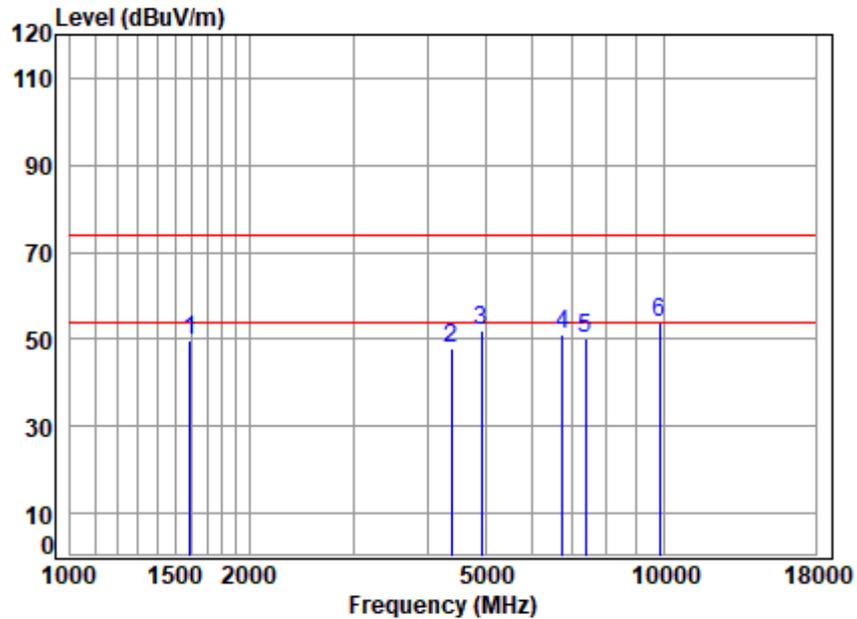
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	63.98	52.06	74.00	-21.94	peak
2	3186.869	5.12	31.21	41.40	53.13	48.06	74.00	-25.94	peak
3	4874.000	7.17	34.05	42.82	54.47	52.87	74.00	-21.13	peak
4	6698.373	8.39	35.72	41.84	48.70	50.97	74.00	-23.03	peak
5	7311.000	8.84	36.15	41.53	47.80	51.26	74.00	-22.74	peak
6	9748.000	10.76	37.75	38.37	43.09	53.23	74.00	-20.77	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:High



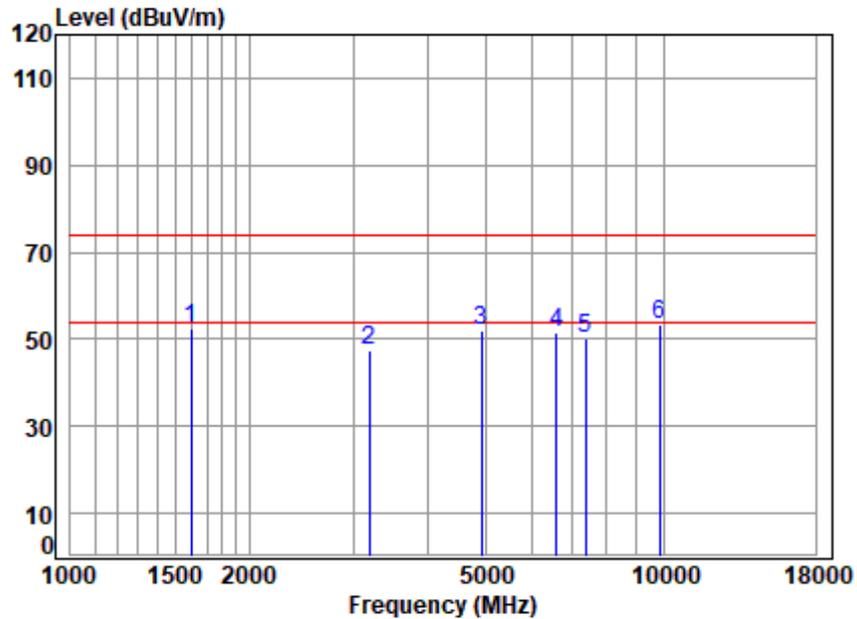
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1592.571	3.34	26.22	40.57	60.74	49.73	74.00	-24.27 peak
2	4379.699	6.65	33.39	42.46	50.44	48.02	74.00	-25.98 peak
3	4924.000	7.22	34.11	42.85	53.62	52.10	74.00	-21.90 peak
4	6737.207	8.41	35.75	41.82	48.55	50.89	74.00	-23.11 peak
5	7386.000	8.91	36.21	41.49	46.36	49.99	74.00	-24.01 peak
6	9848.000	10.73	37.81	38.22	43.50	53.82	74.00	-20.18 peak



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Mode:b; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High



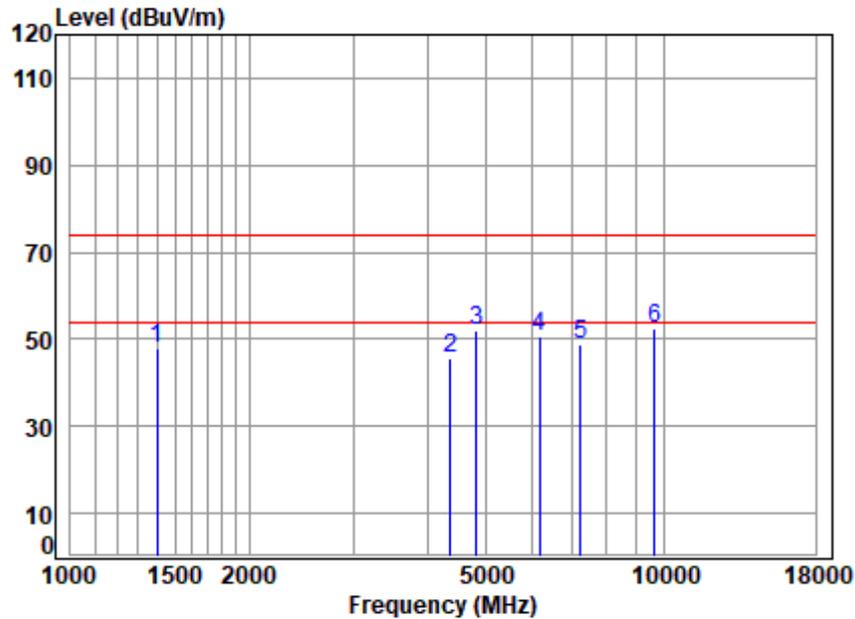
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	3.35	26.24	40.57	63.59	52.61	74.00	-21.39 peak
2	3186.869	5.12	31.21	41.40	52.39	47.32	74.00	-26.68 peak
3	4924.000	7.22	34.11	42.85	53.52	52.00	74.00	-22.00 peak
4	6602.265	8.33	35.66	41.89	49.50	51.60	74.00	-22.40 peak
5	7386.000	8.91	36.21	41.49	46.48	50.11	74.00	-23.89 peak
6	9848.000	10.73	37.81	38.22	42.99	53.31	74.00	-20.69 peak



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Mode:b; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low



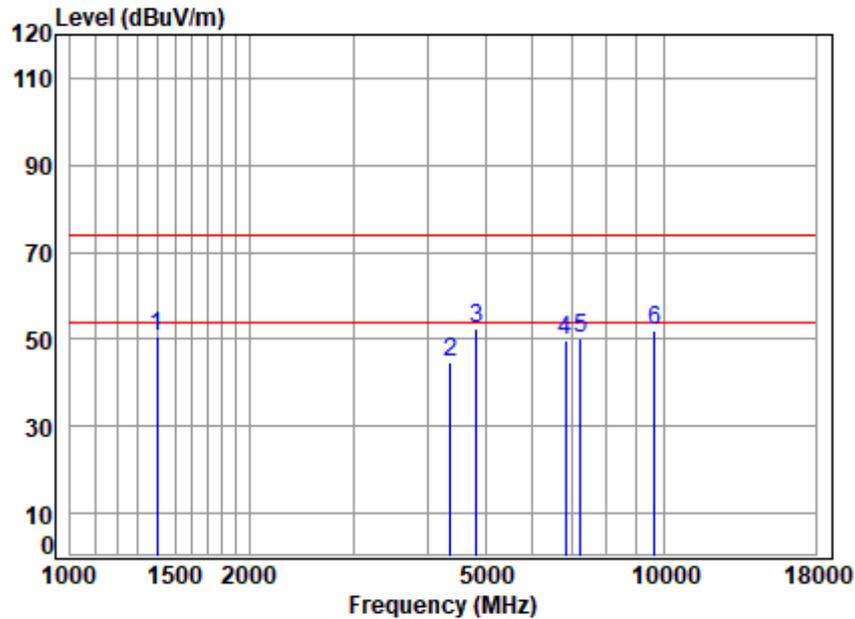
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1402.384	3.11	25.43	40.44	59.89	47.99	74.00	-26.01 peak
2	4367.058	6.64	33.37	42.45	48.18	45.74	74.00	-28.26 peak
3	4824.000	7.12	34.00	42.78	53.67	52.01	74.00	-21.99 peak
4	6177.627	8.27	35.28	42.14	49.14	50.55	74.00	-23.45 peak
5	7236.000	8.77	36.09	41.56	45.56	48.86	74.00	-25.14 peak
6	9648.000	10.79	37.69	38.51	42.36	52.33	74.00	-21.67 peak



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Mode:b; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low



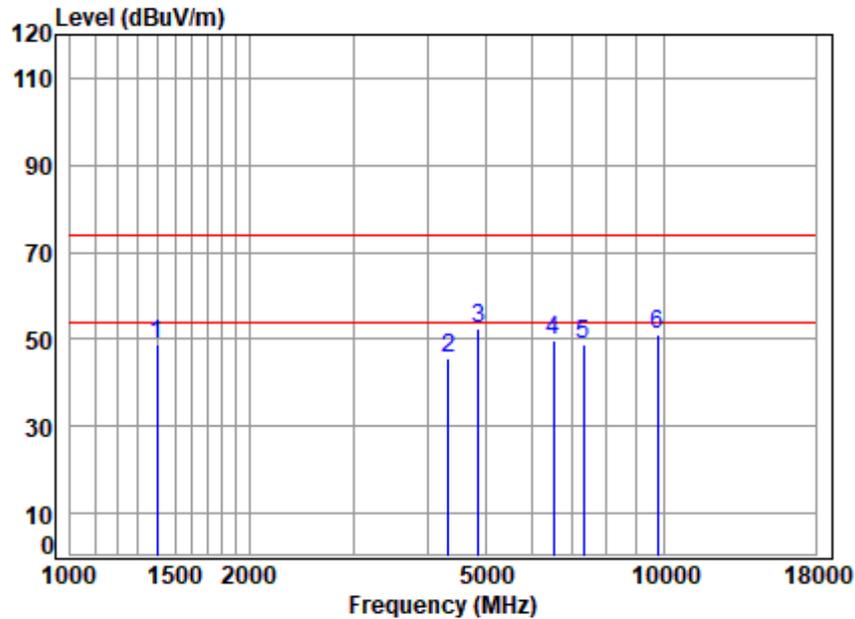
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11G

	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	1398.336	3.10	25.42	40.44	62.46	50.54	74.00	-23.46	peak
2	4367.058	6.64	33.37	42.45	47.30	44.86	74.00	-29.14	peak
3	4824.000	7.12	34.00	42.78	53.97	52.31	74.00	-21.69	peak
4	6835.278	8.46	35.80	41.77	47.19	49.68	74.00	-24.32	peak
5	7236.000	8.77	36.09	41.56	47.02	50.32	74.00	-23.68	peak
6	9648.000	10.79	37.69	38.51	42.16	52.13	74.00	-21.87	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:middle



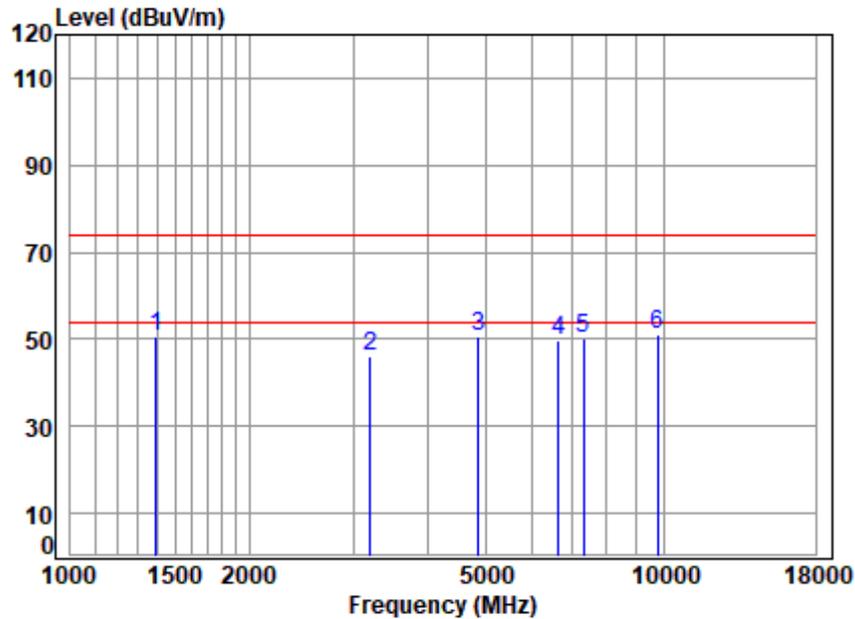
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	60.62	48.70	74.00	-25.30	peak
2	4329.354	6.60	33.30	42.42	47.94	45.42	74.00	-28.58	peak
3	4874.000	7.17	34.05	42.82	54.27	52.67	74.00	-21.33	peak
4	6526.373	8.29	35.62	41.94	47.73	49.70	74.00	-24.30	peak
5	7311.000	8.84	36.15	41.53	45.32	48.78	74.00	-25.22	peak
6	9748.000	10.76	37.75	38.37	40.94	51.08	74.00	-22.92	peak



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Mode:b; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:middle



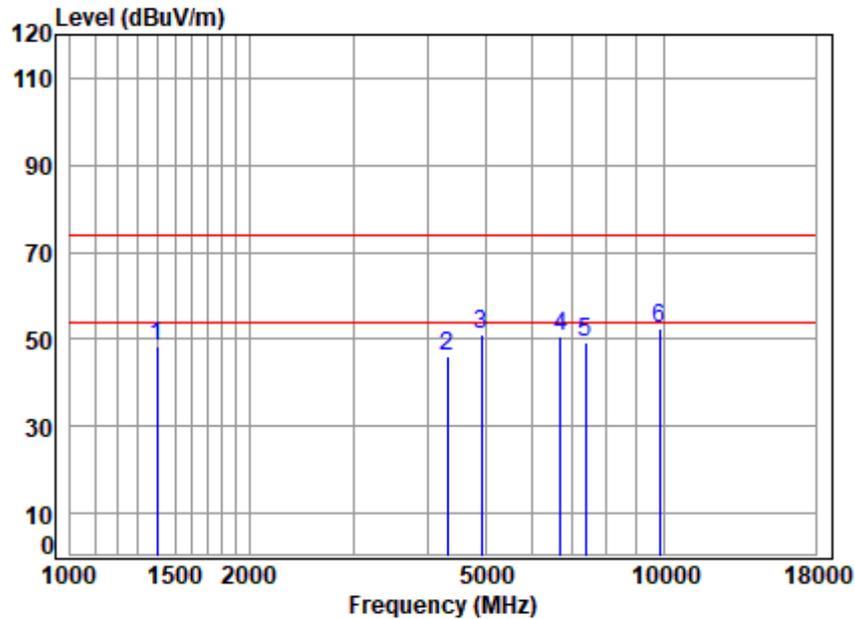
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1394.300	3.10	25.40	40.43	62.38	50.45	74.00	-23.55	peak
2	3196.094	5.13	31.23	41.41	51.28	46.23	74.00	-27.77	peak
3	4874.000	7.17	34.05	42.82	52.36	50.76	74.00	-23.24	peak
4	6640.542	8.36	35.69	41.87	47.43	49.61	74.00	-24.39	peak
5	7311.000	8.84	36.15	41.53	46.80	50.26	74.00	-23.74	peak
6	9748.000	10.76	37.75	38.37	40.94	51.08	74.00	-22.92	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High



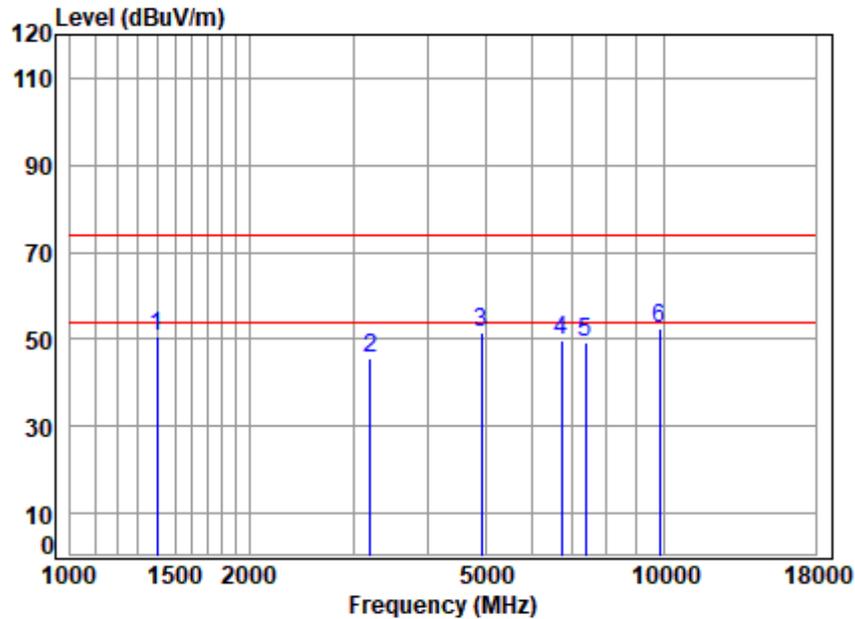
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	60.50	48.58	74.00	-25.42	peak
2	4316.859	6.59	33.28	42.41	48.43	45.89	74.00	-28.11	peak
3	4924.000	7.22	34.11	42.85	52.83	51.31	74.00	-22.69	peak
4	6698.373	8.39	35.72	41.84	48.41	50.68	74.00	-23.32	peak
5	7386.000	8.91	36.21	41.49	45.72	49.35	74.00	-24.65	peak
6	9848.000	10.73	37.81	38.22	42.32	52.64	74.00	-21.36	peak



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Mode:b; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:High



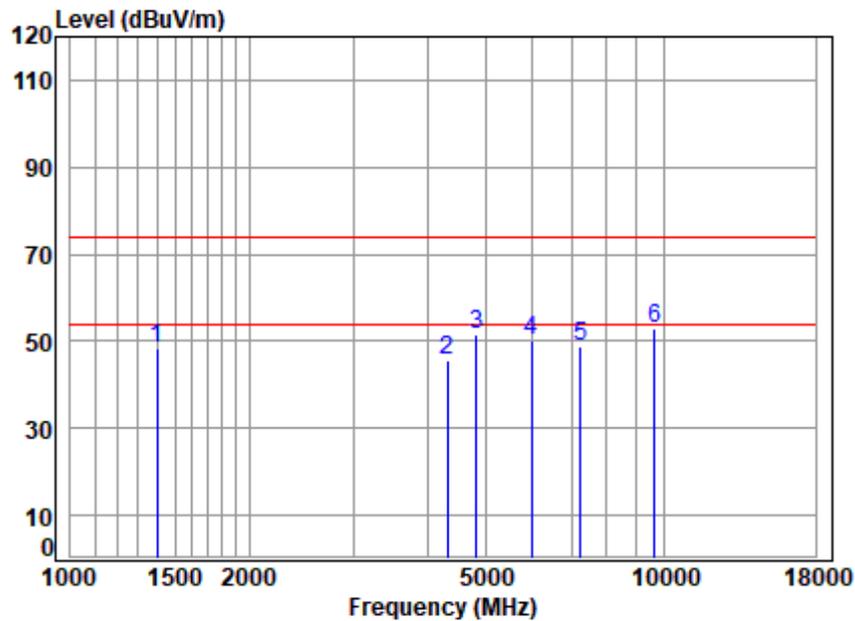
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	62.42	50.50	74.00	-23.50	peak
2	3196.094	5.13	31.23	41.41	50.51	45.46	74.00	-28.54	peak
3	4924.000	7.22	34.11	42.85	53.19	51.67	74.00	-22.33	peak
4	6717.762	8.40	35.73	41.83	47.42	49.72	74.00	-24.28	peak
5	7386.000	8.91	36.21	41.49	45.52	49.15	74.00	-24.85	peak
6	9848.000	10.73	37.81	38.22	42.13	52.45	74.00	-21.55	peak



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Mode:b; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:Low



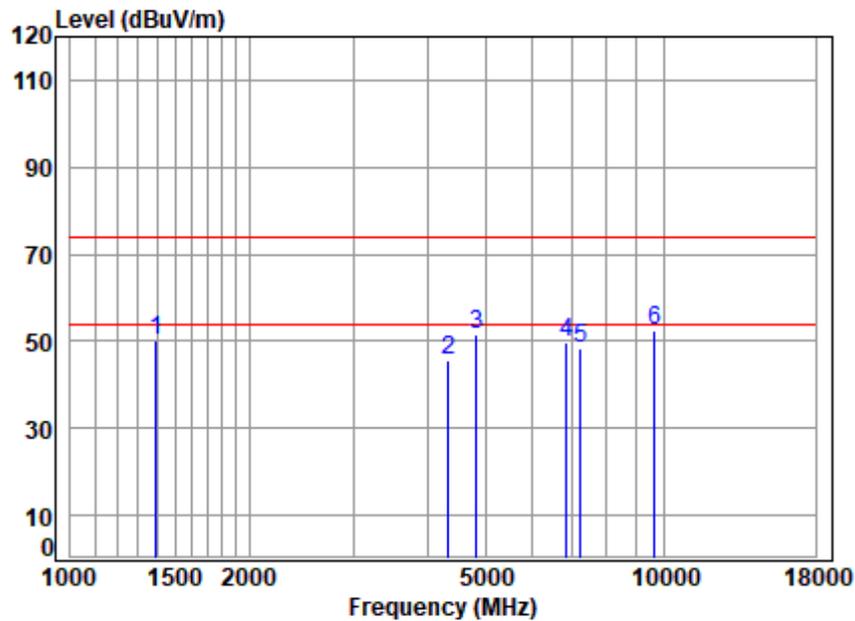
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	60.32	48.40	74.00	-25.60 peak
2	4316.859	6.59	33.28	42.41	48.08	45.54	74.00	-28.46 peak
3	4824.000	7.12	34.00	42.78	53.44	51.78	74.00	-22.22 peak
4	5984.305	8.26	35.08	42.25	49.07	50.16	74.00	-23.84 peak
5	7236.000	8.77	36.09	41.56	45.59	48.89	74.00	-25.11 peak
6	9648.000	10.79	37.69	38.51	42.79	52.76	74.00	-21.24 peak



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Mode:b; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:Low



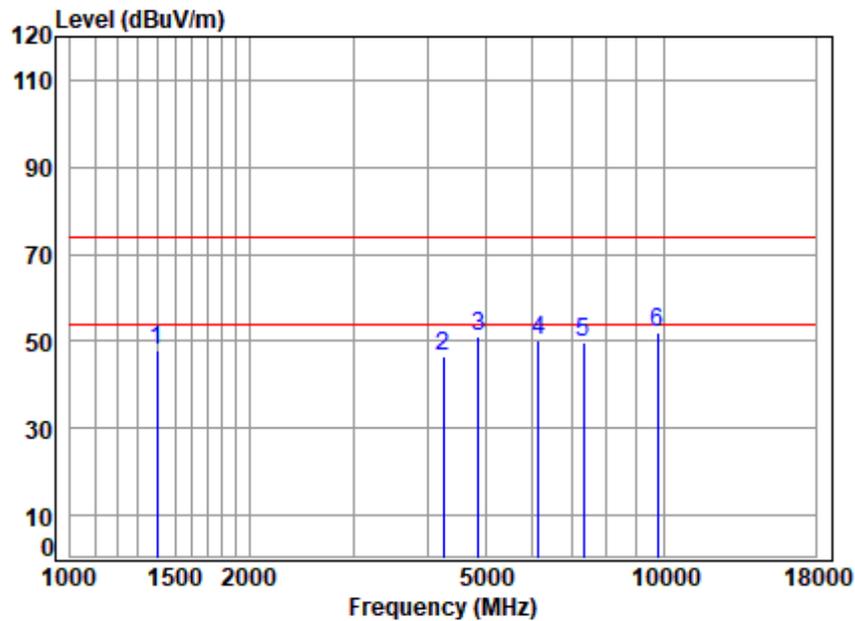
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1394.300	3.10	25.40	40.43	62.12	50.19	74.00	-23.81 peak
2	4329.354	6.60	33.30	42.42	47.93	45.41	74.00	-28.59 peak
3	4824.000	7.12	34.00	42.78	53.19	51.53	74.00	-22.47 peak
4	6855.063	8.47	35.82	41.76	47.18	49.71	74.00	-24.29 peak
5	7236.000	8.77	36.09	41.56	44.99	48.29	74.00	-25.71 peak
6	9648.000	10.79	37.69	38.51	42.54	52.51	74.00	-21.49 peak



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Mode:b; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:middle



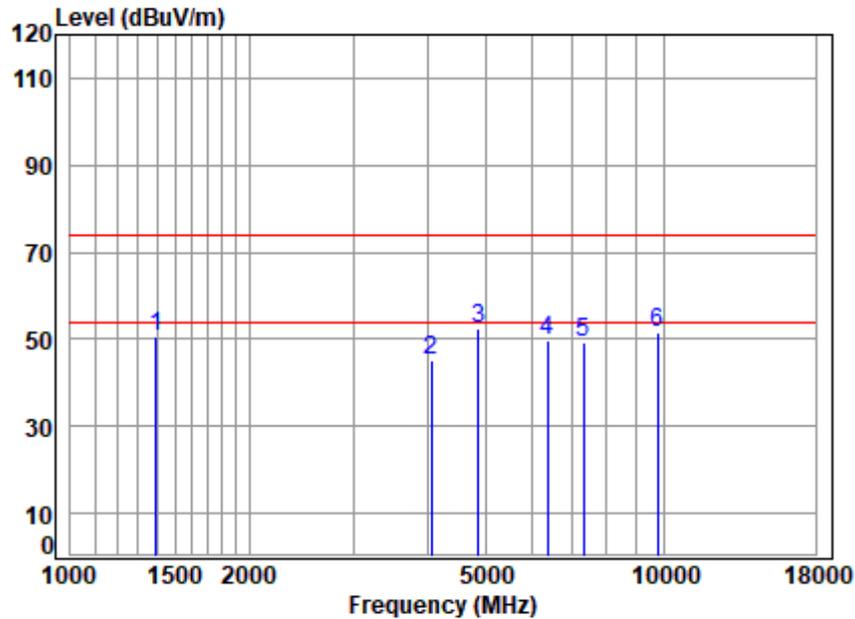
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1398.336	3.10	25.42	40.44	59.73	47.81	74.00	-26.19 peak
2	4242.641	6.52	33.15	42.35	49.10	46.42	74.00	-27.58 peak
3	4874.000	7.17	34.05	42.82	52.69	51.09	74.00	-22.91 peak
4	6142.019	8.27	35.25	42.16	48.61	49.97	74.00	-24.03 peak
5	7311.000	8.84	36.15	41.53	46.24	49.70	74.00	-24.30 peak
6	9748.000	10.76	37.75	38.37	41.73	51.87	74.00	-22.13 peak



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Mode:b; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:middle



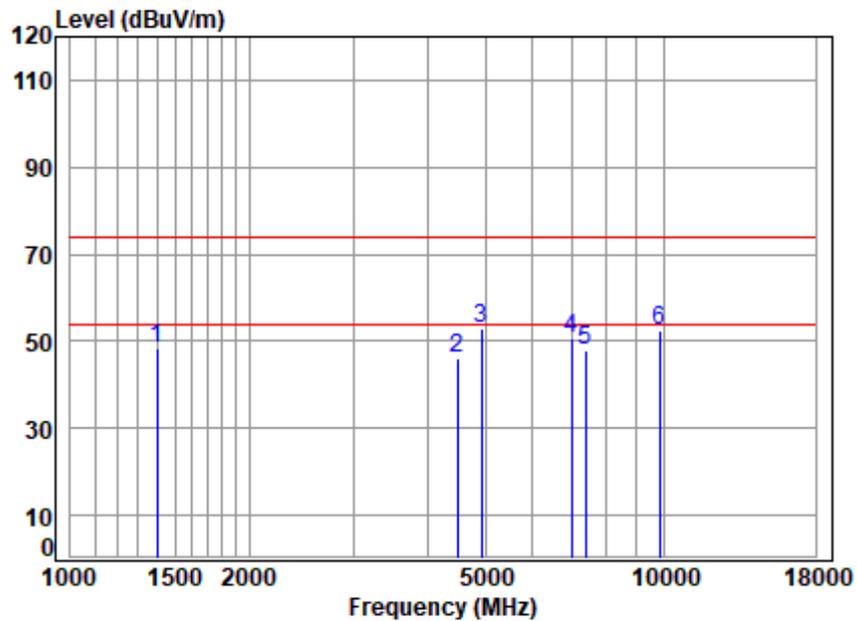
Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1394.300	3.10	25.40	40.43	62.51	50.58	74.00	-23.42 peak
2	4062.629	6.34	32.82	42.21	48.42	45.37	74.00	-28.63 peak
3	4874.000	7.17	34.05	42.82	54.24	52.64	74.00	-21.36 peak
4	6358.789	8.27	35.46	42.03	48.15	49.85	74.00	-24.15 peak
5	7311.000	8.84	36.15	41.53	45.99	49.45	74.00	-24.55 peak
6	9748.000	10.76	37.75	38.37	41.47	51.61	74.00	-22.39 peak



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Mode:b; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High



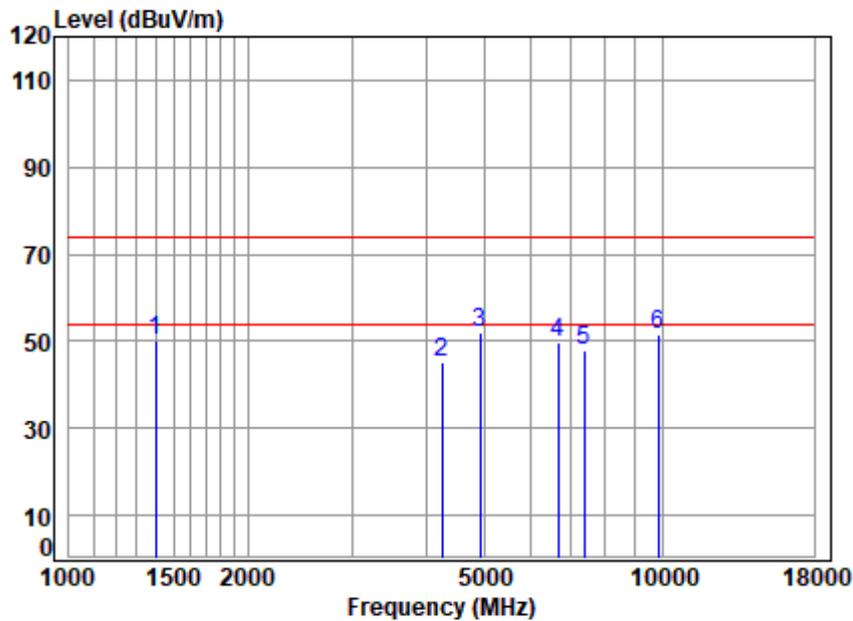
Site : chamber
Condition: 3m HORIZONTAL
Job No : 04343CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1402.384	3.11	25.43	40.44	60.25	48.35	74.00	-25.65 peak
2	4495.125	6.76	33.59	42.55	48.18	45.98	74.00	-28.02 peak
3	4924.000	7.22	34.11	42.85	54.23	52.71	74.00	-21.29 peak
4	6995.172	8.54	35.90	41.69	47.68	50.43	74.00	-23.57 peak
5	7386.000	8.91	36.21	41.49	44.35	47.98	74.00	-26.02 peak
6	9848.000	10.73	37.81	38.22	42.34	52.66	74.00	-21.34 peak



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Mode:b; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 04343CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11N20

	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	1398.336	3.10	25.42	40.44	62.17	50.25	74.00	-23.75	peak
2	4242.641	6.52	33.15	42.35	47.75	45.07	74.00	-28.93	peak
3	4924.000	7.22	34.11	42.85	53.62	52.10	74.00	-21.90	peak
4	6679.040	8.38	35.71	41.85	47.41	49.65	74.00	-24.35	peak
5	7386.000	8.91	36.21	41.49	44.50	48.13	74.00	-25.87	peak
6	9848.000	10.73	37.81	38.22	41.27	51.59	74.00	-22.41	peak



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8 Photographs

8.1 Test Setup

Refer to test setup photos.

8.2 EUT Constructional Details (EUT Photos)

Refer to external and internal photos.



9 Appendix

Appendix 15.247

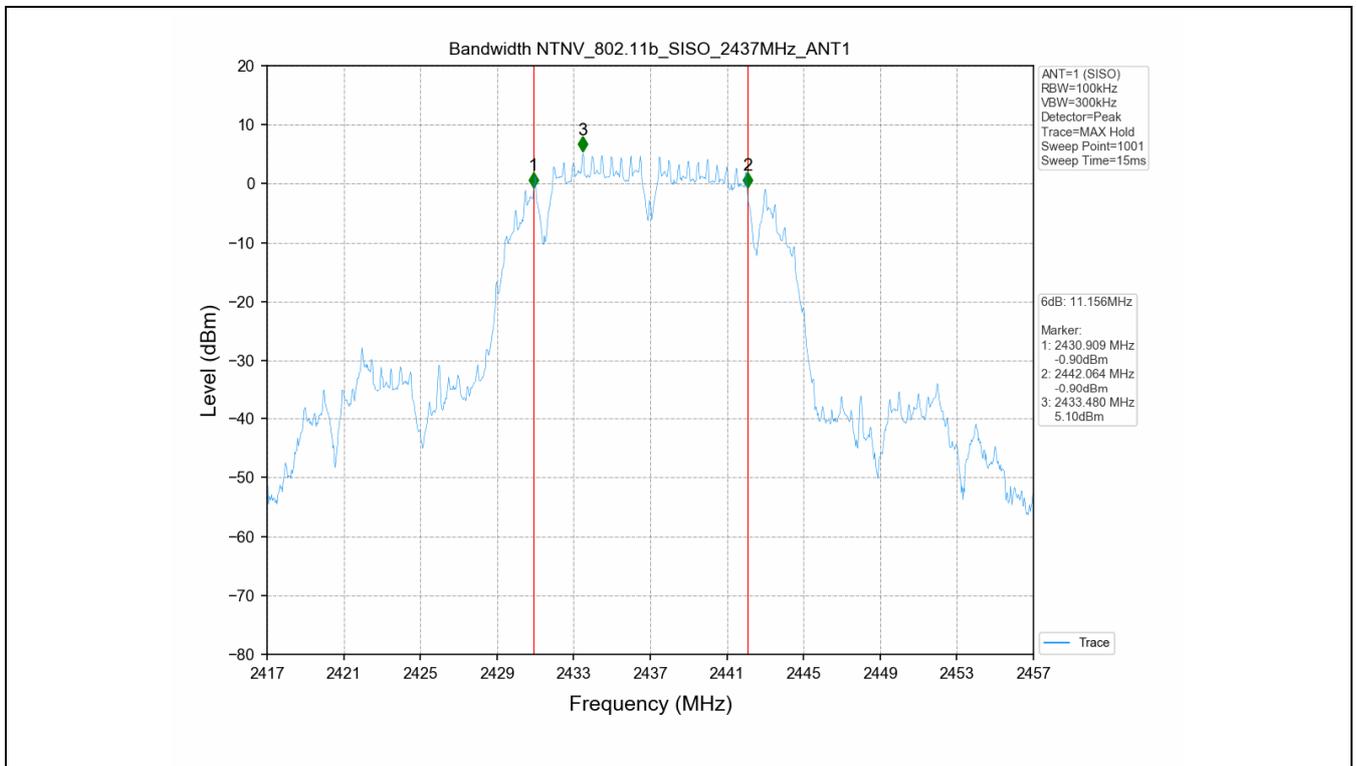
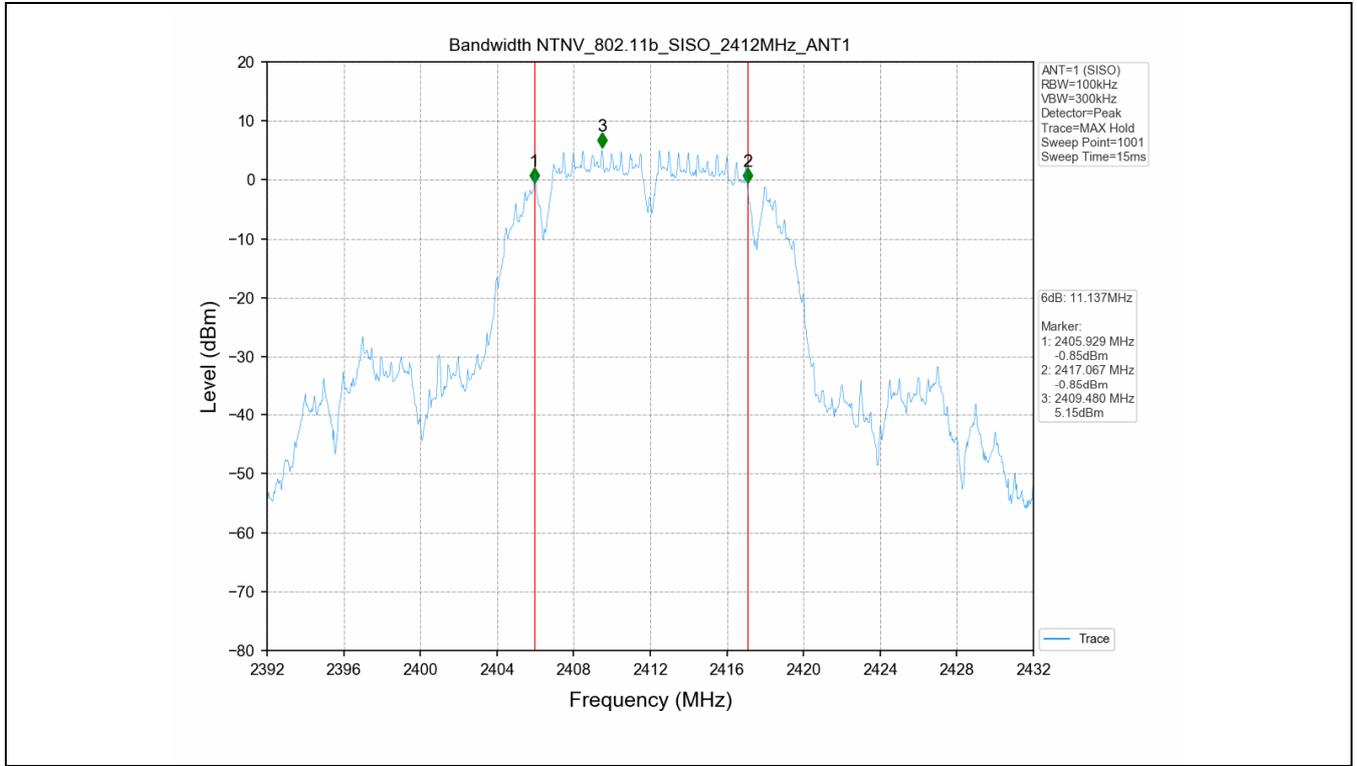
1. Bandwidth

1.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT No.	6dB Bandwidth	Verdict
				Test Result (MHz)	
802.11b	2412	SISO	1	11.137	PASS
	2437	SISO	1	11.156	PASS
	2462	SISO	1	11.106	PASS
802.11g	2412	SISO	1	15.728	PASS
	2437	SISO	1	15.983	PASS
	2462	SISO	1	15.922	PASS
802.11n(HT20)	2412	SISO	1	17.604	PASS
	2437	SISO	1	17.229	PASS
	2462	SISO	1	16.334	PASS

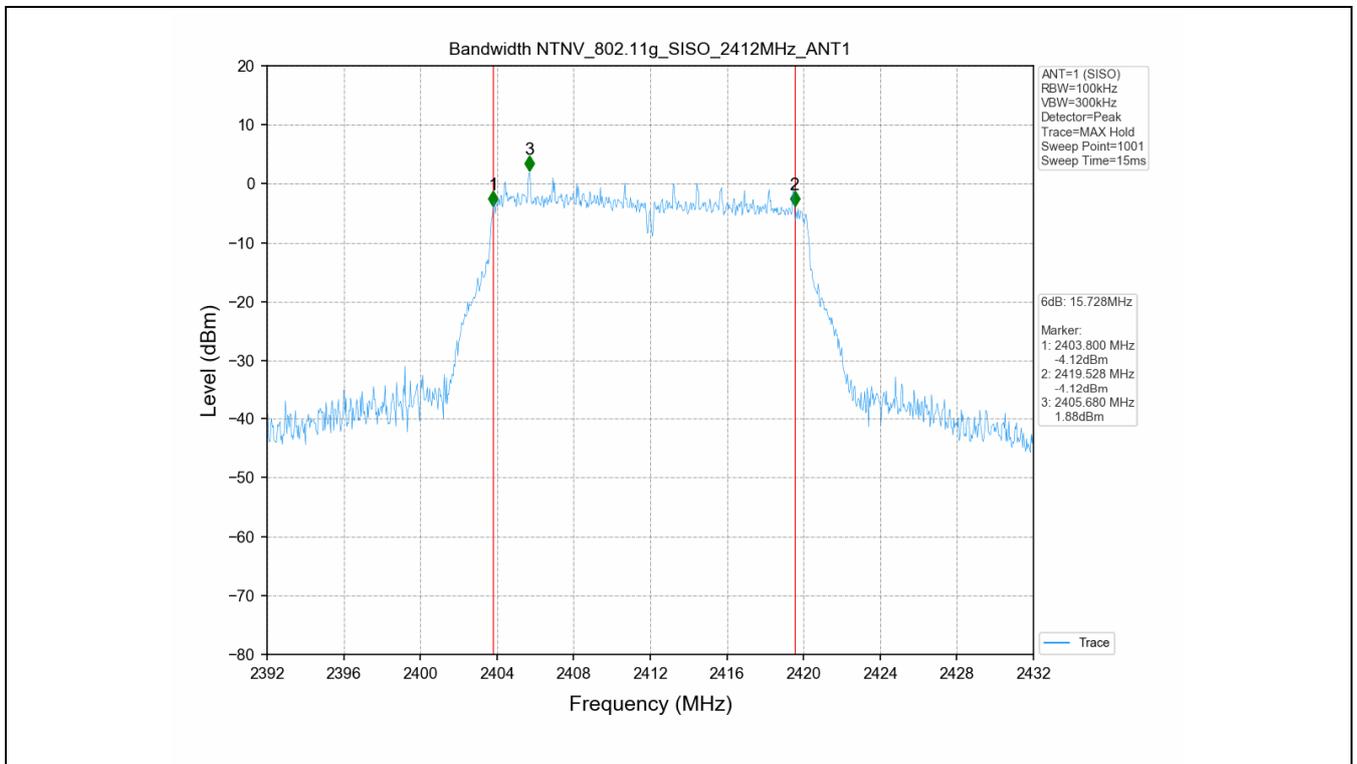
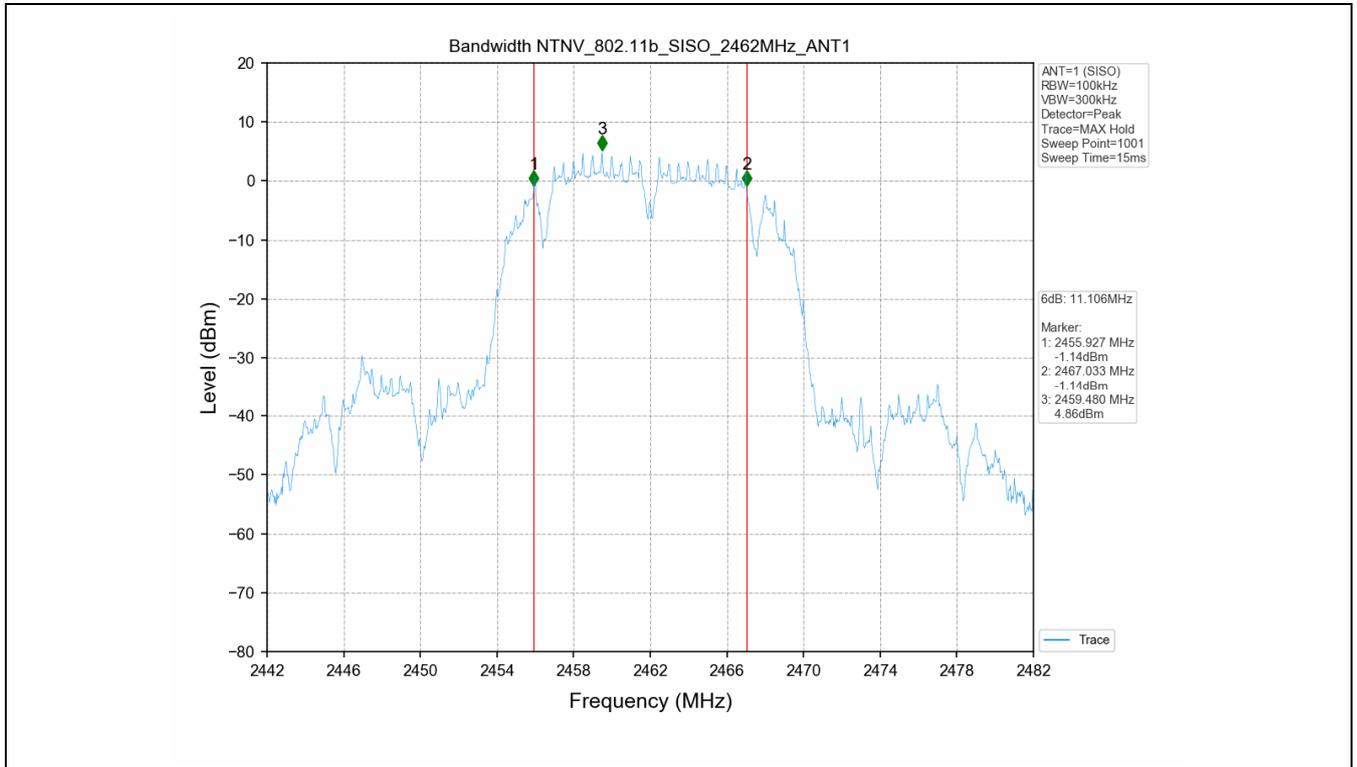


1.2 Test Graph - 6dB Bandwidth



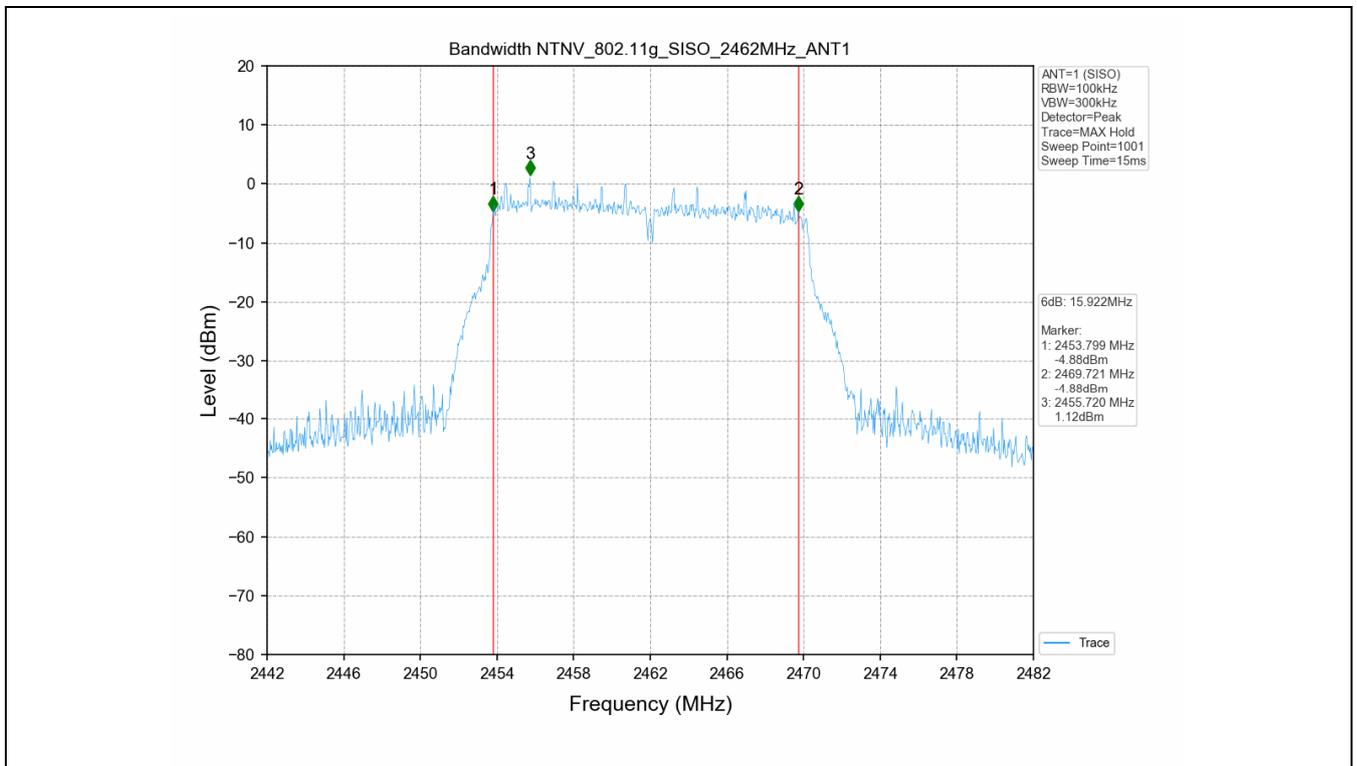
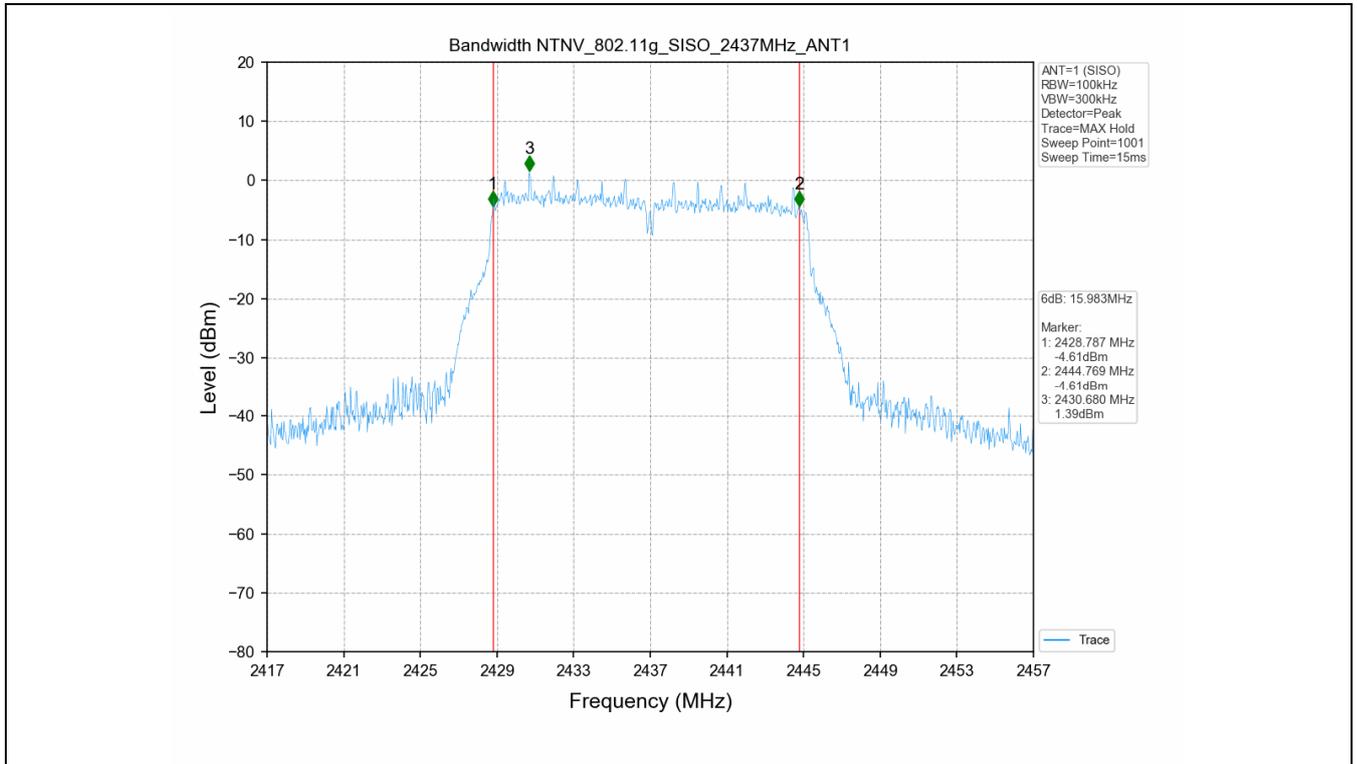
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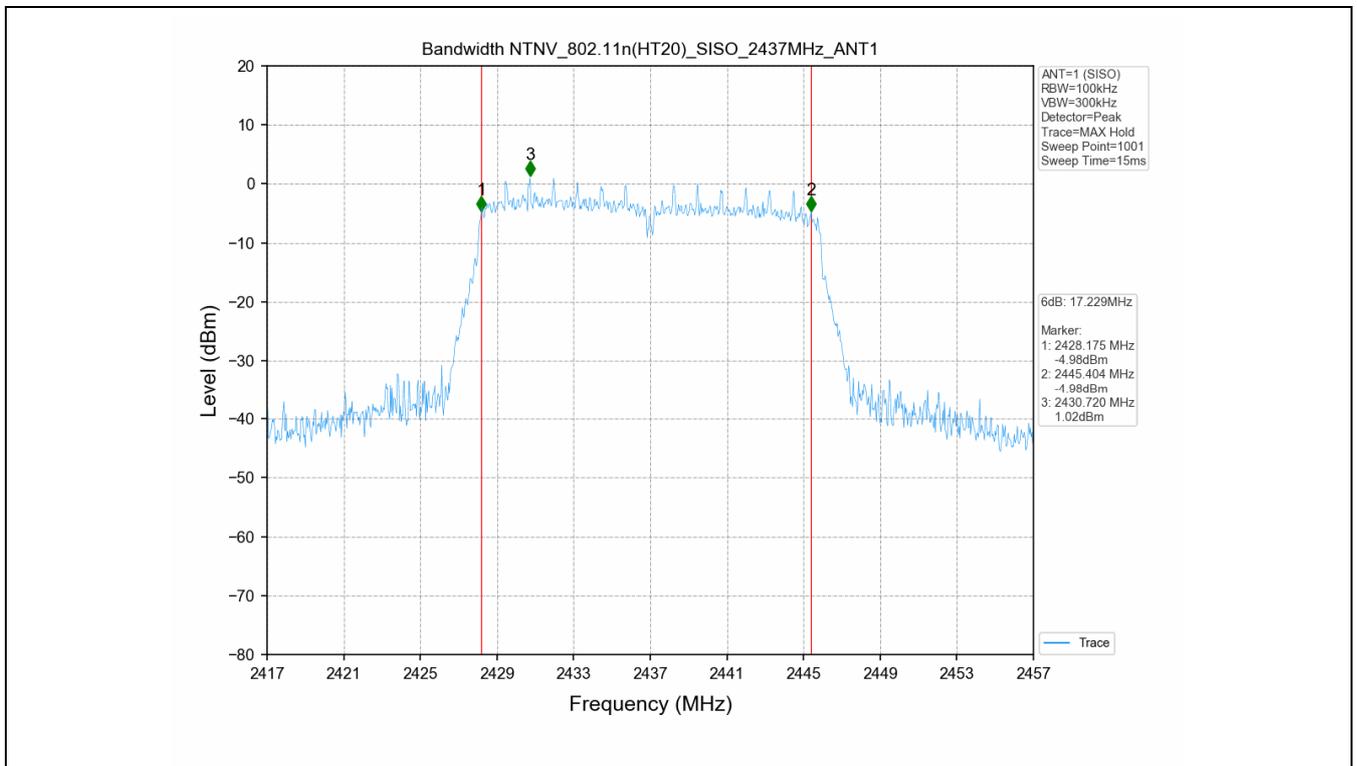
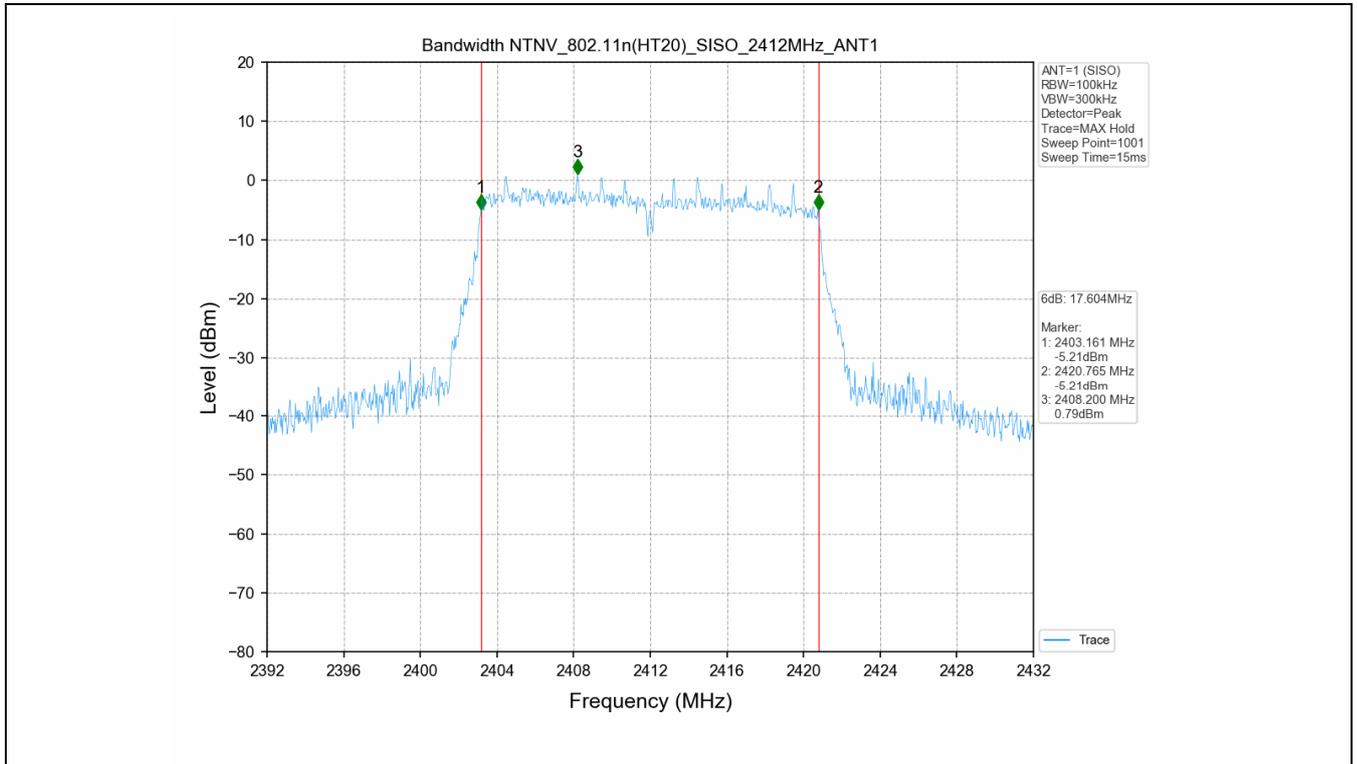
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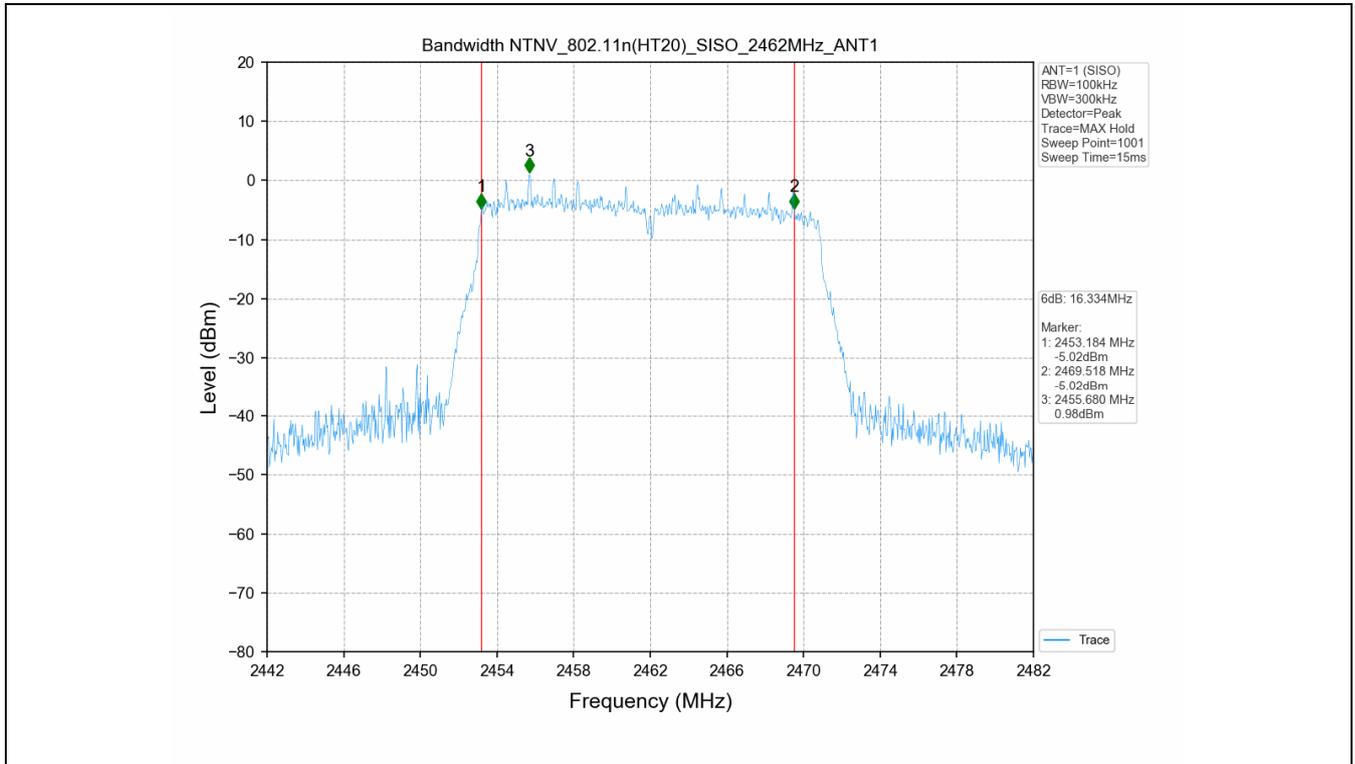
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2. Maximum Conducted Output Power

2.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Measured Average Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1	Ant 1		
802.11b	2412	SISO	16.65	14.14	30	PASS
	2437	SISO	16.16	13.86	30	PASS
	2462	SISO	15.80	13.52	30	PASS
802.11g	2412	SISO	20.30	13.74	30	PASS
	2437	SISO	20.05	13.51	30	PASS
	2462	SISO	19.74	13.19	30	PASS
802.11n(HT20)	2412	SISO	20.61	13.84	30	PASS
	2437	SISO	20.16	13.40	30	PASS
	2462	SISO	19.73	13.04	30	PASS

Remark: Average power is RF exposure evaluation only.

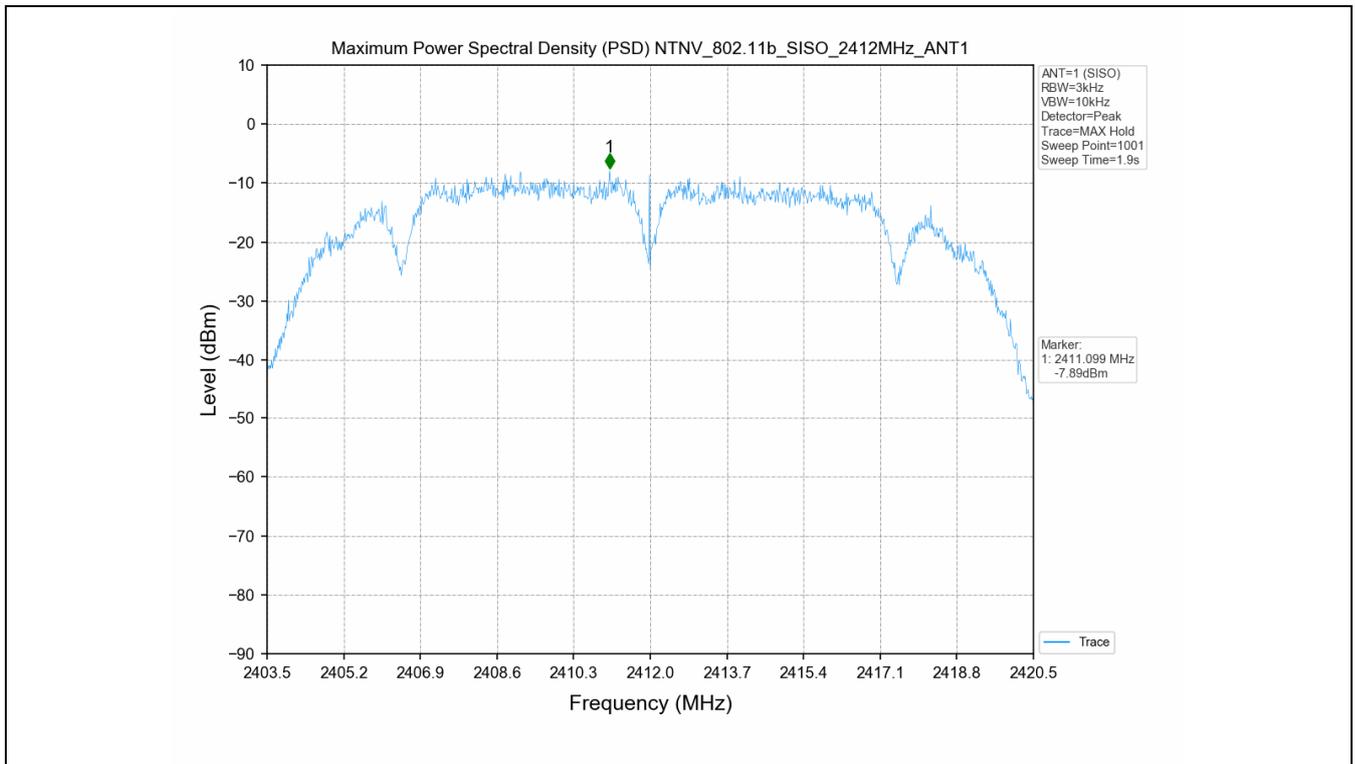


3. Maximum Power Spectral Density (PSD)

3.1 Test Result

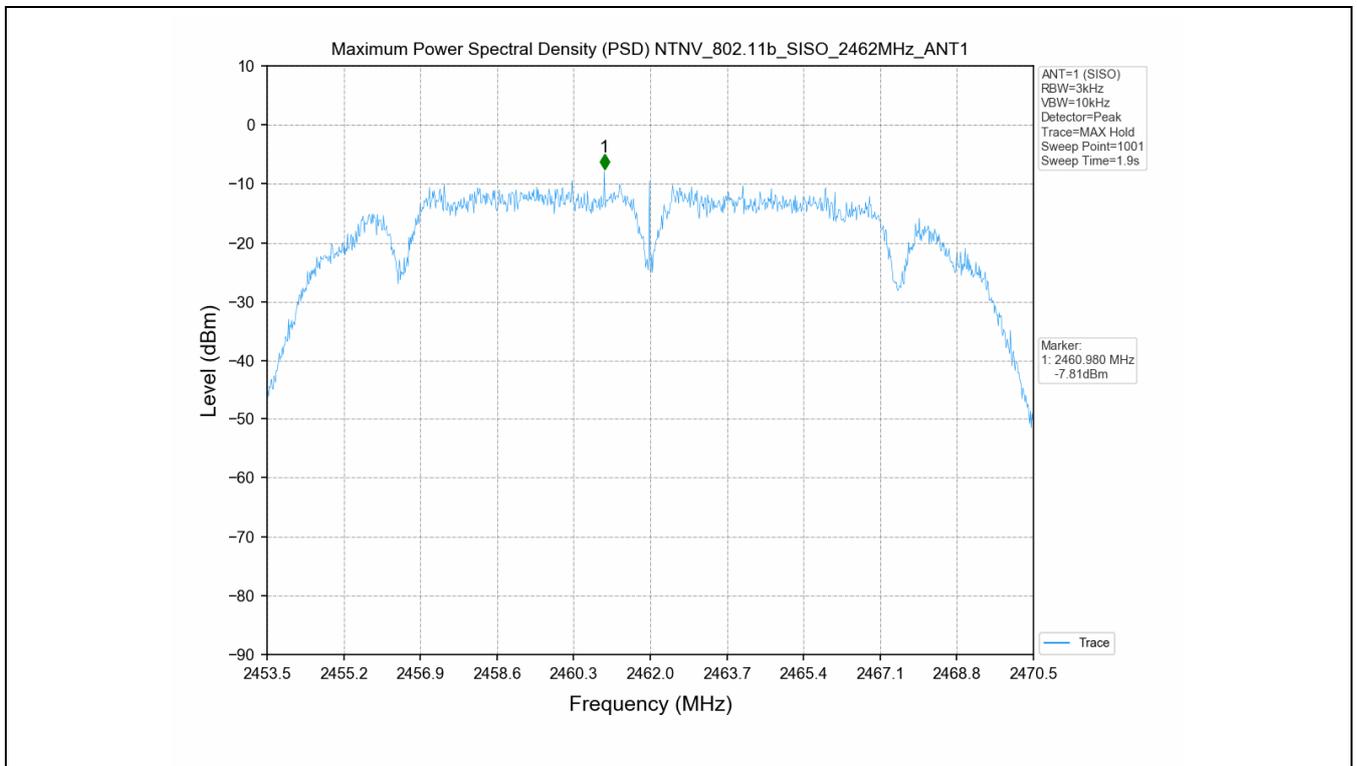
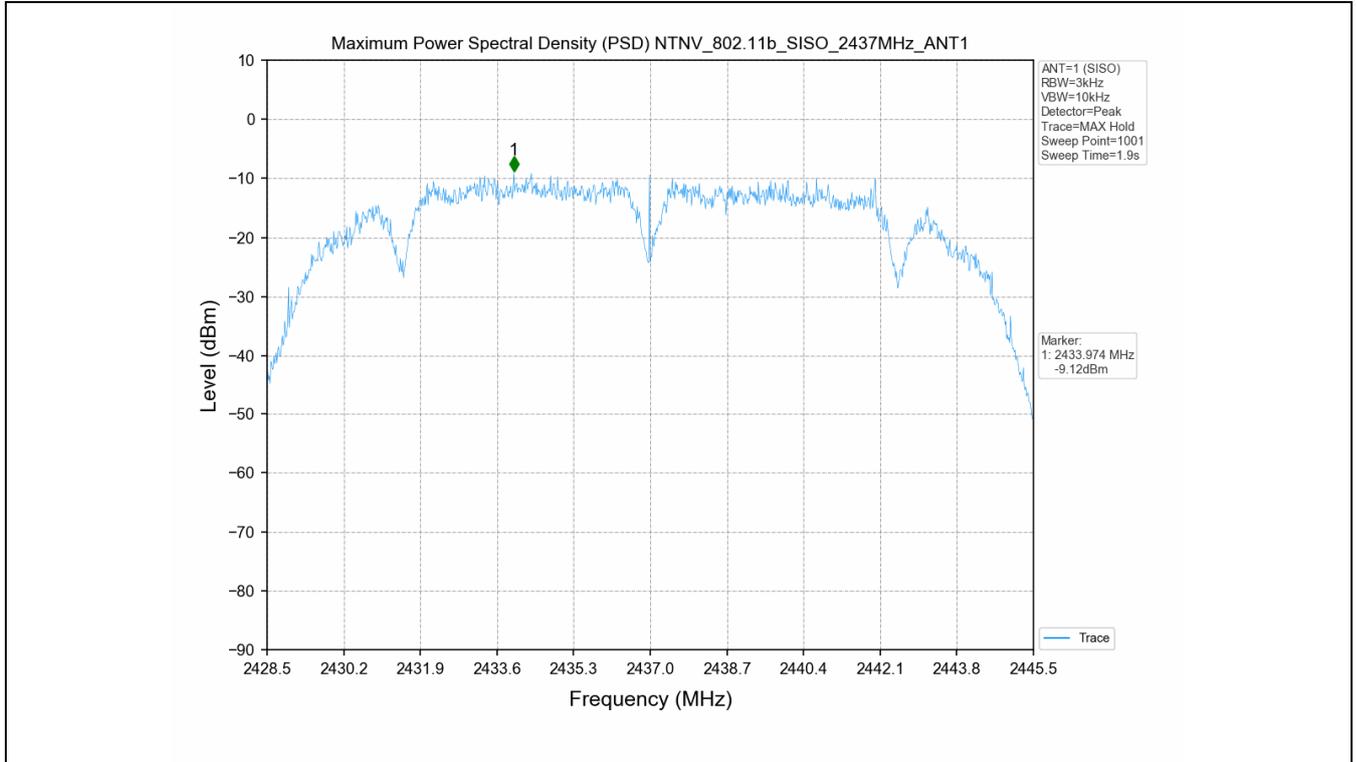
Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
802.11b	2412	SISO	-7.89	≤8	PASS
	2437	SISO	-9.12	≤8	PASS
	2462	SISO	-7.81	≤8	PASS
802.11g	2412	SISO	-8.54	≤8	PASS
	2437	SISO	-8.95	≤8	PASS
	2462	SISO	-9.43	≤8	PASS
802.11n(HT20)	2412	SISO	-8.67	≤8	PASS
	2437	SISO	-8.49	≤8	PASS
	2462	SISO	-9.50	≤8	PASS

3.2 Test Graph



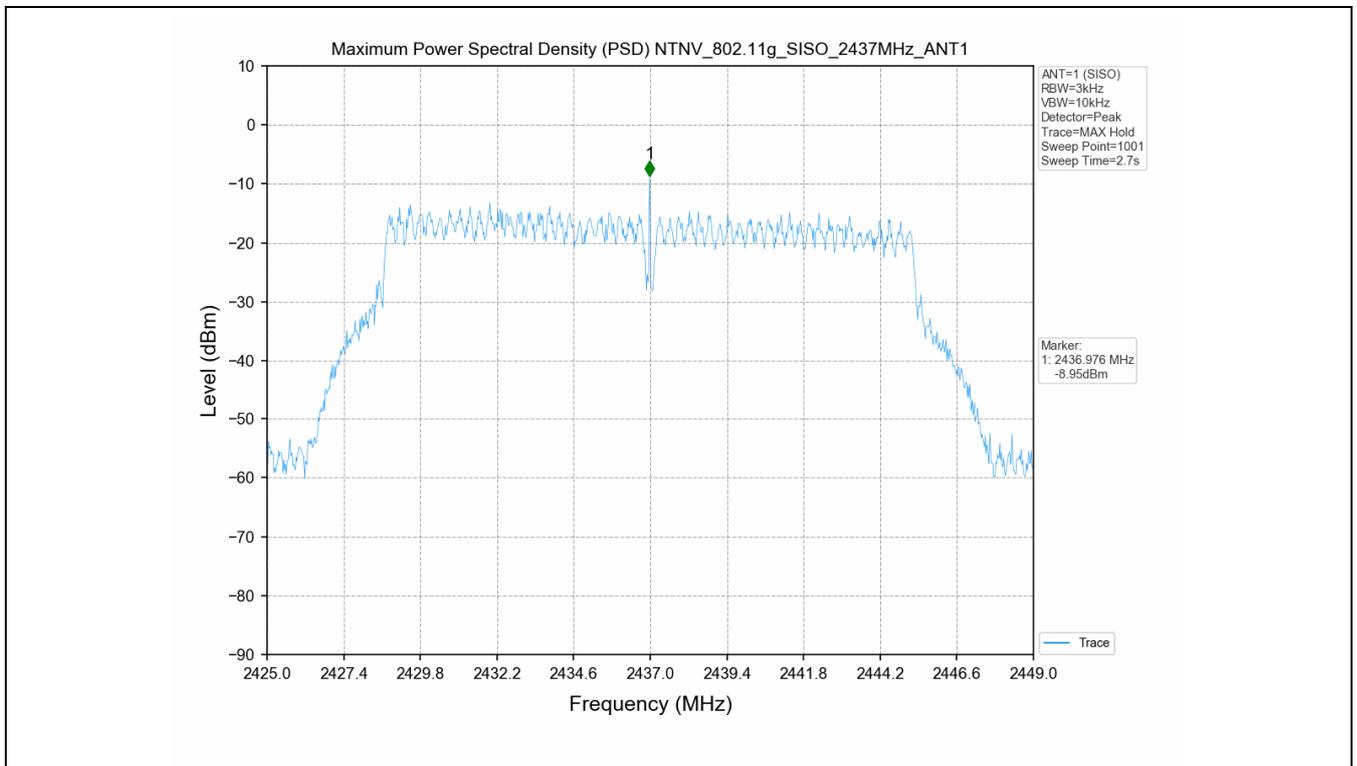
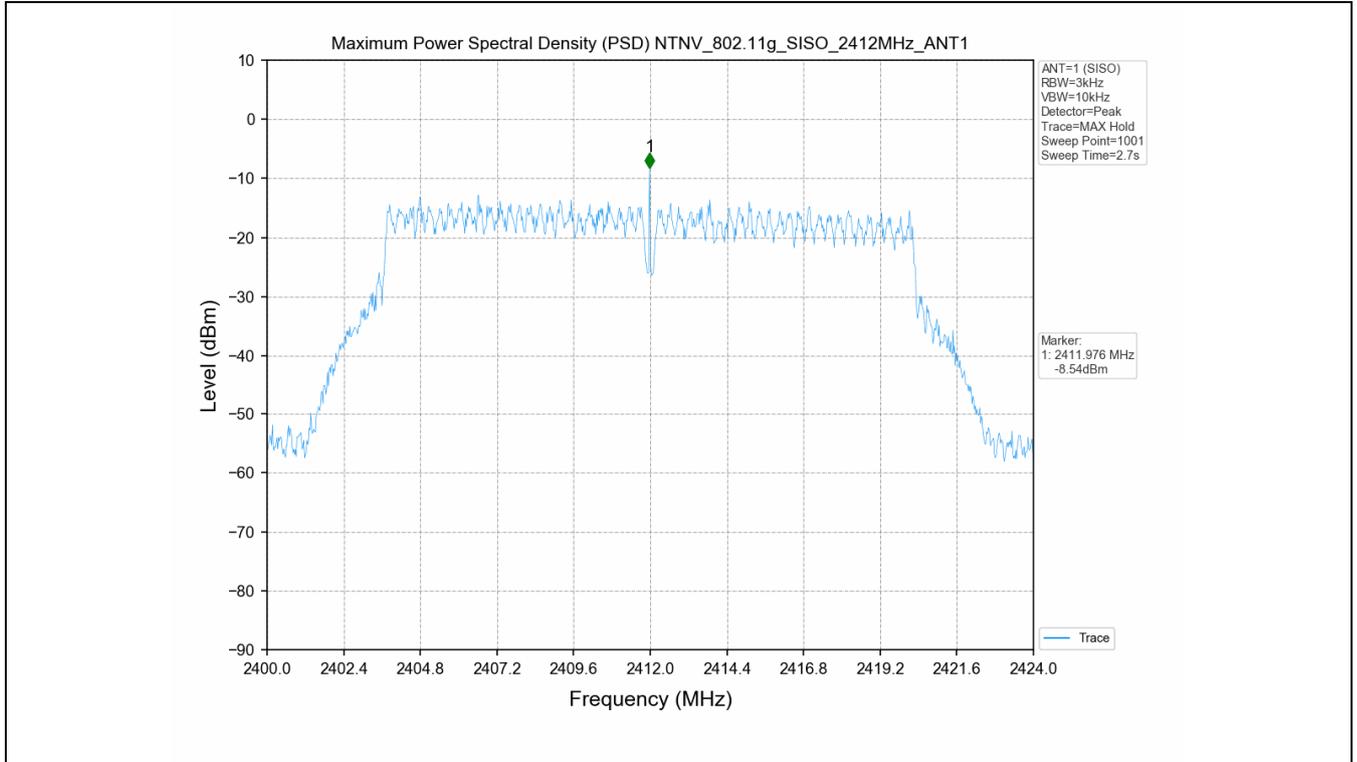
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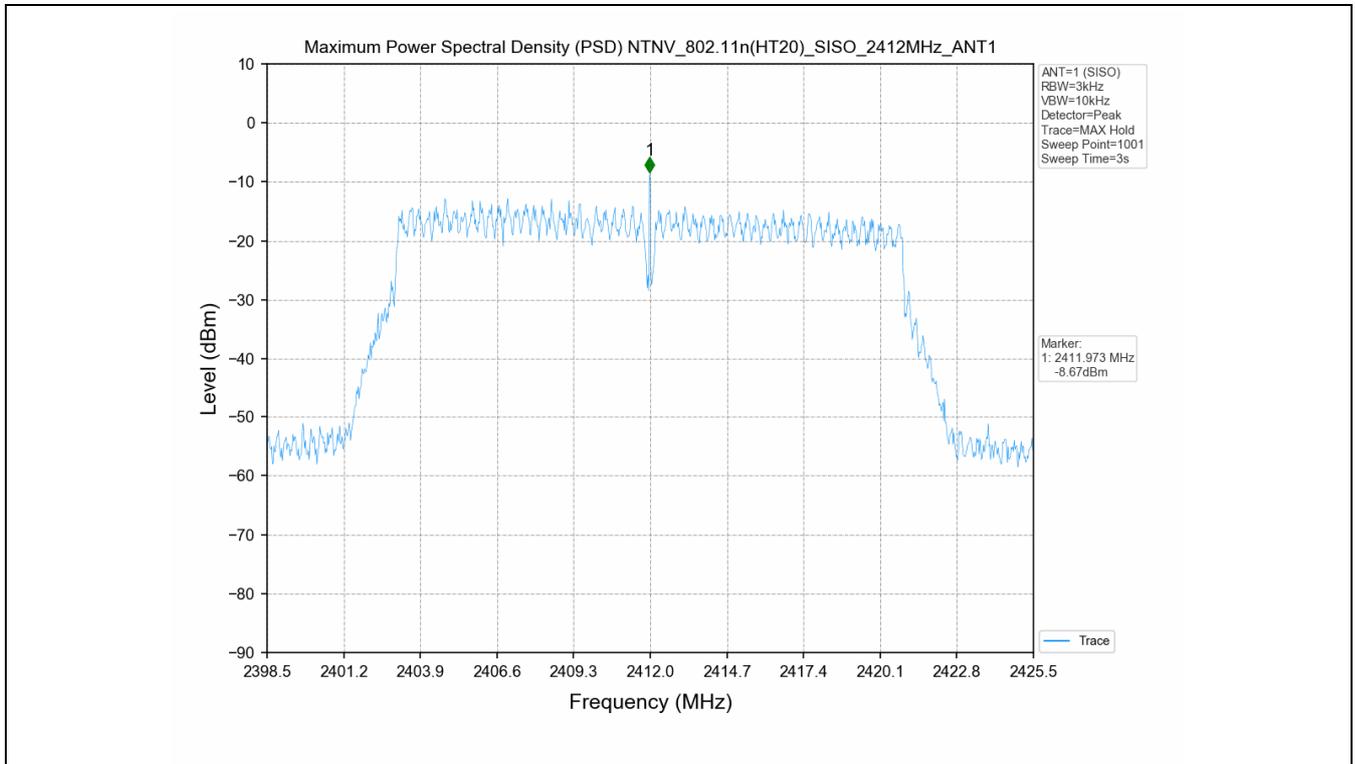
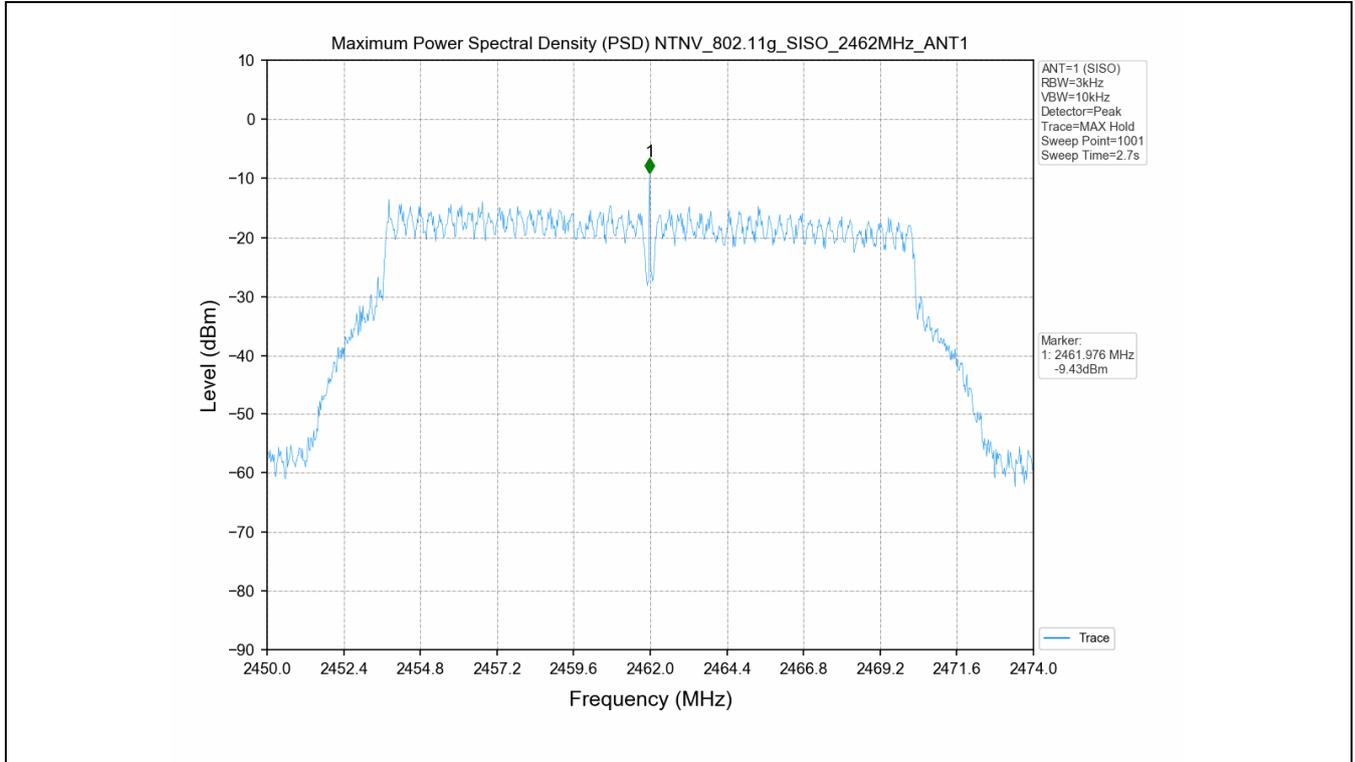
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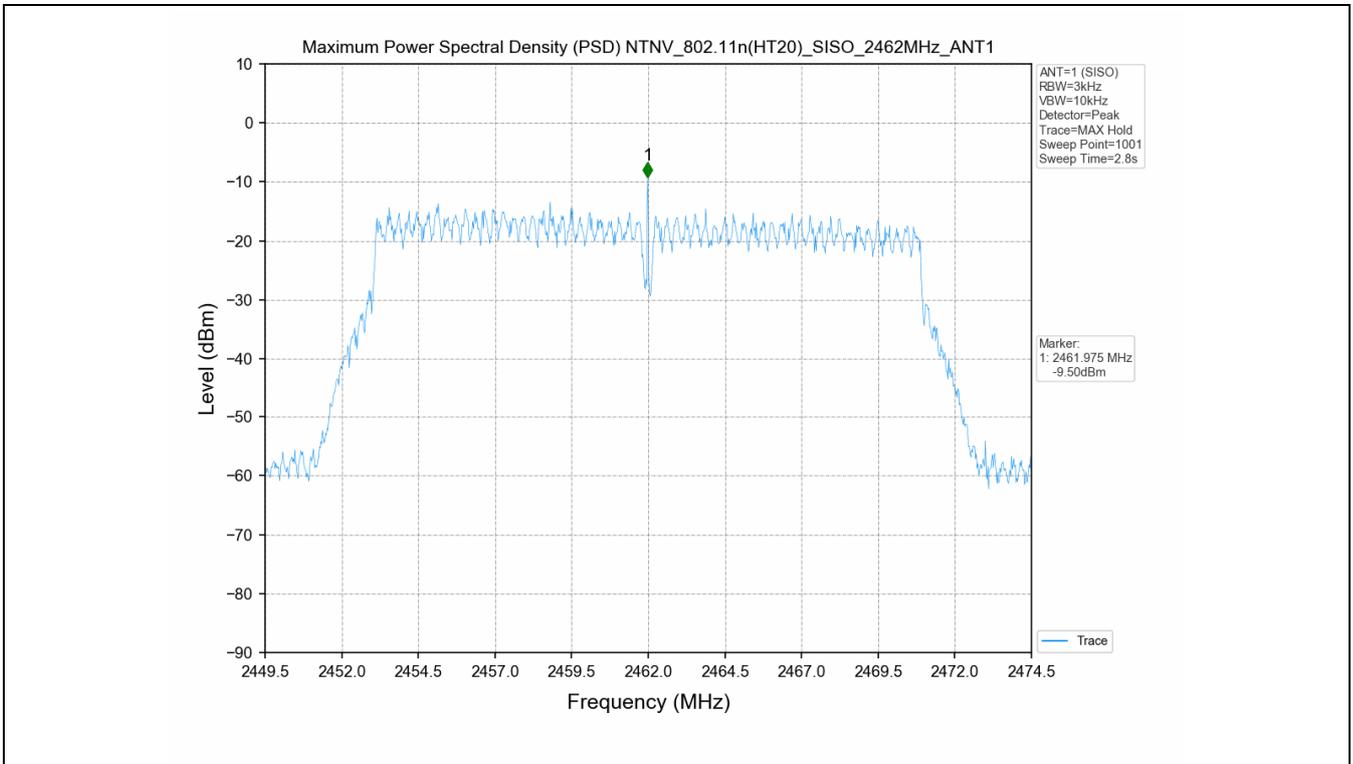
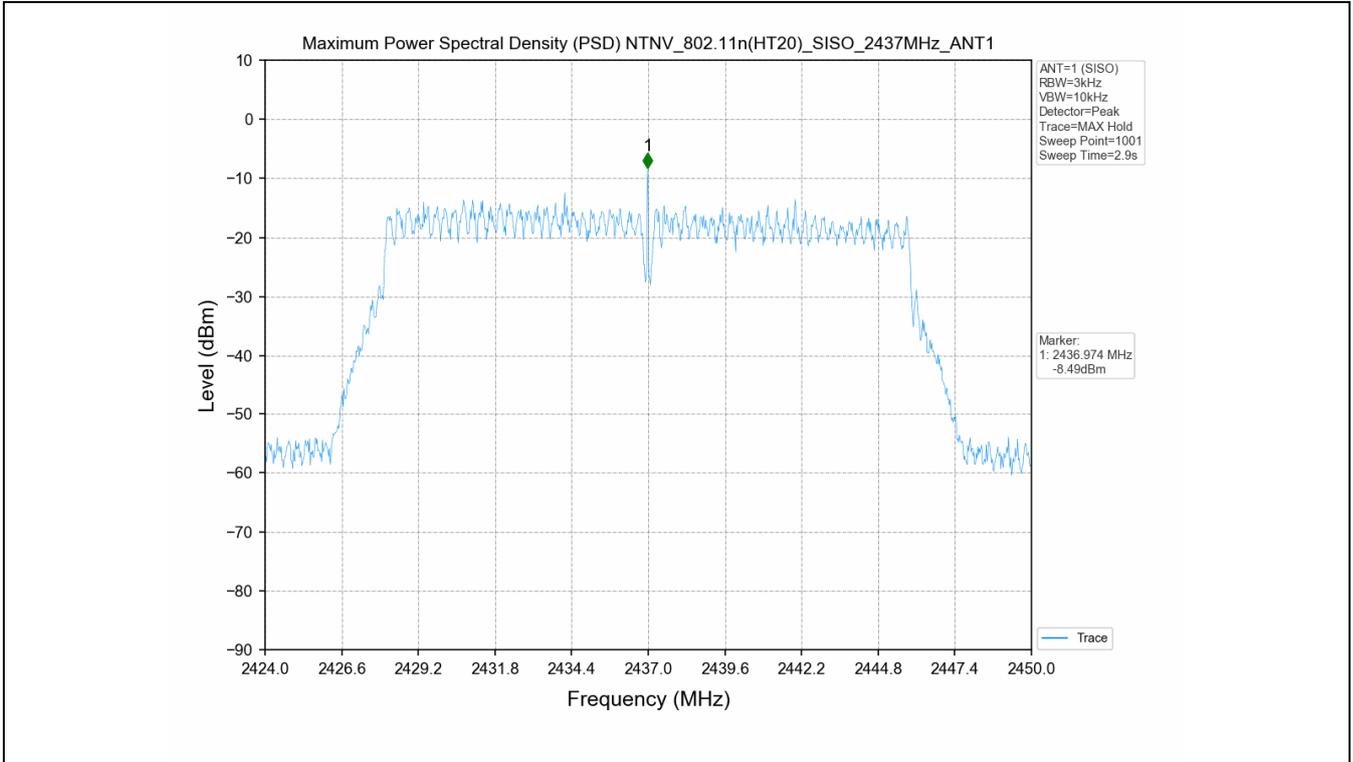
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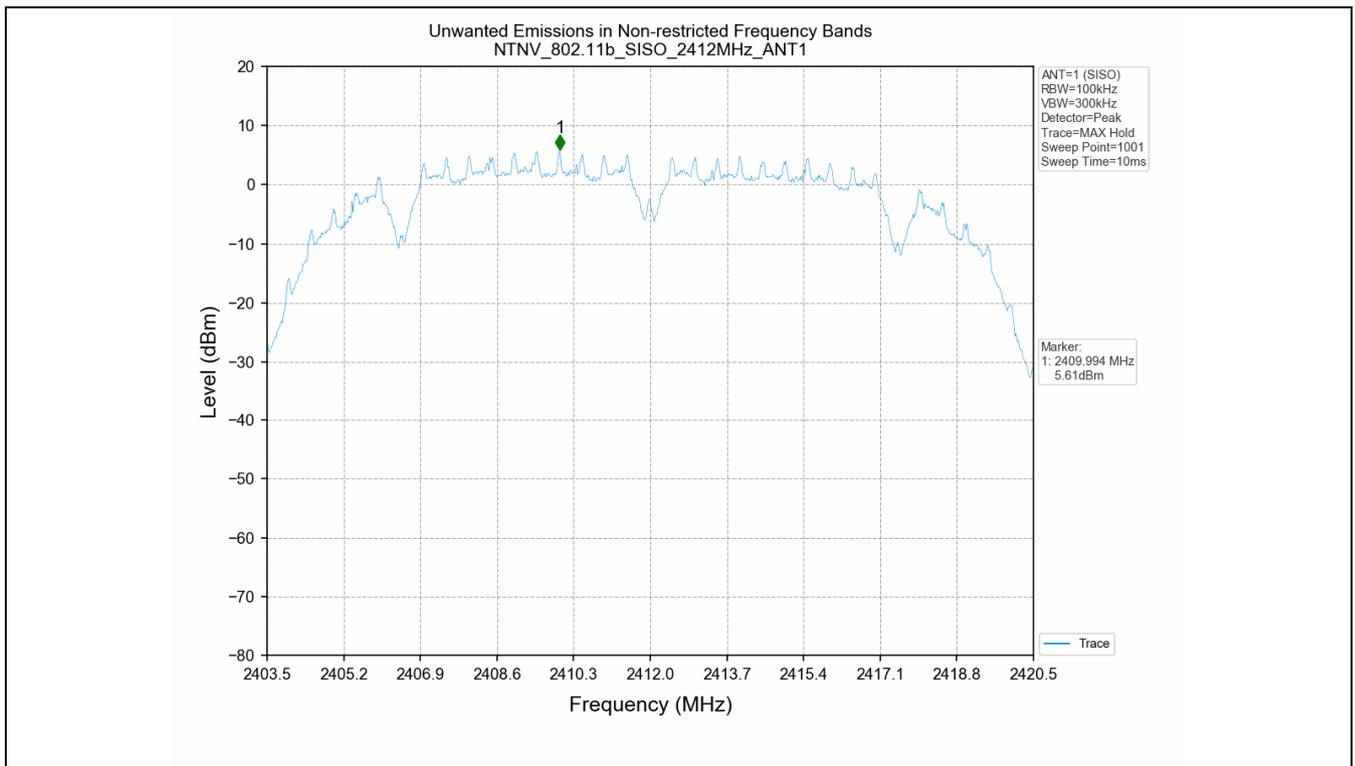
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4. Unwanted Emissions in Non-restricted Frequency Bands

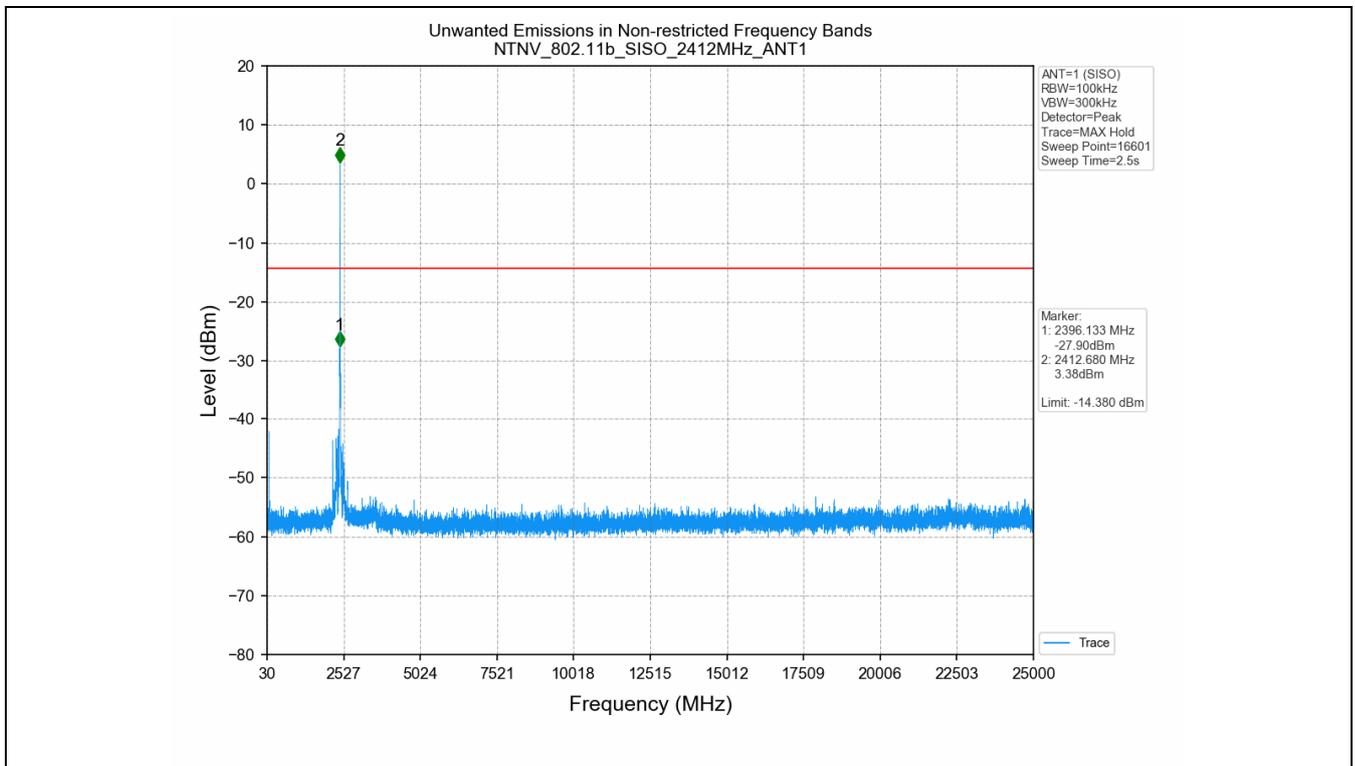
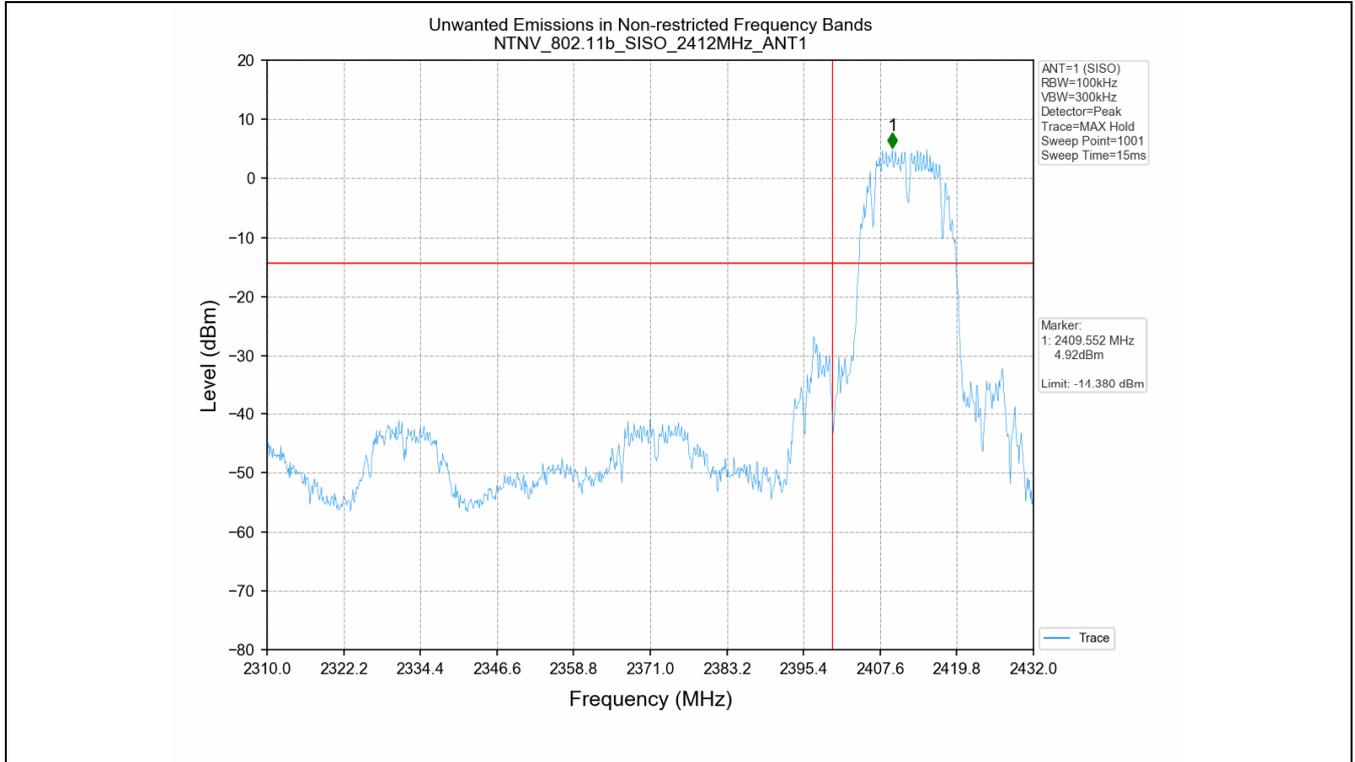
4.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
802.11b	2412	SISO	1	Refer to test graph	-14.38	PASS
	2437	SISO	1	Refer to test graph	-14.38	PASS
	2462	SISO	1	Refer to test graph	-14.38	PASS
802.11g	2412	SISO	1	Refer to test graph	-18.27	PASS
	2437	SISO	1	Refer to test graph	-18.27	PASS
	2462	SISO	1	Refer to test graph	-18.27	PASS
802.11n(HT20)	2412	SISO	1	Refer to test graph	-18.13	PASS
	2437	SISO	1	Refer to test graph	-18.13	PASS
	2462	SISO	1	Refer to test graph	-18.13	PASS

4.2 Test Graph

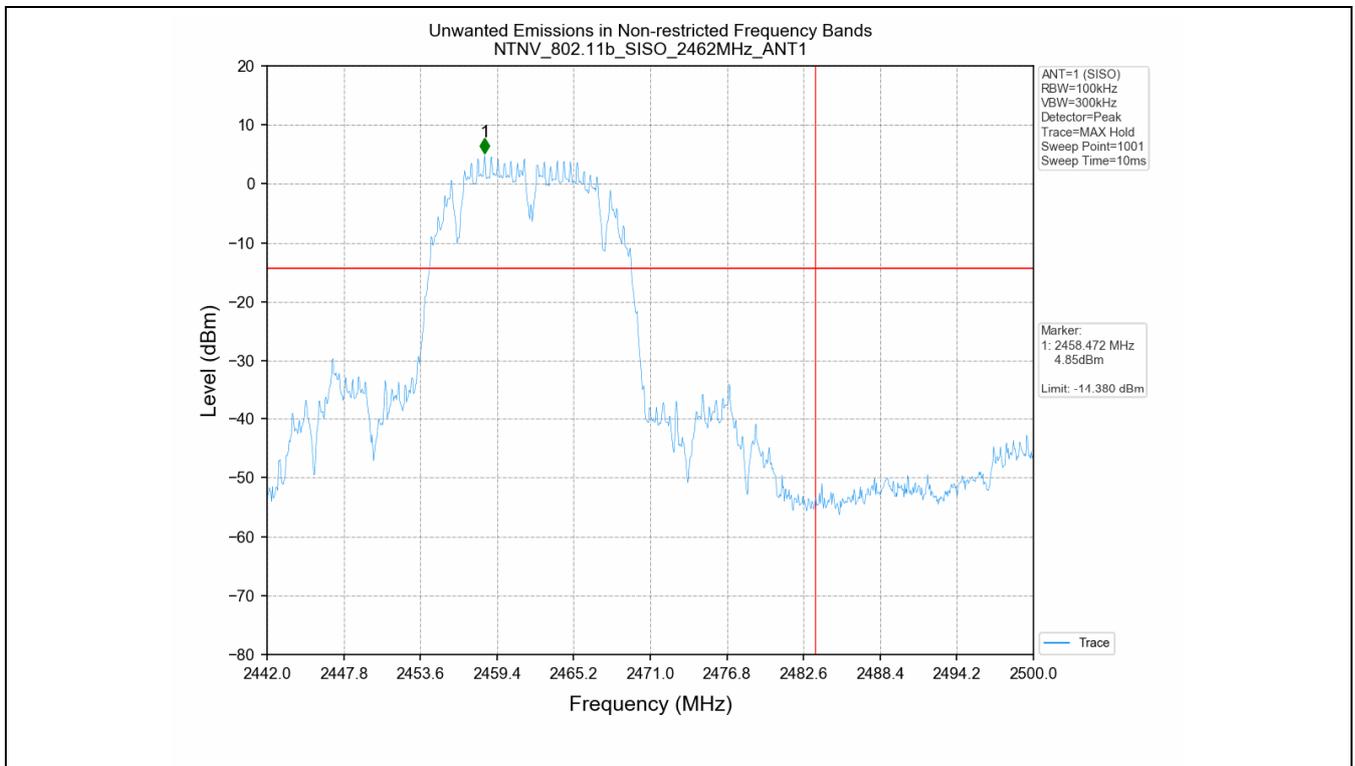
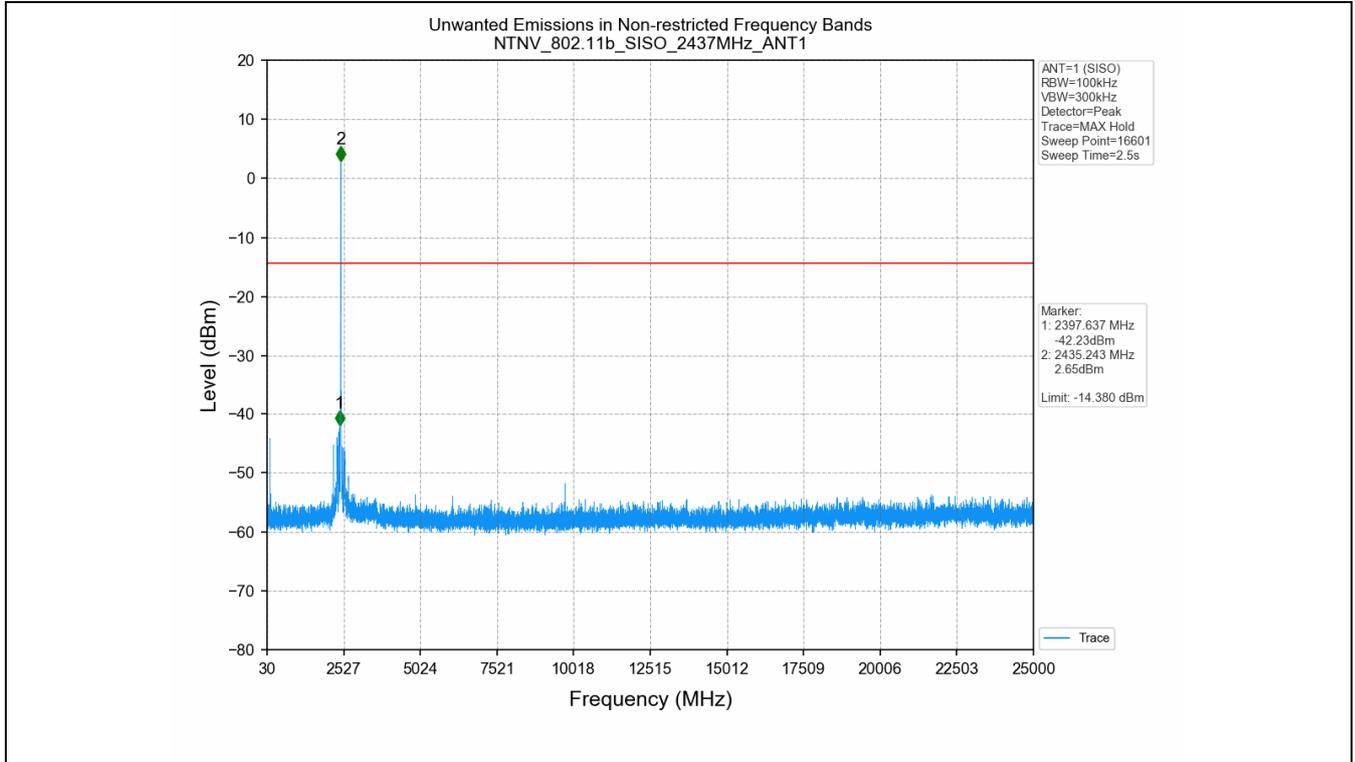


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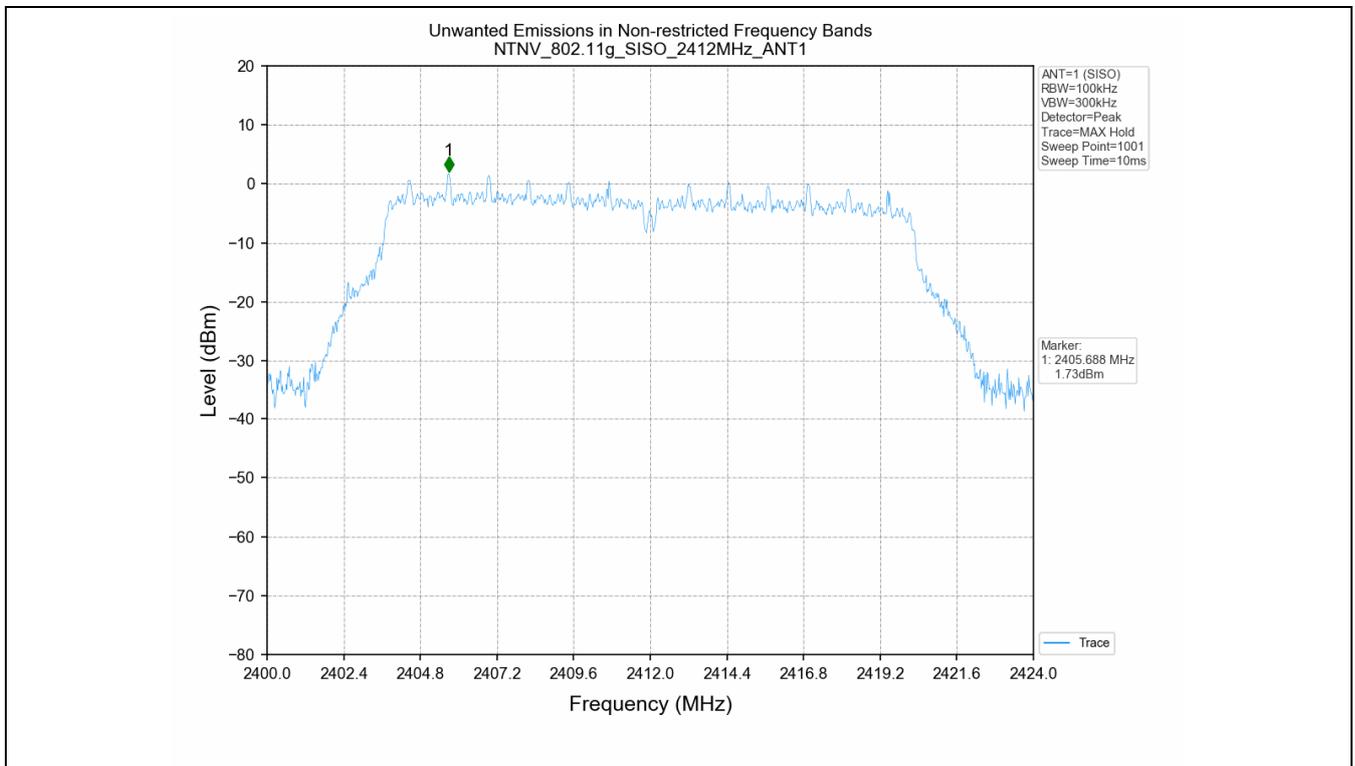
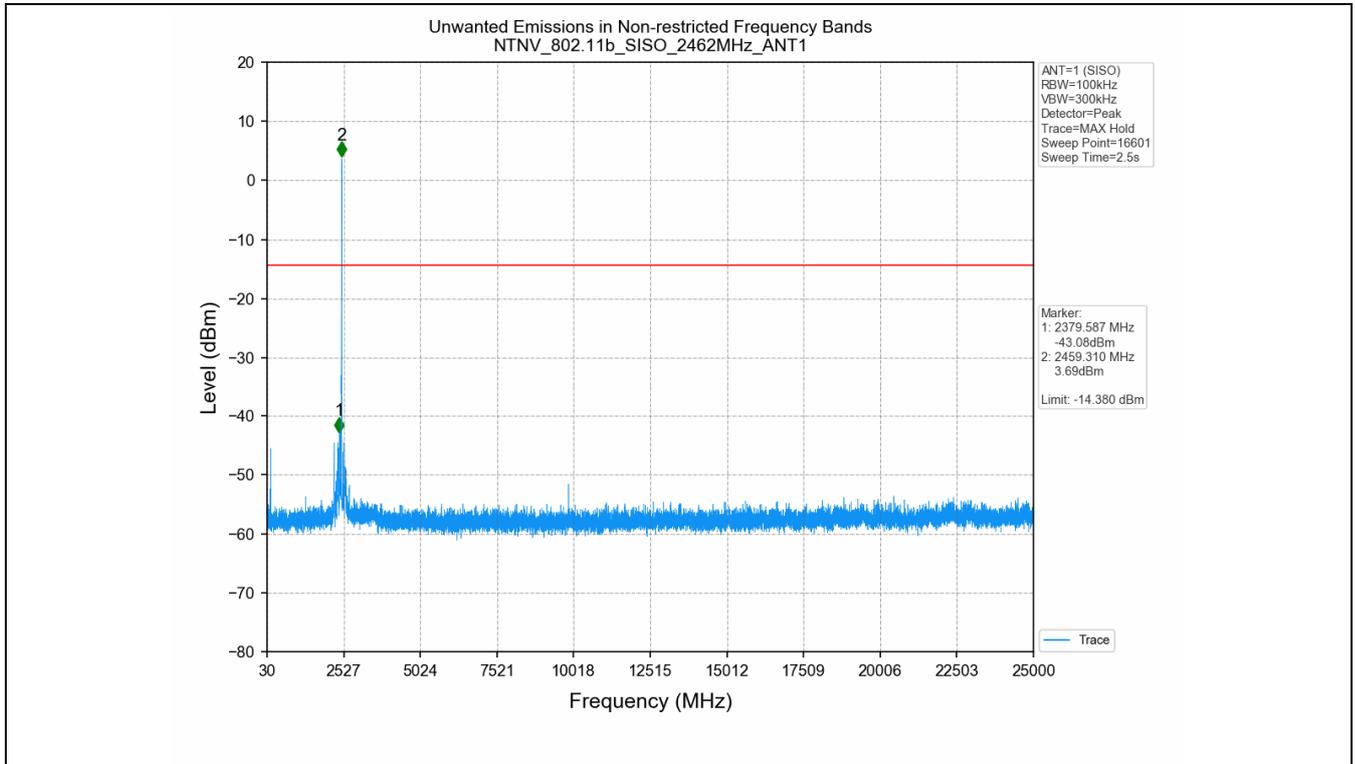
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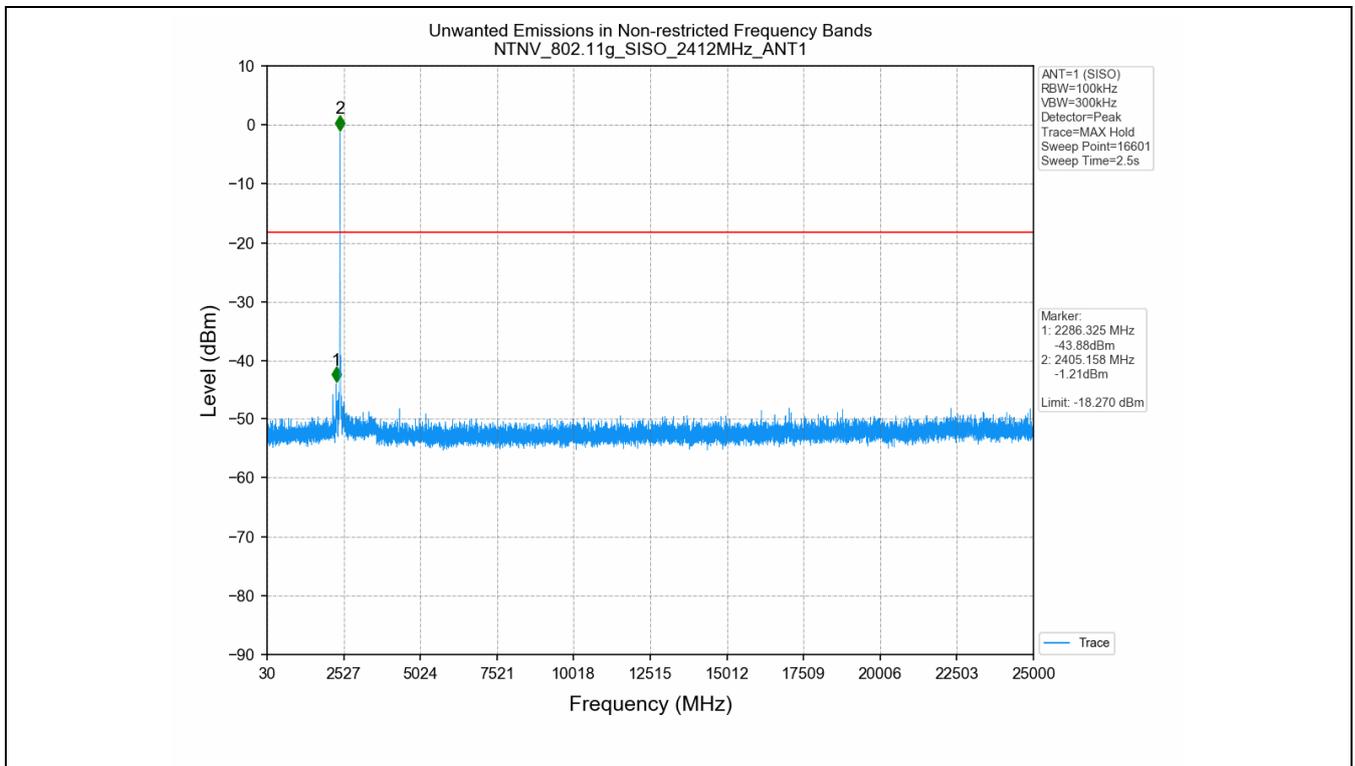
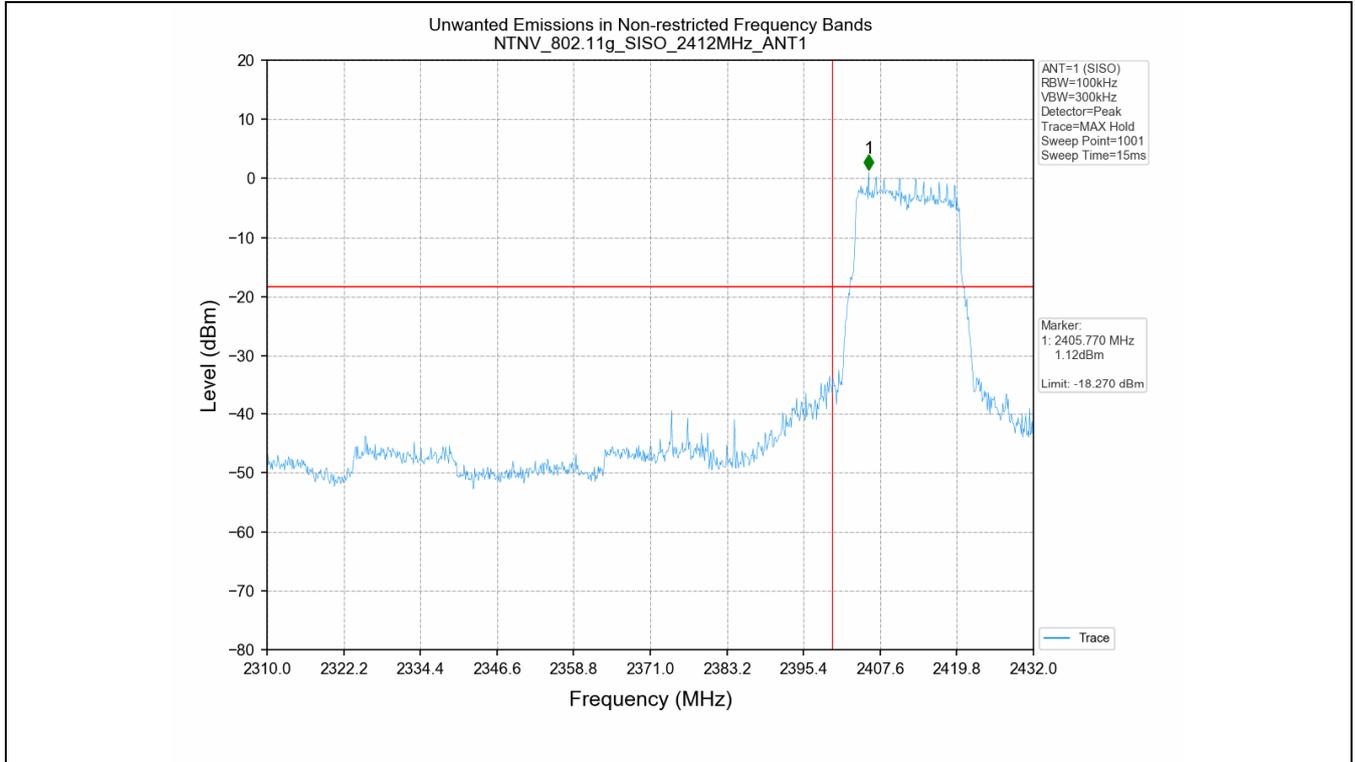
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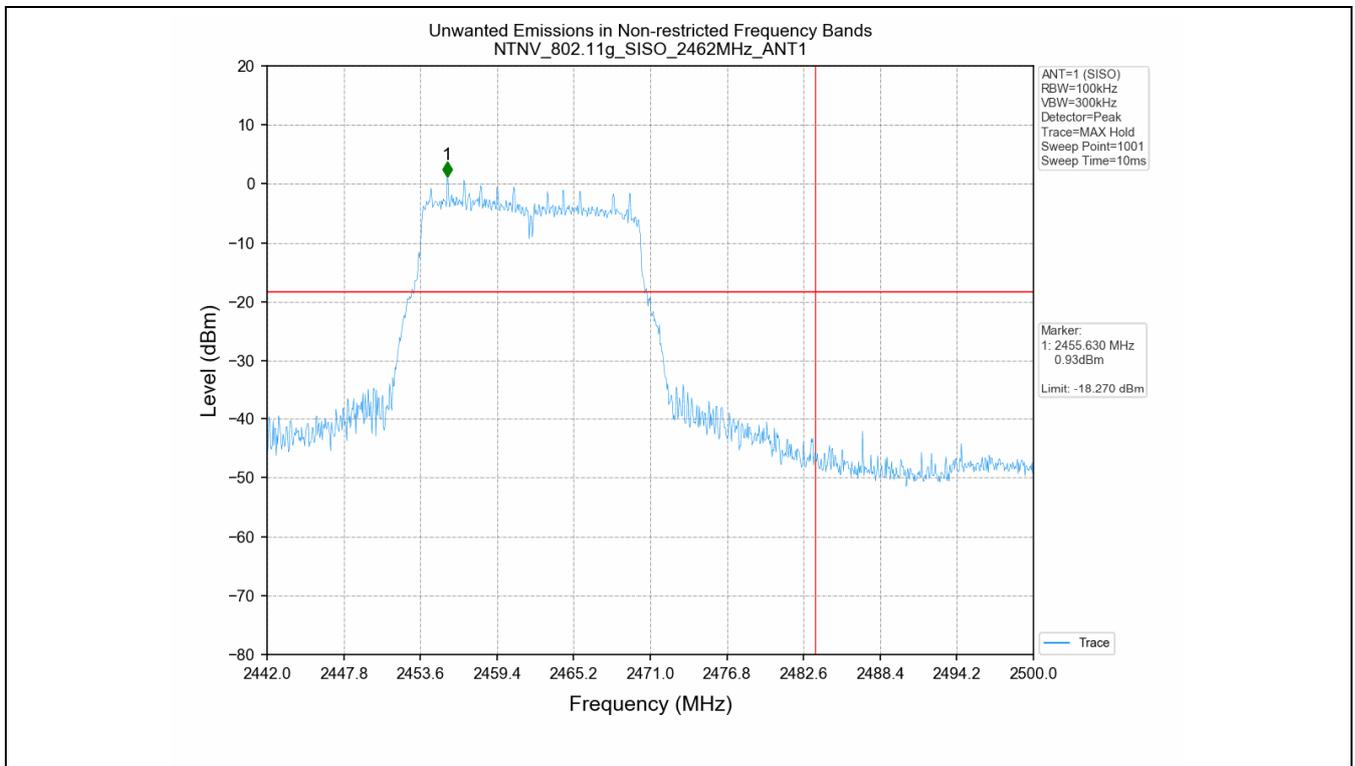
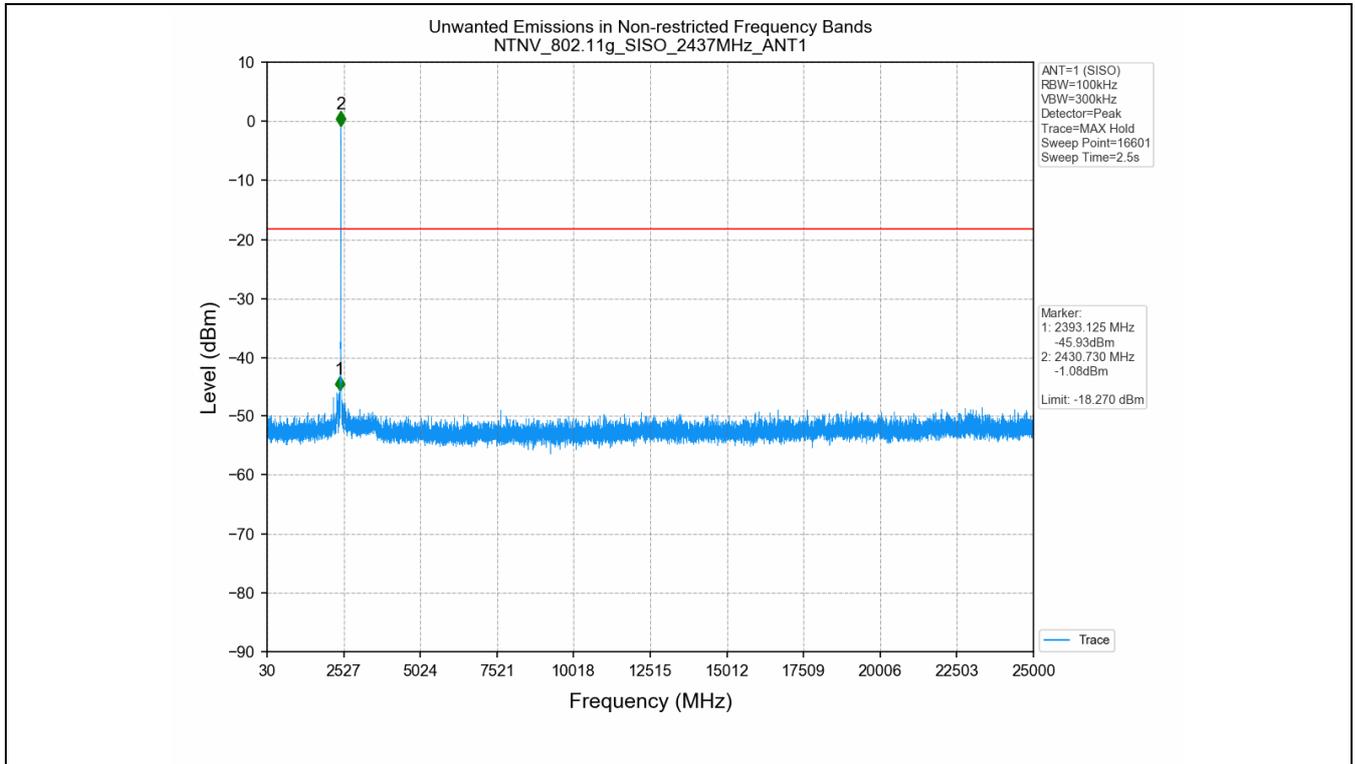
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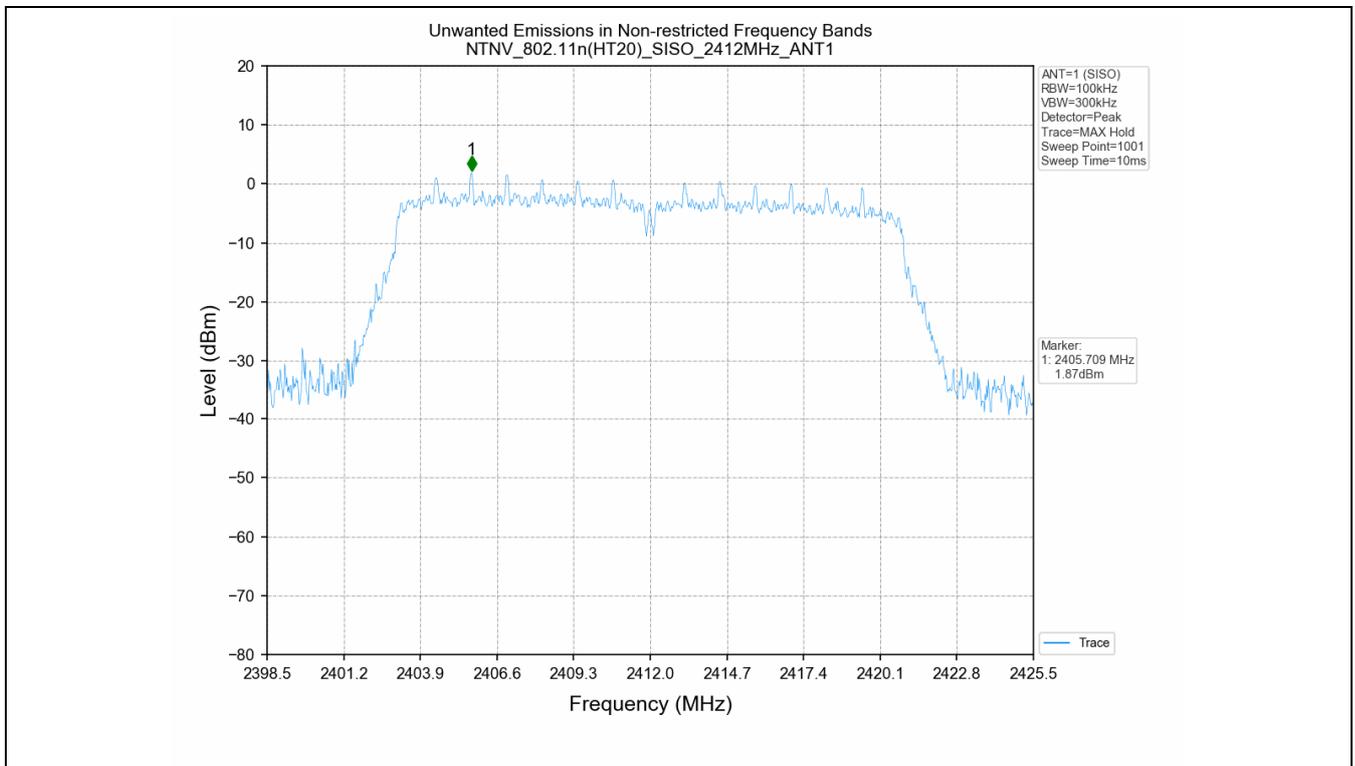
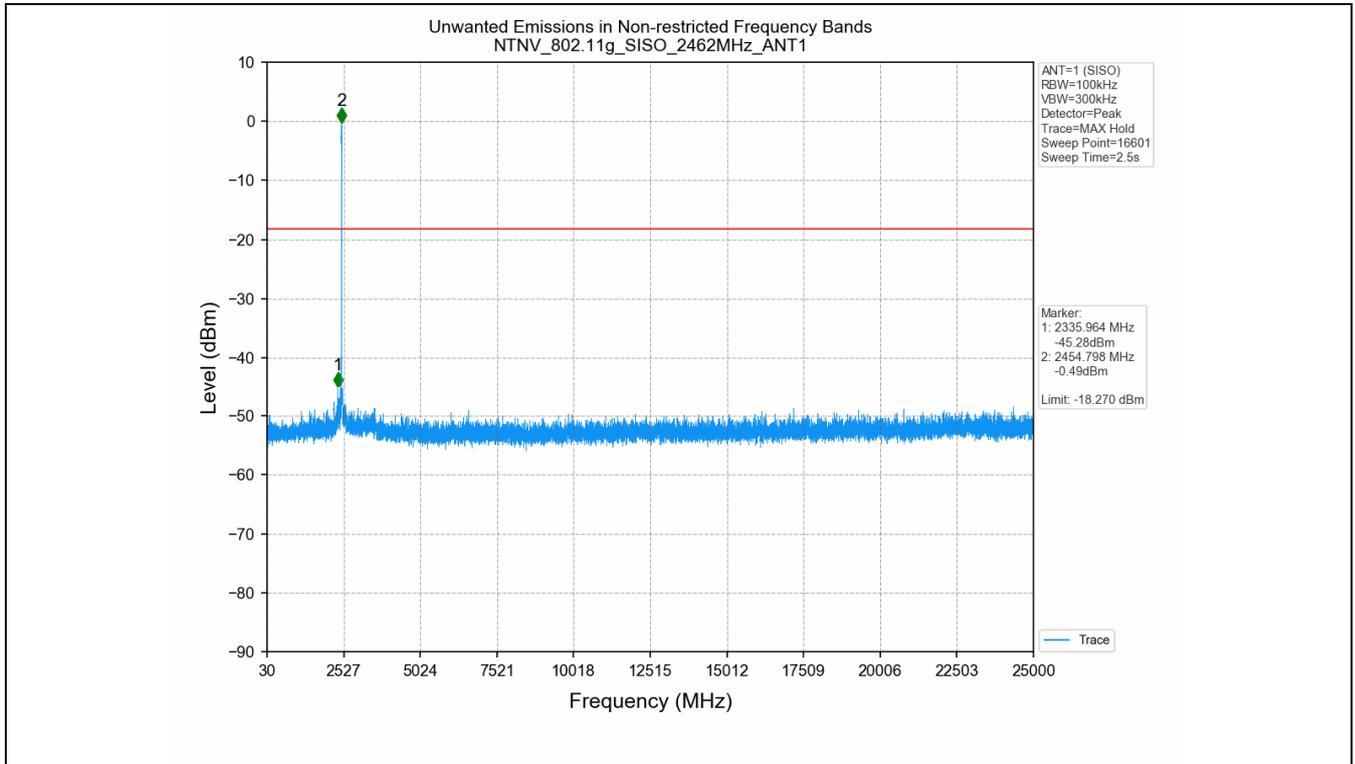
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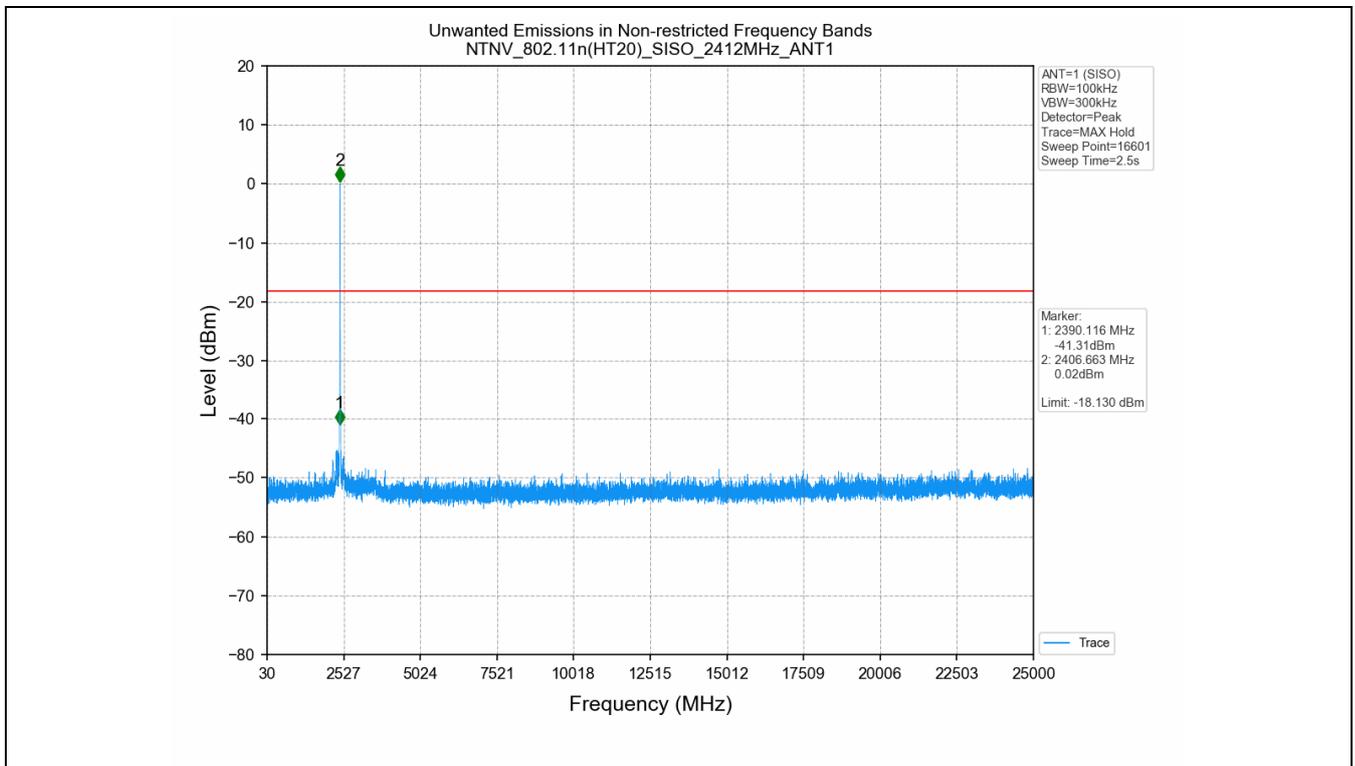
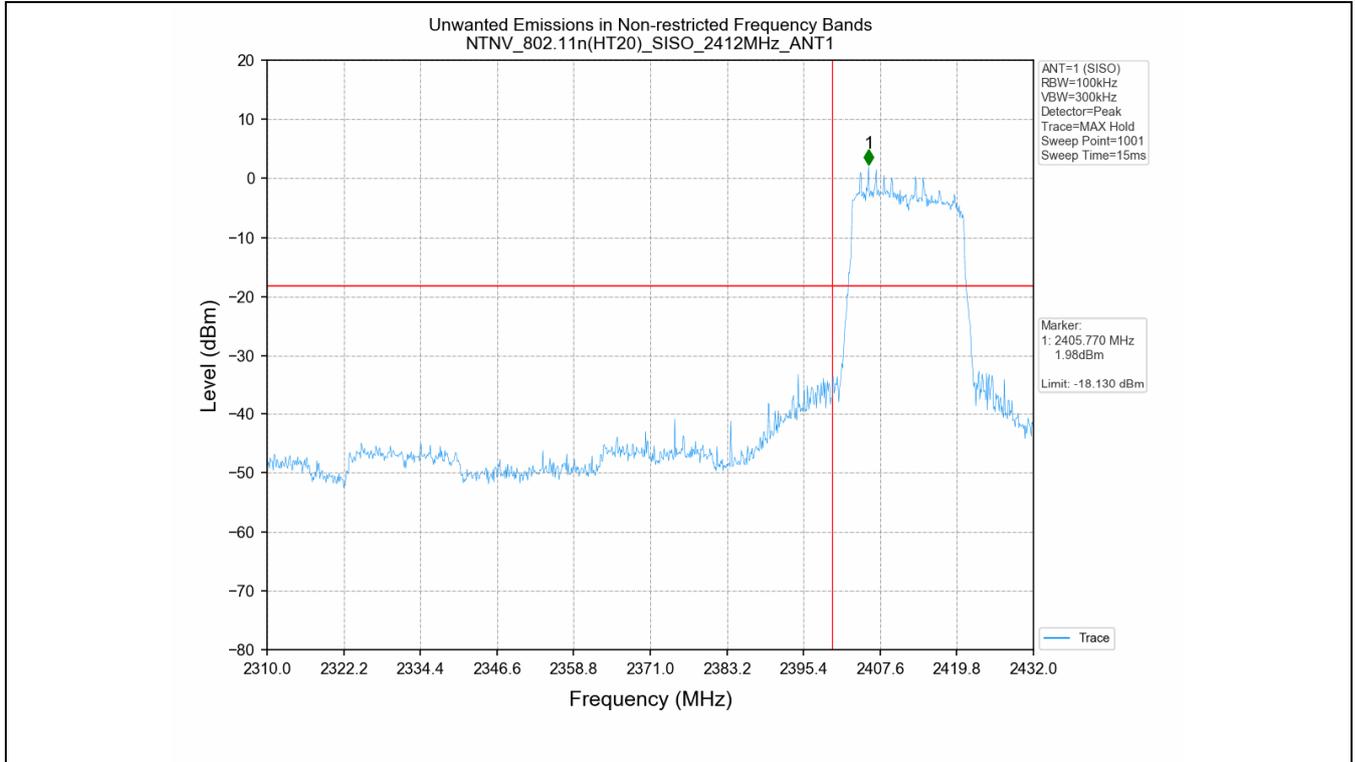
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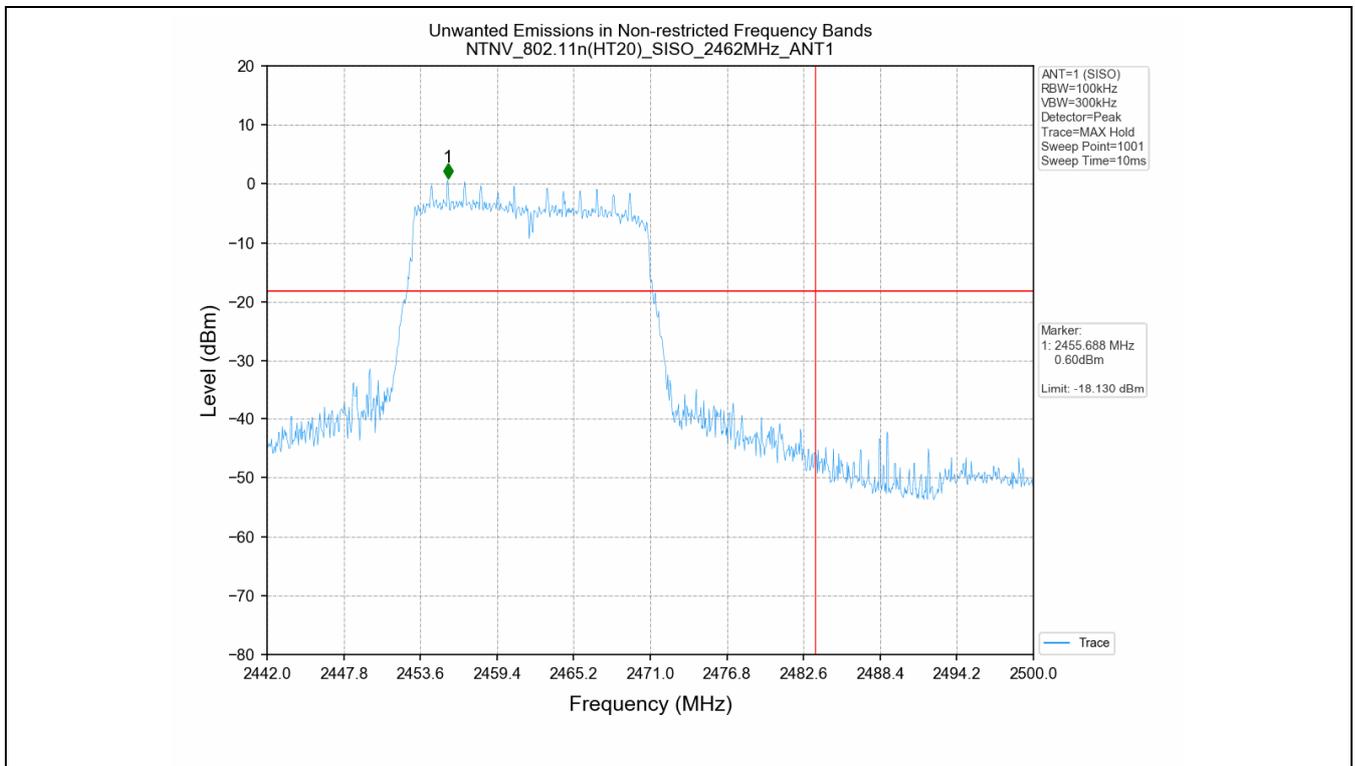
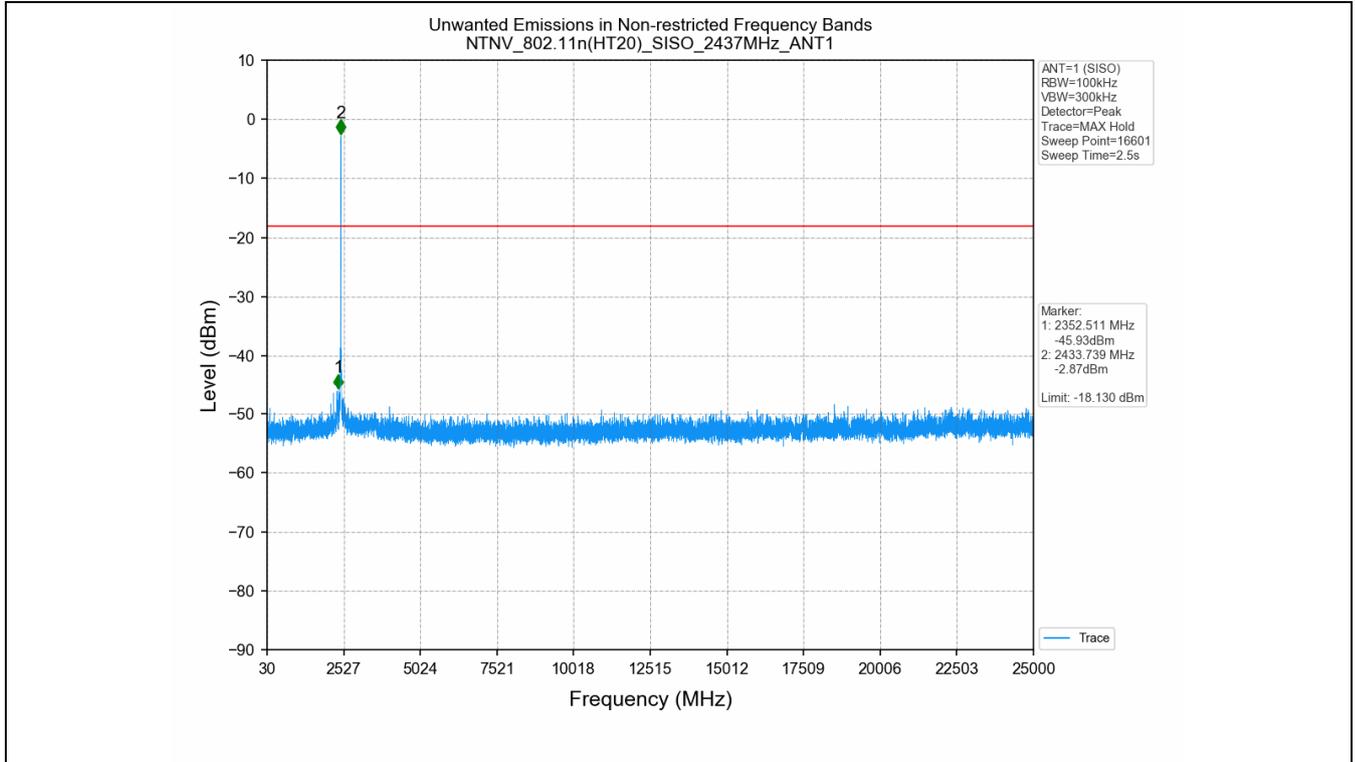
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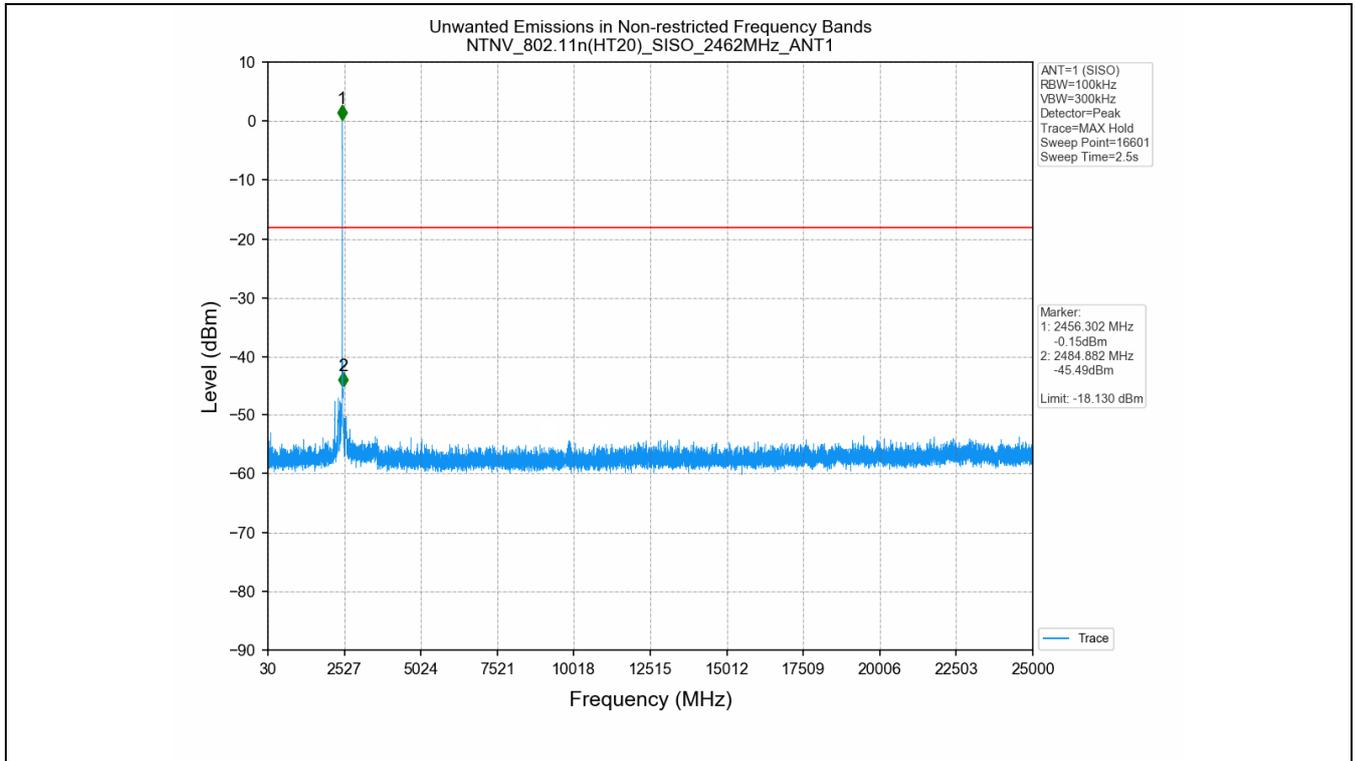
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- End of the Report -



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RF Exposure Evaluation Report

Application No.: SZEM2005004343CR
Applicant: Garmin International Inc
Address of Applicant: 1200 E. 151st. Street, Olathe, Kansas 66062, United States
Manufacturer: Measurement Ltd
Address of Manufacturer: Block A, 19/F., Prince Industrial building, 106 King Fuk Street, San Po Kong, Kowloon, Hong Kong
Factory: Display Electronics(Shenzhen)Co., Ltd
Address of Factory: No.1, Fifth Road, Yangyong Industrial Park, Shapu Community Songgang, Baoan District, Shenzhen,Guangdong Province,China

Equipment Under Test (EUT):

EUT Name: Smart Scale
Model No.: Index™ S2
Trade Mark: Garmin
FCC ID: IPH-37408
Standards: 47 CFR PART 1, Subpart I, Section 1.1310
 47 CRF PART 2, Subpart J, Section 2.1093
 KDB 447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2020-05-28
Date of Test: 2020-05-29 to 2020-06-22
Date of Issue: 2020-06-22

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

Keny Xu
 EMC Laboratory Manager



2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-06-22		Original

Authorized for issue by:			
			
		<hr/> Calvin Weng /Project Engineer	
			
		<hr/> Eric Fu /Reviewer	





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4 General Information

4.1 General Description of EUT

For BT	
Power Supply:	DC6V by 1.5V AAA battery*4
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	5.0
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Gain:	Integral antenna
Antenna Type:	-2.35dBi
For 2.4G WIFI	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11 802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Gain:	-3.78dBi
Antenna Type:	Integral antenna
For 2.4G Proprietary	
Operation Frequency:	2466MHz
Modulation Type:	GFSK
Number of Channels:	1
Antenna Gain:	-2.35dBi
Antenna Type:	Integral antenna



4.2 Test Location

All tests were performed at:

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

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 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.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

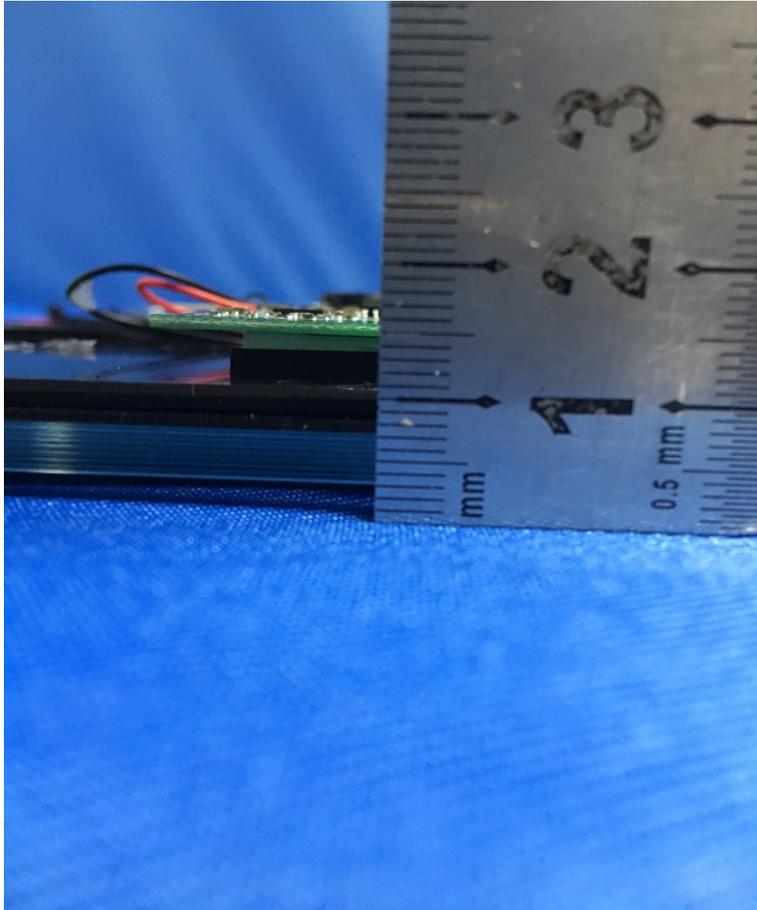
$$\left[\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right] \cdot \left[\sqrt{f(\text{GHz})} \right] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation¹⁷
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion



5.1.3 EUT RF Exposure



Distance from antenna to the top surface is about 1.5cm.

For BLE

Antenna : -2.35dB

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.58 in linear scale.

The Max. power (including tune-up toleranc -5.21 dBm on the lowest channe 2.402 GHz (*)
 -5.21 dBm logarithmic terms convert to numeric result is nearly 0.30 mW

According to the formula. calculate the test exclusion thresholds:

$$General\ RF\ Exposure = \frac{(Max.\ Power\ of\ channel,\ including\ tune-up\ tolerance,\ mW) * \sqrt{f\ (GHz)}}{(min.\ test\ separation\ distance, mm)}$$

$$General\ RF\ Exposure = (0.30\ mW / 15\ mm) \times \sqrt{2.402\ GHz} = 0.03 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)

So the SAR report is not required.

(*) Max. power refer to Report No.:SZEM200500434302



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SGS-CSTC Standards Technical Services Co., Ltd.
 Shenzhen Branch Testing Services Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

For 2.4G WiFi

Antenna Gain: -3.78dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.42 in linear scale.

The Max. power (including tune-up tolerance) 14.14 dBm on the lowest channel 2.412 GHz (*)
 14.14 dBm logarithmic terms convert to numeric result is nearly 25.94 mW

According to the formula, calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f \text{ (GHz)}}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (25.94 \text{ mW} / 15 \text{ mm}) * \sqrt{2.412 \text{ GHz}} = 2.69 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

$$(1) < (2)$$

So the SAR report is not required.

(*) Max. power refer to Report No.:SZEM200500434303

- End of the Report -

