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# TEST REPORT

Application No.:	SZCR2104020551ME
Applicant:	NormaTec Industries LP
Address of Applicant:	480 Pleasant St. Ste A200, Watertown, Massachusetts, 02472 United States
Manufacturer:	NormaTec Industries LP
Address of Manufacturer:	480 Pleasant St. Ste A200, Watertown, Massachusetts, 02472 United States
Factory:	Ryder Electronics (Xinfeng) Ltd.
Address of Factory:	East Shuidong Avenue, Industrial Park, Xinfeng Town, Ganzhou City, Jiangxi Province, P.R. China 341600
Equipment Under Test (EU	Т):
EUT Name:	Normatec 3
Model No.:	REJ6
Trade Mark:	Normatec, Hyperice
FCC ID:	2AY3Y-NT3
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2021-04-15
Date of Test:	2021-04-16 to 2021-04-29
Date of Issue:	2021-05-06
Test Result:	Pass*

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

Keny. Ku

Keny Xu EMC Laboratory Manager



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	Revision Record					
Version	Chapter	Date	Modifier	Remark		
01		2021-05-06		Original		

Authorized for issue by:		
	Damon Su	
	Damon Su/Project Engineer	-
	Eric Fu	
	Eric Fu/Reviewer	-



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## 2 Test Summary

Radio Spectrum Technical Requirement				
ltem	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	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		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Emission Part					
Item	Standard	Method	Requirement	Result	
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass	

Remark: The EUT with 2 different batteries, all the batteries have been tested, only record the worst case(battery1#) in the report.

Battery1# Model: BPI 18650 2S1P		
Battery capacity:	7.4V, 3200mAh	
Manufacturer:	SHENZHEN BETTERPOWER BATTERY CO LTD	
Battery2# Model: HV-Ge	en5	
Battery capacity:	7.2V, 3100mAh	
Manufacturer: Fujian SCUD Power Technology Co., Ltd.		



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## 4 General Information

#### 4.1 Details of E.U.T.

Power supply:	DC 7.4V or DC 7.2V by lithium-ion battery, and recharged by DC 15V 1.6A.
	Adapter Model: PEAMW24I-13-BNL24
	Input: AC 100-240V, 50/60Hz
	Output: 15V 1.6A
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 LE
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Data Rate:	1Mbps and 2Mbps
Antenna Type:	PIFA Antenna
Antenna Gain:	1.3dBi

#### 4.2 Description of Support Units

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

#### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	$\pm$ 3.0dB (150kHz to 30MHz)
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Radiated Emissions which fall in the restricted bands	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)
Radiated Spurious Emissions Below 1GHz	± 4.5dB
Radiated Spurious Emissions Above 1GHz	± 4.8dB

Remark:

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{cispr}$  (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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#### 4.4 Test Location

All tests were performed at: SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China, 518057. Tel: +86 755 2601 2053 Fax: +86 755 2671 0594 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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#### **Equipment List** 5

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2019-06-13	2022-06-12
EMI Test Receiver	Rohde&Schwarz	ESCI	SEM004-02	2021-03-24	2022-03-23
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2020-07-10	2021-07-09
LISN	Rohde&Schwarz	ENV216	SEM007-01	2020-09-23	2021-09-22
LISN	ETS-LINDGREN	3816/2	SEM007-02	2021-03-24	2022-03-25

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	2021-03-23	2022-03-22
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-17	2021-04-08	2022-04-07
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2021-04-08	2022-04-07

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	2021-03-23	2022-03-22
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-17	2021-04-08	2022-04-07
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2021-04-08	2022-04-07

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	2021-03-23	2022-03-22
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-17	2021-04-08	2022-04-07
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09



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Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2021-04-08	2022-04-07
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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	2021-03-23	2022-03-22
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-17	2021-04-08	2022-04-07
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2021-04-08	2022-04-07

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	2021-03-26	2024-03-25
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2021-02-01	2022-01-31
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2021-04-14	2024-04-13
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021-03-24	2022-03-23

Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2020-11-02	2021-11-01
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2021-03-24	2022-03-23
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09



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Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2021-03-26	2024-03-25
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2021-02-01	2022-01-31
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2021-04-14	2024-04-13
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09

General used equipmen	t				
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2020-09-15	2021-09-14
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2020-09-15	2021-09-14
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2021-03-30	2022-03-29



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## 6 Radio Spectrum Technical Requirement

#### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

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

#### 6.1.2 Conclusion

Standard Requirement:

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

15.247(b) (4) requirement:

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

#### EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.3dBi.

Antenna location: Refer to internal photo.



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## 7 Radio Spectrum Matter Test Results

#### 7.1 Conducted Peak Output Power

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

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

#### 7.1.1 E.U.T. Operation

Operating Environ	iment:					
Temperature:	24.8 °C	Humidity:	32.3 % RH	Atmospheric Pressure:	1010	mbar

#### 7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



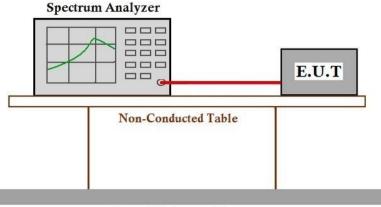
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#### 7.1.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.1.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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#### 7.2 Minimum 6dB Bandwidth

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

Limit: ≥500 kHz

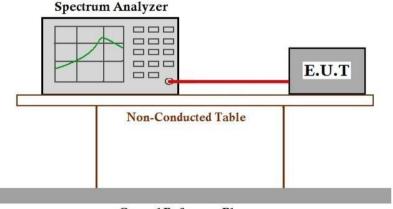
#### 7.2.1 E.U.T. Operation

Operating Enviro	nment:				
Temperature:	24.8 °C	Humidity:	32.3 % RH	Atmospheric Pressure: 1010 mba	ar

#### 7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.2.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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#### 7.3 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2

Limit:

<8dBm in any 3 kHz band during any time interval of continuous transmission

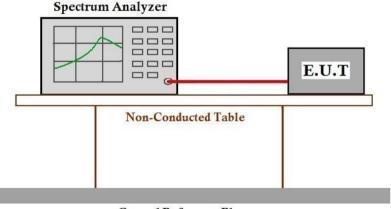
#### 7.3.1 E.U.T. Operation

Operating Enviror	nment:						
Temperature:	24.8 °C	Humidity:	32.3 % RH	Atm	nospheric Pressure:	1010	mbar

#### 7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.3.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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#### 7.4 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

#### 7.4.1 E.U.T. Operation

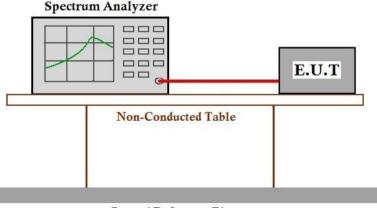
**Operating Environment:** 

Temperature:	24.8 °C	Humidity:	32.3 % RH	Atmospheric Pressure:	1010	mbar

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.4.2 Test Mode Description

#### 7.4.3 Test Setup Diagram



Ground Reference Plane

#### 7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details





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#### 7.5 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11
Limit:	

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

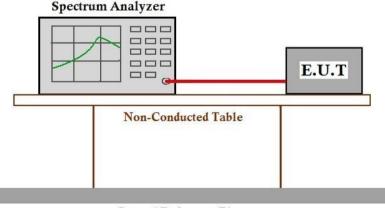
#### 7.5.1 E.U.T. Operation

Operating Enviro	onment:				
Temperature:	24.8 °C	Humidity:	32.3 % RH	Atmospheric Pressure: 1010 m	bar

7.5.2 Test mode Description									
Pre-scan / Final test	Mode Code	Description							
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.							
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.							

#### 7.5.2 Test Mede Description

#### 7.5.3 Test Setup Diagram



#### **Ground Reference Plane**

#### 7.5.4 Measurement Procedure and Data

#### Please Refer to Appendix for Details





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#### 7.6 Radiated Emissions which fall in the restricted bands

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

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

#### 7.6.1 E.U.T. Operation

**Operating Environment:** 

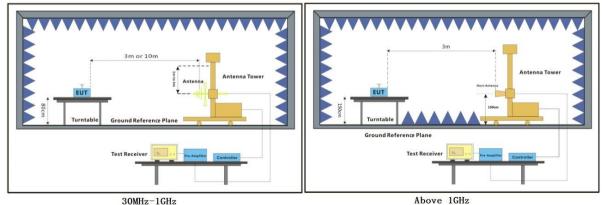
Temperature:	23.5 °C	Humidity:	56.3 % RH	Atmospheric Pressure:	1010	mbar
remperature.	20.0 0	riumany.	00.0 /01111	Autospherie i ressure.	1010	mbai

#### 7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.6.3 Test Setup Diagram

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#### 7.6.4 Measurement Procedure and Data

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

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

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

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

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

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

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

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



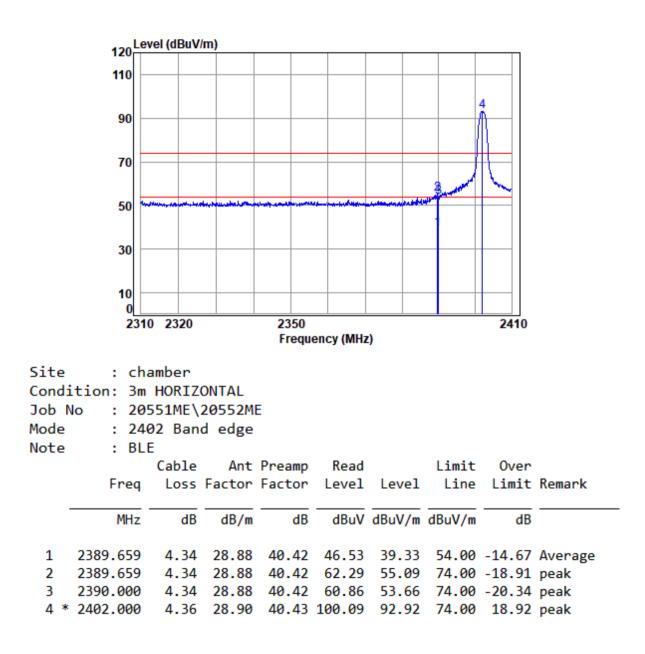
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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low





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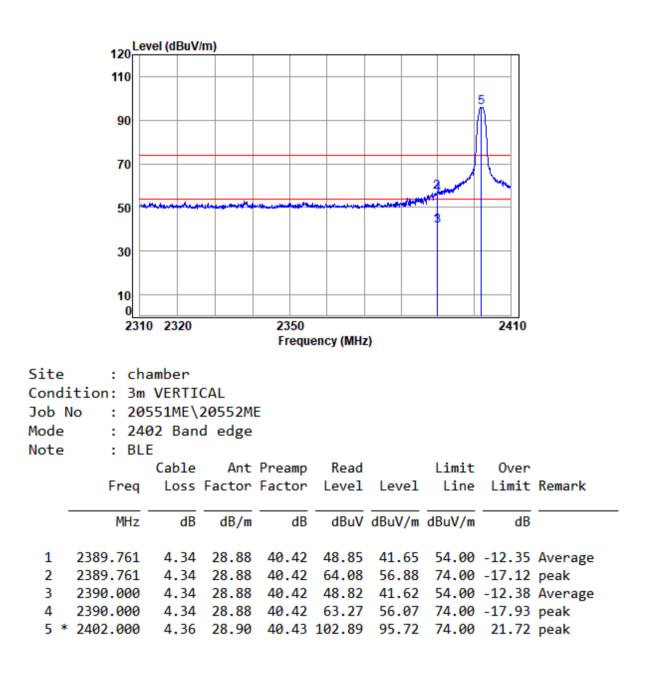
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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low





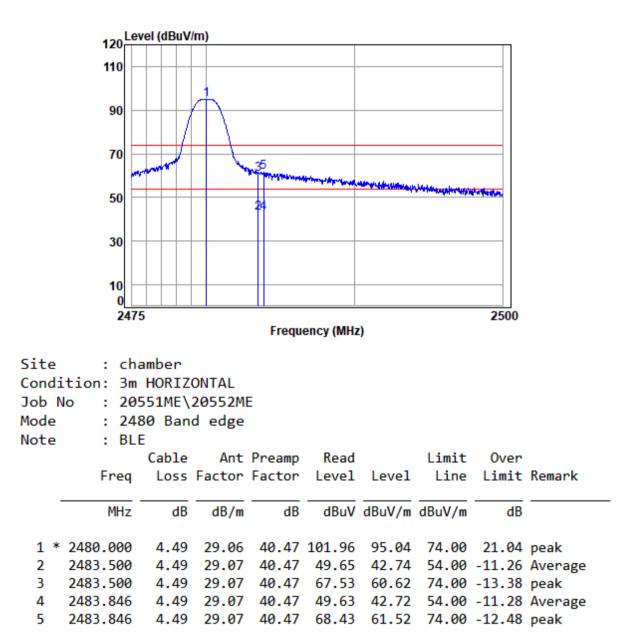
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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High





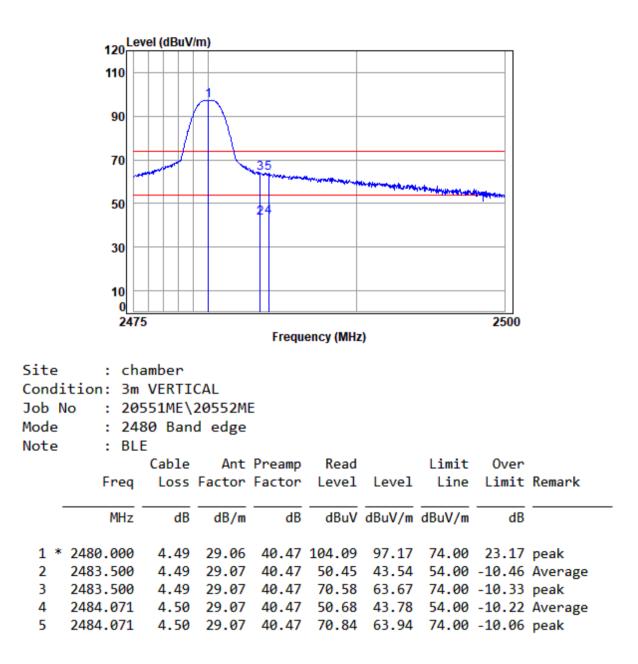
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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High





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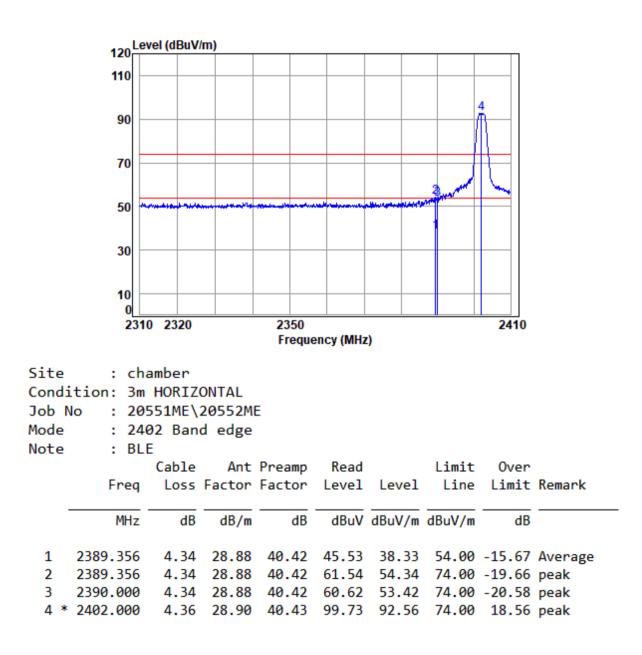
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low





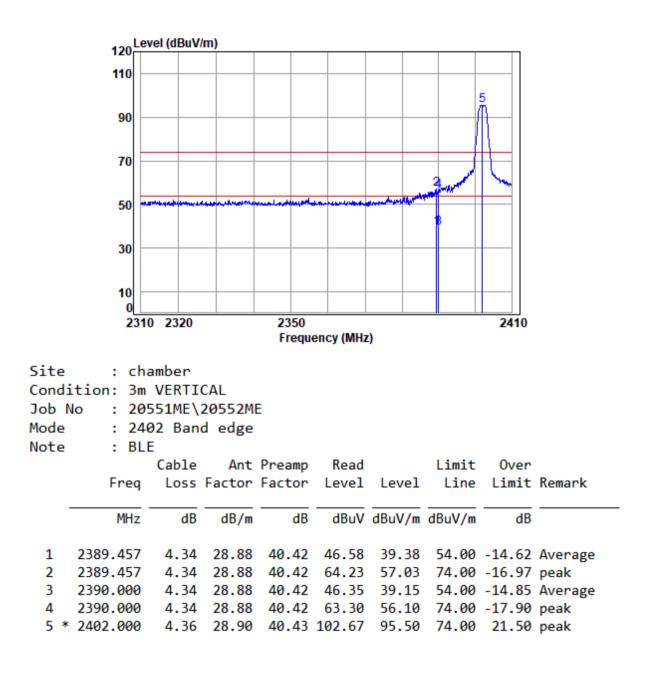
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low





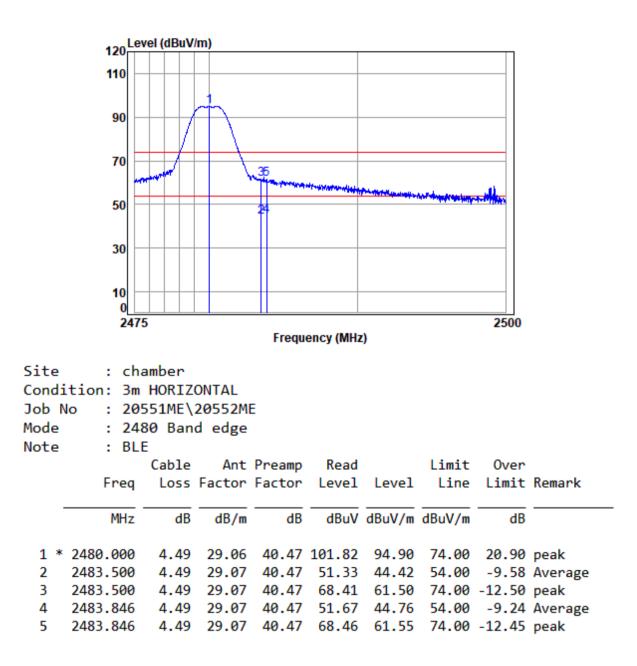
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High





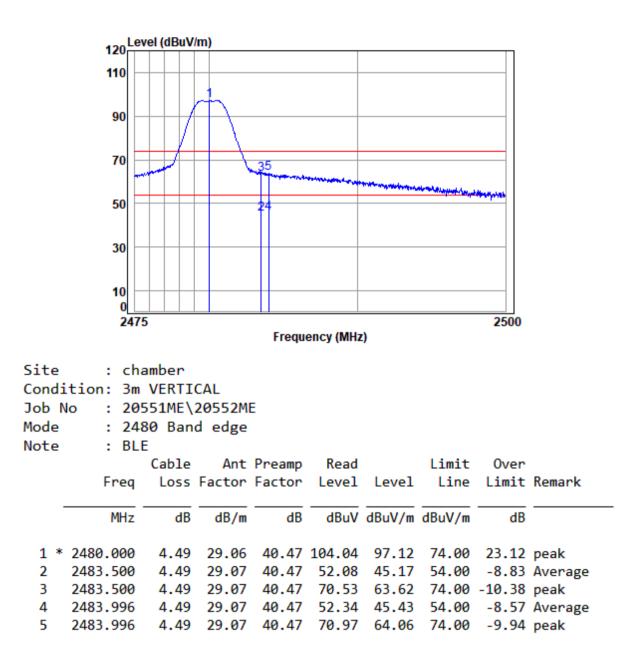
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High





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#### 7.7 Radiated Spurious Emissions Below 1GHz

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.4,6.5
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
960-1000	500	3

#### 7.7.1 E.U.T. Operation

**Operating Environment:** Temperature: 24.4 °C

Humidity: 67.3 % RH

Atmospheric Pressure: 1010 mbar

#### 7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



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7.7.3 Test Setup Diagram

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

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# 0.6m Locp Antenna 3m or 10m Below 30MHz

#### 7.7.4 Measurement Procedure and Data

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

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

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

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

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

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

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

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

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

Remark:

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

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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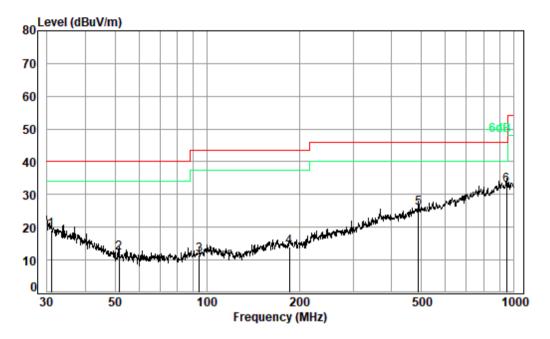
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Test Mode: 00; Polarity: Horizontal Modulation:GFSK; Channel:Low



#### Condition: 3m HORIZONTAL Job No. : 20551ME Test Mode: 00

	Freq			Preamp Factor					Remark
	MHz	dB		dB				dB	
1	30.96	0.61	22.27	27.73	24.16	19.31	40.00	-20.69	QP
2	51.66	0.72	13.60	27.68	25.49	12.13	40.00	-27.87	QP
3	94.43	1.21	13.56	27.62	24.56	11.71	43.50	-31.79	QP
4	185.79	1.19	15.46	27.19	24.63	14.09	43.50	-29.41	QP
5	489.03	2.48	24.30	27.76	26.94	25.96	46.00	-20.04	QP
6 pp	948.76	3.55	29.33	26.91	26.88	32.85	46.00	-13.15	QP



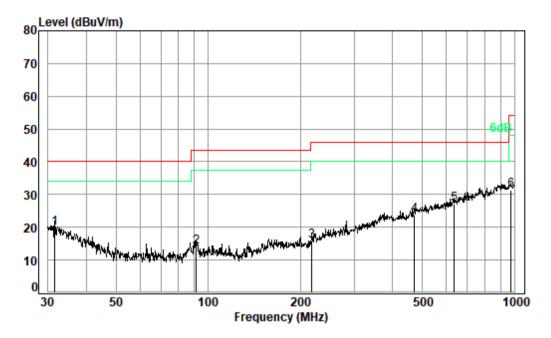
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Test Mode: 00; Polarity: Vertical Modulation:GFSK; Channel:Low



#### Condition: 3m VERTICAL Job No. : 20551ME Test Mode: 00

	Enor			Preamp					Romank
	Freq	LOSS	Factor	Factor	Level	Level	LTHE	LIMIC	Kelliark
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	31.62	0.62	21.78	27.73	25.14	19.81	40.00	-20.19	QP
2	91.49	1.27	13.40	27.62	26.95	14.00	43.50	-29.50	QP
3	218.31	1.37	16.55	27.08	25.11	15.95	46.00	-30.05	QP
4	472.18	2.45	23.75	27.69	25.35	23.86	46.00	-22.14	QP
5 pp	636.13	2.78	26.32	28.05	26.00	27.05	46.00	-18.95	QP
6	975.75	3.58	29.50	26.78	25.10	31.40	54.00	-22.60	QP



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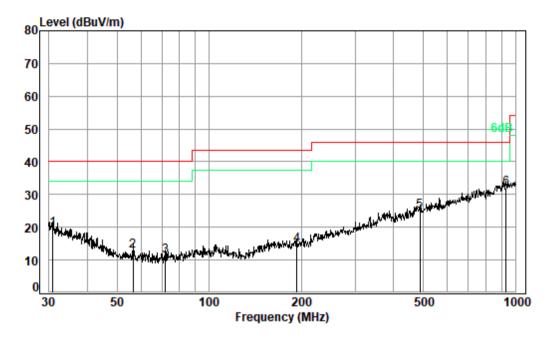
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Test Mode: 01; Polarity: Horizontal Modulation:GFSK; Channel:Low



#### Condition: 3m HORIZONTAL Job No. : 20551ME Test Mode: 01

	_			Preamp					
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.85	0.61	22.35	27.73	24.23	19.46	40.00	-20.54	QP
2	56.39	0.77	12.96	27.67	26.83	12.89	40.00	-27.11	QP
3	72.08	0.89	12.50	27.64	25.47	11.22	40.00	-28.78	QP
4	193.09	1.19	15.59	27.17	24.88	14.49	43.50	-29.01	QP
5	487.32	2.48	24.30	27.75	25.88	24.91	46.00	-21.09	QP
6 pp	932.27	3.53	29.20	27.00	26.33	32.06	46.00	-13.94	QP



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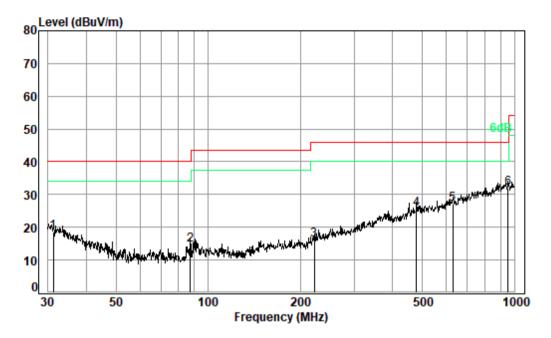
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Test Mode: 01; Polarity: Vertical Modulation:GFSK; Channel:Low



#### Condition: 3m VERTICAL Job No. : 20551ME Test Mode: 01

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	31.18	0.61	22.10	27.73	23.69	18.67	40.00	-21.33	QP
2	87.42	1.28	12.78	27.62	28.11	14.55	40.00	-25.45	QP
3	222.17	1.41	16.91	27.07	24.82	16.07	46.00	-29.93	QP
4	478.85	2.46	24.22	27.72	26.61	25.57	46.00	-20.43	QP
5	629.48	2.76	26.51	28.06	25.93	27.14	46.00	-18.86	QP
6 pp	952.09	3.55	29.38	26.90	25.93	31.96	46.00	-14.04	QP



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#### 7.8 Radiated Spurious Emissions Above 1GHz

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.6

Limit:

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

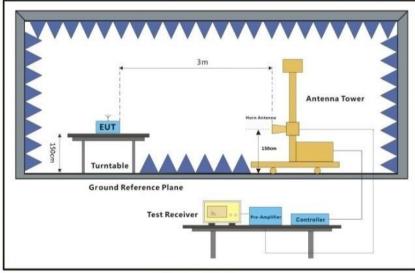
#### 7.8.1 E.U.T. Operation

Operating Enviro	nment:					
Temperature:	23.5 °C	Humidity:	56.3 % RH	Atmospheric Pressure:	1010	mbar

#### 7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.8.3 Test Setup Diagram



#### Above 1GHz





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#### 7.8.4 Measurement Procedure and Data

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

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

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

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

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

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

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

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

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

Remark:

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

2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

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



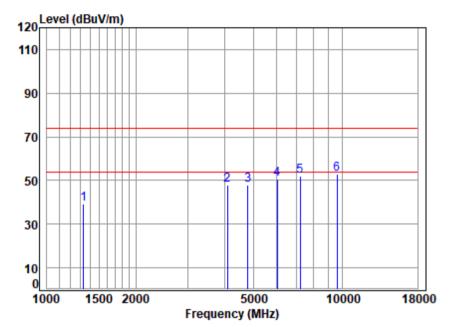
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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site	: cha	amber							
Condition	: 3m	HORIZ	ONTAL						
Job No	: 205	551ME\	20552M	E					
Mode	: 246	92 TX	SE						
Note	: BLE	Ξ							
		Cable	Ant	Preamp	Read		Limit	0ver	
I	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	

1	1331.288	3.00	25.38	39.85	50.82	39.35	74.00 -34.65 peak
2	4086.182	6.37	32.67	41.49	50.53	48.08	74.00 -25.92 peak
3	4804.000	7.10	33.62	42.14	49.20	47.78	74.00 -26.22 peak
4	6018.999	8.26	34.60	42.39	50.08	50.55	74.00 -23.45 peak
5	7206.000	8.74	35.67	41.50	49.03	51.94	74.00 -22.06 peak
6	9608.000	10.81	37.34	37.76	42.57	52.96	74.00 -21.04 peak



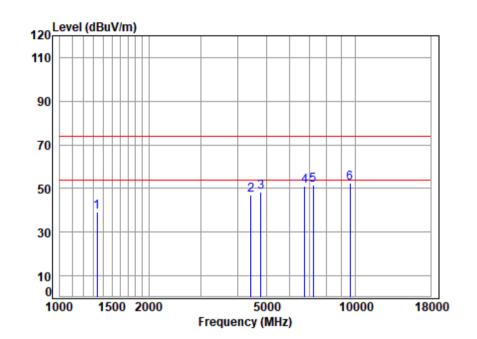
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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site	:	chamber
Condition	:	3m VERTICAL
Job No	:	20551ME\20552ME
Mode	:	2402 TX SE
Note	:	BLE
		Cable Ant Preamp

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz			dB	-dpV	dBull/m	dBull/m	dB	
	MITZ	dB	ub/m	ub	ubuv	ubuv/m	ubuv/m	ub	
1	1335.141	3.00	25.38	39.85	50.86	39.39	74.00	-34.61	peak
2	4443.453	6.71	32.96	41.82	49.35	47.20	74.00	-26.80	peak
3	4804.000	7.10	33.62	42.14	49.76	48.34	74.00	-25.66	peak
4	6737.207	8.41	35.04	41.87	49.65	51.23	74.00	-22.77	peak
5	7206.000	8.74	35.67	41.50	48.68	51.59	74.00	-22.41	peak
6	9608.000	10.81	37.34	37.76	42.02	52.41	74.00	-21.59	peak



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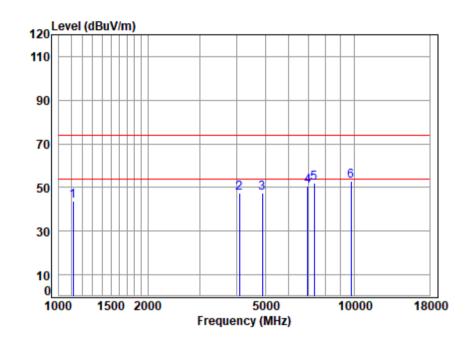
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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Job N	tion: o :	3m 20	HORIZ	20552M	E					
Note	:	BL	E							
			Cable	Ant	Preamp	Read		Limit	0ver	
	F	req	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
-		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	

1	1116.093	2.60	24.90	39.70	56.10	43.90	74.00 -30.10 peak
2	4086.182	6.37	32.67	41.49	49.72	47.27	74.00 -26.73 peak
3	4880.000	7.18	33.77	42.20	48.73	47.48	74.00 -26.52 peak
4	6954.852	8.52	35.42	41.73	48.55	50.76	74.00 -23.24 peak
5	7320.000	8.84	35.76	41.40	48.75	51.95	74.00 -22.05 peak
6	9760.000	10.76	37.41	37.50	42.10	52.77	74.00 -21.23 peak



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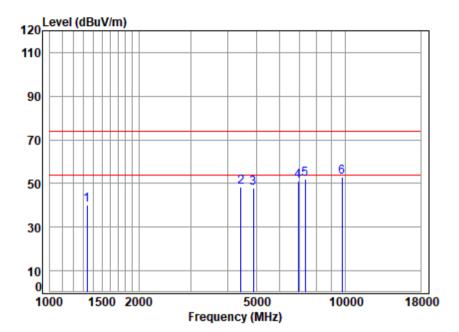
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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site	:	char	nber				
Conditio	n:	3m \	/ERTI	CAL			
Job No	:	2055	51ME\	20552M	E		
Mode	:	2446	Э ТХ	SE			
Note	:	BLE					
		(	Cable	Ant	Preamp	Read	
	Fr	eq	Loss	Factor	Factor	Level	L

	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335.141	3.00	25.38	39.85	51.61	40.14	74.00	-33.86	peak
2	4443.453	6.71	32.96	41.82	50.63	48.48	74.00	-25.52	peak
3	4880.000	7.18	33.77	42.20	49.36	48.11	74.00	-25.89	peak
4	6934.778	8.51	35.39	41.74	48.84	51.00	74.00	-23.00	peak
5	7320.000	8.84	35.76	41.40	48.63	51.83	74.00	-22.17	peak
6	9760.000	10.76	37.41	37.50	42.27	52.94	74.00	-21.06	peak



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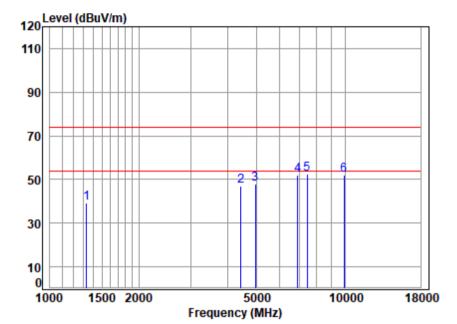
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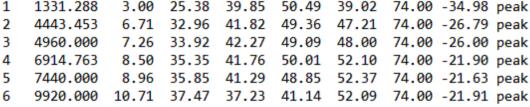
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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site	: ch	amber							
Condi	ition: 3m	HORIZ	ONTAL						
Job N	Vo : 20	551ME\	20552M	E					
Mode	: 24	80 TX	SE						
Note	: BL	E							
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1331.288	3.00	25.38	39.85	50.49	39.02	74.00	-34.98	peak
2	<b>1112 1E2</b>	6 71	22.06	/1 00	10 26	47 01	74 00	26 70	neels





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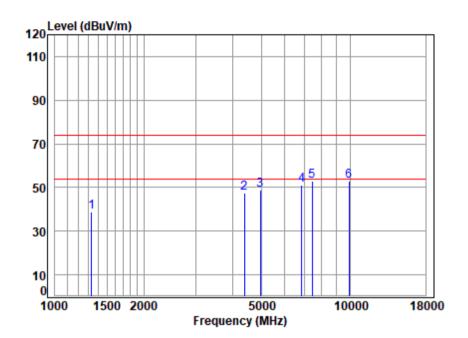
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Limit

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



Site	:	chamber
Condition	:	3m VERTICAL
Job No	:	20551ME\20552ME
Mode	:	2480 TX SE
Note	:	BLE
		Cable Ant Preamp Read
	г	and Long Contan Contan Louis

	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1331.288	3.00	25.38	39.85	50.30	38.83	74.00	-35.17	peak
2	4379.699	6.65	32.91	41.77	49.87	47.66	74.00	-26.34	peak
3	4960.000	7.26	33.92	42.27	50.01	48.92	74.00	-25.08	peak
4	6855.063	8.47	35.25	41.80	49.31	51.23	74.00	-22.77	peak
5	7440.000	8.96	35.85	41.29	49.50	53.02	74.00	-20.98	peak
6	9920.000	10.71	37.47	37.23	41.76	52.71	74.00	-21.29	peak



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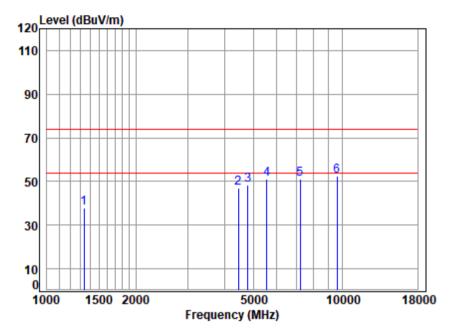
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site	:	cha	amber							
Condi	ition:	Зm	HORIZ	ONTAL						
Job N	lo :	20	551ME\	20552M	E					
Mode	:	24(	02 TX 3	SE						
Note	:	BLI	E							
			Cable	Ant	Preamp	Read		Limit	0ver	
	F	req	Loss	Factor	Factor	Level	Level	Line	Limit	F
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335 '	141	3 00	25 38	39 85	49 45	37 98	74 00	-36 02	r

1	1335.141	3.00	25.38	39.85	49.45	37.98	74.00 -36.02 peak
2	4456.315	6.72	32.97	41.84	49.14	46.99	74.00 -27.01 peak
3	4804.000	7.10	33.62	42.14	49.89	48.47	74.00 -25.53 peak
4	5567.137	8.19	34.26	42.36	50.94	51.03	74.00 -22.97 peak
5	7206.000	8.74	35.67	41.50	48.32	51.23	74.00 -22.77 peak
6	9608.000	10.81	37.34	37.76	41.87	52.26	74.00 -21.74 peak



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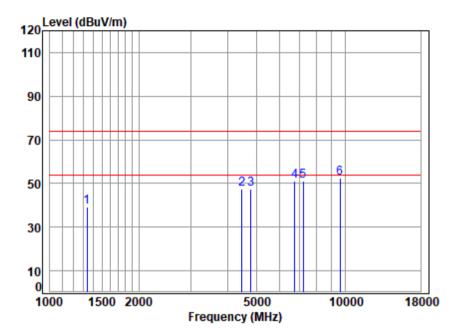
Remark



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



Site	:	cha	amber				
Condition	n:	Зm	VERTI	CAL			
Job No	:	20	551ME\	20552M	E		
Mode	:	24(	02 TX	SE			
Note	:	BLI	E				
			Cable	Ant	Preamp	Read	
	Fr	req	Loss	Factor	Factor	Level	Level

	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335.141	3.00	25.38	39.85	50.55	39.08	74.00	-34.92	peak
2	4469.214	6.73	32.98	41.85	49.43	47.29	74.00	-26.71	peak
3	4804.000	7.10	33.62	42.14	49.10	47.68	74.00	-26.32	peak
4	6756.708	8.42	35.07	41.86	49.54	51.17	74.00	-22.83	peak
5	7206.000	8.74	35.67	41.50	48.33	51.24	74.00	-22.76	peak
6	9608.000	10.81	37.34	37.76	42.23	52.62	74.00	-21.38	peak



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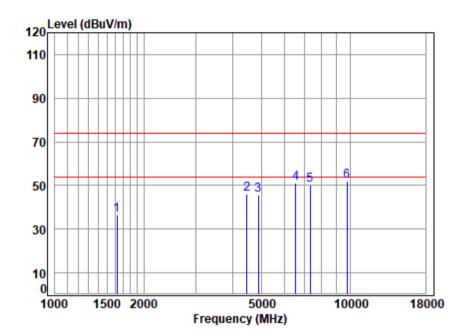
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Condi Job N		3m HC 20551	ORIZ LME\	20552M	E					
Mode	:	2440	TX :	SE						
Note	:	BLE								
		Ca	able	Ant	Preamp	Read		Limit	0ver	
	Fr	eq l	.055	Factor	Factor	Level	Level	Line	Limit	Remark
-	Μ	IHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1620 /	31 7	36	26 32	10 02	46 97	36 63	7/ 00	- 37 37	neak

1	1620.431	3.36	26.32	40.02	46.97	36.63	74.00 -37.37 peak
2	4469.214	6.73	32.98	41.85	48.39	46.25	74.00 -27.75 peak
3	4880.000	7.18	33.77	42.20	46.65	45.40	74.00 -28.60 peak
4	6545.263	8.30	34.68	42.01	50.11	51.08	74.00 -22.92 peak
5	7320.000	8.84	35.76	41.40	46.85	50.05	74.00 -23.95 peak
6	9760.000	10.76	37.41	37.50	41.33	52.00	74.00 -22.00 peak



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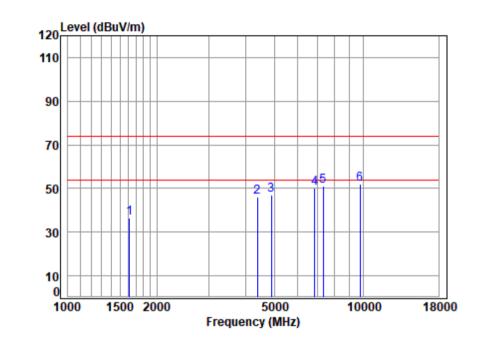
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site :	chamber
Condition:	3m VERTICAL
Job No :	20551ME\20552ME
Mode :	2440 TX SE
Note :	BLE
	C 1 3 A 1 D

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	-								
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
						,			
1	1615.754	3.36	26.29	40.02	47.06	36.69	74.00	-37.31	peak
2	4379.699	6.65	32.91	41.77	48.34	46.13	74.00	-27.87	peak
3	4880.000	7.18	33.77	42.20	48.10	46.85	74.00	-27.15	peak
4	6855.063	8.47	35.25	41.80	48.21	50.13	74.00	-23.87	peak
5	7320.000	8.84	35.76	41.40	47.68	50.88	74.00	-23.12	peak
6	9760.000	10.76	37.41	37.50	41.44	52.11	74.00	-21.89	peak
									•



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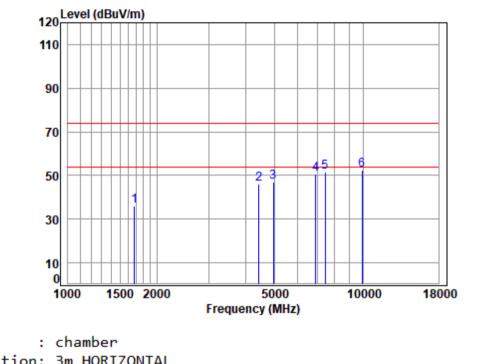
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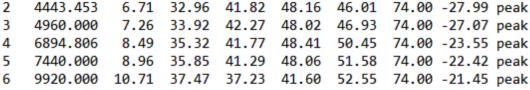
Report No.: SZCR210402055102

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



	ition: No : :	chamber 3m HORIZ 20551ME 2480 TX BLE	20552M	E					
	-		Ant	Preamp	Read		Limit	0ver	
	Fr	eq Loss					Line	Limit	Remark
	м	Hz dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1682.4	77 3.42	26.62	40.05	46.26	36.25	74.00	-37.75	peak
2	4443.4	53 6.71	32.96	41.82	48.16	46.01	74.00	-27.99	peak
3	4960.0	00 7.26	33.92	42.27	48.02	46.93	74.00	-27.07	peak
-									-





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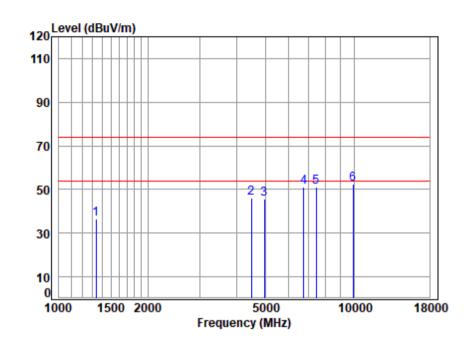
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site :	chamber
Condition:	3m VERTICAL
Job No :	20551ME\20552ME
Mode :	2480 TX SE
Note :	BLE
	Cable Ant Preamp

	_			Preamp					
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1335.141	3.00	25.38	39.85	47.91	36.44	74.00	-37.56	peak
2	4495.125	6.76	33.00	41.87	48.14	46.03	74.00	-27.97	peak
3	4960.000	7.26	33.92	42.27	46.88	45.79	74.00	-28.21	peak
4	6756.708	8.42	35.07	41.86	49.57	51.20	74.00	-22.80	peak
5	7440.000	8.96	35.85	41.29	47.58	51.10	74.00	-22.90	peak
6	9920.000	10.71	37.47	37.23	41.74	52.69	74.00	-21.31	peak



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## 8 Emission Test Results

### 8.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement:	47 CFR Part 15, Subpart C 15.207
Test Method:	ANSI C63.10 (2013) Section 6.2

Limit:

	Conducted limit(dBµV)					
Frequency of emission(MHz)	Quasi-peak 66 to 56* 56 60	Average				
0.15-0.5	66 to 56*	56 to 46*				
0.5-5	56	46				
5-30	60	50				
*Decreases with the logarithm of t	*Decreases with the logarithm of the frequency.					
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz						

#### 8.1.1 E.U.T. Operation

Operating Environment: Temperature: 23.6 °C

Humidity: 58.9 % RH Atm

Atmospheric Pressure: 1010 mbar

#### 8.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Pre-scan	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



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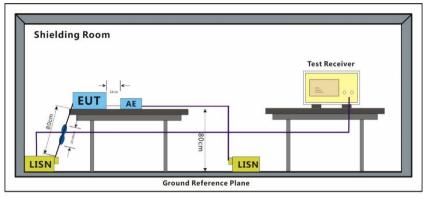
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8.1.3 Test Setup Diagram



#### 8.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50 $\mu$ H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



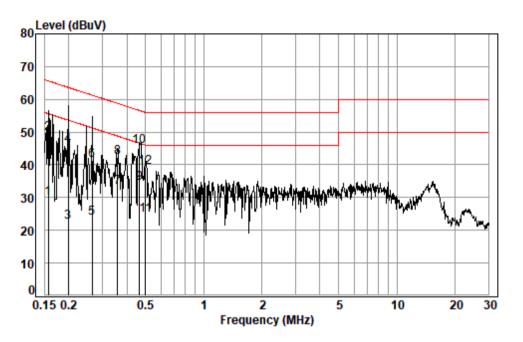
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Test Mode: 00; Line: Live line; Modulation:GFSK; Channel:Low

Site :	Shielding	Room
Condition:	Line	
Job No. :	20551ME	
Test mode:	00	

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1573	0.03	9.70	20.11	29.84	55.60	-25.76	Average
2	0.1573	0.03	9.70	39.93	49.66	65.60	-15.94	QP
3	0.1986	0.04	9.72	12.78	22.54	53.67	-31.13	Average
4	0.1986	0.04	9.72	36.18	45.94	63.67	-17.73	QP
5	0.2644	0.05	9.74	14.06	23.85	51.29	-27.44	Average
6	0.2644	0.05	9.74	31.53	41.32	61.29	-19.97	QP
7	0.3577	0.06	9.75	23.22	33.03	48.78	-15.75	Average
8	0.3577	0.06	9.75	32.60	42.41	58.78	-16.37	QP
9	0.4661	0.07	9.77	24.38	34.22	46.58	-12.36	Average
10	0.4661	0.07	9.77	35.71	45.55	56.58	-11.03	QP
11	0.4994	0.07	9.77	14.94	24.78	46.01	-21.23	Average
12	0.4994	0.07	9.77	29.30	39.14	56.01	-16.87	QP



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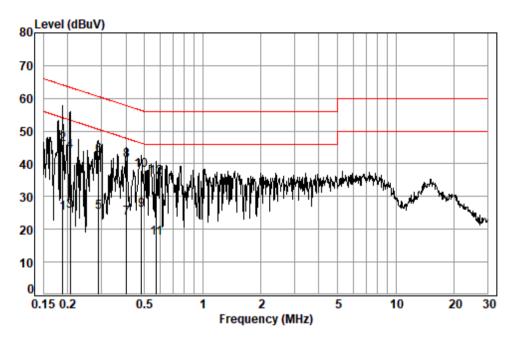
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Test Mode: 00; Line: Neutral Line; Modulation:GFSK; Channel:Low

Site :	Shielding	Room
Condition:	Neutral	
Job No. :	20551ME	
Test mode:	00	

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1884	0.03	9.72	15.16	24.91			Average
2	0.1884	0.03	9.72	36.11	45.86		-18.25	-
3	0.2061	0.04	9.72	15.66	25.42	53.36	-27.94	Average
4	0.2061	0.04	9.72	34.13	43.89	63.36	-19.47	QP
5	0.2893	0.05	9.74	15.51	25.30	50.54	-25.24	Average
6	0.2893	0.05	9.74	32.71	42.50	60.54	-18.04	QP
7	0.4040	0.06	9.75	13.65	23.46	47.77	-24.31	Average
8	0.4040	0.06	9.75	31.30	41.11	57.77	-16.66	QP
9	0.4812	0.07	9.76	16.14	25.97	46.32	-20.35	Average
10	0.4812	0.07	9.76	28.33	38.16	56.32	-18.16	QP
11	0.5762	0.08	9.77	7.46	17.31	46.00	-28.69	Average
12	0.5762	0.08	9.77	26.11	35.96	56.00	-20.04	QP



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## 9 Test Setup Photo

Please Refer to setup photos.

# **10 EUT Constructional Details (EUT Photos)**

Refer to external and internal photos for SZCR2104020551ME.



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## 11 Appendix

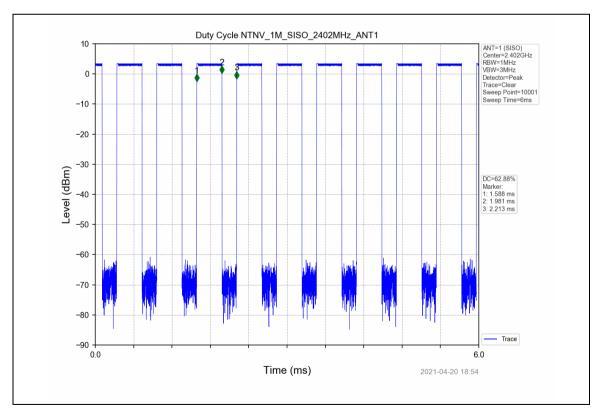
### Appendix for 15.247

### 1. Duty Cycle

### 1.1 Test Result

Test Mode	Channel Frequency (MHz)	ТХ Туре	ANT No.	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1M	2402	SISO	1	0.393	0.625	62.88	2.01
	2440	SISO	1	0.393	0.625	62.88	2.01
	2480	SISO	1	0.393	0.625	62.88	2.01
	2402	SISO	1	0.207	0.625	33.12	4.80
2M	2440	SISO	1	0.207	0.625	33.12	4.80
	2480	SISO	1	0.207	0.624	33.17	4.79

### 1.2 Test Graph





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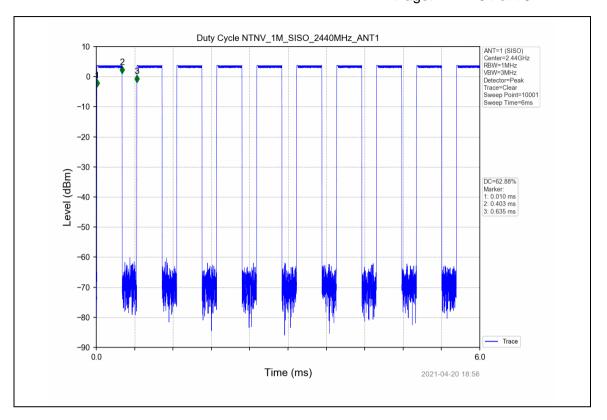
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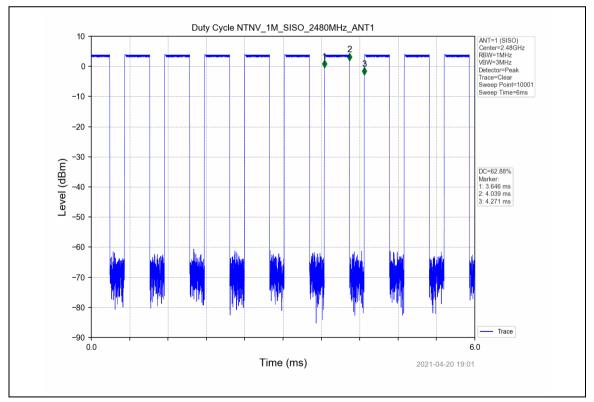
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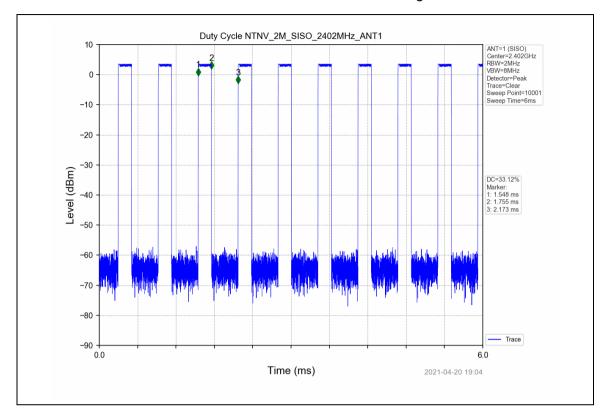
Shenzhen B

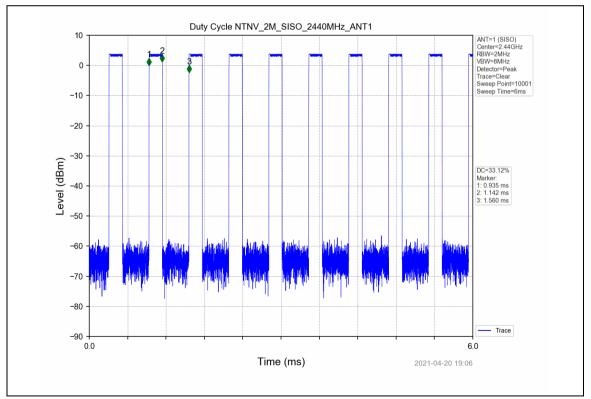
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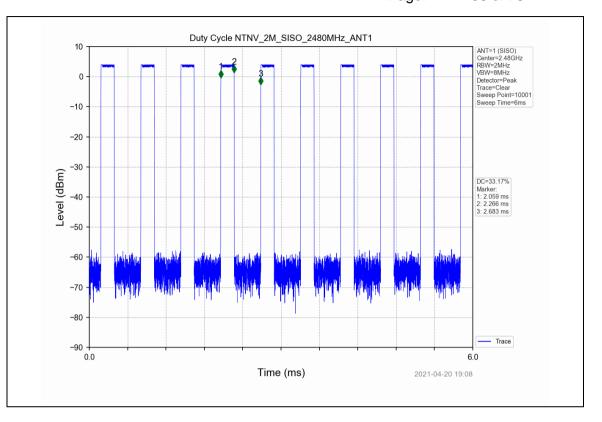
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### 2. Bandwidth

#### 2.1 Test Result

Test Mede	Frequency	TV Tuno		6dB Bandwidth	Verdiet
Test Mode	(MHz)	ТХ Туре	ANT No.	Test Result (MHz)	Verdict
	2402	SISO	1	0.697	PASS
1M	2440	SISO	1	0.697	PASS
	2480	SISO	1	0.699	PASS
	2402	SISO	1	1.134	PASS
2M	2440	SISO	1	1.143	PASS
	2480	SISO	1	1.130	PASS

Test Mode	Frequency	TV Tuno	ANT No.	99% Occupied Bandwidth Test Result (MHz)			
Test Mode	(MHz)	ТХ Туре					
	2402	SISO	1	1.049	Only for Report Use		
1M	2440	SISO	1	1.051	Only for Report Use		
	2480	SISO	1	1.054	Only for Report Use		
	2402	SISO	1	2.052	Only for Report Use		
2M	2440	SISO	1	2.053	Only for Report Use		
	2480	SISO	1	2.059	Only for Report Use		



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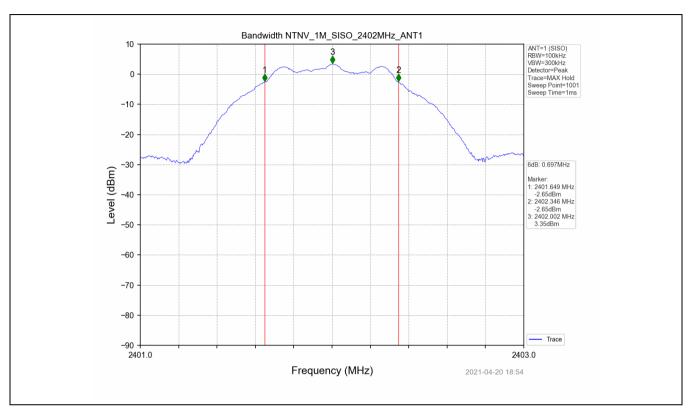
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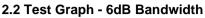
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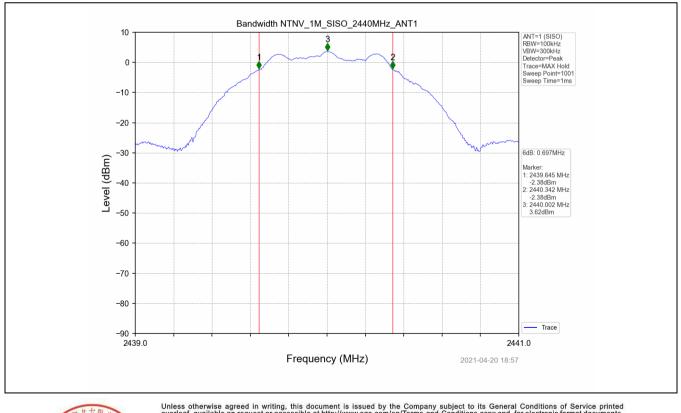


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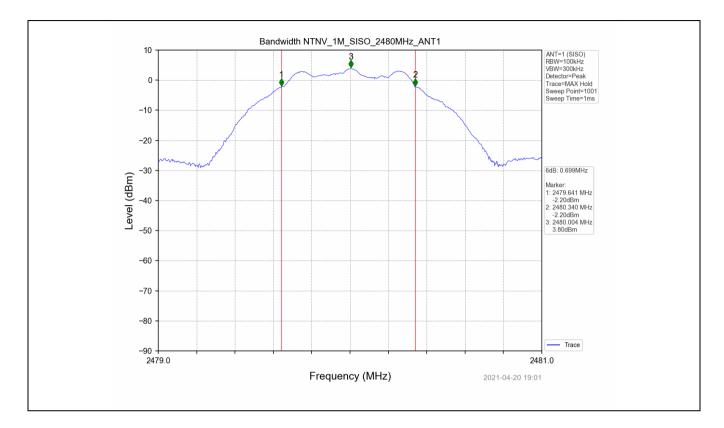
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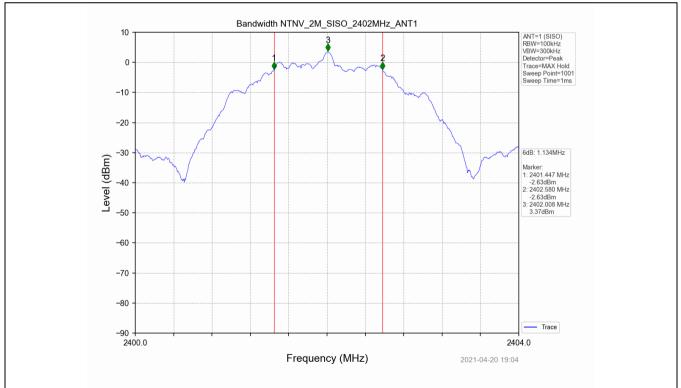
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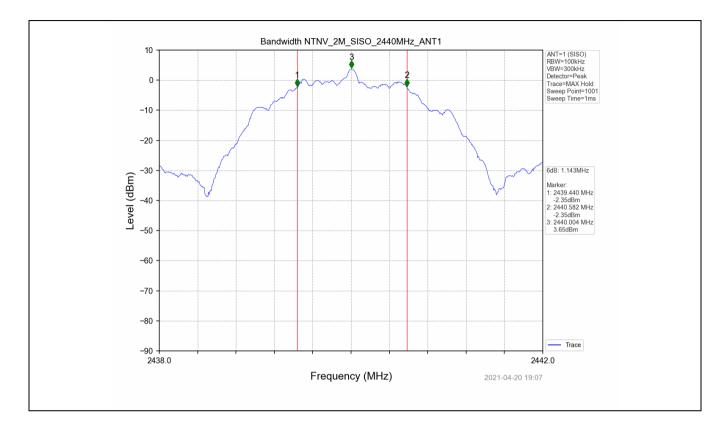
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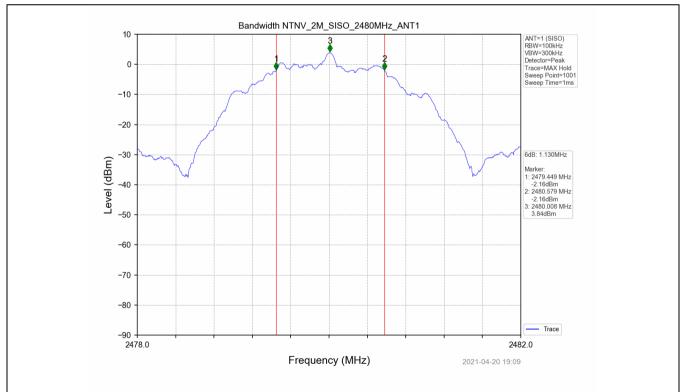
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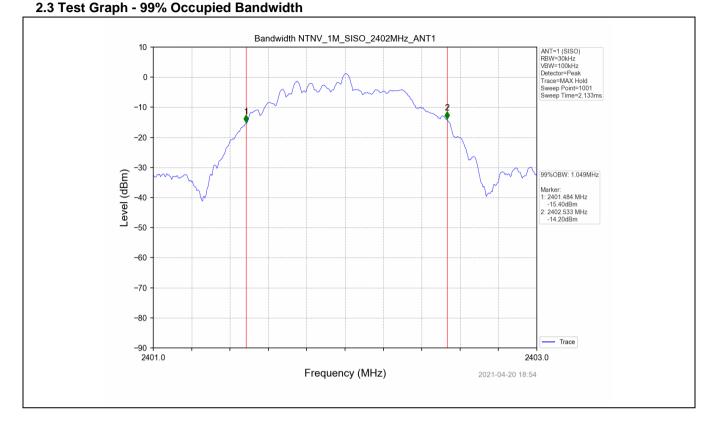
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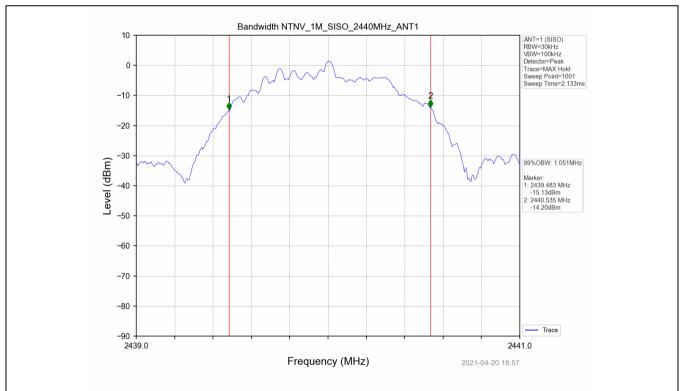


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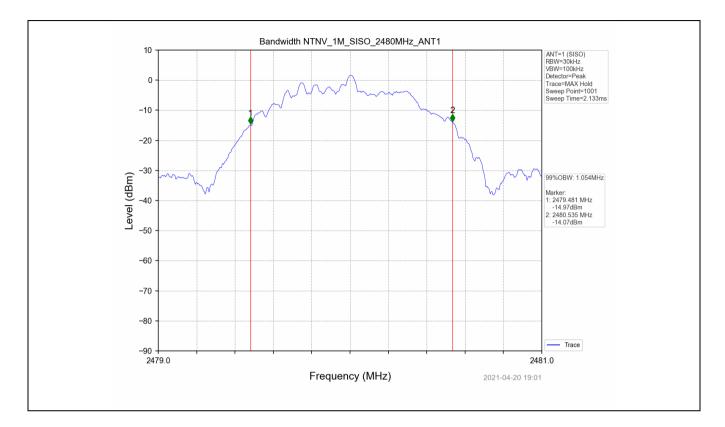
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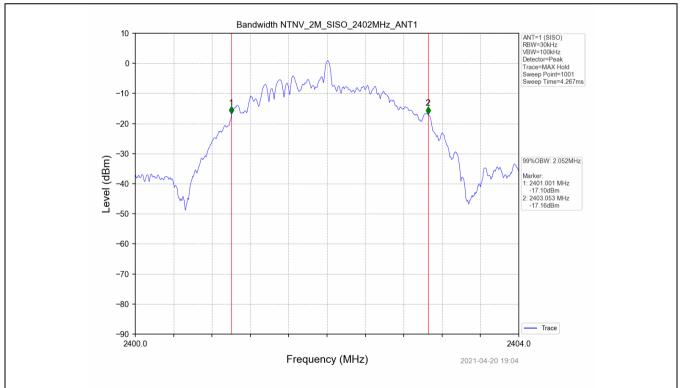
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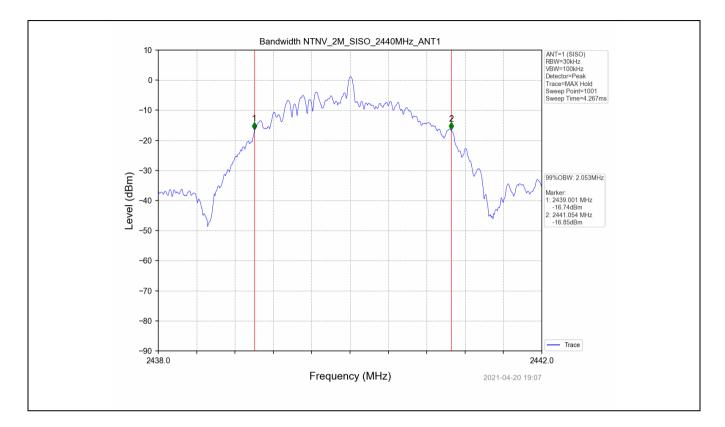
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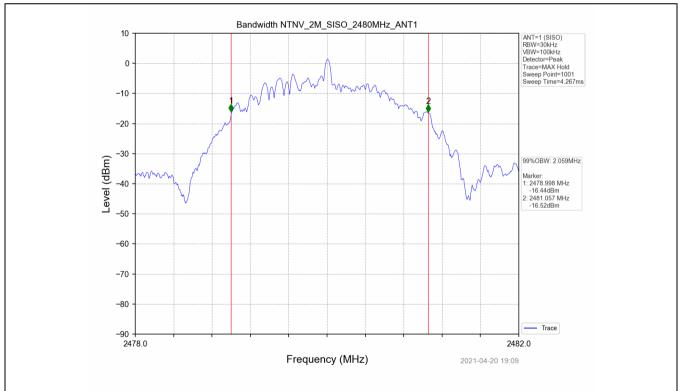
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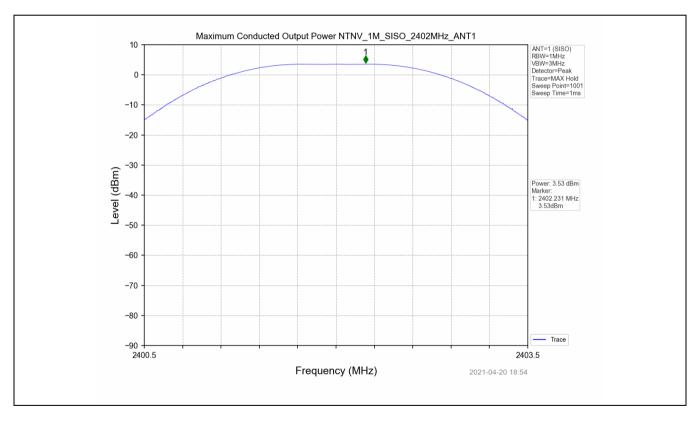
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### 3. Maximum Conducted Output Power

#### 3.1 Test Result

Test Mode	Frequency (MHz)	Тх Туре	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict	
	(101112)		Ant 1			
	2402	SISO	3.53	30	PASS	
1M	2440	SISO	3.79	30	PASS	
	2480	SISO	3.97	30	PASS	
	2402	SISO	3.54	30	PASS	
2M	2440	SISO	3.82	30	PASS	
	2480	SISO	3.99	30	PASS	

#### 3.2 Test Graph



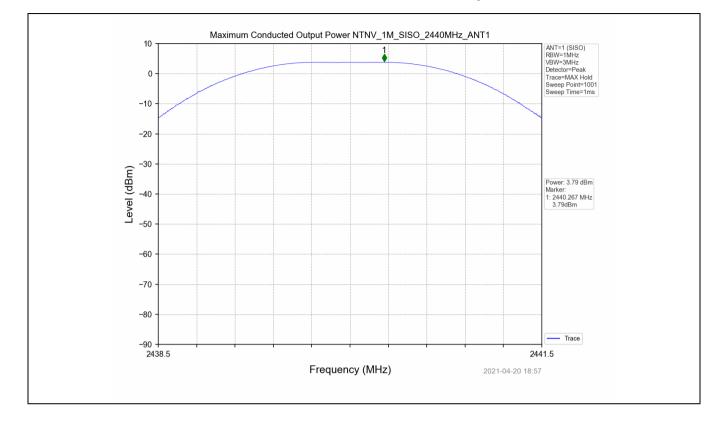


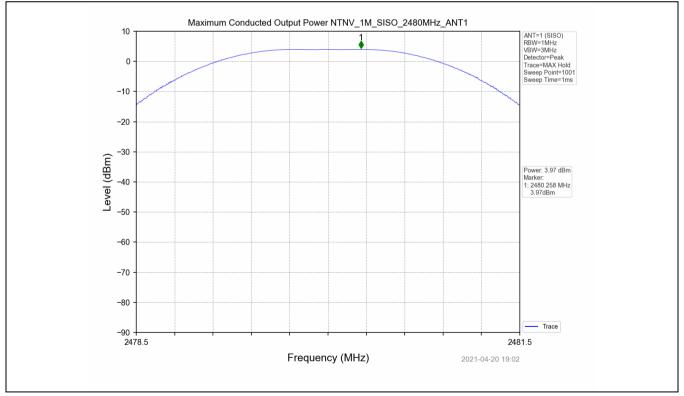


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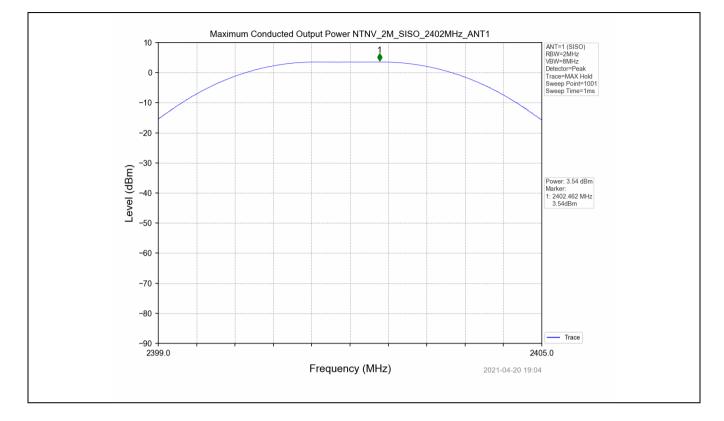
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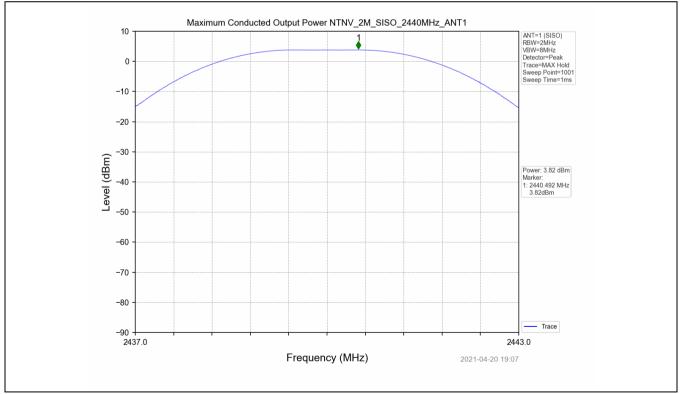


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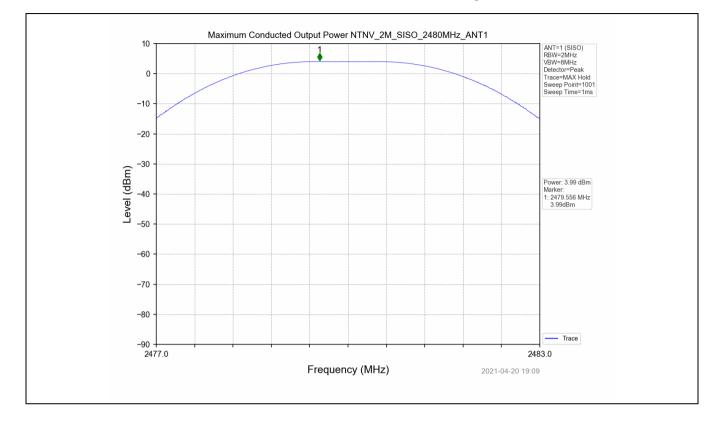
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### 4. Maximum Power Spectral Density (PSD)

#### 4.1 Test Result

Test Mode	Frequency (MHz) Tx Type		Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict	
			Ant 1			
	2402	SISO	-12.05	≤8	PASS	
1M	2440	SISO	-11.69	≤8	PASS	
	2480	SISO	-11.56	≤8	PASS	
	2402	SISO	-14.28	≤8	PASS	
2M	2440	SISO	-14.13	≤8	PASS	
	2480	SISO	-14.03	≤8	PASS	



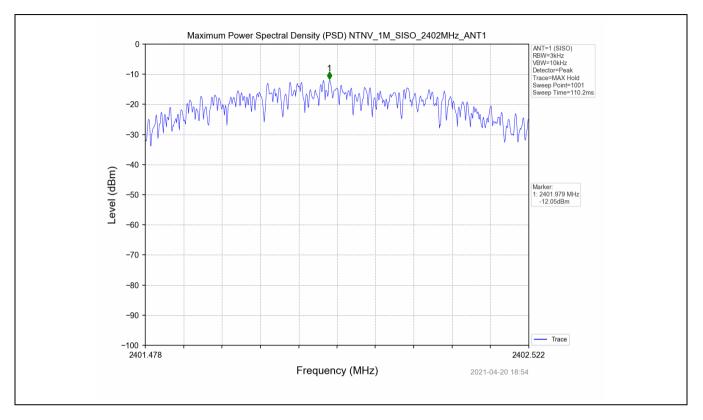
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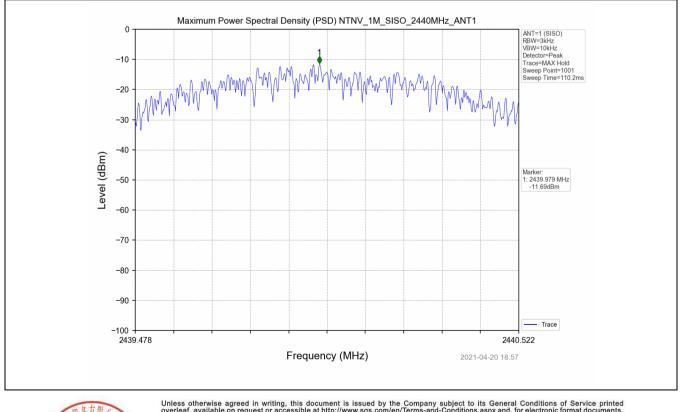


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#### 4.2 Test Graph





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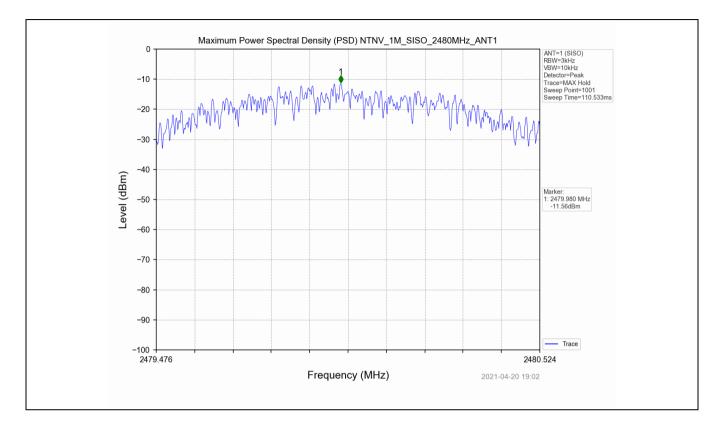
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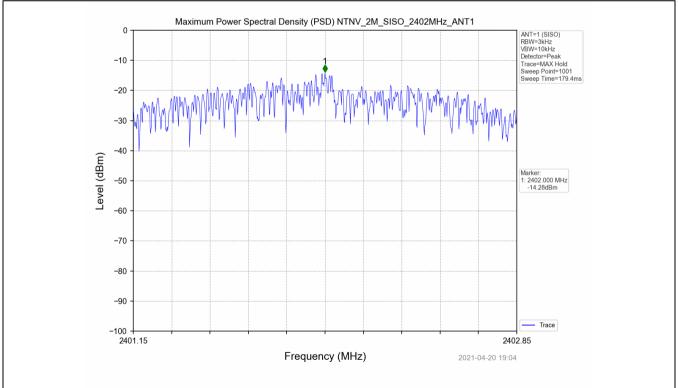
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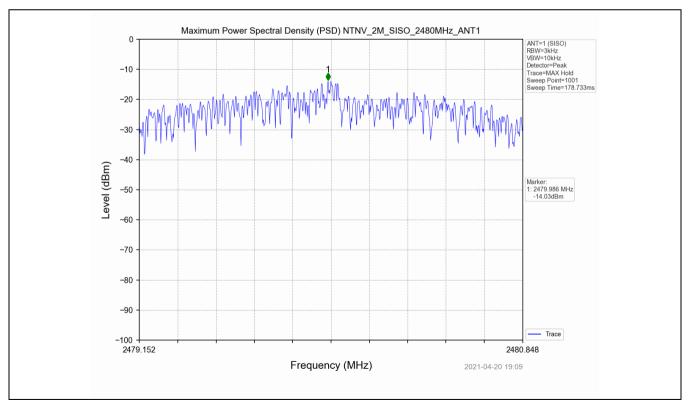
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Maximum Power Spectral Density (PSD) NTNV\_2M\_SISO\_2440MHz\_ANT1 0 ANT=1 (SISO) RBW=3kHz VBW=10kHz Detector=Peak -10 Trace=MAX Hold Sweep Point=1001 Sweep Time=180.867ms -20 MAMAMA -30 -40 Level (dBm) Marke -50 1: 2440.000 MHz -14.13dBm -60 -70 -80 -90 Trace -100 2439 142 2440.858 Frequency (MHz) 2021-04-20 19:07





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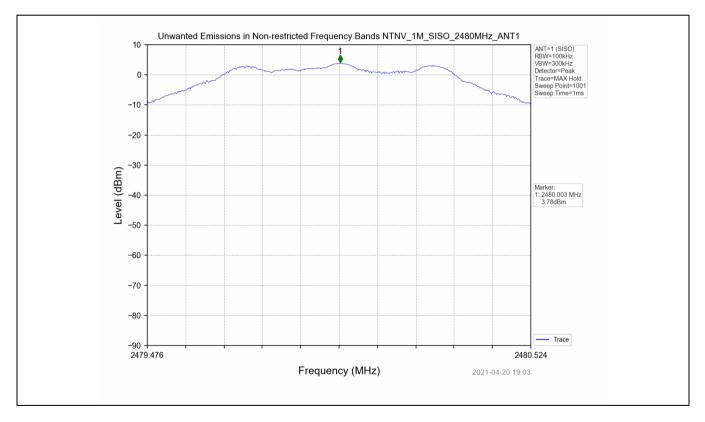
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## 5. Unwanted Emissions in Non-restricted Frequency Bands

#### 5.1 Test Result

Test Mode	Frequency (MHz)	ТХ Туре	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
	2402	SISO	1	Refer to test graph	-16.22	PASS
1M	2440	SISO	1	Refer to test graph	-16.22	PASS
	2480	SISO	1	Refer to test graph	-16.22	PASS
	2402	SISO	1	Refer to test graph	-16.20	PASS
2M	2440	SISO	1	Refer to test graph	-16.20	PASS
	2480	SISO	1	Refer to test graph	-16.20	PASS

#### 5.2 Test Graph





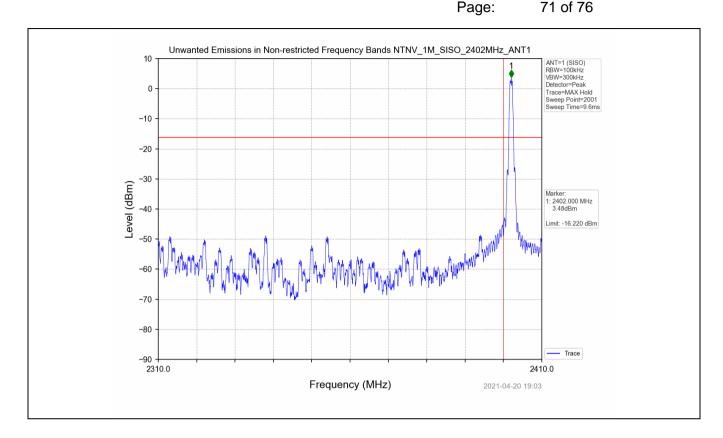


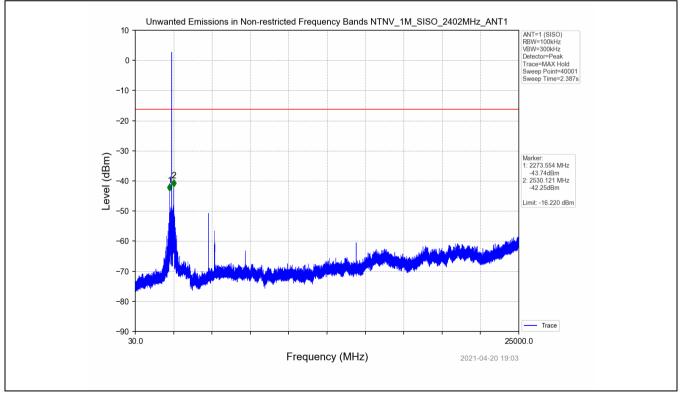
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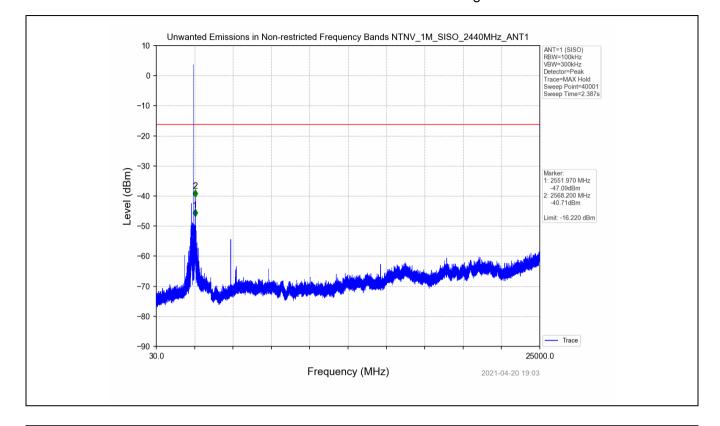


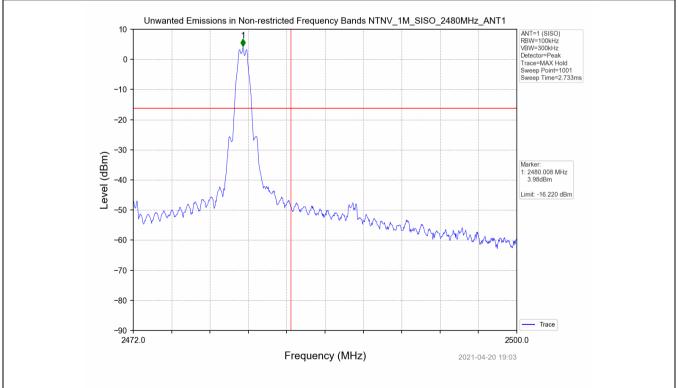




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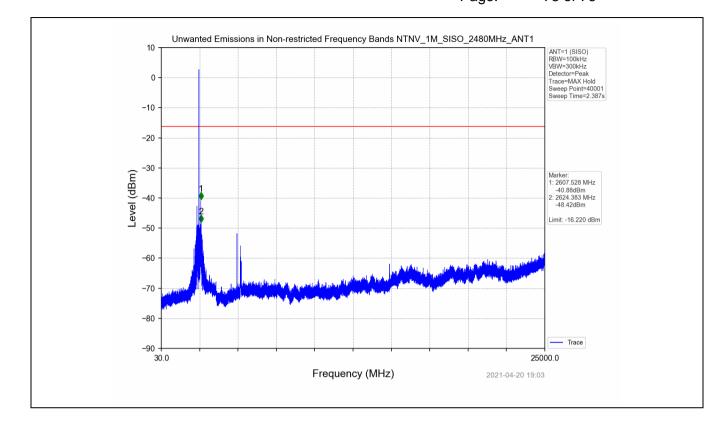
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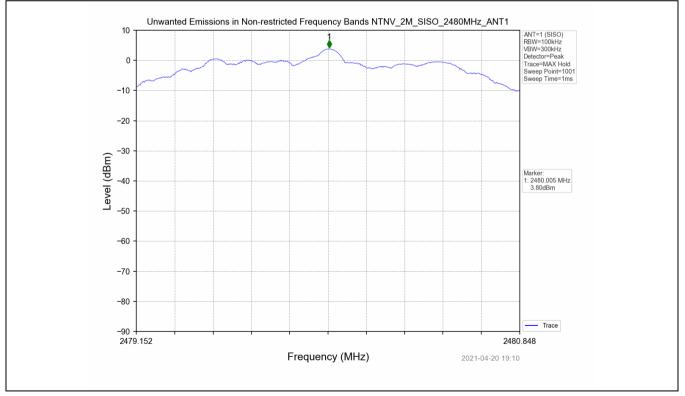
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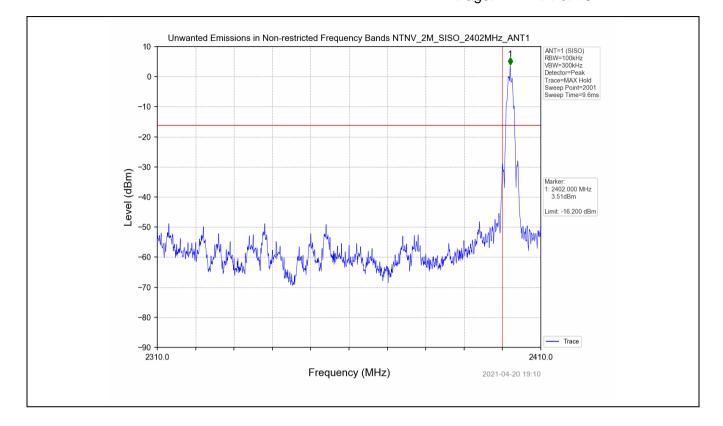
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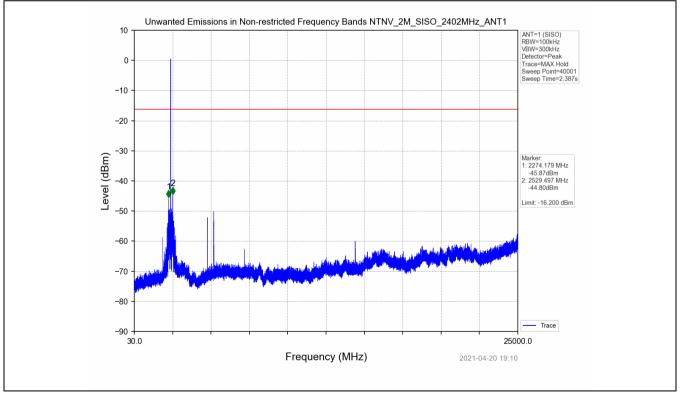
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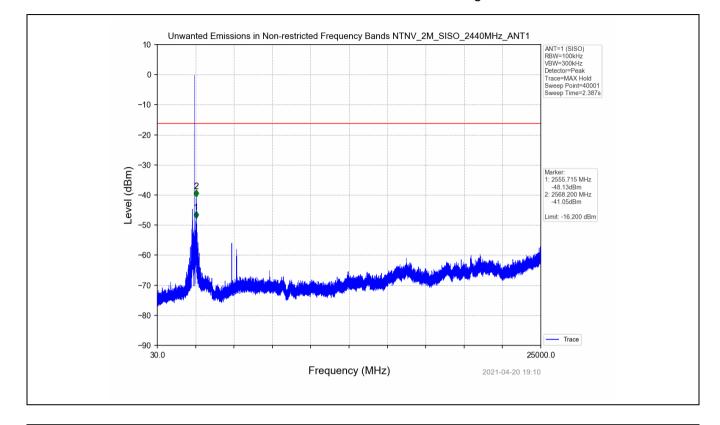
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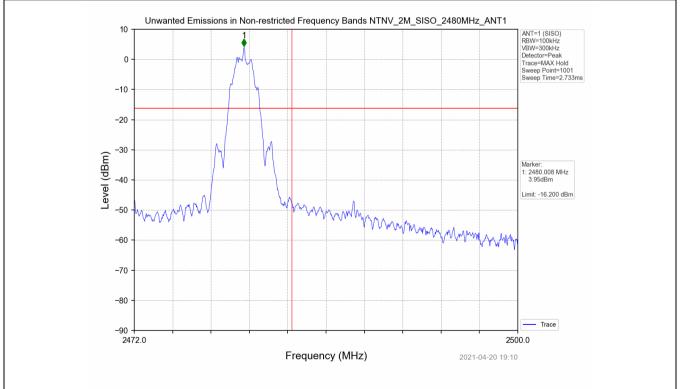
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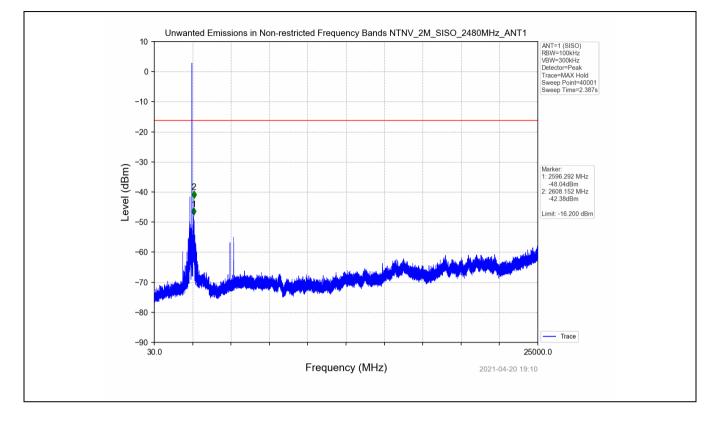
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