

SZEMC-TRF-01 Rev. A/1 Report No.: SZCR240600246202

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# TEST REPORT

Application No.: SZCR2406002462AT

Applicant: Wyze Labs, Inc.

Address of Applicant: 5808 Lake Washington Blvd NE Ste 300, Kirkland, Washington, 98033,

**United States** 

Manufacturer: Wyze Labs, Inc.

Address of Manufacturer: 5808 Lake Washington Blvd NE Ste 300, Kirkland, Washington, 98033,

**United States** 

**Equipment Under Test (EUT):** 

EUT Name: Wyze Scale Ultra

Model No.: WL\_SCLUB, WL\_SCLUW

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade Mark: WYZE

FCC ID: 2AUIUWLSCLU

Standard(s): 47 CFR Part 15, Subpart C 15.247

**Date of Receipt:** 2024-06-26

**Date of Test:** 2024-07-05 to 2024-07-29

**Date of Issue:** 2024-08-15

Test Result: Pass\*

Keny Xu EMC Laboratory Manager

Ceny. Ku



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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record					
Version	Version Chapter Date Modifier Rem					
01		2024-08-15		Original		

Authorized for issue by:		
	Charle Der	
	Charlie Dai/Project Engineer	
	Exic Fu	
	Eric Fu/Reviewer	



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# **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		
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		
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass		
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass		
Power Spectrum  Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass		
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass		
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass		

### **Declaration of EUT Family Grouping:**

Model No.: WL\_SCLUB, WL\_SCLUW

Only the model WL SCLUB was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used, internal wiring and functions were identical for all the above models, with only difference on model name and color.



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### **General Information**

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

Power supply:	Powered by 6.0V DC (1.5V x 4 "AAA" Size Rechargeable Batteries).
Cable(s):	N/A
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.1 LE
Modulation Type:	GFSK
Data Rate:	1Mbps
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	-2.49dBi
Cable Loss (for RF conducted test):	0.8dB

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

### 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

no modern oncortainty				
Test Item	Measurement Uncertainty			
Radiated Emissions which fall in the restricted bands	± 6.0dB (Below 1GHz);± 4.6dB (Above 1GHz)			
Radiated Spurious Emissions Below 1GHz	± 6.0dB for 3m; ± 5.0dB for 10m			
Radiated Spurious Emissions Above 1GHz	± 4.6dB (1-18GHz);± 4.8dB (18- 40GHz)			
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			

#### Remark:

The Ulab (lab Uncertainty) is less than Ucispr/ETSI (CISPR/ETSI Uncertainty), so the test results

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



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#### 4.4 Test Location

All tests were performed at:

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

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, 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 (Member No. 1937)

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. Shenzhen EMC laboratory 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: CN1336

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

Designation Number: CN1336. Test Firm Registration Number: 787754.

#### 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**

Radiated Emissions which fall in the restricted bands						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10	
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14	
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22	
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05	
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14	

Radiated Spurious Emissions Below 1GHz						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19	
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18	
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2023-10-19	2024-10-18	
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15	
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2024-03-14	2025-03-13	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05	



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Radiated Spurious Emis	Radiated Spurious Emissions Above 1GHz									
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date					
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10					
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14					
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22					
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18					
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A					
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05					
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09					
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14					

RF Conducted Test										
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date					
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2023-10-19	2024-10-18					
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2024-03-14	2025-03-13					
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A					
Coaxial Cable	SGS	N/A	SEM031-01	2024-07-06	2025-07-05					
Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2024-03-27	2025-03-26					

General used equipment										
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date					
Humidity/ Temperature	9 401: 0020		SEM002-32	2023-07-28	2024-07-27					
Indicator	deli	8838	3EIVI002-32	2024-07-24	2025-07-23					
Humidity/ Temperature	doli	8838	SEM002-33	2023-07-28	2024-07-27					
Indicator	deli		3EIVI002-33	2024-07-24	2025-07-23					
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2024-03-18	2025-03-17					



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# **Radio Spectrum Technical Requirement**

### 6.1 Antenna Requirement

### 6.1.1 Test Requirement:

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

#### 6.1.2 Conclusion

#### 15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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 -2.49dBi.

Antenna location: Refer to internal photos



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#### **Radio Spectrum Matter Test Results** 7

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

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

ANSI C63.10 (2013) Section 6.10.5 Test Method:

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.

### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C Humidity: 63.3 % RH Atmospheric Pressure: 1020 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.



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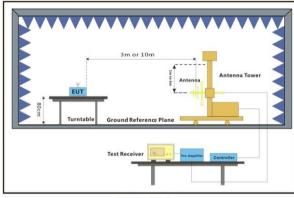
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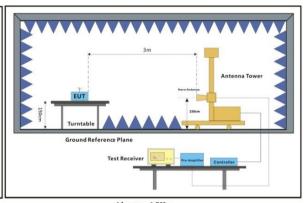


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#### 7.1.3 Test Setup Diagram





30MHz-1GHz

Above 1GHz

### 7.1.4 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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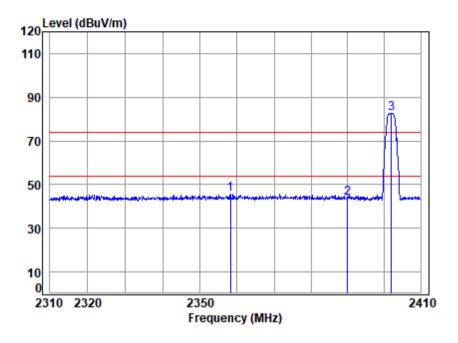


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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 02462AT/02463AT Mode : 2402 Band edge

Note : BLE 1M

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2358.171	15.79	29.10	52.12	53.00	45.77	74.00	-28.23	peak
2	2390.000	15.81	29.10	52.13	51.07	43.85	74.00	-30.15	peak
3	p 2402.000	15.82	29.09	52.13	89.83	82.61	74.00	8.61	peak



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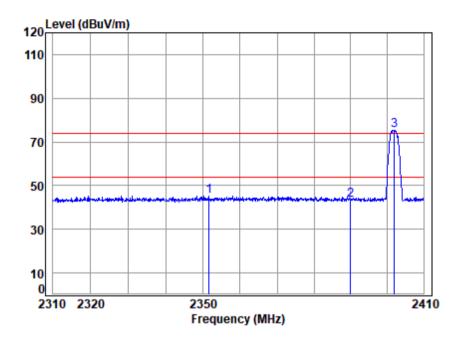


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 02462AT/02463AT Mode : 2402 Band edge

Note : BLE 1M

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2351.584	15.79	29.10	52.12	52.54	45.31	74.00	-28.69	peak
2	2390.000	15.81	29.10	52.13	50.51	43.29	74.00	-30.71	peak
3	p 2402.000	15.82	29.09	52.13	82.38	75.16	74.00	1.16	peak



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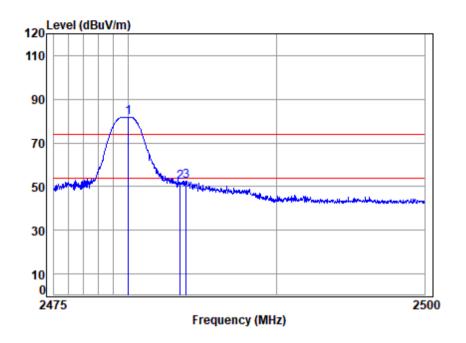


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Test Mode: 00; Polarity: Horizontal; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m HORIZONTAL : 02462AT/02463AT Mode : 2480 Band edge

Note : BLE 1M

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 p	2480.000	15.86	28.90	52.14	89.24	81.86	74.00	7.86	peak
2	2483.500	15.86	28.90	52.14	59.29	51.91	74.00	-22.09	peak
3	2483.896	15.86	28.90	52.14	59.93	52.55	74.00	-21.45	peak



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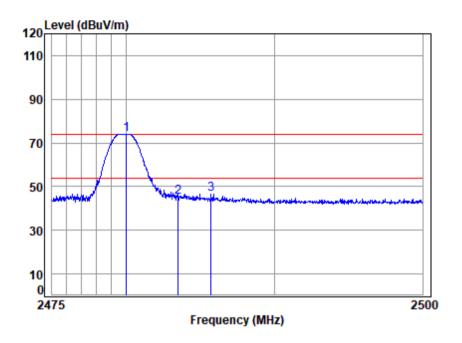


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

: 02462AT/02463AT Mode : 2480 Band edge

Note : BLE 1M

	Freq			Preamp Factor					Remark
•	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 p	2480.000	15.86	28.90	52.14	81.52	74.14	74.00	0.14	peak
2	2483.500	15.86	28.90	52.14	52.67	45.29	74.00	-28.71	peak
3	2485.719	15.86	28.90	52.14	54.04	46.66	74.00	-27.34	peak



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### 7.2 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		

### 7.2.1 E.U.T. Operation

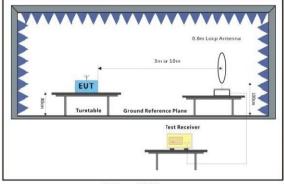
Operating Environment:

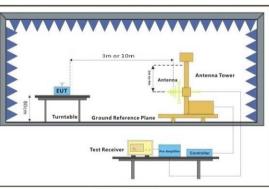
Temperature: 20.2 °C Humidity: 45.2 % RH Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

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

### 7.2.3 Test Setup Diagram





Below 30MHz 30MHz-1GHz



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#### 7.2.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete. Remark:
- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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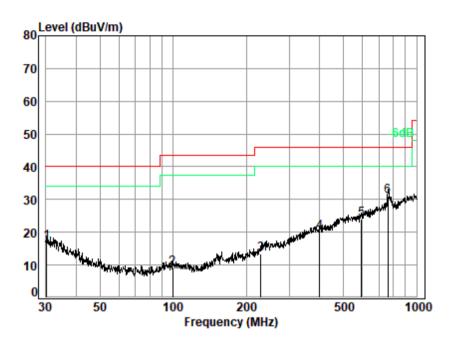


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Test Mode: 00; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No. : 02462AT

Test Mode: 00

		Ant	Cable	Preamp	Read		Limit	0ver	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
-									
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	20 21	21 10	0.64	27 70	22.00	16 OF	40.00	22 05	OD
_		21.10							•
2	99.53	12.28	1.19	27.59	23.31	9.19	43.50	-34.31	QP
3	229.29	16.34	1.86	27.05	22.35	13.50	46.00	-32.50	QP
4		20.63	2.55	27.15	23.91	19.94	46.00	-26.06	QP
5	595.13	24.46	3.19	27.95	24.30	24.00	46.00	-22.00	QP
6 a	763.38	26.50	3.71	27.57	28.45	31.09	46.00	-14.91	OP



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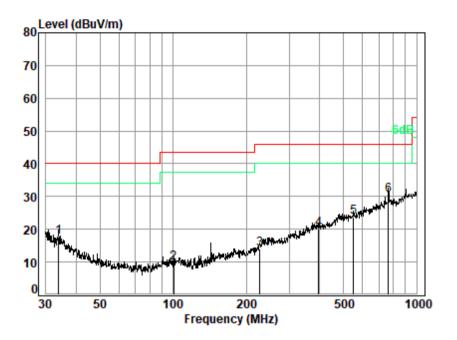


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Test Mode: 00; Polarity: Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : 02462AT

Test Mode: 00

		Ant	Cable	Preamp	Read		Limit	0ver	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
-	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	33.92	19.46	0.68	27.78	25.43	17.79	40.00	-22.21	QP
2	100.58	12.31	1.19	27.59	23.68	9.59	43.50	-33.91	QP
3	226.89	15.99	1.85	27.06	23.07	13.85	46.00	-32.15	QP
4	396.24	20.69	2.54	27.14	23.89	19.98	46.00	-26.02	QP
5	550.95	23.78	3.05	27.77	24.59	23.65	46.00	-22.35	QP
6 q	766.06	26.54	3.72	27.56	27.79	30.49	46.00	-15.51	OP



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### 7.3 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

Measurement Distance: 3m

Limit:

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

### 7.3.1 E.U.T. Operation

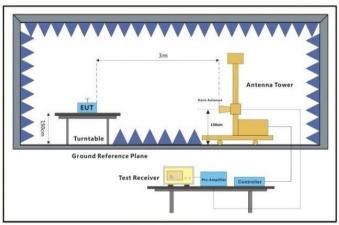
Operating Environment:

Temperature: 22.0 °C Humidity: 63.1 % RH Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

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

### 7.3.3 Test Setup Diagram



Above 1GHz



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#### 7.3.4 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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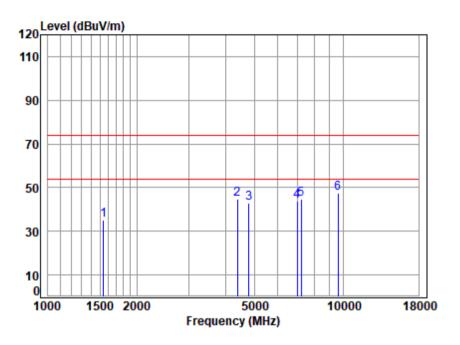


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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 02462AT/02463AT Mode : 2402 TX RSE

: BLE 1M

			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		1542.733	4.66	26.97	61.67	65.28	35.24	74.00	-38.76	peak
2		4379.699	8.02	34.64	61.52	63.47	44.61	74.00	-29.39	peak
3		4804.000	8.00	34.32	61.88	62.48	42.92	74.00	-31.08	peak
4		6995.172	9.53	35.71	62.16	60.88	43.96	74.00	-30.04	peak
5		7206.000	9.32	35.70	62.04	61.63	44.61	74.00	-29.39	peak
6	р	9608.000	11.41	37.42	62.15	60.75	47.43	74.00	-26.57	peak



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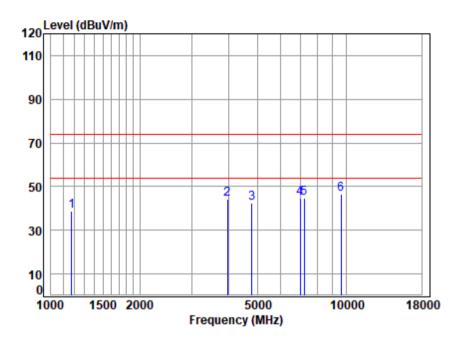


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 02462AT/02463AT

Mode : 2402 TX RSE

: BLE 1M

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1175.697	4.56	24.16	61.54	71.58	38.76	74.00	-35.24	peak
2	3969.767	8.47	33.30	61.18	63.86	44.45	74.00	-29.55	peak
3	4804.000	8.00	34.32	61.88	62.21	42.65	74.00	-31.35	peak
4	6995.172	9.53	35.71	62.16	61.42	44.50	74.00	-29.50	peak
5	7206.000	9.32	35.70	62.04	61.70	44.68	74.00	-29.32	peak
6	p 9608.000	11.41	37.42	62.15	59.80	46.48	74.00	-27.52	peak



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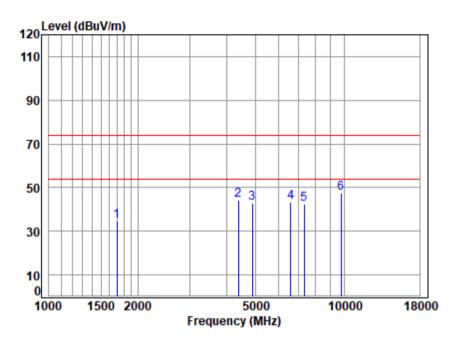


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Test Mode: 00; Polarity: Horizontal; Modulation: GFSK; Channel: middle



Site : chamber

Condition: 3m HORIZONTAL : 02462AT/02463AT Mode : 2440 TX RSE

: BLE 1M

		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	1697.129	4.99	26.21	61.71	65.10	34.59	74.00	-39.41	peak
2	4379.699	8.02	34.64	61.52	63.19	44.33	74.00	-29.67	peak
3	4880.000	8.03	34.62	61.94	62.29	43.00	74.00	-31.00	peak
4	6602.265	9.22	35.30	62.38	61.43	43.57	74.00	-30.43	peak
5	7320.000	9.21	35.70	61.98	59.50	42.43	74.00	-31.57	peak
6	p 9760.000	11.32	37.38	62.19	60.76	47.27	74.00	-26.73	peak



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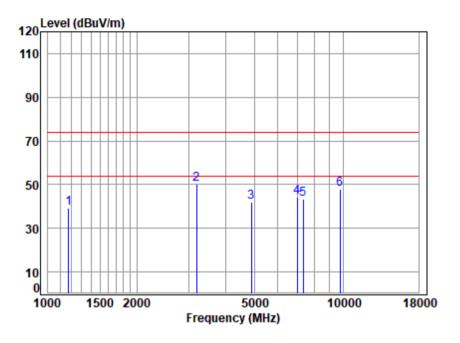


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m VERTICAL

: 02462AT/02463AT

: 2440 TX RSE Mode

: BLE 1M

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1175.697	4.56	24.16	61.54	71.88	39.06	74.00	-34.94	peak
2 p	3186.869	6.77	32.79	61.37	72.04	50.23	74.00	-23.77	peak
3	4880.000	8.03	34.62	61.94	61.33	42.04	74.00	-31.96	peak
4	6995.172	9.53	35.71	62.16	61.28	44.36	74.00	-29.64	peak
5	7320.000	9.21	35.70	61.98	60.34	43.27	74.00	-30.73	peak
6	9760.000	11.32	37.38	62.19	61.19	47.70	74.00	-26.30	peak



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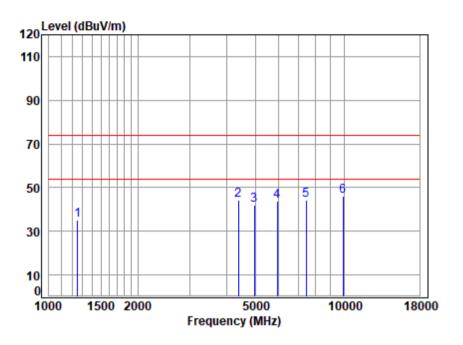


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Test Mode: 00; Polarity: Horizontal; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m HORIZONTAL : 02462AT/02463AT

: 2480 TX RSE Mode

: BLE 1M

		Freq			Preamp Factor		Level			Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1249.269	4.56	25.09	61.57	66.84	34.92	74.00	-39.08	peak
2		4392.376	8.00	34.74	61.53	63.03	44.24	74.00	-29.76	peak
3		4960.000	8.06	34.56	62.01	61.22	41.83	74.00	-32.17	peak
4		5932.638	9.49	34.67	62.71	62.22	43.67	74.00	-30.33	peak
5		7440.000	9.09	35.96	61.92	61.19	44.32	74.00	-29.68	peak
6	р	9920.000	11.23	37.30	62.24	60.00	46.29	74.00	-27.71	peak



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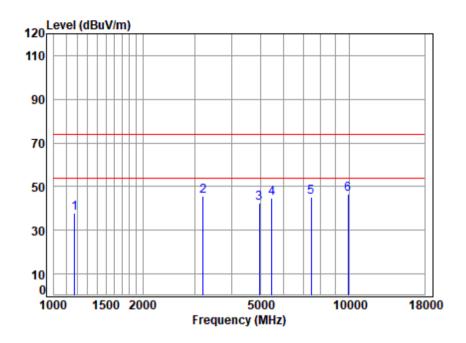


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

: 02462AT/02463AT

: 2480 TX RSE Mode

: BLE 1M

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1175.697	4.56	24.16	61.54	70.91	38.09	74.00	-35.91	peak
2	3196.094	6.78	32.87	61.36	67.16	45.45	74.00	-28.55	peak
3	4960.000	8.06	34.56	62.01	61.90	42.51	74.00	-31.49	peak
4	5471.422	9.23	34.61	62.39	63.13	44.58	74.00	-29.42	peak
5	7440.000	9.09	35.96	61.92	62.02	45.15	74.00	-28.85	peak
6	p 9920.000	11.23	37.30	62.24	60.14	46.43	74.00	-27.57	peak



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### 7.4 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

### 7.4.1 E.U.T. Operation

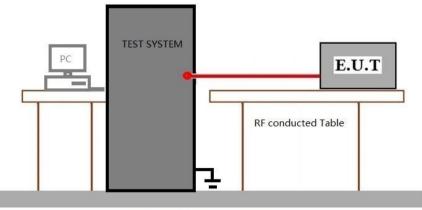
Operating Environment:

Temperature: 25.4 °C Atmospheric Pressure: 1020 mbar Humidity: 41.9 % RH

#### 7.4.2 Test Mode Description

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

### 7.4.3 Test Setup Diagram



Ground Reference Plane



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#### 7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.5 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

### 7.5.1 E.U.T. Operation

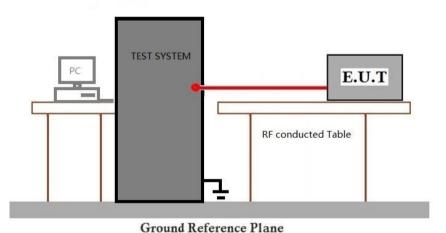
Operating Environment:

Atmospheric Pressure: 1020 mbar Temperature: 25.4 °C Humidity: 41.9 % RH

7.5.2 Test Mode Description

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

### 7.5.3 Test Setup Diagram



Please Refer to Appendix for Details

7.5.4 Measurement Procedure and Data



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### 7.6 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

### 7.6.1 E.U.T. Operation

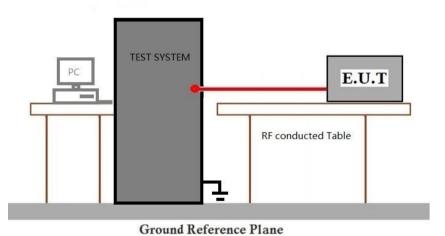
Operating Environment:

Temperature: 25.4 °C Humidity: 41.9 % RH Atmospheric Pressure: 1020 mbar

#### 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.

### 7.6.3 Test Setup Diagram



### 7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.7 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).

### 7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 25.4 °C Humidity: 41.9 % RH Atmospheric Pressure: 1020 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.



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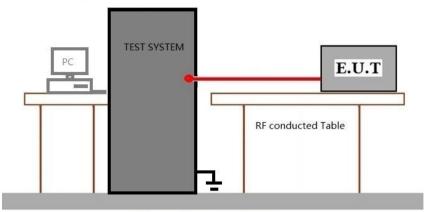


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### 7.7.3 Test Setup Diagram



Ground Reference Plane

#### 7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.8 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).

### 7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 25.4 °C Humidity: 41.9 % RH Atmospheric Pressure: 1020 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.



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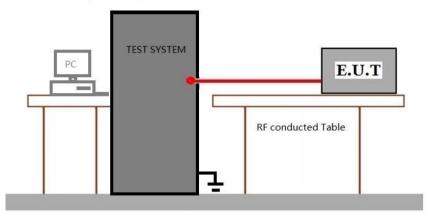


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### 7.8.3 Test Setup Diagram



Ground Reference Plane

### 7.8.4 Measurement Procedure and Data

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#### **Test Setup Photo** 8

Refer to Appendix - Test Setup Photo for SZCR2406002462AT

#### **EUT Constructional Details (EUT Photos)** 9

Refer to External and Internal Photos for SZCR2406002462AT



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# 10 Appendix

1. Duty Cycle

1.1 Test Result

#### 1.1.1 Ant1

Ant1								
Mode TX Frequency T_on Period Duty Cycle Duty Cycle Type (MHz) (ms) (ms) (%) Correction Factor (decomposed for the content of					Duty Cycle Correction Factor (dB)	Max. DC Variation (%)		
1M	SISO	2402	0.238	1.250	19.04	7.20	0.03	
		2440	0.238	1.250	19.04	7.20	0.01	
		2480	0.238	1.250	19.04	7.20	0.03	



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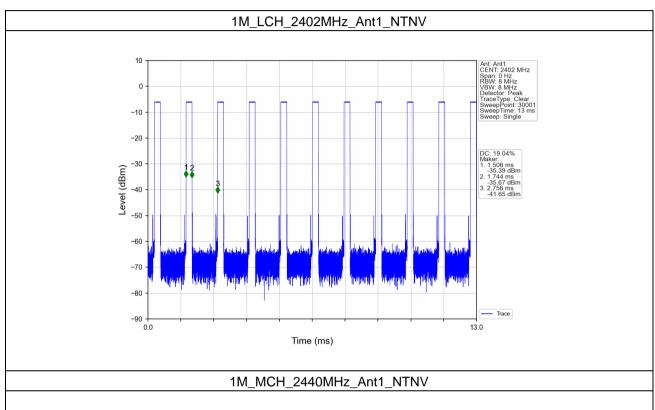
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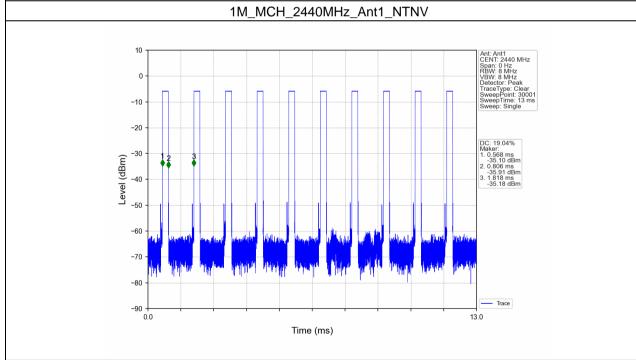
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## 1.2 Test Graph

### 1.2.1 Ant1







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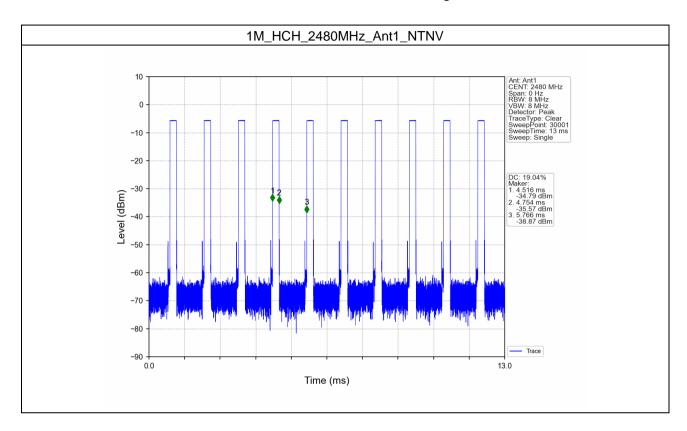
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## 2. Bandwidth

## 2.1 Test Result

## 2.1.1 OBW

Mode	TX	Frequency	A NIT	99% Occupied E	\/a =diat	
Mode	Type	(MHz)	ANT	Result	Limit	Verdict
1M	SISO	2402	1	1.002	/	Pass
		2440	1	1.002	/	Pass
		2480	1	1.006	/	Pass

## 2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandv	\/a =d:at	
				Result	Limit	Verdict
1M	SISO	2402	1	0.682	>=0.5	Pass
		2440	1	0.671	>=0.5	Pass
		2480	1	0.675	>=0.5	Pass



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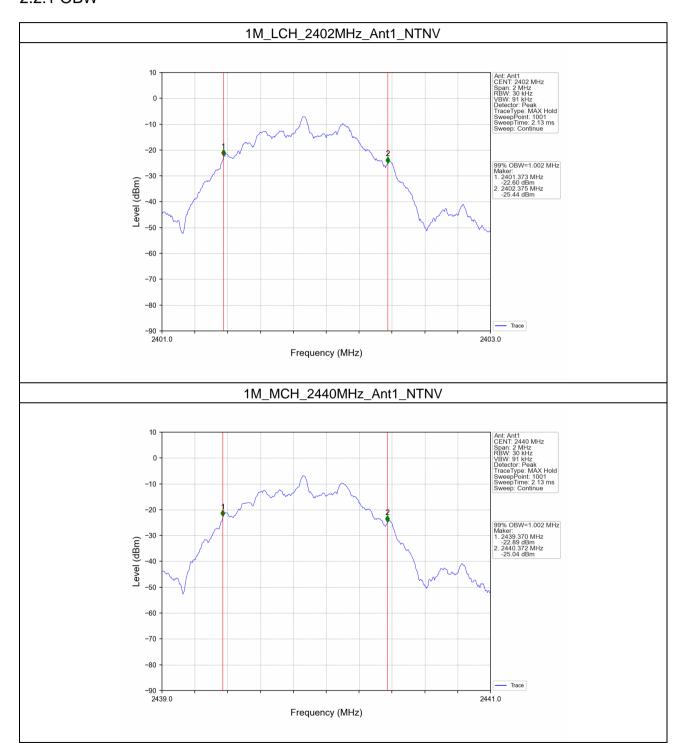
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## 2.2 Test Graph

## 2.2.1 OBW





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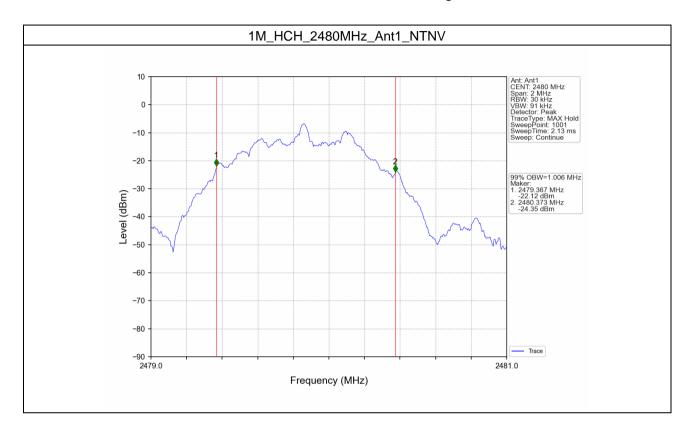
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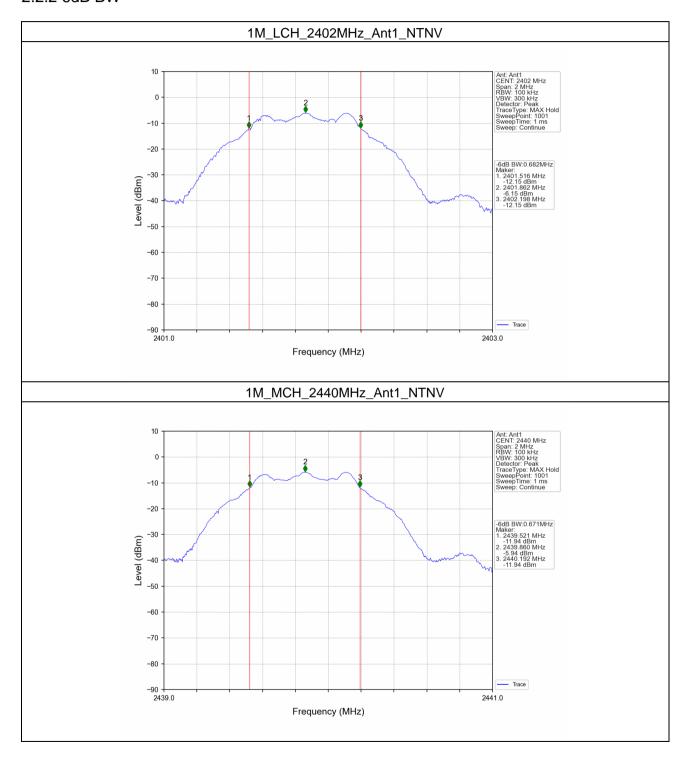


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#### 2.2.2 6dB BW





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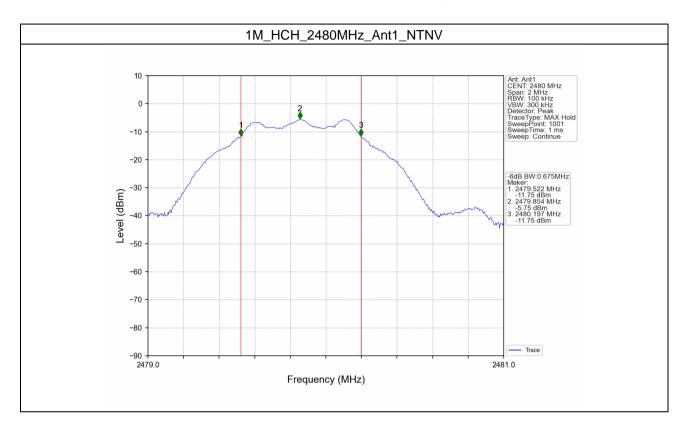
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## 3. Maximum Conducted Output Power

## 3.1 Test Result

### 3.1.1 Power

Mode	TX	Frequency (MHz)	Maximum Peak Conduc	Verdict			
	Type		ANT1	Limit	verdict		
1M	SISO	2402	-6.08	<=30	Pass		
		2440	-5.87	<=30	Pass		
		2480	-5.69	<=30	Pass		
Note1: Antenna Gain: Ant1: -2.49dBi;							

## 4. Maximum Power Spectral Density

## 4.1 Test Result

## 4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PS	\/a =d:a4			
			ANT1	Limit	Verdict		
1M	SISO	2402	-21.15	<=8	Pass		
		2440	-21.33	<=8	Pass		
		2480	-21.30	<=8	Pass		
Note1: Antenna Gain: Ant1: -2.49dBi;							



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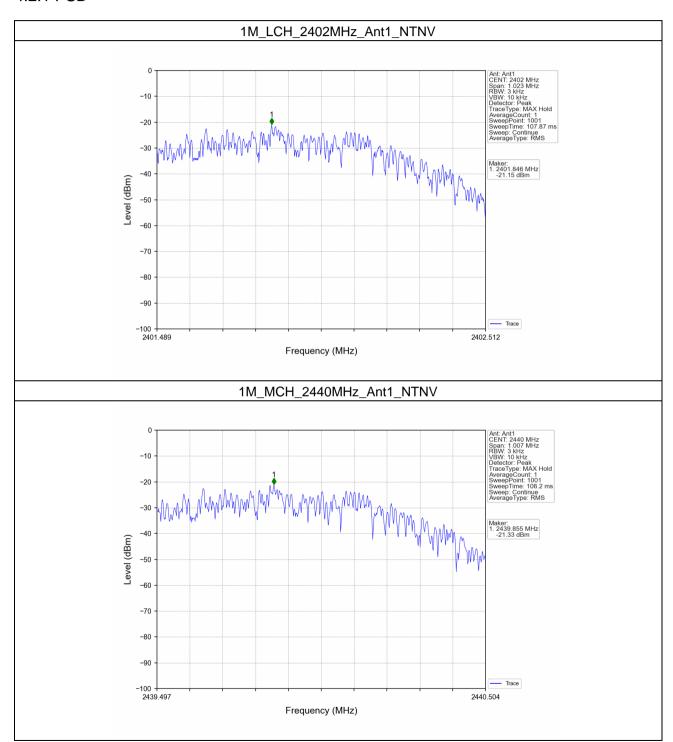
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## 4.2 Test Graph

## 4.2.1 PSD





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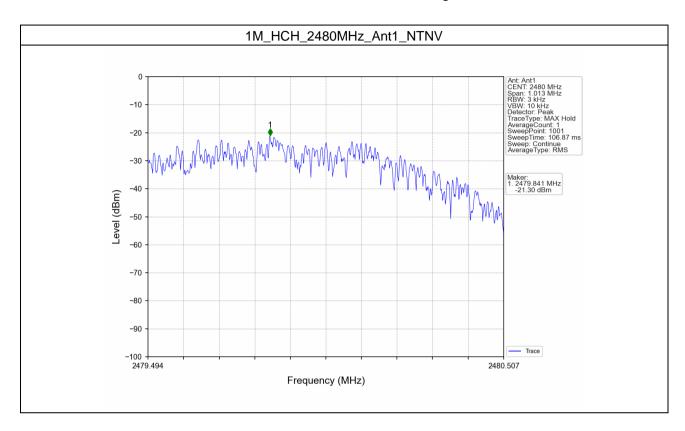
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## Unwanted Emissions In Non-restricted Frequency Bands

## 5.1 Test Result

#### 5.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
	SISO	2402	1	-6.14
1M		2440	1	-5.94
1101		2480	1	-5.76

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

## 5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-5.76	-25.76	Pass
		2440	1	-5.76	-25.76	Pass
		2480	1	-5.76	-25.76	Pass

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



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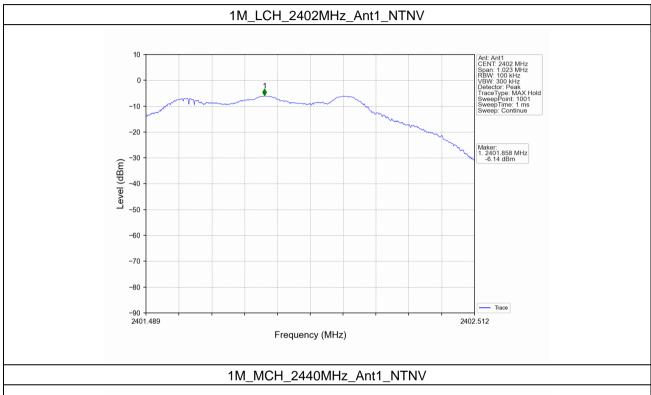
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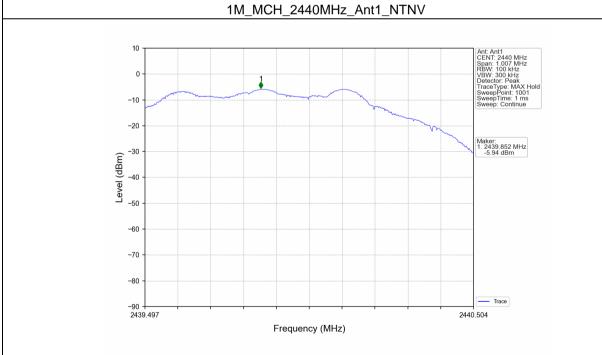
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## 5.2 Test Graph

## 5.2.1 Ref







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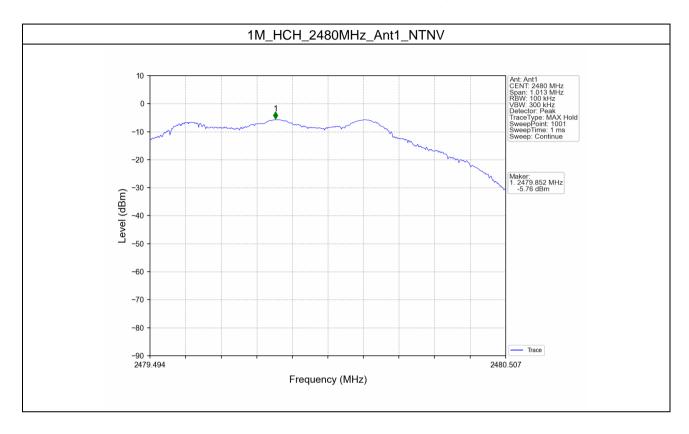
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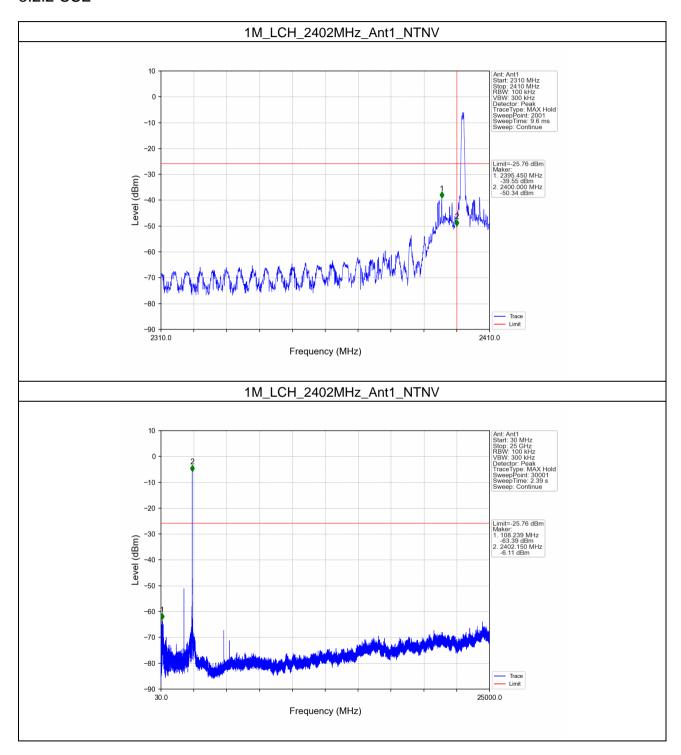


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### 5.2.2 CSE





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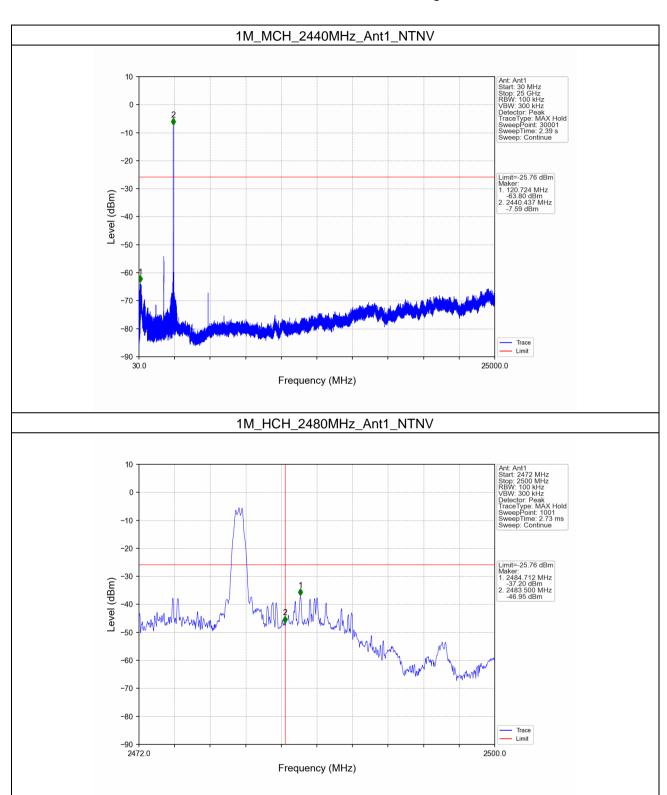
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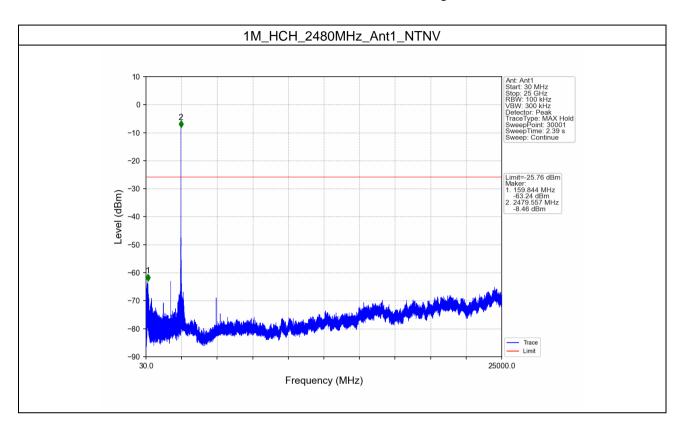
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