

# TEST REPORT

**Application No.:** GZCR2206000720AT  
**Applicant:** Guangdong Transtek Medical Electronics Co., Ltd.  
**Address of Applicant:** Zone A, No 105, Dongli Road, Torch Development District, 528437 Zhongshan, Guangdong, China  
**Manufacturer:** Guangdong Transtek Medical Electronics Co., Ltd.  
**Address of Manufacturer:** Zone A, No 105, Dongli Road, Torch Development District, 528437 Zhongshan, Guangdong, China  
**Factory:** Guangdong Transtek Medical Electronics Co., Ltd.  
**Address of Factory:** Zone A, No 105, Dongli Road, Torch Development District, 528437 Zhongshan, Guangdong, China

**Equipment Under Test (EUT):**

**EUT Name:** Blood Pressure Monitor  
**Model No.:** BC 87  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.247  
**Date of Receipt:** 2022-06-07  
**Date of Test:** 2022-06-21 to 2022-06-27  
**Date of Issue:** 2022-07-07

<b>Test Result:</b>	<b>Pass*</b>
---------------------	--------------


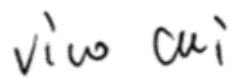
\* In the configuration tested, the EUT complied with the standards specified above.

Kobe Jian  
EMC Laboratory Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZCR220600072002	2022-07-07	Original

Authorized for issue by			
			
		<hr/> <b>Curry Wu/Project Engineer</b>	
			
		<hr/> <b>Vico Cui/Reviewer</b>	



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## 2 Test Summary

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

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 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

**Note:**

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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## 4 General Information

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

Power supply:	DC 3V =Size 'AAA' battery x2
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB antenna
Antenna Gain:	-0.5dBi
Sample NO.	A1

### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Radiated Emissions which fall in the restricted bands	±5.00dB (30MHz-1GHz; 3m);±4.38dB (30MHz-1GHz; 10m);± 5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB (18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	±5.00dB (3m); ±4.38dB (10m)
Radiated Spurious Emissions Above 1GHz	±5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)

### 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,  
 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,  
 Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



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## 4.5 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

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

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

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

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

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

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

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

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

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

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

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

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

## 4.6 Deviation from Standards

None

## 4.7 Abnormalities from Standard Conditions

None



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## 5 Equipment List

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
Power Meter (U2021XA_Ch1)	Agilent Technologies	U2021XA_Ch1	SEM009-01	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch3)	Agilent Technologies	U2021XA_Ch3	SEM009-03	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch4)	Agilent Technologies	U2021XA_Ch4	SEM009-04	2022-05-16	2023-05-15
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
Power Meter (U2021XA_Ch1)	Agilent Technologies	U2021XA_Ch1	SEM009-01	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch3)	Agilent Technologies	U2021XA_Ch3	SEM009-03	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch4)	Agilent Technologies	U2021XA_Ch4	SEM009-04	2022-05-16	2023-05-15
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
Power Meter (U2021XA_Ch1)	Agilent Technologies	U2021XA_Ch1	SEM009-01	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch3)	Agilent Technologies	U2021XA_Ch3	SEM009-03	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch4)	Agilent Technologies	U2021XA_Ch4	SEM009-04	2022-05-16	2023-05-15
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A



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<b>Conducted Spurious Emissions</b>					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2222	2022-06-21	2023-06-20
Power Meter (U2021XA_Ch1)	Agilent Technologies	U2021XA_Ch1	SEM009-01	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch3)	Agilent Technologies	U2021XA_Ch3	SEM009-03	2022-05-16	2023-05-15
Power Meter (U2021XA_Ch4)	Agilent Technologies	U2021XA_Ch4	SEM009-04	2022-05-16	2023-05-15
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A

<b>Radiated Emissions which fall in the restricted bands</b>					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2021-11-01	2022-10-31
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A



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Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2022-06-21	2023-06-20
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2022-05-20	2023-05-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-03-03	2025-03-02

Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-12-17	2022-12-16
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2021-11-01	2022-10-31
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05



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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 -0.5 dBi.

Antenna location: Refer to internal photo.



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## 7 Radio Spectrum Matter Test Results

### 7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

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

Limit:

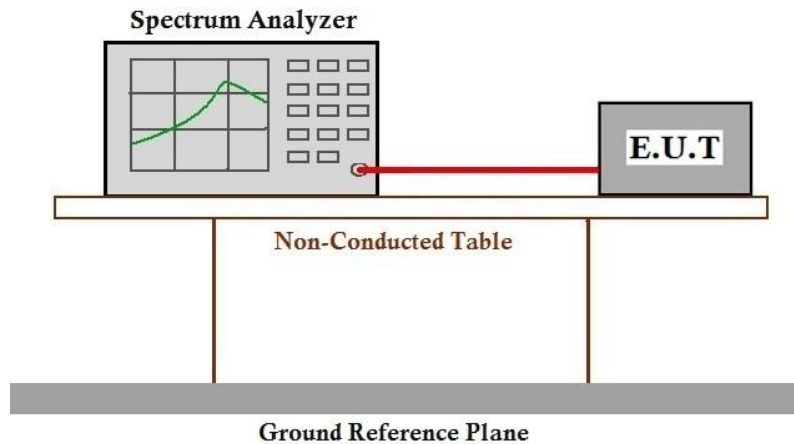
Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for $\geq 50$ hopping channels
	0.25 for $25 \leq$ hopping channels $< 50$
	1 for digital modulation
2400-2483.5	1 for $\geq 75$ non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital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

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

Operating Environment:

Temperature: 23.2 °C Humidity: 57.2 % RH Atmospheric Pressure: 1005 mbar

#### 7.1.2 Test Setup Diagram



#### 7.1.3 Measurement Procedure and Data

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

Please Refer to Appendix for Details



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### 7.2 Minimum 6dB Bandwidth

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

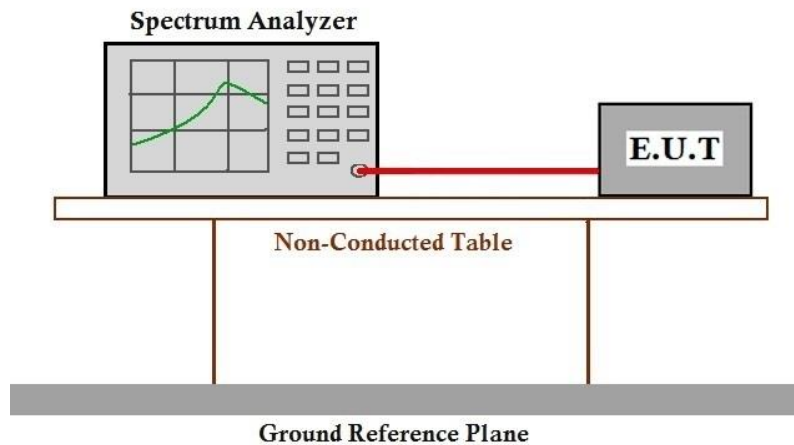
#### 7.2.1 E.U.T. Operation

Operating Environment:			
Temperature:	23.2 °C	Humidity:	57.2 % RH
		Atmospheric Pressure:	1005 mbar

#### 7.2.2 Test Mode Description

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

#### 7.2.3 Test Setup Diagram



#### 7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.3 Power Spectrum Density

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

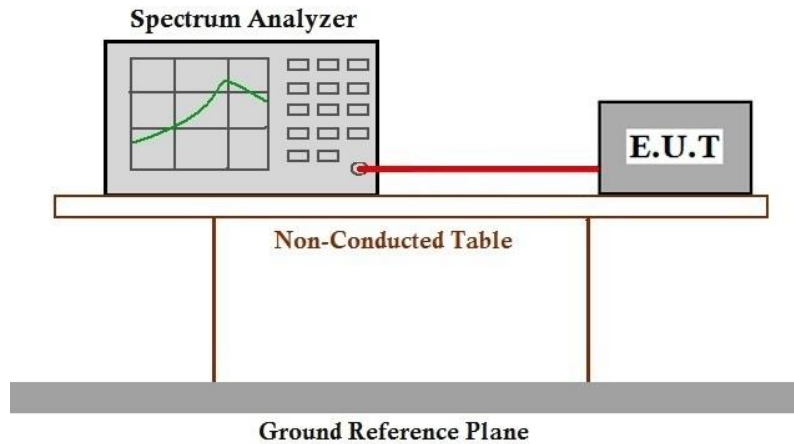
#### 7.3.1 E.U.T. Operation

Operating Environment:					
Temperature:	23.2 °C	Humidity:	57.2 % RH	Atmospheric Pressure:	1005 mbar

#### 7.3.2 Test Mode Description

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

#### 7.3.3 Test Setup Diagram



#### 7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.4 Conducted Band Edges Measurement

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

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

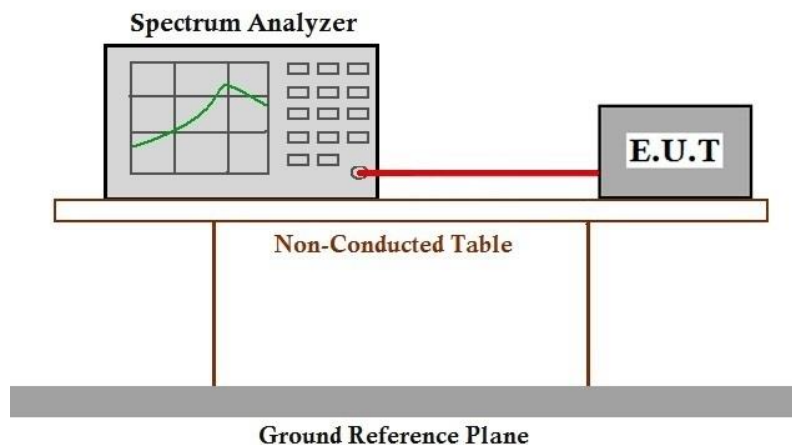
#### 7.4.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.2 °C Humidity: 57.2 % RH Atmospheric Pressure: 1005 mbar

#### 7.4.2 Test Mode Description

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

#### 7.4.3 Test Setup Diagram



#### 7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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## 7.5 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

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

### 7.5.1 E.U.T. Operation

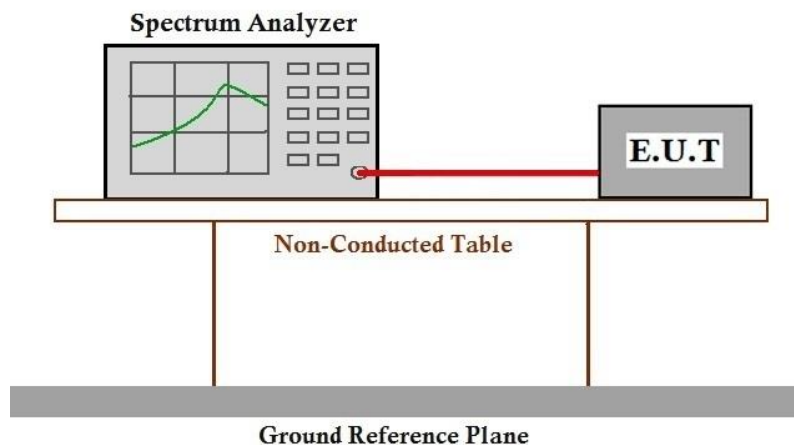
Operating Environment:

Temperature: 23.2 °C Humidity: 57.2 % RH Atmospheric Pressure: 1005 mbar

### 7.5.2 Test Mode Description

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

### 7.5.3 Test Setup Diagram



### 7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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

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

Test Method: ANSI C63.10 (2013) Section 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

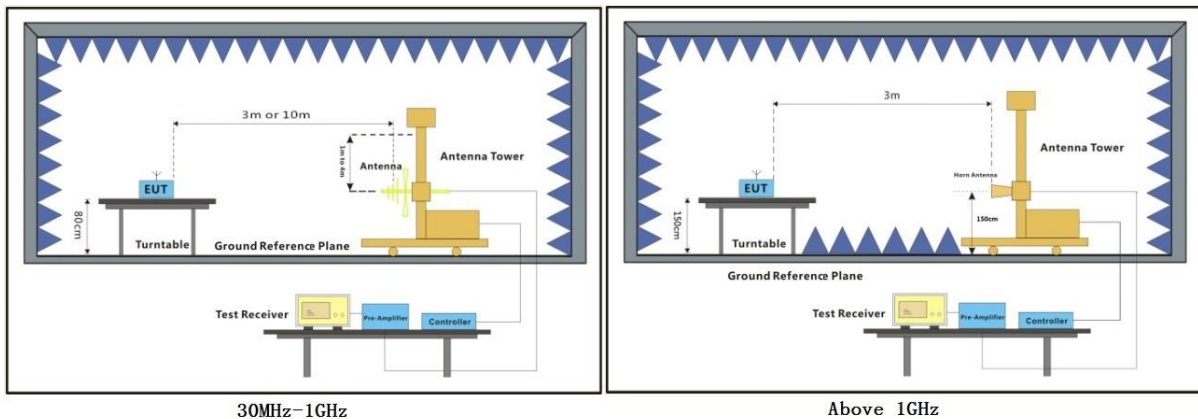
Operating Environment:

Temperature: 23.1 °C Humidity: 61.4 % RH Atmospheric Pressure: 1005 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



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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

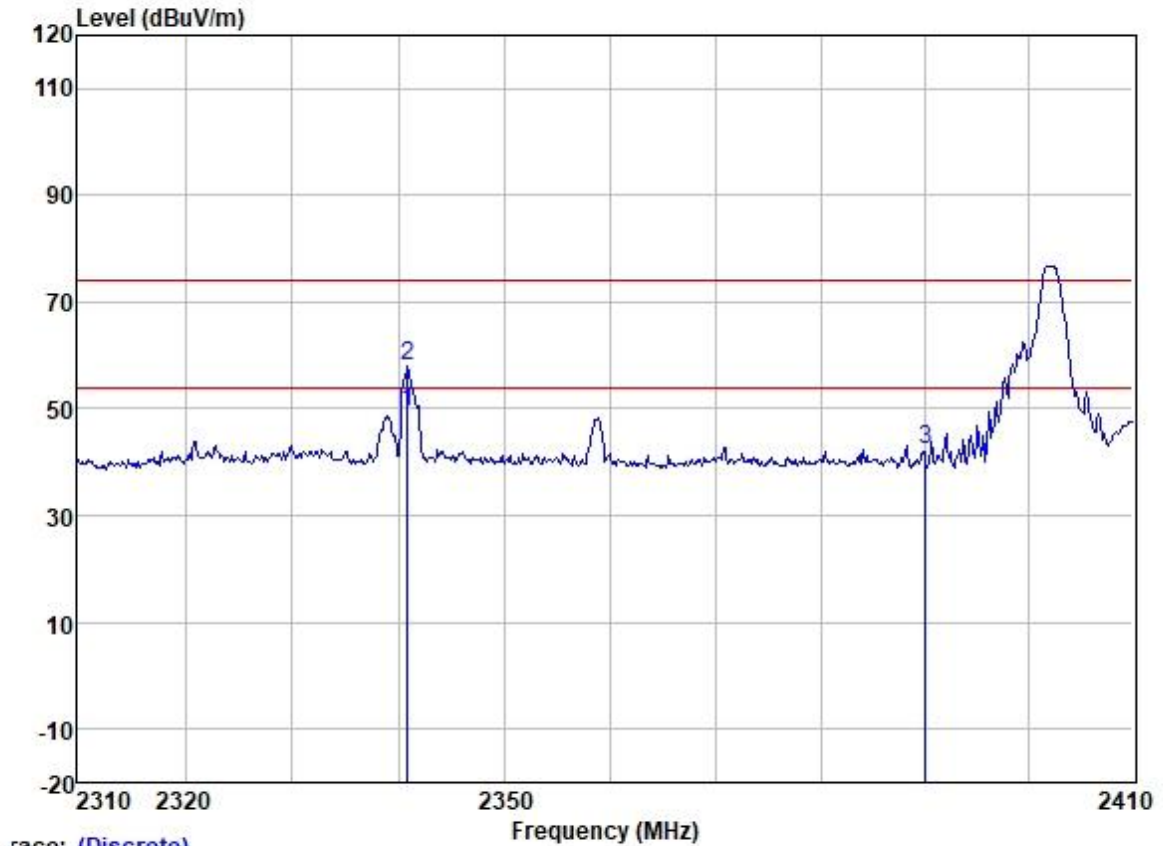
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level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



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



Trace: (Discrete)

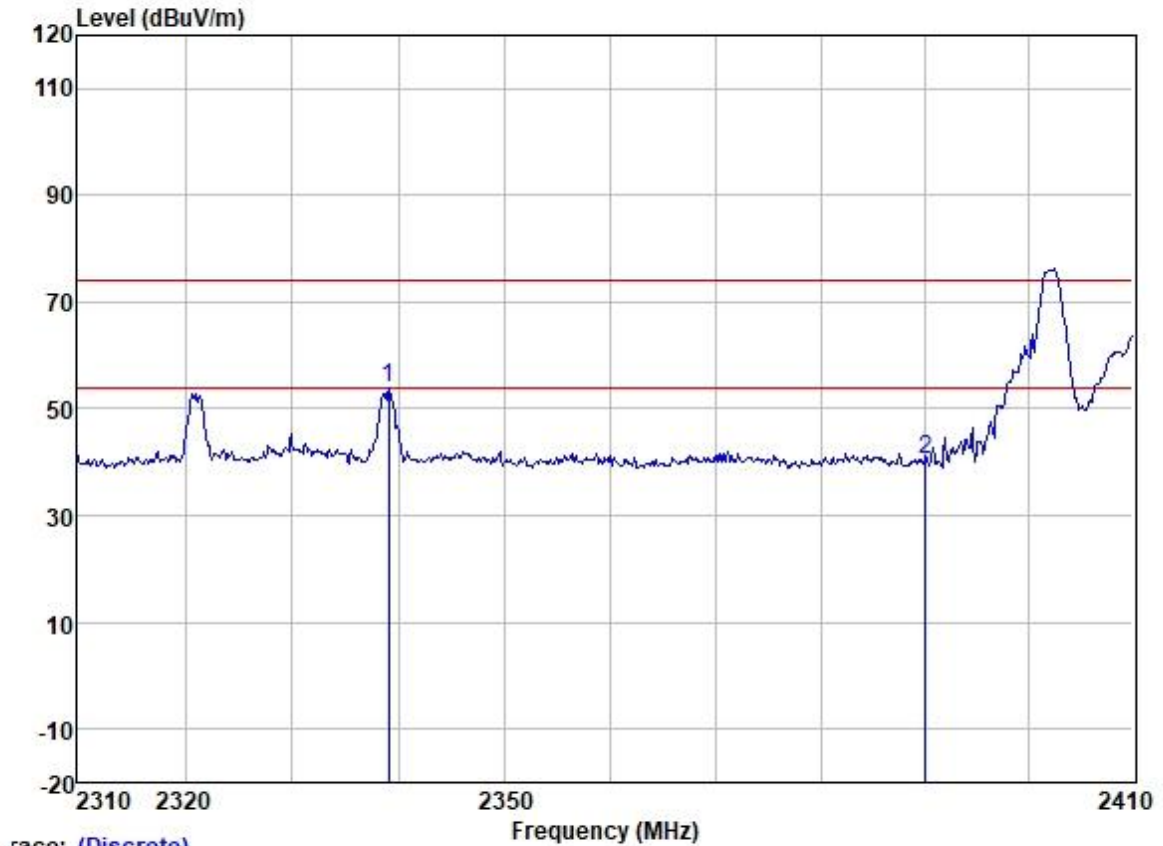
	Read Freq	Antenna Level	Cable Loss	Preamp Factor	Level	Limit	Over	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2340.845	54.67	27.22	4.68	37.15	49.42	54.00	-4.58	VERTICAL Average
2	2340.845	63.18	27.22	4.68	37.15	57.93	74.00	-16.07	VERTICAL Peak
3	2390.000	47.91	27.33	4.22	37.14	42.32	74.00	-31.68	VERTICAL Peak



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



Trace: (Discrete)

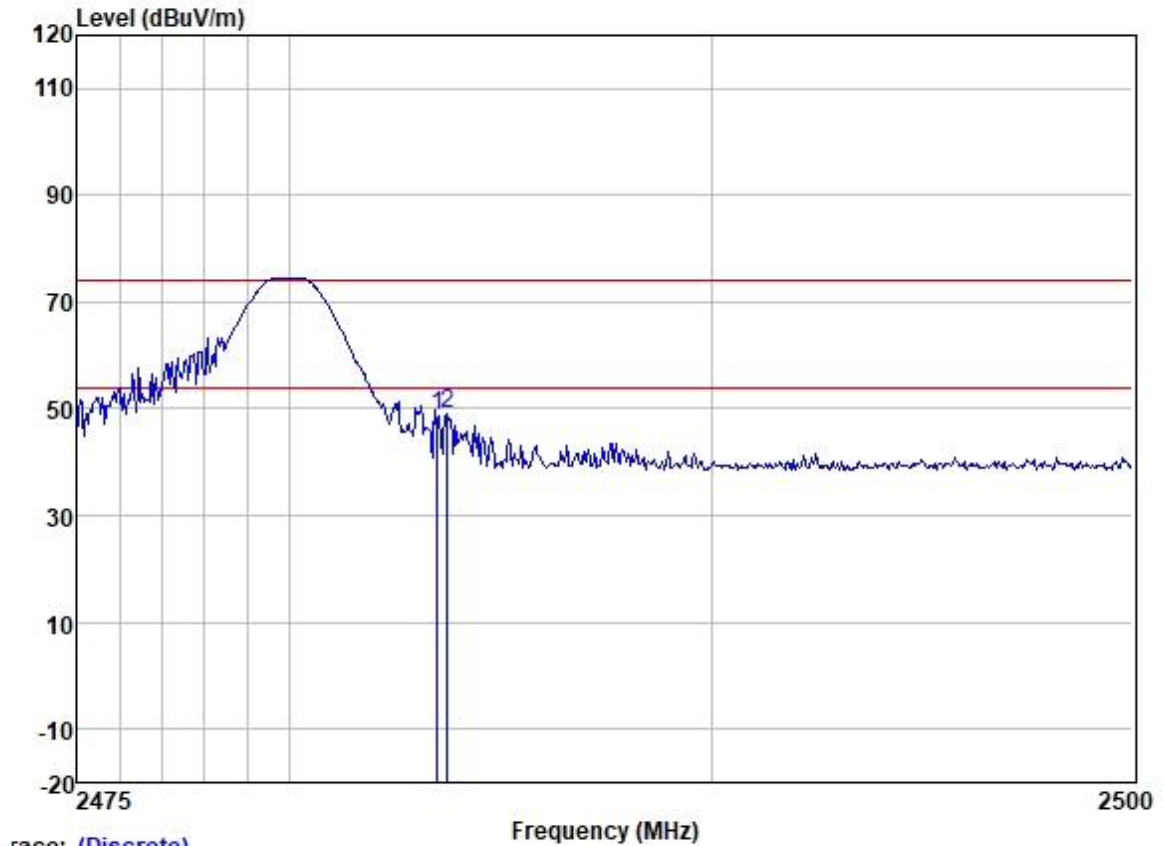
	Read Freq	Antenna Level	Cable Factor	Preamp Loss	Limit Level	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2339.061	59.09	27.22	4.68	37.15	53.84	74.00	-20.16 HORIZONTAL Peak
2	2390.000	46.07	27.33	4.22	37.14	40.48	74.00	-33.52 HORIZONTAL Peak



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



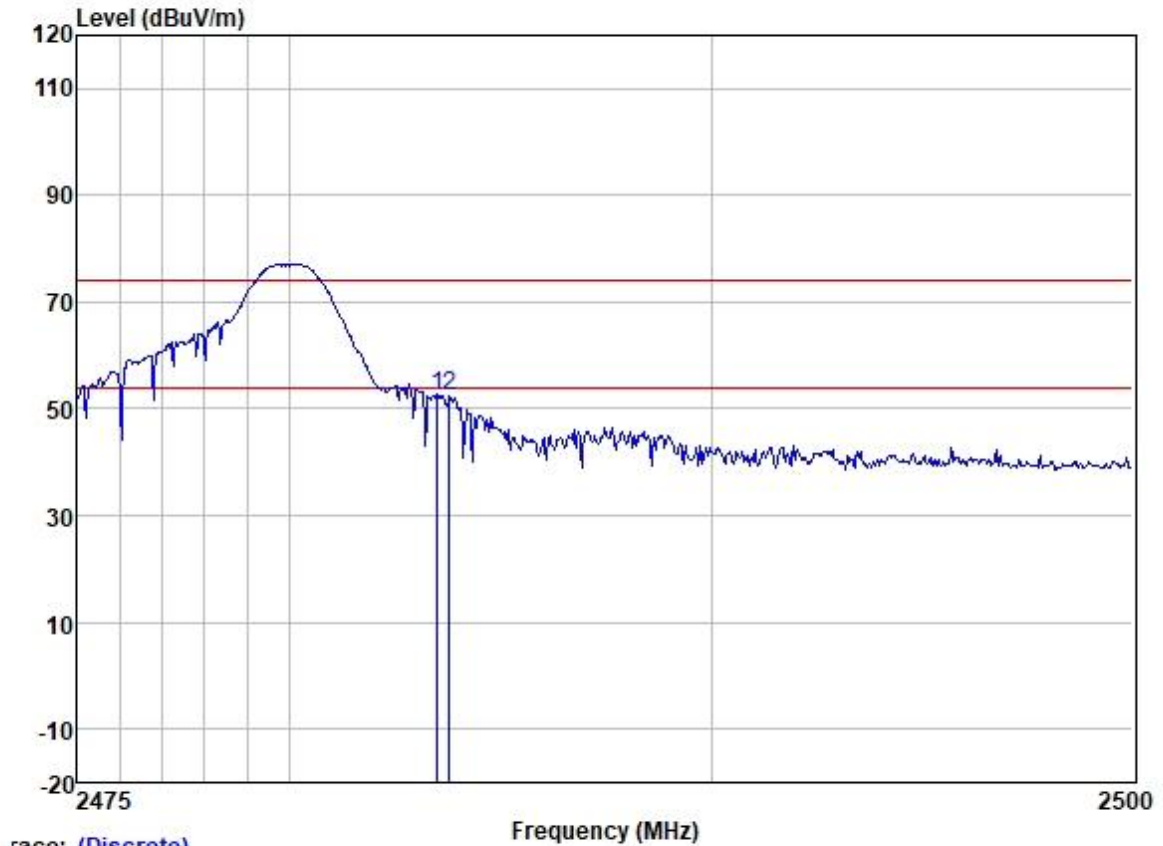
Trace: (Discrete)

	Read	Antenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2483.500	54.76	27.48	3.42	37.13	48.53	74.00	-25.47	VERTICAL	Peak
2	2483.721	55.31	27.48	3.42	37.13	49.08	74.00	-24.92	VERTICAL	Peak



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



Trace: (Discrete)

	Read	Antenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	58.62	27.48	3.42	37.13	52.39	74.00	-21.61	HORIZONTAL Peak
2	2483.771	58.52	27.48	3.42	37.13	52.29	74.00	-21.71	HORIZONTAL Peak



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### 7.7 Radiated Spurious Emissions Below 1GHz

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

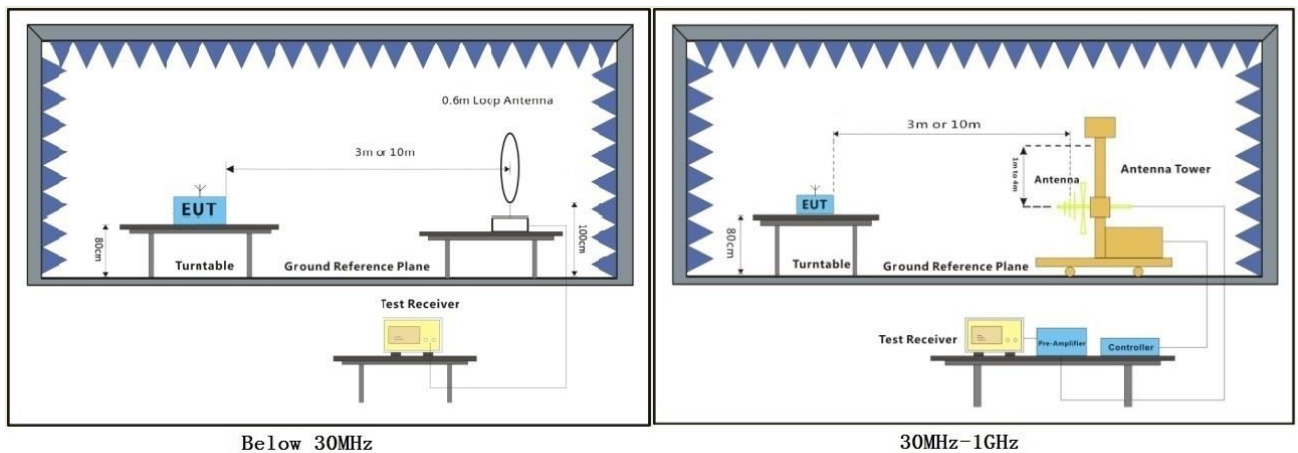
#### 7.7.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.9 °C Humidity: 66.2 % RH Atmospheric Pressure: 1005 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.

#### 7.7.3 Test Setup Diagram



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**7.7.4 Measurement Procedure and Data**

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

Remark:

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

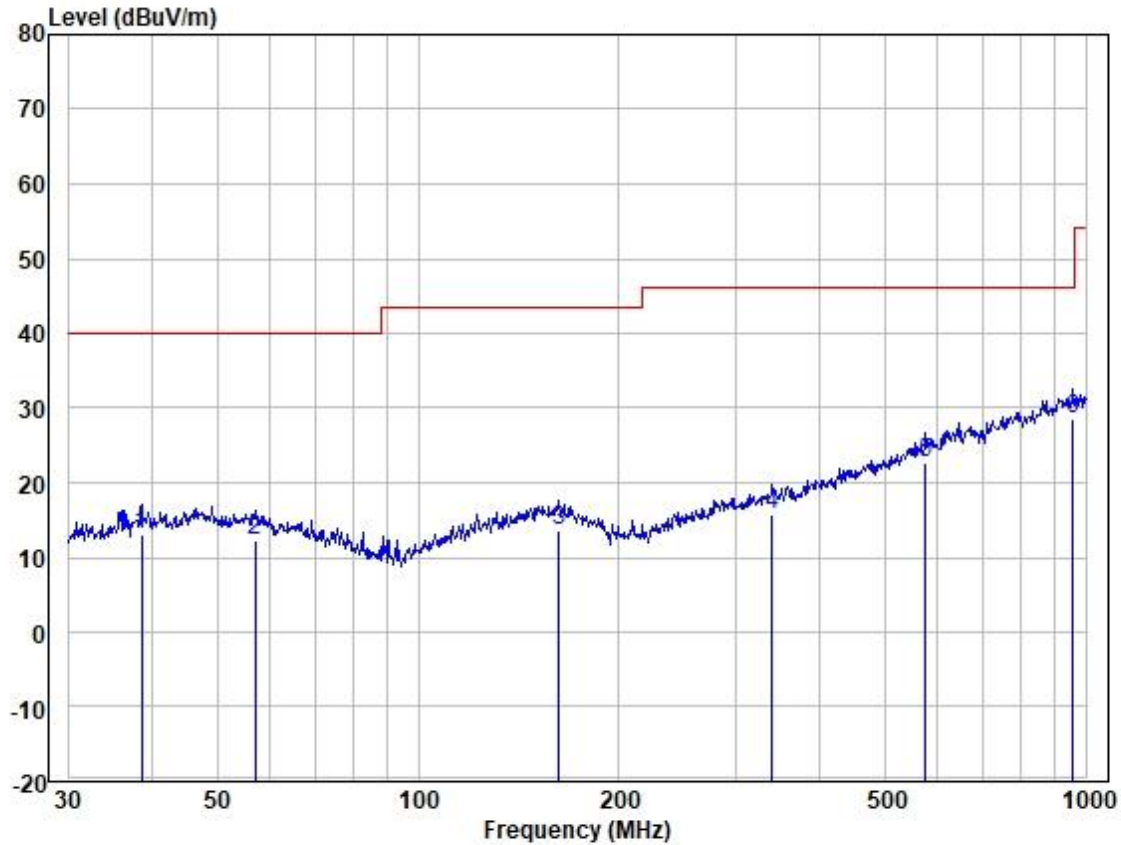


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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : SGS  
Job :  
Model :  
Power :  
Test Mode :

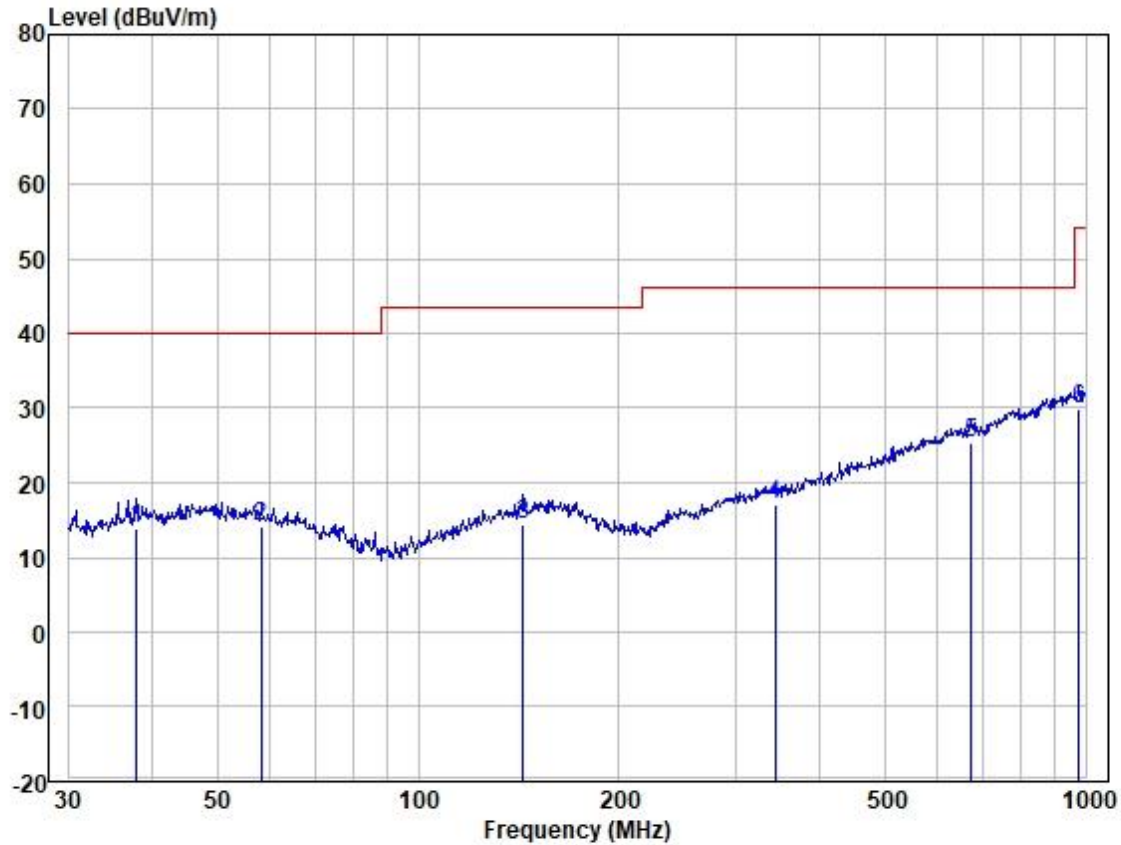
	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	38.616	26.32	18.93	0.70	32.96	12.99	40.00	-27.01	HORIZONTAL	QP
2	56.991	25.43	19.08	0.84	33.00	12.35	40.00	-27.65	HORIZONTAL	QP
3	162.611	26.01	19.11	1.53	33.00	13.65	43.50	-29.85	HORIZONTAL	QP
4	338.400	26.36	20.23	2.40	33.14	15.85	46.00	-30.15	HORIZONTAL	QP
5	574.626	27.81	25.12	3.20	33.38	22.75	46.00	-23.25	HORIZONTAL	QP
6	955.438	26.30	29.75	4.13	31.69	28.49	46.00	-17.51	HORIZONTAL	QP



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



Site : SGS  
 Job :  
 Model :  
 Power :  
 Test Mode :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	37.945	27.10	18.73	0.90	32.96	13.77	40.00	-26.23	VERTICAL	QP
2	58.203	27.23	18.99	0.86	33.00	14.08	40.00	-25.92	VERTICAL	QP
3	143.830	27.22	18.77	1.36	33.00	14.35	43.50	-29.15	VERTICAL	QP
4	341.979	27.47	20.25	2.40	33.14	16.98	46.00	-29.02	VERTICAL	QP
5	672.845	28.53	26.59	3.45	33.33	25.24	46.00	-20.76	VERTICAL	QP
6	975.753	27.32	29.89	4.18	31.46	29.93	54.00	-24.07	VERTICAL	QP



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### 7.8 Radiated Spurious Emissions Above 1GHz

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

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

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

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

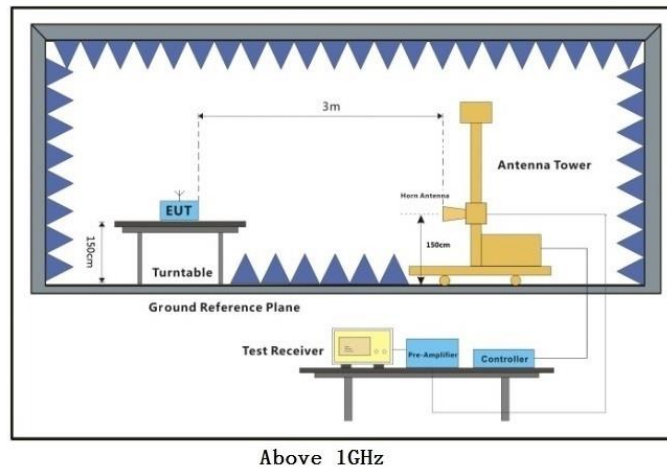
Operating Environment:

Temperature: 23.1 °C Humidity: 61.4 % RH Atmospheric Pressure: 1005 mbar

#### 7.8.2 Test Mode Description

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

#### 7.8.3 Test Setup Diagram



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**7.8.4 Measurement Procedure and Data**

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



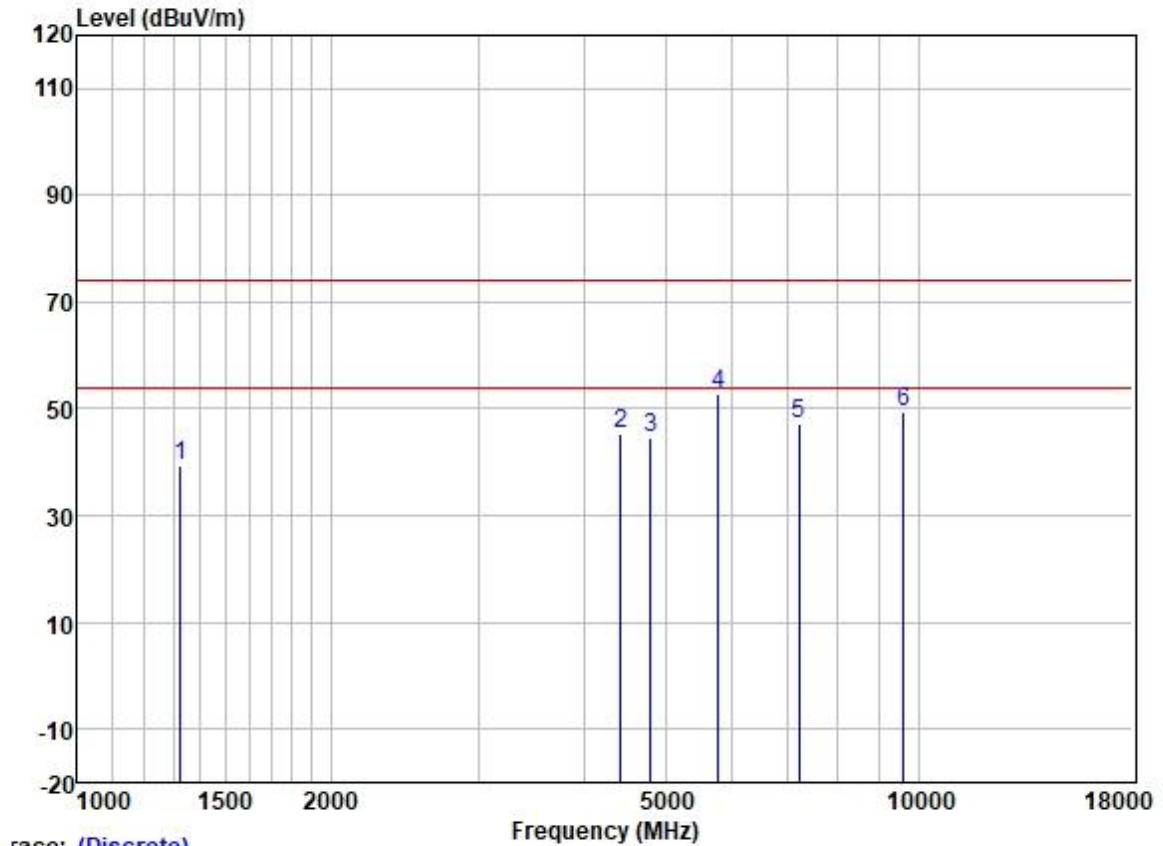
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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



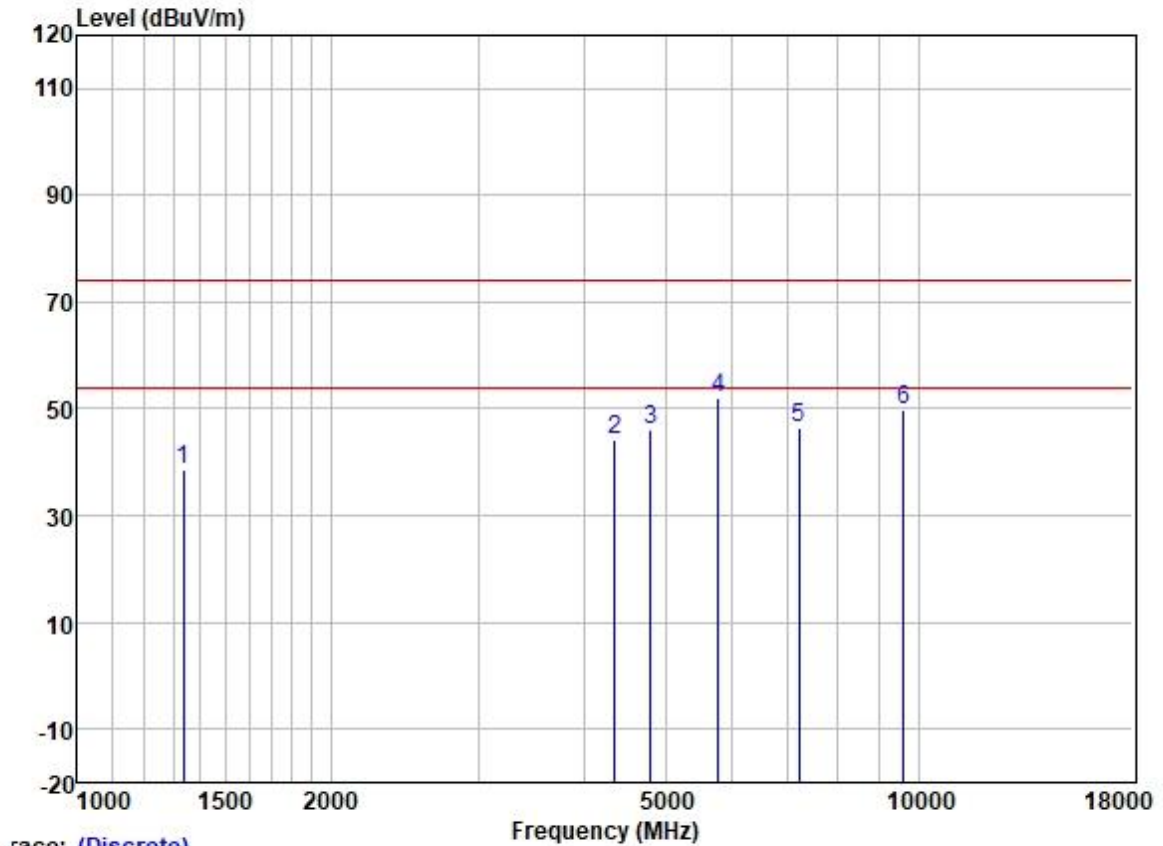
Trace: (Discrete)

	Read Freq	Antenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit	Over	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1327.446	49.53	25.27	2.72	38.02	39.50	74.00	-34.50	VERTICAL	peak
2	4430.628	45.80	30.72	5.36	36.62	45.26	74.00	-28.74	VERTICAL	peak
3	4804.000	44.19	31.42	5.46	36.51	44.56	74.00	-29.44	VERTICAL	peak
4	5780.300	51.22	32.16	5.68	36.14	52.92	74.00	-21.08	VERTICAL	peak
5	7206.000	42.34	35.54	6.36	36.92	47.32	74.00	-26.68	VERTICAL	peak
6	9608.000	40.07	38.37	7.99	36.86	49.57	74.00	-24.43	VERTICAL	peak



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



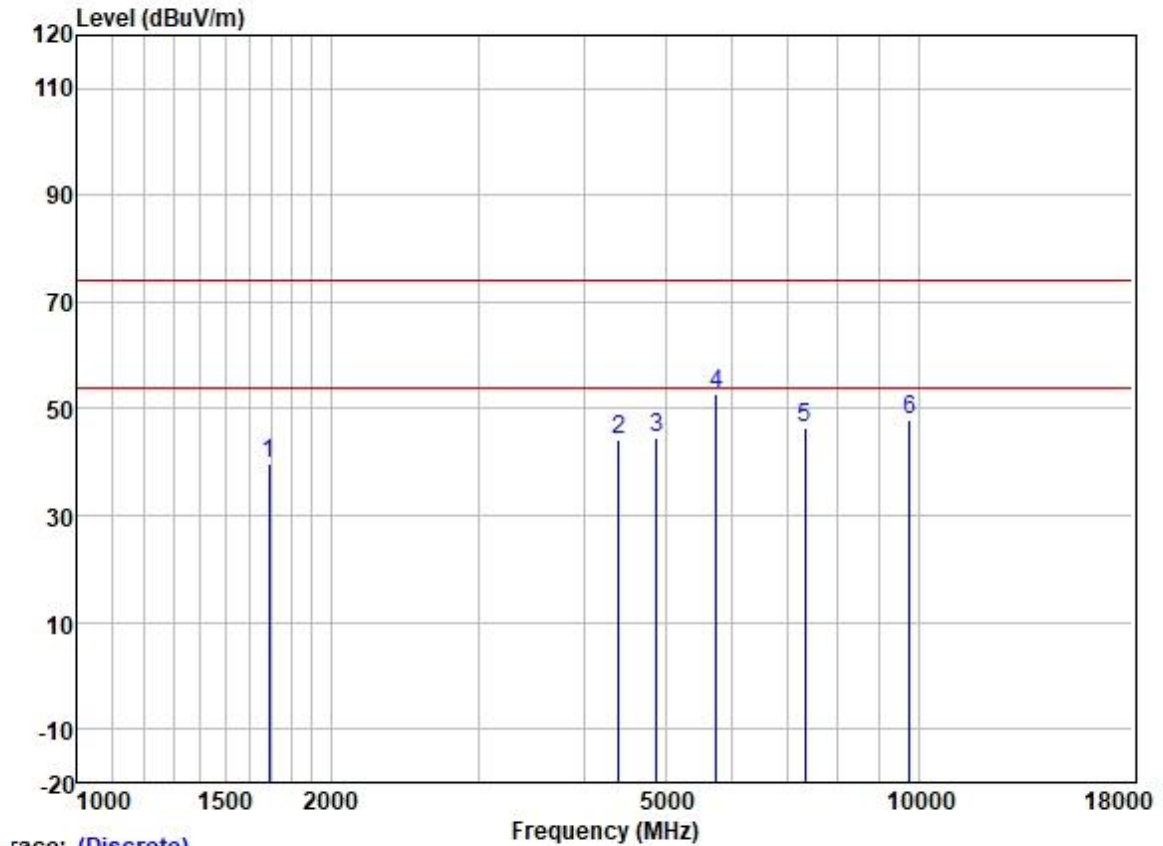
Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1335.141	48.80	25.28	2.73	38.02	38.79	74.00	-35.21	HORIZONTAL	peak
2	4354.454	45.09	30.59	5.34	36.64	44.38	74.00	-29.62	HORIZONTAL	peak
3	4804.000	45.60	31.42	5.46	36.51	45.97	74.00	-28.03	HORIZONTAL	peak
4	5780.300	50.45	32.16	5.68	36.14	52.15	74.00	-21.85	HORIZONTAL	peak
5	7206.000	41.63	35.54	6.36	36.92	46.61	74.00	-27.39	HORIZONTAL	peak
6	9608.000	40.37	38.37	7.99	36.86	49.87	74.00	-24.13	HORIZONTAL	peak



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



Trace: (Discrete)

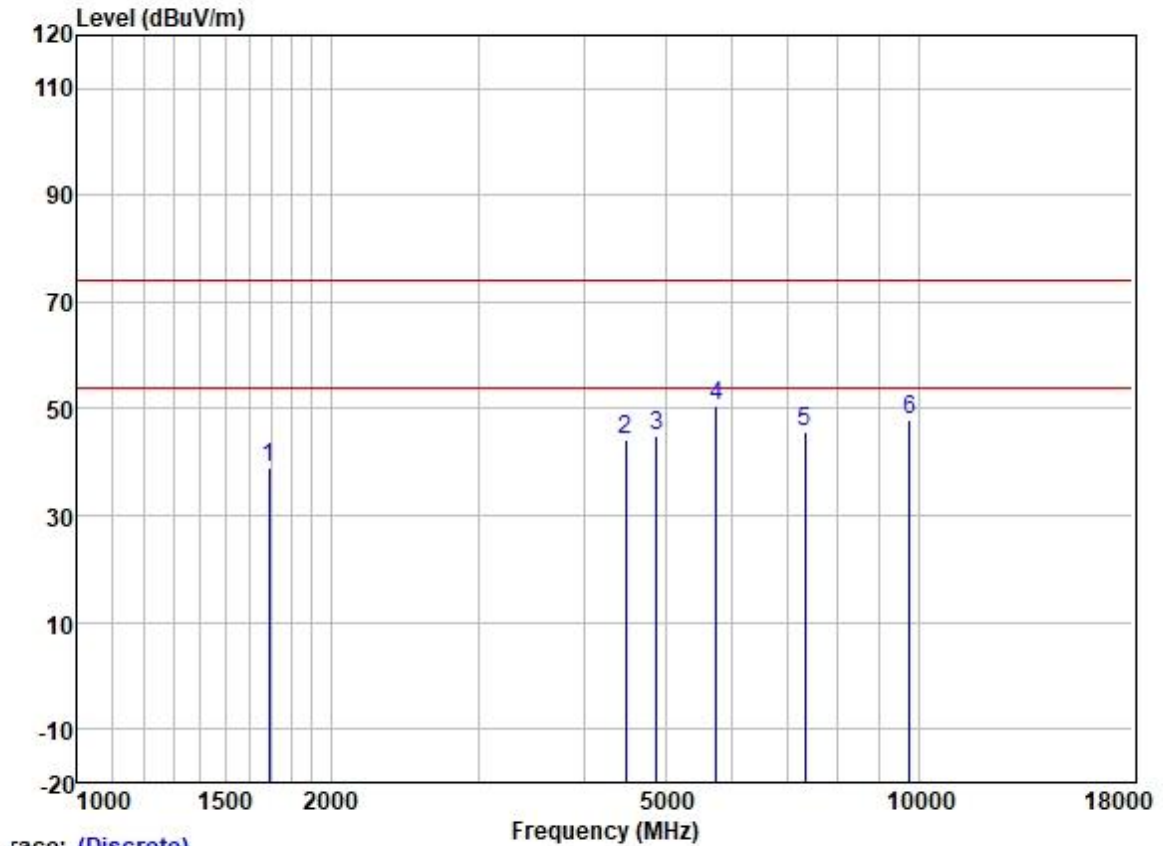
	Read	Antenna	Cable	Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1692.231	48.02	25.70	3.30	37.46	39.56	74.00	-34.44	VERTICAL	peak
2	4405.090	44.98	30.68	5.37	36.63	44.40	74.00	-29.60	VERTICAL	peak
3	4880.000	43.86	31.54	5.49	36.48	44.41	74.00	-29.59	VERTICAL	peak
4	5746.982	51.25	32.10	5.70	36.14	52.91	74.00	-21.09	VERTICAL	peak
5	7320.000	41.31	36.00	6.32	37.01	46.62	74.00	-27.38	VERTICAL	peak
6	9760.000	38.92	38.50	7.43	36.83	48.02	74.00	-25.98	VERTICAL	peak



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



Trace: (Discrete)

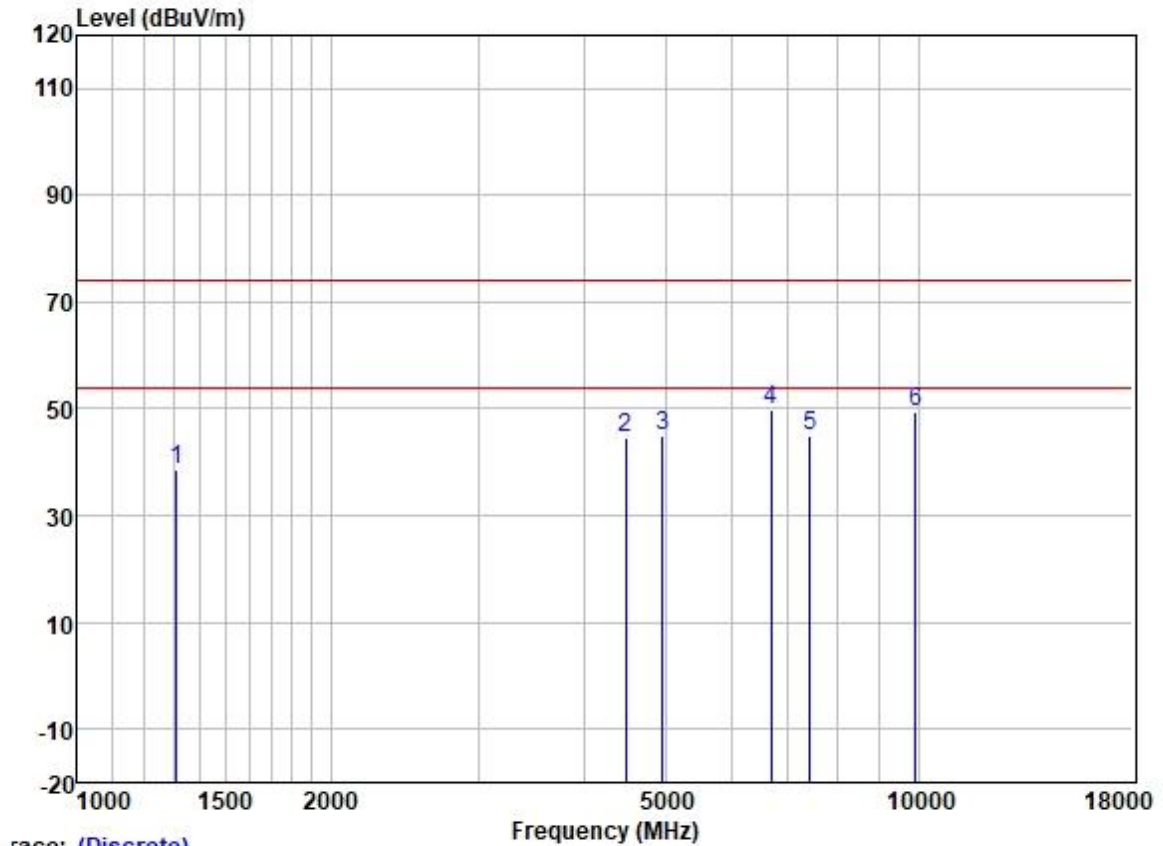
	Read	Antenna	Cable	Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1692.231	47.30	25.70	3.30	37.46	38.84	74.00	-35.16	HORIZONTAL	peak
2	4482.150	44.89	30.78	5.34	36.61	44.40	74.00	-29.60	HORIZONTAL	peak
3	4880.000	44.51	31.54	5.49	36.48	45.06	74.00	-28.94	HORIZONTAL	peak
4	5746.982	49.01	32.10	5.70	36.14	50.67	74.00	-23.33	HORIZONTAL	peak
5	7320.000	40.31	36.00	6.32	37.01	45.62	74.00	-28.38	HORIZONTAL	peak
6	9760.000	39.02	38.50	7.43	36.83	48.12	74.00	-25.88	HORIZONTAL	peak



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



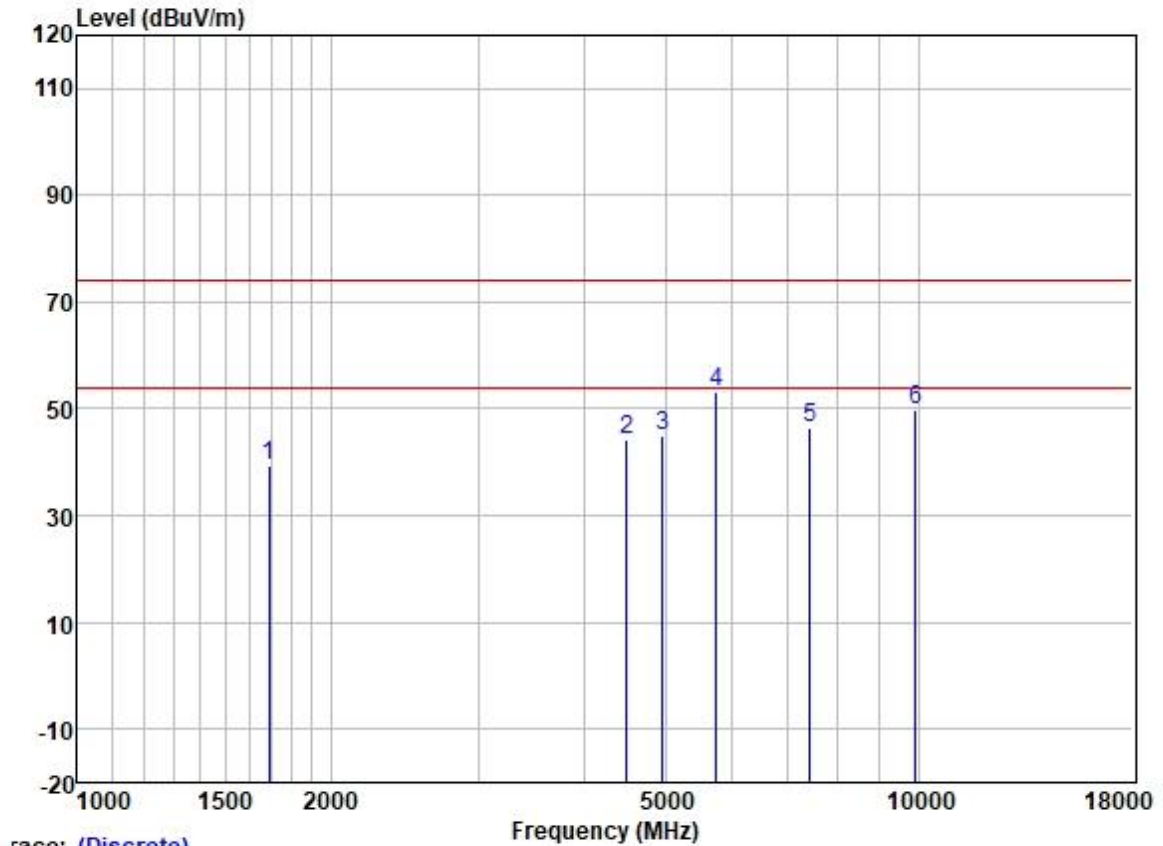
Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1312.187	48.76	25.23	2.70	38.04	38.65	74.00	-35.35	VERTICAL peak
2	4482.150	44.90	30.78	5.34	36.61	44.41	74.00	-29.59	VERTICAL peak
3	4960.000	44.36	31.65	5.53	36.43	45.11	74.00	-28.89	VERTICAL peak
4	6679.040	45.71	34.33	6.27	36.39	49.92	74.00	-24.08	VERTICAL peak
5	7440.000	39.31	36.27	6.29	37.08	44.79	74.00	-29.21	VERTICAL peak
6	9920.000	40.92	38.65	6.77	36.81	49.53	74.00	-24.47	VERTICAL peak



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



Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1692.231	47.77	25.70	3.30	37.46	39.31	74.00	-34.69	HORIZONTAL	peak
2	4495.125	44.56	30.80	5.33	36.60	44.09	74.00	-29.91	HORIZONTAL	peak
3	4960.000	44.28	31.65	5.53	36.43	45.03	74.00	-28.97	HORIZONTAL	peak
4	5746.982	51.36	32.10	5.70	36.14	53.02	74.00	-20.98	HORIZONTAL	peak
5	7440.000	40.88	36.27	6.29	37.08	46.36	74.00	-27.64	HORIZONTAL	peak
6	9920.000	41.10	38.65	6.77	36.81	49.71	74.00	-24.29	HORIZONTAL	peak



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## 8 Test Setup Photo

Refer to Setup Photos for GZCR220600072002



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## 9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2206000720AT



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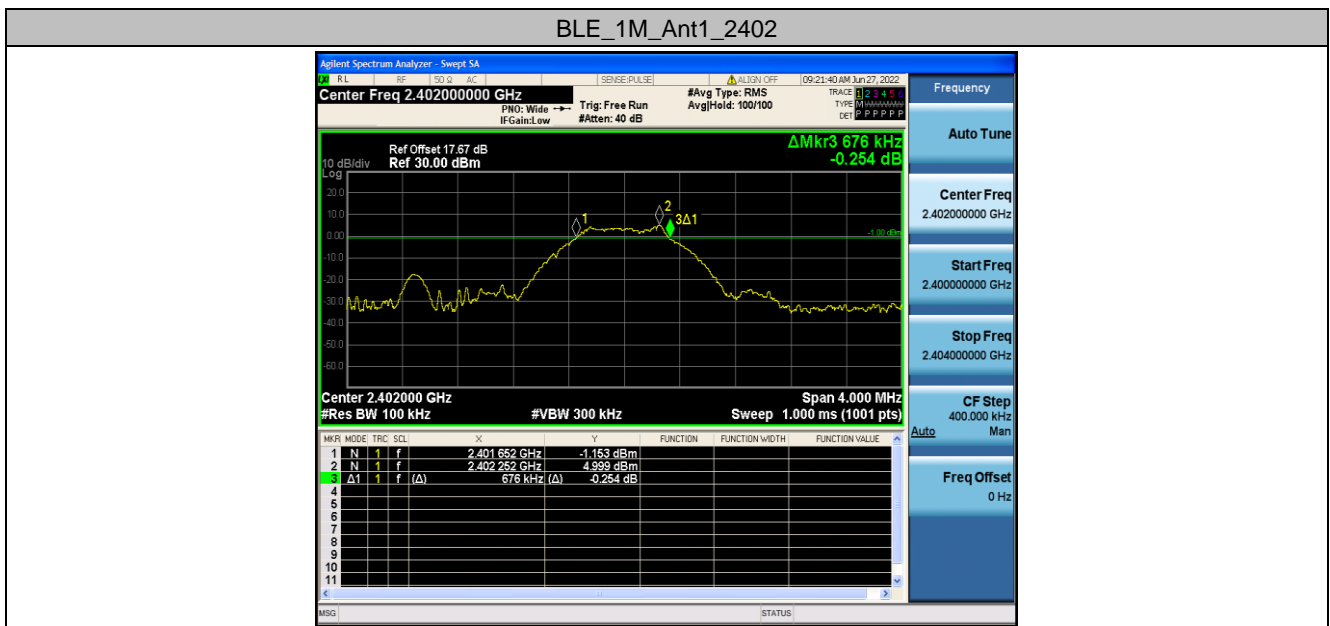
## 10 Appendix

### 10.1 Appendix A: DTS Bandwidth

#### 10.1.1 Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Min Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.676	2401.652	2402.328	0.5	PASS
		2440	0.668	2439.656	2440.324	0.5	PASS
		2480	0.648	2479.664	2480.312	0.5	PASS

#### 10.1.2 Test Graphs



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BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



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## 10.2 Appendix B: Maximum conducted output power

### 10.2.1 Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	6.12	<=30	PASS
		2440	7.41	<=30	PASS
		2480	8.14	<=30	PASS

### 10.2.2 Test Graphs



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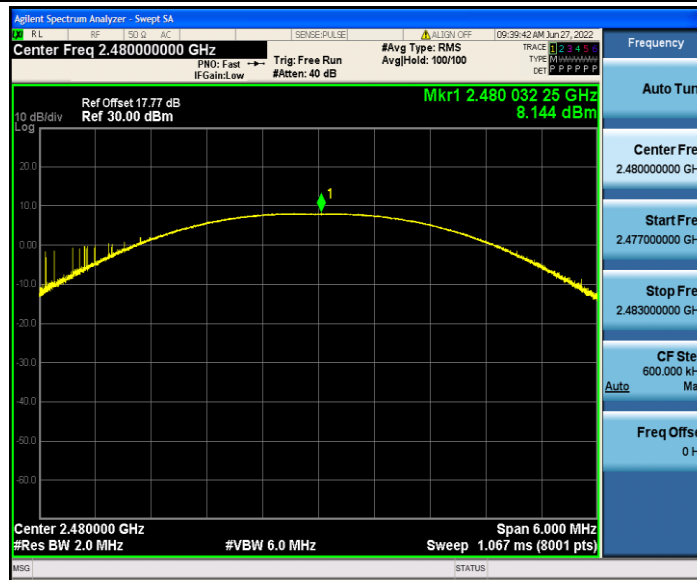
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BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



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### 10.3 Appendix C: Maximum power spectral density

#### 10.3.1 Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-4.7	<=8	PASS
		2440	-3.42	<=8	PASS
		2480	-2.5	<=8	PASS

#### 10.3.2 Test Graphs



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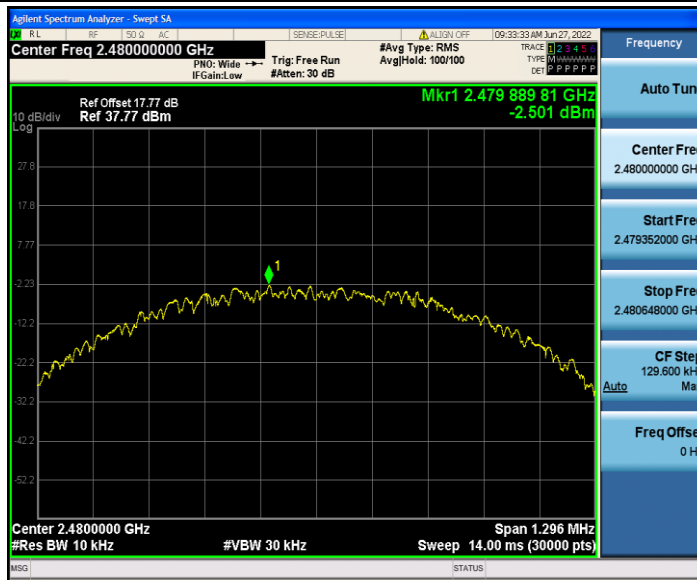
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BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



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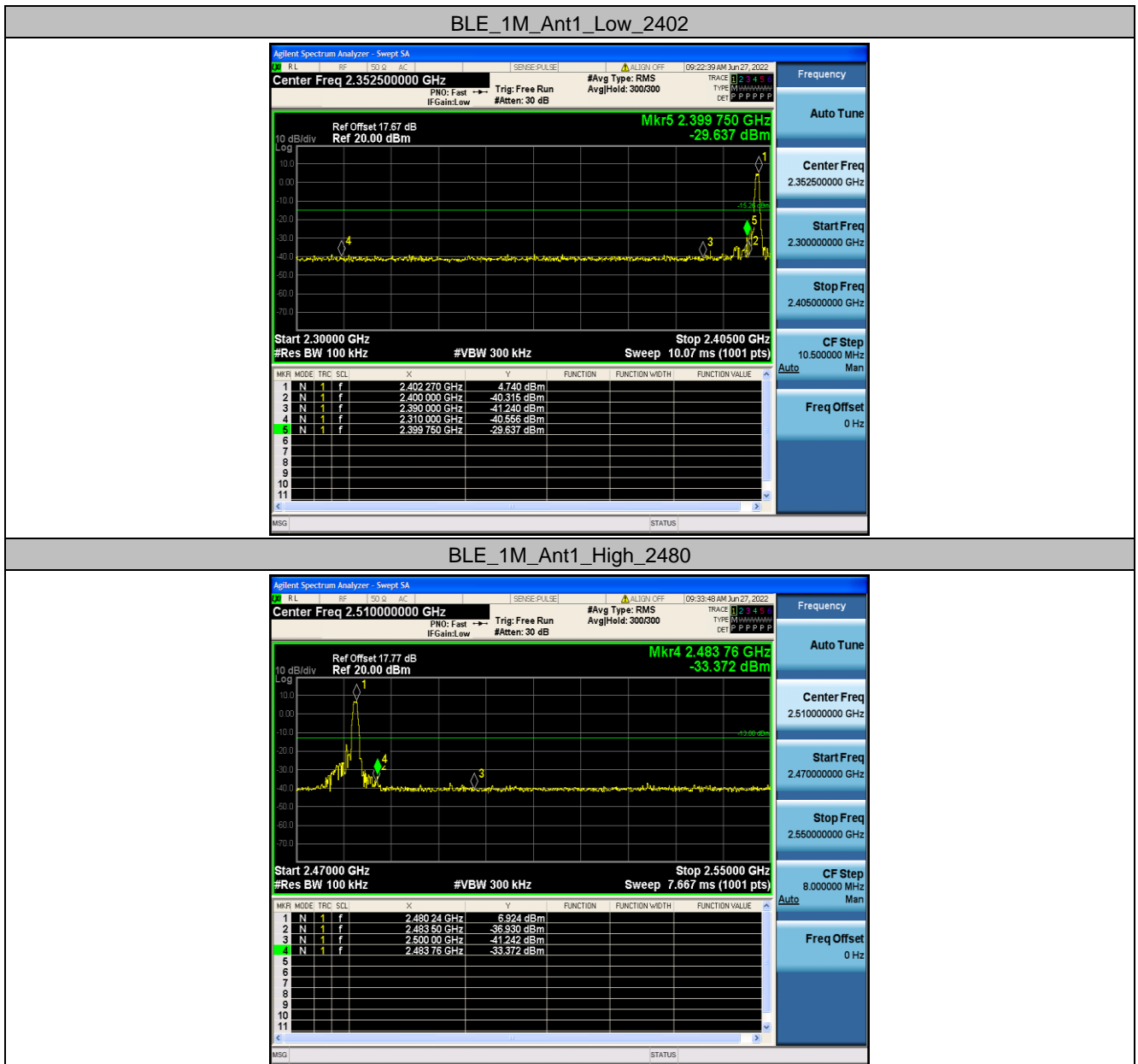
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### 10.4 Appendix D: Band edge measurements

#### 10.4.1 Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	4.74	-29.64	<=-15.26	PASS
		High	2480	6.92	-33.37	<=-13.08	PASS

#### 10.4.2 Test Graphs



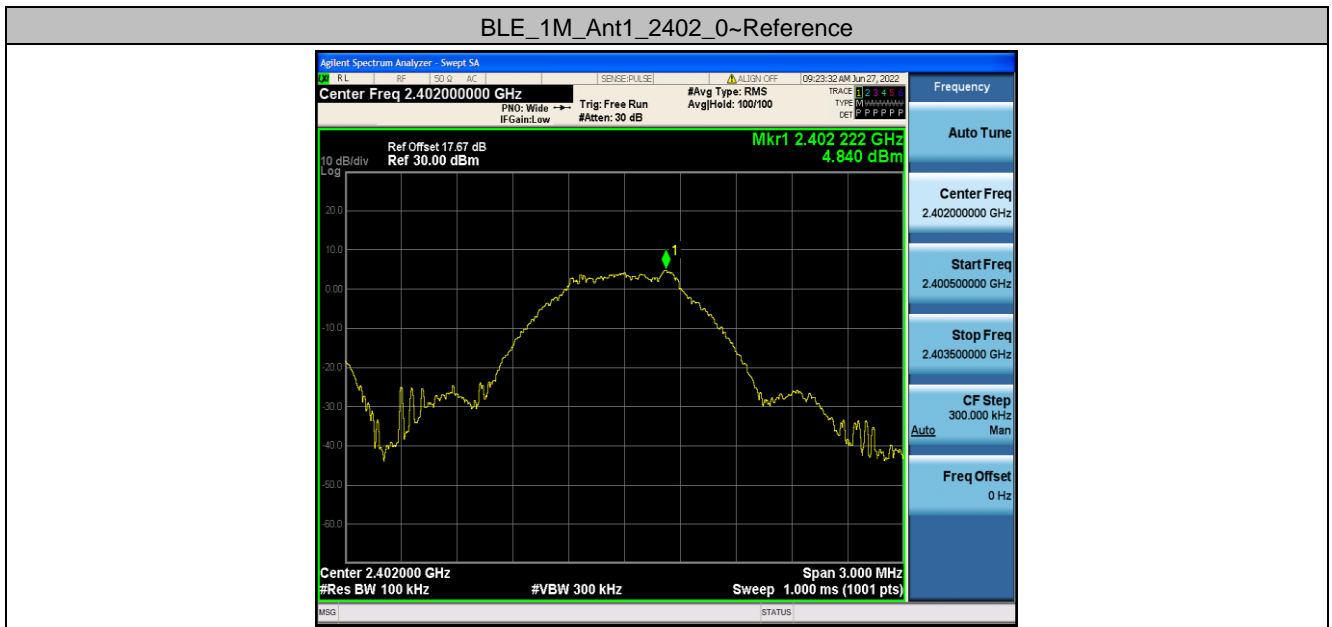
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## 10.5 Appendix E: Conducted Spurious Emission

### 10.5.1 Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	4.84	4.84	---	PASS
			30~1000	---	-48.972	<=-15.16	PASS
			1000~26500	---	-29.748	<=-15.16	PASS
		2440	Reference	5.83	5.83	---	PASS
			30~1000	---	-48.208	<=-14.168	PASS
			1000~26500	---	-30.006	<=-14.168	PASS
		2480	Reference	6.65	6.65	---	PASS
			30~1000	---	-48.873	<=-13.349	PASS
			1000~26500	---	-30.362	<=-13.349	PASS

### 10.5.2 Test Graphs

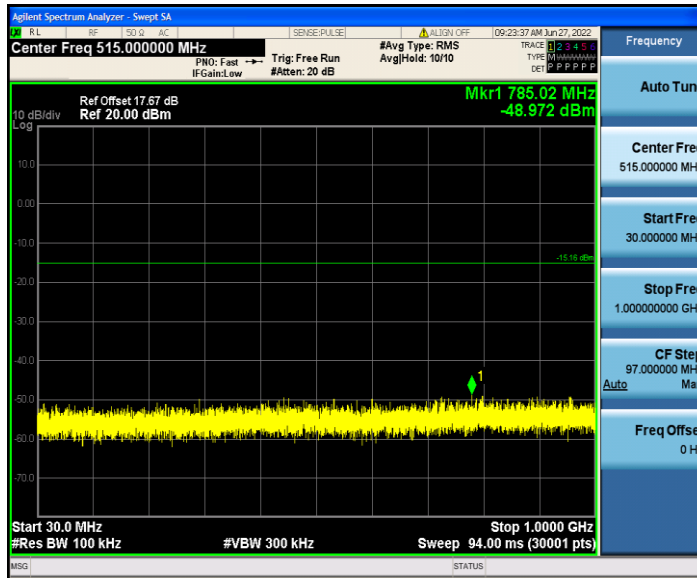


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BLE\_1M\_Ant1\_2402\_30~1000



BLE\_1M\_Ant1\_2402\_1000~26500

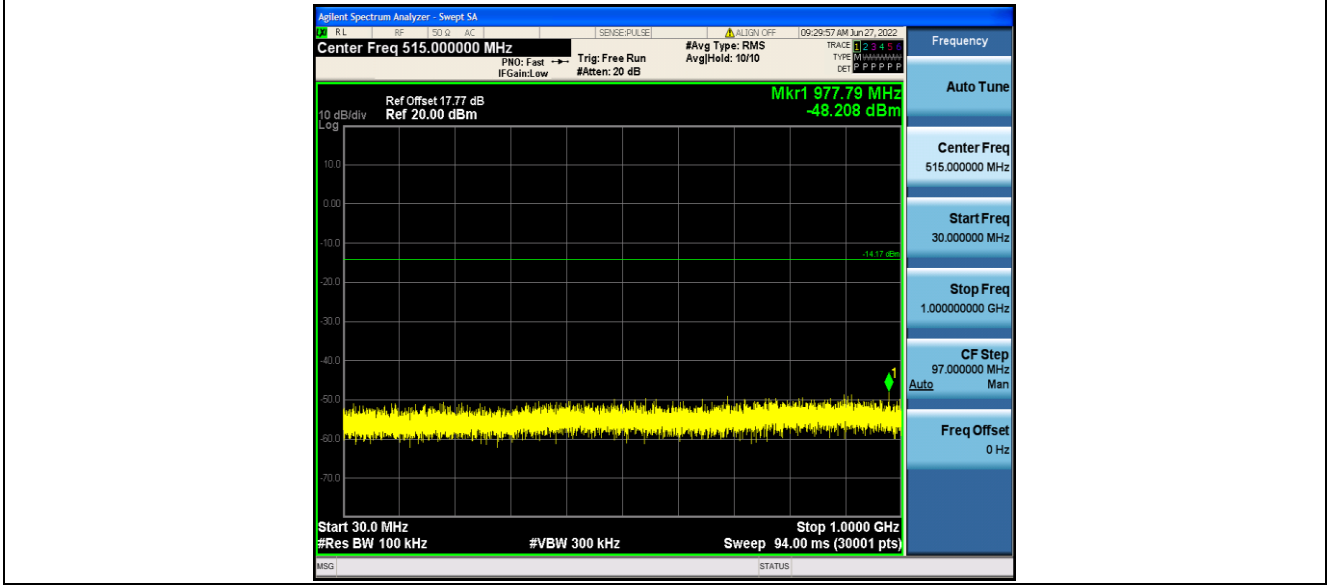


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BLE\_1M\_Ant1\_2440\_0~Reference

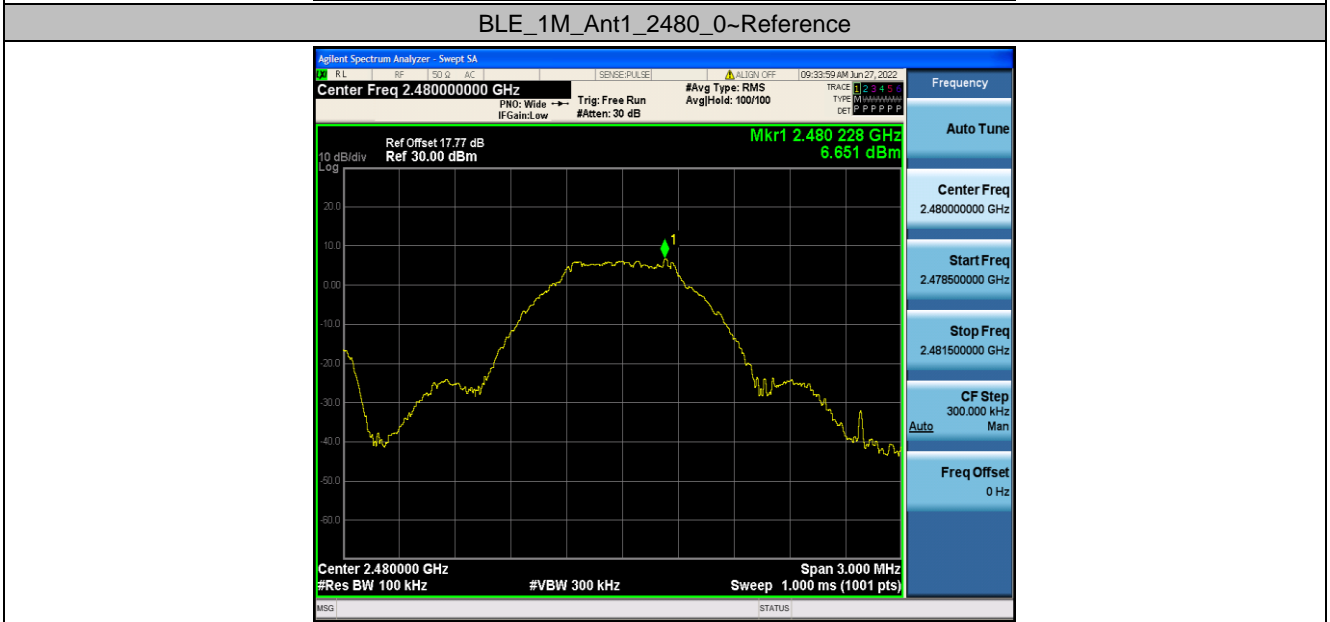
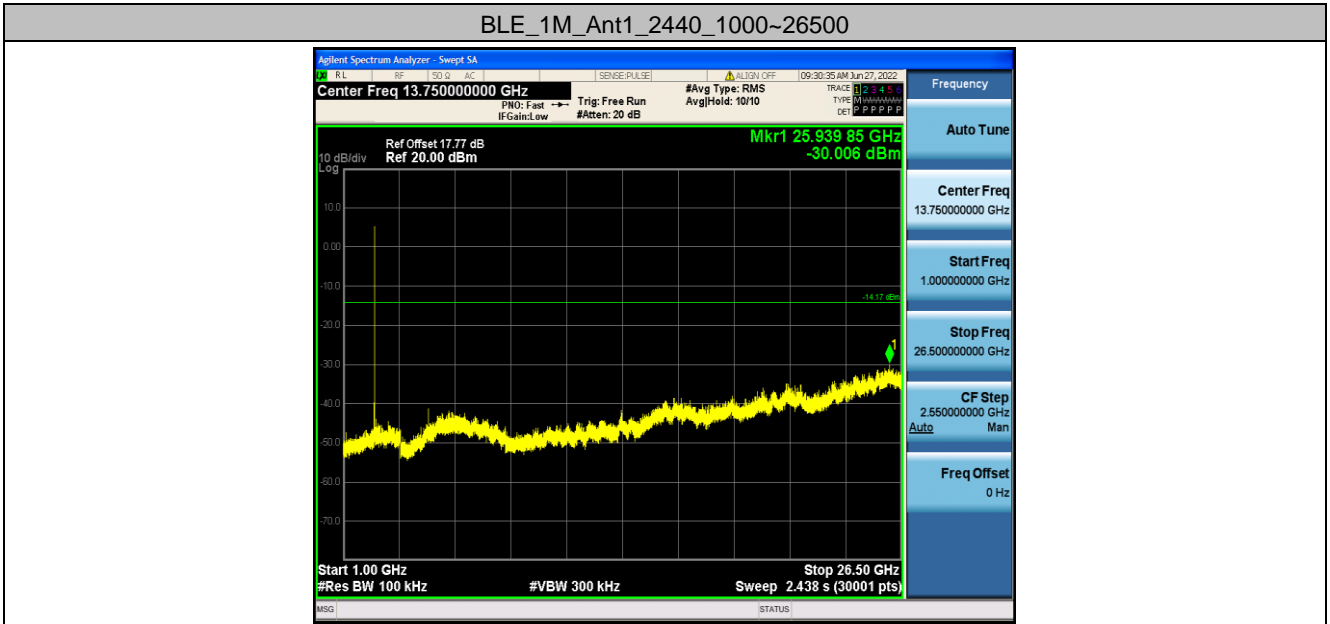


BLE\_1M\_Ant1\_2440\_30~1000



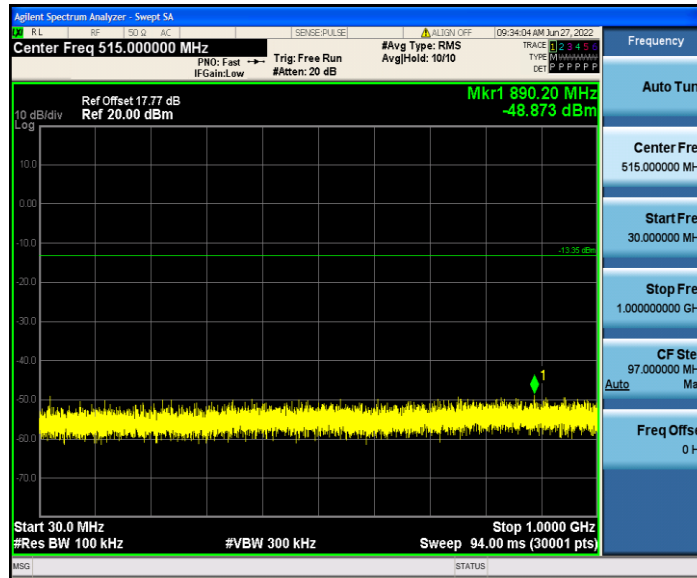
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BLE\_1M\_Ant1\_2480\_30~1000



BLE\_1M\_Ant1\_2480\_1000~26500



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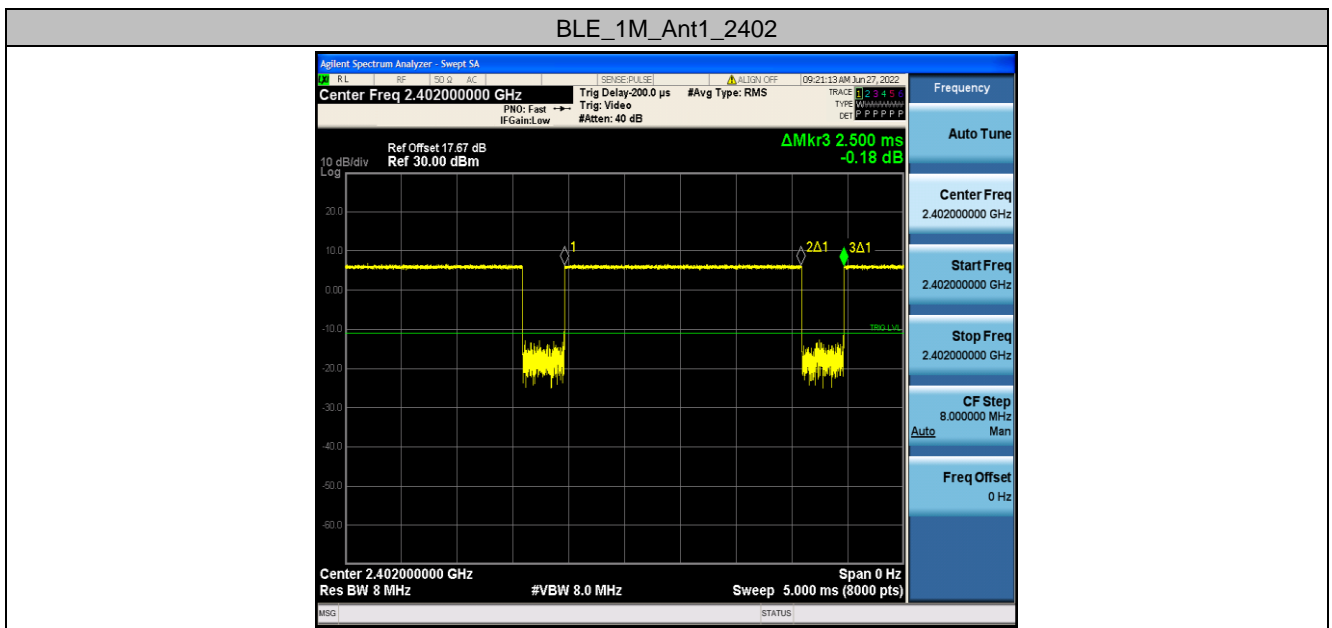


## 10.6 Appendix F: Duty Cycle

### 10.6.1 Test Result

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
BLE_1M	Ant1	2402	2.12	2.51	84.4
		2440	2.11	2.50	84.4
		2480	2.13	2.52	84.4

### 10.6.2 Test Graphs

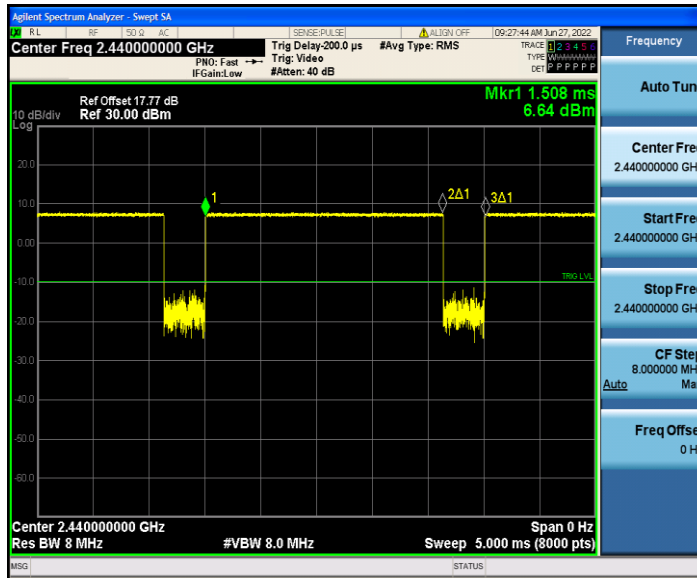


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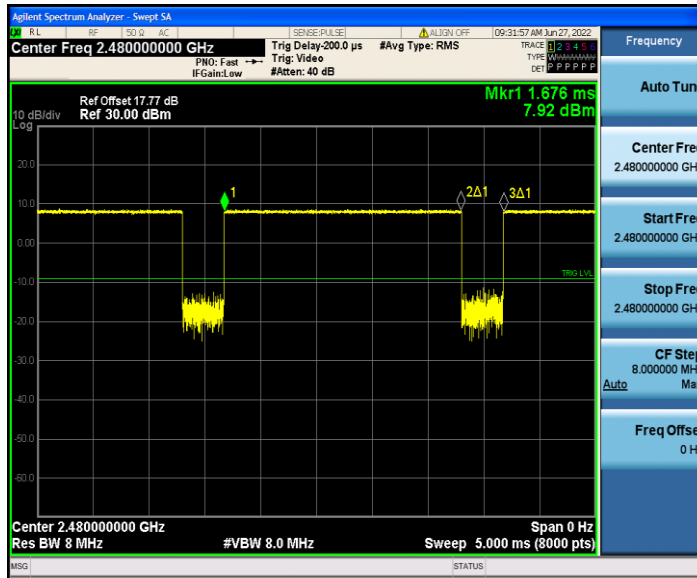
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BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



- End of the Report -



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