

# TEST REPORT

**Application No.:** GZCR2112021513AT  
**Applicant:** Harman International Industries, Incorporated  
**Address of Applicant:** 8500 Balboa Blvd, Northridge, CA 91329, USA  
**Manufacturer:** Harman International Industries, Incorporated  
**Address of Manufacturer:** 8500 Balboa Blvd, Northridge, CA 91329, USA  
**Factory:** Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.  
**Address of Factory:** No. 5 Building, No. 139, Zhouxing Street, Dongchong Town, Nansha District, Guangzhou City, Guangdong Province, China

**Equipment Under Test (EUT):**  
**EUT Name:** Wireless Microphone  
**Model No.:** PARTYBOX ENCORE MIC  
**Trade Mark:** JBL  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2021-12-16  
**Date of Test:** 2022-02-21 to 2022-03-17  
**Date of Issue:** 2022-04-19

<b>Test Result:</b>	<b>Pass*</b>
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\* 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	GZCR211202151301	2022-04-19	Original

Authorized for issue by:			
			
		<hr/> <b>Curry Wu/Project Engineer</b>	
			
		<hr/> <b>Ricky Liu/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 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.249(a))		ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Radiated Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	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 "AA" battery x 2
Cable(s):	N/A
Test Voltage:	DC 3V
Operation Frequency:	2402-2480Mhz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	2.51dBi

### 4.2 Description of Support Units

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

### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
20dB Bandwidth	± 3%
Field Strength of the Fundamental Signal (15.249(a))	± 5.00dB (Below 1GHz):3m;± 4.38dB (30MHz-1GHz):10m;± 4.52dB (1GHz-6GHz);± 4.54dB (above 6GHz)
Restricted Band Around Fundamental Frequency	± 5.00dB (Below 1GHz):3m;± 4.38dB (30MHz-1GHz):10m;± 4.52dB (1GHz-6GHz);± 4.54dB (above 6GHz)
Radiated Emissions Below 1GHz	± 5.00dB (30MHz-1GHz):3m; ± 4.38dB (30MHz-1GHz):10m
Radiated Emissions Above 1GHz	± 4.52dB (1GHz-6GHz);± 4.54dB (above 6GHz)

### 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,  
 198 Kezhu Road, Sciotech 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

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer (10Hz-8.4GHz)	Agilent Technologies	N9020A	SEM004-10	2022-03-03	2023-03-02
MI CABLE	SGS	0.8M	EMC2136	2021-11-02	2023-11-01

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

Restricted Band Around Fundamental Frequency					
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
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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<b>Radiated Emissions Below 1GHz</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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	2021-05-19	2022-05-18
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2021-05-26	2022-05-25
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)-Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22

<b>Radiated Emissions Above 1GHz</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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
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

<b>General used equipment</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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

#### 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 2.51 dBi.

Antenna location: Refer to Internal photos



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## 7 Radio Spectrum Matter Test Results

### 7.1 20dB Bandwidth

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

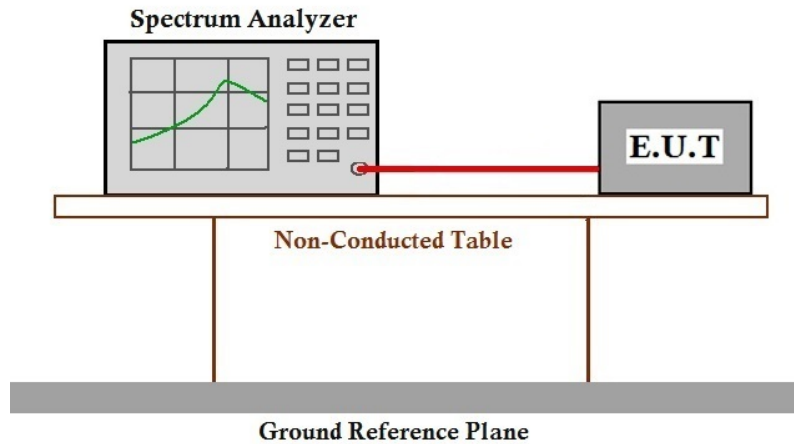
#### 7.1.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.7 °C Humidity: 60.6 % RH Atmospheric Pressure: 1008 mbar

#### 7.1.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in transmitting with modulation mode.

#### 7.1.3 Test Setup Diagram



#### 7.1.4 Measurement Procedure and Data

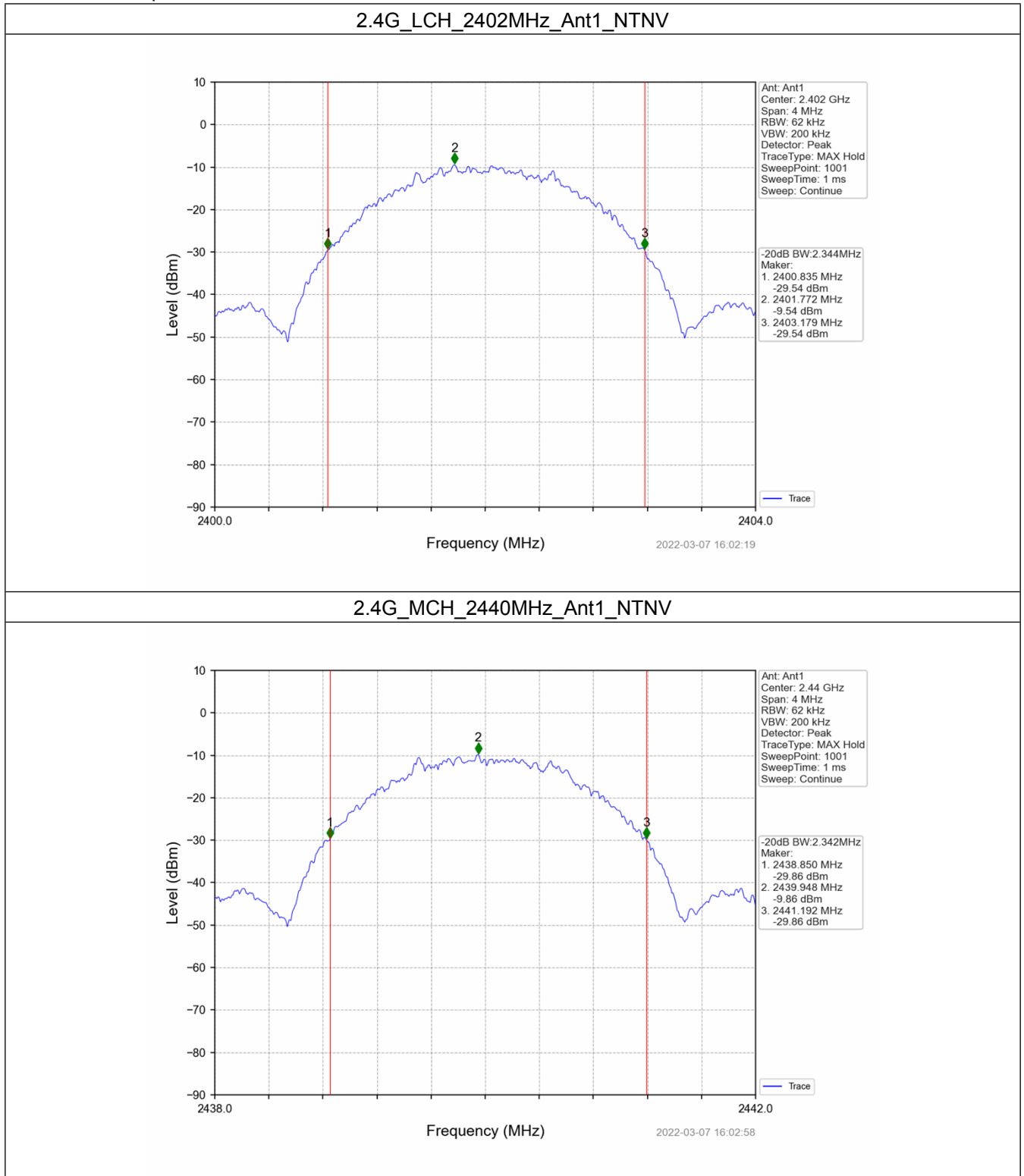
##### 1. 20dB BW

##### 1.1 Test Result

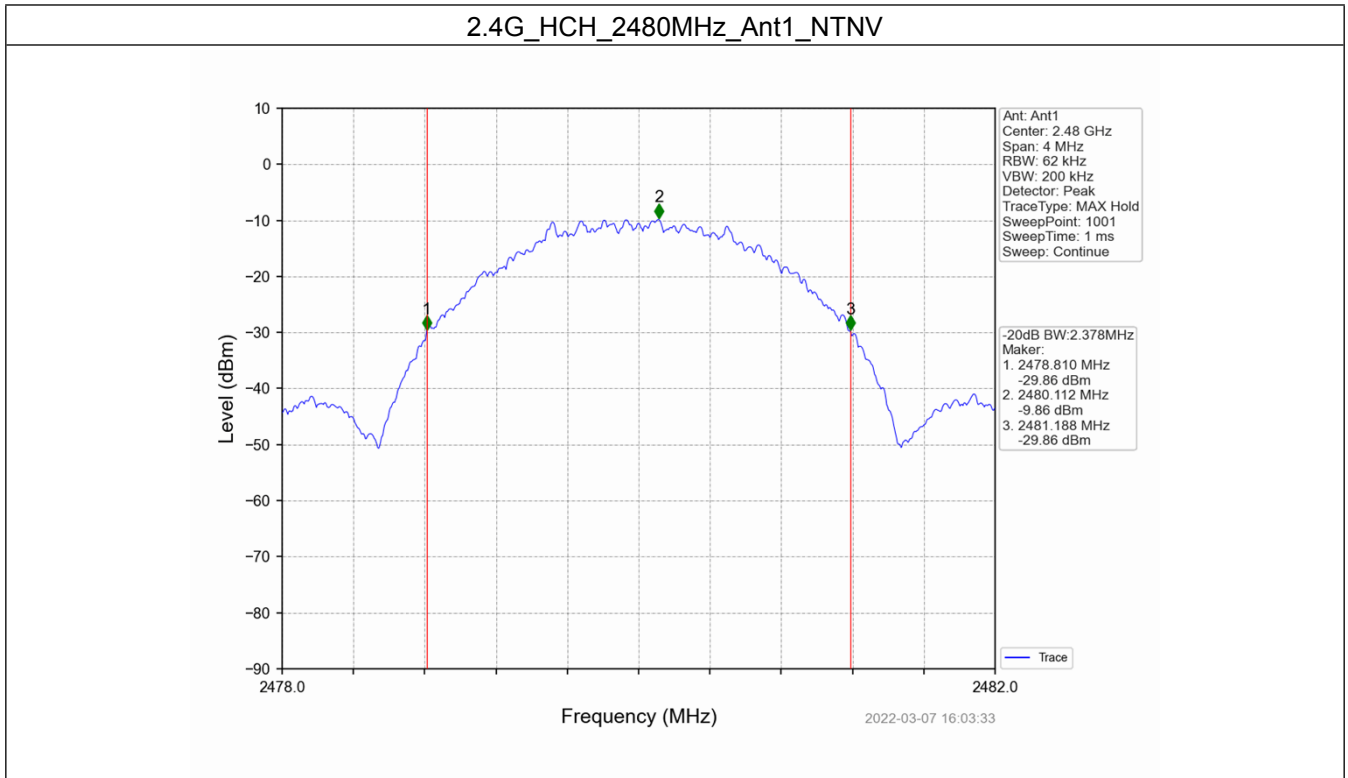
Mode	TX Type	Frequency (MHz)	Ant	20dB Bandwidth (MHz)	Verdict
				Result	
2.4G	SISO	2402	1	2.344	Pass
		2440	1	2.342	Pass
		2480	1	2.378	Pass



### 1.2.2 Test Graph



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

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)

Test Method: ANSI C63.10 (2013) Section 6.5&6.6

Limit:

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

Remark: The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

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

### 7.2.1 E.U.T. Operation

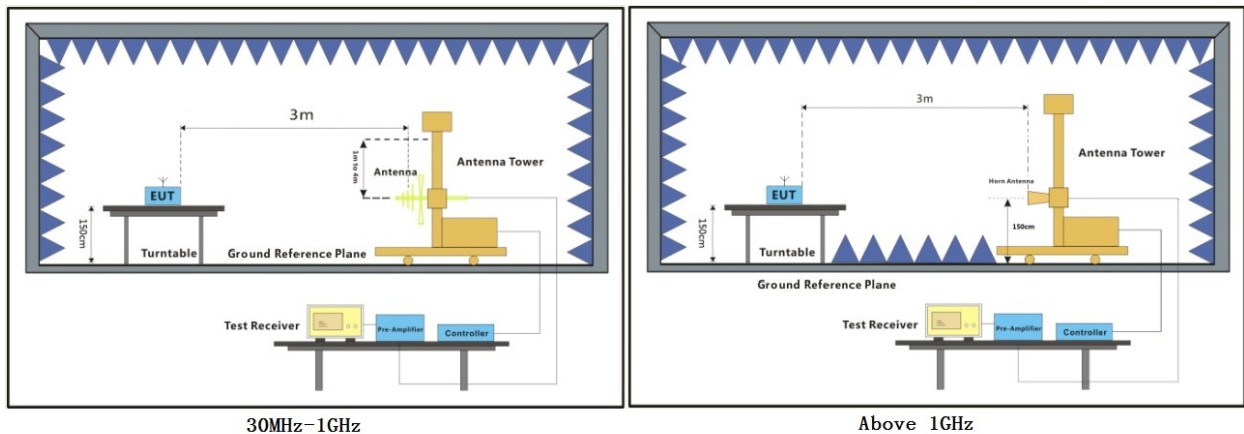
Operating Environment:

Temperature: 17.1 °C Humidity: 59.2 % RH Atmospheric Pressure: 1014 mbar

### 7.2.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in transmitting with modulation mode.

### 7.2.3 Test Setup Diagram



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**7.2.4 Measurement Procedure and Data**

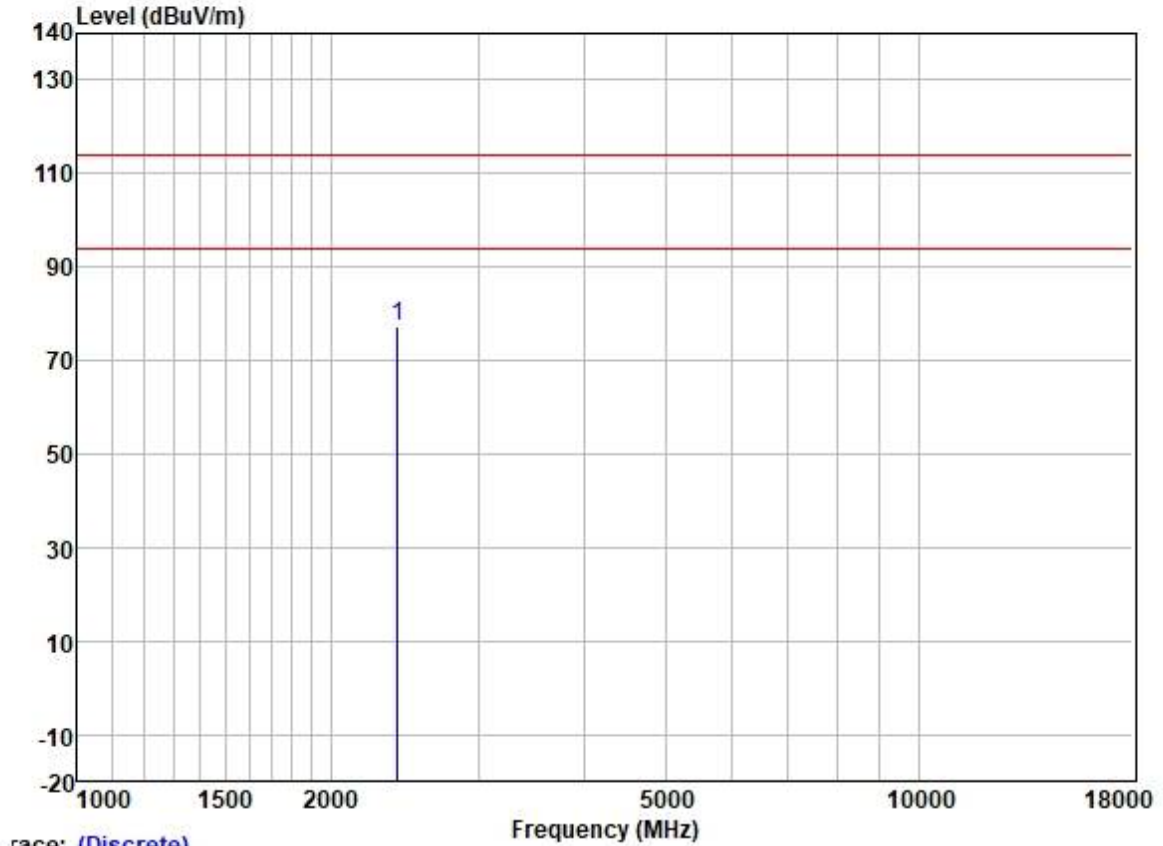
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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

Mode	TX Type	Frequency (MHz)	Ant	Max Field strength of the Fundamental Signal(dBuV/m)	Verdict
2.4G	SISO	2402	1	89.92	Pass
		2440	1	89.94	Pass
		2480	1	89.47	Pass



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



Trace: (Discrete)

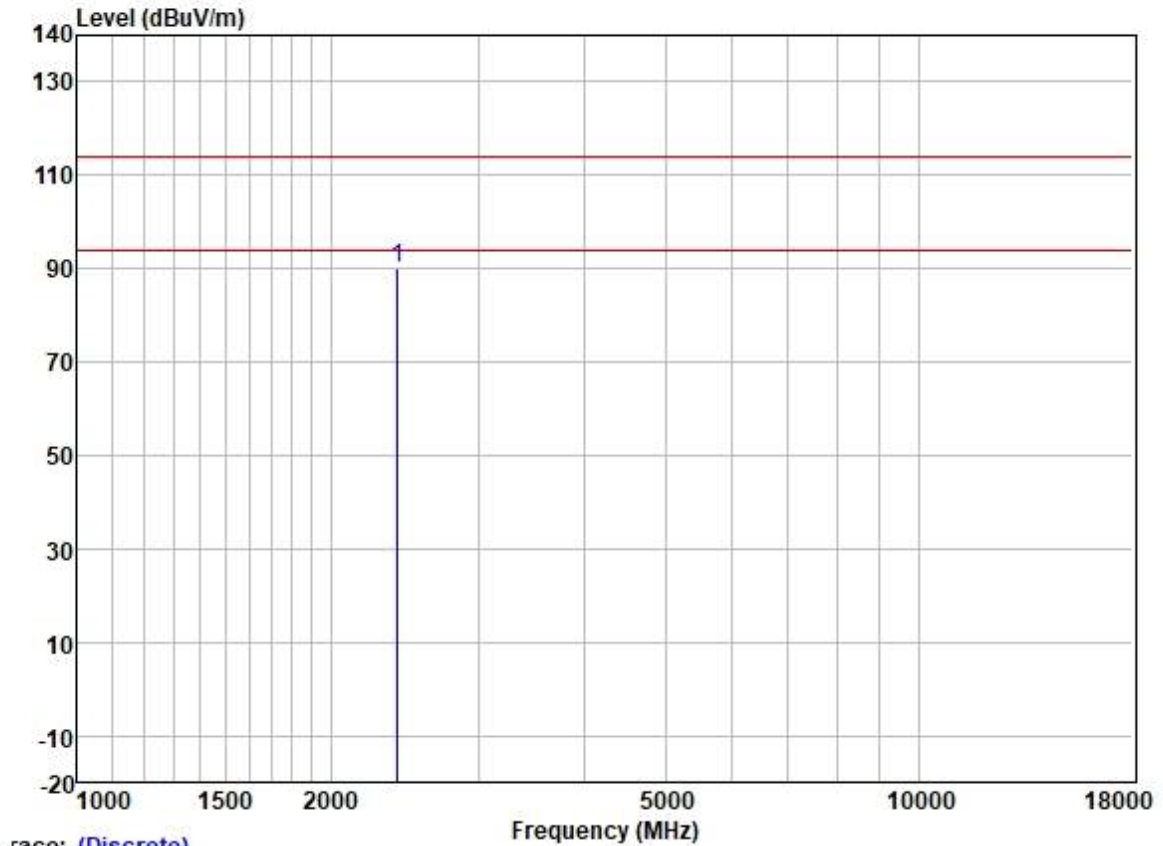
	Read	Antenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2402.753	84.17	27.35	3.51	37.59	77.44	114.00	-36.56	VERTICAL Peak



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



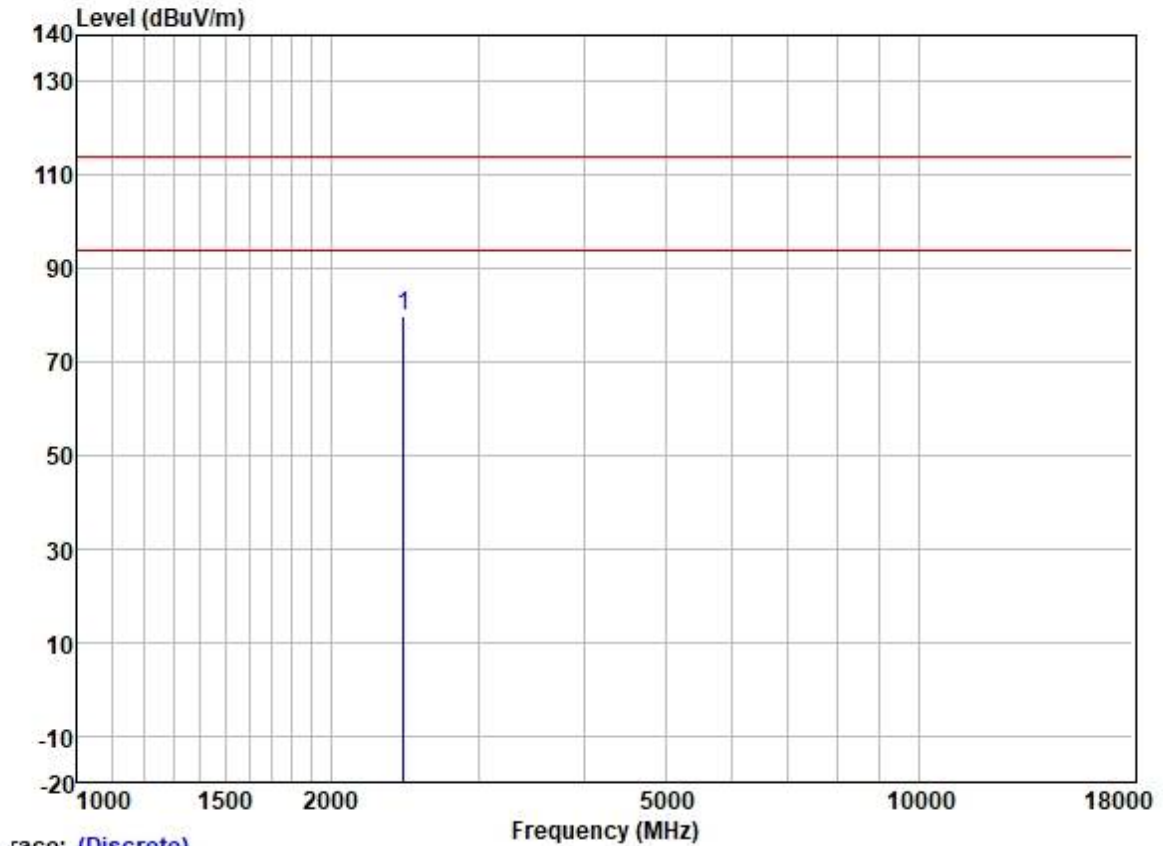
Trace: (Discrete)

	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	2402.753	96.65	27.35	3.51	37.59	89.92	114.00	-24.08	HORIZONTAL Peak



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



Trace: (Discrete)

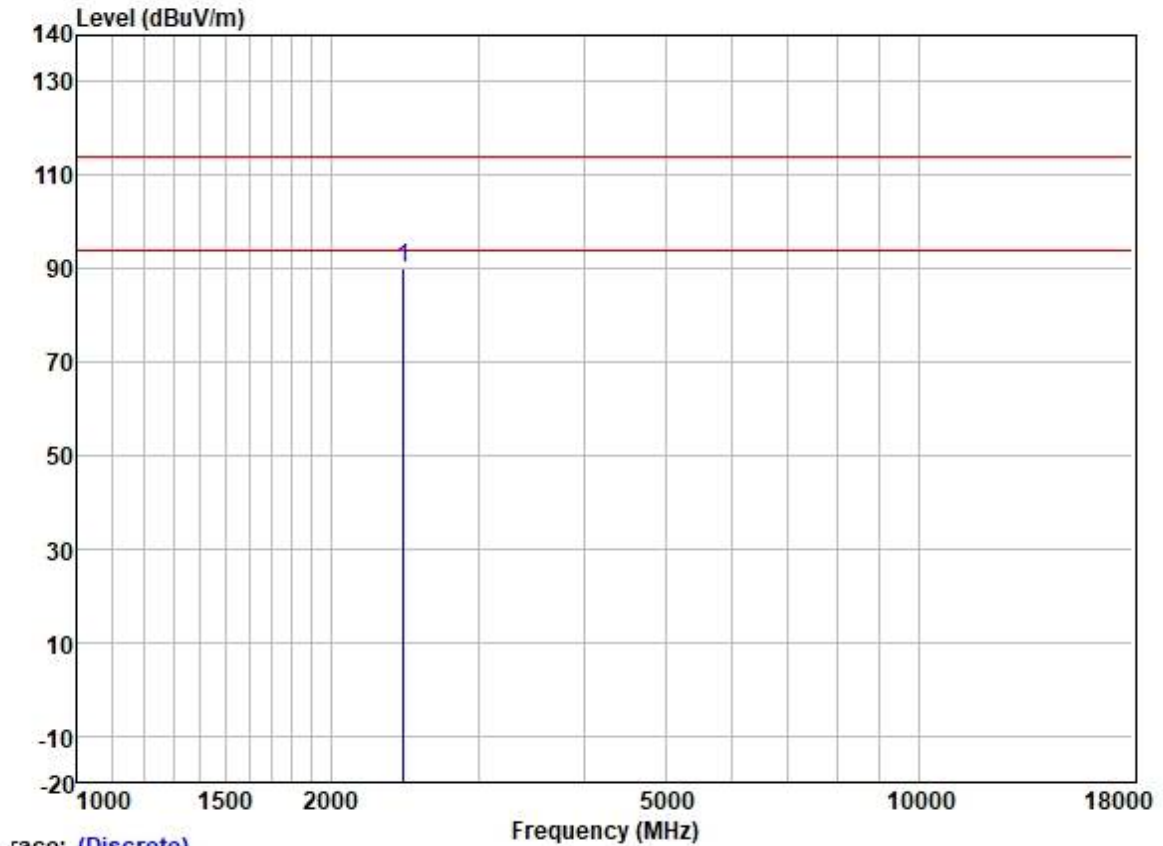
	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2440.751	86.47	27.42	3.52	37.58	79.83	114.00	-34.17	VERTICAL Peak



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



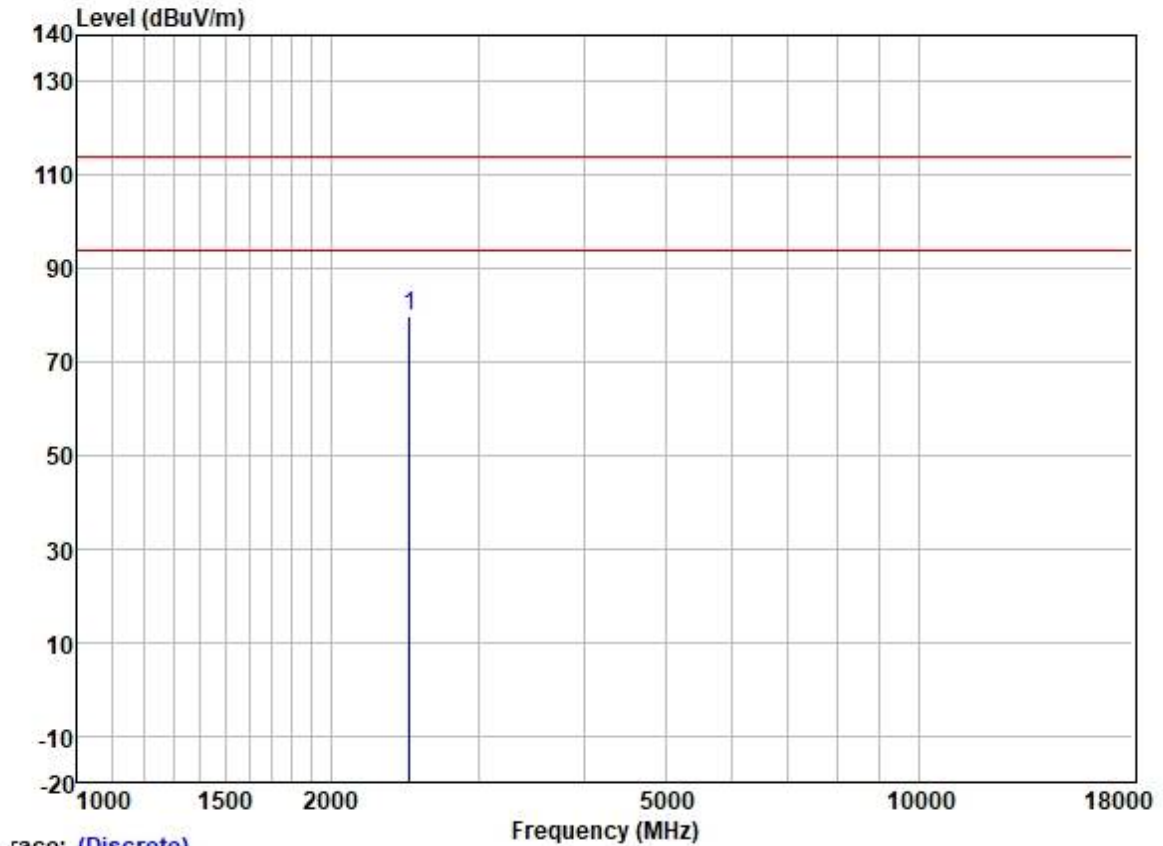
Trace: (Discrete)

	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	2440.751	96.58	27.42	3.52	37.58	89.94	114.00	-24.06	HORIZONTAL Peak



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



Trace: (Discrete)

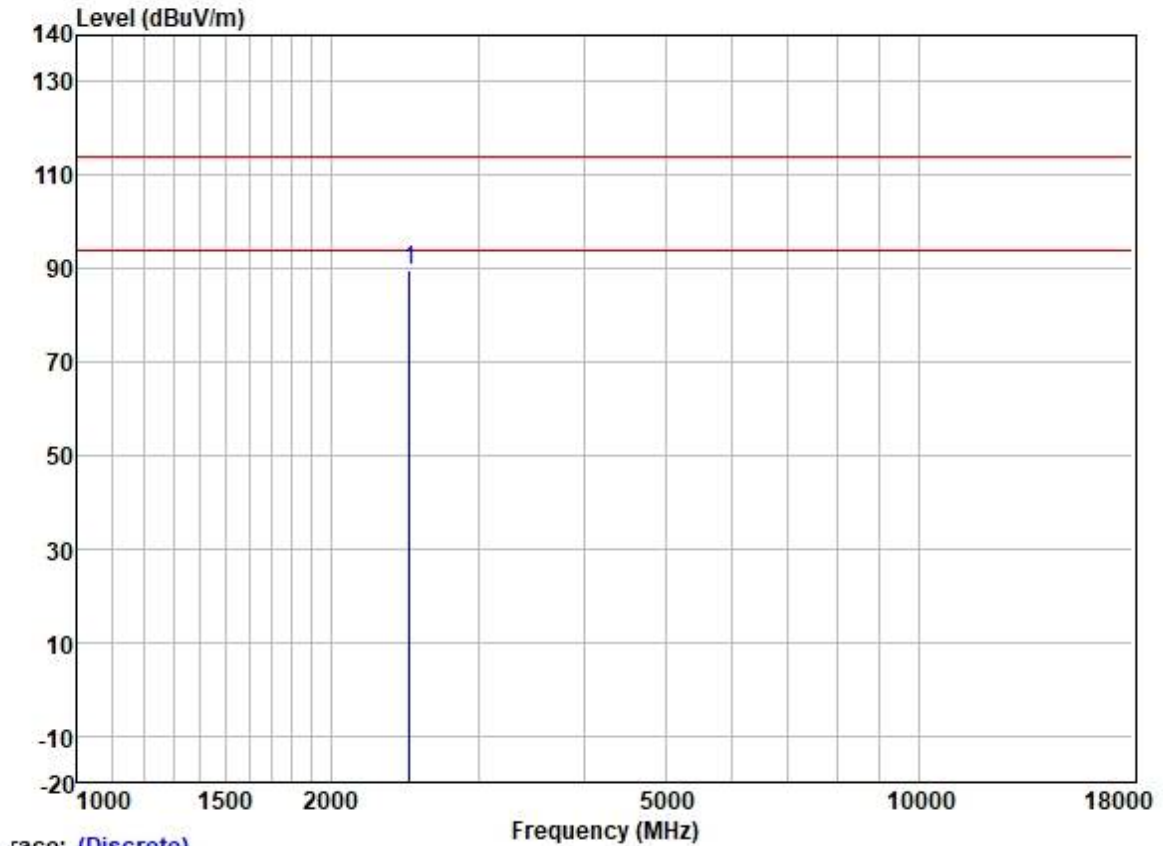
	Read	Antenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2480.157	86.36	27.47	3.53	37.57	79.79	114.00	-34.21	VERTICAL Peak



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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	2480.157	96.04	27.47	3.53	37.57	89.47	114.00	-24.53	HORIZONTAL Peak



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### 7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209

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

Limit:

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

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

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

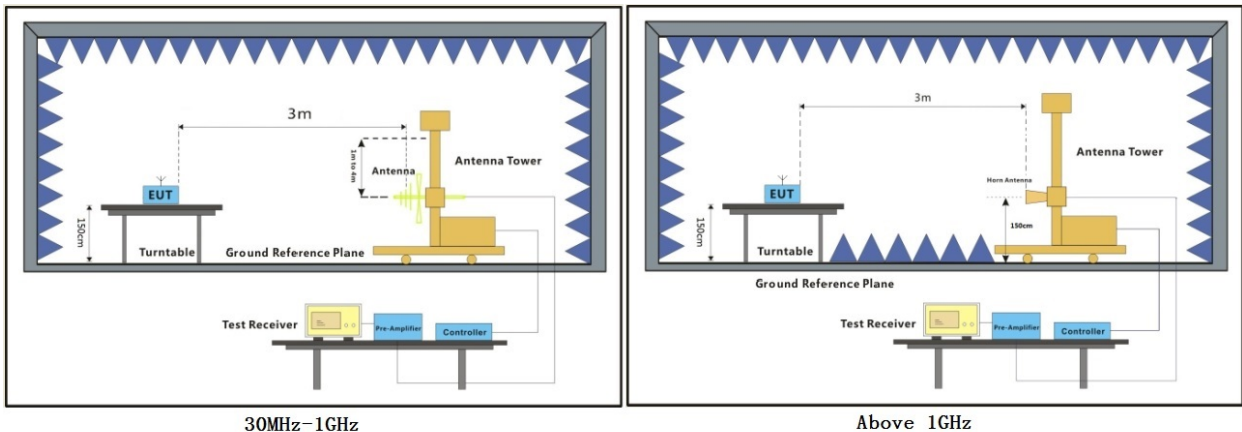
Operating Environment:

Temperature: 17.1 °C Humidity: 59.3 % RH Atmospheric Pressure: 1014 mbar

#### 7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in transmitting with modulation mode.

#### 7.3.3 Test Setup Diagram



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 Guangzhou Branch Testing Center EEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

**7.3.4 Measurement Procedure and Data**

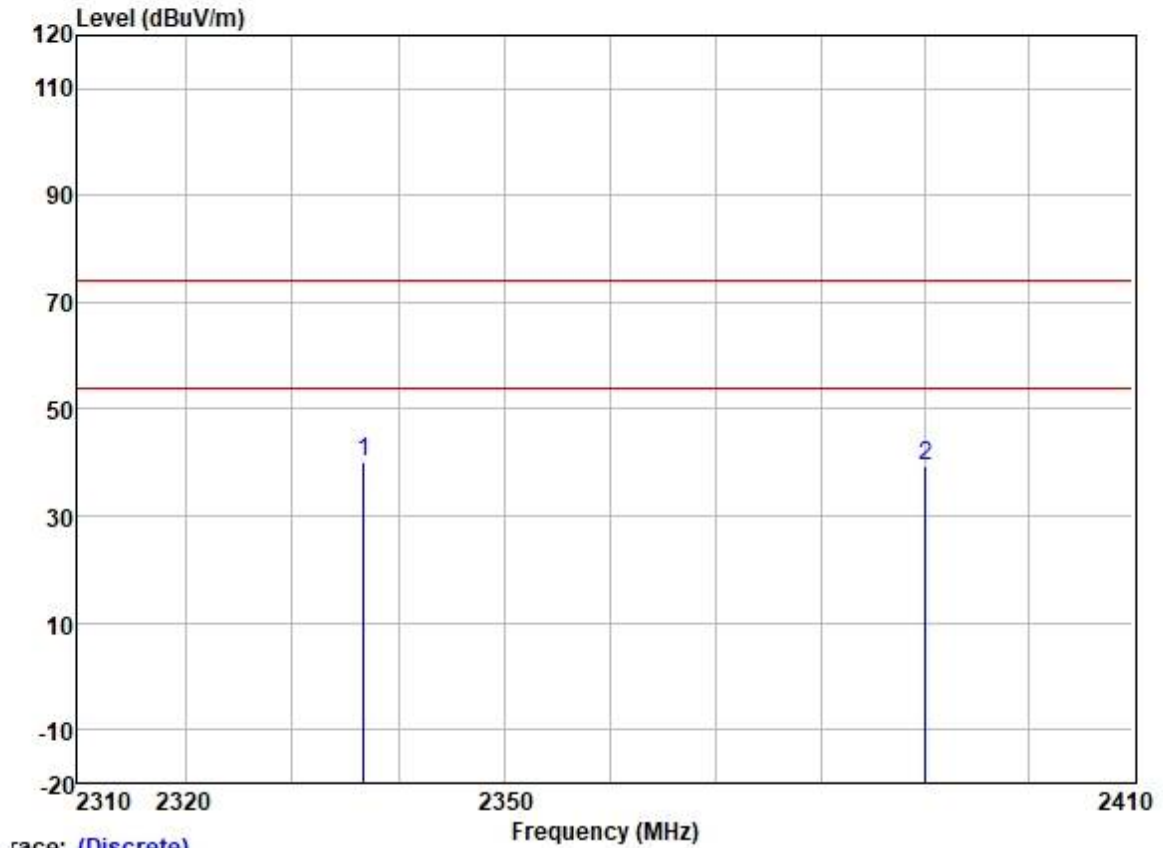
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5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



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



Trace: (Discrete)

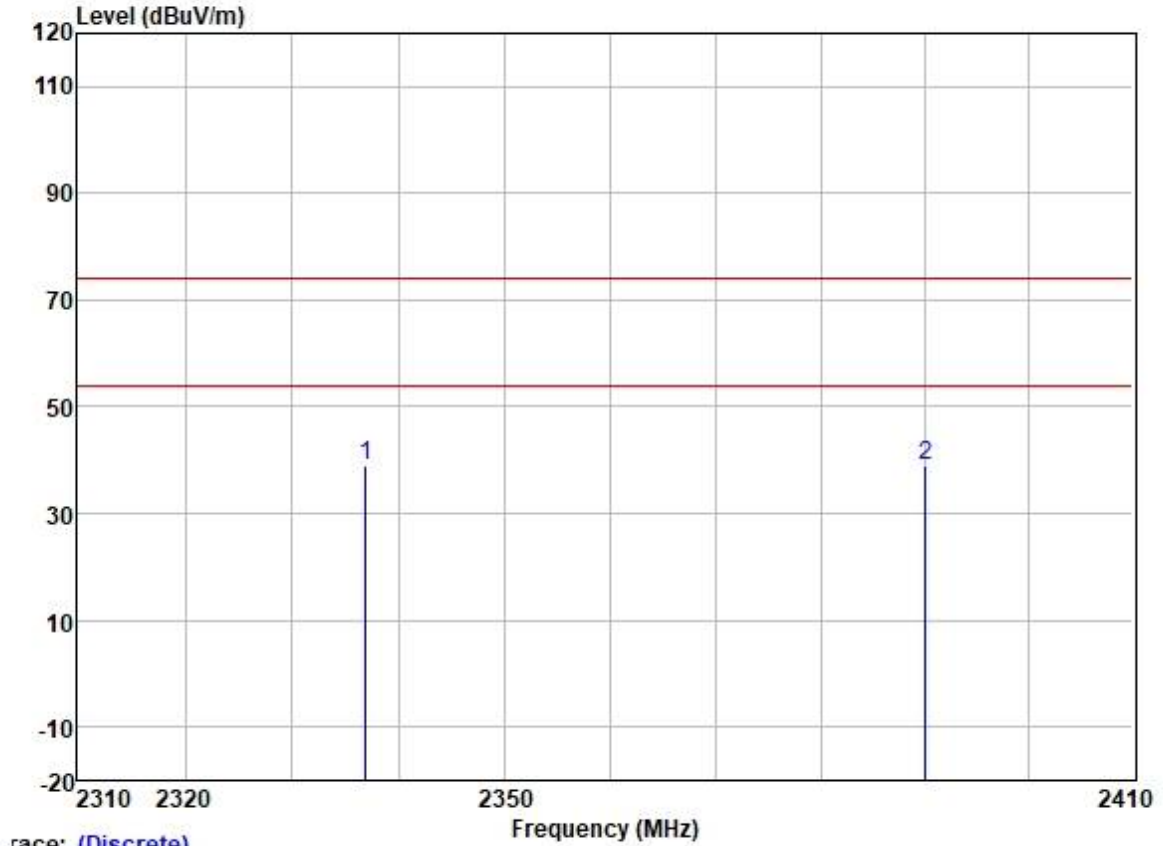
	Read Freq	Antenna Level	Cable Factor	Preamp Loss	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB		
1	2336.683	47.01	27.22	3.47	37.62	40.08	74.00	-33.92	VERTICAL Peak
2	2390.000	46.07	27.33	3.50	37.59	39.31	74.00	-34.69	VERTICAL Peak



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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	2336.881	46.04	27.22	3.47	37.62	39.11	74.00	-34.89 HORIZONTAL Peak
2	2390.000	45.71	27.33	3.50	37.59	38.95	74.00	-35.05 HORIZONTAL Peak

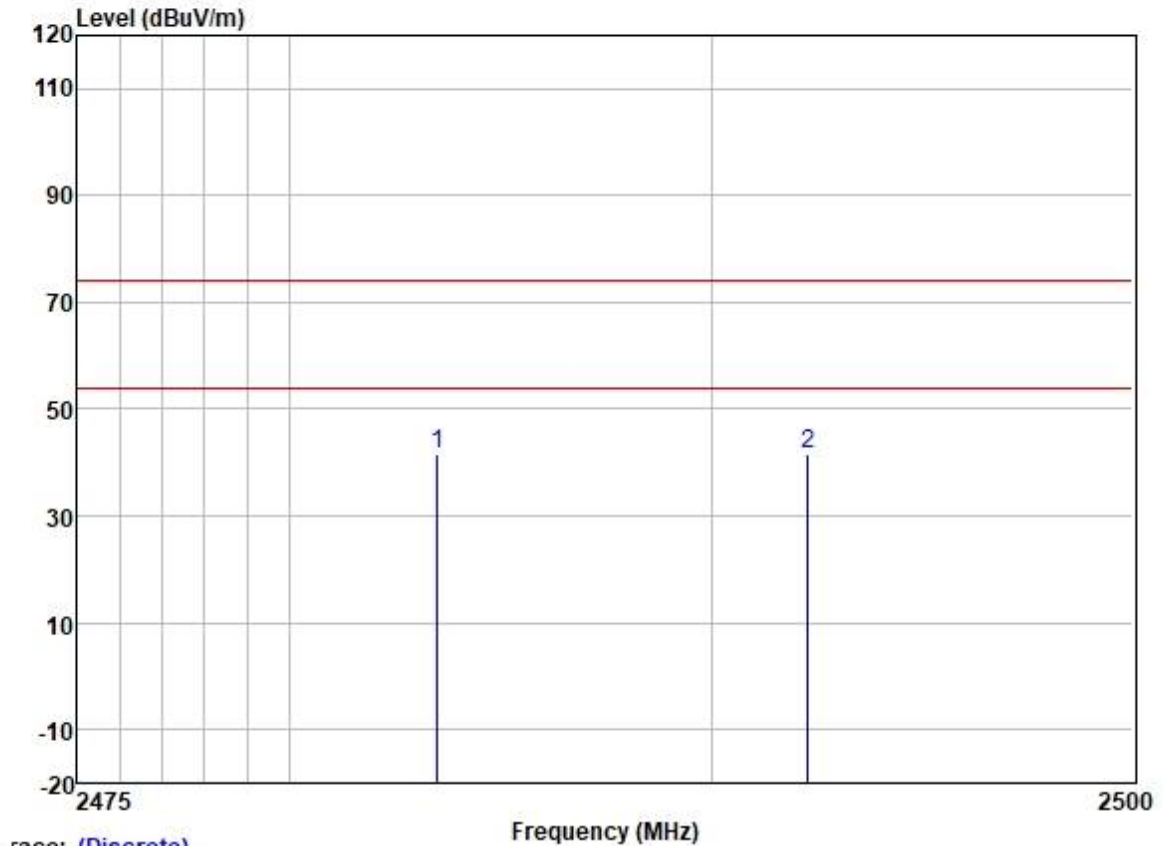


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Trace: (Discrete)

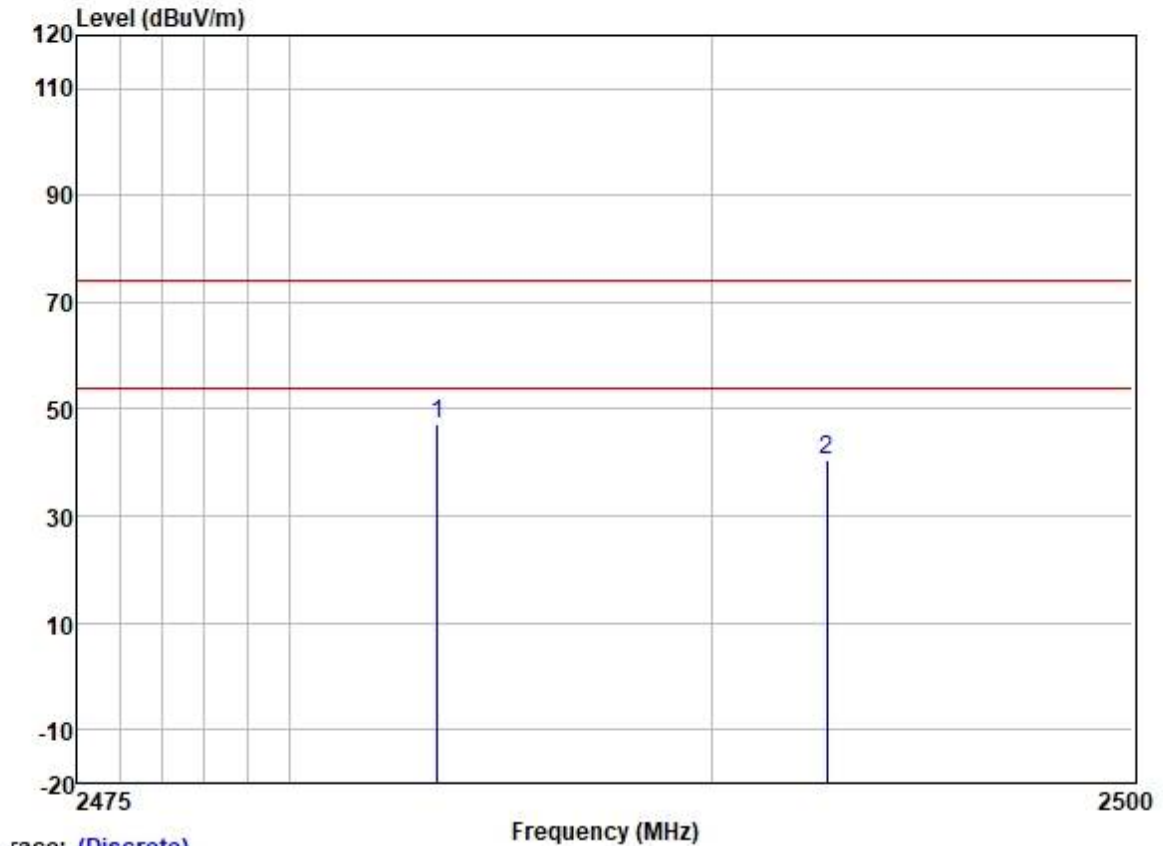
	Read	Antenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	48.14	27.48	3.54	37.57	41.59	74.00	-32.41	VERTICAL Peak
2	2492.273	48.02	27.49	3.54	37.56	41.49	74.00	-32.51	VERTICAL Peak



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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	53.69	27.48	3.54	37.57	47.14	74.00	-26.86	HORIZONTAL Peak
2	2492.724	47.15	27.49	3.54	37.56	40.62	74.00	-33.38	HORIZONTAL Peak



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### 7.4 Radiated Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

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

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

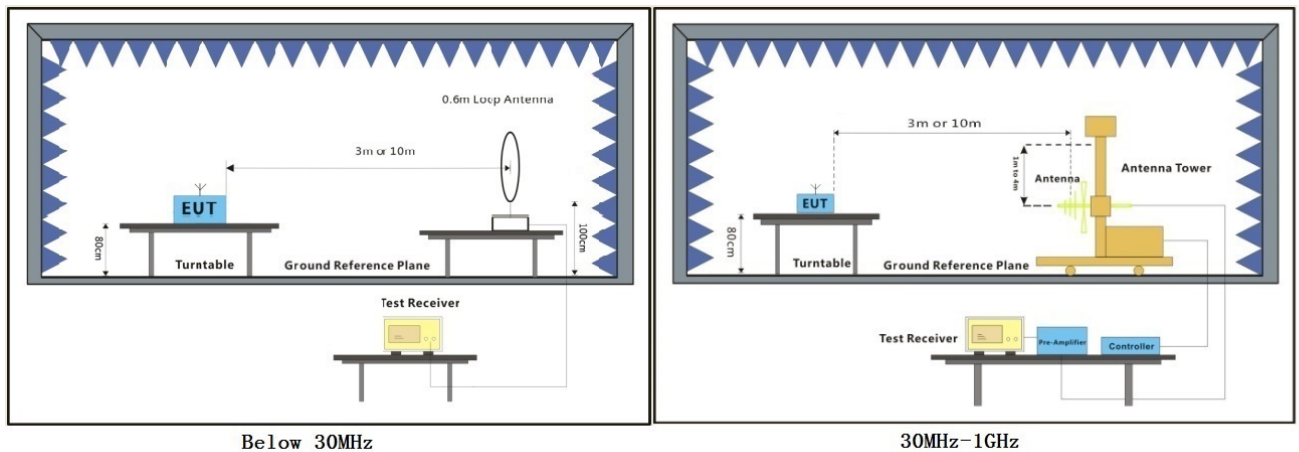
Operating Environment:

Temperature: 23 °C Humidity: 52 % RH Atmospheric Pressure: 1014 mbar

#### 7.4.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in transmitting with modulation mode.

#### 7.4.3 Test Setup Diagram



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**7.4.4 Measurement Procedure and Data**

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

Remark:

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

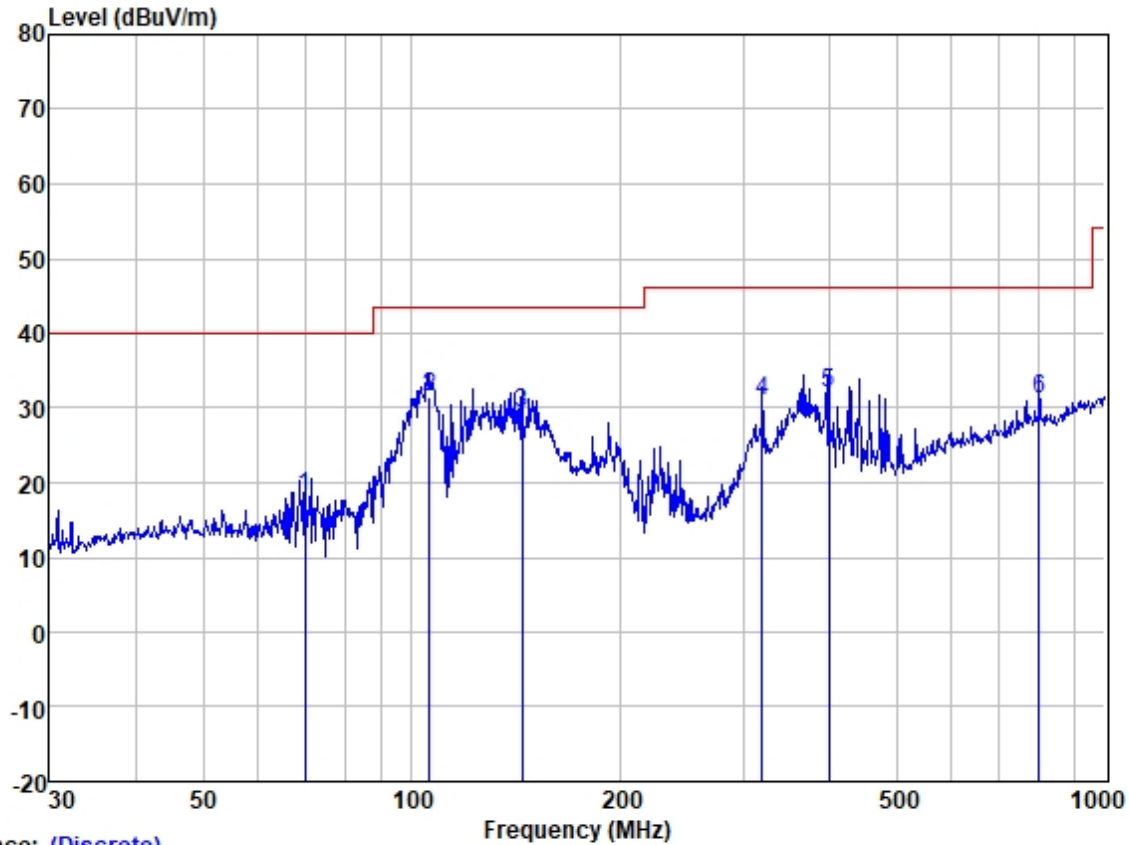


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Test Mode: 00; Polarity: Horizontal



Trace: (Discrete)

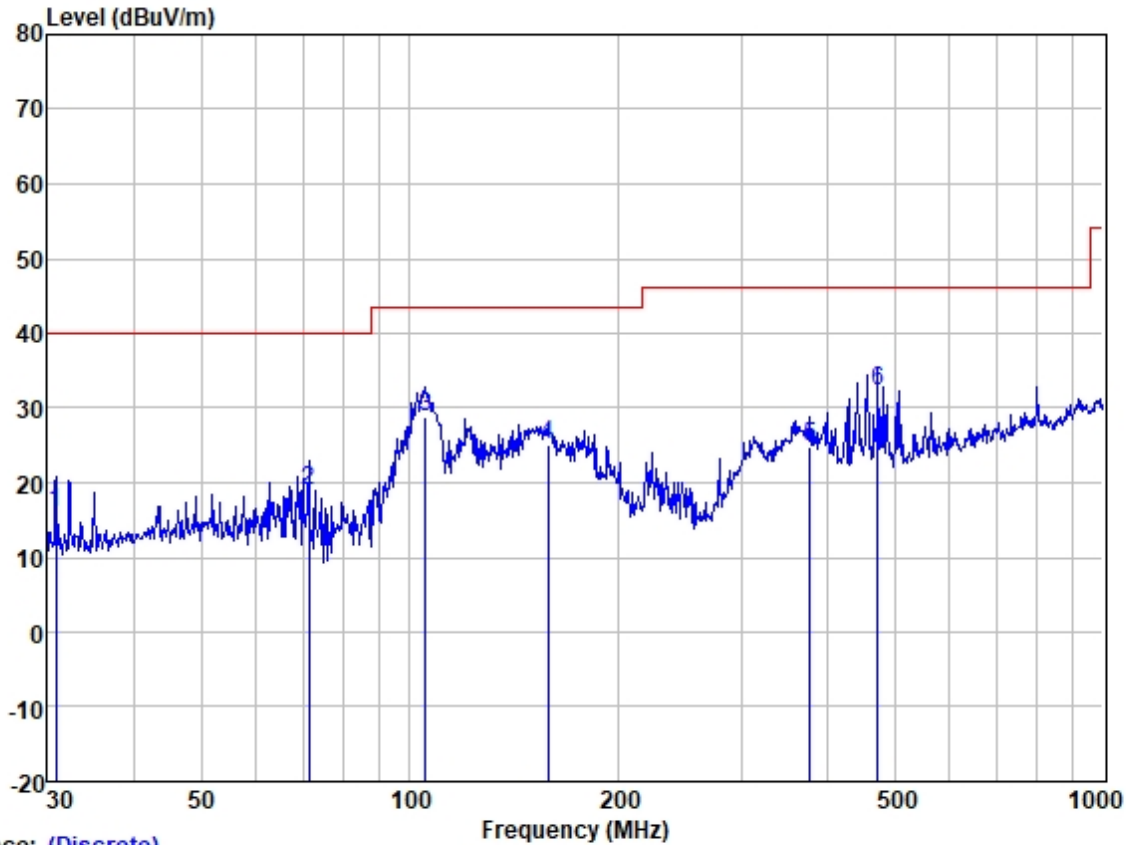
Site : SGS  
Job :  
Model : M11  
Power :  
Test Mode :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	70.090	31.96	11.80	1.40	27.13	18.03	40.00	-21.97	HORIZONTAL	QP
2	106.013	47.21	9.61	1.68	27.07	31.43	43.50	-12.07	HORIZONTAL	QP
3	144.335	41.03	13.27	2.01	26.87	29.44	43.50	-14.06	HORIZONTAL	QP
4	319.937	40.51	14.00	3.01	26.66	30.86	46.00	-15.14	HORIZONTAL	QP
5	399.030	39.87	15.39	3.93	27.32	31.87	46.00	-14.13	HORIZONTAL	QP
6	801.786	31.00	22.31	5.99	28.03	31.27	46.00	-14.73	HORIZONTAL	QP



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Test Mode: 00; Polarity: Vertical



Trace: (Discrete)

Site : SGS  
Job :  
Model : M11  
Power :  
Test Mode :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	30.853	30.11	11.97	1.01	27.20	15.89	40.00	-24.11	VERTICAL	QP
2	71.581	33.34	11.34	1.41	27.12	18.97	40.00	-21.03	VERTICAL	QP
3	105.272	44.65	9.51	1.68	27.07	28.77	43.50	-14.73	VERTICAL	QP
4	158.112	36.22	13.41	2.12	26.80	24.95	43.50	-18.55	VERTICAL	QP
5	377.259	33.43	15.13	3.43	27.23	24.76	46.00	-21.24	VERTICAL	QP
6	472.176	38.85	17.22	4.13	27.86	32.34	46.00	-13.66	VERTICAL	QP



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**7.5 Radiated Emissions Above 1GHz**

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

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

Limit:

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

**7.5.1 E.U.T. Operation**

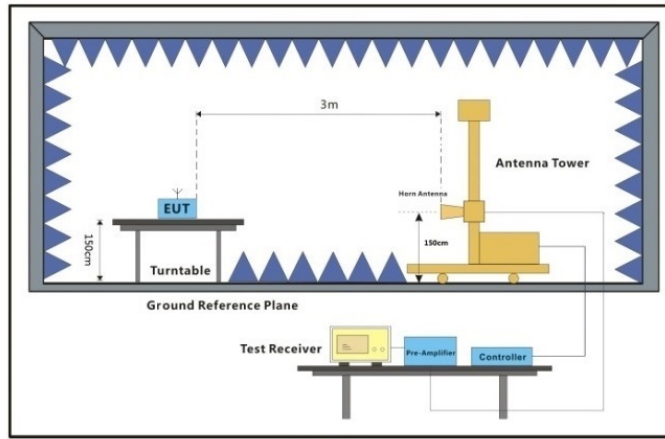
Operating Environment:

Temperature: 17.1 °C Humidity: 59.3 % RH Atmospheric Pressure: 1014 mbar

**7.5.2 Test Mode Description**

Pre-scan / Mode	Description
Final test Code	
Final test 00	TX mode_Keep the EUT in transmitting with modulation mode.

**7.5.3 Test Setup Diagram**



Above 1GHz



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**7.5.4 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 18GHz to 40GHz, 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.
- 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

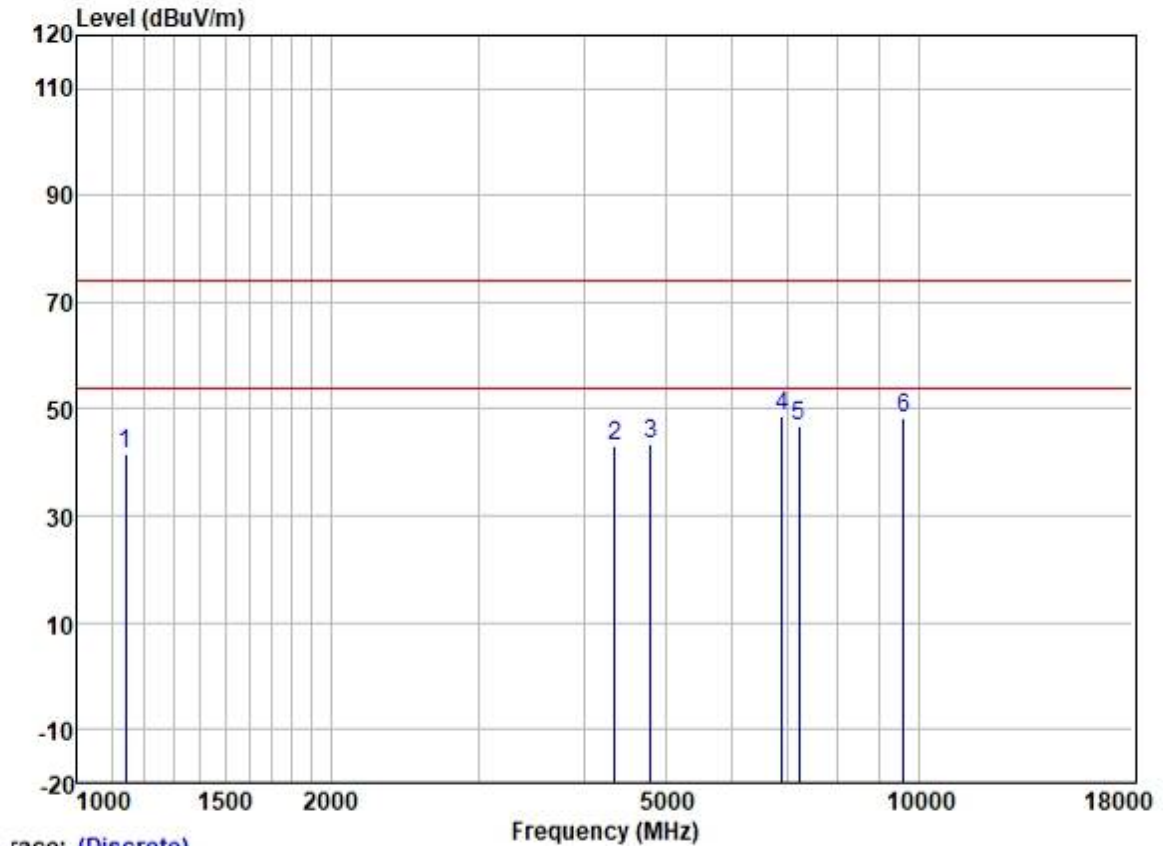


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



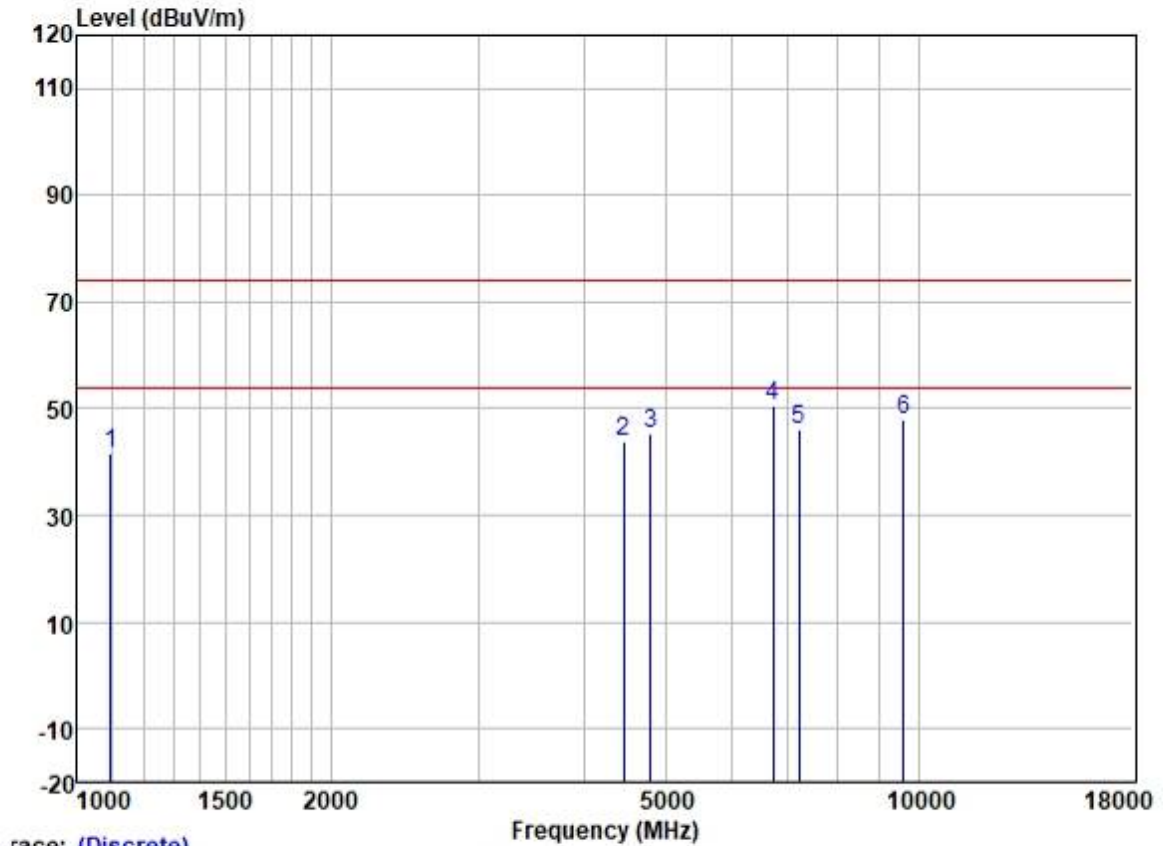
Trace: (Discrete)

	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	1142.201	48.26	24.47	7.23	38.42	41.54	74.00	-32.46	VERTICAL	peak
2	4354.454	44.54	30.59	4.88	36.81	43.20	74.00	-30.80	VERTICAL	peak
3	4804.000	43.67	31.42	5.20	36.83	43.46	74.00	-30.54	VERTICAL	peak
4	6874.906	44.31	34.82	6.71	37.16	48.68	74.00	-25.32	VERTICAL	peak
5	7206.000	42.07	35.54	6.68	37.38	46.91	74.00	-27.09	VERTICAL	peak
6	9608.000	39.81	38.37	7.50	37.42	48.26	74.00	-25.74	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	1096.904	48.02	24.36	7.61	38.45	41.54	74.00	-32.46	HORIZONTAL	peak
2	4456.315	44.88	30.75	4.86	36.81	43.68	74.00	-30.32	HORIZONTAL	peak
3	4804.000	45.68	31.42	5.20	36.83	45.47	74.00	-28.53	HORIZONTAL	peak
4	6717.762	46.52	34.44	6.63	37.09	50.50	74.00	-23.50	HORIZONTAL	peak
5	7206.000	41.23	35.54	6.68	37.38	46.07	74.00	-27.93	HORIZONTAL	peak
6	9608.000	39.66	38.37	7.50	37.42	48.11	74.00	-25.89	HORIZONTAL	peak

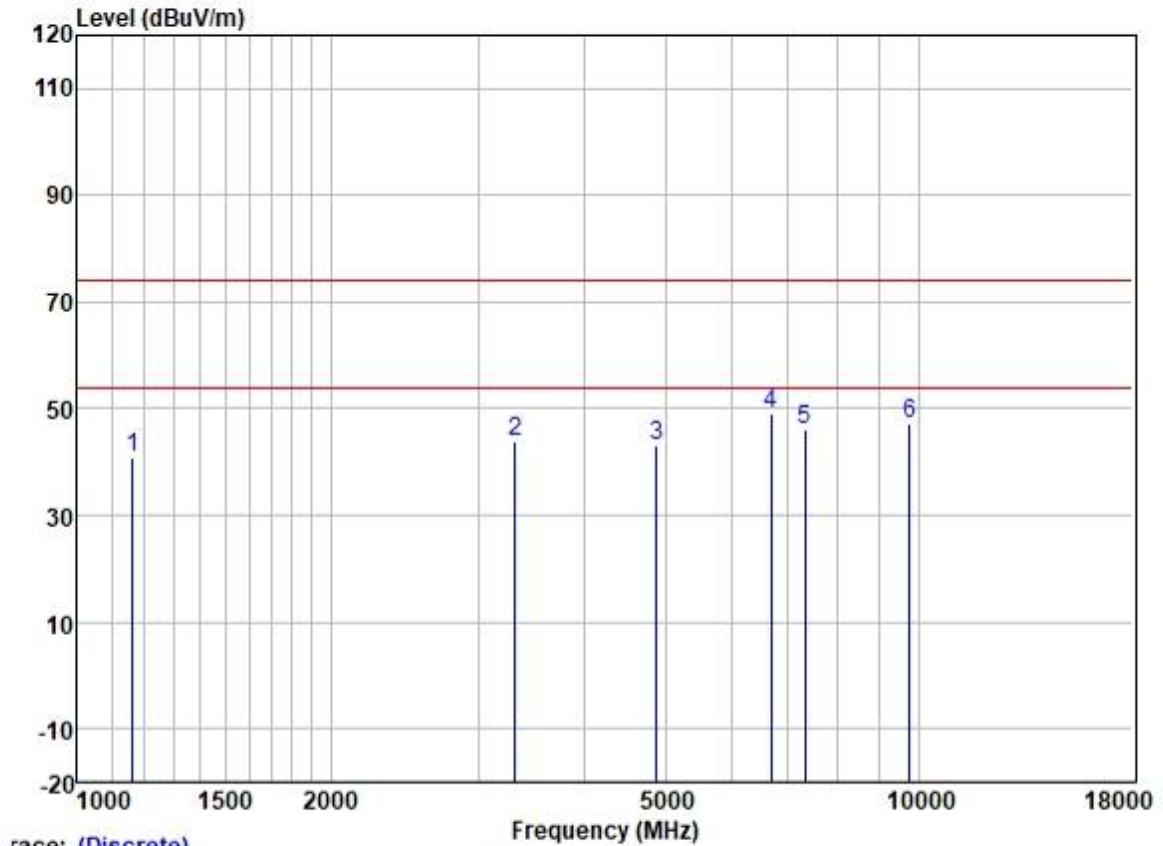


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle



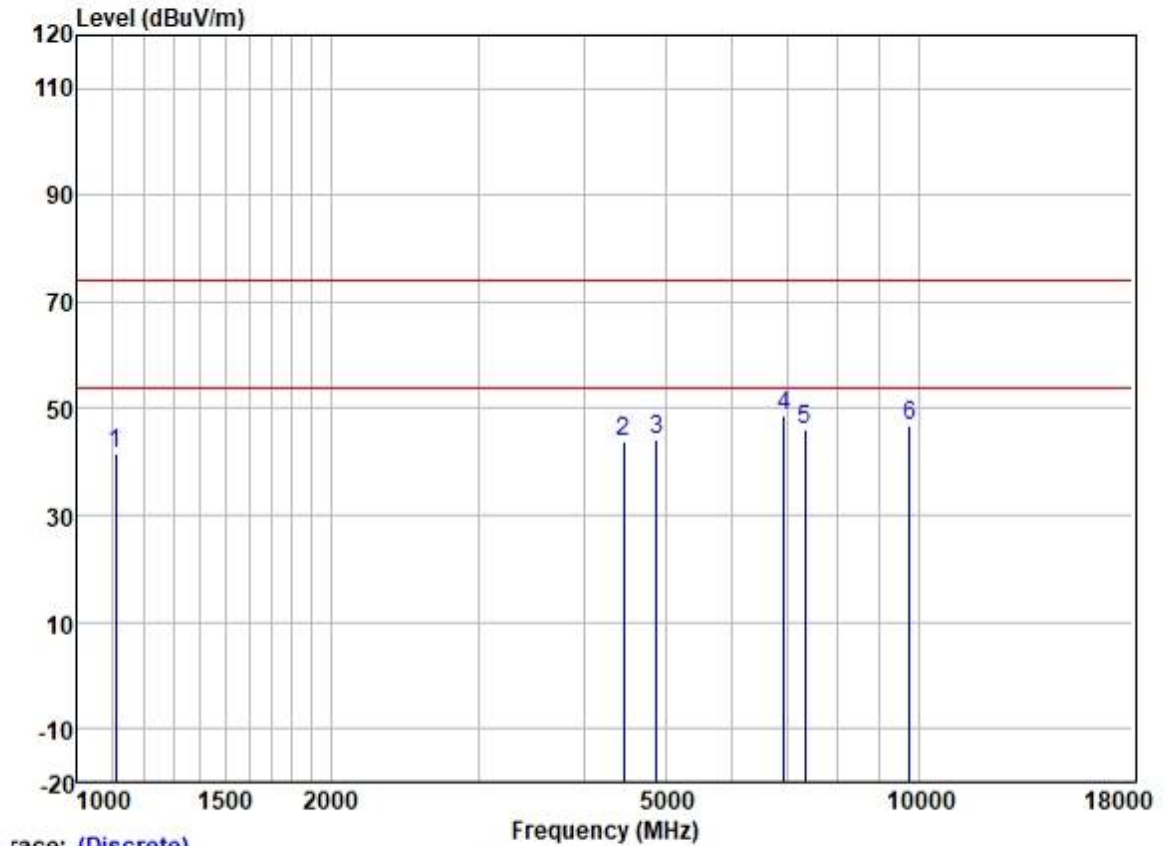
Trace: (Discrete)

	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	1162.182	47.86	24.53	7.03	38.42	41.00	74.00	-33.00	VERTICAL peak
2	3318.471	47.67	28.77	4.24	37.02	43.66	74.00	-30.34	VERTICAL peak
3	4880.000	43.20	31.54	5.27	36.84	43.17	74.00	-30.83	VERTICAL peak
4	6679.040	45.02	34.33	6.61	37.07	48.89	74.00	-25.11	VERTICAL peak
5	7320.000	40.88	36.00	6.61	37.43	46.06	74.00	-27.94	VERTICAL peak
6	9760.000	38.58	38.50	7.62	37.41	47.29	74.00	-26.71	VERTICAL peak



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



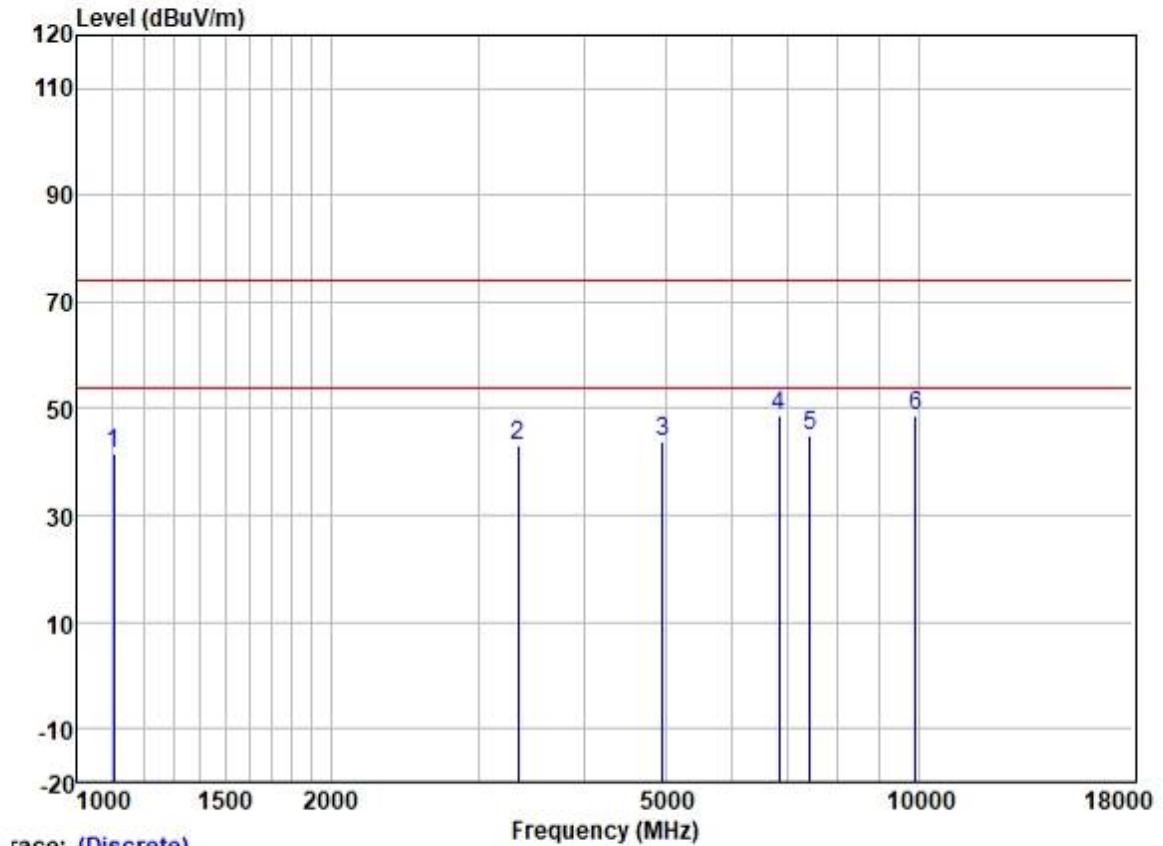
Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1109.660	48.18	24.39	7.51	38.45	41.63	74.00	-32.37	HORIZONTAL peak
2	4456.315	45.18	30.75	4.86	36.81	43.98	74.00	-30.02	HORIZONTAL peak
3	4880.000	44.25	31.54	5.27	36.84	44.22	74.00	-29.78	HORIZONTAL peak
4	6914.763	44.08	34.89	6.73	37.19	48.51	74.00	-25.49	HORIZONTAL peak
5	7320.000	41.07	36.00	6.61	37.43	46.25	74.00	-27.75	HORIZONTAL peak
6	9760.000	38.14	38.50	7.62	37.41	46.85	74.00	-27.15	HORIZONTAL peak



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



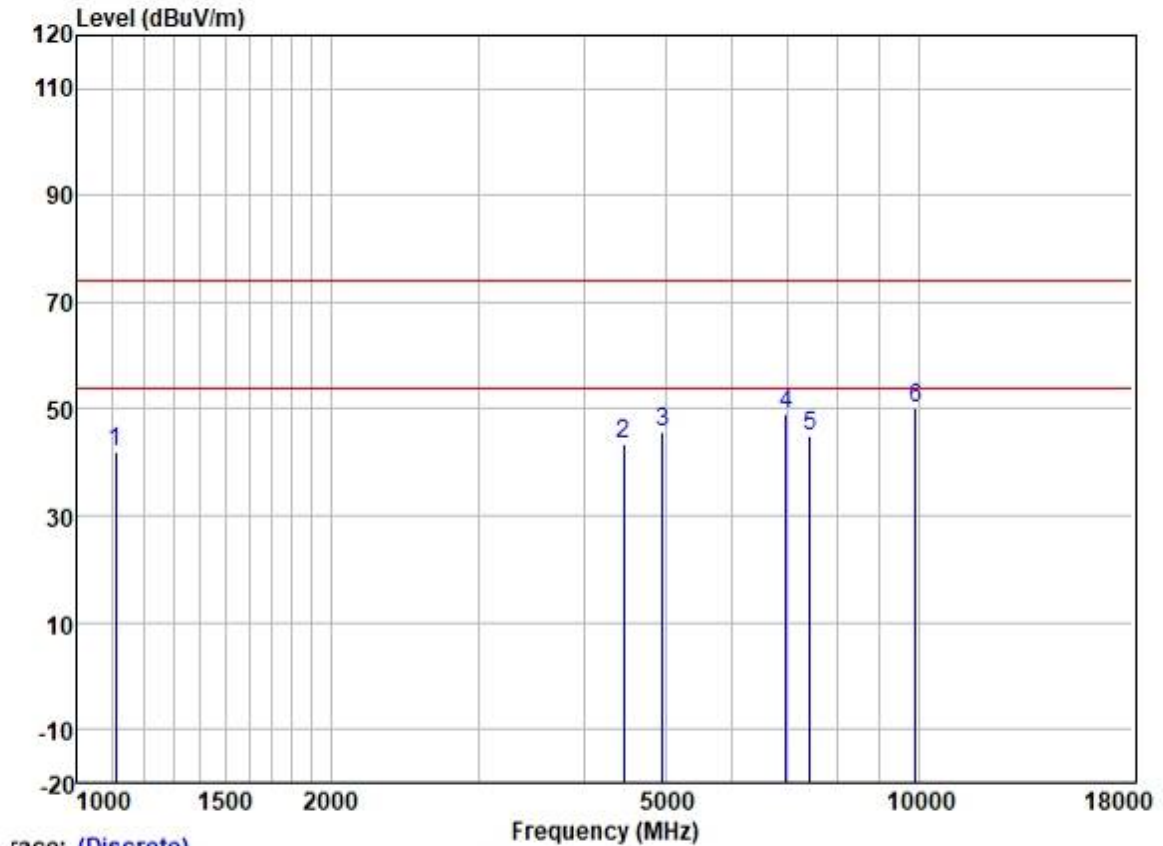
Trace: (Discrete)

	Read	Antenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dB				
1	1103.264	48.00	24.37	7.56	38.45	41.48	74.00	-32.52	VERTICAL	peak
2	3337.710	47.03	28.79	4.25	37.01	43.06	74.00	-30.94	VERTICAL	peak
3	4960.000	43.51	31.65	5.33	36.84	43.65	74.00	-30.35	VERTICAL	peak
4	6835.278	44.40	34.74	6.70	37.13	48.71	74.00	-25.29	VERTICAL	peak
5	7440.000	39.49	36.27	6.58	37.47	44.87	74.00	-29.13	VERTICAL	peak
6	9920.000	39.62	38.65	7.78	37.40	48.65	74.00	-25.35	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	1109.660	48.67	24.39	7.51	38.45	42.12	74.00	-31.88	HORIZONTAL	peak
2	4456.315	44.63	30.75	4.86	36.81	43.43	74.00	-30.57	HORIZONTAL	peak
3	4960.000	45.47	31.65	5.33	36.84	45.61	74.00	-28.39	HORIZONTAL	peak
4	6954.852	44.69	34.95	6.74	37.21	49.17	74.00	-24.83	HORIZONTAL	peak
5	7440.000	39.43	36.27	6.58	37.47	44.81	74.00	-29.19	HORIZONTAL	peak
6	9920.000	41.06	38.65	7.78	37.40	50.09	74.00	-23.91	HORIZONTAL	peak



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## 8 Test Setup Photo

Refer to Appendix - Test Setup Photos for GZCR211202151301



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## 9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2112021513AT

- End of the Report -



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