

## TEST REPORT

**Application No.:** GZCR2109021175AT  
**Applicant:** Beyerdynamic  
**Address of Applicant:** 56 Central Avenue Farmingdale, New York 11735, United States  
**Manufacturer:** Beyerdynamic  
**Address of Manufacturer:** 56 Central Avenue Farmingdale, New York 11735, United States  
**Factory:** Shenzhen Grandsun Electronic Co.,Ltd.  
**Address of Factory:** East Park,Gaoqiao Industry Zone,Pingdi Street,Longgang,Shenzhen City  
**Equipment Under Test (EUT):**  
**EUT Name:** Free BYRD  
**Model No.:** Free BYRD ♣  
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Trade Mark:** beyerdynamic  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.247  
**Date of Receipt:** 2021-09-23  
**Date of Test:** 2021-09-25 to 2021-10-12  
**Date of Issue:** 2021-10-14

<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	Chapter	Date	Modifier	Remark
01		2021-10-14		Original

Authorized for issue by				
				
		Curry Wu/Project Engineer		
				
		Ricky Liu/Reviewer		

## 2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A Note 1	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 11.9.1.3	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.

Note: 1.N/A= Not applicable.

### Declaration of EUT Family Grouping:

Model No.: Free BYRD

For the model Free BYRD which have two color samples :black and white ,Only the black sample 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 color.



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### 3 Contents

	Page
<b>1 Cover Page .....</b>	<b>1</b>
<b>2 Test Summary.....</b>	<b>3</b>
<b>3 Contents .....</b>	<b>4</b>
<b>4 General Information.....</b>	<b>6</b>
4.1 Details of E.U.T. ....	6
4.2 Description of Support Units.....	7
4.3 Measurement Uncertainty .....	8
4.4 Test Location .....	9
4.5 Test Facility.....	9
4.6 Deviation from Standards.....	10
4.7 Abnormalities from Standard Conditions.....	10
<b>5 Equipment List .....</b>	<b>11</b>
<b>6 Radio Spectrum Technical Requirement.....</b>	<b>14</b>
6.1 Antenna Requirement .....	14
6.1.1 Test Requirement: .....	14
6.1.2 Conclusion .....	14
<b>7 Radio Spectrum Matter Test Results.....</b>	<b>15</b>
7.1 Conducted Peak Output Power .....	15
7.1.1 E.U.T. Operation.....	15
7.1.2 Test Mode Description .....	15
7.1.3 Test Setup Diagram .....	16
7.1.4 Measurement Procedure and Data.....	16
7.2 Minimum 6dB Bandwidth.....	17
7.2.1 E.U.T. Operation.....	17
7.2.2 Test Mode Description .....	17
7.2.3 Test Setup Diagram .....	17
7.2.4 Measurement Procedure and Data.....	17
7.3 Power Spectrum Density .....	18
7.3.1 E.U.T. Operation.....	18
7.3.2 Test Mode Description .....	18
7.3.3 Test Setup Diagram .....	18
7.3.4 Measurement Procedure and Data.....	18
7.4 Conducted Band Edges Measurement .....	19
7.4.1 E.U.T. Operation.....	19
7.4.2 Test Mode Description .....	19
7.4.3 Test Setup Diagram .....	19
7.4.4 Measurement Procedure and Data.....	19
7.5 Conducted Spurious Emissions .....	20
7.5.1 E.U.T. Operation.....	20
7.5.2 Test Mode Description .....	20
7.5.3 Test Setup Diagram .....	20
7.5.4 Measurement Procedure and Data.....	20

7.6	Radiated Emissions which fall in the restricted bands .....	21
7.6.1	E.U.T. Operation .....	21
7.6.2	Test Mode Description .....	21
7.6.3	Test Setup Diagram .....	22
7.6.4	Measurement Procedure and Data.....	22
7.7	Radiated Spurious Emissions (Below 1GHz) .....	39
7.7.1	E.U.T. Operation .....	39
7.7.2	Test Mode Description .....	39
7.7.3	Test Setup Diagram .....	40
7.7.4	Measurement Procedure and Data.....	40
7.8	Radiated Spurious Emissions (Above 1GHz).....	49
7.8.1	E.U.T. Operation .....	49
7.8.2	Test Mode Description .....	49
7.8.3	Test Setup Diagram .....	50
7.8.4	Measurement Procedure and Data.....	51
8	Test Setup Photo .....	76
9	EUT Constructional Details (EUT Photos).....	79
10	Appendix.....	80



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## 4 General Information

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

Power supply:	Left earbuds: Li-Ion Polymer Battery 3.7V 85mAh (Charge by Charging box) Right earbuds: Li-Ion Polymer Battery 3.7V 85mAh (Charge by Charging box) Charging box with backup battery: Li-Ion Polymer Battery 3.7V 500mAh (Charged by type-C port)
Cable(s):	Type-c cable: 60cm unshielded
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.2 Dual mode
Modulation Type:	GFSK
Channel Spacing:	2MHz
Number of Channels:	40
Data Rate:	Support 1Mb/s and 2Mb/s
Antenna Type:	Loop_LDS
Antenna Gain:	-2.6dBi(for left earbud) and -2.5dBi(for Right earbud)

#### Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Selected Test Channel	
Channel	Frequency
The lowest channel (CH0)	2402MHz
The middle channel (C19)	2440MHz
The highest channel (CH39)	2480MHz



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## 4.2 Description of Support Units

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



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### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Peak Output Power	$\pm 0.75\text{dB}$
Minimum 6dB Bandwidth	$\pm 3\%$
Power Spectrum Density	$\pm 2.84\text{dB}$
Conducted Band Edges Measurement	$\pm 0.75\text{dB}$
Conducted Spurious Emissions	$\pm 0.75\text{dB}$
Radiated Emissions which fall in the restricted bands	$\pm 5.08\text{dB}$ (1GHz-6GHz); $\pm 5.14\text{dB}$ (above 6GHz)
Radiated Spurious Emissions (Below 1GHz)	$\pm 5.06\text{dB}$ (3m); $\pm 4.46\text{dB}$ (10m)
Radiated Spurious Emissions (Above 1GHz)	$\pm 5.08\text{dB}$ (1GHz-6GHz); $\pm 5.14\text{dB}$ (above 6GHz)
<p>Remark:</p> <p>The <math>U_{\text{lab}}</math> (lab Uncertainty) is less than <math>U_{\text{CISPR}}</math> (CISPR Uncertainty), so the test results</p> <ul style="list-style-type: none"> <li>– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;</li> <li>– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.</li> </ul>	



#### 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.

#### 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.



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#### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None



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## 5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2021-05-19	2022-05-18
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software	TST	V2.0	GZE100-78	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software	TST	V2.0	GZE100-78	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software	TST	V2.0	GZE100-78	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software	TST	V2.0	GZE100-78	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Conducted Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software	TST	V2.0	GZE100-78	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01



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**Radiated Emissions which fall in the restricted bands**

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver(20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-01-08	2022-01-07
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
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-16	2022-09-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2021-07-29	2022-07-28
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2021-08-30	2022-08-29

**Radiated Spurious Emissions (Below 1GHz)**

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Trilog Broadband Antenna(25MHz-1GHz)-Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2021-05-19	2022-05-18
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2019-12-27	2021-12-26
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
EMI Test Receiver(1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2021-05-26	2022-05-25



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Radiated Spurious Emissions (Above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver(20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-01-08	2022-01-07
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
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-16	2022-09-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2021-07-29	2022-07-28
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2021-08-30	2022-08-29

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05
DMM	Fluke	73	EMC0007	2021-07-05	2022-07-05



## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

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

#### 6.1.2 Conclusion

Standard Requirement:

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

15.247(b) (4) requirement:

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

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -2.6dBi(for left earbud) and -2.5dBi(for Right earbud)

Antenna location: Refer to Internal photo.

## 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 11.9.1.3

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: 25.6 °C Humidity: 51.5 % RH Atmospheric Pressure: 1003 mbar

#### 7.1.2 Test Mode Description

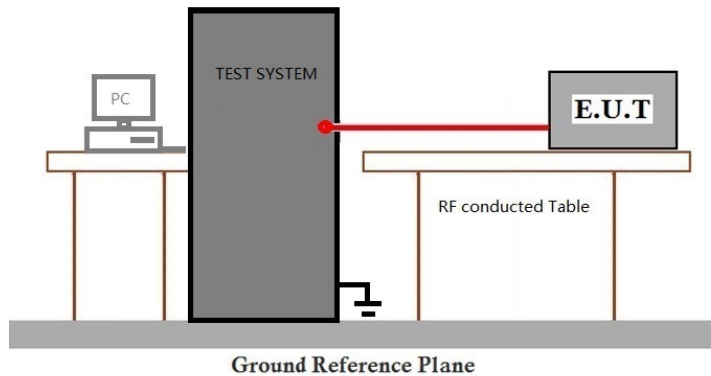
Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.



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### 7.1.3 Test Setup Diagram



### 7.1.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details

## 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: 25.6 °C

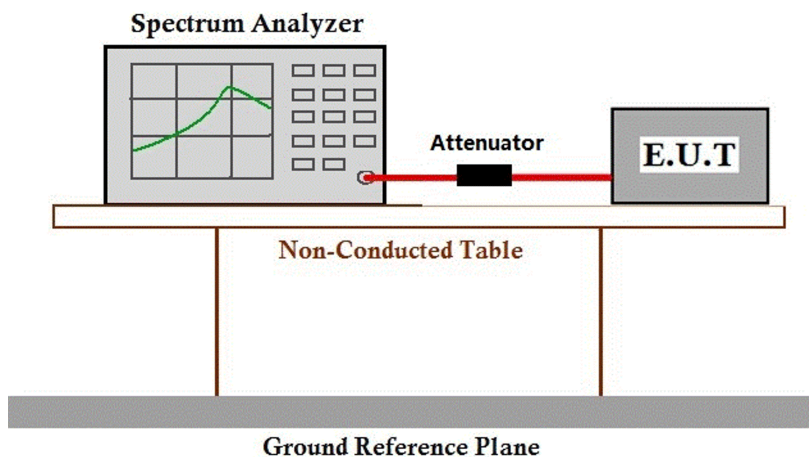
Humidity: 51.5 % RH

Atmospheric Pressure: 1003 mbar

### 7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.

### 7.2.3 Test Setup Diagram



### 7.2.4 Measurement Procedure and Data

cable loss=0.9dB

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: 25.6 °C

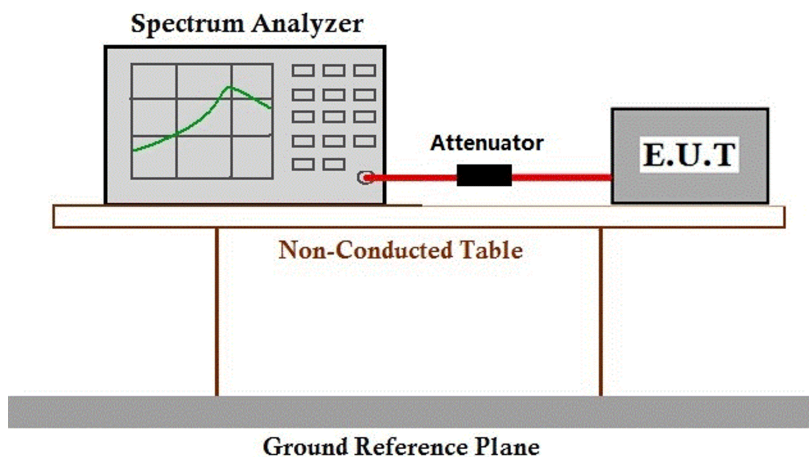
Humidity: 51.5 % RH

Atmospheric Pressure: 1003 mbar

#### 7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.

#### 7.3.3 Test Setup Diagram



#### 7.3.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



## 7.4 Conducted Band Edges Measurement

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

Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

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

### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25.6 °C

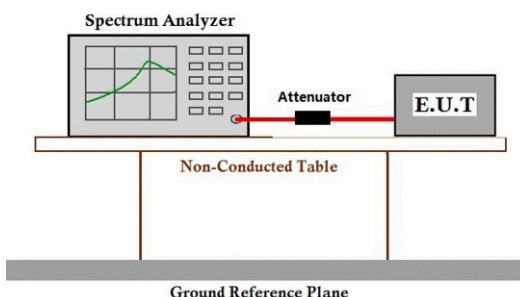
Humidity: 51.5 % RH

Atmospheric Pressure: 1003 mbar

### 7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.

### 7.4.3 Test Setup Diagram



### 7.4.4 Measurement Procedure and Data

cable loss=0.9dB

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: 25.6 °C

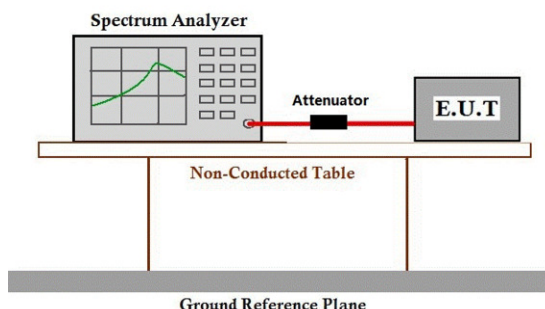
Humidity: 51.5 % RH

Atmospheric Pressure: 1003 mbar

### 7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.

### 7.5.3 Test Setup Diagram



### 7.5.4 Measurement Procedure and Data

cable loss=0.9dB

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

Measurement Distance: 3m

Limit:

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

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

### 7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24.5 °C Humidity: 52.5 % RH Atmospheric Pressure: 1003 mbar

### 7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.

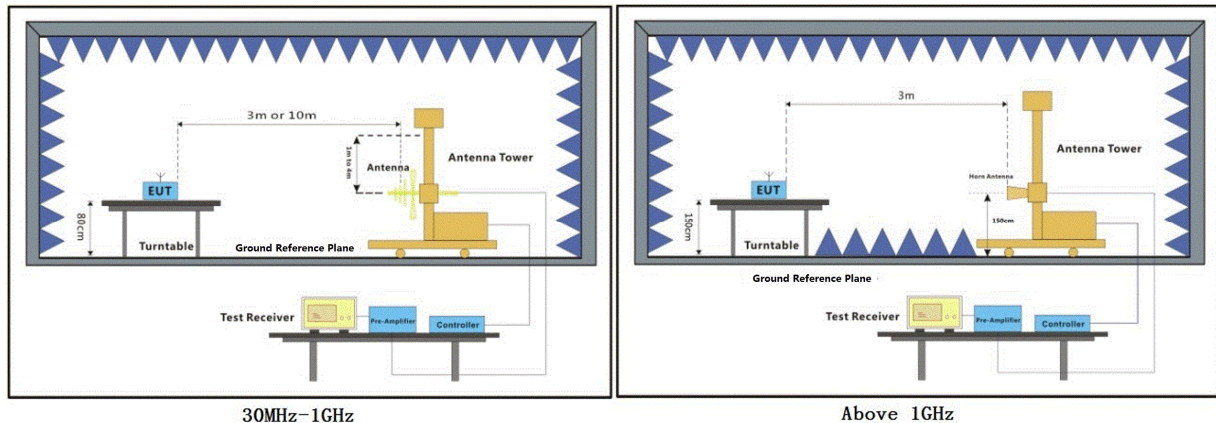


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### 7.6.3 Test Setup Diagram



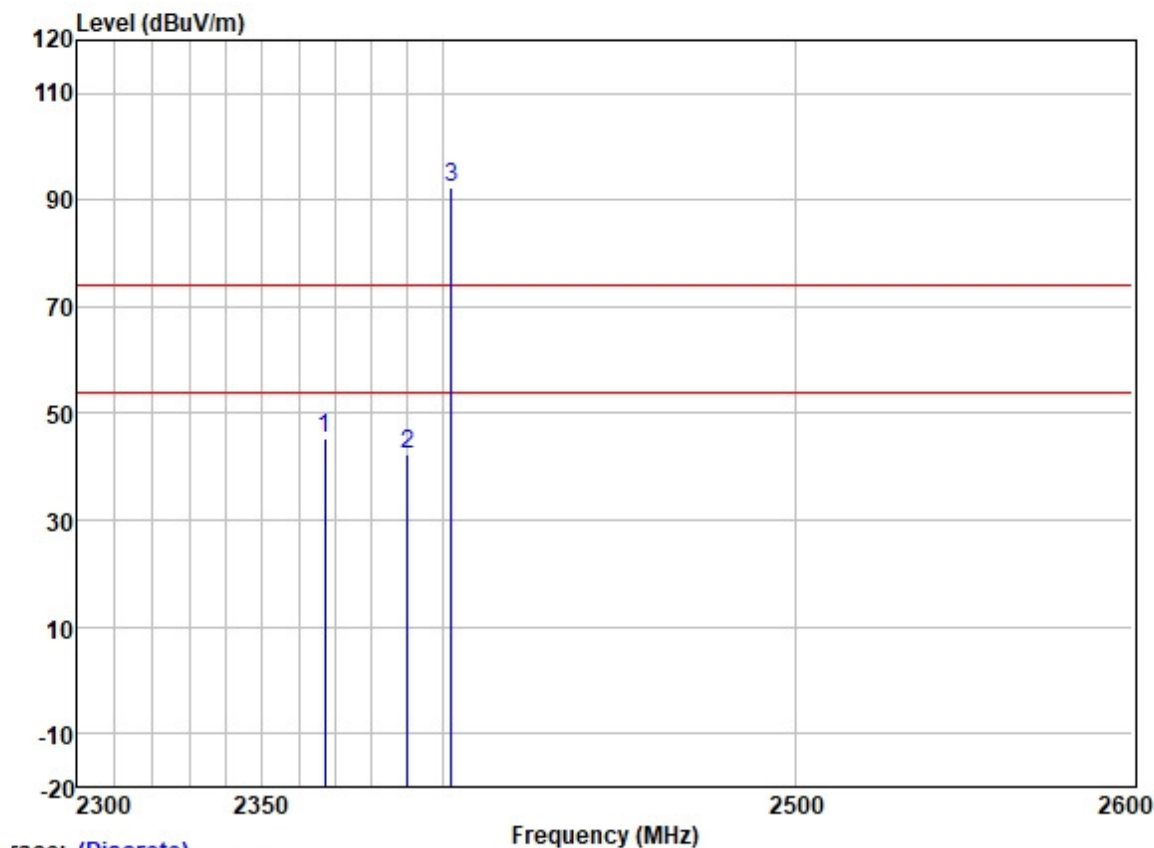
### 7.6.4 Measurement Procedure and Data

- 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.
- 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.
- 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.
- Test the EUT in the lowest channel, the Highest channel.
- 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.
- 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.

Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low

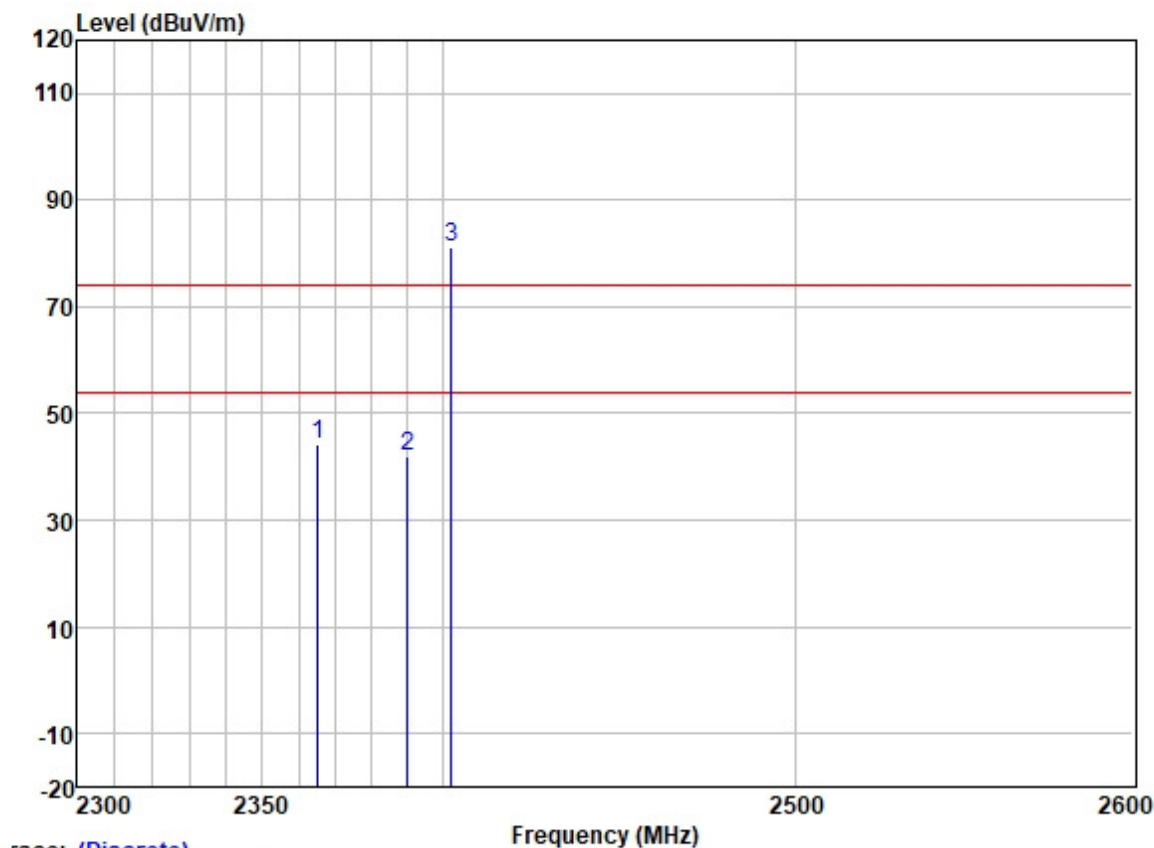


Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2367.082	52.30	27.28	3.43	37.60	45.41	74.00	-28.59	HORIZONTAL Peak
2	2390.000	49.16	27.33	3.48	37.59	42.38	74.00	-31.62	HORIZONTAL Peak
3 *	2402.000	99.27	27.35	3.50	37.59	92.53	74.00	18.53	HORIZONTAL Peak



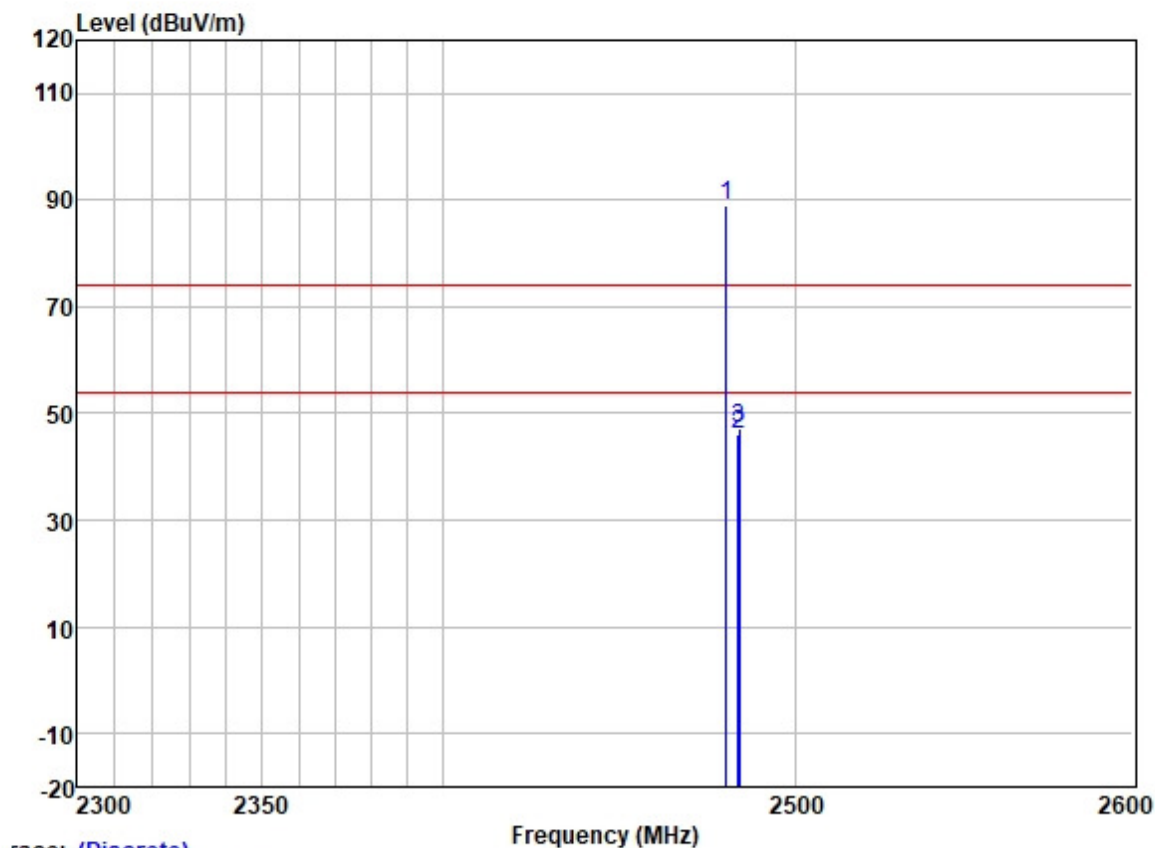
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2365.277	51.11	27.28	3.43	37.60	44.22	74.00	-29.78	VERTICAL	Peak
2	2390.000	48.71	27.33	3.48	37.59	41.93	74.00	-32.07	VERTICAL	Peak
3 *	2402.000	87.89	27.35	3.50	37.59	81.15	74.00	7.15	VERTICAL	Peak

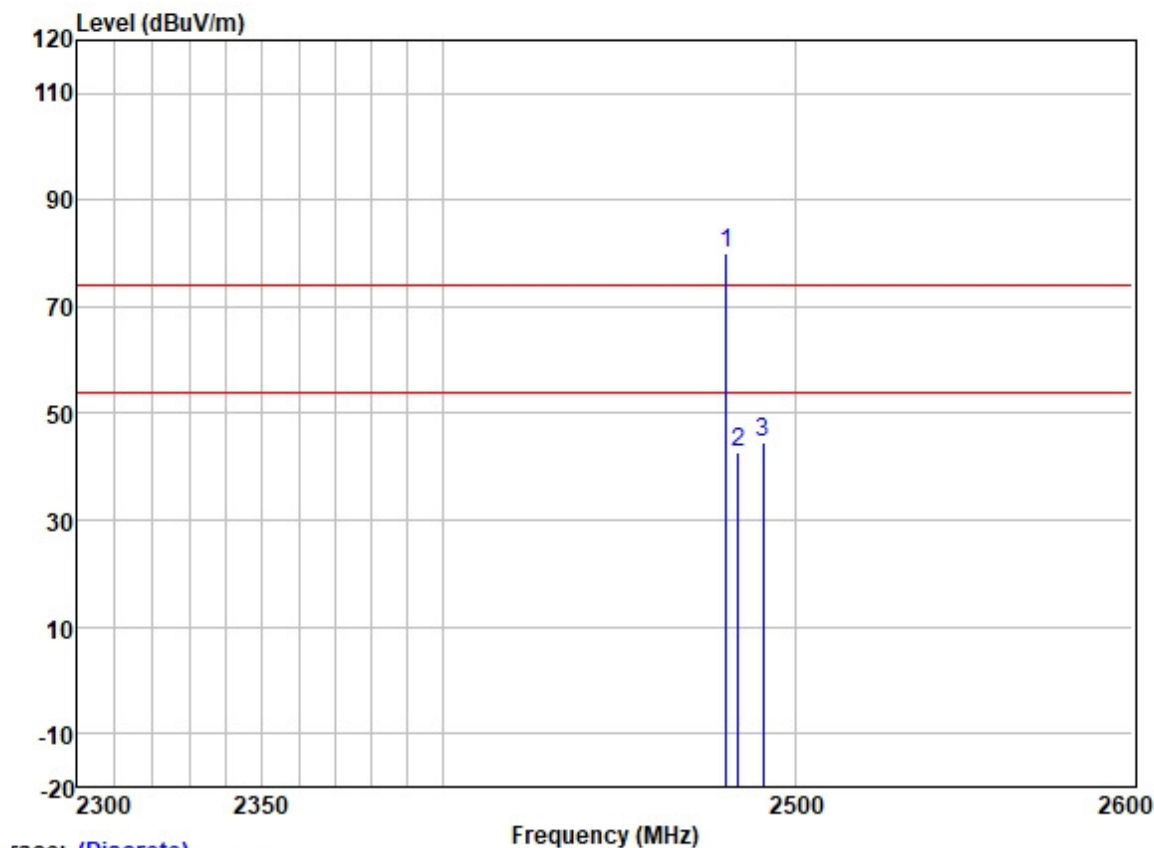
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



race: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over		
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Remark
1 *	2480.000	95.67	27.47	3.60	37.57	89.17	74.00	15.17	HORIZONTAL Peak
2	2483.500	52.54	27.48	3.53	37.57	45.98	74.00	-28.02	HORIZONTAL Peak
3	2483.821	53.82	27.48	3.53	37.57	47.26	74.00	-26.74	HORIZONTAL Peak

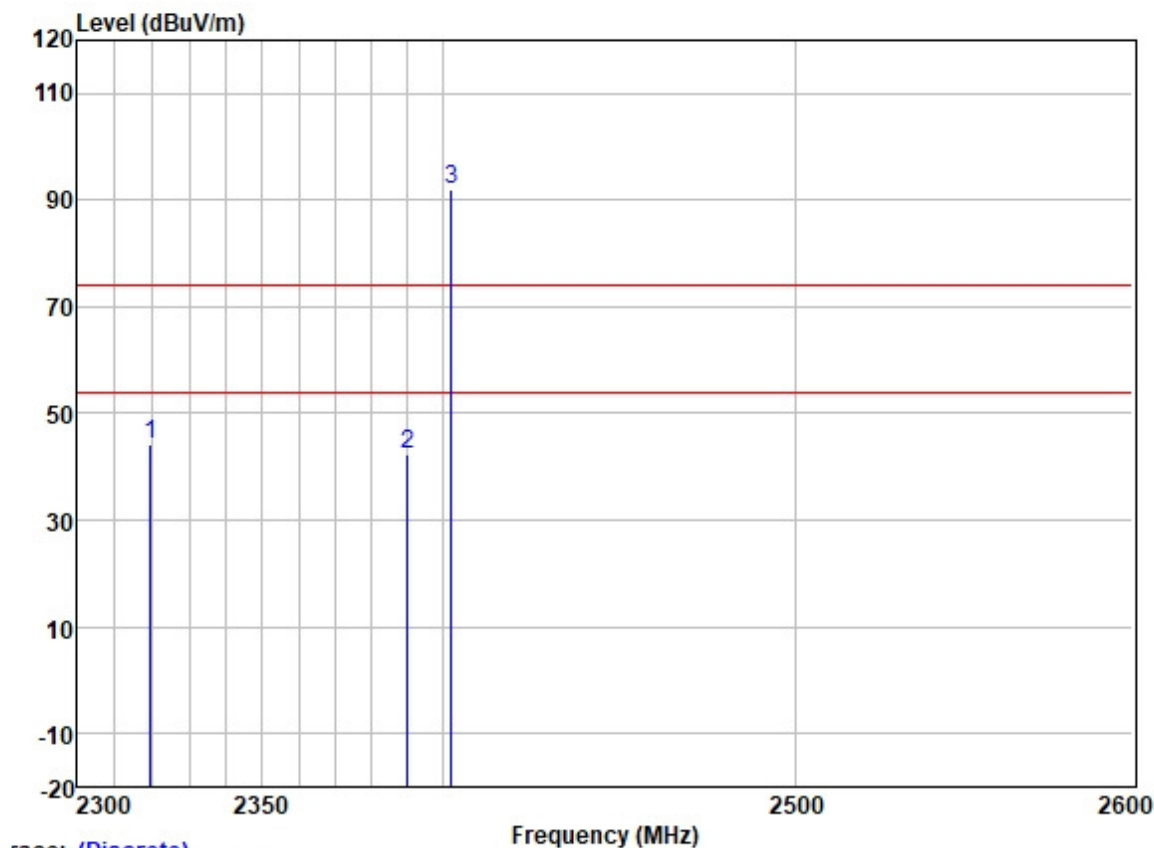
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2480.000	86.59	27.47	3.60	37.57	80.09	74.00	6.09	VERTICAL	Peak
2	2483.500	49.32	27.48	3.53	37.57	42.76	74.00	-31.24	VERTICAL	Peak
3	2490.671	51.29	27.49	3.47	37.56	44.69	74.00	-29.31	VERTICAL	Peak

Test Mode: 05; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low

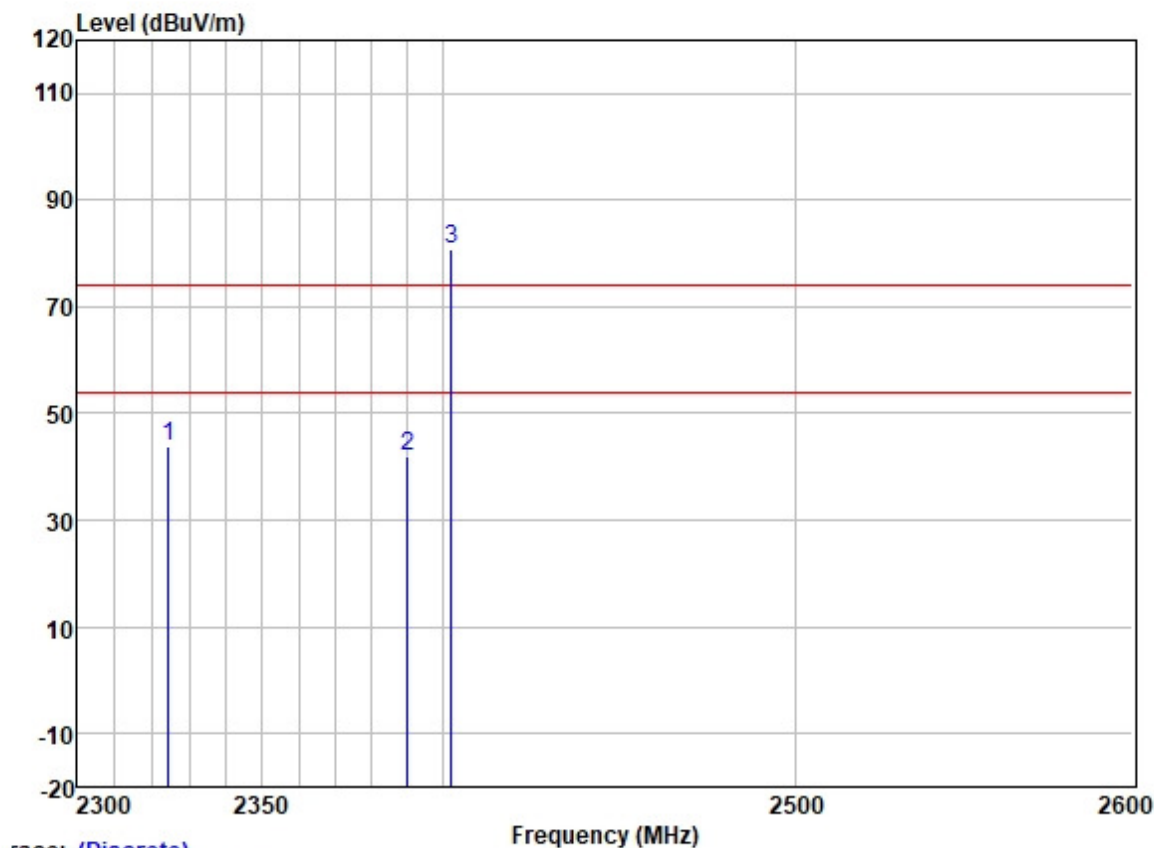


Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2319.712	51.29	27.17	3.33	37.62	44.17	74.00	-29.83	HORIZONTAL	Peak
2	2390.000	49.12	27.33	3.48	37.59	42.34	74.00	-31.66	HORIZONTAL	Peak
3 *	2402.000	98.84	27.35	3.50	37.59	92.10	74.00	18.10	HORIZONTAL	Peak



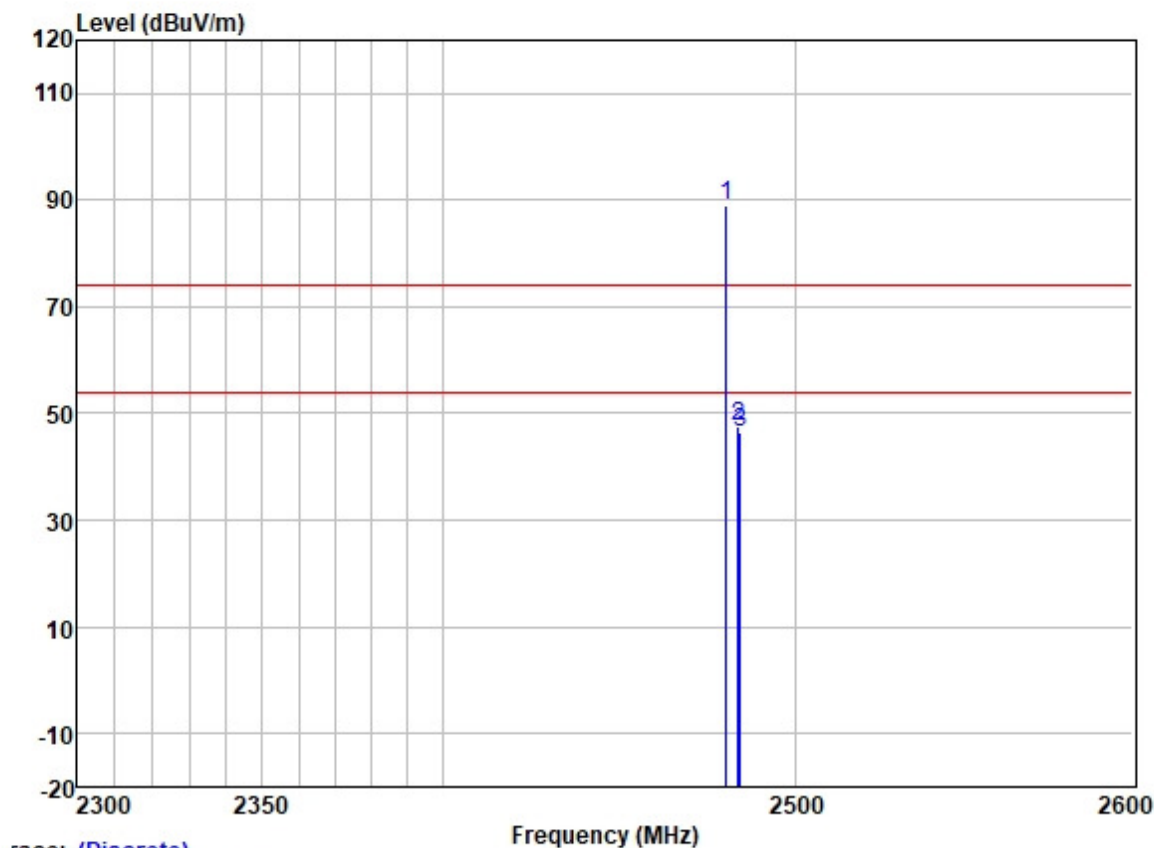
Test Mode: 05; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2324.534	50.92	27.19	3.34	37.62	43.83	74.00	-30.17	VERTICAL	Peak
2	2390.000	48.67	27.33	3.48	37.59	41.89	74.00	-32.11	VERTICAL	Peak
3 *	2402.000	87.50	27.35	3.50	37.59	80.76	74.00	6.76	VERTICAL	Peak

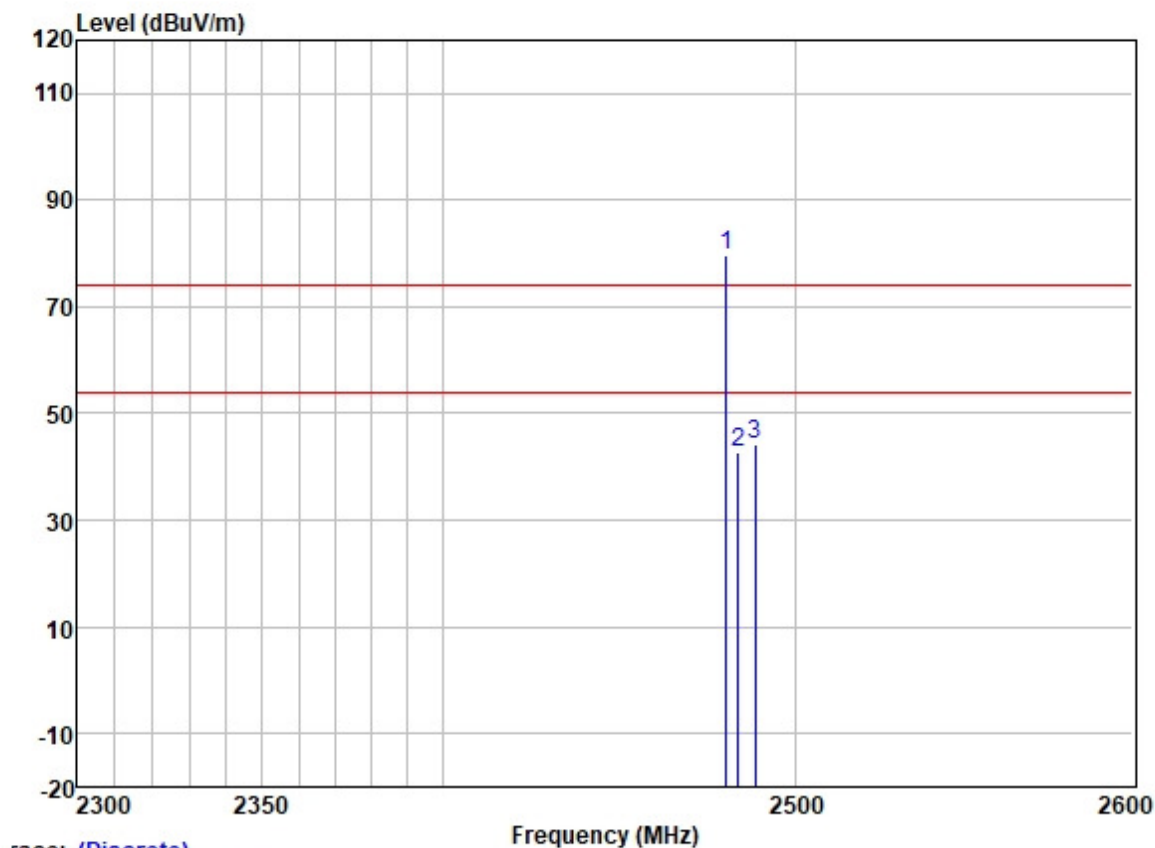
Test Mode: 05; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

	Freq	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2480.000	95.39	27.47	3.60	37.57	88.89	74.00	14.89	HORIZONTAL Peak
2	2483.500	54.05	27.48	3.53	37.57	47.49	74.00	-26.51	HORIZONTAL Peak
3	2483.896	53.15	27.48	3.53	37.57	46.59	74.00	-27.41	HORIZONTAL Peak

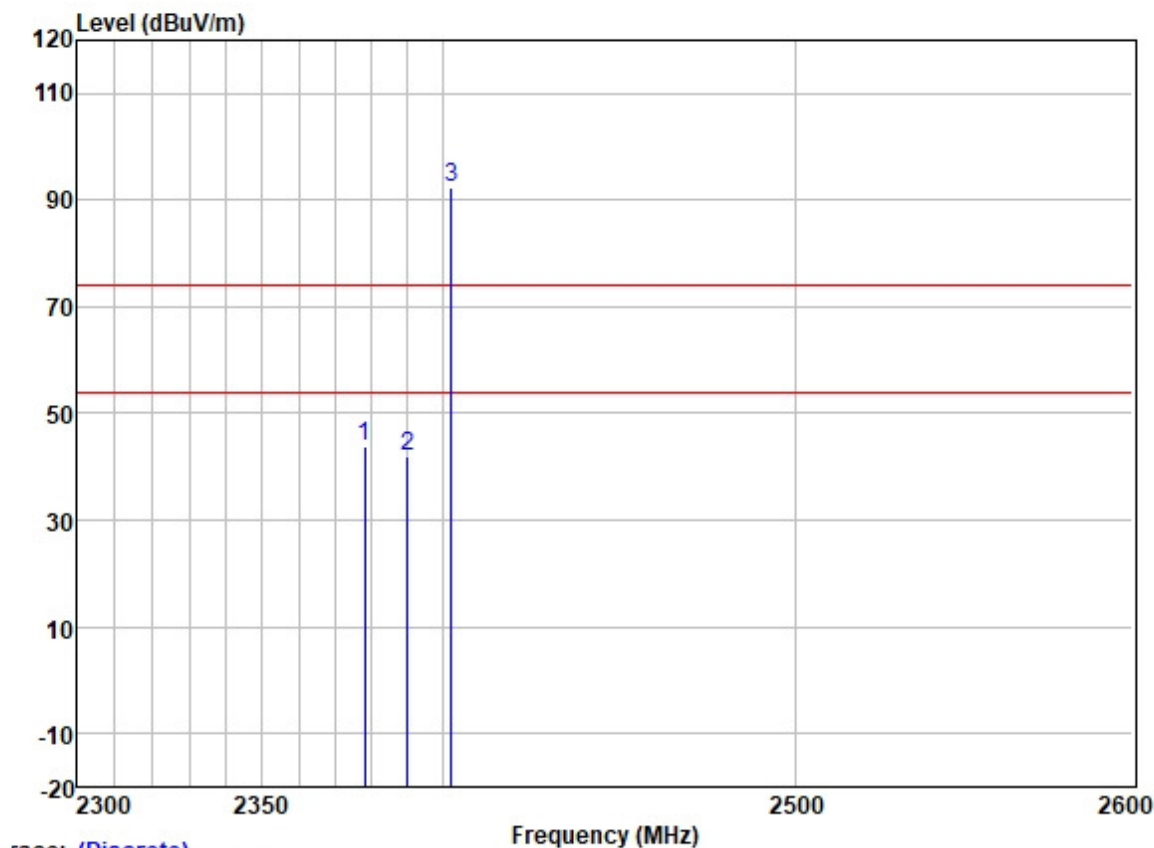
Test Mode: 05; Polarity: Vertical; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

	Freq	Read	Antenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2480.000	86.31	27.47	3.60	37.57	79.81	74.00	5.81	VERTICAL Peak
2	2483.500	49.42	27.48	3.53	37.57	42.86	74.00	-31.14	VERTICAL Peak
3	2488.294	50.63	27.48	3.53	37.56	44.08	74.00	-29.92	VERTICAL Peak

Test Mode: 06; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low

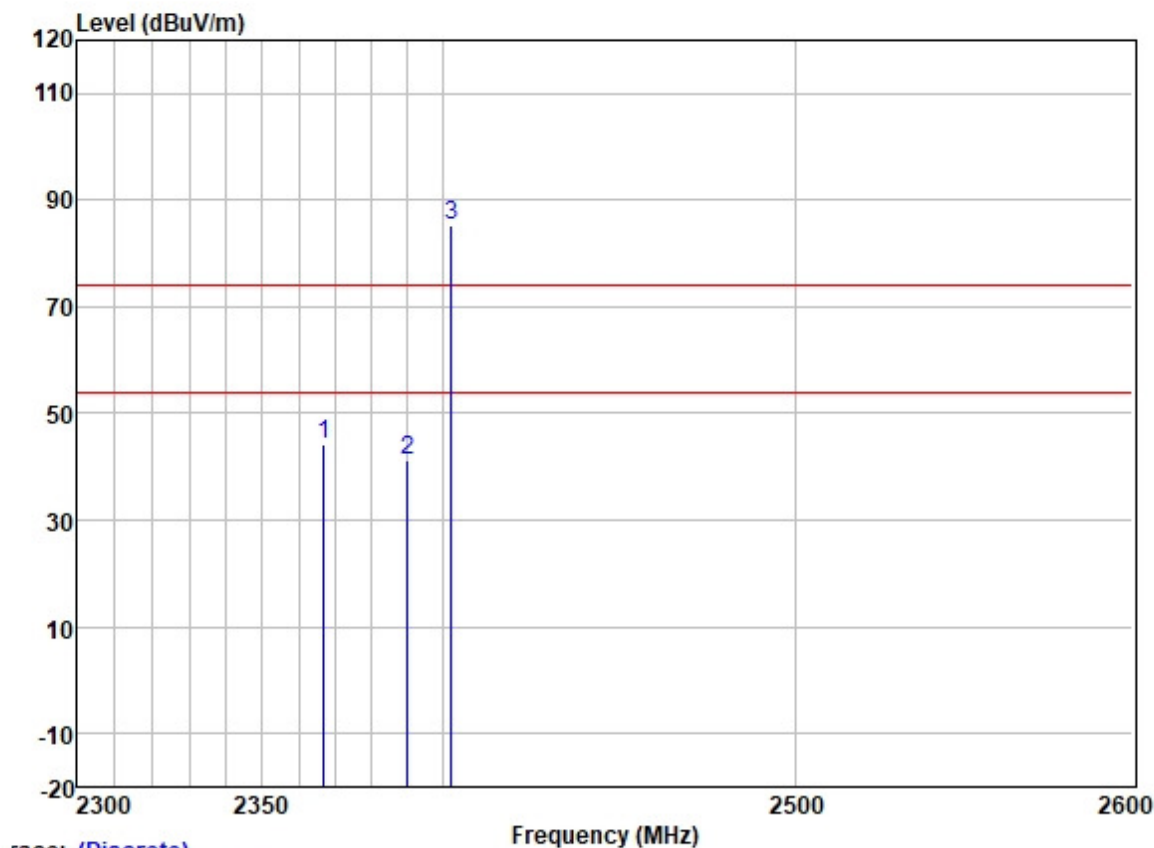


Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2378.142	50.54	27.31	3.46	37.60	43.71	74.00	-30.29	HORIZONTAL	Peak
2	2390.000	48.61	27.33	3.48	37.59	41.83	74.00	-32.17	HORIZONTAL	Peak
3 *	2402.000	99.29	27.35	3.50	37.59	92.55	74.00	18.55	HORIZONTAL	Peak



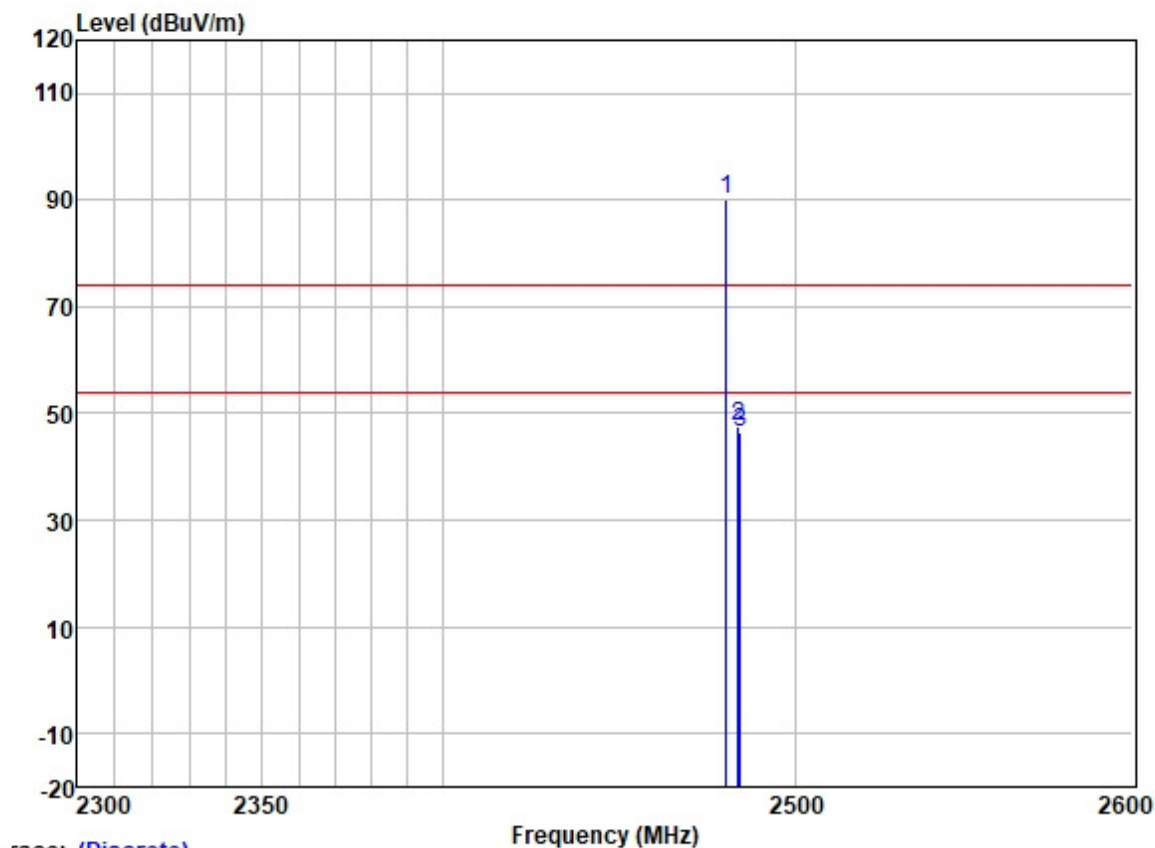
Test Mode: 06; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



race: (Discrete)

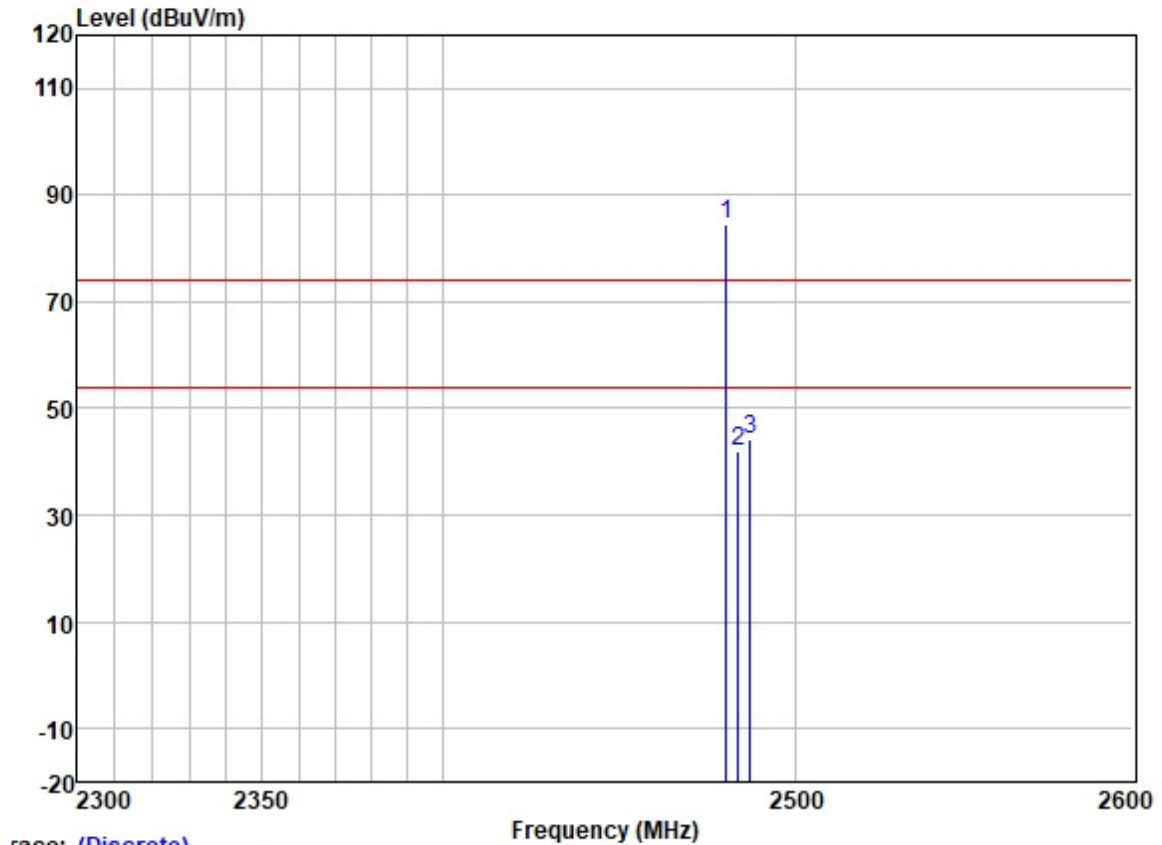
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2366.781	51.22	27.28	3.43	37.60	44.33	74.00	-29.67	VERTICAL	Peak
2	2390.000	48.15	27.33	3.48	37.59	41.37	74.00	-32.63	VERTICAL	Peak
3 *	2402.000	91.85	27.35	3.50	37.59	85.11	74.00	11.11	VERTICAL	Peak

Test Mode: 06; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2480.000	96.66	27.47	3.60	37.57	90.16	74.00	16.16	HORIZONTAL	Peak
2	2483.500	54.18	27.48	3.53	37.57	47.62	74.00	-26.38	HORIZONTAL	Peak
3	2484.071	53.14	27.48	3.53	37.57	46.58	74.00	-27.42	HORIZONTAL	Peak

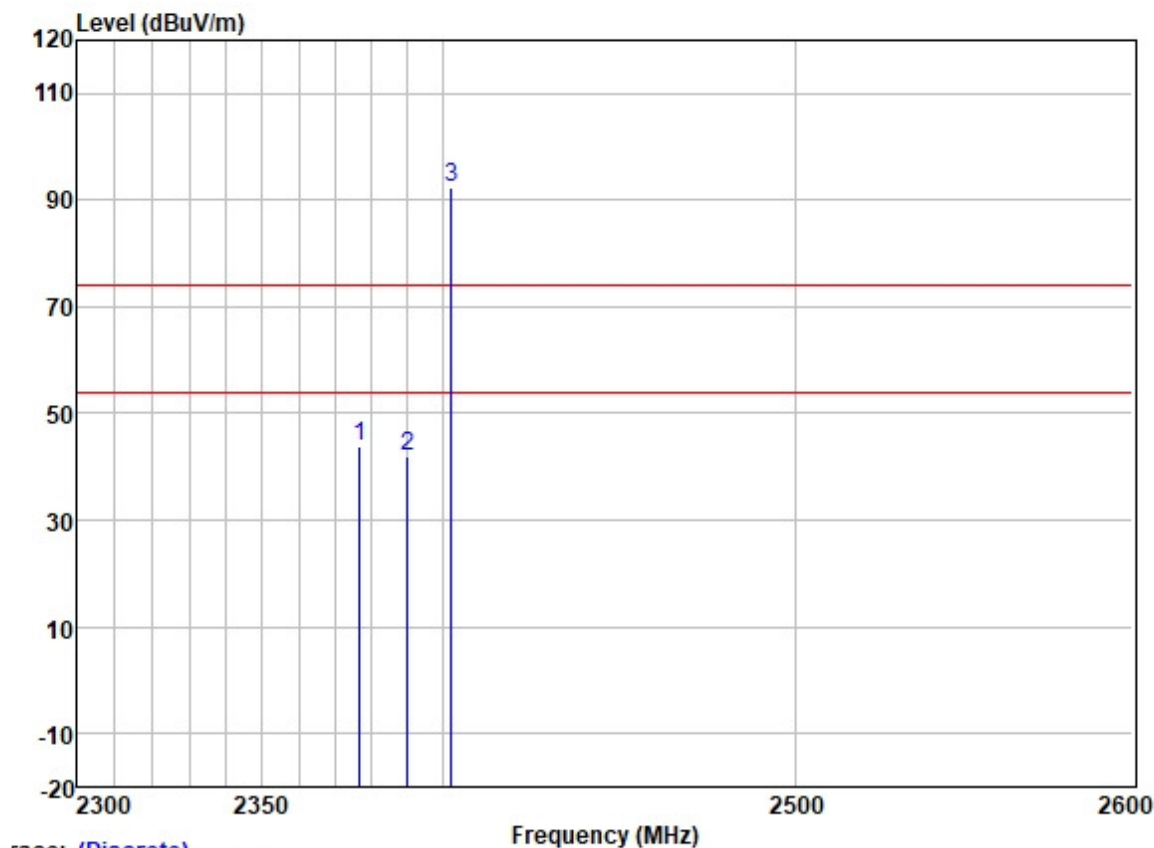
Test Mode: 06; Polarity: Vertical; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB		
1 *	2480.000	90.96	27.47	3.60	37.57	84.46	74.00	10.46	VERTICAL Peak
2	2483.500	48.58	27.48	3.53	37.57	42.02	74.00	-31.98	VERTICAL Peak
3	2486.919	50.62	27.48	3.53	37.57	44.06	74.00	-29.94	VERTICAL Peak

Test Mode: 07; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low

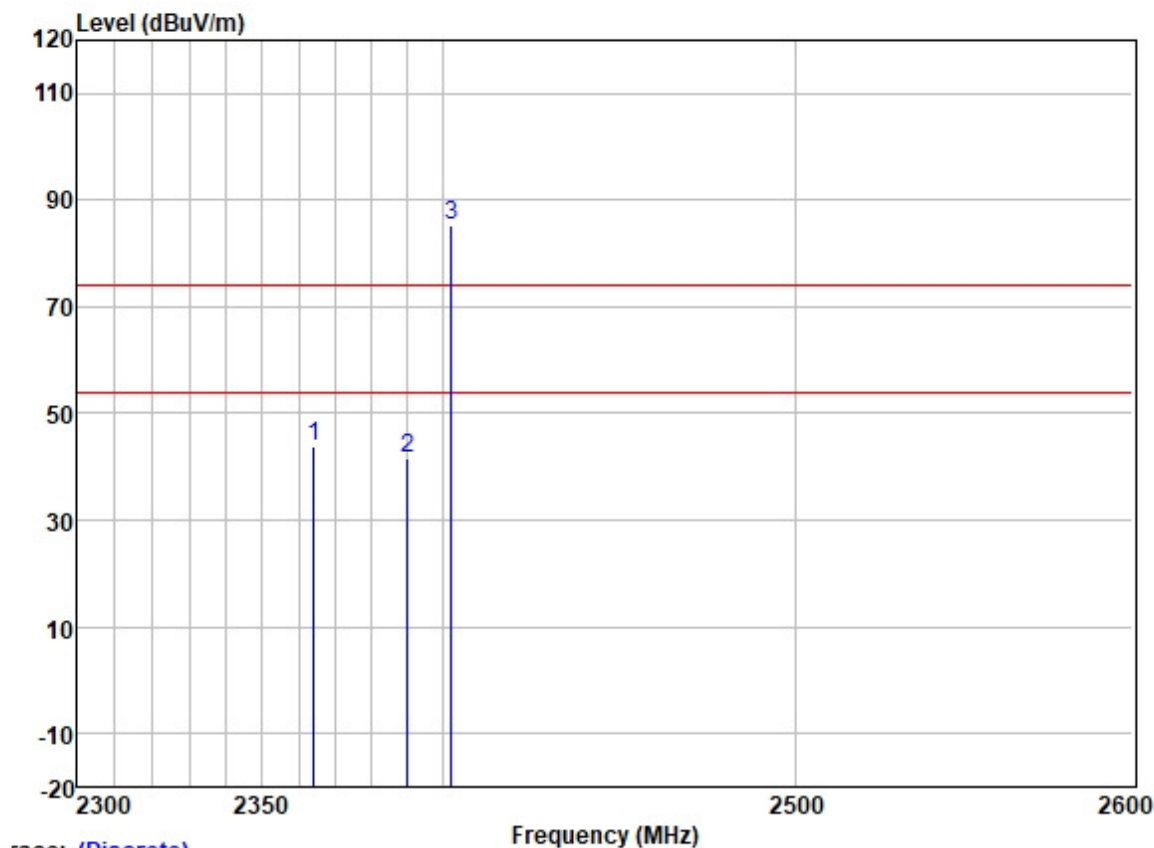


Trace: (Discrete)

	Freq	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2376.732	50.62	27.31	3.46	37.60	43.79	74.00	-30.21	HORIZONTAL Peak
2	2390.000	48.85	27.33	3.48	37.59	42.07	74.00	-31.93	HORIZONTAL Peak
3 *	2402.000	99.26	27.35	3.50	37.59	92.52	74.00	18.52	HORIZONTAL Peak



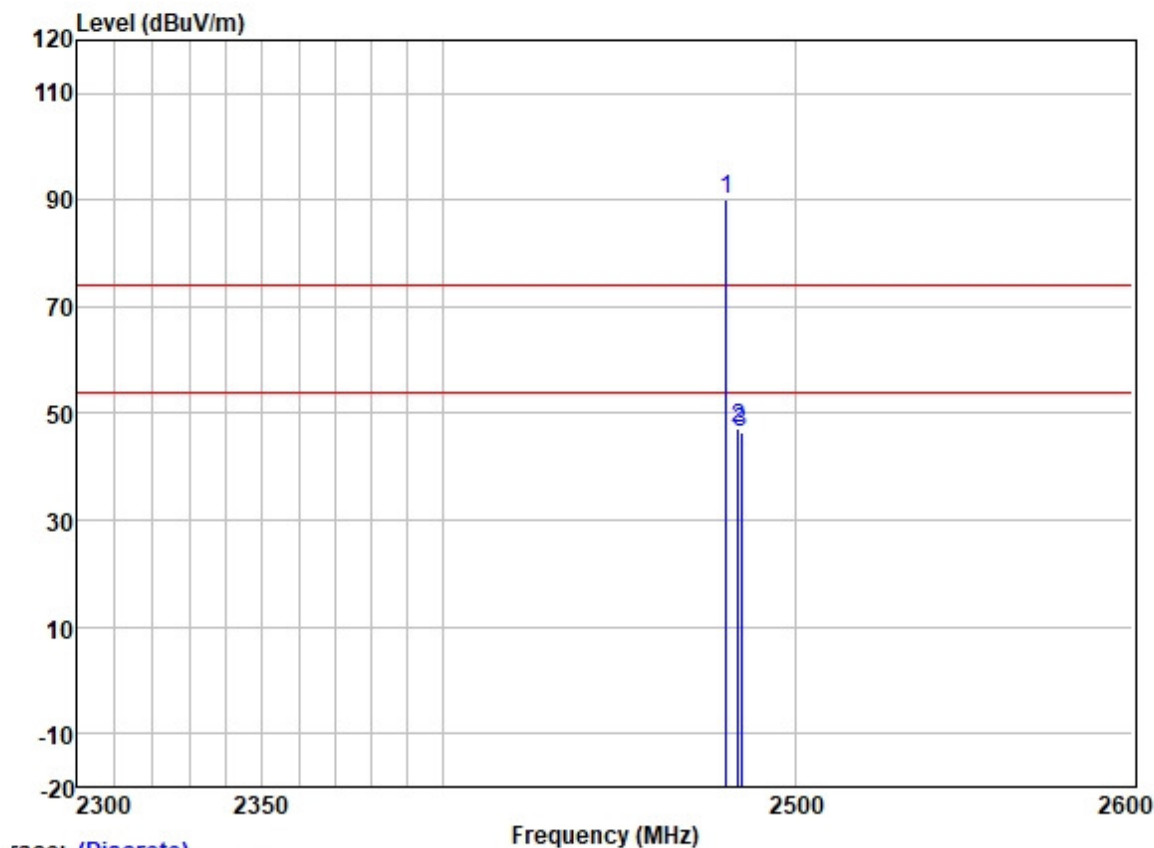
Test Mode: 07; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



Trace: (Discrete)

	Freq	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2364.074	50.67	27.28	3.43	37.60	43.78	74.00	-30.22	VERTICAL Peak
2	2390.000	48.37	27.33	3.48	37.59	41.59	74.00	-32.41	VERTICAL Peak
3 *	2402.000	91.92	27.35	3.50	37.59	85.18	74.00	11.18	VERTICAL Peak

Test Mode: 07; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



race: (Discrete)

	Freq	ReadAntenna Level Factor	Cable Preamp Loss Factor	Limit Line	Over Limit	Pol/Phase	Remark		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2480.000	96.68	27.47	3.60	37.57	90.18	74.00	16.18	HORIZONTAL Peak
2	2483.500	53.90	27.48	3.53	37.57	47.34	74.00	-26.66	HORIZONTAL Peak
3	2484.196	53.18	27.48	3.53	37.57	46.62	74.00	-27.38	HORIZONTAL Peak



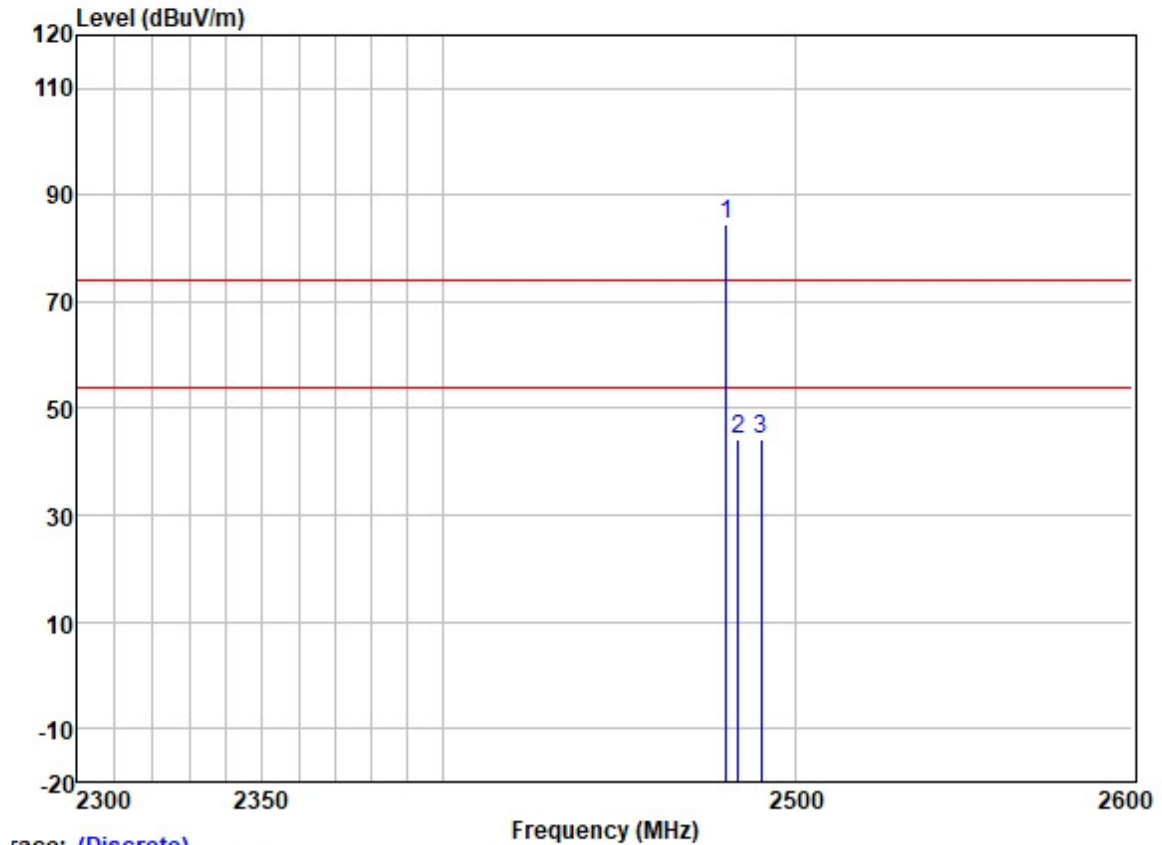
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Guangzhou Branch Testing Center EEC Laboratory.

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Test Mode: 07; Polarity: Vertical; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	2480.000	90.97	27.47	3.60	37.57	84.47	74.00	10.47	VERTICAL	Peak
2	2483.500	50.77	27.48	3.53	37.57	44.21	74.00	-29.79	VERTICAL	Peak
3	2490.145	50.87	27.49	3.47	37.56	44.27	74.00	-29.73	VERTICAL	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

Measurement Distance: 3m

Limit:

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

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

### 7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 24.8 °C Humidity: 50.8 % RH Atmospheric Pressure: 1003 mbar

### 7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.

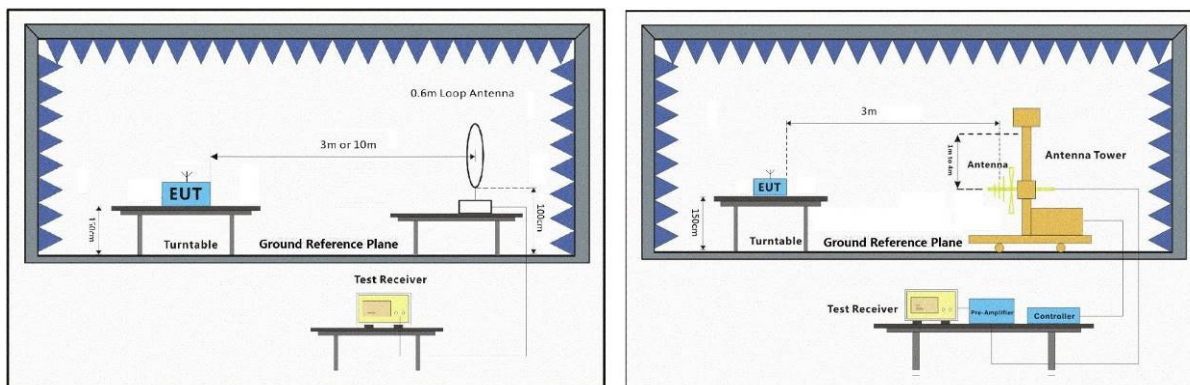


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### 7.7.3 Test Setup Diagram



### 7.7.4 Measurement Procedure and Data

- 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.
- 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- 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.
- Repeat above procedures until all frequencies measured was complete.

Remark:

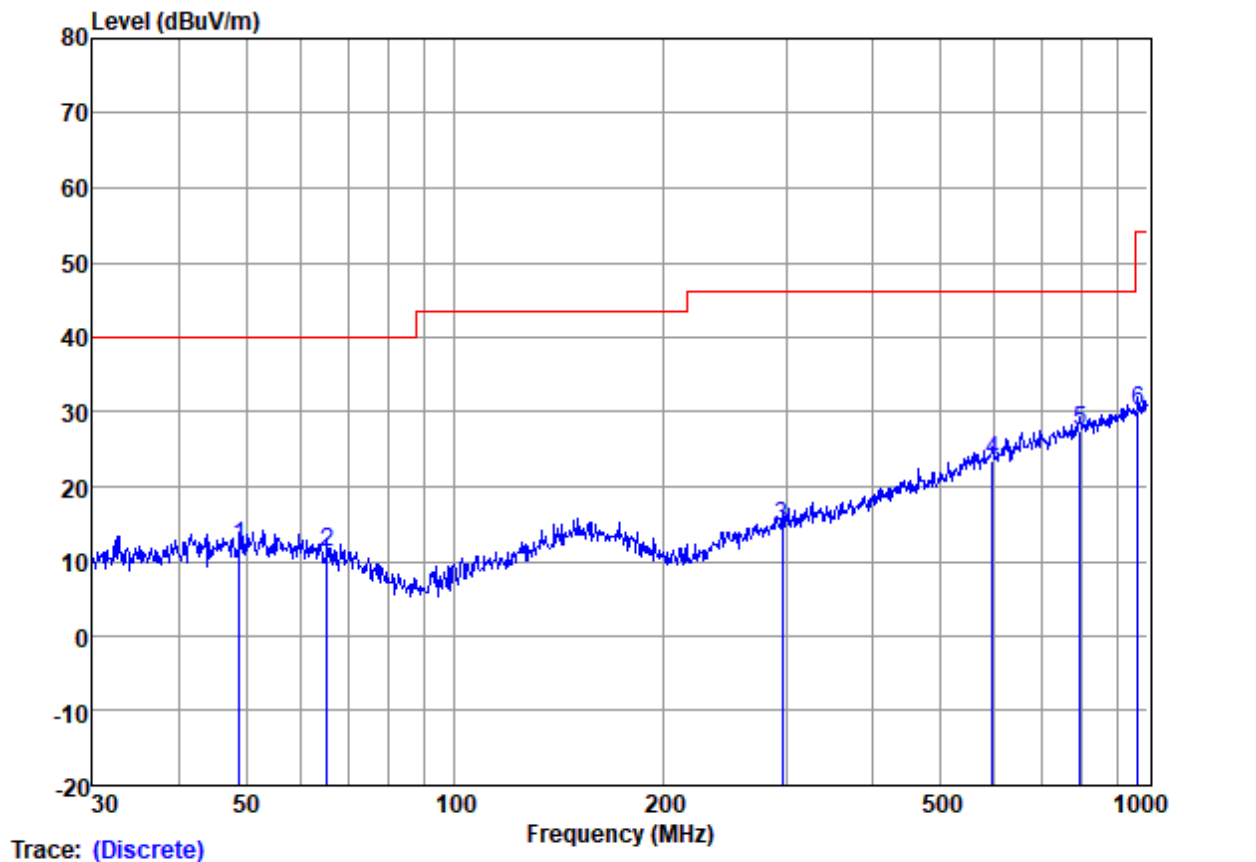
1) Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

3) Scan from 9kHz to 1 GHz, 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.

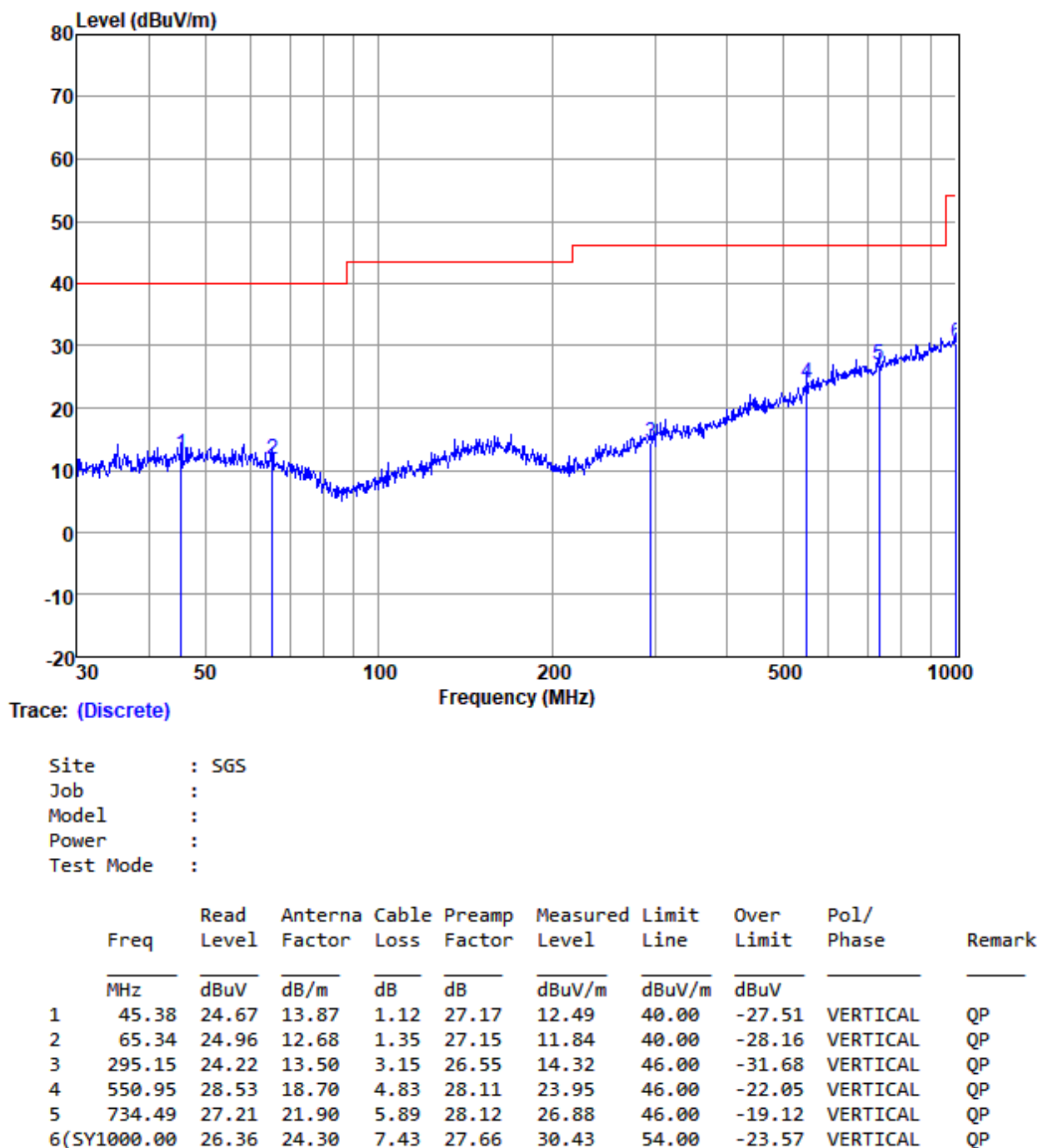
Test Mode: 04; Polarity: Horizontal; Modulation: GFSK; ; Channel: Low



Site : SGS  
Job :  
Model :  
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	dBuV		
1	48.84	24.00	13.96	1.14	27.17	11.93	40.00	-28.07	HORIZONTAL	QP
2	65.34	24.35	12.68	1.35	27.15	11.23	40.00	-28.77	HORIZONTAL	QP
3	296.18	24.49	13.52	3.15	26.55	14.61	46.00	-31.39	HORIZONTAL	QP
4	595.13	26.82	19.70	5.10	28.20	23.42	46.00	-22.58	HORIZONTAL	QP
5	796.18	26.88	22.57	6.14	28.03	27.56	46.00	-18.44	HORIZONTAL	QP
6	965.54	26.74	23.90	7.25	27.71	30.18	54.00	-23.82	HORIZONTAL	QP

Test Mode: 04; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



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

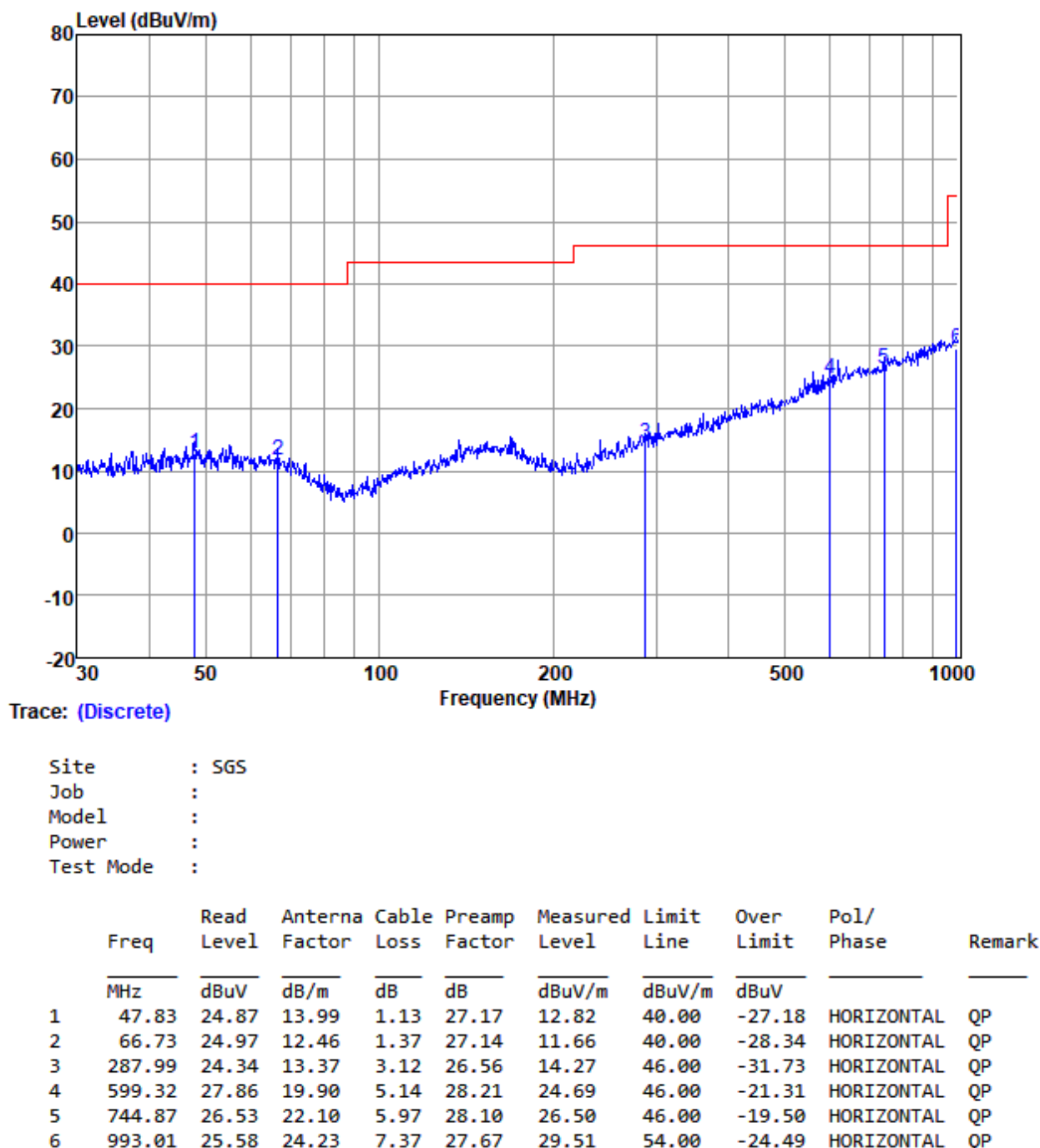


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Test Mode: 05; Polarity: Horizontal; Modulation: GFSK; ; Channel: Low



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

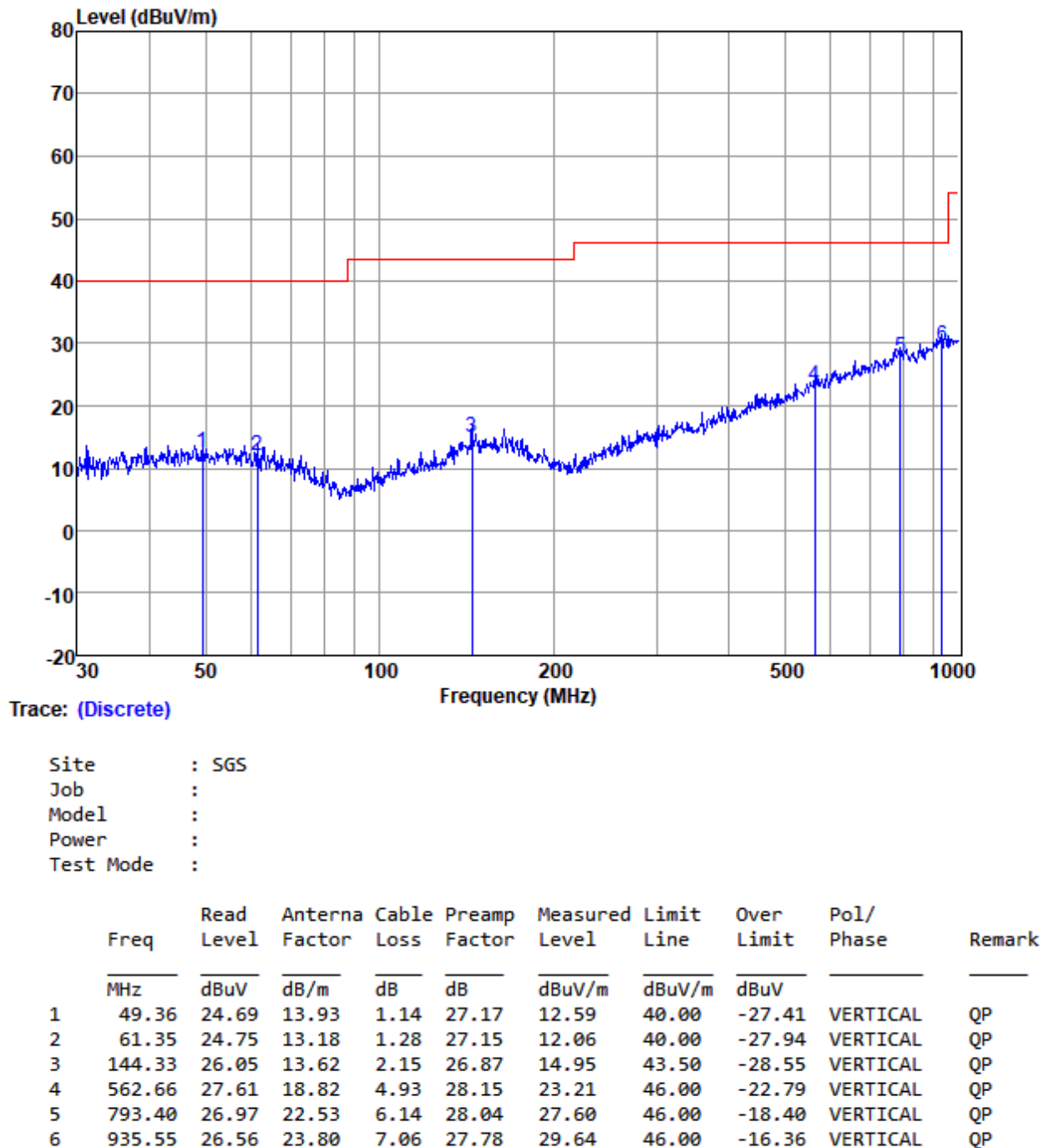


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Test Mode: 05; Polarity: Vertical; Modulation: GFSK; ; Channel: Low

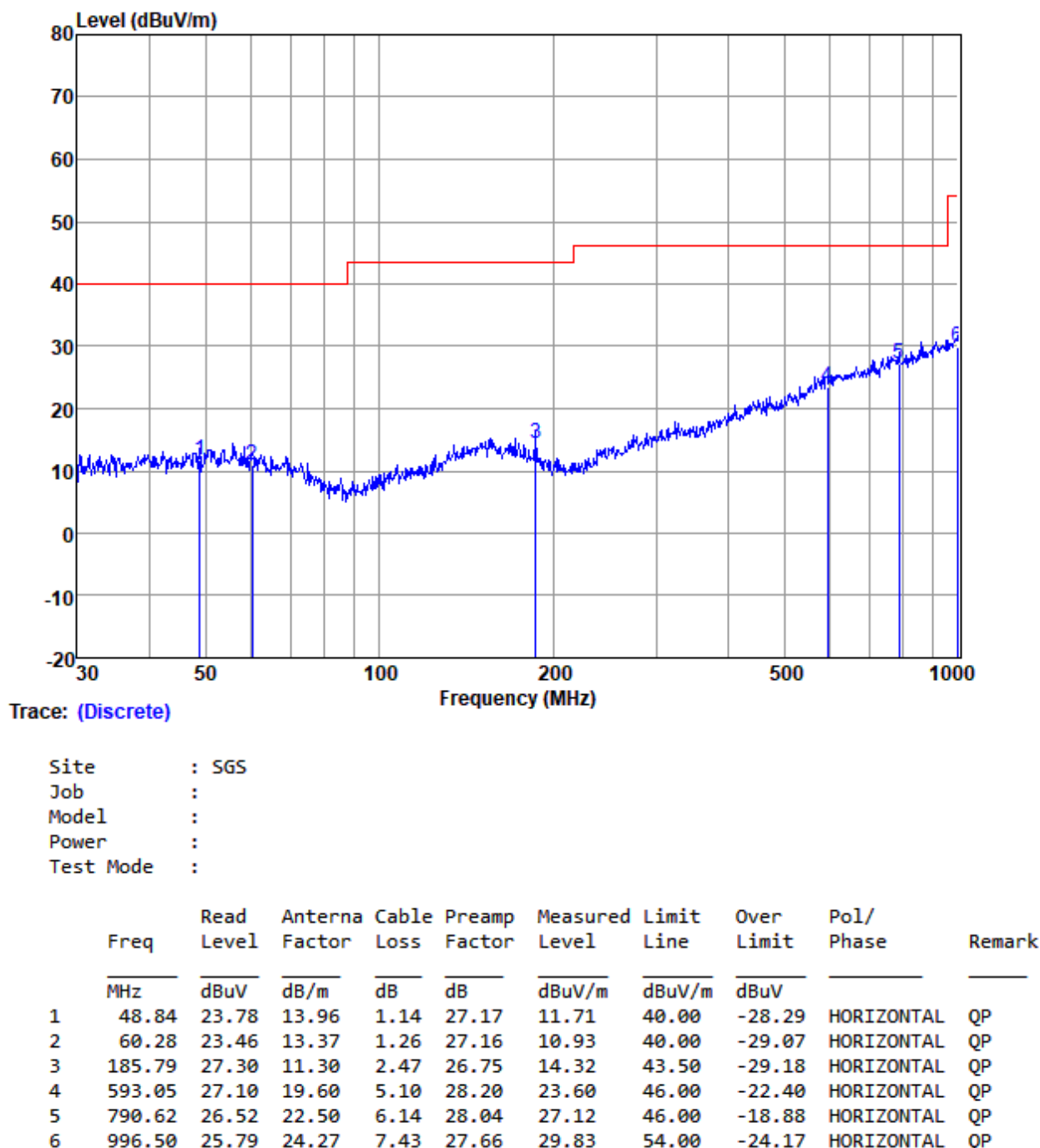


Site : SGS  
Job :  
Model :  
Power :  
Test Mode :



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Guangzhou branch Testing & Calibration 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

Test Mode: 06; Polarity: Horizontal; Modulation: GFSK; ; Channel: Low



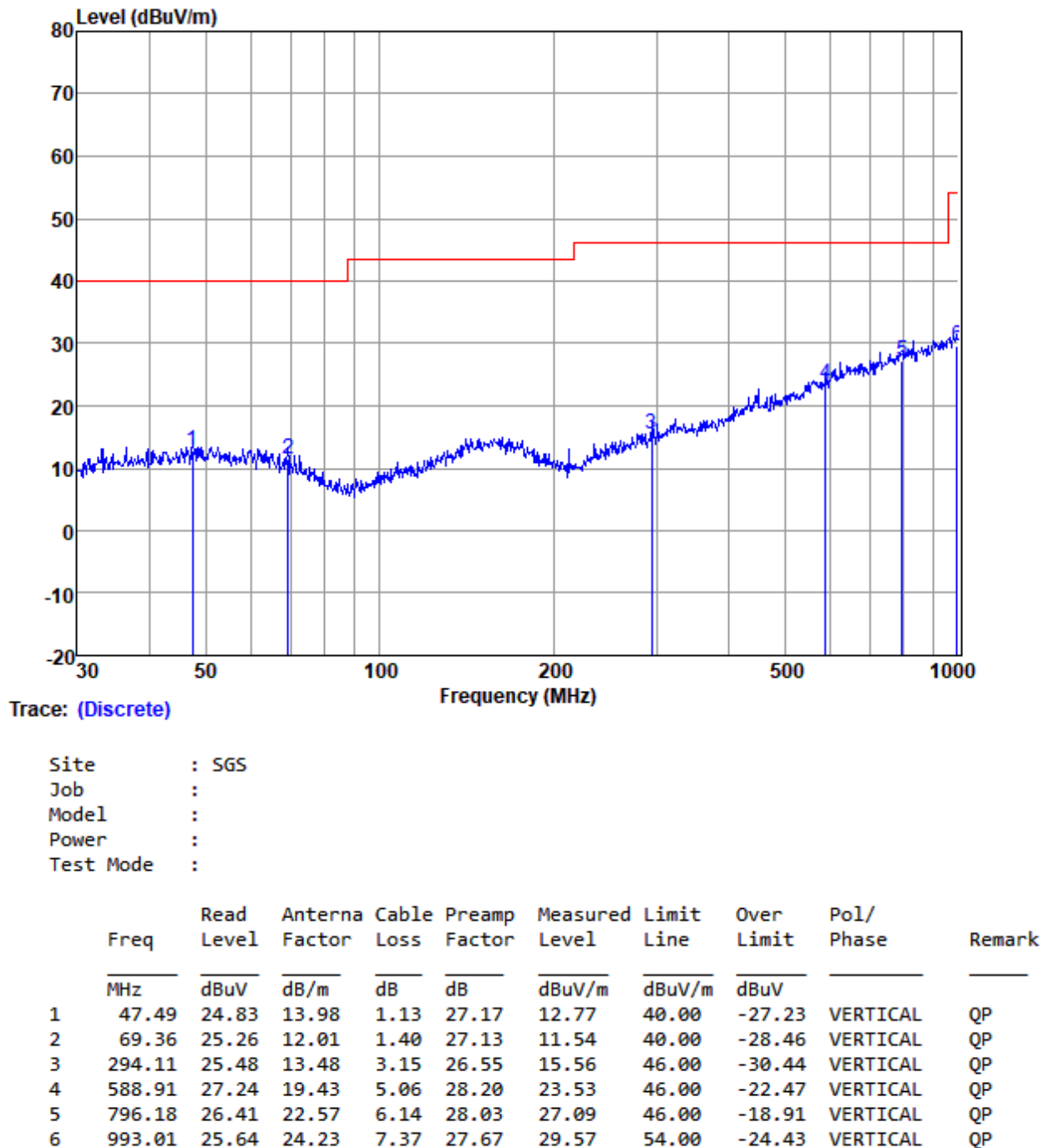
Site : SGS  
Job :  
Model :  
Power :  
Test Mode :



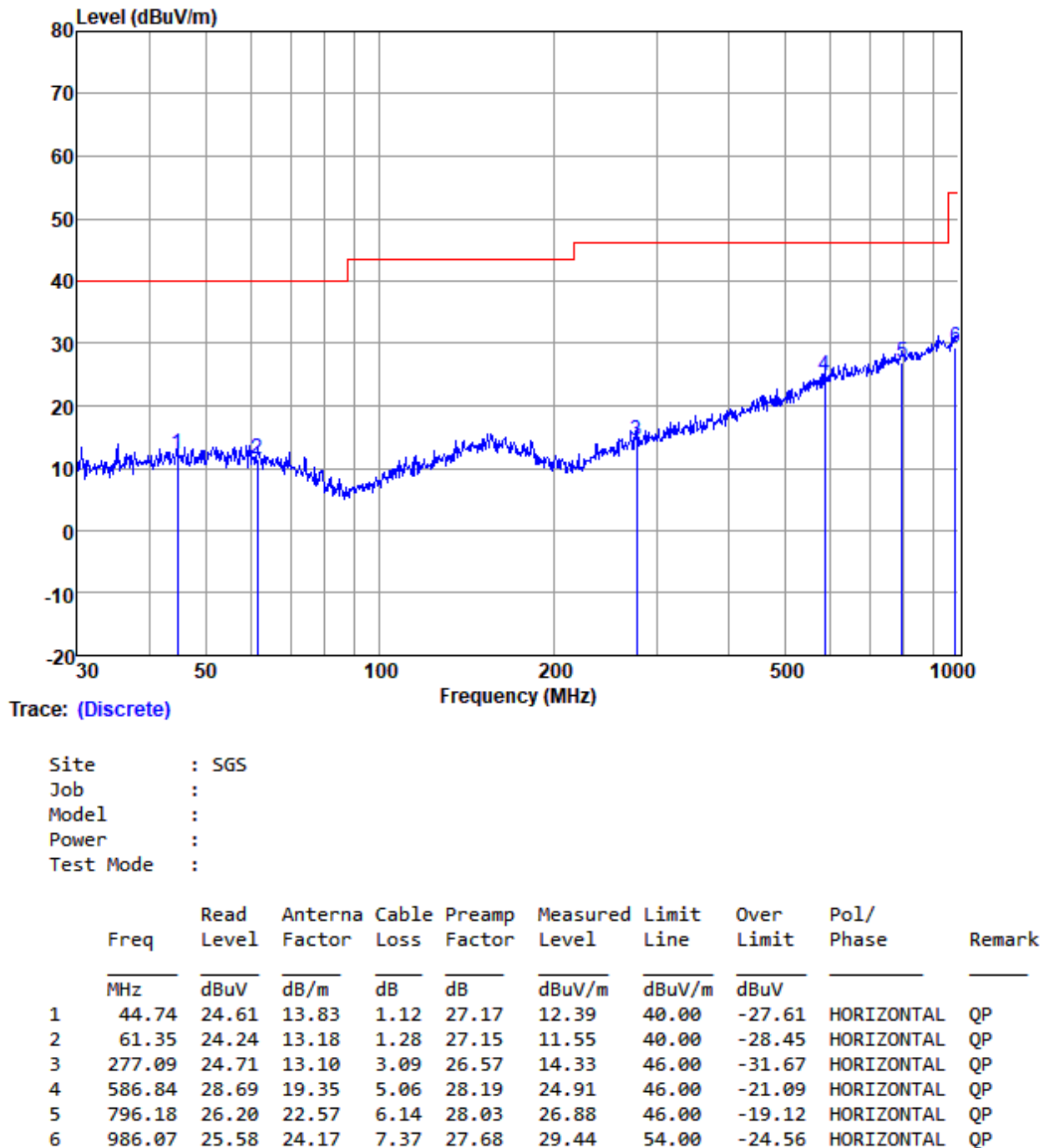
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Test Mode: 06; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



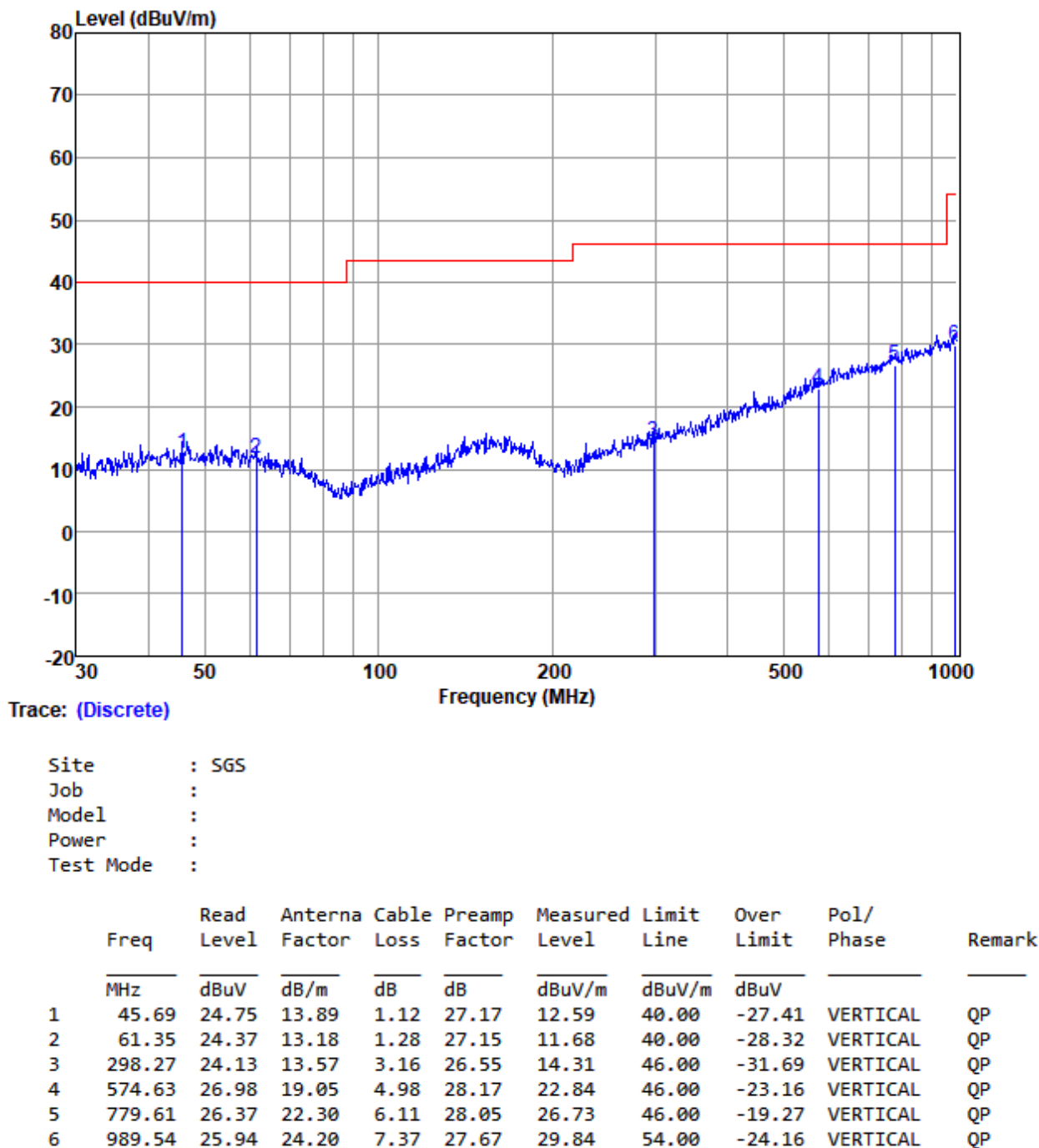
Test Mode: 07; Polarity: Horizontal; Modulation: GFSK; ; Channel: Low



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



Test Mode: 07; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



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

**7.8 Radiated Spurious Emissions (Above 1GHz)**

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

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

Measurement Distance: 3m

Limit:

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

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

**7.8.1 E.U.T. Operation**

Operating Environment:

Temperature: 24.5 °C Humidity: 52.5 % RH Atmospheric Pressure: 1003 mbar

**7.8.2 Test Mode Description**

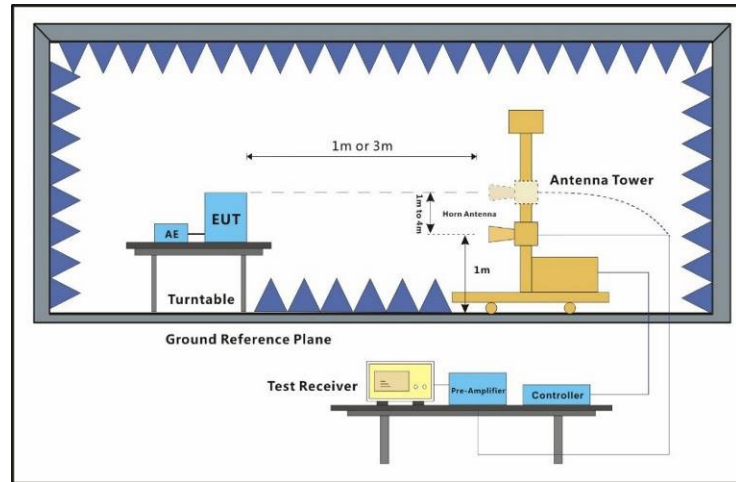
Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode(1Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	05	TX mode(1Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.
Final test	06	TX mode(2Mbps)_Keep the EUT(Left earbud) in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT(right earbud) in continuously transmitting mode with GFSK modulation.



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### 7.8.3 Test Setup Diagram



#### 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 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, quasi-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) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

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) 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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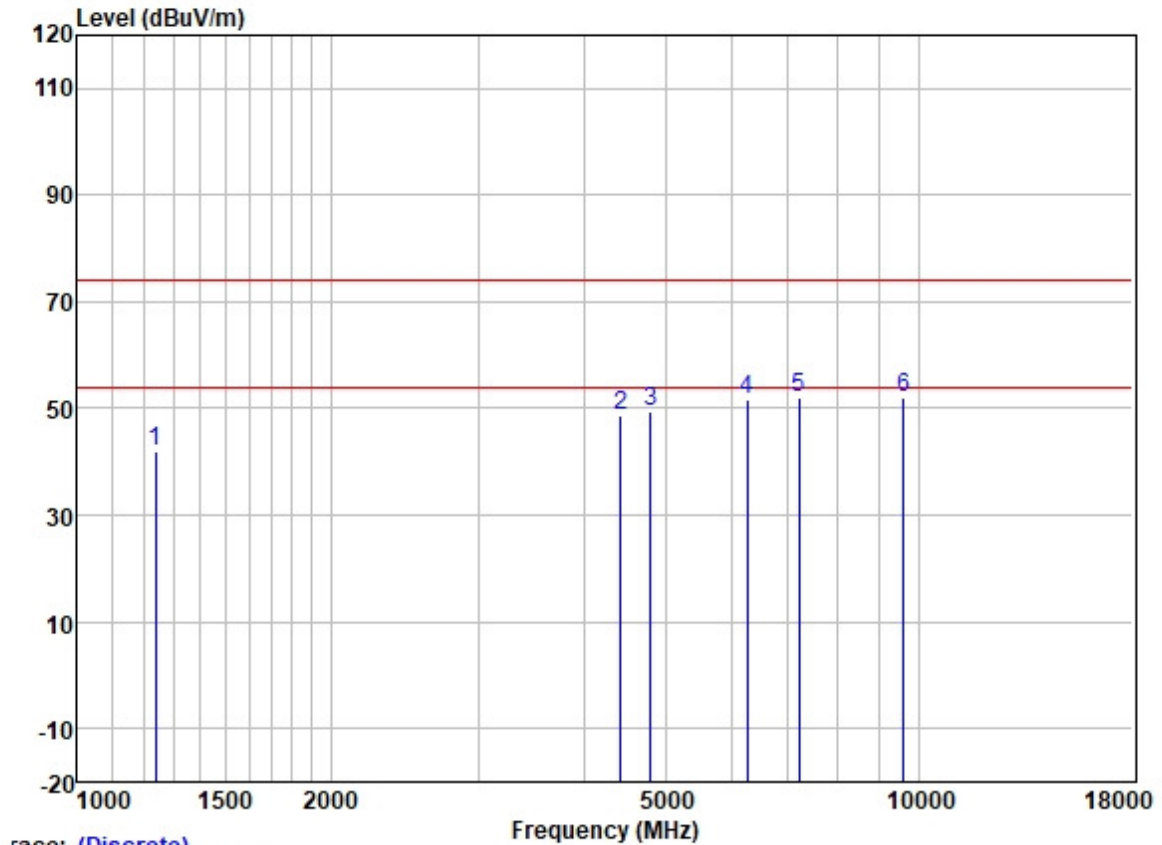
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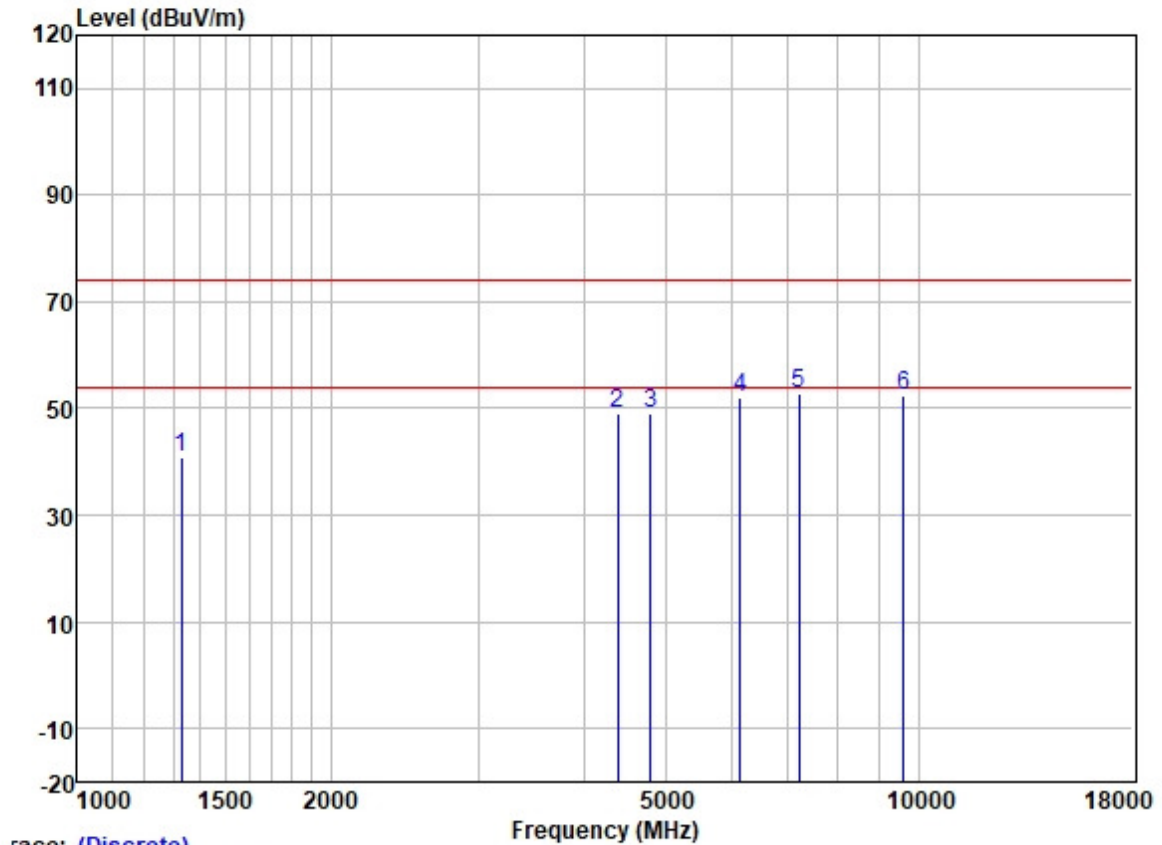


Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low



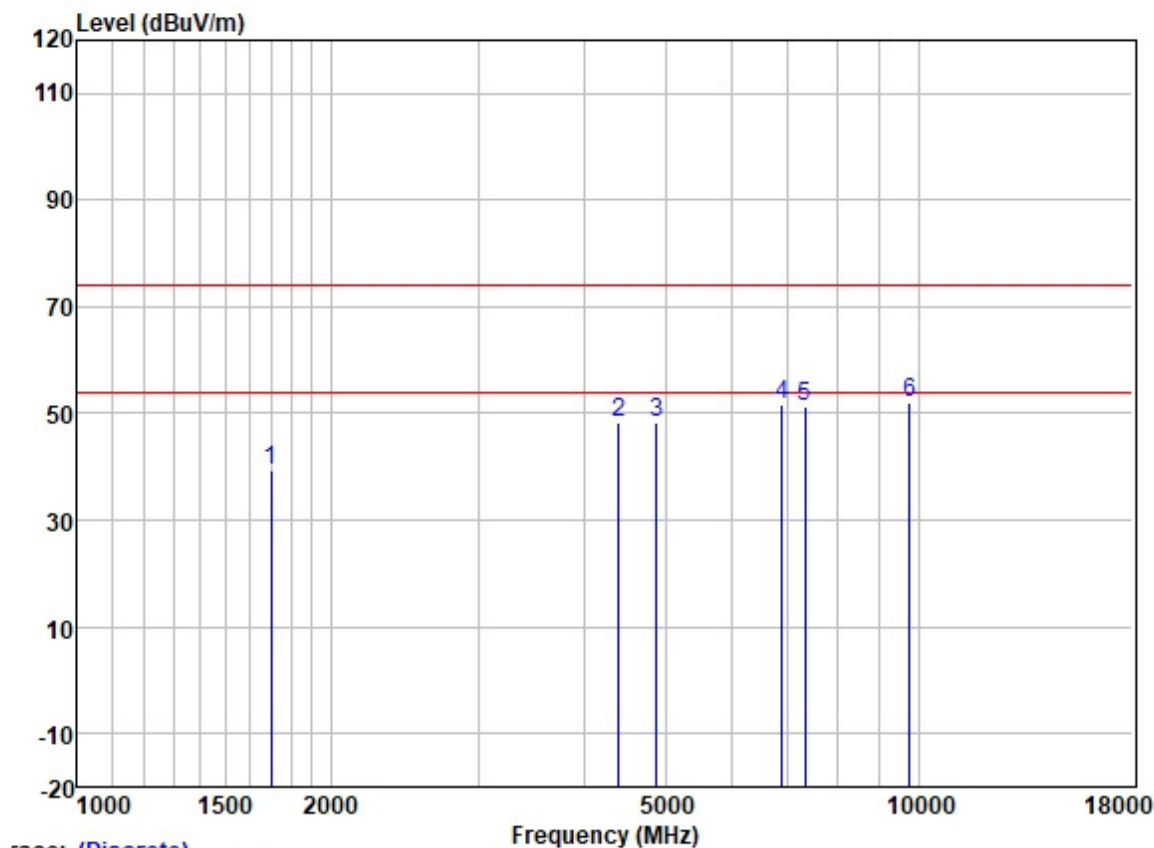
		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1238.483	53.00	24.96	2.30	38.35	41.91	74.00	-32.09	HORIZONTAL	Peak
2	4430.628	49.95	30.72	4.78	36.81	48.64	74.00	-25.36	HORIZONTAL	Peak
3	4804.000	49.55	31.42	5.40	36.83	49.54	74.00	-24.46	HORIZONTAL	Peak
4	6249.464	49.39	33.20	6.02	36.95	51.66	74.00	-22.34	HORIZONTAL	Peak
5	7206.000	47.91	35.54	5.98	37.38	52.05	74.00	-21.95	HORIZONTAL	Peak
6	9608.000	44.06	38.37	7.07	37.42	52.08	74.00	-21.92	HORIZONTAL	Peak

Test Mode: 04; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1331.288	51.10	25.28	2.60	38.29	40.69	74.00	-33.31	VERTICAL	Peak
2	4392.376	50.61	30.66	4.70	36.81	49.16	74.00	-24.84	VERTICAL	Peak
3	4804.000	49.00	31.42	5.40	36.83	48.99	74.00	-25.01	VERTICAL	Peak
4	6142.019	49.96	32.77	6.12	36.93	51.92	74.00	-22.08	VERTICAL	Peak
5	7206.000	48.66	35.54	5.98	37.38	52.80	74.00	-21.20	VERTICAL	Peak
6	9608.000	44.41	38.37	7.07	37.42	52.43	74.00	-21.57	VERTICAL	Peak

Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; ; Channel:middle

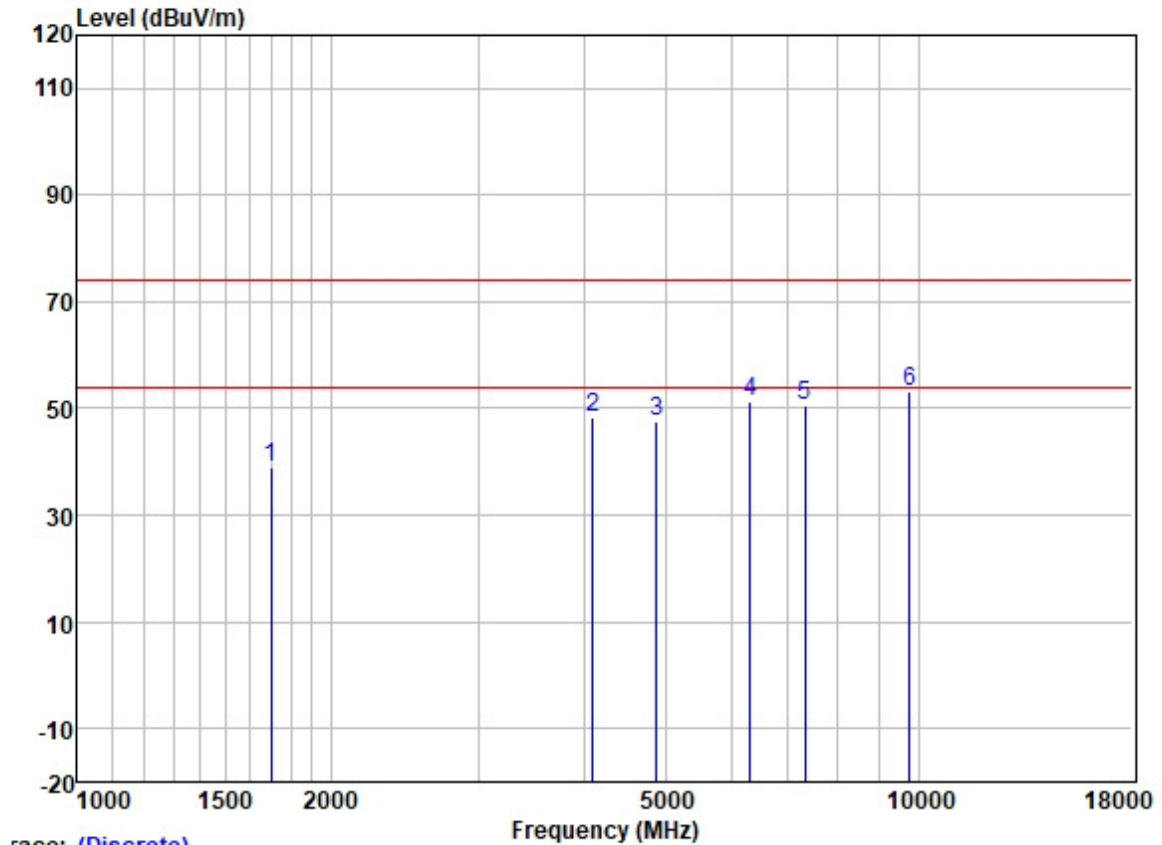


race: (Discrete)

		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	1697.129	48.61	25.71	2.80	37.89	39.23	74.00	-34.77	HORIZONTAL	Peak
2	4405.090	49.86	30.68	4.70	36.81	48.43	74.00	-25.57	HORIZONTAL	Peak
3	4880.000	48.14	31.54	5.50	36.84	48.34	74.00	-25.66	HORIZONTAL	Peak
4	6874.906	48.19	34.82	5.82	37.16	51.67	74.00	-22.33	HORIZONTAL	Peak
5	7320.000	46.58	36.00	6.13	37.43	51.28	74.00	-22.72	HORIZONTAL	Peak
6	9760.000	43.94	38.50	7.02	37.41	52.05	74.00	-21.95	HORIZONTAL	Peak



Test Mode: 04; Polarity: Vertical; Modulation:GFSK; ; Channel:middle

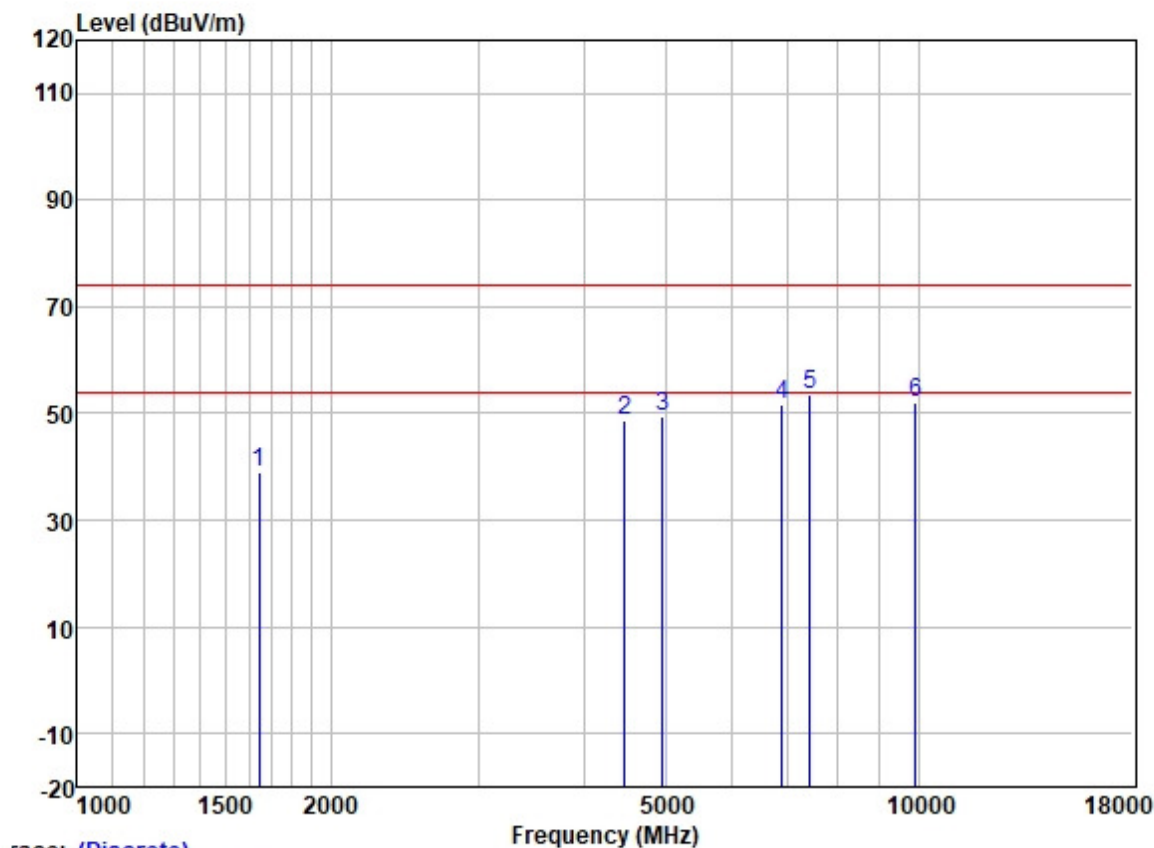


race: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1697.129	48.46	25.71	2.80	37.89	39.08	74.00	-34.92	VERTICAL	Peak
2	4098.010	50.42	29.94	4.60	36.80	48.16	74.00	-25.84	VERTICAL	Peak
3	4880.000	47.27	31.54	5.50	36.84	47.47	74.00	-26.53	VERTICAL	Peak
4	6303.890	48.98	33.44	5.97	36.96	51.43	74.00	-22.57	VERTICAL	Peak
5	7320.000	45.99	36.00	6.13	37.43	50.69	74.00	-23.31	VERTICAL	Peak
6	9760.000	45.04	38.50	7.02	37.41	53.15	74.00	-20.85	VERTICAL	Peak



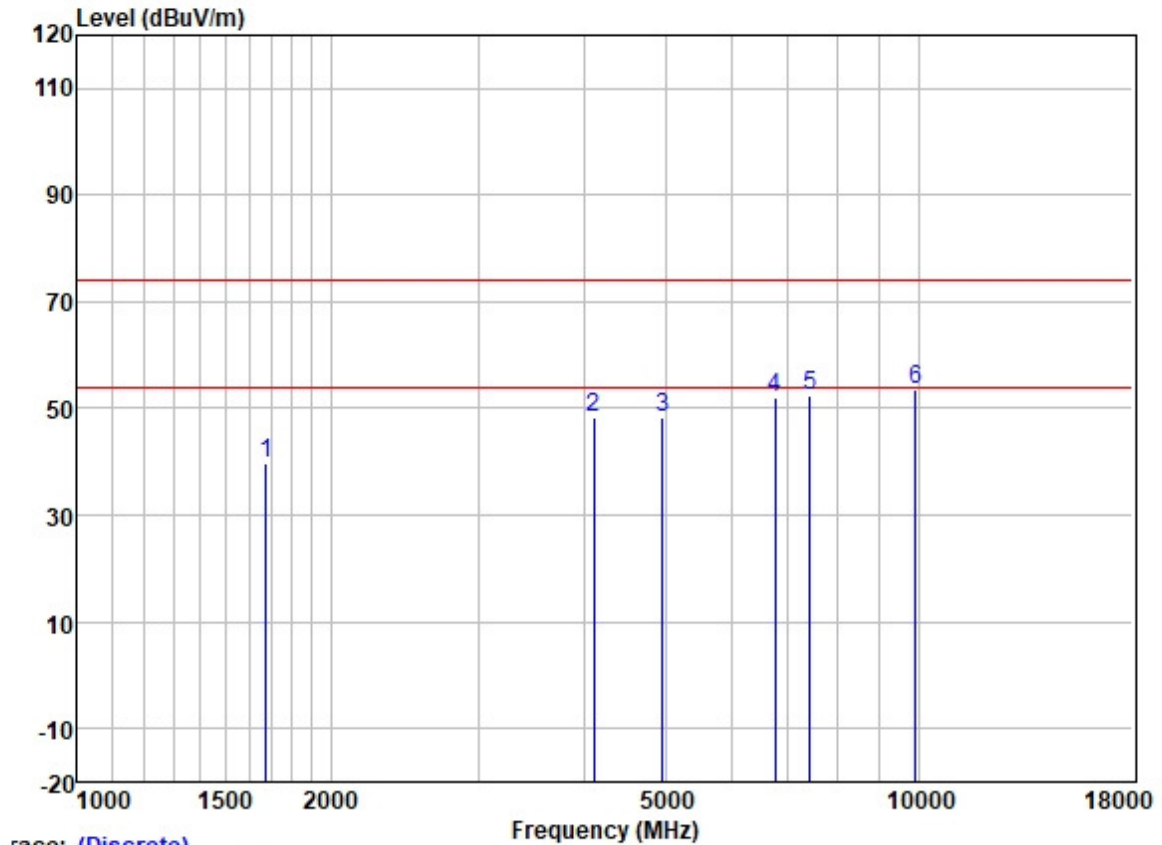
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over		
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Remark
1	1644.019	48.52	25.63	2.80	37.93	39.02	74.00	-34.98	HORIZONTAL Peak
2	4469.214	49.74	30.77	4.93	36.81	48.63	74.00	-25.37	HORIZONTAL Peak
3	4960.000	48.81	31.65	5.65	36.84	49.27	74.00	-24.73	HORIZONTAL Peak
4	6874.906	48.22	34.82	5.82	37.16	51.70	74.00	-22.30	HORIZONTAL Peak
5	7440.000	48.39	36.27	6.22	37.47	53.41	74.00	-20.59	HORIZONTAL Peak
6	9920.000	43.88	38.65	6.96	37.40	52.09	74.00	-21.91	HORIZONTAL Peak

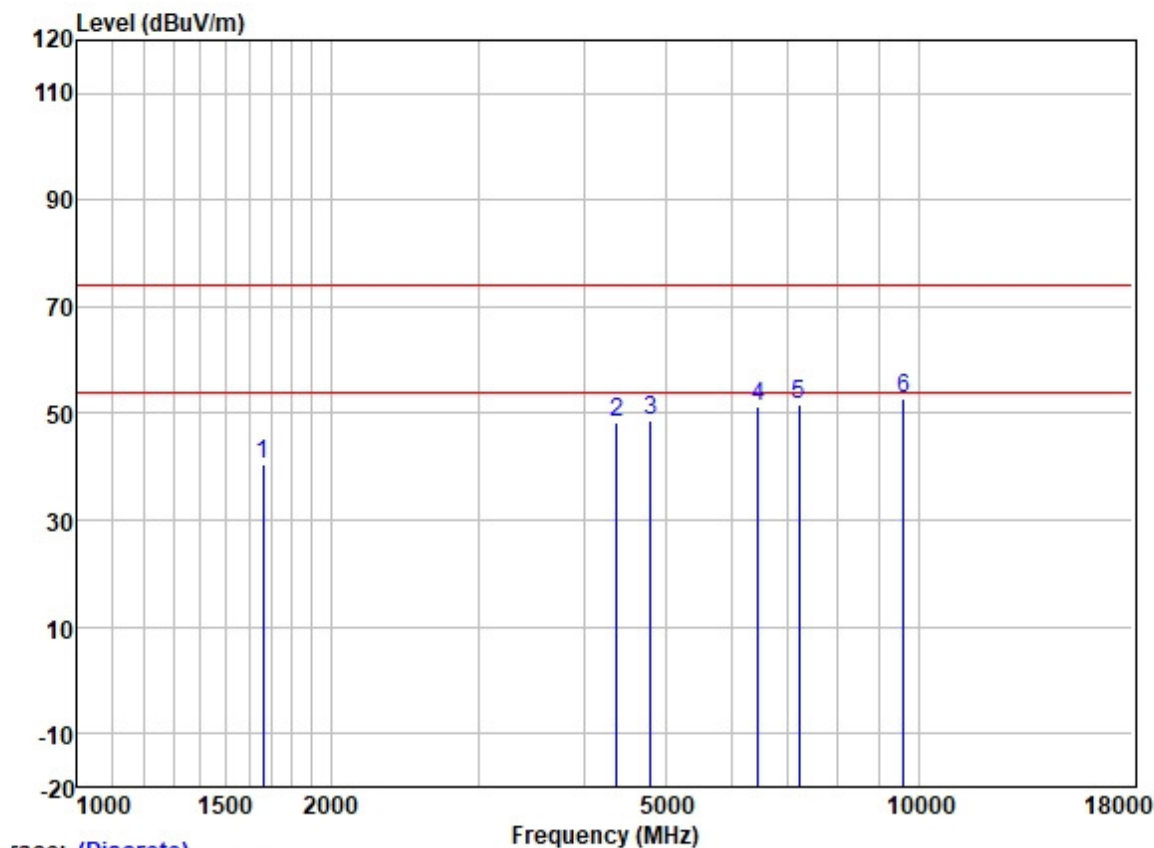
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; ; Channel:High



race: (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	1677.621	49.30	25.68	2.80	37.91	39.87	74.00	-34.13	VERTICAL	Peak
2	4109.872	50.58	29.96	4.60	36.80	48.34	74.00	-25.66	VERTICAL	Peak
3	4960.000	47.86	31.65	5.65	36.84	48.32	74.00	-25.68	VERTICAL	Peak
4	6756.708	48.82	34.56	5.82	37.10	52.10	74.00	-21.90	VERTICAL	Peak
5	7440.000	47.33	36.27	6.22	37.47	52.35	74.00	-21.65	VERTICAL	Peak
6	9920.000	45.50	38.65	6.96	37.40	53.71	74.00	-20.29	VERTICAL	Peak

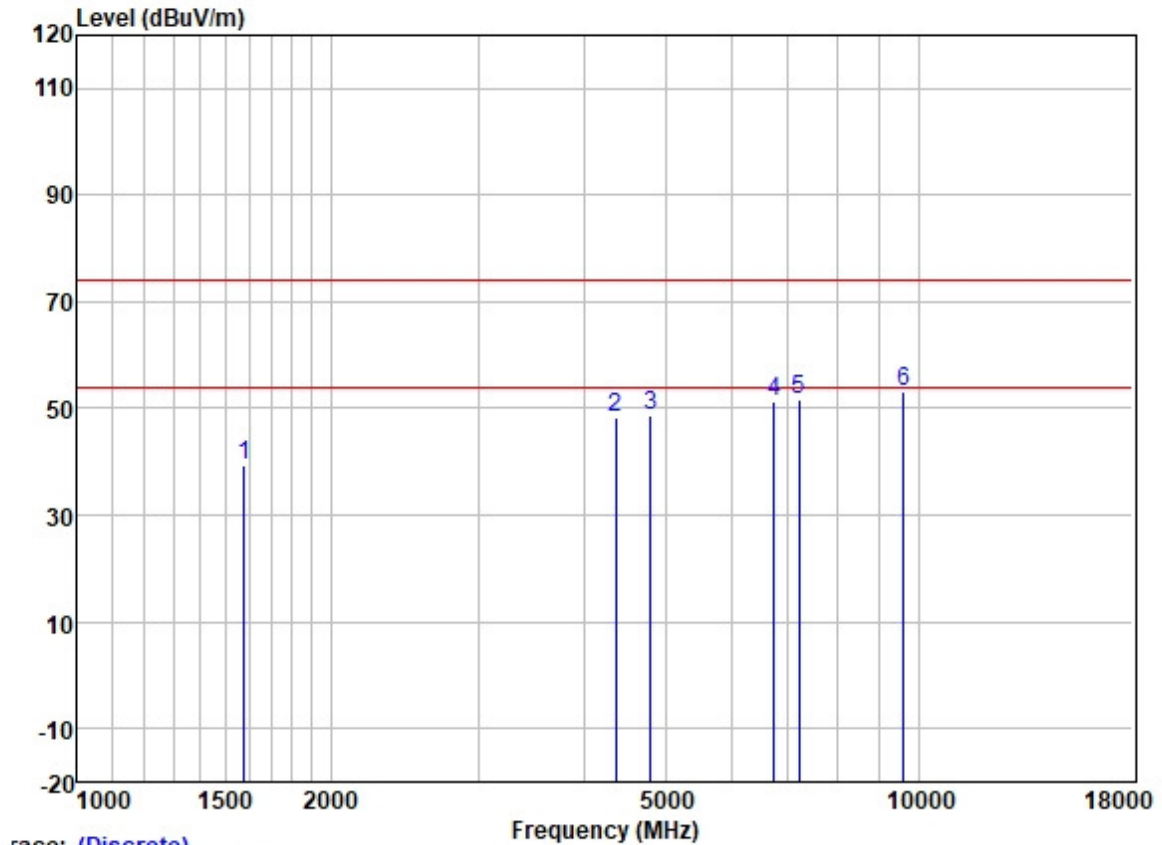
Test Mode: 05; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low



		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	1663.137	49.81	25.65	2.80	37.91	40.35	74.00	-33.65	HORIZONTAL	Peak
2	4379.699	49.95	30.64	4.69	36.81	48.47	74.00	-25.53	HORIZONTAL	Peak
3	4804.000	48.70	31.42	5.40	36.83	48.69	74.00	-25.31	HORIZONTAL	Peak
4	6451.353	48.67	33.88	5.87	37.00	51.42	74.00	-22.58	HORIZONTAL	Peak
5	7206.000	47.59	35.54	5.98	37.38	51.73	74.00	-22.27	HORIZONTAL	Peak
6	9608.000	44.85	38.37	7.07	37.42	52.87	74.00	-21.13	HORIZONTAL	Peak



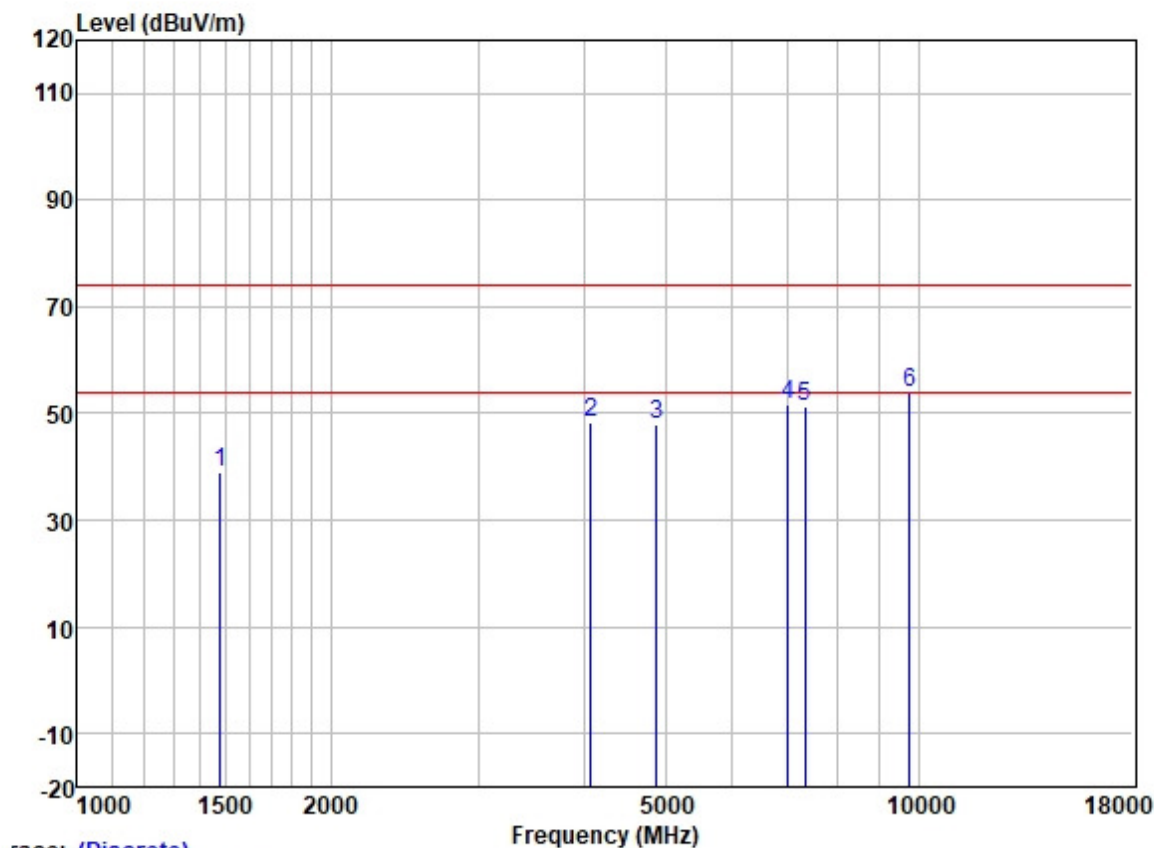
Test Mode: 05; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1578.822	48.98	25.56	2.80	38.00	39.34	74.00	-34.66	VERTICAL	Peak
2	4367.058	49.83	30.62	4.68	36.81	48.32	74.00	-25.68	VERTICAL	Peak
3	4804.000	48.53	31.42	5.40	36.83	48.52	74.00	-25.48	VERTICAL	Peak
4	6737.207	48.05	34.50	5.82	37.09	51.28	74.00	-22.72	VERTICAL	Peak
5	7206.000	47.68	35.54	5.98	37.38	51.82	74.00	-22.18	VERTICAL	Peak
6	9608.000	45.23	38.37	7.07	37.42	53.25	74.00	-20.75	VERTICAL	Peak



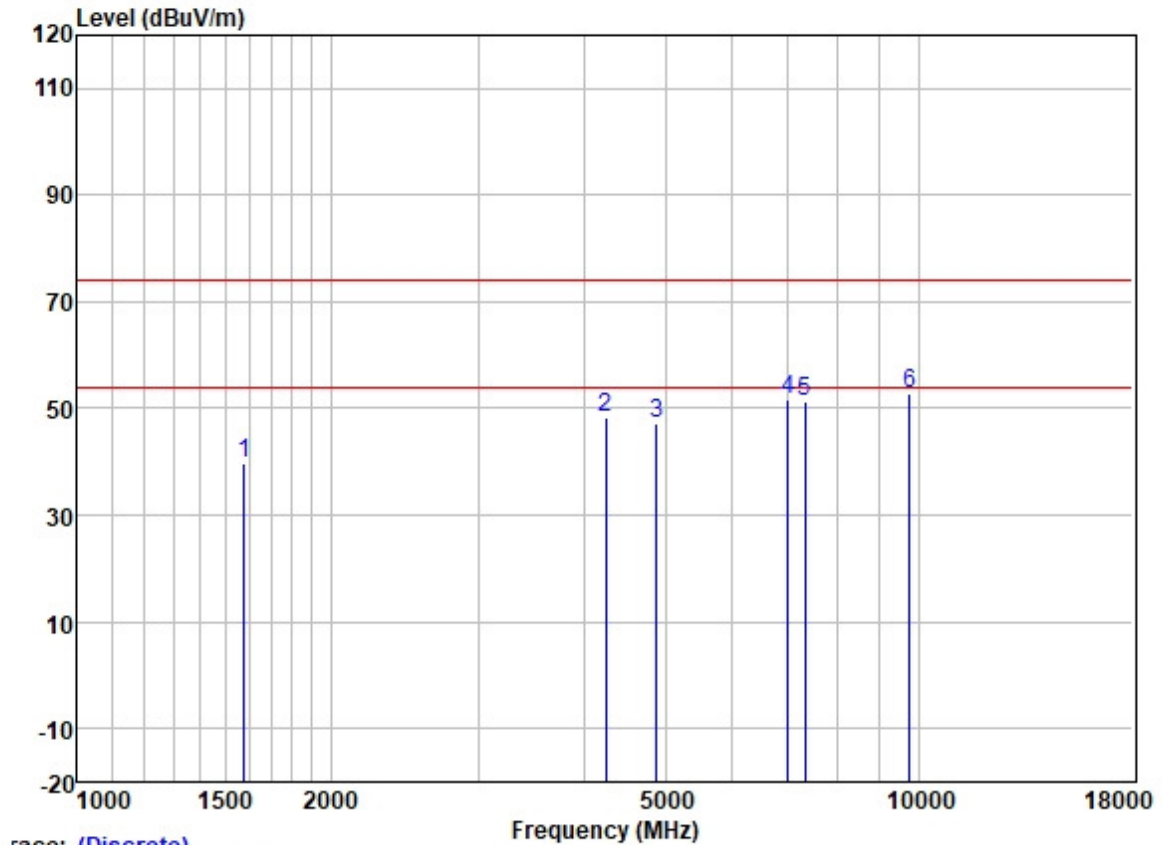
Test Mode: 05; Polarity: Horizontal; Modulation:GFSK; ; Channel:middle



race: (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	1477.276	48.72	25.48	2.77	38.13	38.84	74.00	-35.16	HORIZONTAL	Peak
2	4074.388	50.65	29.90	4.60	36.80	48.35	74.00	-25.65	HORIZONTAL	Peak
3	4880.000	47.71	31.54	5.50	36.84	47.91	74.00	-26.09	HORIZONTAL	Peak
4	6995.172	48.03	35.00	5.81	37.25	51.59	74.00	-22.41	HORIZONTAL	Peak
5	7320.000	46.78	36.00	6.13	37.43	51.48	74.00	-22.52	HORIZONTAL	Peak
6	9760.000	45.86	38.50	7.02	37.41	53.97	74.00	-20.03	HORIZONTAL	Peak

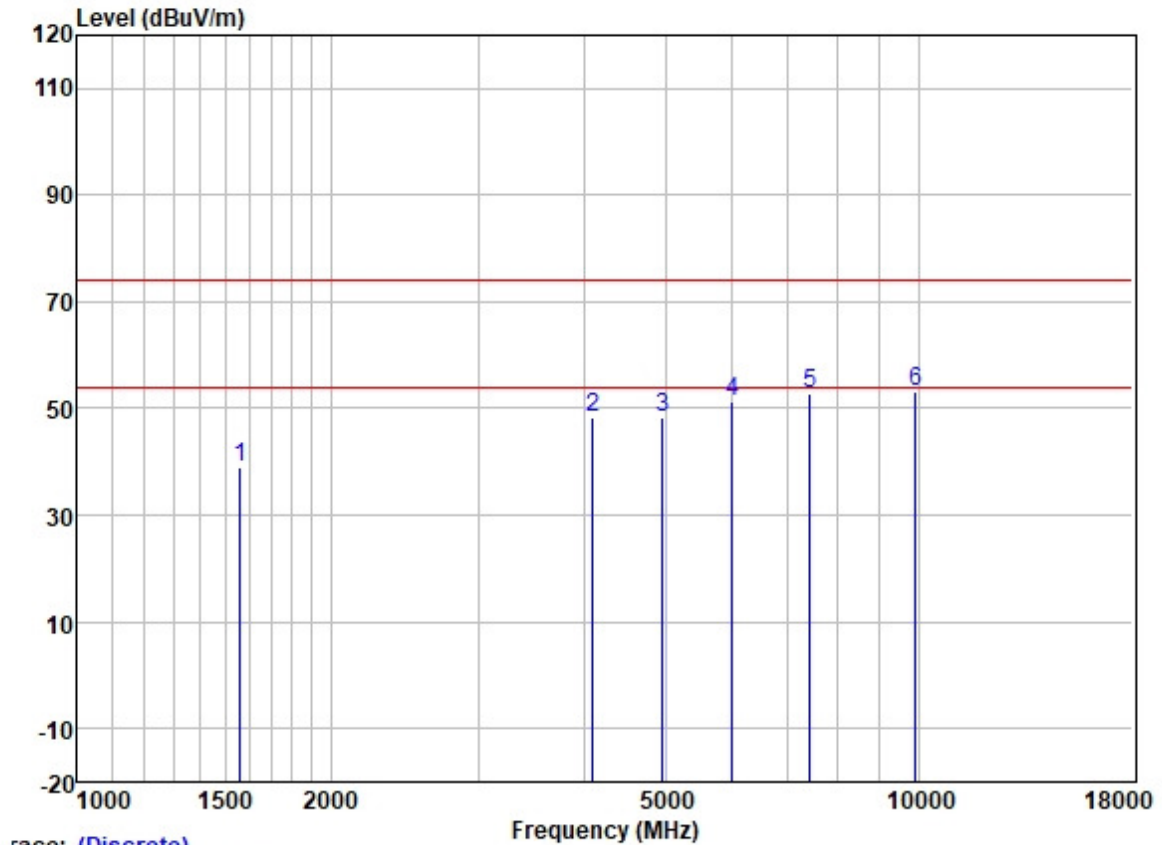
Test Mode: 05; Polarity: Vertical; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1578.822	49.29	25.56	2.80	38.00	39.65	74.00	-34.35	VERTICAL	Peak
2	4242.641	50.28	30.30	4.62	36.81	48.39	74.00	-25.61	VERTICAL	Peak
3	4880.000	47.14	31.54	5.50	36.84	47.34	74.00	-26.66	VERTICAL	Peak
4	6995.172	48.05	35.00	5.81	37.25	51.61	74.00	-22.39	VERTICAL	Peak
5	7320.000	46.66	36.00	6.13	37.43	51.36	74.00	-22.64	VERTICAL	Peak
6	9760.000	44.85	38.50	7.02	37.41	52.96	74.00	-21.04	VERTICAL	Peak

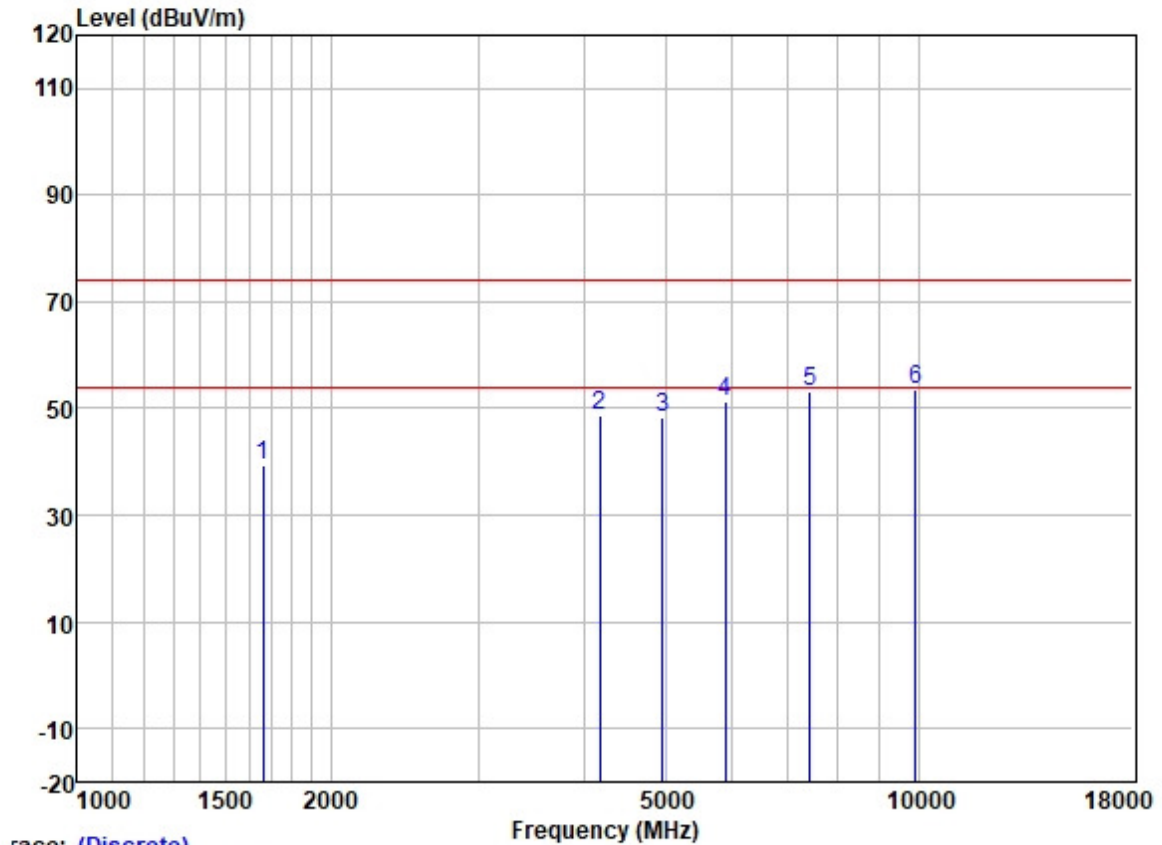
Test Mode: 05; Polarity: Horizontal; Modulation:GFSK; ; Channel:High



	Freq	ReadAntenna	Cable	Preamp		Limit	Over		
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1560.673	48.84	25.54	2.80	38.03	39.15	74.00	-34.85	HORIZONTAL Peak
2	4098.010	50.54	29.94	4.60	36.80	48.28	74.00	-25.72	HORIZONTAL Peak
3	4960.000	47.85	31.65	5.65	36.84	48.31	74.00	-25.69	HORIZONTAL Peak
4	6001.626	49.74	32.40	6.20	36.90	51.44	74.00	-22.56	HORIZONTAL Peak
5	7440.000	47.87	36.27	6.22	37.47	52.89	74.00	-21.11	HORIZONTAL Peak
6	9920.000	45.00	38.65	6.96	37.40	53.21	74.00	-20.79	HORIZONTAL Peak



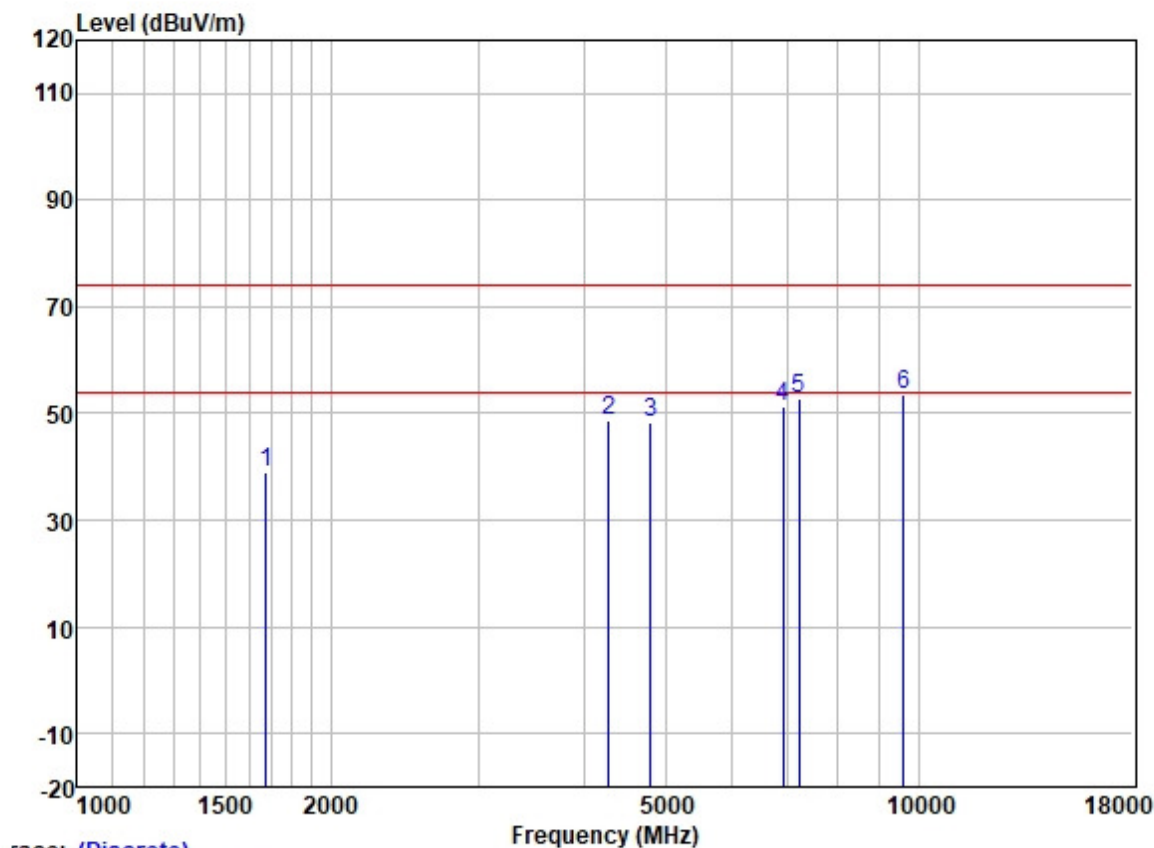
Test Mode: 05; Polarity: Vertical; Modulation:GFSK; ; Channel:High



	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1663.137	48.95	25.65	2.80	37.91	39.49	74.00	-34.51	VERTICAL	Peak
2	4181.768	50.85	30.12	4.60	36.80	48.77	74.00	-25.23	VERTICAL	Peak
3	4960.000	47.87	31.65	5.65	36.84	48.33	74.00	-25.67	VERTICAL	Peak
4	5898.442	50.06	32.31	5.90	36.90	51.37	74.00	-22.63	VERTICAL	Peak
5	7440.000	48.27	36.27	6.22	37.47	53.29	74.00	-20.71	VERTICAL	Peak
6	9920.000	45.49	38.65	6.96	37.40	53.70	74.00	-20.30	VERTICAL	Peak

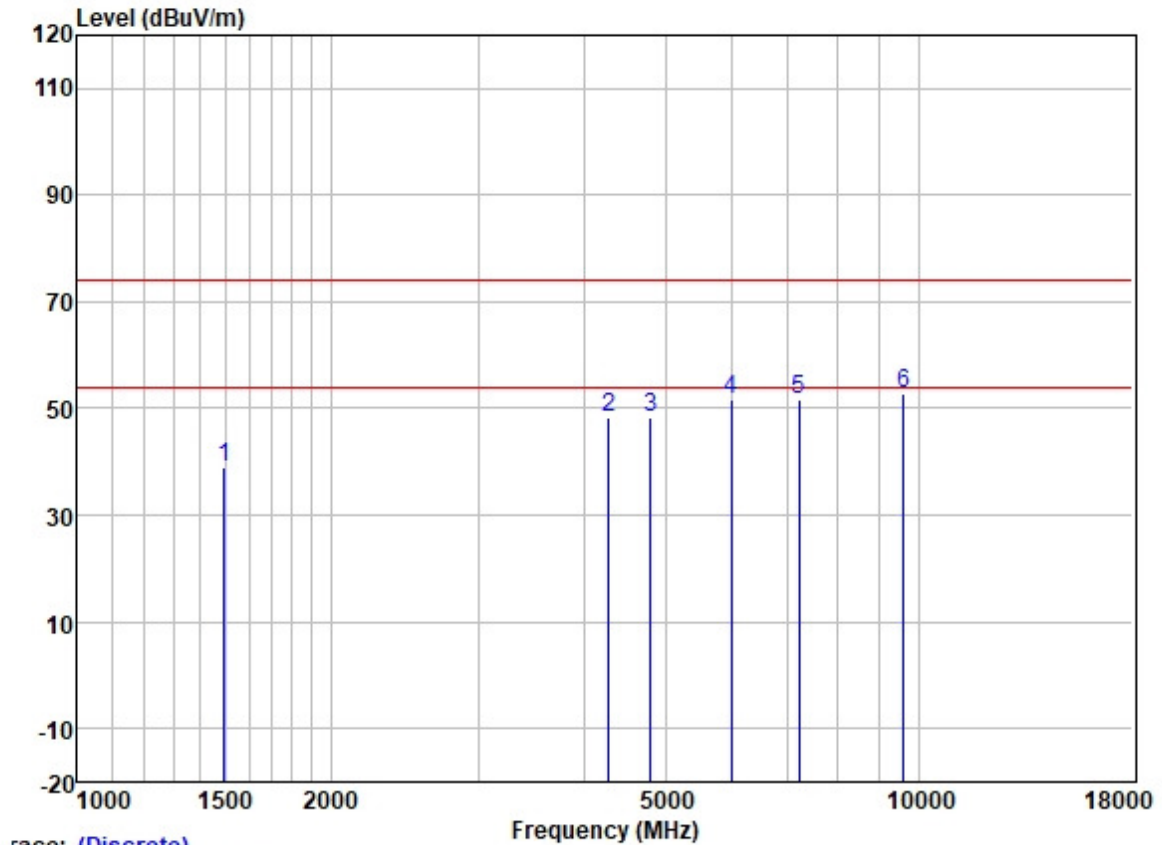


Test Mode: 06; Polarity: Horizontal; Modulation:GFSK; ; Channel:Low



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1677.621	48.53	25.68	2.80	37.91	39.10	74.00	-34.90	HORIZONTAL	Peak
2	4279.589	50.29	30.42	4.63	36.81	48.53	74.00	-25.47	HORIZONTAL	Peak
3	4804.000	48.49	31.42	5.40	36.83	48.48	74.00	-25.52	HORIZONTAL	Peak
4	6894.806	47.65	34.85	5.81	37.18	51.13	74.00	-22.87	HORIZONTAL	Peak
5	7206.000	48.48	35.54	5.98	37.38	52.62	74.00	-21.38	HORIZONTAL	Peak
6	9608.000	45.38	38.37	7.07	37.42	53.40	74.00	-20.60	HORIZONTAL	Peak

Test Mode: 06; Polarity: Vertical; Modulation:GFSK; ; Channel:Low



	Freq	ReadAntenna	Cable	Preamp		Limit	Over		
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1494.455	48.67	25.50	2.79	38.10	38.86	74.00	-35.14	VERTICAL
2	4279.589	50.20	30.42	4.63	36.81	48.44	74.00	-25.56	VERTICAL
3	4804.000	48.31	31.42	5.40	36.83	48.30	74.00	-25.70	VERTICAL
4	5984.305	50.06	32.39	6.15	36.90	51.70	74.00	-22.30	VERTICAL
5	7206.000	47.67	35.54	5.98	37.38	51.81	74.00	-22.19	VERTICAL
6	9608.000	44.92	38.37	7.07	37.42	52.94	74.00	-21.06	VERTICAL