TEST REPORT

Application No.:	GZEM2008014340CR
Applicant:	XIAMEN XDL HEALTH & TECHNOLOGY CO., LTD.
Address of Applicant:	159 TONGHONG ROAD, TONGAN, XIAMEN, CHINA
Manufacturer:	XIAMEN XDL HEALTH & TECHNOLOGY CO., LTD.
Address of Manufacturer:	159 TONGHONG ROAD, TONGAN, XIAMEN, CHINA
Factory:	XIAMEN XDL HEALTH & TECHNOLOGY CO., LTD.
Address of Factory:	159 TONGHONG ROAD, TONGAN, XIAMEN, CHINA
Equipment Under Test (EUT):	
FCC ID: 2AW9B-SF-E3959	
EUT Name:	Electric Elliptical Trainer
Model No.:	SF-E3959, SF-B0960 ¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	SUNNY HEALTH & FITNESS
Standard(s):	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2020-08-12
Date of Test:	2020-09-09 to 2020-11-18
Date of Issue:	2020-11-24
Test Result:	**Pass***

* 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		2020-11-24		Original

Authorized for issue by:				
Tested By		Kevin zhang **Kevin_Zhang /Project Engineer**		2020-09-09 to 2020-11-18 **Date**
Checked By		Riday Liu **Ricky Liu /Reviewer**		2020-11-24 **Date**

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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))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass**
**: The EUT passed Radiated Emissions tests after modification.				

¤ Declaration of EUT Family Grouping:

Model No.: SF-E3959, SF-B0960

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on the appearance decoration, appearance color and model No..

Therefore only one model SF-E3959 was tested in this report.

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4 General Information

4.1 Details of E.U.T.

Power Supply:	AC 120V, 60Hz for main unit. DC 3.0V (cell battery) for remote controller
Test Voltage:	DC 3.0V
Cable:	AC mains (unshielded, 1.8m)
Modulation Type:	GFSK
Number of Channels:	3
Operation Frequency:	2410MHz, 2440MHz, 2475MHz
Antenna Gain:	0dBi
SN:	QB24000000
Hardware Version:	QB-1801-00-2.4G-TX V1
Software Version:	N/A
Power Setting:	N/A
Function:	Wireless remote controller used to control Electric Elliptical Trainer.
Remark:	There is no intentional transmitting in the main unit.

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	±0.57%
3	Occupied Bandwidth	±3%
4	RF Conducted power	0.68dB
5	RF Power Density	1.50dB
6	Conducted Spurious Emissions	1.04dB
7	RF Radiated Power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious Emission Test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
9	Temperature	±0.4℃
10	Humidity	±1.3%
11	Supply Voltages	±1.5%
12	Time	±3%

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4.4 Test Location

All tests were performed at:

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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 C-Tick mark as a result of our NVLAP accreditation.

- **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 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **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, Jul 13, 2017.

- **Industry Canada (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-10449 and T-11179)**

The 10m Semi-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-10449 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 17025:2005, 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

The EUT passed Radiated Emissions tests after modification.

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5 Equipment List

20dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

Field Strength of the Fundamental Signal (15.249(a))					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2020-06-08	2023-06-07
Horn Antenna	SCHWARZBECKMESS-ELEKTRONIK	BBHA 9120D	EMC2016	2019-09-25	2022-09-24
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2020-05-26	2021-05-25
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2020-11-13	2021-11-12
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2021-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2020-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

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Restricted Band Around Fundamental Frequency					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2020-01-10	2021-01-09
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2020-06-08	2023-06-07
Horn Antenna	SCHWARZBECKMESS-ELEKTRONIK	BBHA 9120D	EMC2016	2019-09-25	2022-09-24
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2020-05-26	2021-05-25
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2020-11-13	2021-11-12
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2021-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2020-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

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Radiated Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2020-01-10	2021-01-09
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2020-06-08	2023-06-07
Horn Antenna	SCHWARZBECKMESS-ELEKTRONIK	BBHA 9120D	EMC2016	2019-09-25	2022-09-24
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2020-05-26	2021-05-25
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2020-11-13	2021-11-12
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2021-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2020-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2020-07-09	2021-07-08
DMM	Fluke	73	EMC0007	2020-07-09	2021-07-08

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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

Limit:

15.203 requirement:

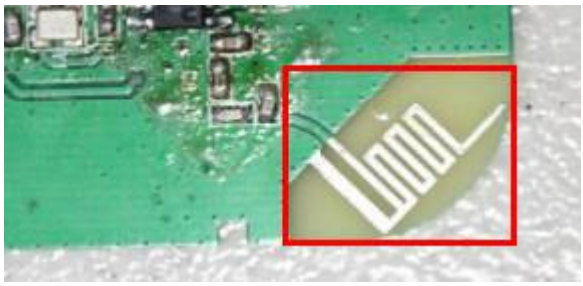
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

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.



EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

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7 Radio Spectrum Matter Test Results

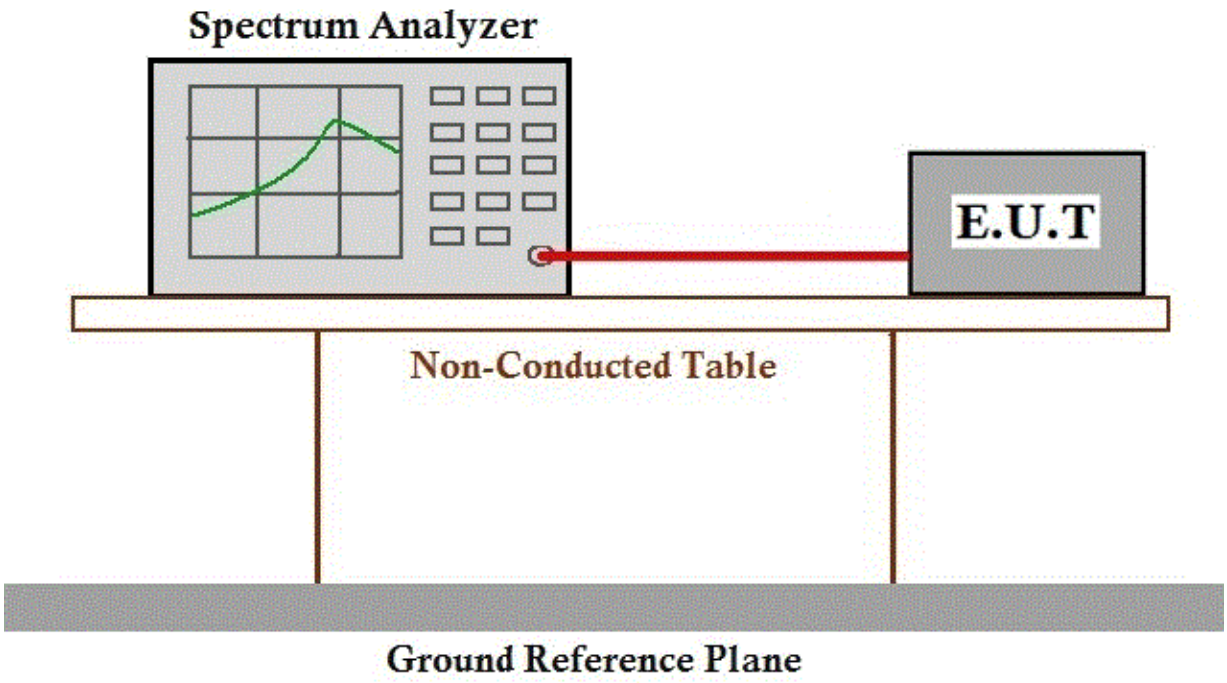
7.1 20dB Bandwidth

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

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 24.7 °C Humidity: 54.8 % RH Atmospheric Pressure: 1020 mbar
Test Mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

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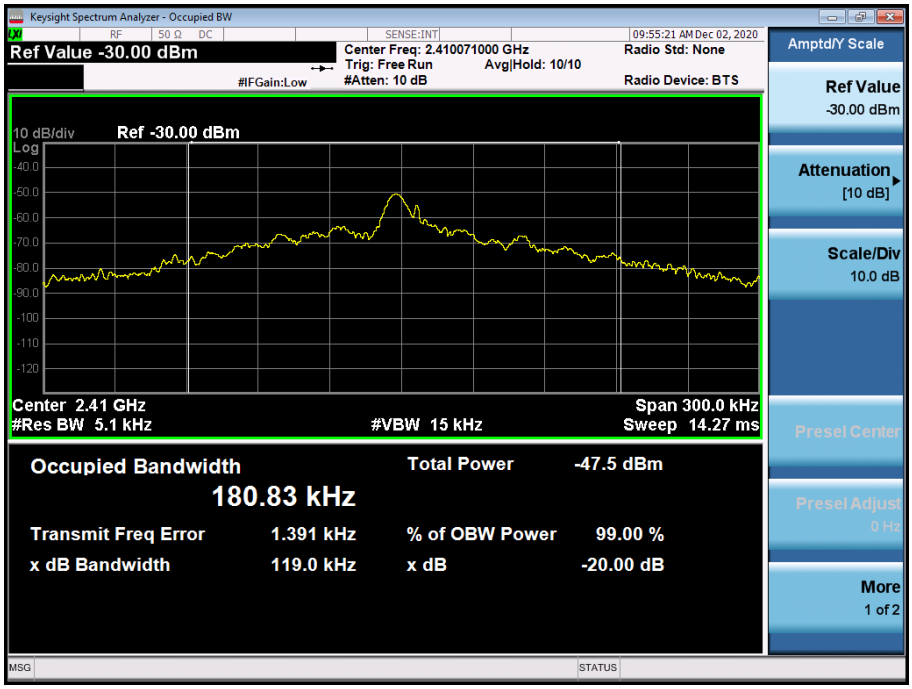
Mode:b, Channel: Low



Mode:b, Channel: Middle

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Mode:b, Channel: High

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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

Measurement Distance: 3m

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.		

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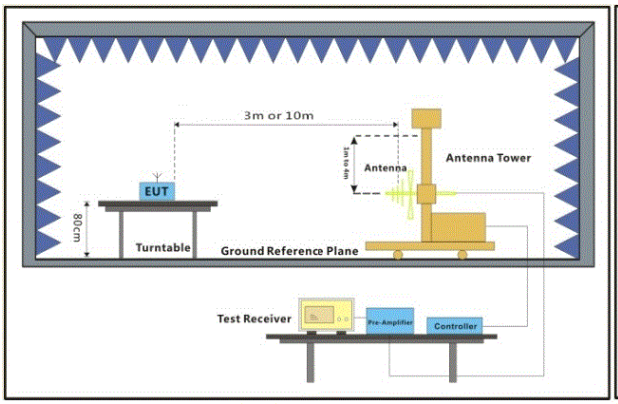
7.2.1 E.U.T. Operation

Operating Environment:

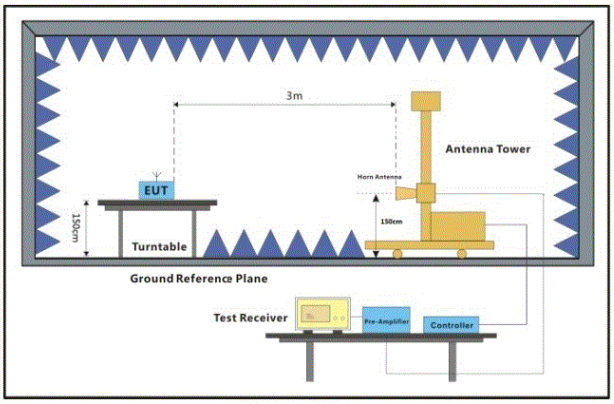
Temperature: 22 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test Mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.2.3 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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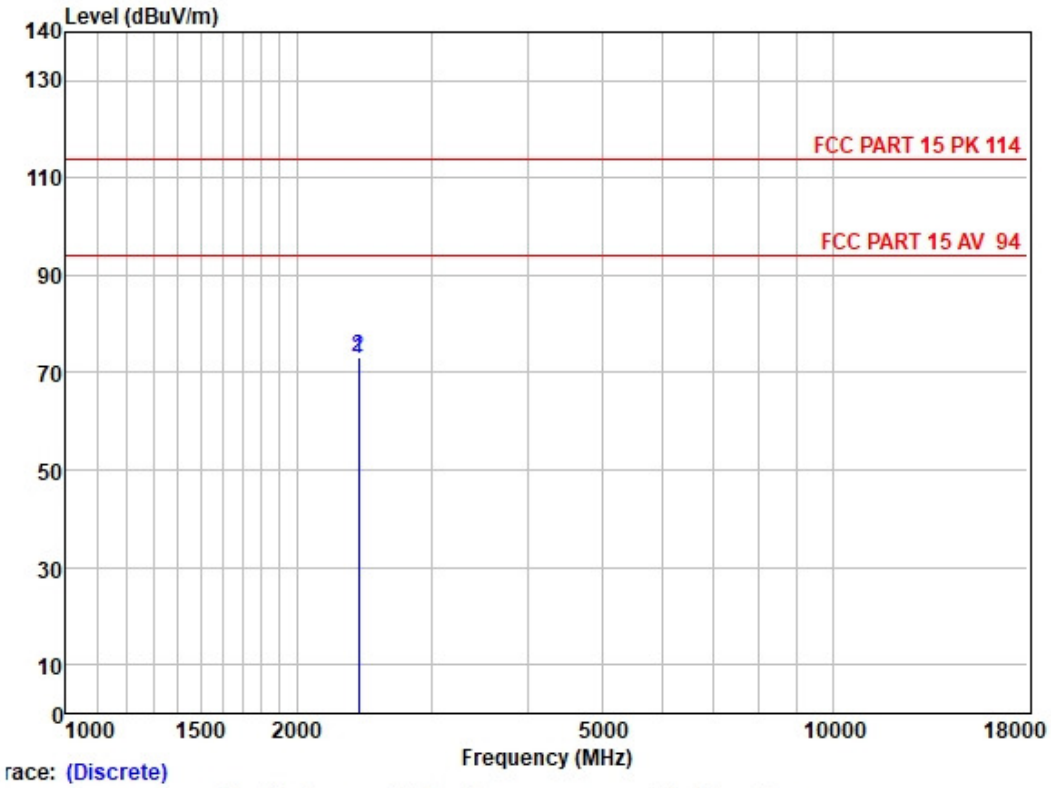
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna 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	2410.110	79.02	27.36	3.48	36.92	72.94	94.00	-21.06	HORIZONTAL	Average
2	2410.110	79.25	27.36	3.48	36.92	73.17	114.00	-40.83	HORIZONTAL	Peak

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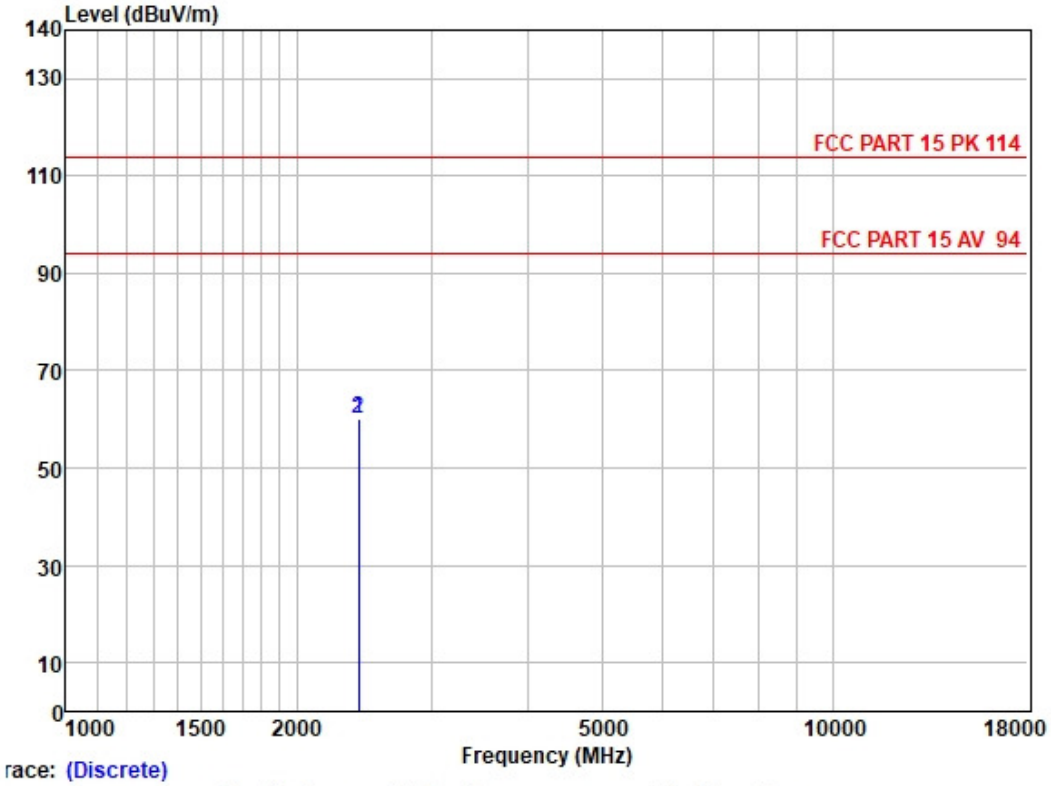
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna 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	2410.070	66.02	27.36	3.48	36.92	59.94	94.00	-34.06	VERTICAL	Average
2	2410.070	66.05	27.36	3.48	36.92	59.97	114.00	-54.03	VERTICAL	Peak

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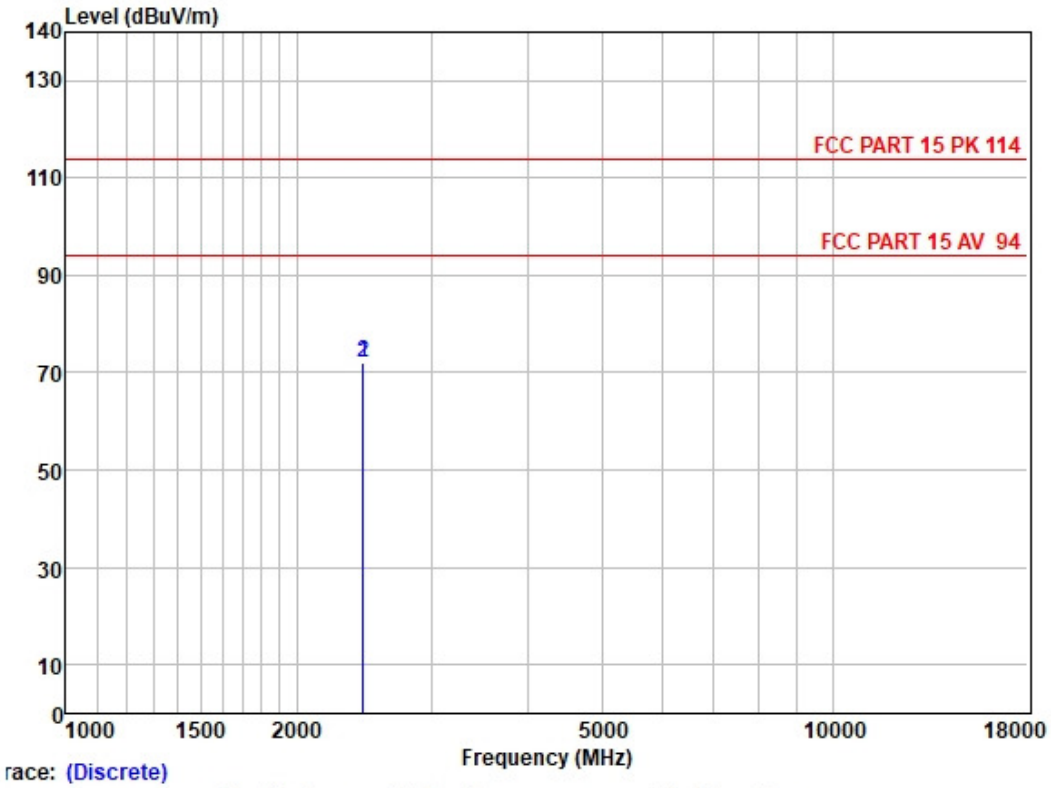
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna 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	2440.090	78.01	27.42	3.40	36.91	71.92	94.00	-22.08	HORIZONTAL	Average
2	2440.090	78.09	27.42	3.40	36.91	72.00	114.00	-42.00	HORIZONTAL	Peak

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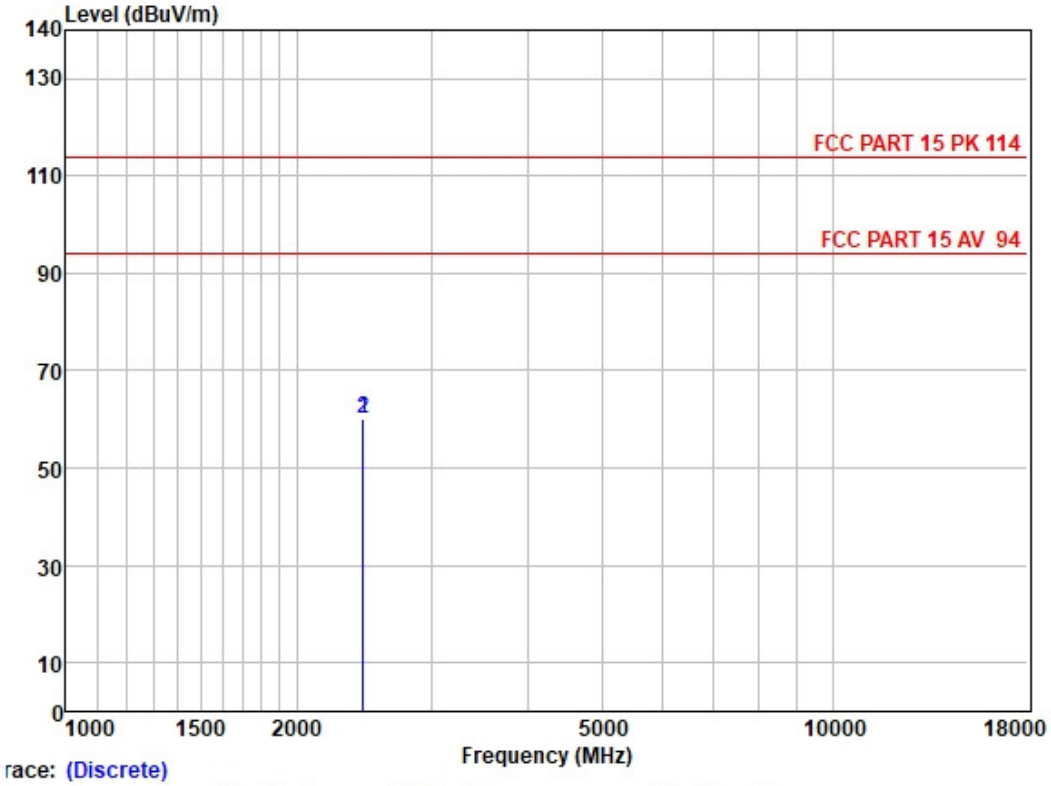
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna 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	2440.150	66.03	27.42	3.40	36.91	59.94	94.00	-34.06	VERTICAL	Average
2	2440.150	66.10	27.42	3.40	36.91	60.01	114.00	-53.99	VERTICAL	Peak

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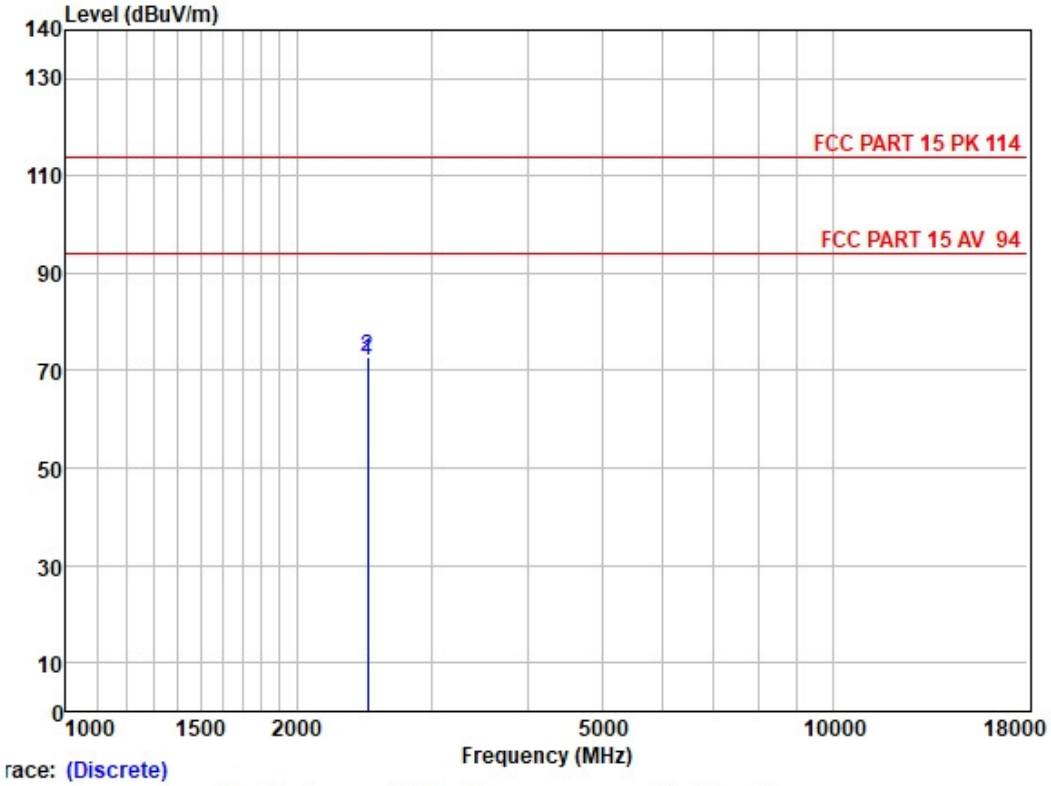
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna 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	2475.070	78.02	27.47	3.60	36.90	72.19	94.00	-21.81	HORIZONTAL	Average
2	2475.070	78.69	27.47	3.60	36.90	72.86	114.00	-41.14	HORIZONTAL	Peak

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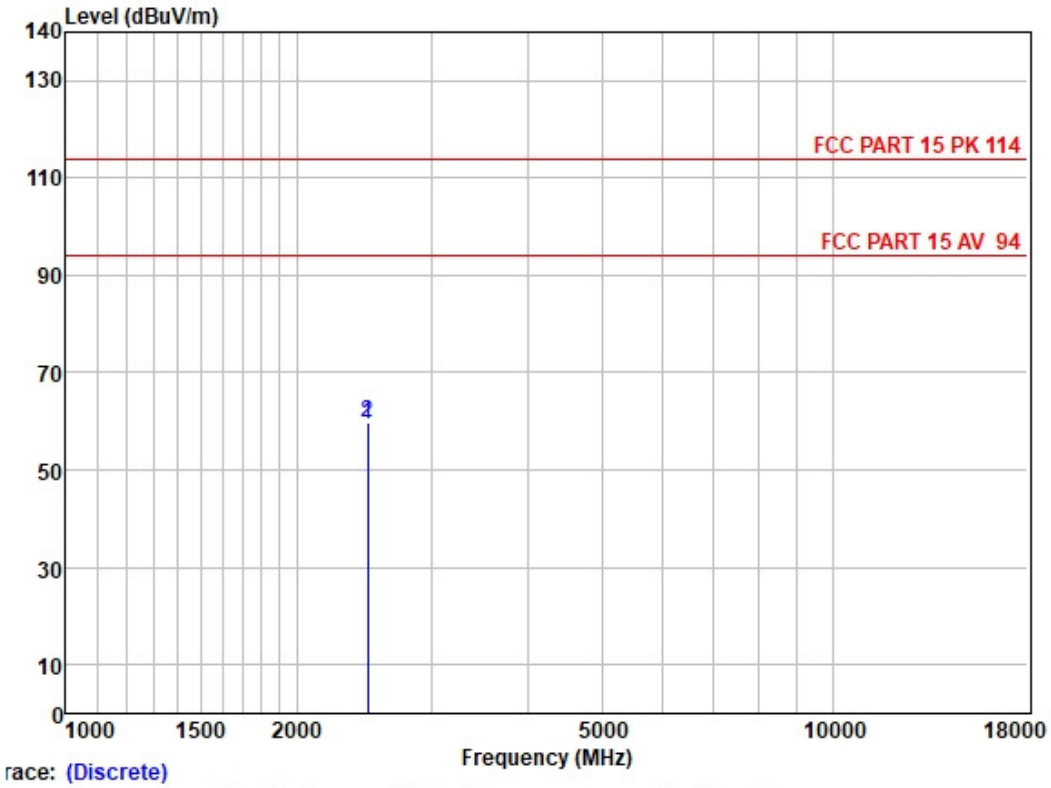
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna 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	2475.030	65.04	27.47	3.60	36.90	59.21	94.00	-34.79	VERTICAL	Average
2	2475.030	65.65	27.47	3.60	36.90	59.82	114.00	-54.18	VERTICAL	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 6.4&6.5&6.6
Measurement Distance: 3m
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.		

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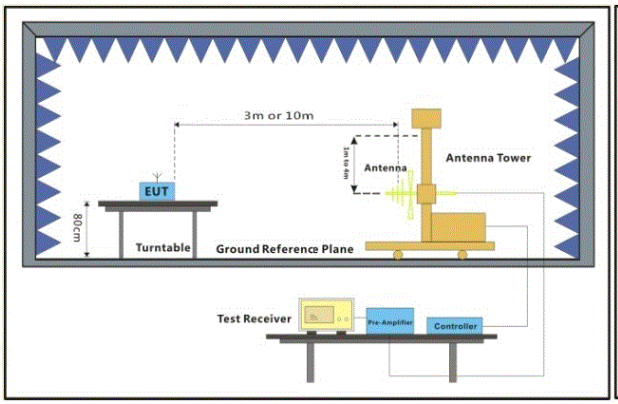
7.3.1 E.U.T. Operation

Operating Environment:

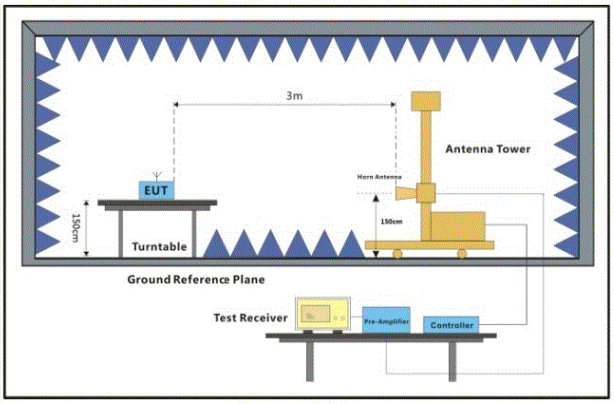
Temperature: 22 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test Mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.3.3 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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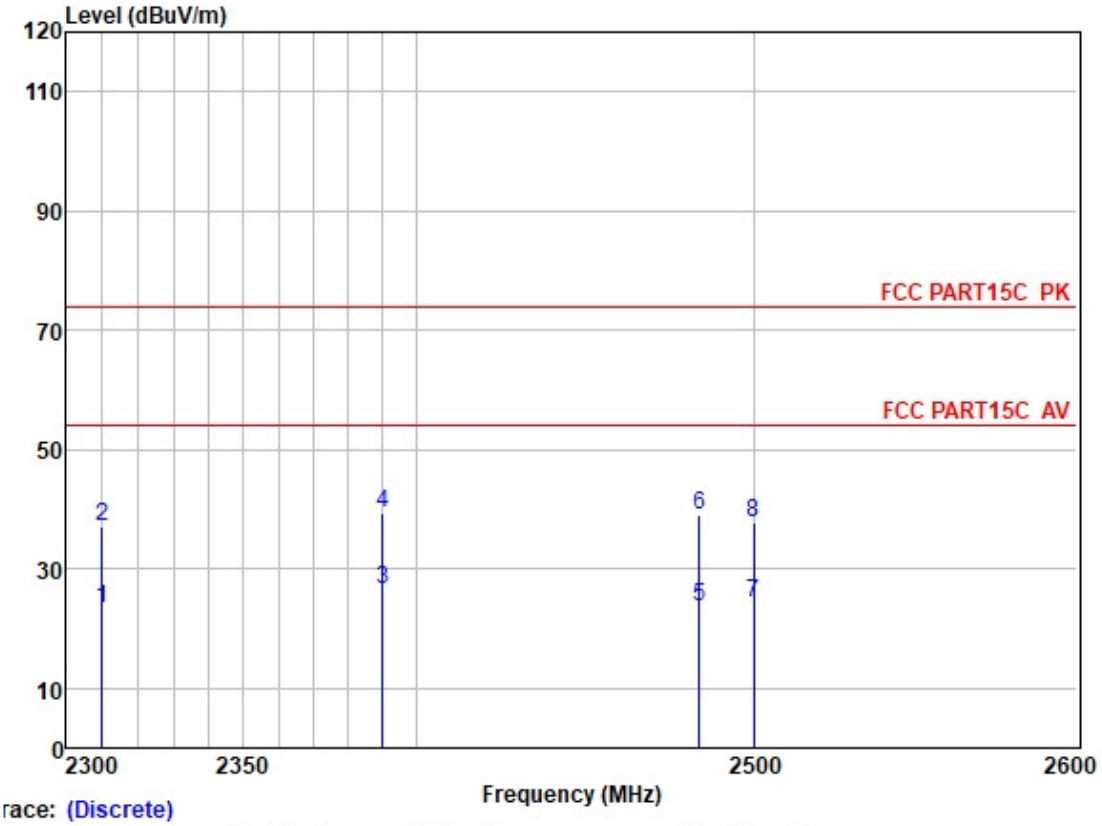

race: (Discrete)

	Freq	Read Level	Antenna 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	2310.000	30.44	27.15	3.32	37.62	23.29	54.00	-30.71	HORIZONTAL	Average
2	2310.000	44.17	27.15	3.32	37.62	37.02	74.00	-36.98	HORIZONTAL	Peak
3	2390.000	33.48	27.33	3.48	37.59	26.70	54.00	-27.30	HORIZONTAL	Average
4	2390.000	46.16	27.33	3.48	37.59	39.38	74.00	-34.62	HORIZONTAL	Peak
5	2483.500	30.26	27.48	3.53	37.57	23.70	54.00	-30.30	HORIZONTAL	Average
6	2483.500	45.53	27.48	3.53	37.57	38.97	74.00	-35.03	HORIZONTAL	Peak
7	2500.000	31.06	27.50	3.40	37.56	24.40	54.00	-29.60	HORIZONTAL	Average
8	2500.000	44.26	27.50	3.40	37.56	37.60	74.00	-36.40	HORIZONTAL	Peak

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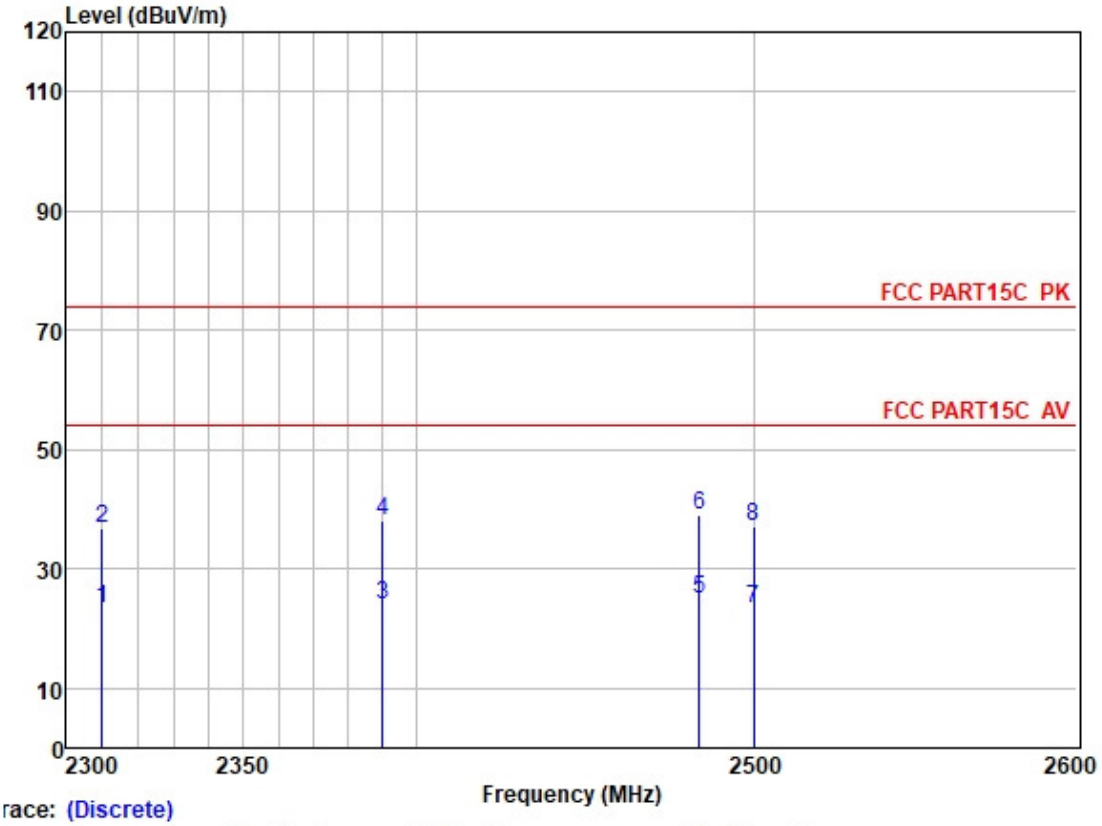

race: (Discrete)

	Freq	Read Level	Antenna 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	2310.000	30.52	27.15	3.32	37.62	23.37	54.00	-30.63	VERTICAL	Average
2	2310.000	44.07	27.15	3.32	37.62	36.92	74.00	-37.08	VERTICAL	Peak
3	2390.000	30.82	27.33	3.48	37.59	24.04	54.00	-29.96	VERTICAL	Average
4	2390.000	44.78	27.33	3.48	37.59	38.00	74.00	-36.00	VERTICAL	Peak
5	2483.500	31.56	27.48	3.53	37.57	25.00	54.00	-29.00	VERTICAL	Average
6	2483.500	45.47	27.48	3.53	37.57	38.91	74.00	-35.09	VERTICAL	Peak
7	2500.000	30.02	27.50	3.40	37.56	23.36	54.00	-30.64	VERTICAL	Average
8	2500.000	43.83	27.50	3.40	37.56	37.17	74.00	-36.83	VERTICAL	Peak

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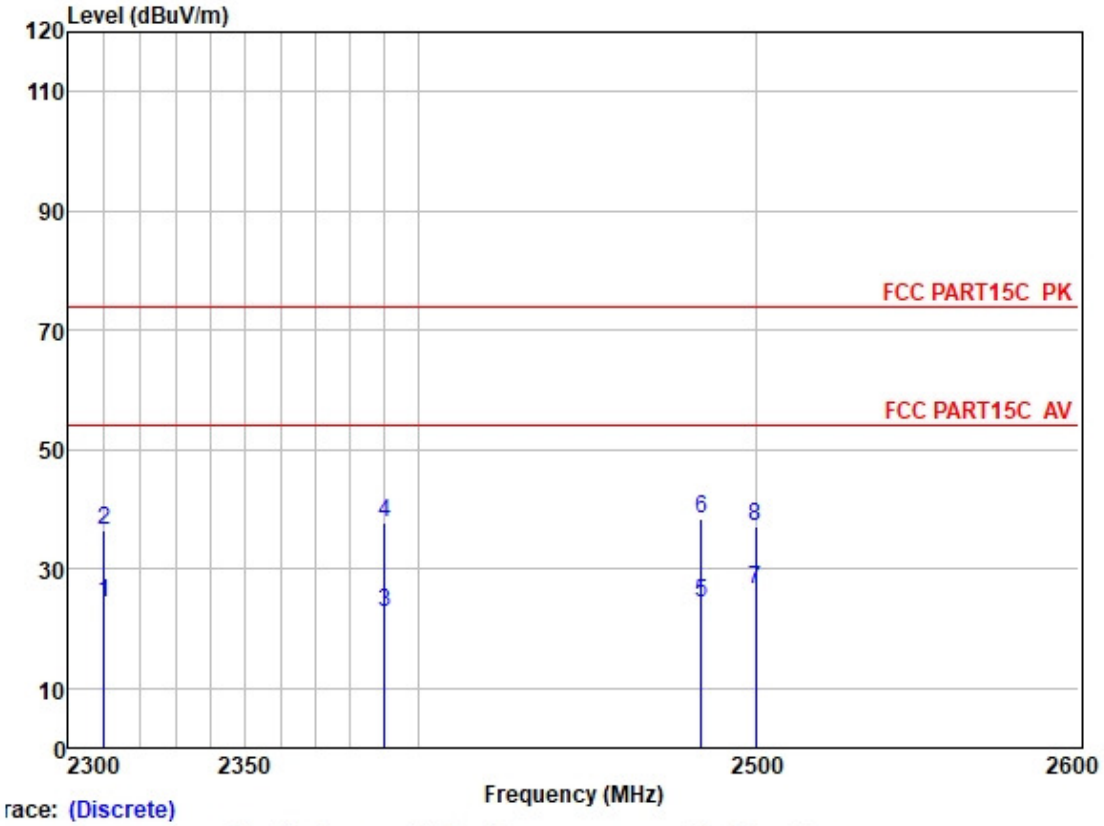

race: (Discrete)

	Freq	Read Level	Antenna 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	2310.000	31.63	27.15	3.32	37.62	24.48	54.00	-29.52	HORIZONTAL	Average
2	2310.000	43.68	27.15	3.32	37.62	36.53	74.00	-37.47	HORIZONTAL	Peak
3	2390.000	29.40	27.33	3.48	37.59	22.62	54.00	-31.38	HORIZONTAL	Average
4	2390.000	44.46	27.33	3.48	37.59	37.68	74.00	-36.32	HORIZONTAL	Peak
5	2483.500	30.98	27.48	3.53	37.57	24.42	54.00	-29.58	HORIZONTAL	Average
6	2483.500	44.88	27.48	3.53	37.57	38.32	74.00	-35.68	HORIZONTAL	Peak
7	2500.000	33.09	27.50	3.40	37.56	26.43	54.00	-27.57	HORIZONTAL	Average
8	2500.000	43.63	27.50	3.40	37.56	36.97	74.00	-37.03	HORIZONTAL	Peak

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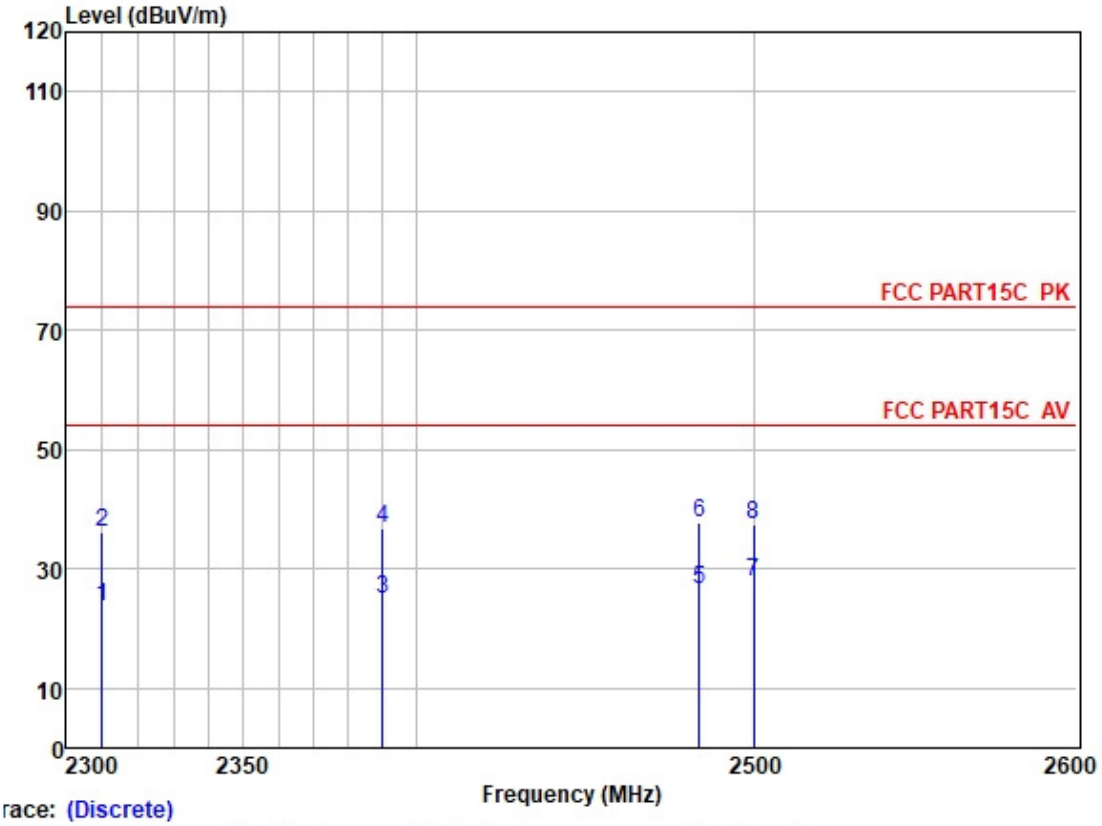
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna 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	2310.000	30.80	27.15	3.32	37.62	23.65	54.00	-30.35	VERTICAL	Average
2	2310.000	43.42	27.15	3.32	37.62	36.27	74.00	-37.73	VERTICAL	Peak
3	2390.000	31.81	27.33	3.48	37.59	25.03	54.00	-28.97	VERTICAL	Average
4	2390.000	43.58	27.33	3.48	37.59	36.80	74.00	-37.20	VERTICAL	Peak
5	2483.500	33.07	27.48	3.53	37.57	26.51	54.00	-27.49	VERTICAL	Average
6	2483.500	44.46	27.48	3.53	37.57	37.90	74.00	-36.10	VERTICAL	Peak
7	2500.000	34.64	27.50	3.40	37.56	27.98	54.00	-26.02	VERTICAL	Average
8	2500.000	44.02	27.50	3.40	37.56	37.36	74.00	-36.64	VERTICAL	Peak

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7.4 Radiated Emissions

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&6.6
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

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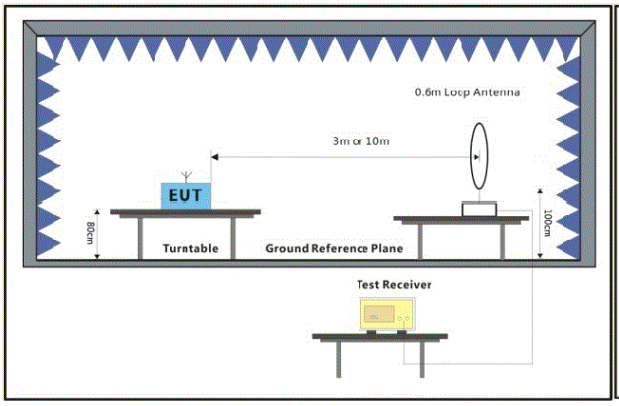
7.4.1 E.U.T. Operation

Operating Environment:

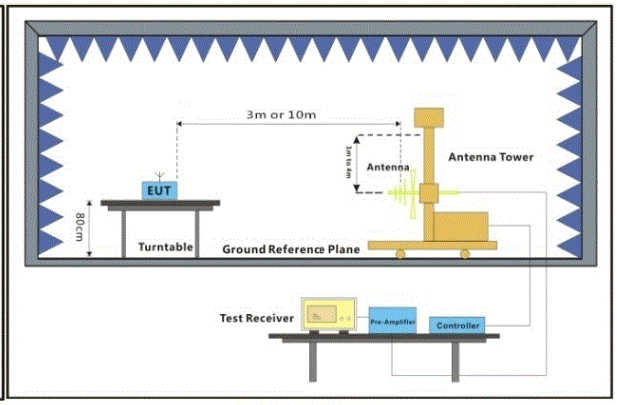
Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test Mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

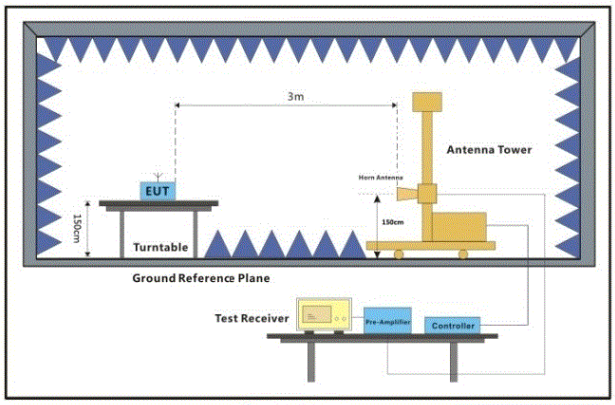
7.4.2 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

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7.4.3 Measurement Procedure and Data

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

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

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

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

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

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

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

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

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

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

Remark:

1) For emission below 1GHz, 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 25GHz, the disturbance above 18GHz and 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.

4) 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

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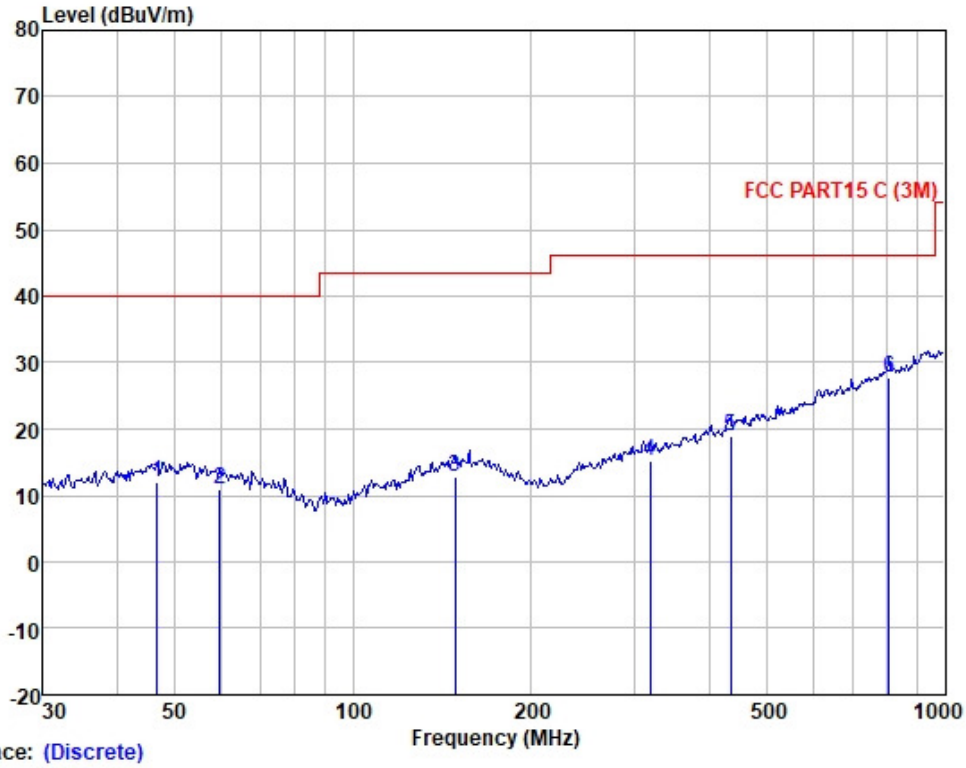
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Trace: (Discrete)

Site : SGS
Condition: FCC PART15 C (3M) 3m HORIZONTAL
Job :
Model :
Power :
Test Mode:

	Freq	Read Level	Antenna 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	46.666	24.00	13.93	1.19	27.17	11.95	40.00	-28.05	HORIZONTAL	QP
2	59.649	23.40	13.44	1.32	27.16	11.00	40.00	-29.00	HORIZONTAL	QP
3	148.963	23.94	13.75	2.05	26.84	12.90	43.50	-30.60	HORIZONTAL	QP
4	317.701	24.60	14.20	3.00	26.65	15.15	46.00	-30.85	HORIZONTAL	QP
5	434.065	25.84	16.85	3.81	27.53	18.97	46.00	-27.03	HORIZONTAL	QP
6	804.603	27.05	22.65	5.99	28.03	27.66	46.00	-18.34	HORIZONTAL	QP

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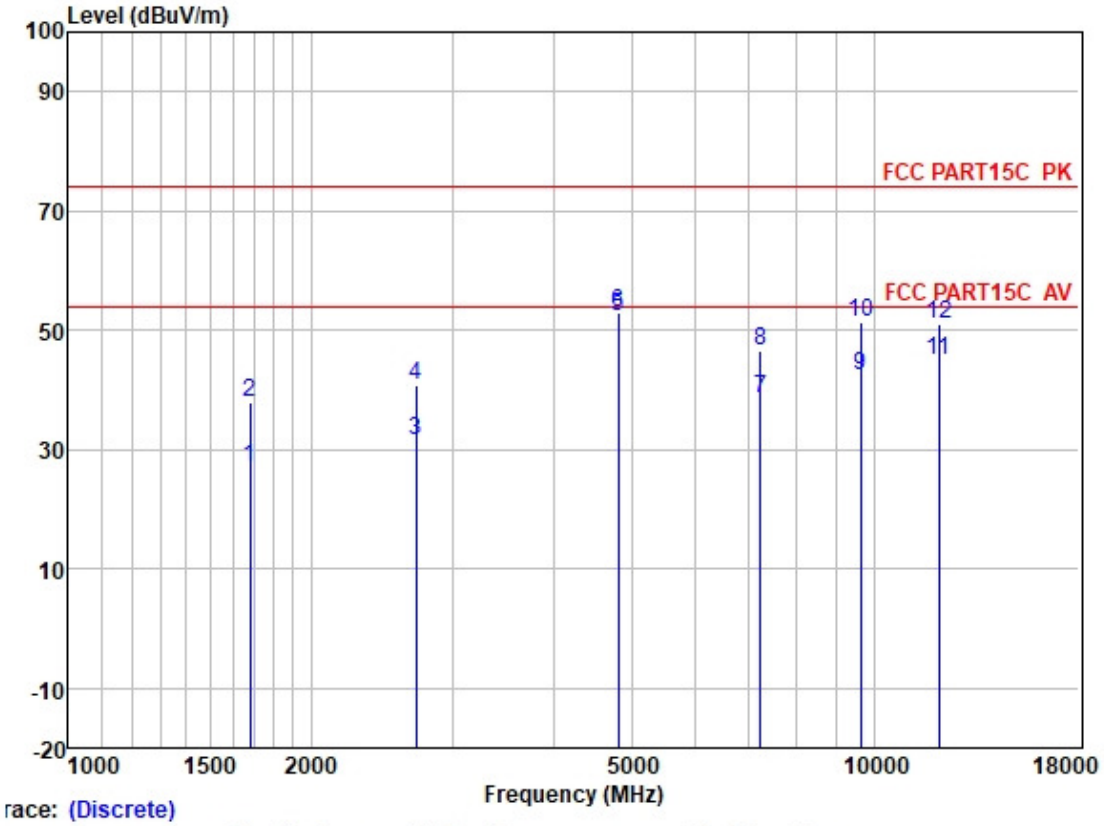
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna 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	1682.477	36.59	25.68	2.80	37.91	27.16	54.00	-26.84	HORIZONTAL	Average
2	1682.477	47.48	25.68	2.80	37.91	38.05	74.00	-35.95	HORIZONTAL	Peak
3	2702.799	37.65	27.84	3.60	37.47	31.62	54.00	-22.38	HORIZONTAL	Average
4	2702.799	46.76	27.84	3.60	37.47	40.73	74.00	-33.27	HORIZONTAL	Peak
5	4820.154	52.38	31.45	5.42	36.83	52.42	54.00	-1.58	HORIZONTAL	Average
6	4820.154	52.96	31.45	5.42	36.83	53.00	74.00	-21.00	HORIZONTAL	Peak
7	7230.763	34.40	35.62	6.01	37.39	38.64	54.00	-15.36	HORIZONTAL	Average
8	7230.763	42.42	35.62	6.01	37.39	46.66	74.00	-27.34	HORIZONTAL	Peak
9	9640.062	34.27	38.40	7.06	37.42	42.31	54.00	-11.69	HORIZONTAL	Average
10	9640.062	43.18	38.40	7.06	37.42	51.22	74.00	-22.78	HORIZONTAL	Peak
11	12050.130	34.89	38.88	8.17	37.08	44.86	54.00	-9.14	HORIZONTAL	Average
12	12050.130	41.12	38.88	8.17	37.08	51.09	74.00	-22.91	HORIZONTAL	Peak

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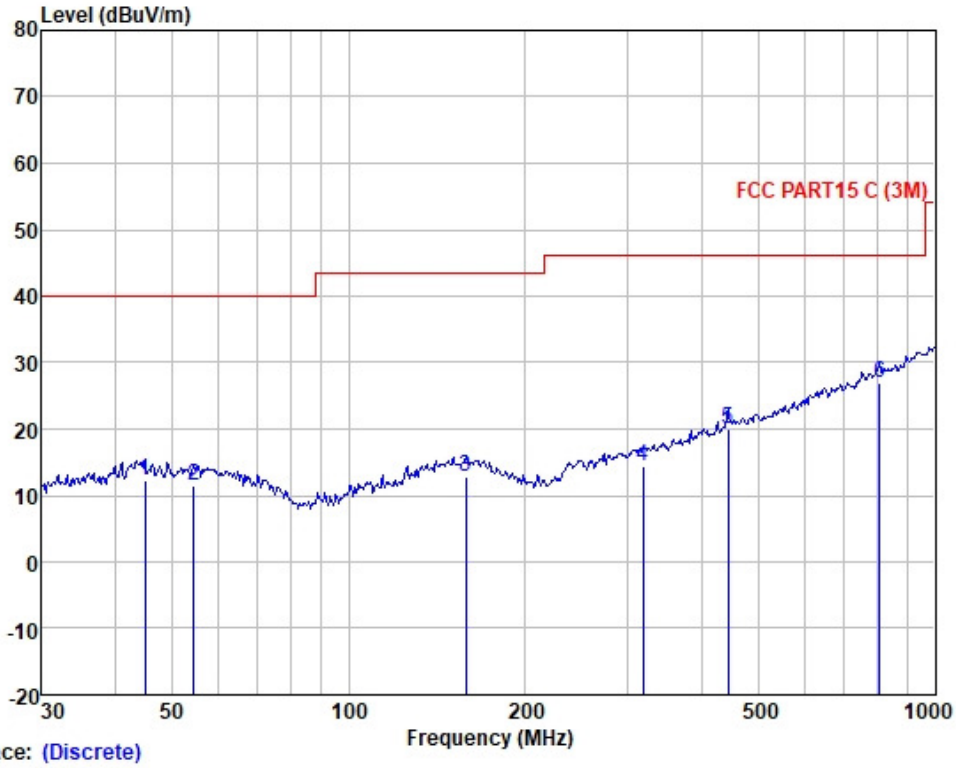
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Site : SGS
Condition: FCC PART15 C (3M) 3m VERTICAL
Job :
Model :
Power :
Test Mode:

	Freq	Read Level	Antenna 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	45.058	24.33	13.85	1.19	27.17	12.20	40.00	-27.80	VERTICAL	QP
2	54.452	23.67	13.78	1.26	27.16	11.55	40.00	-28.45	VERTICAL	QP
3	158.668	23.78	13.67	2.13	26.80	12.78	43.50	-30.72	VERTICAL	QP
4	317.701	23.75	14.20	3.00	26.65	14.30	46.00	-31.70	VERTICAL	QP
5	443.294	26.58	17.13	3.97	27.61	20.07	46.00	-25.93	VERTICAL	QP
6	804.603	26.20	22.65	5.99	28.03	26.81	46.00	-19.19	VERTICAL	QP

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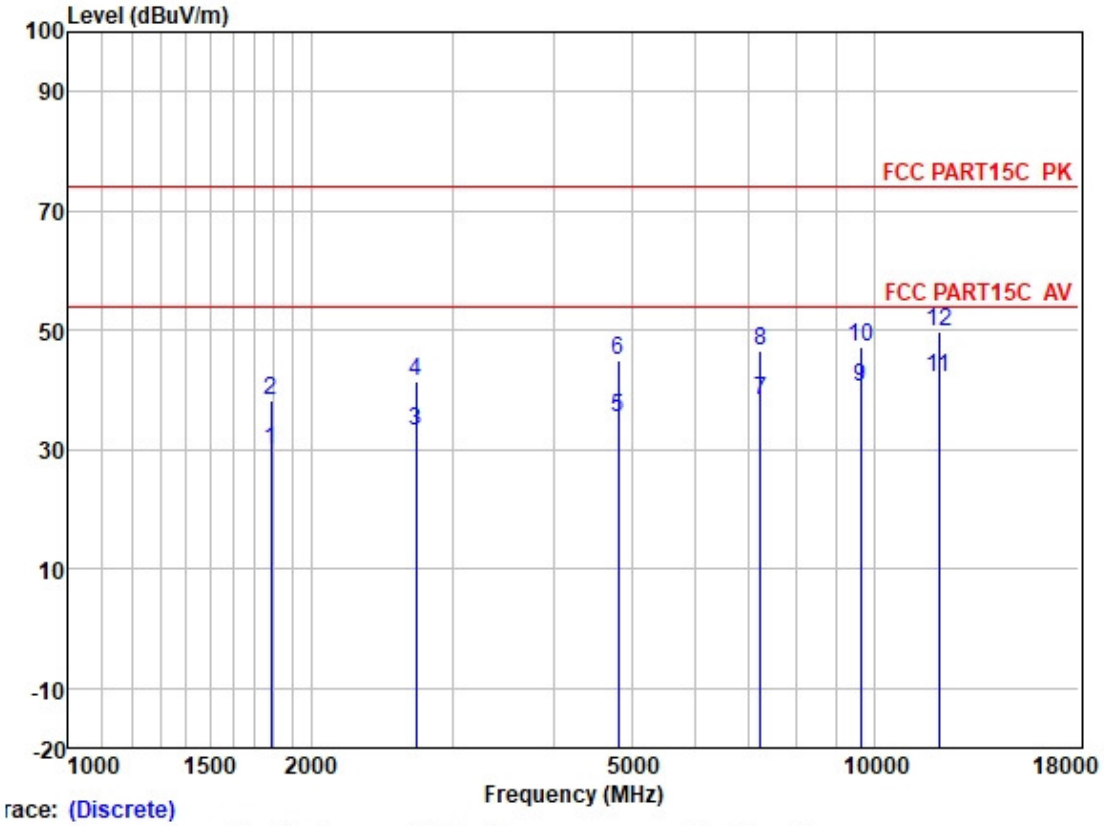
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



race: (Discrete)

	Freq	Read Level	Antenna 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	1782.602	38.84	25.92	2.97	37.83	29.90	54.00	-24.10	VERTICAL	Average
2	1782.602	47.34	25.92	2.97	37.83	38.40	74.00	-35.60	VERTICAL	Peak
3	2702.799	39.22	27.84	3.60	37.47	33.19	54.00	-20.81	VERTICAL	Average
4	2702.799	47.58	27.84	3.60	37.47	41.55	74.00	-32.45	VERTICAL	Peak
5	4820.887	35.45	31.45	5.42	36.83	35.49	54.00	-18.51	VERTICAL	Average
6	4820.887	44.93	31.45	5.42	36.83	44.97	74.00	-29.03	VERTICAL	Peak
7	7230.032	33.91	35.62	6.01	37.39	38.15	54.00	-15.85	VERTICAL	Average
8	7230.032	42.17	35.62	6.01	37.39	46.41	74.00	-27.59	VERTICAL	Peak
9	9640.754	32.53	38.40	7.06	37.42	40.57	54.00	-13.43	VERTICAL	Average
10	9640.754	39.08	38.40	7.06	37.42	47.12	74.00	-26.88	VERTICAL	Peak
11	12050.020	32.17	38.88	8.17	37.08	42.14	54.00	-11.86	VERTICAL	Average
12	12050.020	39.94	38.88	8.17	37.08	49.91	74.00	-24.09	VERTICAL	Peak

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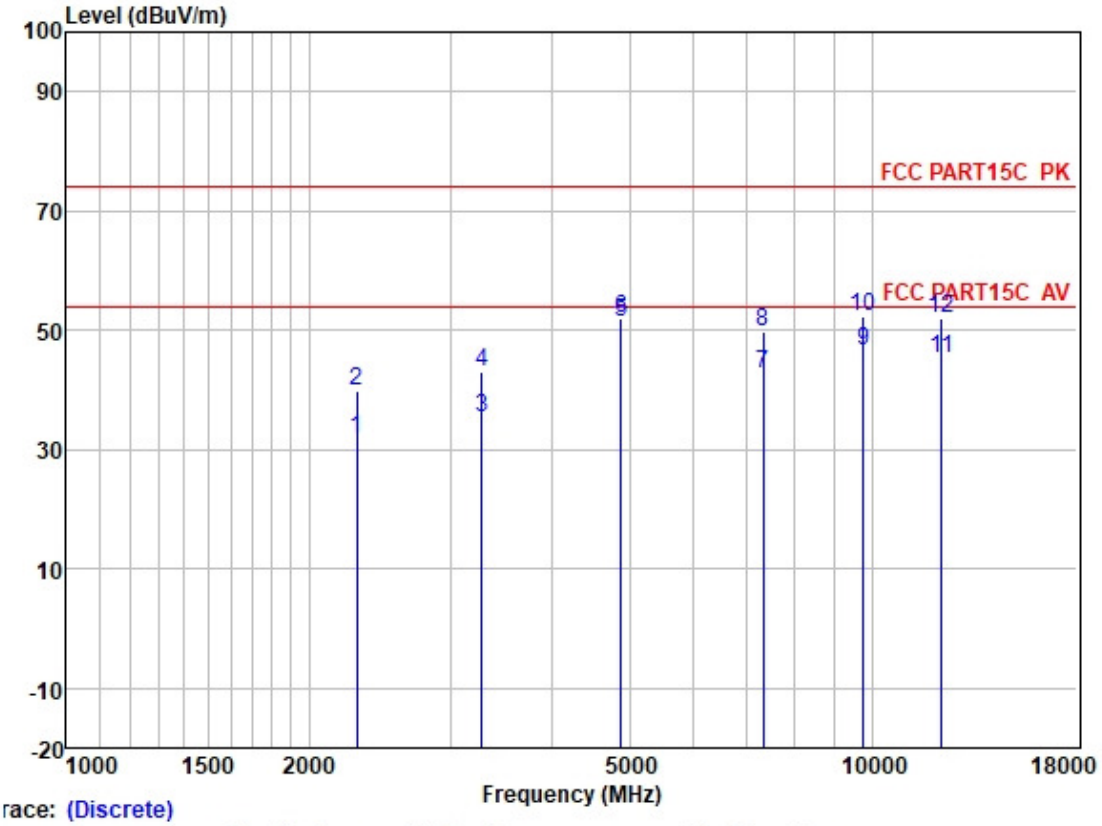
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna 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	2292.257	39.05	27.08	3.30	37.62	31.81	54.00	-22.19	HORIZONTAL	Average
2	2292.257	47.20	27.08	3.30	37.62	39.96	74.00	-34.04	HORIZONTAL	Peak
3	3280.326	39.66	28.73	4.04	37.04	35.39	54.00	-18.61	HORIZONTAL	Average
4	3280.326	47.35	28.73	4.04	37.04	43.08	74.00	-30.92	HORIZONTAL	Peak
5	4880.020	51.20	31.54	5.50	36.84	51.40	54.00	-2.60	HORIZONTAL	Average
6	4880.020	51.95	31.54	5.50	36.84	52.15	74.00	-21.85	HORIZONTAL	Peak
7	7320.788	37.97	36.00	6.13	37.43	42.67	54.00	-11.33	HORIZONTAL	Average
8	7320.788	44.91	36.00	6.13	37.43	49.61	74.00	-24.39	HORIZONTAL	Peak
9	9760.430	38.52	38.50	7.02	37.41	46.63	54.00	-7.37	HORIZONTAL	Average
10	9760.430	44.19	38.50	7.02	37.41	52.30	74.00	-21.70	HORIZONTAL	Peak
11	12200.670	35.52	38.77	8.10	37.00	45.39	54.00	-8.61	HORIZONTAL	Average
12	12200.670	42.07	38.77	8.10	37.00	51.94	74.00	-22.06	HORIZONTAL	Peak

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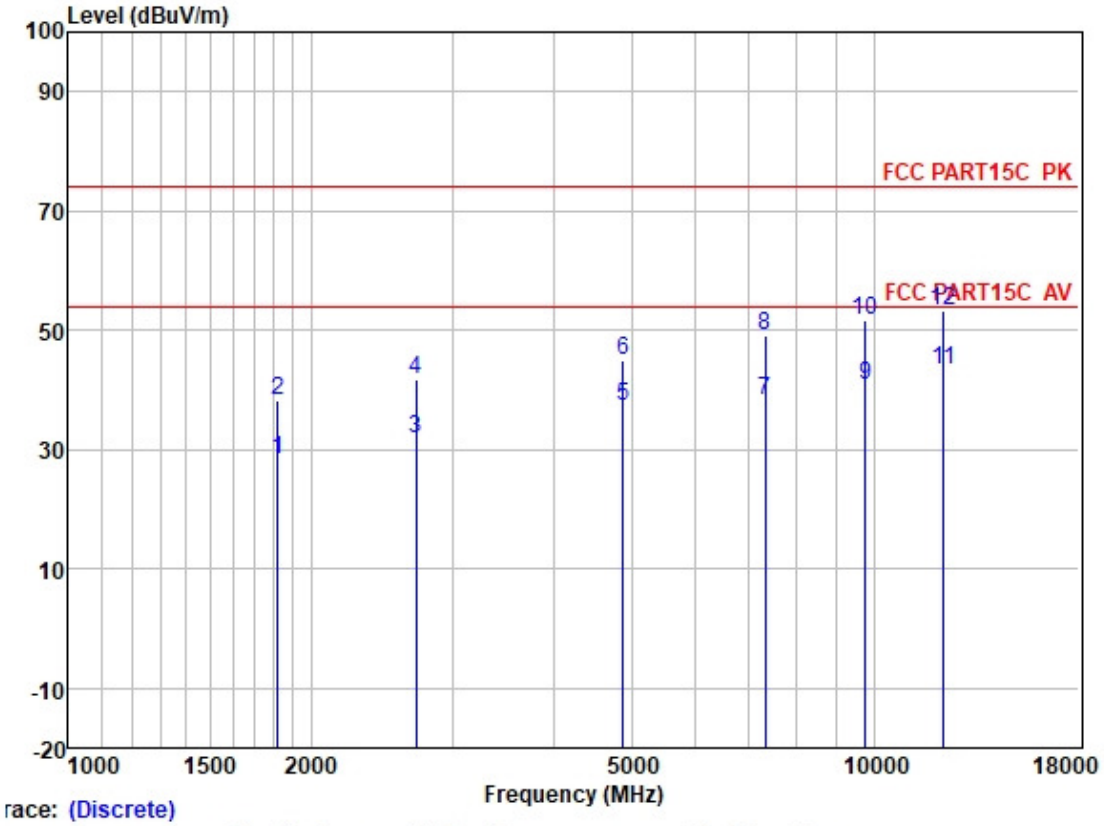
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



race: (Discrete)

	Freq	Read Level	Antenna 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	1819.036	37.09	25.97	2.98	37.80	28.24	54.00	-25.76	VERTICAL	Average
2	1819.036	47.09	25.97	2.98	37.80	38.24	74.00	-35.76	VERTICAL	Peak
3	2702.799	37.92	27.84	3.60	37.47	31.89	54.00	-22.11	VERTICAL	Average
4	2702.799	47.76	27.84	3.60	37.47	41.73	74.00	-32.27	VERTICAL	Peak
5	4880.592	37.13	31.54	5.50	36.84	37.33	54.00	-16.67	VERTICAL	Average
6	4880.592	44.85	31.54	5.50	36.84	45.05	74.00	-28.95	VERTICAL	Peak
7	7320.006	33.58	36.00	6.13	37.43	38.28	54.00	-15.72	VERTICAL	Average
8	7320.006	44.30	36.00	6.13	37.43	49.00	74.00	-25.00	VERTICAL	Peak
9	9760.710	32.78	38.50	7.02	37.41	40.89	54.00	-13.11	VERTICAL	Average
10	9760.710	43.69	38.50	7.02	37.41	51.80	74.00	-22.20	VERTICAL	Peak
11	12200.230	33.37	38.77	8.10	37.00	43.24	54.00	-10.76	VERTICAL	Average
12	12200.230	43.30	38.77	8.10	37.00	53.17	74.00	-20.83	VERTICAL	Peak

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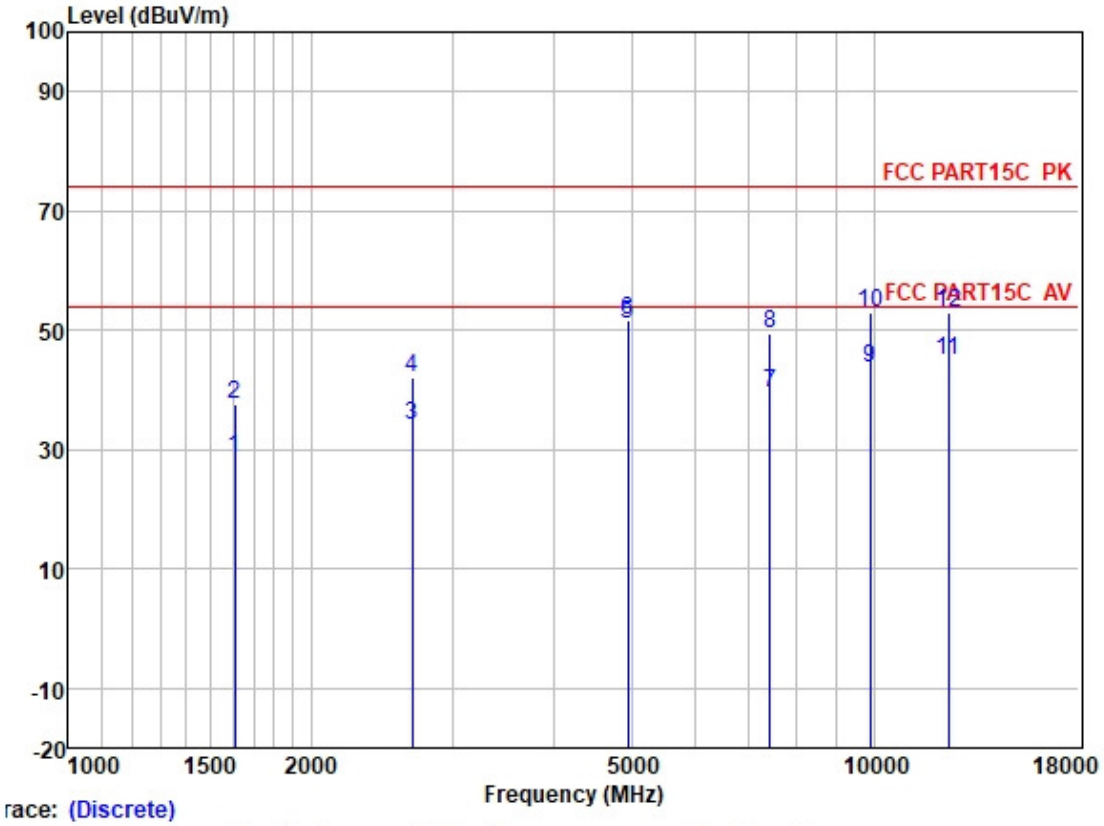
Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



race: (Discrete)

	Freq	Read Level	Antenna 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	1611.091	38.23	25.59	2.80	37.98	28.64	54.00	-25.36	HORIZONTAL	Average
2	1611.091	47.08	25.59	2.80	37.98	37.49	74.00	-36.51	HORIZONTAL	Peak
3	2671.730	40.36	27.76	3.57	37.48	34.21	54.00	-19.79	HORIZONTAL	Average
4	2671.730	48.10	27.76	3.57	37.48	41.95	74.00	-32.05	HORIZONTAL	Peak
5	4950.490	50.77	31.64	5.62	36.84	51.19	54.00	-2.81	HORIZONTAL	Average
6	4950.490	51.22	31.64	5.62	36.84	51.64	74.00	-22.36	HORIZONTAL	Peak
7	7425.524	34.53	36.27	6.22	37.47	39.55	54.00	-14.45	HORIZONTAL	Average
8	7425.524	44.46	36.27	6.22	37.47	49.48	74.00	-24.52	HORIZONTAL	Peak
9	9900.717	35.43	38.63	6.97	37.41	43.62	54.00	-10.38	HORIZONTAL	Average
10	9900.717	44.73	38.63	6.97	37.41	52.92	74.00	-21.08	HORIZONTAL	Peak
11	12375.710	35.23	38.60	7.99	36.90	44.92	54.00	-9.08	HORIZONTAL	Average
12	12375.710	43.25	38.60	7.99	36.90	52.94	74.00	-21.06	HORIZONTAL	Peak

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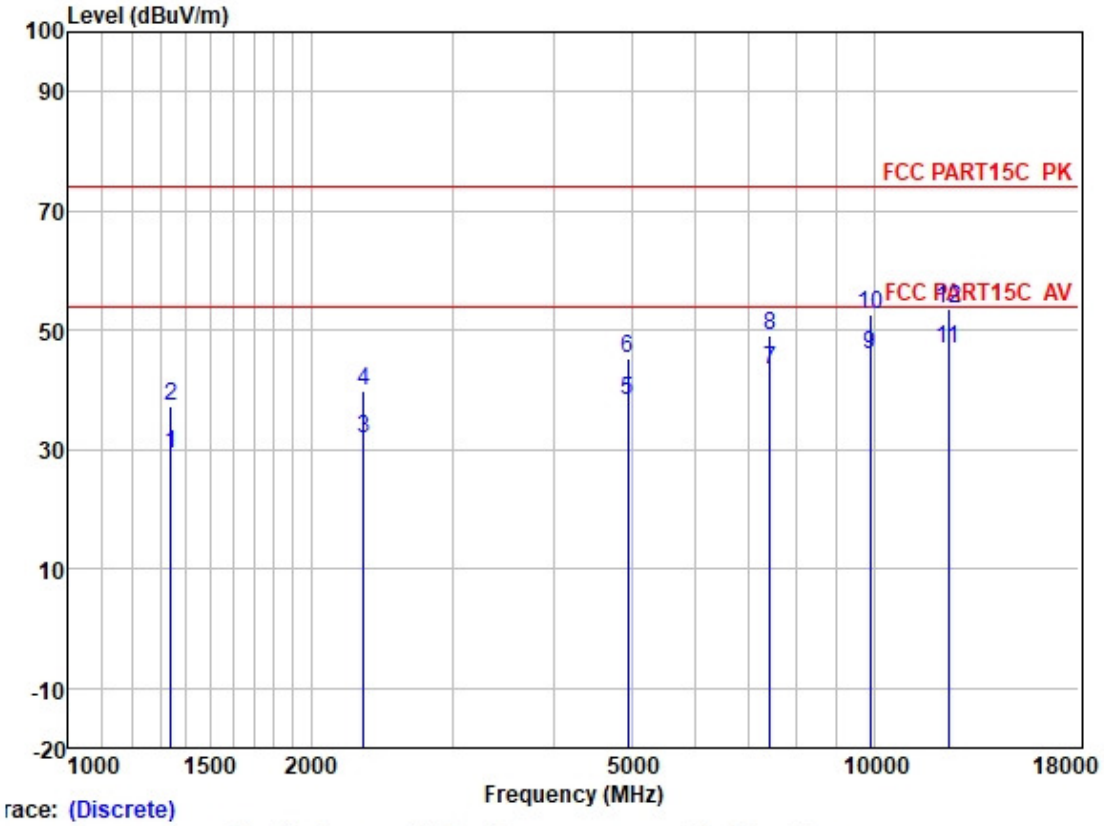
Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



	Freq	Read Level	Antenna 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	1339.006	39.56	25.29	2.60	38.27	29.18	54.00	-24.82	VERTICAL	Average
2	1339.006	47.81	25.29	2.60	38.27	37.43	74.00	-36.57	VERTICAL	Peak
3	2325.624	38.90	27.19	3.34	37.62	31.81	54.00	-22.19	VERTICAL	Average
4	2325.624	47.01	27.19	3.34	37.62	39.92	74.00	-34.08	VERTICAL	Peak
5	4950.490	37.82	31.64	5.62	36.84	38.24	54.00	-15.76	VERTICAL	Average
6	4950.490	44.88	31.64	5.62	36.84	45.30	74.00	-28.70	VERTICAL	Peak
7	7425.833	38.42	36.27	6.22	37.47	43.44	54.00	-10.56	VERTICAL	Average
8	7425.833	44.25	36.27	6.22	37.47	49.27	74.00	-24.73	VERTICAL	Peak
9	9900.497	37.70	38.63	6.97	37.41	45.89	54.00	-8.11	VERTICAL	Average
10	9900.497	44.33	38.63	6.97	37.41	52.52	74.00	-21.48	VERTICAL	Peak
11	12375.580	37.10	38.60	7.99	36.90	46.79	54.00	-7.21	VERTICAL	Average
12	12375.580	43.98	38.60	7.99	36.90	53.67	74.00	-20.33	VERTICAL	Peak

--End of Report--

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