



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

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Report No.: SZEM170800849901  
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## **TEST REPORT**

**Application No.:** SZEM1708008499CR  
**Applicant:** Guangdong Cheerson Hobby Technology Co., Ltd.  
**Address of Applicant:** FENGXIN NO.2 ROAD&LAIMEI ROAD FENGXIN INDUSTRIAL ZONE  
CHENGHAI SHANTOU GUANGDONG PROVINCE CHINA  
**Manufacturer:** Guangdong Cheerson Hobby Technology Co., Ltd.  
**Address of Manufacturer:** FENGXIN NO.2 ROAD&LAIMEI ROAD FENGXIN INDUSTRIAL ZONE  
CHENGHAI SHANTOU GUANGDONG PROVINCE CHINA  
**Factory:** Guangdong Cheerson Hobby Technology Co., Ltd.  
**Address of Factory:** FENGXIN NO.2 ROAD&LAIMEI ROAD FENGXIN INDUSTRIAL ZONE  
CHENGHAI SHANTOU GUANGDONG PROVINCE CHINA  
**Equipment Under Test (EUT):**  
**EUT Name:** UFO  
**Model No.:** CX-23, CX-20, CX-21, CX-22, CX-24, CX-35, CX-39, CX-70, CX-71, CX-72,  
CX-73, CX-90, CX-91, CX-92, CX-93, CX-93S, CX-93W, CX-95, CX-95D,  
CX-95S, CX-95W ♣  
♣ Please refer to section 2 of this report which indicates which model was  
actually tested and which were electrically identical.  
**FCC ID:** 2AD6LGC032423  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2017-08-11  
**Date of Test:** 2017-09-04 to 2017-10-18  
**Date of Issue:** 2017-10-23

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.



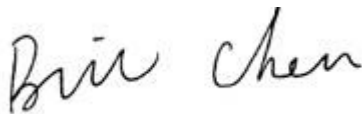

Jack Zhang  
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-10-23		Original

Authorized for issue by:				
				
		<hr/>		
		Bill Chen /Project Engineer		
				
		<hr/>		
		Eric Fu /Reviewer		



## 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
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
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

Remark:

Model No.: CX-23, CX-20, CX-21, CX-22, CX-24, CX-35, CX-39, CX-70, CX-71, CX-72, CX-73, CX-90, CX-91, CX-92, CX-93, CX-93S, CX-93W, CX-95, CX-95D, CX-95S, CX-95W.

Only the model CX-23 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on model name.



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## 4 General Information

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

Power supply:	Remote control:rechargeable battery DC 3.7V 2000mAh
Cable:	USB cable:32cm unshielded
Operating Frequency:	2410MHz ~ 2480MHz
Channel Number:	71
Modulation Technique:	GFSK
Antenna Type:	Brass Antenna
Antenna Gain:	3dBi

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2410MHz	19	2428MHz	37	2446MHz	55	2464MHz
2	2411MHz	20	2429MHz	38	2447MHz	56	2465MHz
3	2412MHz	21	2430MHz	39	2448MHz	57	2466MHz
4	2413MHz	22	2431MHz	40	2449MHz	58	2467MHz
5	2414MHz	23	2432MHz	41	2450MHz	59	2468MHz
6	2415MHz	24	2433MHz	42	2451MHz	60	2469MHz
7	2416MHz	25	2434MHz	43	2452MHz	61	2470MHz
8	2417MHz	26	2435MHz	44	2453MHz	62	2471MHz
9	2418MHz	27	2436MHz	45	2454MHz	63	2472MHz
10	2419MHz	28	2437MHz	46	2455MHz	64	2473MHz
11	2420MHz	29	2438MHz	47	2456MHz	65	2474MHz
12	2421MHz	30	2439MHz	48	2457MHz	66	2475MHz
13	2422MHz	31	2440MHz	49	2458MHz	67	2476MHz
14	2423MHz	32	2441MHz	50	2459MHz	68	2477MHz
15	2424MHz	33	2442MHz	51	2460MHz	69	2478MHz
16	2425MHz	34	2443MHz	52	2461MHz	70	2479MHz
17	2426MHz	35	2444MHz	53	2462MHz	71	2480MHz
18	2427MHz	36	2445MHz	54	2463MHz		

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:

Channel	Frequency
The Lowest channel(CH1)	2410MHz
The Middle channel(CH41)	2450MHz
The Highest channel(CH71)	2480MHz

### 4.2 Description of Support Units



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Description	Manufacturer	Model No.	Serial No.
Adapter	Apple	A1357 W010A051	REF. No.SEA0500



### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$7.25 \times 10^{-8}$
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
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 test	1 °C
10	Humidity test	3%
11	Supply voltages	1.5%
12	Time	3%



#### **4.4 Test Location**

All tests were performed at:

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

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.  
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

#### **4.5 Test Facility**

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 3816.01.

- **VCCI**

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.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC –Designation Number: CN1178**

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

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

#### **4.6 Deviation from Standards**

None

#### **4.7 Abnormalities from Standard Conditions**

None



## 5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017-05-10	2018-05-10
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2017-07-13	2018-07-12
LISN	Rohde & Schwarz	ENV216	SEM007-01	2017-09-27	2018-09-27
LISN	ETS-LINDGREN	3816/2	SEM007-02	2017-04-14	2018-04-13
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2017-04-14	2018-04-13

RF conducted					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2017-09-27	2018-09-27
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2017-07-13	2018-07-12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2017-09-27	2018-09-27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2017-09-27	2018-09-27

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2017-09-27	2018-09-27
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-02	2017-03-05	2020-03-05
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2017-07-13	2018-07-12



Field Strength of the Fundamental Signal (15.249(a))					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-02	2020-05-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2017-07-13	2018-07-12
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2017-09-27	2018-09-27
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2017-09-27	2018-09-27
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2016-12-02	2017-12-01
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017-09-27	2018-09-27
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A



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<b>Restricted Band Around Fundamental Frequency</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-02	2020-05-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2017-07-13	2018-07-12
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2017-09-27	2018-09-27
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2017-09-27	2018-09-27
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2016-12-02	2017-12-01
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017-09-27	2018-09-27
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A

<b>General used equipment</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2017-09-29	2018-09-29
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2017-09-29	2018-09-29
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2017-09-29	2018-09-29
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-18

## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

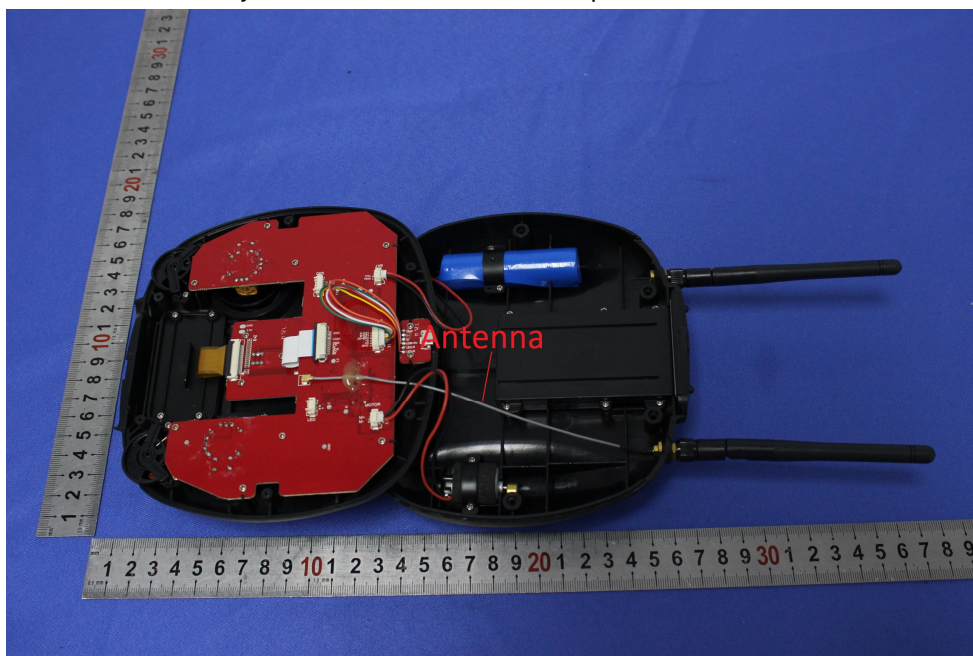
#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

#### 6.1.2 Conclusion

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 3dBi.

## 7 Radio Spectrum Matter Test Results

### 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

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

Operating Environment:

Temperature: 25 °C Humidity: 45 % RH Atmospheric Pressure: 1005 mbar

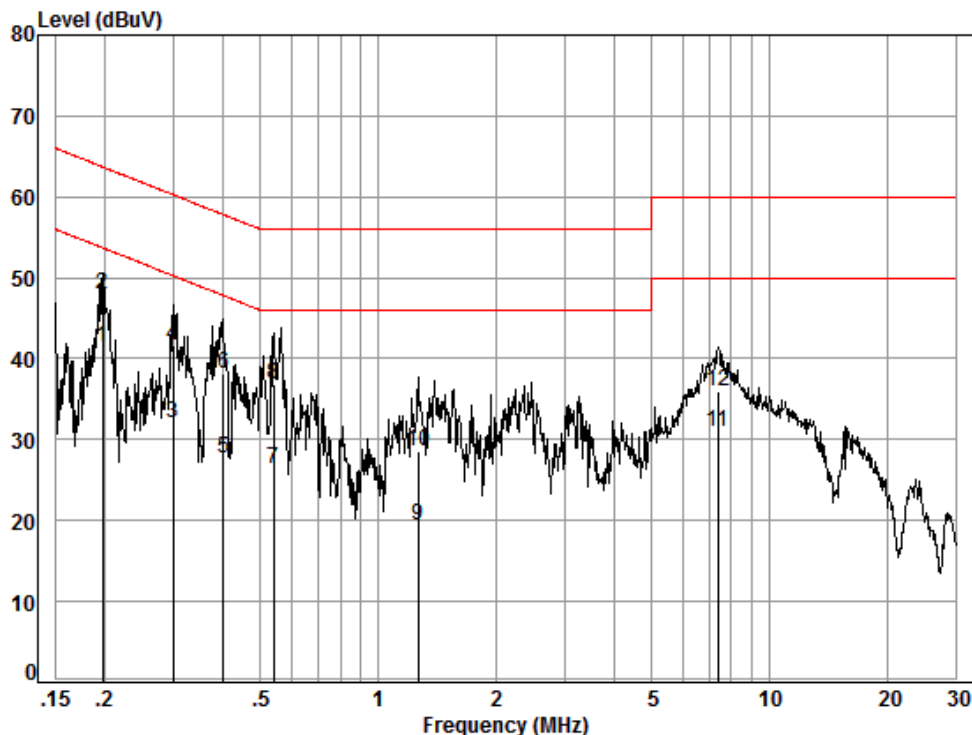
Test mode: b:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

#### 7.1.2 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

Mode:b; Line:Live Line



Site : Shielding Room

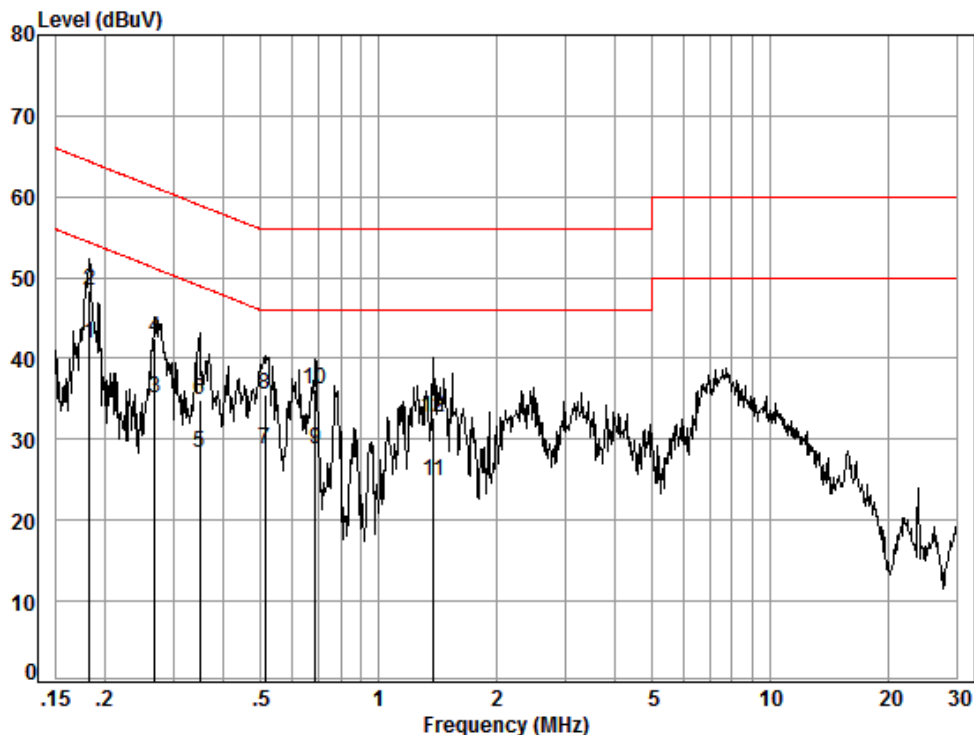
Condition: Line

Job No. : 08499CR

Test mode: b

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.20	0.02	9.63	31.74	41.39	53.71	-12.32	Average
2	0.20	0.02	9.63	38.39	48.04	63.71	-15.67	QP
3	0.30	0.01	9.63	22.51	32.15	50.28	-18.13	Average
4	0.30	0.01	9.63	31.99	41.63	60.28	-18.65	QP
5	0.40	0.01	9.63	17.97	27.61	47.81	-20.20	Average
6	0.40	0.01	9.63	28.44	38.08	57.81	-19.73	QP
7	0.54	0.01	9.63	16.78	26.42	46.00	-19.58	Average
8	0.54	0.01	9.63	27.14	36.78	56.00	-19.22	QP
9	1.27	0.02	9.64	9.73	19.39	46.00	-26.61	Average
10	1.27	0.02	9.64	18.92	28.58	56.00	-27.42	QP
11	7.41	0.01	9.78	21.23	31.02	50.00	-18.98	Average
12	7.41	0.01	9.78	26.13	35.92	60.00	-24.08	QP

Mode:b; Line:Neutral Line



Site : Shielding Room

Condition: Neutral

Job No. : 08499CR

Test mode: b

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.18	0.02	9.63	32.25	41.90	54.37	-12.47	Average
2	0.18	0.02	9.63	38.71	48.36	64.37	-16.01	QP
3	0.27	0.01	9.63	25.52	35.16	51.16	-16.00	Average
4	0.27	0.01	9.63	32.92	42.56	61.16	-18.60	QP
5	0.35	0.01	9.63	18.70	28.34	48.96	-20.62	Average
6	0.35	0.01	9.63	25.29	34.93	58.96	-24.03	QP
7	0.51	0.01	9.63	19.11	28.75	46.00	-17.25	Average
8	0.51	0.01	9.63	25.98	35.62	56.00	-20.38	QP
9	0.69	0.02	9.64	19.17	28.83	46.00	-17.17	Average
10	0.69	0.02	9.64	26.59	36.25	56.00	-19.75	QP
11	1.38	0.02	9.65	15.26	24.93	46.00	-21.07	Average
12	1.38	0.02	9.65	23.06	32.73	56.00	-23.27	QP

## 7.2 20dB Bandwidth

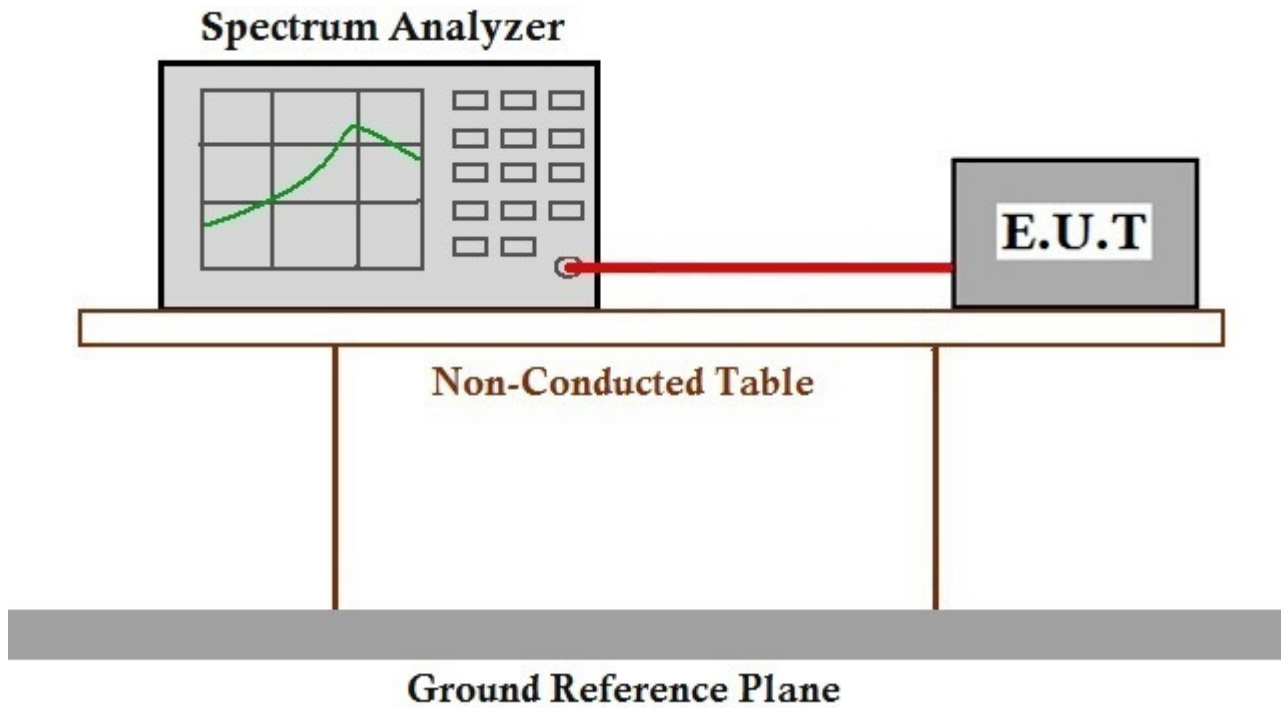
Test Requirement 47 CFR Part 15, Subpart C 15.215  
Test Method: ANSI C63.10 (2013) Section 6.9  
Limit: N/A

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1010 mbar  
Test mode a:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.2.2 Test Setup Diagram

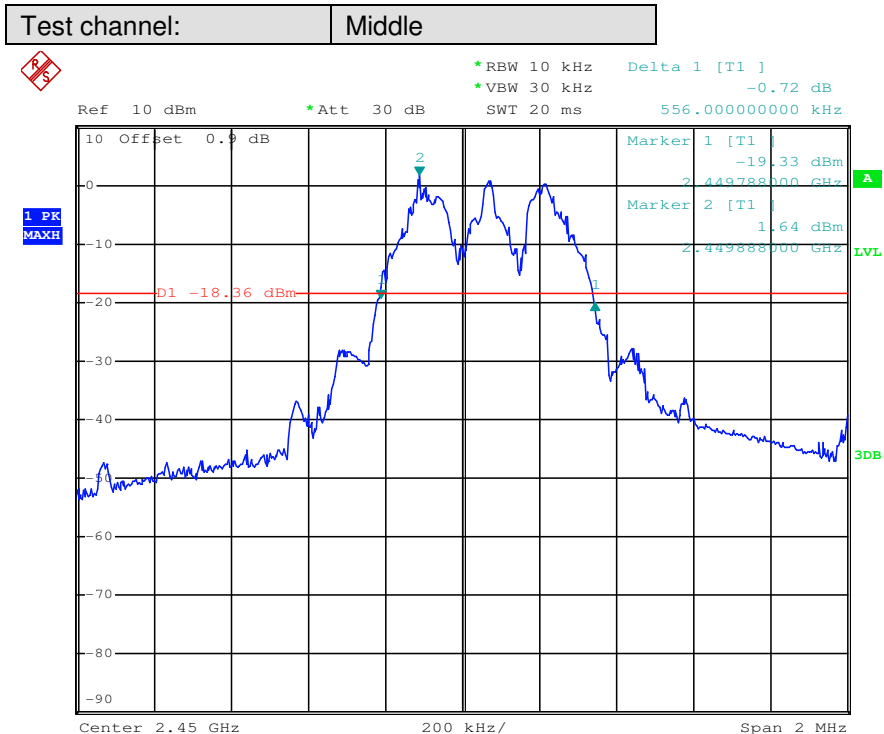
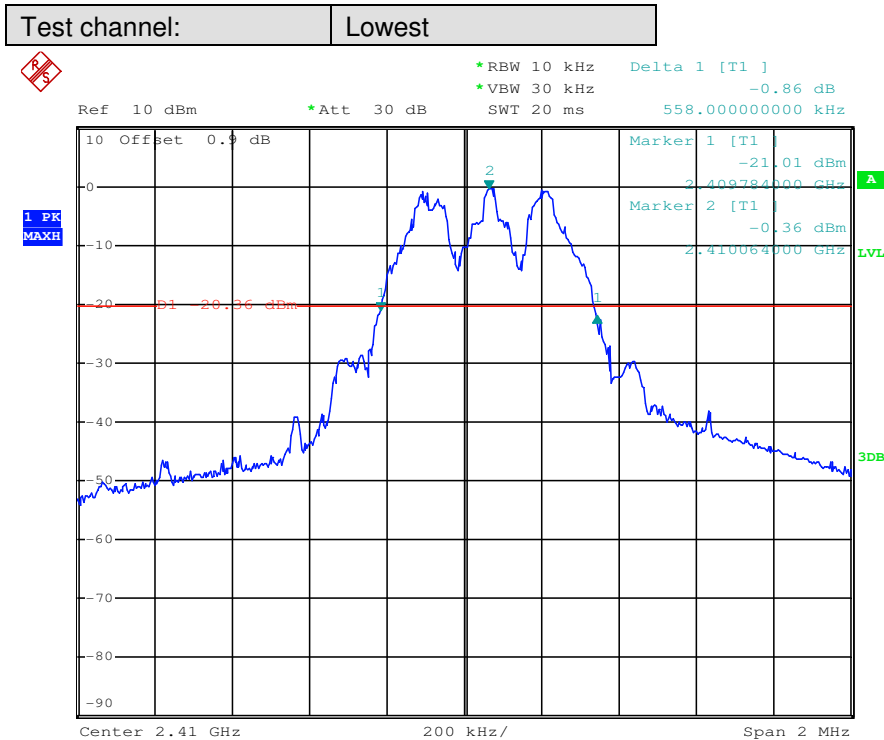


### 7.2.3 Measurement Procedure and Data

Test channel	20dB bandwidth (MHz)	Results
Lowest	0.558	Pass
Middle	0.556	Pass
Highest	0.576	Pass



Test plot as follows:





Test channel: Highest

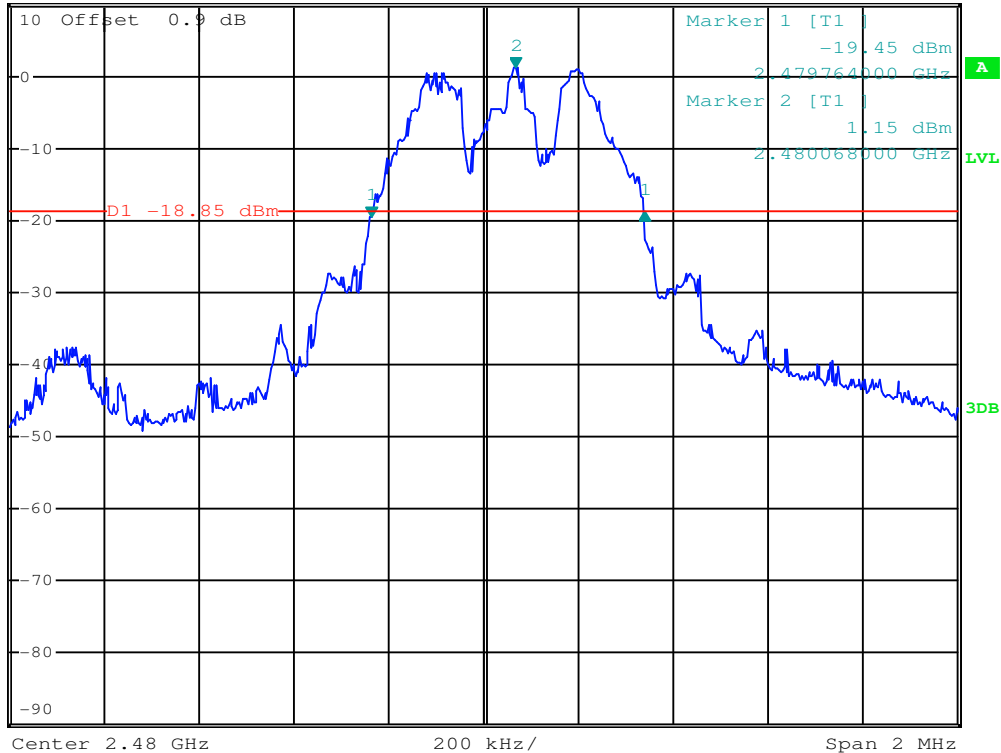


\*RBW 10 kHz Delta 1 [T1 ]  
\*VBW 30 kHz 0.79 dB  
SWT 20 ms 576.00000000 kHz

Ref 10 dBm

\*Att 30 dB

1 PK  
MAXH





### 7.3 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:

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

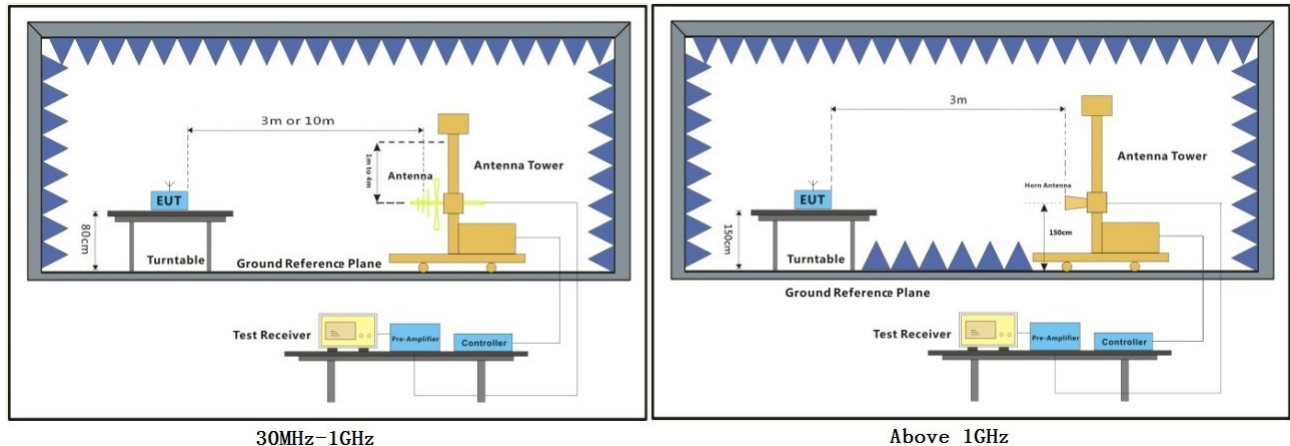
### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Test mode a:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.3.2 Test Setup Diagram

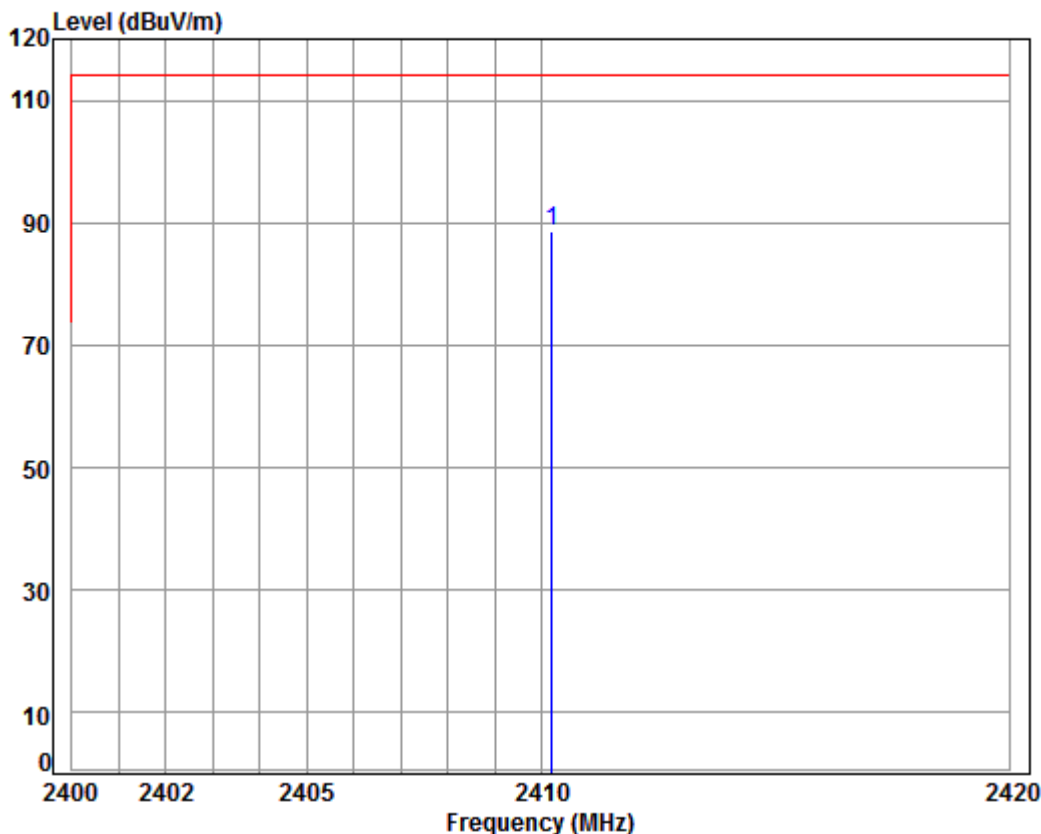


### 7.3.3 Measurement Procedure and Data

- 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



Mode:a; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:Low



Condition: 3m HORIZONTAL

Job No: : 08499CR

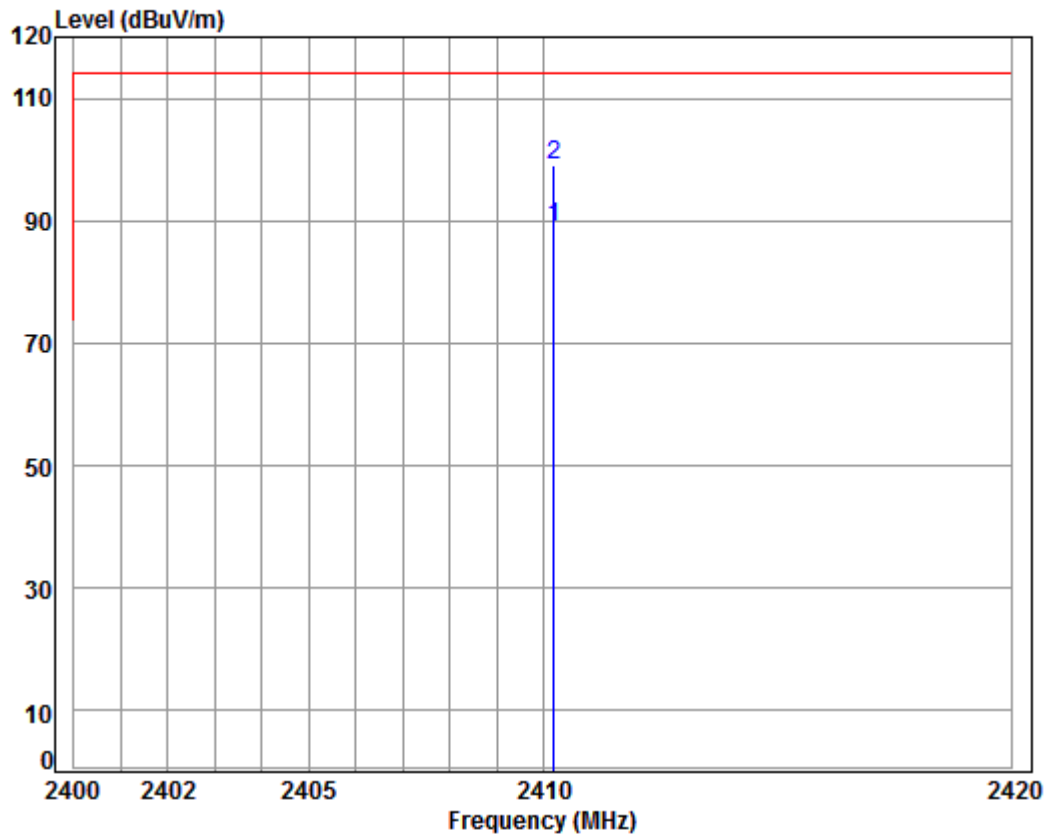
Mode: : 2410 Field Strength

Note : 2.4G Remote

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp 2410.226	5.50	29.14	37.95	91.87	88.56	114.00	-25.44	Peak



Mode:a; Polarization:Vertical; Modulation Type:GFSK; ; Channel:Low



Condition: 3m VERTICAL

Job No: : 08499CR

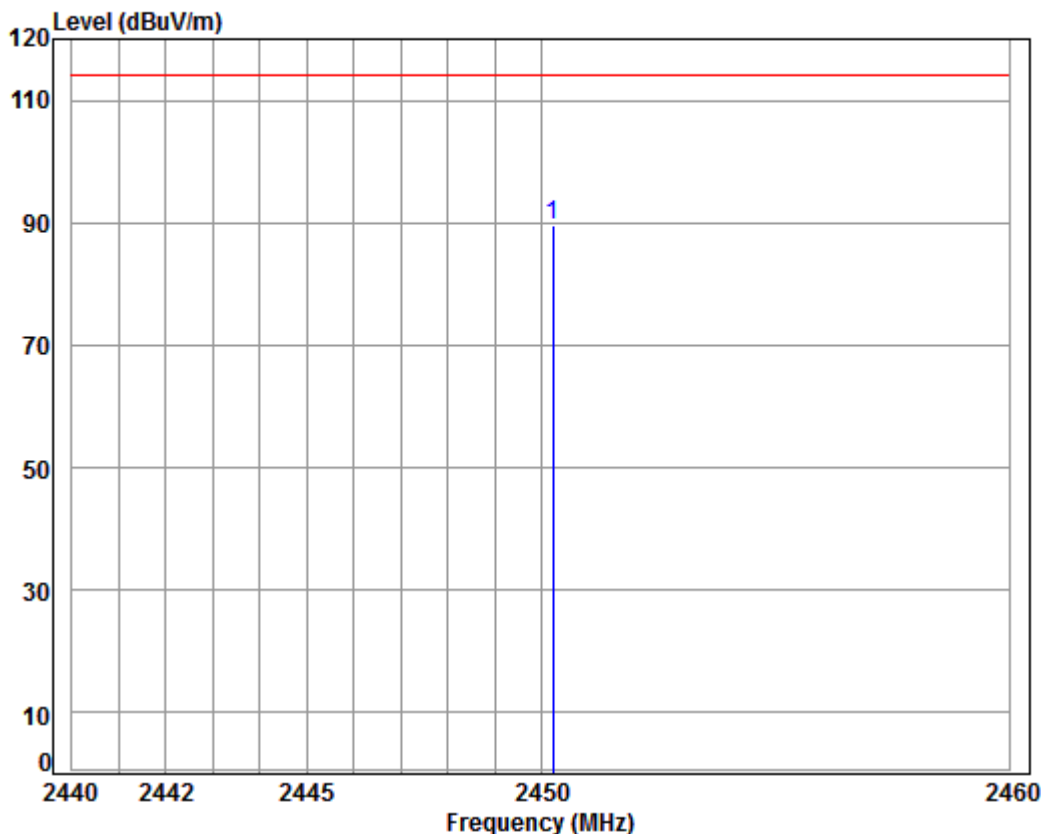
Mode: : 2410 Field Strength

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2410.226	5.50	29.14	37.95	92.11	88.80	94.00	-5.20	Average
2 pk	2410.226	5.50	29.14	37.95	102.22	98.91	114.00	-15.09	Peak



Mode:a; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:middle



Condition: 3m HORIZONTAL

Job No: : 08499CR

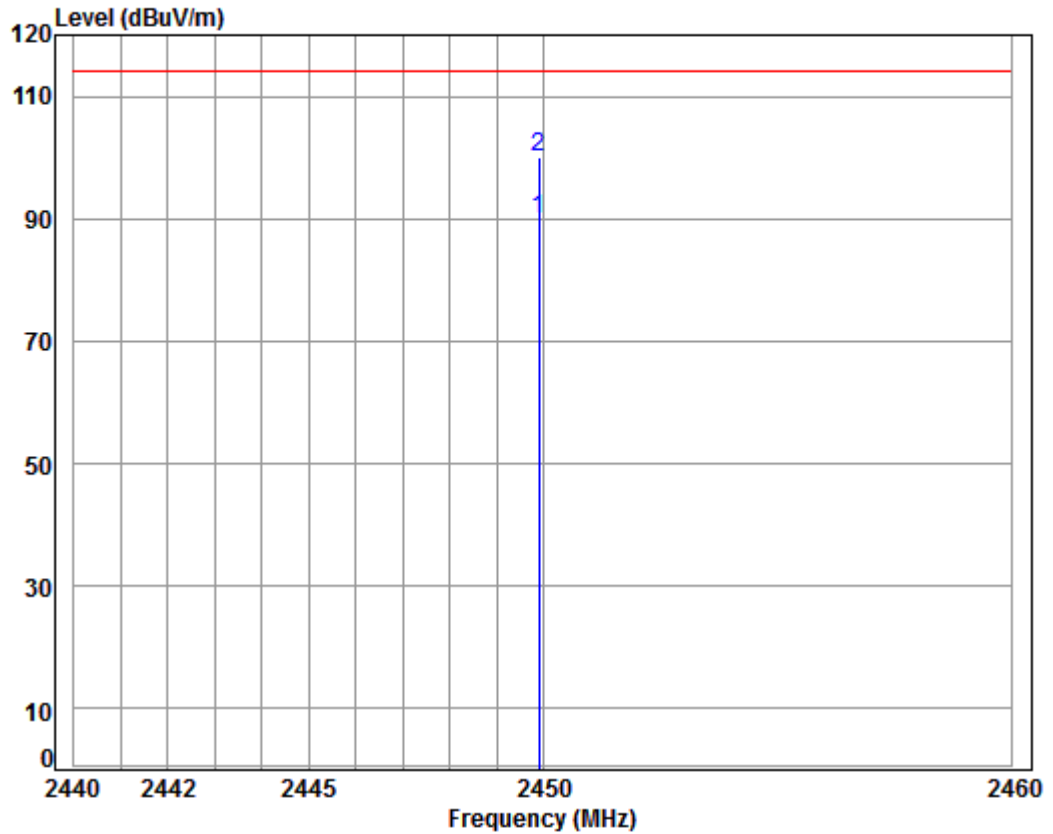
Mode: : 2450 Field Strength

Note : 2.4G Remote

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp 2450.240	5.56	29.26	37.95	92.69	89.56	114.00	-24.44	Peak



Mode:a; Polarization:Vertical; Modulation Type:GFSK; ; Channel:middle



Condition: 3m VERTICAL

Job No: : 08499CR

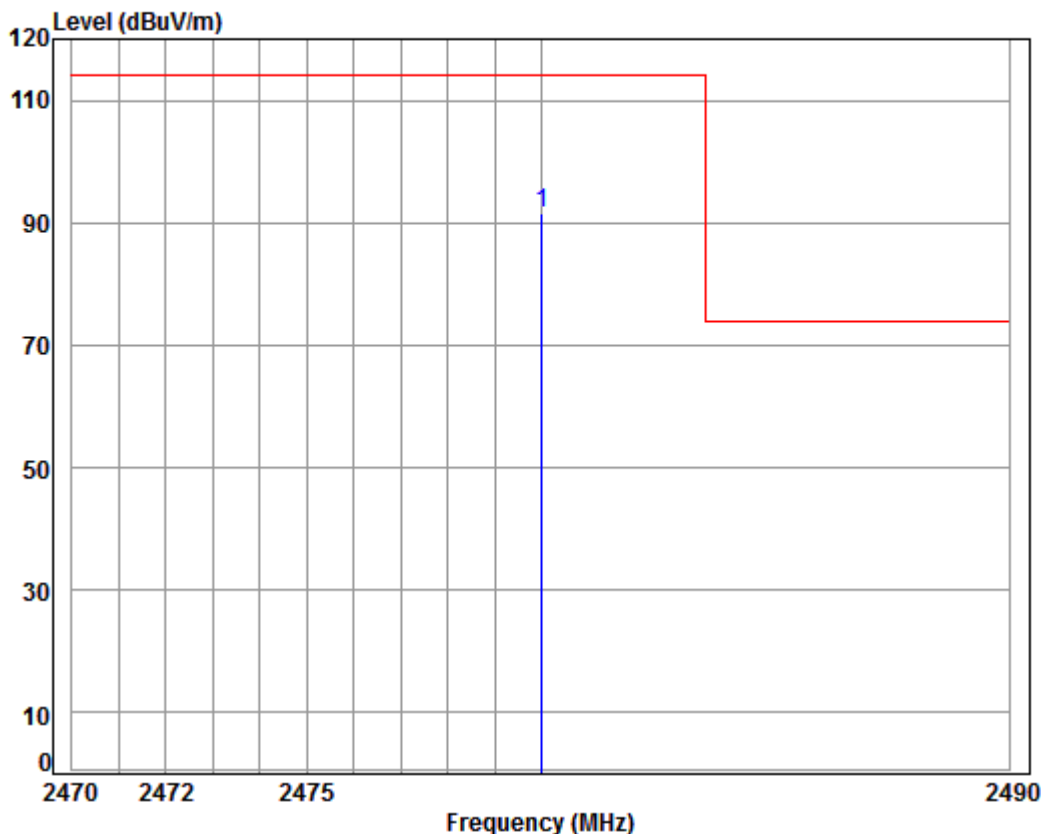
Mode: : 2450 Field Strength

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2449.900	5.55	29.25	37.95	93.11	89.96	94.00	-4.04	Average
2 pk	2449.900	5.55	29.25	37.95	103.21	100.06	114.00	-13.94	Peak



Mode:a; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:High



Condition: 3m HORIZONTAL

Job No: : 08499CR

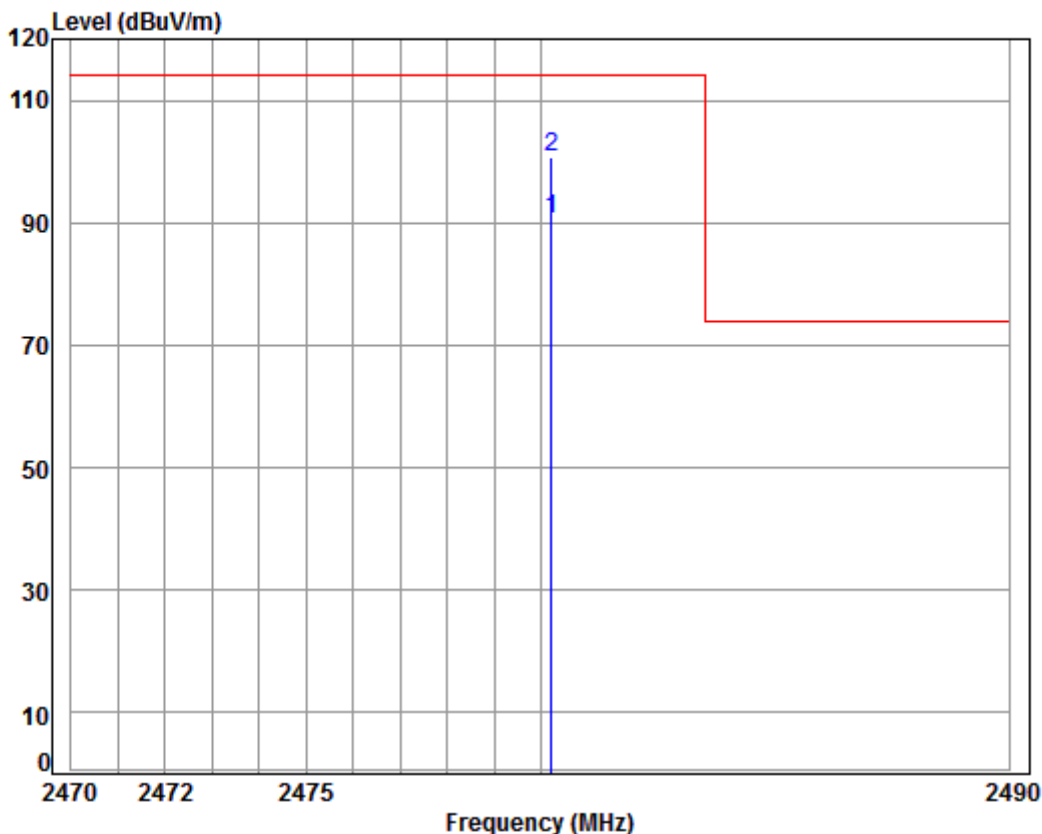
Mode: : 2480 Field Strength

Note : 2.4G Remote

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp 2480.010	5.59	29.34	37.95	94.73	91.71	114.00	-22.29	Peak



Mode:a; Polarization:Vertical; Modulation Type:GFSK; ; Channel:High



Condition: 3m VERTICAL  
Job No: : 08499CR  
Mode: : 2480 Field Strength  
Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2480.219	5.59	29.34	37.95	93.63	90.61	94.00	-3.39	Average
2 pk	2480.219	5.59	29.34	37.95	103.73	100.71	114.00	-13.29	peak



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) 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. So, only the above measurement data were shown in the report.



#### 7.4 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.		

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

Operating Environment:

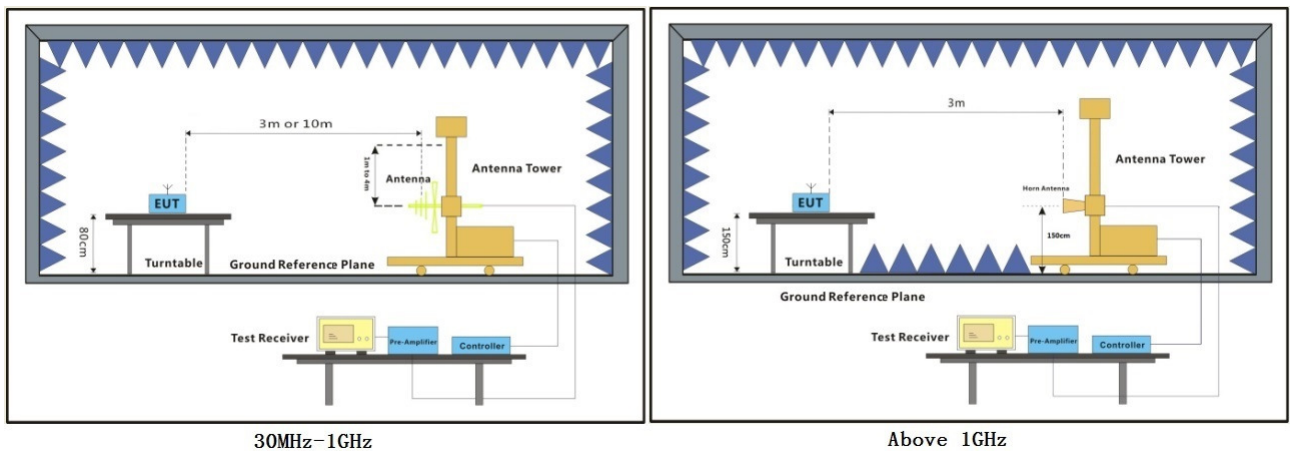
Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case:

- a:TX mode\_Keep the EUT in transmitting with modulation mode.
- b:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

The worst case for final test: b:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

#### 7.4.2 Test Setup Diagram





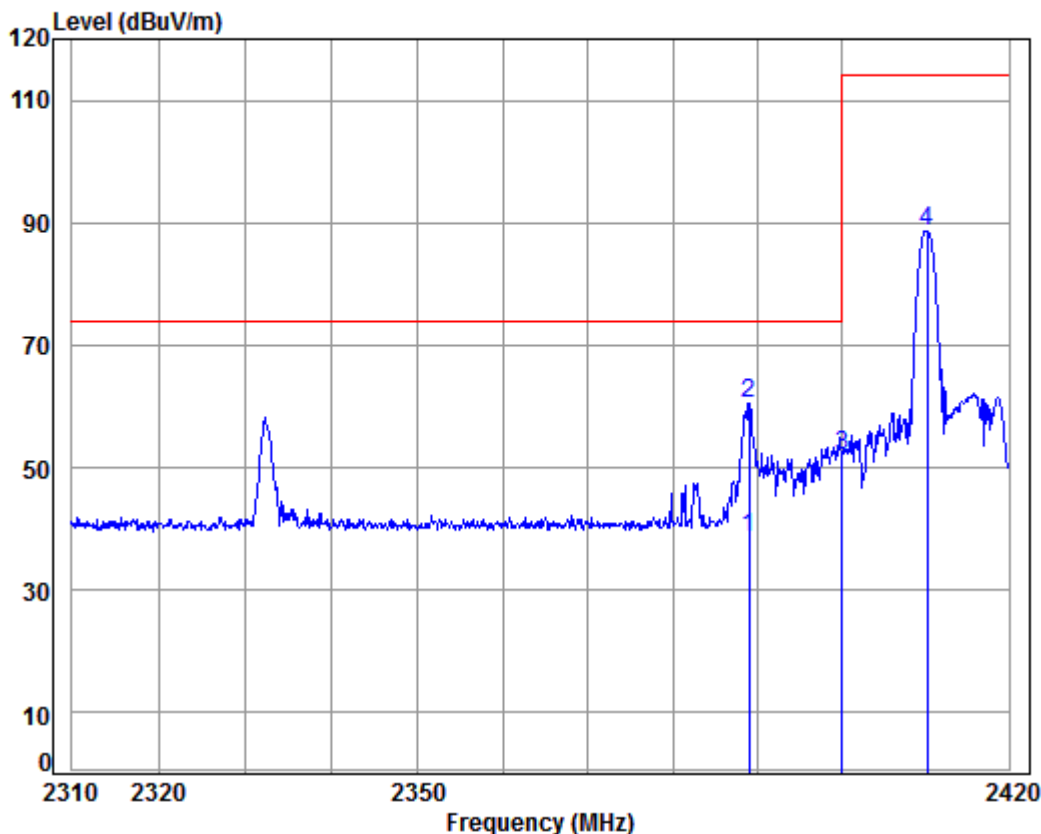
#### **7.4.3 Measurement Procedure and Data**

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



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



Condition: 3m HORIZONTAL

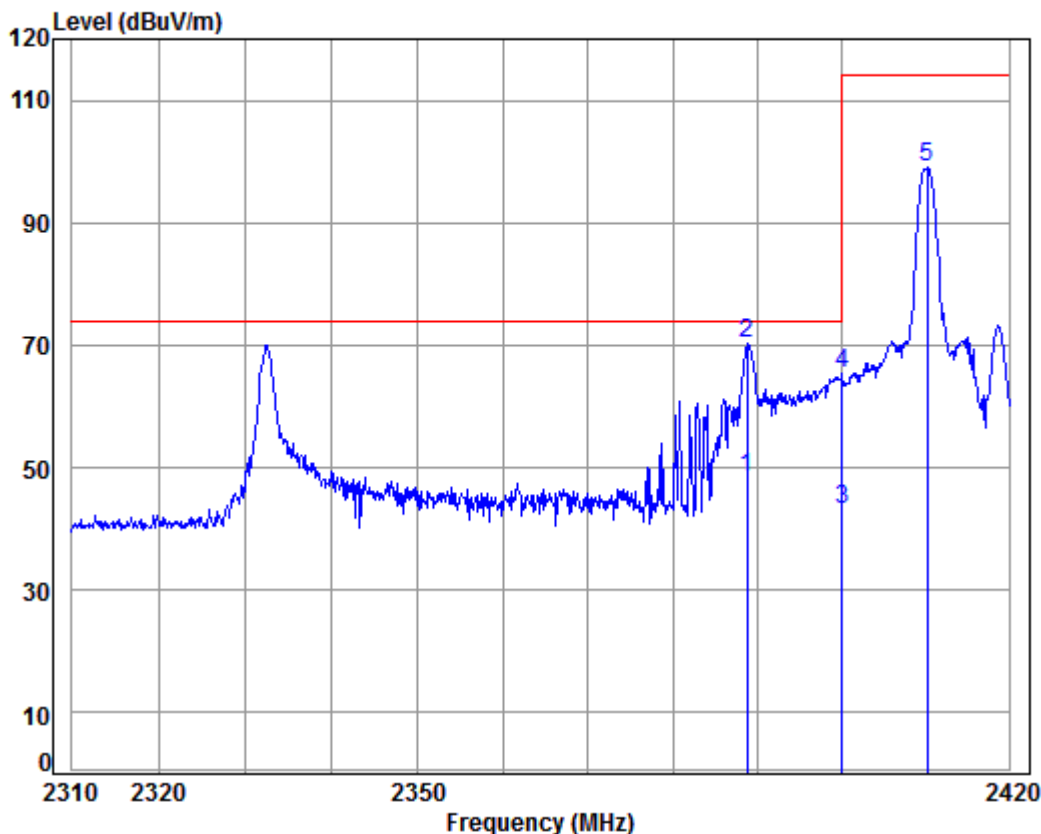
Job No: : 08499CR

Mode: : 2410 Band edge

Note : 2.4G Remote

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 av	2389.016	5.47	29.07	37.96	41.89	38.47	54.00	-15.53	Average
2 pp	2389.016	5.47	29.07	37.96	63.99	60.57	74.00	-13.43	Peak
3	2400.000	5.49	29.11	37.96	55.28	51.92	74.00	-22.08	Peak
4	2410.226	5.50	29.14	37.95	91.87	88.56	114.00	-25.44	Peak

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



Condition: 3m VERTICAL

Job No: : 08499CR

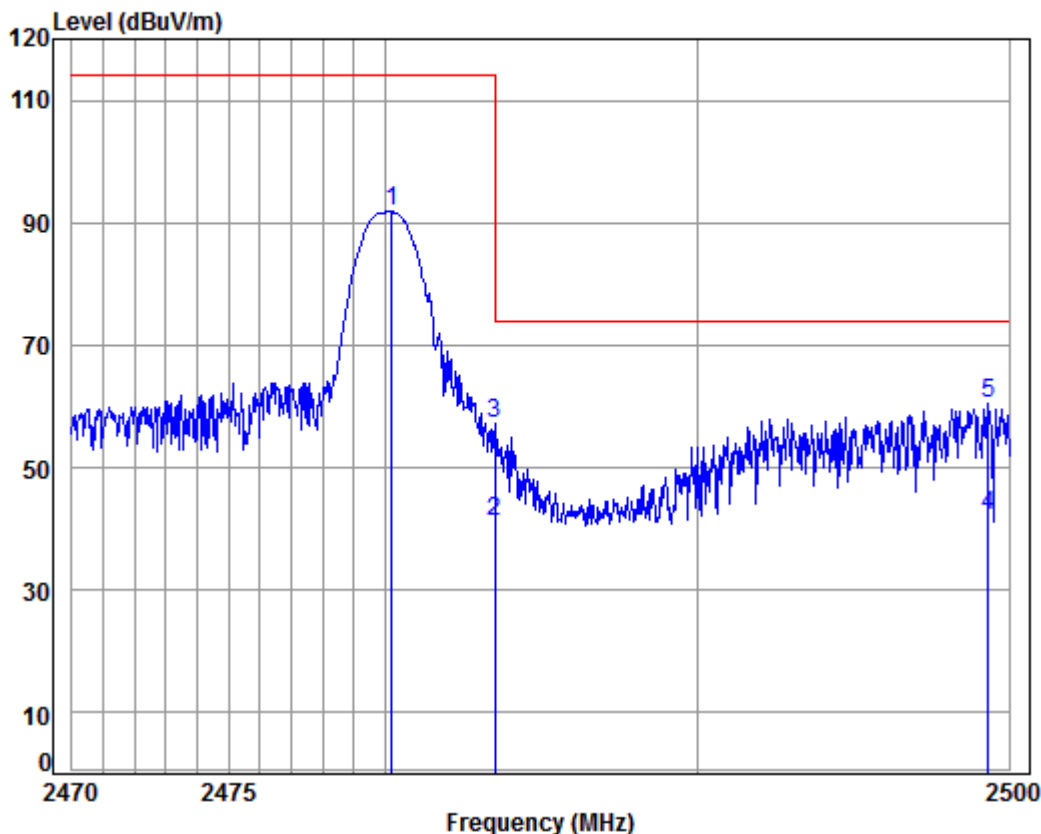
Mode: : 2410 Band edge

Note : 2.4G Remote

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 av	2388.793	5.47	29.07	37.96	51.67	48.25	54.00	-5.75	Average
2 pp	2388.793	5.47	29.07	37.96	73.77	70.35	74.00	-3.65	Peak
3	2400.000	5.49	29.11	37.96	46.63	43.27	54.00	-10.73	Average
4	2400.000	5.49	29.11	37.96	68.74	65.38	74.00	-8.62	Peak
5	2410.226	5.50	29.14	37.95	102.22	98.91	114.00	-15.09	Peak



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



Condition: 3m HORIZONTAL

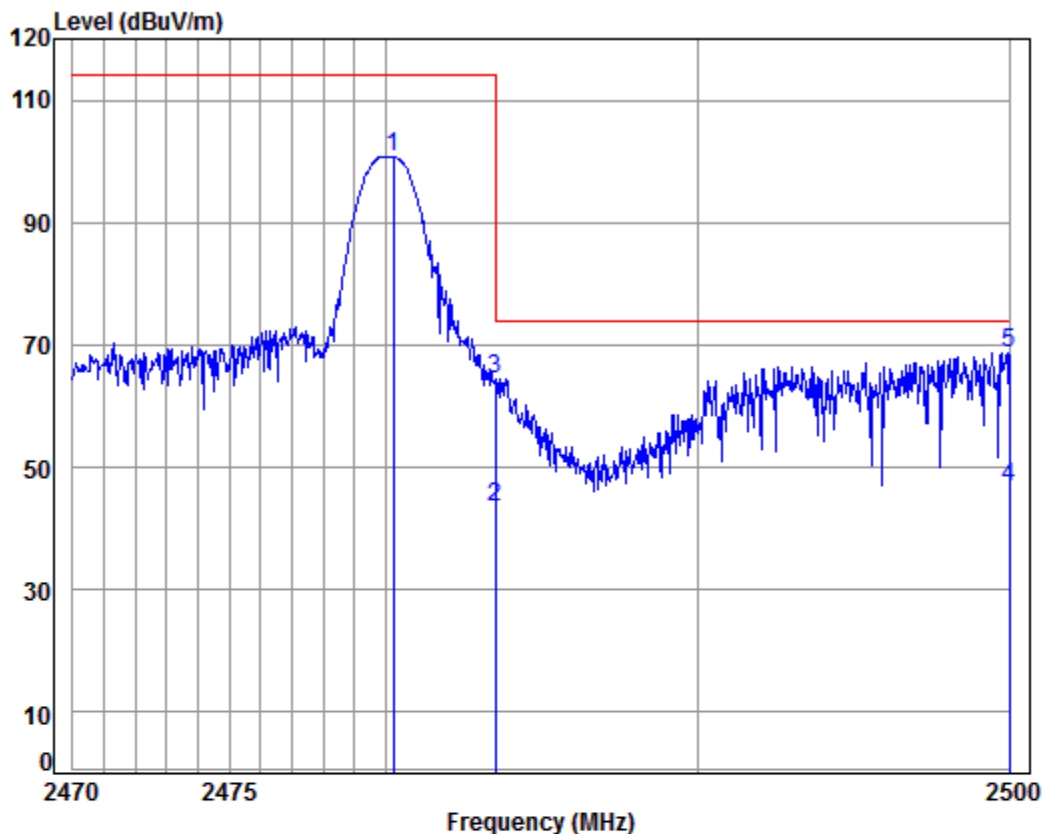
Job No: : 08499CR

Mode: : 2480 Band edge

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2480.189	5.59	29.34	37.95	94.77	91.75	114.00	-22.25	peak
2	2483.500	5.60	29.35	37.95	44.23	41.23	54.00	-12.77	Average
3	2483.500	5.60	29.35	37.95	60.34	57.34	74.00	-16.66	peak
4 pp	2499.336	5.62	29.40	37.95	45.17	42.24	54.00	-11.76	Average
5 pk	2499.336	5.62	29.40	37.95	63.28	60.35	74.00	-13.65	peak

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



Condition: 3m VERTICAL

Job No: : 08499CR

Mode: : 2480 Band edge

Note : 2.4G Remote

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2480.219	5.59	29.34	37.95	103.73	100.71	114.00	-13.29 peak
2	2483.500	5.60	29.35	37.95	46.35	43.35	54.00	-10.65 Average
3	2483.500	5.60	29.35	37.95	67.46	64.46	74.00	-9.54 peak
4 av	2500.000	5.62	29.40	37.94	49.67	46.75	54.00	-7.25 Average
5 pp	2500.000	5.62	29.40	37.94	71.68	68.76	74.00	-5.24 peak



Remark:

- 3) 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
- 4) 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. So, only the above measurement data were shown in the report.



## 7.5 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

### 7.5.1 E.U.T. Operation

Operating Environment:

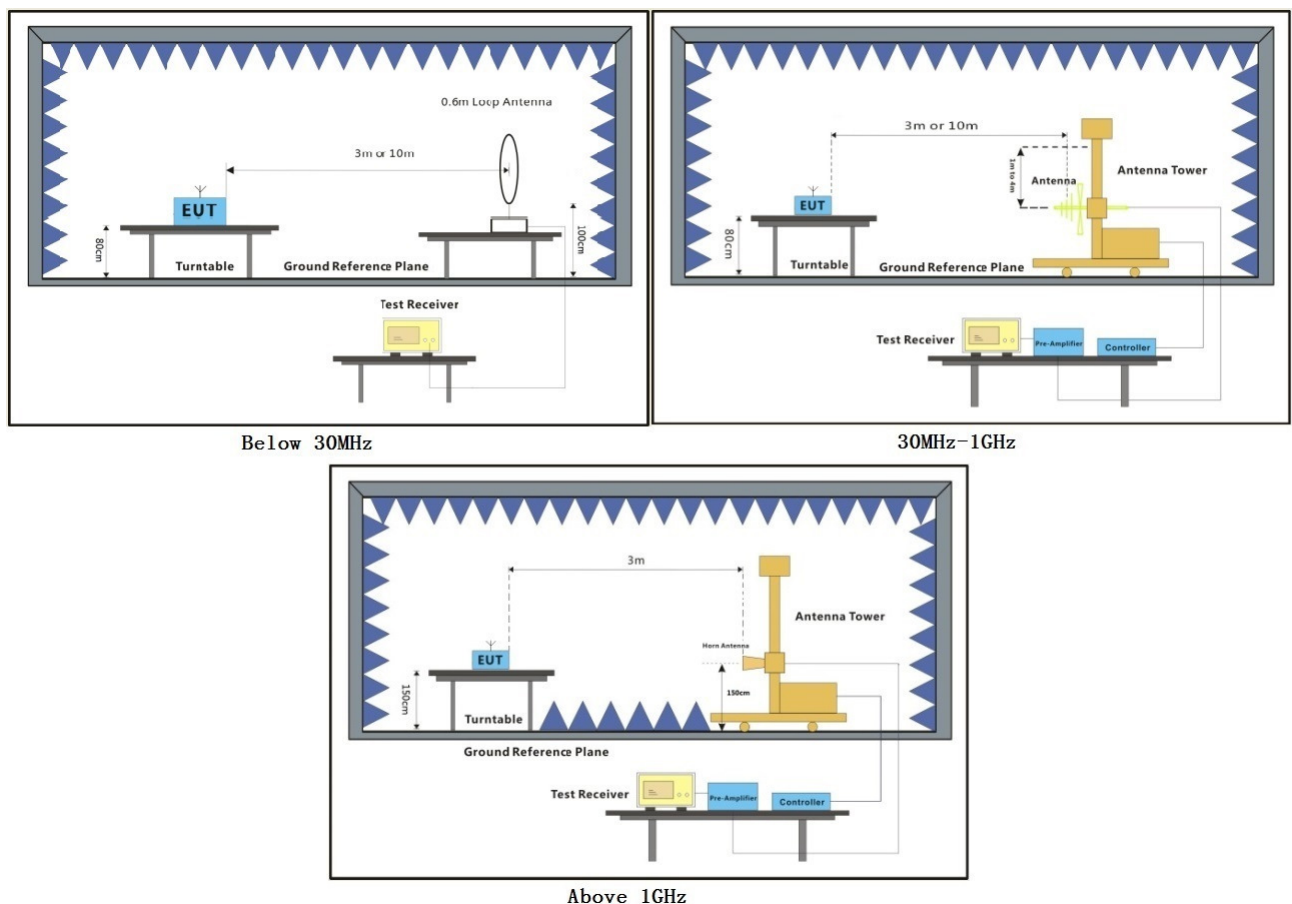
Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: a:TX mode\_Keep the EUT in transmitting with modulation mode.

b:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

The worst case for final test: b:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

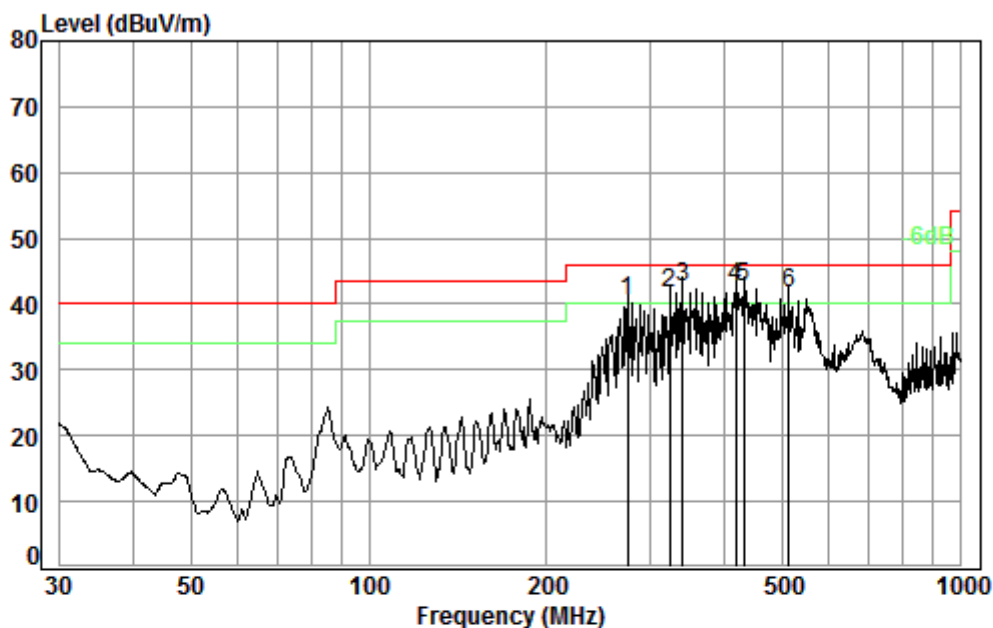
For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



30MHz~1GHz

QP value:

Mode:b; Polarization:Horizontal;



Condition: 3m HORIZONTAL

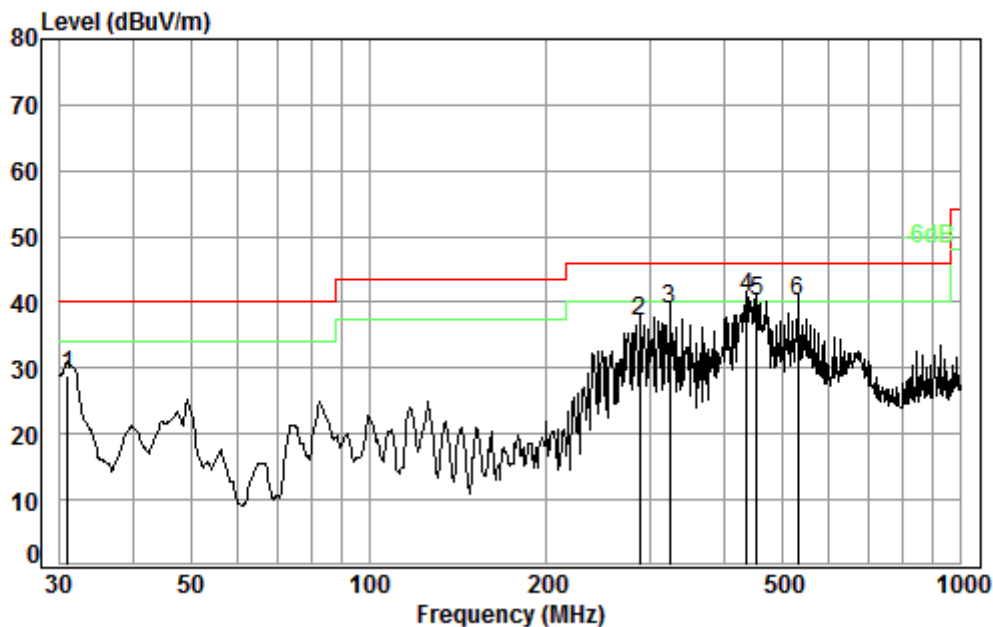
Job No. : 08499CR

Test mode: b

		Cable	Ant	Preamp	Read	Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	273.23	1.78	12.76	26.66	52.62	40.50	46.00 -5.50
2	322.19	1.97	14.70	26.72	51.61	41.56	46.00 -4.44
3 pp	339.59	2.03	14.27	26.81	53.20	42.69	46.00 -3.31
4	417.64	2.28	16.37	27.17	50.98	42.46	46.00 -3.54
5	431.03	2.33	16.52	27.23	51.01	42.63	46.00 -3.37
6	513.63	2.62	18.18	27.53	48.34	41.61	46.00 -4.39



Mode:b; Polarization:Vertical



Condition: 3m VERTICAL

Job No. : 08499CR

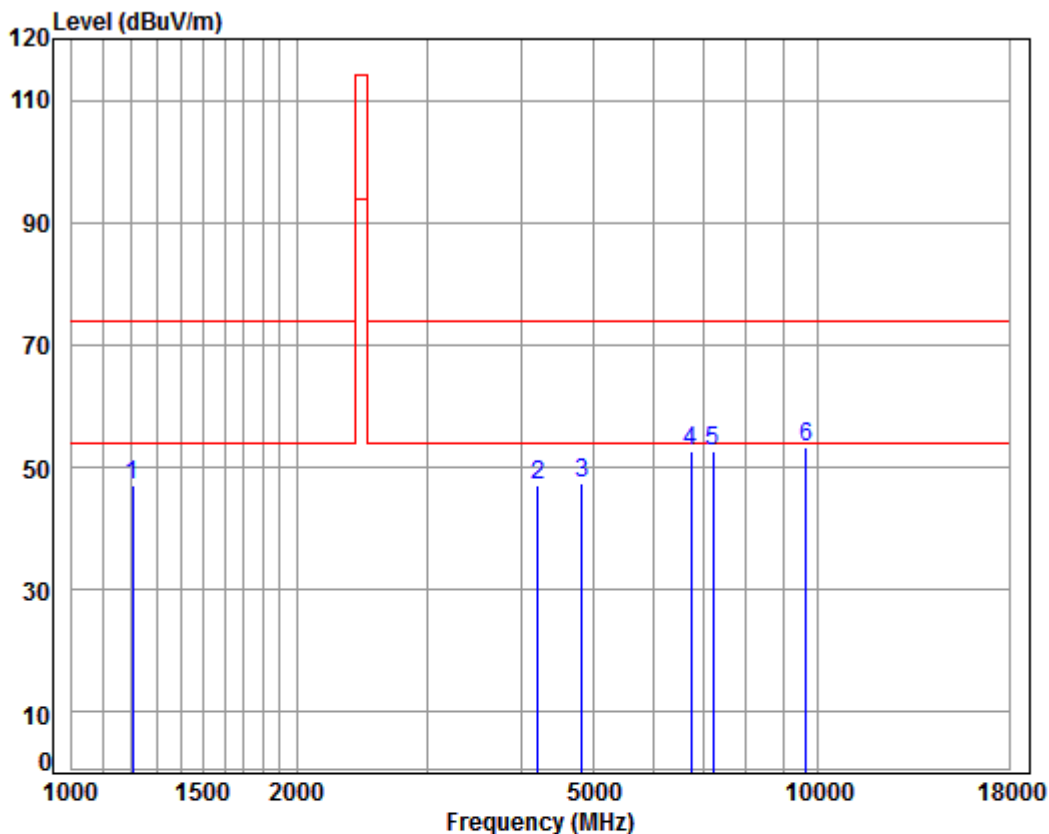
Test mode: b

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.96	0.60	18.16	27.40	37.52	28.88	40.00	-11.12
2	286.98	1.84	13.33	26.63	48.43	36.97	46.00	-9.03
3	322.19	1.97	14.70	26.72	49.00	38.95	46.00	-7.05
4 pp	435.59	2.35	16.61	27.25	48.97	40.68	46.00	-5.32
5	452.72	2.42	17.00	27.31	48.19	40.30	46.00	-5.70
6	530.10	2.63	18.58	27.59	46.45	40.07	46.00	-5.93



Above 1GHz

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



Condition: 3m HORIZONTAL

Job No : 08499CR

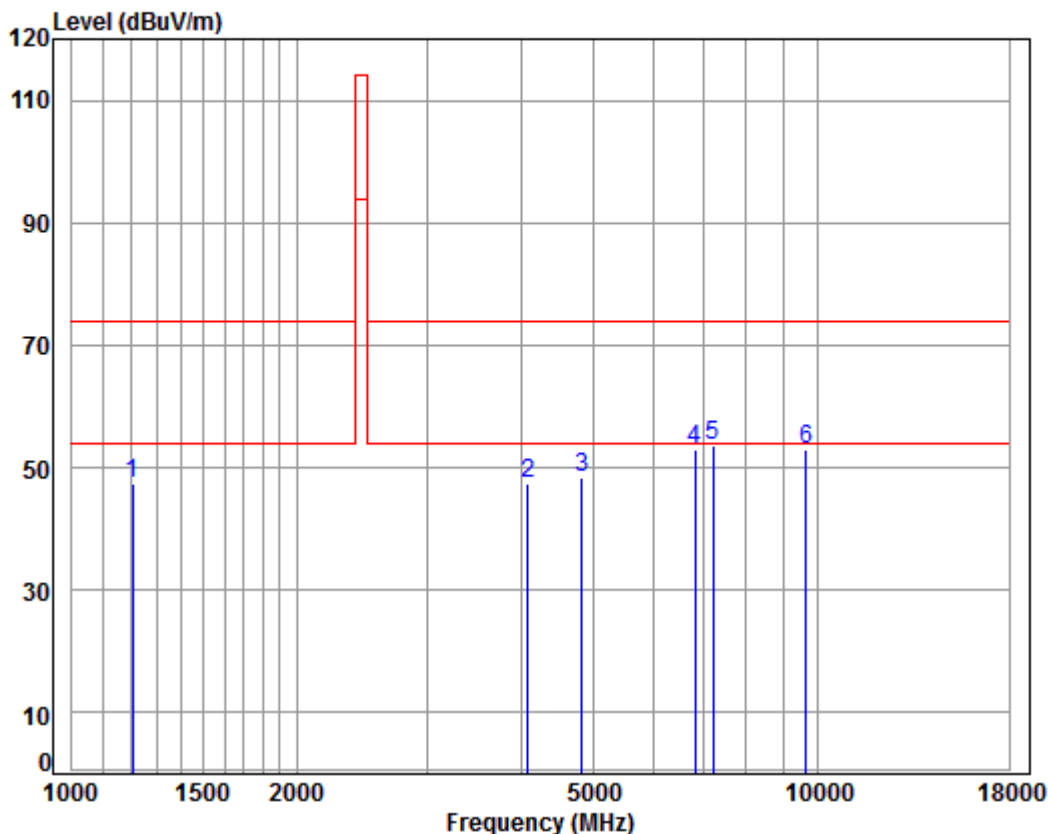
Mode : 2410 TX RSE

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1206.682	4.44	24.51	38.07	56.25	47.13	74.00	-26.87	peak
2	4206.011	7.23	33.60	38.11	44.38	47.10	74.00	-26.90	peak
3	4820.000	7.91	34.19	38.42	43.66	47.34	74.00	-26.66	peak
4	6756.708	10.80	35.83	37.53	43.68	52.78	74.00	-21.22	peak
5	7230.000	10.07	36.41	37.08	43.32	52.72	74.00	-21.28	peak
6 pp	9640.000	10.76	37.53	35.07	39.93	53.15	74.00	-20.85	peak



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



Condition: 3m VERTICAL

Job No : 08499CR

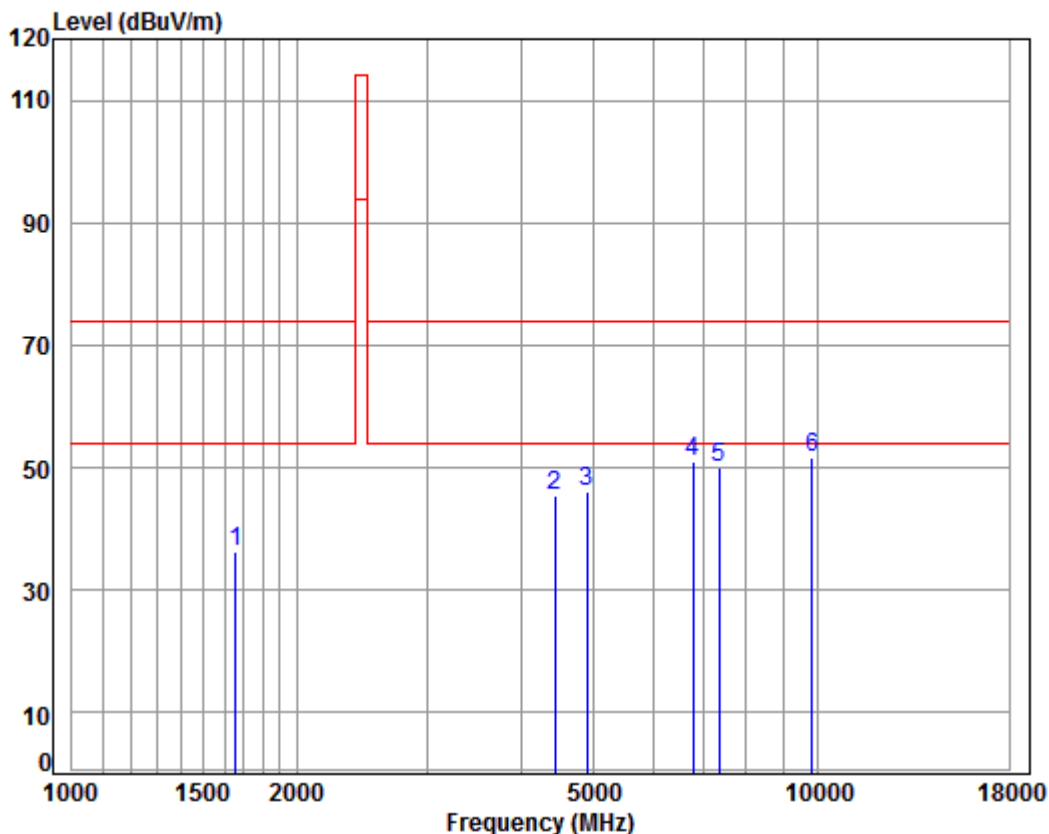
Mode : 2410 TX RSE

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1206.682	4.44	24.51	38.07	56.53	47.41	74.00	-26.59	peak
2	4086.182	7.08	33.60	38.05	44.70	47.33	74.00	-26.67	peak
3	4820.000	7.91	34.19	38.42	44.64	48.32	74.00	-25.68	peak
4	6835.278	10.58	36.05	37.45	43.77	52.95	74.00	-21.05	peak
5 pp	7230.000	10.07	36.41	37.08	44.26	53.66	74.00	-20.34	peak
6	9640.000	10.76	37.53	35.07	39.87	53.09	74.00	-20.91	peak



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



Condition: 3m HORIZONTAL

Job No : 08499CR

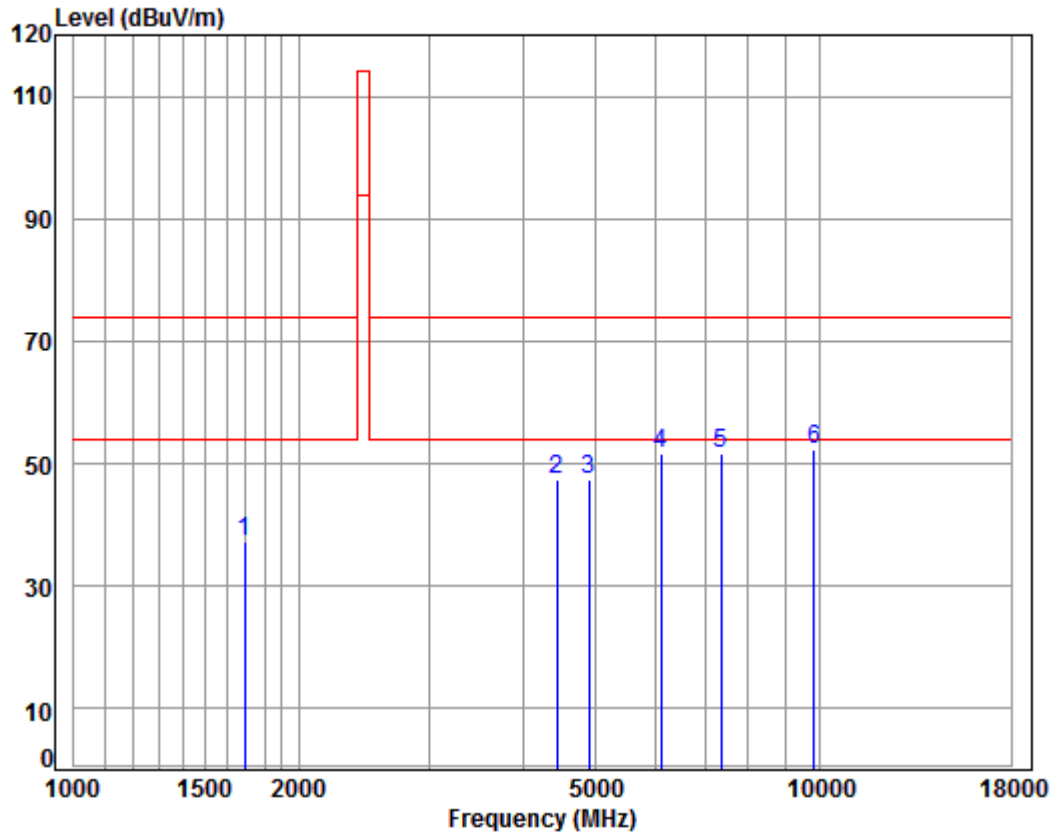
Mode : 2450 TX RSE

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1658.337	5.28	26.50	38.03	42.54	36.29	74.00	-37.71	peak
2	4443.453	7.50	33.60	38.24	42.67	45.53	74.00	-28.47	peak
3	4900.000	7.99	34.33	38.45	42.25	46.12	74.00	-27.88	peak
4	6795.879	10.69	35.94	37.49	41.91	51.05	74.00	-22.95	peak
5	7350.000	10.04	36.36	36.97	40.59	50.02	74.00	-23.98	peak
6 pp	9800.000	10.84	37.56	35.00	38.22	51.62	74.00	-22.38	peak



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



Condition: 3m VERTICAL

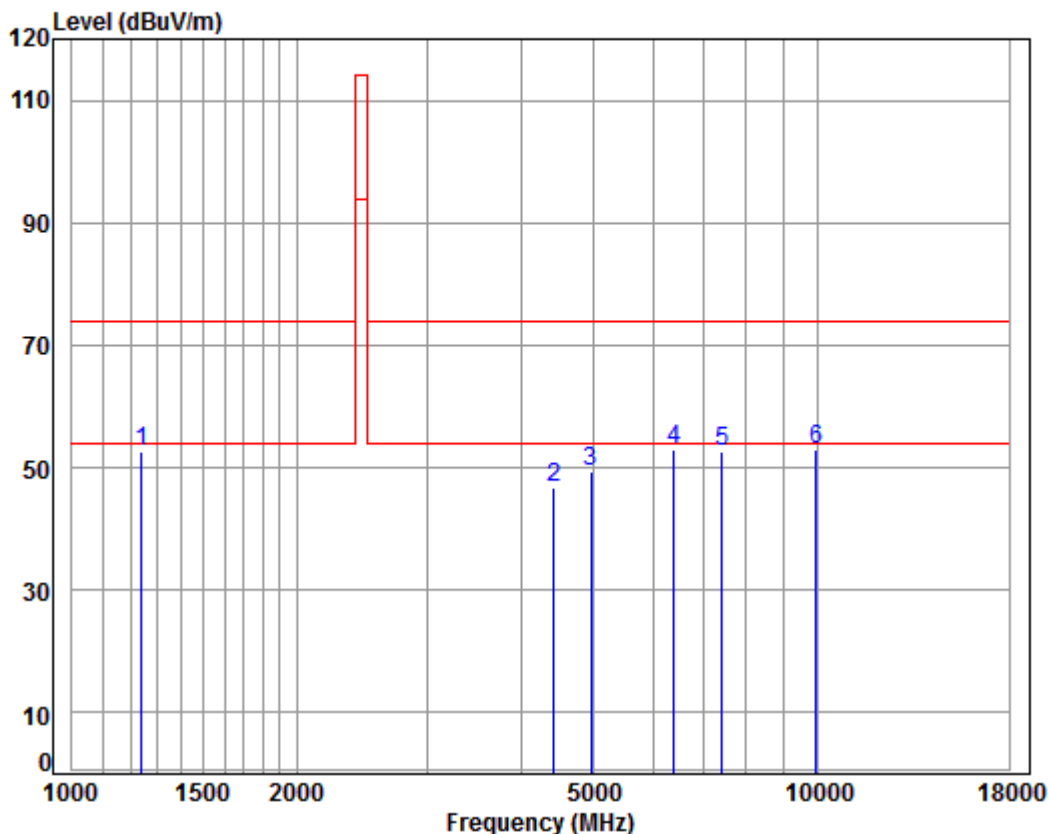
Job No : 08499CR

Mode : 2450 TX RSE

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1692.231	5.24	26.64	38.02	43.36	37.22	74.00	-36.78	peak
2	4430.628	7.48	33.60	38.23	44.59	47.44	74.00	-26.56	peak
3	4900.000	7.99	34.33	38.45	43.38	47.25	74.00	-26.75	peak
4	6106.616	10.78	34.79	38.19	44.34	51.72	74.00	-22.28	Peak
5	7350.000	10.04	36.36	36.97	42.18	51.61	74.00	-22.39	peak
6 pp	9800.000	10.84	37.56	35.00	39.07	52.47	74.00	-21.53	peak

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



Condition: 3m HORIZONTAL

Job No : 08499CR

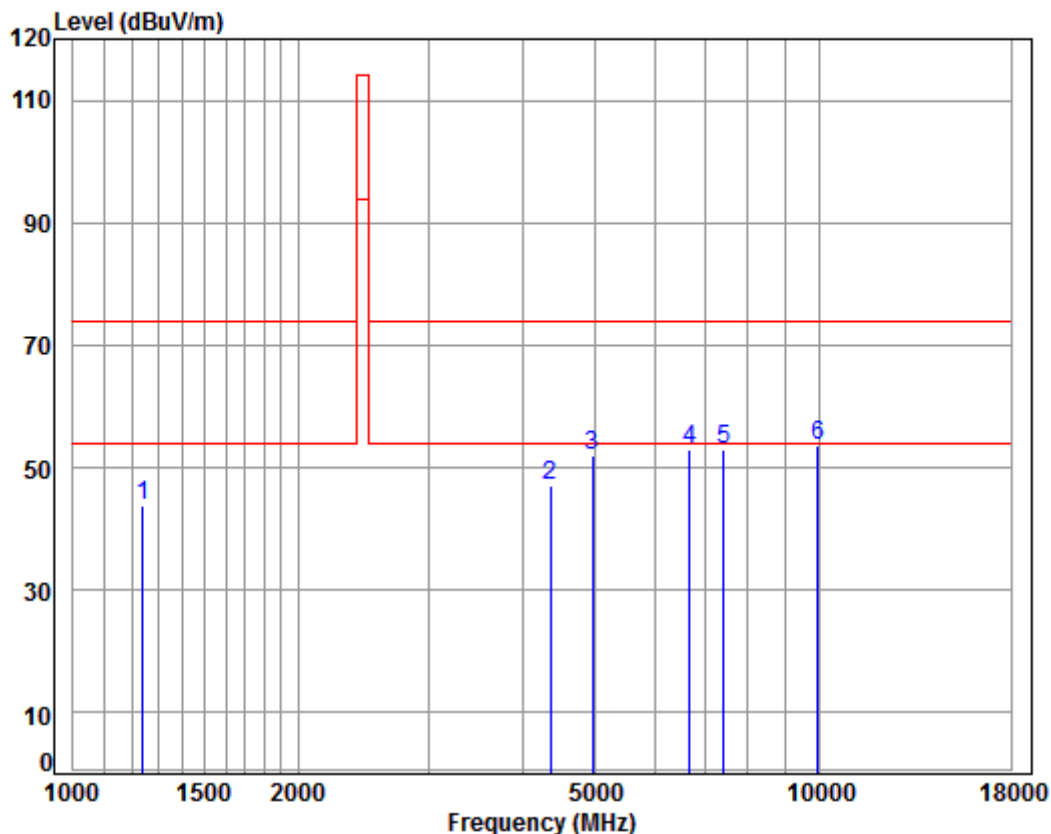
Mode : 2480 TX RSE

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1238.483	4.57	24.67	38.07	61.35	52.52	74.00	-21.48	peak
2	4417.841	7.47	33.60	38.22	43.86	46.71	74.00	-27.29	peak
3	4960.000	8.05	34.43	38.48	45.30	49.30	74.00	-24.70	peak
4	6414.167	11.38	35.03	37.87	44.41	52.95	74.00	-21.05	peak
5	7440.000	10.02	36.32	36.89	43.11	52.56	74.00	-21.44	peak
6 pp	9920.000	10.90	37.58	34.94	39.46	53.00	74.00	-21.00	peak



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



Condition: 3m VERTICAL

Job No : 08499CR

Mode : 2480 TX RSE

Note : 2.4G Remote

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1238.483	4.57	24.67	38.07	52.54	43.71	74.00	-30.29	peak
2	4354.454	7.40	33.60	38.19	44.40	47.21	74.00	-26.79	peak
3	4960.000	8.05	34.43	38.48	48.09	52.09	74.00	-21.91	peak
4	6698.373	10.97	35.67	37.59	43.80	52.85	74.00	-21.15	peak
5	7440.000	10.02	36.32	36.89	43.62	53.07	74.00	-20.93	peak
6 pp	9920.000	10.90	37.58	34.94	39.95	53.49	74.00	-20.51	peak



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:

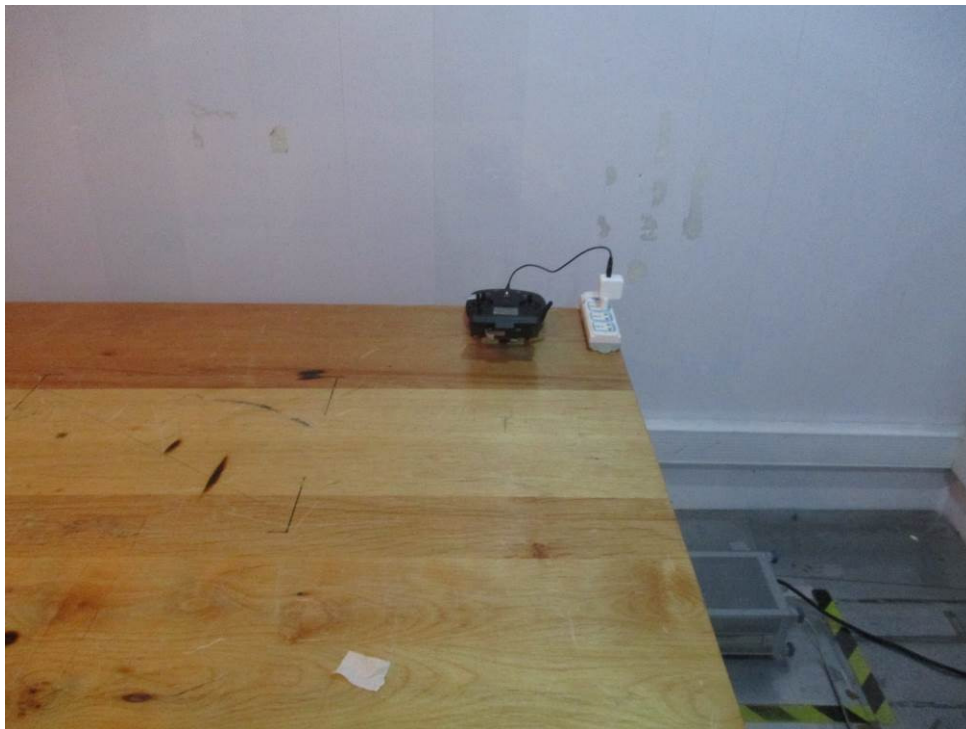
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

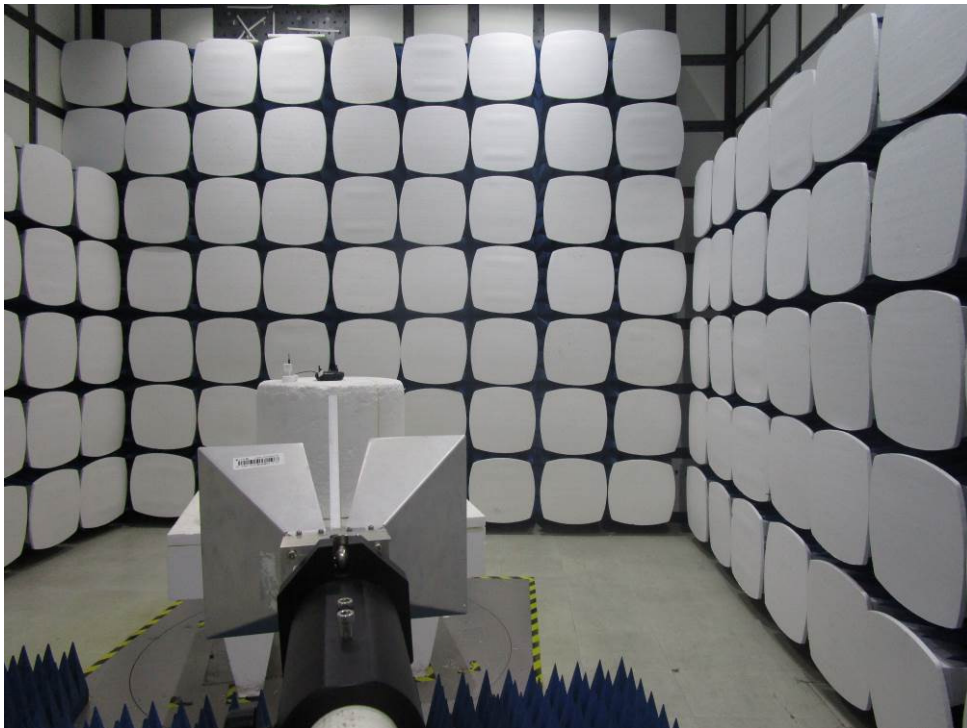
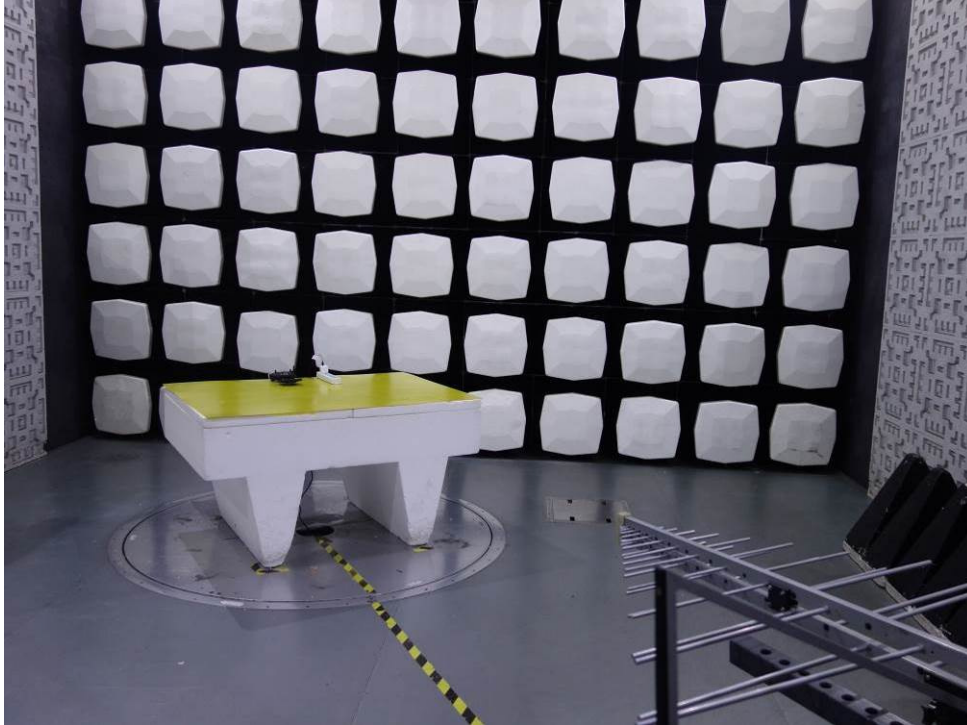
3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

## 8 Photographs

### 8.1 Conducted Emissions at AC Power Line (150kHz-30MHz) Test Setup



## 8.2 Radiated Emissions Test Setup





### **8.3 EUT Constructional Details**

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1708008499CR.