



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

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

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM170500523102
Page: 1 of 36

TEST REPORT

Application No.: SZEM1705005231CR
Applicant: GUANGDONG SONGYANG PLASTIC TOYS CO., LTD
Address of Applicant: HuaiNan, a section 324 National Highway, Lianxia Town, Chenhai, Shantou, Guangdong, China
Manufacturer: GUANGDONG SONGYANG PLASTIC TOYS CO., LTD
Address of Manufacturer: Huainan Road, Lianxia Town, Chenghai Area, Shantou City, Guangdong, P.R.China
Factory: GUANGDONG SONGYANG PLASTIC TOYS CO., LTD
Address of Factory: Huainan Road, Lianxia Town, Chenghai Area, Shantou City, Guangdong, P.R.China
Equipment Under Test (EUT):
EUT Name: REMOTE CONTROL AIRCRAFT
Model No.: Please refer to the remark on section 2 ♣
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID: 2AEXV85171288
Standards: 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2017-05-26
Date of Test: 2017-05-31 to 2017-06-13
Date of Issue: 2017-06-17

Test Result :	Pass*
----------------------	--------------

* 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.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-06-17		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
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.:

X1, X1B, X1C, X2, X2B, X2C, X3, X3B, X3C, X4, X4B, X4C, X5, X5B, X5C, X6, X6B, X6C, X6B-3, X6C-3, X7, X7B, X7C, X8, X8B, X8C, X9, X9B, X9C, X9B-3, X9C-3, X9G, X9G-3, X10, X10B, X10C, X11, X11B, X11C, X12, X12B, X12C, X13, X13B, X13C, X14, X14B, X14C, X15, X15B, X15C, X16, X16B, X16C, X17, X17B, X17C, X18, X18B, X18C, X19, X19B, X19C, X20, X20B, X20C, X21, X21B, X21C, X21B-3, X21C-3, X22, X22B, X22C, X23, X23B, X23C, X24, X24B, X24C, X25, X25B, X25C, X26, X26B, X26C, X27, X27B, X27C, X28, X28B, X28C, X29, X29B, X29C, X30, X30B, X30C, X31, X31B, X31C, X32, X32B, X32C, X33, X33B, X33C, X33B-3, X33C-3, X34, X34B, X34C, X34B-3, X34C-3, X34G, X34G-3, X35, X35B, X35C, X36, X36B, X36C, X36B-3, X36C-3, X37, X37B, X37C, X38, X38B, X38C, X39, X39B, X39C, X40, X40B, X40C, X41, X41B, X41C, X42, X42B, X42C, X43, X43B, X43C, X44, X44B, X44C, X45, X45B, X45C, X46, X46B, X46C, X47, X47B, X47C, X48, X48B, X48C, X49, X49B, X49C, X50, X50B, X50C

Only the model X24 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, only different on model No. and appearance of the structure.



3 Contents

	Page
1 COVER PAGE	1
2 TEST SUMMARY	3
3 CONTENTS	4
4 GENERAL INFORMATION.....	5
4.1 DETAILS OF E.U.T.	5
4.2 DESCRIPTION OF SUPPORT UNITS.....	6
4.3 MEASUREMENT UNCERTAINTY.....	6
4.4 TEST LOCATION	7
4.5 TEST FACILITY	7
4.6 DEVIATION FROM STANDARDS.....	7
4.7 ABNORMALITIES FROM STANDARD CONDITIONS	7
5 EQUIPMENT LIST.....	8
6 RADIO SPECTRUM TECHNICAL REQUIREMENT.....	10
6.1 ANTENNA REQUIREMENT	10
6.1.1 Test Requirement:.....	10
6.1.2 Conclusion.....	10
7 RADIO SPECTRUM MATTER TEST RESULTS	11
7.1 20dB BANDWIDTH.....	11
7.1.1 E.U.T. Operation.....	11
7.1.2 Measurement Procedure and Data.....	11
7.2 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.249(A))	13
7.2.1 E.U.T. Operation.....	13
7.2.2 Measurement Procedure and Data.....	13
7.3 RESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY.....	20
7.3.1 E.U.T. Operation.....	21
7.3.2 Measurement Procedure and Data.....	21
7.4 RADIATED EMISSIONS.....	26
7.4.1 E.U.T. Operation.....	26
7.4.2 Measurement Procedure and Data.....	26
8 PHOTOGRAPHS.....	35
8.1 RADIATED EMISSIONS TEST SETUP	35
8.2 EUT CONSTRUCTIONAL DETAILS	36

4 General Information

4.1 Details of E.U.T.

Carrier Frequency:	2405MHz-2475MHz
Modulation Type:	GFSK
Number of Channels:	71
Channel Spacing:	1MHz (declared by the client)
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	0dBi
Power supply:	Tx: DC 3V by 1.5V x 2"AAA" batteries

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2405MHz	19	2423MHz	37	2441MHz	55	2459MHz
2	2406MHz	20	2424MHz	38	2442MHz	56	2460MHz
3	2407MHz	21	2425MHz	39	2443MHz	57	2461MHz
4	2408MHz	22	2426MHz	40	2444MHz	58	2462MHz
5	2409MHz	23	2427MHz	41	2445MHz	59	2463MHz
6	2410MHz	24	2428MHz	42	2446MHz	60	2464MHz
7	2411MHz	25	2429MHz	43	2447MHz	61	2465MHz
8	2412MHz	26	2430MHz	44	2448MHz	62	2466MHz
9	2413MHz	27	2431MHz	45	2449MHz	63	2467MHz
10	2414MHz	28	2432MHz	46	2450MHz	64	2468MHz
11	2415MHz	29	2433MHz	47	2451MHz	65	2469MHz
12	2416MHz	30	2434MHz	48	2452MHz	66	2470MHz
13	2417MHz	31	2435MHz	49	2453MHz	67	2471MHz
14	2418MHz	32	2436MHz	50	2454MHz	68	2472MHz
15	2419MHz	33	2437MHz	51	2455MHz	69	2473MHz
16	2420MHz	34	2438MHz	52	2456MHz	70	2474MHz
17	2421MHz	35	2439MHz	53	2457MHz	71	2475MHz
18	2422MHz	36	2440MHz	54	2458MHz		

Using test software was control EUT work in continuous transmitter and receiver mode.and select test channel as below:

Channel	Frequency
The Lowest channel(CH1)	2405MHz
The Middle channel(CH41)	2445MHz
The Highest channel(CH71)	2475MHz

4.2 Description of Support Units

None

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 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 – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen 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 No.: 556682.

- **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

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

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	2017-05-10	2018-05-10
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2016-10-09	2017-10-09
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2014-11-01	2017-11-01
Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015-10-17	2018-10-17
Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2014-11-24	2017-11-24
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-14
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2015-05-13	2018-05-13

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	AUDIX	N/A	SEM001-02	2017-05-10	2018-05-10
EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2016-07-19	2017-07-19
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
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:

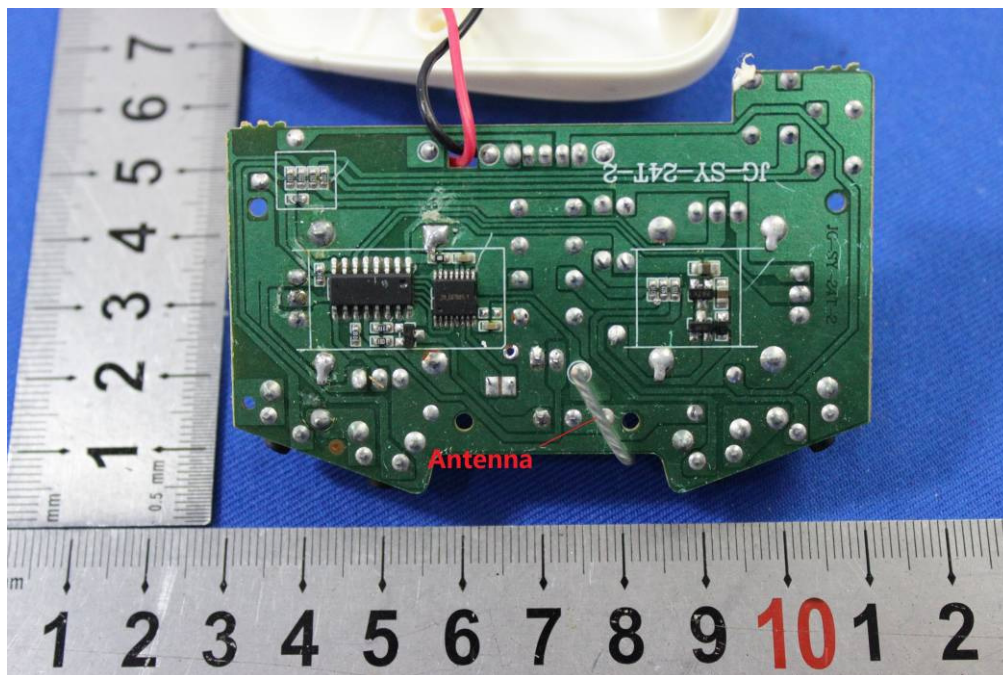
47 CFR Part 15, Subpart C 15.203

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 0dBi.



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

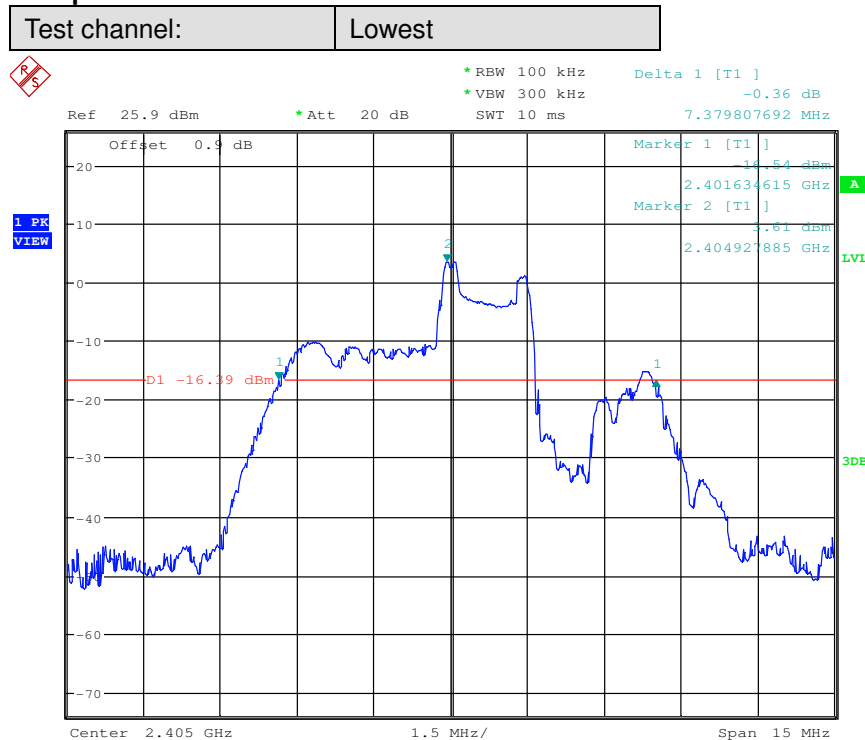
Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Measurement Procedure and Data

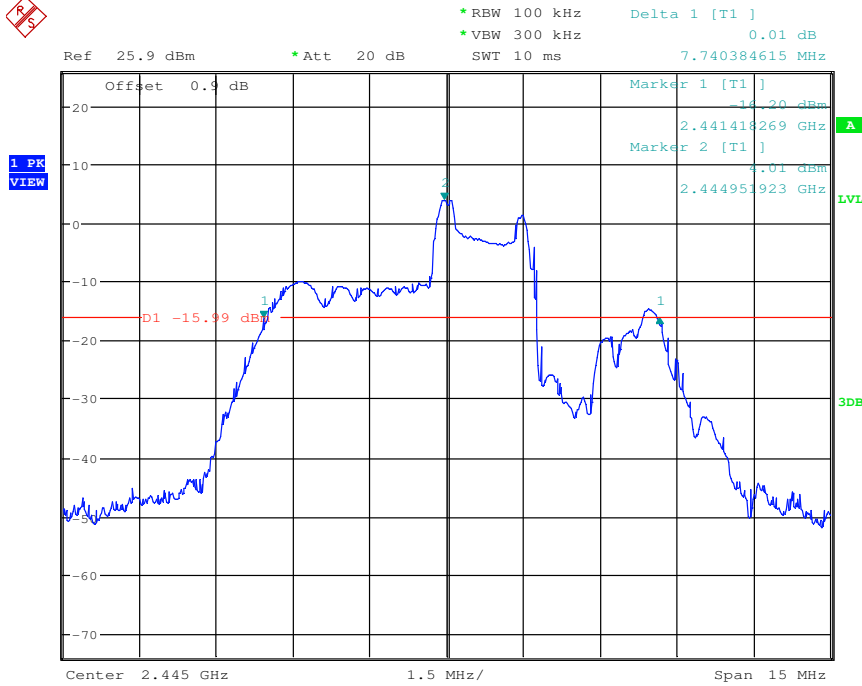
Test Channel	20dB bandwidth (MHz)	Results
Lowest	7.3798	Pass
Middle	7.7404	Pass
Highest	7.6442	Pass

Test plot as follows:

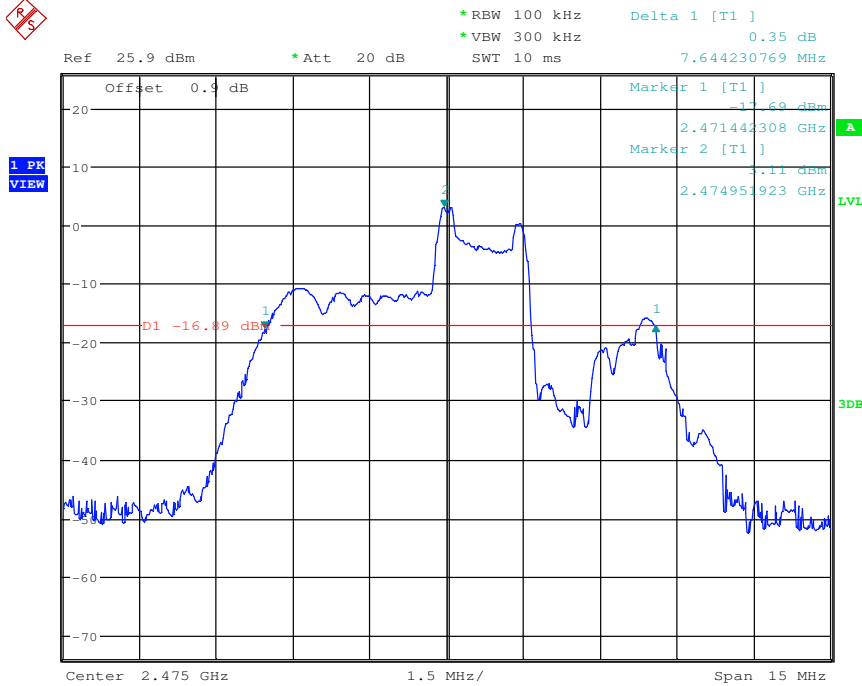




Test channel: Middle



Test channel: Highest





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:

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

7.2.1 E.U.T. Operation

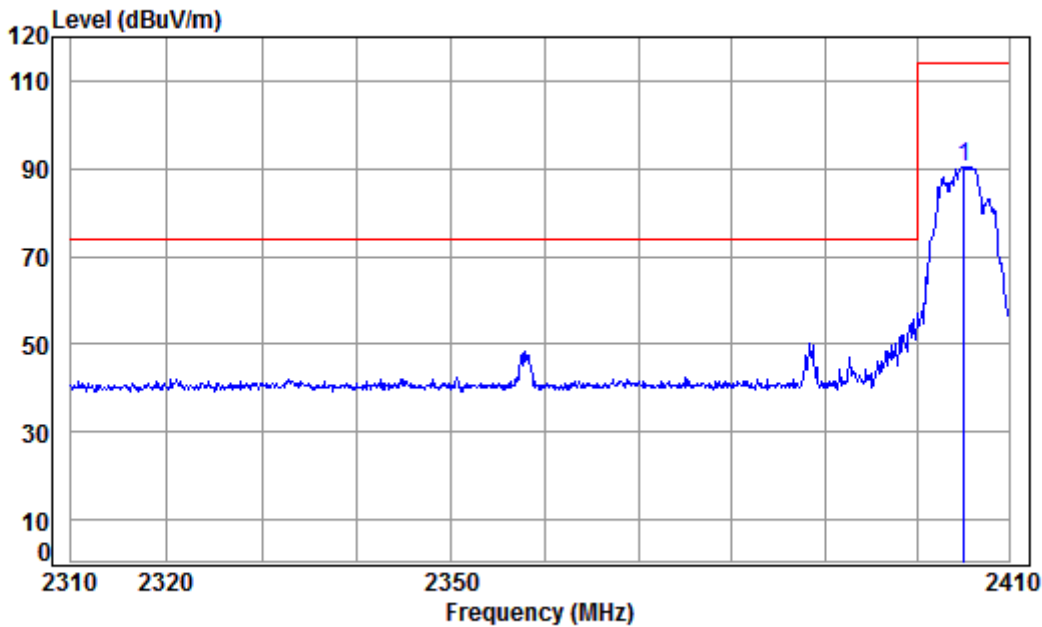
Operating Environment:
Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Measurement Procedure and Data

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



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



Condition: 3m HORIZONTAL

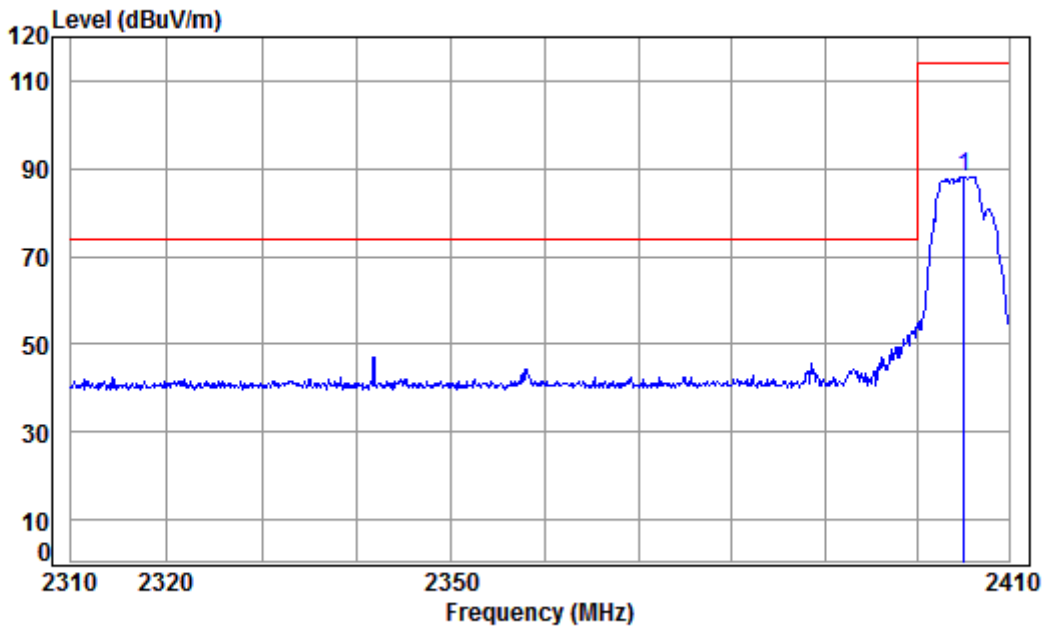
Job No: : 05231CR

Mode: : 2405 Filed Strength

	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 pp 2405.103	5.35	29.12	37.96	93.82	90.33	114.00	-23.67	peak



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



Condition: 3m Vertical

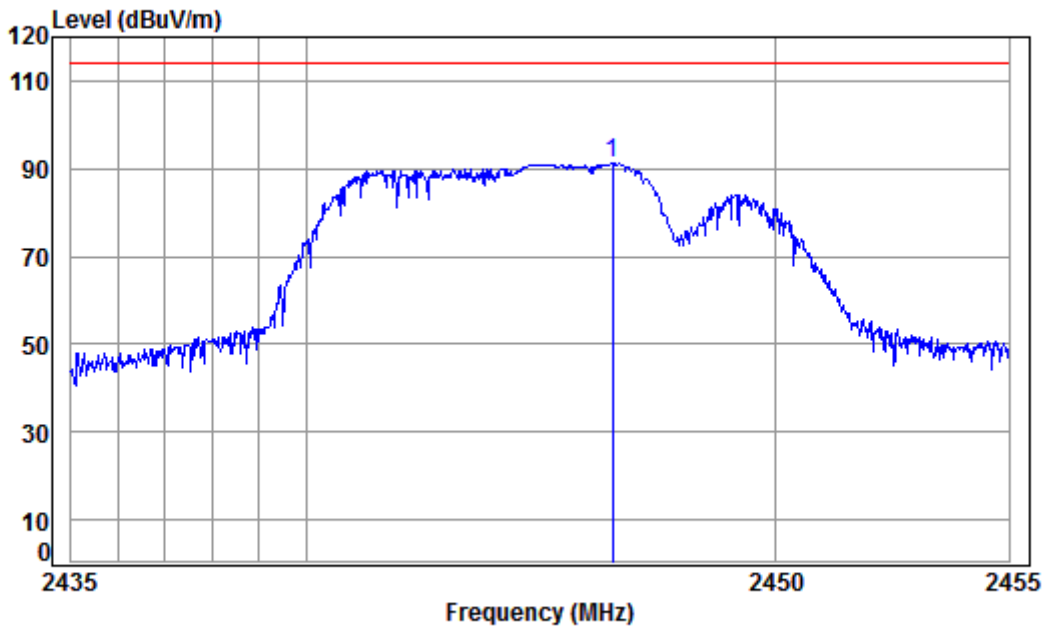
Job No: : 05231CR

Mode: : 2405 Filed Strength

	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 pp 2405.103	5.35	29.12	37.96	91.74	88.25	114.00	-25.75	peak



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



Condition: 3m HORIZONTAL

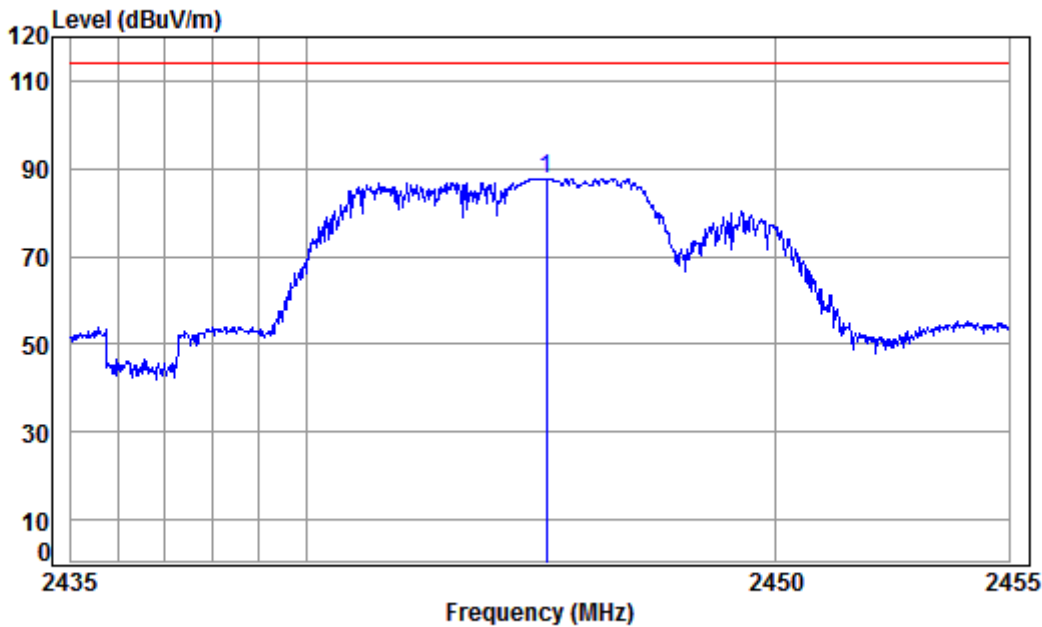
Job No: : 05231CR

Mode: : 2445 Filed Strength

	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 pp 2446.520	5.38	29.24	37.96	94.41	91.07	114.00	-22.93	Peak



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



Condition: 3m VERTICAL

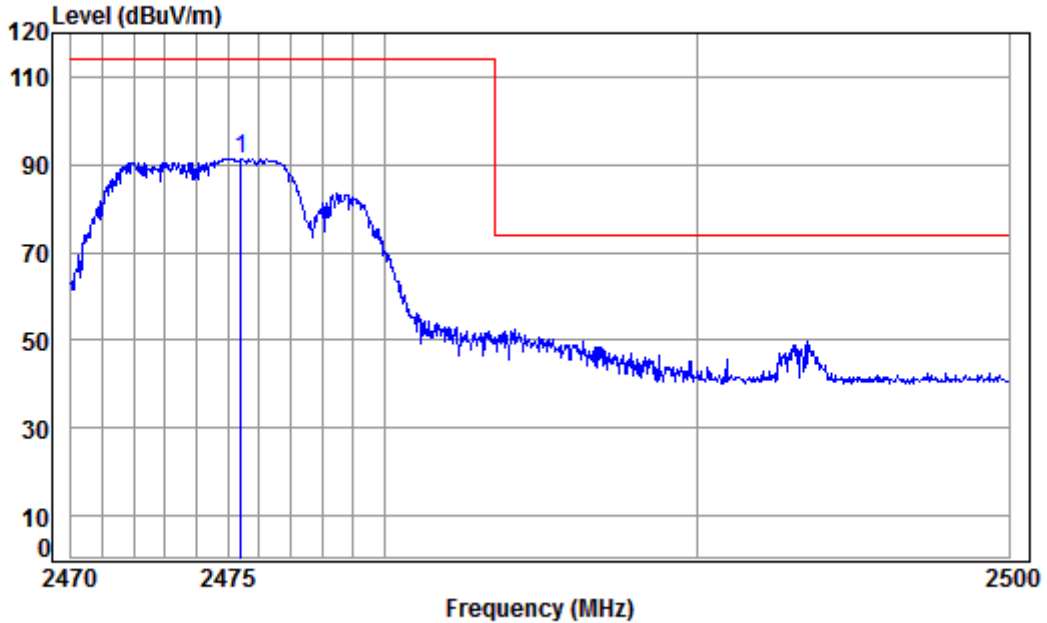
Job No: : 05231CR

Mode: : 2445 Filed Strength

	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 pp 2445.120	5.38	29.24	37.96	90.97	87.63	114.00	-26.37	Peak



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



Condition: 3m HORIZONTAL

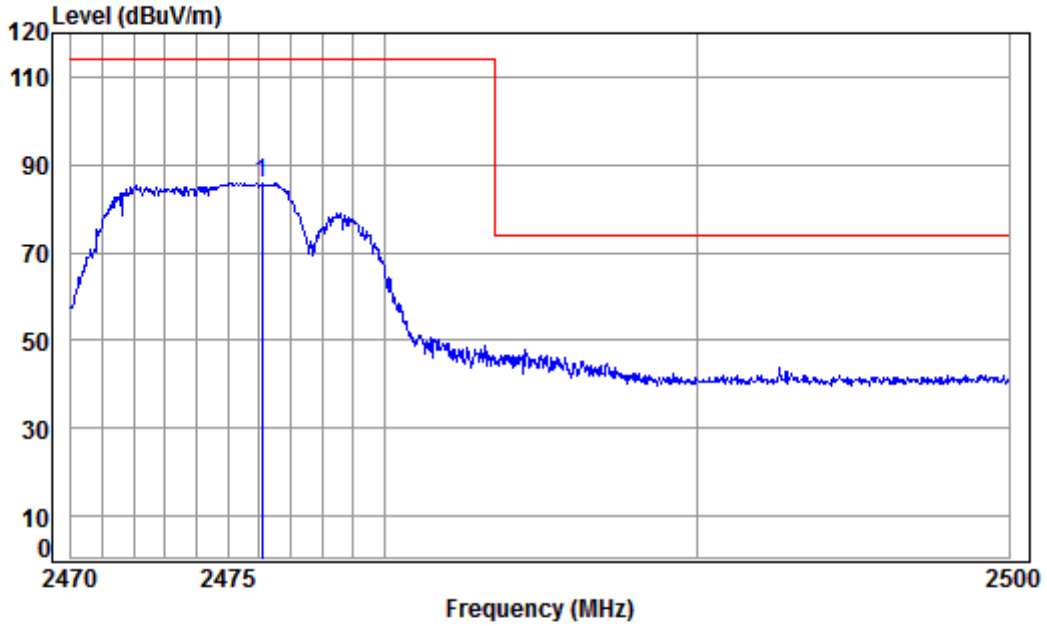
Job No: : 05231CR

Mode: : 2475 Filed Strength

	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 pp 2475.403	5.40	29.33	37.95	94.38	91.16	114.00	-22.84	peak



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



Condition: 3m VERTICAL

Job No: : 05231CR

Mode: : 2475 Filed Strength

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp 2476.091	5.40	29.33	37.95	88.92	85.70	114.00	-28.30 peak



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.



7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1010 mbar

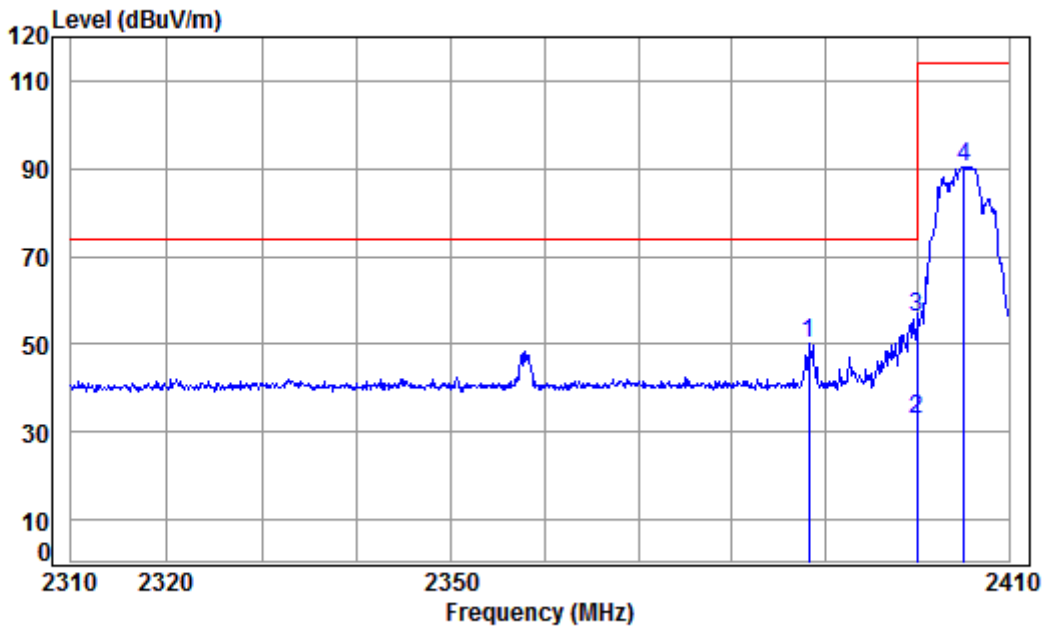
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Measurement Procedure and Data

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



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



Condition: 3m HORIZONTAL

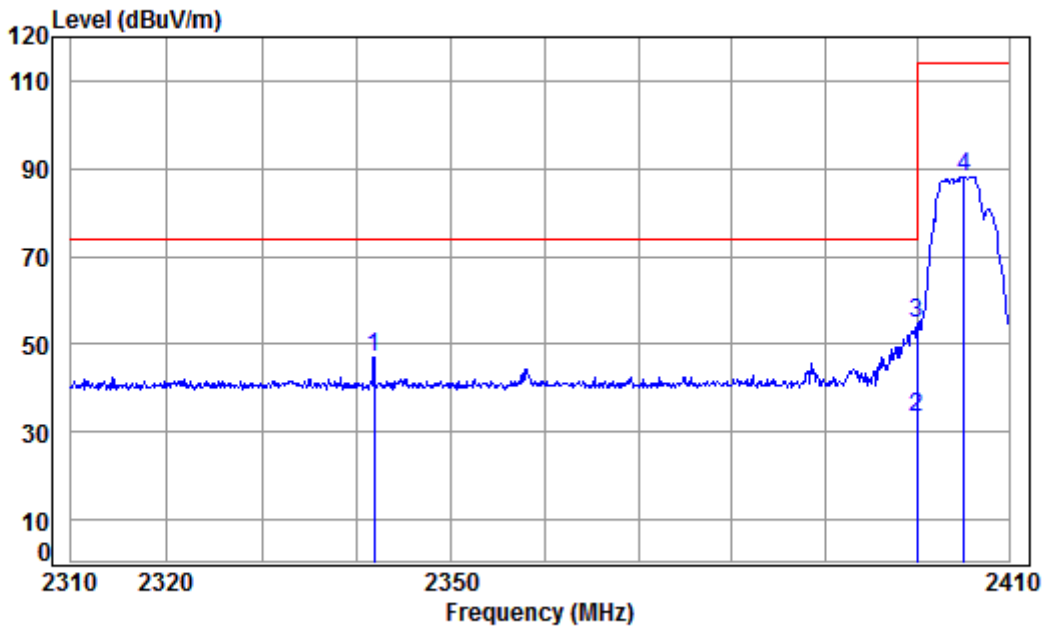
Job No: : 05231CR

Mode: : 2405 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	2388.343	5.34	29.07	37.96	53.77	50.22	74.00	-23.78 peak
2	av 2400.000	5.35	29.11	37.96	36.26	32.76	54.00	-21.24 Average
3	pp 2400.000	5.35	29.11	37.96	59.70	56.20	74.00	-17.80 Peak
4	2405.103	5.35	29.12	37.96	93.82	90.33	114.00	-23.67 peak



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



Condition: 3m Vertical

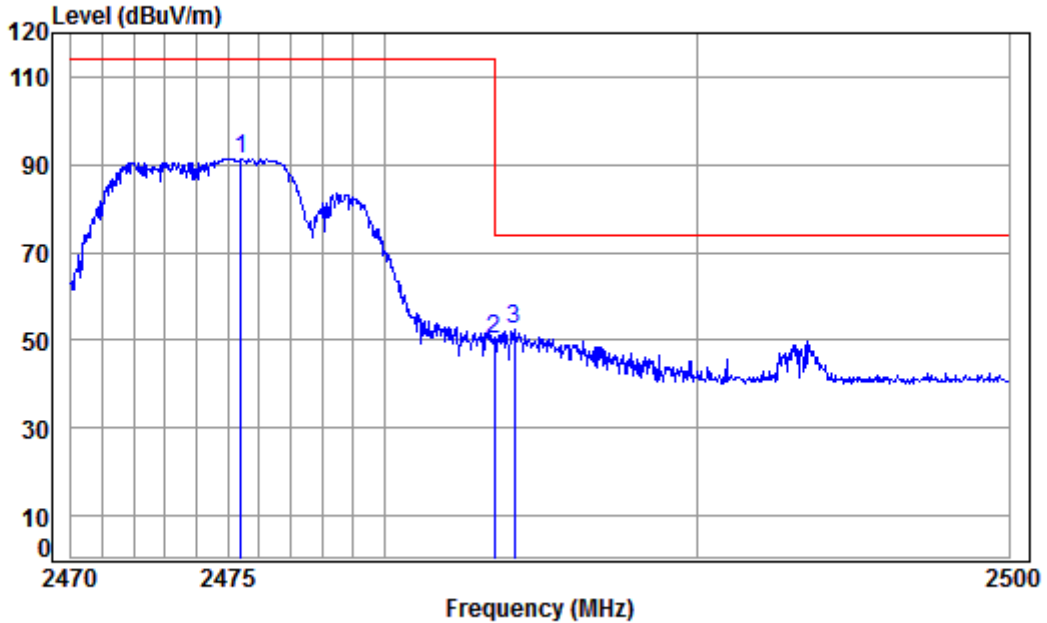
Job No: : 05231CR

Mode: : 2405 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2341.838	5.30	28.93	37.97	50.79	47.05	74.00	-26.95 peak
2 av	2400.000	5.35	29.11	37.96	36.90	33.40	54.00	-20.60 Average
3 pp	2400.000	5.35	29.11	37.96	58.10	54.60	74.00	-19.40 Peak
4	2405.103	5.35	29.12	37.96	91.74	88.25	114.00	-25.75 peak



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

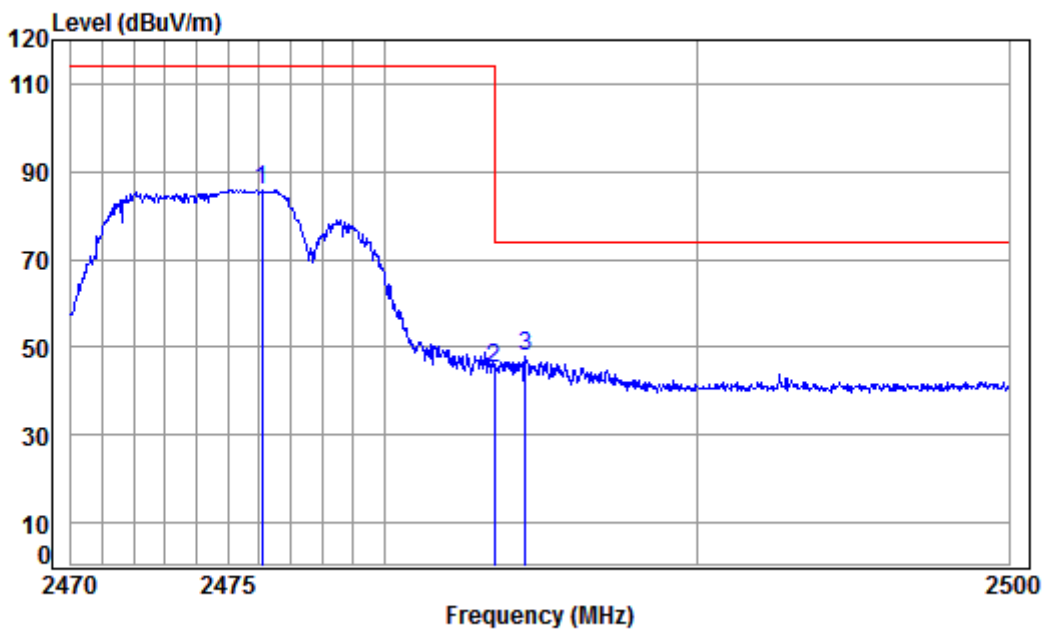


Condition: 3m HORIZONTAL
Job No: : 05231CR
Mode: : 2475 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	2475.403	5.40	29.33	37.95	94.38	91.16	114.00	-22.84 peak
2	2483.500	5.41	29.35	37.95	53.54	50.35	74.00	-23.65 peak
3 pp	2484.145	5.41	29.35	37.95	55.50	52.31	74.00	-21.69 peak



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



Condition: 3m VERTICAL

Job No: : 05231CR

Mode: : 2475 Band edge

	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	2476.091	5.40	29.33	37.95	88.92	85.70	114.00	-28.30	peak
2	2483.500	5.41	29.35	37.95	48.21	45.02	74.00	-28.98	peak
3 pp	2484.505	5.41	29.36	37.95	51.10	47.92	74.00	-26.08	peak



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
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

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

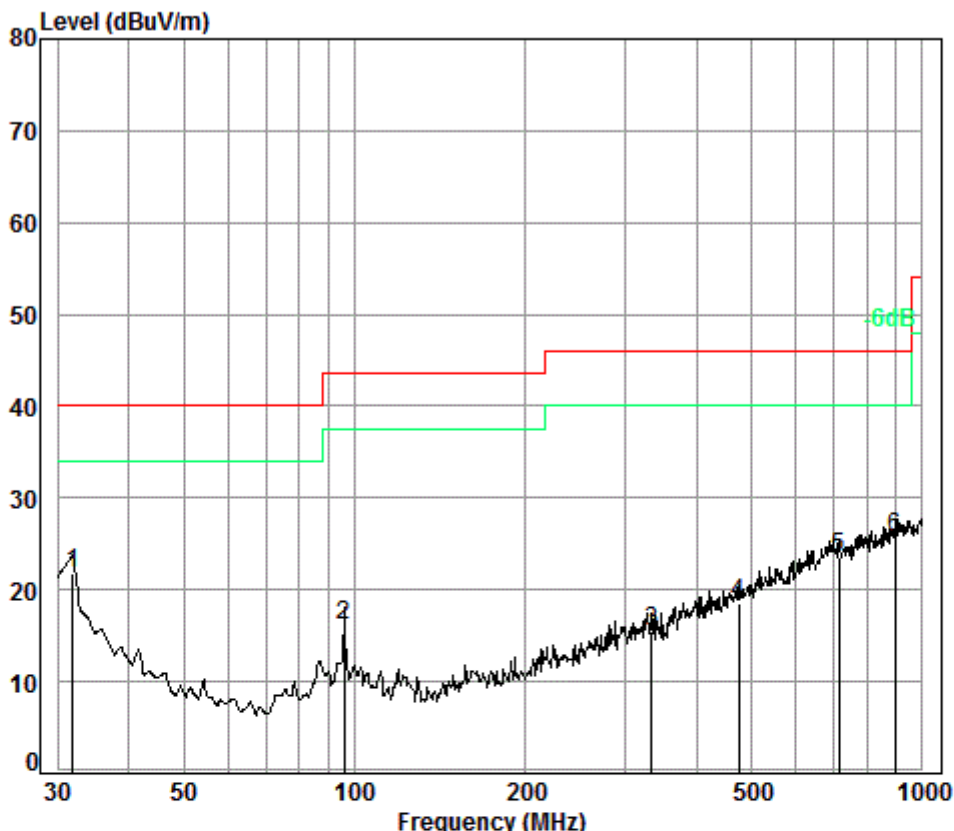
7.4.2 Measurement Procedure and Data

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

Detector:QP

Mode:a ; Horizontal



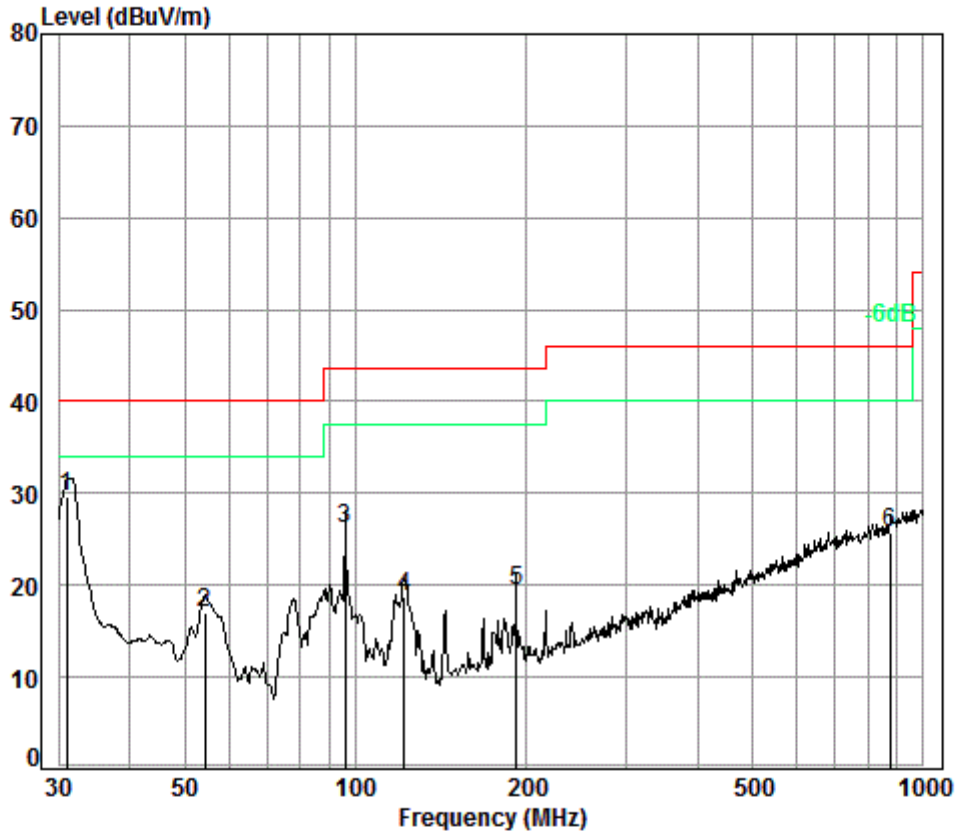
Condition: 3m HORIZONTAL

Job No. : 05231 CR

Test Mode: a

	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 pp	31.95	0.60	17.61	27.35	30.98	21.84	40.00	-18.16
2	96.10	1.16	8.94	27.21	33.28	16.17	43.50	-27.33
3	333.69	2.01	14.49	26.66	25.64	15.48	46.00	-30.52
4	475.50	2.51	17.80	27.58	25.71	18.44	46.00	-27.56
5	714.17	2.95	21.60	27.39	26.42	23.58	46.00	-22.42
6	897.00	3.59	23.18	26.78	25.75	25.74	46.00	-20.26

Mode:a; Vertical

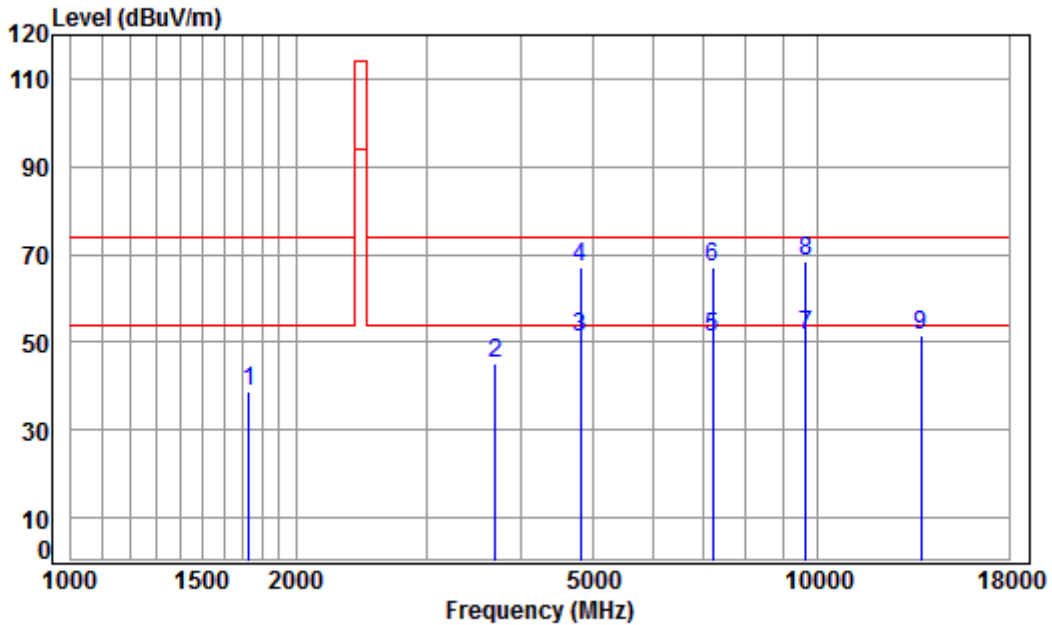


Condition: 3m VERTICAL
Job No. : 05231 CR
Test Mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	30.96	0.60	18.16	27.35	38.20	29.61	40.00	-10.39
2	54.26	0.80	8.06	27.28	35.42	17.00	40.00	-23.00
3	96.10	1.16	8.94	27.21	43.16	26.05	43.50	-17.45
4	121.98	1.26	7.86	27.06	36.67	18.73	43.50	-24.77
5	191.75	1.39	10.12	26.73	34.53	19.31	43.50	-24.19
6	875.25	3.51	23.00	26.89	26.12	25.74	46.00	-20.26



Above1GHz:
Mode:a; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:Low

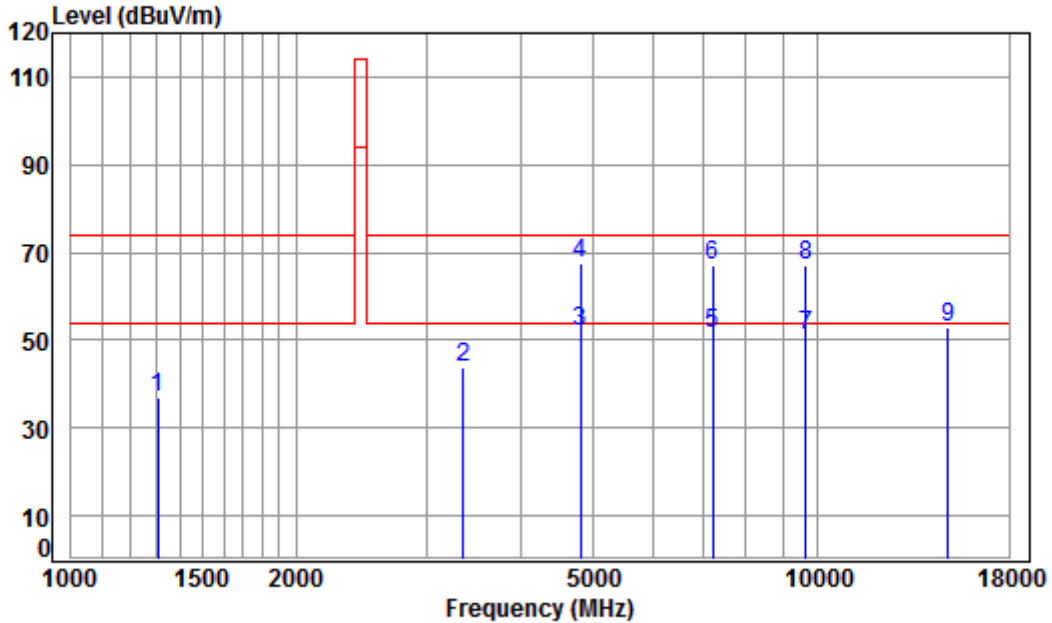


Condition: 3m HORIZONTAL
Job No: : 05231CR
Mode: : 2405 TX SE

	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	1731.816	4.74	26.80	38.03	45.46	38.97	74.00	-35.03	Peak
2	3703.723	6.47	32.79	37.97	44.07	45.36	74.00	-28.64	Peak
3	4810.000	7.73	34.16	38.40	47.78	51.27	54.00	-2.73	Average
4	4810.000	7.73	34.16	38.40	63.67	67.16	74.00	-6.84	Peak
5	7215.000	9.66	36.41	37.10	42.28	51.25	54.00	-2.75	Average
6	7215.000	9.66	36.41	37.10	58.16	67.13	74.00	-6.87	Peak
7 pp	9620.000	11.06	37.52	35.09	37.86	51.35	54.00	-2.65	Average
8 pk	9620.000	11.06	37.52	35.09	54.74	68.23	74.00	-5.77	Peak
9	13717.560	14.32	38.86	38.72	37.29	51.75	74.00	-22.25	Peak



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

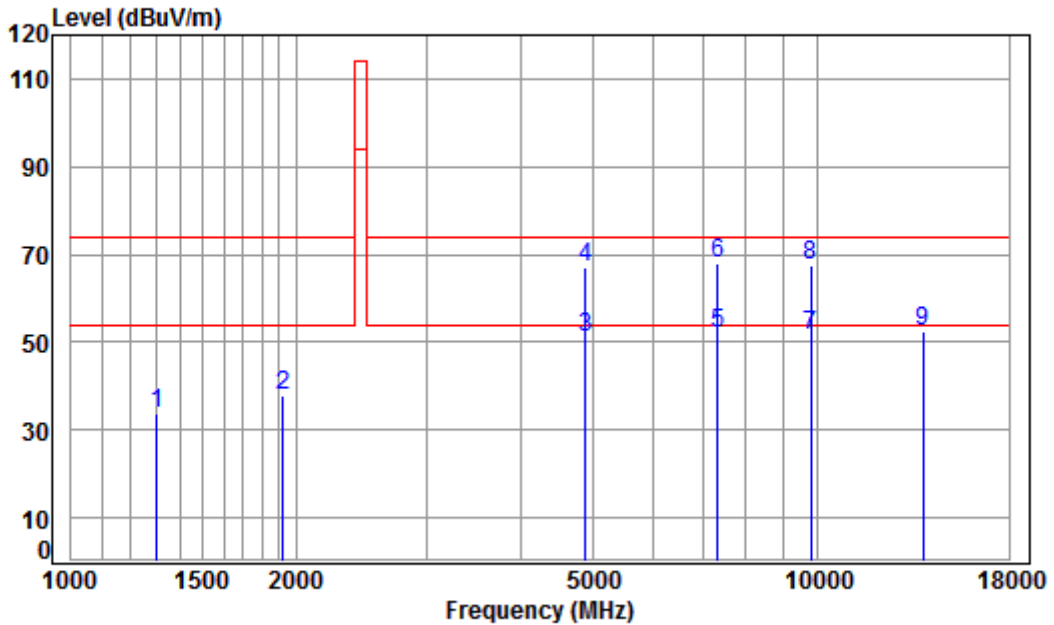


Condition: 3m Vertical
Job No: : 05231CR
Mode: : 2405 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	1308.399	4.23	24.99	38.07	46.01	37.16	74.00	-36.84 Peak
2	3347.371	6.19	31.94	37.93	43.52	43.72	74.00	-30.28 Peak
3	pp 4810.000	7.73	34.16	38.40	48.39	51.88	54.00	-2.12 Average
4	pk 4810.000	7.73	34.16	38.40	64.24	67.73	74.00	-6.27 Peak
5	7215.000	9.66	36.41	37.10	42.39	51.36	54.00	-2.64 Average
6	7215.000	9.66	36.41	37.10	58.27	67.24	74.00	-6.76 Peak
7	9620.000	11.06	37.52	35.09	37.82	51.31	54.00	-2.69 Average
8	9620.000	11.06	37.52	35.09	53.70	67.19	74.00	-6.81 Peak
9	14916.940	14.83	41.15	38.91	35.91	52.98	74.00	-21.02 Peak



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

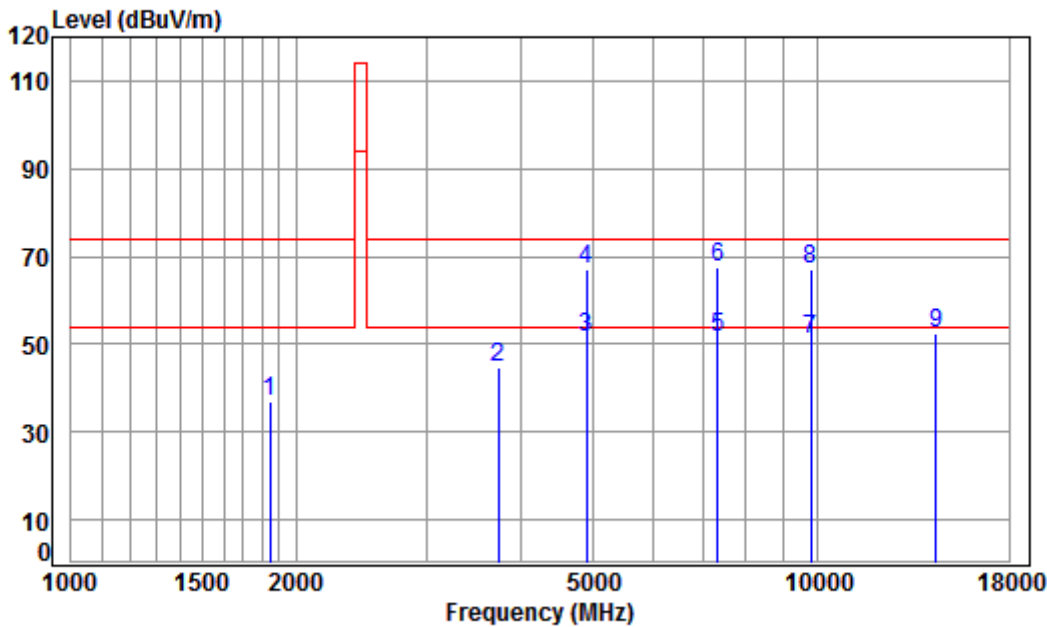


Condition: 3m HORIZONTAL
Job No: : 05231CR
Mode: : 2445 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	1304.623	4.23	24.97	38.07	42.79	33.92	74.00	-40.08 Peak
2	1921.727	4.94	27.52	38.01	43.64	38.09	74.00	-35.91 Peak
3	4888.151	7.85	34.31	38.44	47.49	51.21	54.00	-2.79 Average
4	4888.151	7.85	34.31	38.44	63.38	67.10	74.00	-6.90 Peak
5	pp 7326.267	9.73	36.37	37.01	42.82	51.91	54.00	-2.09 Average
6	pk 7326.267	9.73	36.37	37.01	58.69	67.78	74.00	-6.22 Peak
7	9781.603	11.23	37.56	35.01	37.78	51.56	54.00	-2.44 Average
8	9781.603	11.23	37.56	35.01	53.66	67.44	74.00	-6.56 Peak
9	13797.090	14.40	38.96	38.80	38.07	52.63	74.00	-21.37 Peak



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



Condition: 3m VERTICAL

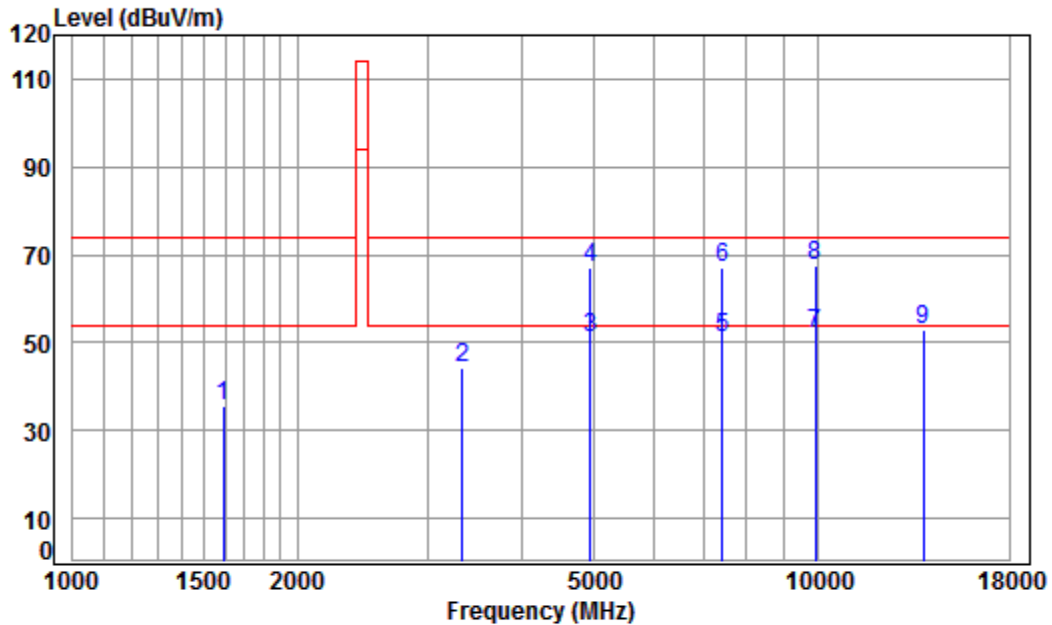
Job No: : 05231CR

Mode: : 2445 TX SE

	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	1845.516	4.86	27.24	38.02	42.78	36.86	74.00	-37.14	Peak
2	3735.978	6.50	32.88	37.97	43.42	44.83	74.00	-29.17	Peak
3	4890.000	7.85	34.31	38.44	47.63	51.35	54.00	-2.65	Average
4	4890.000	7.85	34.31	38.44	63.52	67.24	74.00	-6.76	Peak
5	pp 7335.000	9.73	36.37	37.01	42.69	51.78	54.00	-2.22	Average
6	pk 7335.000	9.73	36.37	37.01	58.56	67.65	74.00	-6.35	Peak
7	9780.000	11.23	37.56	35.01	37.28	51.06	54.00	-2.94	Average
8	9780.000	11.23	37.56	35.01	53.16	66.94	74.00	-7.06	Peak
9	14366.840	14.69	40.08	38.96	36.85	52.66	74.00	-21.34	Peak



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

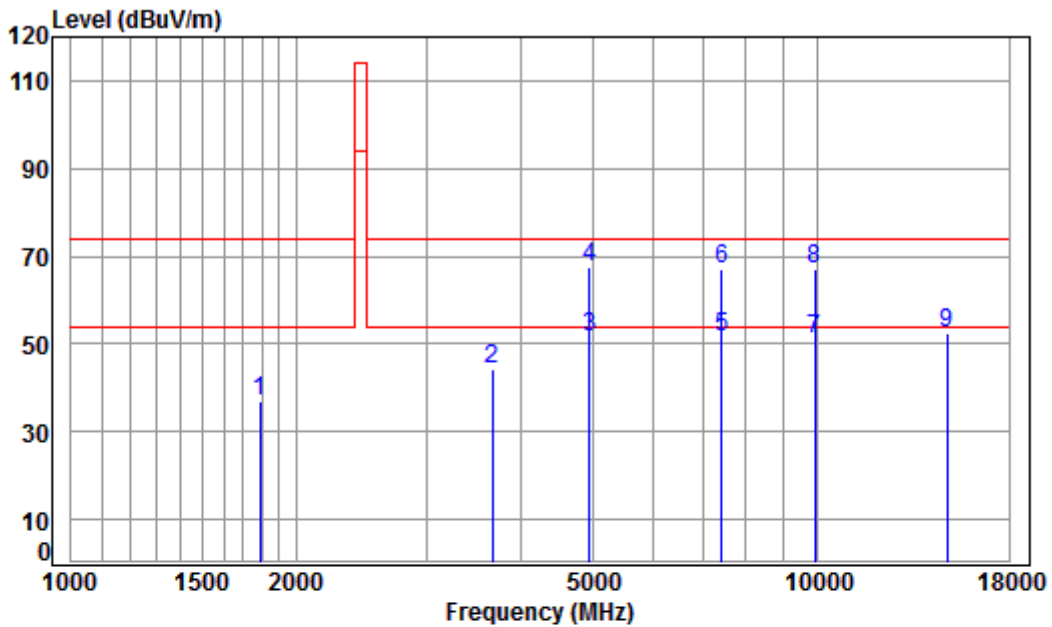


Condition: 3m HORIZONTAL
Job No: : 05231CR
Mode: : 2475 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1592.571	4.58	26.22	38.04	42.91	35.67	74.00	-38.33	Peak
2	3328.077	6.18	31.91	37.93	44.17	44.33	74.00	-29.67	Peak
3	4950.000	7.92	34.41	38.47	47.35	51.21	54.00	-2.79	Average
4	4950.000	7.92	34.41	38.47	63.23	67.09	74.00	-6.91	Peak
5	7425.000	9.81	36.33	36.91	41.95	51.18	54.00	-2.82	Average
6	7425.000	9.81	36.33	36.91	57.84	67.07	74.00	-6.93	Peak
7 pp	9900.000	11.34	37.58	34.95	37.90	51.87	54.00	-2.13	Average
8 pk	9900.000	11.34	37.58	34.95	53.78	67.75	74.00	-6.25	Peak
9	13797.090	14.40	38.96	38.80	38.36	52.92	74.00	-21.08	Peak



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



Condition: 3m VERTICAL
Job No: : 05231CR
Mode: : 2475 TX SE

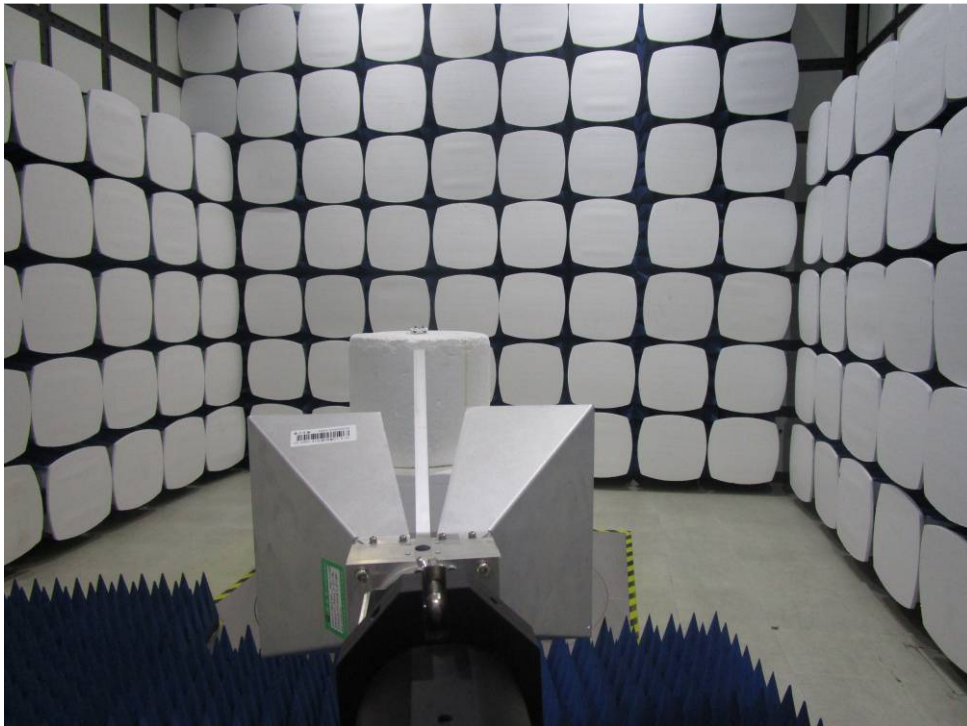
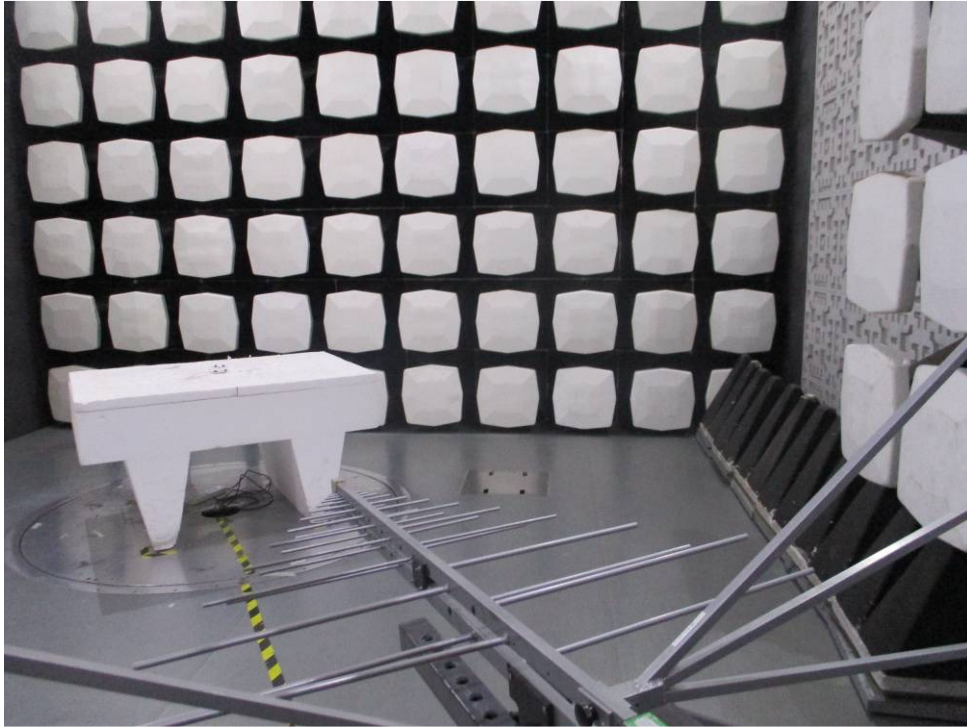
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1792.937	4.80	27.04	38.02	43.05	36.87	74.00	-37.13	Peak
2	3661.149	6.43	32.67	37.97	43.29	44.42	74.00	-29.58	Peak
3 pp	4950.000	7.92	34.41	38.47	47.54	51.40	54.00	-2.60	Average
4 pk	4950.000	7.92	34.41	38.47	63.56	67.42	74.00	-6.58	Peak
5	7425.000	9.81	36.33	36.91	42.10	51.33	54.00	-2.67	Average
6	7425.000	9.81	36.33	36.91	57.99	67.22	74.00	-6.78	Peak
7	9900.000	11.34	37.58	34.95	37.20	51.17	54.00	-2.83	Average
8	9900.000	11.34	37.58	34.95	53.08	67.05	74.00	-6.95	Peak
9	14873.890	14.82	41.08	38.91	35.33	52.32	74.00	-21.68	Peak

Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Pre-amplifier Factor
- Scan from 9kHz to 25GHz, The disturbance above 13GHz 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.

8 Photographs

8.1 Radiated Emissions Test Setup





8.2 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1705005231CR.