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Report No.: SZEM170600628701
Page: 1 of 40

TEST REPORT

Application No.: SZEM1706006287CR
Applicant/ Manufacturer: ZHEN CHENG TOYS FACTORY
/Factory:
Address of Applicant: CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA
/ Manufacturer/Factory:

Equipment Under Test (EUT):
EUT Name: R/C CAR SERIES
Model No.: 171601, 171801B, 171802B, 171801A, 171802A, 171601B, 171601A, 171602B, 171602A, 171603B, 171603A, 171604B, 171604A, 173201, 333-MUD12B, 333-MUD12A, 333-MUD13B, 333-MUD13A, 333-MUD21B, 333-MUD21A, 333-MUD22B, 333-MUD2A, 333-MUD23B, 333-MUD23A, 333-DS01, 333-DS01A, 333-GS01, 333-GS01A, 333-TK01A, 333-TK01, 333-TK11, 333-TK11A, 333-ZJ01, 333-ZJ11, 333-ZJ11A, 17ZJ11B, 17ZJ11A, 17TK11A, 17TK11B, 333-PF04, 333-P011, 333-P012, 333-P013, 333-P014, 333-P015, 333-P011A, 333-P014A, 333-P015A, 333-P013A, 333-P012A, 333-P021A, 333-P022A, 333-P023A, 333-P024A, 333-933B, 333-933A, 333-DZ11, 17DZ11, 333-VS01, 333-VS03, 333-PS024A, 333-BBD01, 333-BBD03*

* Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

FCC ID: 2AAGP17160102B
Standards: 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2017-06-22
Date of Test: 2017-06-27 to 2017-07-05
Date of Issue: 2017-07-12

Table with 2 columns: 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.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-07-12		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

Declaration of EUT Family Grouping:

Model No.:171601, 171801B, 171802B, 171801A, 171802A, 171601B, 171601A, 171602B, 171602A, 171603B, 171603A, 171604B, 171604A, 173201, 333-MUD12B, 333-MUD12A, 333-MUD13B, 333-MUD13A, 333-MUD21B, 333-MUD21A, 333-MUD22B, 333-MUD2A, 333-MUD23B, 333-MUD23A, 333-DS01, 333-DS01A, 333-GS01, 333-GS01A, 333-TK01A, 333-TK01, 333-TK11, 333-TK11A, 333-ZJ01, 333-ZJ11, 333-ZJ11A, 17ZJ11B, 17ZJ11A, 17TK11A, 17TK11B, 333-PF04, 333-P011, 333-P012, 333-P013, 333-P014, 333-P015, 333-P011A, 333-P014A, 333-P015A, 333-P013A, 333-P012A, 333-P021A, 333-P022A, 333-P023A, 333-P024A, 333-933B, 333-933A, 333-DZ11, 17DZ11, 333-VS01, 333-VS03, 333-PS024A, 333-BBD01, 333-BBD03

Only the model 171601B 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 No.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 6.0V by 1.5V x 4 "AA" batteries
Frequency Range:	2405MHz-2475MHz
Modulation Type:	GFSK
Number of Channels:	71
Antenna Type:	Integral
Antenna Gain:	2dBi

Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1CH	2405 MHz	25CH	2429 MHz	49CH	2453 MHz
2CH	2406 MHz	26CH	2430 MHz	50CH	2454 MHz
3CH	2407 MHz	27CH	2431 MHz	51CH	2455 MHz
4CH	2408 MHz	28CH	2432 MHz	52CH	2456 MHz
5CH	2409 MHz	29CH	2433 MHz	53CH	2457 MHz
6CH	2410 MHz	30CH	2434 MHz	54CH	2458 MHz
7CH	2411 MHz	31CH	2435 MHz	55CH	2459 MHz
8CH	2412 MHz	32CH	2436 MHz	56CH	2460 MHz
9CH	2413 MHz	33CH	2437 MHz	57CH	2461 MHz
10CH	2414 MHz	34CH	2438 MHz	58CH	2462 MHz
11CH	2415 MHz	35CH	2439 MHz	59CH	2463 MHz
12CH	2416 MHz	36CH	2440 MHz	60CH	2464 MHz
13CH	2417 MHz	37CH	2441 MHz	61CH	2465 MHz
14CH	2418 MHz	38CH	2442 MHz	62CH	2466 MHz
15CH	2419 MHz	39CH	2443 MHz	63CH	2467 MHz
16CH	2420 MHz	40CH	2444 MHz	64CH	2468 MHz
17CH	2421 MHz	41CH	2445 MHz	65CH	2469 MHz
18CH	2422 MHz	42CH	2446 MHz	66CH	2470 MHz



19CH	2423 MHz	43CH	2447 MHz	67CH	2471 MHz
20CH	2424 MHz	44CH	2448 MHz	68CH	2472 MHz
21CH	2425 MHz	45CH	2449 MHz	69CH	2473 MHz
22CH	2426 MHz	46CH	2450 MHz	70CH	2474 MHz
23CH	2427 MHz	47CH	2451 MHz	71CH	2475 MHz
24CH	2428 MHz	48CH	2452 MHz		

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)	2405MHz
The Middle channel(CH36)	2440MHz
The Highest channel(CH71)	2475MHz

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	7.25×10^{-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
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2017-04-14	2018-04-13
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

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	2017-05-10	2018-05-10
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
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
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
Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-13
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
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	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A



Restricted Band Around Fundamental Frequency					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-10	2018-05-10
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
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
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
Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-13
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
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	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A



Radiated Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-10	2018-05-10
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
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
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
Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-13
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
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	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14
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

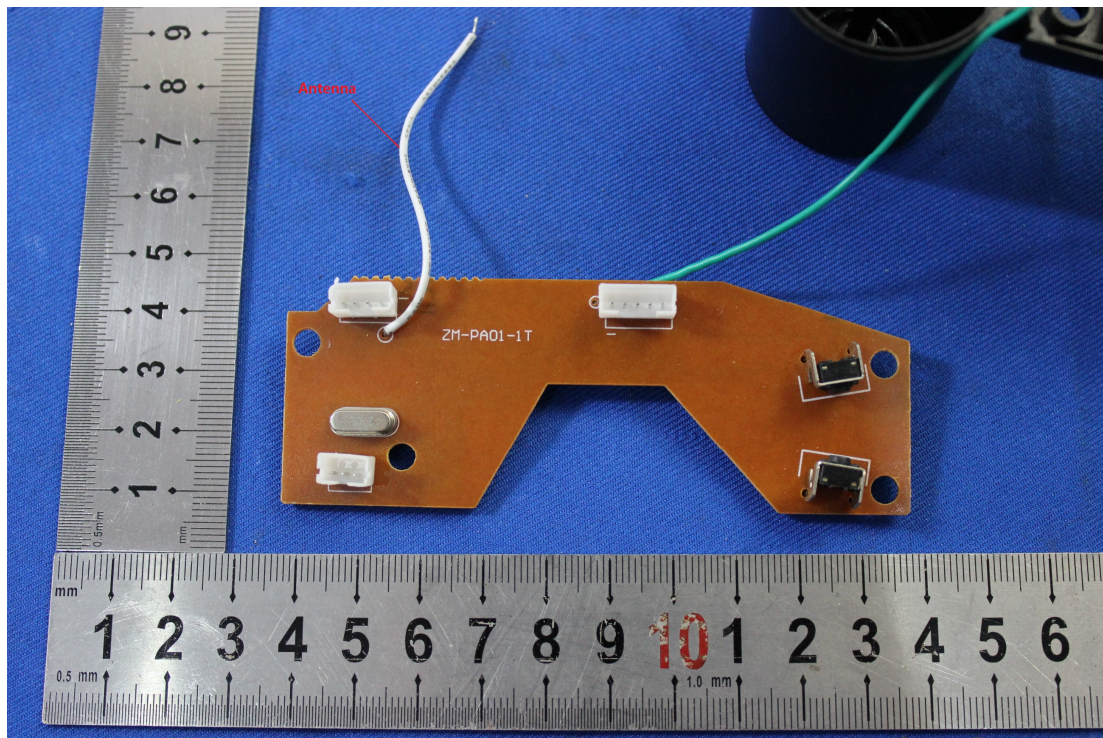
6.1.1 Test Requirement:

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 2dBi.

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

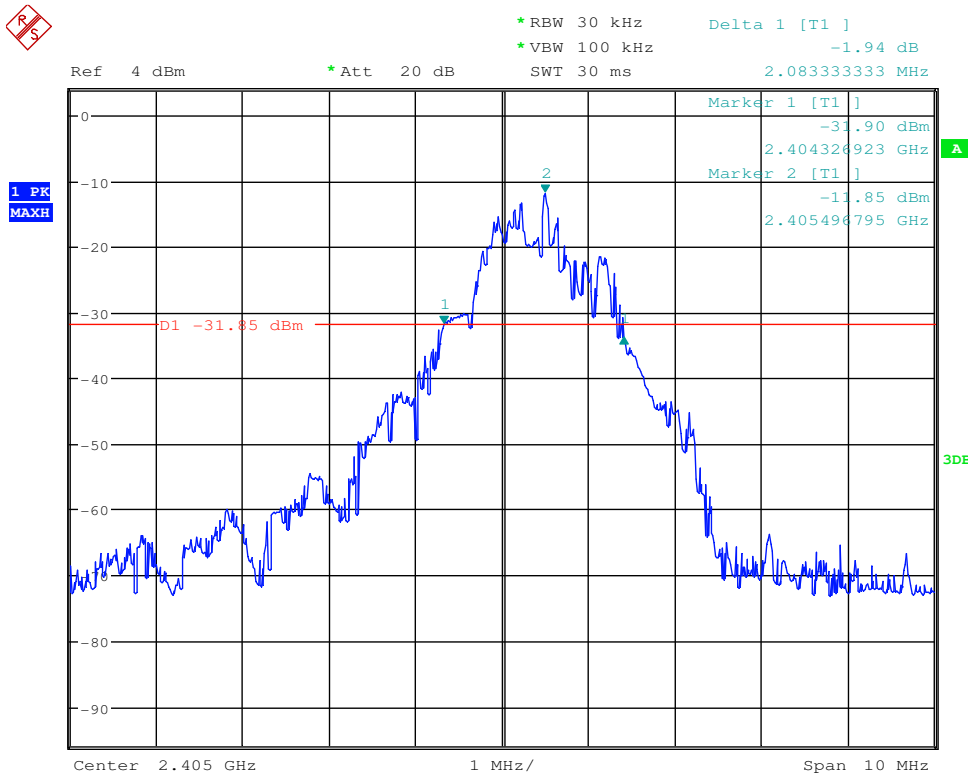
7.1.1 E.U.T. Operation

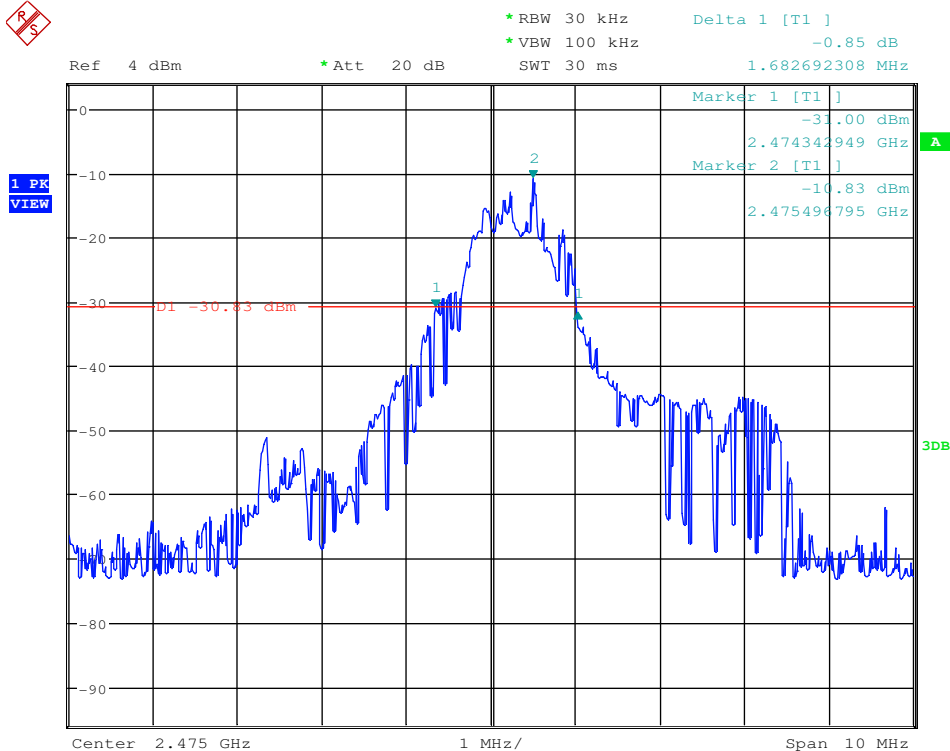
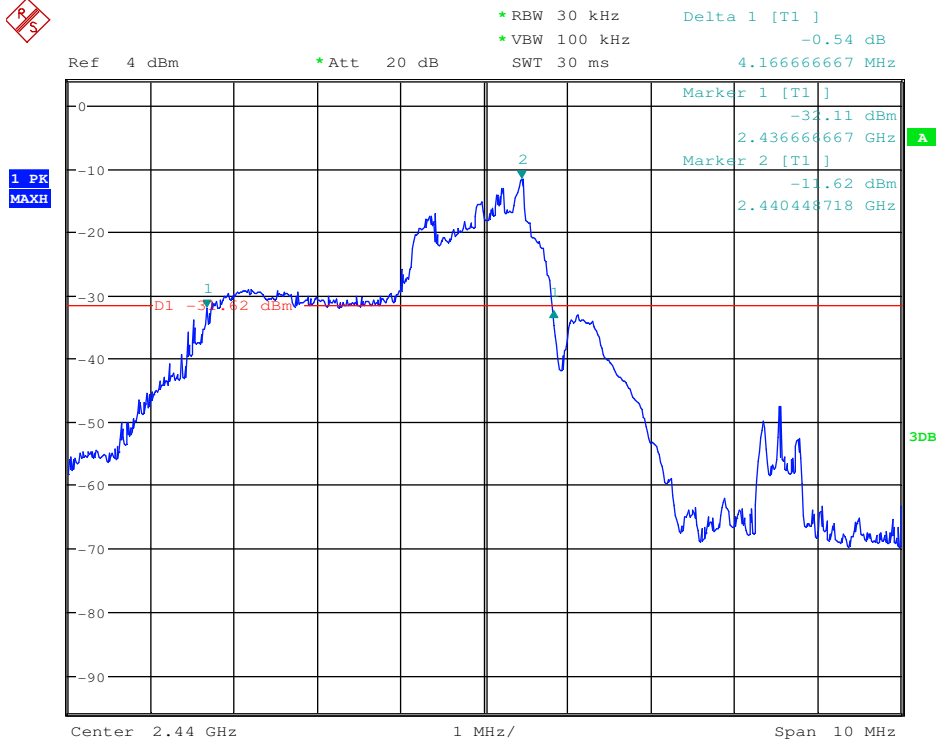
Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 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	2.08	Pass
Middle	4.17	Pass
Highest	1.62	Pass







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

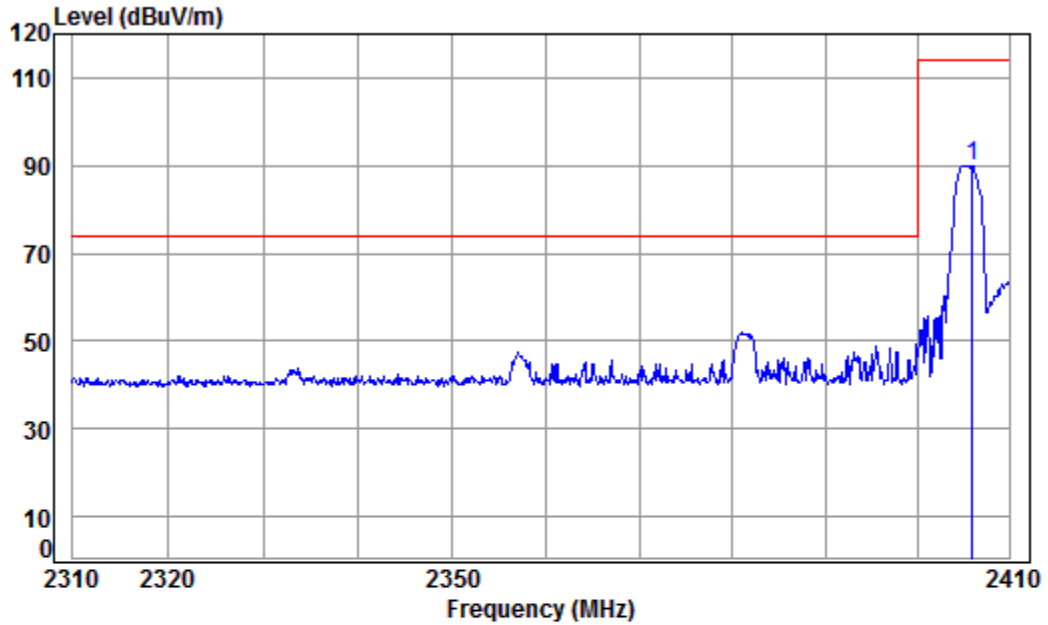
Operating Environment:
Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

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

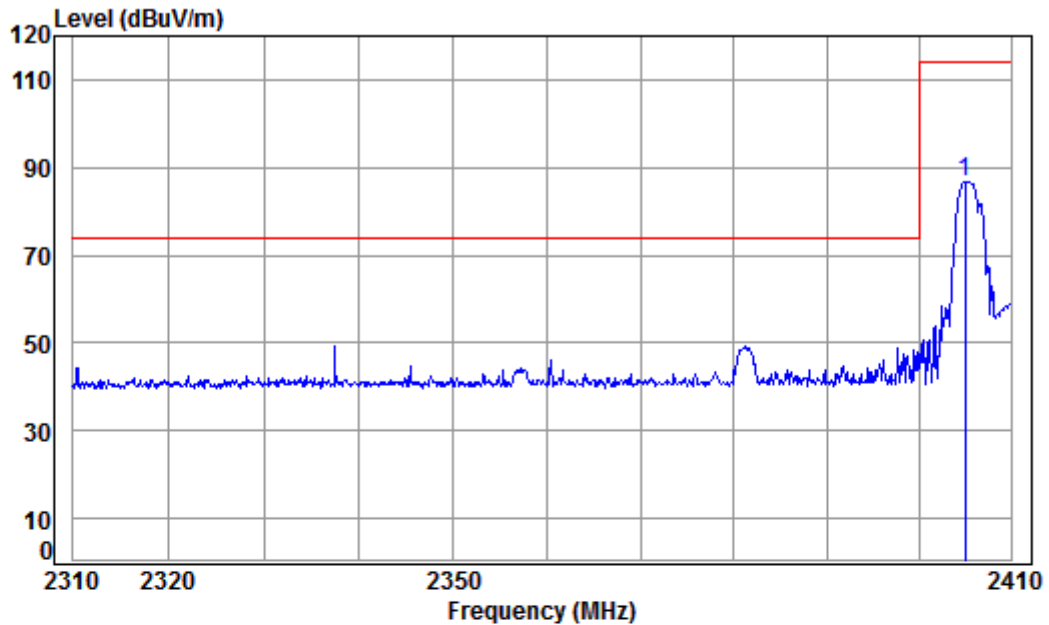
Job No : 06287CR

Mode : 2405 Filed Strength

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp 2406.020	5.35	29.13	37.96	93.39	89.91	114.00	-24.09 peak



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



Condition: 3m VERTICAL

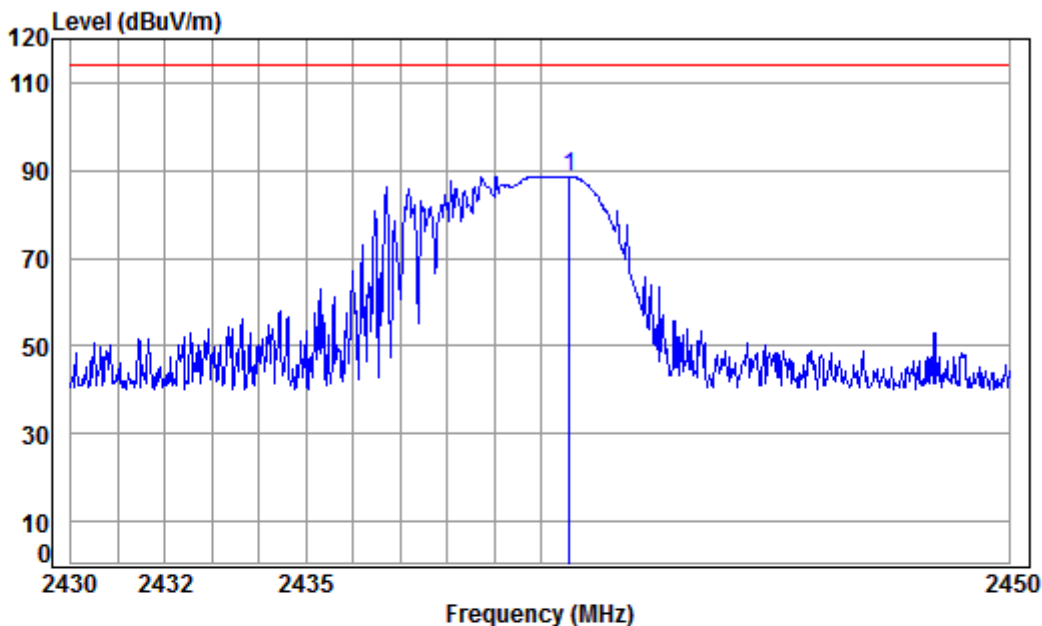
Job No : 06287CR

Mode : 2405 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 2405.001	5.35	29.12	37.96	90.17	86.68	114.00	-27.32 peak



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



Condition: 3m HORIZONTAL

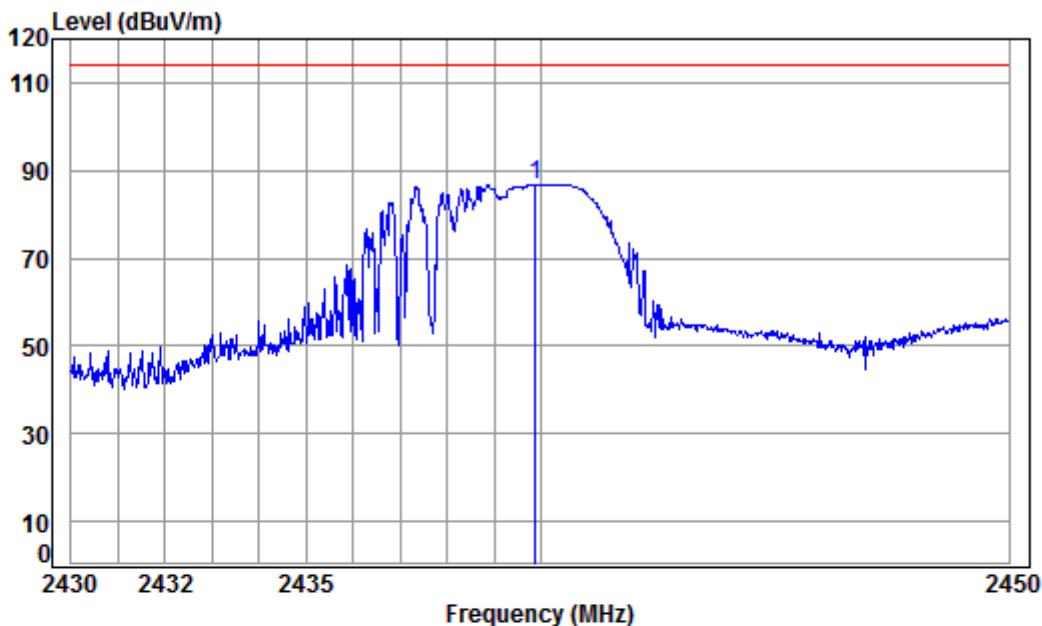
Job No : 06287CR

Mode : 2440 Band edge

	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 2440.600	5.38	29.23	37.96	92.08	88.73	114.00	-25.27	Peak



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



Condition: 3m VERTICAL

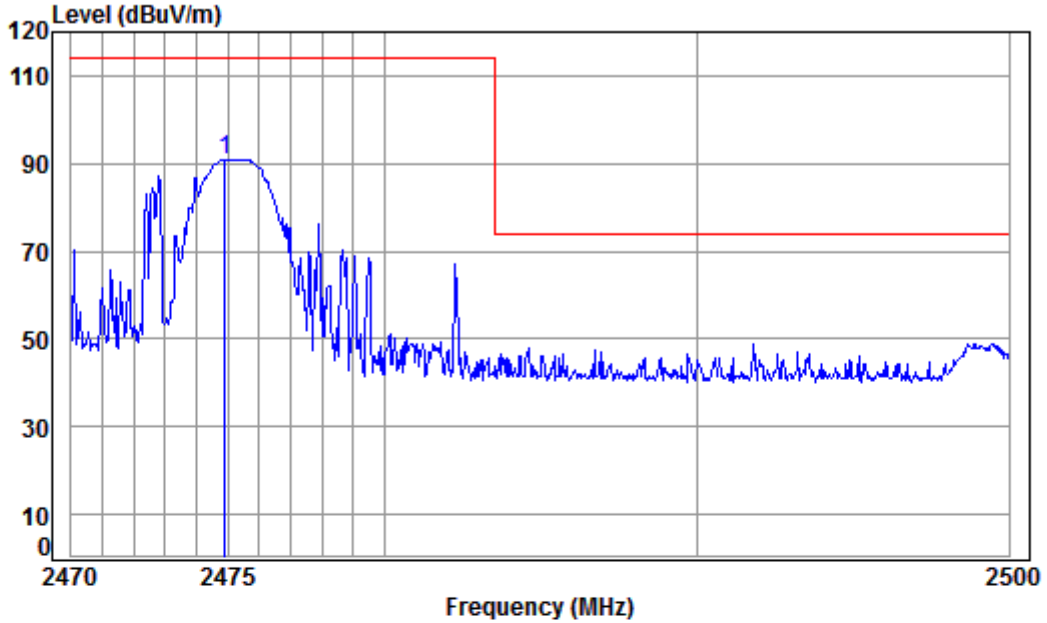
Job No : 06287CR

Mode : 2440 Band edge

	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 2439.879	5.38	29.23	37.96	90.17	86.82	114.00	-27.18 Peak



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



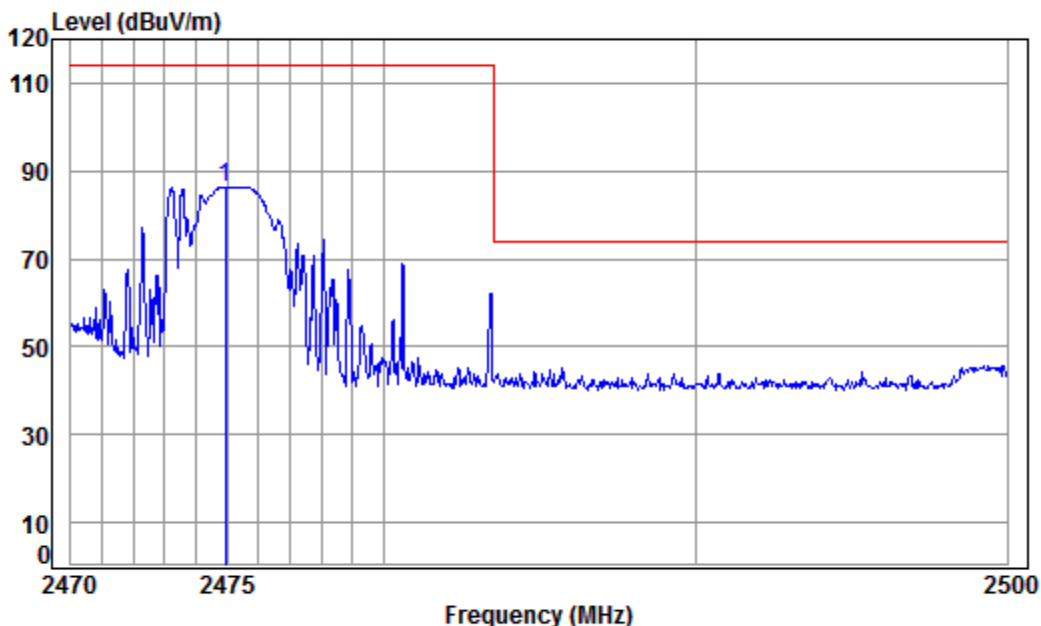
Condition: 3m HORIZONTAL

Job No : 06287CR

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 2474.890	5.40	29.33	37.95	94.06	90.84	114.00	-23.16 peak

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



Condition: 3m VERTICAL

Job No : 06287CR

Mode : 2475 Band edge

	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 2474.925	5.40	29.33	37.95	89.53	86.31	114.00	-27.69 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:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

2) 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 above measurement data were shown in the report.



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: 1005 mbar

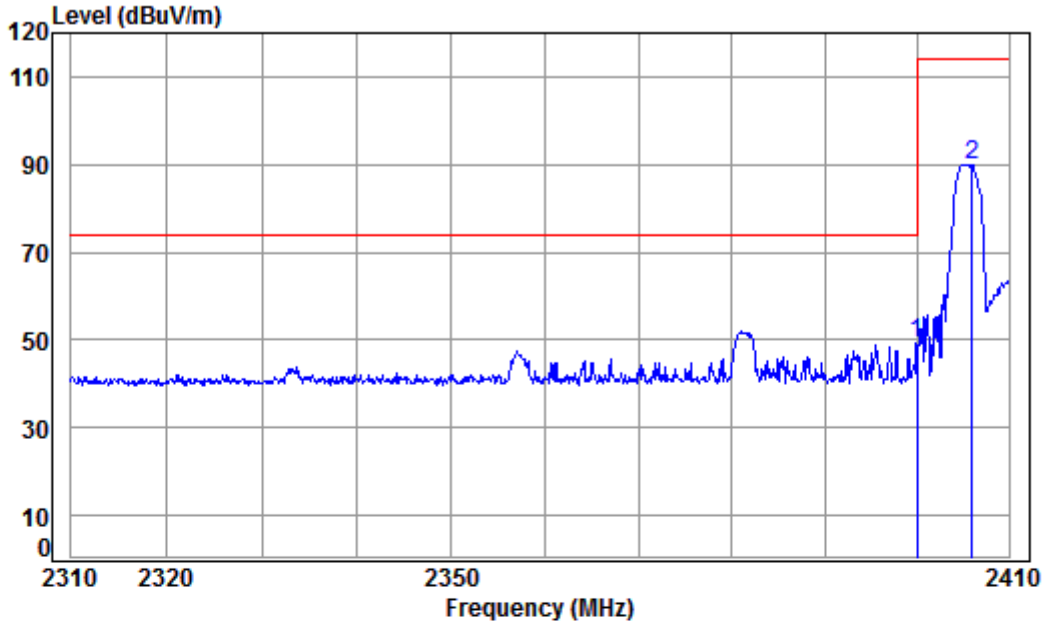
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

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

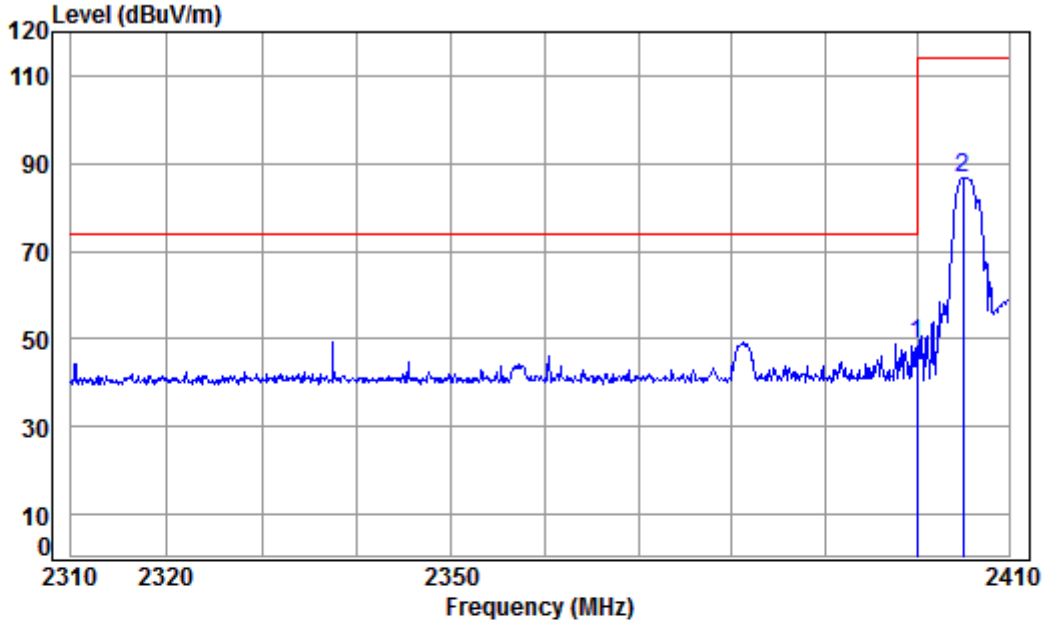
Job No : 06287CR

Mode : 2405 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2400.000	5.34	29.11	37.96	52.92	49.41	74.00	-24.59 peak
2 pp	2406.020	5.35	29.13	37.96	93.39	89.91	114.00	-24.09 peak



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



Condition: 3m VERTICAL

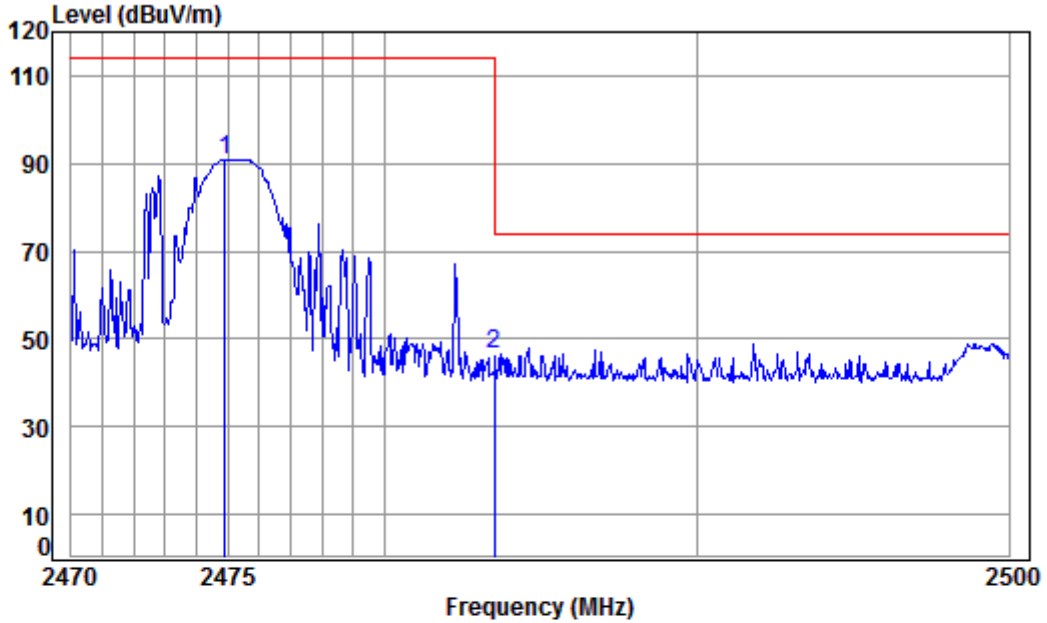
Job No : 06287CR

Mode : 2405 Band edge

		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 2400.000	5.34	29.10	37.96	52.27	48.75	74.00	-25.25 peak
2	2405.001	5.35	29.12	37.96	90.17	86.68	114.00	-27.32 peak



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



Condition: 3m HORIZONTAL

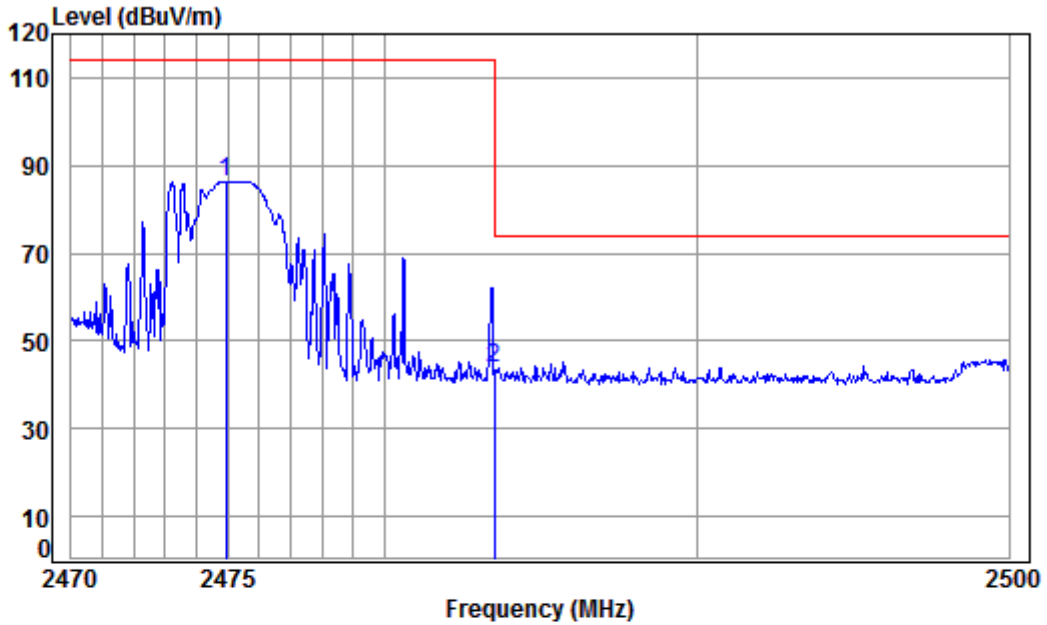
Job No : 06287CR

Mode : 2475 Band edge

		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 pp	2474.890	5.40	29.33	37.95	94.06	90.84	114.00	-23.16 peak
2	2483.500	5.41	29.35	37.95	49.95	46.76	74.00	-27.24 peak



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



Condition: 3m VERTICAL

Job No : 06287CR

Mode : 2475 Band edge

		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 pp	2474.925	5.40	29.33	37.95	89.53	86.31	114.00	-27.69 peak
2	2483.500	5.41	29.35	37.95	46.99	43.80	74.00	-30.20 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
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

7.4.1 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.

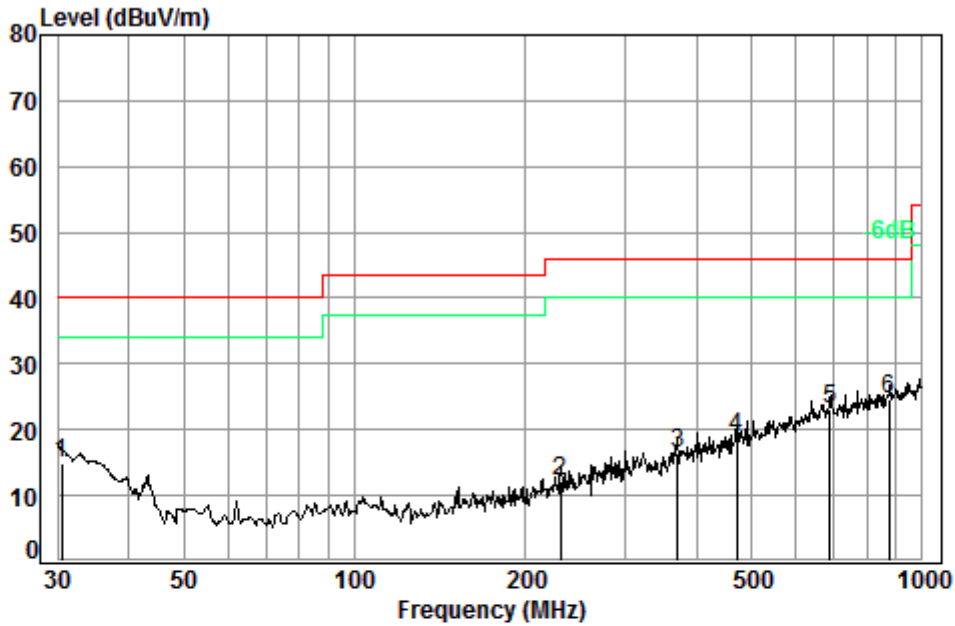


7.4.2 Measurement Procedure and Data

- 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.



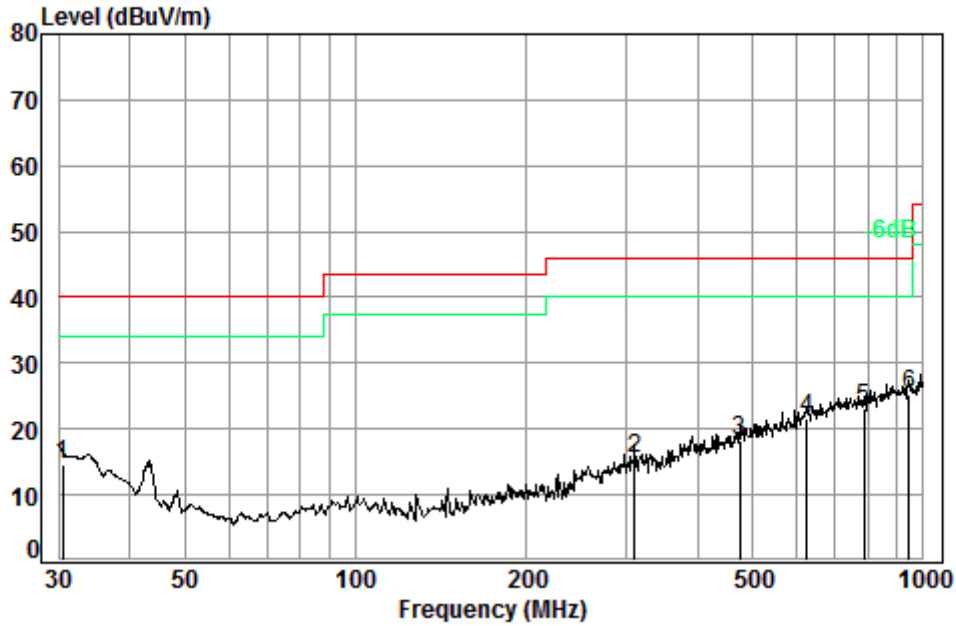
30MHz~1GHz
Detector:QP
Horizontal



Condition: 3m HORIZONTAL
Job No. : 06287CR
Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	30.53	0.60	18.40	27.35	23.40	15.05	40.00 -24.95
2	230.91	1.58	11.69	26.59	25.55	12.23	46.00 -33.77
3	370.70	2.12	15.64	26.93	25.69	16.52	46.00 -29.48
4	472.18	2.50	17.70	27.56	26.08	18.72	46.00 -27.28
5	687.15	2.88	21.50	27.43	26.05	23.00	46.00 -23.00
6 pp	875.25	3.51	23.00	26.89	25.06	24.68	46.00 -21.32

Vertical



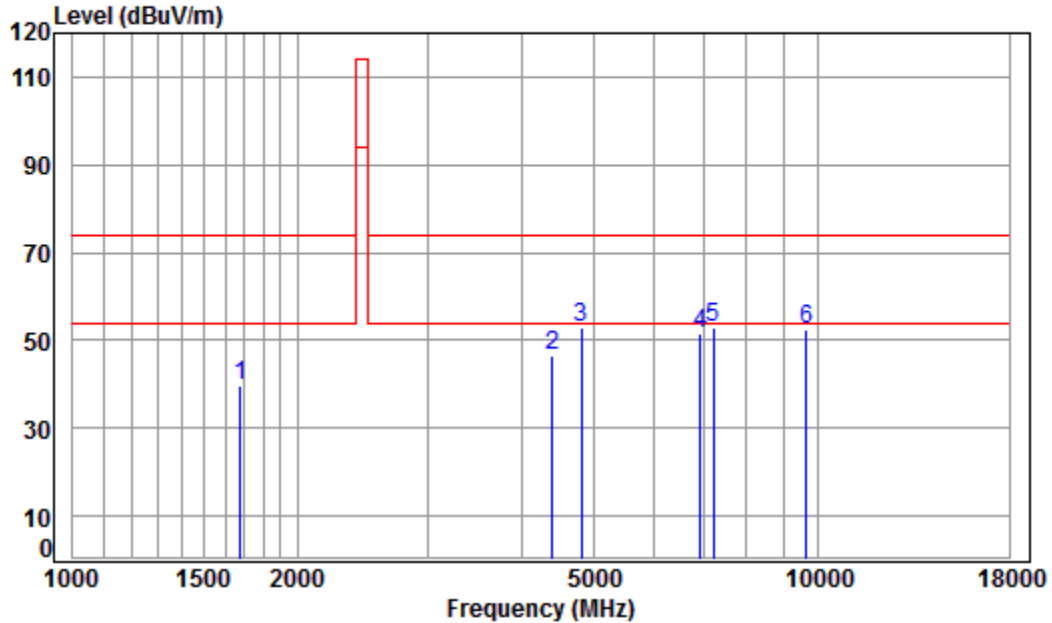
Condition: 3m VERTICAL
Job No. : 06287CR
Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.53	0.60	18.40	27.35	22.95	14.60	40.00	-25.40
2	310.00	1.93	14.26	26.48	25.82	15.53	46.00	-30.47
3	475.50	2.51	17.80	27.58	25.56	18.29	46.00	-27.71
4	622.89	2.75	20.44	27.51	25.86	21.54	46.00	-24.46
5	785.09	3.16	22.04	27.31	25.14	23.03	46.00	-22.97
6 pp	942.13	3.64	23.30	26.58	24.89	25.25	46.00	-20.75



Above 1GHz

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



Condition: 3m HORIZONTAL

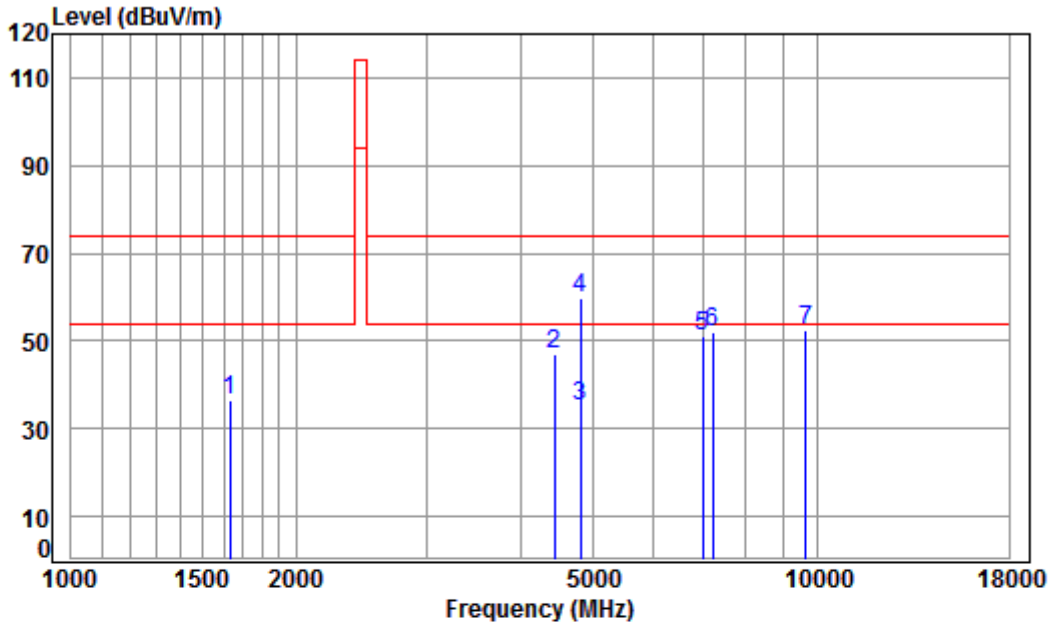
Job No : 06287CR

Mode : 2405 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	1677.621	4.68	26.58	38.03	46.33	39.56	74.00	-34.44	peak
2	4392.376	7.16	33.60	38.20	43.83	46.39	74.00	-27.61	peak
3	4810.000	7.74	34.17	38.40	49.35	52.86	74.00	-21.14	peak
4	6934.778	9.45	36.32	37.37	43.21	51.61	74.00	-22.39	peak
5 pp	7215.000	9.66	36.41	37.11	44.16	53.12	74.00	-20.88	peak
6	9620.000	11.07	37.52	35.09	39.07	52.57	74.00	-21.43	peak



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

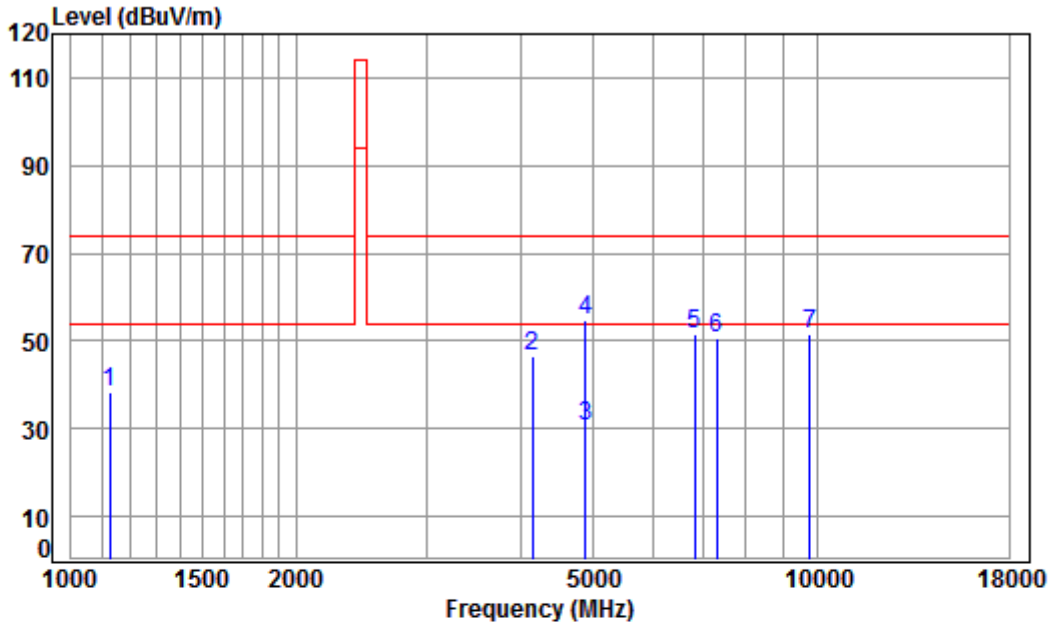


Condition: 3m VERTICAL
Job No : 06287CR
Mode : 2405 TX SE

	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	1634.543	4.63	26.40	38.04	43.56	36.55	74.00	-37.45	peak
2	4430.628	7.20	33.60	38.22	44.20	46.78	74.00	-27.22	peak
3	av 4810.000	7.74	34.17	38.40	31.77	35.28	54.00	-18.72	Average
4	pp 4810.000	7.74	34.17	38.40	56.08	59.59	74.00	-14.41	peak
5	6995.172	9.51	36.49	37.30	42.61	51.31	74.00	-22.69	peak
6	7215.000	9.66	36.41	37.11	42.96	51.92	74.00	-22.08	peak
7	9620.000	11.07	37.52	35.09	39.15	52.65	74.00	-21.35	peak



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

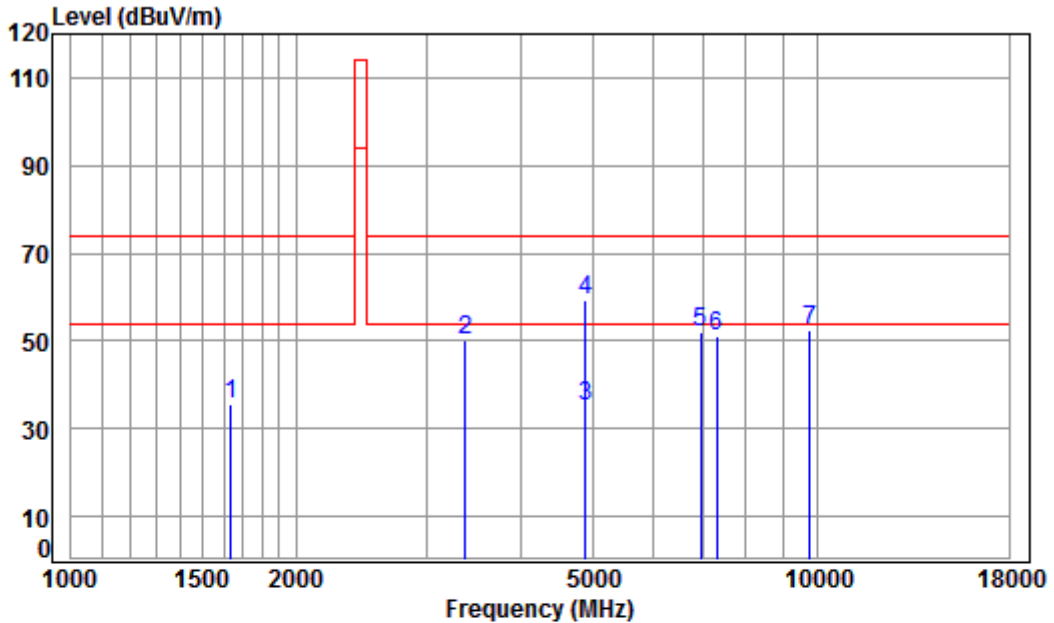


Condition: 3m HORIZONTAL
Job No : 06287CR
Mode : 2440 TX SE

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1125.813	3.97	24.10	38.09	48.44	38.42	74.00	-35.58 peak
2	4145.664	6.88	33.60	38.07	44.12	46.53	74.00	-27.47 peak
3	av 4880.000	7.83	34.29	38.44	26.94	30.62	54.00	-23.38 Average
4	pp 4880.000	7.83	34.29	38.44	51.23	54.91	74.00	-19.09 peak
5	6835.278	9.37	36.05	37.46	43.61	51.57	74.00	-22.43 peak
6	7320.000	9.73	36.37	37.01	41.65	50.74	74.00	-23.26 peak
7	9760.000	11.21	37.55	35.02	37.84	51.58	74.00	-22.42 peak



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

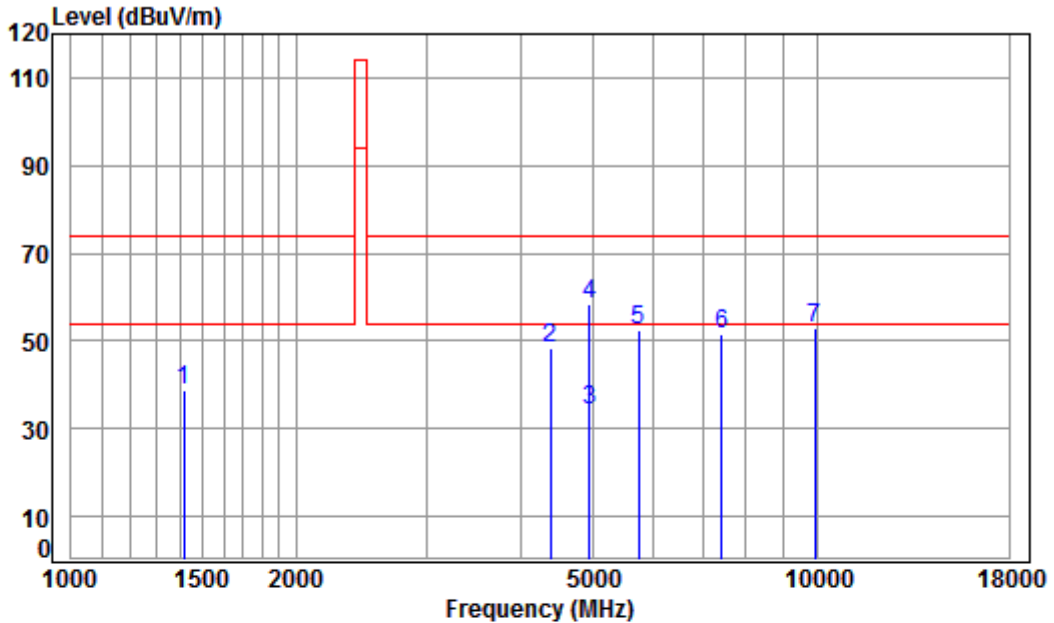


Condition: 3m VERTICAL
Job No : 06287CR
Mode : 2440 TX SE

	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	1639.274	4.64	26.42	38.04	42.49	35.51	74.00	-38.49 peak
2	3366.778	6.21	31.97	37.94	50.12	50.36	74.00	-23.64 peak
3	av 4880.000	7.83	34.29	38.44	31.57	35.25	54.00	-18.75 Average
4	pp 4880.000	7.83	34.29	38.44	55.86	59.54	74.00	-14.46 peak
5	6954.852	9.47	36.38	37.35	43.55	52.05	74.00	-21.95 peak
6	7320.000	9.73	36.37	37.01	42.19	51.28	74.00	-22.72 peak
7	9760.000	11.21	37.55	35.02	38.82	52.56	74.00	-21.44 peak



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



Condition: 3m HORIZONTAL

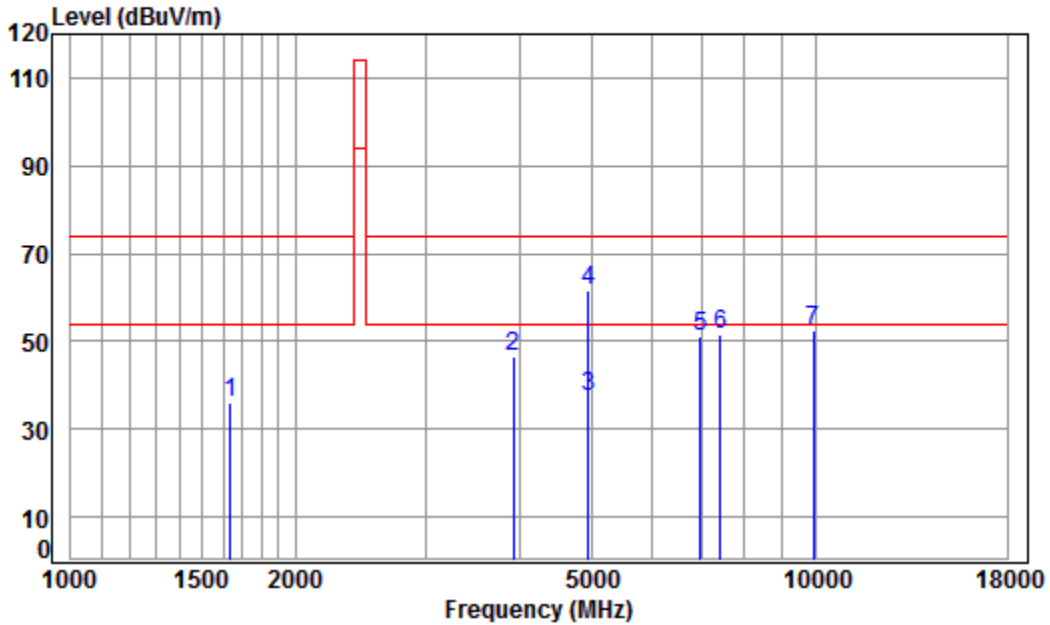
Job No : 06287CR

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	1414.597	4.37	25.45	38.06	47.09	38.85	74.00	-35.15	peak
2	4379.699	7.15	33.60	38.19	45.64	48.20	74.00	-25.80	peak
3	av 4950.000	7.93	34.41	38.47	30.13	34.00	54.00	-20.00	Average
4	pp 4950.000	7.93	34.41	38.47	54.43	58.30	74.00	-15.70	peak
5	5746.982	8.50	34.55	38.35	47.85	52.55	74.00	-21.45	peak
6	7425.000	9.80	36.33	36.92	42.24	51.45	74.00	-22.55	peak
7	9900.000	11.34	37.58	34.95	39.06	53.03	74.00	-20.97	peak



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



Condition: 3m VERTICAL
Job No : 06287CR
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	1639.274	4.64	26.42	38.04	42.94	35.96	74.00	-38.04	peak
2	3924.135	6.64	33.40	37.99	44.29	46.34	74.00	-27.66	peak
3	av 4950.000	7.93	34.41	38.47	33.45	37.32	54.00	-16.68	Average
4	pp 4950.000	7.93	34.41	38.47	57.75	61.62	74.00	-12.38	peak
5	6974.982	9.49	36.43	37.33	42.74	51.33	74.00	-22.67	peak
6	7425.000	9.80	36.33	36.92	42.50	51.71	74.00	-22.29	peak
7	9900.000	11.34	37.58	34.95	38.68	52.65	74.00	-21.35	peak



Remark:

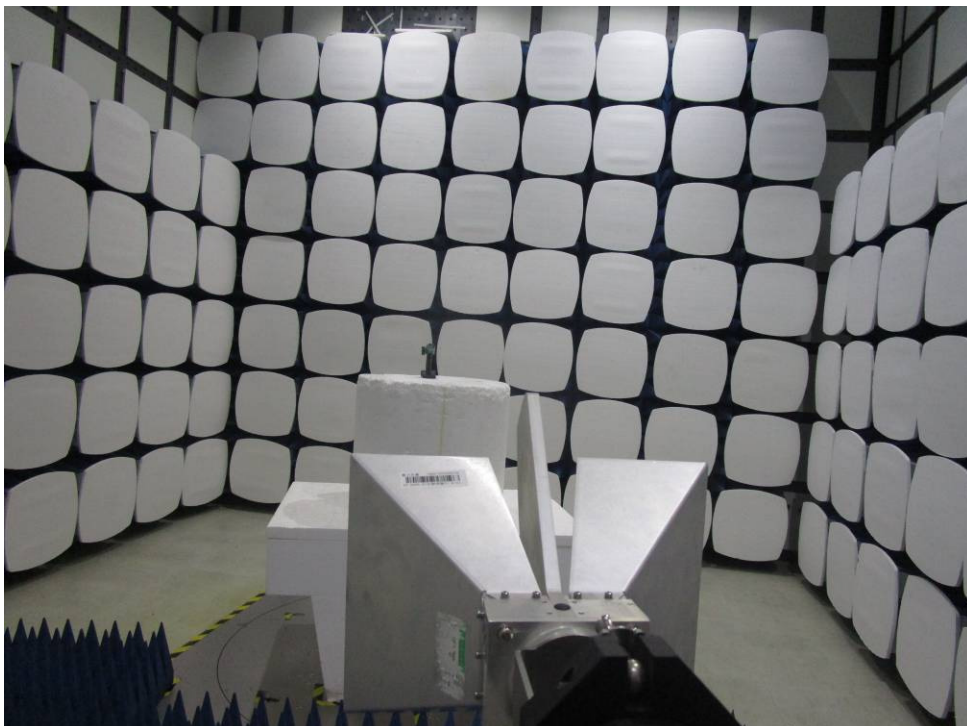
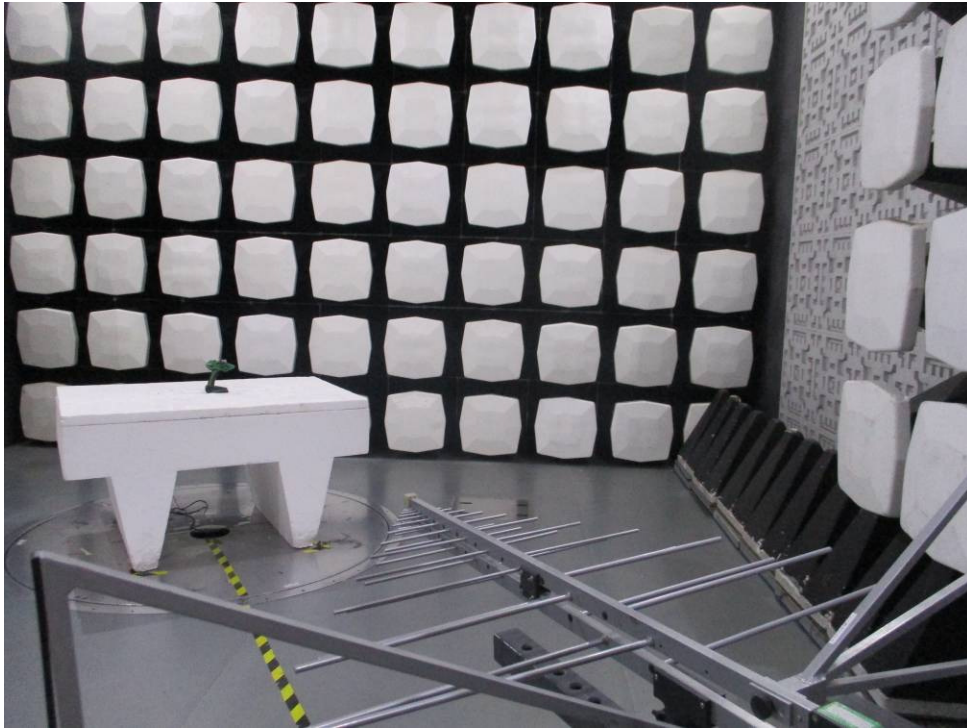
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

- 2) Scan from 9kHz to 25GHz, The disturbance above 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 .
- 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 above measurement data were shown in the report.

8 Photographs

8.1 Radiated Emissions Test Setup





8.2 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1706006287CR.