TEST REPORT

FCC ID	: QE822029TX
Applicant	: Interactive Toy Concepts Limited
Address	: Unit 709,7/F., Tower 2,Cheung Sha Wan Plaza ,No.833 Cheung Sha Wan Road., Kowloon,Hong Kong
Manufacturer	: Interactive Toy Concepts (HK) Ltd.
Address	: Unit 709,7/F., Tower 2,Cheung Sha Wan Plaza ,No.833 Cheung Sha Wan Road., Kowloon,Hong Kong

Equipment Under Test (EUT) :

Product Name	: 2.4G R/C Vehicle
Model No.	: 22029
Rules	: FCC CFR47 Part 15 Section 15.249: 2012
Date of Test	: June 18, 2013
Date of Issue	: June 25, 2013

Test Result	**: PASS***

Remark:
* The sample described above has been tested to be in compliance with the requirements of the rules listed above.
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

PERPARED BY:
Waltek Services (Shenzhen) Co., Ltd.
1/F, Fukangtai Building, West of Baima Road., Songgang Street, Bao'an District, Shenzhen, China
Tel: +86-755-83551033 Fax: +86-755-83552400

Compiled by: Approved by:

Maikou.zhang / Project Engineer

Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Out-of-band Emissions	15.205	PASS
20dB Bandwidth	15:215(c)	PASS
Conducted Emissions	15.207	N/A
Radiated Emission	15.205(a) 15.209 15.249(a)	PASS
Antenna Requirement	15.203	PASS

3 Contents

4 General Information

4.1 General Description of E.U.T.

Product Name	: 2.4G R/C Vehicle
Model No.	: 22029
Type of Modulation	: GFSK
Frequency Range	: 2414~2473 MHz, Separated by 1MHz, 60 channels in total
Oscillator	: 12MHz
Antenna installation	: Integrated Antenna

4.2 Details of E.U.T.

Technical Data	: DC 9V Powered by battery
Adapter manufacturer	: N/A
M/N	: N/A

4.3 Frequency Table

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2414	2	2415	3	2416	4	2417
5	2418	6	2419	7	2420	8	2421
9	2422	10	2423	11	2424	12	2425
13	2426	14	2427	15	2428	16	2429
17	2430	18	2431	19	2432	20	2433
21	2434	22	2435	23	2436	24	2437
25	2438	26	2439	27	2440	28	2441
29	2442	30	2443	31	2444	32	2445
33	2446	34	2447	35	2448	36	2449
37	2450	38	2451	39	2452	40	2453
41	2454	42	2455	43	2456	44	2457
45	2458	46	2459	47	2460	48	2461
49	2462	50	2463	51	2464	52	2465
53	2466	54	2467	55	2468	56	2469
57	2470	58	2471	59	2472	60	2473

4.4 Test Facility

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

- **FCC – Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, May 26, 2011.

- **IC – Registration No.:7760A**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, July 12, 2012.

4.5 Test Location

All Emissions testswere performed at:-
1/F, Fukangtai Building,West Baima Rd.,Songgang Street, Baoan District, Shenzhen 518105, Guangdong,China.

4.6 General condition

Ambient Condition: 25.5 ℃ 58 %RH

4.6.1 Environmental condition of test site

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

The follow condition is not applicable

Test Voltage	Input voltage
Rated voltage-15%	
normal	
Rated voltage+15%	

The follow condition is applicable.

Test voltage	Test Voltage
Rated voltage	New Battery 9.0V DC

4.6.2 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Lower channel	Middle channel	Upper channel
Transmitting	2414MHz	2442MHz	2473MHz
Receiving	MHz	MHz	MHz

5 Equipment Used during Test

5.1 Equipments List

3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer	Agilent	E7405A	MY45114943	Aug. 13,2012	Aug. 12,2013
2.	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Aug. 13,2012	Aug. 12,2013
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr. 20,2013	Apr. 19,2014
4.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr. 20,2013	Apr. 19,2014
5.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	399	Aug. 13,2012	Aug. 12,2013
6.	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.07,2013	Apr.06,2014
7.	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-148	Aug. 13,2012	Aug. 12,2013
8.	Cable	Top	EWO2014-7	-	Apr. 20,2013	Apr. 19,2014
9.	Cable	Top	TYPE16(13M)	-	Aug. 13,2012	Aug. 12,2013

5.2 Measurement Uncertainty

Parameter	**Uncertainty**
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 4.50 dB (Active Loop Antenna 9kHz~30MHz)
	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 4.74 dB (Horn antenna 1000M~25000MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 Conducted Emission Test

Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	ANSI C63.4
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)
	Quasi-Peak & Average if maximised peak within 6dB of Average Limit
Test Result:	N/A

Remark:This device powered by battery, this test is not applicable.

7 Radiation Emission Test

Test Requirement: FCC Part15 Paragraph 15.249

Test Method: ANSI 63.4

Measurement Distance: 3m

Detector: Peak for pre-scan (120kHz resolution bandwidth)

Quasi-Peak if maximised peak within 6dB of limit

Test Result: PASS

15.249 Limit:

Fundamental frequency	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928 MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25 GHz	250	108	2500	68

15.209 Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Note: RF Voltage(dBuV)=20 $\log_{10}$ RF Voltage(uV)

7.1 EUT Operation:

Operating Environment:

Temperature: 25.5 °C
Humidity: 51 % RH
Atmospheric Pressure: 1012 mbar

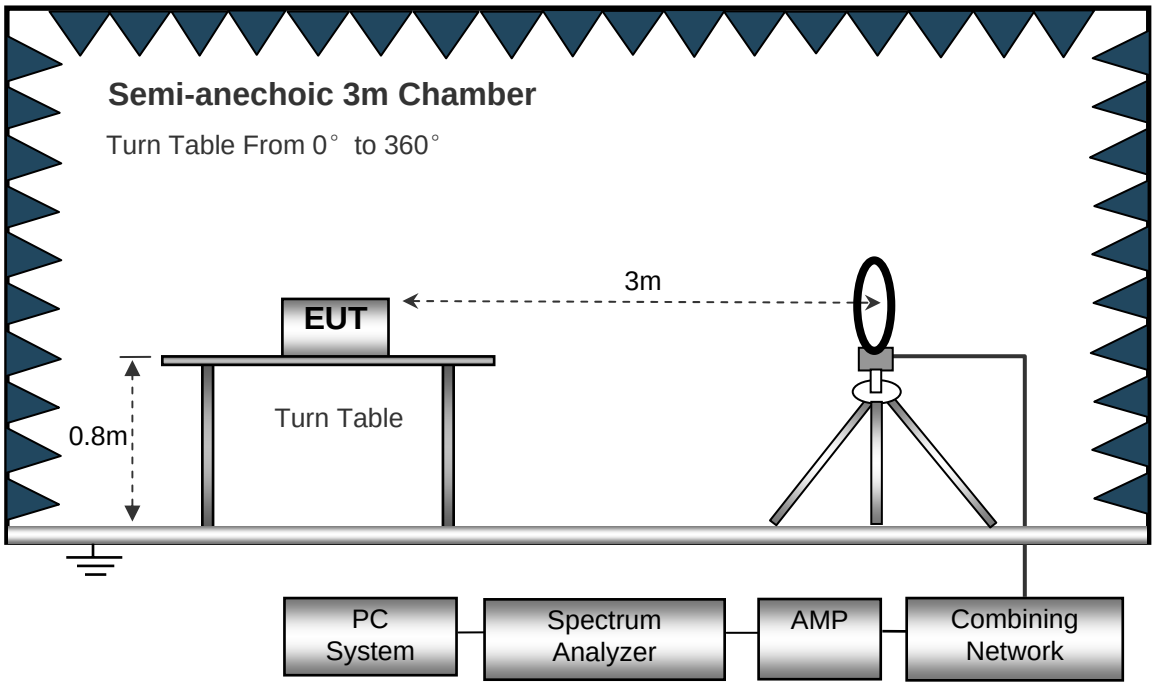
Operation Mode:

The EUT was tested in continuously transmitting and normal linking mode. The test data were shown as follow.

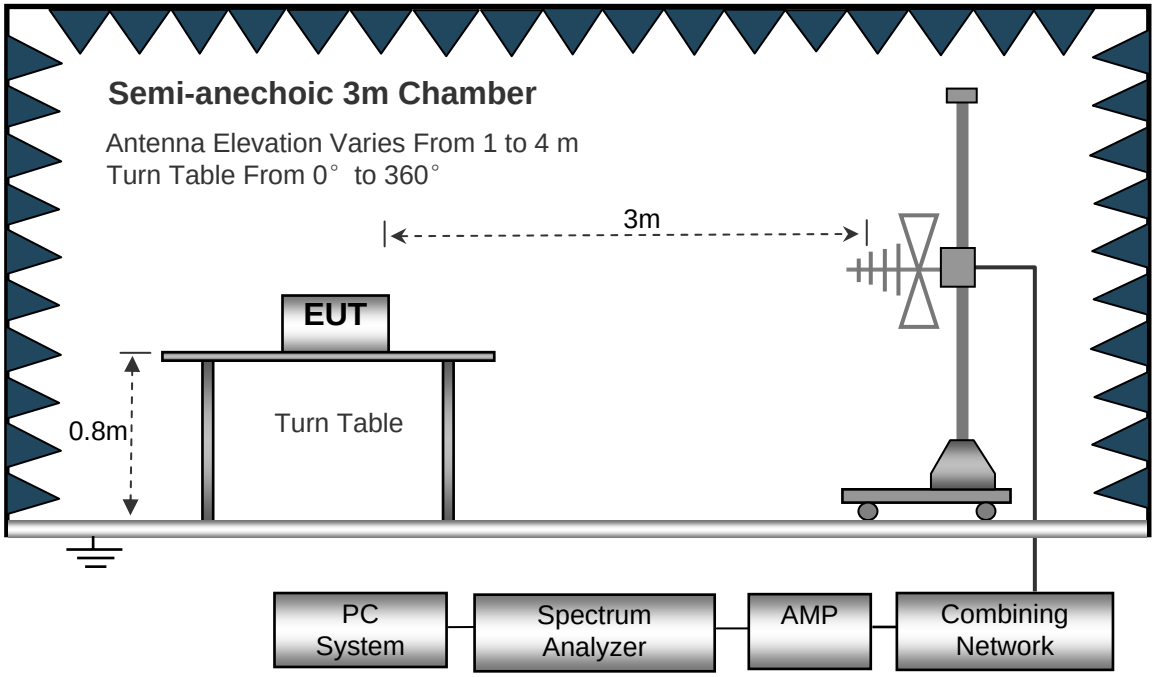
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

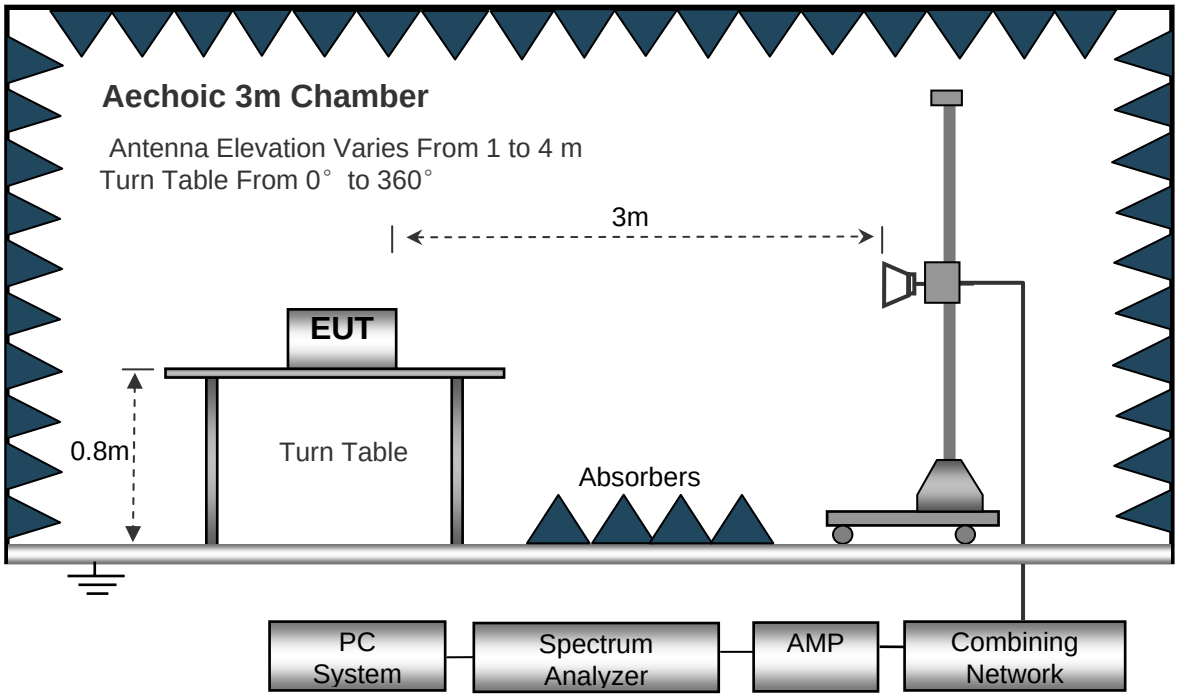
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested from 12MHz to 18GHz.

Below 30MHz

Sweep Speed .....Auto
IF Bandwidth .....10 KHz
Video Bandwidth 10KHz
Resolution Bandwidth .....10 KHz

30MHz ~ 1GHz

Sweep Speed .....Auto
IF Bandwidth .....120 KHz
Video Bandwidth 100KHz
Quasi-Peak Adapter Bandwidth.....120 KHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 100KHz

Above 1GHz

Sweep Speed .....Auto
IF Bandwidth .....120 KHz
Video Bandwidth 3MHz
Quasi-Peak Adapter Bandwidth.....120 KHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 1MHz

7.4 Test Procedure

1. The new battery was used in the equipment under test for radiated emissions test.
2. This is a handhold device,The radiation emission should be tested under 3-axes(X,Y,Z) position(X denotes lying on the table,Y denotes side stand and Z denotes vertical stand),After pre-test,It was found that the worse radiation emission was get at the X position.
   So the data shown was the X position only.
3. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
4. All data was recorded in the peak and average detection mode.
5. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor – Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

7.6 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was egtablished by adding
The meter reading of the spectrum analyzer (which is set to read in units of dBuV/m)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared in terms of dB.The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz)	Meter Reading +ACF=FS
33	20dBuV+10.36dB=30.36dBuV/m @3m

7.7 Radiated Emission Data

Test mode: normal operation mode:

Test Frequency :Below 30MHz

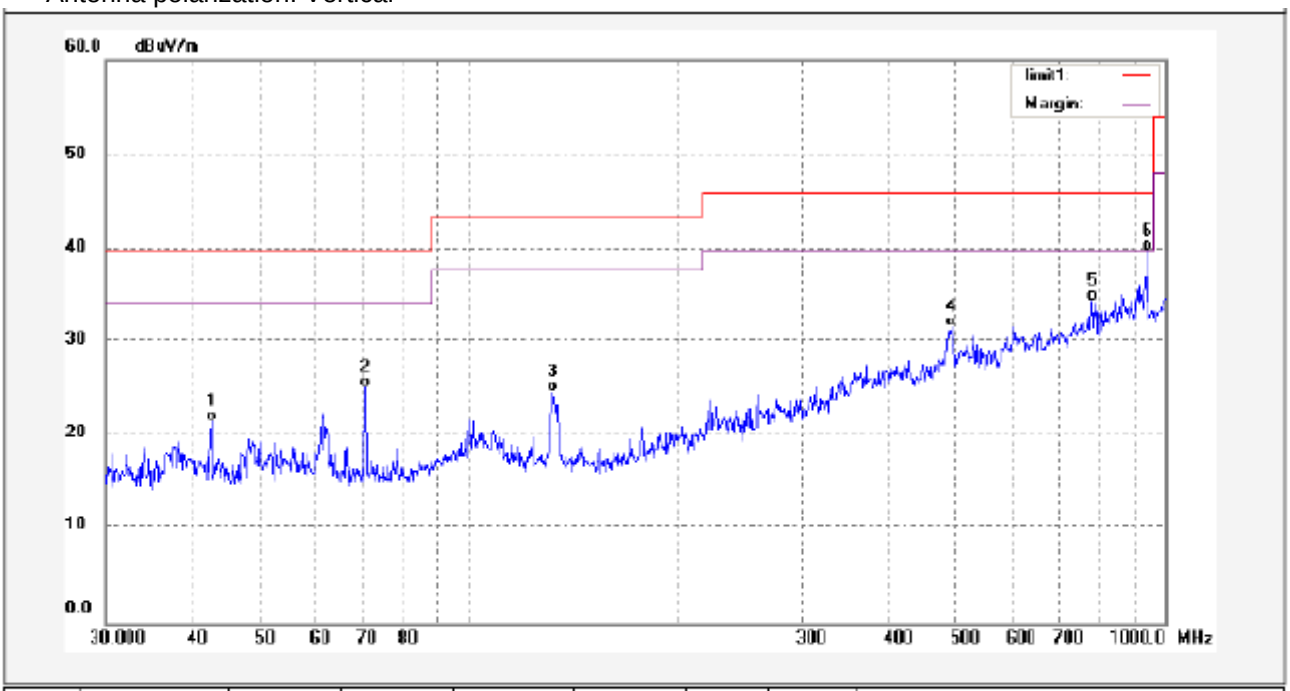
The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 1000MHz

Remark: the EUT was pretested at the highest, middle and lowest channel, and the worst case was the lowest Channel, so the data show was the lowest channel only.

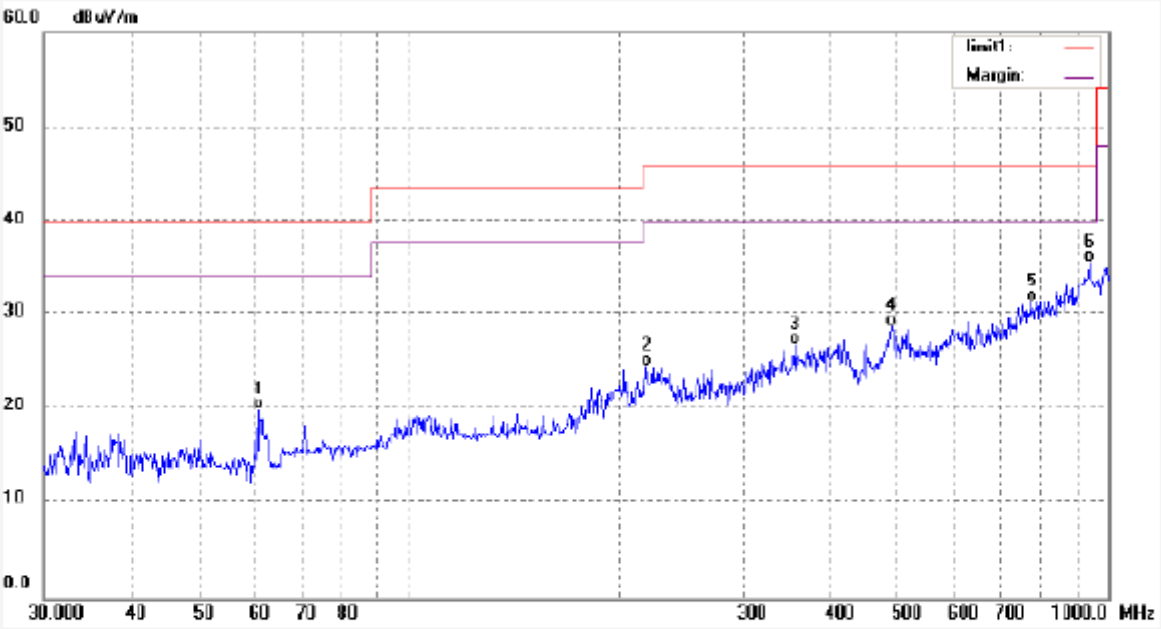
Test Mode: Transmitting mode

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	42.6299	6.07	15.44	21.51	40.00	-18.49	QP	
2	70.7047	15.32	9.86	25.18	40.00	-14.82	QP	
3	131.6855	12.81	11.93	24.74	43.50	-18.76	QP	
4	491.7700	6.83	24.78	31.61	46.00	-14.39	QP	
5	781.9606	5.69	28.57	34.26	46.00	-11.74	QP	
6	942.0180	8.54	31.26	39.80	46.00	-6.20	QP	

Antenna polarization: Horizontal



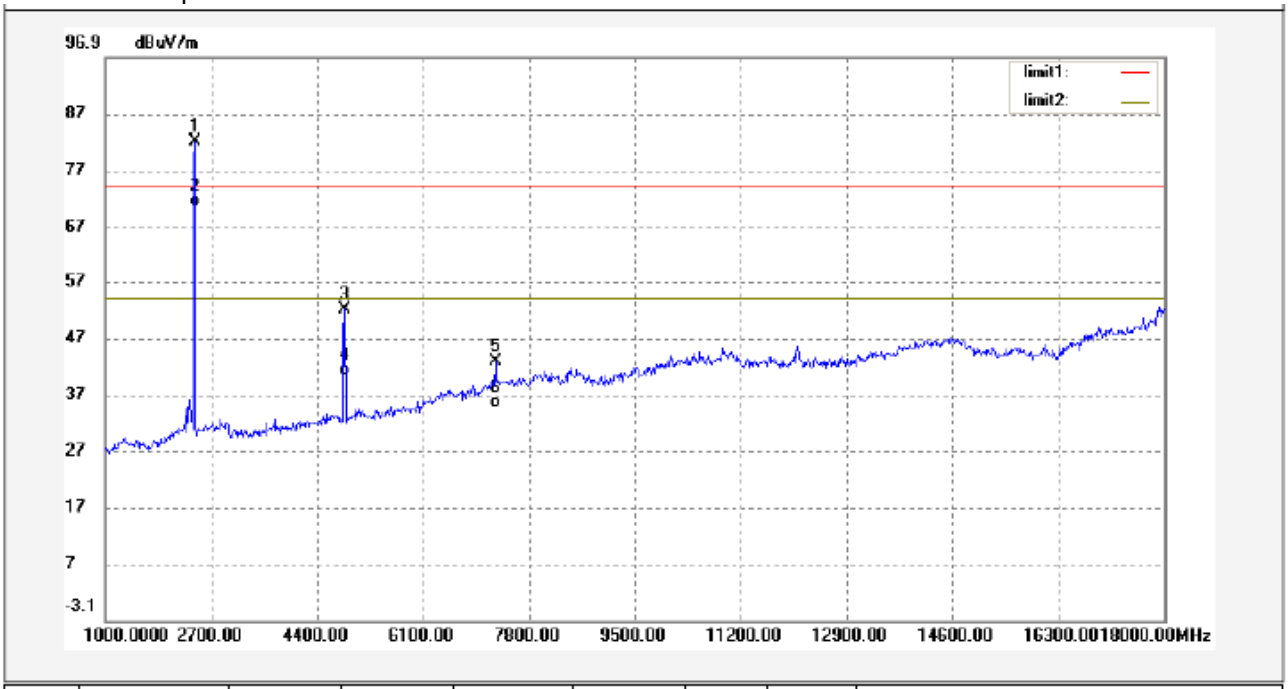
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	60.7902	7.50	12.38	19.88	40.00	-20.12	QP	
2	218.4098	9.28	15.21	24.49	46.00	-21.51	QP	
3	357.1925	6.94	19.89	26.83	46.00	-19.17	QP	
4	490.0451	3.42	25.24	28.66	46.00	-17.34	QP	
5	776.4849	2.97	28.27	31.24	46.00	-14.76	QP	
6	942.0180	4.26	31.26	35.52	46.00	-10.48	QP	

Test Frequency: 1GHz ~ 18GHz

Test Mode: Continuously Transmitting

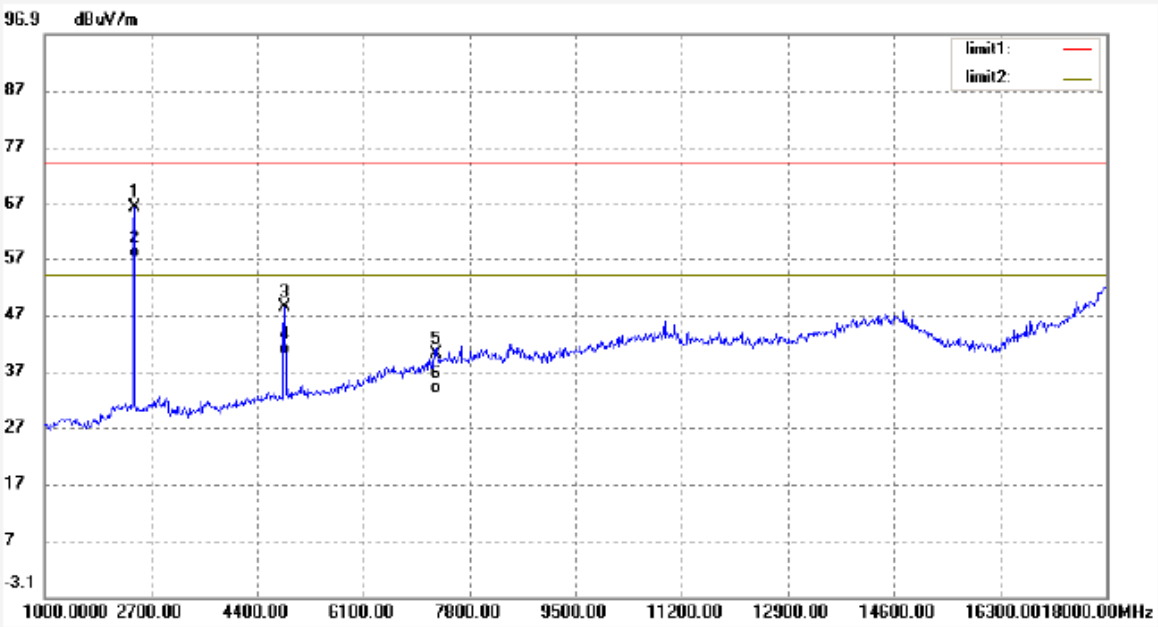
Test channel: TX 2414MHz

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2414.000	97.58	-15.62	81.96	114.00	-32.04	peak	Fundamental Wave
2	2414.000	86.22	-15.62	70.60	94.00	-23.40	AVG	Fundamental Wave
3	4828.000	64.09	-11.95	52.14	74.00	-21.86	peak	
4	4828.000	52.14	-11.95	40.19	54.00	-13.81	AVG	
5	7242.000	49.92	-7.15	42.77	74.00	-31.23	peak	
6	7242.000	41.58	-7.15	34.43	54.00	-19.57	AVG	

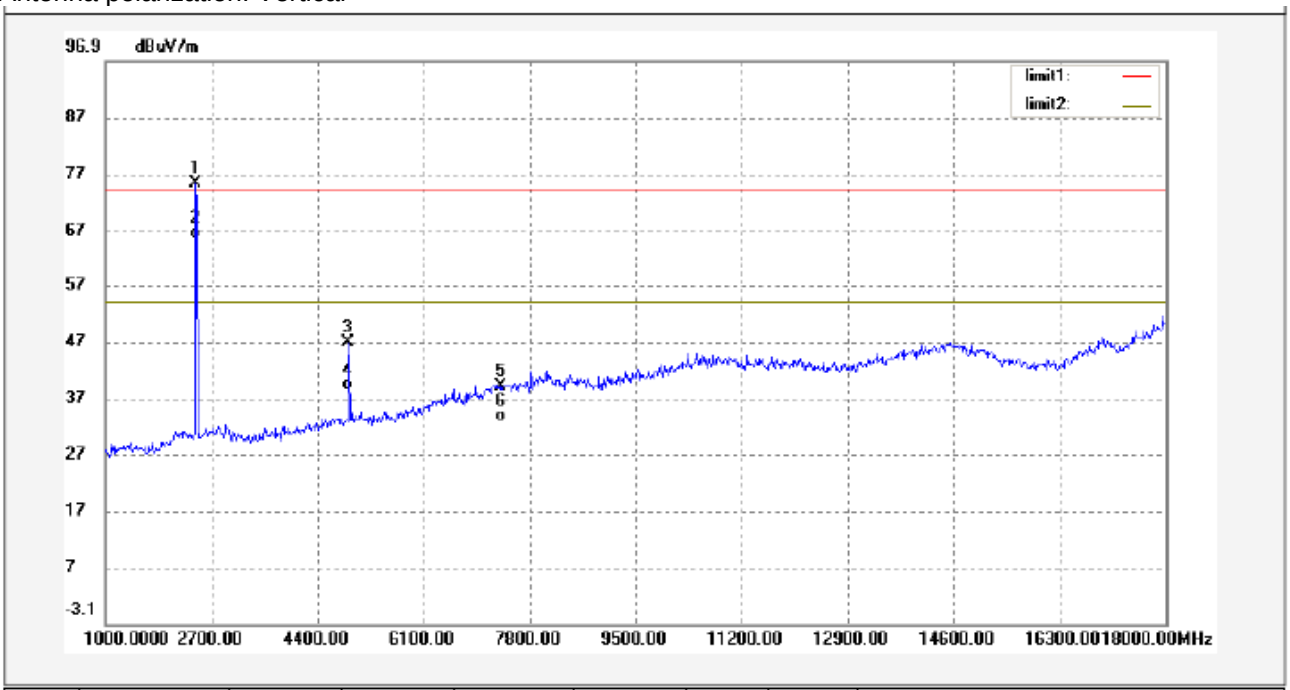
Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2414.000	81.83	-15.62	66.21	114.00	-47.79	peak	Fundamental Wave
2	2414.000	72.56	-15.62	56.94	94.00	-37.06	AVG	Fundamental Wave
3	4828.000	60.19	-11.95	48.24	74.00	-25.76	peak	
4	4828.000	51.68	-11.95	39.73	54.00	-14.27	AVG	
5	7242.000	47.24	-7.15	40.09	74.00	-33.91	peak	
6	7242.000	40.28	-7.15	33.13	54.00	-20.87	AVG	

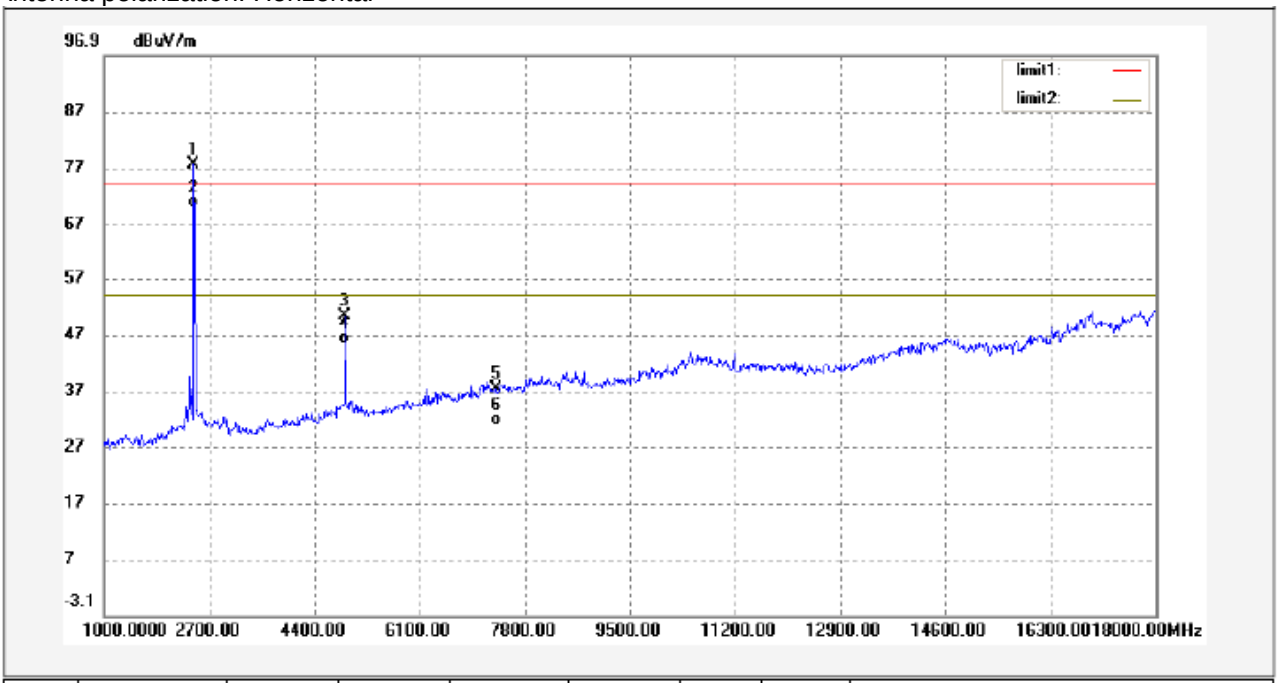
Test channel: TX 2442MHz

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2442.000	90.93	-15.70	75.23	114.00	-38.77	peak	Fundamental Wave
2	2442.000	81.25	-15.70	65.55	94.00	-28.45	AVG	Fundamental Wave
3	4884.000	58.62	-11.92	46.70	74.00	-27.30	peak	
4	4884.000	50.27	-11.92	38.35	54.00	-15.65	AVG	
5	7326.000	46.05	-7.13	38.92	74.00	-35.08	peak	
6	7326.000	39.81	-7.13	32.68	54.00	-21.32	AVG	

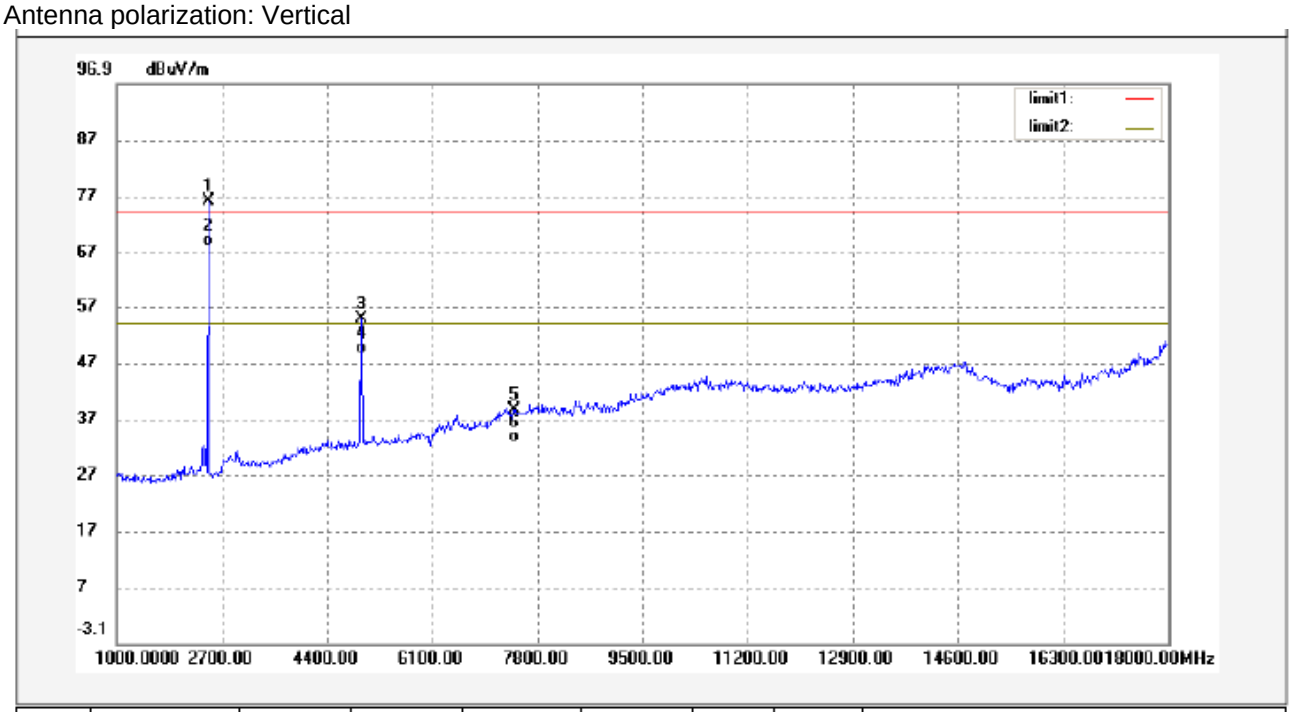
Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2442.000	93.27	-15.70	77.57	114.00	-36.43	peak	Fundamental Wave
2	2442.000	85.38	-15.70	69.68	94.00	-24.32	AVG	Fundamental Wave
3	4884.000	62.28	-11.92	50.36	74.00	-23.64	peak	
4	4884.000	57.18	-11.92	45.26	54.00	-8.74	AVG	
5	7326.000	44.47	-7.13	37.34	74.00	-36.66	peak	
6	7326.000	38.02	-7.13	30.89	54.00	-23.11	AVG	

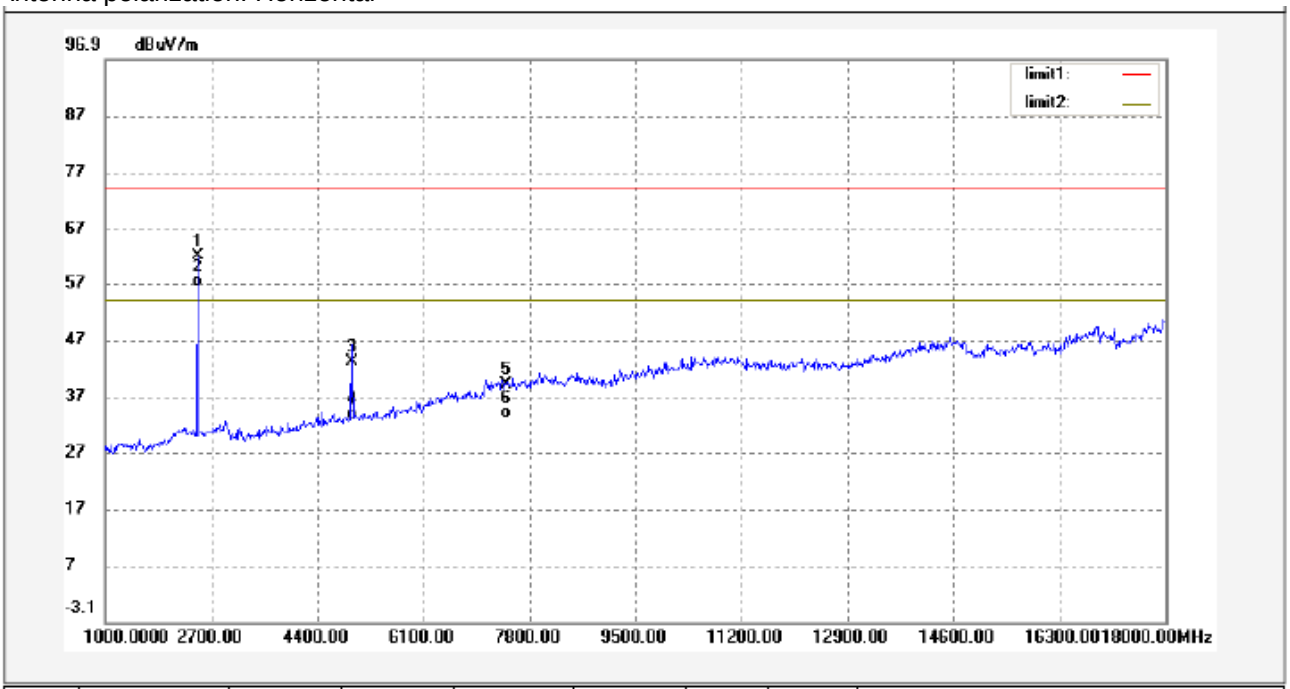
Test channel: TX 2473MHz

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2473.000	91.61	-15.69	75.92	114.00	-38.08	peak	Fundamental Wave
2	2473.000	83.72	-15.69	68.03	94.00	-25.97	AVG	Fundamental Wave
3	4946.000	66.66	-11.80	54.86	74.00	-19.14	peak	
4	4946.000	60.25	-11.80	48.45	54.00	-5.55	AVG	
5	7419.000	45.45	-6.98	38.47	74.00	-35.53	peak	
6	7419.000	39.81	-6.98	32.83	54.00	-21.17	AVG	

Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2473.000	77.80	-15.69	62.11	114.00	-51.89	peak	Fundamental Wave
2	2473.000	71.86	-15.69	56.17	94.00	-37.83	AVG	Fundamental Wave
3	4946.000	54.76	-11.80	42.96	74.00	-31.04	peak	
4	4946.000	44.62	-11.80	32.82	54.00	-21.18	AVG	
5	7419.000	46.00	-6.98	39.02	74.00	-34.98	peak	
6	7419.000	40.04	-6.98	33.06	54.00	-20.94	AVG	

Test Frequency :Above 18GHz

The measurements were more than 20 dB below the limit and not reported.

8 20dB Bandwidth

Test Requirement:	FCC Part15.215(c)
Test Method:	ANSI C63.4: 2003
Test mode:	Transmitting
Test Result:	PASS

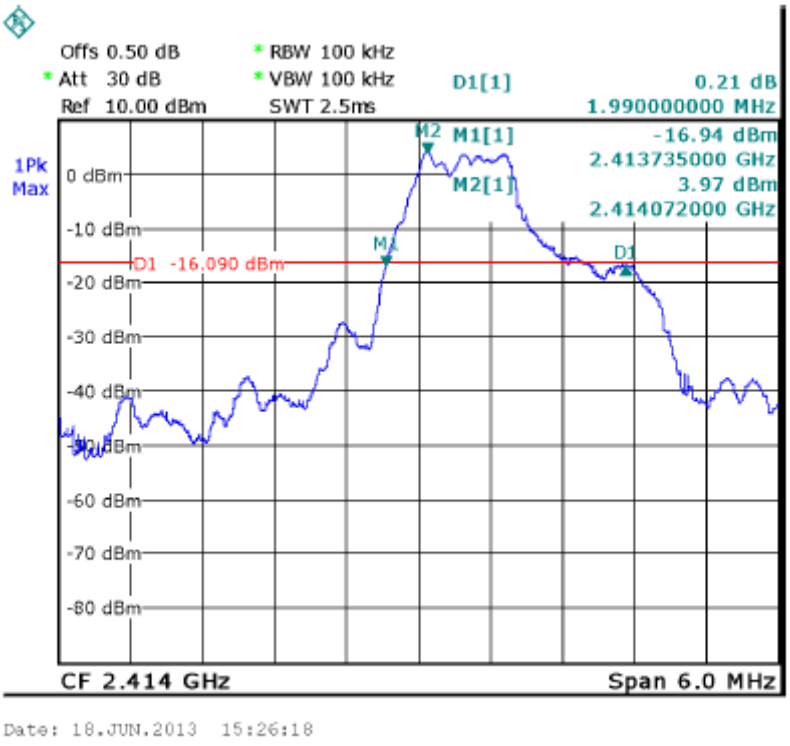
8.1 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 300KHz VBW.

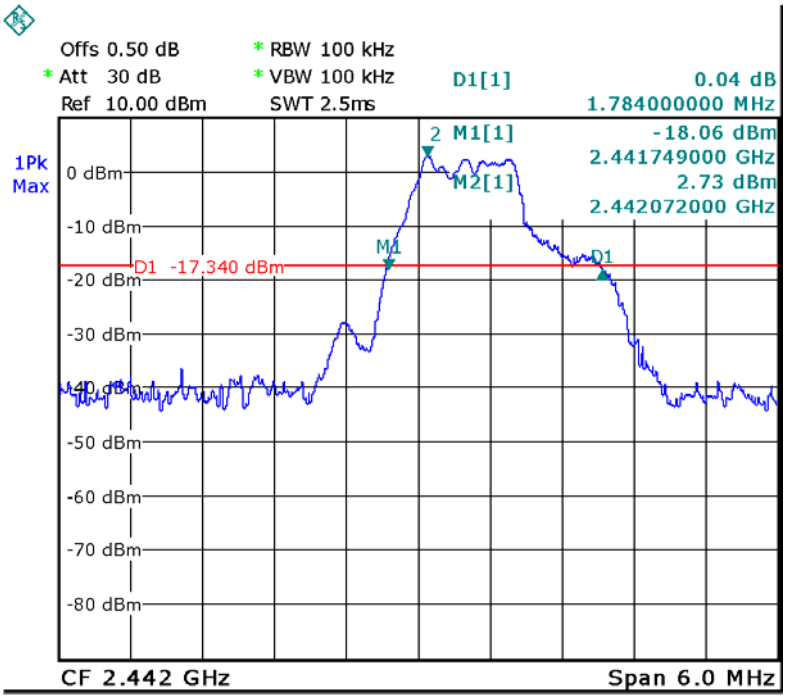
8.2 Test Result

Please refer the graph as below:

Lowest Channel:

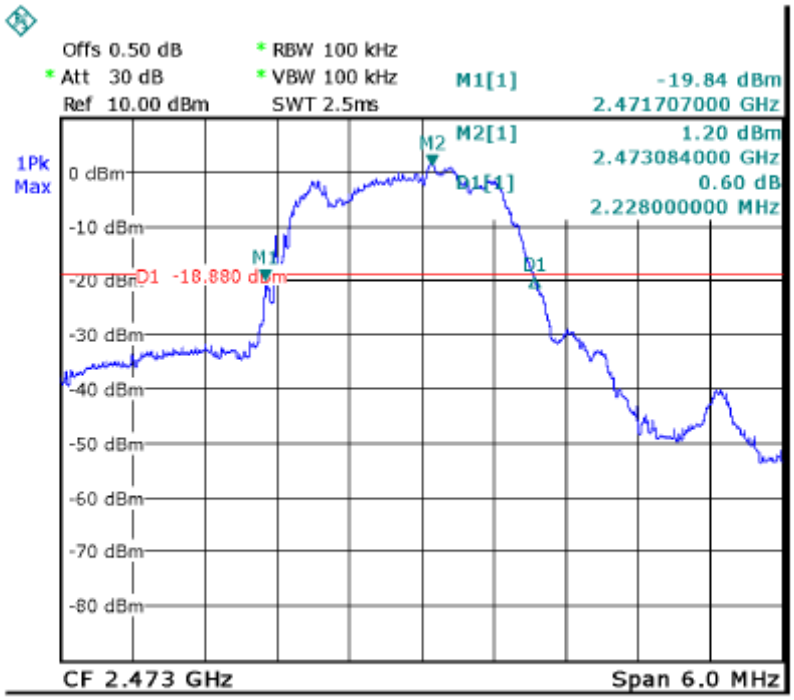


Middle Channel:



Date: 18.JUL.2013 18:53:30

Highest Channel:



Date: 18.JUN.2013 15:48:13

9 Restricted band

Test Requirement: FCC Part15 Paragraph 15.205

Test Method: ANSI C63.4: 2003

Test Result: N/A

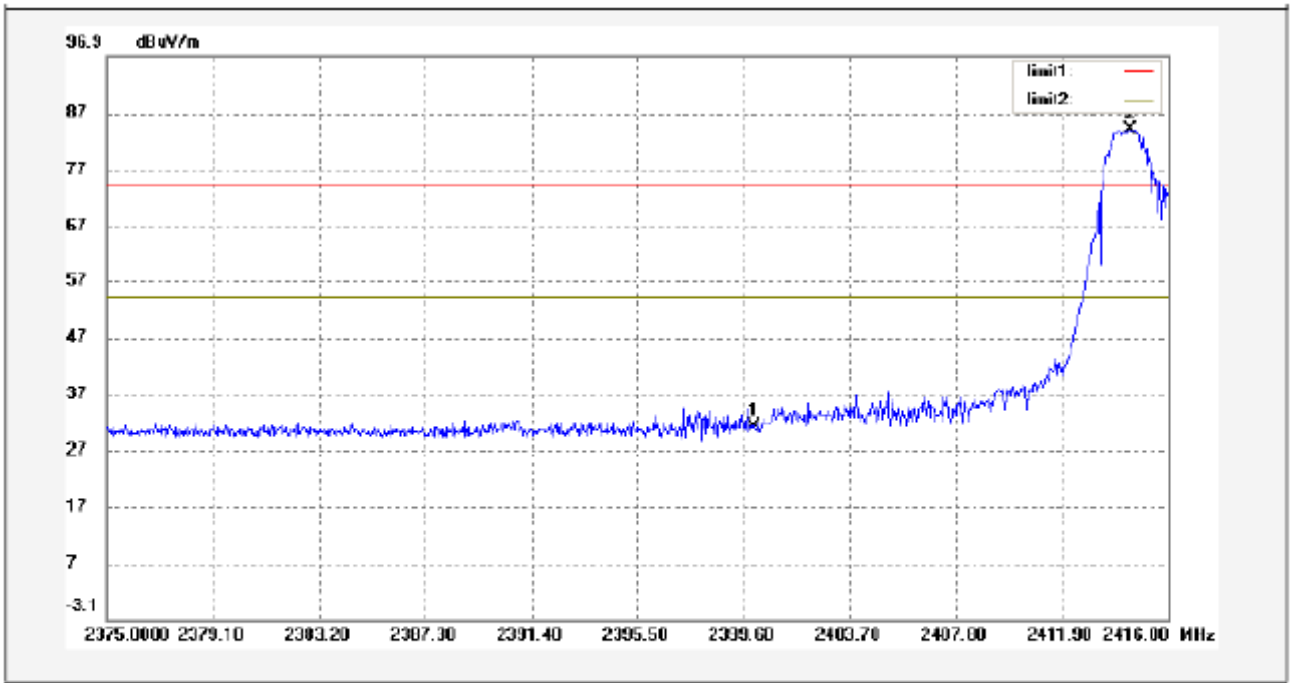
9.1 Requiments:

emissions that fall in the restricted bands(15.205).Above 1000MHz, compliance with the emissions limits in section 15.209 shall be demonstrated based on the average value of the measured emissions,The provisions in section 15.35apply to these measurements.

9.2 Test Result

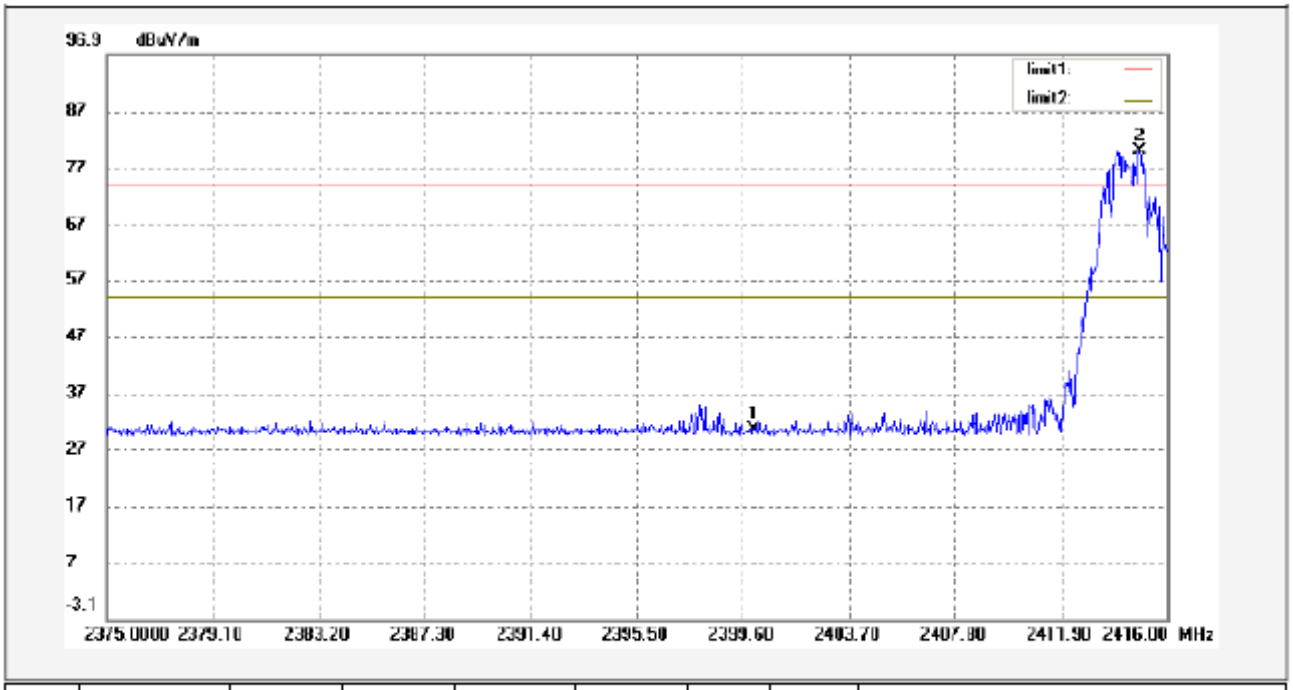
Mode:transmitting at lower channel

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	46.92	-15.58	31.34	74.00	-42.66	peak	
2	2414.524	99.62	-15.62	84.00	-	-	peak	Fundamental Wave

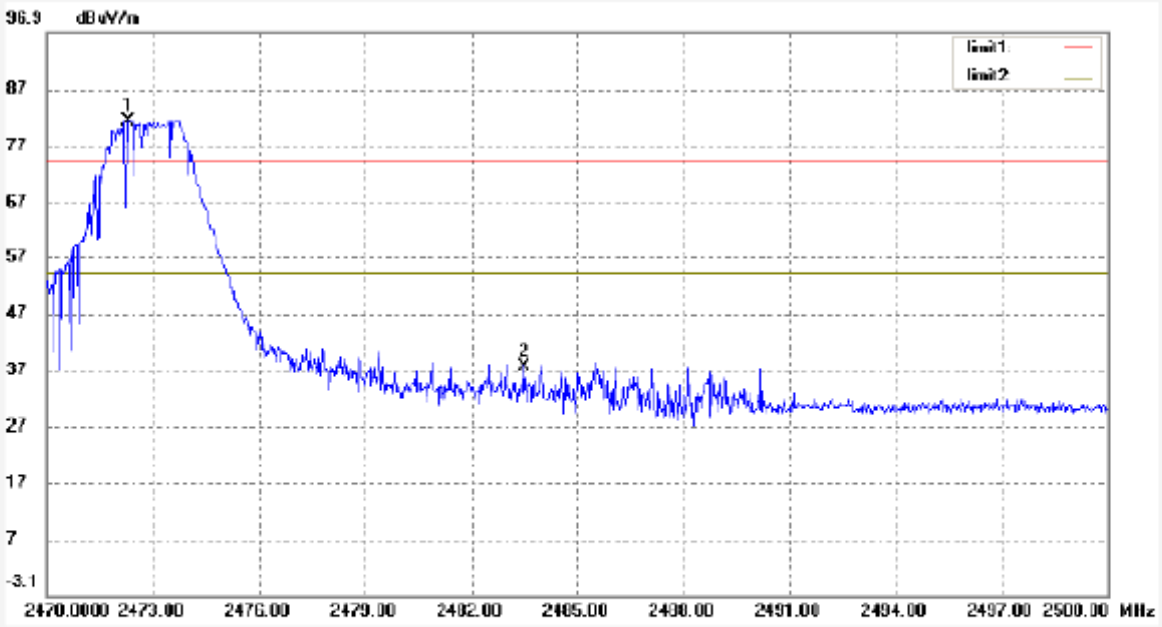
Antenna Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	46.09	-15.58	30.51	74.00	-43.49	peak	
2	2414.934	95.64	-15.63	80.01	-	-	peak	Fundamental Wave

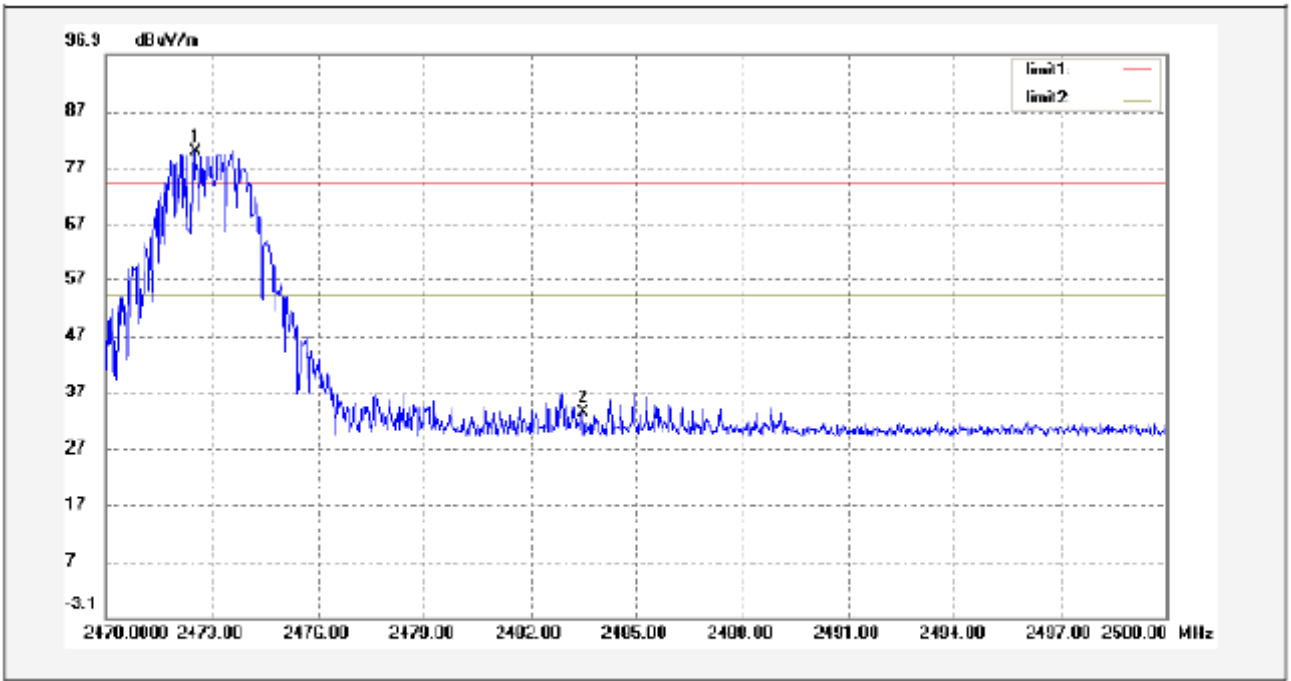
Mode:transmitting at upper channel

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2472.310	97.04	-15.69	81.35	-	-	peak	Fundamental Wave
2	2483.500	53.08	-15.67	37.41	74.00	-36.59	peak	

Antenna Polarization: Horizontal



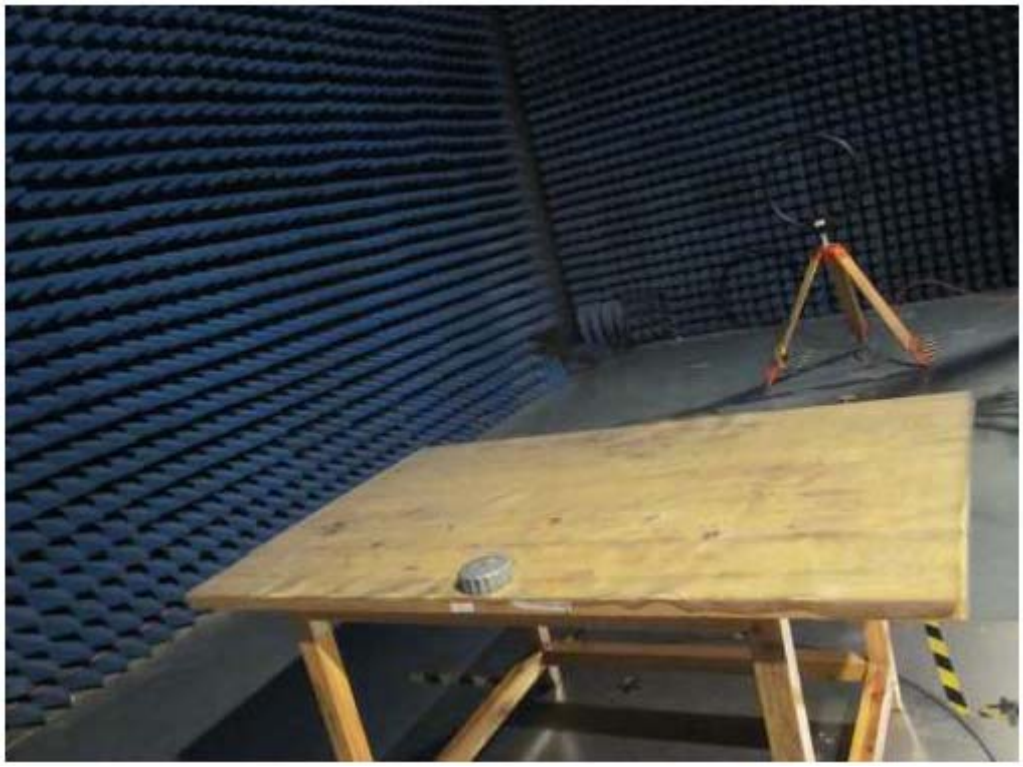
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2472.520	95.43	-15.69	79.74	-	-	peak	Fundamental Wave
2	2483.500	48.83	-15.67	33.16	74.00	-40.84	peak	

10 Antenna Requirement

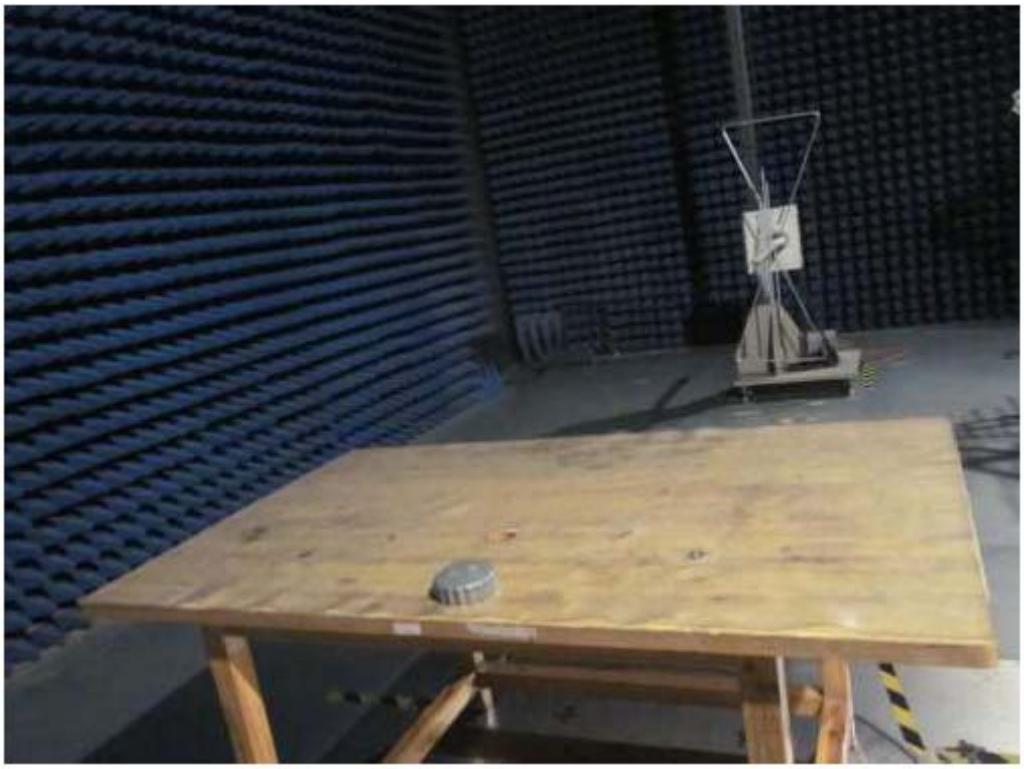
According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has a integrated antenna, fulfil the requirement of this section.

11 Photographs of Testing

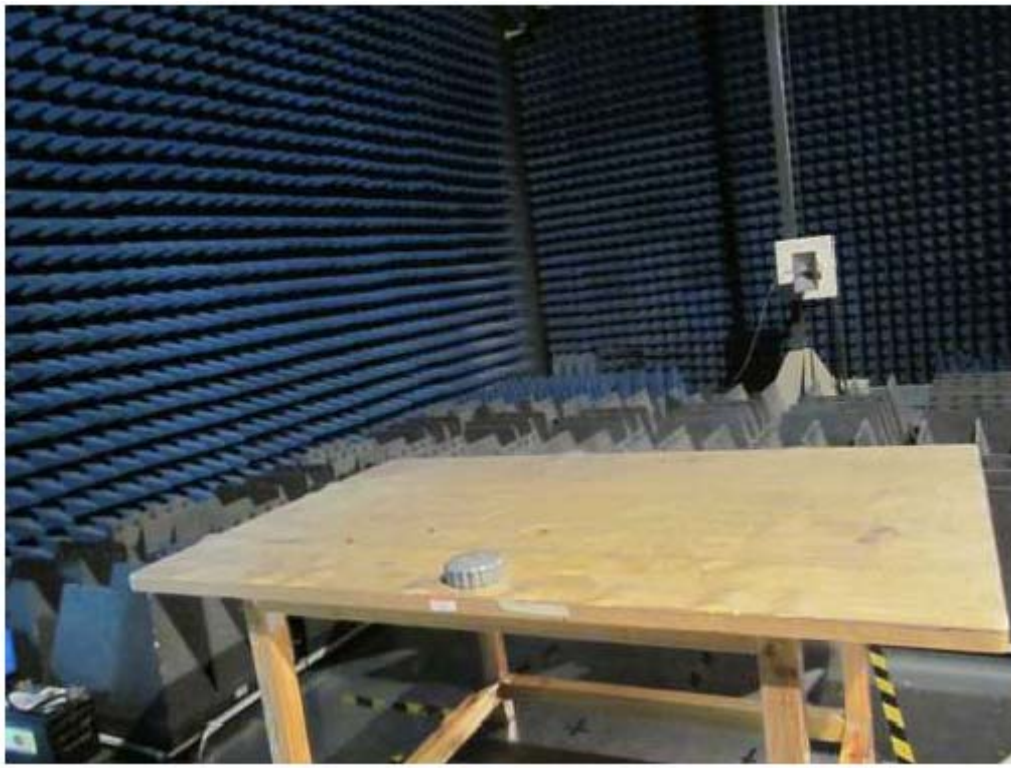
11.1 Radiation Emission From Below 30MHz



11.2 Radiation Emission From 30MHz-1GHz

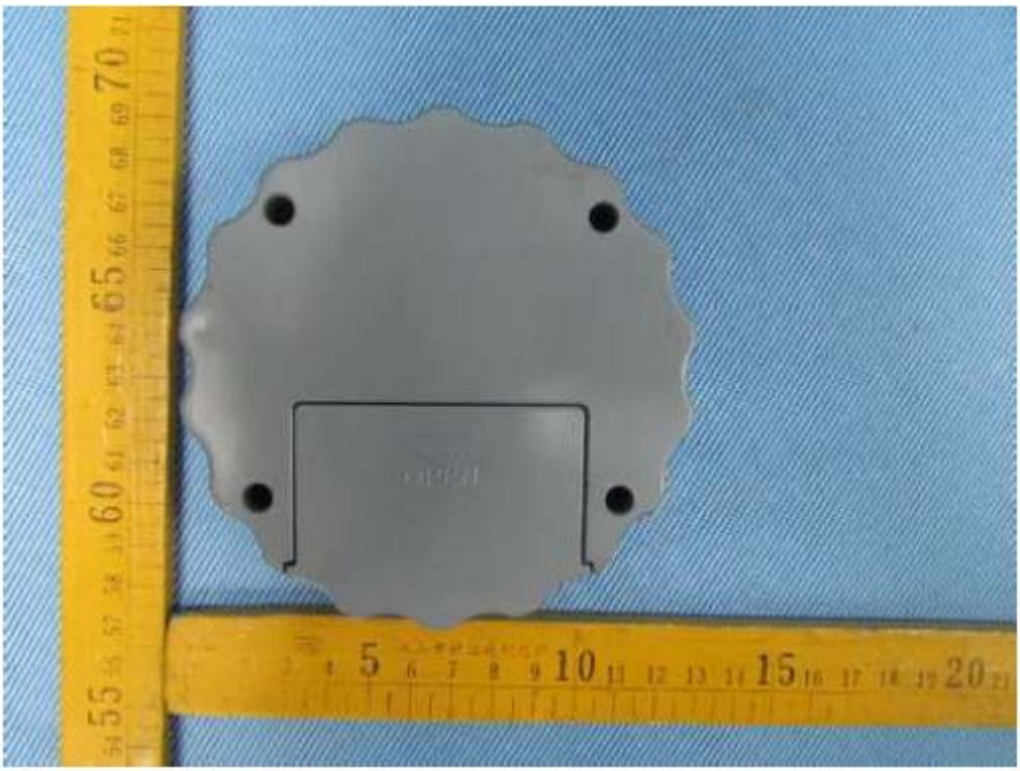


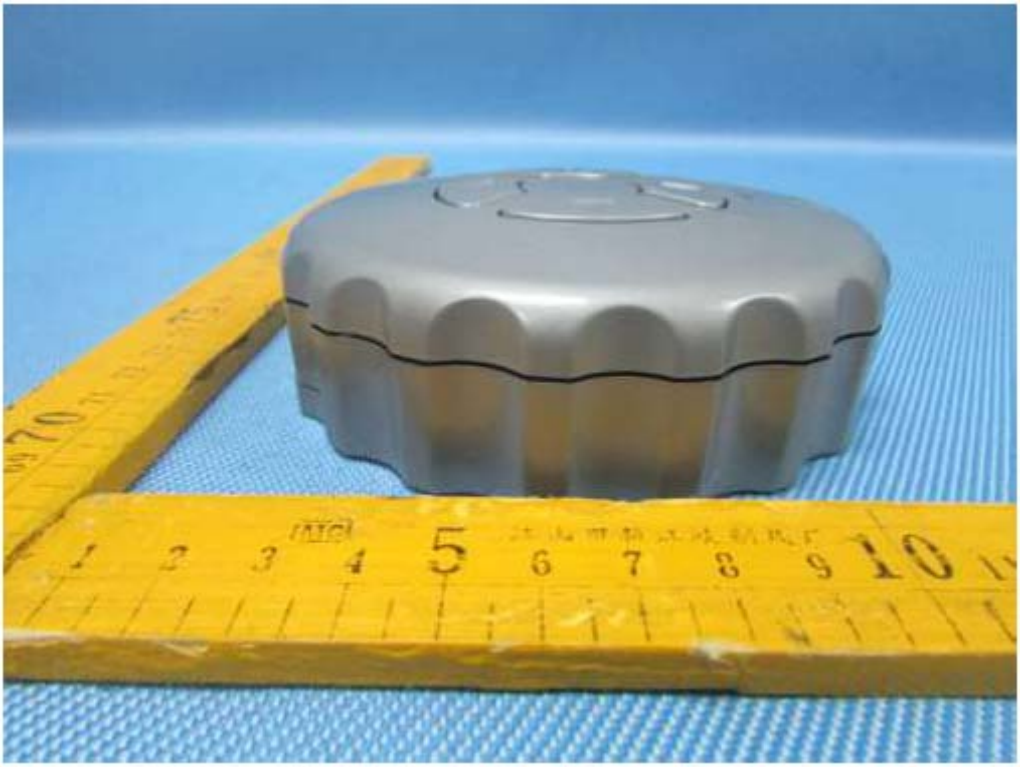
11.3 Radiation Emission Above 1GHz



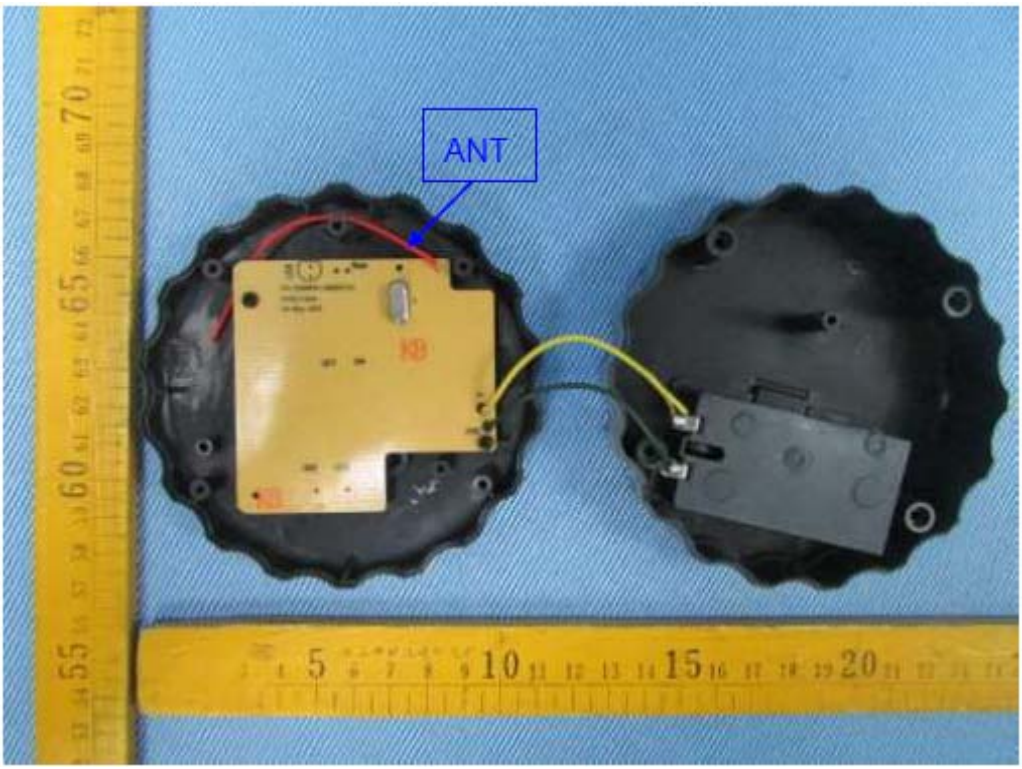
12 Photographs - Constructional Details

12.1 EUT - Appearance View

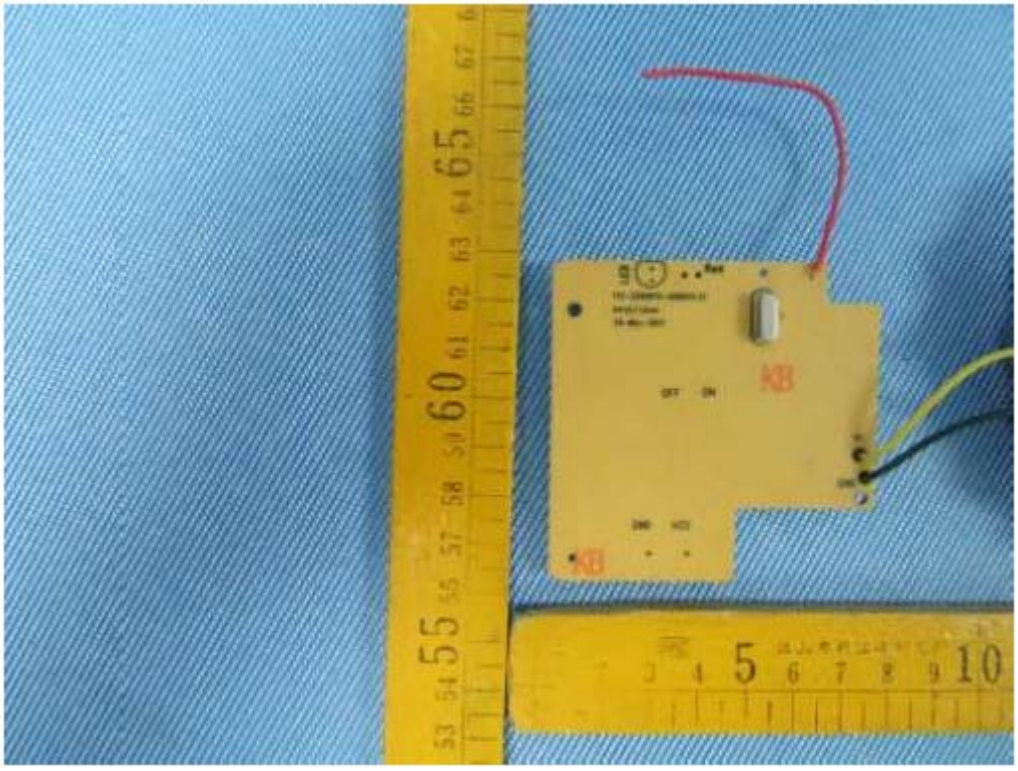


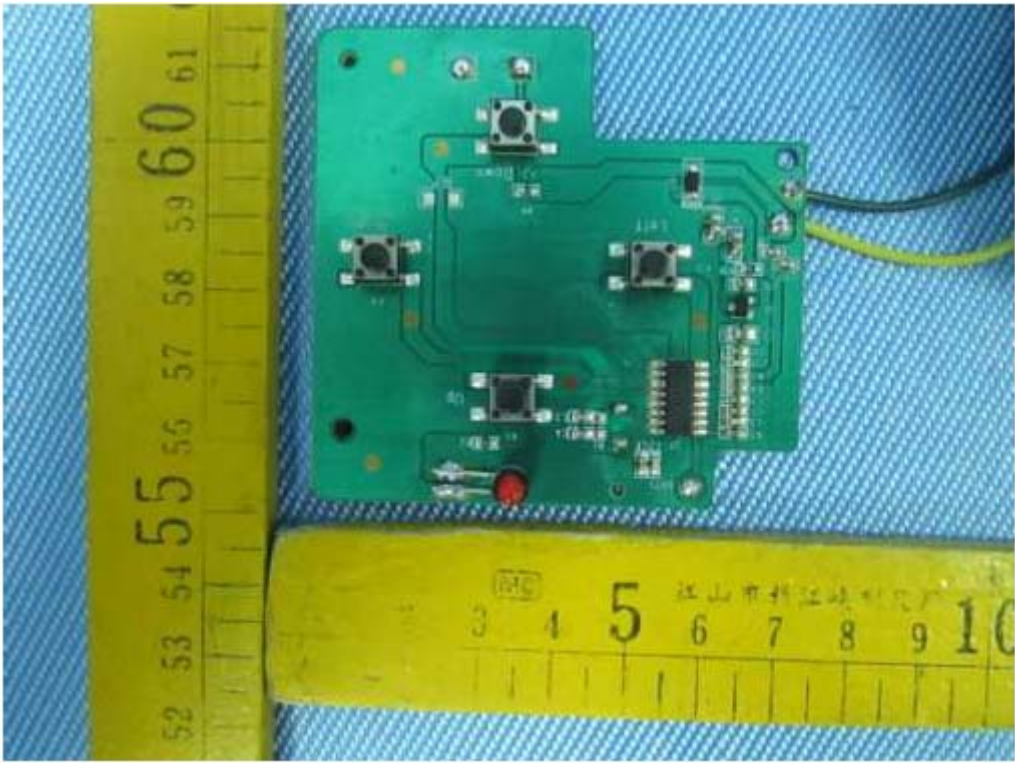


12.2 EUT - Open View



12.3 PCB - View





13 FCC ID Label

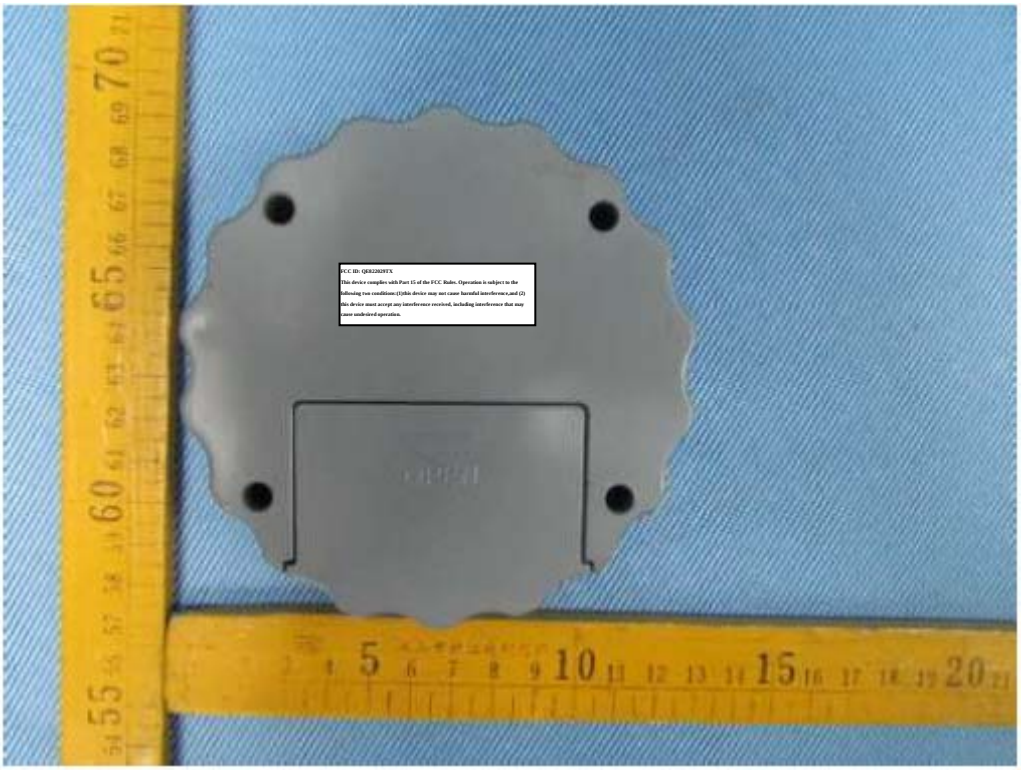
13.1 Label sample

Label sample for model: 22029

FCC ID: QE822029TX
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

13.2 Label Location

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.



==END==