

# FCC/Canada IC Report

**Applicant:** Dongguan Jinchi Industrial Co., Ltd.

**Address of Applicant:** Kunhao Industrial Park, 8 Zhonghe Road, Banshixia Village, Changping Town, Dongguan City, China

**Equipment Under Test (EUT)**

Product Name: Remote Control

Model No.: X5

Trade Mark: extreme flyers

**FCC ID:** ZYOX5

**IC:** 9888A-X5

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247:2012  
RSS-Gen Issue 3: December 2010  
RSS-210 Issue 8: December 2010

**Date of sample receipt:** April 22, 2013

**Date of Test:** April 22-25, 2013

**Date of report issued:** April 25, 2013

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular blue ink stamp from GTS Global United Technology Services Co., Ltd. is visible. The stamp contains the text "GTS", "GLOBAL TESTING", and "180116". A handwritten signature in black ink is written across the stamp.

Robinson Lo  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2 Version

Version No.	Date	Description
00	April 25, 2013	Original

Prepared By:

*hank. yan.*

Date:

April 25, 2013

Project Engineer

Check By:

*Hans. Hu*

Date:

April 25, 2013

Reviewer

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## 4 Test Summary

Test Item	Section	Result
Antenna Requirement	15.203/15.247 (c)/ RSS-Gen 7.1.2	Pass
AC Power Line Conducted Emission	15.207/ RSS-Gen 7.2.4	N/A
Conducted Peak Output Power	15.247 (b)(1)/ RSS-210 A8.4(2)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)/ RSS-210 A8.2(a)	Pass
99% Occupy Bandwidth	RSS-Gen 4.6.1	Pass
Carrier Frequencies Separation	15.247 (a)(1)/ RSS-210 A8.1(b)	Pass
Hopping Channel Number	15.247 (a)(1)/ RSS-210 A8.1(d)	Pass
Dwell Time	15.247 (a)(1)/ RSS-210 A8.1(d)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)/ RSS-210 A8.1(d)	Pass
Radiated Emission	15.205/15.209/ RSS-210 A8.5 RSS-Gen7.2.5	Pass
Band Edge	15.247(d)/ RSS-210 A8.5	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

Applicant:	Dongguan Jinchi Industrial Co., Ltd.
Address of Applicant:	Kunhao Industrial Park, 8 Zhonghe Road, Banshixia Village, Changping Town, Dongguan City, China
Manufacturer:	Dongguan Jinchi Industrial Co., Ltd.
Address of Manufacturer:	Kunhao Industrial Park, 8 Zhonghe Road, Banshixia Village, Changping Town, Dongguan City, China

### 5.2 General Description of EUT

Product Name:	Remote Control
Model No.:	X5
Operation Frequency:	2416MHz~2451MHz
Channel numbers:	36
Modulation type:	GFSK
Antenna Type:	Integral
Antenna gain:	2dBi
Power supply:	DC 6.0V (4*1.5V "AA" Size Battery)

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2416MHz	10	2425MHz	19	2434MHz	28	2443MHz
2	2417MHz	11	2426MHz	20	2435MHz	29	2444MHz
3	2418MHz	12	2427MHz	21	2436MHz	30	2445MHz
4	2419MHz	13	2428MHz	22	2437MHz	31	2446MHz
5	2420MHz	14	2429MHz	23	2438MHz	32	2447MHz
6	2421MHz	15	2430MHz	24	2439MHz	33	2448MHz
7	2422MHz	16	2431MHz	25	2440MHz	34	2449MHz
8	2423MHz	17	2432MHz	26	2441MHz	35	2450MHz
9	2424MHz	18	2433MHz	27	2442MHz	36	2451MHz

Note 1:

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:

Note 2:

In RSS-Gen Issue 3 section 4.3, 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	2416MHz
The middle channel	2434MHz
The Highest channel	2451MHz

## 5.3 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
<i>Remark: During the test, the new battery was used.</i>	

## 5.4 Test Facility

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

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing 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 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

## 5.5 Test Location

All tests were performed at:
Shenzhen Zhongjian Nanfang Testing Co., Ltd. Address: 1st Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-23118282 Fax: 0755-23116366

## 5.6 Other Information Requested by the Customer

None.
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## 5.7 Description of Support Units

None.
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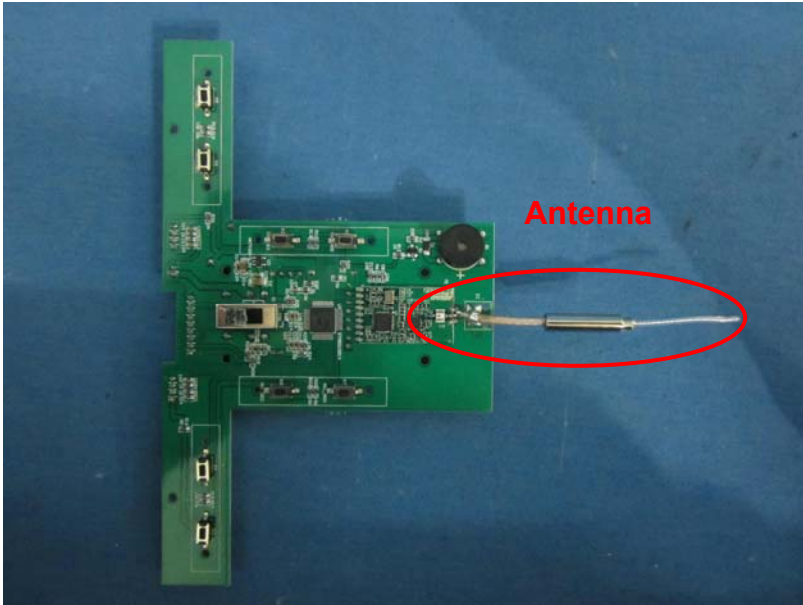
## 5.8 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 29 2013	Mar. 28 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 6, 2012	Dec. 5, 2013
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 03 2012	Jul. 02 2013
5	Loop Antenna	ZHINAN	ZN30900A	GTS220	Feb. 24 2013	Feb. 23 2014
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 24 2013	Feb. 23 2014
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2012	June 28 2013
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 29 2013	Mar. 28 2014
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	Mar. 30 2013	Mar. 29 2014
11	Coaxial Cable	GTS	N/A	GTS211	Mar. 30 2013	Mar. 29 2014
12	Coaxial cable	GTS	N/A	GTS210	Mar. 30 2013	Mar. 29 2014
13	Coaxial Cable	GTS	N/A	GTS212	Mar. 30 2013	Mar. 29 2014
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 03 2012	Jul. 02 2013
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 03 2012	Jul. 02 2013
16	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2012	June 28 2013
17	Band filter	Amindeon	82346	GTS219	Mar. 30 2013	Mar. 29 2014



## 6 Test results and Measurement Data

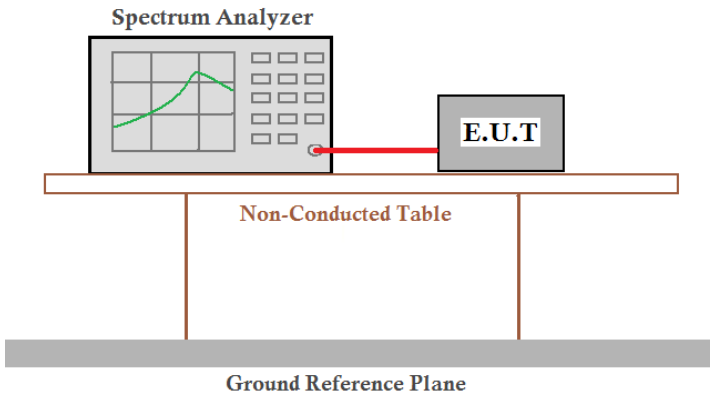
### 6.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(c)
<p><b>15.203 requirement:</b></p> <p>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.</p> <p><b>15.247(c) (1)(i) requirement:</b></p> <p>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p>	
<b>Standard requirement:</b>	RSS-Gen 7.1.2
<p>A transmitter can only be sold or operated with antennas with which it was approved.</p> <p>When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits.</p>	
<b>E.U.T Antenna:</b>	
<p><i>The antenna is Integral Antenna, the best case gain of the antenna is 2dBi</i></p> 	

## 6.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207, RSS-Gen Section 7.2.4			
Test Method:	ANSI C63.10:2009, RSS-Gen			
Test Frequency Range:	150KHz to 30MHz			
Class / Severity:	Class B			
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto			
Limit:	Frequency range (MHz)	Limit (dBuV)		
		Quasi-peak	Average	
		0.15-0.5	66 to 56*	56 to 46*
		0.5-5	56	46
		5-30	60	50
* Decreases with the logarithm of the frequency.				
Test setup:	<div><p style="text-align: center;"><b>Reference Plane</b></p><p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>			
Test procedure:	<div><ol style="list-style-type: none"><li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li><li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li><li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.</li></ol></div>			
Test Instruments:	Refer to section 6.0 for details			
Test mode:	N/A			
Test results:	N/A			
Remark:	Due to the EUT is powered by battery, this test does not apply.			

## 6.3 Conducted Peak Output Power

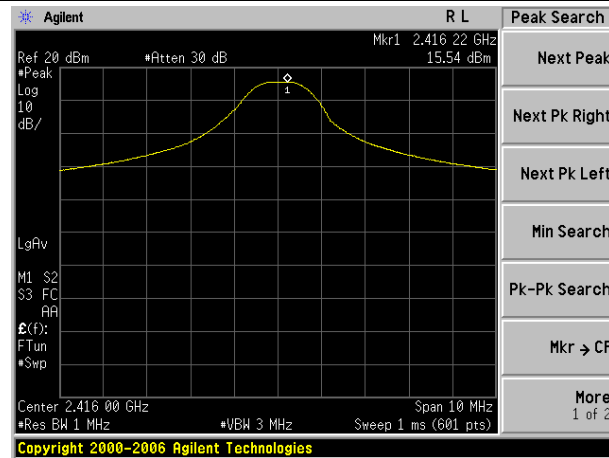
Test Requirement:	FCC Part15 C Section 15.247 (b)(1), RSS-210 A8.4(2)
Test Method:	DA 00-705, ANSI C63.10:2009, RSS-Gen
Limit:	20.97dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

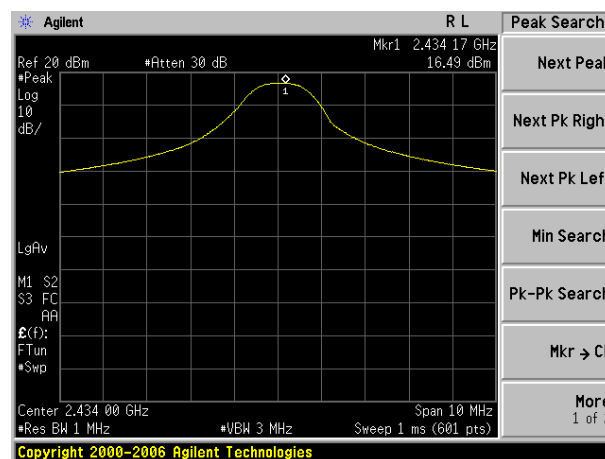
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	15.54	20.97	Pass
Middle	16.49		
Highest	17.48		

Test plot as follows:

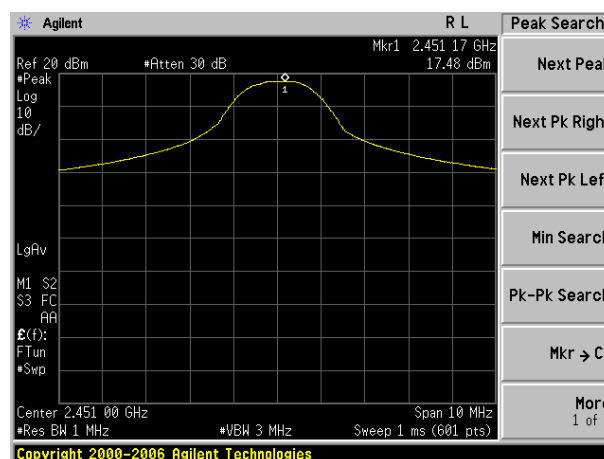
Test mode:	GFSK mode
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Lowest channel

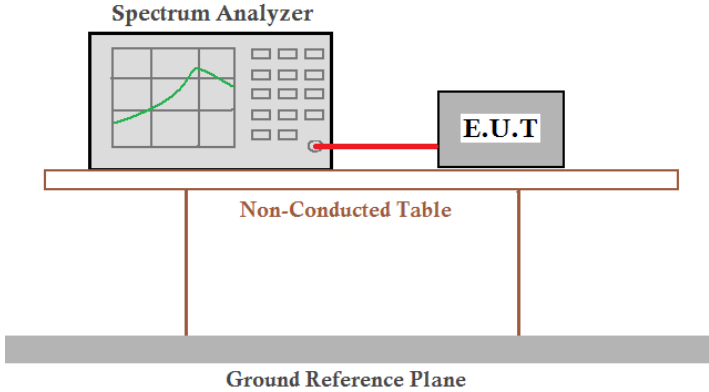


Middle channel



Highest channel

## 6.4 20dB Emission Bandwidth & 99% Occupy Bandwidth

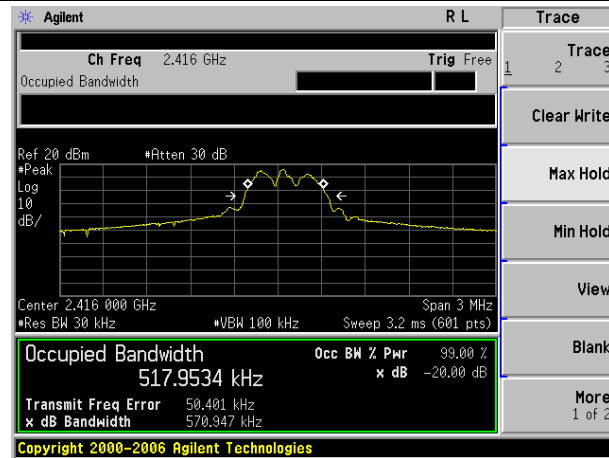
Test Requirement:	FCC Part15 C Section 15.247 (a)(1), RSS-210 A8.1(a) & RSS-Gen
Test Method:	DA 00-705, ANSI C63.10:2009, RSS-Gen
Limit:	N/A
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

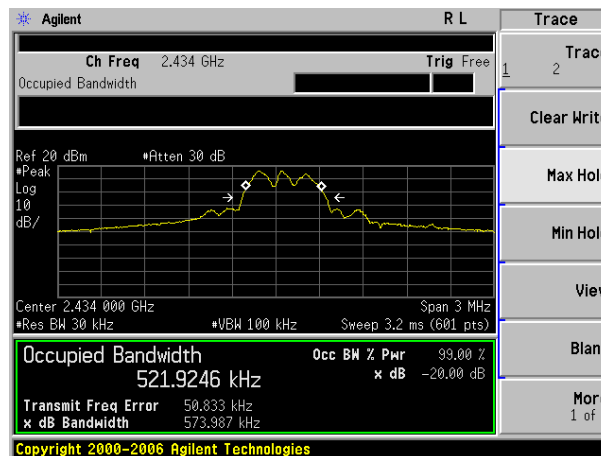
Test channel	20dB Emission Bandwidth (MHz)	99% Occupy Bandwidth (MHz)	Result
Lowest	0.571	0.518	Pass
Middle	0.574	0.522	
Highest	0.677	0.667	

Test plot as follows:

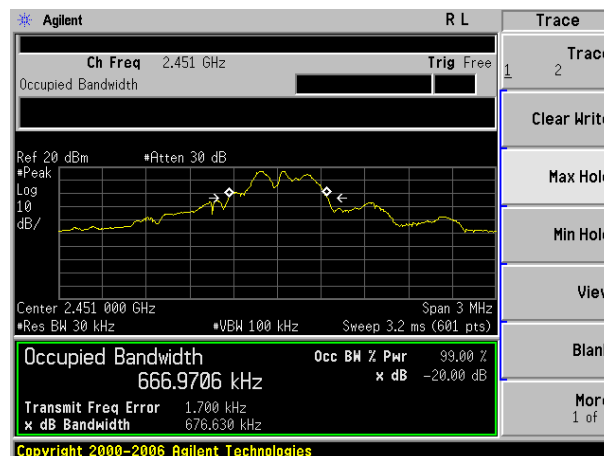
Test mode:	GFSK mode
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Lowest channel

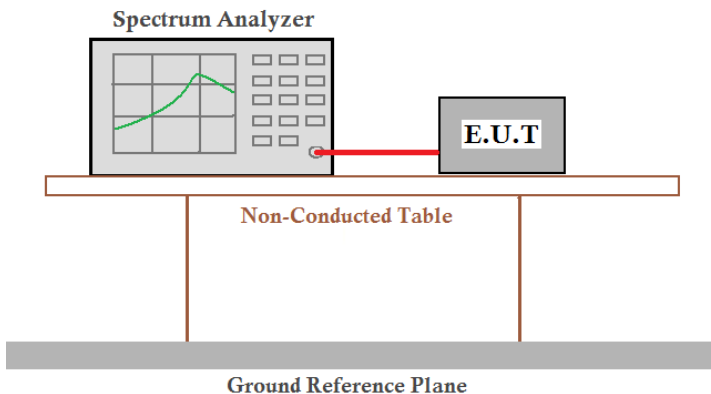


Middle channel



Highest channel

## 6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1), RSS 210 A8.1(b)
Test Method:	DA 00-705, ANSI C63.10:2009
Receiver setup:	RBW=100KHz, VBW=300KHz, detector=Peak
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

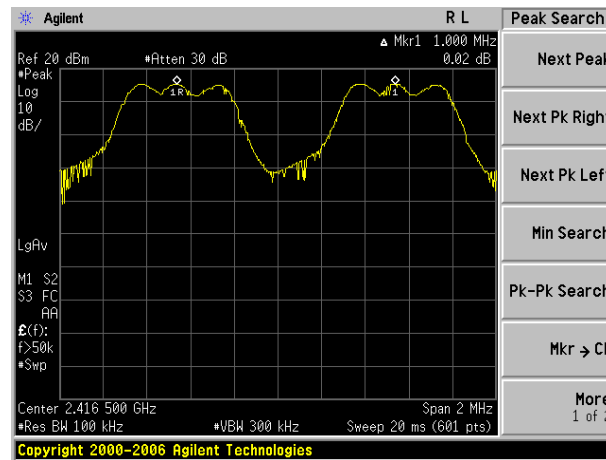
### Measurement Data

GFSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1000	444.7	Pass
Middle	1000	444.7	Pass
Highest	1003	444.7	Pass

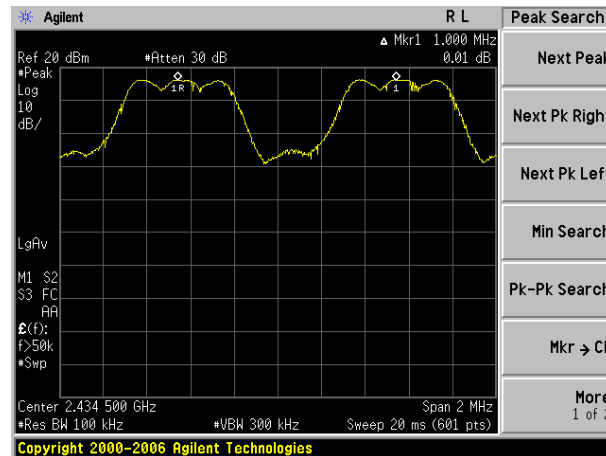
Note: According to section 6.3

Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GFSK	667	444.7

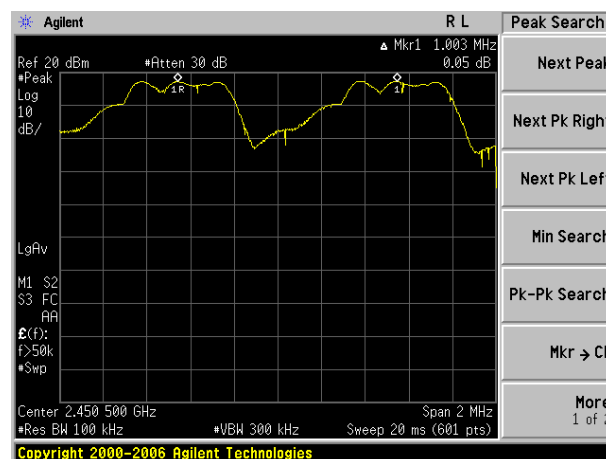
Test plot as follows:



Lowest channel



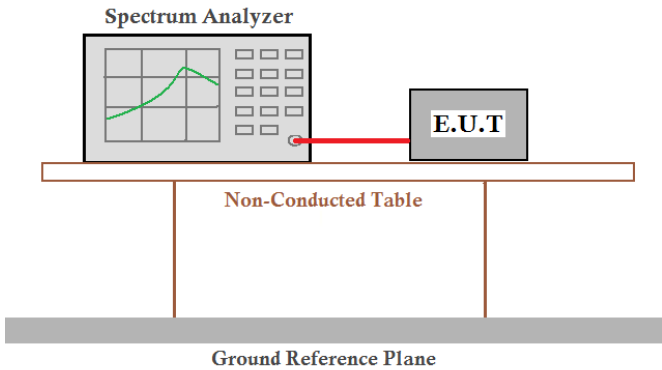
Middle channel



Highest channel

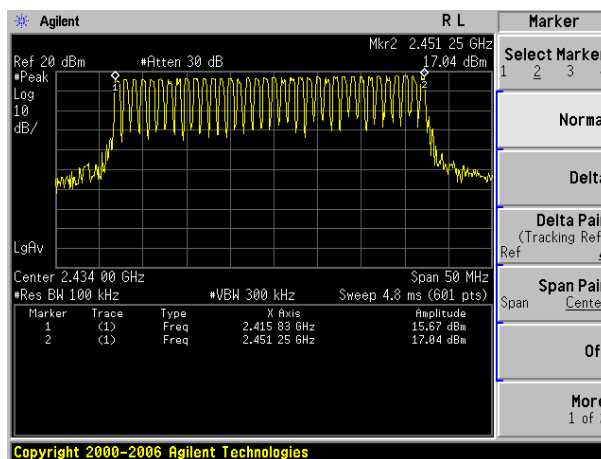


## 6.6 Hopping Channel Number

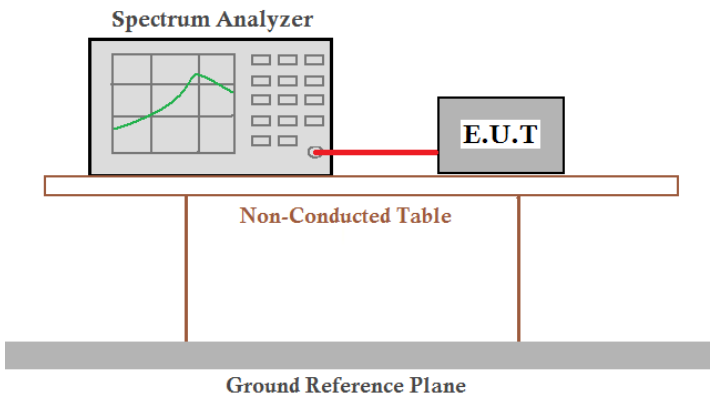
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii), RSS 210 8.1(d)
Test Method:	DA 00-705, ANSI C63.10:2009
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data:

Mode	Hopping channel numbers	Limit	Result
GFSK	36	15	Pass



## 6.7 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii), RSS 210 A8.1(d)
Test Method:	DA 00-705, ANSI C63.10:2009
Receiver setup:	RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

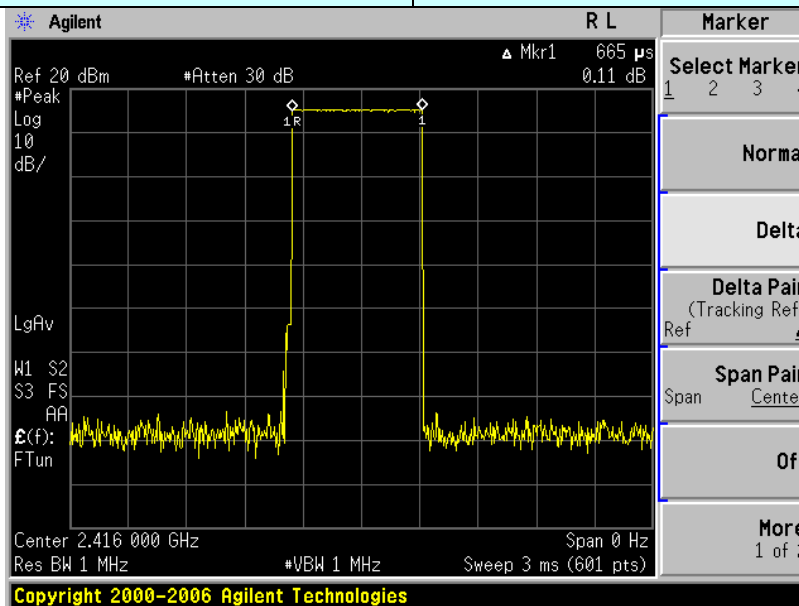
Frequency	Ton (ms)	Dwell time(ms)	Limit(ms)	Result
2.416GHz	0.665	26.81	400	Pass
2.434GHz	0.665	26.81	400	Pass
2.451GHz	0.665	26.81	400	Pass

The formula as below:

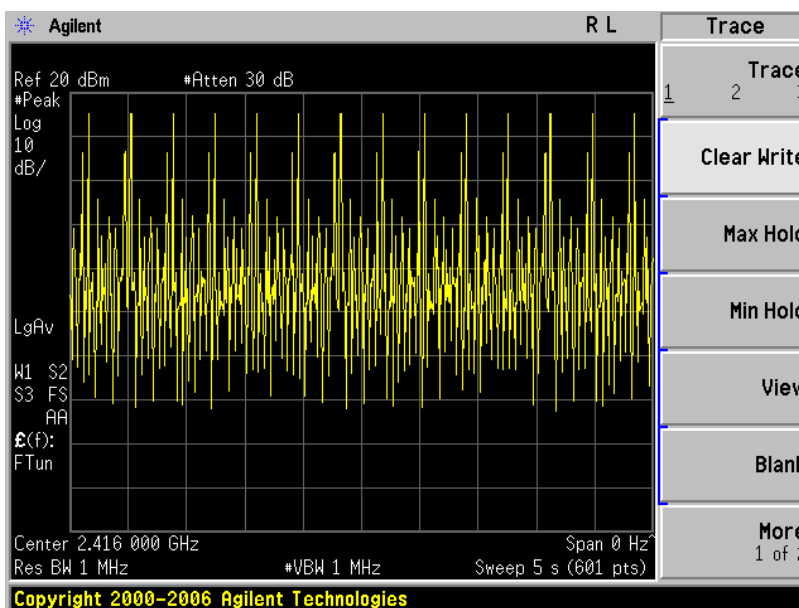
$$\text{Dwell time} = \text{Ton} * \text{Ton times in 1s} * 0.4\text{s} * \text{channel numbers} = 0.665\text{ms} * (14/5) * 0.4 * 36 = 26.81\text{ms}$$

Test plot as follows:

Frequency:	2416MHz
------------	---------

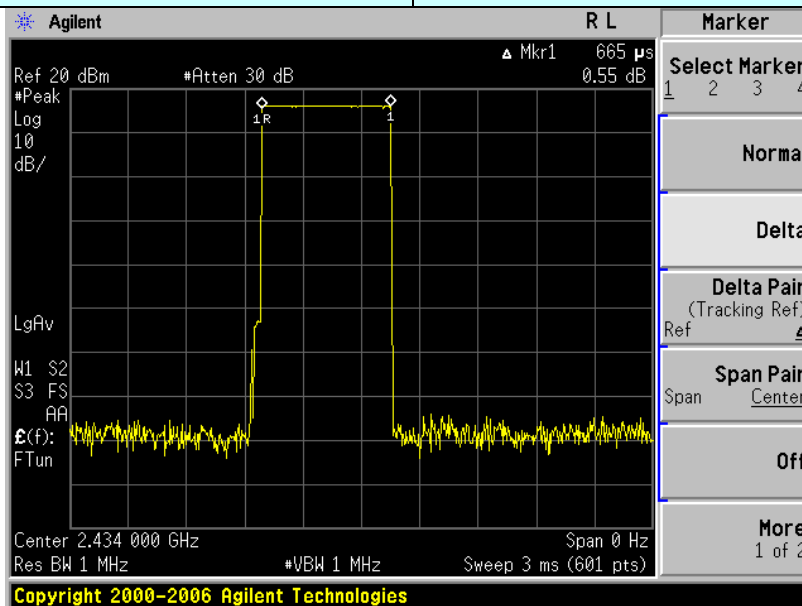


Ton

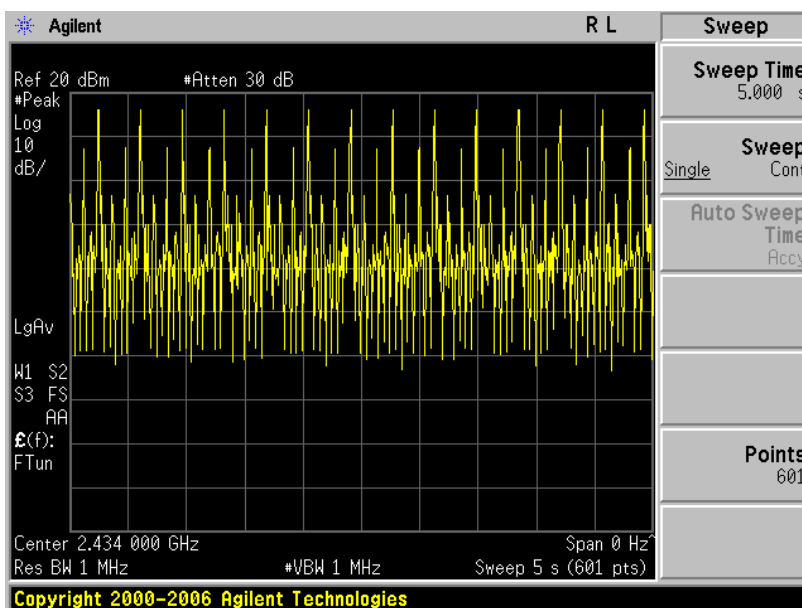


Ton times in 5s

Frequency:	2434MHz
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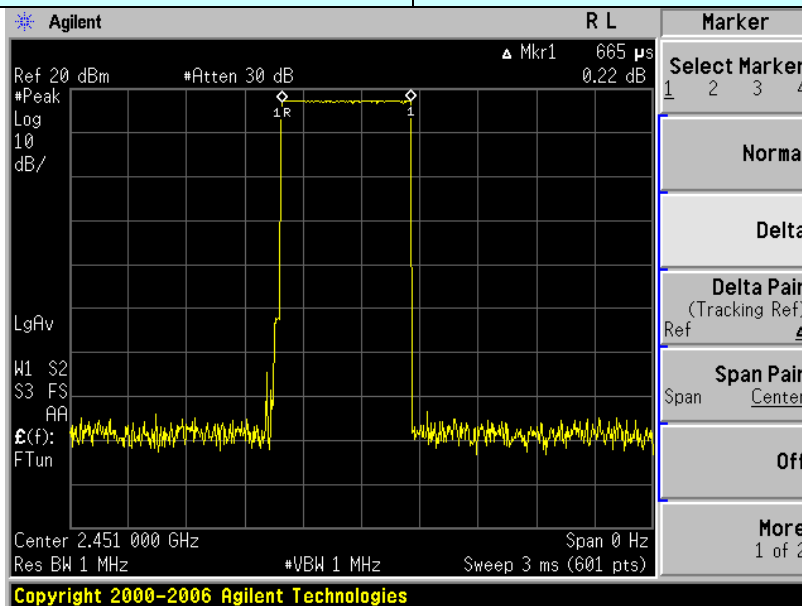


Ton

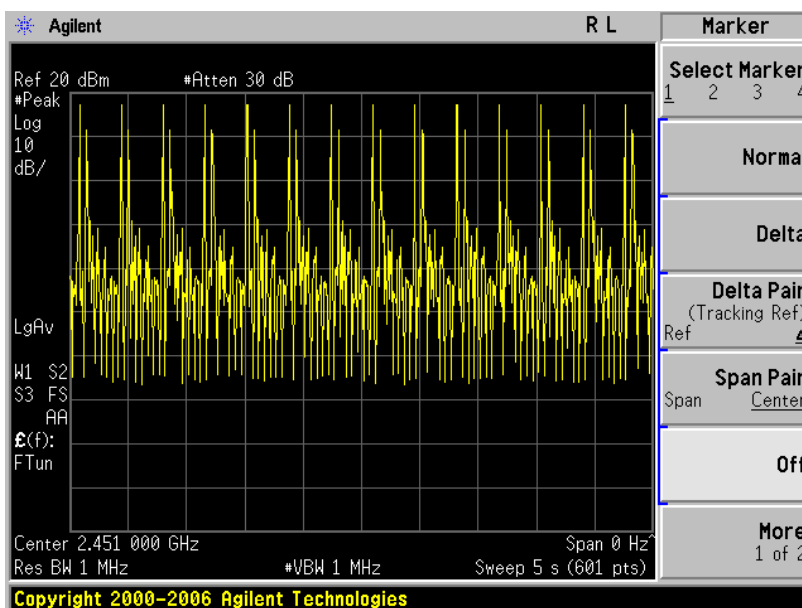


Ton times in 5s

Frequency:	2451MHz
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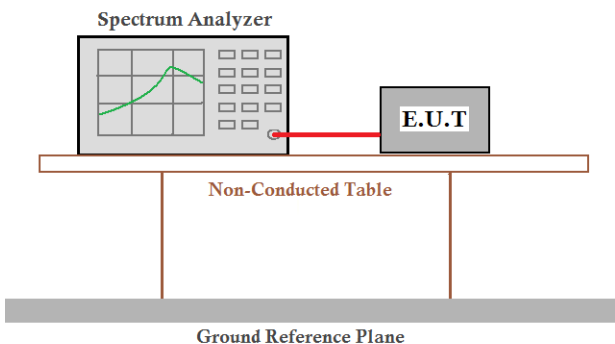
Ton



Ton times in 5s

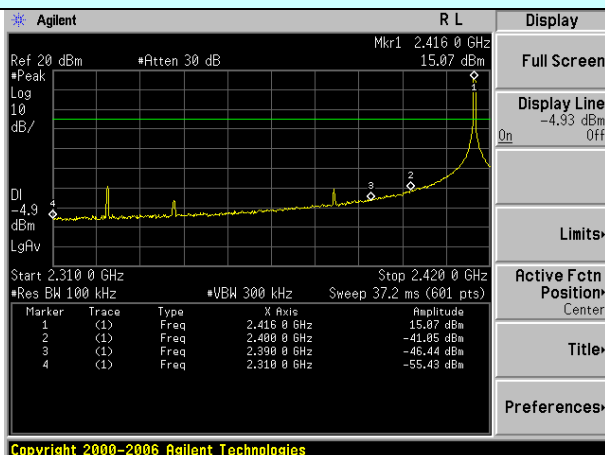
## 6.8 Band Edge

### 6.8.1 Conducted Emission Method

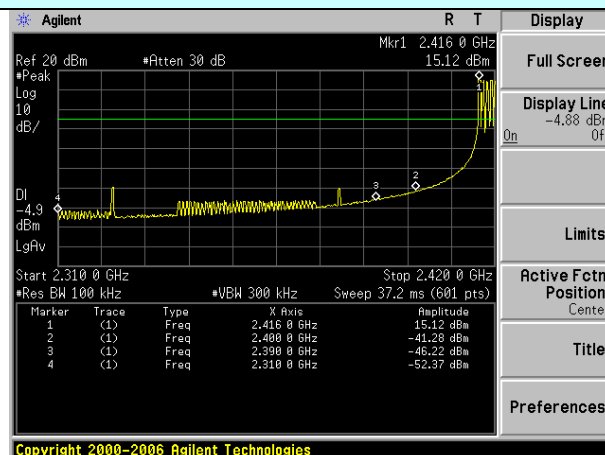
Test Requirement:	FCC Part15 C Section 15.247 (d), RSS-210 A8.5 & RSS-Gen7.2.5
Test Method:	DA 00-705, ANSI C63.10:2009, RSS-Gen
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Test plot as follows:

Test channel:	Lowest channel
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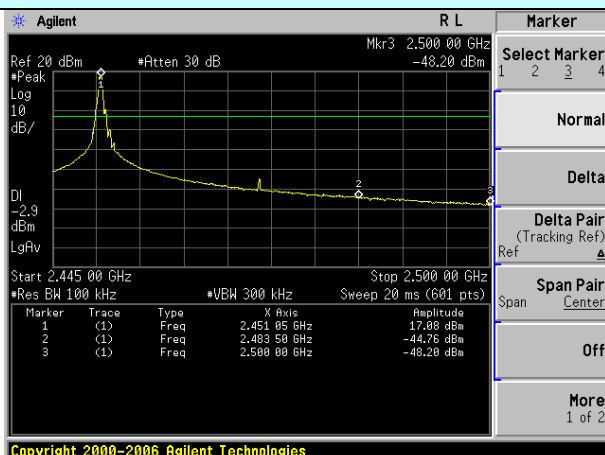


No-hopping mode

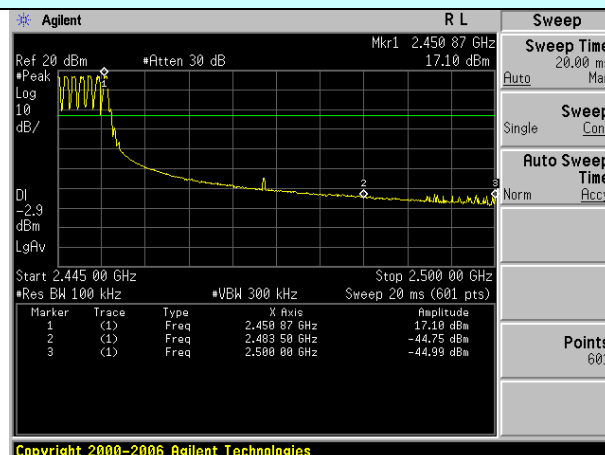


Hopping mode

Test channel:	Highest channel
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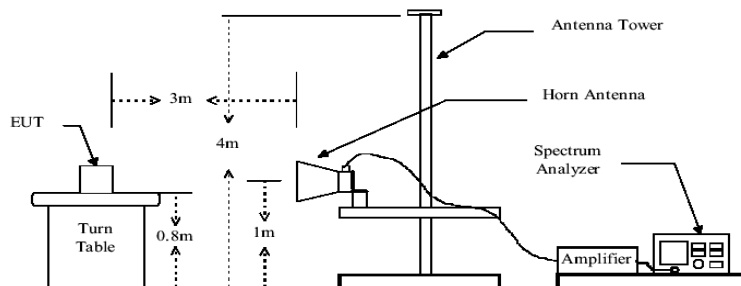


No-hopping mode



Hopping mode

## 6.8.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205, RSS-210 A8.5				
Test Method:	ANSI C63.10: 2009, RSS-Gen				
Test Frequency Range:	All restriction band have been tested, and 2.3GHz to 2.5GHz band is the worse case				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	10Hz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test setup:					
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</div> <div>3. 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.</div> <div>4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>6. 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.</div>				
Test Instruments:	Refer to section 5.8 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				

### Remark:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.



Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	42.10	27.59	5.38	30.18	44.89	74.00	-29.11	Horizontal
2400.00	44.92	27.58	5.39	30.18	47.71	74.00	-26.29	Horizontal
2390.00	43.67	27.59	5.38	30.18	46.46	74.00	-27.54	Vertical
2400.00	45.98	27.58	5.39	30.18	48.77	74.00	-25.23	Vertical

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	31.60	27.59	5.38	30.18	34.39	54.00	-19.61	Horizontal
2400.00	32.85	27.58	5.39	30.18	35.64	54.00	-18.36	Horizontal
2390.00	32.56	27.59	5.38	30.18	35.35	54.00	-18.65	Vertical
2400.00	34.52	27.58	5.39	30.18	37.31	54.00	-16.69	Vertical

Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	45.28	27.53	5.47	29.93	48.35	74.00	-25.65	Horizontal
2500.00	44.55	27.55	5.49	29.93	47.66	74.00	-26.34	Horizontal
2483.50	44.40	27.53	5.47	29.93	47.47	74.00	-26.53	Vertical
2500.00	43.53	27.55	5.49	29.93	46.64	74.00	-27.36	Vertical

**Average value:**

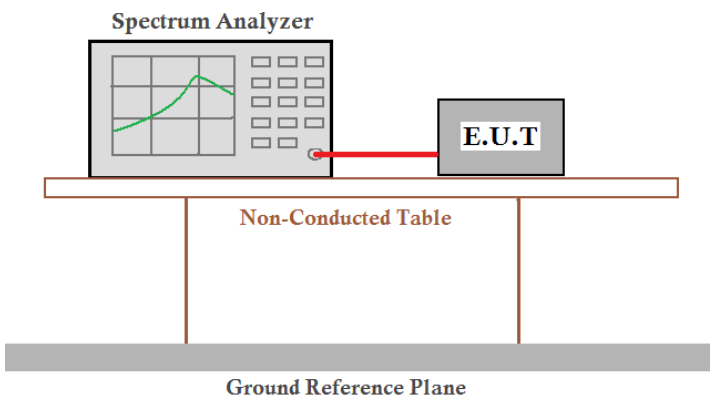
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	37.01	27.53	5.47	29.93	40.08	54.00	-13.92	Horizontal
2500.00	33.69	27.55	5.49	29.93	36.80	54.00	-17.20	Horizontal
2483.50	35.78	27.53	5.47	29.93	38.85	54.00	-15.15	Vertical
2500.00	33.75	27.55	5.49	29.93	36.86	54.00	-17.14	Vertical

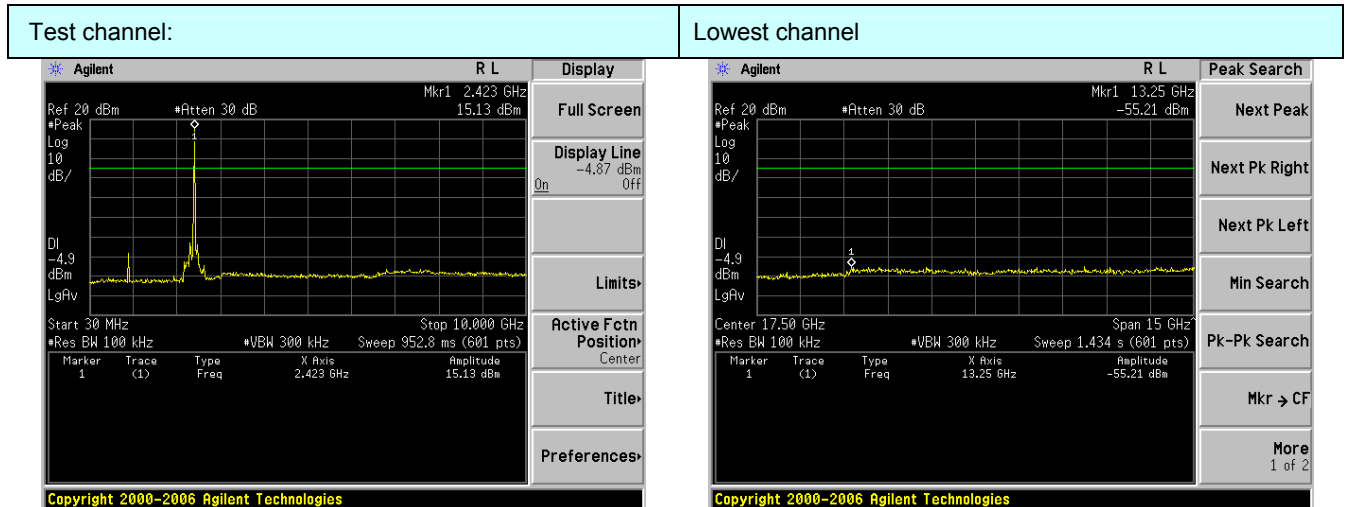
**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 6.9 Spurious Emission

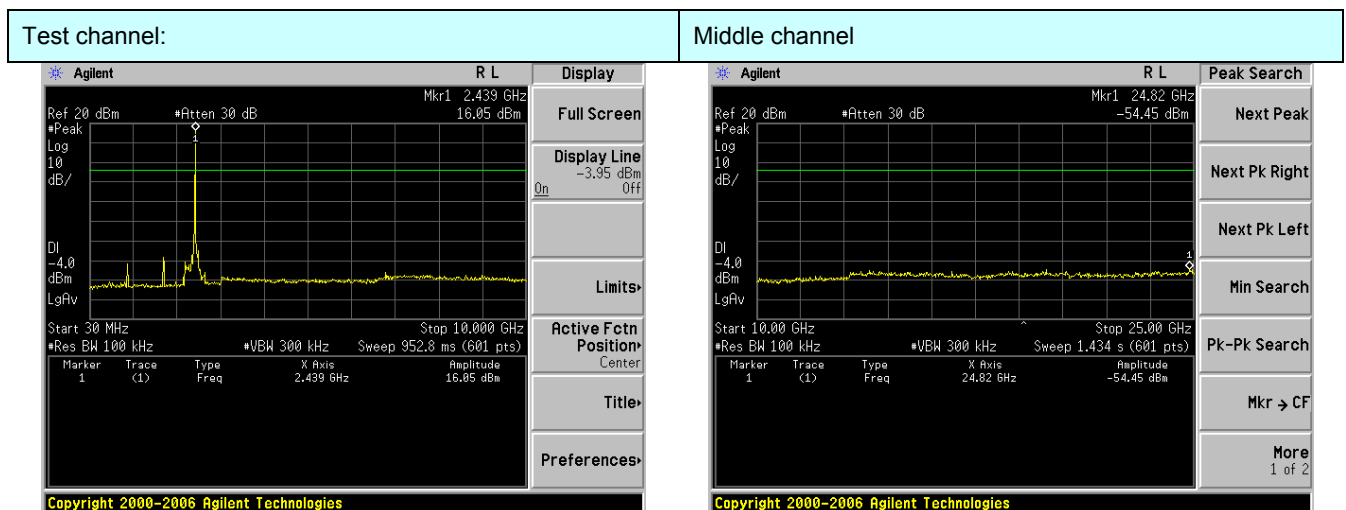
### 6.9.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d), RSS-210 A8.5 & RSS-Gen7.2.5
Test Method:	ANSI C63.10:2009, RSS-Gen
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emissions. A Spectrum Analyzer is connected to an Equipment Under Test (E.U.T.) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass



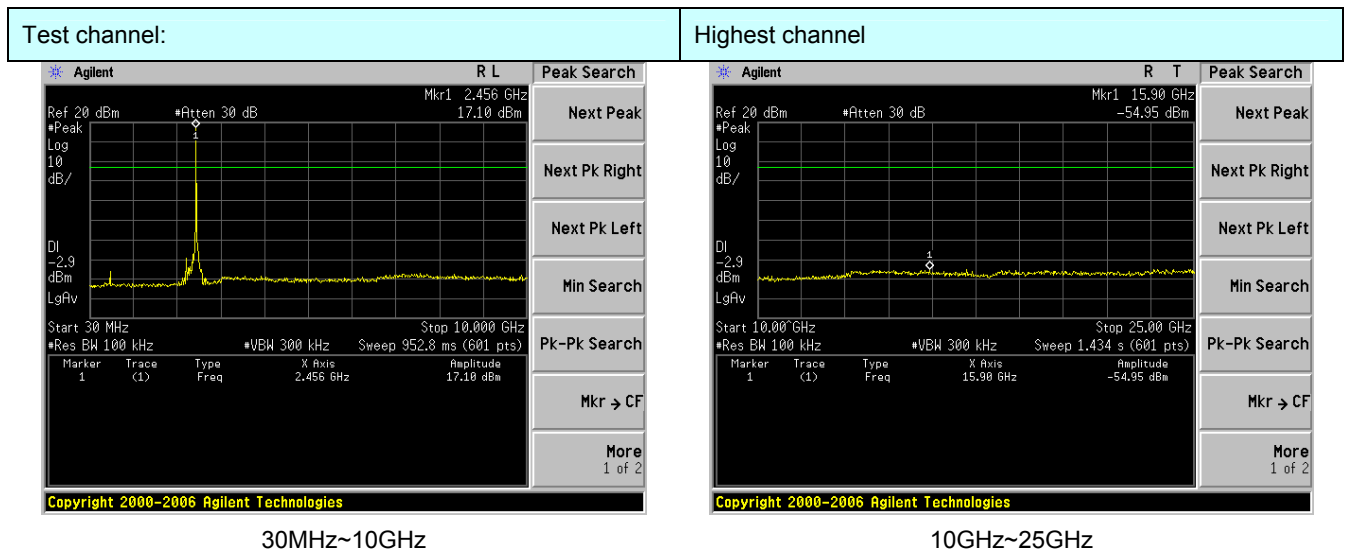
30MHz~10GHz

10GHz~25GHz

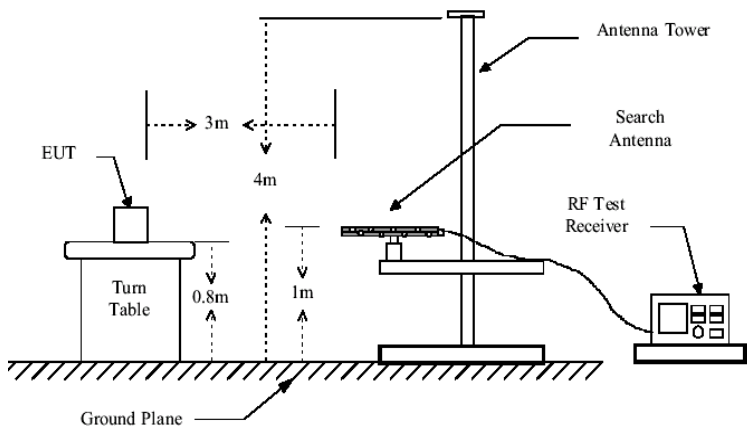


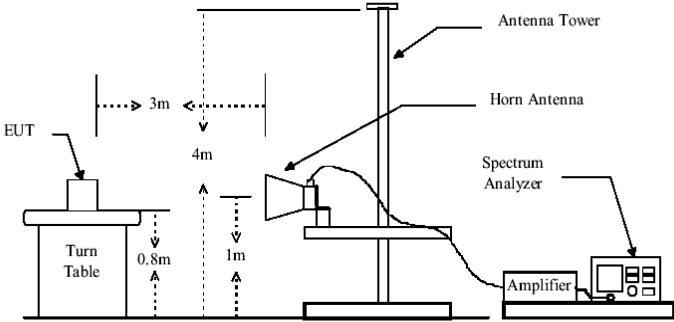
30MHz~10GHz

10GHz~25GHz



## 6.9.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209, RSS-210 A8.5 & RSS-Gen7.2.5				
Test Method:	ANSI C63.10: 2009, RSS-Gen				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	2400MHz-2483.5MHz	94.00		Average Value	
		114.00		Peak Value	
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-1.705MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	300m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Test setup:	Below 1GHz				
	<div></div>				
Test setup:	Above 1GHz				

	 <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a turn table at a height of 0.8m. The turn table is rotated 360 degrees. The EUT is positioned 3m away from the antenna tower. The antenna tower has a horn antenna at a height of 4m. A spectrum analyzer is connected to the antenna tower via an amplifier. The antenna height is varied from 1m to 4m.</p>
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. 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.</li> <li>4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. 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.</li> </ol>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

## Remark:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

**Measurement data:**
**■ Below 30MHz**

Frequency (kHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit @3m (dBuV/m)	Over Limit (dB)	ANT. Polarization
125.00	54.37	21.27	0.18	0.00	75.82	105.67	-29.85	Vertical
250.00	*					99.65		Vertical
375.00	*					96.12		Vertical
125.00	58.58	21.27	0.18	0.00	70.03	105.67	-35.64	Horizontal
250.00	*					99.65		Horizontal
375.00	*					96.12		Horizontal

**Remark:**

1.  $\text{Limit dBuV/m @3m} = \text{Limit dBuV/m @300m} + 80$ ,  $\text{Limit dBuV/m @3m} = \text{Limit dBuV/m @30m} + 40$
  2.  $\text{Final Level} = \text{Receiver Read level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamplifier Factor}$
  3. The emission levels of other frequencies are very lower than the limit and not show in test report.
- “\*” means this data is too weak instrument of signal is unable to test.

**■ 30MHz ~ 1GHz**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
47.16	41.21	16.53	0.74	31.99	26.49	40.00	-13.51	Vertical
68.63	41.07	13.29	0.93	31.89	23.40	40.00	-16.60	Vertical
100.23	38.61	16.08	1.19	31.76	24.12	43.50	-19.38	Vertical
239.99	40.63	15.07	2.07	32.16	25.61	46.00	-20.39	Vertical
390.72	40.62	16.92	2.81	31.91	28.44	46.00	-17.56	Vertical
942.13	39.97	23.95	5.01	31.21	37.72	46.00	-8.28	Vertical
40.42	38.95	16.58	0.66	32.05	24.14	40.00	-15.86	Horizontal
52.95	38.20	16.20	0.80	31.95	23.25	40.00	-16.75	Horizontal
102.36	38.49	15.98	1.21	31.77	23.91	43.50	-19.59	Horizontal
240.83	40.19	15.07	2.08	32.16	25.18	46.00	-20.82	Horizontal
755.39	39.37	22.53	4.29	31.26	34.93	46.00	-11.07	Horizontal
935.55	38.66	23.96	4.99	31.20	36.41	46.00	-9.59	Horizontal

## ■ Above 1GHz

Test channel:	Lowest
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### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4832.00	35.30	31.81	8.62	24.15	51.58	74.00	-22.42	Vertical
7248.00	34.54	36.24	11.68	26.52	55.94	74.00	-18.06	Vertical
9664.00	33.11	38.07	14.18	25.42	59.94	74.00	-14.06	Vertical
12080.00	*					74.00		Vertical
14496.00	*					74.00		Vertical
4832.00	31.40	31.81	8.62	24.15	47.68	74.00	-26.32	Horizontal
7248.00	32.43	36.24	11.68	26.52	53.83	74.00	-20.17	Horizontal
9664.00	29.81	38.07	14.18	25.42	56.64	74.00	-17.36	Horizontal
12080.00	*					74.00		Horizontal
14496.00	*					74.00		Horizontal

### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4832.00	21.26	31.81	8.62	24.15	37.54	54.00	-16.46	Vertical
7248.00	20.62	36.24	11.68	26.52	42.02	54.00	-11.98	Vertical
9664.00	20.78	38.07	14.18	25.42	47.61	54.00	-6.39	Vertical
12080.00	*					54.00		Vertical
14496.00	*					54.00		Vertical
4832.00	17.18	31.81	8.62	24.15	33.46	54.00	-20.54	Horizontal
7248.00	17.61	36.24	11.68	26.52	39.01	54.00	-14.99	Horizontal
9664.00	17.80	38.07	14.18	25.42	44.63	54.00	-9.37	Horizontal
12080.00	*					54.00		Horizontal
14496.00	*					54.00		Horizontal

### Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test channel:	Middle
---------------	--------

**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4868.00	35.75	31.83	8.64	24.12	52.10	74.00	-21.90	Vertical
7302.00	35.72	36.33	11.71	26.65	57.11	74.00	-16.89	Vertical
9736.00	32.53	38.27	14.23	25.38	59.65	74.00	-14.35	Vertical
12170.00	*					74.00		Vertical
14604.00	*					74.00		Vertical
4868.00	32.04	31.83	8.64	24.12	48.39	74.00	-25.61	Horizontal
7302.00	31.53	36.33	11.71	26.65	52.92	74.00	-21.08	Horizontal
9736.00	28.83	38.27	14.23	25.38	55.95	74.00	-18.05	Horizontal
12170.00	*					74.00		Horizontal
14604.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4868.00	22.58	31.83	8.64	24.12	38.93	54.00	-15.07	Vertical
7302.00	21.48	36.33	11.71	26.65	42.87	54.00	-11.13	Vertical
9736.00	20.47	38.27	14.23	25.38	47.59	54.00	-6.41	Vertical
12170.00	*					54.00		Vertical
14604.00	*					54.00		Vertical
4868.00	18.69	31.83	8.64	24.12	35.04	54.00	-18.96	Horizontal
7302.00	18.47	36.33	11.71	26.65	39.86	54.00	-14.14	Horizontal
9736.00	17.91	38.27	14.23	25.38	45.03	54.00	-8.97	Horizontal
12170.00	*					54.00		Horizontal
14604.00	*					54.00		Horizontal

**Remark:**

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“\*”*, means this data is the too weak instrument of signal is unable to test.
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test channel:	Highest
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4902.00	34.56	31.88	8.68	24.08	51.04	74.00	-22.96	Vertical
7353.00	34.74	36.45	11.74	26.84	56.09	74.00	-17.91	Vertical
9804.00	30.06	38.43	14.29	25.33	57.45	74.00	-16.55	Vertical
12255.00	*					74.00		Vertical
14706.00	*					74.00		Vertical
4902.00	31.64	31.88	8.68	24.08	48.12	74.00	-25.88	Horizontal
7353.00	31.74	36.45	11.74	26.84	53.09	74.00	-20.91	Horizontal
9804.00	27.37	38.43	14.29	25.33	54.76	74.00	-19.24	Horizontal
12255.00	*					74.00		Horizontal
14706.00	*					74.00		Horizontal

## Average value:

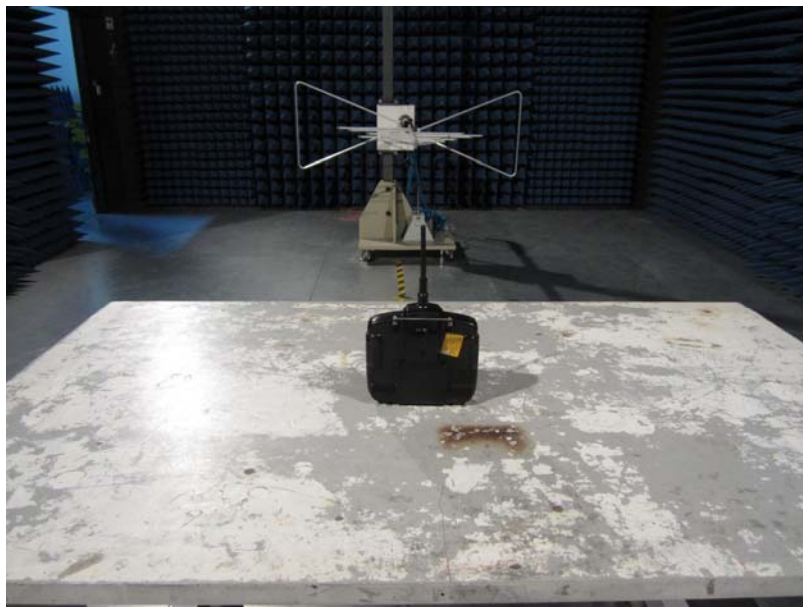
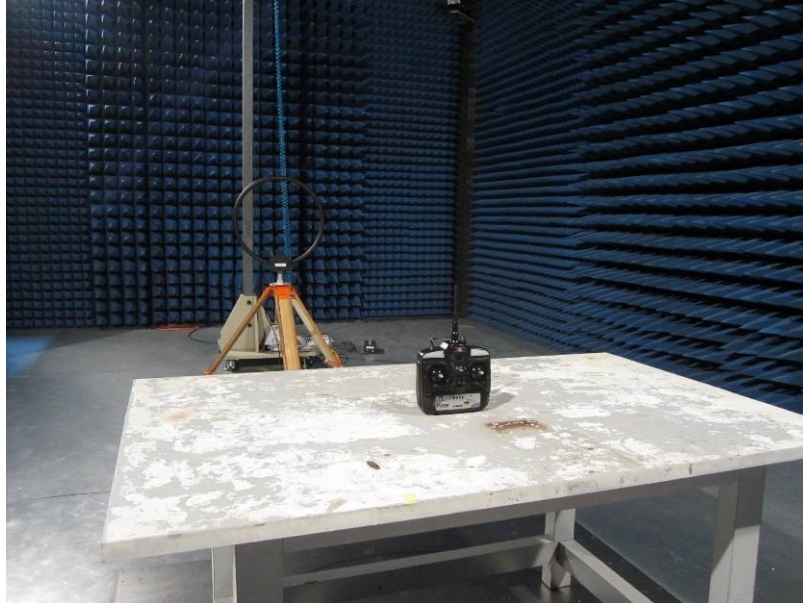
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4902.00	23.13	31.88	8.68	24.08	39.61	54.00	-14.39	Vertical
7353.00	23.61	36.45	11.74	26.84	44.96	54.00	-9.04	Vertical
9804.00	19.31	38.43	14.29	25.33	46.70	54.00	-7.30	Vertical
12255.00	*					54.00		Vertical
14706.00	*					54.00		Vertical
4902.00	20.03	31.88	8.68	24.08	36.51	54.00	-17.49	Horizontal
7353.00	20.66	36.45	11.74	26.84	42.01	54.00	-11.99	Horizontal
9804.00	17.92	38.43	14.29	25.33	45.31	54.00	-8.69	Horizontal
12255.00	*					54.00		Horizontal
14706.00	*					54.00		Horizontal

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 7 Test Setup Photo

Radiated Emission



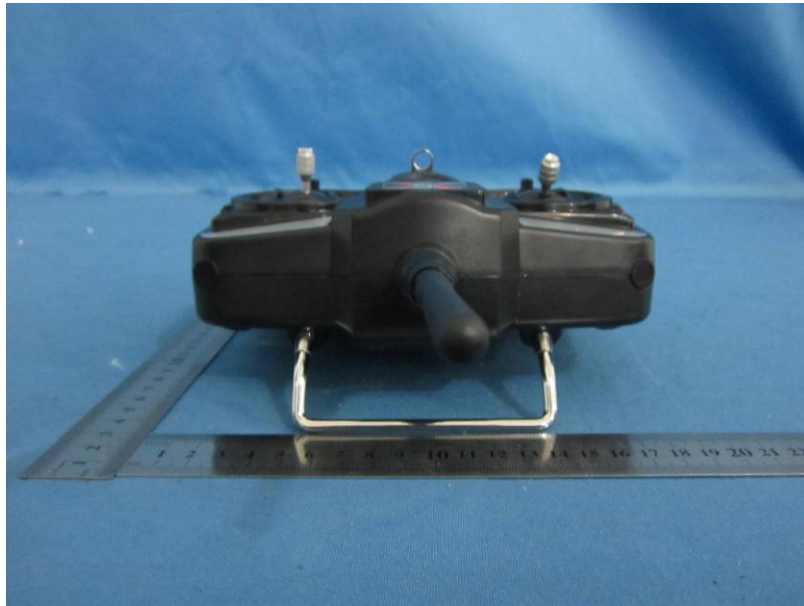


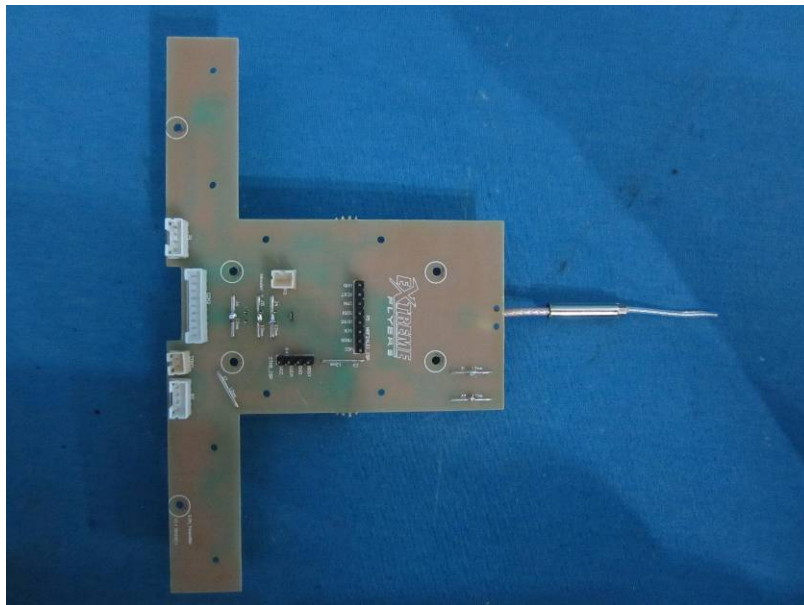
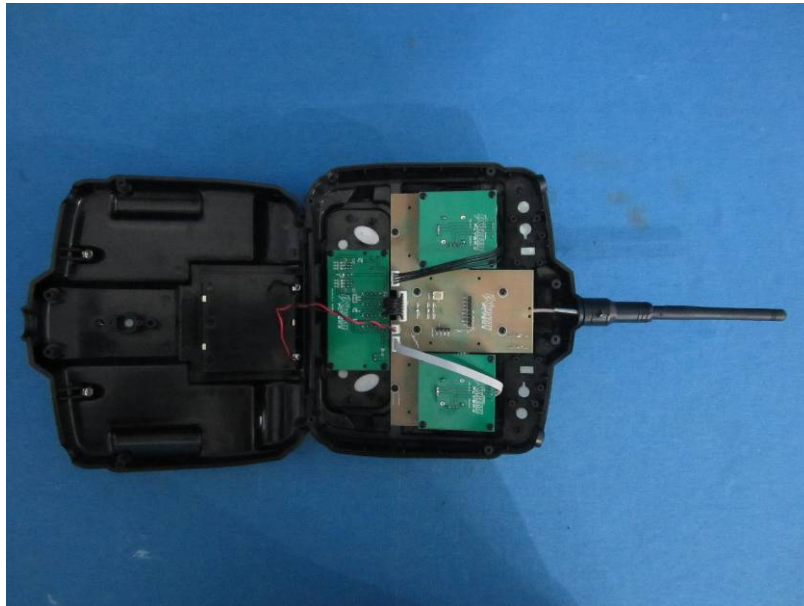
## 8 EUT Constructional Details



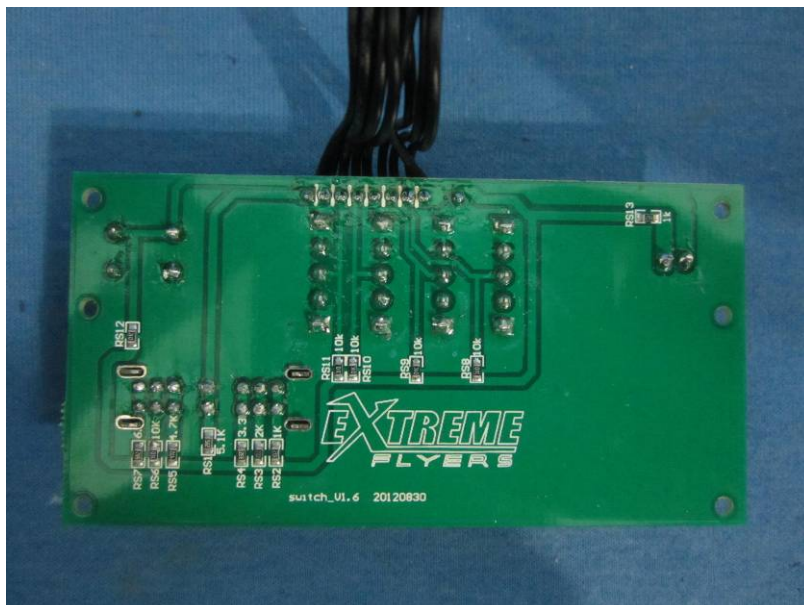
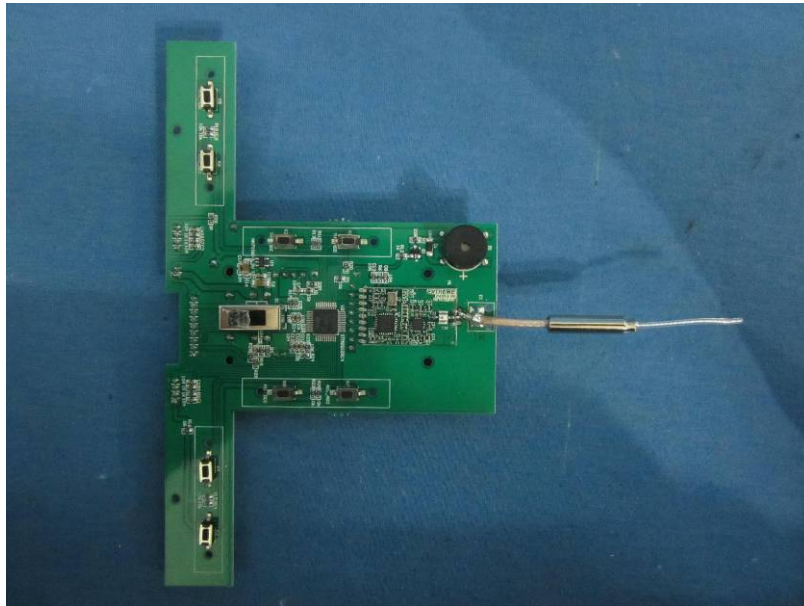


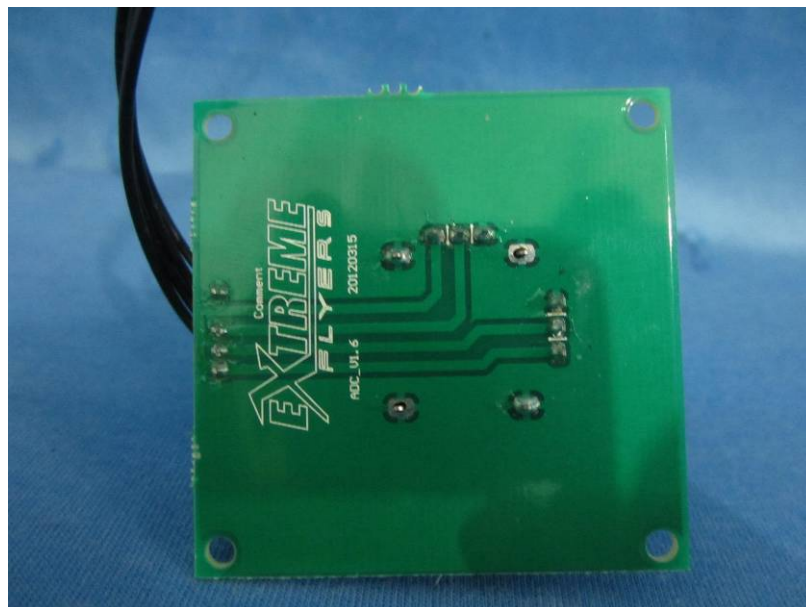


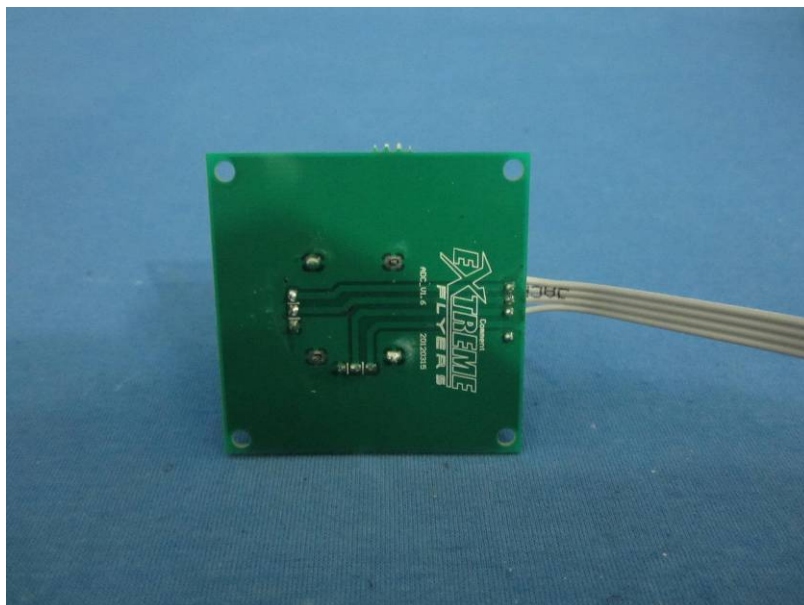
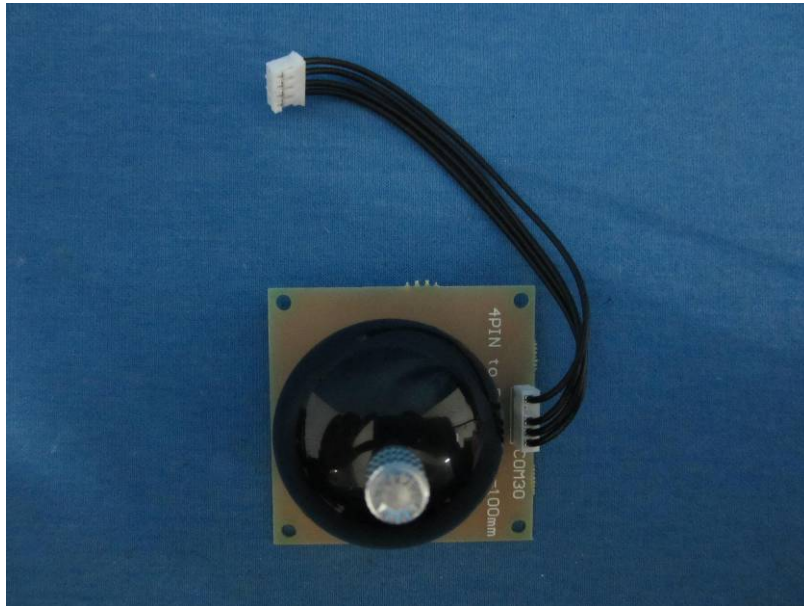












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