Global Unite Technology Co., Ltd.
环球众一科技有限公司

Telephone: +86 (0) 755 2779 8480
Fax: +86 (0) 755 2779 8960

FCC REPORT

Application No:	GTS10040002RF
Applicant:	Shenzhen Dianxuntong Electronics Co., LTD.
Equipment Under Test (EUT)	
Name:	Computer wireless mouse
Model No.	imouse M10, imouse M11, imouse M12, imouse M13, OP-1000RF
Operation Frequency:	2406MHz~2468MHz
FCC ID:	YBP-DXTM001
Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of Receipt:	26 March 2010
Date of Test:	27 March to 4 April 2010
Date of Issue:	4 April 2010
Test Result :	**PASS ***

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

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Contents

3 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Passed
Field strength of the fundamental signal	15.249 (a)	Passed
Spurious emissions	15.209/15.205	Passed
20dB Occupied Bandwidth	15.215 (c)	Passed

Remark:

1>. Passed: The EUT complies with the essential requirements in the standard.

2>.Model No. imouse M10, imouse M11, imouse M12, imouse M13, OP-1000RF

Only the model No. imouse M10 was tested, since the electrical circuit design, PCB layout, Electrical Parts and figure are identical to the basic model, except the outer decoration.

4 General Information

4.1 Client Information

Applicant:	Shenzhen Dianxuntong Electronics Co., LTD.
Address of Applicant:	5-6 floor, D building , Huafong First Technology Park, Sanwei, Baoan, Shenzhen, China
Manufacturer/ Factory:	NA
Address of Manufacturer/ Factory:	NA

4.2 General Description of E.U.T.

Product Name:	Computer wireless mouse
Item No.:	imouse M10, imouse M11, imouse M12, imouse M13, OP-1000RF
Operation Frequency:	2406MHz~2468MHz
Channel numbers:	32
Channel separation:	2MHz
Modulation type:	GFSK
Antenna Type:	Integral
Antenna gain:	2dBi
Power supply:	2*1.5V("AAA" size)=3.0V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2406MHz	9	2422MHz	17	2438MHz	25	2454MHz
2	2408MHz	10	2424MHz	18	2440MHz	26	2456MHz
3	2410MHz	11	2426MHz	19	2442MHz	27	2458MHz
4	2412MHz	12	2428MHz	20	2444MHz	28	2460MHz
5	2414MHz	13	2430MHz	21	2446MHz	29	2462MHz
6	2416MHz	14	2432MHz	22	2448MHz	30	2464MHz
7	2418MHz	15	2434MHz	23	2450MHz	31	2466MHz
8	2420MHz	16	2436MHz	24	2452MHz	32	2468MHz

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	Channel	Frequency	Channel	Frequency
The lowest channel	2406MHz	The middle channel	2436MHz	The Highest channel	2468MHz

4.3 E.U.T Operation mode

Operating Environment:

Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar

Test mode:

Normal operation mode:

Transmitting mode: Keep the EUT in transmitting mode with modulation.

4.4 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057 Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

4.5 Other Information Requested by the Customer

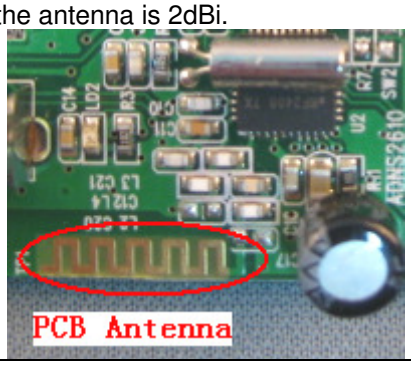
None.

4.6 Test Instruments list:

Radiated emissions						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2009	15-06-2010
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	18-06-2009	17-06-2010
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2009	17-06-2010
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2009	11-08-2010
6	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2009	11-08-2010
7	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2009	11-08-2010
8	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2009	17-06-2010
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2009	17-06-2010
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	SEL0080	18-06-2009	17-06-2010
11	Band filter	Amindeon	82346	SEL0094	18-06-2009	17-06-2010

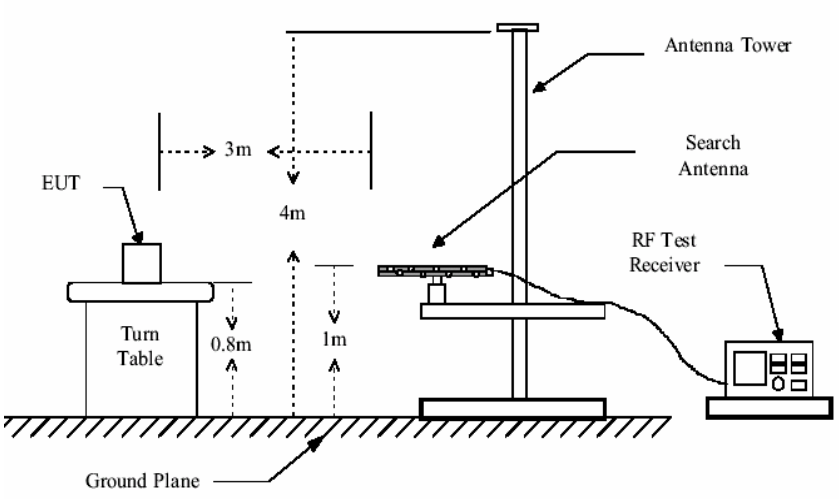
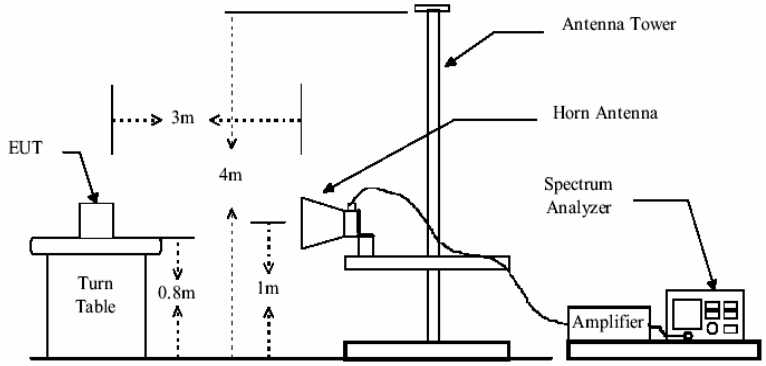
5 Test results and Measurement Data

5.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 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.	
E.U.T Antenna:	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2dBi.  	

5.2 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.249, 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 25000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td rowspan="2">2400MHz-2483.5MHz</td><td>94.0</td><td>Average Value</td></tr>
<tr><td>114.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(band edge)</td><td>Emissions 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.</td></tr>
<tr><td>Test Procedure:</td><td>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. 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.
d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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.</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 4.7 for details
Test mode:	Transmitting mode
Test results:	Passed

Note:
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

Measurement Data

5.2.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2406	6.39	32.30	38.88	83.42	83.23	114.00	-30.77	Horizontal
2406	6.39	32.30	38.88	82.10	81.91	114.00	-32.09	Vertical
2436	6.45	32.43	39.18	85.53	85.23	114.00	-28.77	Horizontal
2436	6.45	32.43	39.18	82.58	82.28	114.00	-31.72	Vertical
2468	6.54	32.55	39.54	88.98	88.53	114.00	-25.47	Horizontal
2468	6.54	32.55	39.54	89.04	88.59	114.00	-25.41	Vertical

Average value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2406	6.39	32.30	38.88	76.85	76.66	94.00	-17.34	Horizontal
2406	6.39	32.30	38.88	77.68	77.49	94.00	-16.51	Vertical
2436	6.45	32.43	39.18	75.14	74.84	94.00	-19.16	Horizontal
2436	6.45	32.43	39.18	79.05	78.75	94.00	-15.25	Vertical
2468	6.54	32.55	39.54	82.57	82.12	94.00	-11.88	Horizontal
2468	6.54	32.55	39.54	83.67	83.22	94.00	-10.78	Vertical

5.2.2 Spurious Emissions

30MHz~1GHz		
Test mode:	Transmitting	

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
39.700	0.60	11.30	28.09	47.20	31.01	40.00	-8.99	Vertical
118.27	1.25	8.02	27.70	46.99	28.56	43.50	-14.94	Vertical
129.91	1.28	7.70	27.61	49.29	30.66	43.50	-12.84	Vertical
144.46	1.31	8.53	27.49	46.35	28.70	43.50	-14.80	Vertical
432.55	2.34	16.56	27.52	47.40	38.78	46.00	-7.22	Vertical
797.27	3.20	22.09	26.95	39.61	37.95	46.00	-8.05	Vertical
78.50	1.05	7.59	28.00	39.12	19.76	40.00	-20.24	Horizontal
118.27	1.25	8.02	27.70	43.50	25.07	43.50	-18.43	Horizontal
129.91	1.28	7.70	27.61	51.67	33.04	43.50	-10.46	Horizontal
144.46	1.31	8.53	27.49	41.60	23.95	43.50	-19.55	Horizontal
710.94	2.94	21.60	27.24	37.50	34.80	46.00	-11.20	Horizontal
749.74	3.06	21.70	27.11	44.39	40.04	46.00	-5.96	Horizontal

Above 1GHz					
Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.0	6.28	29.98	39.03	52.49	49.72	74.00	-24.28	Vertical
2400.0	6.34	30.03	38.87	54.18	51.68	74.00	-22.32	Vertical
4810.4	9.36	34.25	41.53	53.68	55.76	74.00	-18.24	Vertical
7215.6	13.30	37.24	40.88	48.65	58.31	74.00	-15.69	Vertical
9620.8	13.39	37.99	37.56	46.63	60.45	74.00	-13.55	Vertical
12026.0	16.45	39.10	39.09	45.95	62.41	74.00	-11.59	Vertical
2390.0	6.28	29.98	39.03	51.94	49.17	74.00	-24.83	Horizontal
2400.0	6.34	30.03	38.87	53.69	51.19	74.00	-22.81	Horizontal
4810.4	9.36	34.25	41.53	54.87	56.95	74.00	-17.05	Horizontal
7215.6	13.30	37.24	40.88	49.38	59.04	74.00	-14.96	Horizontal
9620.8	13.39	37.99	37.56	46.94	60.76	74.00	-13.24	Horizontal
12026.0	16.45	39.10	39.09	44.75	61.21	74.00	-12.79	Horizontal

Test mode:	Transmitting	Test channel:	Lowest	Remark:	average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.0	6.28	29.98	39.03	36.45	33.68	54.00	-20.32	Vertical
2400.0	6.34	30.03	38.87	39.58	37.08	54.00	-16.92	Vertical
4810.4	9.36	34.25	41.53	32.94	35.02	54.00	-18.98	Vertical
7215.6	13.30	37.24	40.88	29.47	39.13	54.00	-14.87	Vertical
9620.8	13.39	37.99	37.56	29.68	43.50	54.00	-10.50	Vertical
12026.0	16.45	39.10	39.09	29.43	45.89	54.00	-8.11	Vertical
2390.0	6.28	29.98	39.03	35.77	33.00	54.00	-21.00	Horizontal
2400.0	6.34	30.03	38.87	38.59	36.09	54.00	-17.91	Horizontal
4810.4	9.36	34.25	41.53	36.70	38.78	54.00	-15.22	Horizontal
7215.6	13.30	37.24	40.88	31.66	41.32	54.00	-12.68	Horizontal
9620.8	13.39	37.99	37.56	29.99	43.81	54.00	-10.19	Horizontal
12026.0	16.45	39.10	39.09	27.83	44.29	54.00	-9.71	Horizontal

Test mode:	Transmitting	Test channel:	Middle	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.0	6.28	29.98	39.03	53.64	50.87	74.00	-23.13	Vertical
2500.0	5.76	30.37	39.15	56.10	53.08	74.00	-20.92	Vertical
4878.4	10.36	34.34	39.89	51.48	56.29	74.00	-17.71	Vertical
7317.6	12.91	37.31	40.40	48.52	58.34	74.00	-15.66	Vertical
9756.8	13.89	38.03	37.94	46.42	60.40	74.00	-13.60	Vertical
12195.0	18.03	39.21	39.27	43.65	61.62	74.00	-12.38	Vertical
2390.0	6.28	29.98	39.03	55.29	52.52	74.00	-21.48	Horizontal
2500.0	5.76	30.37	39.15	53.64	50.62	74.00	-23.38	Horizontal
4878.4	10.36	34.34	39.89	50.51	55.32	74.00	-18.68	Horizontal
7317.6	12.91	37.31	40.40	47.95	57.77	74.00	-16.23	Horizontal
9756.8	13.89	38.03	37.94	45.67	59.65	74.00	-14.35	Horizontal
12195.0	18.03	39.21	39.27	42.31	60.28	74.00	-13.72	Horizontal

Test mode:	Transmitting	Test channel:	Middle	Remark:	average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.0	6.28	29.98	39.03	36.94	34.17	54.00	-19.83	Vertical
2500.0	5.76	30.37	39.15	38.14	35.12	54.00	-18.88	Vertical
4878.4	10.36	34.34	39.89	32.66	37.47	54.00	-16.53	Vertical
7317.6	12.91	37.31	40.40	33.92	43.74	54.00	-10.26	Vertical
9756.8	13.89	38.03	37.94	32.03	46.01	54.00	-7.99	Vertical
12195.0	18.03	39.21	39.27	29.58	47.55	54.00	-6.45	Vertical
2390.0	6.28	29.98	39.03	37.51	34.74	54.00	-19.26	Horizontal
2500.0	5.76	30.37	39.15	37.84	34.82	54.00	-19.18	Horizontal
4878.4	10.36	34.34	39.89	31.58	36.39	54.00	-17.61	Horizontal
7317.6	12.91	37.31	40.40	30.49	40.31	54.00	-13.69	Horizontal
9756.8	13.89	38.03	37.94	30.01	43.99	54.00	-10.01	Horizontal
12195.0	18.03	39.21	39.27	28.05	46.02	54.00	-7.98	Horizontal

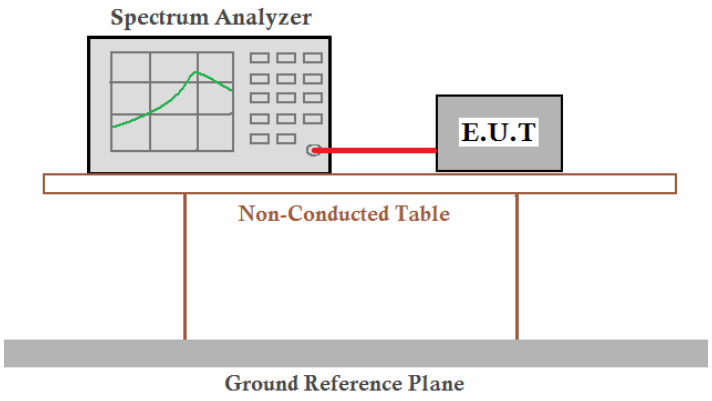
Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2327.8	6.02	29.76	39.75	53.69	49.72	74.00	-24.28	Vertical
2483.5	6.22	30.32	39.53	58.92	55.93	74.00	-18.07	Vertical
2500.0	5.76	30.37	39.15	54.69	51.67	74.00	-22.33	Vertical
4952.4	10.43	34.45	41.03	52.48	56.33	74.00	-17.67	Vertical
7428.6	12.72	37.37	40.01	48.16	58.24	74.00	-15.76	Vertical
9904.8	14.21	38.07	37.85	45.27	59.70	74.00	-14.30	Vertical
2351.3	6.14	29.86	39.43	54.16	50.73	74.00	-23.27	Horizontal
2483.5	6.22	30.32	39.53	57.92	54.93	74.00	-19.07	Horizontal
2500.0	5.76	30.37	39.15	55.28	52.26	74.00	-21.74	Horizontal
4952.4	10.43	34.45	41.03	53.48	57.33	74.00	-16.67	Horizontal
7428.6	12.72	37.37	40.01	49.89	59.97	74.00	-14.03	Horizontal
12381.0	17.55	39.34	39.48	45.95	63.36	74.00	-10.64	Horizontal

Test mode:	Transmitting	Test channel:	Highest	Remark:	average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	6.22	30.32	39.53	38.75	35.76	54.00	-18.24	Vertical
2500.0	5.76	30.37	39.15	36.86	33.84	54.00	-20.16	Vertical
4952.4	10.43	34.45	41.03	33.61	37.46	54.00	-16.54	Vertical
7428.6	12.72	37.37	40.01	29.67	39.75	54.00	-14.25	Vertical
9904.8	14.21	38.07	37.85	26.48	40.91	54.00	-13.09	Vertical
12381.0	17.55	39.34	39.48	25.07	42.48	54.00	-11.52	Vertical
2483.5	6.22	30.32	39.53	39.43	36.44	54.00	-17.56	Horizontal
2500.0	5.76	30.37	39.15	35.97	32.95	54.00	-21.05	Horizontal
4952.4	10.43	34.45	41.03	33.58	37.43	54.00	-16.57	Horizontal
7428.6	12.72	37.37	40.01	31.54	41.62	54.00	-12.38	Horizontal
9904.8	14.21	38.07	37.85	29.88	44.31	54.00	-9.69	Horizontal
12381.0	17.55	39.34	39.48	30.20	47.61	54.00	-6.39	Horizontal

5.3 20dB Bandwidth

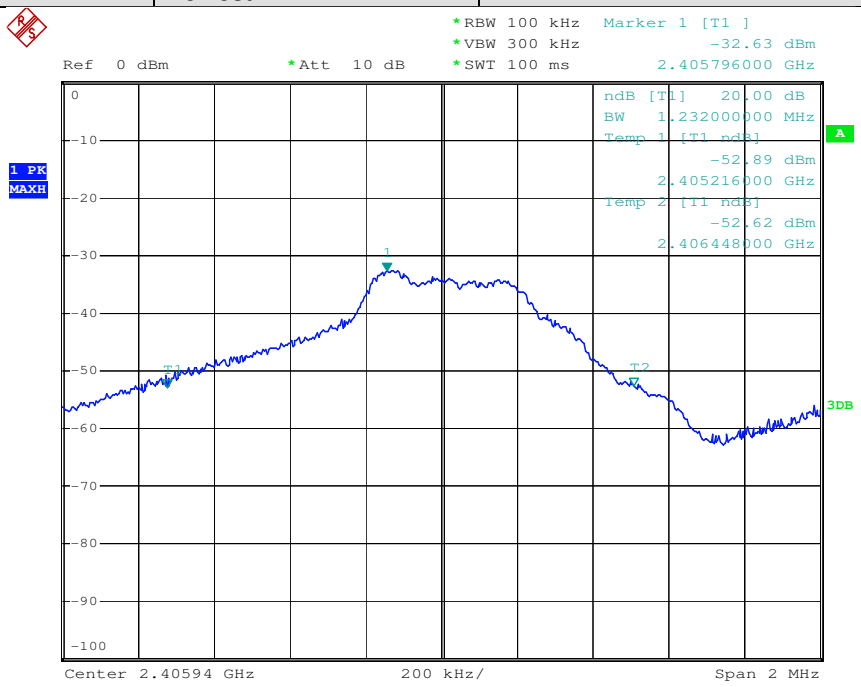
Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=10KHz, VBW=30KHz, detector: Peak
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	
Test Instruments:	Refer to section 4.7 for details
Test mode:	Keep the EUT in transmitting with modulation.
Test results:	Pass

Measurement Data

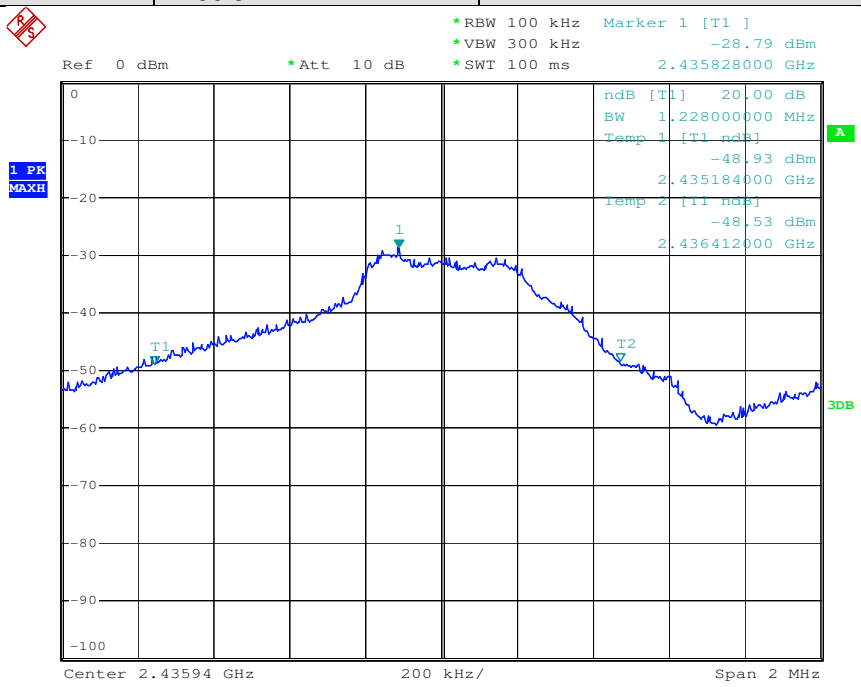
Test channel	20dB bandwidth (MHz)	Results
Lowest	1.232	Pass
Middle	1.228	Pass
Highest	1.344	Pass

Test plot as follows:

Test channel:	Lowest	



Test channel:	Middle	



Test channel:	Highest