

FCC REPORT

Applicant: Front Electronics (H.K.) Ltd.

Address of Applicant: Rm 2919, Asia Trade Centre, 79 Lei Muk Road, Kwai Chung

Equipment Under Test (EUT)

Product Name: REMOTE & PLAYCHUK for Wii

Model No.: ASD837/ASD839, ASD837/ASD840, ASD838/ASD839, ASD838/ASD840

FCC ID: TAZASD837

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249:2010

Date of sample receipt: May 29, 2012

Date of Test: May 29-31, 2012

Date of report issued: May 31, 2012

Test Result : PASS *

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

Authorized Signature:



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	May 31, 2012	Original

Prepared By:

Oscar. Li

Date:

May 31, 2012

Project Engineer

Check By:

Hans. Hu

Date:

May 31, 2012

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	N/A
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

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

N/A: not applicable.

5 General Information

5.1 Client Information

Applicant:	Front Electronics (H.K.) Ltd.
Address of Applicant:	Rm 2919, Asia Trade Centre, 79 Lei Muk Road, Kwai Chung
Manufacturer:	Front Electronics (H.K.) Ltd.
Address of Manufacturer:	Rm 2919, Asia Trade Centre, 79 Lei Muk Road, Kwai Chung
Factory:	Shenzhen Front Electronics Co., Ltd.
Address of factory :	lock 10, No. 2 Hexi Industrial Zone,Baoan, Shenzhen 518102 China

5.2 General Description of E.U.T.

Product Name:	REMOTE & PLAYCHUK for Wii
Model No.:	ASD837/ASD839, ASD837/ASD840, ASD838/ASD839, ASD838/ASD840
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Modulation technology:	GFSK
Antenna Type:	Integral
Antenna gain:	2dBi
Power supply:	DC 3.0V(2*1.5"AA")
Remark:	Only the model ASD837/ASD839 was tested. ASD837/ASD840, ASD838/ASD839, ASD838/ASD840 and ASD837/ASD839 are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and appearance color for commercial purpose.

5.3 Test mode

Transmitting mode	Keep transmitting mode.
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Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	90.13	92.09	91.42

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”:
Y axis (see the test setup photo)

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC approval
IBM	Notebook	T42	GTS209	DoC
IBM	AC Adapter	92P1024	N/A	VoC

5.5 Test Facility

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

- **FCC —Registration No.: 600491**

Global United Technology 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 600491, July 20, 2010.

- **Industry Canada (IC)**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been

Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

5.7 Other Information Requested by the Customer

None.

5.8 Test Instruments list

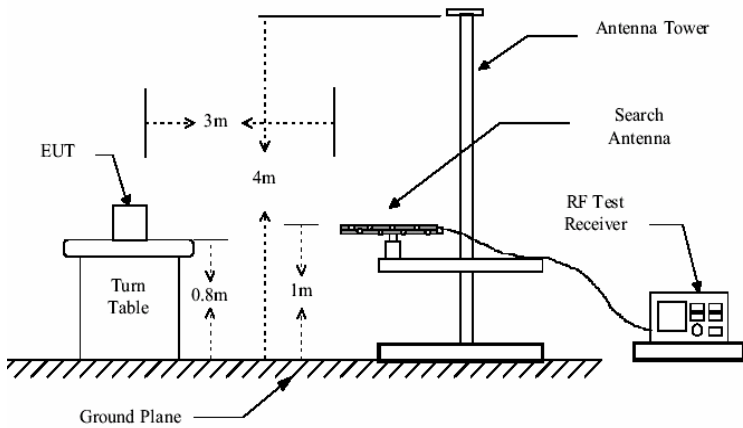
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 30 2011	Mar. 29 2013
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 04 2011	Jul. 03 2012
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 25 2012	Feb. 24 2013
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 30 2011	June 29 2012
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2011	Mar. 29 2013
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Mar. 31 2012	Mar. 30 2013
9	Coaxial Cable	GTS	N/A	GTS211	Mar. 31 2012	Mar. 30 2013
10	Coaxial cable	GTS	N/A	GTS210	Mar. 31 2012	Mar. 30 2013
11	Coaxial Cable	GTS	N/A	GTS212	Mar. 31 2012	Mar. 30 2013
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 04 2011	Jul. 03 2012
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 04 2011	Jul. 03 2012
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 30 2011	June 29 2012
15	Band filter	Amindeon	82346	GTS219	Mar. 31 2012	Mar. 30 2013

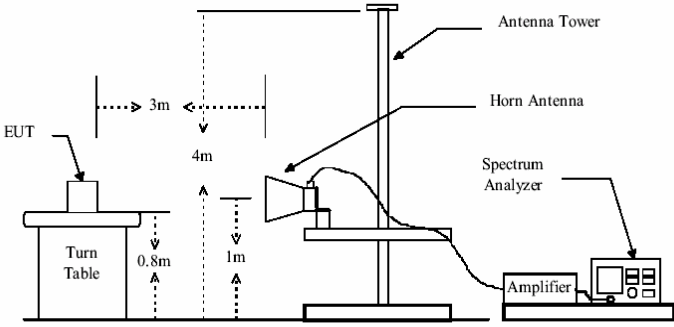
6 Test results and Measurement Data

6.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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 Integral antenna, the best case gain of the antenna is 2dBi	
 RF Antenna	

6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.4:2003				
Test Frequency Range:	30MHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
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 (dBuV/m @3m)		Remark
	30MHz-88MHz		40.00		Quasi-peak Value
	88MHz-216MHz		43.50		Quasi-peak Value
	216MHz-960MHz		46.00		Quasi-peak Value
	960MHz-1GHz		54.00		Quasi-peak Value
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Limit: (band edge)	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.				
Test setup:	Below 1GHz				
					
	Above 1GHz				

	 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. The antenna height is varied from 1m to 4m. The test receiver system consists of a spectrum analyzer and an amplifier.
Test Procedure:	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. 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. 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. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Transmitting mode
Test results:	Pass

Measurement data:

6.2.1 Field Strength of The Fundamental Signal

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
2402.00	84.98	27.58	5.39	30.18	87.77	114.00	-26.23	Horizontal
2402.00	87.21	27.58	5.39	30.18	90.00	114.00	-24.00	Vertical
2441.00	86.80	27.48	5.43	30.06	89.65	114.00	-24.35	Horizontal
2441.00	89.24	27.48	5.43	30.06	92.09	114.00	-21.91	Vertical
2480.00	85.97	27.52	5.47	29.93	89.03	114.00	-24.97	Horizontal
2480.00	83.12	27.52	5.47	29.93	86.18	114.00	-27.82	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
2402.00	69.78	27.58	5.39	30.18	72.57	94.00	-21.43	Horizontal
2402.00	75.21	27.58	5.39	30.18	78.00	94.00	-16.00	Vertical
2441.00	73.40	27.48	5.43	30.06	76.25	94.00	-17.75	Horizontal
2441.00	75.64	27.48	5.43	30.06	78.49	94.00	-15.51	Vertical
2480.00	71.77	27.52	5.47	29.93	74.83	94.00	-19.17	Horizontal
2480.00	76.95	27.52	5.47	29.93	80.01	94.00	-13.99	Vertical

According to the follow transmitter output power (P_t) formula:

$$P_t = (E \times d)^2 / (30 \times g_t)$$

P_t =transmitter output power in watts

g_t =numeric gain of the transmitting antenna (unitless)

E =electric field strength in V/m

d = measurement distance in meters (m).

According to the above test data, $E_{max}=92.09\text{dBuV/m}=0.0402\text{V/m}$, $d=3\text{m}$, $g_t=1.58$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.0402 \times 3)^2 / (30 \times 1.58) = 0.000307\text{W}$$

6.2.2 Spurious emissions

■ Below 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
44.12	41.42	14.27	0.14	32.08	23.75	40.00	-16.25	Vertical
132.69	50.78	9.35	0.31	31.88	28.56	43.50	-14.94	Vertical
221.39	59.77	9.01	0.46	32.28	36.96	46.00	-9.04	Vertical
375.94	56.05	13.89	0.77	32.32	38.39	46.00	-7.61	Vertical
531.96	49.30	17.79	1.05	31.51	36.63	46.00	-9.37	Vertical
916.07	36.92	24.46	1.74	31.47	31.65	46.00	-14.35	Vertical
50.94	38.28	14.84	0.18	32.01	21.29	40.00	-18.71	Horizontal
88.34	47.17	10.32	0.22	31.77	25.94	43.50	-17.56	Horizontal
221.39	62.12	10.98	0.46	32.28	41.28	46.00	-4.72	Horizontal
243.38	60.65	11.73	0.51	32.28	40.61	46.00	-5.39	Horizontal
265.68	55.86	11.63	0.56	32.29	35.76	46.00	-10.24	Horizontal
531.96	45.02	19.88	1.05	31.51	34.44	46.00	-11.56	Horizontal

■ Above 1GHz

Test channel:	Lowest channel
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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
4804.00	37.59	31.78	8.60	24.20	53.77	74.00	-20.23	Vertical
7206.00	41.58	36.15	11.65	26.46	62.92	74.00	-11.08	Vertical
9608.00	38.26	37.95	14.14	25.45	64.90	74.00	-9.10	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	36.49	31.78	8.60	24.20	52.67	74.00	-21.33	Horizontal
7206.00	40.58	36.15	11.65	26.46	61.92	74.00	-12.08	Horizontal
9608.00	37.06	37.95	14.14	25.45	63.70	74.00	-10.30	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					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
4804.00	22.69	31.78	8.60	24.20	38.87	54.00	-15.13	Vertical
7206.00	21.34	36.15	11.65	26.46	42.68	54.00	-11.32	Vertical
9608.00	17.69	37.95	14.14	25.45	44.33	54.00	-9.67	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	21.49	31.78	8.60	24.20	37.67	54.00	-16.33	Horizontal
7206.00	25.18	36.15	11.65	26.46	46.52	54.00	-7.48	Horizontal
9608.00	20.14	37.95	14.14	25.45	46.78	54.00	-7.22	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

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.
3. “*”, means this data is the too weak instrument of signal is unable to test.

Test channel:	Middle channel
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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
4882.00	36.86	31.85	8.67	24.10	53.28	74.00	-20.72	Vertical
7323.00	39.38	36.37	11.72	26.71	60.76	74.00	-13.24	Vertical
9764.00	37.38	38.35	14.25	25.36	64.62	74.00	-9.38	Vertical
12205.00	*					74.00		Vertical
14646.00	*					74.00		Vertical
4882.00	35.66	31.85	8.67	24.10	52.08	74.00	-21.92	Horizontal
7323.00	38.08	36.37	11.72	26.71	59.46	74.00	-14.54	Horizontal
9764.00	36.28	38.35	14.25	25.36	63.52	74.00	-10.48	Horizontal
12205.00	*					74.00		Horizontal
14646.00	*					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
4882.00	22.16	31.85	8.67	24.10	38.58	54.00	-15.42	Vertical
7323.00	24.18	36.37	11.72	26.71	45.56	54.00	-8.44	Vertical
9764.00	18.47	38.35	14.25	25.36	45.71	54.00	-8.29	Vertical
12205.00	*					54.00		Vertical
14646.00	*					54.00		Vertical
4882.00	21.06	31.85	8.67	24.10	37.48	54.00	-16.52	Horizontal
7323.00	22.68	36.37	11.72	26.71	44.06	54.00	-9.94	Horizontal
9764.00	18.42	38.35	14.25	25.36	45.66	54.00	-8.34	Horizontal
12205.00	*					54.00		Horizontal
14646.00	*					54.00		Horizontal

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.
3. “*”, means this data is the too weak instrument of signal is unable to test.

Test channel:	Highest channel
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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
4960.00	37.69	31.93	8.73	24.03	54.32	74.00	-19.68	Vertical
7440.00	38.72	36.59	11.79	27.03	60.07	74.00	-13.93	Vertical
9920.00	36.33	38.81	14.38	25.26	64.26	74.00	-9.74	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	36.59	31.93	8.73	24.03	53.22	74.00	-20.78	Horizontal
7440.00	37.62	36.59	11.79	27.03	58.97	74.00	-15.03	Horizontal
9920.00	34.93	38.81	14.38	25.26	62.86	74.00	-11.14	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					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
4960.00	22.89	31.93	8.73	24.03	39.52	54.00	-14.48	Vertical
7440.00	23.32	36.59	11.79	27.03	44.67	54.00	-9.33	Vertical
9920.00	17.97	38.81	14.38	25.26	45.90	54.00	-8.10	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	20.59	31.93	8.73	24.03	37.22	54.00	-16.78	Horizontal
7440.00	21.52	36.59	11.79	27.03	42.87	54.00	-11.13	Horizontal
9920.00	15.34	38.81	14.38	25.26	43.27	54.00	-10.73	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

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.
3. “*”, means this data is the too weak instrument of signal is unable to test.

6.2.3 Bandedge emissions

Test channel:	Lowest channel
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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	50.05	27.59	5.38	30.18	52.84	74.00	-21.16	Horizontal
2400.00	53.24	27.58	5.39	30.18	56.03	74.00	-17.97	Horizontal
2390.00	52.67	27.59	5.38	30.18	55.46	74.00	-18.54	Vertical
2400.00	55.06	27.58	5.39	30.18	57.85	74.00	-16.15	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	36.95	27.59	5.38	30.18	39.74	54.00	-14.26	Horizontal
2400.00	40.21	27.58	5.39	30.18	43.00	54.00	-11.00	Horizontal
2390.00	39.87	27.59	5.38	30.18	42.66	54.00	-11.34	Vertical
2400.00	42.38	27.58	5.39	30.18	45.17	54.00	-8.83	Vertical

Test channel:	Highest channel
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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	43.29	27.45	5.43	29.85	46.32	74.00	-27.68	Horizontal
2500.00	41.39	27.34	5.39	29.84	44.28	74.00	-29.72	Horizontal
2483.50	48.36	27.53	5.47	29.93	51.43	74.00	-22.57	Vertical
2500.00	44.35	27.55	5.49	29.93	47.46	74.00	-26.54	Vertical

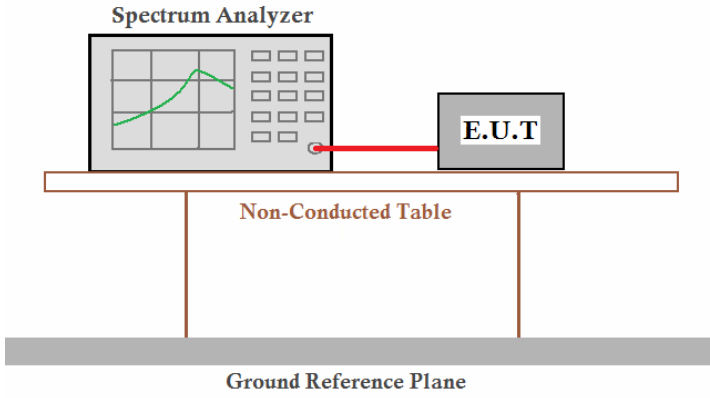
Average value:

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	34.99	27.45	5.43	29.85	38.02	54.00	-15.98	Horizontal
2500.00	33.19	27.34	5.39	29.84	36.08	54.00	-17.92	Horizontal
2483.50	40.16	27.53	5.47	29.93	43.23	54.00	-10.77	Vertical
2500.00	36.05	27.55	5.49	29.93	39.16	54.00	-14.84	Vertical

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

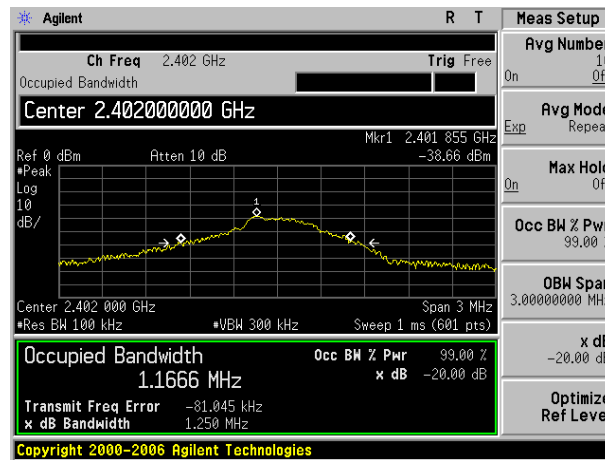
6.3 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.4:2003
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	 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.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Transmitting mode
Test results:	Pass

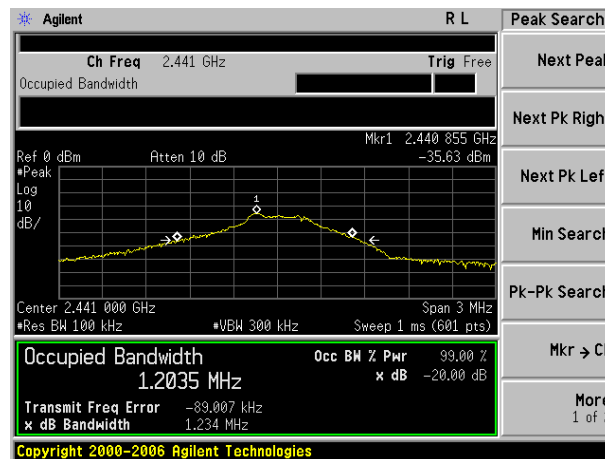
Measurement Data

Test channel	20dB bandwidth(MHz)	Result
Lowest	1.250	Pass
Middle	1.234	Pass
Highest	1.249	Pass

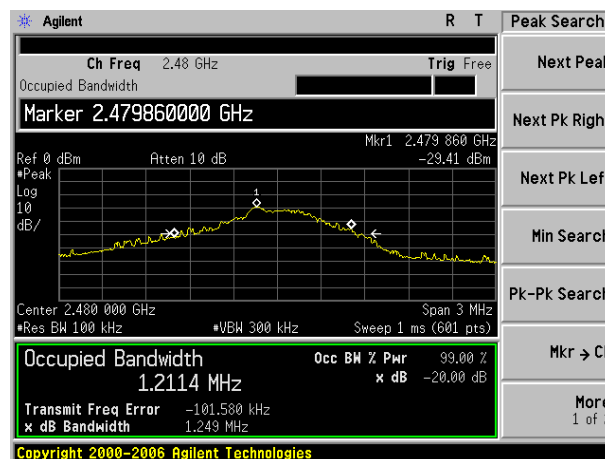
Test plot as follows:



Lowest channel



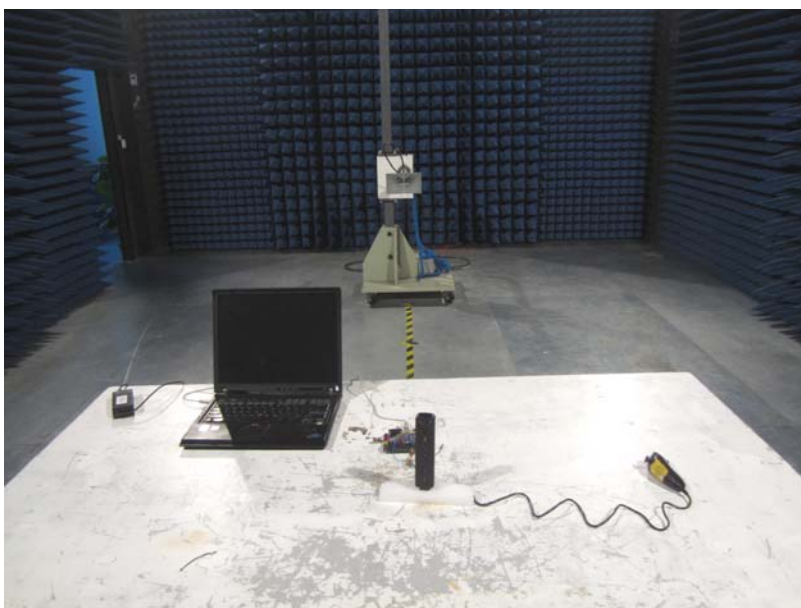
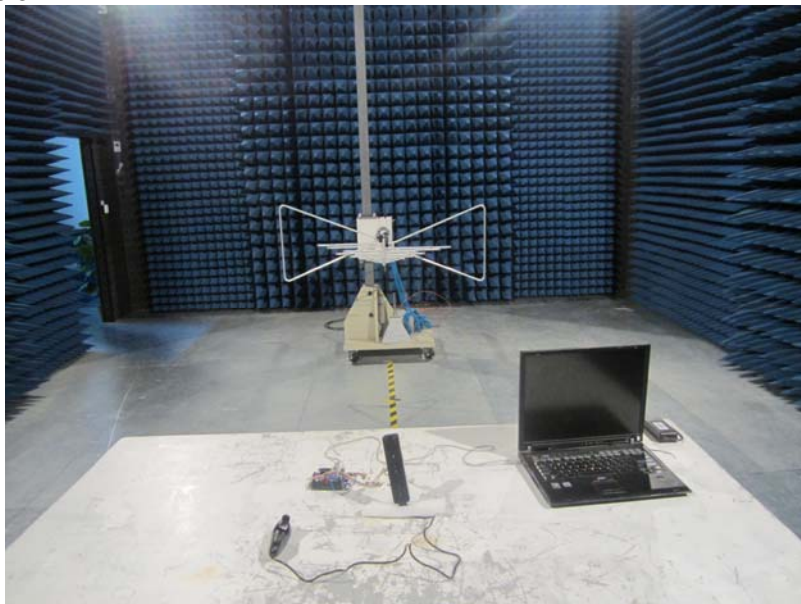
Middle channel



Highest channel

7 Test Setup Photo

Radiated Emission

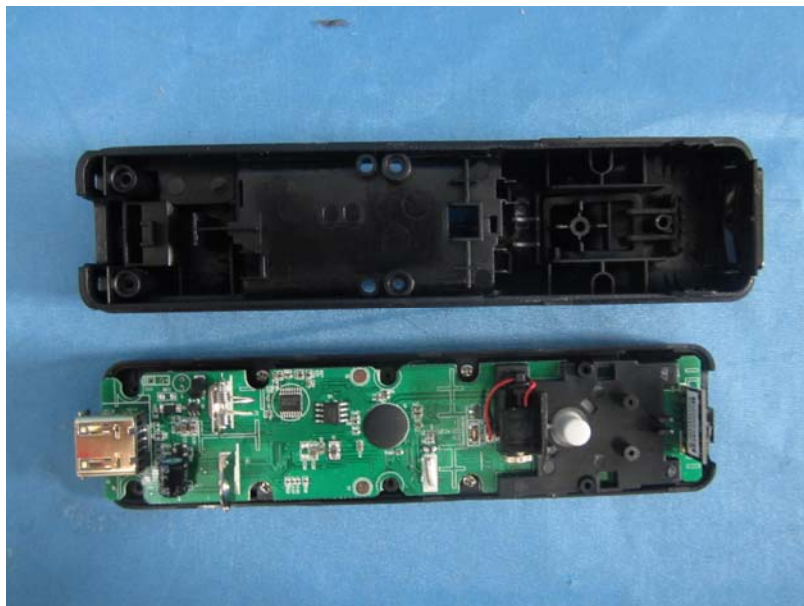


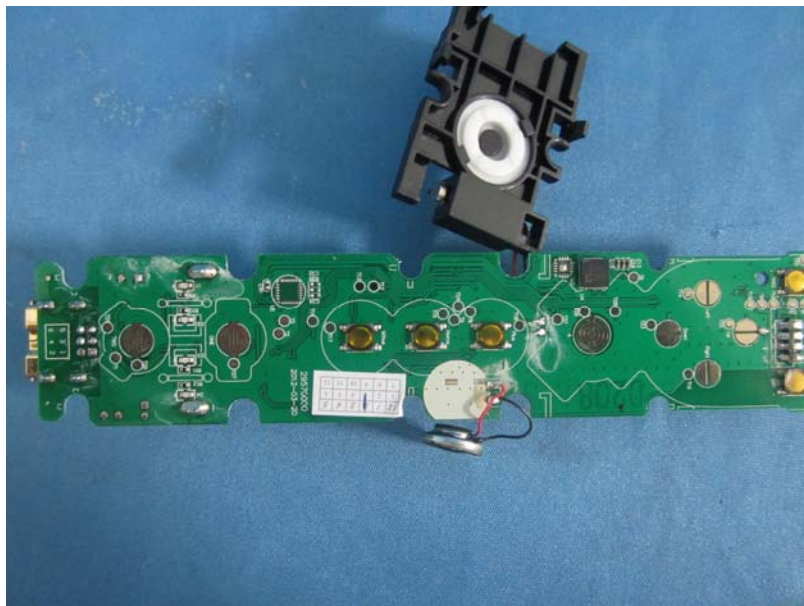
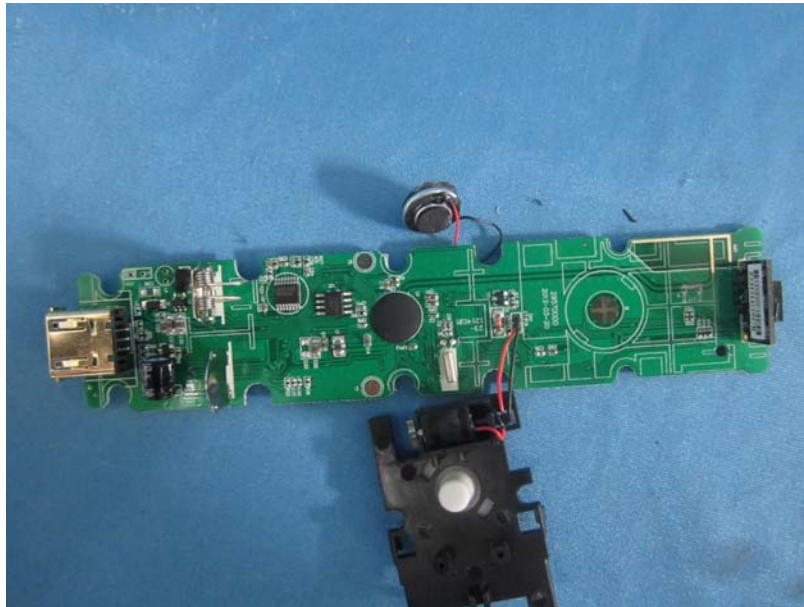
8 EUT Constructional Details

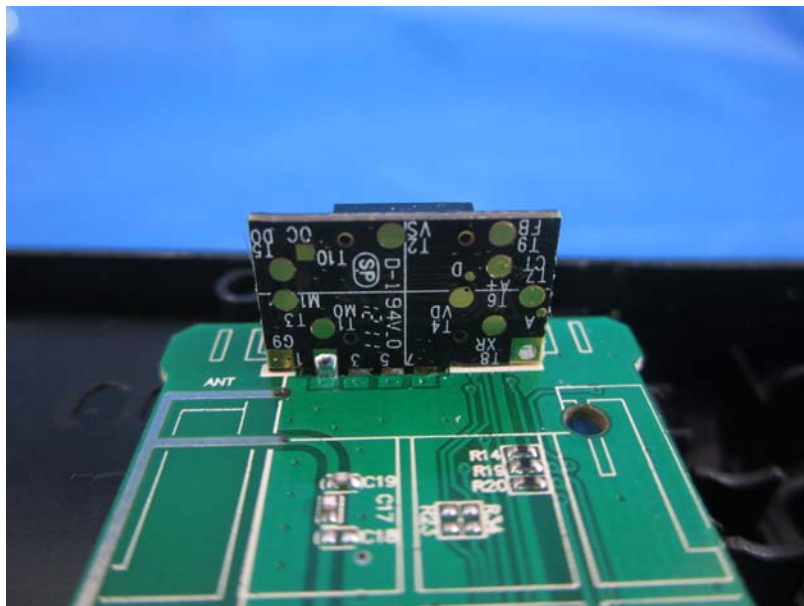
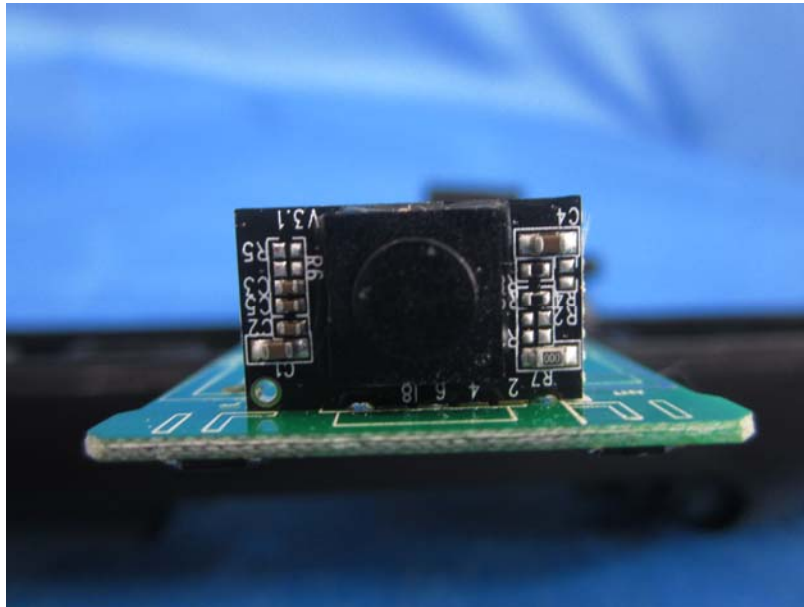




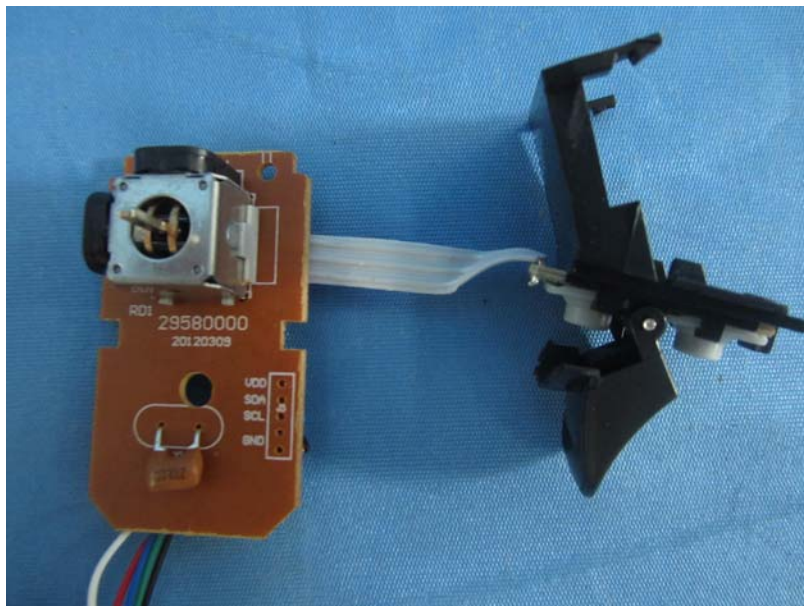














-----End-----