

# FCC REPORT

**Applicant:** ACME TECH.(SHENZHEN) CO., LTD.

**Address of Applicant:** 3/F, KELINLUN BLDG, JINGNAN DISTRICT, BUJI, SHZHEN, CHINA

**Equipment Under Test (EUT)**

Product Name: 2.4GHz Radio

Model No.: B1160

**FCC ID:** U8Z-B1160

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.249:2012

**Date of sample receipt:** May 02, 2013

**Date of Test:** May 02-08, 2013

**Date of report issued:** May 09, 2013

**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.

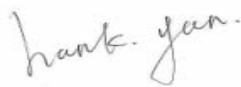
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## 2 Version

Version No.	Date	Description
00	May 09, 2013	Original

Prepared By:



Date:

May 09, 2013

Project Engineer

Check By:



Date:

May 09, 2013

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:	ACME TECH.(SHENZHEN) CO., LTD.
Address of Applicant:	3/F, KELINLUN BLDG, JINGNAN DISTRICT, BUJI, SHZHEN, CHINA
Manufacturer:	ACME TECH.(SHENZHEN) CO., LTD.
Address of Manufacturer:	3/F, KELINLUN BLDG, JINGNAN DISTRICT, BUJI, SHZHEN, CHINA

### 5.2 General Description of EUT

Product Name:	2.4GHz Radio
Model No.:	B1160
Operation Frequency:	2410MHz-2474MHz
Modulation technology:	GFSK
Antenna Specification:	Integral
Antenna Gain:	0.5dBi
Power supply:	DC 6.0V (4*1.5V "AA" SIZE battery )

## 5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

### 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)	101.41	103.63	102.52

### 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

None.
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## 5.5 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **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 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

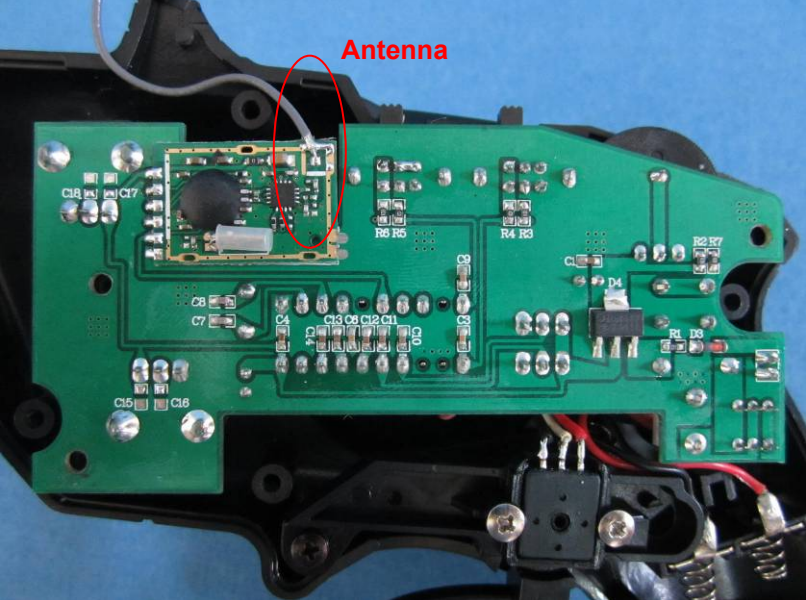
None.
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## 6 Test Instruments list

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 2014
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	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 25 2013	Feb. 24 2014
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2012	June 28 2013
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 29 2013	Mar. 28 2014
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 30 2013	Mar. 29 2014
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 30 2013	Mar. 29 2014
11	Coaxial cable	GTS	N/A	GTS210	Mar. 30 2013	Mar. 29 2014
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 30 2013	Mar. 29 2014
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 03 2012	Jul. 02 2013
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 03 2012	Jul. 02 2013
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2012	June 28 2013
16	Band filter	Amindeon	82346	GTS219	Mar. 30 2013	Mar. 29 2014

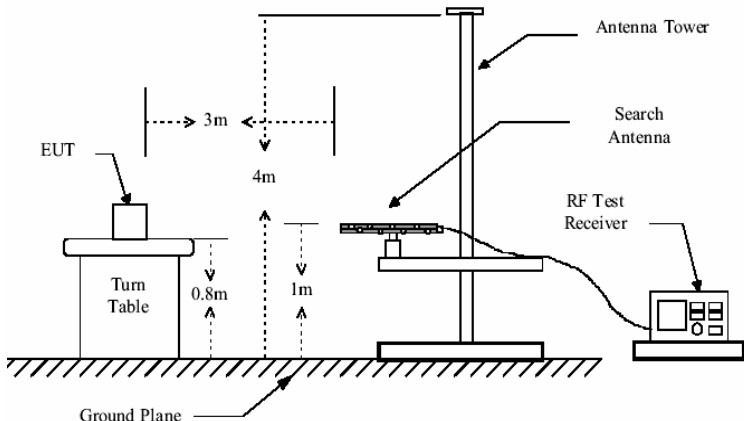
## 7 Test results and Measurement Data

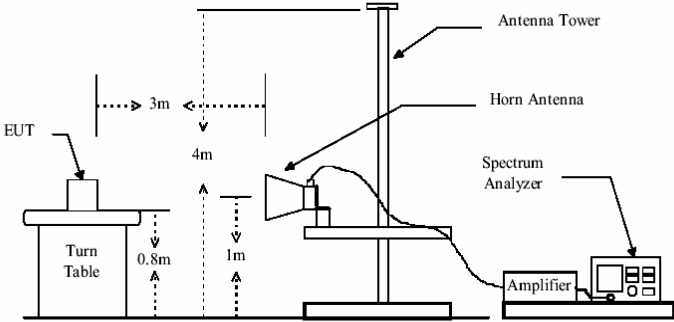
### 7.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<b>15.203 requirement:</b> <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>	
<b>E.U.T Antenna:</b> <p>The antenna is Integral antenna, the best case gain of the antenna is 0.5dBi</p>	
	



## 7.2 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
		AV	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				

	 <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 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 Spectrum Analyzer is also connected to the Antenna Tower. The distance between the EUT and the Antenna Tower is 3m. The height of the Turn Table is 0.8m. The height of the Antenna Tower is 4m. The height of the Horn Antenna is 1m.</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 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

## Measurement data:

## 7.2.1 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
2410.00	97.06	31.29	5.40	30.12	103.63	114.00	-10.37	Horizontal
2410.00	94.93	31.29	5.40	30.12	101.50	114.00	-12.50	Vertical
2444.80	96.14	27.48	5.43	30.06	98.99	114.00	-15.01	Horizontal
2444.80	92.85	27.48	5.43	30.06	95.70	114.00	-18.30	Vertical
2474.00	96.23	27.52	5.47	29.99	99.23	114.00	-14.77	Horizontal
2474.00	92.86	27.52	5.47	29.99	95.86	114.00	-18.14	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
2410.00	86.39	31.29	5.40	30.12	92.96	94.00	-1.04	Horizontal
2410.00	83.37	31.29	5.40	30.12	89.94	94.00	-4.06	Vertical
2444.80	84.87	27.48	5.43	30.06	87.72	94.00	-6.28	Horizontal
2444.80	81.53	27.48	5.43	30.06	84.38	94.00	-9.62	Vertical
2474.00	85.04	27.52	5.47	29.99	88.04	94.00	-5.96	Horizontal
2474.00	81.38	27.52	5.47	29.99	84.38	94.00	-9.62	Vertical

## 7.2.2 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
48.84	38.67	16.43	0.76	31.97	23.89	40.00	-16.11	Vertical
95.76	39.08	15.99	1.16	31.74	24.49	43.50	-19.01	Vertical
246.82	39.52	15.08	2.11	32.16	24.55	46.00	-21.45	Vertical
410.38	39.16	17.27	2.91	31.86	27.48	46.00	-18.52	Vertical
593.05	38.54	20.35	3.70	31.07	31.52	46.00	-14.48	Vertical
912.86	37.53	24.04	4.90	31.19	35.28	46.00	-10.72	Vertical
46.67	38.80	16.55	0.74	31.99	24.10	40.00	-15.90	Horizontal
100.58	38.21	16.08	1.19	31.76	23.72	43.50	-19.78	Horizontal
321.06	39.07	16.32	2.47	32.11	25.75	46.00	-20.25	Horizontal
393.47	39.80	16.97	2.82	31.91	27.68	46.00	-18.32	Horizontal
857.03	38.75	23.64	4.68	31.24	35.83	46.00	-10.17	Horizontal
958.79	38.45	23.87	5.08	31.22	36.18	46.00	-9.82	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
4820.00	32.75	31.78	8.60	24.17	48.96	74.00	-25.04	Vertical
7230.00	31.42	36.15	11.65	26.39	52.83	74.00	-21.17	Vertical
9640.00	30.35	38.01	14.14	25.45	57.05	74.00	-16.95	Vertical
12050.00	*					74.00		Vertical
14460.00	*					74.00		Vertical
4820.00	28.85	31.78	8.60	24.17	45.06	74.00	-28.94	Horizontal
7230.00	29.31	36.15	11.65	26.39	50.72	74.00	-23.28	Horizontal
9640.00	27.05	38.01	14.14	25.45	53.75	74.00	-20.25	Horizontal
12050.00	*					74.00		Horizontal
14460.00	*					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
4820.00	21.26	31.78	8.60	24.17	37.47	54.00	-16.53	Vertical
7230.00	20.62	36.15	11.65	26.39	42.03	54.00	-11.97	Vertical
9640.00	20.78	38.01	14.14	25.45	47.48	54.00	-6.52	Vertical
12050.00	*					54.00		Vertical
14460.00	*					54.00		Vertical
4820.00	17.18	31.78	8.60	24.17	33.39	54.00	-20.61	Horizontal
7230.00	17.61	36.15	11.65	26.39	39.02	54.00	-14.98	Horizontal
9640.00	17.80	38.01	14.14	25.45	44.50	54.00	-9.50	Horizontal
12050.00	*					54.00		Horizontal
14460.00	*					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
4889.60	33.20	31.85	8.66	24.10	49.61	74.00	-24.39	Vertical
7334.40	32.60	36.37	11.72	26.71	53.98	74.00	-20.02	Vertical
9779.20	29.77	38.35	14.25	25.36	57.01	74.00	-16.99	Vertical
12224.00	*					74.00		Vertical
14668.80	*					74.00		Vertical
4889.60	29.49	31.85	8.66	24.10	45.90	74.00	-28.10	Horizontal
7334.40	28.41	36.37	11.72	26.71	49.79	74.00	-24.21	Horizontal
9779.20	26.07	38.35	14.25	25.36	53.31	74.00	-20.69	Horizontal
12224.00	*					74.00		Horizontal
14668.80	*					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
4889.60	21.71	31.85	8.66	24.10	38.12	54.00	-15.88	Vertical
7334.40	20.69	36.37	11.72	26.71	42.07	54.00	-11.93	Vertical
9779.20	19.66	38.35	14.25	25.36	46.90	54.00	-7.10	Vertical
12224.00	*					54.00		Vertical
14668.80	*					54.00		Vertical
4889.60	17.82	31.85	8.66	24.10	34.23	54.00	-19.77	Horizontal
7334.40	17.68	36.37	11.72	26.71	39.06	54.00	-14.94	Horizontal
9779.20	17.10	38.35	14.25	25.36	44.34	54.00	-9.66	Horizontal
12224.00	*					54.00		Horizontal
14668.80	*					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
4948.00	32.01	31.93	8.73	24.03	48.64	74.00	-25.36	Vertical
7422.00	31.62	36.59	11.79	27.03	52.97	74.00	-21.03	Vertical
9896.00	27.30	38.81	14.38	25.26	55.23	74.00	-18.77	Vertical
12370.00	*					74.00		Vertical
14844.00	*					74.00		Vertical
4948.00	29.09	31.93	8.73	24.03	45.72	74.00	-28.28	Horizontal
7422.00	28.62	36.59	11.79	27.03	49.97	74.00	-24.03	Horizontal
9896.00	24.61	38.81	14.38	25.26	52.54	74.00	-21.46	Horizontal
12370.00	*					74.00		Horizontal
14844.00	*					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
4948.00	20.52	31.93	8.73	24.03	37.15	54.00	-16.85	Vertical
7422.00	21.24	36.59	11.79	27.03	42.59	54.00	-11.41	Vertical
9896.00	16.88	38.81	14.38	25.26	44.81	54.00	-9.19	Vertical
12370.00	*					54.00		Vertical
14844.00	*					54.00		Vertical
4948.00	17.42	31.93	8.73	24.03	34.05	54.00	-19.95	Horizontal
7422.00	18.29	36.59	11.79	27.03	39.64	54.00	-14.36	Horizontal
9896.00	15.49	38.81	14.38	25.26	43.42	54.00	-10.58	Horizontal
12370.00	*					54.00		Horizontal
14844.00	*					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.

## 7.2.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

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	58.07	31.25	5.38	30.18	64.52	74.00	-9.48	Horizontal
2400.00	63.01	31.25	5.39	30.18	69.47	74.00	-4.53	Horizontal
2390.00	56.30	31.25	5.38	30.18	62.75	74.00	-11.25	Vertical
2400.00	62.26	31.25	5.39	30.18	68.72	74.00	-5.28	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	34.67	31.25	5.38	30.18	41.12	54.00	-12.88	Horizontal
2400.00	35.38	31.25	5.39	30.18	41.84	54.00	-12.16	Horizontal
2390.00	34.51	31.25	5.38	30.18	40.96	54.00	-13.04	Vertical
2400.00	35.08	31.25	5.39	30.18	41.54	54.00	-12.46	Vertical

Test channel:	Highest channel
---------------	-----------------

### 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	61.80	27.53	5.47	29.93	64.87	74.00	-9.13	Horizontal
2500.00	55.93	27.55	5.49	29.93	59.04	74.00	-14.96	Horizontal
2483.50	60.92	27.53	5.47	29.93	63.99	74.00	-10.01	Vertical
2500.00	54.02	27.55	5.49	29.93	57.13	74.00	-16.87	Vertical

### Average value:

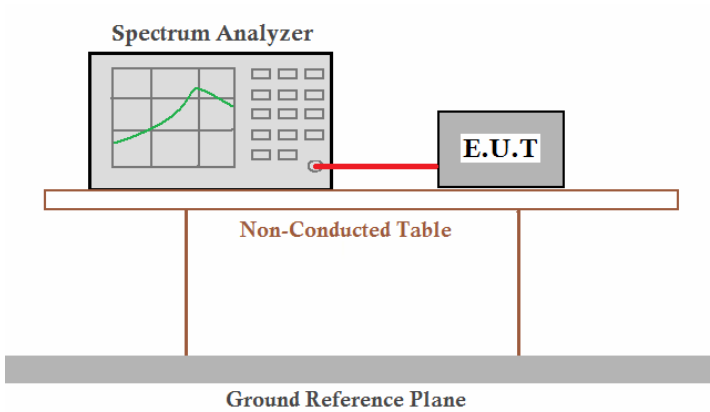
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	35.10	27.53	5.47	29.93	38.17	54.00	-15.83	Horizontal
2500.00	34.35	27.55	5.49	29.93	37.46	54.00	-16.54	Horizontal
2483.50	34.77	27.53	5.47	29.93	37.84	54.00	-16.16	Vertical
2500.00	34.15	27.55	5.49	29.93	37.26	54.00	-16.74	Vertical

Remark:

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



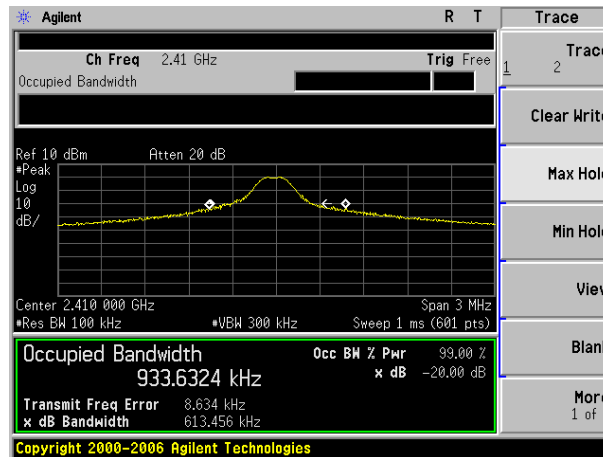
## 7.3 20dB Occupy Bandwidth

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:	 <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 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

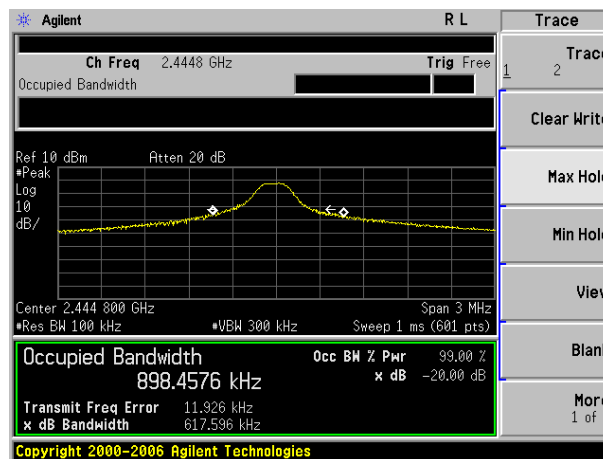
### Measurement Data

Test channel	20dB bandwidth(MHz)	Result
Lowest	0.613	Pass
Middle	0.618	Pass
Highest	0.604	Pass

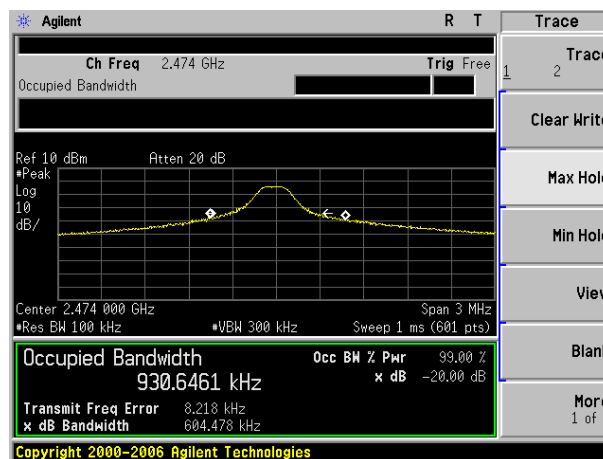
Test plot as follows:



Lowest channel



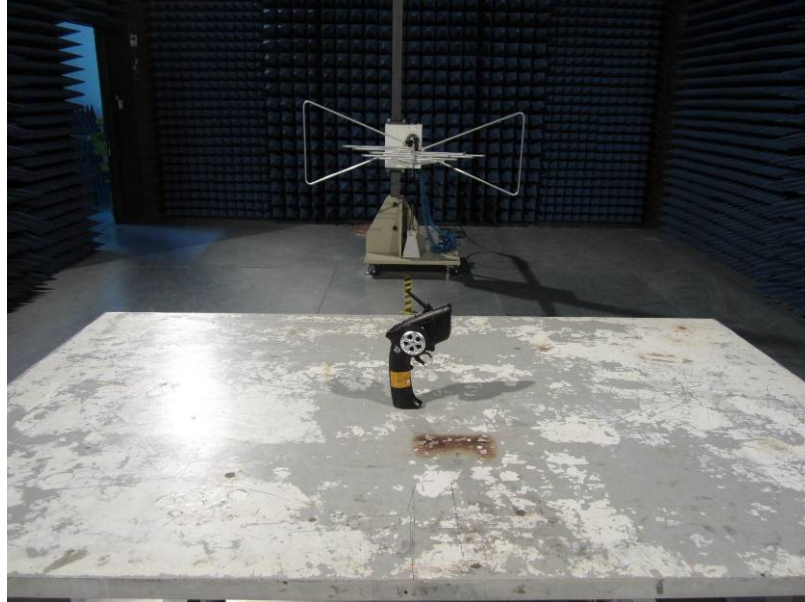
Middle channel



Highest channel

## 8 Test Setup Photo

Radiated Emission

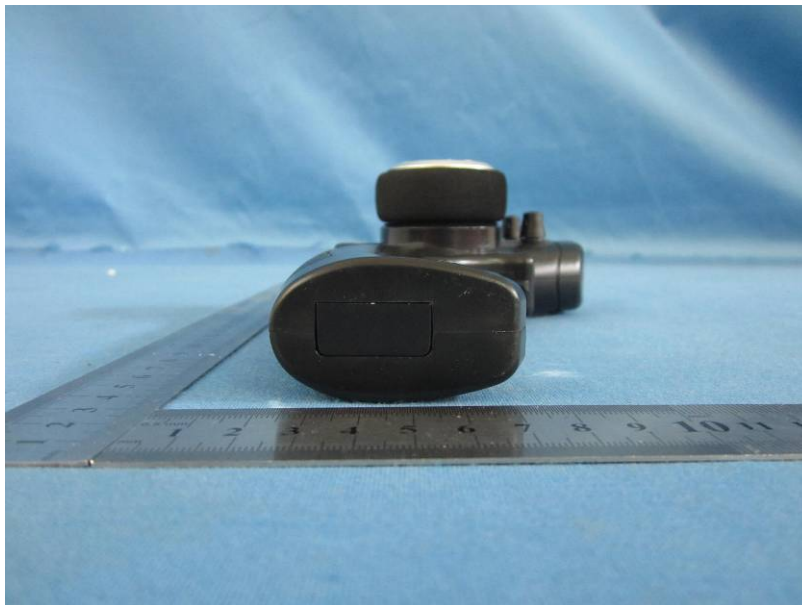


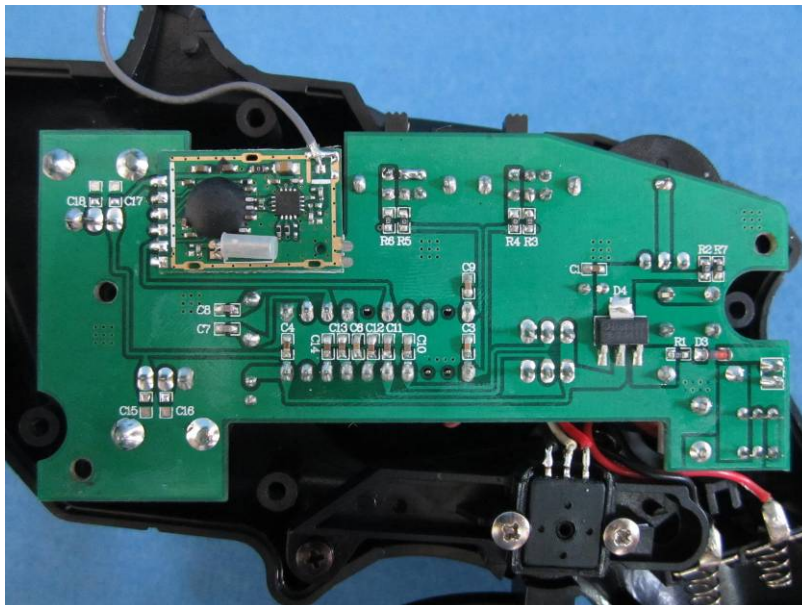
## 9 EUT Constructional Details

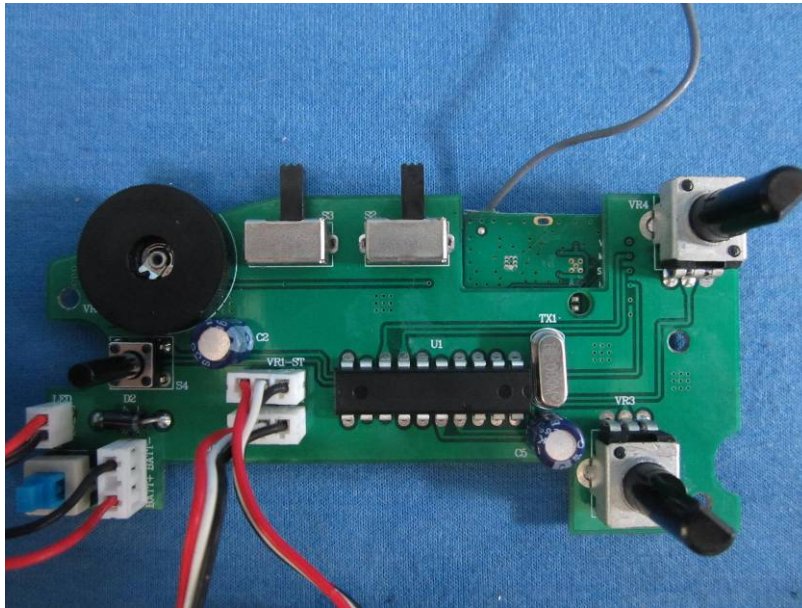












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