



FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.: WE10100014

FCC ID.: YW4BTKB1000

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Date of issue: Nov 01, 2010

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd

Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name: Tostrong Technology Co.,Ltd.

Address: Room 310,3F,XuShiDaMingYuan,XinAn 4 Lu,BaoAn, ShenZhen, China

Test specification:

Standard: FCC Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System

TRF Originator: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF: Dated 2006-06

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Test item description: Bluetooth Keyboard

Trade Mark: /

Model/Type reference: BT-KB1000

Listed Models: /

Result: Positive

TEST REPORT

Test Report No. : WE10100014	Nov 01, 2010 Date of issue
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Equipment under Test : Bluetooth Keyboard

Model /Type : BT-KB1000

Listed Models : /

Applicant : **Tostrong Technology Co.,Ltd.**

Address : Room 310,3F,XuShiDaMingYuan,XinAn 4 Lu,BaoAn,
ShenZhen, China

Manufacturer **Tostrong Technology Co.,Ltd.**

Address : Room 310,3F,XuShiDaMingYuan,XinAn 4 Lu,BaoAn,
ShenZhen, China

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

<u>1.</u>	<u>TEST STANDARDS</u>	<u>4</u>
<u>2.</u>	<u>SUMMARY</u>	<u>5</u>
2.1.	General Remarks	5
2.2.	Equipment Under Test	5
2.3.	Short description of the Equipment under Test (EUT)	5
2.4.	EUT operation mode	5
2.5.	EUT configuration	5
2.6.	Related Submittal(s) / Grant (s)	6
2.7.	Modifications	6
2.8.	NOTE	6
<u>3.</u>	<u>TEST ENVIRONMENT.....</u>	<u>7</u>
3.1.	Address of the test laboratory	7
3.2.	Test Facility	7
3.3.	Environmental conditions	8
3.4.	Configuration of Tested System	8
3.5.	Test Description	8
3.6.	Statement of the measurement uncertainty	8
3.7.	Equipments Used during the Test	9
<u>4.</u>	<u>TEST CONDITIONS AND RESULTS.....</u>	<u>10</u>
4.1.	AC Power Conducted Emission	10
4.2.	Radiated Emission	13
4.3.	Maximum Peak Output Power	20
4.4.	20dB Bandwidth	23
4.5.	Band Edge Compliance of RF Emission	26
4.6.	Frequency Separation	28
4.7.	Number of hopping frequency	30
4.8.	Time Of Occupancy(Dwell Time)	31
4.9.	Spurious RF Conducted Emission	37
4.10.	Antenna Requirement	40
<u>5.</u>	<u>TEST SETUP PHOTOS OF THE EUT</u>	<u>41</u>
<u>6.</u>	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u>	<u>42</u>

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.4-2009: American National Standard for Methods of Measurement of Radio-Noise Emissions From Low Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : Oct 22, 2010

Testing commenced on : Oct 22, 2010

Testing concluded on : Nov 01, 2010

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : ☐ 120V / 60 Hz ☐ 115V / 60Hz
☐ 12 V DC ☐ 24 V DC
☒ Other (specified in blank below)

DC 3.7V from battery

2.3. Short description of the Equipment under Test (EUT)

2.4GHz (Bluetooth Keyboard (BT-KB1000)) For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides Bluetooth tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. There are 79 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel

Frequency Range:	2402-2480MHz
Channel number:	79 channels
Modulation type:	Frequency Hopping Spread Spectrum
Antenna:	PCB Antenna

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

☒ - supplied by the manufacturer

☐ - supplied by the lab

- Power Cable
 - Length (m) : /
 - Shield : /
 - Detachable : /
 - Multimeter
 - Manufacturer : /
 - Model No. : /

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: YW4BTKB1000** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

2.8. NOTE

1. The EUT is a an Bluetooth Standard type device,The functions of the EUT listed as below:

	Test Standards	Reference Report
Bluetooth	FCC Part 15 Subpart C (Section 15.247)	WE10100014

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
Bluetooth	√	—	—	—

3. The EUT provides one completed transmitter and receiver.

Modulation Mode	TX Function
Bluetooth	1TX

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: August 02, 2007. Valid time is until March 29, 2012.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is from Aug 24, 2005 to Oct 31, 2009.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection 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 662850, Renewal date July 01, 2009.

IC-Registration No.: 5377

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377 on February 13th, 2011.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

NEMKO-Aut. No.: ELA125

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025:2005 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10, the Authorization is valid through April 25, 2009.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: December 20, 2006. Valid time is until December 19, 2009.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: December 20, 2006. Valid time is until December 19, 2009.

DNV

Shenzhen Huatongwei International Inspection Co Ltd has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025(2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until 24 Aug, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Test Description

FCC PART 15		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency	PASS
FCC Part 15.247(a)(1)(iii)	Time of Occupancy	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to

that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	± 4.24 dB	(1)
Radiated Emission	1~18GHz	± 5.16 dB	(1)
Radiated Emission	18-40GHz	± 5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	± 3.39 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

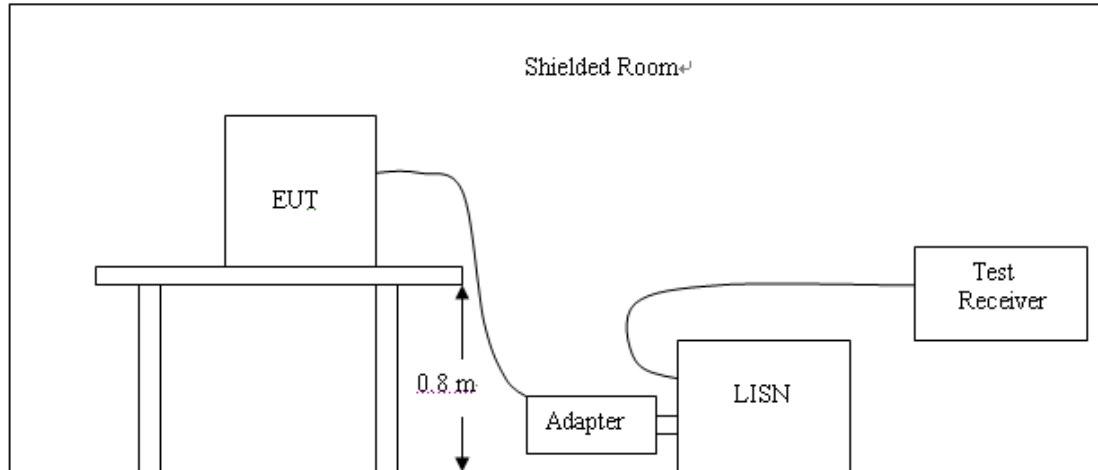
3.7. Equipments Used during the Test

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	ROHDE & SCHWARZ	HL562	100015	2010/05/30
2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESI 26	100009	2010/10/24
3	RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	2010/10/24
4	TURNTABLE	ETS	2088	2149	2010/10/24
5	ANTENNA MAST	ETS	2075	2346	2010/10/24
6	EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	N/A	2010/10/24
7	HORN ANTENNA	ROHDE & SCHWARZ	HF906	100039	2010/11/01
8	Amplifer	Sonoma	310N	E009-13	2010/10/24
9	JS amplifer	ROHDE & SCHWARZ	JS4-00101800-28-5A	F201504	2010/11/01
10	High pass filter	Compliance Direction systems	BSU-6	34202	2010/03/28

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
- 2 Support equipment, if needed, was placed as per ANSI C63.4-2009
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009
- 4 The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

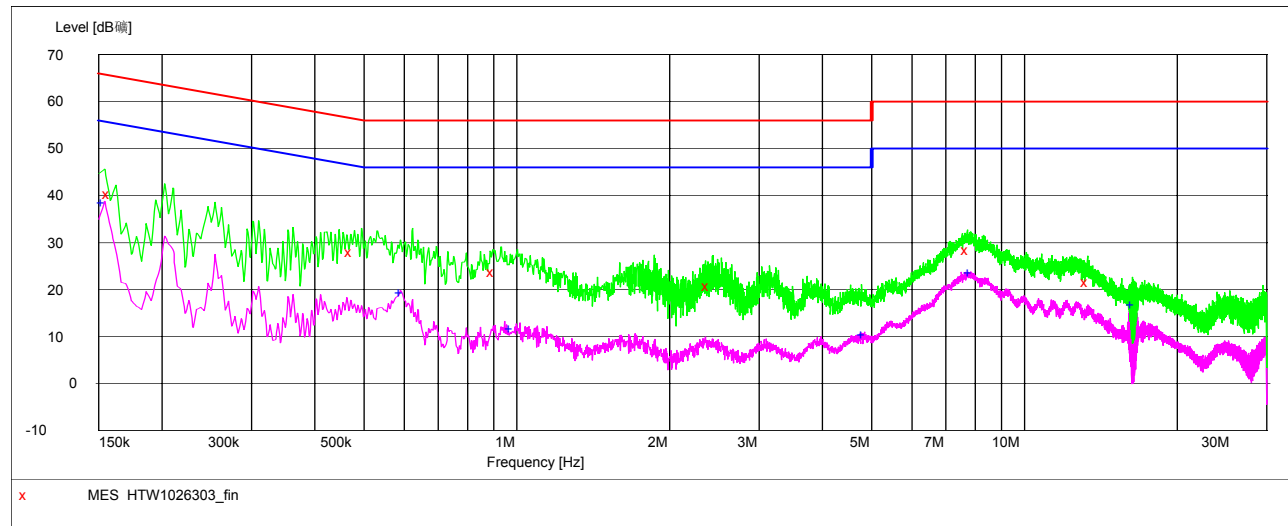
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dBµV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW1026303_fin"**

10/26/2010 9:22AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.158000	40.20	10.5	66	25.4	QP	N	GND
0.474000	27.90	10.4	56	28.5	QP	N	GND
0.902000	23.70	10.4	56	32.3	QP	N	GND
2.394000	20.70	10.5	56	35.3	QP	N	GND
7.758000	28.50	10.7	60	31.5	QP	N	GND
13.346000	21.50	10.9	60	38.5	QP	N	GND

MEASUREMENT RESULT: "HTW1026303_fin2"

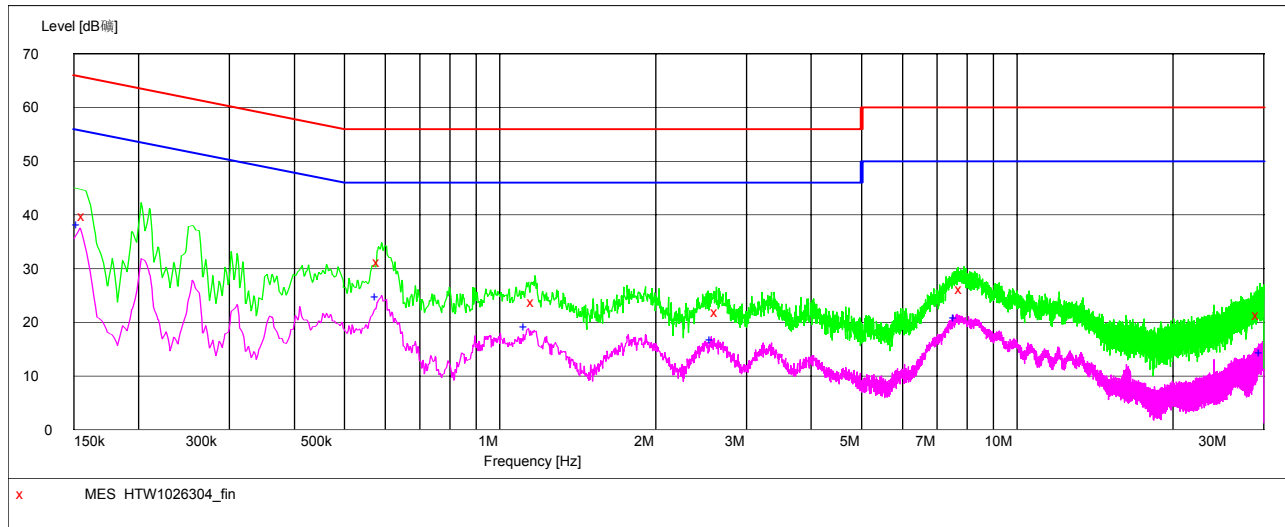
10/26/2010 9:22AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154000	38.50	10.5	56	17.3	AV	N	GND
0.594000	19.20	10.4	46	26.8	AV	N	GND
0.978000	11.50	10.5	46	34.5	AV	N	GND
4.834000	10.30	10.5	46	35.7	AV	N	GND
7.846000	23.50	10.7	50	26.5	AV	N	GND
16.406000	16.70	11.0	50	33.3	AV	N	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description:

150K-30M Voltage

**MEASUREMENT RESULT: "HTW1026304_fin"**

10/26/2010 9:25AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.158000	39.80	10.5	66	25.8	QP	L1	GND
0.586000	31.20	10.4	56	24.8	QP	L1	GND
1.170000	23.80	10.5	56	32.2	QP	L1	GND
2.646000	22.00	10.5	56	34.0	QP	L1	GND
7.858000	26.30	10.7	60	33.7	QP	L1	GND
29.462000	21.30	11.3	60	38.7	QP	L1	GND

MEASUREMENT RESULT: "HTW1026304_fin2"

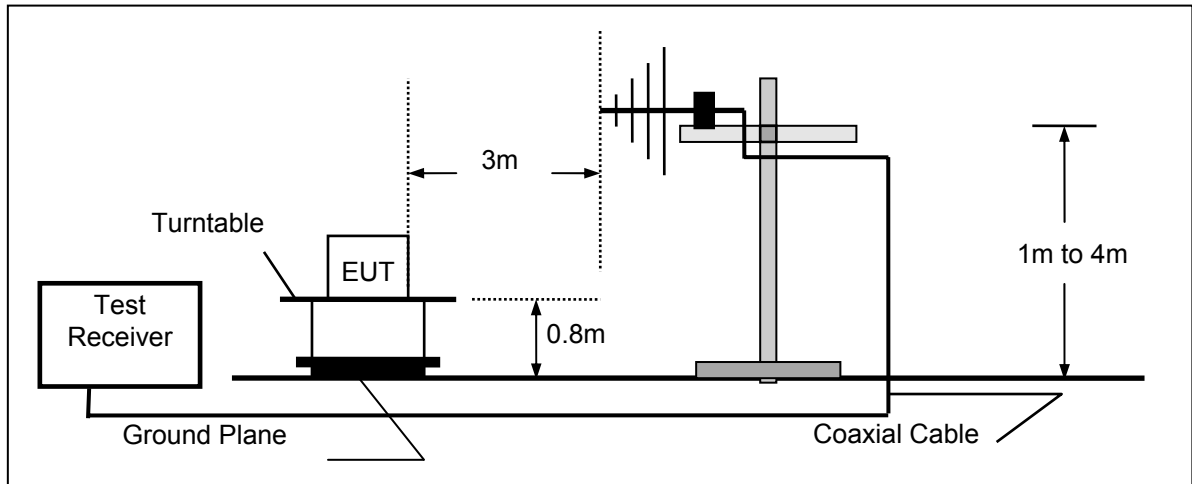
10/26/2010 9:25AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154000	38.20	10.5	56	17.6	AV	L1	GND
0.582000	24.70	10.4	46	21.3	AV	L1	GND
1.130000	19.20	10.5	46	26.8	AV	L1	GND
2.582000	16.70	10.5	46	29.3	AV	L1	GND
7.658000	20.90	10.7	50	29.1	AV	L1	GND
29.790000	14.20	11.3	50	35.8	AV	L1	GND

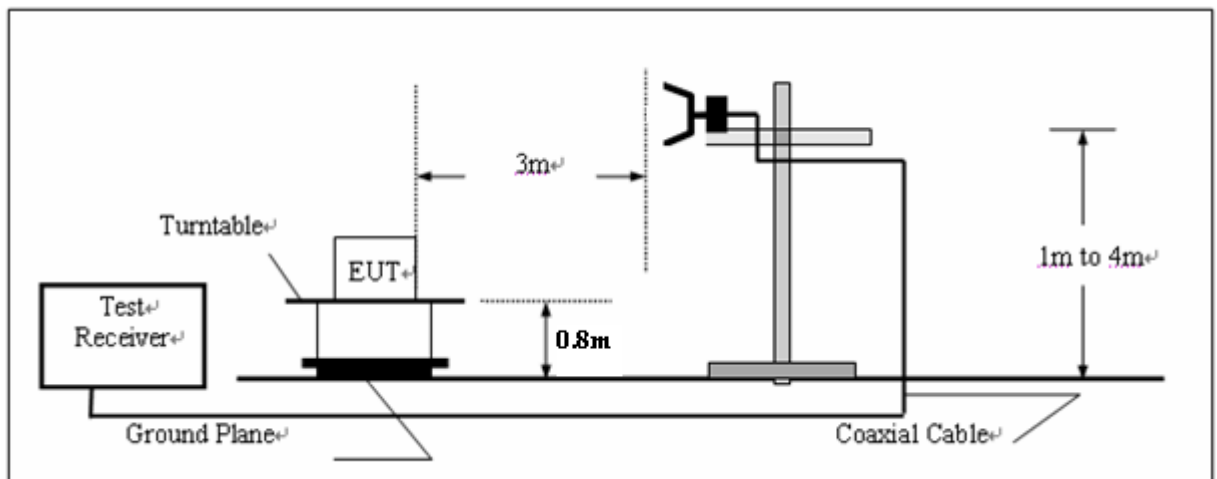
4.2. Radiated Emission

TEST CONFIGURATION

(a) Radiated Emission Test Set-Up, Frequency below 1000MHz



(b) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
- 2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

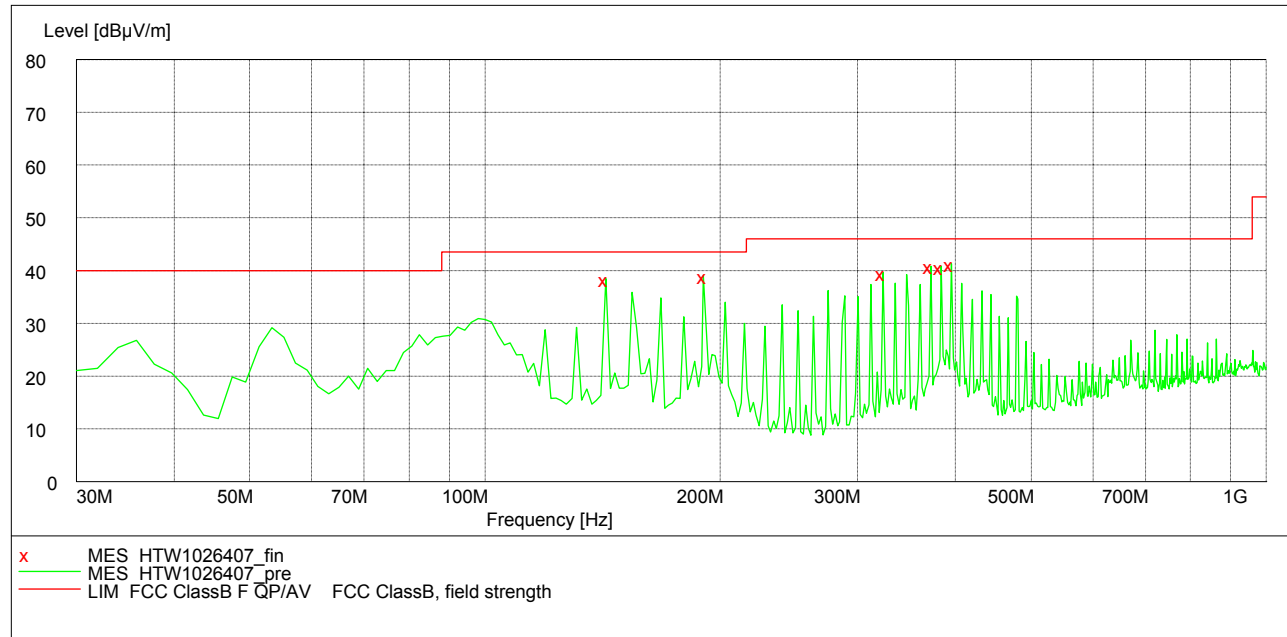
RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS**For 30MHz to 1000MHz****SCAN TABLE: "test Field(30M-1G)QP"**

Short Description:			Field Strength(30M-1G)			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562 09

**MEASUREMENT RESULT: "HTW1026407_fin"**

10/29/2010 9:09AM

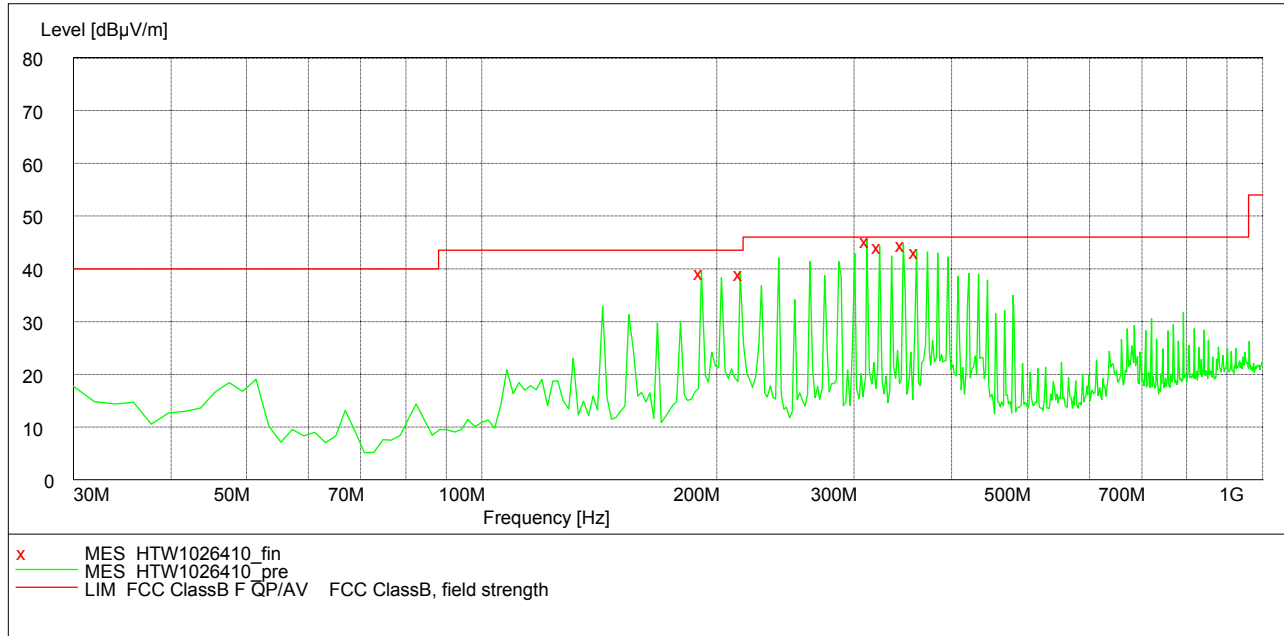
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
142.745491	38.50	-21.4	43.5	5.0	QP	100.0	264.00	VERTICAL
191.342685	39.10	-21.8	43.5	4.4	QP	100.0	355.00	VERTICAL
323.527054	39.60	-17.5	46.0	6.4	QP	100.0	304.00	VERTICAL
372.124248	40.90	-15.9	46.0	5.1	QP	100.0	146.00	VERTICAL
383.787575	40.80	-15.6	46.0	5.2	QP	100.0	149.00	VERTICAL
395.450902	41.30	-15.5	46.0	4.7	QP	100.0	149.00	VERTICAL

REMARKS :

1. *Undetectable
2. The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz
3. The Transd=Cabel loss +Antenna factor -pre-amplifier factor
4. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

SCAN TABLE: "test Field(30M-1G)QP"

Short Description:			Field Strength(30M-1G)			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562 09

**MEASUREMENT RESULT: "HTW1026410_fin"**

10/29/2010 9:00AM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
191.342685	39.50	-21.8	43.5	4.0	QP	100.0	66.00	HORIZONTAL
214.669339	39.20	-20.8	43.5	4.3	QP	100.0	301.00	HORIZONTAL
311.863727	45.50	-17.5	46.0	0.5	QP	100.0	268.00	HORIZONTAL
323.527054	44.30	-17.5	46.0	1.7	QP	100.0	83.00	HORIZONTAL
346.853707	44.80	-16.7	46.0	1.2	QP	100.0	281.00	HORIZONTAL
360.460922	43.50	-16.6	46.0	2.5	QP	100.0	281.00	HORIZONTAL

REMARKS :

1. *Undetectable
2. The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz
3. The Transd=Cabel loss +Antenna factor -pre-amplifier factor
4. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

Above 1G

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

Company	Tostrong Technology Co.,Ltd.	Test Date	10/24/2010
Test Mode	2402MHz	Detector Function	Peak(PK)/Average(AV)
Product Name	Bluetooth Keyboard	Test By	Eric Zhang
Model Name	BT-KB1000	TEMP&Humidity	25°C, 55%

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2402.00	79.21 PK			1.00	189	82.61	28.3	4.90	36.6	-3.40
1	*2402.00	67.45 AV			1.00	189	70.85	28.3	4.90	36.6	-3.40
2	4804.00	47.25 PK	74.00	26.75	1.00	359	44.05	32.7	7.00	36.5	3.20
2	4804.00	36.96 AV	54.00	17.04	1.00	359	33.76	32.7	7.00	36.5	3.20
3	7206.00	43.62 PK	74.00	30.38	1.00	152	34.22	35.8	8.90	35.3	9.40
3	7206.00	34.21 AV	54.00	19.79	1.00	152	24.81	35.8	8.90	35.3	9.40
4	11360.72	46.25 PK	74.00	27.75	1.00	140	29.65	38.0	11.30	32.7	16.6
4	11360.72	35.85 AV	54.00	18.15	1.00	140	19.25	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2402.00	80.13 PK			1.0	124	83.53	28.3	4.90	36.6	-3.40
1	*2402.00	68.25 AV			1.0	124	71.65	28.3	4.90	36.6	-3.40
2	4804.00	46.35 PK	74.00	27.65	1.0	339	43.15	32.7	7.00	36.5	3.20
2	4804.00	35.68 AV	54.00	18.32	1.0	339	32.48	32.7	7.00	36.5	3.20
3	7206.00	45.21 PK	74.00	28.79	1.0	340	35.81	35.8	8.90	35.3	9.40
3	7206.00	32.52 AV	54.00	21.48	1.0	340	23.12	35.8	8.90	35.3	9.40
4	11360.72	46.35 PK	74.00	27.65	1.0	20	29.75	38.0	11.30	32.7	16.6
4	11360.72	34.05 AV	54.00	19.95	1.0	20	17.45	38.0	11.30	32.7	16.6

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. The limit value is defined as per 15.247
6. "*" : Fundamental frequency

Company	Tostrong Technology Co.,Ltd.	Test Date	10/24/2010
Test Mode	2441MHz	Detector Function	Peak(PK)/Average(AV)
Product Name	Bluetooth Keyboard	Test By	Eric Zhang
Model Name	BT-KB1000	TEMP&Humidity	25°C, 55%

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2441.00	86.94	PK			1.00 H	153	90.14	28.3	5.10	36.6	-3.20
1	*2441.00	77.24	AV			1.00 H	153	80.44	28.3	5.10	36.6	-3.20
2	4882.00	44.12	PK	74.00	29.88	1.00 H	202	40.72	32.3	7.60	36.5	3.40
2	4882.00	36.48	AV	54.00	17.52	1.00 H	202	33.08	32.3	7.60	36.5	3.40
3	7323.00	43.45	PK	74.00	30.55	1.00 H	355	34.05	36.1	8.60	35.3	9.40
3	7323.00	34.58	AV	54.00	19.42	1.00 H	355	25.18	36.1	8.60	35.3	9.40
4	11360.72	49.73	PK	74.00	24.27	1.00 H	28	33.13	38.0	11.30	32.7	16.6
4	11360.72	40.14	AV	54.00	13.86	1.00 H	28	23.54	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2441.00	85.59	PK			1.00 V	121	88.79	28.3	5.10	36.6	-3.20
1	*2441.00	67.54	AV			1.00 V	121	70.74	28.3	5.10	36.6	-3.20
2	4882.00	45.99	PK	74.00	28.01	1.00 V	97	42.59	32.3	7.60	36.5	3.40
2	4882.00	36.45	AV	54.00	17.55	1.00 V	97	33.05	32.3	7.60	36.5	3.40
3	7323.00	44.06	PK	74.00	29.94	1.00 V	288	34.66	36.1	8.60	35.3	9.40
3	7323.00	35.15	AV	54.00	18.85	1.00 V	288	25.75	36.1	8.60	35.3	9.40
4	11360.72	49.01	PK	74.00	24.99	1.00 V	89	32.41	38.0	11.30	32.7	16.6
4	11360.72	39.54	AV	54.00	14.46	1.00 V	89	22.94	38.0	11.30	32.7	16.6

- REMARKS:**
1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value- Emission level.
 5. The limit value is defined as per 15.247
 6. “* “: Fundamental frequency

Company	Tostrong Technology Co.,Ltd.	Test Date	10/24/2010
Test Mode	2480MHz	Detector Function	Peak(PK)/Average(AV)
Product Name	Bluetooth Keyboard	Test By	Eric Zhang
Model Name	BT-KB1000	TEMP&Humidity	25°C, 55%

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2480.00	94.15	PK			1.00 H	156	97.45	28.2	5.10	36.6	-3.30
1	*2480.00	84.15	AV			1.00 H	156	87.45	28.2	5.10	36.6	-3.30
2	4960.00	51.25	PK	74.00	22.75	1.00 H	198	47.45	33.0	7.00	36.2	3.80
2	4960.00	42.14	AV	54.00	11.86	1.00 H	198	38.34	33.0	7.00	36.2	3.80
3	7340.00	50.12	PK	74.00	23.88	1.00 H	90	40.72	36.2	8.50	35.3	9.40
3	7340.00	40.52	AV	54.00	13.48	1.00 H	90	31.12	36.2	8.50	35.3	9.40
4	11360.72	57.77	PK	74.00	16.23	1.00 H	124	41.17	38.0	11.30	32.7	16.6
4	11360.72	46.52	AV	54.00	7.48	1.00 H	124	29.92	38.0	11.30	32.7	16.6

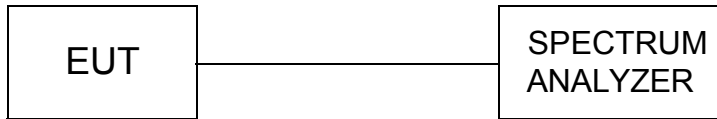
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2480.00	96.46	PK			1.0	125	99.76	28.2	5.10	36.6	-3.30
1	*2480.00	86.53	AV			1.0	125	89.83	28.2	5.10	36.6	-3.30
2	4960.00	54.56	PK	74.00	19.44	1.0	96	50.76	36.2	8.50	35.3	3.80
2	4960.00	45.52	AV	54.00	8.48	1.0	96	41.72	36.2	8.50	35.3	3.80
3	7340.00	52.35	PK	74.00	21.65	1.0	35	42.95	37.4	10.10	34.8	9.40
3	7340.00	43.51	AV	54.00	10.49	1.0	35	34.11	37.4	10.10	34.8	9.40
4	11360.72	55.69	PK	74.00	18.31	1.0	37	39.09	38.0	11.30	32.7	16.6
4	11360.72	45.10	AV	54.00	8.90	1.0	37	28.5	38.0	11.30	32.7	16.6

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value - Emission level.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum. Set the RBW=2MHz VBW=3MHz.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

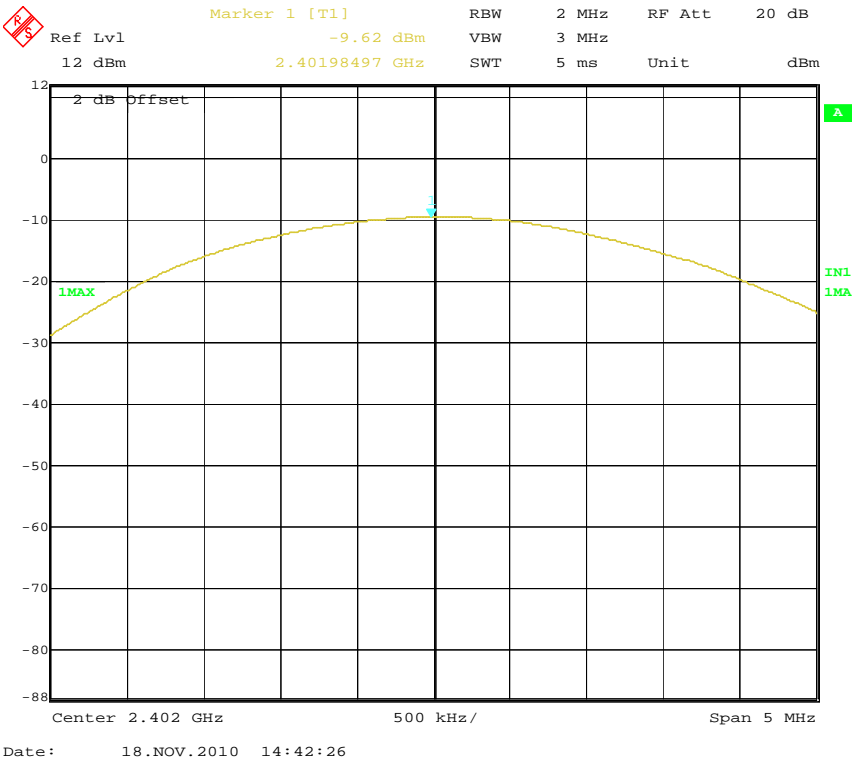
TEST RESULTS

Company	Tostrong Technology Co.,Ltd.	Test Date	10/24/2010
Product Name	Bluetooth Keyboard	Test By	Eric Zhang
Model Name	BT-KB1000	TEMP&Humidity	25°C, 55%

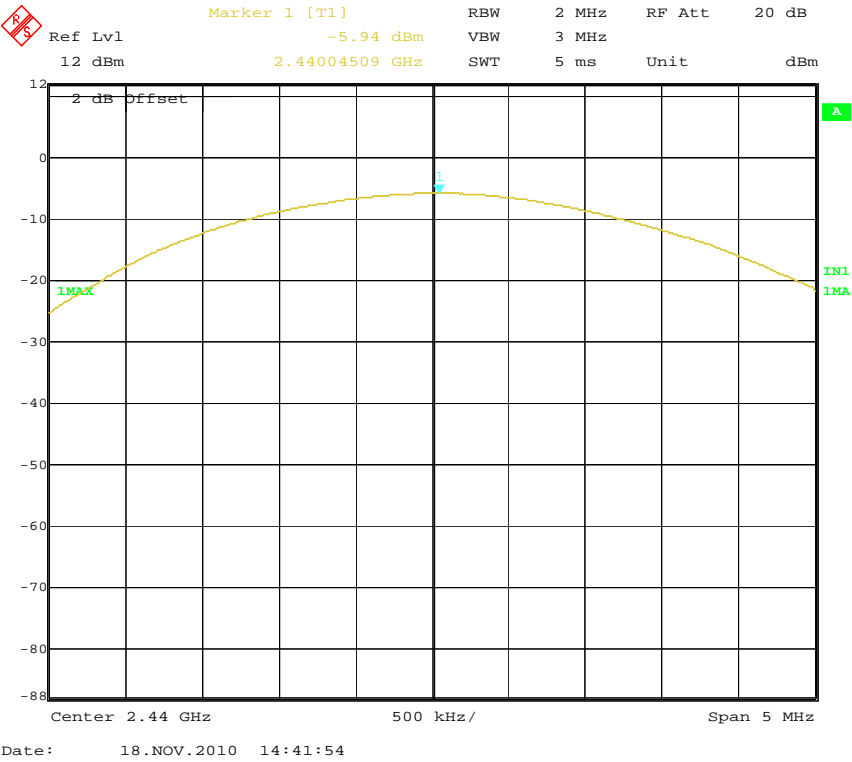
Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
2402	-9.62	30	PASS
2441	-5.94	30	PASS
2480	-0.47	30	PASS

Note: The test results including the cable lose.

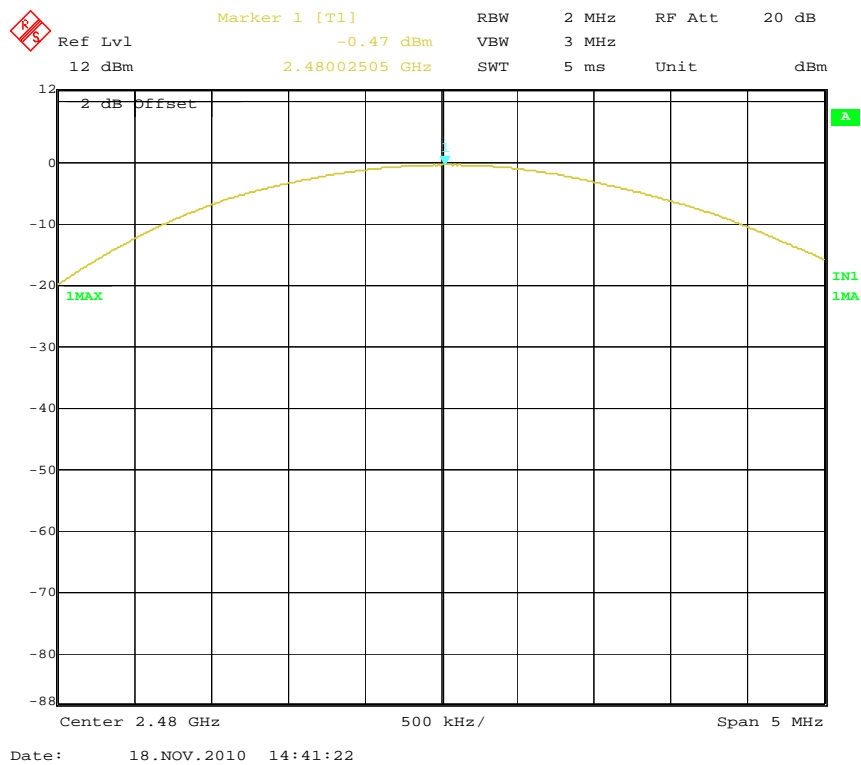
Low channel



Middle channel

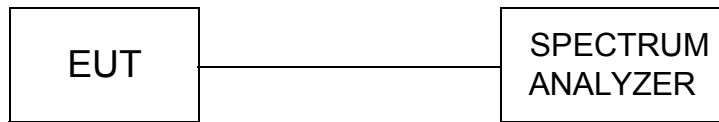


High channel



4.4. 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

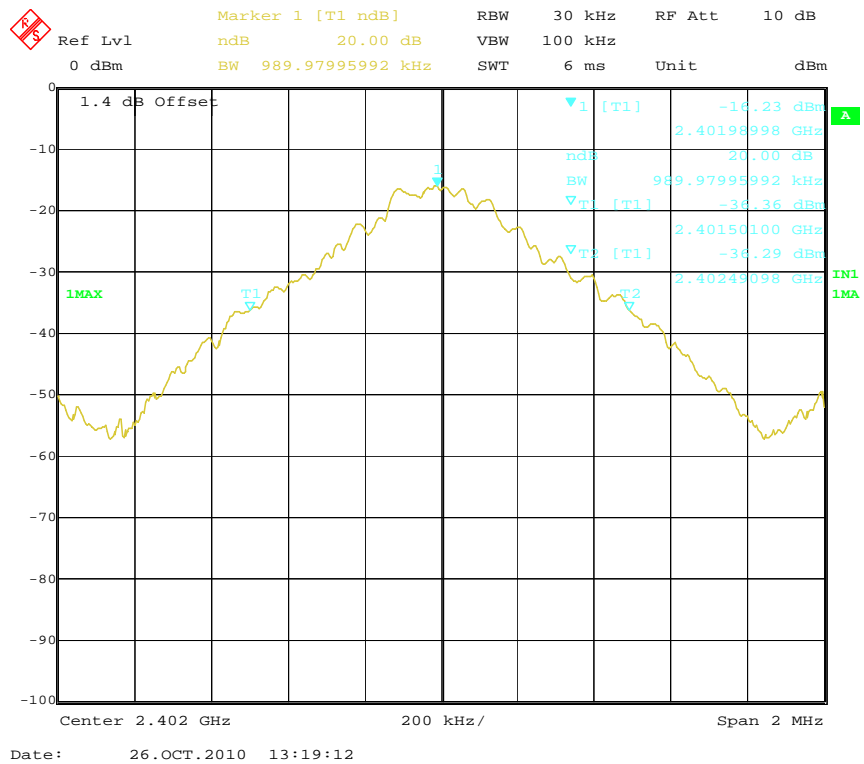
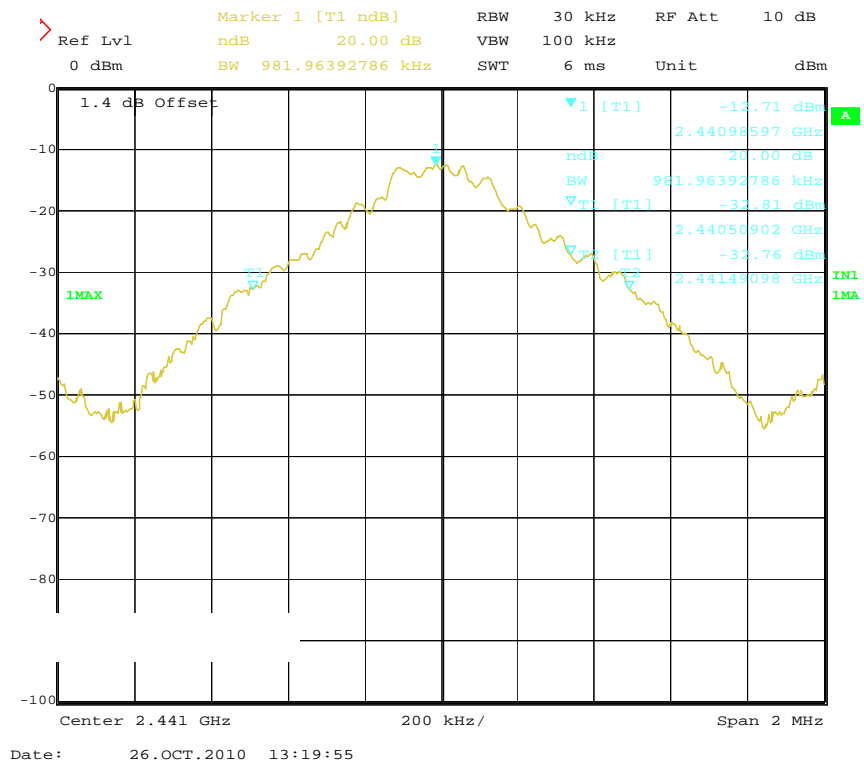
LIMIT

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

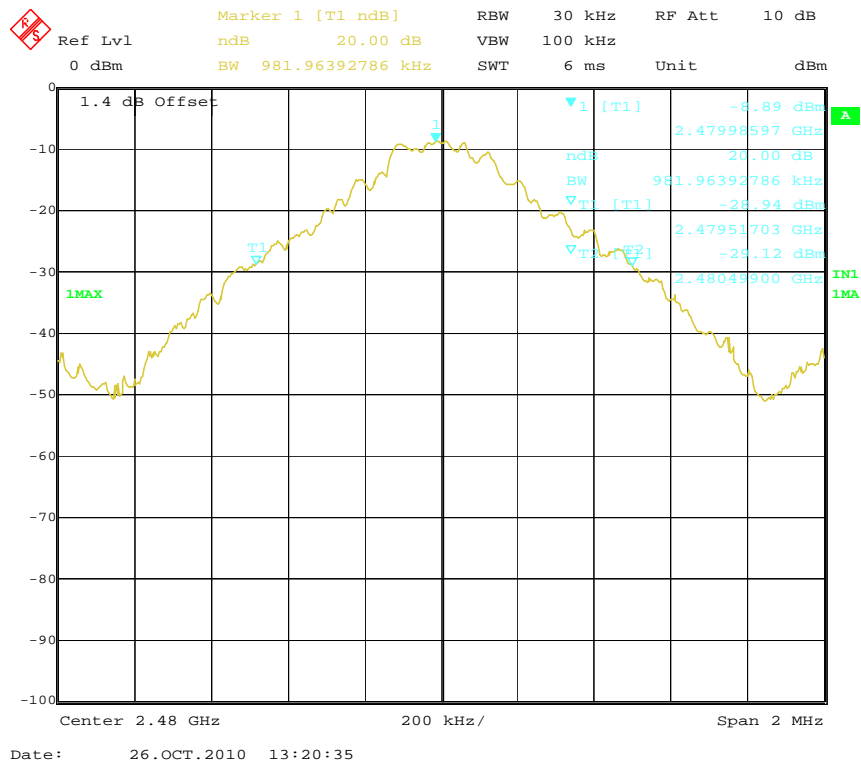
TEST RESULTS

Company	Tostrong Technology Co.,Ltd.	Test Date	10/24/2010
Product Name	Bluetooth Keyboard	Test By	Eric Zhang
Model Name	BT-KB1000	TEMP&Humidity	25°C, 55%

CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	LIMIT (MHz)	PASS/FAIL
2402	0.990	/	/
2441	0.982	/	/
2480	0.982	/	/

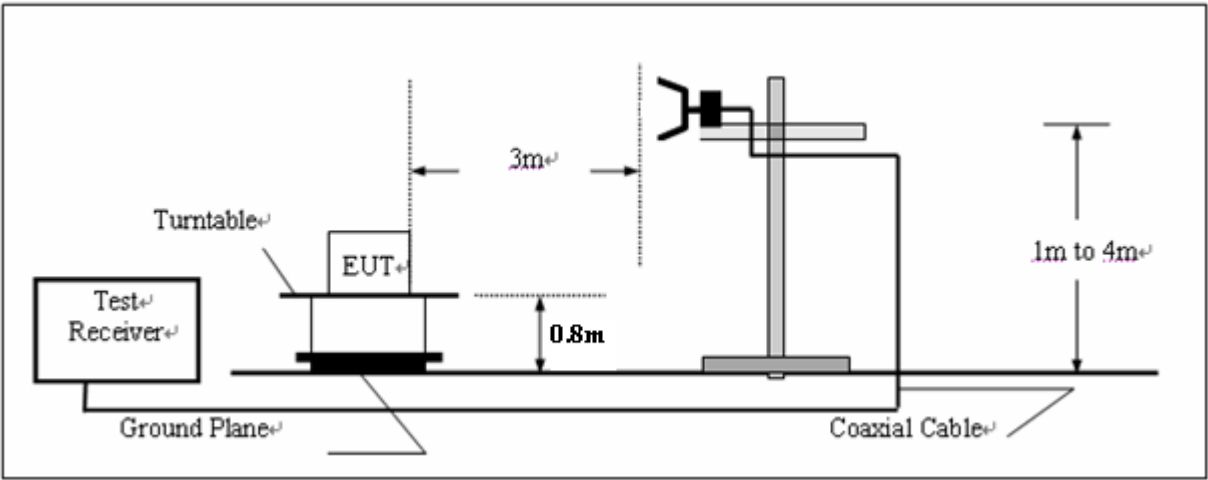
Photos of 20dB Bandwidth Measurement**Frequency Channel 2402****Frequency Channel 2441**

Frequency Channel 2480



4.5. Band Edge Compliance of RF Emission

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4:2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=1MHz and VBM= 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

LIMIT

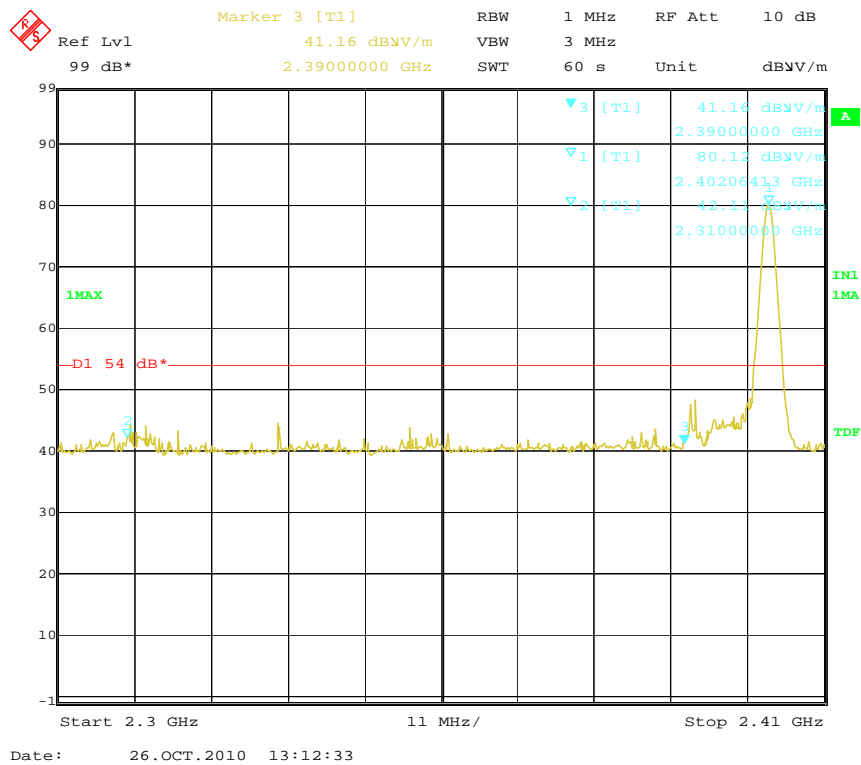
Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

Frequency (MHz)	Limit Average (dBuv/m)	Limit Peak (dBuv/m)
Below 2390 or Above 2483.5	54	74

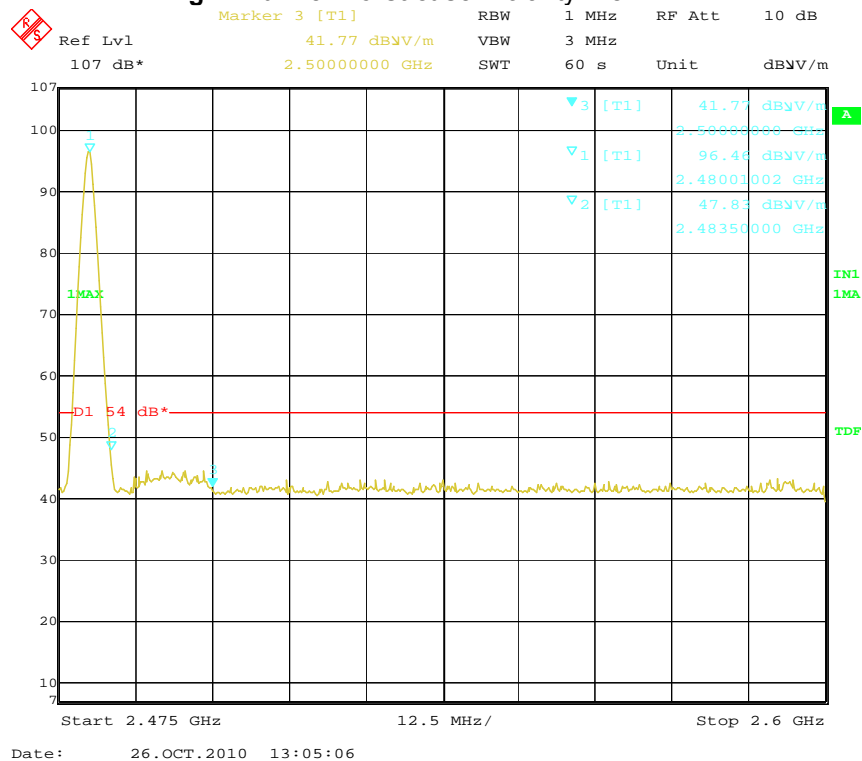
TEST RESULTS

Photos of Band Edge Measurement

Low Channel worst case Polarity: Ver.



High Channel worst case Polarity: Ver.

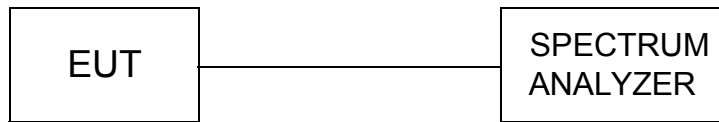


Note : 1.The average measurement was not performed when the peak measured data under the limit of average detection.

2.The pre-test have done for both polarization and found the worst emission at Vertical.The worst case data is recorded in the report.

4.6. Frequency Separation

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100KHz VBW.

LIMIT

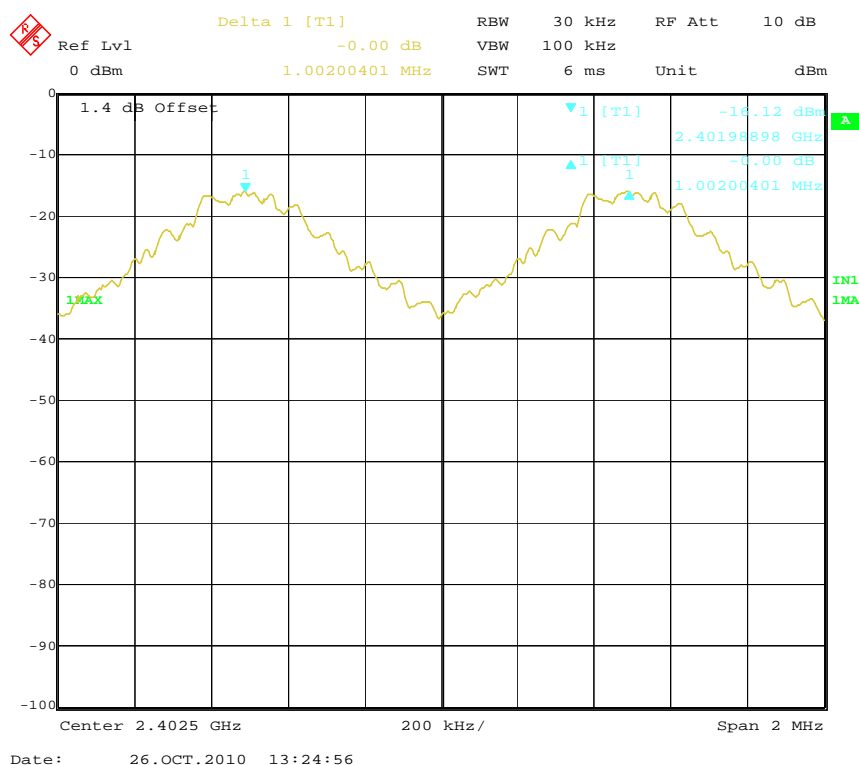
According to 15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the $2/3 \times 20\text{dB}$ bandwidth of the hopping channel, whichever is greater.

TEST RESULTS

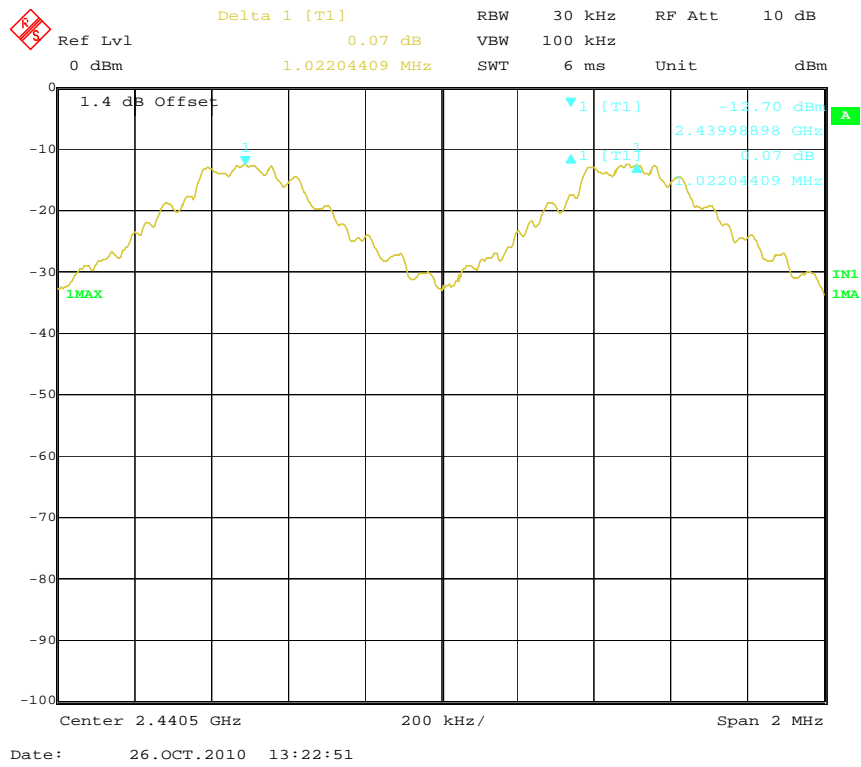
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.002	25KHz or $2/3 \times 20\text{dB}$ bandwidth	Pass
Adjacency Channel	2403			
Mid Channel	2440	1.022	25KHz or $2/3 \times 20\text{dB}$ bandwidth	Pass
Adjacency Channel	2441			
High Channel	2479	1.022	25KHz or $2/3 \times 20\text{dB}$ bandwidth	Pass
Adjacency Channel	2480			

Photos of Frequency separation Measurement

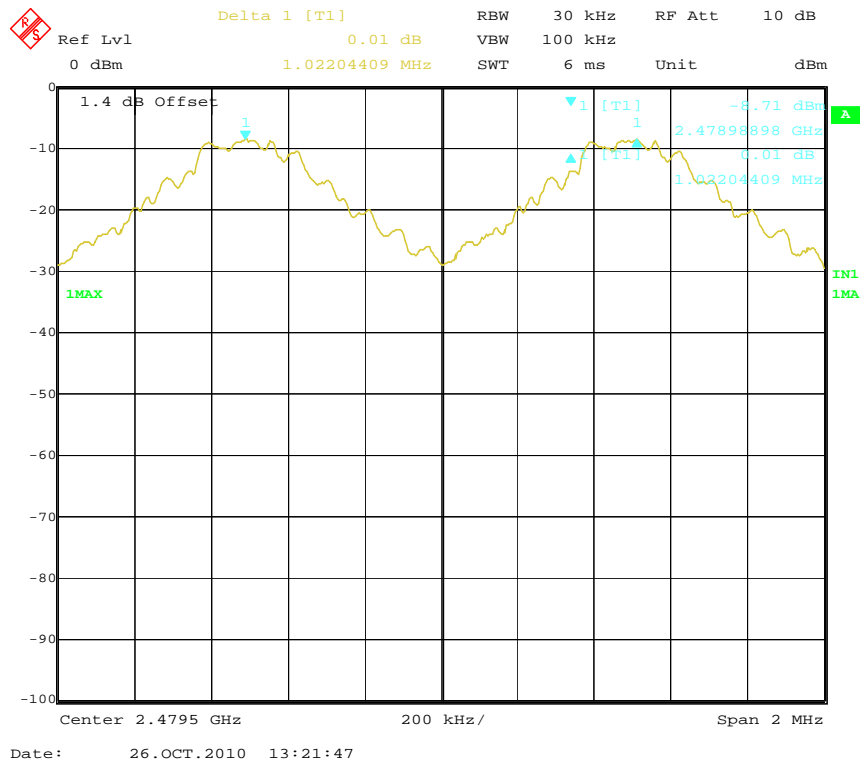
Low channel



Middle channel

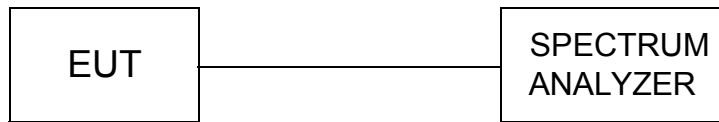


High channel



4.7. Number of hopping frequency

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz with 100 KHz RBW and 300KHz VBW.

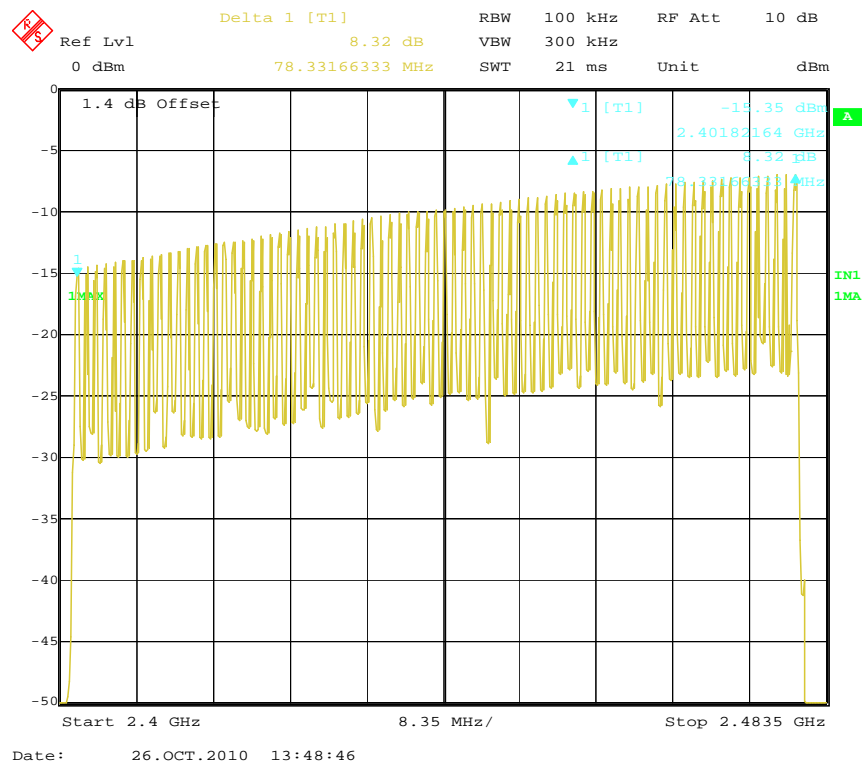
LIMIT

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

TEST RESULTS

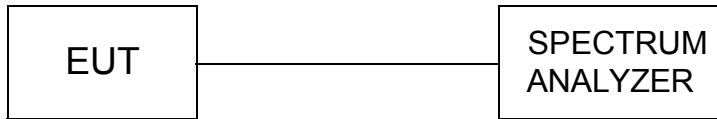
Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15

Photos of Number of hopping channel Measurement



4.8. Time Of Occupancy(Dwell Time)

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with 1MHz RBW and 3MHz VBW, Span 0Hz.

LIMIT

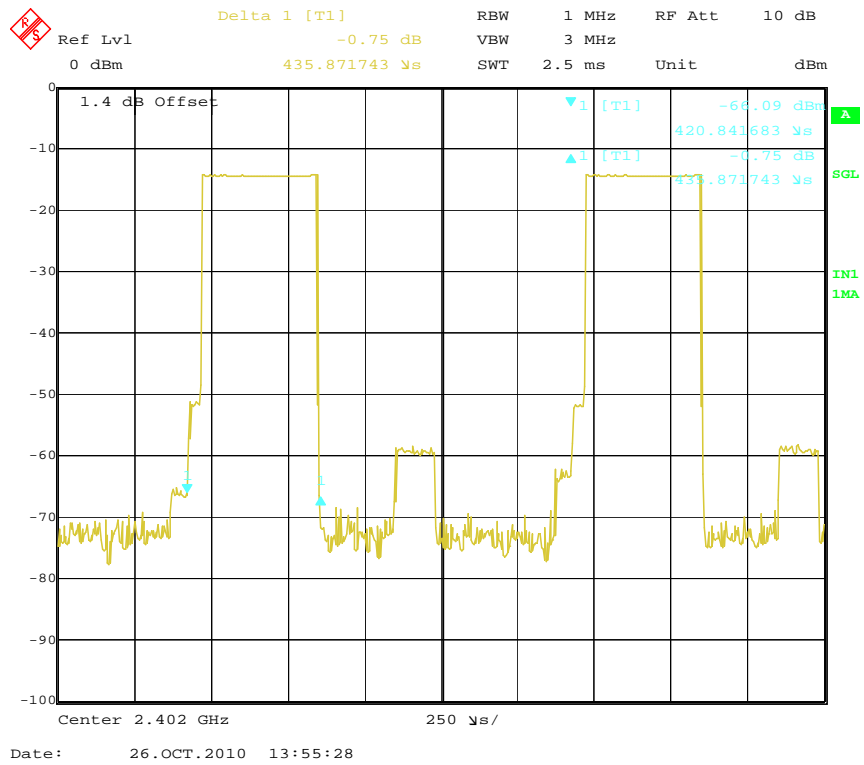
The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

TEST RESULTS

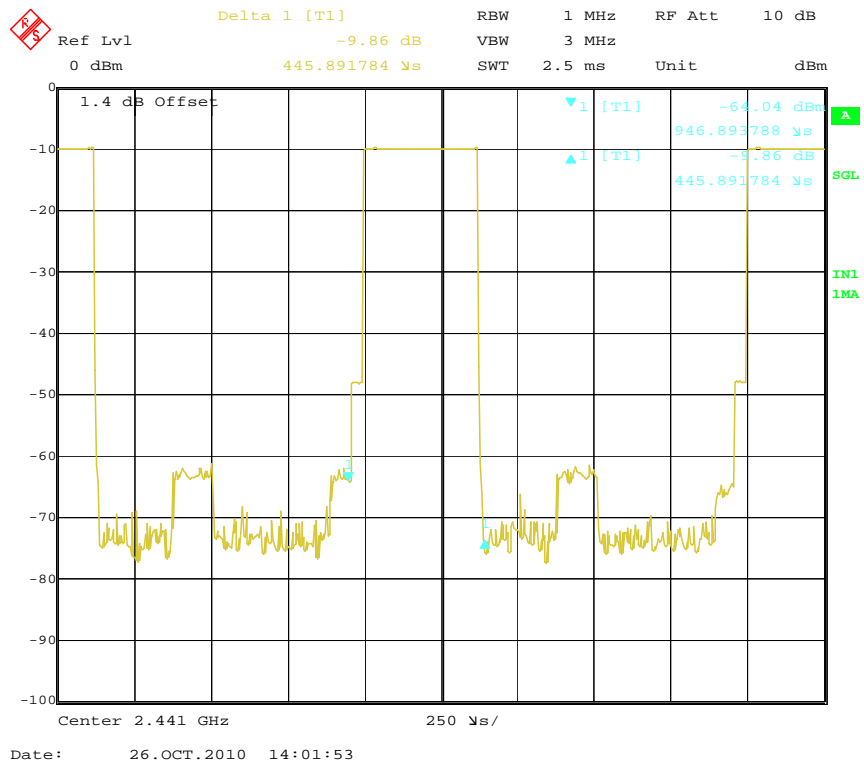
Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.436	0.1395	0.4	Pass
	Middle	0.446	0.1427	0.4	Pass
	High	0.441	0.1411	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH 3	Low	1.709	0.2734	0.4	Pass
	Middle	1.707	0.2731	0.4	Pass
	High	1.713	0.2741	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH 5	Low	2.963	0.3161	0.4	Pass
	Middle	2.960	0.3157	0.4	Pass
	High	2.964	0.3161	0.4	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

Photos of Dwell time Measurement

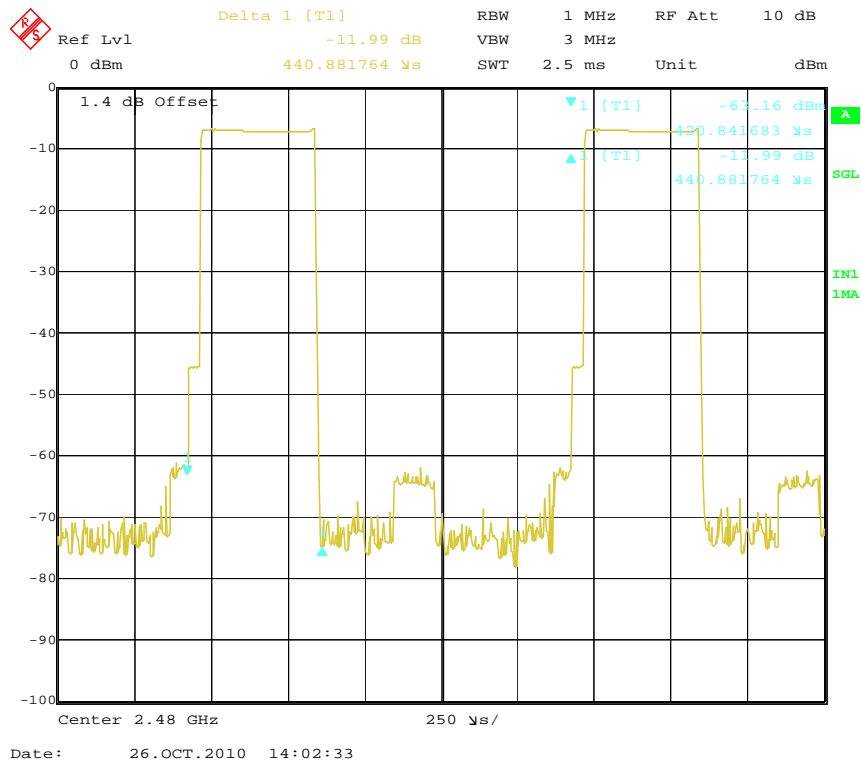
DH1-Low channel



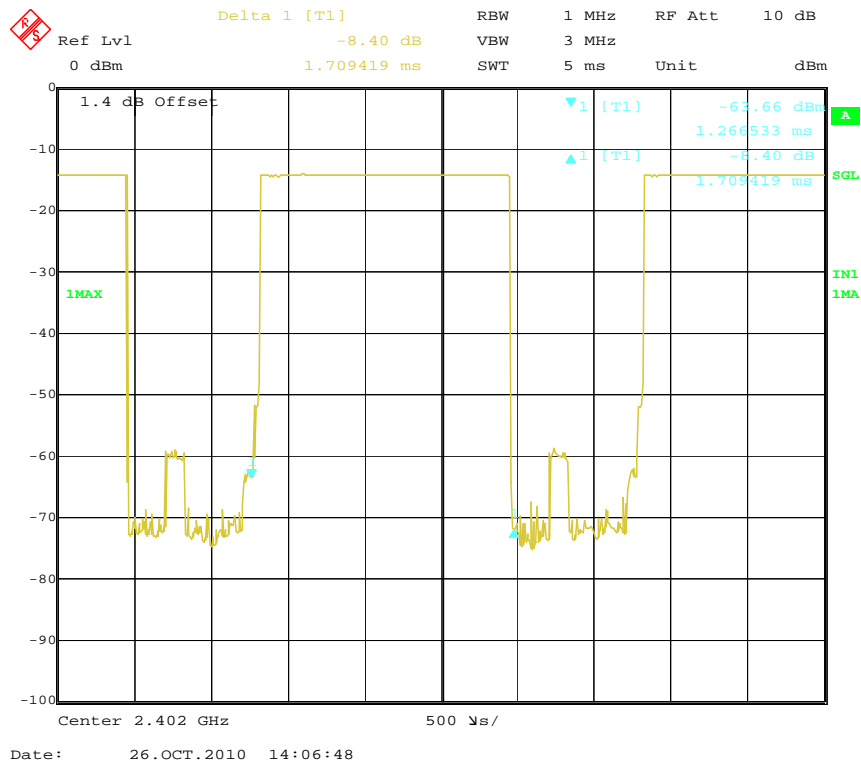
DH1-Middle channel



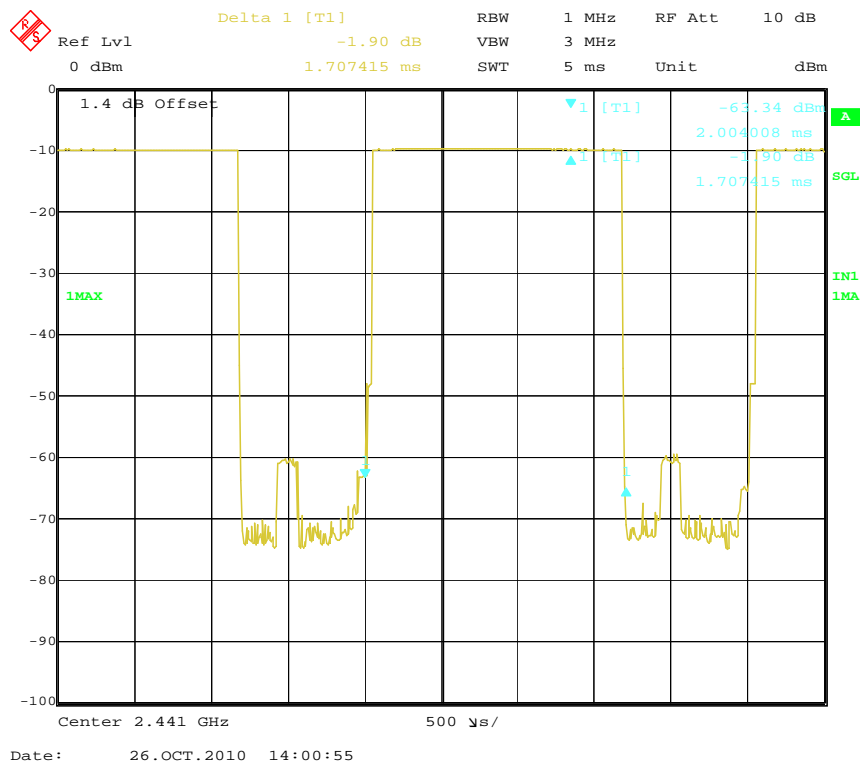
DH1-High channel



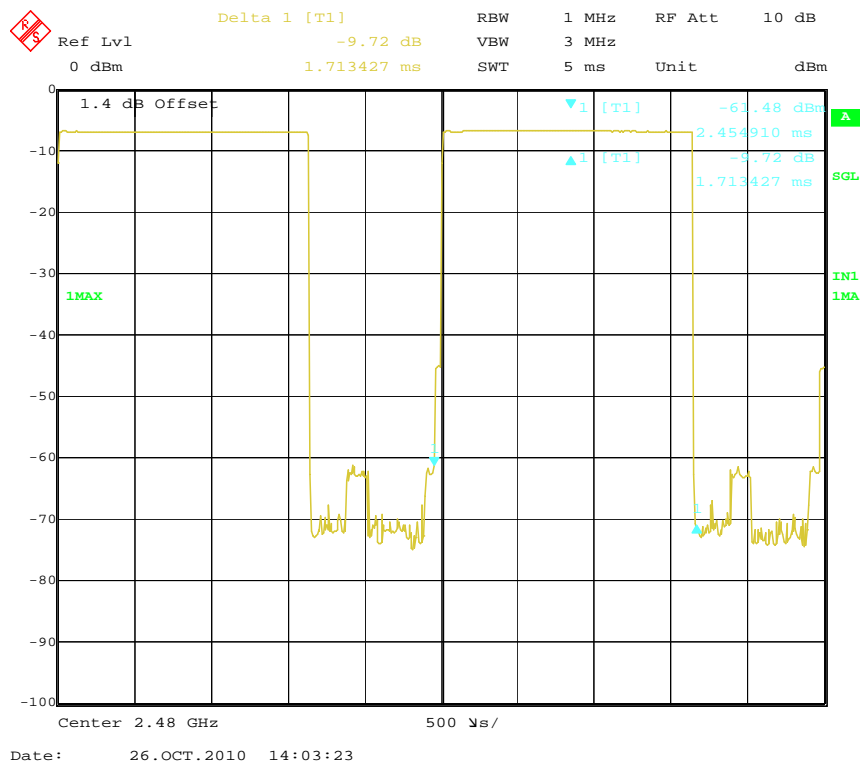
DH3-Low channel



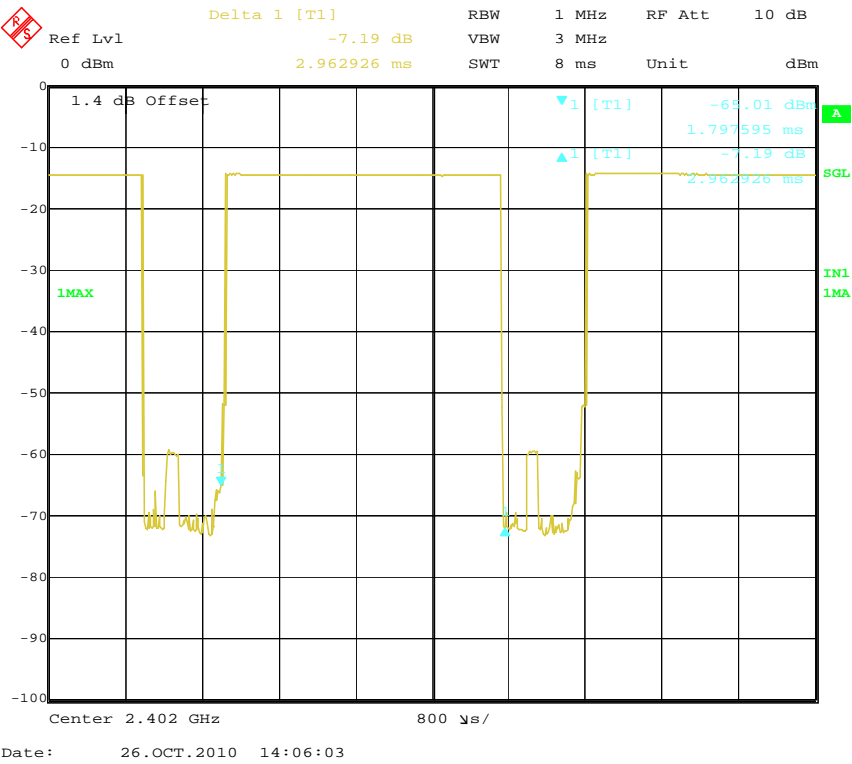
DH3-Middle channel



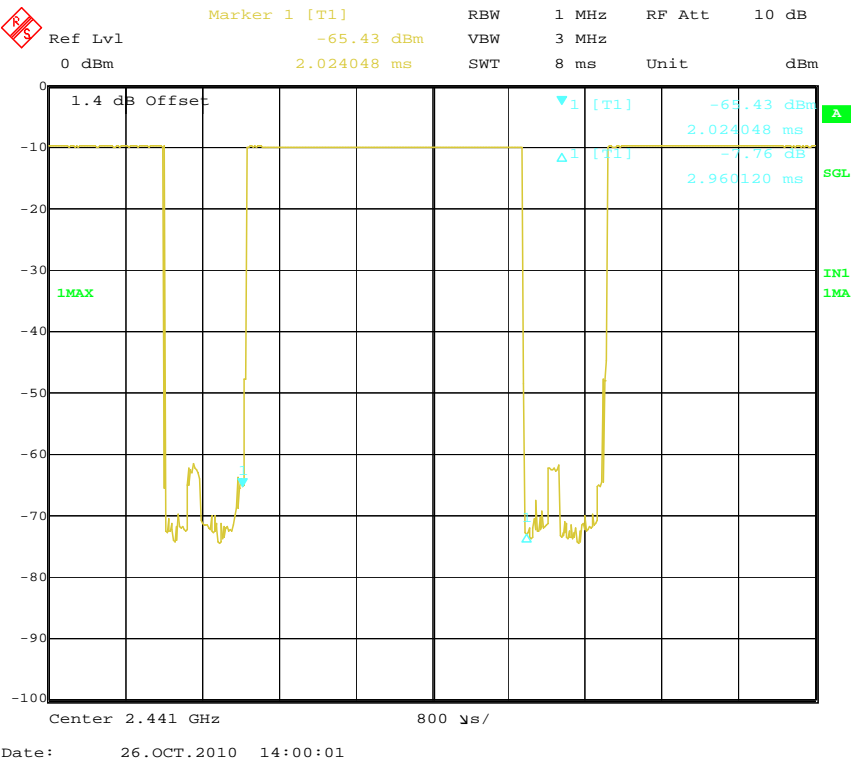
DH3-High channel



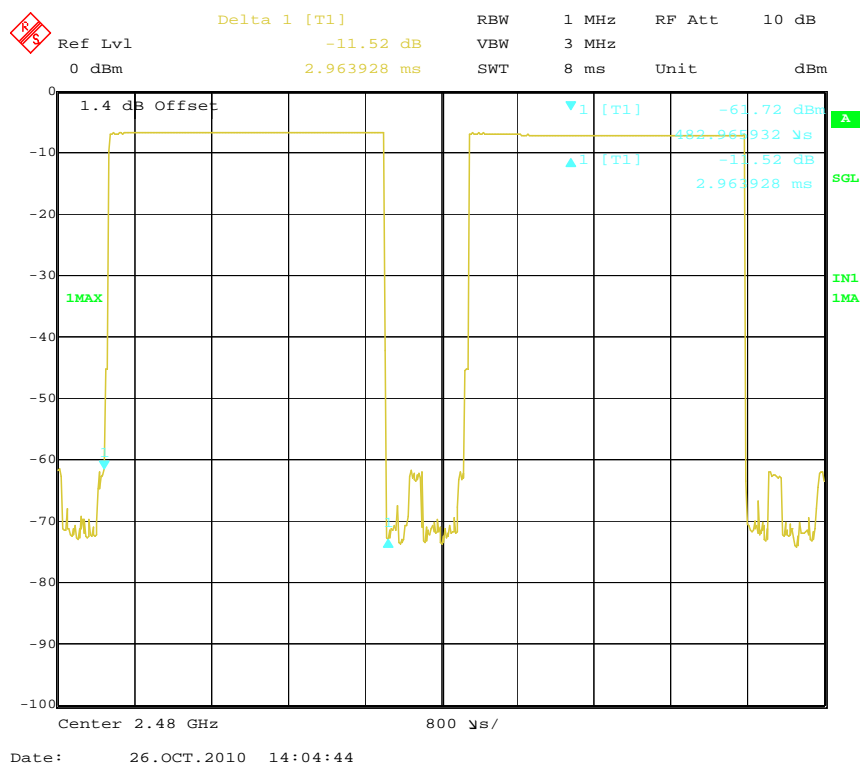
DH5-Low channel



DH5-Middle channel

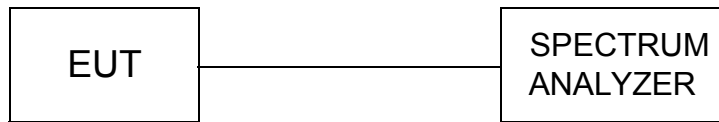


DH5-High channel



4.9. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

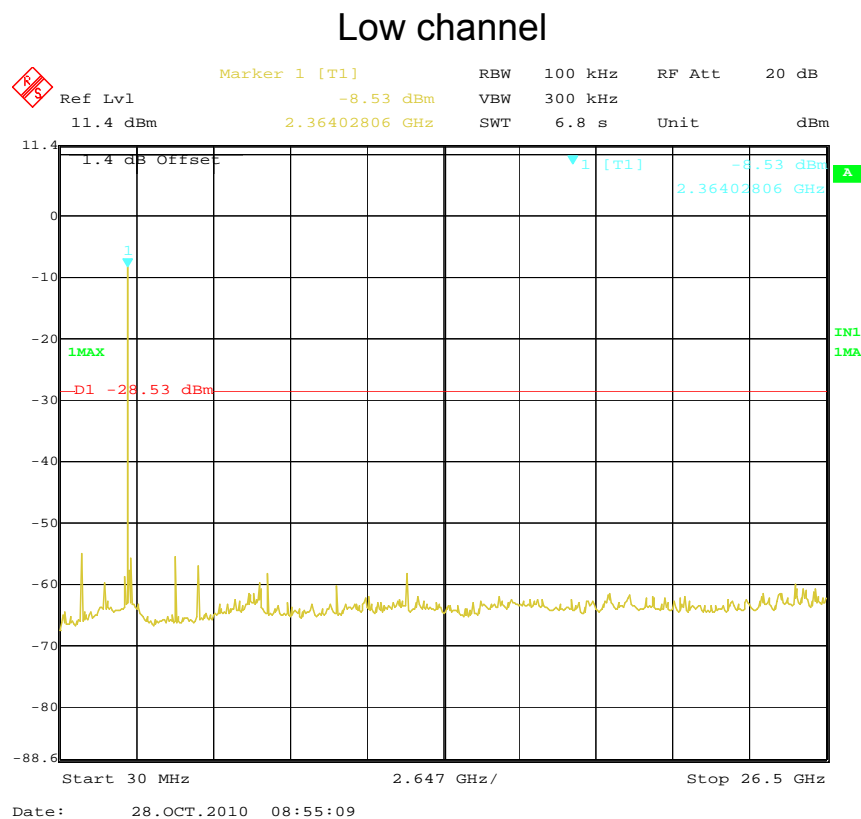
The unlicensed wireless device antenna port connected to the spectrum analyzer, If a second antenna port is available, it shall be tested at one frequency to verify it has similar output characteristics as the fully-tested port. Set the spectrum RBW=100KHz, RBW=300KHz.

LIMIT

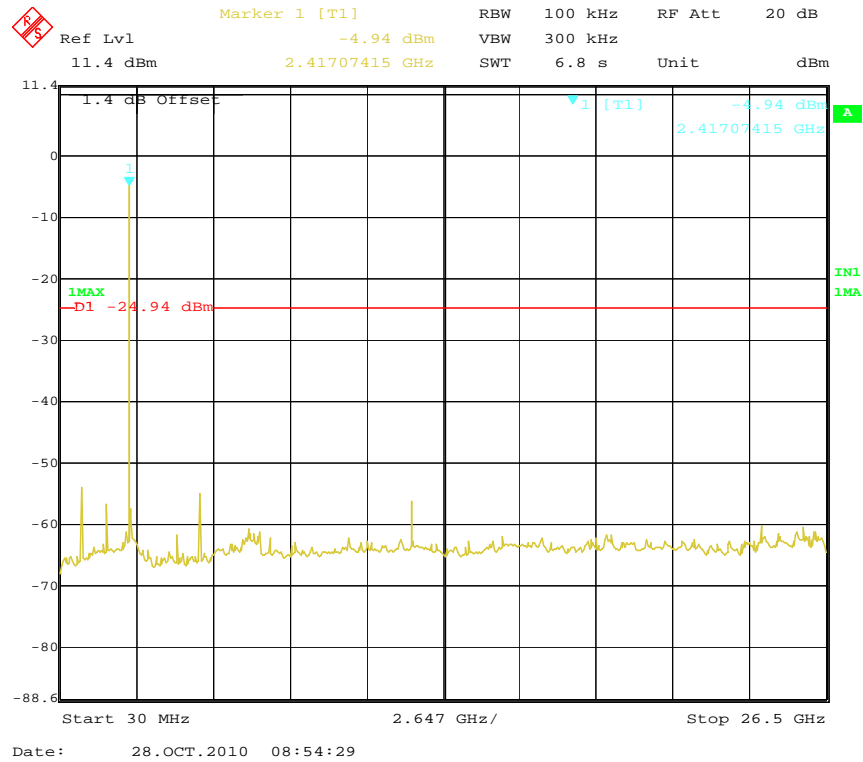
The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

TEST RESULTS

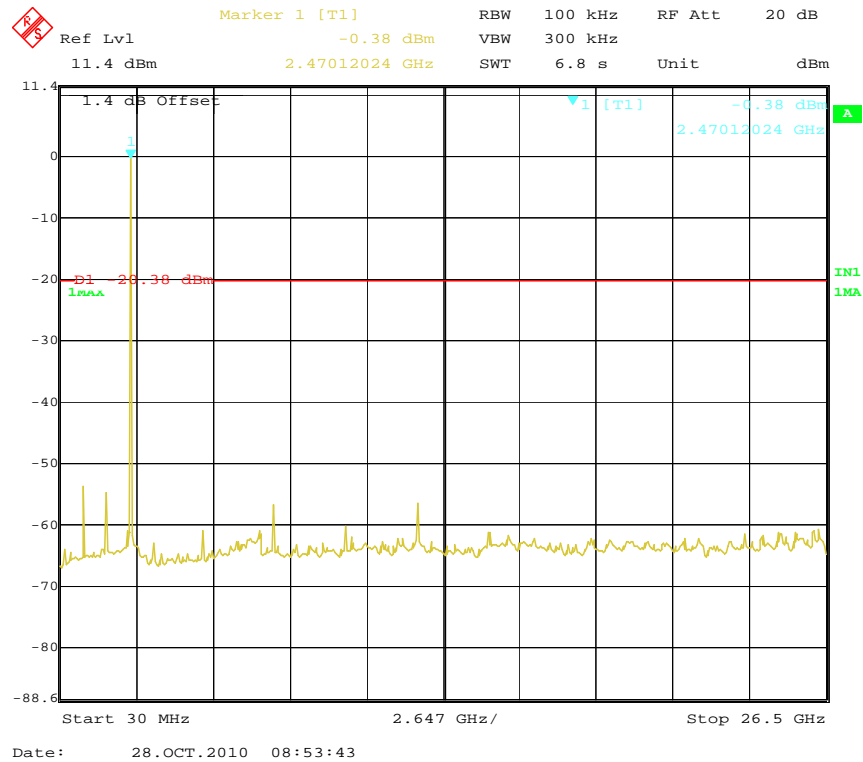
Photo of Spurious RF Conducted Emission Measurement



Middle Channel

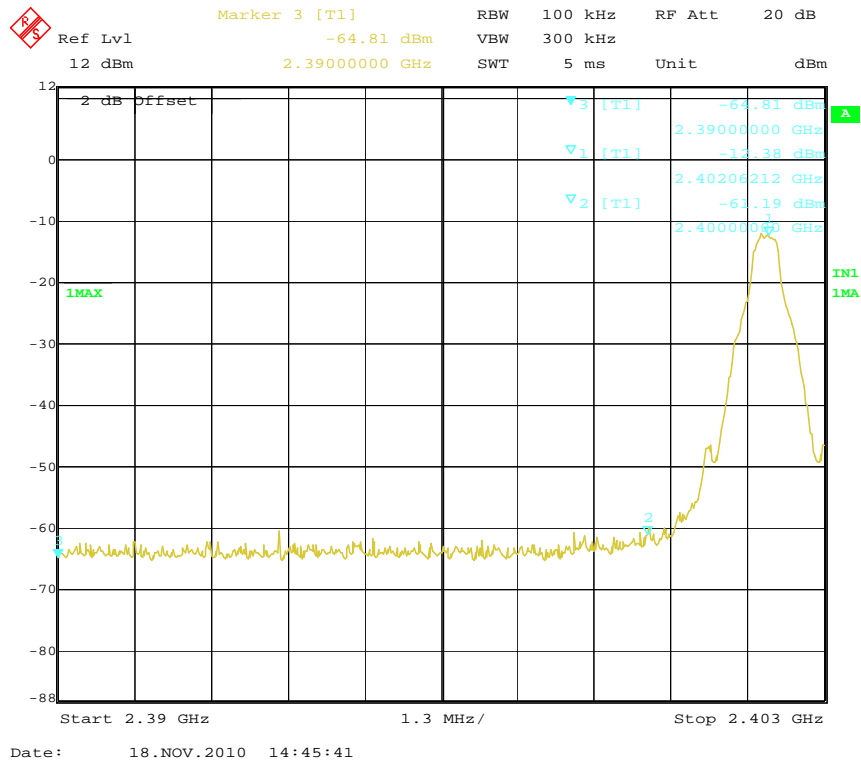


High channel

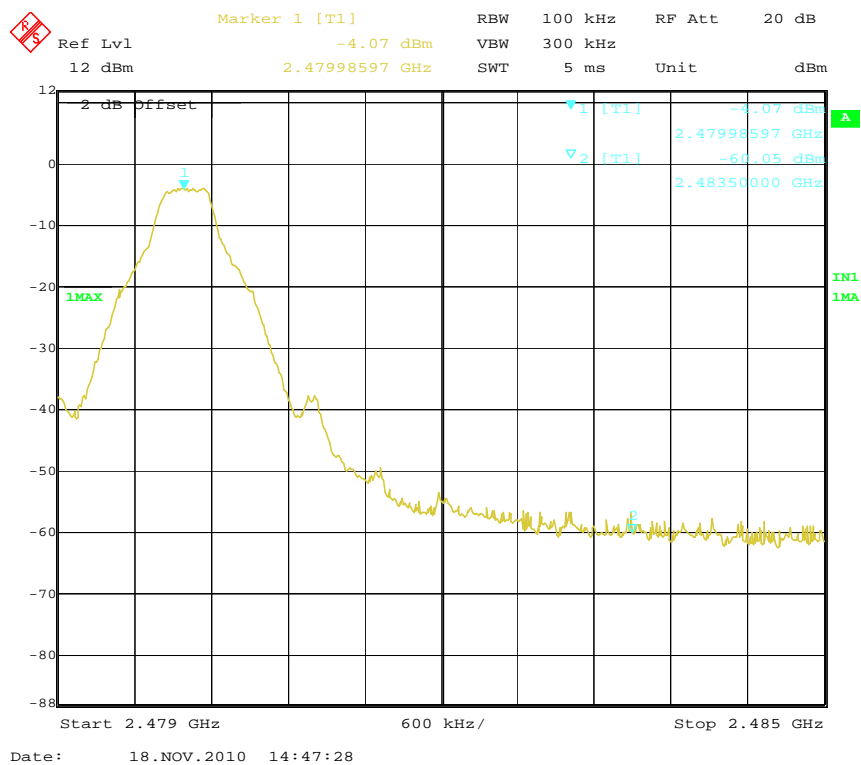


Frequency	Delta peak to band emission	Limit(dBc)
2400MHz	48.81	20
2483.5MHz	55.98	20

Low channel



High channel



4.10. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

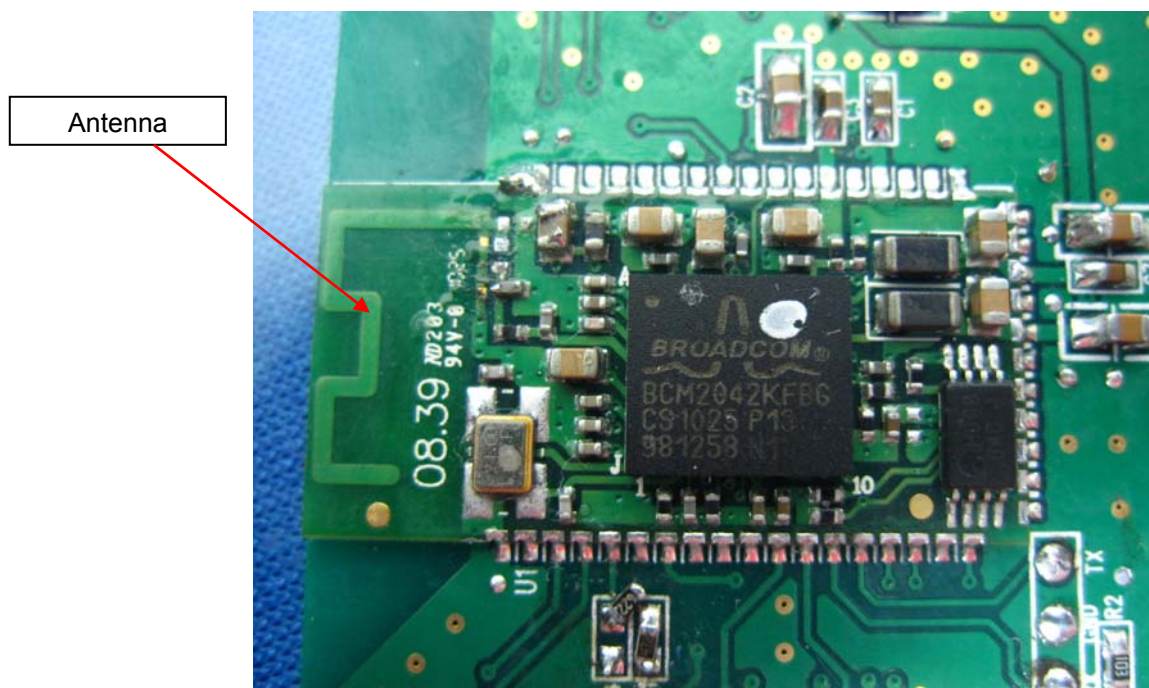
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

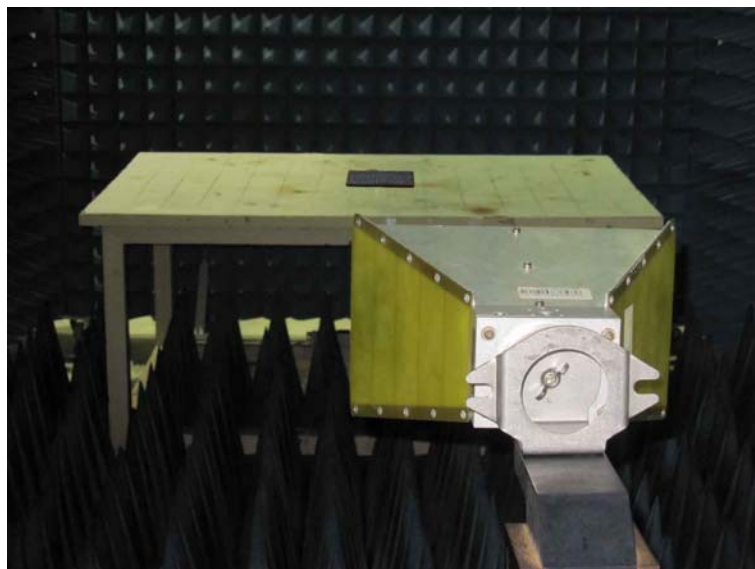
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a PCB Antenna .The maximum Gain of the antenna only 2.78dBi. Detial please see the photos as following:



5. Test Setup Photos of the EUT

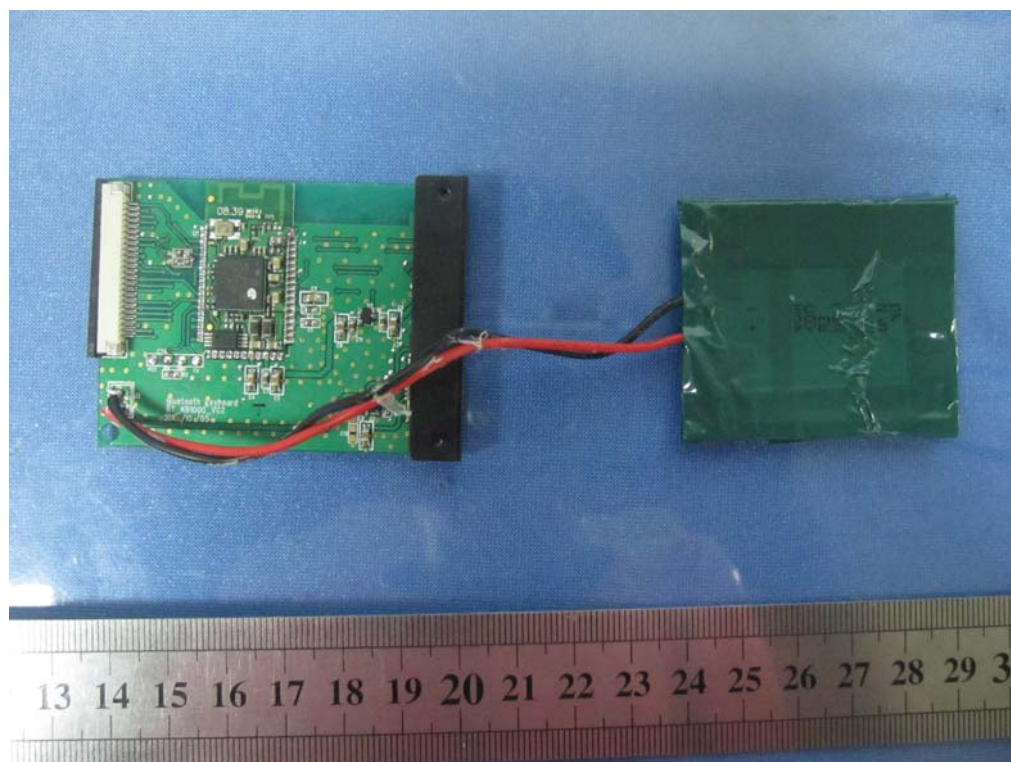


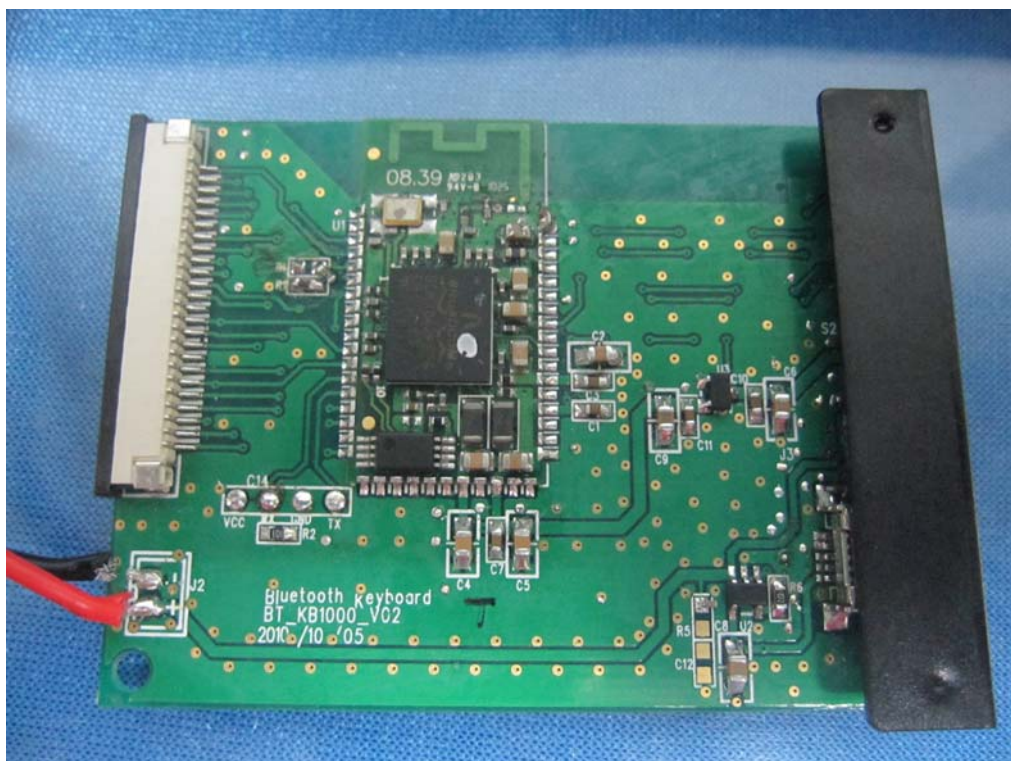
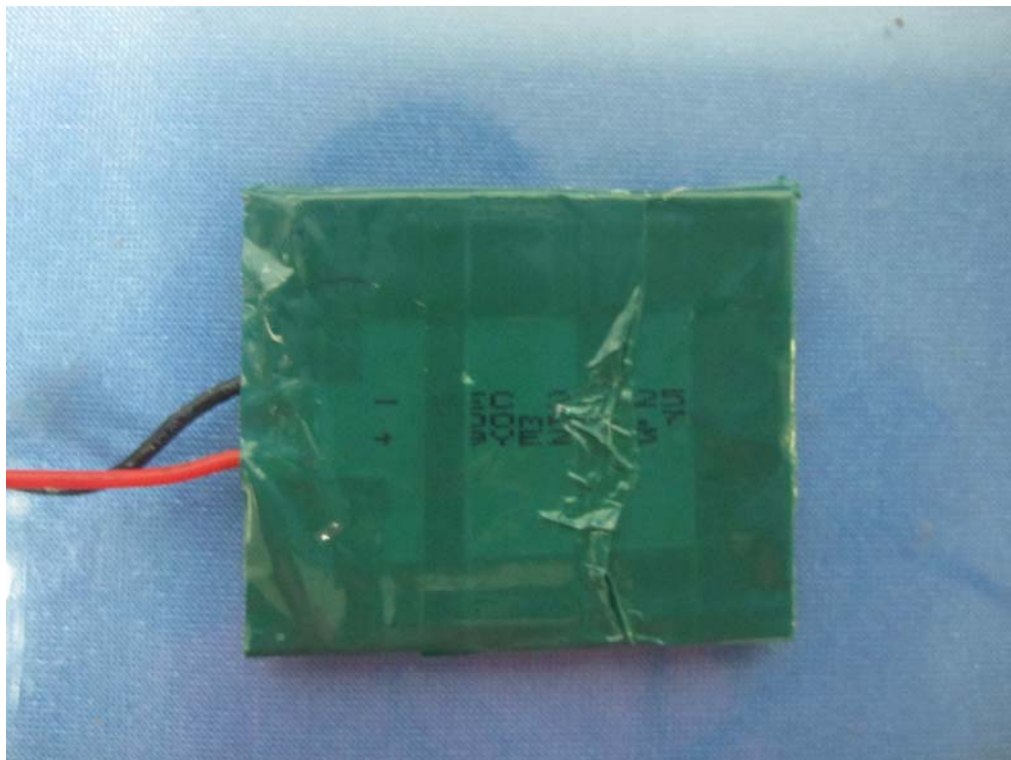
6. External and Internal Photos of the EUT

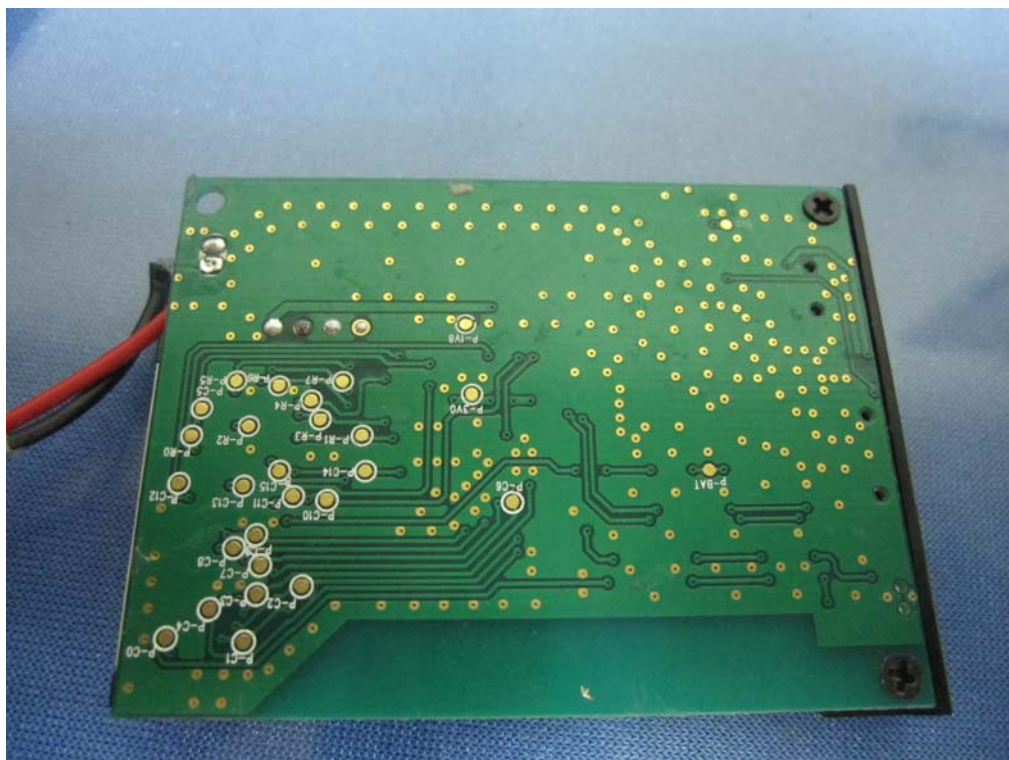
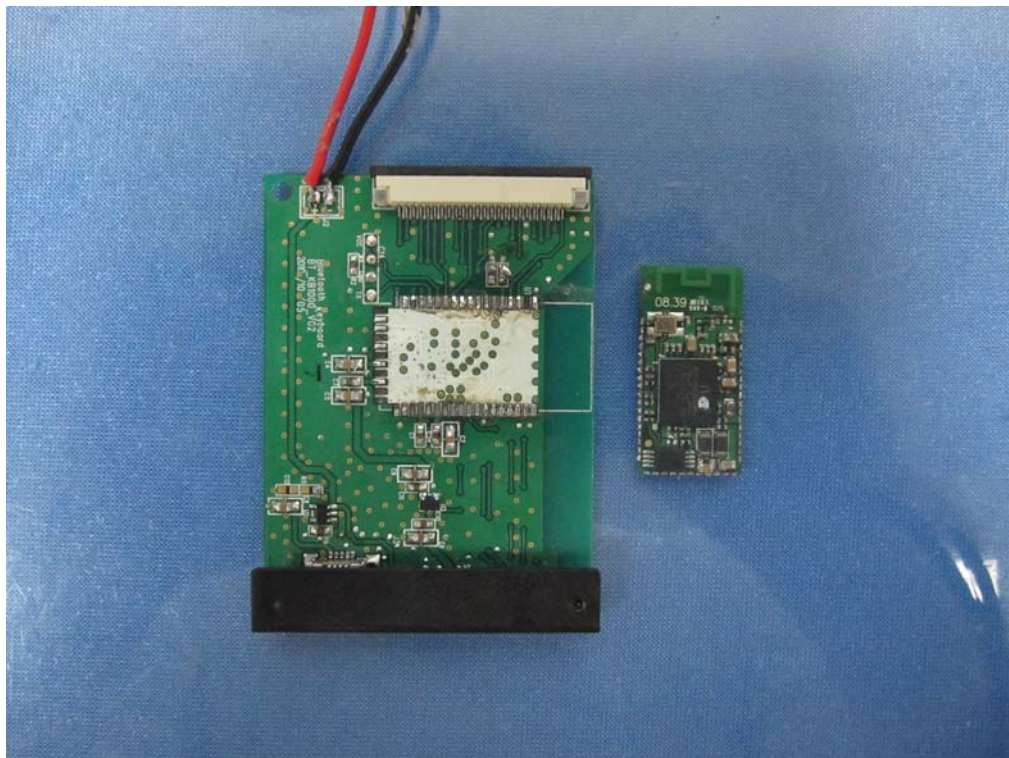
External Photos

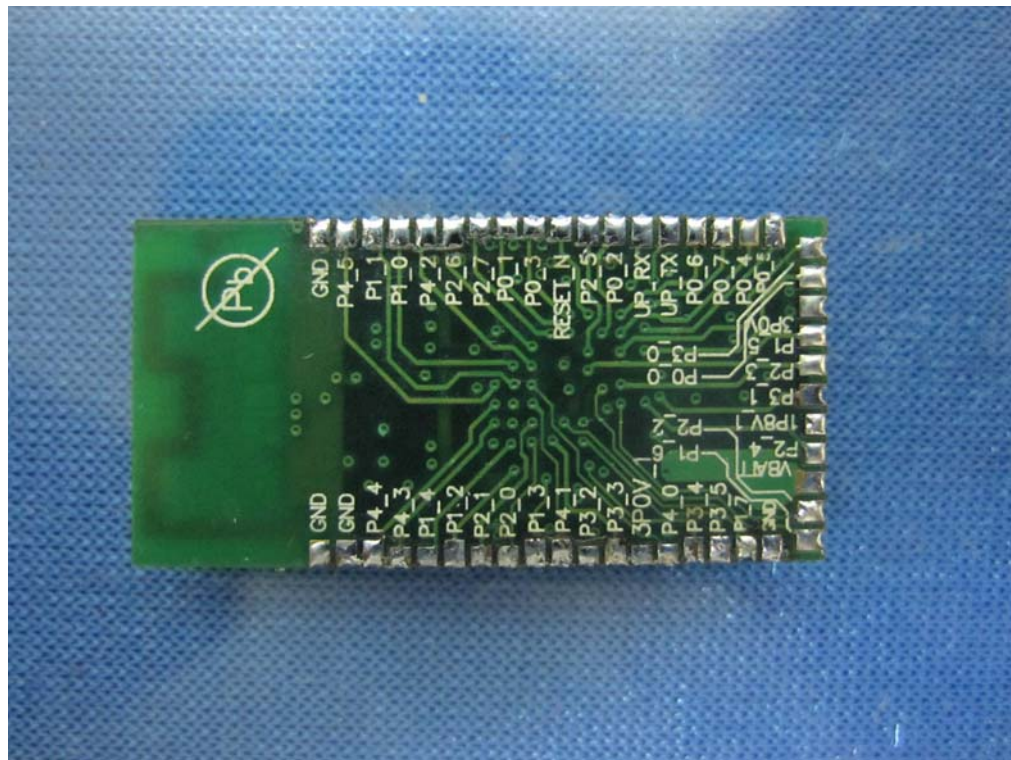




Internal Photos







.....**End of Report**.....