

**FCC PART 15 SUBPART C (Class II Change)
MEASUREMENT AND TEST REPORT**

For

Acrox Technologies Co., Ltd.

4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C

E.U.T.: Wireless Bluetooth Mouse

Model Name: BWB15HO213, BKW

Brand Name: Blackweb

FCC ID: PRDMU36

Report Number: NTC1512241F

Test Date(s): December 30, 2015 to January 06, 2016

Report Date(s): January 06, 2016

Prepared by

Dongguan Nore Testing Center Co., Ltd.

**Building D, Gaosheng Science and Technology Park, Hongtu Road,
Nancheng District, Dongguan City, Guangdong, China**

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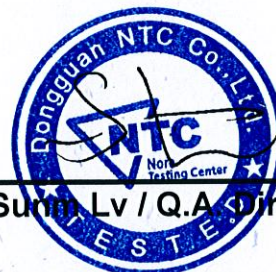
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Prepared By

Approved & Authorized Signer



Rose Hu / Engineer



Sum Lv / Q.A. Director

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan Nore Testing Center Co., Ltd. The test results referenced from this report are relevant only to the sample tested.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

Manufacturer	: Acrox Technologies Co., Ltd.
Address	: Hsinmin Industrial, Changan Town, Dongguan City, Guangdong, China
Power Supply	: 2* 1.5V AAA Battery
Model name	: BWB15HO213, BKW
Model Difference Description	: Both of models have the same circuit schematic, construction, PCB Layout and critical components except model number due to marketing purpose.
Hardware	: 1.0
Software	: 1.0

For 2.4GHz Function

Frequency range:	: 2408-2474MHz
Modulation	: GFSK
Number of Channel	: 34
Channel space	: 2MHz
Antenna Type	: PCB
Antenna Gain	: -1.55dBi (declaration by manufacturer)

For BT Function

BT Version	: BLE(V4.0)
Frequency	: 2402-2480MHz
Modulation	: GFSK
Number of Channel	: 40
Channel space	: 2MHz
Antenna Type	: Integral antenna
Antenna Gain	: -0.615 dBi

Remark	: The product was originally authorized for FCC certification under FCC ID: PRDMU36 The device contains both a 2.4G Bluetooth radio and 2.4G RF radio. No changes have been made to either radio. The Class II Permissive changes to the original product are as follows: 1. Bluetooth antenna type: From PCBA change to Integral. 2. Antenna Gain. For Bluetooth evaluation, RF Output power, spurious emissions, Band Edge and Restricted Bands were retested.
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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: PRDMU36 filing to comply with Section 15.247 of the FCC Part 15(2014), Subpart C Rule.

1.3 Test Methodology

The radiated emission measurement was performed according to the procedures in ANSI C63.10: 2013. Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

None

1.6 Test Facility and Location

Listed by FCC, August 02, 2011
The Certificate Registration Number is 665078.
Listed by Industry Canada, July 01, 2011
The Certificate Registration Number is 46405-9743.

Dongguan NTC Co., Ltd.
(Full Name: Dongguan Nore Testing Center Co., Ltd.)

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Zhouxi Longxi Road, Nancheng District, Dongguan, Guangdong, China.

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.247(b)(3)	Max. Conducted Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band Edge and Conducted Spurious Emissions	Compliance
§15.247(d), §15.209, §15.205	Radiated Spurious Emissions and Restricted Bands	Compliance
§15.203	Antenna Requirement	Compliance

- Note: 1. The EUT has been tested as an independent unit. (The new battery was used during the test.)
2. The EUT operate multiple positions, so the EUT shall be performed 3 planes. The worst plane is X.



2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

The EUT has been tested under continuous operating condition (The duty cycle >98%). Test program used to control the EUT staying in continuous transmitting mode. The Lowest, middle and highest channel were chosen for testing, and modulation type GFSK was tested, but only the worst case data is shown in this report.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Max. Conducted Output Power

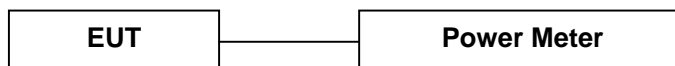
3.1 Measurement Procedure

Maximum Conducted Output power at Antenna Terminals, FCC Rules 15.247(b)(3):

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

3.2 Test SET-UP (Block Diagram of Configuration)



3.3 Measurement Results

Please refer to following table and plots.

Modulation:	GFSK	Humidity :	58 %
Temperature :	21 °C	Test Date :	January 02, 2016
Test By:	Sance		
Test Result:	PASS		

Frequency MHz	Data Rate Mbps	Peak Output Power dBm	Limit dBm
Low Channel: 2402	1	2.98	30
Middle Channel: 2440	1	2.46	30
High Channel: 2480	1	1.73	30

4. Power Spectral Density

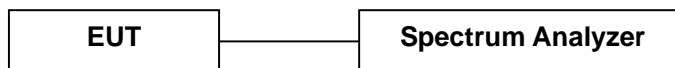
4.1 Measurement Procedure

DTS 6dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03r02):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.2 Test SET-UP (Block Diagram of Configuration)



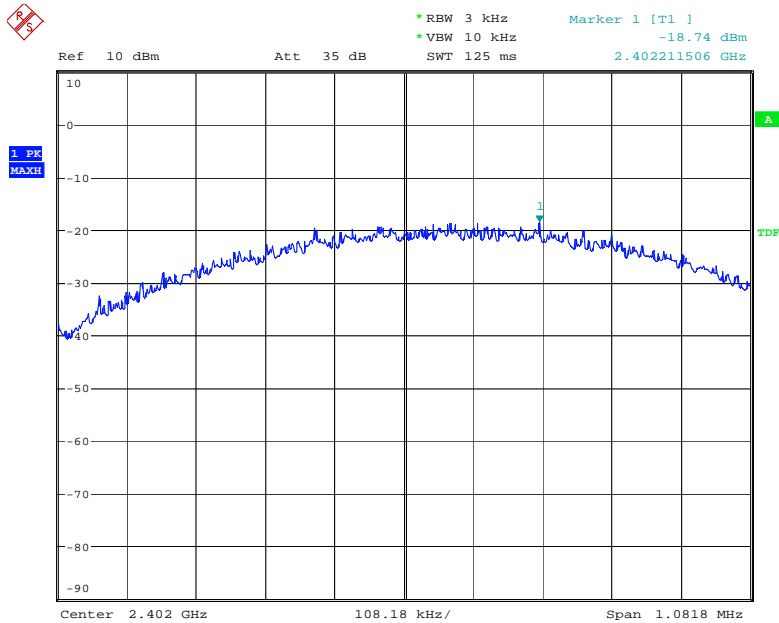
4.3 Measurement Results

Please refer to following table and plots.

Modulation:	GFSK		
Temperature :	21 °C	Humidity :	58 %
Test By:	Sance	Test Date :	January 02, 2016
Test Result:	PASS		

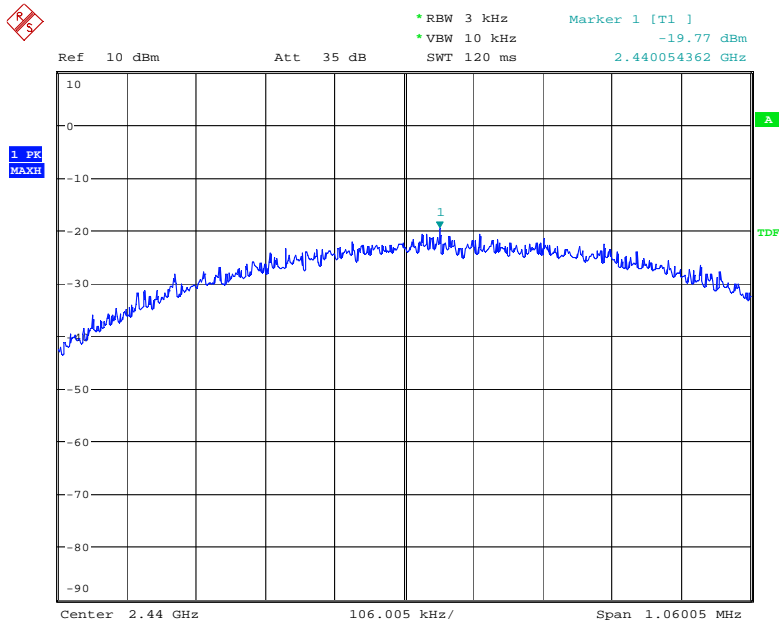
Frequency MHz	Data Rate Mbps	PSD dBm/3kHz	Limit dBm/3kHz
Low Channel: 2402	1	-18.74	8
Middle Channel: 2440	1	-19.77	8
High Channel: 2480	1	-22.12	8

Low Channel



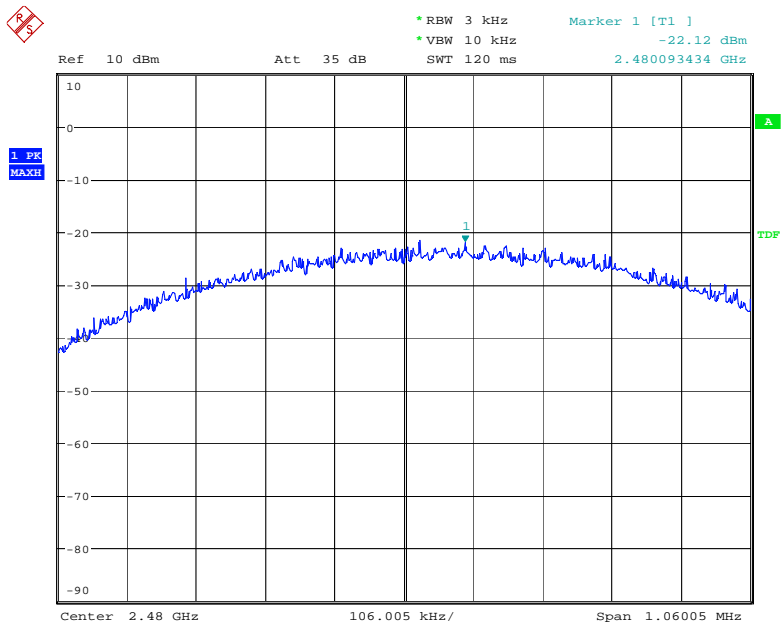
Date: 2.JAN.2016 10:03:02

Middle Channel



Date: 2.JAN.2016 10:15:55

High Channel



Date: 2.JAN.2016 10:23:21

5. Band Edge and Conducted Spurious Emissions

5.1 Requirement and Measurement Procedure

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set according to FCC KDB558074(v03r02) clause 11.3.

A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

For 30MHz to 1GHz:

Set the spectrum analyzer as: RBW=120kHz, VBW=300kHz, Detector=Quasi-Peak

For Above 1GHz:

Set the spectrum analyzer as: RBW=1MHz, VBW=3MHz, Detector=Peak.

Set the spectrum analyzer as: RBW=1MHz, VBW=10Hz, Detector=Peak.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

5.2 Test SET-UP (Block Diagram of Configuration)



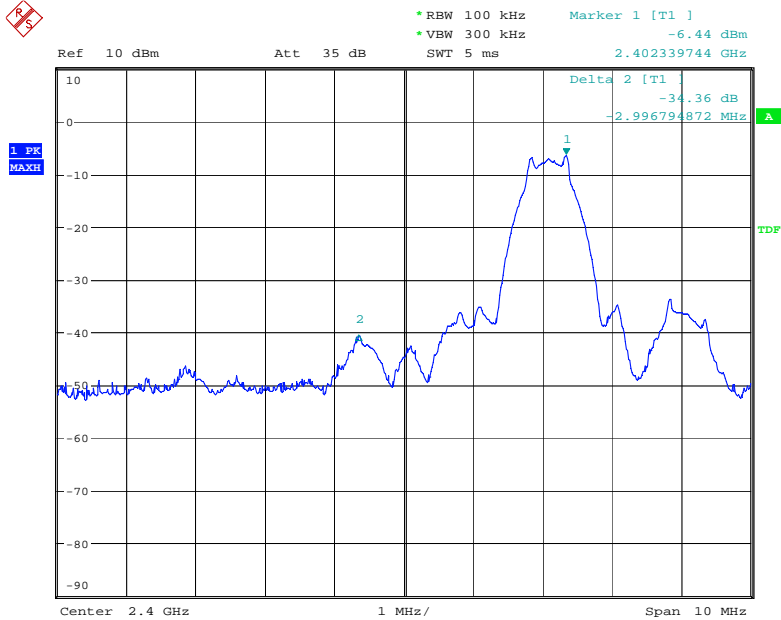
5.3 Measurement Results

The test plots and table showed all spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB below the highest level of the desired power in the passband. Please refer to below plots.

Freq. (MHz)	Ant.Pol. (H/V)	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
2399.990	H	55.25	42.05	74.00	54.00	-18.75	-11.95
2399.990	V	52.95	43.79	74.00	54.00	-21.05	-10.21
2483.510	H	48.96	37.20	74.00	54.00	-25.04	-16.80
2483.510	V	46.93	37.08	74.00	54.00	-27.07	-16.92

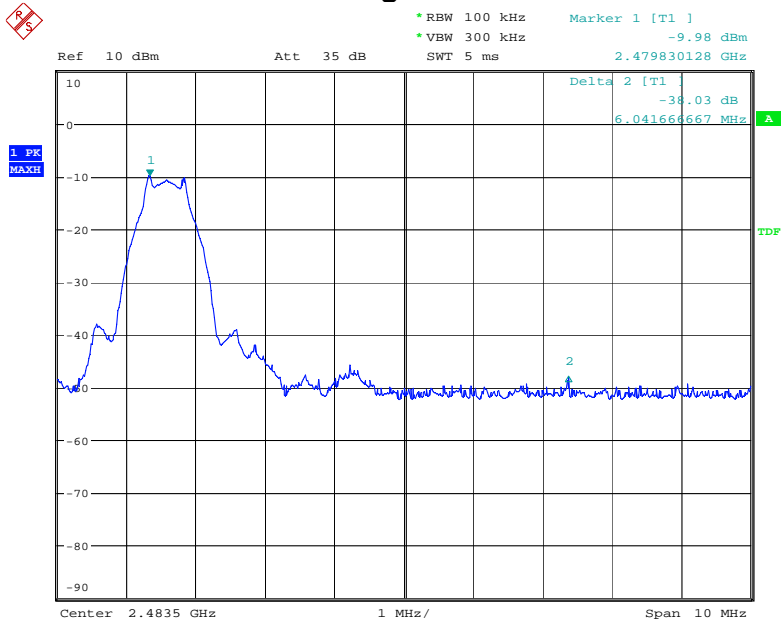
Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss
 (3) Measurement uncertainty : $\pm 3.7\text{dB}$

Band Edge
Low Channel



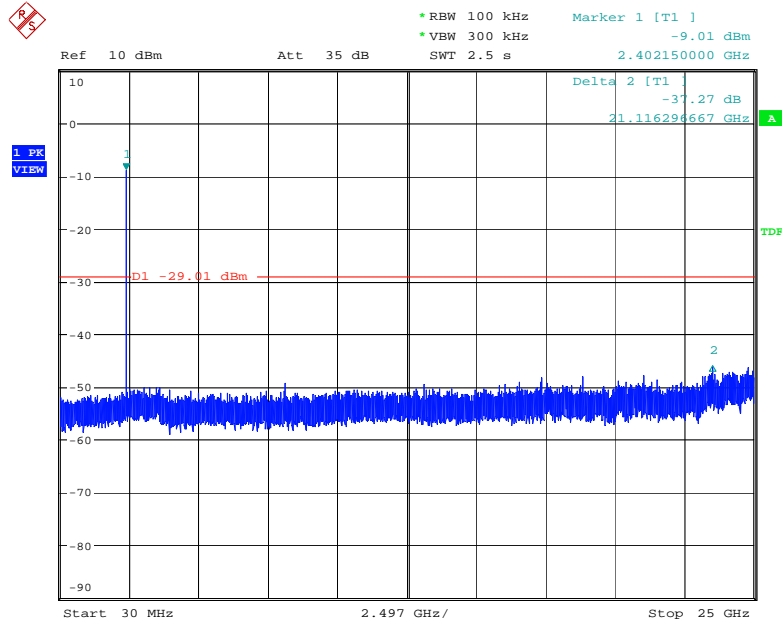
Date: 2.JAN.2016 10:07:22

High Channel



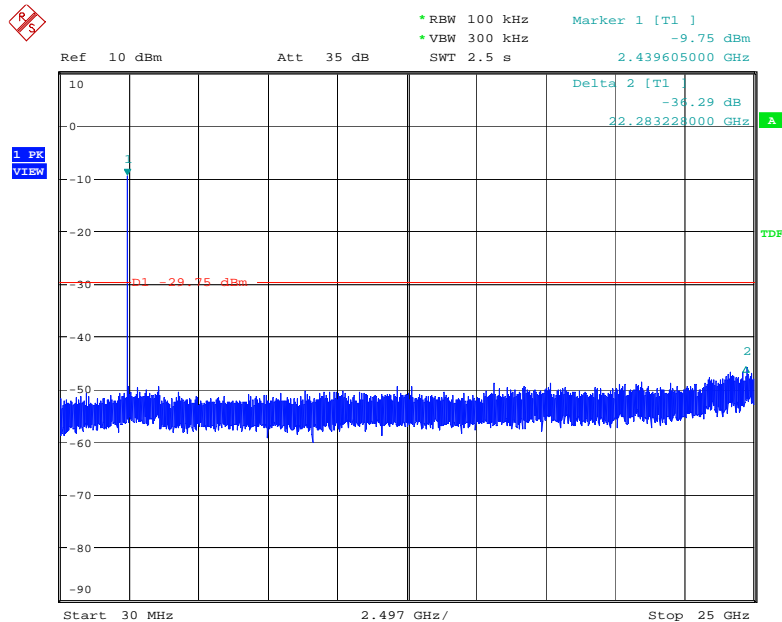
Date: 2.JAN.2016 10:24:43

Conducted Spurious Emissions Low Channel



Date: 2.JAN.2016 10:04:58

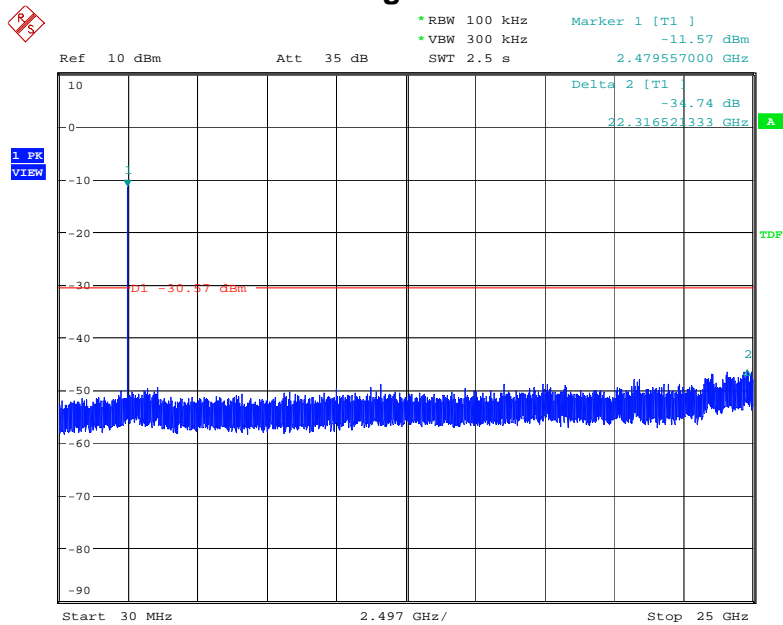
Note: Sweep points=30001pts
Middle Channel



Date: 2.JAN.2016 10:19:27

Note: Sweep points=30001pts

High Channel



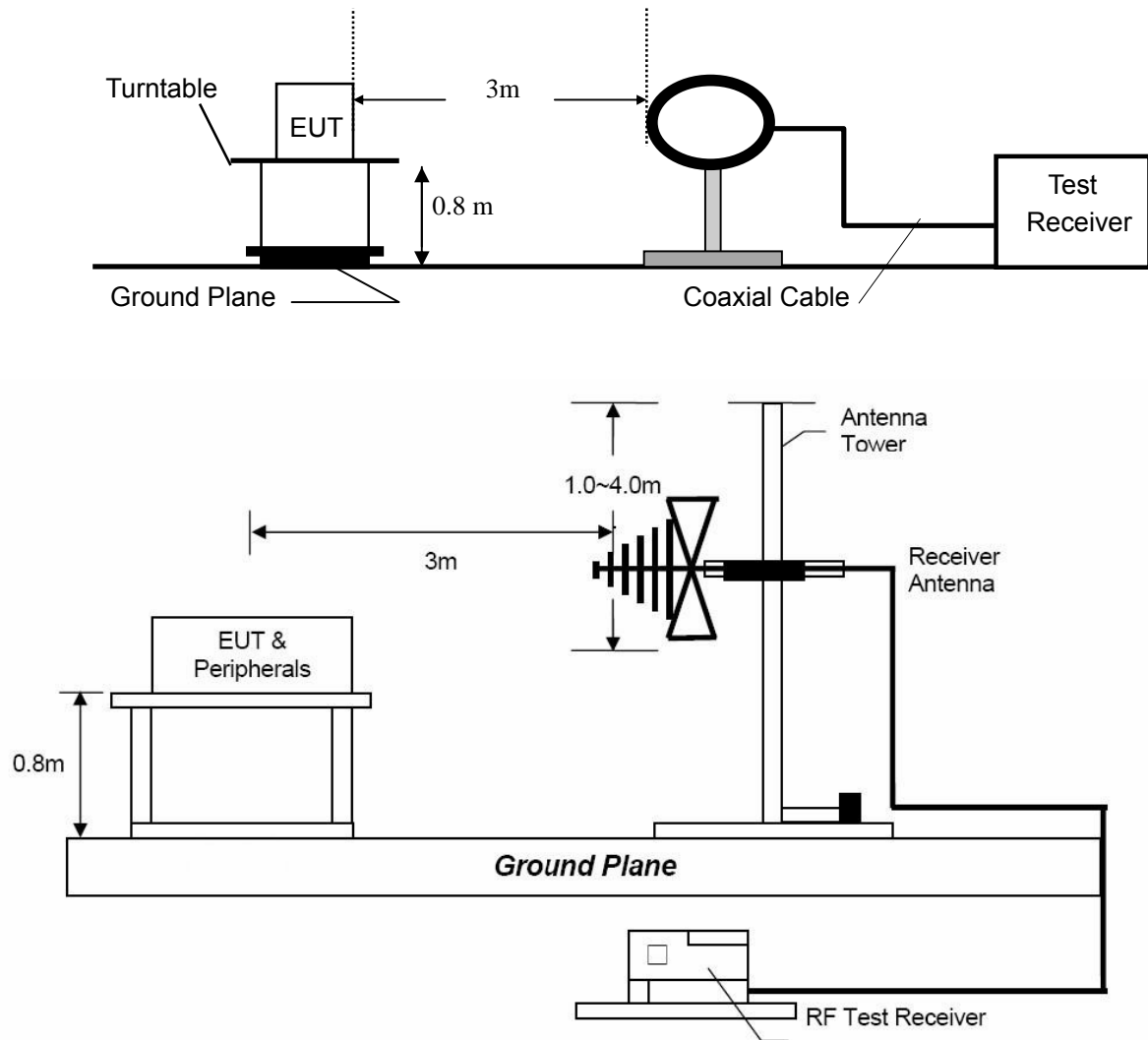
Date: 2.JAN.2016 10:24:05

Note: Sweep points=30001pts

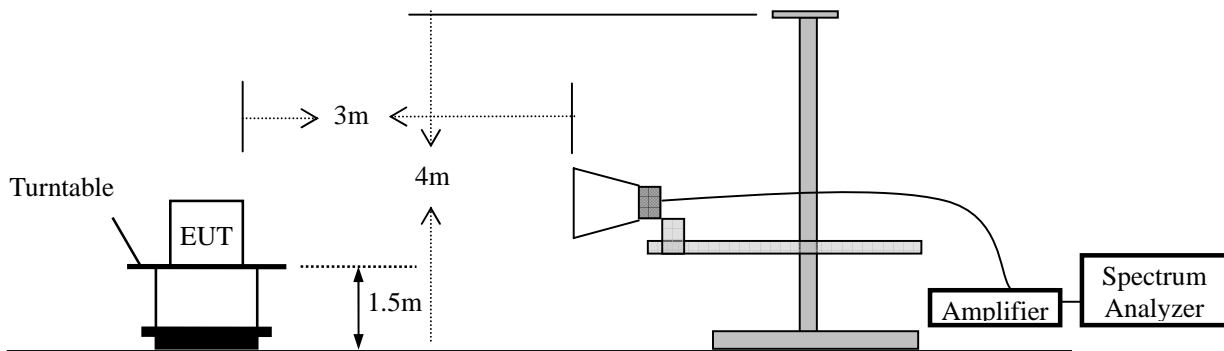
6. Radiated Spurious Emissions and Restricted Bands

6.1 Test SET-UP (Block Diagram of Configuration)

6.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz



6.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



6.2 Measurement Procedure

- Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. Above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi- anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna 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.
- 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. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

For 30MHz to 1GHz:

Set the spectrum analyzer as: RBW=120kHz, VBW=300kHz, Detector=Quasi-Peak

For Above 1GHz:

Set the spectrum analyzer as: RBW=1MHz, VBW=3MHz, Detector=Peak.

Set the spectrum analyzer as: RBW=1MHz, VBW=10Hz, Detector=Peak.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

6.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		$\mu\text{V/m}$
0.009 ~ 0.490	300	$2400/F(\text{kHz})$
0.490 ~ 1.705	30	$24000/F(\text{kHz})$
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

- Remark : (1) Emission level (dB) μV = 20 log Emission level $\mu\text{V/m}$
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
(5) §15.247(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

6.4 Measurement Results

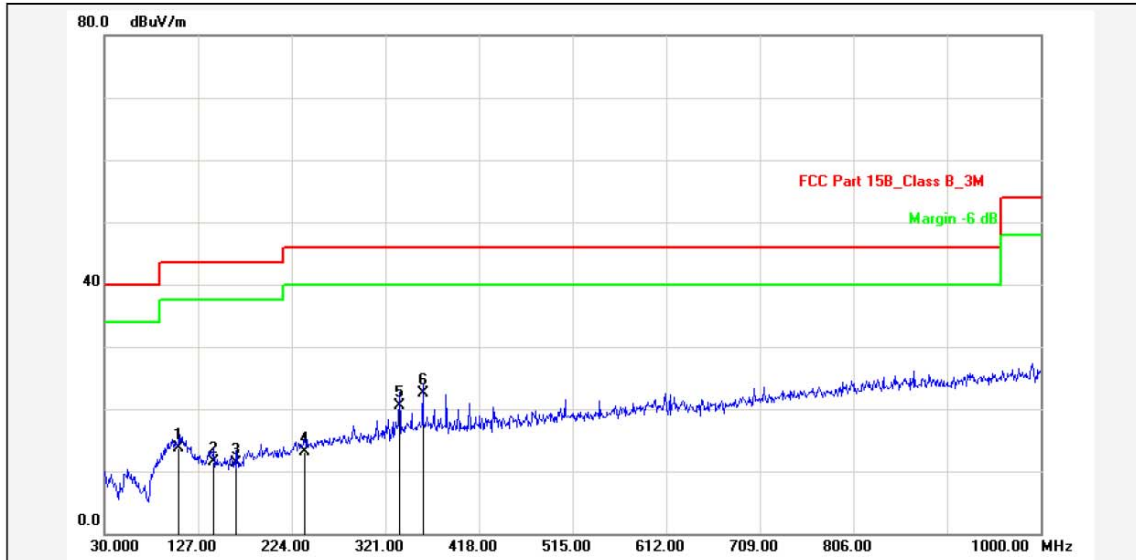
Please refer to following the test plots and data tables of the worst case: **X Plane**.



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2016-1-5 11:28:03



Report No.: BWB15HO213

Test Standard: FCC Part 15B_Class B_3M

Test item: Radiation Emission

Applicant: Acrox

Product: Wireless Bluetooth Mouse

Model No.: BWB15HO213

Test Distance: 3m

Ant. Polarization: Horizontal

Temp.(C)/Hum.(%): 22(C) / 54 %

Power Rating: DC 3V

Test Engineer: Jerry

Test Mode: TX

Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	107.5999	-12.06	25.86	13.80	43.50	-29.70	QP			P	
2	143.4900	-15.59	27.19	11.60	43.50	-31.90	QP			P	
3	166.7700	-14.92	26.22	11.30	43.50	-32.20	QP			P	
4	237.5800	-12.14	25.34	13.20	46.00	-32.80	QP			P	
5	335.5500	-9.43	30.03	20.60	46.00	-25.40	QP			P	
6	359.8000	-9.13	31.63	22.50	46.00	-23.50	QP			P	

Note: Level=Reading+Factor.

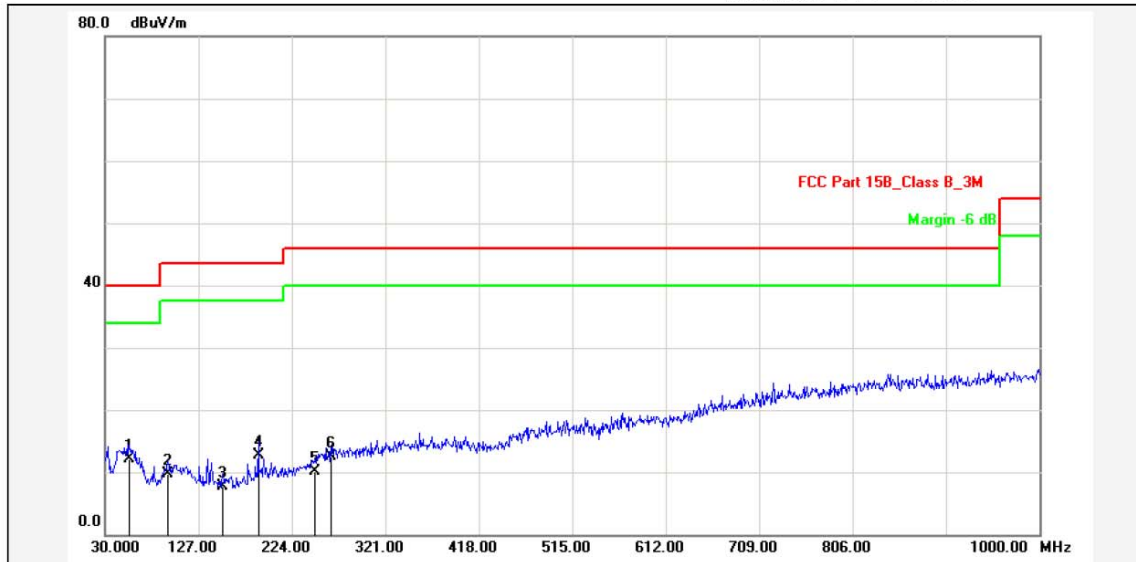
Margin=Limit-Level.



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Site: Radiation

Test Time: 2016-1-5 11:34:59



Report No.: BWB15HO213

Test Standard: FCC Part 15B_Class B_3M

Test item: Radiation Emission

Applicant: Acrox

Product: Wireless Bluetooth Mouse

Model No.: BWB15HO213

Test Distance: 3m

Ant. Polarization: Vertical

Temp.(C)/Hum.(%): 22(C) / 54 %

Power Rating: DC 3V

Test Engineer: Jerry

Test Mode: TX

Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	55.2199	-13.72	25.92	12.20	40.00	-27.80	QP			P	
2	94.9899	-15.77	25.57	9.80	43.50	-33.70	QP			P	
3	152.2198	-18.43	26.13	7.70	43.50	-35.80	QP			P	
4	189.0800	-16.63	29.43	12.80	43.50	-30.70	QP			P	
5	248.2500	-13.94	24.14	10.20	46.00	-35.80	QP			P	
6	264.7400	-13.31	25.91	12.60	46.00	-33.40	QP			P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

The worst case: X Plane

Modulation:	GFSK	Test Date :	January 05, 2016
Frequency Range:	1-25GHz	Temperature :	22 °C
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m		
Test By:	Sance		

Freq. (MHz)	Ant.Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
4804	V	40.09	27.69	14.63	54.72	42.32	74.00	54.00	-19.28	-11.68
7206	V	36.37	22.36	20.68	57.05	43.04	74.00	54.00	-16.95	-10.96

4804	H	38.28	27.87	14.63	52.91	42.50	74.00	54.00	-21.09	-11.50
7206	H	34.9	22.31	20.68	55.58	42.99	74.00	54.00	-18.42	-11.01

Operation Mode: TX Mode (Mid)										
4884	V	39.16	27.55	14.98	54.14	42.53	74.00	54.00	-19.86	-11.47
7326	V	36.62	22.46	20.93	57.55	43.39	74.00	54.00	-16.45	-10.61

4884	H	38.69	28.58	14.98	53.67	43.56	74.00	54.00	-20.33	-10.44
7326	H	35.05	22.44	20.93	55.98	43.37	74.00	54.00	-18.02	-10.63

Operation Mode: TX Mode (High)										
4960	V	38.34	25.77	15.30	53.64	41.07	74.00	54.00	-20.36	-12.93
7440	V	34.52	22.37	21.16	55.68	43.53	74.00	54.00	-18.32	-10.47

4960	H	38.62	27.83	15.30	53.92	43.13	74.00	54.00	-20.08	-10.87
7440	H	36.95	22.46	21.16	58.11	43.62	74.00	54.00	-15.89	-10.38

Other harmonics emissions are lower than 10dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level + Factor
 - (3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
 - (4) Data of measurement within this frequency range shown “ ---” in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
 - (5) Measurement uncertainty : ±3.7dB.
 - (6) Horn antenna used for the emission over 1000MHz.

7. Antenna Application

7.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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.

Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

7.2 Measurement Results

The antenna is integral antenna that no antenna other than that furnished by the responsible party shall be used with the device, and the best case gain of the antenna is -0.615dBi, So, the antenna is consider meet the requirement.

8. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Nov. 24, 2015	Nov. 23, 2016
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Nov. 27, 2015	Nov. 26, 2016
Positioning Controller	UC	UC 3000	N/A	0~360° , 1-4m	N/A	N/A
Color Monitor	SUNSPO	SP-140A	N/A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	32A	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	200A	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	200A	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Nov. 07, 2015	Nov. 06, 2016
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Nov. 07, 2015	Nov. 06, 2016
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Nov. 07, 2015	Nov. 06, 2016
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	15GHz~26.5GHz	Oct.23, 2015	Oct.22, 2016
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Nov. 05, 2015	Nov. 04, 2016
Loop antenna	Daze	ZA30900A	0708	9KHz~30MHz	Oct.10, 2015	Oct.09, 2016
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	20Hz~26.5GHz	Sep. 01, 2015	Aug. 31, 2016
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Nov. 03, 2015	Nov. 02, 2016
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	9KHz~30MHz	Nov. 07, 2015	Nov. 06, 2016
Temporary antenna connector	TESCOM	SS402	N/A	1G-18GHz	N/A	N/A
Power Meter	Anritsu	ML2495A	1139001	100k-65GHz	Nov. 05, 2015	Nov. 04, 2016
Power Sensor	Anritsu	MA2411B	100345	300M-40GHz	Nov. 05, 2015	Nov. 04, 2016

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