FCC Part 15C

Measurement And Test Report For

HongKong Tide Technology Co., Ltd.

FLAT/RM H 15/F SIU KING BLDG 6 ON WAH ST NGAU TAU KOK KLN HK

Model: IPKW250FUSK, IPKW250LUSK,KW250FDEK, KW250LDEK, KW250FUSK, KW250LUSK, IPKW250LDKK, IPKW250FDKK, Magic-Pro ProMini RF-Touch 2.4g

Mar. 3, 2011

This Report Concerns:	Equipment Type:
⊠ Original Report	2.4G Wireless Micro Keyboard with touchpad
Report Number:	MTI110222002RF
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Test Date:	Feb. 28-Mar. 3, 2011
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of MTI Technology Laboratory Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant: HongKong Tide Technology Co., Ltd.

Address of applicant: FLAT/RM H 15/F SIU KING BLDG 6 ON WAH ST NGAU TAU

KOK KLN HK

Manufacturer: HongKong Tide Technology Co., Ltd.

Address of manufacturer: FLAT/RM H 15/F SIU KING BLDG 6 ON WAH ST NGAU TAU

KOK KLN HK

Equipment Under Test: 2.4G Wireless Micro Keyboard with touchpad

Tested Model No.: IPKW250FUSK

Supplementary Models No: IPKW250LUSK,KW250FDEK, KW250LDEK, KW250FUSK,

KW250LUSK, IPKW250LDKK, IPKW250FDKK,

Magic-Pro ProMini RF-Touch 2.4g

Remark: supplementary models are only different in exterior with tested Model and with the same circuit construction

FCC ID: ZBYTIDE-RF250

Type of Modulation: GFSK

Frequency Band: 2429MHz

Number of Channels: 1
Channel Separation: /

Output Power: <10 mW

Antenna Type: Integral Antenna
Power Supply: DC 3.7V Battery

Remark: * The test data gathered are from the production sample provided by the manufacturer.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207, and 15.249 rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of MTI Technology Laboratory Ltd. at 10F, Yinxing Business Building, Xixiang Road, Bao'an District, Shenzhen, P.R.China.

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

FCC – Registration No.: 167003

MTI Technology Laboratory 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 167003, May 04, 2009.

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2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

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 that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

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2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100079	2010/11	1 year
2	Horn Antenna	R/S	CH14- H052	1091698	2010/11	1 year
3	3m Semi- Anechoic Chamber	ETS	N/A	N/A	2010/11	1 year
4	LISN	ROHDE&SCHWARZ	ESH3-Z5	100305	2010/11	1 year
5	Pulse Limiter	ROHDE&SCHWARZ	ESH3-Z2	100305	2010/11	1 year
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	2010/11	1 year
2	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2010/11	1 year
3	Receiver/ Spectrum Analyzer	ROHDE & SCHWARZ	ESCI	100106	2010/11	1 year
4	Spectrum Analyzer	Agilent	E7405A	US41160415	2010/11	1 year
5	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2010/11	1 year
6	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100044	2010/11	1 year
7	LISN	COM Power	LI-200	12212	2010/11	1 year
8	LISN	COM Power	LI-200	12019	2010/11	1 year
9	3m/5m Semi- Anechoic Chamber	ETS	N/A	N/A	2010/11	1 year
10	Ultra-Broadband Antenna	R/S	HL562	100015	2010/11	1 year
11	Horn Antenna	R/S	HF906	100039	2010/11	1 year
12	RF Test Panel	R/S	TS / RSP	335015/ 0017	N/A	N/A
13	Turntable	ETS	2088	2149	N/A	N/A
14	Antenna Mast	ETS	2075	2346	N/A	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.203	Antenna Requirement	Pass
15.205	Restricted Band of Operation	Pass
15.207	Conduction Emission	Pass
15.209	Radiated Emission	Pass
15.249(a)	Field Strength	Pass
15.249(d)	Out of Band Emission	Pass

4. ANTENNA REQUIREMENT

4.1 Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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.

4.2 Antenna Connected Construction

This product has a permanent antenna, fulfill the requirement of this section.

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5. §15.207 CONDUCTED DISTURBANCES

5.1. Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is +2.4 dB.

5.2. Limit of Conducted Disturbances (Class B)

Frequency Range (MHz)	Limits (dBuV)				
requeitty range (wirtz)	Quasi-Peak	Average			
0.150~0.500	66~56	56~46			
0.500~5.000	56	46			
5.000~30.00	60	50			

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

5.3. EUT Setup

The setup of EUT is according with CISPR 16-1: 2002, CISPR16-2: 2002 measurement procedure.

The EUT was placed center and the back edge of the test table.

The cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

5.4. Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range......150 KHz to 30 MHz

Detector.....Peak & Quasi-Peak & Average

5.5. Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB $_{\mu}$ V of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "AV".

5.6. Summary of Test Results

According to the data in section 3.6, the worst margin reading of:

EUT Configuration on Test

2.4G Wireless Micro Keyboard with touchpad

Model Number : IPKW250FUSK

Serial Number : N/A

Applicant : HongKong Tide Technology Co., Ltd.

5.7. Test Result

Detailed information, Please refer to the following pages.

According to the data in section 3.8, the EUT complied with the FCC 15B Conducted margin for a Class B device, with the worst margin reading of:

-4.23 dBµV at 1.13 MHz in the Line mode, Ave detector, 0.15-30MHz

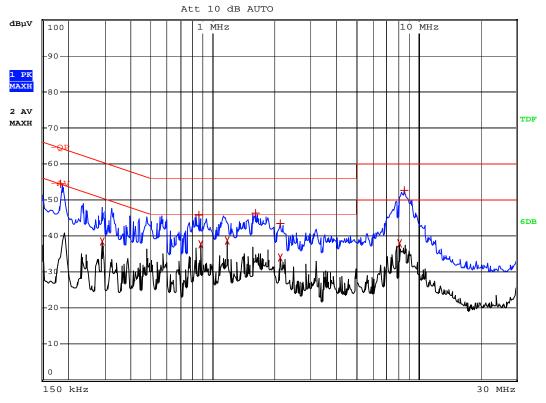
Plot of Conducted Emissions Test Data

Conducted Disturbance
EUT: 2.4G Wireless Micro Keyboard with touchpad
M/N: IPKW250FUSK
Operating Condition: Charging
Test Specification: N

Comment: AC 120V/60Hz connect to PC, USB 5V



9 kHz TM5 ms



	EDIT PEAK LIST	(Prescan Results)	
Trace1:	-QP		
Trace2:	-AV		
Trace3:			
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	186 kHz	54.51	-9.69
2 Average	290 kHz	38.57	-11.95
1 Max Peak	858 kHz	45.73	-10.26
2 Average	874 kHz	37.69	-8.30
2 Average	1.182 MHz	38.65	-7.34
1 Max Peak	1.622 MHz	46.42	-9.57
1 Max Peak	2.15 MHz	43.34	-12.65
2 Average	2.15 MHz	33.97	-12.02
2 Average	8.142 MHz	38.02	-11.97
1 Max Peak	8.598 MHz	52.51	-7.48

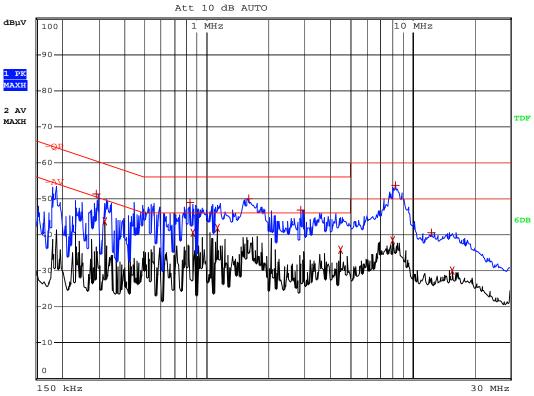
Plot of Conducted Emissions Test Data

Conducted Disturbance

EUT: 2.4G Wireless Micro Keyboard with touchpad M/N: IPKW250FUSK Operating Condition: Charging Test Specification: L

Comment: AC 120V/60Hz connect to PC, USB 5V





	EDIT PEAK LIST (Prescan Results)				
Trace1:	-QP					
Trace2:	-AV					
Trace3:						
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB			
1 Max Peak	294 kHz	51.42	-8.98			
2 Average	318 kHz	43.82	-5.93			
1 Max Peak	834 kHz	48.87	-7.12			
2 Average	858 kHz	40.58	-5.41			
2 Average	1.13 MHz	41.76	-4.23			
1 Max Peak	1.606 MHz	50.00	-5.99			
1 Max Peak	2.874 MHz	46.93	-9.06			
2 Average	4.514 MHz	35.88	-10.11			
2 Average	8.03 MHz	38.40	-11.59			
1 Max Peak	8.282 MHz	53.59	-6.40			
1 Max Peak	12.494 MHz	40.59	-19.40			
2 Average	15.774 MHz	30.09	-19.91			

6. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

6.1 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

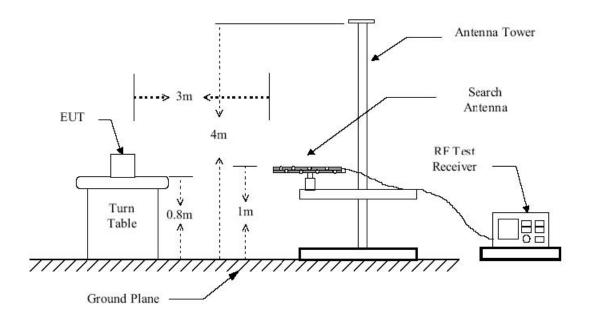
Fundamental Frequency	Field strength of fundamental	Field strength of fundamental
	(milli-volts/meter)	(micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

6.2 EUT Setup



6.3 Test Equipment List and Details

See section 2.4.

6.4 Test Procedure

- 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 is a broadband antenna, and its 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 rotatable 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 10 dB 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 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

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6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss - Ampl. Gain

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

6.6 Test Result

According to the data below, the <u>FCC Part 15.205, 15.209 and 15.249</u> standards, and had the worst margin of:

-1.24 dBμV at 948.76 MHz in the Horizontal polarization, 30 MHz to 25 GHz, 3Meters, Transmitting mode

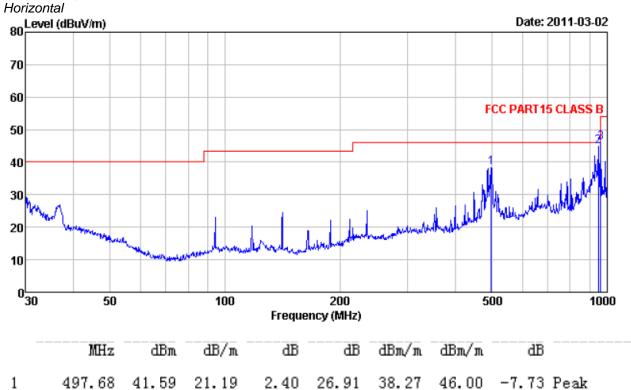
-5.19 dBµV at 836.24 MHz in the Vertical polarization, 30 MHz to 1 GHz, 3Meters, Charging mode

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

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Plot of Radiation Emissions Test

Transmitting below 1GHz



46.00

-1.24 Peak

54.00 -8.06 Peak

2

948.76

962.16

40.02

42.82

27.64

26.04

3.42

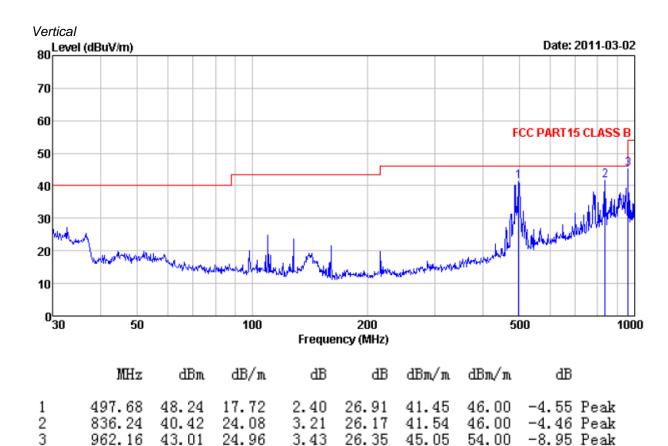
3.43

26.32

26.35

44.76

45.94



3.43 26.35 45.05

962.16 43.01

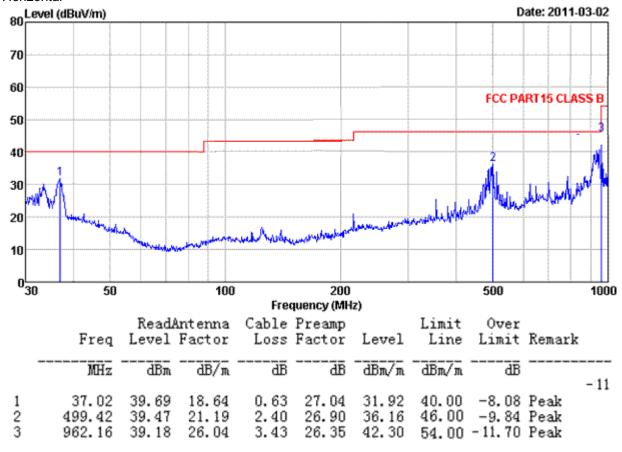
24.96

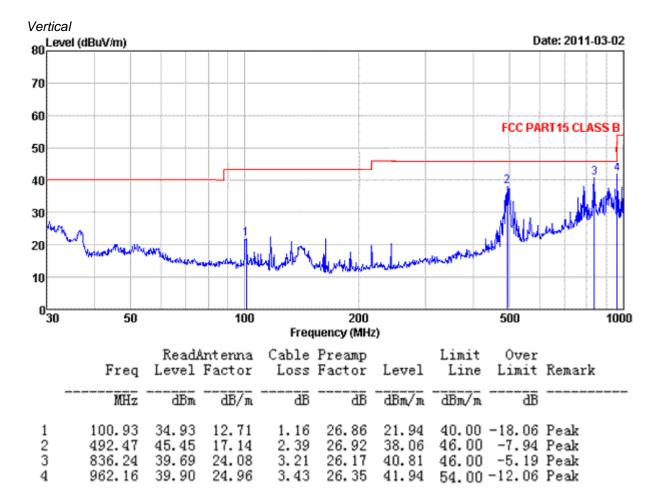
54.00 -8.95 Peak

Plot of Radiation Emissions Test

Test mode: Charging

Horizontal





Spurious Emission Above 1GHz

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
4858.0	AV	33.2	24	V	34.1	5.2	33.0	39.5	54	-14.5
4858.0	AV	29.7	341	Н	34.1	5.2	33.0	36.0	54	-18.0
4858.0	PK	58.8	177	V	34.1	5.2	33.0	65.1	74	-8.9
4858.0	PK	55.3	28	Н	34.1	5.2	33.0	61.6	74	-12.4
7287.0	AV	27.2	325	V	37.4	6.1	33.5	37.2	54	-16.8
7287.0	AV	25.5	159	Н	29.1	3.7	34.0	44.3	54	-9.7
7287.0	PK	52.8	77	V	37.4	6.1	33.5	62.8	74	-11.2
7287.0	PK	49.7	267	Н	37.4	6.1	33.5	59.7	74	-14.3
2429.0	AV	72.8	55	V	29.1	3.7	34.0	71.6	94	-22.4
2429.0	AV	69.9	55	Н	29.1	3.7	34.0	68.7	94	-25.3
2429.0	PK	98.4	47	V	29.1	3.7	34.0	97.2	114	-16.8
2429.0	PK	95.5	47	Н	29.1	3.7	34.0	94.3	114	-19.7

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 4th Harmonics is close to the noise base even antenna close up to Imeter distance according the measurement of ANSI C63.4. Emissions 20dB lower than the limit are not reported.

7. §15.249(b) OUT OF BAND EMISSIONS

7.1 Limits of Dwell Time Measurement

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 §15.209, whichever is the lesser attenuation.

7.2 Test Equipment List and Details

See section 2.4.

7.3 Test Procedure

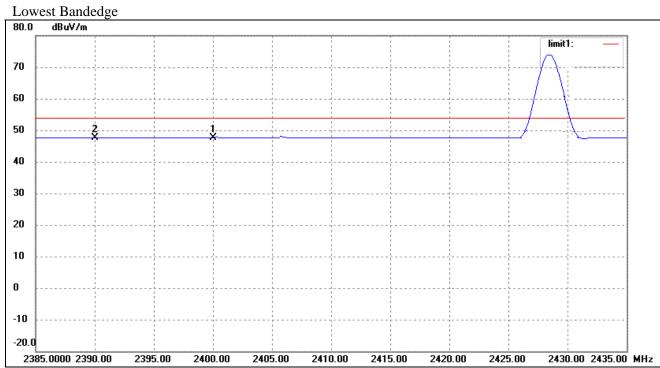
As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2483.5MHz, than mark the higher-level emission for comparing with the FCC rules.

7.4 Test Result /Plots

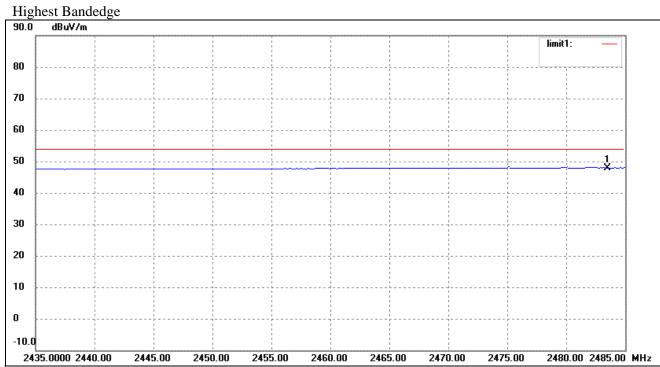
Frequency	Limit	Result
MHz	dBuv	
Low Edge	<54	Pass
High Edge	<54	Pass

The edge emissions are below the FCC 15.209 Limits. Please refer to the test plots below.

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No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2390.000	12.57	35.59	48.16	54.00	-5.84	Average Detector
	2390.000	22.08	35.59	57.67	74.00	-16.33	Peak Detector
2	2400.000	12.57	35.68	48.25	54.00	-5.75	Average Detector
	2400.000	22.43	35.68	58.11	74.00	-15.89	Peak Detector



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	12.15	35.97	48.12	54.00	-5.88	Average Detector
	2483.500	21.96	35.97	57.93	74.00	-16.07	Peak Detector

APPENDIX A - PRODUCT LABELING

ID Label Specification

FCC ID: ZBYTIDE-RF250

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

<u>Specification:</u> Text is Black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.

Proposed Label Location on EUT

Proposed ID Label Location on the EUT



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APPENDIX B - EUT PHOTOGRAPHS

EUT - Front View



EUT - Rear View

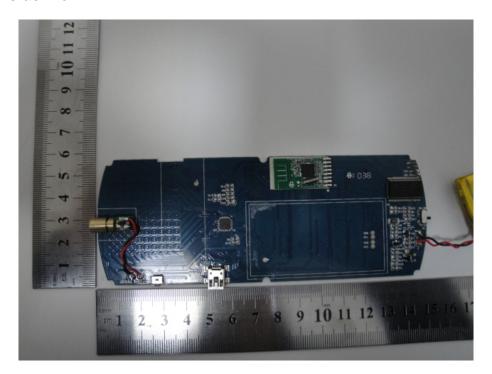


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EUT – Open View



EUT – Inside View 1



EUT – Inside View 2



APPENDIX C - TEST SETUP PHOTOGRAPHS

Conducted Disturbances Test



Radiated Emission (Below 1GHz) Test mode: Transmitting



Test mode: Charging



Radiated Emission (Above 1GHz)

