FCC TEST REPORT

Product Name	:	Double Trouble
Trade Name	:	Mojo
Model Name	:	HW2200
Serial Number	:	N/A
Technical Data	:	DC 4.5V
FCC ID	:	SHMHW2200
Report Number	:	EESZE04200006-1
Date	:	June 25, 2012
Regulations	:	See below

Test Standards	Results
☒ 47 CFR FCC Part 15 Subpart C 15.231:2011	PASS

Prepared for:

Huntwise Inc.
623 Hwy. 594, Monroe,
Louisiana, 71203, United States

Prepared by:

Centre Testing International (Shenzhen) Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
Shenzhen, Guangdong, China
TEL: +86-755-3368 3666
FAX: +86-755-3368 3385

Tested by: Yaping Shen Reviewed by: Louisa Lu

Approved by: Jimmy Li Approved date: June 25, 2012

Lab manager Check No.: 30001410

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N/A means not applicable.

1. GENERAL INFORMATION

Applicant:	Huntwise Inc. 623 Hwy. 594, Monroe, Louisiana, 71203, United States
Manufacturer:	Shenzhen Top-Tek Electronics Co., Ltd. Jufa Industrial Park, Liaokeng Shiyan Town, Baoan District, Shenzhen City.
Equipment Authorization:	FCC Part 15 Certification
FCC ID:	SHMHW2200
Product Name:	Double Trouble
Trade Name:	Mojo
Model Name:	HW2200
Serial Number:	N/A
Report Number:	EESZE04200006-1
Date of Test:	April 20, 2012 to June 25, 2012

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart C and the measurement procedure according to ANSI C63.4:2003.

2. TEST SUMMARY

Clause	Test Item	Rule	Result
1	20dB bandwidth	FCC Part15.231(c)	PASS
2	Time measurement	FCC Part15.231(a)(1)	PASS
3	Radiated Emission	FCC Part15.231(b) & FCC Part15.209(a)	PASS
4	Antenna Requirements	FCC 15.203	PASS*

* Integral antenna used.

3. MEASUREMENT UNCERTAINTY

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

Test item	Value (dB)
Radiated disturbance (30MHz to 1GHz)	4.5
Radiated disturbance (1GHz to 6GHz)	4.8

4. PRODUCT INFORMATION

Items	Description
Rating	DC 4.5V
Equipments Class	Remote Control/Security Device Transceiver
Modulation	FSK
Frequency Range	314.850MHz
Channel Number	1

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All test facilities used to collect the test data are located at Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing. The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

3M Semi-anechoic Chamber - Radiated Emission Test				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
Spectrum Analyzer	Agilent	E4440A	MY46185649	03/07/2013
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	401	07/06/2012
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/06/2012
Microwave Preamplifier	Agilent	8449B	3008A02425	07/06/2012

6. SYSTEM TEST CONFIGURATION

6.1 JUSTIFICATION

For emission testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 4.5 V DC of battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 200Hz from 9kHz to 150kHz, 9kHz from 150kHz to 30MHz and 100kHz or greater for frequencies between 30MHz to 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed 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 to 40 GHz, whichever is lower.

The unit was operated standalone and placed in the center of the turntable.

6.2 EUT EXERCISING SOFTWARE

No Software was used during testing.

7. 20dB Bandwidth Measurement

7.1 LIMITS

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

As the center frequency for the device operating is 314.850MHz, thus, the 20dB bandwidth limit is 0.7871MHz.

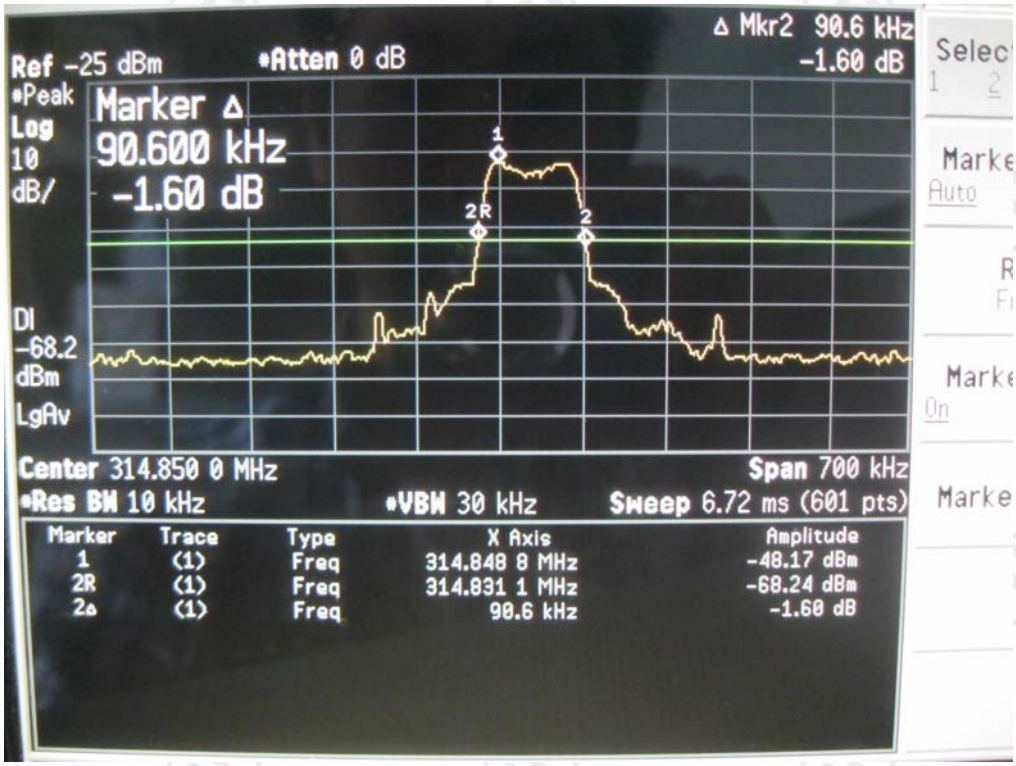
7.2 BLOCK DIAGRAM OF TEST SETUP

7.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. A PEAK output reading and 20B BW function in spectrum analyzer were taken.

7.4 TEST RESULT

Frequency (MHz)	20dB BW (MHz)	Limit (MHz)	Result (Pass / Fail)
314.850	0.0906	0.7871	Pass



8. Time measurement

8.1 LIMITS

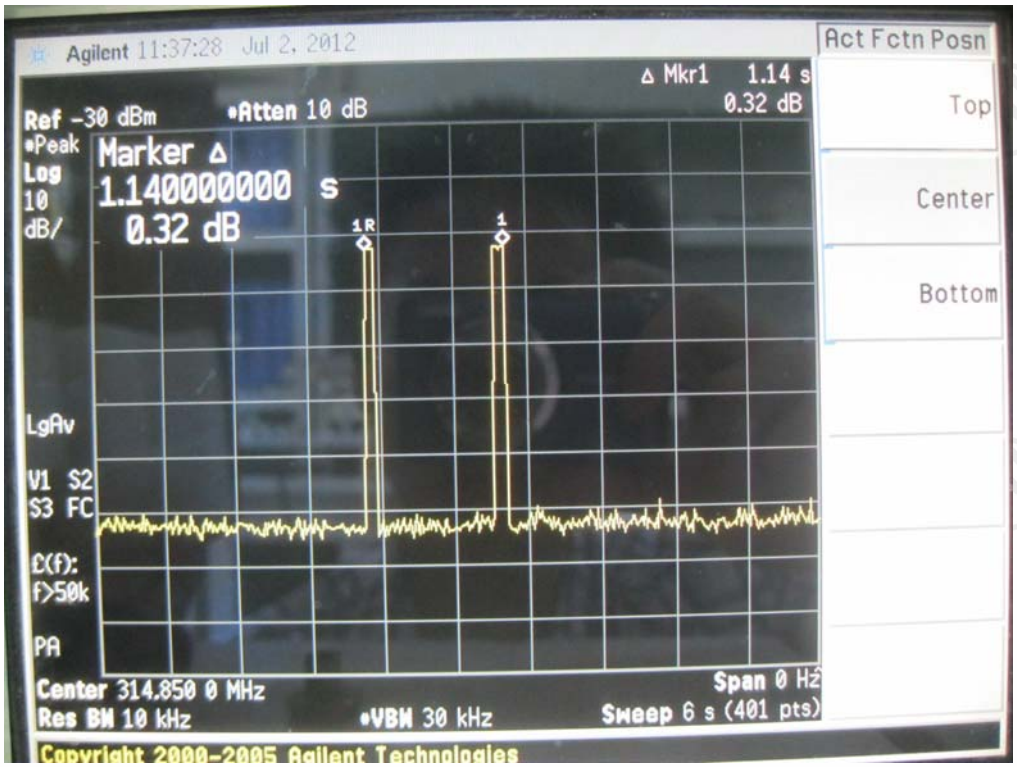
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

8.2 BLOCK DIAGRAM OF TEST SETUP

8.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the center frequency is 314.850MHz and set the Span is 0Hz.
3. Set spectrum analyzer's RBW and VBW to applicable value with Peak.
4. Read the time from transmission to silent from the spectrum analyzer directly.

8.4 TEST RESULT



9. Radiated Emissions Measurement

9.1 LIMITS

FCC Part 15.209(a):

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

FCC Part 15.231(b):

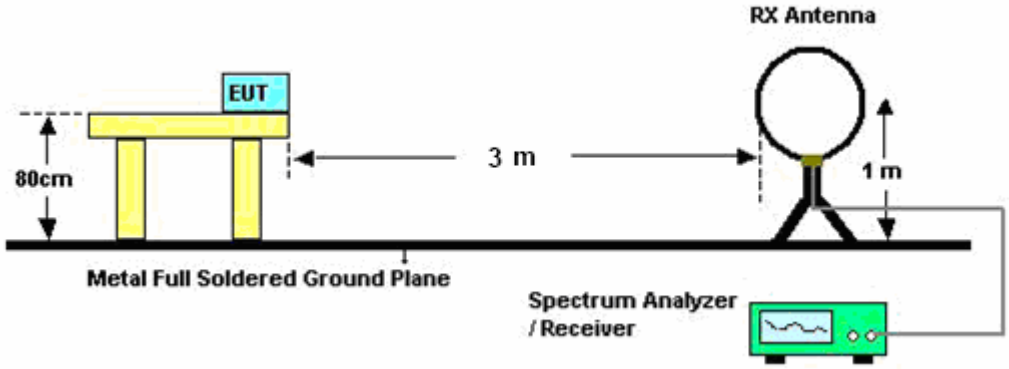
Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
260-470	3750 to 12500*	375 to 1250

Note 1: Linear interpolation in frequency band 260-470 MHz.

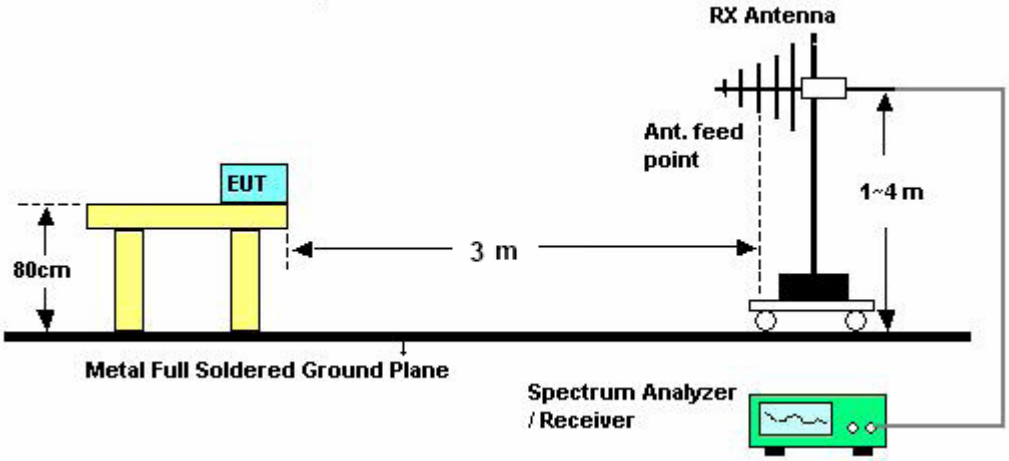
2: The above field strength limits are specified at a distance of 3 meters.

9.2 BLOCK DIAGRAM OF TEST SETUP

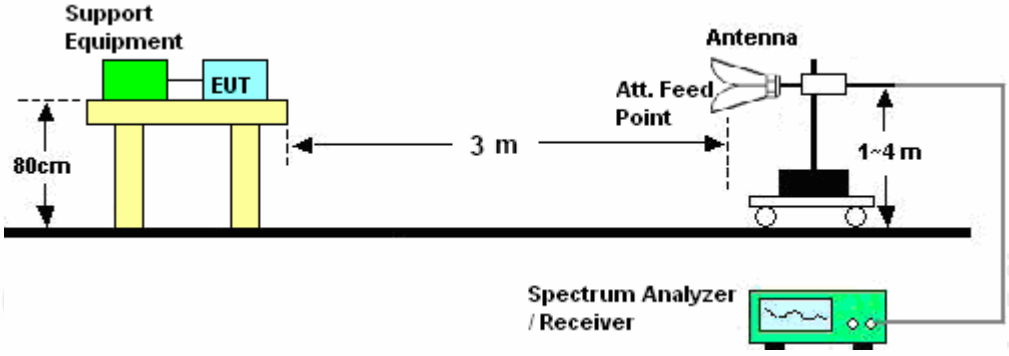
For radiated emissions from 9 kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions above 1GHz



9.3 TEST PROCEDURE

A. 30 - 1000MHz

a. The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. 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 turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

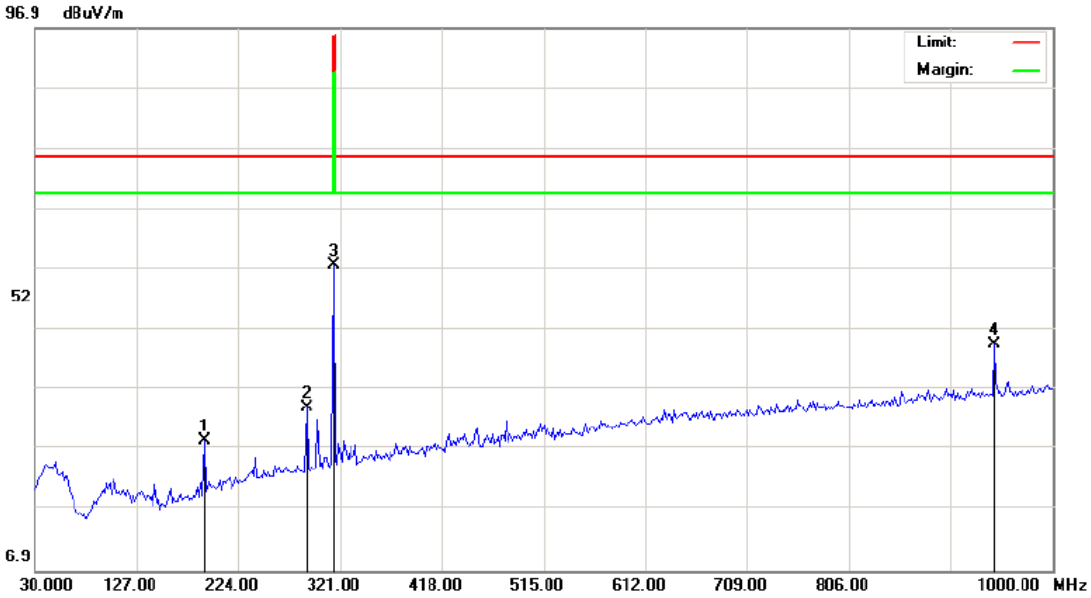
B. Below 30MHz and Above 1GHz

a. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

9.4 TEST RESULT



Site site #1 Polarization: *Horizontal* Temperature: 23

Limit: FCC 15.231(A)315 Power: DC 4.5V Humidity: 58 %

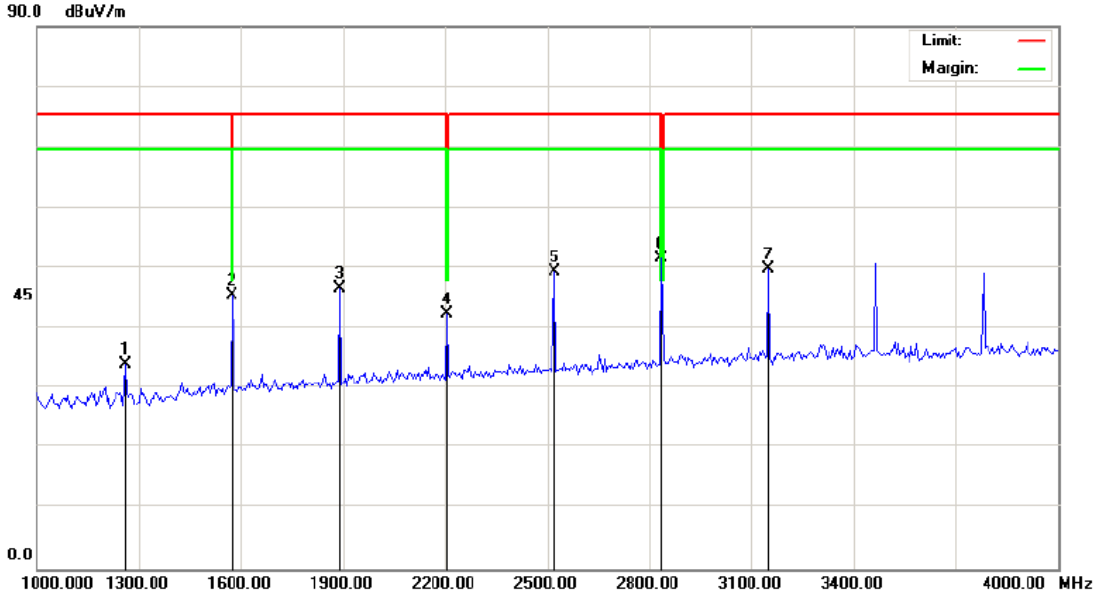
EUT: Double Trouble

M/N: HW2200

Mode: TX

Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	191.6665	16.05			12.28	28.33			75.60		-47.27		P	
2	288.6666	18.18			15.94	34.12			75.60		-41.48		P	
3	314.8533	41.05			16.66	57.71			95.60		-37.89		P	
4	945.0333	16.81			27.77	44.58			75.60		-31.02		P	



Site site #1 Polarization: *Horizontal* Temperature: 23

Limit: FCC 15.231 315M(ABOVE 1G) Power: DC 4.5V Humidity: 58 %

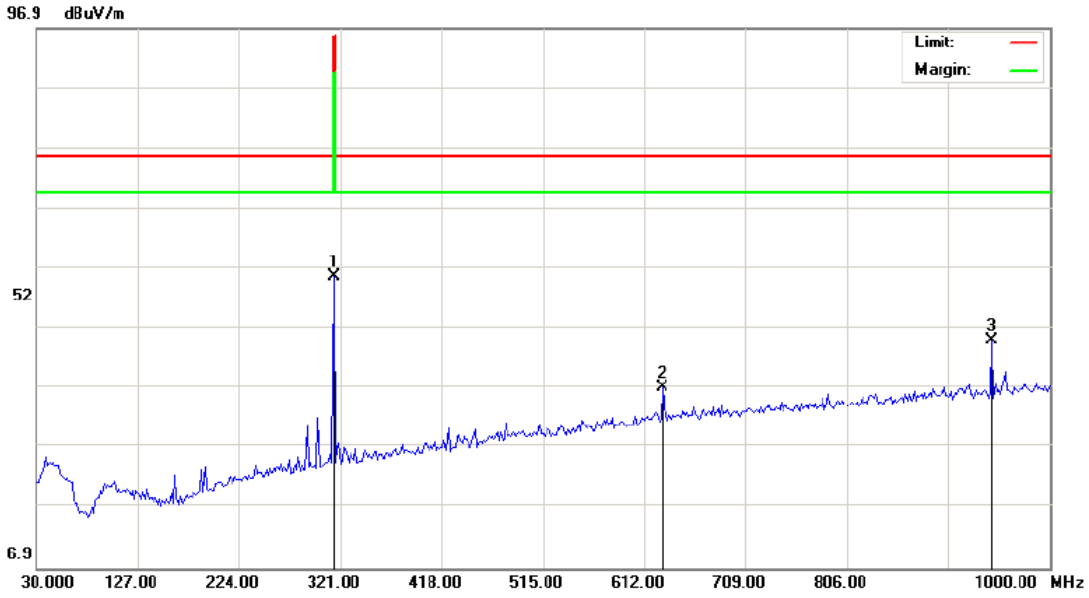
EUT: Double Trouble

M/N: HW2200

Mode: TX

Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	1260.000	38.38			-4.19	34.19			75.60		-41.41		P	
2	1575.000	47.60			-2.06	45.54			54.00		-8.46		P	
3	1890.000	46.67			0.07	46.74			75.60		-28.86		P	
4	2205.000	40.93			1.53	42.46			54.00		-11.54		P	
5	2520.000	46.83			2.62	49.45			75.60		-26.15		P	
6	2835.000	47.84			3.72	51.56			54.00		-2.44		P	
7	3150.000	44.99			4.77	49.76			75.60		-25.84		P	

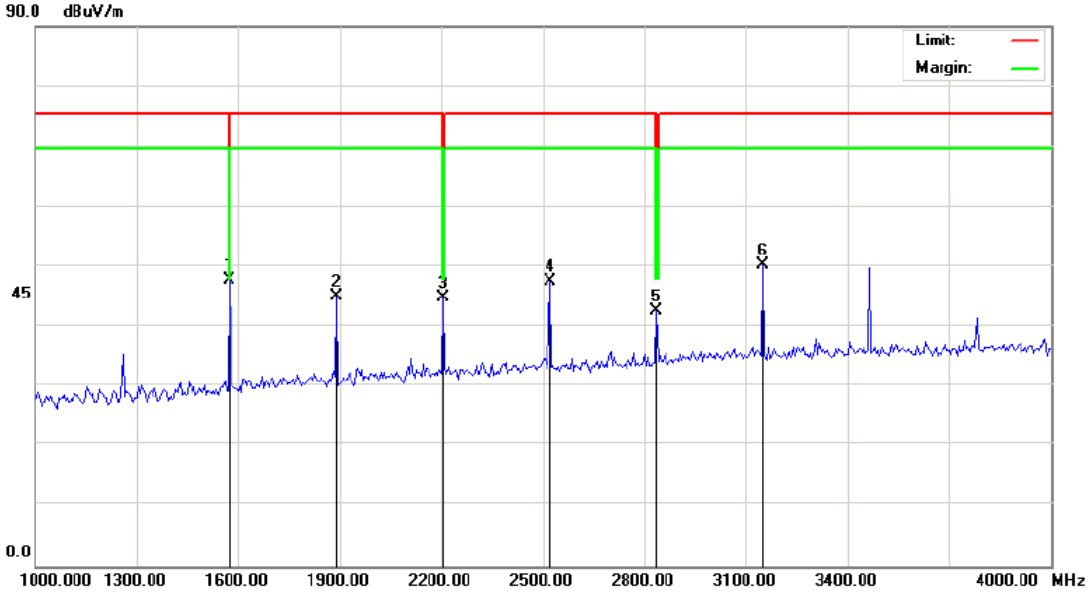


Site site #1
Limit: FCC 15.231(A)315
EUT: Double Trouble
M/N: HW2200
Mode: TX
Note:

Polarization: *Vertical*
Power: DC 4.5V

Temperature: 23
Humidity: 58 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F Comment
1	314.8533	38.94			16.66	55.60			95.60		-40.00		P
2	629.7833	13.52			23.59	37.11			75.60		-38.49		P
3	945.0333	17.28			27.77	45.05			75.60		-30.55		P



Site site #1 Polarization: *Vertical* Temperature: 23
Limit: FCC 15.231 315M(ABOVE 1G) Power: DC 4.5V Humidity: 58 %
EUT: Double Trouble
M/N: HW2200
Mode: TX
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F Comment
1	1575.000	49.87			-2.06	47.81			54.00		-6.19		P
2	1890.000	45.03			0.07	45.10			75.60		-30.50		P
3	2205.000	43.29			1.53	44.82			54.00		-9.18		P
4	2520.000	44.93			2.62	47.55			75.60		-28.05		P
5	2835.000	39.03			3.72	42.75			54.00		-11.25		P
6	3150.000	45.60			4.77	50.37			75.60		-25.23		P

Note 1: The peak data are all below the average limit (please refer to the test graph in above pages), so the average data are deems to fulfill the average limits and not reported.

Note 2: The emissions below 30MHz are not reported for they are much lower than the limits.

Note 3: Below 1GHz: The total factor = cable loss+ antenna factor.
Above 1GHz: The total factor = cable loss+ antenna factor -amplifier factor.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

TEST SETUP OF RADIATED EMISSION (30MHz-1GHz)

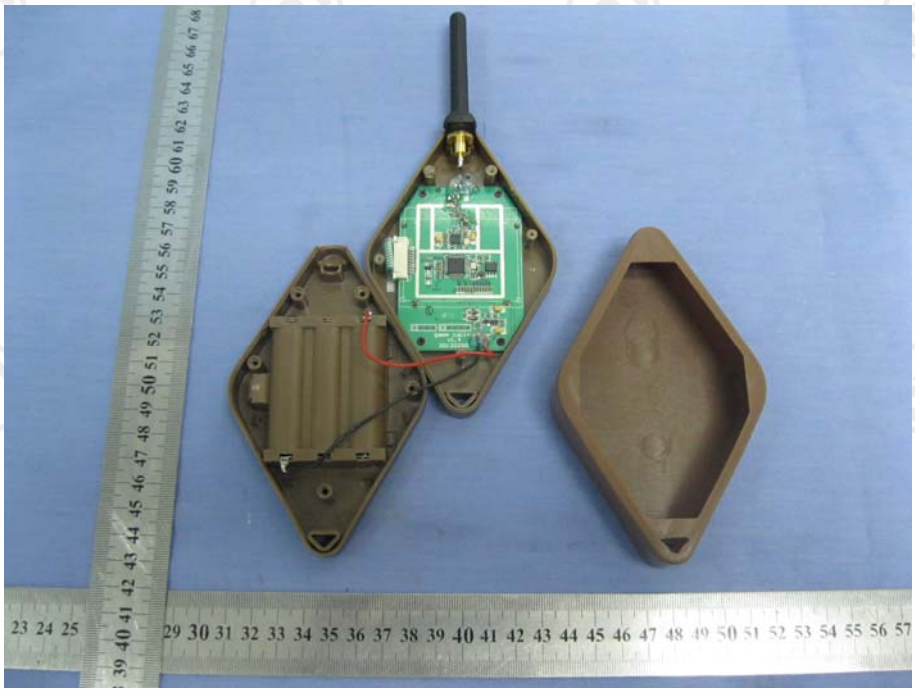
TEST SETUP OF RADIATED EMISSION (1GHz-4GHz)

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT

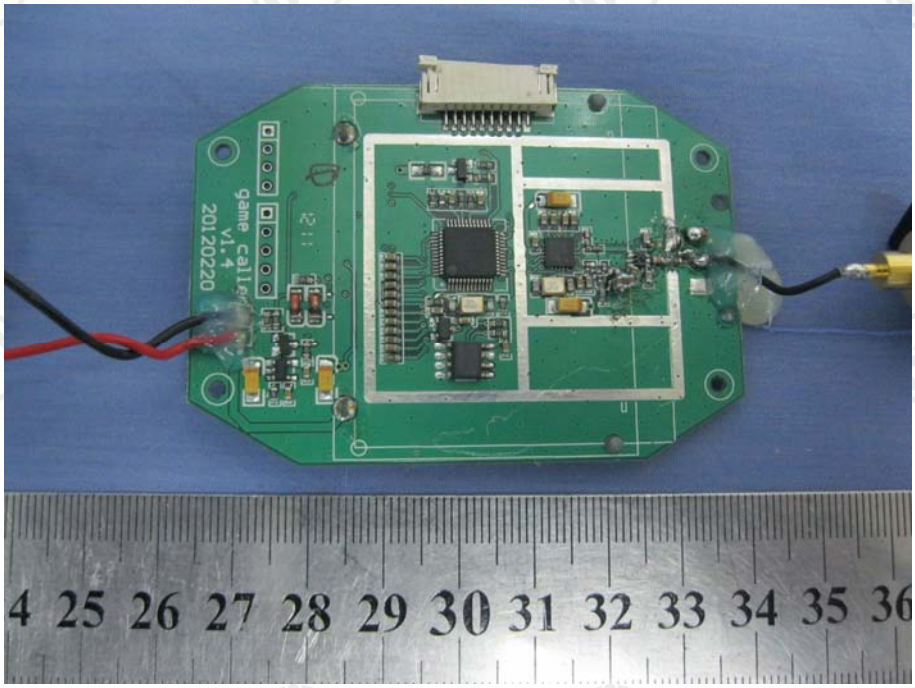
Front View of EUT

Rear View of EUT

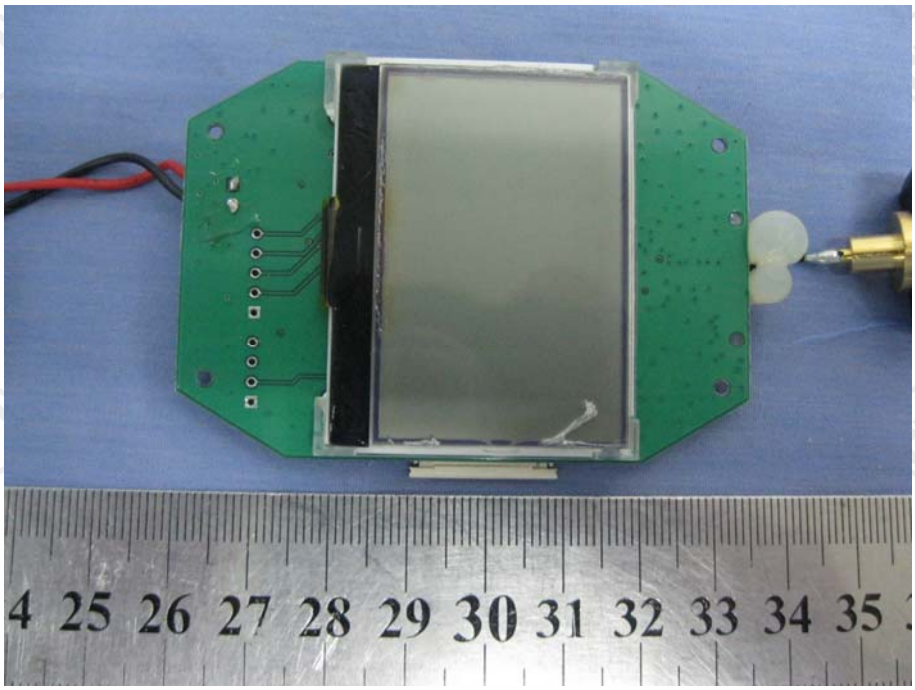
APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT



Internal View of EUT



Front View of PCB



Rear View of PCB

*** End of report ***

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