

FCC&IC TEST REPORT

for

Woodstream Corp.

Spray Away

Model Number: Spray Away

FCC ID:SNA-SPRAY
IC: 9458A-SPRAY

Prepared for : Woodstream Corp.
Address : 69 N. Locust Street,Lititz,PA17543,USA

Prepared by : Keyway Testing Technology Co., Ltd.
Address : Baishun Industrial Zone, Zhangmutou Town,
Dongguan, Guangdong, China

Tel: 86-769-8718 2258

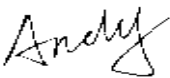
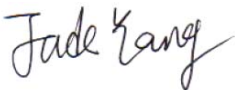

Fax: 86-769-8718 1058

Report No. : 14KWE01112301F
Date of Test : Feb. 5~12. 2014
Date of Report : Feb. 13,2014

TABLE OF CONTENTS

Test Report Declaration	Page
1. GENERAL PRODUCT INFORMATION.....	4
1.1. Product Function.....	4
1.2. Description of Device (EUT)	4
1.3. Independent Operation Modes	4
1.4. Test Supporting System.....	4
2. TEST SITES	5
2.1. Test Facilities	5
2.2. List of Test and Measurement Instruments.....	6
3. TEST SET-UP AND OPERATION MODES	7
3.1. Principle of Configuration Selection	7
3.2. Block Diagram of Test Set-up	7
3.3. Test Operation Mode and Test Software	7
3.4. Special Accessories and Auxiliary Equipment	7
3.5. Countermeasures to Achieve EMC Compliance.....	7
4. EMISSION TEST RESULTS	8
4.1. Radiated Emission Test.....	8
5. CALCULATION OF AVERAGE FACTOR.....	12
6. 20DB OCCUPY BANDWIDTH.....	14
6.1. Limits.....	14
7. 99% OCCUPY BANDWIDTH	15
7.1. Limits.....	15
8. DWELL TIME	16
8.1. Limits.....	16
9. PHOTOGRAPHS OF TEST SET-UP	17
10. PHOTOGRAPHS OF THE EUT.....	18

Keyway Testing Technology Co., Ltd.

Applicant:	Woodstream Corp.		
Address:	69 N. Locust Street, Lititz, PA17543, USA		
Manufacturer:	Peter Parts Electronics Inc.		
Address:	6285 Dean Parkway, Ontario, NY14519, USA		
Factor:	Dong Guan KingBright Electronics Factory		
Address:	The 2nd industrial zone, Da li area, Qingxi town, Dongguan city, Guangdong Province, China.		
E.U.T:	Spray Away		
Model Number:	Spray Away		
Trade Name:	Havahart	Serial No.:	-----
Date of Receipt:	Jan. 14, 2014	Date of Test:	Feb. 5~12. 2014
Test Specification:	FCC Part 15, Subpart C: Oct. 1, 2013 ANSI C63.4:2009 RSS-Gen Issue 3:2010 RSS-210 Issue 8:2010		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied.		
		Issue Date: Feb. 13, 2014	
Tested by:	Reviewed by:	Approved by:	
			
Andy Gao / Engineer	Jade Yang / Supervisor	Chris Du / Manager	
Other Aspects:	None.		
<i>Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested</i>			
<i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd.</i>			

1. GENERAL PRODUCT INFORMATION

1.1. Product Function

Refer to Technical Construction Form and User Manual.

1.2. Description of Device (EUT)

Description	:	Spray Away
M/N	:	Spray Away
Power Supply	:	DC 3V(1.5V AA battery*2)
Operation Frequency	:	433.92MHz
Modulation Technology	:	ASK
Antenna Type	:	Integral
Antenna Gain	:	2dBi

1.3. Independent Operation Modes

The basic operation modes are:

1.3.1. Keep the EUT in transmitting mode.

1.4. Test Supporting System

None.

2. TEST SITES

2.1. Test Facilities

Lab Qualifications : 944 Shielded Room built by ETS-Lindgren, USA
Date of completion: March 28, 2011

966 Chamber built by ETS-Lindgren, USA
Date of completion: March 28, 2011

Certificated by TUV Rheinland, Germany.
Registration No.: UA 50207153
Date of registration: July 13, 2011

Certificated by UL, USA
Registration No.: 100567-237
Date of registration: September 1, 2011

Certificated by Intertek
Registration No.: 2011-RTL-L1-31
Date of registration: October 11, 2011

Certificated by FCC, USA
Registration No.: 795647
Date of registration: November 7, 2011

Certificated by Industry Canada
Registration No.: 9868A
Date of registration: December 8, 2011

Name of Firm : Keyway Testing Technology Co., Ltd.

Site Location : Baishun Industrial Zone, Zhangmutou Town,
Dongguan, Guangdong, China

2.2. List of Test and Measurement Instruments

2.2.1. For above 1GHz radiated emission, band edge, 20dB bandwidth test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	May 9,13	May 9,14
Bilog Antenna	ETS-LINDGREN	3142D	00135452	May 20,13	May 20,14
Horn Antenna	DAZE	ZN30701	11003	May 11,13	May 11,14
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	May 11,13	May 11,14
Spectrum Analyzer	Agilent	8593E	3911A04271	May 9,13	May 9,14
Spectrum Analyzer	Agilent	E4408B	MY44211125	May 9,13	May 9,14
Spectrum Analyzer	Rohde&Schwarz	FSP	100394	May 9,13	May 9,14
3m Semi-anechoic Chamber	ETS-LINDGREN	966	KW01	May 20,13	May 20,14
Signal Amplifier	SONOMA	310	187303	May 9,13	May 9,14
Signal Amplifier	DAZE	ZN3380C	11001	May 9,13	May 9,14
Signal Amplifier	Agilent	8449B	3008A00251	May 9,13	May 9,14
High Pass filter	Micro	HPM50111	324216	May 9,13	May 9,14
Power Meter	R&S	NRVS	101824	May 9,13	May 9,14
RF Cable	IMRO	IMRO-400	966 Cable 1#	May 9,13	May 9,14
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A

3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: Spray Away)

Note:1: By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Y axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report. Test data as below.

2: For all test, used new battery.

Frequency (MHz)	Axis	Field Strength (dBuV/m)	Antenna Polarization
433.92	X	82.67	Horizontal
433.92	Y	84.76	Horizontal
433.92	Z	83.29	Horizontal

3.3. Test Operation Mode and Test Software

Refer to Test Setup in clause 4.

3.4. Special Accessories and Auxiliary Equipment

None.

3.5. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Radiated Emission Test

4.1.1. Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

4.1.2. Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	$(\mu\text{V}/\text{m}@3\text{m})$	$(\text{dB } \mu\text{V}/\text{m}@3\text{m})$	$(\mu\text{V}/\text{m}@3\text{m})$	$(\text{dB } \mu\text{V}/\text{m}@3\text{m})$
433.92	10996	80.8	1099.6	60.8

4.1.3. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.1.4. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

The frequency ranges from 30MHz to 10th harmonic (5GHz) are checked.

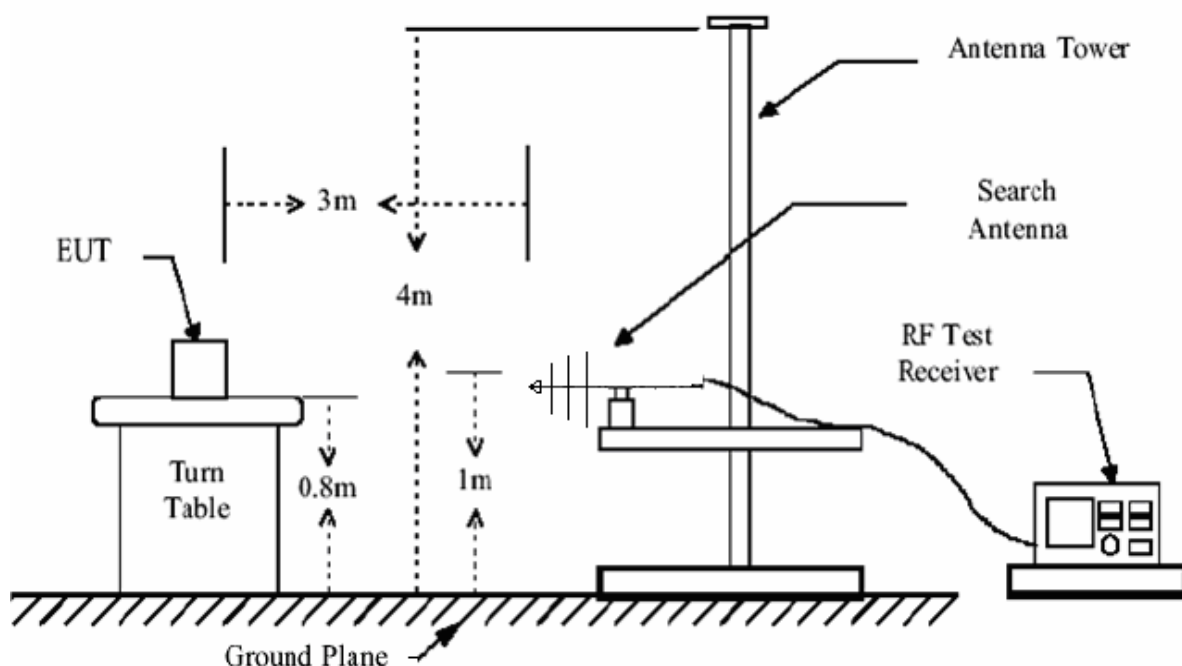
The test data of the worst case condition(s) was reported on the following pages.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

2. Measurement Uncertainty: ± 3.2 dB at a level of confidence of 95%.

3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

4. For Both PK and AV value above 1GHz, PK detector is used.



Vertical

	Freq	Preamp	Read	CableAntenna		Level	Limit	Over	Remark
		Factor	Level	Loss	Factor		Line	Limit	
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	54.25	31.37	53.24	0.75	8.16	30.78	40.00	-9.22	QP
2 !	219.15	30.99	60.10	1.53	11.92	42.56	46.00	-3.44	QP
3 !	328.76	30.79	54.82	2.02	14.65	40.70	46.00	-5.30	QP
4	433.92	30.62	95.19	2.55	17.28	84.40	100.80	-16.40	Peak
5	546.04	30.85	44.74	3.03	19.45	36.37	46.00	-9.63	QP
6	867.84	30.27	55.55	4.67	23.39	53.34	80.80	-27.46	Peak

Horizontal

	Freq	Preamp	Read	CableAntenna		Level	Limit	Over	Remark
		Factor	Level	Loss	Factor		Line	Limit	
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	109.54	31.31	45.46	1.03	9.31	24.49	43.50	-19.01	QP
2 !	219.15	30.99	60.00	1.53	11.92	42.46	46.00	-3.54	QP
3 !	328.76	30.79	56.40	2.02	14.65	42.28	46.00	-3.72	QP
4	433.92	30.62	95.55	2.55	17.28	84.76	100.80	-16.04	Peak
5	546.04	30.85	47.08	3.03	19.45	38.71	46.00	-7.29	QP
6	867.84	30.27	62.69	4.67	23.39	60.48	80.80	-20.32	Peak

For average:

Frequency MHz	Peak Level dBuV/m	Duty cycle factor(dB)	Emission Level dBuV/m	Limits dBuV/m	Margin dB	Antenna Polarization
433.92	84.40	-6.27	78.13	80.80	-2.67	Vertical
867.84	53.34	-6.27	47.07	60.80	-13.73	Vertical
433.92	84.76	-6.27	78.49	80.80	-2.31	Horizontal
867.84	60.48	-6.27	54.21	60.80	-6.59	Horizontal

- Notes: 1.Emission Level = Peak Level + Duty cycle factor
2.Duty cycle level please see clause 5.
3. Pulse Desensitization Correction Factor
Pulse Width (PW) = 33.82ms
1/PW = 1/33.82ms = 0.0296kHz
RBW (100 kHz) > 1/PW (0.0296 kHz)
Therefore PDCF is not needed

Above 1GHz

Vertical

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1301.76	26.06	39.21	5.15	24.84	43.14	74.00	-30.86	Peak
2	1735.68	26.15	38.68	5.85	26.75	45.13	74.00	-28.87	Peak
3	2140.00	26.24	33.61	6.71	28.51	42.59	74.00	-31.41	Peak
4	2768.00	26.43	33.76	8.84	29.44	45.61	74.00	-28.39	Peak
5	3148.00	26.57	33.58	9.94	30.14	47.09	74.00	-26.91	Peak
6	3804.00	26.91	34.44	10.24	31.12	48.89	74.00	-25.11	Peak

Horizontal

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	1301.76	26.06	45.07	5.15	24.84	49.00	74.00	-25.00	Peak
2	1735.68	26.15	40.98	5.85	26.75	47.43	74.00	-26.57	Peak
3	2212.00	26.26	35.62	6.89	28.57	44.82	74.00	-29.18	Peak
4	2568.00	26.37	34.57	7.84	28.96	45.00	74.00	-29.00	Peak
5	2764.00	26.43	34.99	8.84	29.44	46.84	74.00	-27.16	Peak
6	3300.00	26.65	34.22	9.96	30.29	47.82	74.00	-26.18	Peak

5. CALCULATION OF AVERAGE FACTOR

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

Averaging factor in dB = $20 \log$ (duty cycle)

The duration of one cycle = 69.6ms

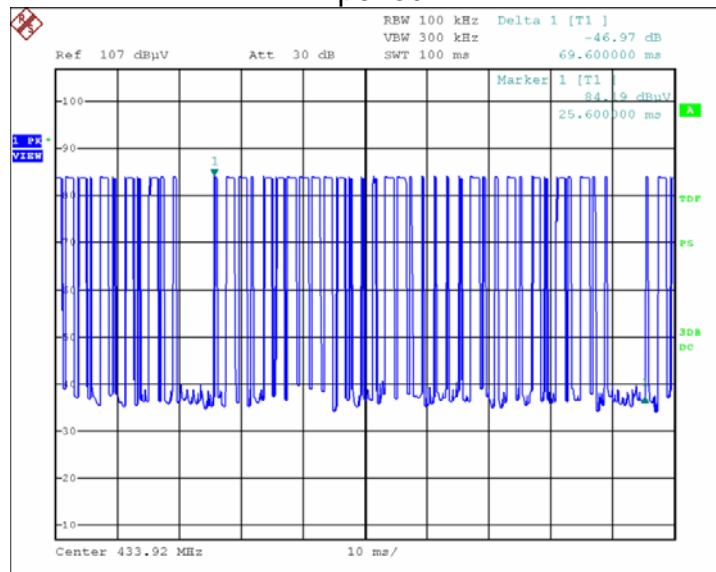
The duty cycle is simply the on-time divided the duration of one cycle

Duty Cycle = $(1.54\text{ms} * 16 + 0.54\text{ms} * 17) / 69.6 = 33.82\text{ms} / 69.6\text{ms} = 0.486$

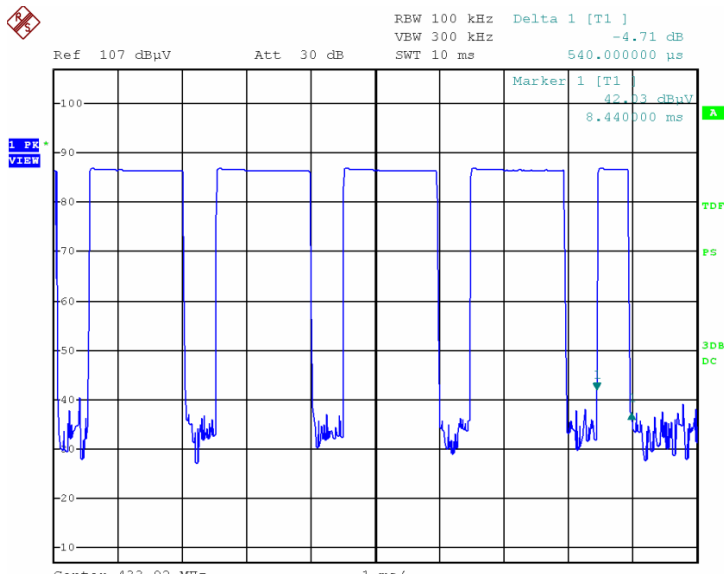
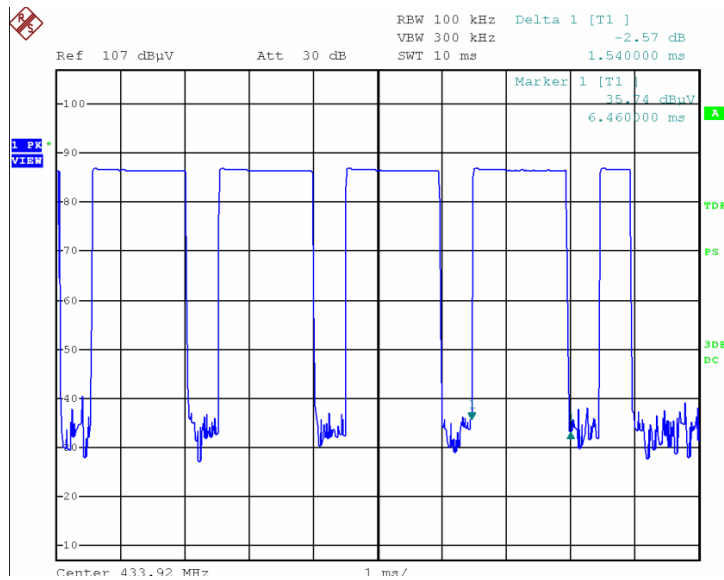
Therefore, the averaging factor is found by $20 \log 0.486 = -6.27\text{dB}$

Test plot as follows:

T period



T on time slot



6. 20DB OCCUPY BANDWIDTH

6.1. Limits

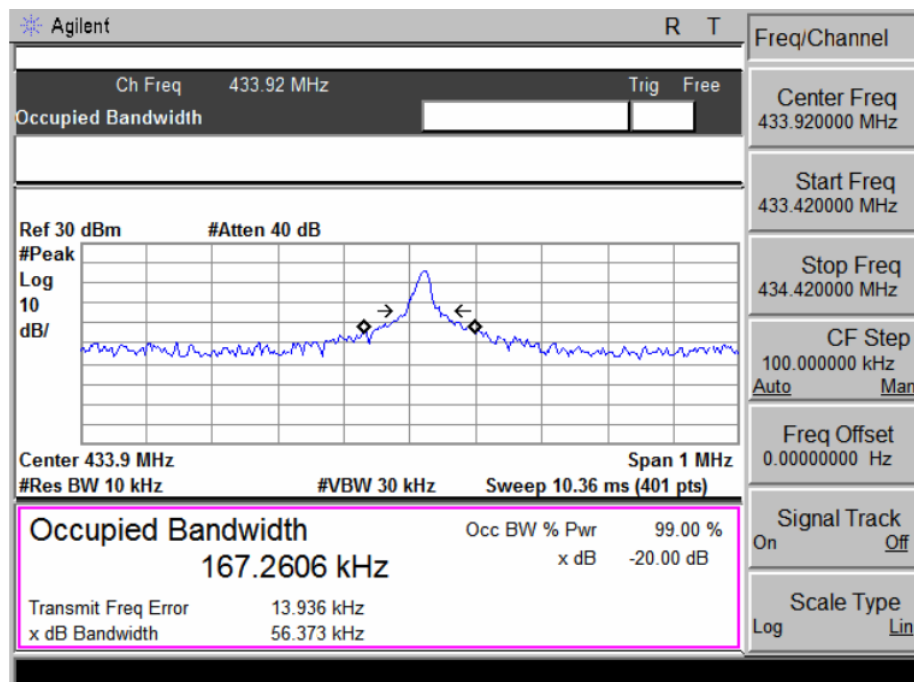
According to FCC 15.231(c) requirement:

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

Test data:

Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.056	1.0848	Pass

Test plot as follows:



7. 99% OCCUPY BANDWIDTH

7.1. Limits

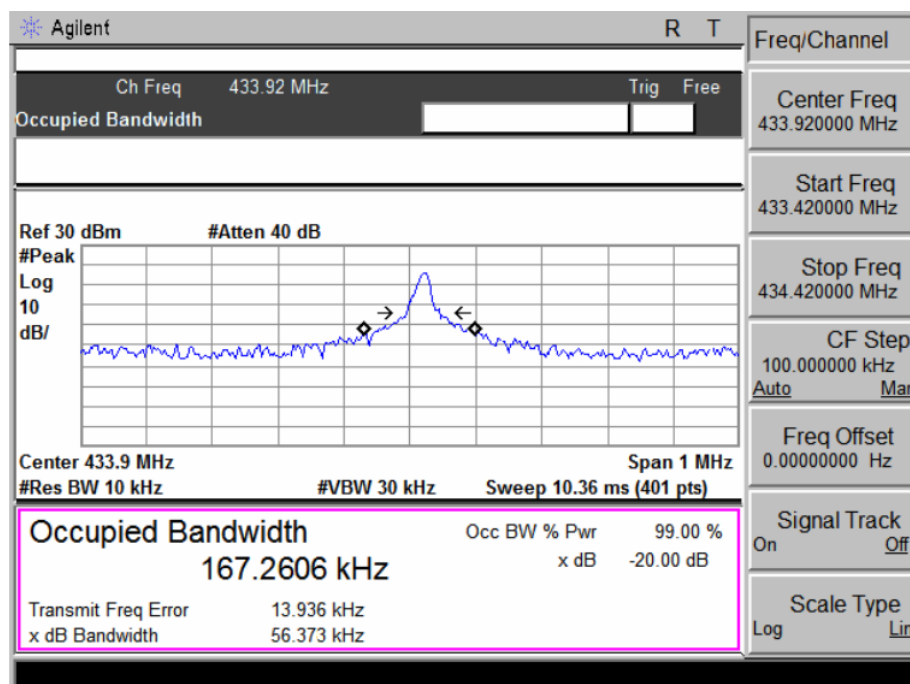
According to RSS GEN 4.4.1 and RSS 210 A1.1.3 requirement:

For the purpose of Section A1.1, the 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz.

Test data:

Channel Frequency (MHz)	99% Bandwidth (MHz)	Limi (MHz)	Result
433.92	0.167	1.0848	PASS

Test plot as follows:



8. DWELL TIME

8.1. Limits

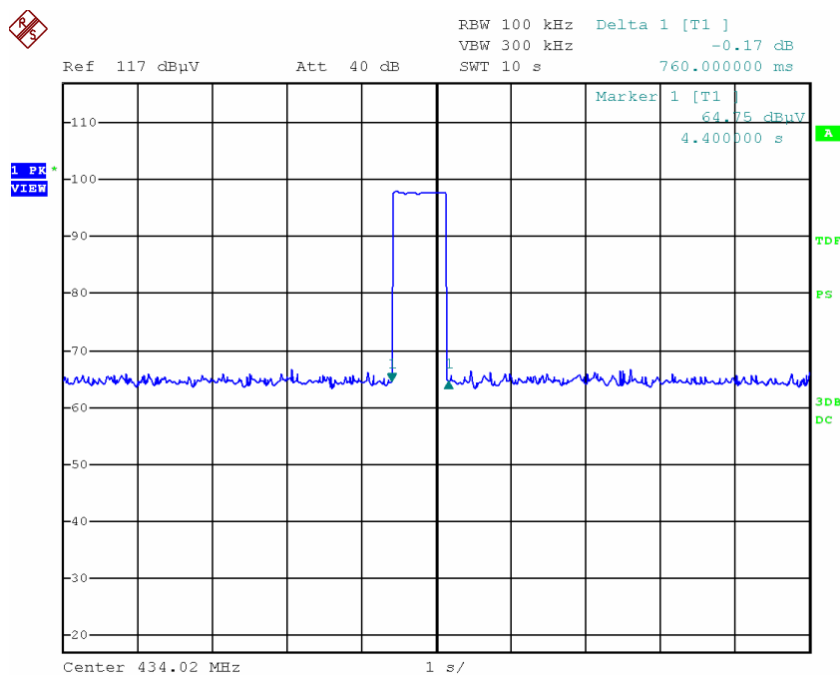
According to FCC 15.231(a) requirement:

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

Test Data:

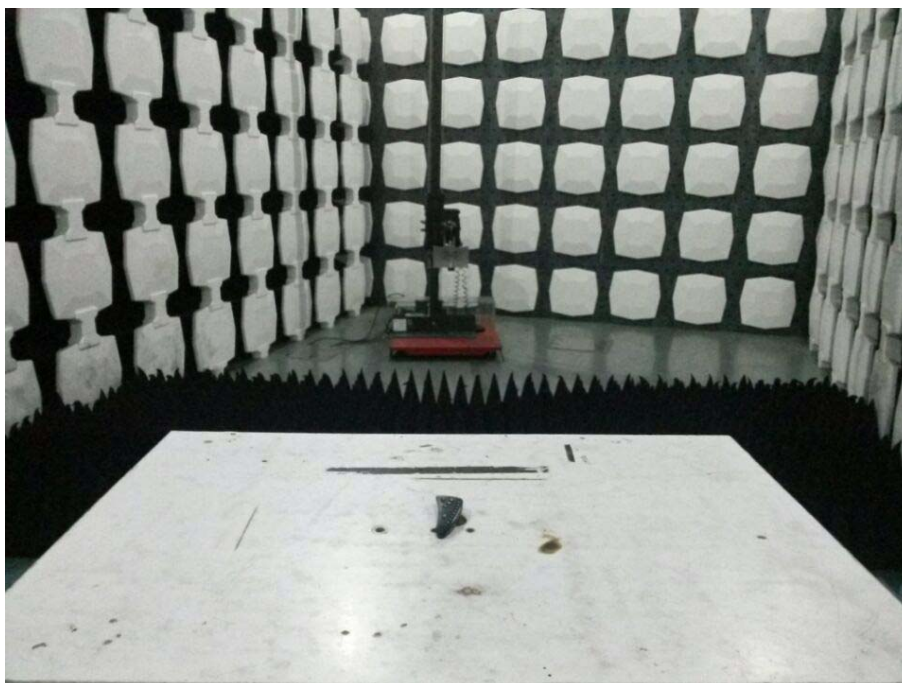
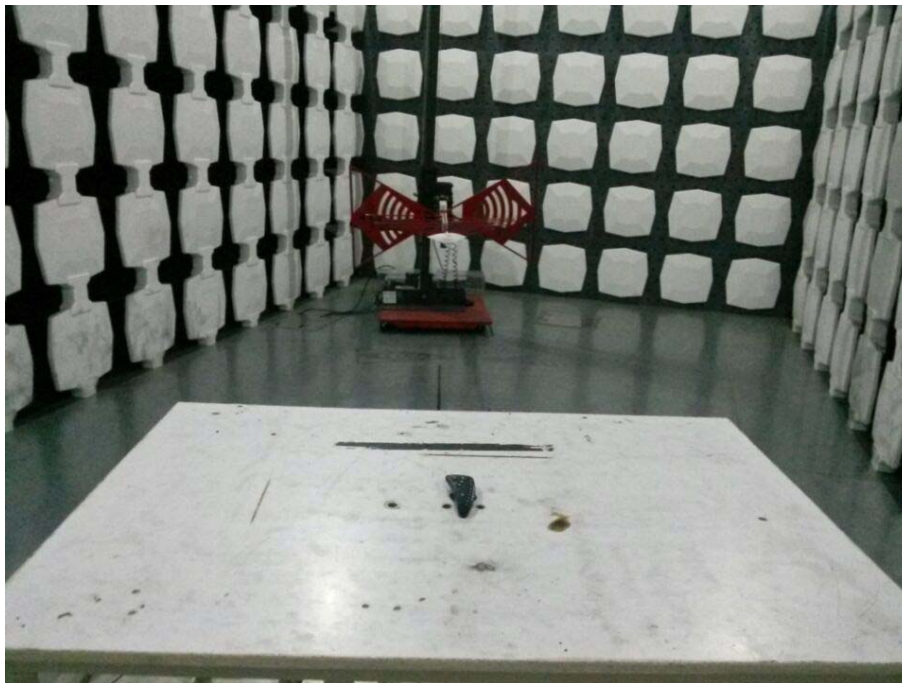
Dwell time (second)	Limit (second)	Result
0.76s	<5s	Pass

Test plot as follows:



9. PHOTOGRAPHS OF TEST SET-UP

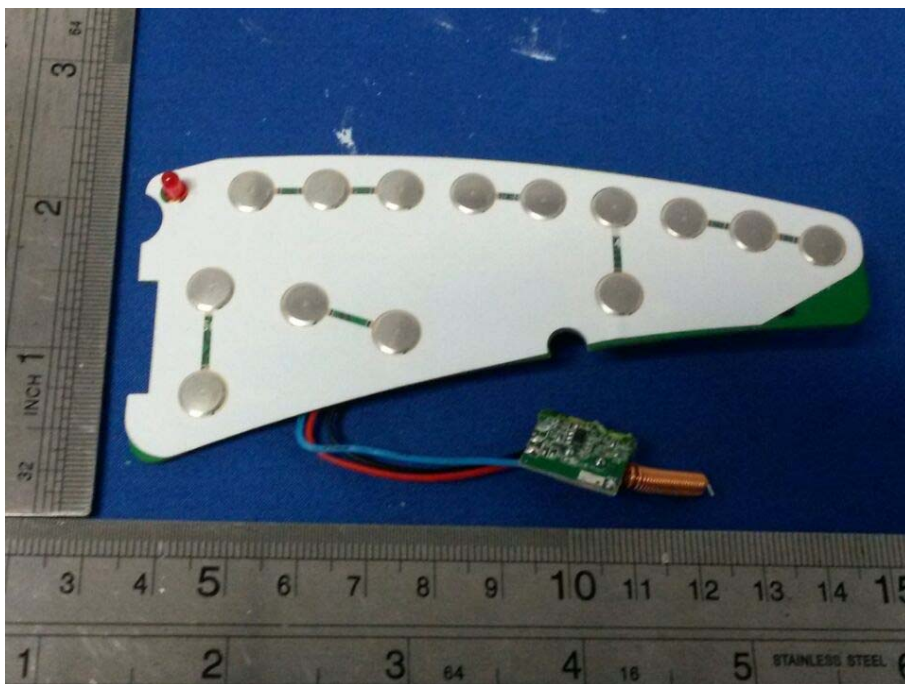
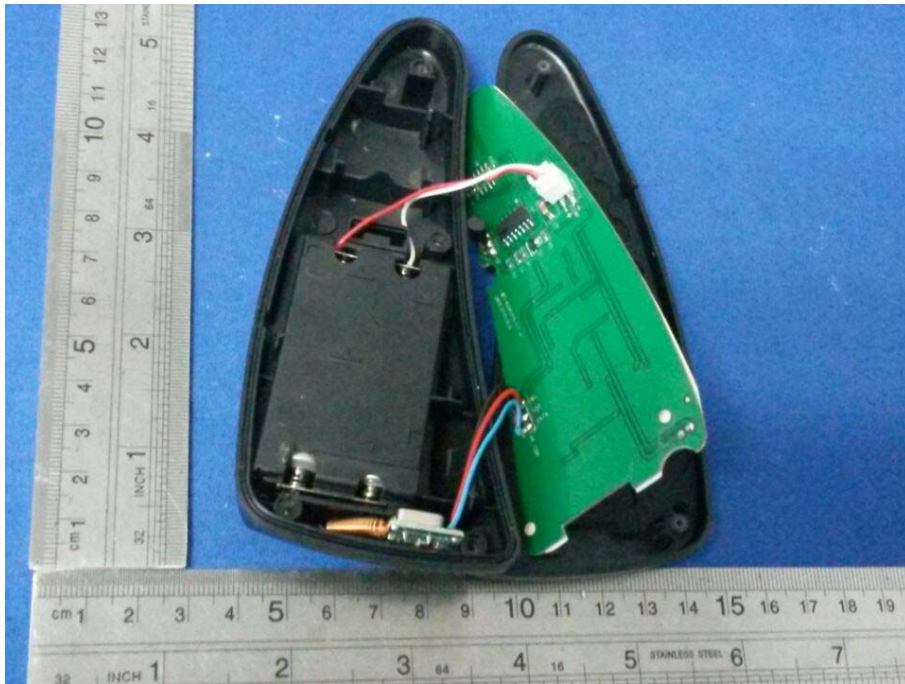
Radiated Emission

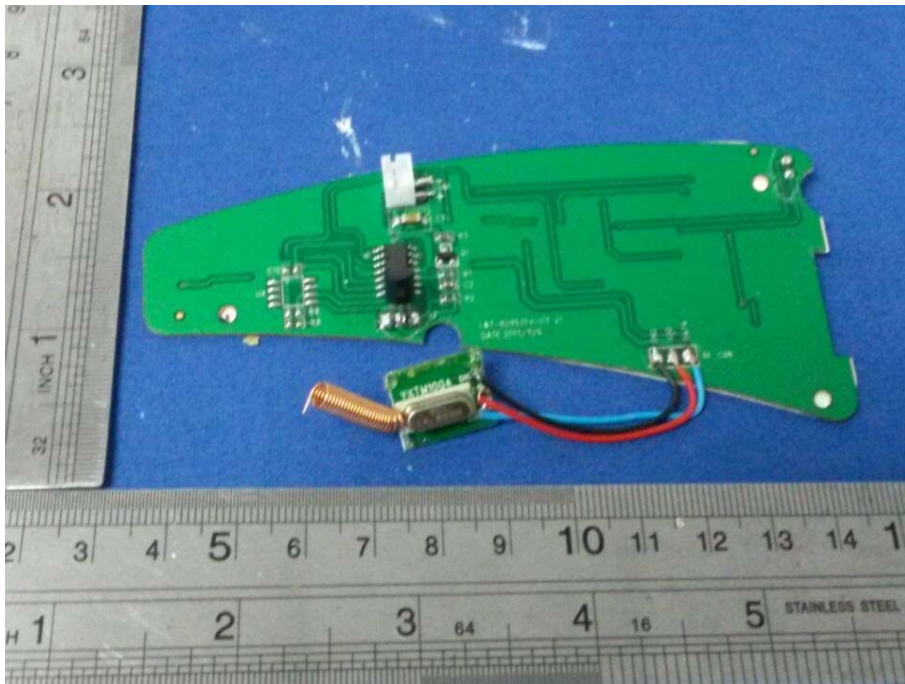


10. PHOTOGRAPHS OF THE EUT









END.