

Global United Technology Services Co., Ltd.

Report No.: GTSE15050084701

FCC REPORT

Applicant: Serene Innovations Inc.

Address of Applicant: 14731 Carmenita Road, Norwalk, Ca. 90650 U.S.A

Equipment Under Test (EUT)

Product Name: 2-Way Paging

Model No.: PG-200, PG-200RX

Trade Mark: SERENE, JiritsuCom, amplicomms

FCC ID: Z33-PG1

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.231:2014

Date of sample receipt: June 05, 2015

Date of Test: June 05-12, 2015

Date of report issued: June 12, 2015

Test Result: PASS *

In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo **Laboratory Manager**

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in

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2 Version

Version No.	Date	Description
00	June 12, 2015	Original

Edward. Pan	Date:	June 12, 2015
Project Engineer	_	
hank. yan	Date:	June 12, 2015
	4	Project Engineer hank. yan Date:



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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.231 (b)	Pass
Spurious emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Release time	15.231 (a)	Pass

Pass: The EUT complies with the essential requirements in the standard.



5 General Information

5.1 Client Information

Applicant:	Serene Innovations Inc.
Address of Applicant:	14731 Carmenita Road, Norwalk, Ca. 90650 U.S.A
Manufacturer:	Serene Innovations Inc.
Address of Manufacturer	14731 Carmenita Road, Norwalk, Ca. 90650 U.S.A
Factory:	Shenzhen Transtar Electronics Co., LTD
Address of Factory:	Colinda Industrial Park, Opposite Side of No. 15 Furong Road, Tantou, Songgang Town, Bao'an District, Shenzhen, Guangdong, China 518105

5.2 General Description of EUT

Product Name:	2-Way Paging			
Model No.:	PG-200, PG-200RX			
Test Model No.:	PG-200			
	identical in the same PCB layout, interior structure and electrical circuits.			
Operation Frequency:	868MHz			
Modulation technology:	ООК			
Antenna Type:	Integral Antenna			
Antenna gain:	0dBi (declare by Manufacturer)			
Power supply:	AC/DC Adapter			
	Model: KWT-0500500			
	Input: AC 100-240V, 50/60Hz			
	Output: DC 5.0V, 500mA			
	Or			
	DC 3.7V Li-ion Battery 300mAh			



5.3 Test mode

Transmitting mode Keep the EUT in transmitting mode.

Remark: The test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Υ	Z
Field Strength(dBuV/m)	78.23	79.15	77.59

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup":

Y axis (see the test setup photo)

5.4 Test Facility

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

CNAS —Registration No.: CNAS L5775

CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• FCC —Registration No.: 600491

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, June 28, 2013.

• Industry Canada (IC) —Registration No.: 9079A-2

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China

Tel: 0755-27798480 Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

5.7 Description of Support Units

N/A

Global United Technology Services Co., Ltd.

Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960

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6 Test Instruments list

Radi	Radiated Emission:							
Item	em Test Equipment Manufacturer		Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 27 2015	Mar. 26 2016		
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A		
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 04 2014	Dec. 03 2015		
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	July 01 2014	June 30 2015		
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015	Feb. 21 2016		
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015		
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016		
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016		
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016		
11	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016		
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016		
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	July 01 2014	June 30 2015		
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	July 01 2014	June 30 2015		
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015		
16	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016		
17	D.C. Power Supply	Instek	PS-3030	GTS232	Mar. 28 2015	Mar. 27 2016		

Cond	Conducted Emission:								
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)			
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 07 2013	Sep. 06 2015			
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	July 01 2014	June 30 2015			
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	July 01 2014	June 30 2015			
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July 01 2014	June 30 2015			
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	July 01 2014	June 30 2015			
6	Coaxial Cable	GTS	N/A	GTS227	July 01 2014	June 30 2015			
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A			

Gene	General used equipment:								
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)			
1	Barometer	ChangChun	DYM3	GTS257	July 08 2014	July 07 2015			



7 Test results and Measurement Data

7.1 Antenna requirement

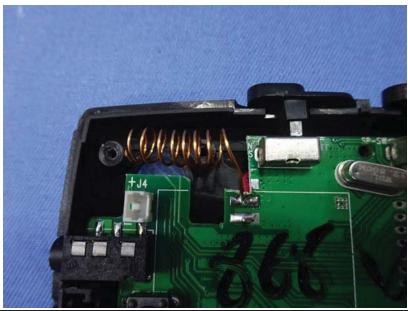
Standard requirement: FCC Part15 C Section 15.203

15.203 requirement:

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.

EUT Antenna:

The EUT make use of integral antenna, the typical gain of the antenna is 0dBi.





7.2 Conducted Emissions

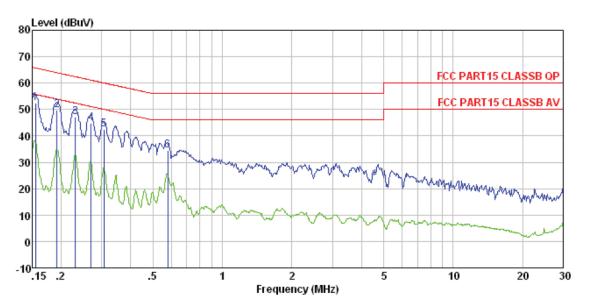
Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.4:2009					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sv	weep time=auto				
Limit:		Limit (c	dBuV)			
	Frequency range (MHz)	Average				
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5 56 46					
	5-30	60	50			
	* Decreases with the logarithm	n of the frequency.				
Test setup:	Reference Plane					
	AUX Filter AC power Equipment E.U.T Remark: E.U.T Equipment Under Test LISN Line Impedence Stabilization Network Test table height=0.8m					
Test procedure:	The E.U.T and simulators a line impedance stabilization 50ohm/50uH coupling impe	n network (L.I.S.N.). Th	nis provides a			
	2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).					
	3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2009 on conducted measurement.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

Measurement data:

Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960



Line:



Condition : FCC PART15 CLASSB QP LISN-2013 LINE

: 0847RF

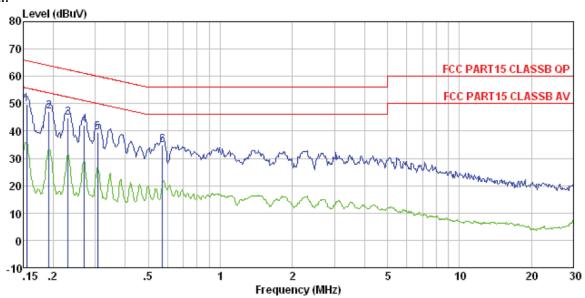
Job No. Test mode : Charging and Transmitting mode

Test Engineer: Qing

Freq	Read Level 1		Cable Loss				Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
2 0.192 3 0.230 4 0.270 5 0.307	52. 05 49. 43 46. 92 44. 63 42. 29 34. 23	0.14 0.12 0.11 0.11	0.13 0.12 0.11	49. 70 47. 16 44. 85 42. 50	63. 93 62. 44 61. 12 60. 06	-14.23 -15.28 -16.27 -17.56	QP QP QP QP



Neutral:



Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL

Job No. : 0847RF

Test mode : Charging and Transmitting mode

Test Engineer: Qing

	Freq		LISN Factor					Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1 2 3 4 5 6	0. 192 0. 230 0. 270 0. 307	44.52 41.87 39.45	0.07 0.06	0.12 0.11 0.10	47. 21 44. 70 42. 04 39. 61	63. 93 62. 44 61. 12 60. 06	-16.72 -17.74 -19.08 -20.45	QP QP QP QP

Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss



7.3 Radiated Emission Method

	Radiated Emission Method						
Test Requirement:	FCC Part15 C Section 15.209						
Test Method:	ANSI C63.4:2009						
Test Frequency Range:	30MHz to 9000MHz						
Test site:	Measurement Di	Measurement Distance: 3m					
Receiver setup:	Frequency	Detector	RBW	VBW	Remark		
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value		
	Above 1GHz	Peak	1MHz	3MHz	Peak Value		
Limit:	Frequer	псу	Limit (dBuV	//m @3m)	Remark		
(Field strength of the	 868MHz		81.9		Average Value		
fundamental signal)	OOOIVII 12		101.	94	Peak Value		
Limit:							
(Spurious Emissions)	Freque		Limit (dBuV		Remark		
(00000000)	30MHz-88		40.0		Quasi-peak Value		
	88MHz-21		43.5		Quasi-peak Value		
	216MHz-96		46.00		Quasi-peak Value		
	960MHz-1	IGHz	54.00		Quasi-peak Value		
	Above 10	GHz -	54.00 74.00		Average Value Peak Value		
					is 20 dB below the permits a higher field		
Test setup:	EUT	3m ← 4m 4m V V V N N N N N N N N N N N N N N N N		Sea	arch enna		



	Report No.: GTSE15050084701
	Antenna Tower Horn Antenna Spectrum Analyzer Turn Table Amplifier
Test Procedure:	During the test, the New Battery was used.
	2. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
	3. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
	4. The antenna 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.
	5. 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 rota 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.
	7. If the emission level of the EUT in peak mode was 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass



Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
868.00	79.74	22.78	4.74	29.13	78.13	101.94	-23.81	Horizontal
868.00	80.76	22.78	4.74	29.13	79.15	101.94	-22.79	Vertical

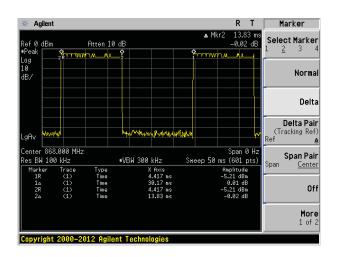
Average value:

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
868.00	78.13	-6.78	71.35	81.94	-10.59	Horizontal
868.00	79.15	-6.78	72.37	81.94	-9.57	Vertical

Average value:						
	Average value=Peak value + Duty Cycle Factor					
Calculate Formula:	Duty cycle factor=20 log(Duty cycle)					
	Duty cycle= T on time / T period					
	Ton time =13.83ms					
Took data:	T period = 30.17ms					
Test data:	Duty cycle= 13.83/30.17=0.4584					
	duty cycle factor=-6.78					

Test plot as follows:

Ton time:





7.3.2 Spurious emissions

Quasi-peak Value

Quasi-peak Value Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
677.58	41.81	20.73	4.00	29.22	37.32	46.00	-8.68	Vertical
701.76	46.73	20.81	4.09	29.20	42.43	46.00	-3.57	Vertical
779.61	43.98	21.82	4.38	29.20	40.98	46.00	-5.02	Vertical
958.79	37.78	23.49	5.08	29.10	37.25	46.00	-8.75	Vertical
701.76	46.64	20.81	4.09	29.20	42.34	46.00	-3.66	Horizontal
716.68	45.89	21.00	4.15	29.20	41.84	46.00	-4.16	Horizontal
778.00	47.70	21.77	4.37	29.20	44.64	46.00	-1.36	Horizontal
958.79	38.06	23.49	5.08	29.10	37.53	46.00	-8.47	Horizontal



Harmonic emissions

Peak value:

Report No.: GTSE15050084701

reak value.								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1736.00	48.98	25.05	4.82	34.00	44.85	81.94	-37.09	Vertical
2604.00	42.01	27.80	5.58	33.78	41.61	81.94	-40.33	Vertical
3472.00	42.27	28.90	6.91	32.79	45.29	81.94	-36.65	Vertical
4340.00	39.51	30.88	8.19	31.86	46.72	74.00	-27.28	Vertical
5208.00	35.56	31.92	9.08	32.29	44.27	81.94	-37.67	Vertical
6076.00	31.71	32.90	10.20	32.12	42.69	81.94	-39.25	Vertical
6944.00	31.07	35.24	11.45	32.24	45.52	81.94	-36.42	Vertical
7812.00	31.52	37.07	11.99	31.43	49.15	81.94	-32.79	Vertical
8680.00	29.61	36.90	13.27	32.62	47.16	81.94	-34.78	Vertical
1736.00	46.78	25.05	4.82	34.00	42.65	81.94	-39.29	Horizontal
2604.00	41.88	27.80	5.58	33.78	41.48	81.94	-40.46	Horizontal
3472.00	40.24	28.90	6.91	32.79	43.26	81.94	-38.68	Horizontal
4340.00	35.43	30.88	8.19	31.86	42.64	74.00	-31.36	Horizontal
5208.00	34.36	31.92	9.08	32.29	43.07	81.94	-38.87	Horizontal
6076.00	31.85	32.90	10.20	32.12	42.83	81.94	-39.11	Horizontal
6944.00	32.64	35.24	11.45	32.24	47.09	81.94	-34.85	Horizontal
7812.00	29.73	37.07	11.99	31.43	47.36	81.94	-34.58	Horizontal
8680.00	29.21	36.90	13.27	32.62	46.76	81.94	-35.18	Horizontal



Average value:

		I				
Frequency (MHz)	Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1736.00	44.85	-6.78	38.07	61.94	-23.87	Vertical
2604.00	41.61	-6.78	34.83	61.94	-27.11	Vertical
3472.00	45.29	-6.78	38.51	61.94	-23.43	Vertical
4340.00	46.72	-6.78	39.94	54.00	-14.06	Vertical
5208.00	44.27	-6.78	37.49	61.94	-24.45	Vertical
6076.00	42.69	-6.78	35.91	61.94	-26.03	Vertical
6944.00	45.52	-6.78	38.74	61.94	-23.20	Vertical
7812.00	49.15	-6.78	42.37	61.94	-19.57	Vertical
8680.00	47.16	-6.78	40.38	61.94	-21.56	Vertical
1736.00	42.65	-6.78	35.87	61.94	-26.07	Horizontal
2604.00	41.48	-6.78	34.70	61.94	-27.24	Horizontal
3472.00	43.26	-6.78	36.48	61.94	-25.46	Horizontal
4340.00	42.64	-6.78	35.86	54.00	-18.14	Horizontal
5208.00	43.07	-6.78	36.29	61.94	-25.65	Horizontal
6076.00	42.83	-6.78	36.05	61.94	-25.89	Horizontal
6944.00	47.09	-6.78	40.31	61.94	-21.63	Horizontal
7812.00	47.36	-6.78	40.58	61.94	-21.36	Horizontal
8680.00	46.76	-6.78	39.98	61.94	-21.96	Horizontal

Remark:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. Average value=Peak value + Duty cycle factor



7.4 20dB Occupy Bandwidth

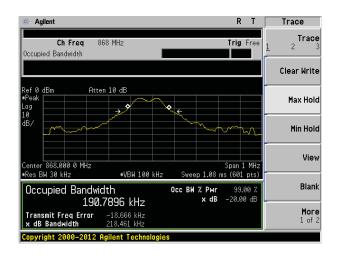
Test Requirement:	FCC Part15 C Section 15.231 (c)				
Test Method:	ANSI C63.4:2009				
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				

Measurement Data

Test Frequency (MHz)	20dB bandwidth (MHz)	Limit (MHz)	Result
868.00	0.218	2.17 MHz	Pass

Note: Limit= Fundamental frequency × 0.25% = 868.00 × 0.25% = 2.17 MHz

Test plot as follows:





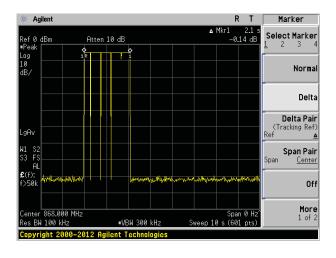
7.5 Release time

Test Requirement:	FCC Part15 C Section 15.231 (a)(1)			
Test Method:	ANSI C63.4:2009			
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak			
Limit:	Not more than 5 seconds			
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane			
Test Instruments:	Refer to section 6.0 for details			
Test mode:	Refer to section 5.3 for details			
Test results:	Pass			
Product Description: It is a manually operated transmitter.				

Measurement data:

Release time (second)	Limit (second)	Result
2.1	<5.0	Pass

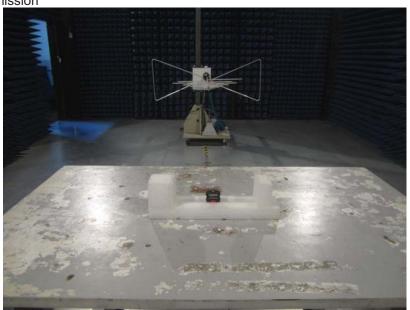
Test plot as follows:

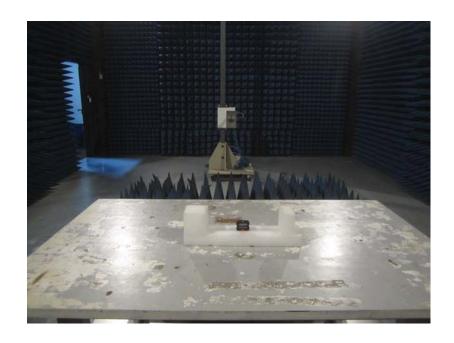




8 Test Setup Photo

Radiated Emission







Conducted Emission





9 EUT Constructional Details

















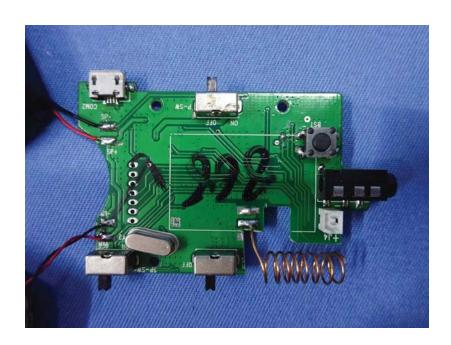




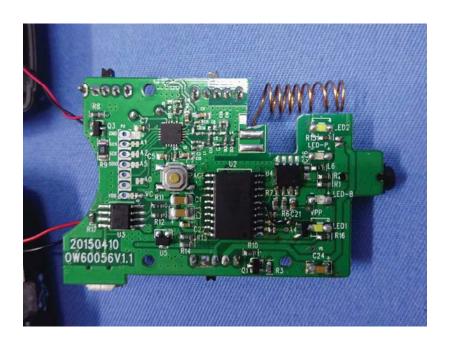


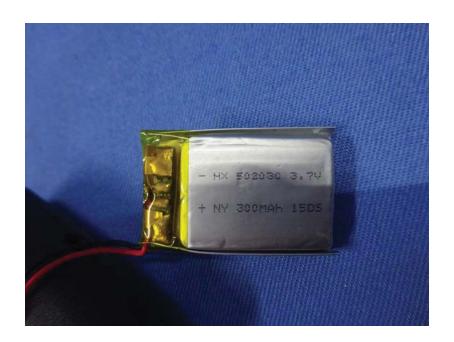
















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