RF TEST REPORT

Report No.: 15021324-FCC-R1
Supersede Report No.: N/A

Applicant	Dalian Seaside Door Controlling System Co., Ltd
Product Name	wireless keyless entry
Model No.	M12S
Serial Model	M12S-X(X=A~Z)
Test Standard	FCC Part 15.231a, ANSI C63.10: 2013
Test Date	January 29, 2016
Issue Date	February 17, 2016
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Amos Xia		
Amos Xia Test Engineer	Herve Idoko Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC , RF/Wireless , Telecom
Canada	EMC, RF/Wireless , Telecom
Taiwan	EMC, RF, Telecom , Safety
Hong Kong	RF/Wireless ,Telecom
Australia	EMC, RF, Telecom , Safety
Korea	EMI, EMS, RF , Telecom, Safety
Japan	EMI, RF/Wireless, Telecom
Singapore	EMC , RF , Telecom
Europe	EMC, RF, Telecom , Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
15021324-FCC-R1	NONE	Original	February 17, 2016

2. Customer information

Applicant Name	Dalian Seaside Door Controlling System Co., Ltd
Applicant Address	NO.23-7,yaobei road,Ganjingzi District,DALIAN
Manufacturer Name	Dalian Seaside Door Controlling System Co., Ltd
Manufacturer Address	NO.23-7,yaobei road,Ganjingzi District,DALIAN

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	Labview of SIEMIC version 1.0

4. Equipment Under Test (EUT) Information

Description of EUT:	wireless keyless entry
Main Model:	M12S
Serial Model:	M12S-X(X=A~Z)
Date EUT received:	January 21, 2016
Test Date(s):	January 29, 2016
Antenna Gain:	0 dBi
Type of Modulation:	ASK
RF Operating Frequency (ies):	315MHz(TX)
Number of Channels:	1 CH
Port:	N/A
Input Power:	DC: 9V
Trade Name :	NA
FCC ID:	2AAAL-M12S

5. Test Summary

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207	Conducted Emissions Voltage	N/A
§15.231(b)	Fundamental & Radiated Spurious Emission	Compliance
§15.231(c)	20dB Bandwidth	Compliance
§15.231(a)(1)	Deactivation	Compliance

Note: Preliminary radiated emission testing has been performed on X, Y, Z axis, only worst case test result is presented in this test report.

"N/A" means the EUT worked by battery.

Measurement Uncertainty

Emissions		
Test Item	Description	Uncertainty
Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB

6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

Requirement(s): 47 CFR §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.

Antenna requirement must meet at least one of the following:

a) Antenna must be permanently attached to the device.

b) Antenna must use a unique type of connector to attach to the device.

c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna is permanently attached to the device which meets the requirement.

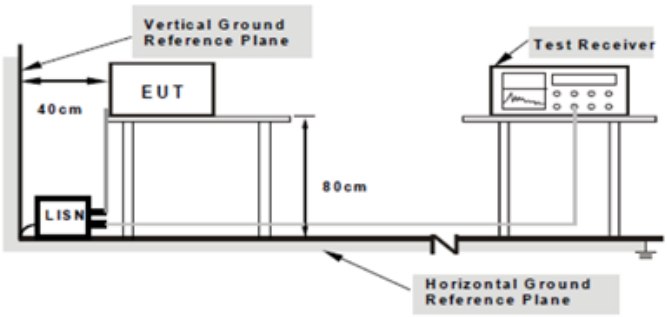
Result: Compliance.

6.2 AC Conducted Emissions Voltage

Temperature	---
Relative Humidity	---
Atmospheric Pressure	---
Test date :	---
Tested By :	---

Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBμV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Spec	Item	Requirement	Applicable
47CFR§15.207, RSS210 (A8.1)	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	☑
Test Setup	 Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.		
Procedure	- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B. - The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment were powered separately from another main supply.		
Remark			
Result	☐ Pass ☐ Fail ☑ N/A		

Test Data ☐ Yes ☑ N/A

Test Plot ☐ Yes (See below) ☑ N/A

NOTE：EUT worked by battery

6.3 20dB Occupied Bandwidth

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	January 29, 2016
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.231(c)	a)	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.	☑
	b)	For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.	☐
Test Setup	Spectrum Analyzer — EUT		
Test Procedure	20dB Emission bandwidth measurement procedure - Set RBW = 100 kHz. - Set the video bandwidth (VBW) ≥ 3 ´ RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes ☐ N/A

20dB Bandwidth measurement result

Type	Freq (MHz)	CH	Measured 20dB Bandwidth (kHz)	Limit (kHz)	Result
20dB BW	315	1 CH	629	787.5	Pass

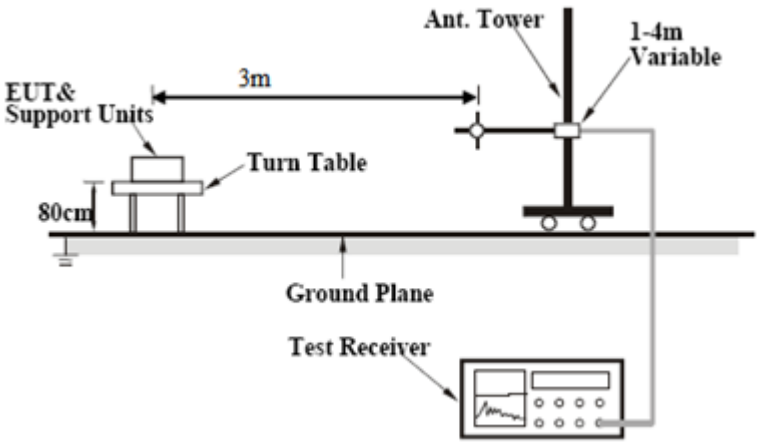
Test Plots

20dB Bandwidth measurement result

6.4 Radiated Fundamental and Spurious Emission

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	January 29, 2016
Tested By :	Amos Xia

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>§15.231(b)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Fundamental frequency (MHz)</th><th>Field strength of fundamental (microvolts/meter)</th><th>Field strength of spurious emissions (microvolts/meter)</th></tr>
<tr><td>40.66-40.70</td><td>2250</td><td>225</td></tr>
<tr><td>70-130</td><td>1250</td><td>125</td></tr>
<tr><td>130-174</td><td>1250 to 3750</td><td>125 to 375</td></tr>
<tr><td>174-260</td><td>3750</td><td>375</td></tr>
<tr><td>260-470</td><td>3750-12500</td><td>375 to 1250</td></tr>
<tr><td>Above 470</td><td>12500</td><td>1250</td></tr>
<tr><td colspan="3">Note: All 3 axes have been investigated. Only worst case is presented in the test report.</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. A Quasi-peak measurement was then made for that frequency point.
4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</td></tr>
<tr><td>Remark</td><td colspan="3"></td></tr>
</table>

Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Fundamental Measurement Result

Frequency (MHz)	Cord. Amp. (dBµV/m)	Azimuth	Polarity	Height(m)	Factors(dB)	FCC 15.231(a) Limit (dBµV)	Margin (dB)	Comments
315.00	66.22	207	V	1	-29.19	95.62	-29.40	Pk
315.00	63.22	-	V	-	-	75.62	-12.40	Ave
315.00	75.79	253.4	H	2	-29.48	95.62	-19.83	Pk
315.00	72.79	-	H	-	-	75.62	-2.83	Ave

Spurious Emissions (< 1GHz) Measurement Result

Frequency (MHz)	Cord. Amp. (dBµV/m)	Azimuth	Polarity	Height(m)	Factors(dB)	FCC 15.231(a) Limit (dBµV)	Margin (dB)	Comments
630.00	40.80	357	V	2	-21.83	75.62	-34.82	Pk
630.00	37.80	-	V	-	-	55.62	-17.82	Ave
630.00	48.54	267.9	H	3	-20.78	75.62	-27.08	Pk
630.00	45.54	-	H	-	-	55.62	-10.08	Ave
945.00	36.01	144.1	V	2	-18.11	75.62	-39.61	Pk
945.00	33.01	-	V	-	-	55.62	-22.61	Ave
945.00	46.88	66.7	H	3	-16.92	75.62	-28.74	Pk
945.00	43.88	-	H	-	-	55.62	-11.74	Ave

Notes:

1. Duty cycle is 70.759%, 20log (duty cycle) = -3.004dB correction was used to determine the average level from the peak reading. Average = peak reading + 20log (duty cycle), Final Average= peak reading -3.00dB

2. All the data measurement of peak values.

3. FCC Limit for Average Measurement=13125 (315MHz)-7083.3333=6041.67µV/m=75.6dBµV/m

4. Average pulsed signal over one complete pulse train or 100 ms time frame if pulse train exceeds 100 ms

5. Maximum average in 100 ms

6. Calculate duty cycle for pulse train or 100 ms

7. Duty cycle = (t1 + t2 + t3+…tn)/T where tn = pulse width, T = pulse train length or 100 ms

Note:Average Duty Factor:-3.004dB≈ -3.00dB

Spurious Emissions (> 1GHz) Measurement Result

Frequency	Direction	Height	Polar	Factors (dB)	Amplifier	Cord. Amp.	FCC 15.231	Margin	Comments
MHz	Degree	Meter	H/V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	(dB)	(Pk/Av)
1260.23	121.3	0.88	H	-23.25	55	47.36	75.62	-28.26	Peak
1260.23	-	-	H	-	-	44.36	55.62	-11.26	Ave
1575.3	152.7	1.17	H	-20.32	55	47.32	74	-26.68	Peak
1575.3	-	-	H	-	-	44.32	54	-9.68	Ave
1890.36	83.0	0.94	H	-18.62	55	52.35	75.62	-23.27	Peak
1890.36	-	-	H	-	-	49.50	55.62	-6.12	Ave
2205.42	210.9	2.28	H	-16.42	55	41.09	74	-32.91	Peak
2205.42	-	-	H	-	-	38.09	54	-15.91	Ave
2520.48	131.7	2.42	H	-13.21	55	41.90	75.62	-33.72	Peak
2520.48	-	-	H	-	-	38.90	55.62	-16.72	Ave
2835.54	18.0	1.63	H	-10.18	55	39.17	74	-34.83	Peak
2835.54	-	-	H	-	-	36.17	54	-17.83	Ave
3150.6	90.5	2.03	H	-8.24	55	41.38	75.62	-34.24	Peak
3150.6	-	-	H	-	-	38.38	55.62	-17.24	Ave
3465.66	133.9	2.25	H	-6.73	55	41.17	75.62	-34.45	Peak
3465.66	-	-	H	-	-	38.17	55.62	-17.45	Ave
1260.23	208.5	1.52	V	-23.25	55	49.21	75.62	-26.41	Peak
1260.23	-	-	V	-	-	46.21	55.62	-9.41	Ave
1575.3	114.9	1.84	V	-20.32	55	47.49	74	-26.51	Peak
1575.3	-	-	V	-	-	44.49	54	-9.51	Ave
1890.36	144.0	0.83	V	-18.62	55	44.14	75.62	-31.48	Peak
1890.36	-	-	V	-	-	41.14	55.62	-14.48	Ave
2205.42	224.4	1.65	V	-16.42	55	42.19	74	-31.81	Peak
2205.42	-	-	V	-	-	39.19	54	-14.81	Ave
2520.48	253.3	2.16	V	-13.21	55	38.35	75.62	-37.27	Peak
2520.48	-	-	V	-	-	35.35	55.62	-20.27	Ave
2835.54	125.8	1.76	V	-10.18	55	41.80	74	-32.20	Peak
2835.54	-	-	V	-	-	38.80	54	-15.20	Ave
3150.6	46.2	1.85	V	-8.24	55	36.38	75.62	-39.24	Peak
3150.6	-	-	V	-	-	33.38	55.62	-22.24	Ave
3465.66	202.8	2.11	V	-6.73	55	34.08	75.62	-41.54	Peak
3465.66	-	-	V	-	-	31.08	55.62	-24.54	Ave

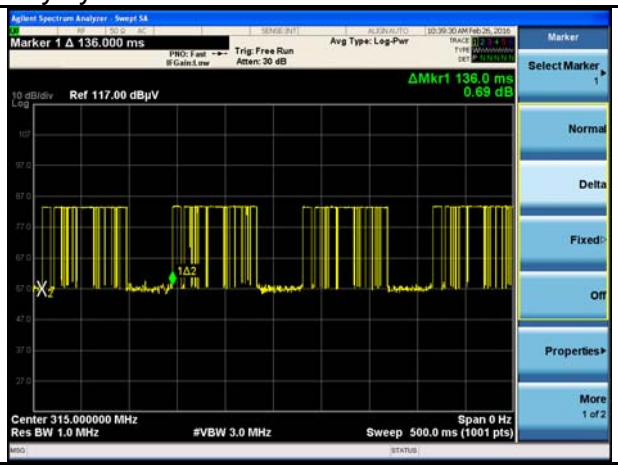
Note: 1. Duty cycle is 70.759 %, 20log (duty cycle) = -3.004 dB correction was used to determine the average level from the peak reading. Average = peak reading + 20log (duty cycle), Final Average= peak reading -3.00dB

Note:
Pulse width (PW) =0.26ms
2/PW = 2/0.26ms =7.69kHz
RBW > 2/PW (7.69kHz)
Therefore PDCF is not needed.

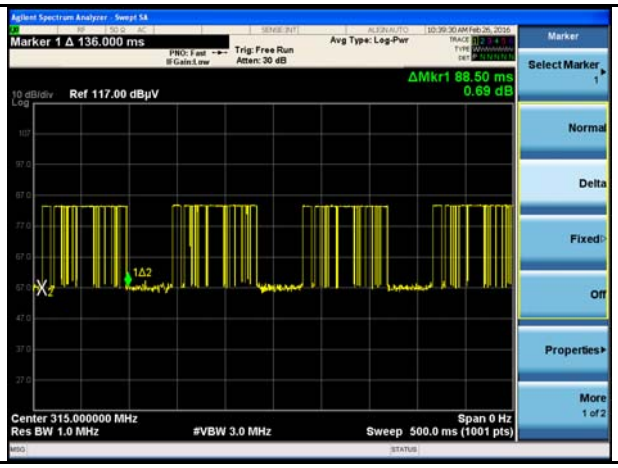
Note:Average Duty Factor:-3.004dB≈ -3.00dB

Test Plots

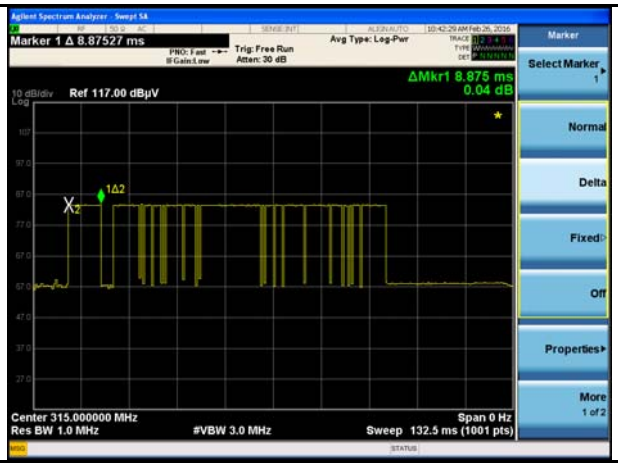
Duty Cycle Measurement Result



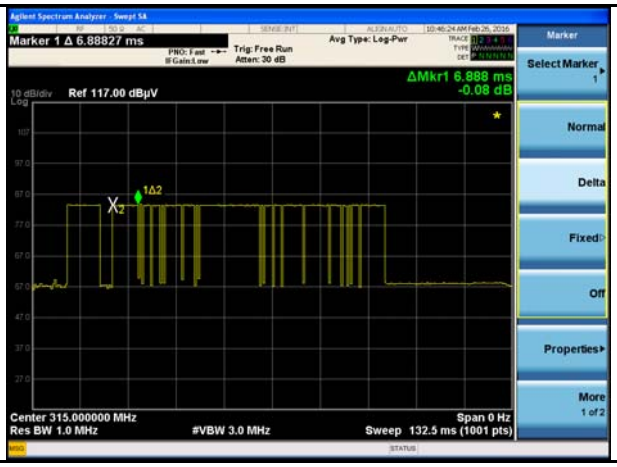
Duty Cycle 1#



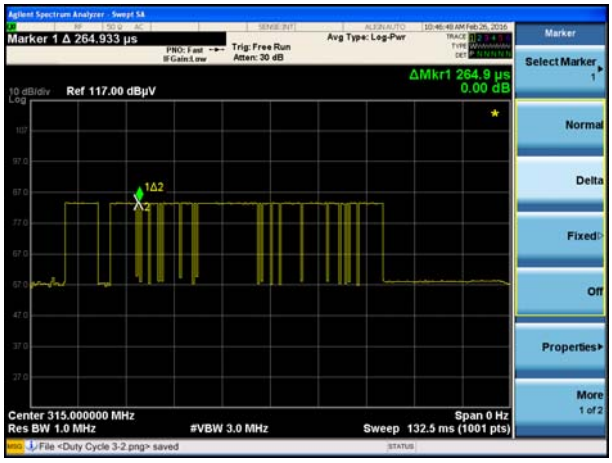
Duty Cycle 2#



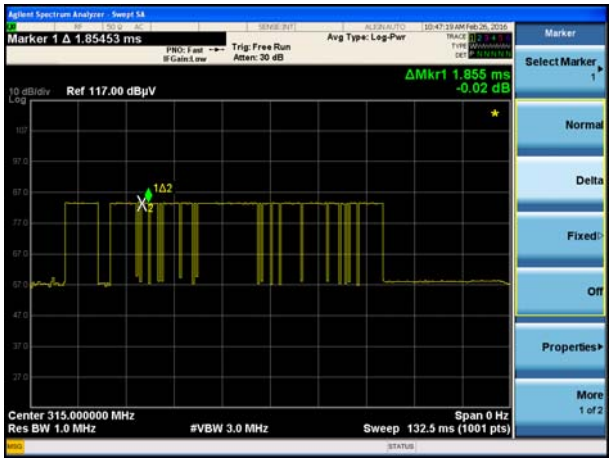
Duty Cycle 3#



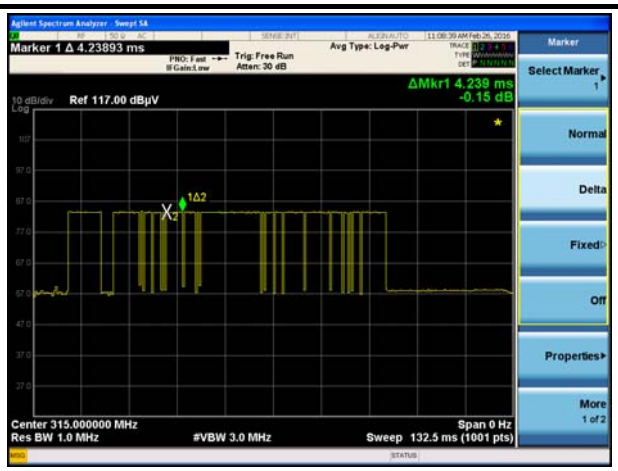
Duty Cycle 4#



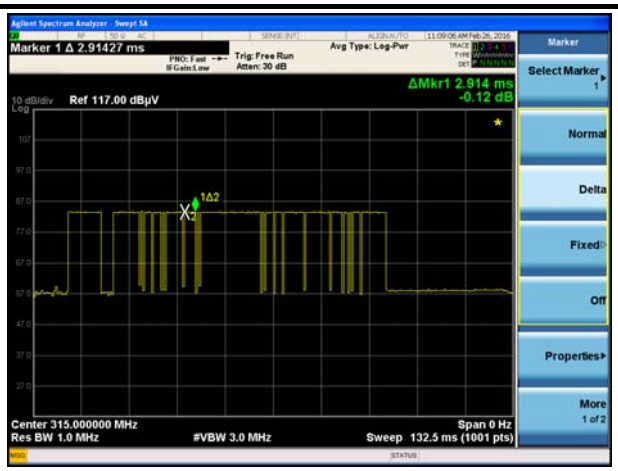
Duty Cycle 5#



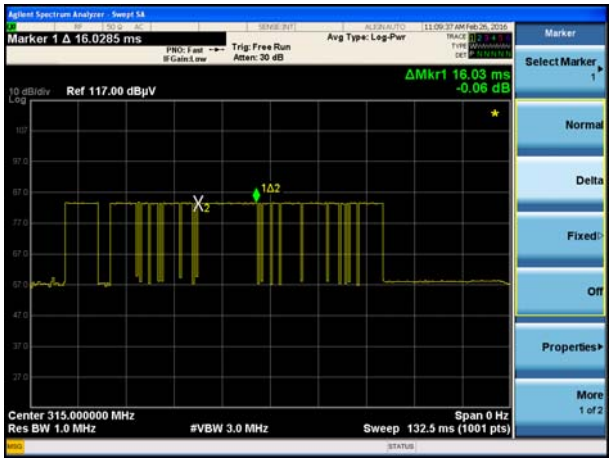
Duty Cycle 6#



Duty Cycle 7#



Duty Cycle 8#



Duty Cycle 9#

Duty cycle= (8.895+6.888*3+0.265*6+1.855*5+4.239*2+2.914*2+16.029)/100=70.759%
Average Duty Factor: 20*log (Duty Cycle) = -3.004dB

Pulse Duty Cycle

Note:Average Duty Factor:-3.004dB≈ -3.00dB

6.5 Deactivation

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	January 29, 2016
Tested By :	Amos Xia

Requirement(s):

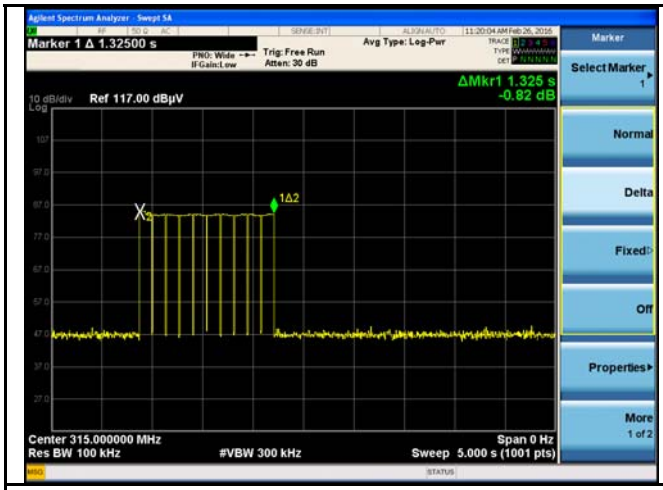
Spec	Item	Requirement	Applicable
§15.231 (a)(1)	a)	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.	☑
Test Setup	Spectrum Analyzer — EUT		
Test Procedure	measurement procedure - Set analyzer center frequency to channel center frequency. - Set the span to 0Hz. - Set the RBW=100KHz - Set the VBW ≥ 3 ´ RBW. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☐ Yes ☑ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Plots

Duty Cycle Measurement Result



< 5 seconds

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	09/27/2015	09/26/2016	N/A
V-LISN	ESH3-Z5	838979/005	09/27/2015	09/26/2016	N/A
Com-Power Transient Limiter	LIT-153	531021	09/27/2015	09/26/2016	N/A
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/09/2015	10/08/2016	N/A
SIEMIC Conducted Emissions software	V1.0	N/A	N/A	N/A	N/A
RF conducted test					
R&S EMI Receiver	ESPI3	101216	09/27/2015	09/26/2016	☑
Power Splitter	1#	1#	02/02/2015	02/01/2016	☑
Spectrum Analyzer	N9010A	MY47191130	09/27/2015	09/26/2016	☑
Temperature/Humidity Chamber	1007H	N/A	01/07/2015	01/06/2016	☑
Radiated Emissions					
Spectrum Analyzer	N9010A	MY47191130	09/27/2015	09/26/2016	☑
R&S EMI Receiver	ESPI3	101216	09/27/2015	09/26/2016	☑
Antenna (30MHz~6GHz)	JB6	A121411	04/15/2015	04/14/2016	☑
EMCO Horn Antenna (1 ~18GHz)	3115	N/A	10/09/2015	10/08/2016	☑
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/09/2015	10/08/2016	☑
Horn Antenna (18~40GHz)	AH-840	101013	04/22/2015	04/22/2016	N/A
Microwave Pre-Amp (18~40GHz)	PA-840	181250	05/29/2015	05/28/2016	N/A
Hp Agilent Pre-Amplifier	8447F	1937A01160	10/27/2015	10/26/2016	☑
MITEQ Pre-Amplifier (0.1 ~ 18GHz)	AMF-7D-00101800-30-10P	1451709	10/27/2015	10/26/2016	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

Front View of EUT

Rear View of EUT

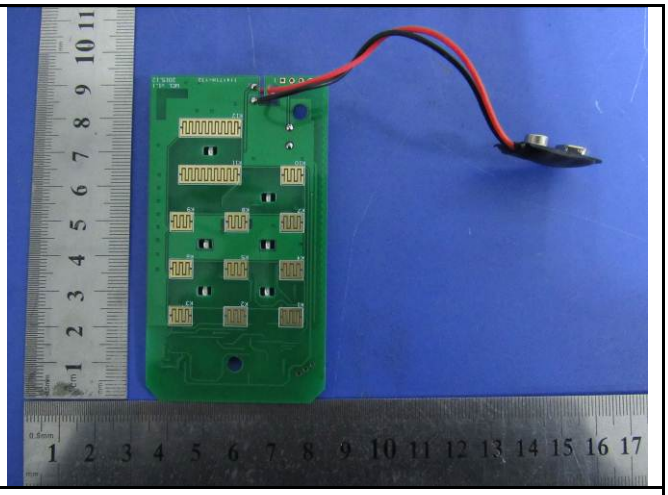
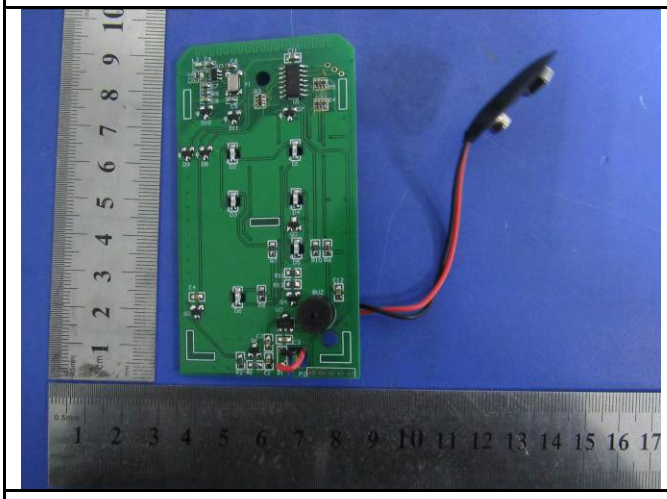
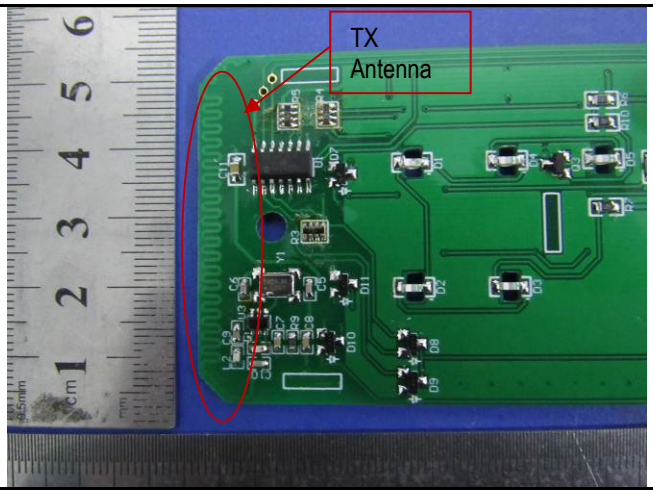
Top View of EUT

Bottom View of EUT

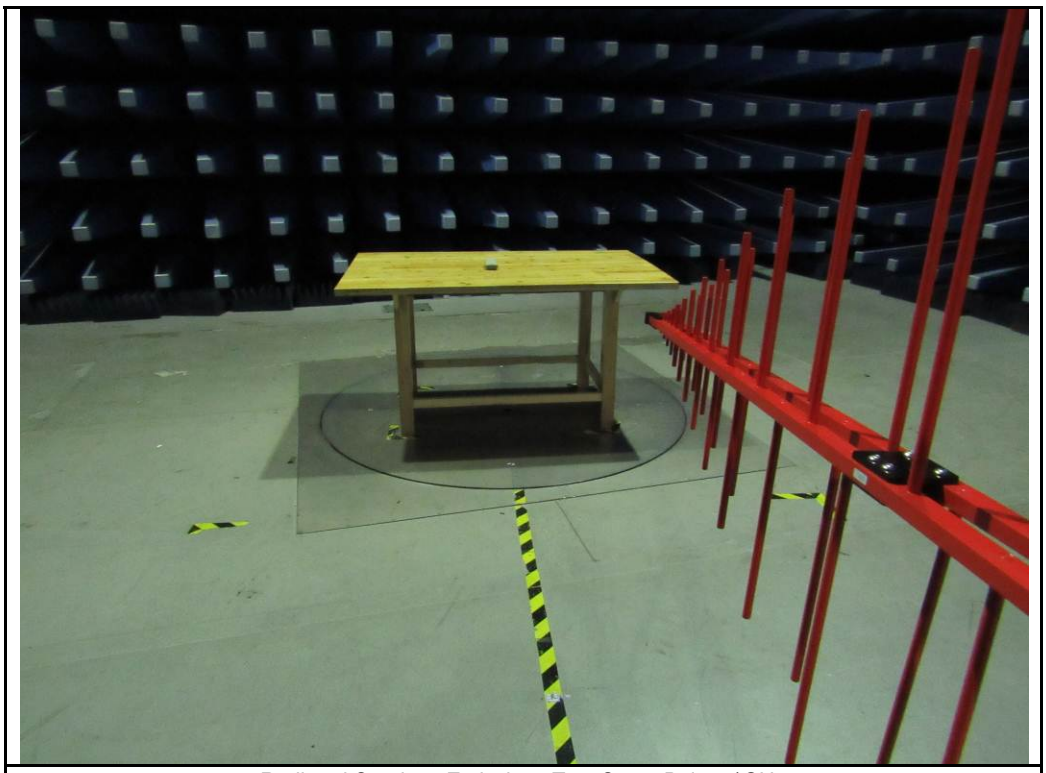
Left View of EUT

Right View of EUT

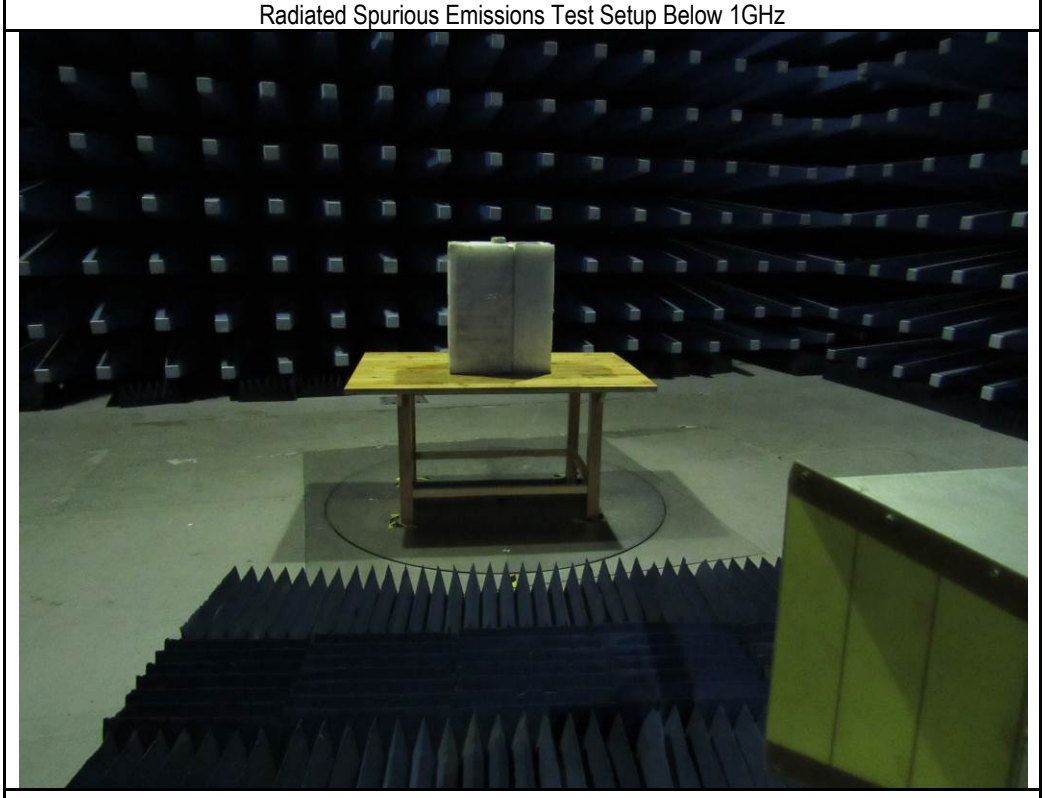
Annex B.ii. Photograph: EUT Internal Photo

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Uncover - Front View</td><td>EUT PCBA – Front View</td></tr>
<tr><td>  </td><td> 
</td></tr>
<tr><td>EUT PCBA – Rear View</td><td>EUT – PCB Rear View</td></tr>
</table>

Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz



Radiated Spurious Emissions Test Setup Above 1GHz

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Annex C. iI. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Annex E. DECLARATION OF SIMILARITY

To：SIEMIC INC.

Declaration letter

Dear Sir，

For our business issue and marketing requirement, we would like to list different models numbers on the FCC certificates and reports, as following:

Model No.: M12S

Serial Model Name: M12S-X（X=A~Z）

The Main test model M12S and M12S-X（X=A~Z）have the same circuit board and system, just have the different in colors and shell, so the test results in the certification for M12S equally apply to M12S-X(X=A~Z).

Thank you!

Product name: wireless keyless entry
FCC ID：2AAAL-M12S
Applicant: Dalian Seaside Door Controlling System Co., Ltd
Address: NO.23-7,yaobei road,Ganjingzi District,DALIAN

Company representative: