FCC 15C Report

FCC ID: LSD-HM1000

FCC 47 CFR Part 15 Subpart C

Product： **Stand alone controller**

Trade Name： DoorKing

Model Number： HM1000

Issued for

Doorking, Inc.

120 Glasgow Ave. Inglewood,CA90301, USA

Issued by

Shenzhen STONE Testing Technology Co., Ltd.

F/6, Bldg.12, Zhongxing Industrial City, Chuangye Rd.,
Nanshan District, Shenzhen, Guangdong, China

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Website: www.stt-lab.org

TEST RESULT CERTIFICATION

Product	:	**Stand alone controller**
Applicant	:	Doorking, Inc.
Address	:	120 Glasgow Ave. Inglewood,CA90301, USA
Manufacturer	:	JAT ENTERPRISE CO., LTD
Address	:	6F, ChuangCheng Building, TaiWang industrial area, BaoAn District, ShenZhen, China,
Model No.	:	HM1000
Standards	:	FCC Part 15 Subpart C
Test Method	:	ANSI C63.4: 2003

The above equipment has been tested by Shenzhen STONE Testing Technology Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Test.....:

Date of receipt of test item 2013-10-08

Date(s) of performance of test..... 2013-10-10 to 2013-10-18

Test Result..... : Pass

Testing by	:	Linna Liu	Date	:	2013-10-18
		(Linna Liu)			
Check by	:	Andy Huang	Date	:	2013-10-21
		(Andy Huang)			
Approved by	:	Ethan Chen	Date	:	2013-10-22
		(Ethan Chen)			

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1. TEST SUMMARY

Test procedures according to the technical standards:

FCC Part 15 C			
Emission			
Standard Section	Test Item	Judgment	Remark
FCC Part 15C 15.207	AC Power Line Conducted Emission	PASS	
FCC Part 15C 15.209	Transmitter Radiated Unwanted Emissions	PASS	
FCC Part 15C 15.209	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2)The test results of this report relate only to the tested sample(s) identified in this report.

1.1 TEST FACILITY

Shenzhen STONE Testing Technology Co., Ltd.
Add. : F/6, Bldg.12, Zhongxing Industrial City, Chuangye Rd., Nanshan District, Shenzhen, Guangdong, China
Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.
FCC Registration No.: 323508

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %.

A. Conducted Emission :
The measurement uncertainty is evaluated as ± 3.2 dB.

B. Radiated Measurement :
The measurement uncertainty is evaluated as ± 3.7 dB.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	**Stand alone controller**
Model Name	HM1000
Additional Model Number(s)	N/A
Operating Frequency	125 kHz
Channel Number	1 CH
Model Difference	All models are identical except model names.
Power Source	Powered by DC power system.
Power Rating	DC 9V~15V
Remark	Based on the application, features, or specification exhibited in User's Manual, more details of EUT technical specification, please refer to the User's Manual.

Note:

(1) This Test Report is for compliance FCC Part 15 Subpart C (15.207 and 15.209).

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Standby Mode
Mode 2	TX mode

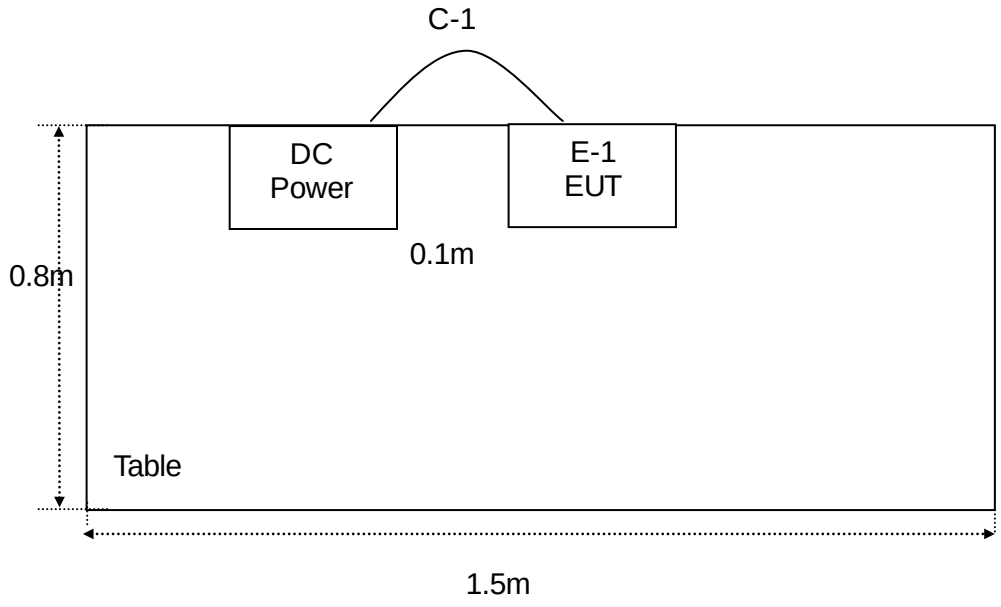
For Conducted Test	
Final Test Mode	Description
Mode 1	
Mode 2	
The equipment is powered by DC power.	

For Radiated Test	
Final Test Mode	Description
Mode 2	TX mode

Note:
(1) After the preliminary scan, the final test was executed the worst condition and test data were recorded in this report.

2.3 DESCRIPTION OF TEST SETUP

Radiated Emission



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Stand alone controller	DoorKing	HM1000	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	20cm	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.
(3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

3. CONDUCTED EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT (Frequency Range 150KHz-30MHz)

CLASS B LIMIT		
FREQUENCY (MHz)	Quasi-peak	Average
	dBuV	dBuV
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

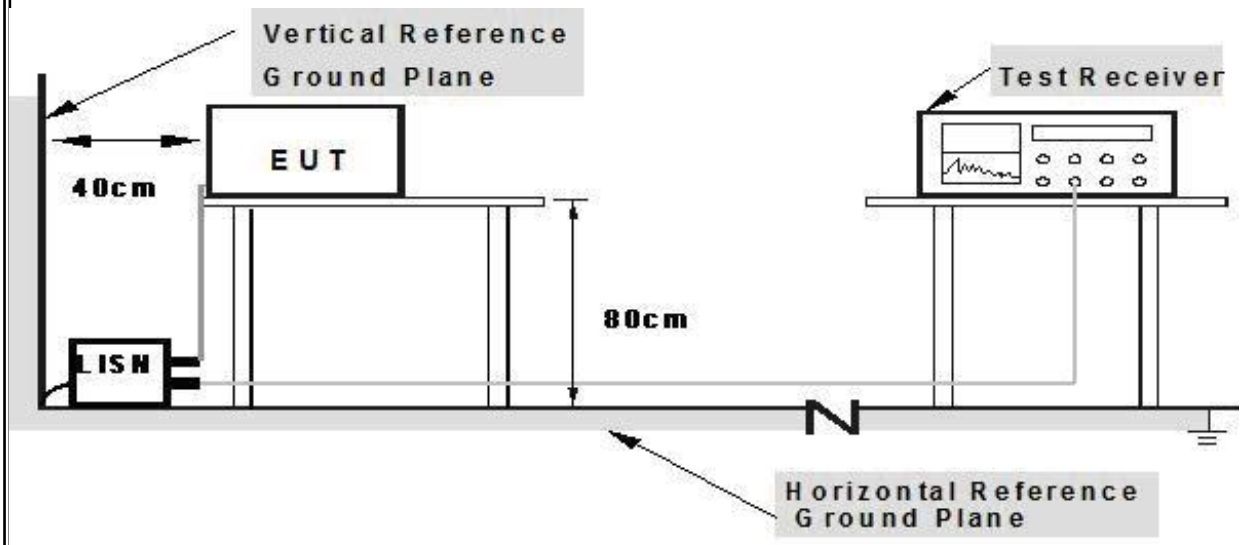
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
LISN	R&S	NSLK81	8126466	Jul. 06, 2012	Jul. 05, 2014	1 year
LISN	R&S	NSLK81	8126487	Dec. 25, 2012	Dec. 24, 2013	1 year
50Ω Switch	ANRITSU CORP	MP59B	6200983704	Jul. 06, 2012	Jul. 05, 2014	1 year
Test Cable	N/A	C01	N/A	Jul. 06, 2012	Jul. 05, 2014	1 year
Test Cable	N/A	C02	N/A	Jul. 06, 2012	Jul. 05, 2014	1 year
Test Cable	N/A	C03	N/A	Jul. 06, 2012	Jul. 05, 2014	1 year
EMI Test Receiver	R&S	ESCI	1166.595	Jul. 06, 2012	Jul. 05, 2014	1 year
Passive Voltage Probe	ESH2-Z3	R&S	100196	Jul. 06, 2012	Jul. 05, 2014	1 year

3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.6 TEST RESULTS

EUT：	Tablet PC	Model Name. ：	M736
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Test Date：	
Test Mode：		Phase：	Line
Test Voltage ：	N/A		
NOTE:	The equipment is powered by Dc power from Host system. No required for this test item.		

EUT：	Tablet PC	Model Name. ：	M736
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Test Date：	
Test Mode：		Phase：	Neutral
Test Voltage ：	N/A		
NOTE:	The equipment is powered by Dc power from Host system. No required for this test item.		

4. RADIATED EMISSION MEASUREMENT

4.1 RADIATED EMISSION LIMIT

RADIATED EMISSION LIMITS			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5~13.8	300
0.490~1.705	24000/F(kHz)	33.8~23	30
1.705~30	30	29	30
30~88	100	40	3
88 -216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: The distance for frequency at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distance on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/ decade).

Note 2: The frequency bands 9~90 kHz, 110~490 KHz measurements employing an average detector, and for other frequencies below 1 GHz measurements employing a CISRP Quai-peak detector.

RADIATED EMISSION LIMITS (Above 1GHz)

FREQUENCY (MHz)	Class A (dBuV/m)(at 3 M)		Class B (dBuV/m)(at 3 M)	
	Peak	Average	Peak	Average
Above 1000	80	60	74	54

Note:

(1) The limit for radiated test was performed according to FCC PART 15.209.

(2) The tighter limit applies at the band edges.

(3) Emission Level(dBuV/m)=20log Emission Level(uV/m)

(4) Peak detector limit is corresponding to 20 dB above the maximum permitted average limit.

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without

going below the lowest frequency for which radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or in which the device operated or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.75	30
1.75-108	1000
108-500	2000
500-1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower

The following table is the setting of the receiver (Below 1 GHz)

Frequency Band	Detector Mode	IF Bandwidth
9 kHz~90 kHz	Peak/Average	200 Hz
90 kHz~110 kHz	Quai-peak	200 Hz
110 kHz~150 kHz	Peak/Average	200 Hz
150 kHz~490 kHz	Peak/Average	9 kHz
490 kHz~30 MHz	Quai-peak	9 kHz
30 MHz~1000 MHz	Quai-peak	120 kHz

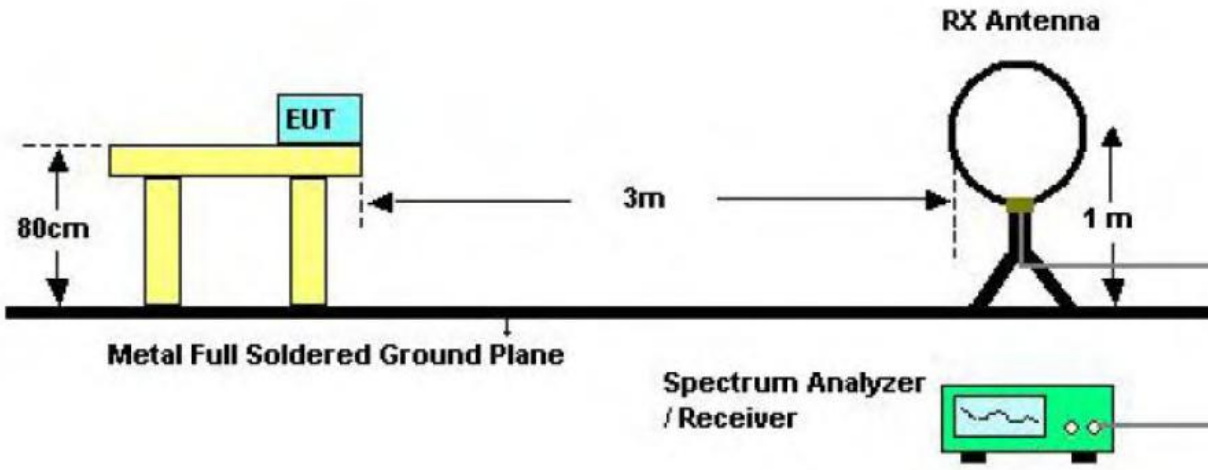
4.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

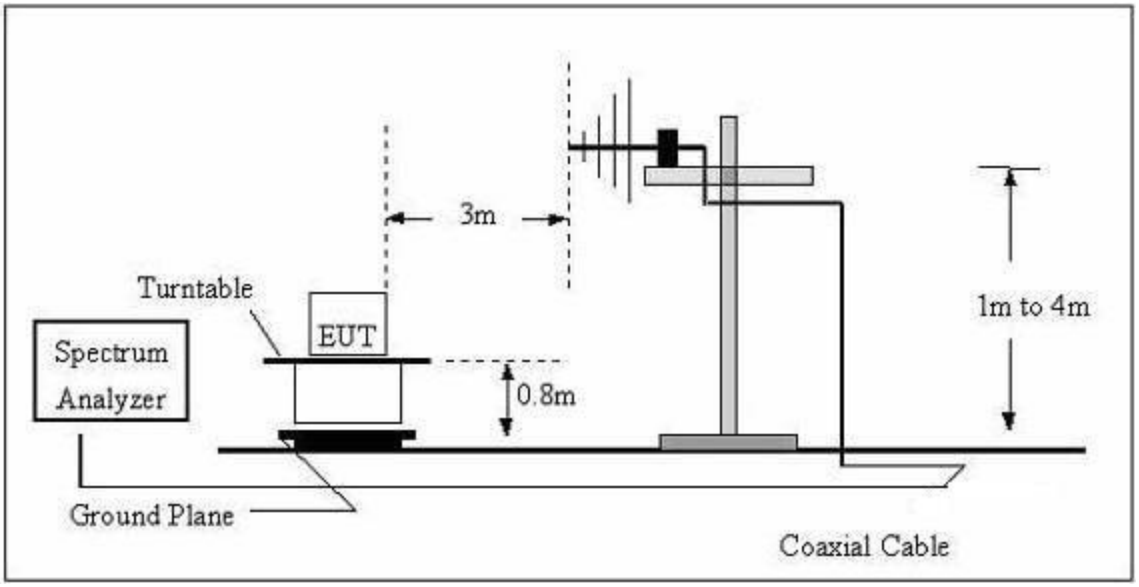
Note:
Both horizontal and vertical antenna polarities were tested.
And performed pretest to three orthogonal axis. The worst case emissions were reported.

4.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency 9 kHz~30 MHz



(B) Radiated Emission Test Set-Up Frequency 30 MHz~1 GHz



4.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Broadband Antenna	R&S	VULB 9168	VULB 9168-456	Jul. 06, 2013	Jul. 05, 2014	1 year
Test Cable	N/A	R-01	N/A	Dec. 25, 2012	Dec. 24, 2013	1 year
Test Cable	N/A	R-02	N/A	Dec. 25, 2012	Dec. 24, 2013	1 year
EMI Test Receiver	R&S	ESCI	101324	Jul. 06, 2012	Jul. 05, 2014	1 year
Antenna Mast	EM	SC100_1	N/A	N/A	N/A	N/A
Turn Table	EM	SC100	060531	N/A	N/A	N/A

50Ω Switch	Anritsu Corp	MP59B	6200983705	Jul. 06, 2013	Jul. 05, 2014	1 year
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2013	Jul. 05. 2014	1 year
Horn Antenna	R&S	HF906	10029	Jul. 06, 2013	Jul. 05. 2014	1 year
Amplifier	EM	EM-30180	060538	Jul. 06, 2013	Jul. 05. 2014	1 year
Loop Antenna	R&S	HFH2-Z2	860004	Aug. 15, 2013	Aug. 14, 2014	1 year

4.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

4.6.1 TEST RESULTS (9 kHz~30 MHz)

EUT：	Stand alone controller	Model Name. ：	HM1000
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Date：	2013-10-17
Test Mode ：	TX Mode	Polarization：	Vertical to EUT
Test Power ：	DC 12V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.1257	80.74	10.05	90.79	105.6	-14.82	peak	
2		0.2500	51.26	9.90	61.16	99.64	-38.48	peak	
3		0.3750	45.72	9.86	55.58	96.12	-40.54	peak	

Remark:
Factor = Antenna Factor + Cable Loss.
Distance Correction Factor= 40 log(Specific Distance/ Test Distance)

EUT：	Stand alone controller	Model Name. ：	HM1000
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Date：	2013-10-17
Test Mode ：	TX Mode	Polarization：	Horizontal to EUT
Test Power ：	DC 12V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.1250	79.59	10.05	89.64	105.6	-16.02	peak	
2		0.2500	54.62	9.90	64.52	99.64	-35.12	peak	
3		0.3750	46.77	9.86	56.63	96.12	-39.49	peak	

-

Remark:
Factor = Antenna Factor + Cable Loss.
Distance Correction Factor= 40 log(Specific Distance/ Test Distance)

4.6.2 TEST RESULTS (30 MHz~ 1GHz)

EUT：	Stand alone controller	Model Name. ：	HM1000
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Date：	2013-10-17
Test Mode ：	TX Mode	Polarization：	Horizontal
Test Power ：	DC 12V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		121.0500	40.15	-15.91	24.24	43.50	-19.26	peak	
2		125.0500	45.06	-16.46	28.60	43.50	-14.90	peak	
3	*	132.6900	46.35	-17.30	29.05	43.50	-14.45	peak	
4		200.0200	40.39	-14.68	25.71	43.50	-17.79	peak	
5		250.0200	37.08	-12.77	24.31	46.00	-21.69	peak	
6		375.0500	41.28	-9.94	31.34	46.00	-14.66	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT：	Stand alone controller	Model Name. ：	HM1000
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010 hPa	Test Date：	2013-10-17
Test Mode ：	TX Mode	Polarization：	Vertical
Test Power ：	DC 12V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		125.0400	41.11	-16.46	24.65	43.50	-18.85	peak	
2		132.6900	43.69	-17.30	26.39	43.50	-17.11	peak	
3		250.0200	38.47	-12.77	25.70	46.00	-20.30	peak	
4		300.1400	38.74	-11.66	27.08	46.00	-18.92	peak	
5	*	350.1400	39.35	-10.27	29.08	46.00	-16.92	peak	
6		375.0100	37.44	-9.94	27.50	46.00	-18.50	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

5. ANTENNA REQUIREMENT

5.1 REQUIREMENT

Antenna Requirement (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.

5.2 ANTENNA CONNECTOR CONSTRUCTION

The EUT antenna is an Integral Antenna (Loop Coil Antenna).

It complies with the standard requirement.