

APPLICATION CERTIFICATION FCC Part 15C  
On Behalf of  
Chuango Security Technology Corporation

MD-20 Pet Friendly Motion Sensor  
Model No.: MD-20

FCC ID: RJY-MD20

Prepared for : Chuango Security Technology Corporation  
Address : 6-17, Overseas Students Pioneer Park, No. 108, Jia  
Economic & Technological Development Zone,  
Fuzhou 350015, China

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Report Number : ATE20170761  
Date of Test : May 18, 2017  
Date of Report : May 18, 2017

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## Test Report Certification

Applicant& address : Chuango Security Technology Corporation  
6-17, Overseas Students Pioneer Park, No. 108, Jia Economic & Technological Development Zone, Fuzhou 350015, China

Manufacturer& address : Chuango Security Technology Corporation  
6-17, Overseas Students Pioneer Park, No. 108, Jia Economic & Technological Development Zone, Fuzhou 350015, China

Product : MD-20 Pet Friendly Motion Sensor

Model No. : MD-20

Trade name : smanos

## Measurement Procedure Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.249**  
**ANSI C63.10: 2013**

The EUT was tested according to FCC 47CFR 15.249 for compliance to FCC 47CFR 15.249 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test :

May 18, 2017

Date of Report:

May 18, 2017

Prepared by :



Approved &amp; Authorized Signer :

(Sean Liu, Manager)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

The submitted sample is a MD-20 Pet Friendly Motion Sensor.  
The sample is powered by DC 3V (Powered by Battery).

		MD-20 Pet Friendly Motion Sensor
Frequency	:	915MHz
Number of Channels	:	1
Modulation Type	:	FSK
Type of Antenna	:	Integral antenna
Max antenna gain	:	1.8dBi
Power Supply	:	DC 3V
Date of sample received	:	May 12, 2017
Date of Test	:	May 18, 2017
Sample Number	:	1700577

### 1.2. Special Accessory and Auxiliary Equipment

N/A

### 1.3.Description of Test Facility

EMC Lab	: Accredited by TUV Rheinland Shenzhen  Listed by FCC The Registration Number is 752051
	Listed by Industry Canada The Registration Number is 5077A-2
	Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	: ACCURATE TECHNOLOGY CO. LTD
Site Location	: F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

### 1.4.Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2  
(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2  
(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2  
(Above 1GHz)

## 2. MEASURING DEVICE AND TEST EQUIPMENT

**Table 1: List of Test and Measurement Equipment**

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 7, 2017	Jan. 6, 2018
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 7, 2017	Jan. 6, 2018
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 7, 2017	Jan. 6, 2018
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 7, 2017	Jan. 6, 2018
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 13, 2017	Jan. 12, 2018
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 13, 2017	Jan. 12, 2018
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 13, 2017	Jan. 12, 2018
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 13, 2017	Jan. 12, 2018
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 7, 2017	Jan. 6, 2018
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 7, 2017	Jan. 6, 2018
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 7, 2017	Jan. 6, 2018
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 7, 2017	Jan. 6, 2018

### 3. OPERATION OF EUT DURING TESTING

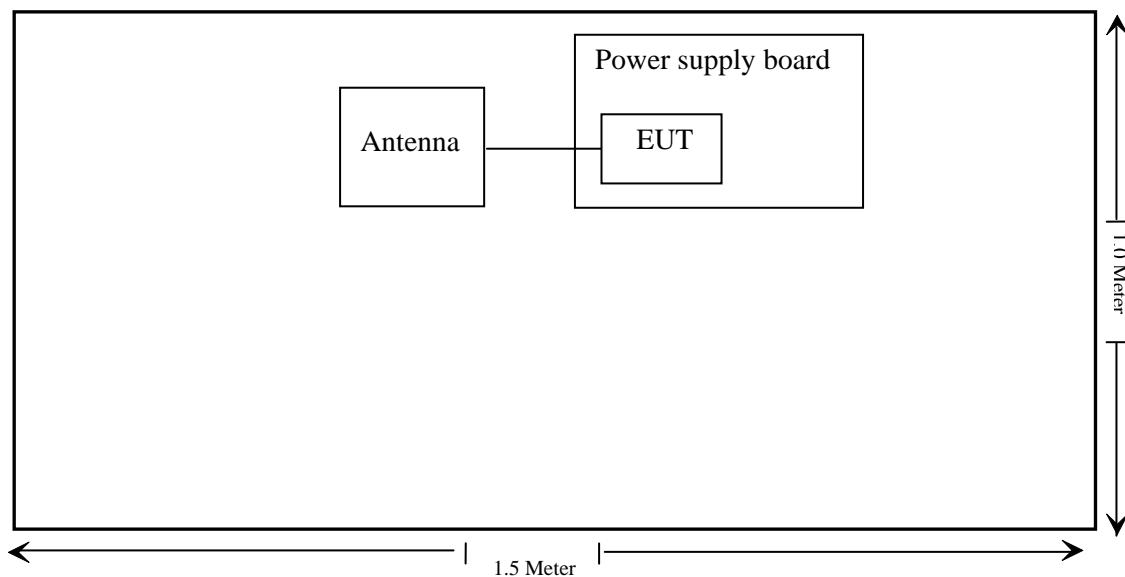
#### 3.1.Operating Mode

The mode is used: **Transmitting mode**

TX Channel: 915MHz

#### 3.2.Configuration and peripherals

Block Diagram of Test Setup



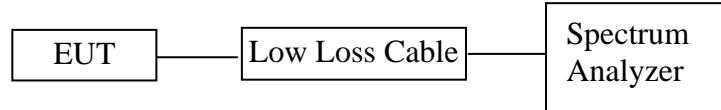
## 4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.215(c)	20dB Bandwidth	Compliant
Section 15.249(d)	Band Edge Compliance Test	Compliant
Section 15.205(a), Section 15.209(a), Section 15.249, Section 15.35	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	N/A
Section 15.203	Antenna Requirement	Compliant

Note: The power supply mode of the module is DC 3V, According to the FCC standard requirements, conducted emission is not applicable.

## 5. 20DB BANDWIDTH MEASUREMENT

### 5.1. Block Diagram of Test Setup



### 5.2. The Requirement For Section 15.215(c)

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.

### 5.3. Operating Condition of EUT

5.3.1. Setup the EUT and simulator as shown as Section 5.1.

5.3.2. Turn on the power of all equipment.

5.3.3. Let the EUT work in TX modes measure it. The transmit frequency is 915MHz.

### 5.4. Test Procedure

5.4.1. Place the EUT on the table and set it in transmitting mode.

5.4.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

5.4.3. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz, Detector function=peak, Trace=max hold, Sweep=auto.

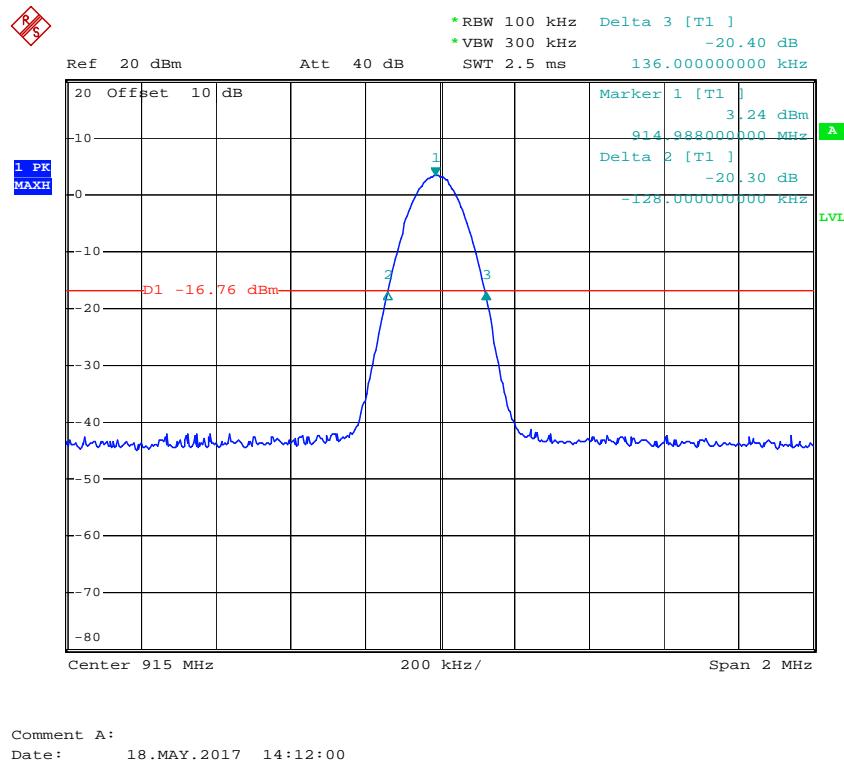
5.4.4. Set the measured low, middle and high frequency and test 20dB bandwidth with spectrum analyzer.

## 5.5. Test Result

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
1	915	0.264

The spectrum analyzer plots are attached as below.

*Low channel*



## 6. BAND EDGE COMPLIANCE TEST

### 6.1. Block Diagram of Test Setup



(EUT: MD-20 Pet Friendly Motion Sensor)

### 6.2. The Requirement For Section 15.249

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

### 6.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

### 6.4. Operating Condition of EUT

6.4.1. Setup the EUT and simulator as shown as Section 6.1.

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX modes measure it. The transmit frequency is 915 MHz.

### 6.5. Test Procedure

Conducted Band Edge:

6.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

6.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

6.5.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

6.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

6.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

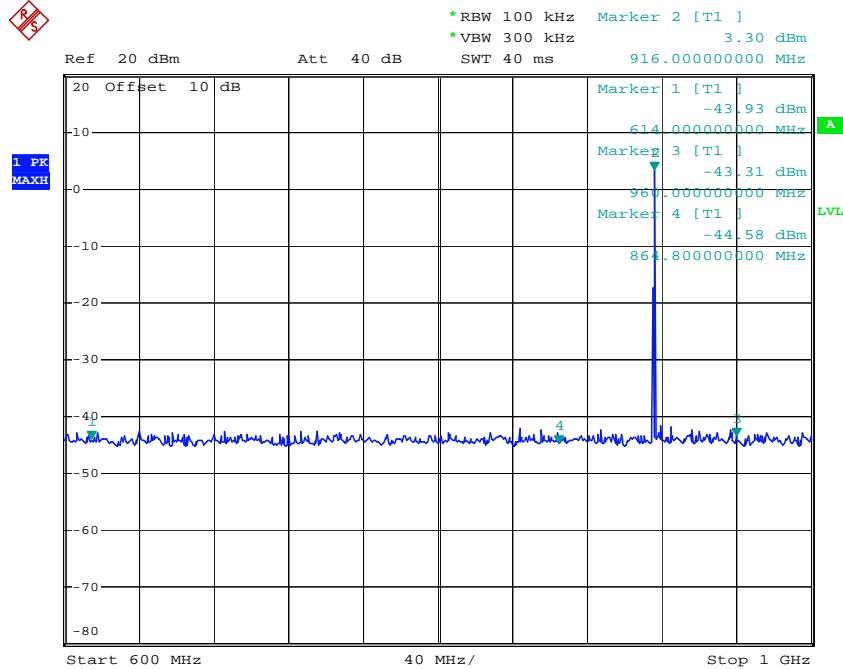
6.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

6.5.7. RBW=1MHz, VBW=1MHz

6.5.8. The band edges was measured and recorded.

## 6.6. Test Result

Pass



Comment A:  
Date: 18.MAY.2017 14:22:42

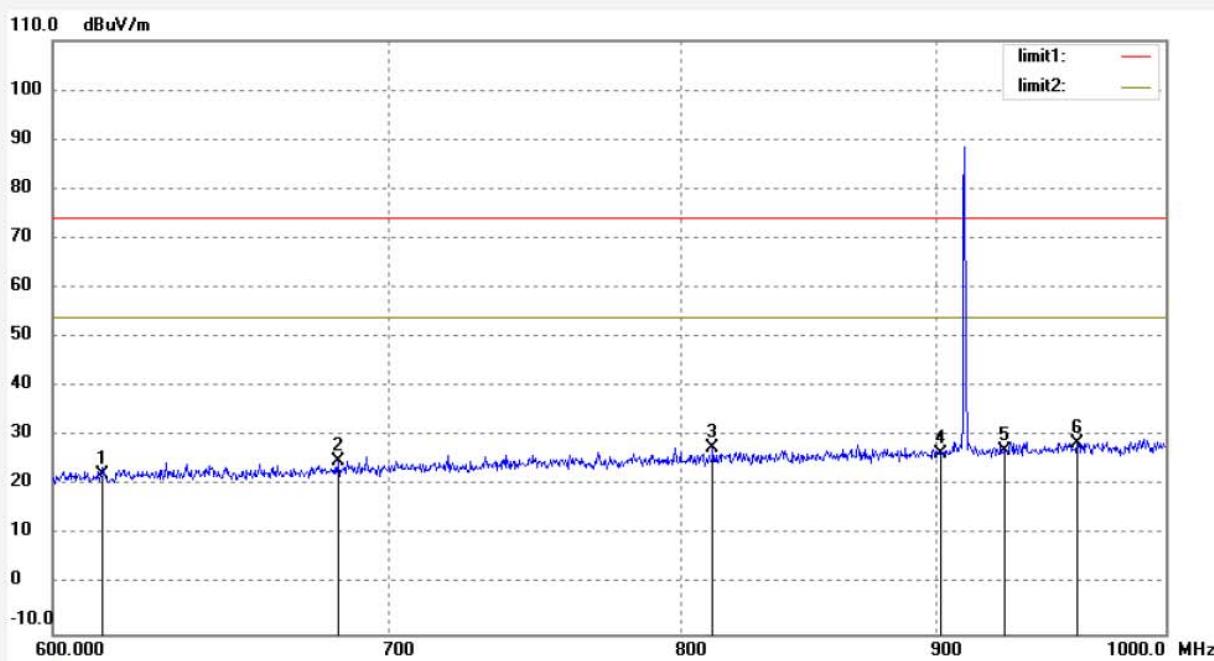


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Site: 1# Chamber  
Tel:+86-0755-26503290  
Fax:+86-0755-26503396

Job No.:	YJZH #995	Polarization:	Vertical
Standard:	FCC PK	Power Source:	DC 3V
Test item:	Radiation Test	Date:	2017/05/16
Temp.( C)/Hum.(%)	25 C / 55 %	Time:	19:10:46
EUT:	MD-20 Pet Friendly Motion Sensor	Engineer Signature:	Nick
Mode:	TX 915MHz	Distance:	3m
Model:	MD-20		
Manufacturer:	Chuango Security		
Note:	Report NO.: ATE20170761		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	614.0000	30.50	-8.10	22.40	74.00	-51.60	peak			
2	684.0035	31.74	-6.67	25.07	74.00	-48.93	peak			
3	812.3605	31.64	-3.91	27.73	74.00	-46.27	peak			
4	902.0000	28.61	-2.26	26.35	74.00	-47.65	peak			
5	928.0000	28.78	-1.85	26.93	74.00	-47.07	peak			
6	960.0000	29.78	-1.23	28.55	74.00	-45.45	peak			

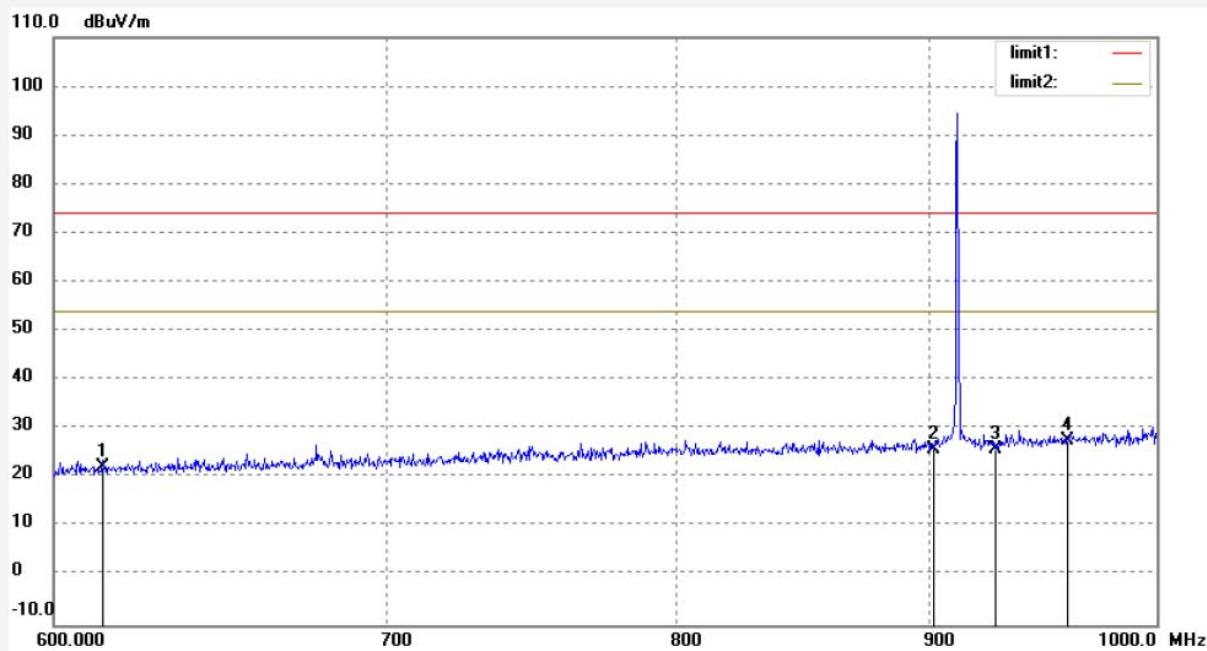


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Site: 1# Chamber  
Tel:+86-0755-26503290  
Fax:+86-0755-26503396

Job No.: YJZH #996	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 2017/05/16
Temp. ( C)/Hum.(%) 25 C / 55 %	Time: 19:14:34
EUT: MD-20 Pet Friendly Motion Sensor	Engineer Signature: Nick
Mode: TX 915MHz	Distance: 3m
Model: MD-20	
Manufacturer: Chuango Security	
Note: Report NO.: ATE20170761	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	614.0000	30.45	-8.10	22.35	74.00	-51.65	peak			
2	902.0000	28.01	-2.26	25.75	74.00	-48.25	peak			
3	928.0000	27.64	-1.85	25.79	74.00	-48.21	peak			
4	960.0000	28.82	-1.23	27.59	74.00	-46.41	peak			

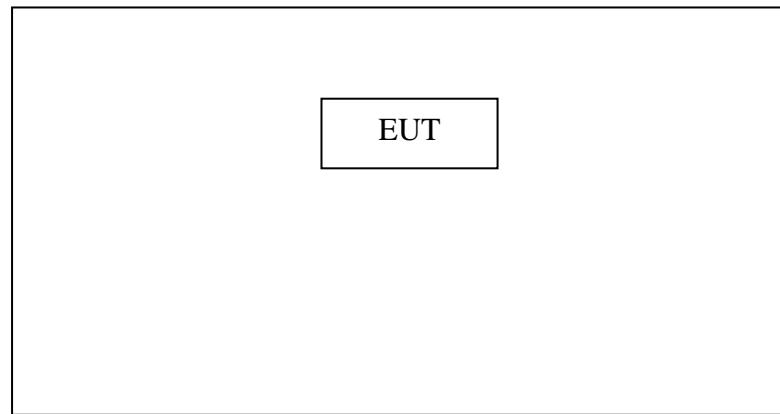
Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:  
Result = Reading + Corrected Factor
3. Display the measurement of peak values.

## 7. RADIATED SPURIOUS EMISSION TEST

### 7.1. Block Diagram of Test Setup

#### 7.1.1. Block diagram of connection between the EUT and peripherals



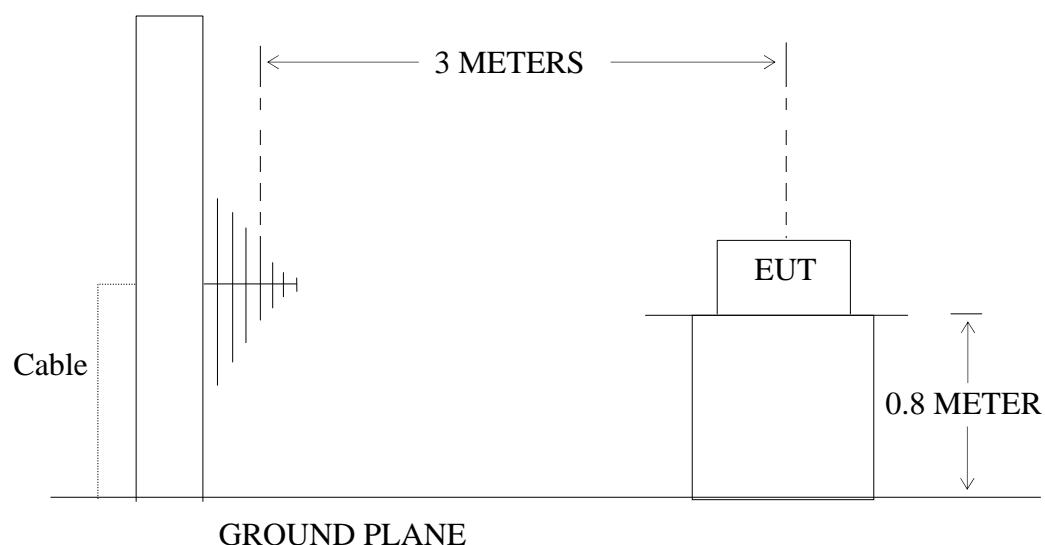
Setup: Transmitting mode

(EUT: MD-20 Pet Friendly Motion Sensor)

#### 7.1.2. Semi-Anechoic Chamber Test Setup Diagram

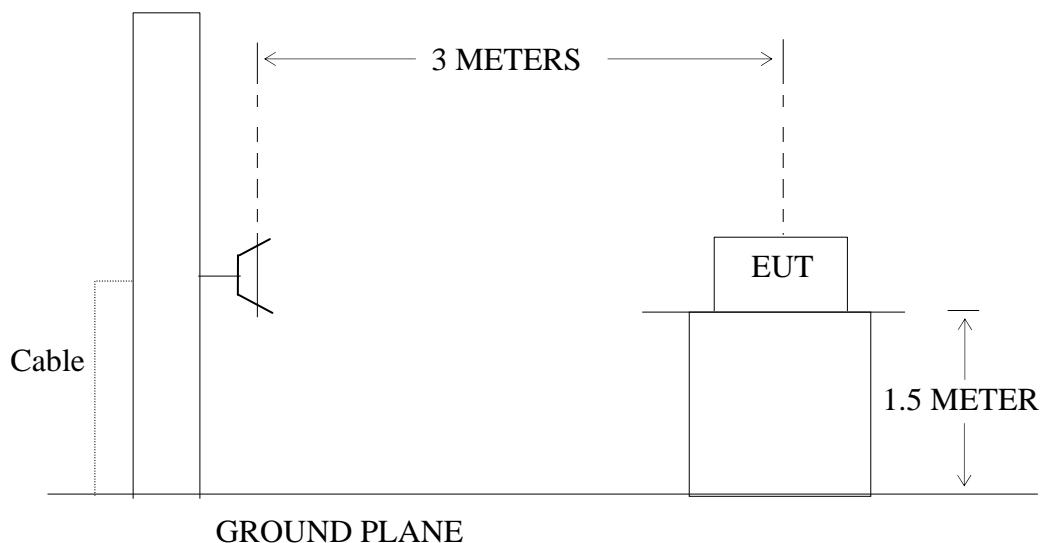
##### **Below 1GHz**

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



**Above 1GHz**

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS

**7.2. The Limit For Section 15.249**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph A8.4(4), the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

### 7.3. Restricted bands of operation

#### 7.3.1. FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 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	( <sup>2</sup> )
13.36-13.41			

<sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510

<sup>2</sup>Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

### 7.4. Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

### 7.5. Operating Condition of EUT

#### 7.5.1. Setup the EUT and simulator as shown as Section 7.1.

#### 7.5.2. Turn on the power of all equipment.

#### 7.5.3. Let the EUT work in TX modes measure it. The transmit frequency is 915MHz.

## 7.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 10GHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

## 7.7. The Field Strength of Radiation Emission Measurement Results

**PASS.**

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. \*: Denotes restricted band of operation.

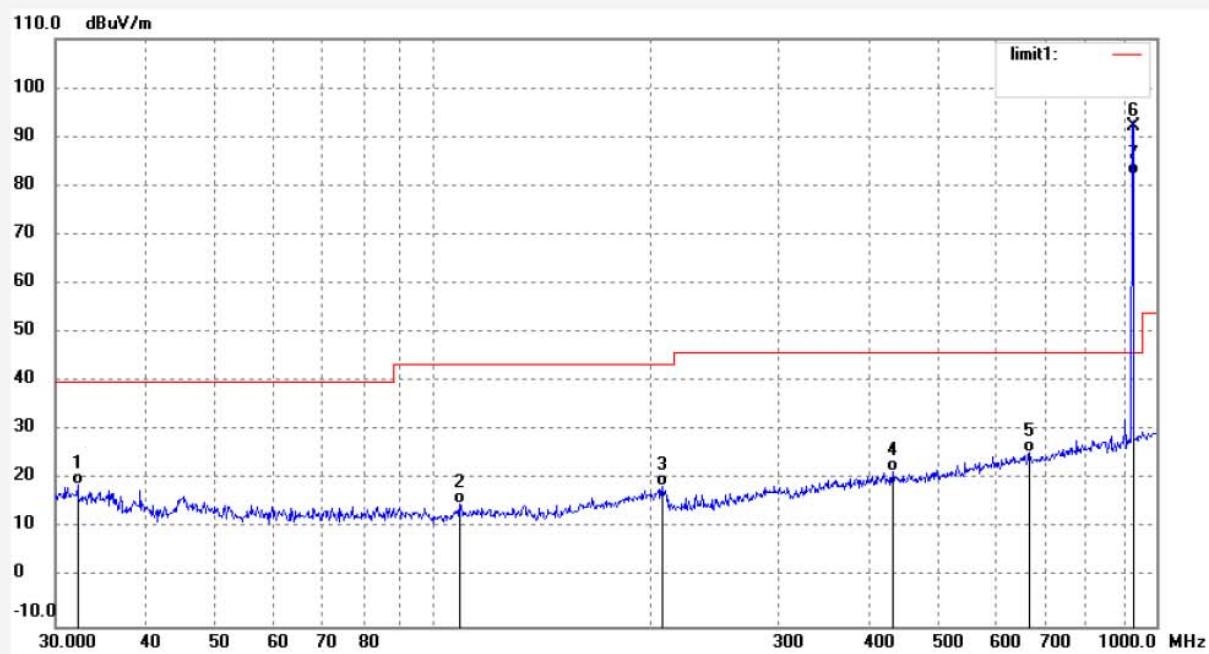


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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber  
Tel:+86-0755-26503290  
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Job No.: YJZH #993	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2017/05/18
Temp.( C)/Hum.(%) 25 C / 55 %	Time: 19:04:03
EUT: MD-20 Pet Friendly Motion Sensor	Engineer Signature: Nick
Mode: TX 915MHz	Distance: 3m
Model: MD-20	
Manufacturer: Chuango Security	
Note: Report NO.: ATE20170761	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.1840	34.27	-15.24	19.03	40.00	-20.97	QP			
2	108.5455	37.09	-22.07	15.02	43.50	-28.48	QP			
3	207.1968	37.13	-18.47	18.66	43.50	-24.84	QP			
4	431.8198	33.89	-12.37	21.52	46.00	-24.48	QP			
5	667.6025	32.60	-6.97	25.63	46.00	-20.37	QP			
6	915.0000	94.11	-1.84	92.27	114.00	-21.73	peak			
7	915.0000	84.11	-1.84	82.27	94.00	-11.73	AVG			



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Tel:+86-0755-26503290  
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Job No.: YJZH #994

Polarization: Vertical

Standard: FCC Class B 3M Radiated

Power Source: DC 3V

Test item: Radiation Test

Date: 2017/05/18

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 19:06:02

EUT: MD-20 Pet Friendly Motion Sensor

Engineer Signature: Nick

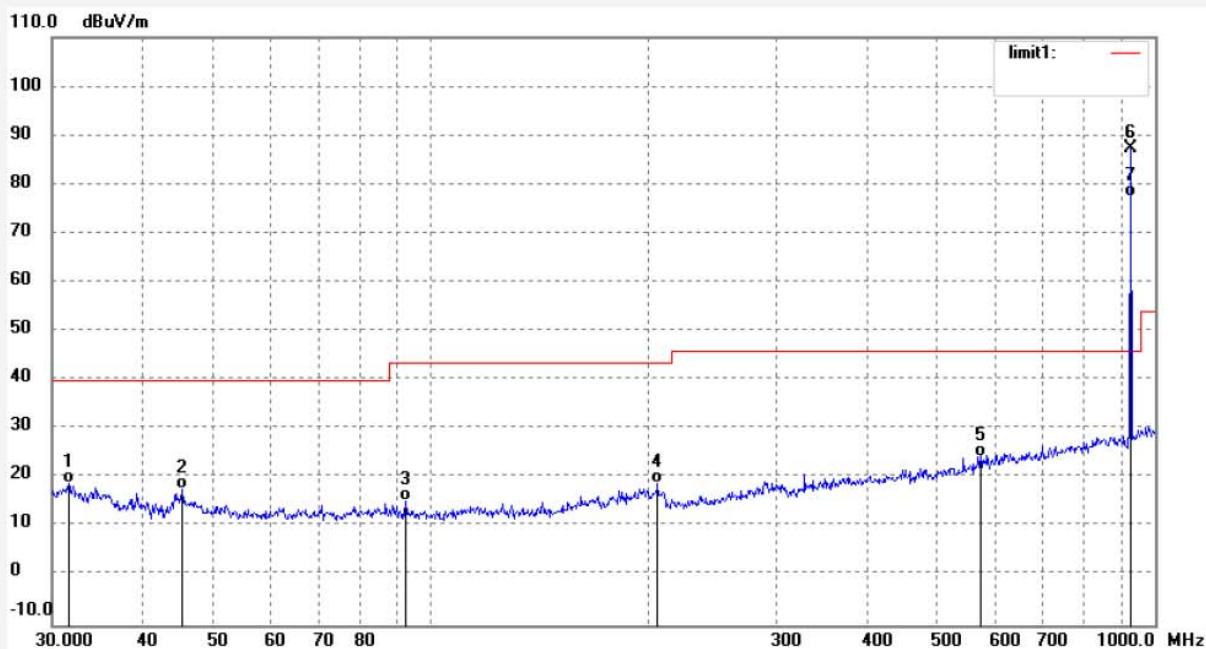
Mode: TX 915MHz

Distance: 3m

Model: MD-20

Manufacturer: Chuango Security

Note: Report NO.: ATE20170761



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.6235	34.02	-15.10	18.92	40.00	-21.08	QP			
2	45.4130	36.70	-19.07	17.63	40.00	-22.37	QP			
3	92.3462	37.40	-21.92	15.48	43.50	-28.02	QP			
4	205.7458	37.41	-18.48	18.93	43.50	-24.57	QP			
5	569.9688	33.52	-9.17	24.35	46.00	-21.65	QP			
6	915.0000	89.33	-1.84	87.45	114.00	-26.55	peak			
7	915.0000	79.33	-1.84	77.45	94.00	-16.55	AVG			

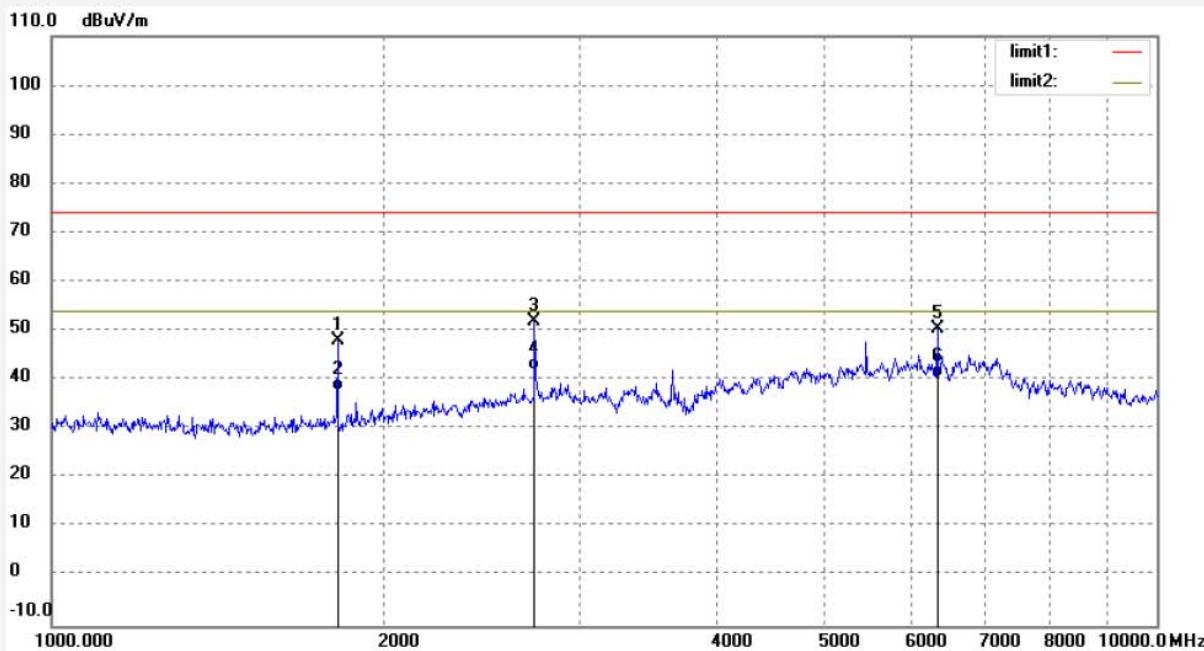


## ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber  
Tel:+86-0755-26503290  
Fax:+86-0755-26503396

Job No.: YJZH #997	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 2017/05/18
Temp.( C)/Hum.(%) 25 C / 55 %	Time: 19:18:30
EUT: MD-20 Pet Friendly Motion Sensor	Engineer Signature: Nick
Mode: TX 915MHz	Distance: 3m
Model: MD-20	
Manufacturer: Chuango Security	
Note: Report NO.: ATE20170761	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1830.000	56.81	-8.85	47.96	74.00	-26.04	peak			
2	1830.000	46.81	-8.85	37.96	54.00	-16.04	AVG			
3	2745.000	56.68	-4.58	52.10	74.00	-21.90	peak			
4	2745.000	46.68	-4.58	42.10	54.00	-11.90	AVG			
5	6405.000	46.57	3.92	50.49	74.00	-23.51	peak			
6	6405.000	36.57	3.92	40.49	54.00	-13.51	AVG			



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F1,Bldg.A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber  
Tel:+86-0755-26503290  
Fax:+86-0755-26503396

Job No.: YJZH #998

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3V

Test item: Radiation Test

Date: 2017/05/18

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 19:19:59

EUT: MD-20 Pet Friendly Motion Sensor

Engineer Signature: Nick

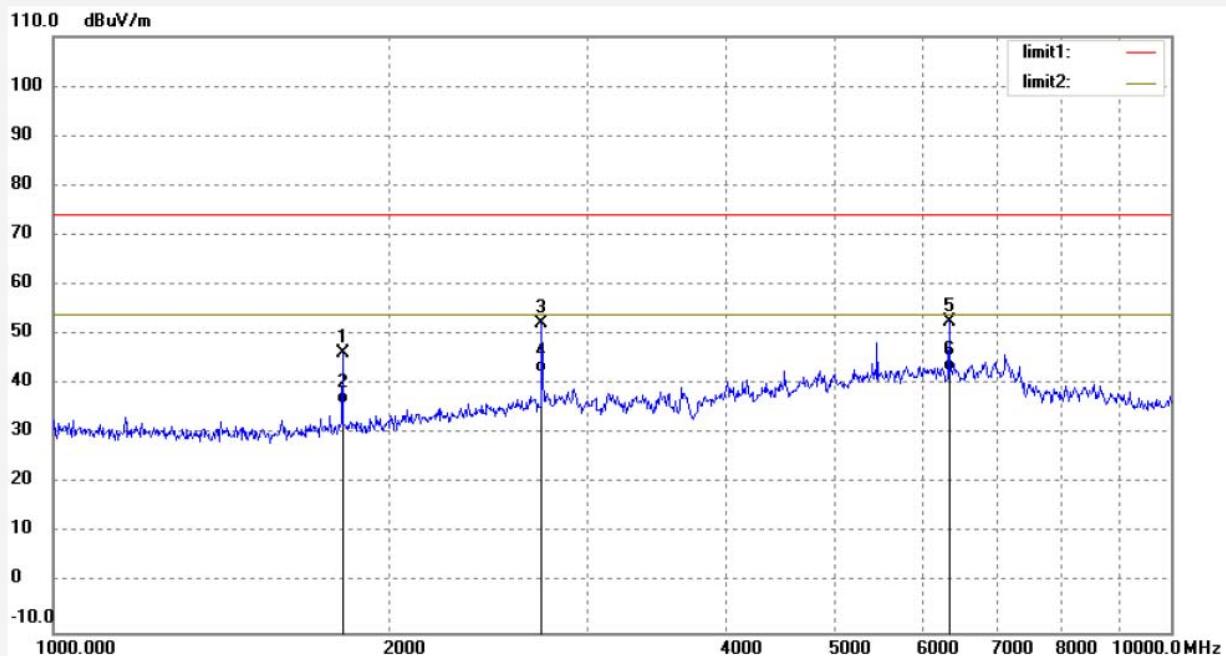
Mode: TX 915MHz

Distance: 3m

Model: MD-20

Manufacturer: Chuango Security

Note: Report NO.: ATE20170761



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1830.000	54.97	-8.85	46.12	74.00	-27.88	peak			
2	1830.000	44.97	-8.85	36.12	54.00	-17.88	AVG			
3	2745.000	56.82	-4.58	52.24	74.00	-21.76	peak			
4	2745.000	46.82	-4.58	42.24	54.00	-11.76	AVG			
5	6405.000	48.70	3.92	52.62	74.00	-21.38	peak			
6	6405.000	38.70	3.92	42.62	54.00	-11.38	AVG			

## 8. ANTENNA REQUIREMENT

### 8.1. The Requirement

According to Section 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.

### 8.2. Antenna Construction

The module must contain a permanently attached antenna, or contain a unique antenna connector, and be marketed and operated only with specific antenna(s), per Sections 15.203, 15.204(b), 15.204(c), 15.212(a), 2.929(b); The Antenna gain of EUT is 1.8dBi. Therefore, the equipment complies with the antenna requirement.

