

## FCC PART 15 SUBPART C MEASURMENT AND TEST REPORT

For

Shunde Advante Electron Ltd.

North Second XinXi Road, LunJiao Industrial Avenue LunJiao, Shunde,  
Foshan, Guangdong, China

E.U.T.: Wireless Door Chime

Model Name: 19249, 19301, Q2

Brand Name: N/A

FCC ID: Q2I19249

Report Number: NTC1212199F

Test Date(s): January 10, 2013 to January 22, 2013

Report Date(s): January 28, 2013

Prepared by

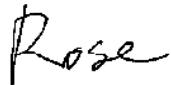
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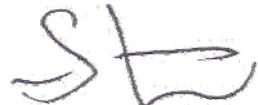
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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan NTC Co., Ltd. The test results referenced from this report are relevant only to the sample tested.

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment under Test

The Shunde Advante Electron Ltd.'s product, model name: 19249 is a transmission system for wireless door chime. It's powered by internal coin battery 3V. For more details features, please refer to User's Manual.

Manufacturer : Shunde Advante Electron Ltd.  
Address : North Second XinXi Road, LunJiao Industrial Avenue  
LunJiao, Shunde, Foshan, Guangdong, China

Frequency: : 433.92MHz ( $\pm 0.5\text{MHz}$ )

Modulation : ASK

Antenna Type : Integral

Antenna Gain : 0.3 dBi

Number of Channels : 1

Power supply : DC 3V Coin battery

Model name : 19249, 19301, Q2

**Note:** : These models are the same except shell and 19249 has the Dial switch on the basis of 19301,Q2.

## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: Q2I19249 filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rule.

## 1.3 Test Methodology

The radiated emission measurements was performed according to the procedures in ANSI C63.4 (2003). Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

## 1.4 Equipment Modifications

Not available for this EUT intended for grant.

## 1.5 Support Device

None

## 1.6 Test Facility and Location

Listed by FCC, August 02, 2011  
The Certificate Registration Number is 665078.

Listed by Industry Canada, July 01, 2011  
The Certificate Registration Number is 46405-9743.

Dongguan NTC Co., Ltd.

Building D, Gaosheng Science and Technology Park,  
Hongtu Road, Nancheng District, Dongguan City,  
Guangdong Province, China

## 1.7 Summary of Test Results

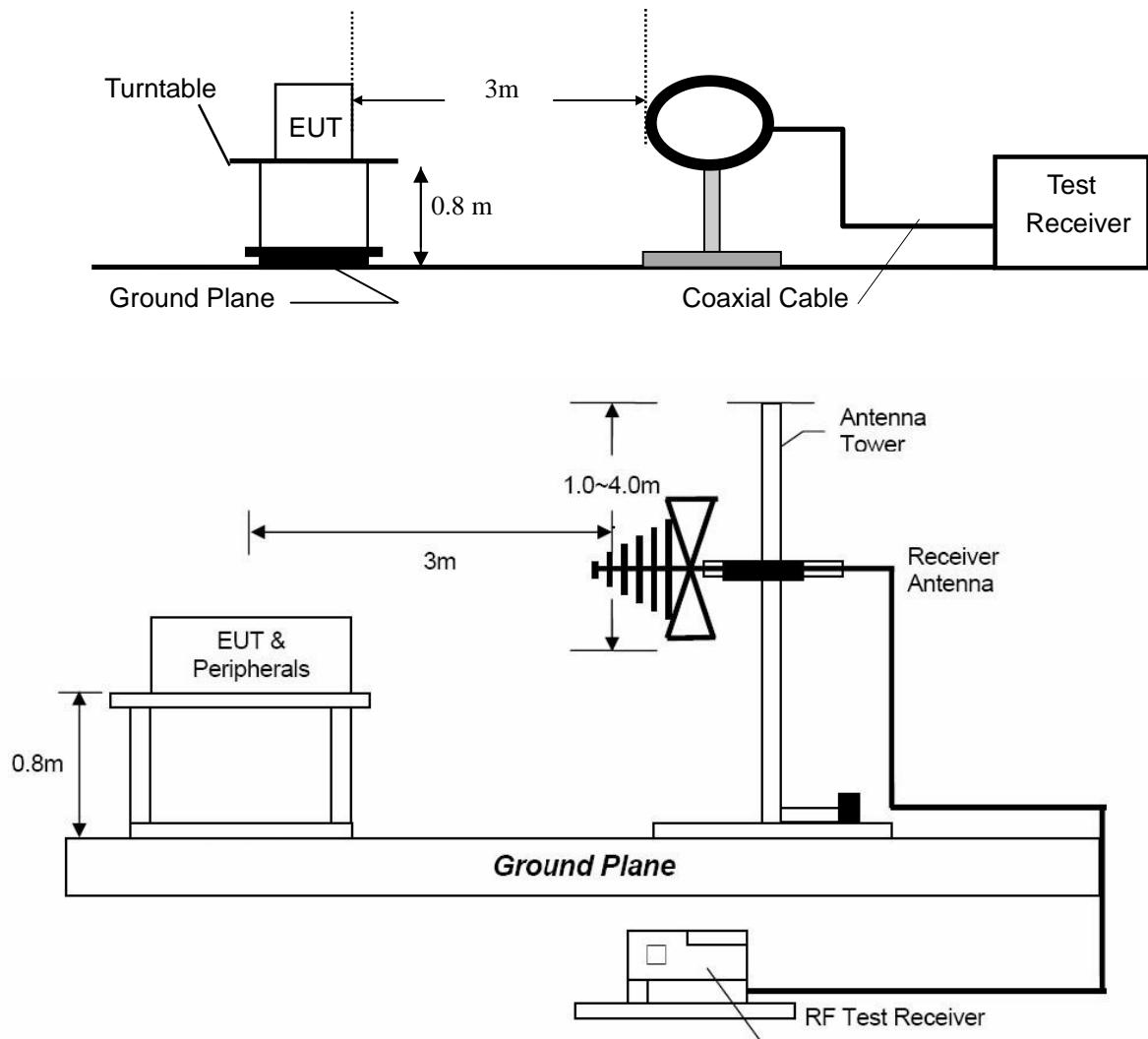
FCC Rules	Description Of Test	Result
§15.231&15.209	Radiated Emission	Compliant
§15.231(c)	Occupied bandwidth	Compliant
§15.231(a)	Transmission time	Compliant
§15.203	Antenna Requirement	Compliant

Note: The EUT has been tested as an independent unit. And Continual transmitting in maximum power (The new battery be used during test)

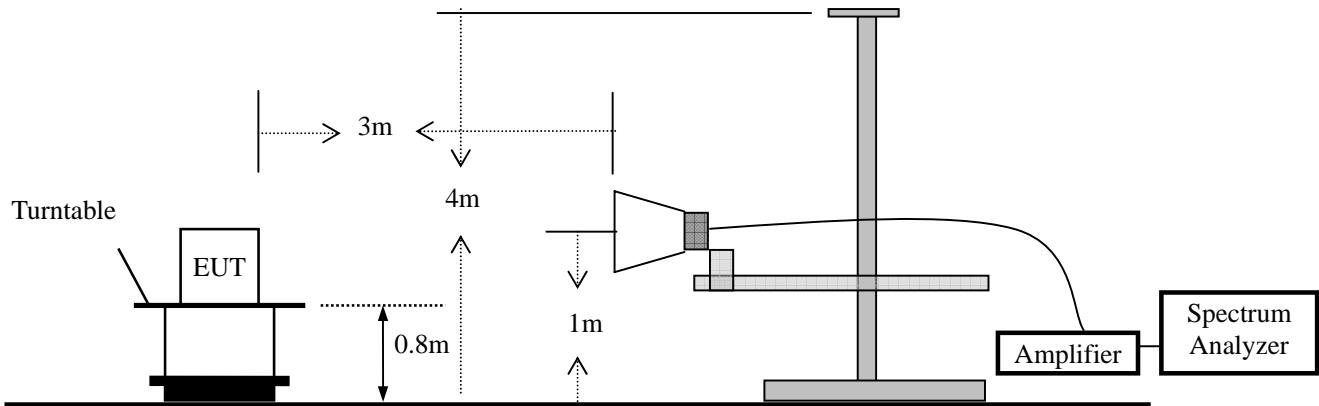
## 2. Radiated Emission Test

### 2.1 Test SET-UP (Block Diagram of Configuration)

(1) Radiated Emission Test Set-Up, Frequency Below 30MHz



(2) Radiated Emission Test Set-Up, Frequency above 1GHz



## 2.2 Measurement Procedure

- A The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- B The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- C The height of antenna 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.
- D 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 rotatable 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.

## 2.3 Limit

Table A [0.009MHz~1GHz]

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		μV/m
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark : (1) Emission level (dB) $\mu$ V = 20 log Emission level  $\mu$ V/m  
 (2) The smaller limit shall apply at the cross point between two frequency bands.  
 (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.  
 (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

Table B

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious Emissions	
	μV/m	dB $\mu$ V/m	μV/m	dB $\mu$ V/m
40.66-40.70	2250	67.04	225	47.04
70-130	1250	61.94	125	41.94
130-174	1250-3370**	61.9-70.55	125-375**	41.94-51.48
174-260	3750	71.48	375	51.48
260-470	3750-12500**	71.48-81.94	375-1250**	51.48-61.94
Above 470	12500	81.94	1250	61.94

\*\*) Linear interpolations

## 2.4 Measurement Results

Operation Mode: TX  
Frequency Range: 9KHz~1GHz  
Test Result: PASS  
Measured Distance: 3m  
Test Date : January 12, 2013  
Temperature : 24 °C  
Humidity : 54 %  
Test By: Think

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
35.8200	V	21.65	40.00	-18.35	QP
47.4600	V	21.65	40.00	-18.35	QP
73.6500	V	21.28	40.00	-18.72	QP
122.1500	V	25.69	43.50	-17.81	QP
149.3100	V	24.82	43.50	-18.68	QP
<hr/>					
78.5000	H	21.22	40.00	-18.78	QP
107.6000	H	21.19	43.50	-22.31	QP
249.2200	H	22.48	46.00	-23.52	QP
379.2000	H	23.24	46.00	-22.76	QP
854.5000	H	34.70	46.00	-11.30	QP

Other emissions are lower than 10dB below the allowable limit.

**Note:** (1) Quasi-Peak detector is used except for others stated.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss  
(3) Measurement uncertainty : ±3.7dB.

Operation Mode: TX  
 Test Result: PASS  
 Measured Distance: 3m  
 Test Date : January 12, 2013  
 Temperature : 24 °C  
 Humidity : 54 %  
 Test By: Think

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
433.9200	V	61.88	100.8	-38.92	peak
433.9200	V	53.68	80.8	-27.12	AV
867.8400	V	40.56	80.8	-40.24	peak
867.8400	V	32.36	60.8	-28.44	AV
<b>1301.760</b>	<b>V</b>	<b>61.58</b>	<b>74.0</b>	<b>-12.42</b>	<b>peak</b>
<b>1301.760</b>	<b>V</b>	<b>53.38</b>	<b>54.0</b>	<b>-0.62</b>	<b>AV</b>
1735.680	V	44.99	80.8	-35.81	peak
1735.680	V	36.79	60.8	-24.01	AV
<hr/>					
433.9200	H	76.62	100.8	-24.18	peak
433.9200	H	68.42	80.8	-12.38	AV
867.8400	H	53.90	80.8	-26.90	peak
867.8400	H	45.70	60.8	-15.10	AV
<b>1301.760</b>	<b>H</b>	<b>58.71</b>	<b>74.0</b>	<b>-15.29</b>	<b>peak</b>
<b>1301.760</b>	<b>H</b>	<b>50.51</b>	<b>54.0</b>	<b>-3.49</b>	<b>AV</b>
1735.680	H	45.87	80.8	-34.93	peak
1735.680	H	37.67	60.8	-23.13	AV

Other harmonics emissions are lower than 10dB below the allowable limit.

**Note:**

- (1) All Readings are Peak Value and AV.
- (2) Emission Level= Reading Level+Probe Factor +Cable Loss
- (3) Measurement uncertainty :  $\pm 3.7\text{dB}$
- (4) Emission (the row indicated by bold) within the restricted band meets the requirement of FCC part 15 Section 15.205.
- (5) Average should be determined by duty cycle factor.

The dutycycle is simply the on time by divided by the period:

The duration of one cycle = 24.2ms

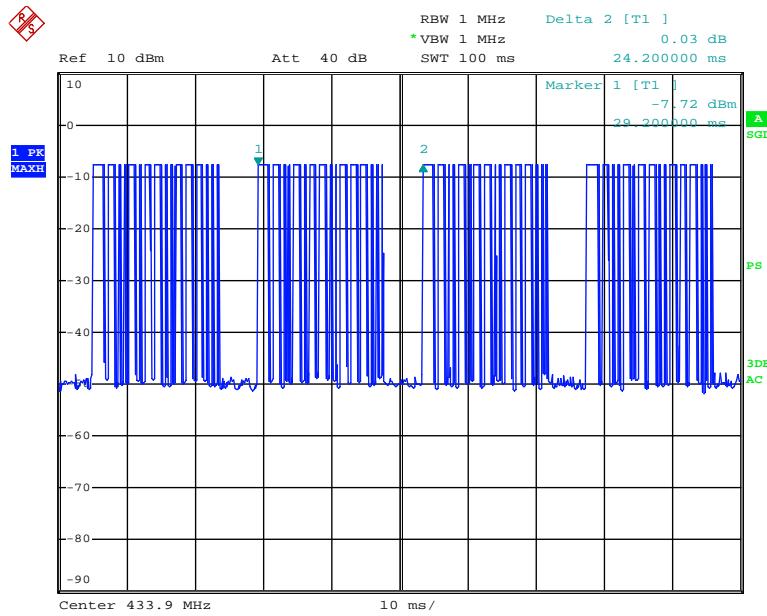
Effective period of the cycle =  $620\text{us} \times 9 + 240\text{us} \times 16 = 9420\text{us} = 9.42\text{ms}$

Duty cycle =  $9.42\text{ms} / 24.2\text{ms} = 0.389\text{ms}$

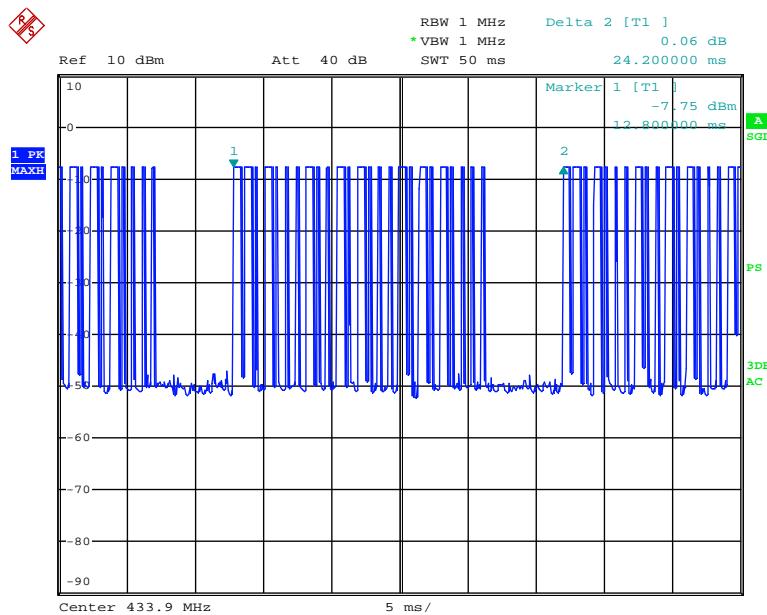
AV Factor =  $20\log 0.389 = -8.20$

Details please see the following plots.

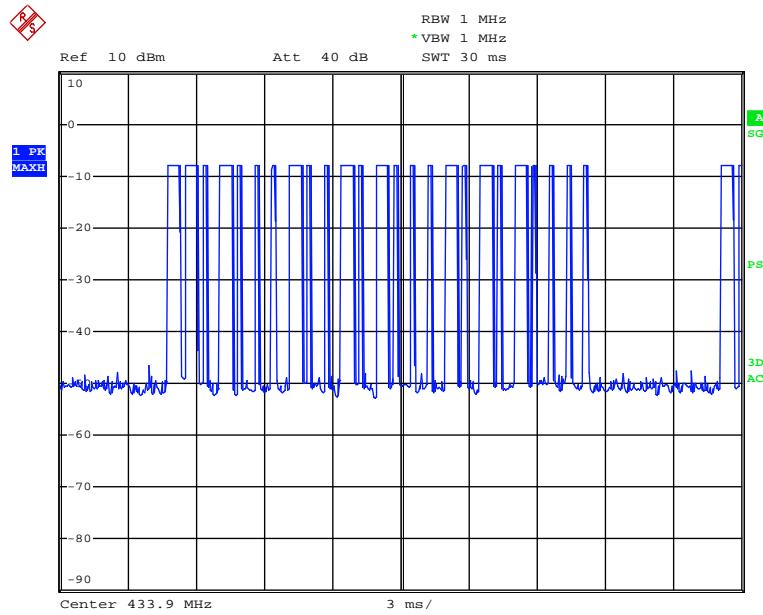
### The duration of one cycle



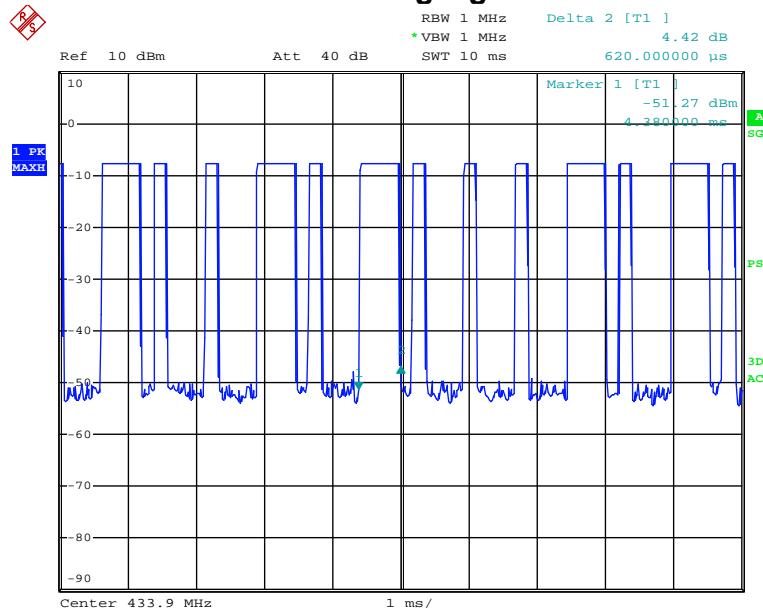
### The duration of one cycle



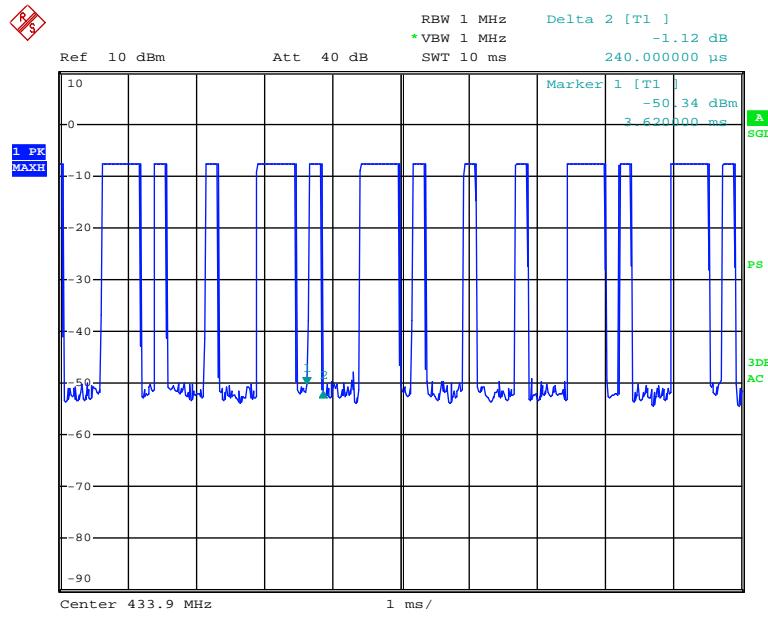
### 9 long signals and 16 short signals



### Long signal



### Short signal



### 3. Occupied Bandwidth

#### 3.1 Measurement Procedure

1. The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
2. The test receiver RBW set 30KHz, VBW set 100KHz, Sweep time set auto.

#### 3.2 Test SET-UP (Block Diagram of Configuration)



#### 3.3 Limit

Please refer section 15.231

According to 15.231(C), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.

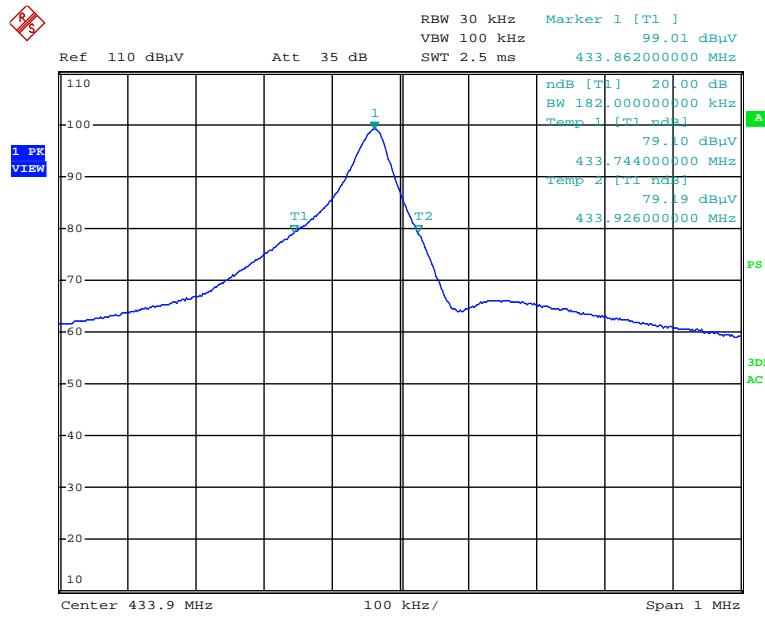
$$\text{Limit} = 433.92 \times 0.25\% = 1.08 \text{ MHz}$$

#### 3.4 Measurement Results

20dB Bandwidth	Limit
182KHz	1.08MHz

Please refer to the following plot.

**DONGGUAN NTC CO., LTD.**  
**Report No.: NTC1212199F**  
**FCC ID: Q2I19249**



## 4 Transmission Time

### 4.1 Measurement Procedure

- 4.1.1 Place the EUT on the table and set it in transmitting mode.
- 4.1.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4.1.3 Set spectrum analyzer center= 433.9MHz, Span=0MHz, Sweep= 10s
- 4.1.4 Set the spectrum analyzer as RBW, VBW=1MHz
- 4.1.5 Max hold, view and count how many channel in the band.

### 4.2 Test SET-UP (Block Diagram of Configuration)



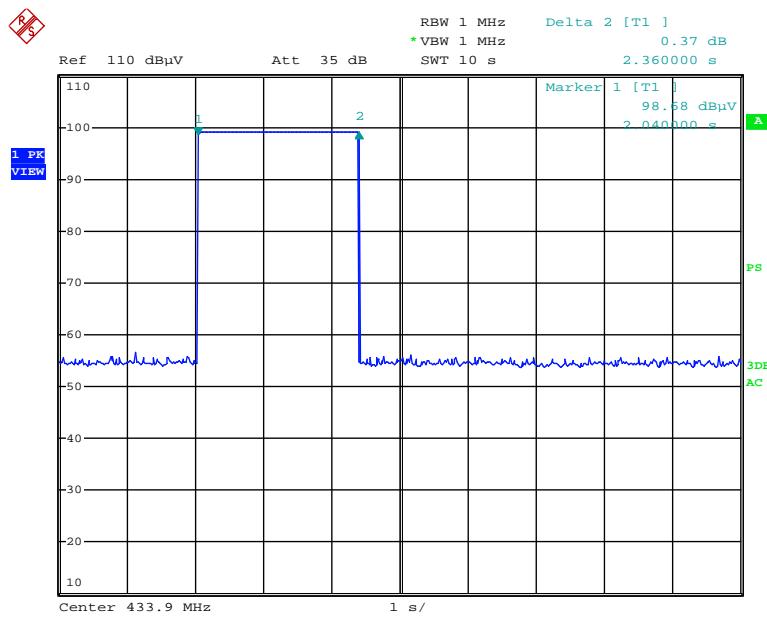
### 4.3 Limit

According to 15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### 4.4 Measurement Results

Transmission Time	Limit
2.36s	5s

Please refer to the following plot.



## 5. Antenna Application

### 5.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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.

### 5.2 Measurement Results

The antenna is integrated on the main PCB and no consideration of replacement, and the best case gain of the antenna is 0.3dBi. So, the antenna is consider meet the requirement.

## 6. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	Nov. 05, 2012	Nov. 04, 2013
Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 28, 2012	Nov. 27, 2013
Positioning Controller	UC	UC 3000	N/A	N/A	N/A
Color Monitor	SUNSPO	SP-140A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22320001	Nov. 05, 2012	Nov. 04, 2013
Cable	Huber+Suhner	CIL02	N/A	Nov. 05, 2012	Nov. 04, 2013
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 05, 2012	Nov. 04, 2013
Horn Antenna	EMCO	3117	00062558	Oct. 19, 2012	Oct. 18, 2013
Loop antenna	Daze	ZA30900A	0708	Oct.16, 2012	Oct.15, 2013
Pre-Amplifier	Agilent	8449B	3008A02964	Dec. 19, 2012	Dec. 18, 2013