

**Shenzhen Global Test Service Co.,Ltd.**

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

TEST REPORT

FCC PART Subpart C 15.231

Report Reference No......: **GTSR17060149****FCC ID**.....: **2AMWL-PSP**

Compiled by

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Date of issue.....: Jun. 26, 2017

Representative Laboratory Name.: **Shenzhen Global Test Service Co.,Ltd.**Address: 1F, Building No. 13A, Zhonghaixin Science and Technology City,
No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District,
Shenzhen, Guangdong**Applicant's name**.....: **Huizhou Zhen An Enterprises Co.,Ltd**

Address: Bangqiao Industry District, TaimeiTown, Boluo, Huizhou

Test specificationStandard: **47 CFR FCC Part 15 Subpart C 15.231****Shenzhen Global Test Service Co.,Ltd. All rights reserved.**

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Test item description: Remote controller

Trade Mark: /

Manufacturer: **Huizhou Zhen An Enterprises Co.,Ltd**

Model/Type reference.....: PSP-01

Listed Models: /

Modulation Type: ASM

Operation Frequency.....: 315MHz

EUT Type: Production Unit

Hardware Version: PSP_V1.0

Software Version: V1.0

Rating: DC 3.0V

Result.....: **PASS**

TEST REPORT

Test Report No. :	GTSR17060149	Jun. 26, 2017
		Date of issue

Equipment under Test : Remote controller

Model /Type : PSP-01

Listed Models : /

Applicant : **Huizhou Zhen An Enterprises Co.,Ltd**

Address : Bangqiao Industry District,TaimeiTown,Boluo,Huizhou

Manufacturer : **Huizhou Zhen An Enterprises Co.,Ltd**

Address : Bangqiao Industry District,TaimeiTown,Boluo,Huizhou

Test Result:	PASS
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.231](#): Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

[ANSI C63.4: 2014](#): –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Jun. 12, 2017
Testing commenced on	:	Jun. 12, 2017
Testing concluded on	:	Jun. 26, 2017

2.2. Product Description

Name of EUT	Remote controller
Trade Mark	/
Model Number	PSP-01
List Model	/
FCC ID	2AMWL-PSP
Antenna Type	Internal antenna
Operation frequency	315MHz
Modulation Type	ASM
Antenna gain	-0.82dBi

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	☐ 230V / 50 Hz	☐ 120V / 60Hz
		☐ 12 V DC	☐ 24 V DC
		☒ Other (specified in blank below)	

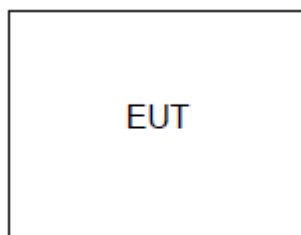
DC 3.0V

2.4. Short description of the Equipment under Test (EUT)

This is a Remote controller.

For more details, refer to the user's manual of the EUT.

2.5. Block Diagram of Test Setup



2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AMWL-PSP** filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules.

2.7. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - Supplied by the lab

○	/	M/N:	/
		Manufacturer:	/

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

Shenzhen CTL Testing Technology Co., Ltd.

1/F.-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, Guangdong, China

3.2. Test Facility

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

FCC-Registration No.: 964637

Shenzhen Global Test Service Co.,Ltd 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 our files. Registration 964637, Jul 24, 2015.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2018.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. 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 our files. Registration 970318, December 19, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

FCC PART 15.231		
FCC Part 15.207	Conducted Emission	N/A
FCC Part 15.231(a)(2)	Automatically Deactivate	PASS
FCC Part 15.231(b)	Electric Field Strength of Fundamental Emission	PASS
FCC Part 15.205 & 15.209 & 15.231(b)	Electric Field Strength of Spurious Emission	PASS
FCC Part 15.231(c)	-20dB bandwidth	PASS

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co., Ltd. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	2.20 dB	(1)
Occupied Bandwidth	0.01ppm	(1)
Radiated Emission 30~1000MHz	4.10dB	(1)
Radiated Emission Above 1GHz	4.32dB	(1)
Conducted Disturbance 0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

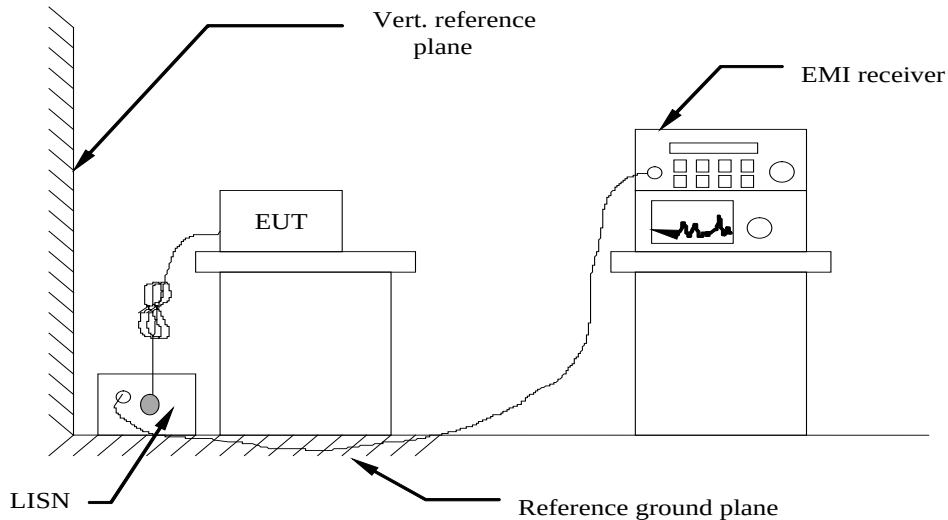
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2017/06/02	2018/06/01
EMI Test Receiver	R&S	ESCI	103710	2017/06/02	2018/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2017/05/21	2018/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2017/05/21	2018/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2017/05/19	2018/05/18
Active Loop Antenna	SCHWARZBEC K	FMZB1519	1519-037	2017/05/19	2018/05/18
Amplifier	Agilent	8349B	3008A02306	2017/05/19	2018/05/18
Amplifier	Agilent	8447D	2944A10176	2017/05/19	2018/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2017/05/20	2018/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2017/05/20	2018/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2017/05/20	2018/05/19
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2017/06/02	2018/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2017/06/02	2018/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2017/06/02	2018/06/01
RF Cable	Megalon	RF-A303	N/A	2017/06/02	2018/06/01

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013.
- 4 The EUT received DC 5V power from adapter, the adapter received AC 120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

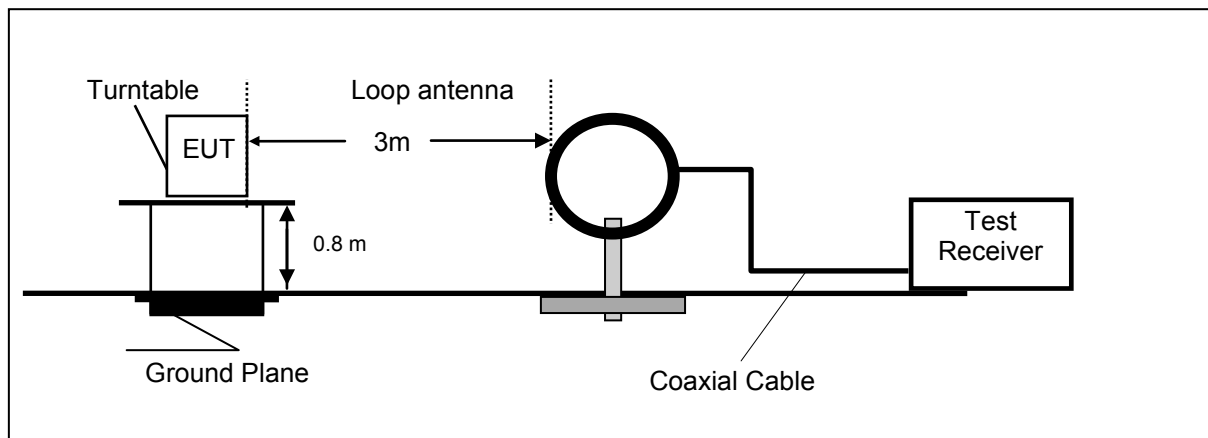
TEST RESULTS

Not applicable for device which is battery supply.

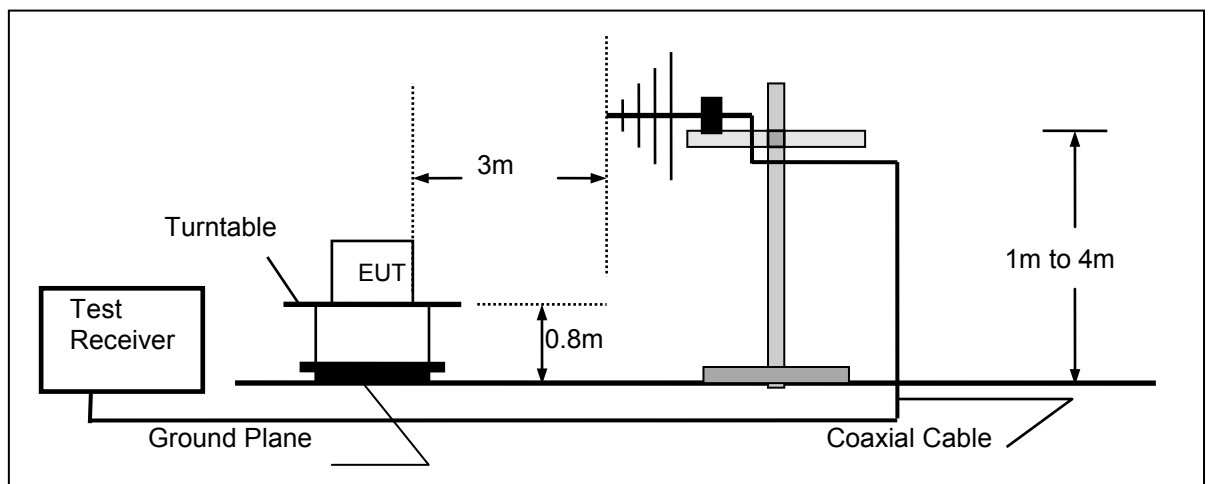
4.2. Radiated Emissions

TEST CONFIGURATION

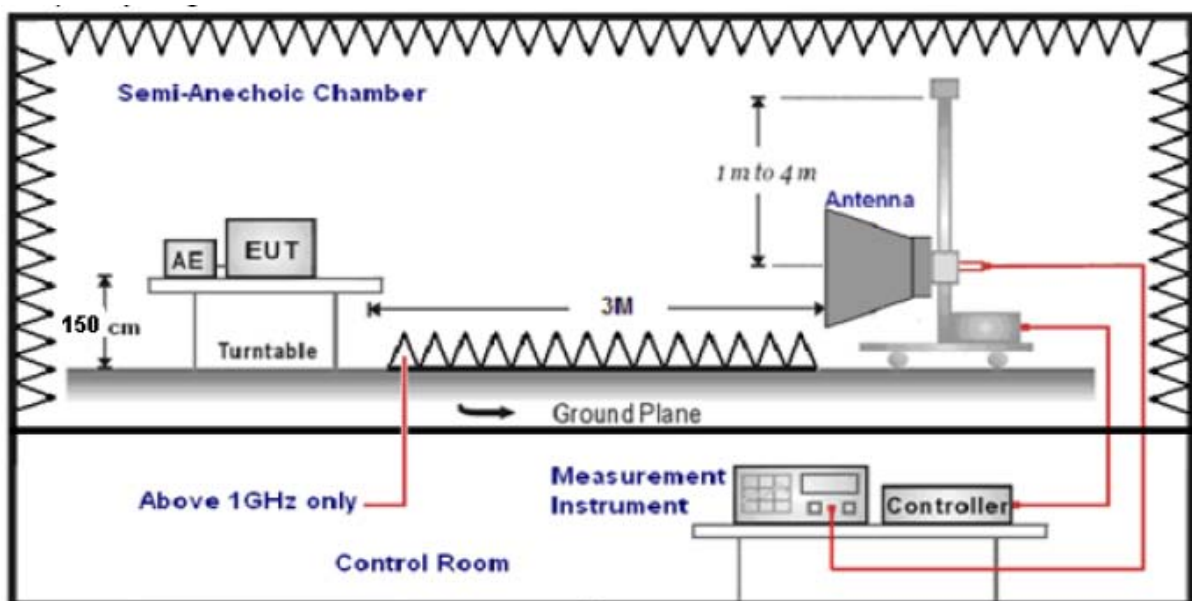
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz-25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

LIMIT

For intentional device, according to 15.209(a) the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

In addition to the provisions of 15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Funda- mental fre- quency (MHz)	Field strength of funda- mental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66– 40.70.	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260–470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ Linear interpolations.

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters $=41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

TEST RESULTS

Test site: Shenzhen CTL Testing Technology Co., Ltd.

The emissions from 30MHz to 4GHz are measured peak and average level, below 1 GHz measured QP level, detailed test data please see below.

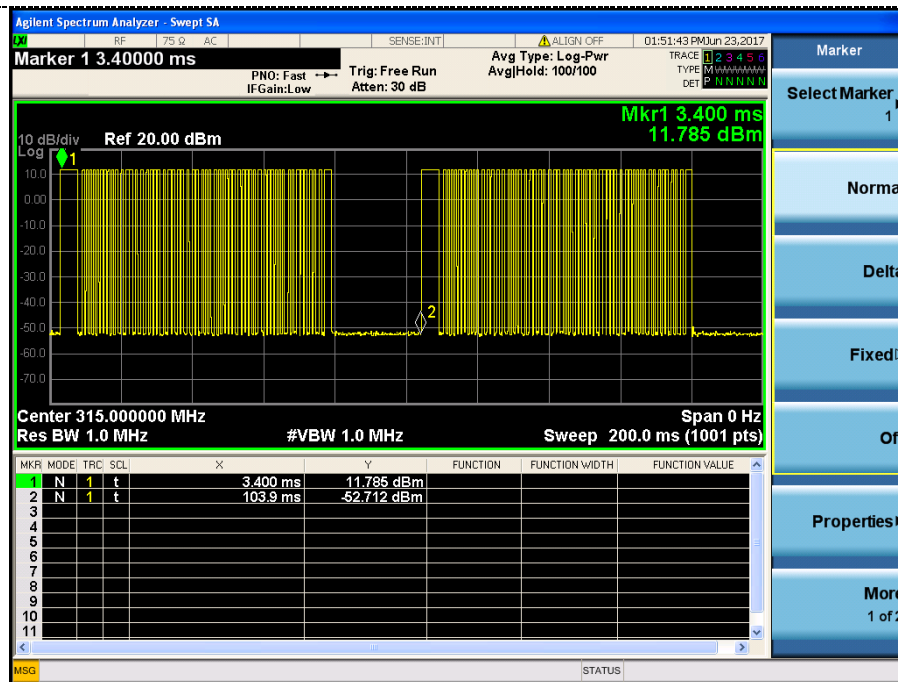
Emission Styles	Frequency (MHz)	PK Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Direction (H/V)
Fundamental	315	58.4	75.6	17.2	PK	H
Harmonics	630	39.6	55.6	16.0	PK	H
Harmonics	945	37.2	55.6	18.4	PK	H
Harmonics	1260	31.3	55.6	24.3	PK	H
Fundamental	315	60.7	75.6	14.9	PK	V
Harmonics	630	40.5	55.6	15.1	PK	V
Harmonics	945	38.1	55.6	17.5	PK	V
Harmonics	1260	31.6	55.6	24.0	PK	V

Emission Styles	Frequency (MHz)	PK Level (dBuV/m)	AV Factor (dB/m)	AV Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Direction (H/V)
Fundamental	315	58.4	-9.50	48.9	55.6	6.7	H
Harmonics	630	39.6	-9.50	30.1	35.6	5.5	H
Harmonics	945	37.2	-9.50	27.7	35.6	7.9	H
Harmonics	1260	31.3	-9.50	21.8	35.6	13.8	H
Fundamental	315	60.7	-9.50	51.2	55.6	4.4	V
Harmonics	630	40.5	-9.50	31.0	35.6	4.6	V
Harmonics	945	38.1	-9.50	28.6	35.6	7.0	V
Harmonics	1260	31.6	-9.50	22.1	35.6	13.5	V

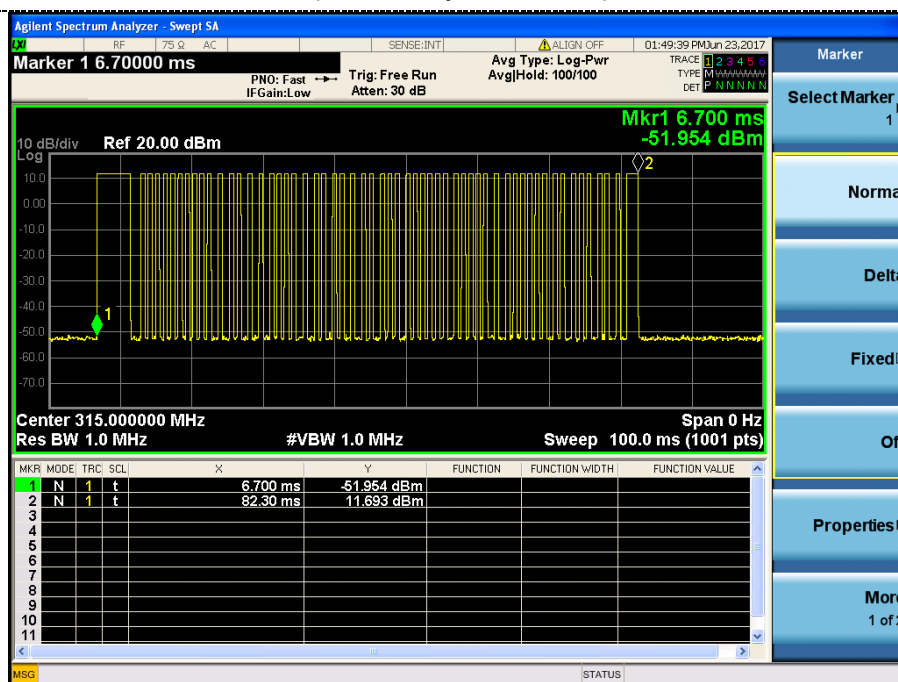
REMARKS:

1. AV Level (dBuV/m)= PK Level (dBuV/m)+ AV Factor(dB)
2. In a transmit cycle 100.5ms period found 4.78ms burst 1pcs, 0.5ms burst 18pcs, 0.48ms burst 38pcs, 1.6ms burst 1pcs, the Duty Cycle can calculate as below:
Duty Cycle= (4.78*1+0.5*18+0.48*38+1.6*1)/100.5=0.335
AV Factor=20*log(Duty Cycle)=20*log(0.283)=-9.50

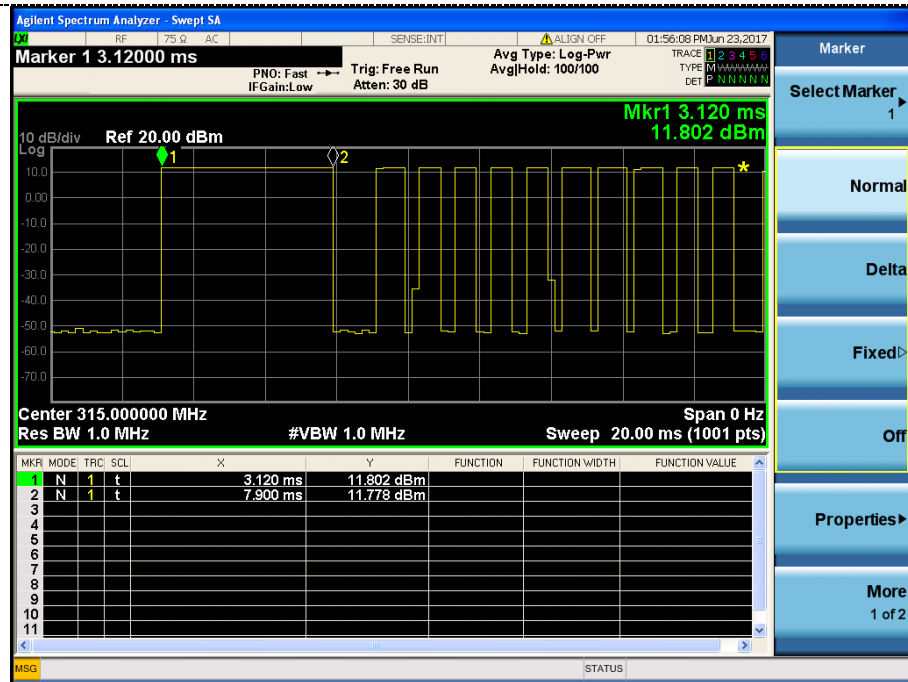
The plot of Duty Cycle See the follow page:



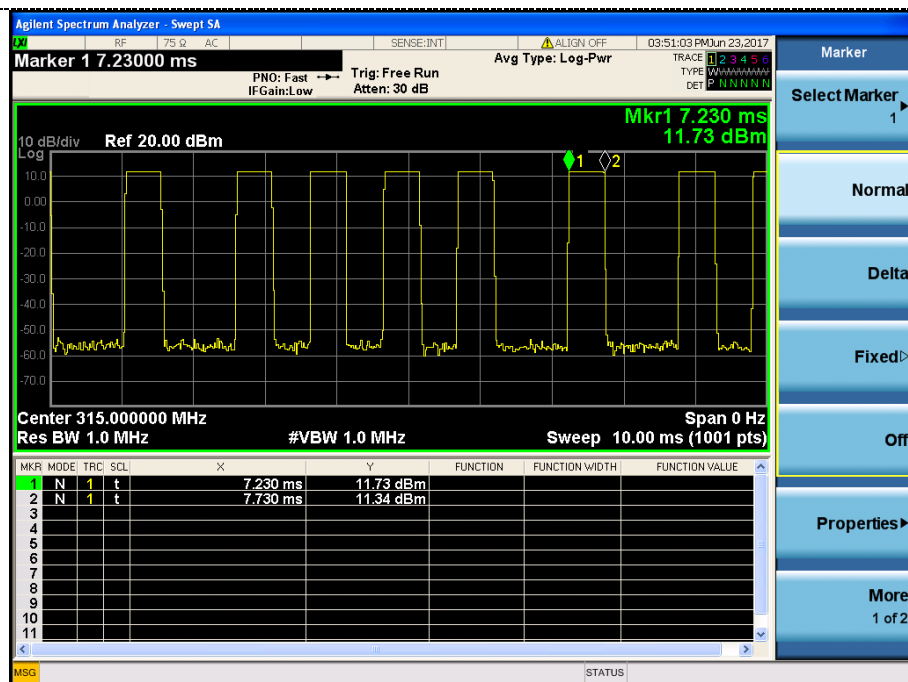
(Transmit cycle 100.5ms)



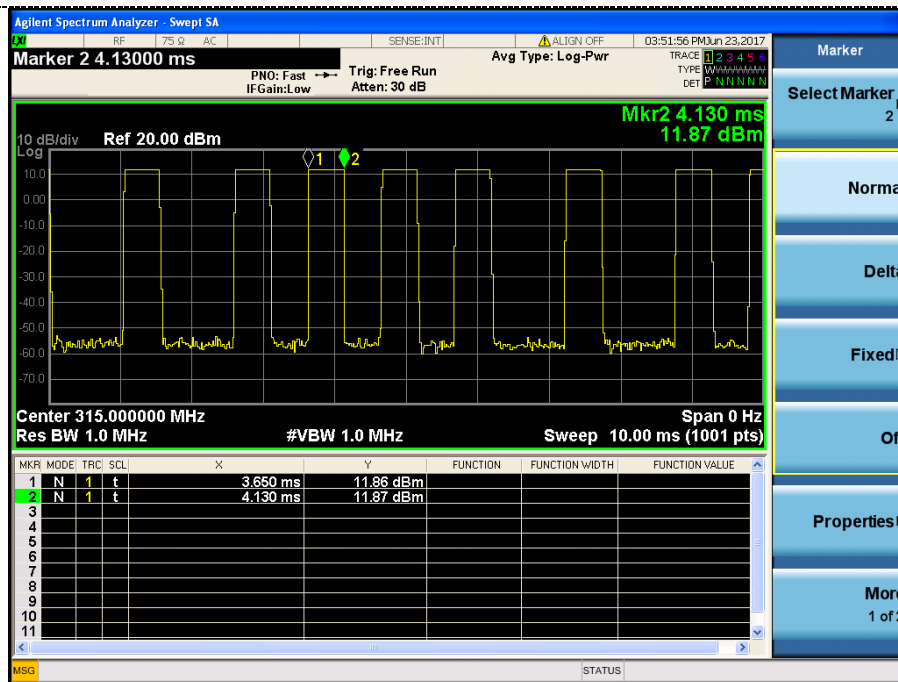
(Total Bursts in a transmit cycle 58pcs)



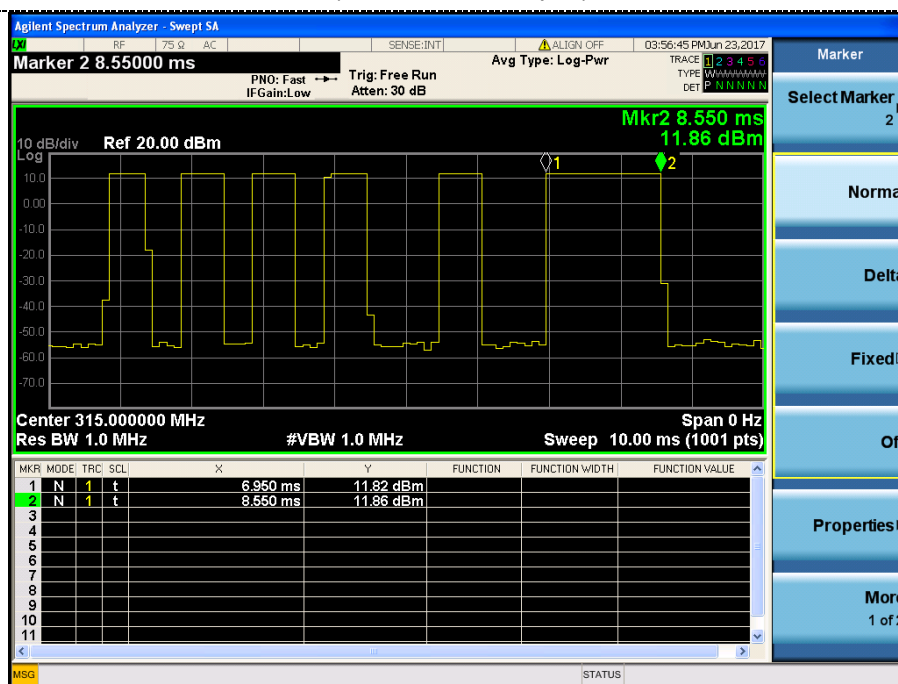
(4.78ms burst 1pcs)



(0.5ms burst 18pcs)



(0.48ms burst 38pcs)



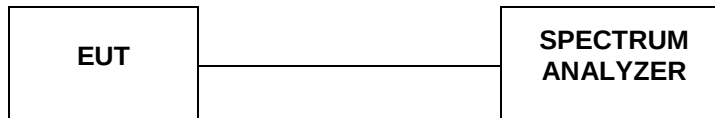
(1.6ms burst 1pcs)

4.3. 20dB Bandwidth

Limit

According to 47 CFR 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

TEST CONFIGURATION



TEST PROCEDURE

The 20dB bandwidth and 99% bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

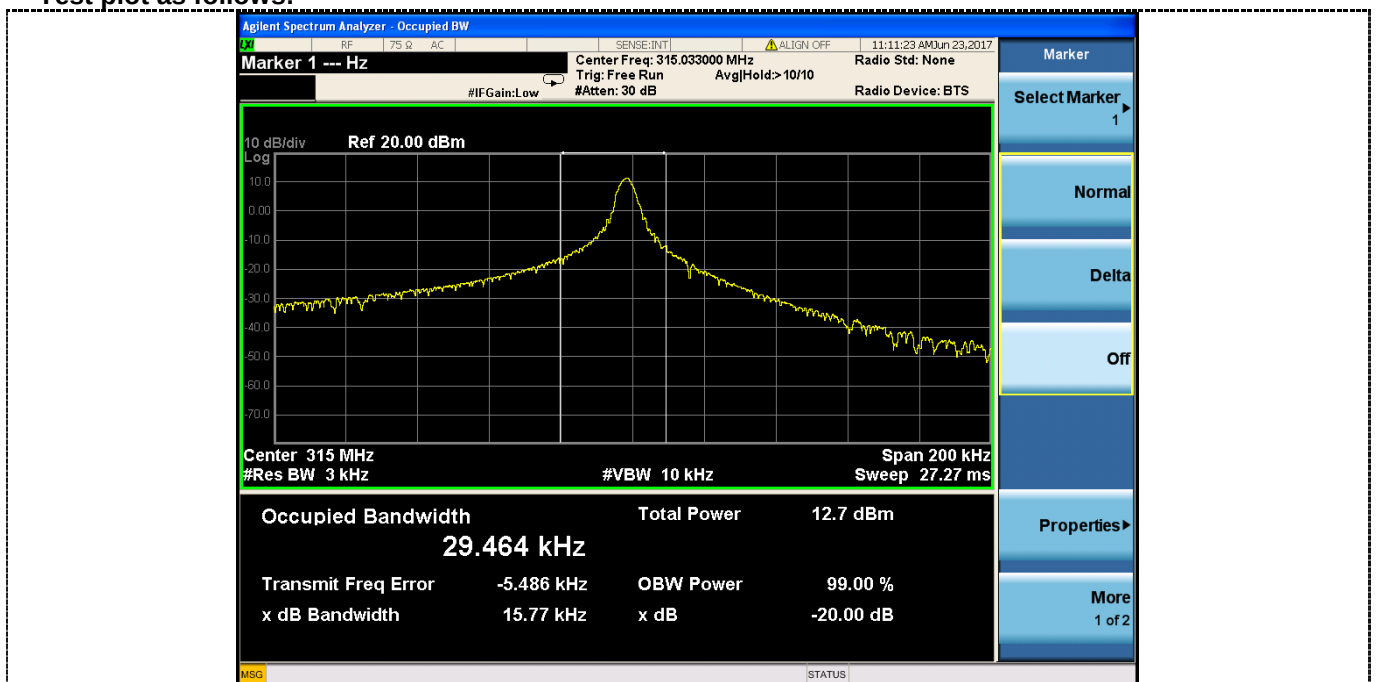
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

TEST RESULTS

Modulation	Channel Frequency (MHz)	99% OBW (KHz)	20dB bandwidth (KHz)	Limit (KHz)	Result
ASM	315	29.464	15.77	$0.25\% \times 315 = 787.5$	Pass

Test plot as follows:

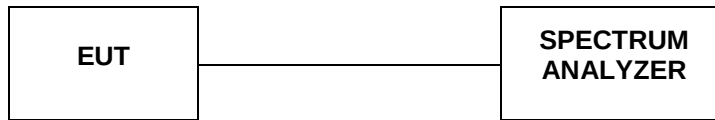


4.4. Deactivation Time

Limit

According to FCC §15.231(a)(2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Test Configuration



Test Procedure

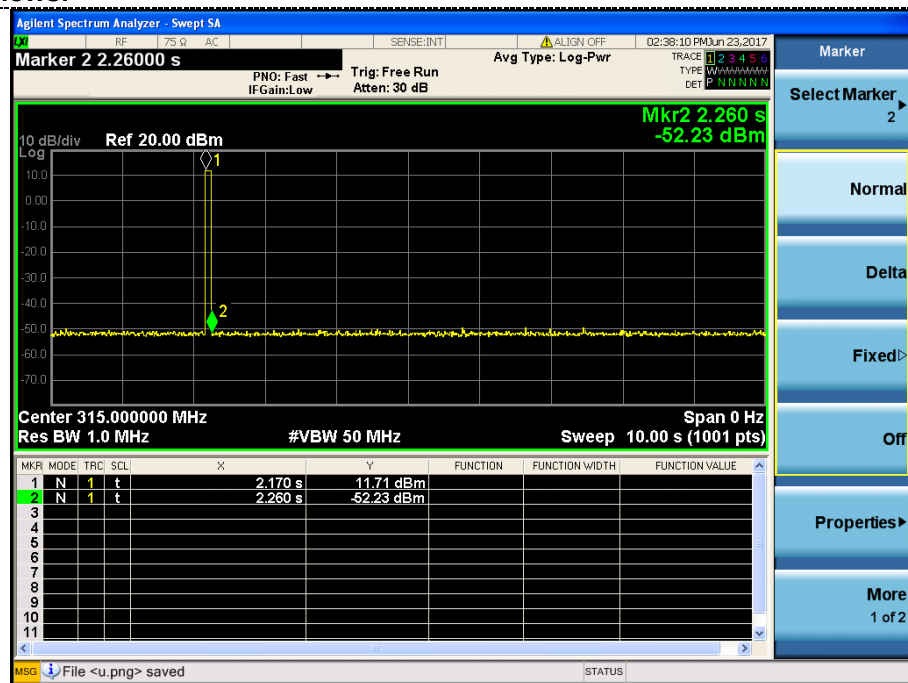
The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz to encompass all significant spectral components during the test. The spectrum analyzer was operated in linear scale and zero span mode after tuning to the transmitter carrier frequency.

TEST RESULTS

Note: The transmitter was automatically activated, and the carrier frequency 315MHz:

Frequency (MHz)	One transmission time (S)	Limit(S)	Result
315	0.09	5	Pass

Test plot as follows:



4.5. Antenna Requirement

Standard Applicable

According to FCC Part 15C 15.203

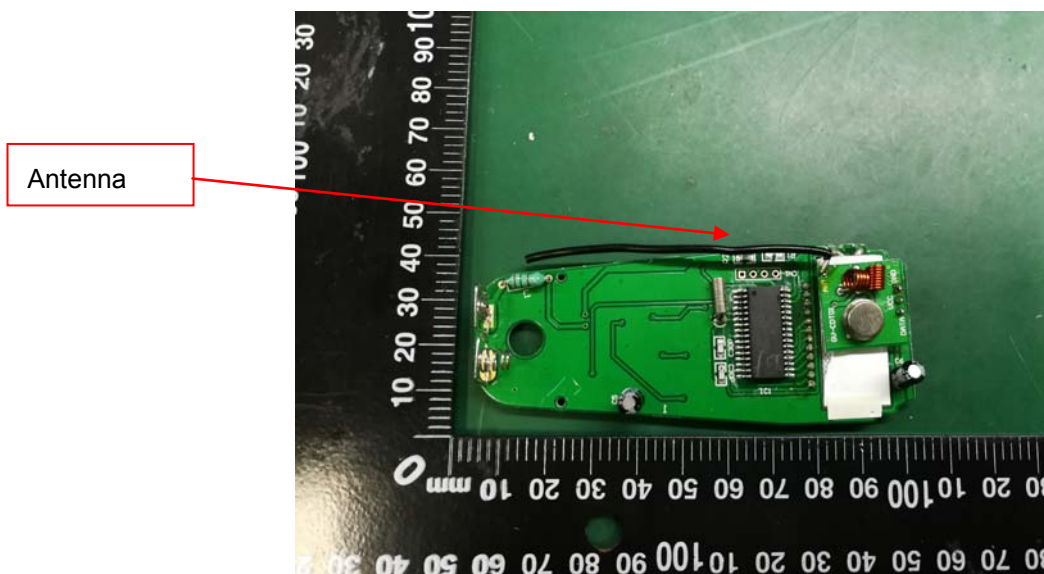
- a) An intentional radiator shall be de-signed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
- b) The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is an internal Antenna, The directional gains of antenna used for transmitting is -0.82dBi.



5. Test Setup Photos of the EUT



6. External and Internal Photos of the EUT

External Photos

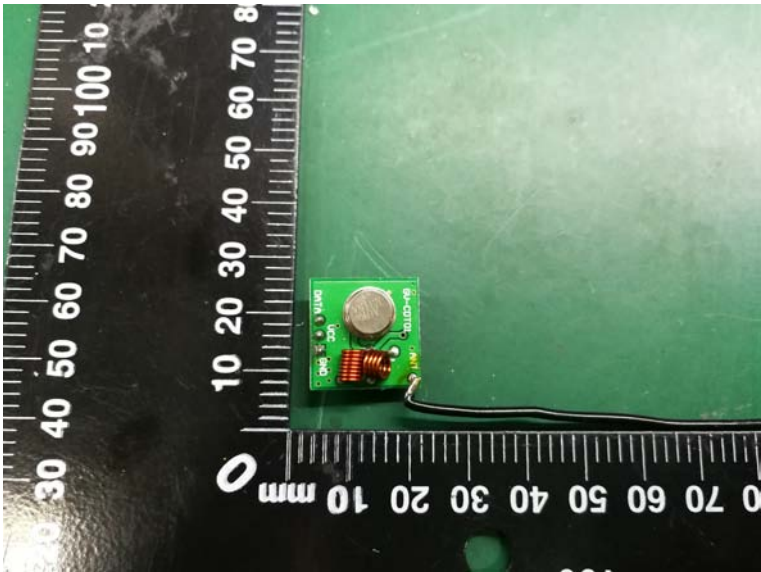
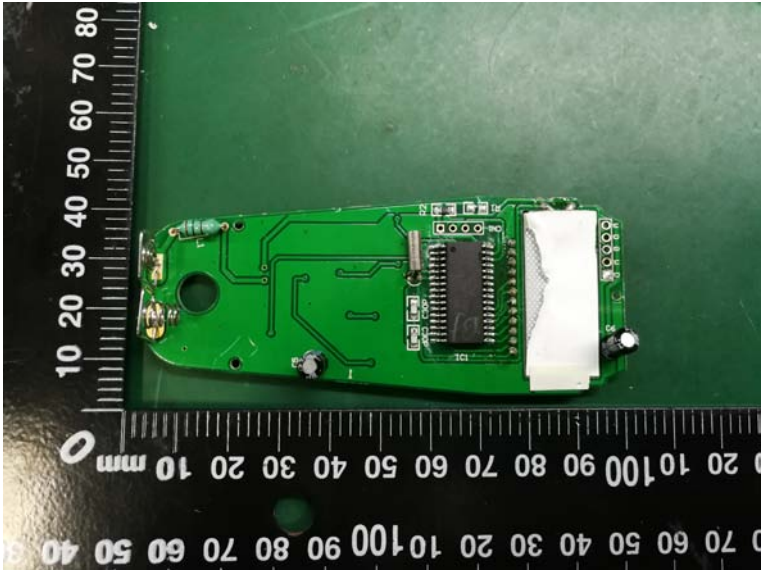
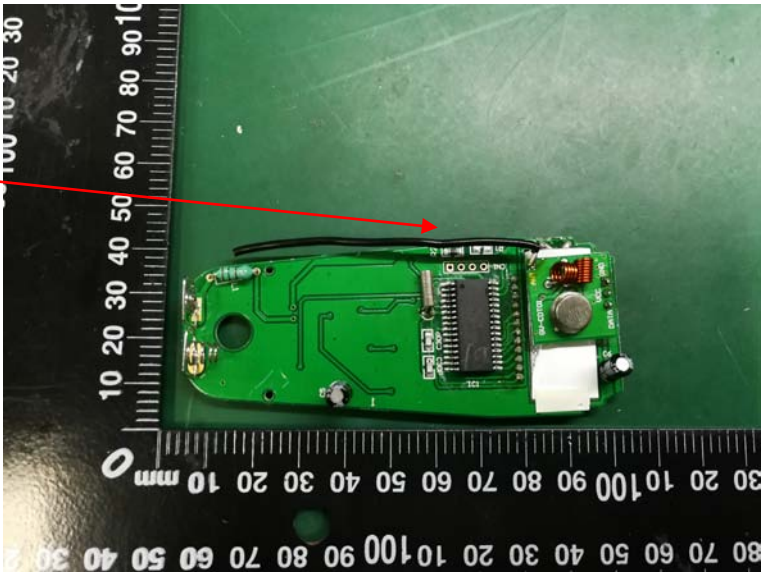


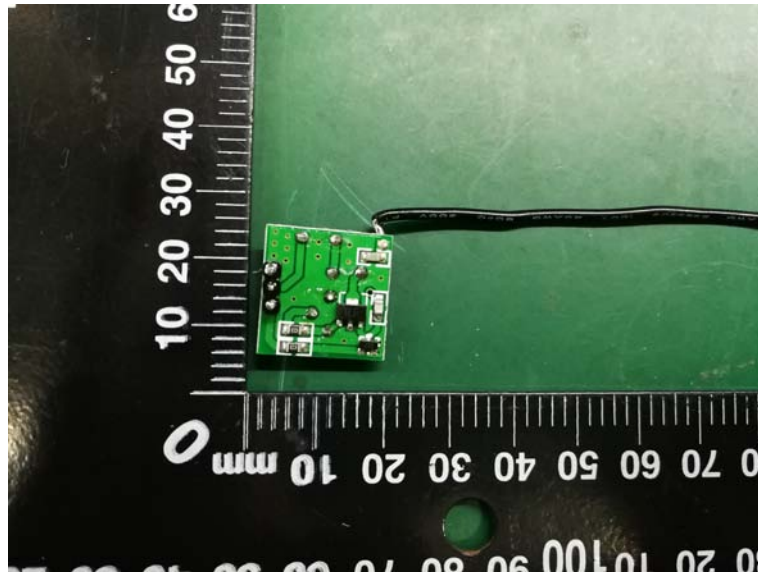


Internal Photos



Antenna





.....End of Report.....