



TEST REPORT

Reference No...... : WTZ16F0961857E
FCC ID..... : 2AJ6K-TJ66A
Applicant..... : JiangMen TengJun electronic technology Co.,Ltd
Address..... : No.19-1 Zilai Road,Peng Jiang Zone,Jiangmen,Guangdong province,China
Manufacturer..... : The same as above
Address..... : The same as above
Product Name..... : Remote Control
Model No...... : TJ66A
Standards..... : FCC CFR47 Part 15 Section 15.231: 2016
Date of Receipt sample..... : 2016-09-28
Date of Test..... : 2016-09-29 to 2016-10-26
Date of Issue..... : 2016-10-29
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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Tested by:

Zero Zhou / Tested Engineer

Approved by:



Philo Zhong / Manager



1 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	N/A*
Radiated Spurious Emissions	15.205(a) 15.209 15.231(a)	Pass
Periodic Operation	15.231(a)	Pass
20dB Bandwidth	15.231(c)	Pass
Antenna Requirement	15.203	Pass

Remark:

Pass Test item meets the requirement

N/A Not Applicable

RF In this whole report RF means Radio Frequency

* The device is powered by battery, it is not application for this test



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3 Report Revision History

Report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTZ16F0961857E	2016-09-28	2016-09-29 to 2016-10-26	2016-10-29	Original	-	Valid



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4 General Information

4.1 General Description of E.U.T.

Product Name	: Remote Control
Model No.	: TJ66A
Remark	: N/A
Type of Modulation	: ASK
Frequency Range	: 433.92MHz
The Lowest Oscillator	: 433.92MHz
Antenna Gain	: 0dBi
Antenna installation	: Integrated Antenna

4.2 Details of E.U.T.

Technical Data	: Battery:2XAA 1.5V
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4.3 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, Oct. 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) 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 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) 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 328995, December 3, 2014.



5 Equipment Used during Test

3m Semi-anechoic Chamber for Radiated Spurious Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY4511494 3	Sep.15,2016	Sep.14,2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Oct.17,2016	Oct.16,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.09,2016	Apr.08,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Apr.13,2016	Apr.12,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09,2016	Apr.08,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09,2016	Apr.08,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13,2016	Apr.12,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.13,2016	Apr.12,2017
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY4511494 3	Sep.15,2016	Sep.14,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.15,2016	Sep.14,2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY5052020 7	Sep.15,2016	Sep.14,2017

5.1 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emissions	150kHz~30MHz	±3.64dB	(1)
Radiated Spurious Emissions	30MHz~1000MHz	±5.03dB	(1)
	1000M~5000MHz	± 5.47 dB	(1)

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

5.2 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.



6 Radiated Spurious Emissions

Test Requirement: FCC Part15 Paragraph 15.231(a)

Test Method: ANSI C63.10:2013, ANSI C634:2014

Test Result: PASS

Measurement Distance: 3m

Limit:

Fundamental Frequency (MHz)	Field Strength of Fundamental (uV/m)	Field Strength of Fundamental (dBuV/m)	Field Strength of Spurious Emission (uV/m)	Field Strength of Spurious Emission (dBuV/m)
44.66-40.70	2250	67	225	47
70-130	1250	62	125	42
130-174	1250 to 3750	62 to 71.48	125 to 375	42 to 51.48
174-260	3750	71.48	375	51.48
260-470	3750 to 12500	71.48 to 81.94	375 to 1250	51.48 to 61.94
Above 470	12500	81.94	1250	61.94

** linear interpolations

6.1 EUT Operation

Operating Environment :

Temperature: 24.3 °C

Humidity: 52.0 % RH

Atmospheric Pressure: 101.2kPa

EUT Operation :

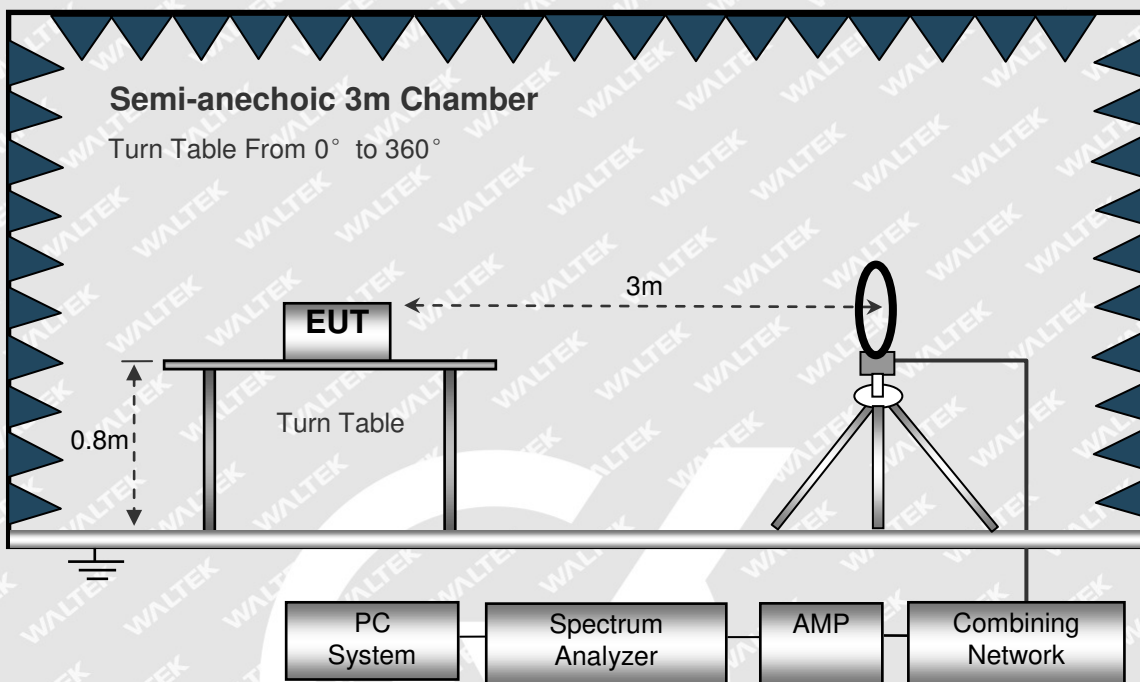
The test was performed in transmitting mode, the test data were shown in the report.

6.2 Test Setup

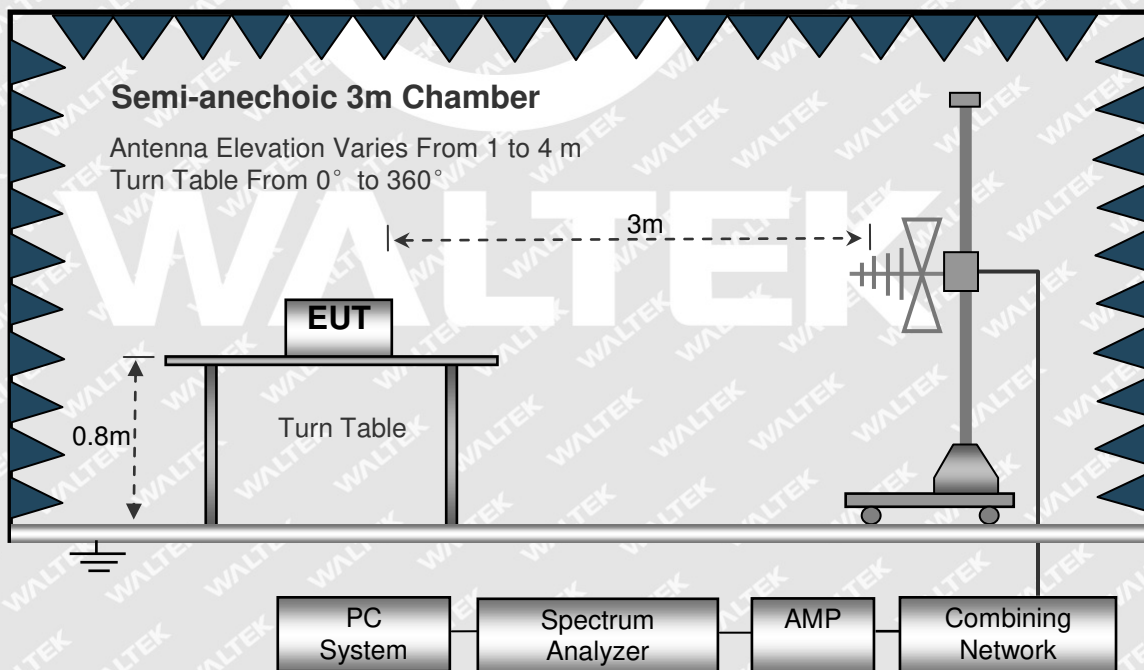
The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10:2013.



The test setup for emission measurement below 30MHz.

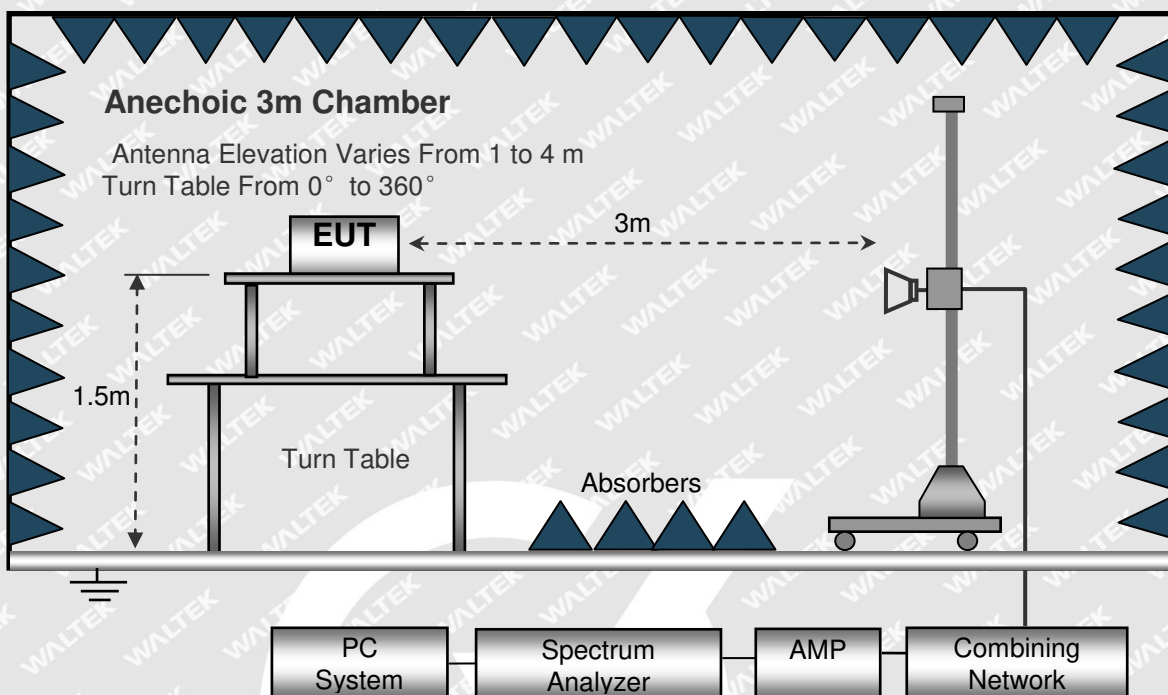


The test setup for emission measurement from 30 MHz to 1 GHz.





The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep SpeedAuto
- IF Bandwidth.....10kHz
- Video Bandwidth.....10kHz
- Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

- Sweep SpeedAuto
- DetectorPK
- Resolution Bandwidth.....100kHz
- Video Bandwidth.....300kHz

Above 1GHz

- Sweep SpeedAuto
- DetectorPK
- Resolution Bandwidth.....1MHz
- Video Bandwidth.....3MHz



6.4 Test Procedure

1. The EUT is placed on a turntable, which is above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X, Y, Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
8. New battery was used during test.

6.5 Summary of Test Results

AV = Peak +20Log₁₀(duty cycle)

Test Frequency: 30MHz-5GHz

The measurements were more than 20 dB below the limit and not reported.

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.231/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
433.92	92.31	PK	225	1.2	H	-7.31	85.00	100.83	-15.83
433.92	90.45	PK	168	1.2	V	-7.31	83.14	100.83	-17.69
867.87	64.22	PK	210	1.2	H	0.04	64.26	80.83	-16.57
867.87	60.53	PK	117	1.4	V	0.04	60.57	80.83	-20.26
1301.33	61.05	PK	106	1.4	H	-16.38	44.67	74	-29.33
1301.33	63.48	PK	59	1.7	V	-16.38	47.10	74	-26.90
1736.48	69.57	PK	154	1	H	-14.87	54.70	74	-19.30
1736.48	64.85	PK	198	1.8	V	-14.87	49.98	74	-24.02



Frequency (MHz)	PK (dB μ V/m)	Turn table Angle Degree	RX Antenna		Duty cycle Factor (dB)	AV (dB μ V/m)	FCC Part 15.231/209/205	
			Height (m)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
433.92	85.00	-	-	H	-10.36	74.64	80.83	-6.19
433.92	83.14	-	-	V	-10.36	72.78	80.83	-8.05
867.87	64.26	-	-	H	-10.36	53.9	60.83	-6.93
867.87	60.57	-	-	V	-10.36	50.21	60.83	-10.62
1300	44.67	-	-	H	-10.36	34.31	54	-19.69
1300	47.10	-	-	V	-10.36	36.74	54	-17.26
1737	54.70	-	-	H	-10.36	44.34	54	-9.66
1737	49.98	-	-	V	-10.36	39.62	54	-14.38



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7 Periodic Operation

The duty cycle was determined by the following equation:

To calculate the actual field intensity, The duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

$$\text{Duty Cycle(\%)} = \text{Total transmitting time(ms)} / \text{Complete transmission period(ms)} * 100 \%$$

$$\text{Duty Cycle Correction Factor(dB)} = 20 * \text{Log}_{10}(\text{Duty Cycle(\%)})$$

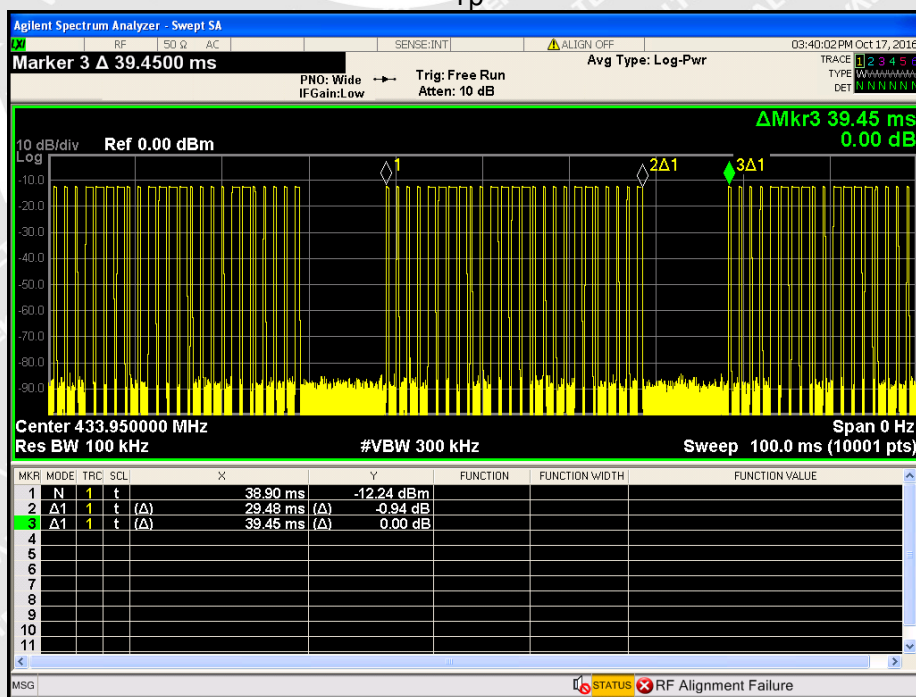
Total transmitting time(ms)	0.8305*10+0.2440*15=11.965
Complete transmission period(ms)	39.45
Duty Cycle(%)	30.33
Duty Cycle Correction Factor(dB)	-10.36

Refer to the duty cycle plot (as below), This device meets the FCC requirement.

Length of a complete pulse train:

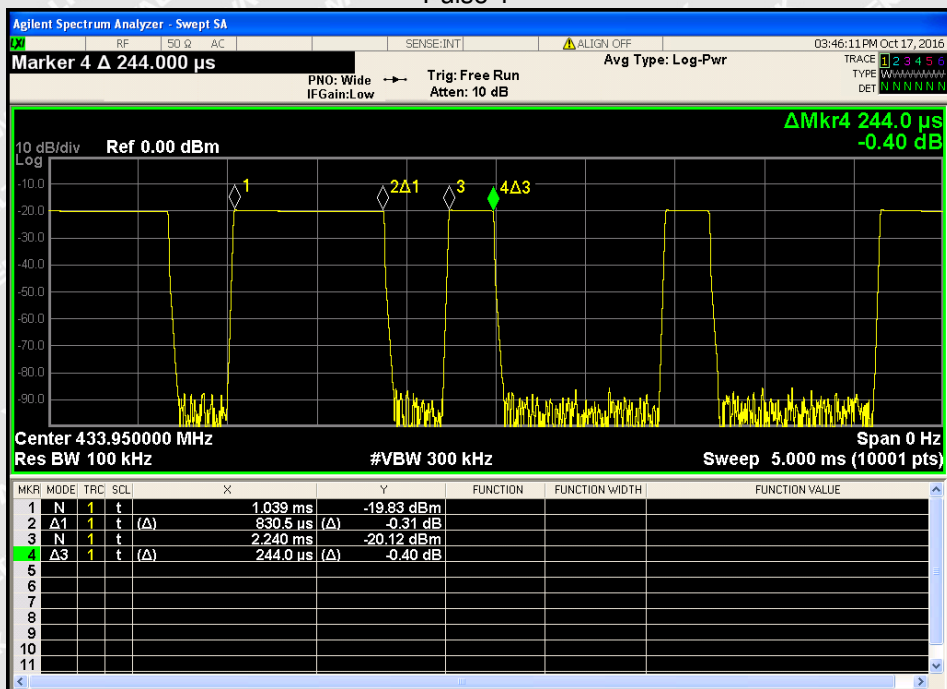
Remark: FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

Tp



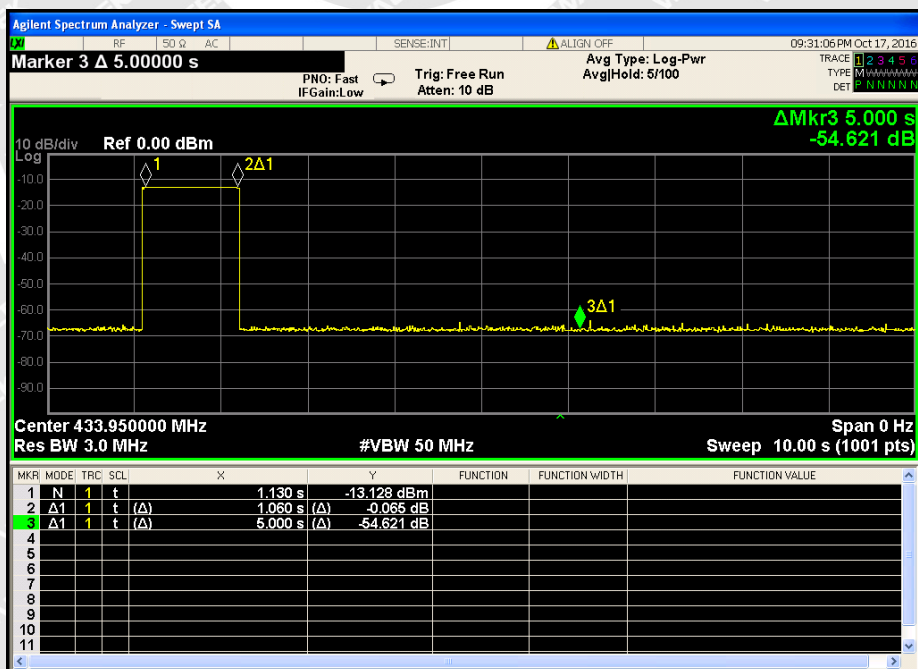


Pulse 1



FCC Part15.231(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.

(2)A transmitter activated automatically shall cease transmission within 5 seconds after activation.





8 20dB Bandwidth

- Test Requirement : FCC Part15.231(c)
- Test Method : FCC Part15.231(c)
- Limit : 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. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

8.1 Test Procedure

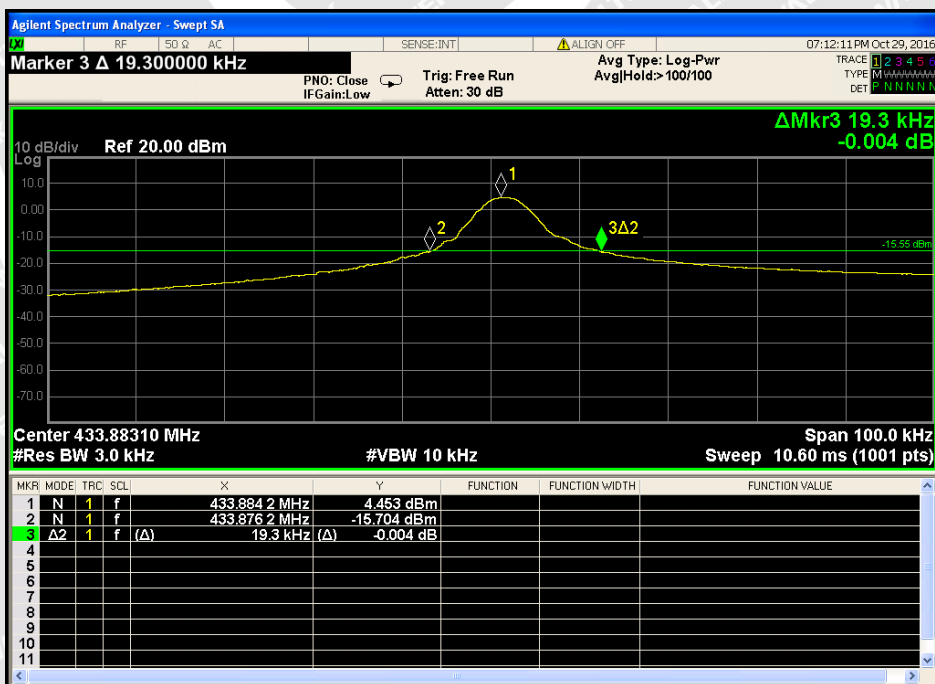
- The transmitter output (antenna port) was connected to the spectrum analyzer. EUT and its simulators are placed on a table, let EUT working in test mode, then test it.
- The bandwidth of the fundamental frequency was measure by spectrum analyser with 3kHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

8.2 Test Result

Frequency (MHz)	Bandwidth Emission (kHz)	Limit (kHz)	Result
433.92	19.3	1084.7	Pass

Limit=Center Frequency*0.25%

Test Plot





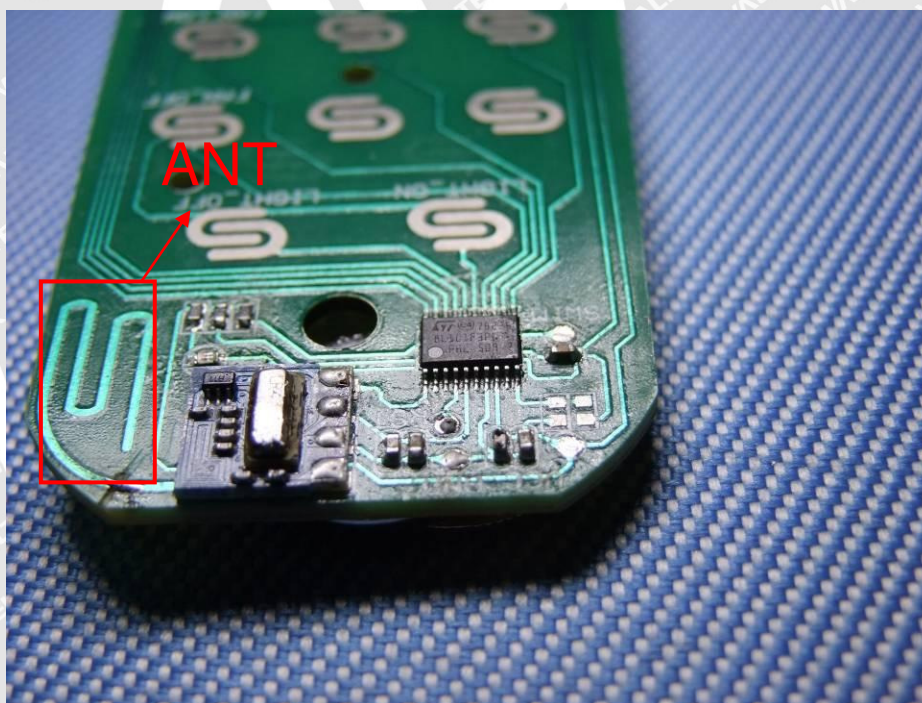
9 Antenna Requirement

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 manufacture 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR 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.

Result:

The EUT has one Internal Integrated Antenna, the gains is 0dBi, meets the requirements of FCC 15.203

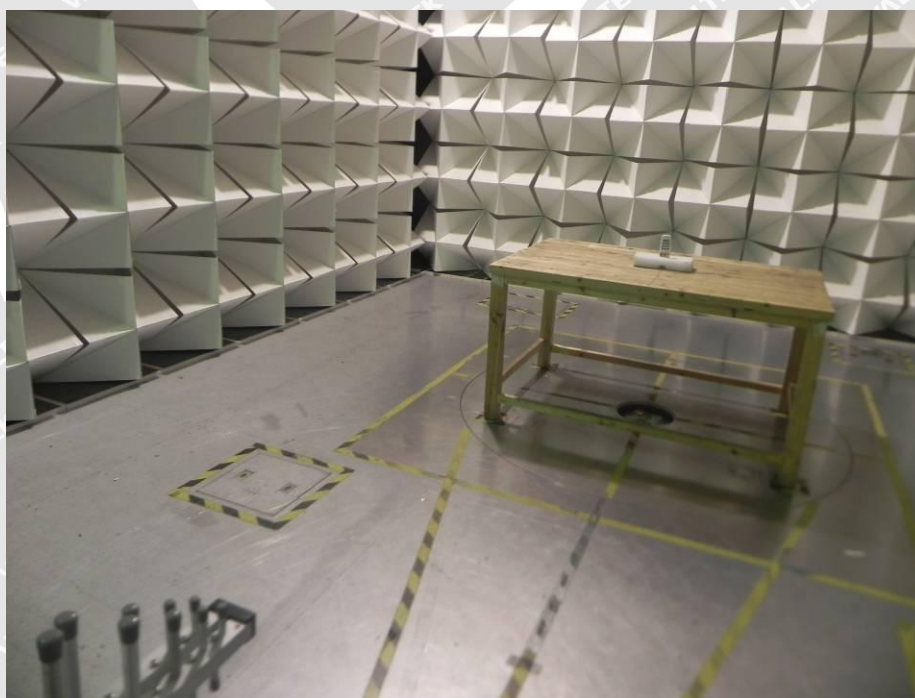
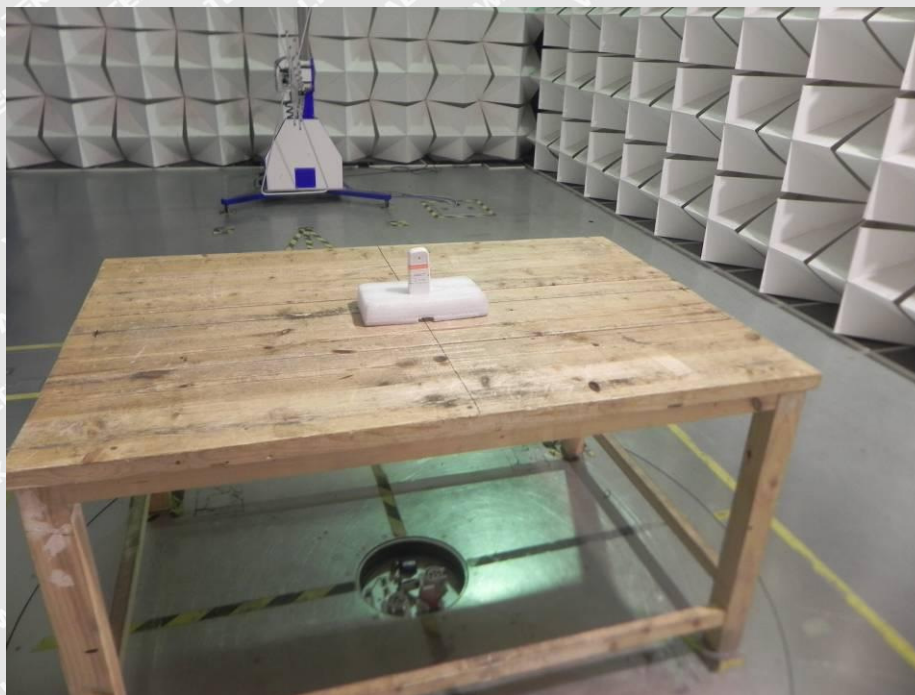




10 Photographs- Test Setup

10.1 Radiated Emission Test Setup

From 30MHz to 1GHz





Above 1GHz



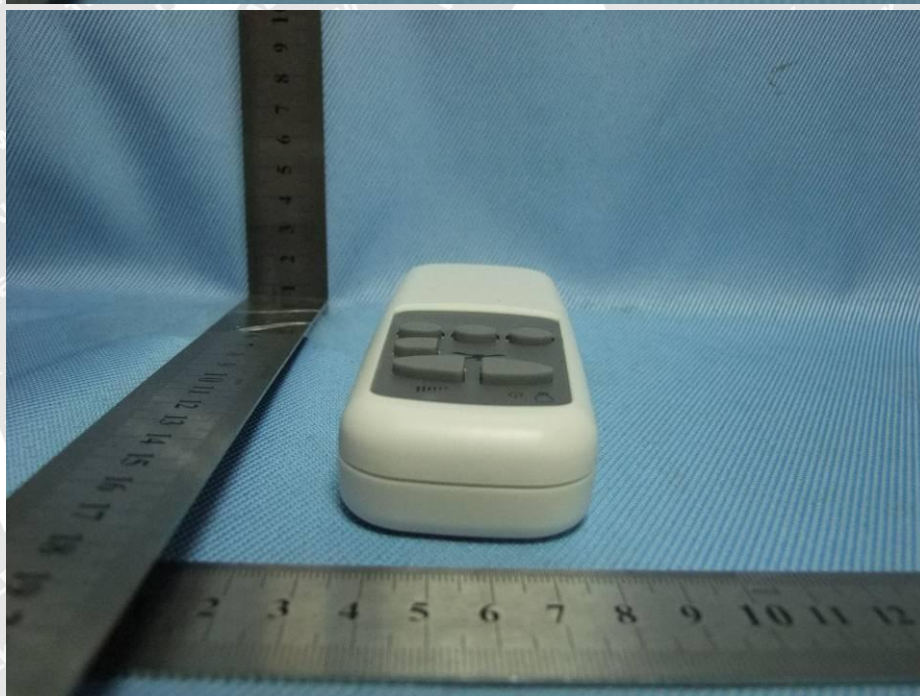


11 Photographs - Constructional Details

11.1 EUT- Appearance View



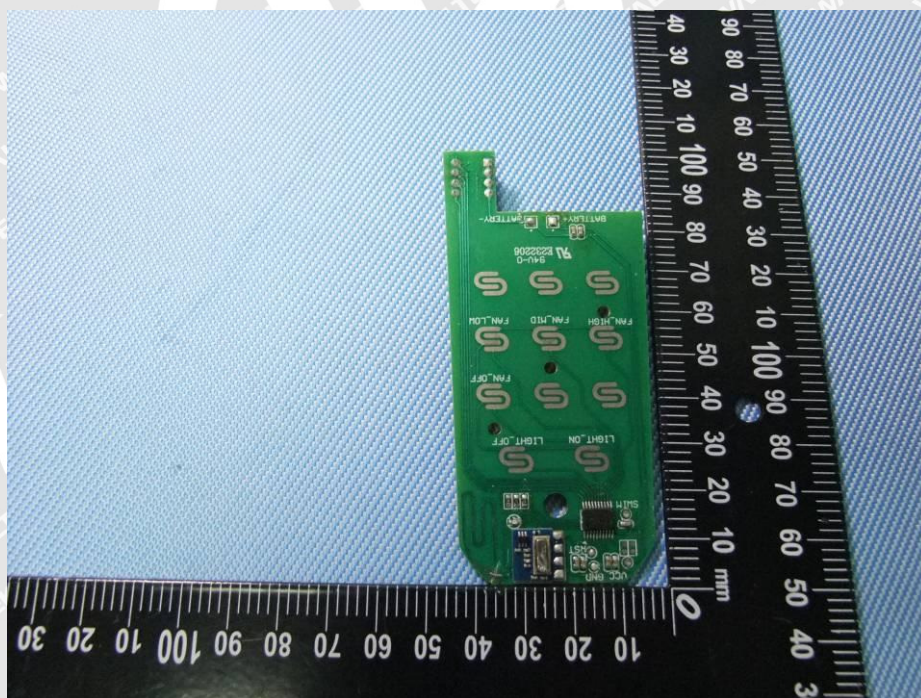


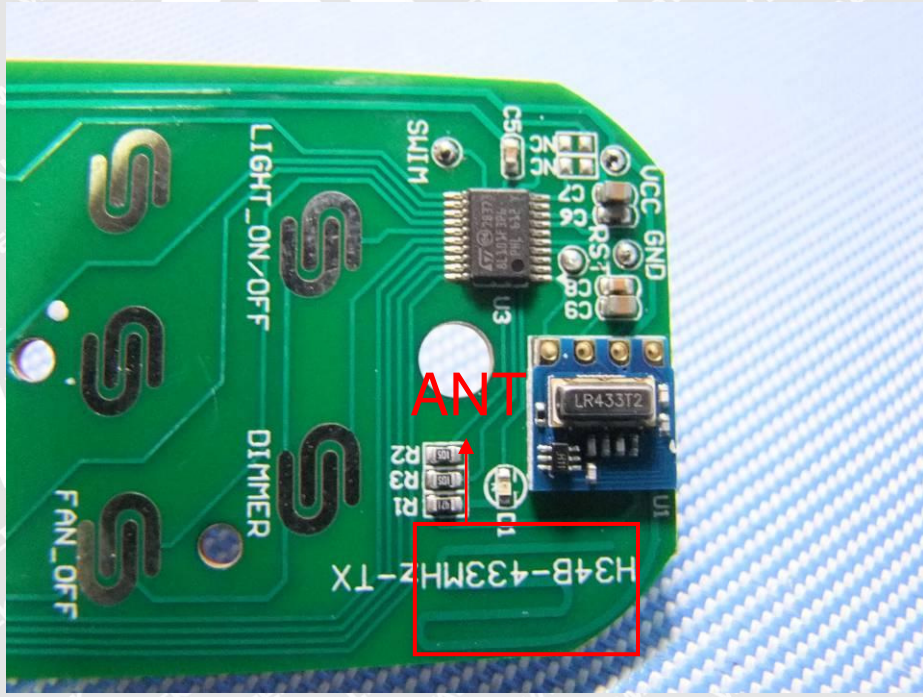
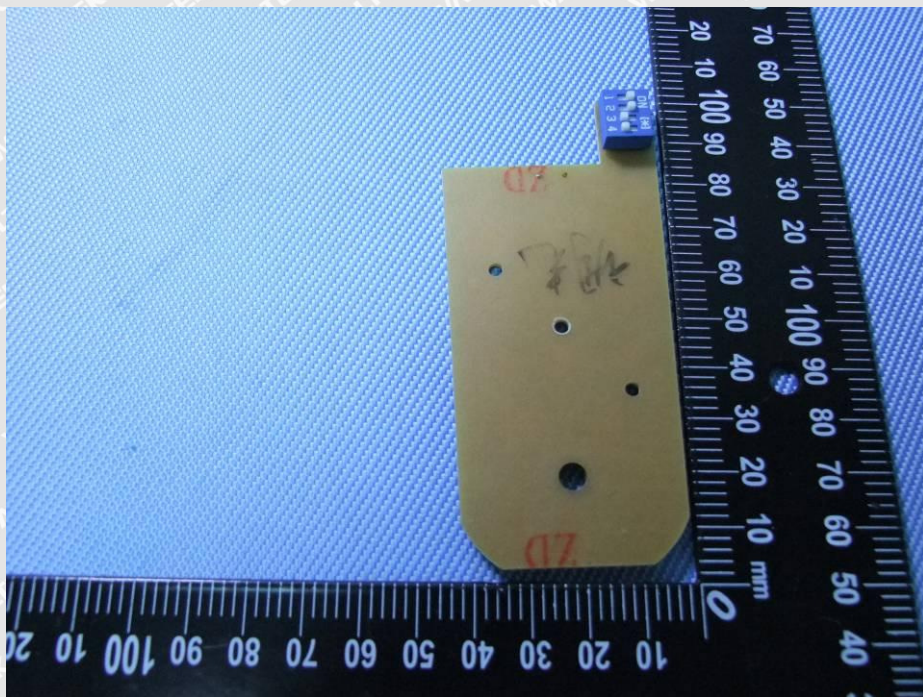




11.2 EUT- Internal View







====End of Report====