# RF TEST REPORT



Report No.: 15020860-FCC-R1 Supersede Report No.: N/A

Caporcoac report from the				
Applicant	Beijing Jia An Electronic Technology Co,.Ltd.			
Product Name	Transmitter			
Main Model	T306			
Serial Model	T306-2			
Test Standard	FCC Part 15.2	231: 2014, ANSI C63.10:	2013	
Test Date	August 21, 20	)15		
Issue Date	August 25, 20	)15		
Test Result	Pass	Fail		
Equipment complied	d with the spec	cification	~	
Equipment did not o	omply with the	e specification		
Amos.	<b>Xid</b>	Have Stoo	ko	
Amos Xia Herve Idoko Test Engineer Checked By				
This test report may be reproduced in full only				
Test resu	It presented in	n this test report is appli	cable to the tes	ted sample only

Issued by:

SIEMIC (Nanjing-China) Laboratories

2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China Tel:+86(25)86730128/86730129 Fax:+86(25)86730127 Email: China@siemic.com.cn



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### **Laboratories Introduction**

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

**Accreditations for Conformity Assessment** 

Accreditations for combinity Assessment		
Country/Region	Scope	
USA	EMC , RF/Wireless , Telecom	
Canada	EMC, RF/Wireless , Telecom	
Taiwan	EMC, RF, Telecom, Safety	
Hong Kong	RF/Wireless ,Telecom	
Australia	EMC, RF, Telecom, Safety	
Korea	EMI, EMS, RF , Telecom, Safety	
Japan	EMI, RF/Wireless, Telecom	
Singapore	EMC, RF, Telecom	
Europe	EMC, RF, Telecom, Safety	



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# 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15020860-FCC-R1	NONE	Original	August 25, 2015

### 2. <u>Customer information</u>

Applicant Name	Beijing Jia An Electronic Technology Co,.Ltd.
Applicant Address	No.19 GuCheng West Street, Shi Jing Shan District, Beijing 100043, China
Manufacturer Name	Beijing Jia An Electronic Technology Co,.Ltd.
Manufacturer Address	No.19 GuCheng West Street, Shi Jing Shan District, Beijing 100043, China

### 3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and
Lab Address	Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	Labview of SIEMIC version 1.0



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### 4. Equipment Under Test (EUT) Information

Description of EUT:

Main Model: T306

Serial Model: T306-2

Date EUT received: August 17, 20145

Test Date(s): August 21, 2015

Antenna Gain: 3 dBi

Type of Modulation: ASK

RF Operating Frequency (ies): Tx:433.97MHz

Number of Channels: 1 CH

Port: N/A

Input Power: DC: 12V

Trade Name : N/A

FCC ID: VVJ-T306R434



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### 5. Test Summary

The product was tested in accordance with the following specifications. All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207	Conducted Emissions Voltage	N/A
§15.231(b)	Fundamental & Radiated Spurious Emission	Compliance
§15.231(c)	20dB Bandwidth	Compliance
§15.231(a)(1)	Deactivation	Compliance

Note: Preliminary radiated emission testing has been performed on X, Y, Z axis, only worst case test result is presented in this test report.

#### Measurement Uncertainty

Emissions					
Test Item	Description	Uncertainty			
Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB			



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### 6. Measurements, Examination And Derived Results

### 6.1 Antenna Requirement

#### **Applicable Standard**

Requirement(s): 47 CFR §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.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna is permanently attached to the device which meets the requirement.

Result: Compliance.



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# **6.2 AC Conducted Emissions Voltage**

Temperature	°C
Relative Humidity	%
Atmospheric Pressure	mbar
Test date :	
Tested By:	Amos Xia

#### Conducted Emission Limit

Conductor Entite				
Frequency ranges	Lir	nit (dBµV)		
(MHz)	QP	Average		
0.15 ~ 0.5	66 – 56	56 – 46		
0.5 ~ 5	56	46		
5 ~ 30	60	50		

Spec	Item	Requirement	Applicable	
47CFR§15.20 7, RSS210 (A8.1)	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	<b>Y</b>	
Test Setup		Vertical Ground Reference Plane  Boom  Horizontal Ground Reference Plane  Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.		
Procedure	<ul> <li>The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.</li> <li>The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>All other supporting equipment were powered separately from another main supply.</li> </ul>			
Remark				
Result	✓ N/A	Fail		



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Test Data	Yes	<b>▽</b> N/A
Test Plot	Yes (See below)	✓ <sub>N/A</sub>

#### Data sample

Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Factors (dB)
XXX	56.21	66.00	-9.79	39.20	56.00	-16.80	12.22

Frequency (MHz) = Emission frequency in MHz

Quais-Peak/Average (dBμV/m)=Receiver Reading(dBμV/m)+ Factor(dB)

 $Limit(dB\mu V/m)$ =Limit stated in standard

Factor (dB)= cable loss+ Insertion loss of LISN+ Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

#### **Calculation Formula:**

Margin (dB)=Quasi Peak / Average (dB $\mu$ V/m) – limit (dB $\mu$ V/m)

Note: Power Supply by battery



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# 6.3 20dB Occupied Bandwidth

Temperature	25°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	August 21, 2015
Tested By:	Amos Xia

Requirement(s):									
Spec	Item	Requirement	Applicable						
§15.231(c)	a)	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.							
	b)	For devices operating above 900 MHz, the emission shall be no vider than 0.5% of the center frequency.							
Test Setup		Spectrum Analyzer EUT							
Test Procedure	- - - - a	Emission bandwidth measurement procedure  Set RBW = 100 kHz.  Set the video bandwidth (VBW) ≥3*RBW.  Detector = Peak.  Trace mode = max hold.  Sweep = auto couple.  Allow the trace to stabilize.  Measure the maximum width of the emission that is constrained by the ssociated with the two outermost amplitude points (upper and lower finat are attenuated by 20 dB relative to the maximum level measured and amental emission.	frequencies)						
Remark									
Result	Pas	s Fail							
Test Data Yes		□ <sub>N/A</sub>							

Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes	□ <sub>N/A</sub>

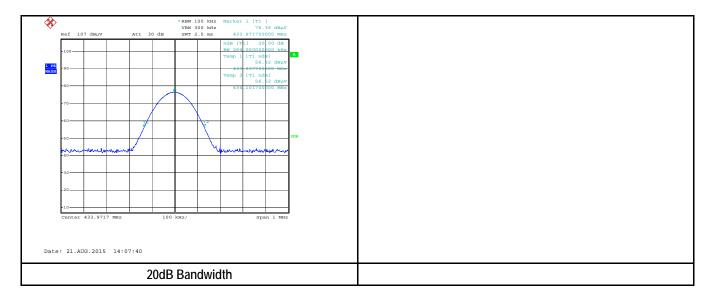


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#### 20dB Bandwidth measurement result

Туре	Freq (MHz)	СН	Measured 20dB Bandwidth (kHz)	Limit (kHz)	Result
20dB BW	433.97	1 CH	264.00	1084.93	Pass

#### Test Plots 20dB Bandwidth measurement result



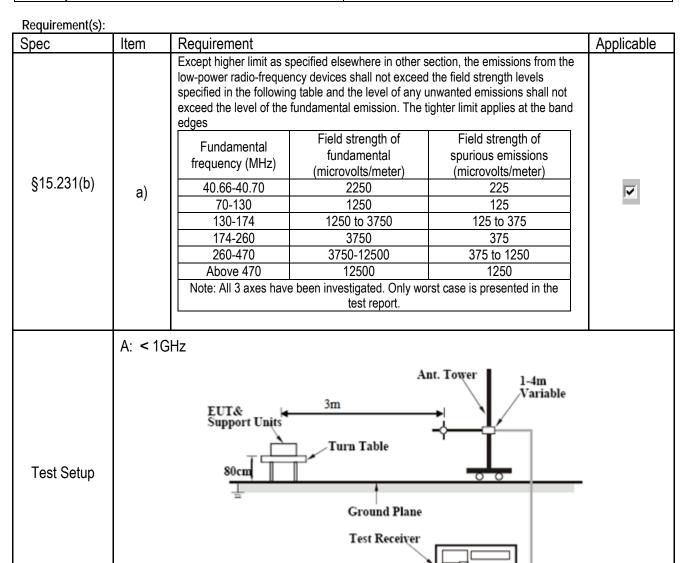


B: >1GHz

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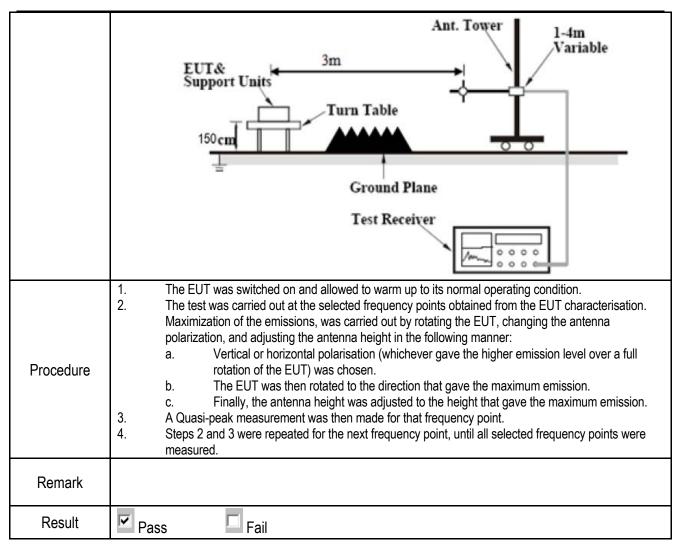
### 6.4 Radiated Fundamental and Spurious Emission

Temperature	25°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	August 21, 2015
Tested By:	Amos Xia





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Test Data	Yes	□ <sub>N/A</sub>
Test Plot	Yes (See below)	□ <sub>N/A</sub>



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#### **Fundamental Measurement Result**

Frequency (MHz)	Reading	Factors	Azimuth	Polarity	Height	correct (dBµV/m)	Limit (dBµV)	Margin	Comments
433.97	91.33	-28.34	215.4	V	2	62.99	100.8	-37.81	Pk
433.97	-	-	-	V	-	57.85	80.8	-22.95	Ave
433.97	96.73	-28.62	117.5	Н	2	63.99	100.8	-36.81	Pk
433.97	-	-	-	Н	-	58.85	80.8	-21.95	Ave

#### Spurious Emissions (< 1GHz) Measurement Result

Frequency (MHz)	Reading	Factors	Azimuth	Polarity	Height	correct (dBµV/m)	Limit (dBµV)	Margin	Comments
867.94	64.06	-18.16	296	V	1	45.9	80.8	-34.9	Pk
867.94	-	-	-	V	-	40.76	60.8	-20.04	Ave
867.94	68.32	-19.3	53.1	Н	1	46.9	80.8	-33.9	Pk
867.94	-	-	-	Н	-	41.76	60.8	-19.04	Ave

#### Notes:

- 1. Duty cycle is 55.36%, 20log (duty cycle) = -5.14dB correction was used to determine the average level from the peak reading. Average = peak reading + 20log (duty cycle), Final Average= peak reading -5.14dB
- 2. All the data measurement of peak values.
- 3. FCC Limit for Average Measurement= $41.67^*$  (433.97MHz)- $7083.333=11000.2 \mu V/m=80.8 dB <math>\mu V/m=80.8 dB$
- 4. Average pulsed signal over one complete pulse train or 100 ms time frame if pulse train exceeds 100 ms
- 5. Maximum average in 100 ms
- 6. Calculate duty cycle for pulse train or 100 ms
- 7. Duty cycle = (t1 + t2 + t3+...tn)/T where tn = pulse width, T = pulse train length or 100 ms



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### Spurious Emissions ( > 1GHz) Measurement Result

Frequency	Reading	Direction	Height	Polar	Factors (dB)	Amplifier	Cord. Amp.	FCC 15.231	Margin	Comments
MHz	(dBmV/m)	Degree	Meter	H/V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	(dB)	(Pk/Av)
1.302	67.18	154.00	2.00	Н	-25.85	55	41.33	80.8	-39.47	Peak
1.302	-	-	-	Н	-	-	36.19	60.8	-24.61	Ave
1.736	62.57	245.00	2.00	Н	-23.33	55	39.24	80.8	-41.56	Peak
1.736	-	-	-	Н	-	-	34.1	60.8	-26.7	Ave
2169	58.33	68.00	2.00	Н	-20.66	55	37.67	80.8	-43.13	Peak
2169	-	•	Ī	Н	ı	-	32.53	60.8	-28.27	Ave
2.603	63.33	235.00	2.00	Н	-18.42	55	44.91	80.8	-35.89	Peak
2.603	-	•	Ī	Н	ı	-	39.77	60.8	-21.03	Ave
3.037	62.93	93.00	2.00	Н	-15.46	55	47.47	80.8	-33.33	Peak
3.037	-	-	-	Н	-	-	42.33	60.8	-18.47	Ave
3.471	54.58	168.00	2.00	Н	-11.48	55	43.1	80.8	-37.7	Peak
3.471	-	-	-	Н	-	-	37.96	60.8	-22.84	Ave
3.905	49.85	252.00	2.00	Н	-9.25	55	40.6	80.8	-40.2	Peak
3.905	-	-	-	Н	-	-	35.46	60.8	-25.34	Ave
4.338	46.09	213.00	2.00	Н	-6.73	55	39.36	80.8	-41.44	Peak
4.338	-	-	-	Н	-	-	34.22	60.8	-26.58	Ave
1.302	65.57	310.00	1.00	V	-25.85	55	39.72	80.8	-41.08	Peak
1.302	-	-	-	V	-	-	34.58	60.8	-26.22	Ave
1.736	64.19	122.00	1.00	V	-23.33	55	40.86	80.8	-39.94	Peak
1.736	-	-	-	V	-	-	35.72	60.8	-25.08	Ave
2169	60.51	221.00	1.00	V	-20.66	55	39.85	80.8	-40.95	Peak
2169	-	-	-	V	-	-	34.71	60.8	-26.09	Ave
2.603	64.86	68.00	1.00	V	-18.42	55	46.44	80.8	-34.36	Peak
2.603	-	-	-	V	-	-	41.3	60.8	-19.5	Ave
3.037	64.51	41.00	1.00	V	-15.46	55	49.05	80.8	-31.75	Peak
3.037	-	-	-	V	-	-	43.91	60.8	-16.89	Ave
3.471	56.33	324.00	1.00	V	-11.48	55	44.85	80.8	-35.95	Peak
3.471	-	-	-	V	-	-	39.71	60.8	-21.09	Ave
3.905	52.25	153.00	1.00	V	-9.25	55	43	80.8	-37.8	Peak
3.905	-	-	-	V	-	-	37.86	60.8	-22.94	Ave
4.338	48.83	286.00	1.00	V	-6.73	55	42.1	80.8	-38.7	Peak
4.338	-	-	-	V	-	-	36.96	60.8	-23.84	Ave

Note: Duty cycle is 55.36%, 20log (duty cycle) = -5.14dB correction was used to determine the average level from the peak reading.

Average = peak reading + 20log (duty cycle), final Average= peak reading -5.14dB

Note:

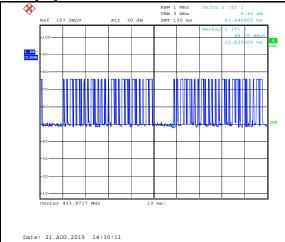
Narrow Pulse: 0.92ms 2/NP = 2/0.92ms =2.17 kHz RBW > 2/NP (2.17 kHz) Therefore PDCF is not needed.

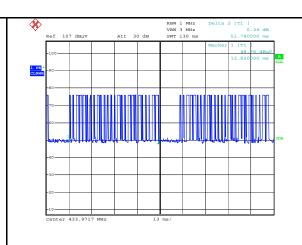


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#### **Test Plots**

### **Duty Cycle Measurement Result**

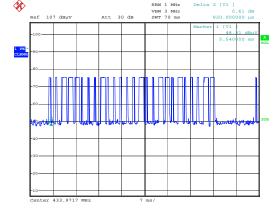




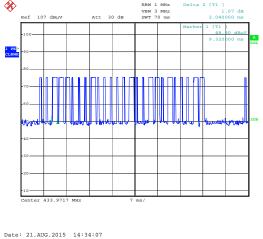
Date: 21.AUG.2015 14:33:23

Date: 21.AUG.2015 14:31:27

### Duty Cycle 1#







Duty Cycle 3#

Duty Cycle 4#

Wide Pulse: 2.04ms Narrow Pulse: 0.92ms

Duty cycle= (2.04\*10+0.92\*16)/63.44 =55.36% Average Duty Factor: 20\*log (Duty Cycle) = -5.14dB

**Pulse Duty Cycle** 



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### 6.5 Deactivation

Yes (See below)

Test Plot

N/A

Temperature	25°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	August 21, 2015
Tested By:	Amos Xia

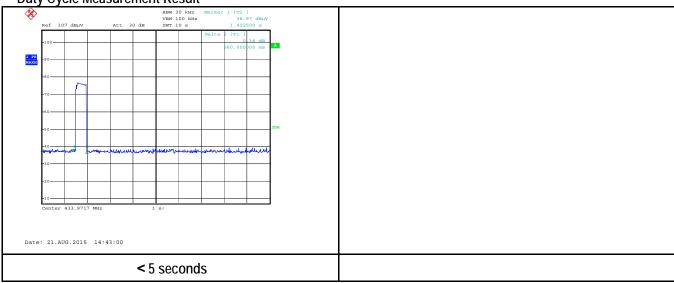
Requirement(s): Requirement Applicable Spec Item A manually operated transmitter shall employ a switch that will ✓ automatically deactivate the transmitter within not more than 5 §15.231 (a)(1) a) seconds of being released. Spectrum Analyzer **EUT** Test Setup measurement procedure Set analyzer center frequency to channel center frequency. Set the span to 0Hz. Set the  $\dot{V}BW \ge 3$  'RBW. Test Procedure Detector = peak. Sweep time = auto couple. Trace mode = max hold. Allow trace to fully stabilize. Remark Pass Result Fail N/A Test Data Yes



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#### **Test Plots**

### Duty Cycle Measurement Result





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# Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions	5				
R&S EMI Test Receiver	ESPI3	101216	11/04/2014	11/03/2015	N/A
V-LISN	ESH3-Z5	838979/005	09/27/2014	09/26/2015	N/A
SIEMIC Conducted Emissions software	V1.0	N/A	N/A	N/A	N/A
RF conducted test					
R&S EMI Receiver	ESPI3	101216	11/04/2014	11/03/2015	>
Radiated Emissions					
Agilent Technologies Spectrum Analyzer	N9010	MY47191130	03/11/2015	03/10/2016	>
R&S EMI Receiver	ESPI3	101216	11/04/2014	11/03/2015	>
Antenna (30MHz~6GHz)	JB6	A121411	06/04/2015	06/03/2016	>
EMCO Horn Antenna (1 ~18GHz)	3115	N/A	10/09/2014	10/08/2015	>
INFOMW Antenna (1 ~18GHz)	JXTXLB- 10180	J2031081120092	10/09/2014	10/08/2015	>
Hp Agilent Pre-Amplifier	8447F	1937A01160	10/27/2014	10/26/2015	>
MITEQ Pre-Amplifier (0.1 ~ 18GHz)	AMF-7D- 00101800-30- 10P	1451709	10/27/2014	10/26/2015	>
SIEMIC Radiated Emissions software	V1.0	N/A	N/A	N/A	



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### Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo



Front View of EUT



Rear View of EUT



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Top View of EUT



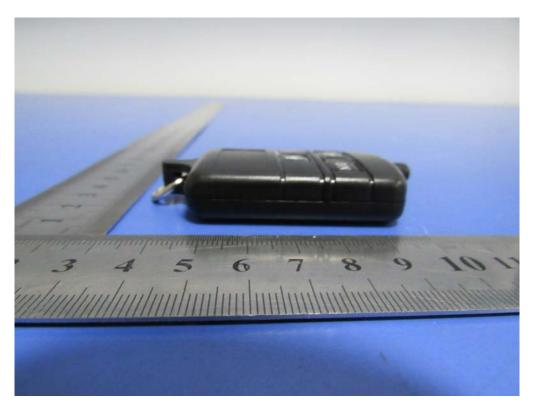
Bottom View of EUT



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Left View of EUT



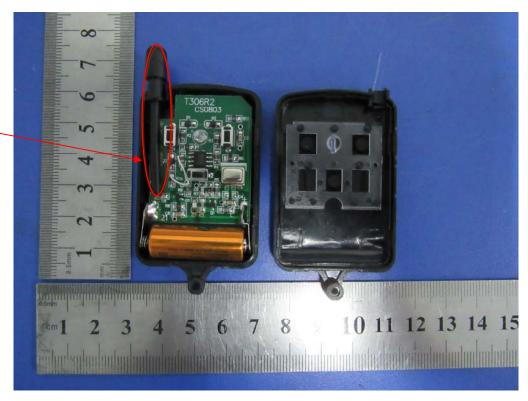
Right View of EUT



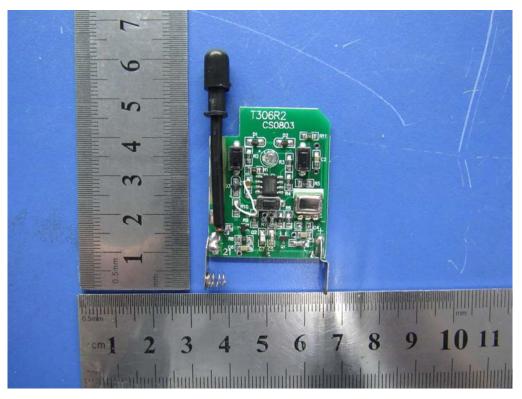
Antenna

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### Annex B.ii. Photograph EUT Internal Photo



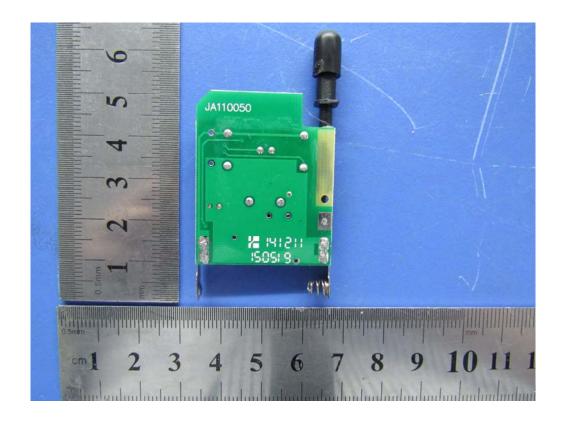
Uncover - Front View



EUT PCBA – Front View



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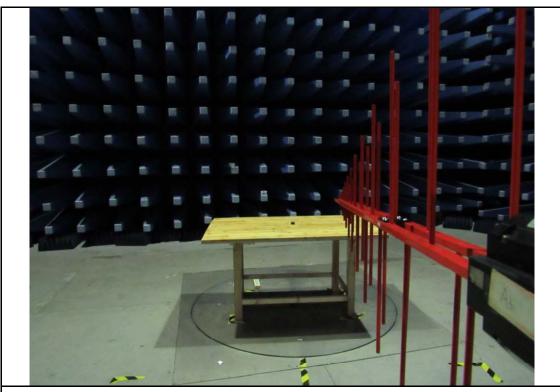


EUT PCBA - Rear View

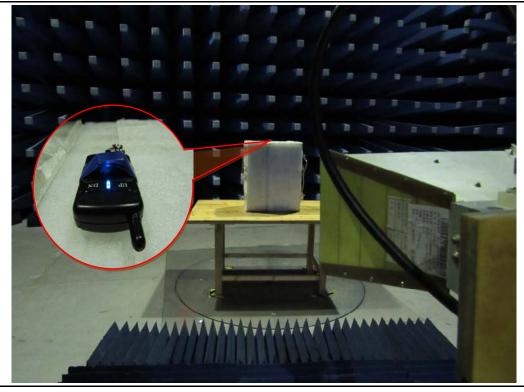


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### Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz



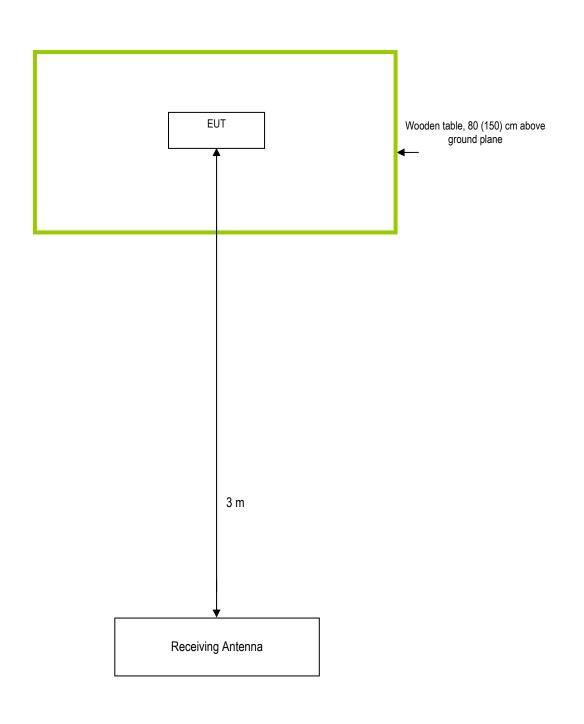
Radiated Spurious Emissions Test Setup Above 1GHz



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### Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.ii. TEST SET UP BLOCK





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### Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A



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# Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment



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#### Annex E. DECLARATION OF SIMILARITY

#### Beijing Jia An Electronics Technology Co,.Ltd.

Add:No.19 Gu Cheng west street,Shi Jing Shan District,Beijing 100043,CHINA Tel:+86-10-6888 9971 Fax:+86-10-6888 9950

#### Declaration on model difference

We the undersigned hereby confirm that any of our production units bearing the following model numbers for the Transmitters are identical in circuitry, PCB Layout, components, material manufacture of PCB, mechanical, and physical construction; the only differences between model No. T306 and T306-2 are the number of activation buttons. The T306-2 is a two button device, the T306 is a three button device.

In fact they are 1 model, but have two names, so named with 2 model numbers.

Production name	Trade name	Model no.	
Transmitter		T306 T306-2	

Please provide at least 1 sample with difference except specified as above for further evaluation.

Production name	Trade name	Model no.	Description
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Confirmed by Beijing Jia An Electronics Technology Co, Ltd.

Authorized Signature: Helendon

Date: 2015.8.24