RF TEST REPORT

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

Applicant	Beijing Jia An Electronic Technology Co,.Ltd.
Product Name	Transmitter
Main Model	T306
Serial Model	T306-2
Test Standard	FCC Part 15.231: 2014, ANSI C63.10: 2013
Test Date	August 21, 2015
Issue Date	August 25, 2015
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Amos. Xia		
Amos Xia Test Engineer	Herve Idoko Checked By	

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Test result presented in this test report is applicable to the tested 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

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.

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Accreditations for Conformity 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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CONTENTS

1. Report Revision History

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

2. Customer information

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 Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	Labview of SIEMIC version 1.0

4. Equipment Under Test (EUT) Information

Description of EUT:	Transmitter
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

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

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.

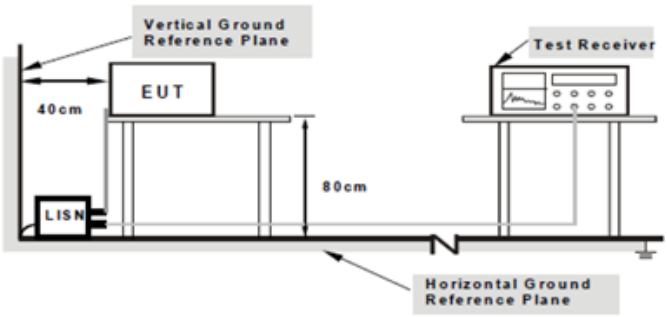
Result: Compliance.

6.2 AC Conducted Emissions Voltage

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

Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBμV)	
	QP	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Spec	Item	Requirement	Applicable
47CFR§15.207, 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.	☑
Test Setup	 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	- 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. - The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment were powered separately from another main supply.		
Remark			
Result	☑ N/A ☐ Fail		

Test Data ☐ Yes ☑ N/A

Test Plot ☐ Yes (See below) ☑ N/A

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(dBμV/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 (dBμV/m) – limit (dBμV/m)

Note: Power Supply by battery

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 wider than 0.5% of the center frequency.	☐
Test Setup	Spectrum Analyzer — EUT		
Test Procedure	20dB 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 frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☑ Yes ☐ N/A

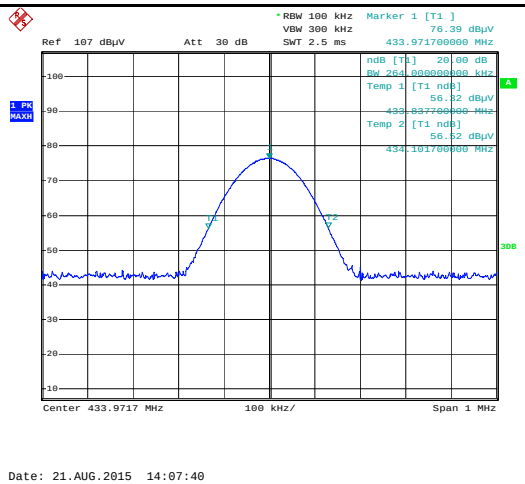
Test Plot ☑ Yes ☐ N/A

20dB Bandwidth measurement result

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

Test Plots

20dB Bandwidth measurement result

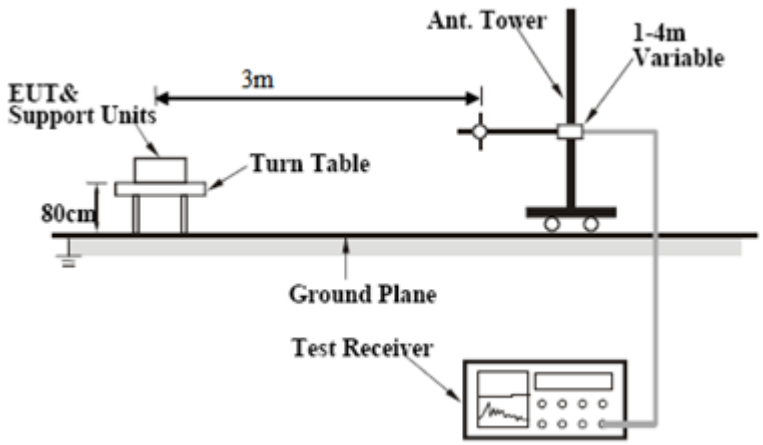


20dB Bandwidth

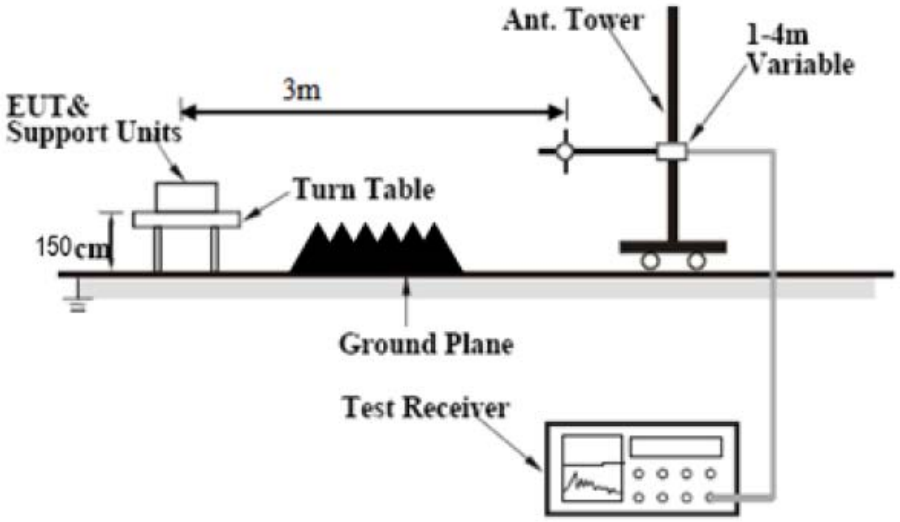
6.4 Radiated Fundamental and Spurious Emission

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

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>§15.231(b)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Fundamental frequency (MHz)</th><th>Field strength of fundamental (microvolts/meter)</th><th>Field strength of spurious emissions (microvolts/meter)</th></tr>
<tr><td>40.66-40.70</td><td>2250</td><td>225</td></tr>
<tr><td>70-130</td><td>1250</td><td>125</td></tr>
<tr><td>130-174</td><td>1250 to 3750</td><td>125 to 375</td></tr>
<tr><td>174-260</td><td>3750</td><td>375</td></tr>
<tr><td>260-470</td><td>3750-12500</td><td>375 to 1250</td></tr>
<tr><td>Above 470</td><td>12500</td><td>1250</td></tr>
<tr><td colspan="3">Note: All 3 axes have been investigated. Only worst case is presented in the test report.</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3">A: < 1GHz


B: >1GHz</td></tr>
</table>

	
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. A Quasi-peak measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

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	H	2	63.99	100.8	-36.81	Pk
433.97	-	-	-	H	-	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	H	1	46.9	80.8	-33.9	Pk
867.94	-	-	-	H	-	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)-7083.3333=11000.2µV/m=80.8dBµV/m
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

Spurious Emissions (> 1GHz) Measurement Result

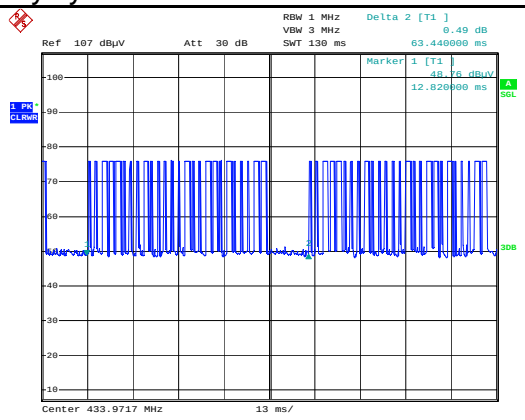
Frequency	Reading	Direction	Height	Polar	Factors (dB)	Amplifier	Cord. Amp.	FCC 15.231	Margin	Comments
MHz	(dBmV/m)	Degree	Meter	H/V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	(dB)	(Pk/Av)
1.302	67.18	154.00	2.00	H	-25.85	55	41.33	80.8	-39.47	Peak
1.302	-	-	-	H	-	-	36.19	60.8	-24.61	Ave
1.736	62.57	245.00	2.00	H	-23.33	55	39.24	80.8	-41.56	Peak
1.736	-	-	-	H	-	-	34.1	60.8	-26.7	Ave
2169	58.33	68.00	2.00	H	-20.66	55	37.67	80.8	-43.13	Peak
2169	-	-	-	H	-	-	32.53	60.8	-28.27	Ave
2.603	63.33	235.00	2.00	H	-18.42	55	44.91	80.8	-35.89	Peak
2.603	-	-	-	H	-	-	39.77	60.8	-21.03	Ave
3.037	62.93	93.00	2.00	H	-15.46	55	47.47	80.8	-33.33	Peak
3.037	-	-	-	H	-	-	42.33	60.8	-18.47	Ave
3.471	54.58	168.00	2.00	H	-11.48	55	43.1	80.8	-37.7	Peak
3.471	-	-	-	H	-	-	37.96	60.8	-22.84	Ave
3.905	49.85	252.00	2.00	H	-9.25	55	40.6	80.8	-40.2	Peak
3.905	-	-	-	H	-	-	35.46	60.8	-25.34	Ave
4.338	46.09	213.00	2.00	H	-6.73	55	39.36	80.8	-41.44	Peak
4.338	-	-	-	H	-	-	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

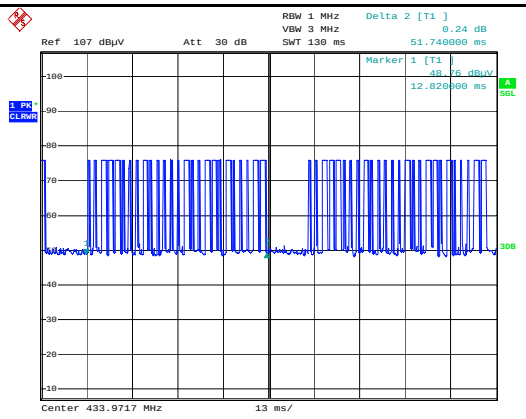
Note:
Narrow Pulse: 0.92ms
2/NP = 2/0.92ms =2.17 kHz
RBW > 2/NP (2.17 kHz)
Therefore PDCF is not needed.

Test Plots

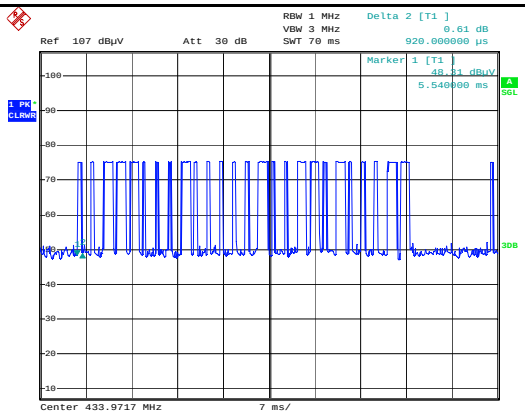
Duty Cycle Measurement Result



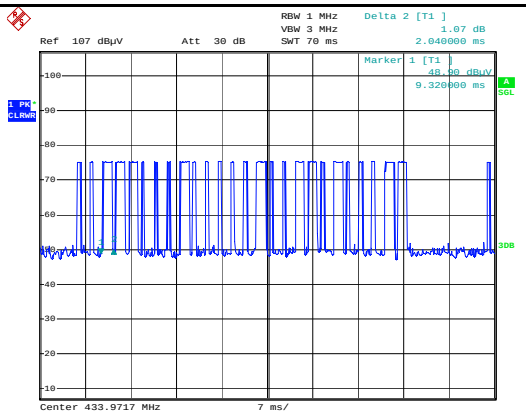
Duty Cycle 1#



Duty Cycle 2#



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

6.5 Deactivation

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

Requirement(s):

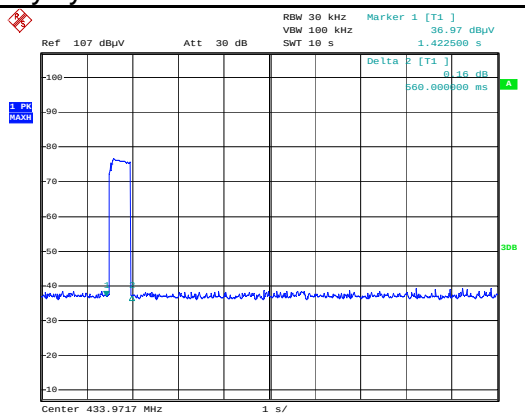
Spec	Item	Requirement	Applicable
§15.231 (a)(1)	a)	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.	☑
Test Setup	Spectrum Analyzer — EUT		
Test Procedure	measurement procedure - Set analyzer center frequency to channel center frequency. - Set the span to 0Hz. - Set the VBW ≥ 3 ´ RBW. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize.		
Remark			
Result	☑ Pass ☐ Fail		

Test Data ☐ Yes ☑ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Plots

Duty Cycle Measurement Result



Date: 21.AUG.2015 14:43:00

< 5 seconds	

Annex A. TEST INSTRUMENT

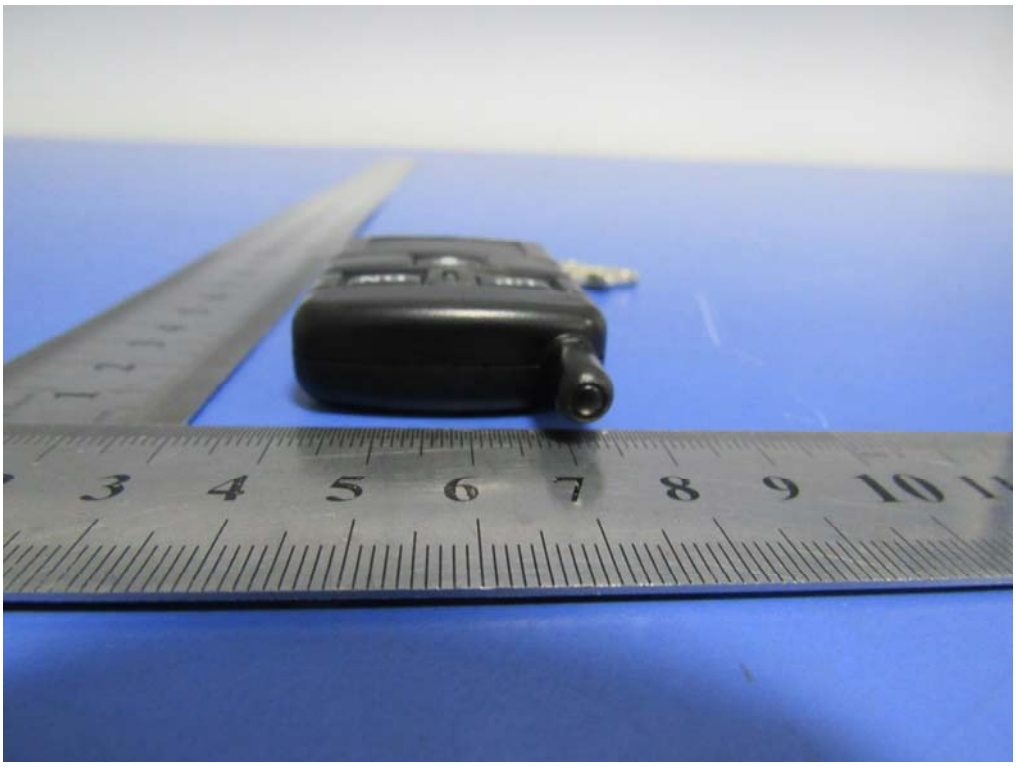
Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	11/04/2014	11/03/2015	N/A
V-LISN	ESH3-Z5	838979/005	09/27/2014	09/26/2015	N/A
SIEMIC Conducted Emissions software	V1.0	N/A	N/A	N/A	N/A
RF conducted test					
R&S EMI Receiver	ESPI3	101216	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	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

Front View of EUT

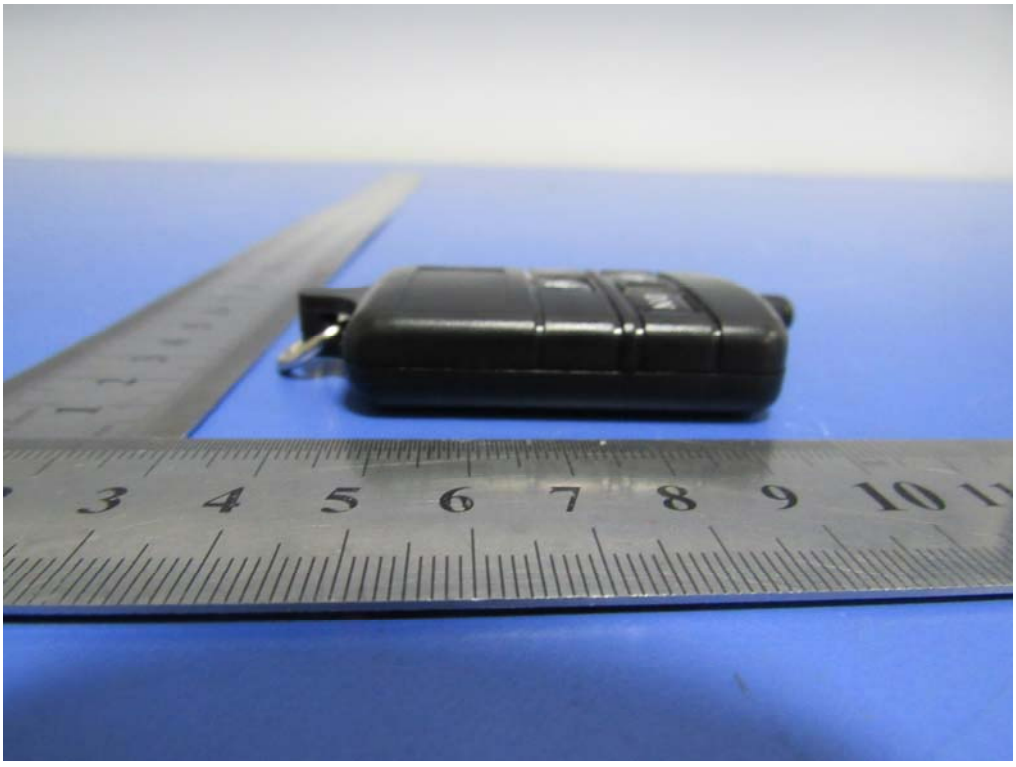
Rear View of EUT



Top View of EUT

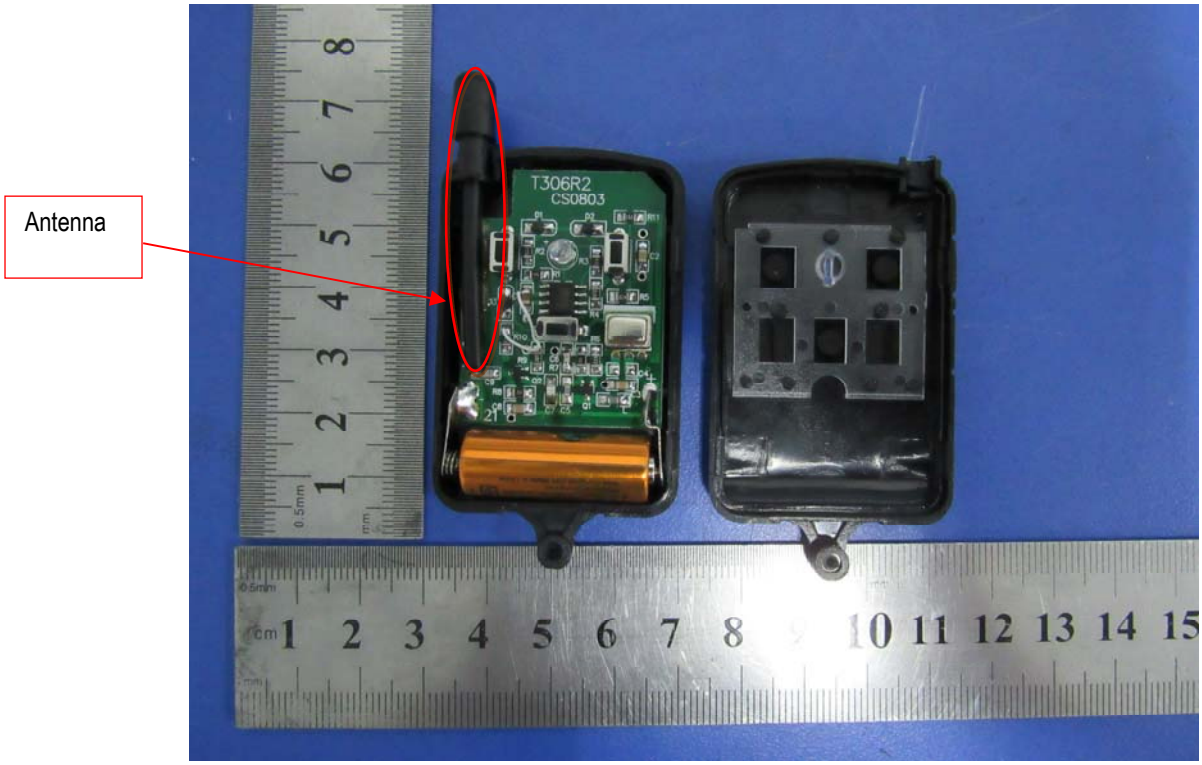
Bottom View of EUT

Left View of EUT

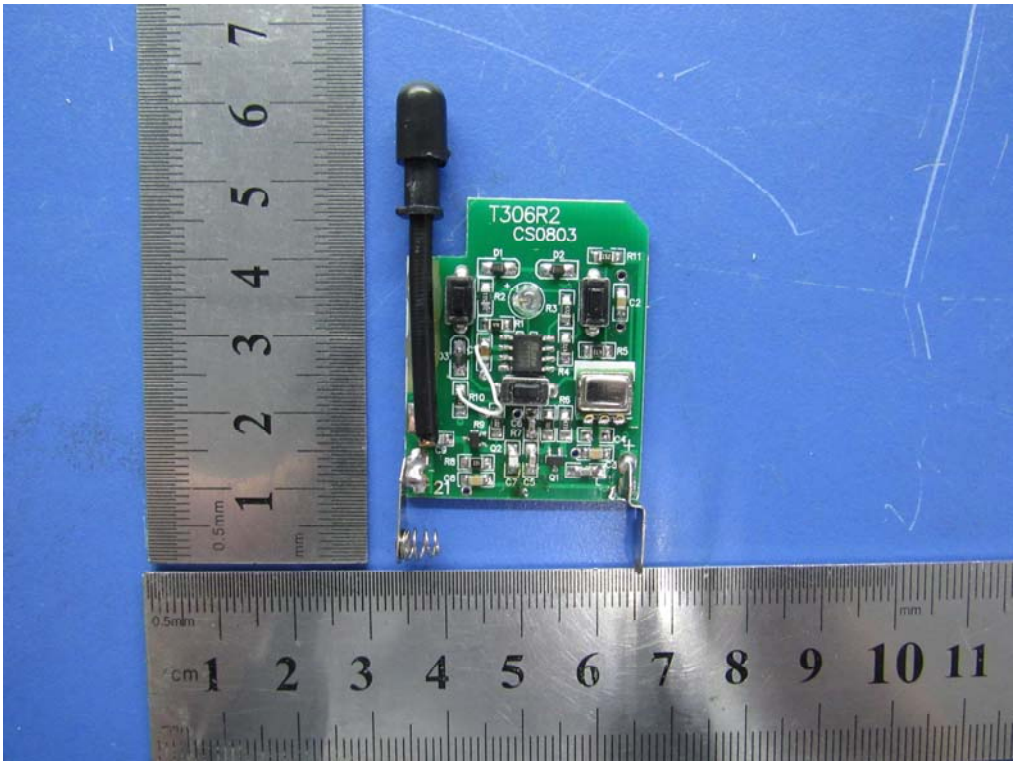


Right View of EUT

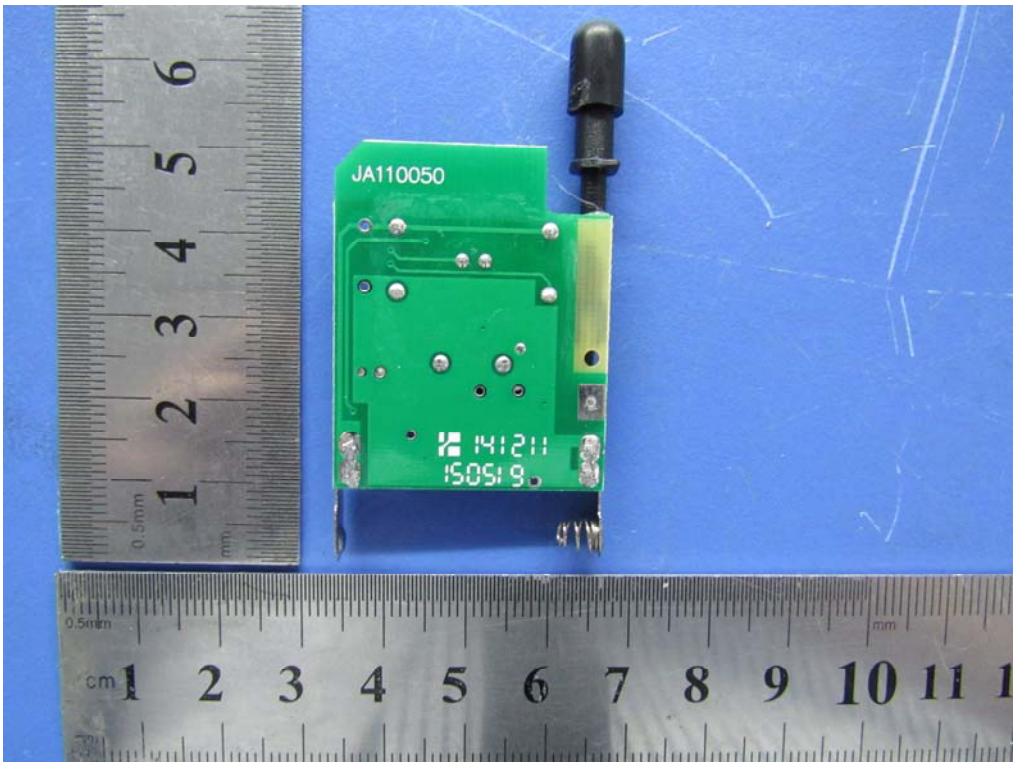
Annex B.ii. Photograph EUT Internal Photo



Uncover - Front View

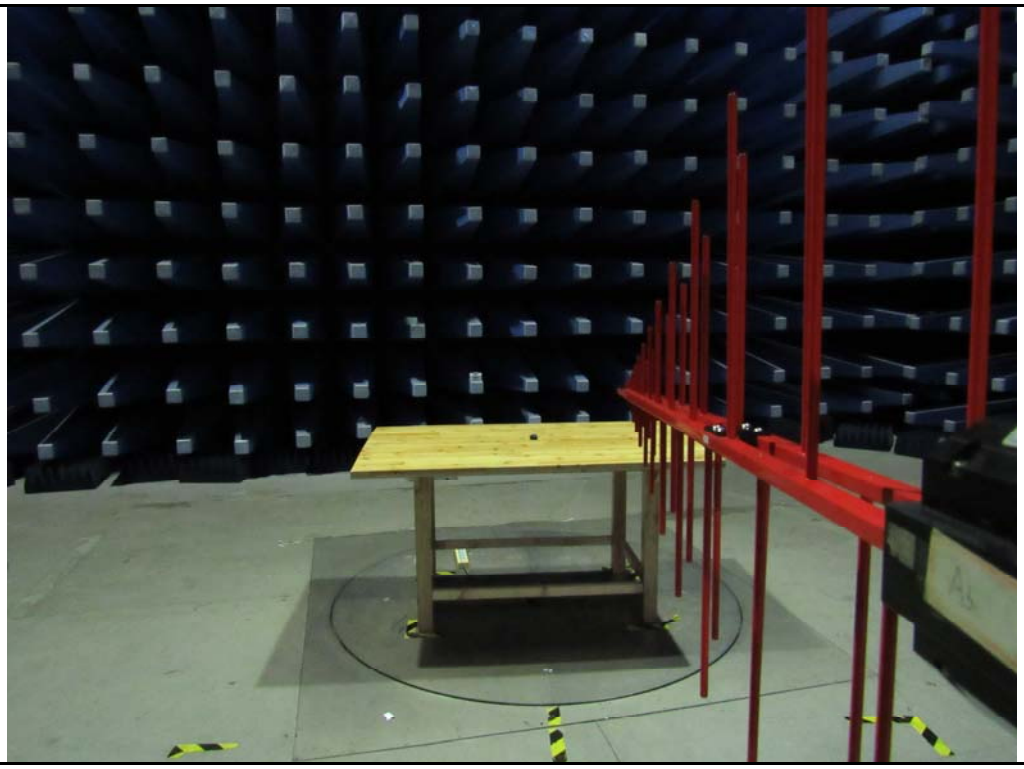


EUT PCBA – Front View

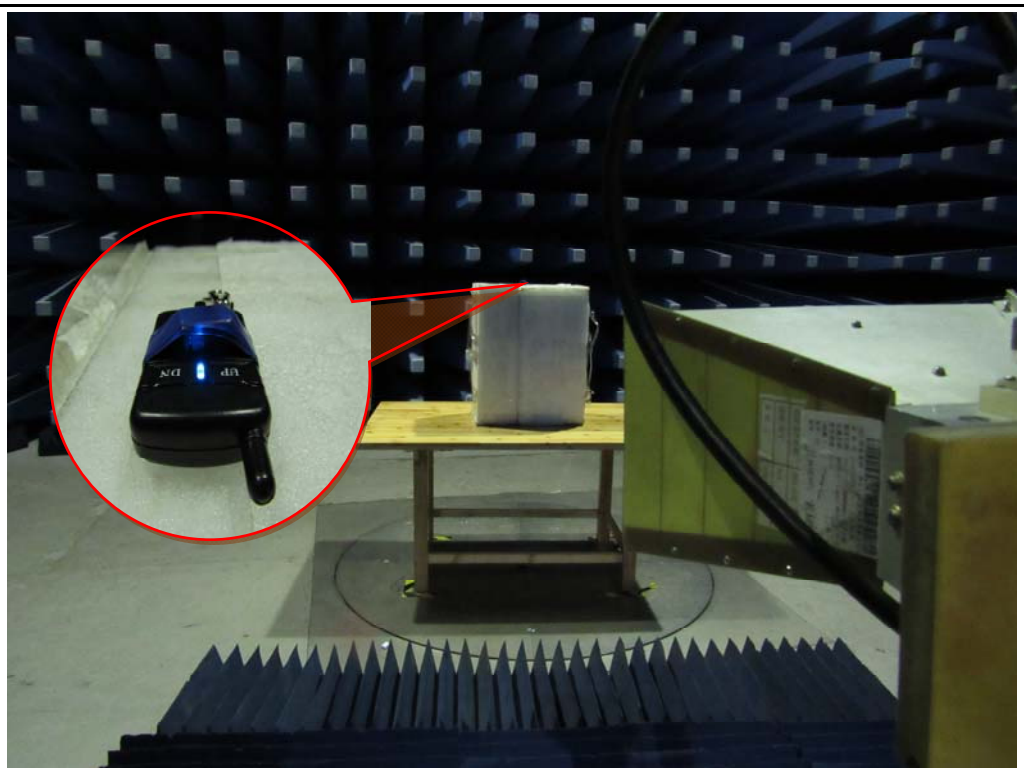


EUT PCBA – Rear View

Annex B.iii. Photograph: Test Setup Photo



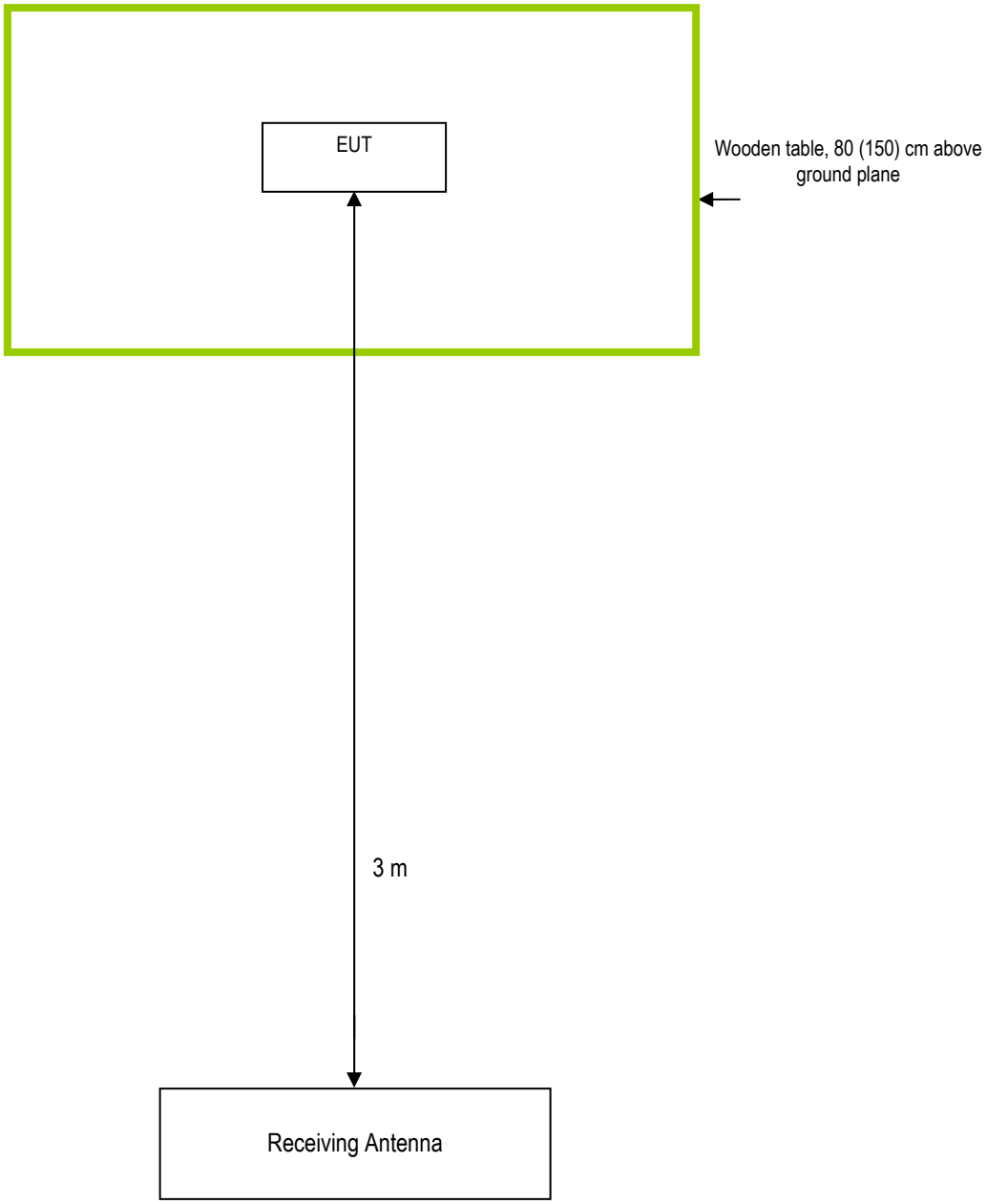
Radiated Spurious Emissions Test Setup Below 1GHz



Radiated Spurious Emissions Test Setup Above 1GHz

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK



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

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

Please see attachment

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

Confirmed by Beijing Jia An Electronics Technology Co,.Ltd.

Authorized Signature: Helen Dan

Date: 2015.8.24