FCC Test Report

Report No.: AGC02059140701FE04

FCC ID	:	Z3CWECCANRC
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Radio control RC helicopter
BRAND NAME	:	Spacegate
MODEL NAME	:	SG-H5501,SG-H5321 ,SG-H5502,SG-H5503,SG-H5504, SG-H5700,SG-H5701,SG-H5702,SG-H5703,SG-H5705, SG-H5602,SG-H6400,SG-H6500,SG-F25,SG-F33,SG-F35, SG-F65,SG-F66,SG-F88,SG-F99
CLIENT	:	Weccan Industrial Limited
DATE OF ISSUE	:	Aug. 04, 2014
STANDARD(S)	:	FCC Part 15 Subpart C, Section 15.227
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 04, 2014	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	Weccan Industrial Limited
Address	Rm209，2/F,BuildingW1-A, No.34 Gaoxin South 4th Street, Hi-tech Industrial Park, Nanshan District, Shenzhen City, China
Manufacturer	Weccan Industrial Limited
Address	Building 10, Fuxing Industrial Area, Fuxing Road, Xiagang Village, Changan Town, Dongguang City, Guangdong Province
Product Designation	Radio control RC helicopter
Brand Name	Spacegate
Test Model	SG-H5501
Series Model	SG-H5321,SG-H5502,SG-H5503,SG-H5504,SG-H5700,SG-H5701, SG-H5702,SG-H5703,SG-H5705,SG-H5602,SG-H6400,SG-H6500, SG-F25,SG-F33,SG-F35,SG-F65,SG-F66,SG-F88,SG-F99
Model Difference	All the same except for model name.
Date of test	July 13,2014 to Aug 02,2014
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BGN/RF (2013-03-01)

We hereby certify that:
The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Tested By : 

Bart Xie Aug. 04, 2014

Reviewed By : 

Kidd Yang Aug. 04, 2014

Approved By: 

Solger Zhang Aug. 04, 2014

2. GENERAL INFORMATION

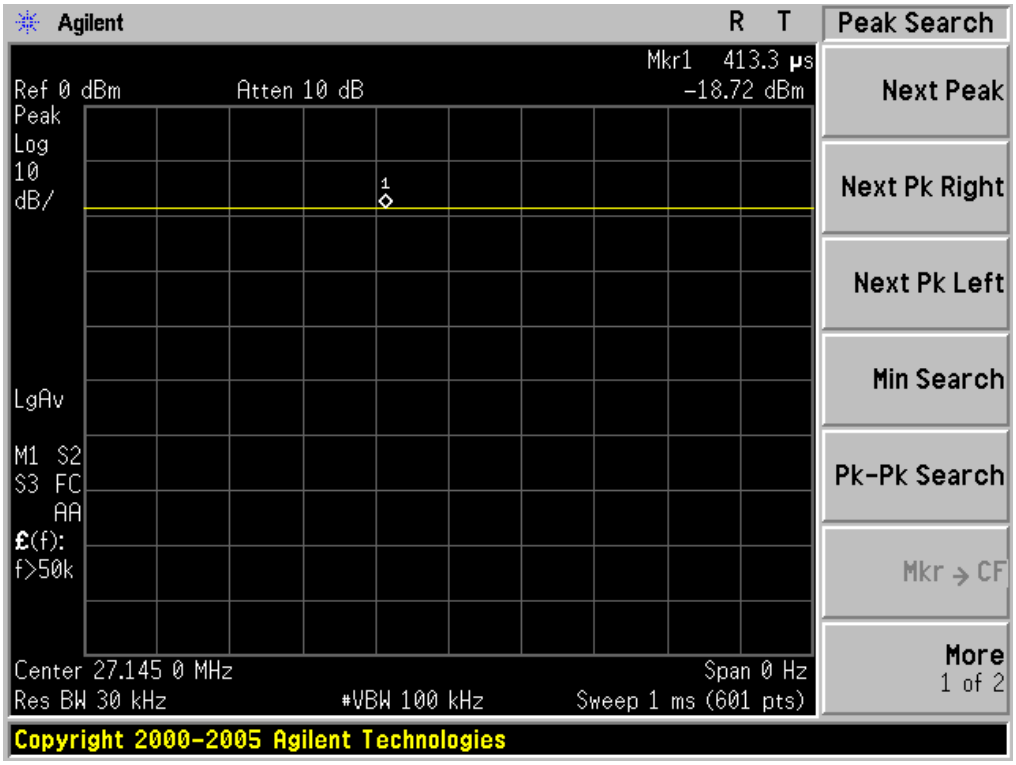
2.1. PRODUCT DESCRIPTION

The equipment under test (EUT) is a transmitter for a RC toy aircraft operating at 27.145MHz. The EUT has 2 control rods to command rise, drop, forward, backward, left and right movement of the associated receiver.

A major technical description of EUT is described as following

Operation Frequency	27.145MHz
Number of channels	1
Bandwidth	86.61KHz
Antenna Designation	Integrated antenna
Power Supply	6.0Vd.c. (4 x “ AA” size batteries)

Note: The transmitter transmits signal for continue to launch. For further information refer to User Manual.



2.3. TEST STANDARDS

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

The following report of is prepared on behalf of the Attestation of Global Compliance Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.227 of the Federal Communication Commission rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.227 of the Federal Communication Commission rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

2.4. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: Z3CWECCANRC** filing to comply with the FCC Part 15 requirements.

2.5. TEST METHODOLOGY

Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

FS = R + System Factor

System Factor = AF + CF + FA – PA

Where FS = Net Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer / Test Receiver in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

Attestation of Global Compliance (Shenzhen) Co., Ltd.

2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.

FCC register No.: 259865

3. MEASUREMENT UNCERTAINTY

Conducted measurement: +/- 2.75dB

Radiated measurement: +/- 3.2dB

4. DESCRIPTION OF TEST MODES

No.	TEST MODES
1	27.145MHZ TX

Note:

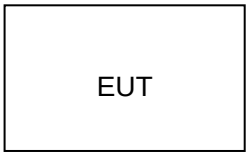
The transmitter transmits signal for continue to launch.

Because this product uses telescopic antenna, so the antennas of different lengths have different test results. All of the tests have antenna length. when the antenna is extended to a maximum worst case, Only report the worst case in the report.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Radio control RC helicopter	SG-H5501	SG-H5501	EUT

Note: All the accessories have been used during the test in conduction emission test.

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.227(a)	Radiated Emission of Carrier Frequency	Compliant
§15.227(b)	Radiated Emission,	Compliant
§15.207	Conducted Emission on AC, 0.15MHz to 30MHz	N/A
§15.215	Bandwidth Measurement	Compliant

Note: N/A - Not Applicable

The EUT received power from DC 6V dry battery.

6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003.

ALL TEST EQUIPMENT LIST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	US41421290	07/25/2014	07/24/2015
Amplifier	EM	EM30180	0607030	02/27/2014	02/26/2015
EMI Test Receiver	Rohde & Schwarz	ESCI	100694	07/25/2014	07/24/2015
Biological Antenna	A.H. Systems Inc.	SAS-521-4	26	06/07/2014	06/06/2015
Loop Antenna	A.H.	SAS-526B	264	07/14/2014	07/13/2015
Radiation Cable 1	Sat	RE1	R003	06/04/2014	06/03/2015
Radiation Cable 2	Sat	RE2	R002	06/04/2014	06/03/2015
Conduction Cable	Sat	CE1	C001	06/04/2014	06/03/2015

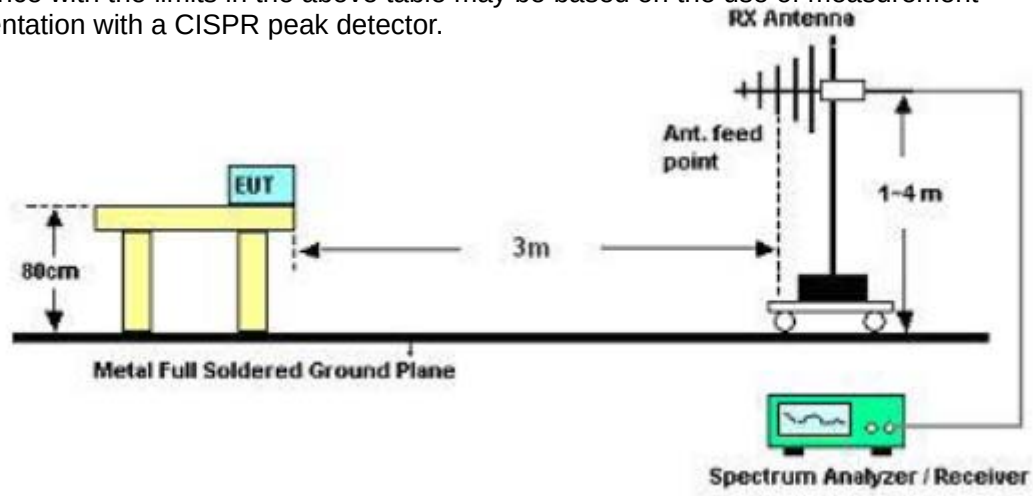
7. Radiated Emission of Carrier Frequency

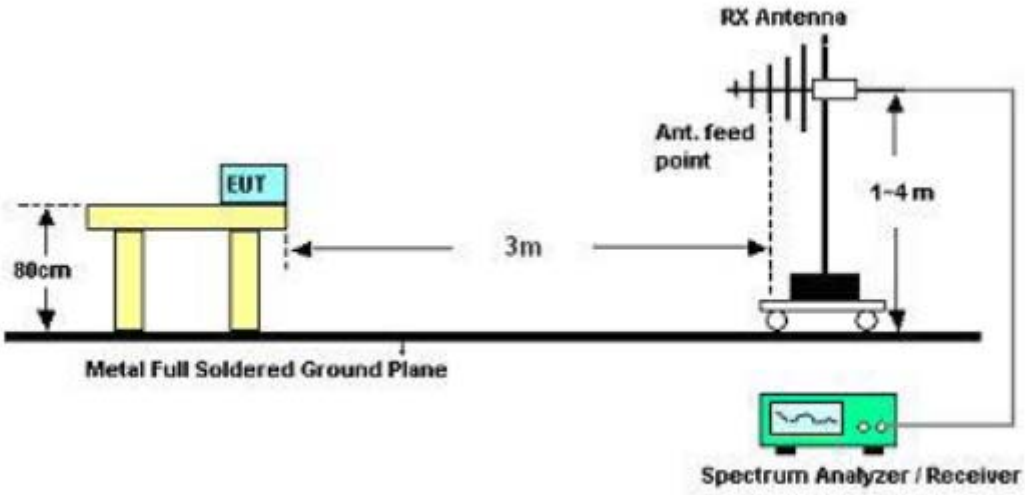
7.1. Limits for Fundamental Frequency: [Section 15.227 (a)]

Limits for Fundamental Frequency: [Section 15.227 (a)]:

Fundamental Frequency [MHz]	Field Strength of Fundamental Emission [Peak] [μV/m]	Field Strength of Fundamental Emission [Average] [dBμV/m]
26.96–27.28	100,000 (100 dBmV/m)	10,000 (80 dBmV/m)

Compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR peak detector.





Results: PASS

Radiated Emissions							
Value	Emissions Frequency	E-Field Polarity	Reading	System Factor	Field Strength at 3m	Limit	Delta to Limit
	MHz		**dBµV/m**	**dB**	**dBµV/m**	**dBµV/m**	**dBµV/m**
PK	27.145	V	38.80	15.4	54.20	100	-45.80
AV	27.145	V	36.70	15.4	52.10	80	-27.90
PK	27.145	H	34.50	15.4	49.90	100	-50.10
AV	27.145	H	33.80	15.4	49.20	80	-30.80

Note:

Remark:
-Calculated measurement uncertainty: ±5.0dB

8. Radiated Emission of Fundamental Frequency

8.1. Limit for Radiated Emission Falling in Restricted Bands [Section 15.209]

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in section 15.209, whichever permits a higher field strength.

Frequency (MHz)	Field Strength [μV/m]	Field Strength [dBμV/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

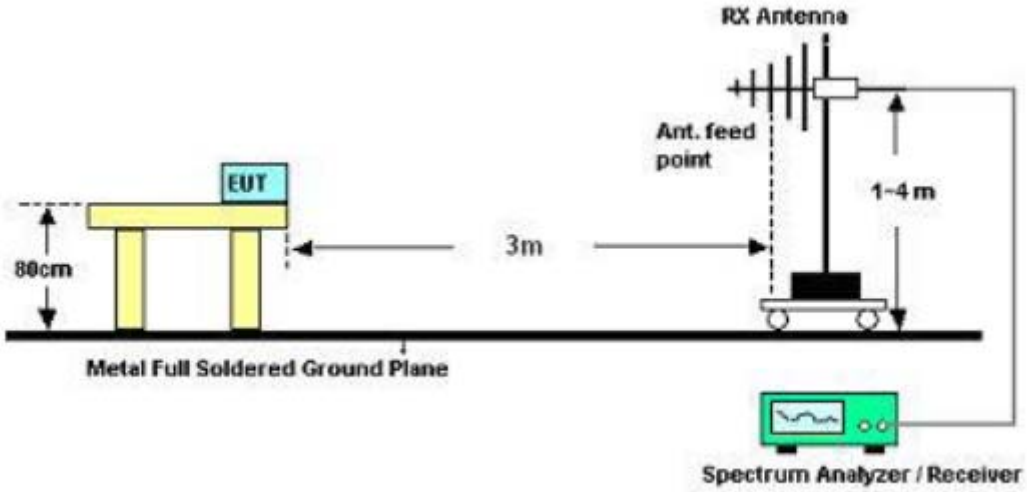
Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

8.2. Test Results

Spurious Radiated Emission

Test Requirement:	FCC part 15 section 15.227(b)
Test Method:	ANSI C63.4:2003
Test Date:	2014-07-15
Mode of Operation:	Transmitting mode.
Detector Function	Quasi Peak
Measurement BW	120 kHz



Results: PASS

Radiated Emissions (1-10th Harmonics)

Value	Emissions Frequency **MHz**	E-Field Polarity	Reading **dBµV/m**	System Factor **dB**	Field strength at 3m **dBµV/m**	Limit **dBµV/m**	Delta to Limit **dBµV/m**
QP	36.95	V	20.40	15.10	35.50	40.00	-4.50
QP	54.38	V	20.68	11.53	32.21	40.00	-7.79
QP	217.73	V	23.13	17.14	40.27	46.00	-5.73
QP	270.92	V	22.85	17.56	40.41	46.00	-5.59
QP	36.60	H	24.49	15.10	39.59	46.00	-6.41
QP	54.84	H	35.83	11.53	47.36	54.00	-6.64
QP	217.75	H	32.73	17.14	49.87	54.00	-4.13
QP	270.83	V	22.08	17.56	39.64	46.00	-6.36

Note: No further spurious emissions found between 30 MHz and lowest internal used/generated frequency.

Remark:
- (*) Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).
- Calculated measurement uncertainty: ±5.0dB.

9. FCC LINE CONDUCTED EMISSION TEST

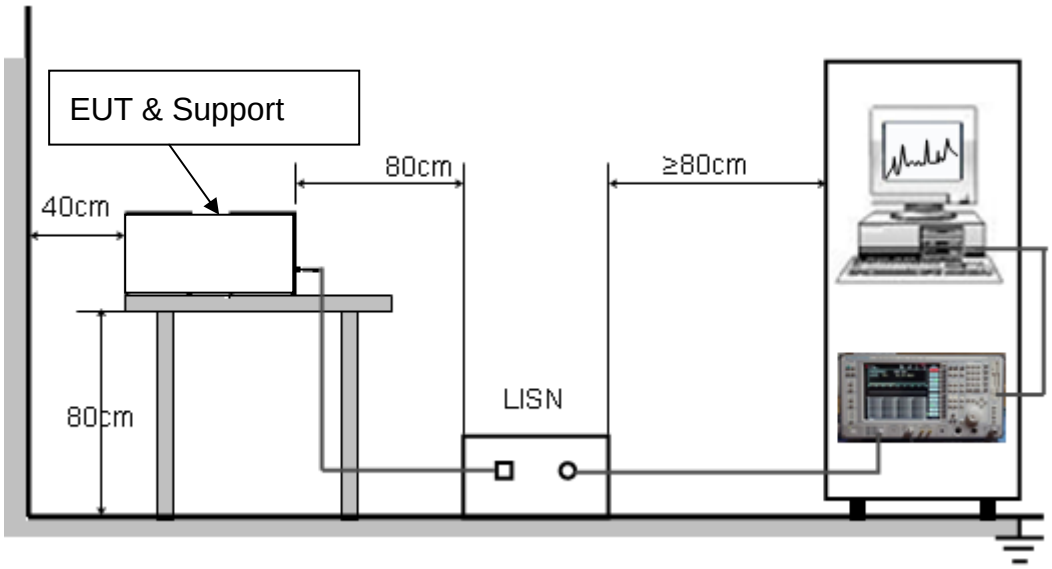
9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

9.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



9.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN..
6. The 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.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

9.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

The test modes were carried out for all operation modes
The worst test data (test mode) was showed as the follow:

Results: N/A
Note : This testing is not applicable for the battery operated EUT.

10. Bandwidth Measurement

10.1. Limit for Bandwidth [Section 15.215]

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

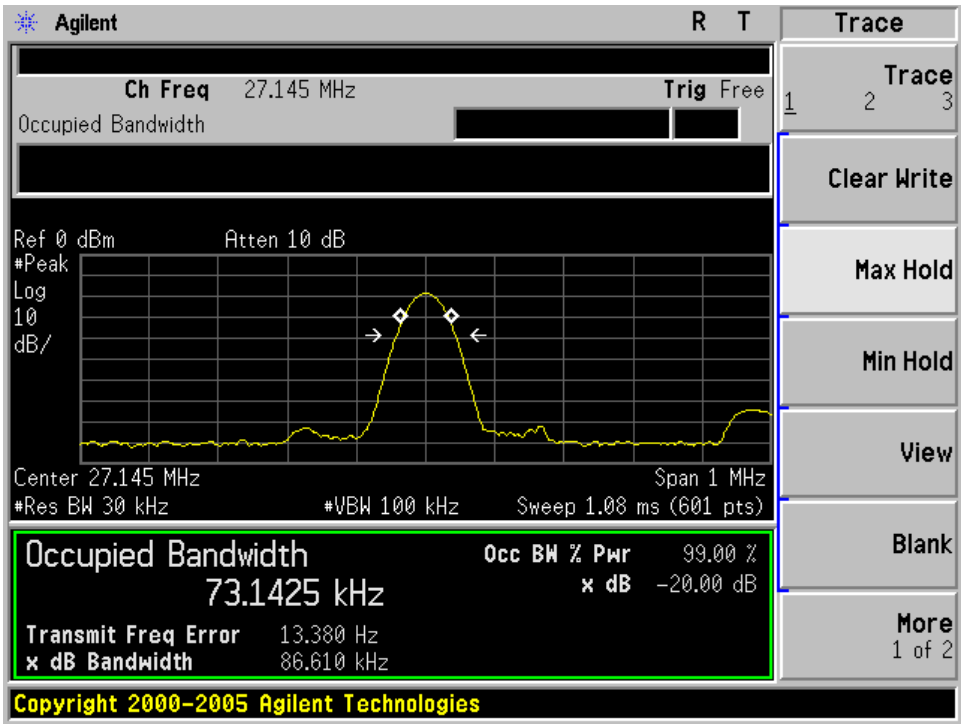
10.2. Test Results

Bandwidth Measurement

Test Requirement:	FCC part 15 section 15.215(c)
Test Method:	ANSI C63.4:2003
Test Date:	2014-07-15
Mode of Operation:	Transmitting mode.
Detector Function:	Peak

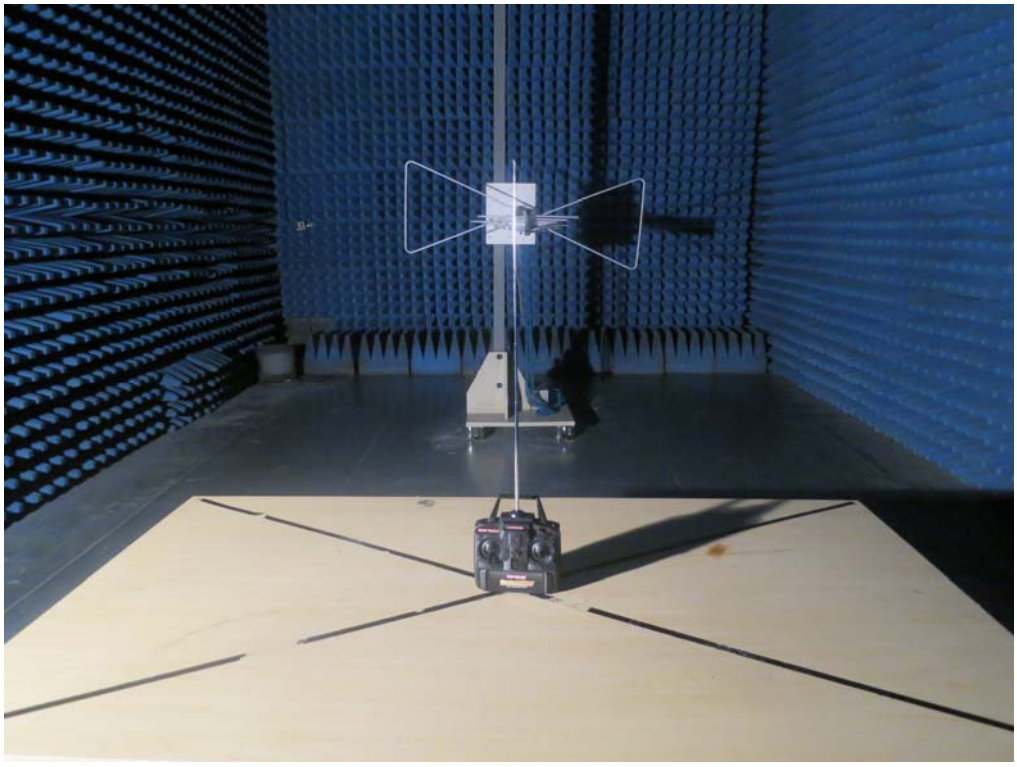
Results: PASS

CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (KHz)
27.145	86.610



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP



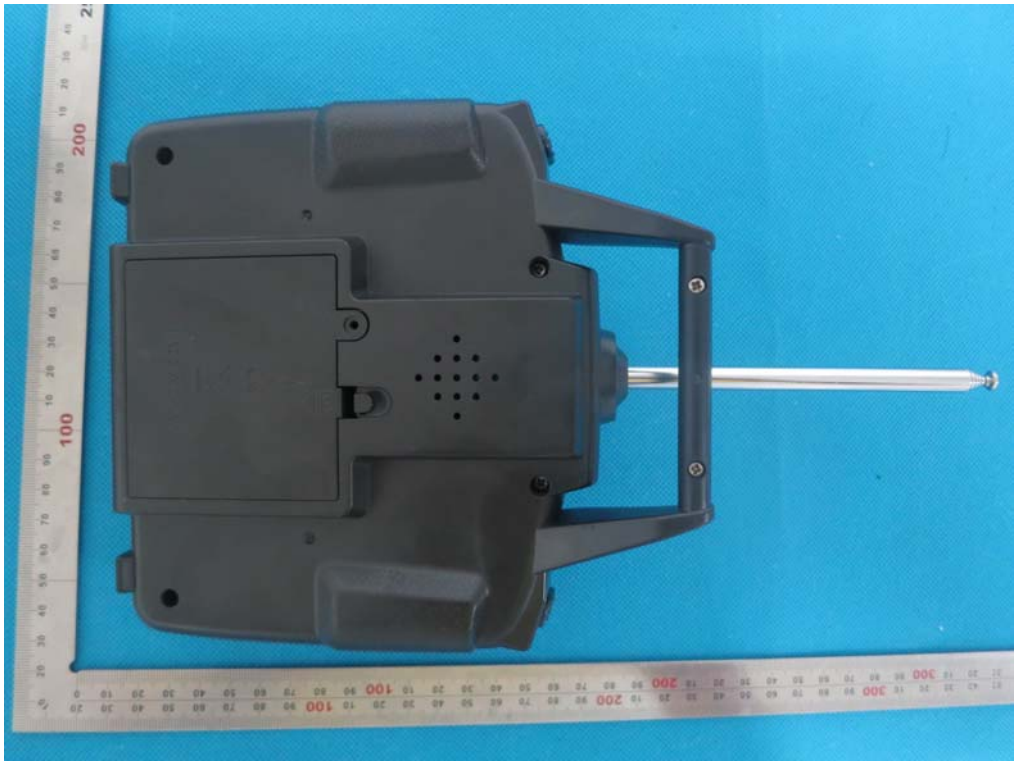
APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

BACK VIEW OF EUT



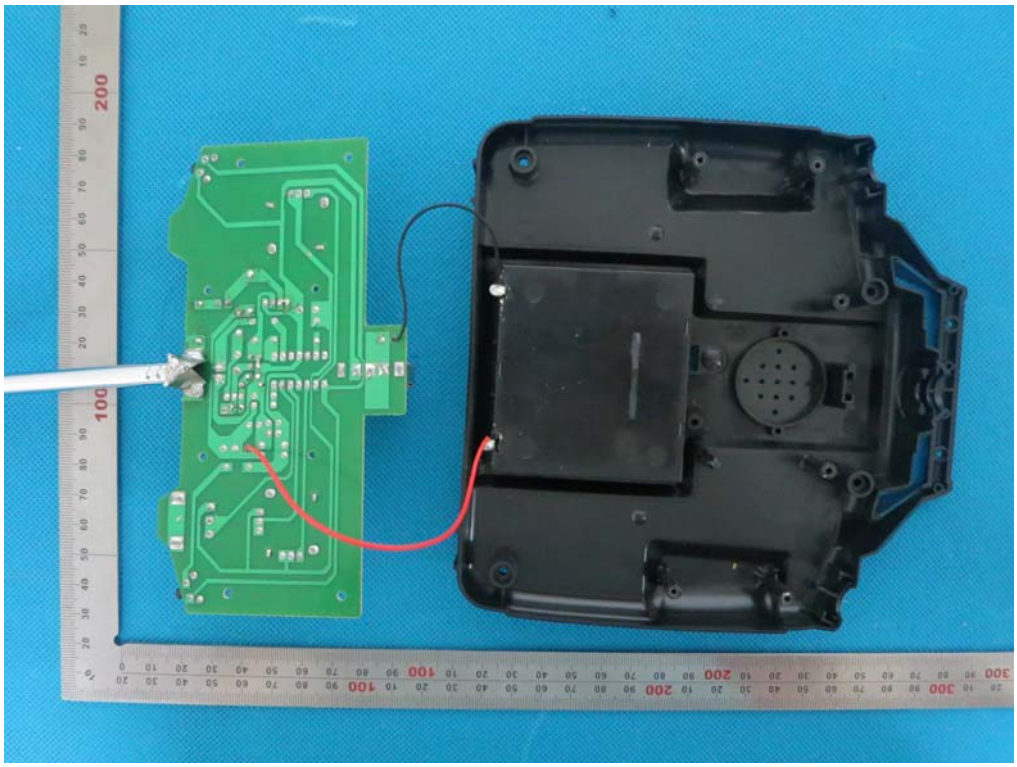
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

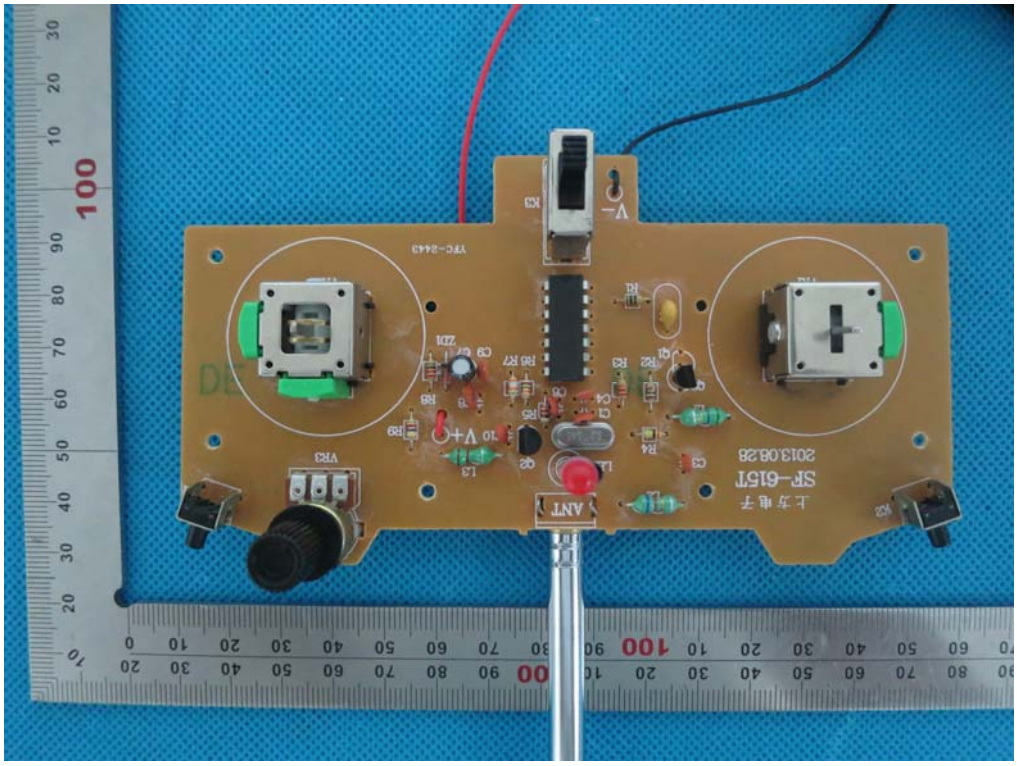
OPEN VIEW OF EUT-1

OPEN VIEW OF EUT-2

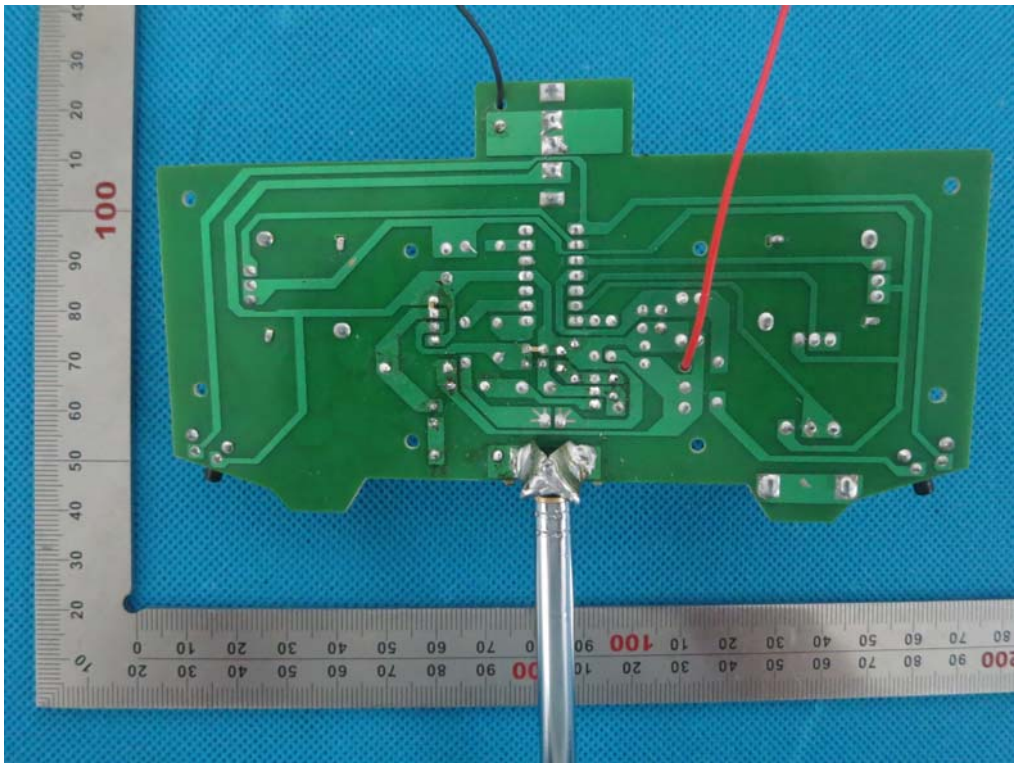
OPEN VIEW OF EUT-3



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



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