FCC TEST REPORT

FCC ID: 2AT99-EX5

On Behalf of

SHENZHEN FEIJIADA TECHNOLOGY CO., LTD

REMOTE CONTROL AIRCRAFTSERIES

Model No.: See page 7

Prepared for	:	SHENZHEN FEIJIADA TECHNOLOGY CO., LTD
Address	:	428, BLDG. 2, JINFANGHUA E-COMMERCE INDUSTRIAL PARK, NO. 450 BULONG ROAD, BANTIAN ST.,LONGGANG DISTRICT SHENZHEN CHINA (MAINLAND)

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2009169-C01-R01
Date of Receipt	:	September 20, 2020
Date of Test	:	September 20-24, 2020
Date of Report	:	September 25, 2020
Version Number	:	V0

TABLE OF CONTENTS

Description Page

1. Summary of Standards And Results 6
1.1. Description of Standards and Results 6
2. General Information 7
2.1. Description of Device (EUT) 7
2.2. Accessories of Device (EUT) 8
2.3. Tested Supporting System Details 8
2.4. Block Diagram of connection between EUT and simulators 8
2.5. Test Mode Description 8
2.6. Test Conditions 9
2.7. Test Facility 9
2.8. Measurement Uncertainty 9
2.9. Test Equipment List 10
3. Power Line Conducted Emission Test 11
3.1. Block Diagram of Test Setup 11
3.2. Test Limits 11
3.3. Configuration of EUT on Test 12
3.4. Operating Condition of EUT 12
3.5. Test Procedure 12
3.6. Test Results 12
The EUT is supplied by Battery, so this item does not applicable 12
4. Radiated Emission Test 13
4.1. Block Diagram of Test Setup 13
4.2. Test Limit 14
4.3. Configuration of EUT on Test 15
4.4. Operating Condition of EUT 15
4.5. Test Procedure 15
4.6. Test Results 16
5. Band Edge Test 21
5.1. Block Diagram of Test Setup 21
5.2. Test Limit 21
5.3. Configuration of EUT on Test 22
5.4. Operating Condition of EUT 22
5.5. Test Procedure 22
5.6. Test Results 24
6. Occupied bandwidth Test 26
6.1. Block Diagram of Test Setup 26
6.2. Test Limit 26
6.3. Test Procedure 26
6.4. Test Results 26
7. Antenna Requirement 28
7.1. Standard Requirement 28

7.2. Antenna Connected Construction 28
7.3. Results 28
8. Photograph 29
8.1. Photos of Radiated Emission Test 29
9. Photos of The EUT 30

TEST REPORT DECLARATION

Applicant	:	SHENZHEN FEIJIADA TECHNOLOGY CO., LTD
Address	:	428, BLDG. 2, JINFANGHUA E-COMMERCE INDUSTRIAL PARK, NO. 450 BULONG ROAD, BANTIAN ST.,LONGGANG DISTRICT SHENZHEN CHINA (MAINLAND)
Manufacturer	:	SHENZHEN FEIJIADA TECHNOLOGY CO., LTD
Address	:	428, BLDG. 2, JINFANGHUA E-COMMERCE INDUSTRIAL PARK, NO. 450 BULONG ROAD, BANTIAN ST.,LONGGANG DISTRICT SHENZHEN CHINA (MAINLAND)
EUT Description	:	REMOTE CONTROL AIRCRAFTSERIES
		(A) Model No. : See page 7
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249

ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part 15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Lucas Pang Project Engineer	Lucas Pang
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	September 25, 2020	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	September 25, 2020	Initial released Issue	Lucas Pang

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION			
Description of Test Item	**Test Requirement**	**Standard Paragraph**	**Results**
Power Line Conducted Emission Test	FCC Part 15	Section 15.207	N/A
Spurious Emission Test	FCC Part 15	Section 15.249&15.209	P
Occupied bandwidth	FCC Part 15	Section 15. 249	P
Band edge Requirement	FCC Part 15	Section 15.249	P
Antenna Requirement	FCC Part 15	Section 15.203	P

Note: 1. P is an abbreviation for Pass.
2. F is an abbreviation for Fail.
3. N/A is an abbreviation for Not Applicable.

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

EUT Name	:	REMOTE CONTROL AIRCRAFTSERIES
Trademark	:	N/A
Model No.	:	JD-22,JD-22S, JD-23, JD-23S, JD-25, JD-25S, JD-26, JD-26S, JD-27, JD-27S, JD-28, JD-28S, JD-29, JD-29S, JD-30, JD-30S, E020, E021, E021S, E022, E022S, E38, E58, E58 PRO, E61, E61H, E61HW, E65H, E65HW, E511, E511S, E520, E520S, E520S PRO, E530, E530S, E68, E69, E610, E540, E540S, EX5 PRO, EX6, EX7, FX1, FX2, FX10, F111, F40, F41, F540, F540S, JY025, JY026, JY028, JY029, S161, S162, S163, S165, S166, S167, S168, S169, S171, S172, S173, S175, S176, S177, S178, S179, S186, S188, S189, S199
DIFF.	:	There is no difference except for the model name. So all the test were performed on the model EX5 PRO
Power supply	:	DC 6V by battery

2.4G Technology		
Operation frequency	:	2405MHz -2475MHz
Modulation	:	GFSK
Number of channels	:	71
Channel spacing	:	1MHz
Antenna Type	:	Internal Antenna, max gain 3.8dBi.
Hardware version	:	6.SJ-297L+PA V3.0
Software version	:	6.SJ-297L+PA V3.0
Sample Type	:	Prototype production

2.2.Accessories of Device (EUT)

Accessories1 : /

Manufacturer : /

Model : /

Power supply : /

2.3.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	/	/	/	/	/

2.4.Block Diagram of connection between EUT and simulators

EUT

2.5.Test Mode Description

Test mode:

Mode	Channel	Frequency (MHz)
GFSK	Low	2405
GFSK	Middle	2445
GFSK	High	2475

Note:
1. The test was used to control EUT work in Continuous TX mode, and select test channel, wireless mode
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. New battery is used during all tests.
4. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω , Cable Loss: 1.0 dB

Channel list:

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2405MHz	5	2409MHz	68	2472MHz
2	2406MHz	6	2410MHz	69	2473MHz
3	2407MHz	7…66	2411…2470 MHz	70	2474MHz
4	2408MHz	67	2471MHz	71	2475MHz

2.6.Test Conditions

Temperature range	21-25℃
Humidity range	40-75%
Pressure range	86-106kPa

2.7.Test Facility

Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

September 15, 2019 Certificated by IC
Registration Number: CN0085

2.8.Measurement Uncertainty

(95% confidence levels, k=2)

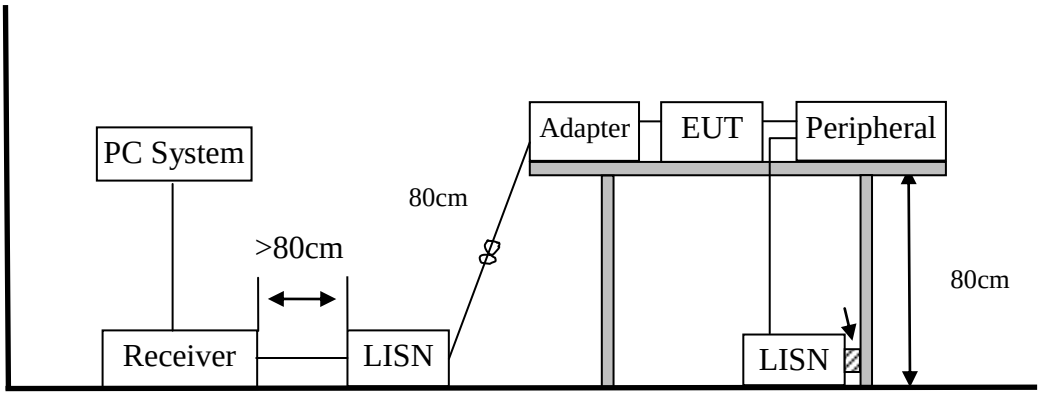
Item	**Uncertainty**
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77 dB (Distance: 3m Polarize: V)
	3.80 dB (Distance: 3m Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13 dB (Distance: 3m Polarize: V)
	4.16 dB (Distance: 3m Polarize: H)
Uncertainty for radio frequency	5.8×10-8
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9.Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2020.09.02	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2020.09.02	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2020.09.02	1Year
Receiver	R&S	ESCI	101165	2020.09.02	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2020.09.02	1Year
Cable	Resenberger	N/A	No.2	2020.09.02	1Year
Cable	Resenberger	N/A	No.3	2020.09.02	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2020.09.02	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2020.09.02	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2020.09.02	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2020.09.02	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2020.09.02	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2020.09.02	1 Year
Power Meter	Agilent	E9300A	MY41496625	2020.09.02	1 Year
Temp. &Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2020.09.02	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2020.09.02	1 Year

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Block Diagram of Test Setup



3.2.Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. Emission level=Read level + LISN factor-Preamp factor + Cable loss

2. * Decreasing linearly with logarithm of frequency.

3. The lower limit shall apply at the transition frequencies.

3.3.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.Operating Condition of EUT

（1） Setup the EUT as shown as Section 3.1.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode taking the test.

3.5.Test Procedure

（1） The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013 on conducted Emission test.

（2） The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver is set at 9kHz.

（3） The frequency range from 30MHz to 1000MHz was pre-scanned with a Peak detector and all final readings of measurement from Test Receiver are Quasi-Peak and Average values.

（4） The test results are reported on Section 3.6.

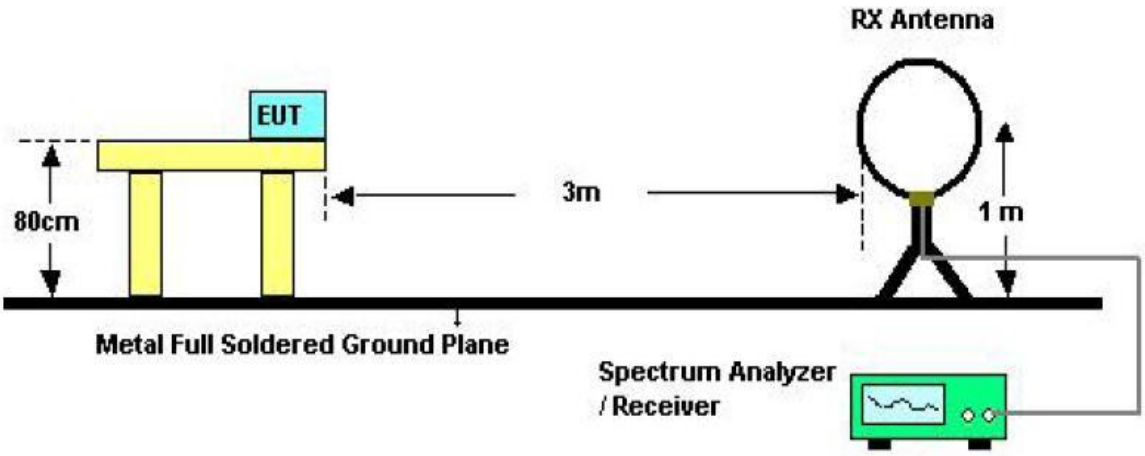
3.6.Test Results

The EUT is supplied by Battery, so this item does not applicable

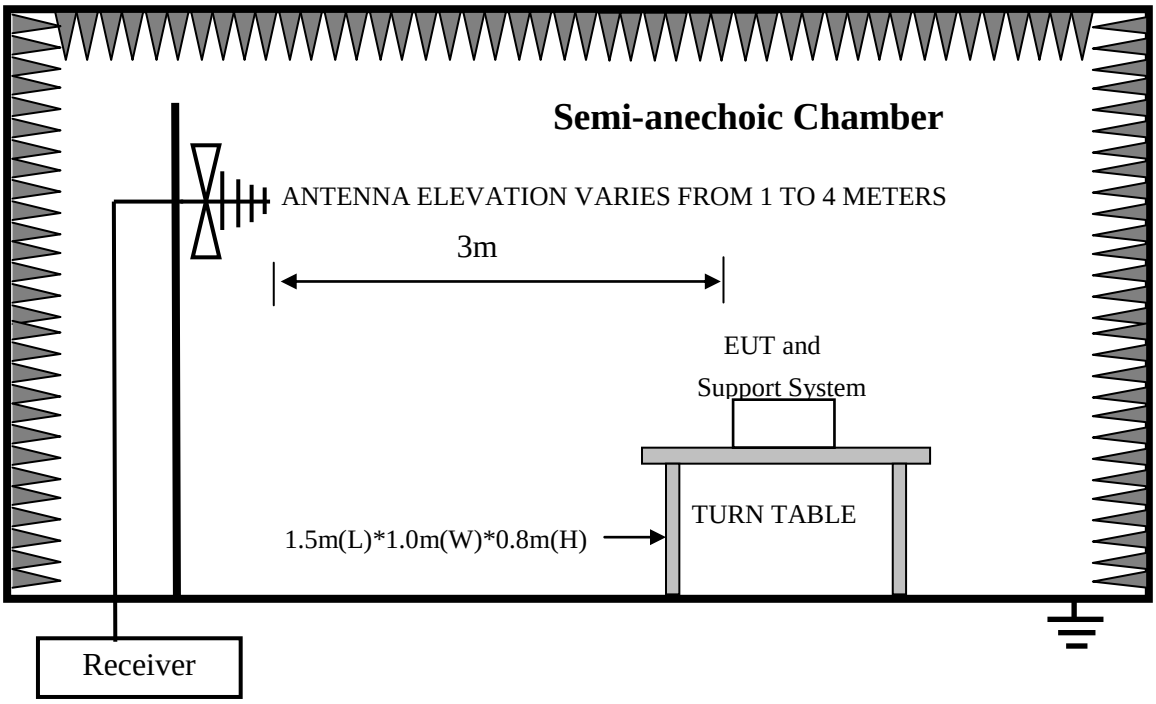
4. RADIATED EMISSION TEST

4.1.Block Diagram of Test Setup

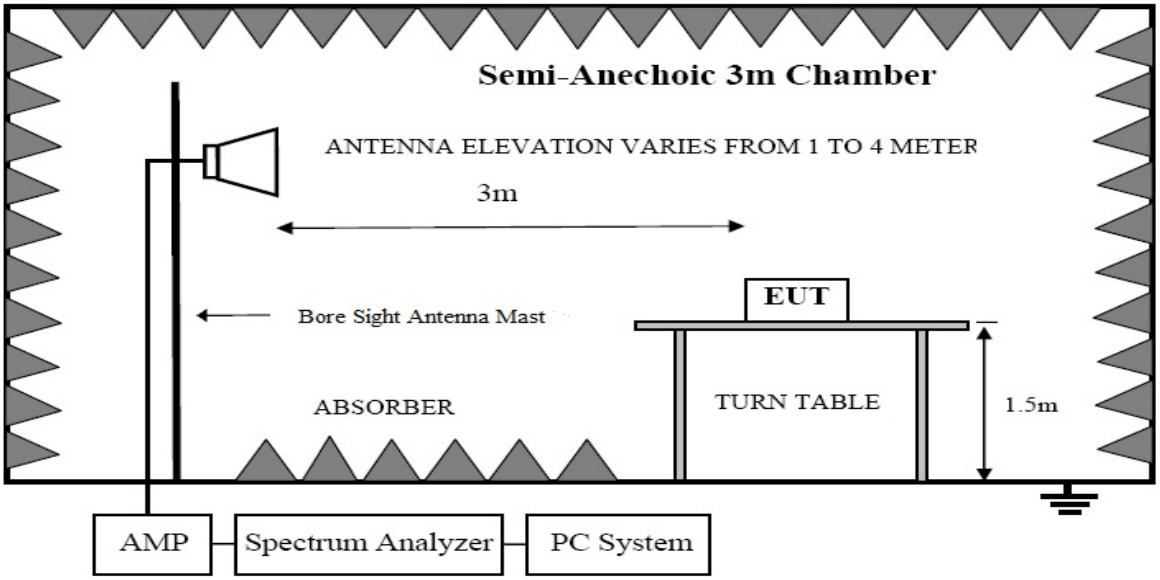
In Semi Anechoic Chamber (3m) Test Setup Diagram for 9KHz~30MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



4.2.Test Limit

Frequency MHz	Distance (Meters)	Field Strengths Limits	
		uV/m	dB uV/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 1.705	30	24000/F(kHz)	----
1.705 30	30	30	29.5
30 88	3	100(3nW)	40
88 216	3	150(6.8nW)	43.5
216 960	3	200(12nW)	46
Above 960	3	500(75nW)	54
Carrier frequency	3	50000(avg)	113.97(peak) 93.97(avg)

Notes:
1. Emission level = Read level + Antenna Factor - Preamp Factor + Cable Loss
2. The smaller limit shall apply at the cross point between two frequency bands.
3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
4. For frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

4.3.Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.4.Operating Condition of EUT

（1） Setup the EUT as shown as Section 4.1.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode taking the test.

4.5.Test Procedure

（1） The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1GHz and 150 cm above the ground plane inside a semi-anechoic chamber for above 1GHz. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10: 2013 on Radiated Emission test.

（2） For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

（3） Test antenna was located 4m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.

(a) Change work frequency or channel of device if practicable.

(b) Change modulation type of device if practicable.

(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions

（4） For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP

（5） The frequency range from 9KHz to 150KHz is checked, the bandwidth of test receiver is

set at 200Hz.

The frequency range from 150KHz to 30MHz is checked, the bandwidth of test receiver is set at 9KHz.

The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver is set at 120kHz.

The frequency range from above 1GHz is checked, the bandwidth of Signal Analyzer is set at 1MHz.

（6） The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, the frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.

（7） Test for all x, y, z axes is performed and only the worst case of X xes was recorded in the test report.

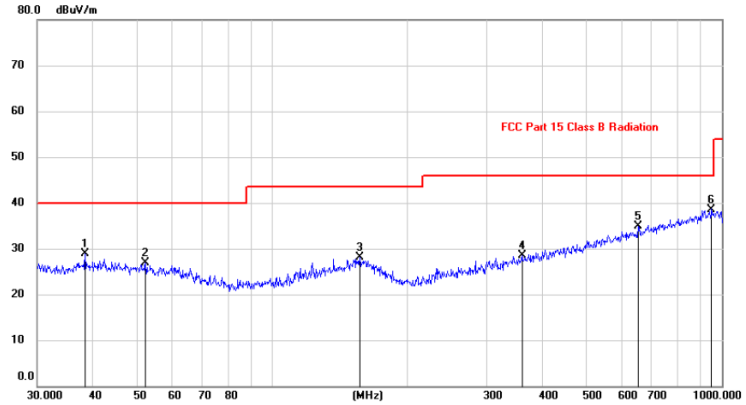
（8） The test results are reported on Section 4.6.

4.6.Test Results

Frequency Range	:	**9KHz~30MHz**			
EUT	:	REMOTE CONTROL AIRCRAFTSERIES	Test Date	:	2020.09.23
M/N	:	EX5	Temperature	:	24℃
Test Engineer	:	Lucas Pang	Humidity	:	56%
Test Mode	:	TX 2405MHz			
Test Results	:	**PASS**			
Note:	1. Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.				

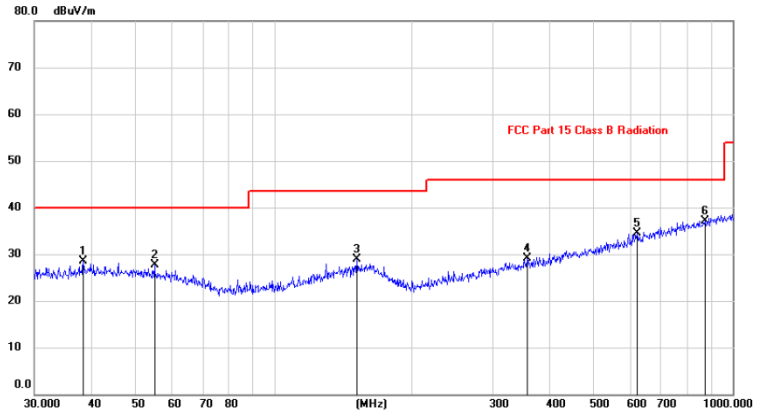
Frequency Range	:	**30MHz~1000MHz`**
Test Mode	:	TX 2405MHz
Test Results	:	**PASS**
Note:	1. The test results are listed in next pages. 2. This mode is worst case mode, and this report only reflected the worst mode. 3. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.	

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		38.3799	14.57	14.26	28.83	40.00	-11.17	peak			
2		52.2536	13.14	13.80	26.94	40.00	-13.06	peak			
3		156.7323	13.09	15.00	28.09	43.50	-15.41	peak			
4		359.5010	13.08	15.39	28.47	46.00	-17.53	peak			
5		653.6586	13.72	21.14	34.86	46.00	-11.14	peak			
6	*	949.1769	13.80	24.80	38.60	46.00	-7.40	peak			

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		38.4472	14.31	14.28	28.59	40.00	-11.41	peak			
2		54.9792	14.09	13.54	27.63	40.00	-12.37	peak			
3		152.0631	13.84	14.99	28.83	43.50	-14.67	peak			
4		357.6151	13.66	15.35	29.01	46.00	-16.99	peak			
5		620.4376	13.92	20.64	34.56	46.00	-11.44	peak			
6	*	874.4800	13.35	23.84	37.19	46.00	-8.81	peak			

Note: This report only shall the worst case mode for TX 2405MHz.

Frequency Range : **1GHz~25GHz**								
EUT : REMOTE CONTROL AIRCRAFTSERIES					Test Date : 2020.09.23			
M/N : EX5					Temperature : 24℃			
Test Engineer : Lucas Pang					Humidity : 56%			
Test Mode : TX 2405MHz								
Test Results : **PASS**								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2405	H	86.33	-4.45	81.88	113.97	-32.09	Peak
2	2405	H	--	-4.45	--	93.97	--	Avg
1	2405	V	78.53	-4.45	74.08	113.97	-39.89	Peak
2	2405	V	--	-4.45	--	93.97	--	Avg

Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.
3. Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK.
4. Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: Avg.
5. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

Frequency Range : **1GHz~25GHz**								
EUT : REMOTE CONTROL AIRCRAFTSERIES					Test Date : 2020.09.23			
M/N : EX5					Temperature : 24℃			
Test Engineer : Lucas Pang					Humidity : 56%			
Test Mode : TX 2445MHz								
Test Results : **PASS**								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2445	H	85.30	-4.28	81.02	113.97	-32.95	Peak
2	2445	H	--	-4.28	--	93.97	--	Avg
1	2445	V	77.68	-4.28	73.4	113.97	-40.57	Peak
2	2445	V	--	-4.28	--	93.97	--	Avg

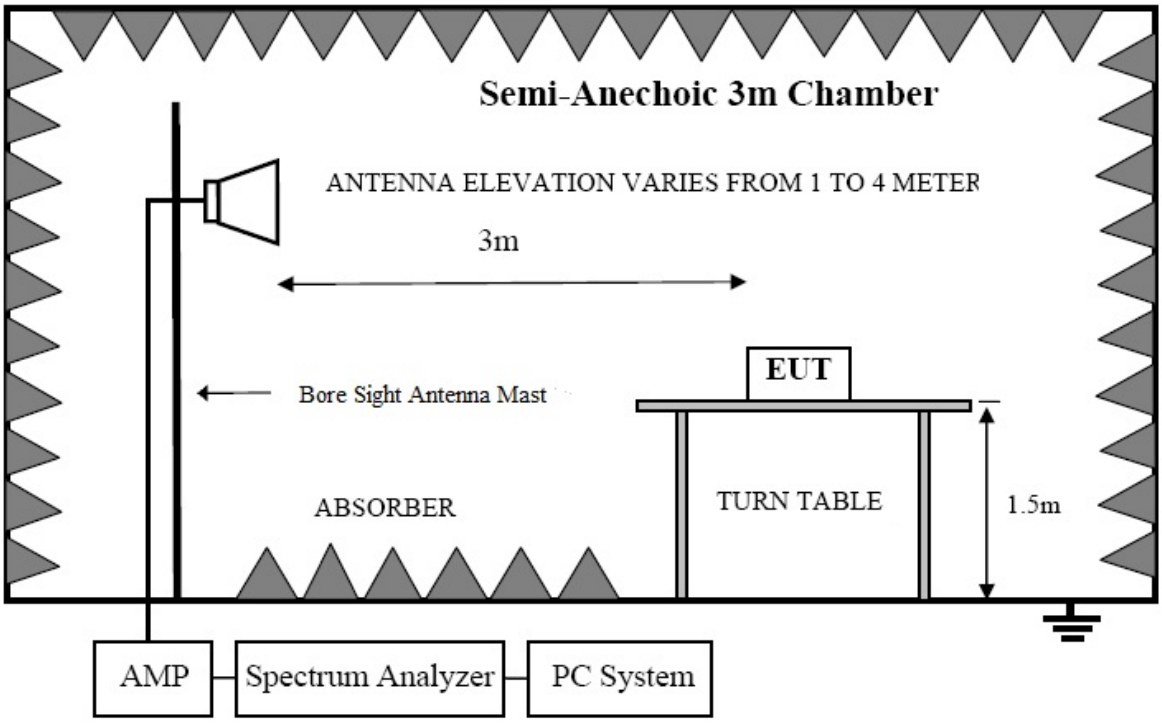
Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.
3. Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK.
4. Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: Avg.
5. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

Frequency Range : **1GHz~25GHz**								
EUT : REMOTE CONTROL AIRCRAFTSERIES					Test Date : 2020.09.23			
M/N : EX5					Temperature : 24℃			
Test Engineer : Lucas Pang					Humidity : 56%			
Test Mode : TX 2475MHz								
Test Results : **PASS**								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2475	H	78.91	-4.04	74.87	113.97	-39.10	Peak
2	2475	H	--	-4.04	--	93.97	--	Avg
1	2475	V	70.19	-4.04	66.15	113.97	-47.82	Peak
2	2475	V	--	-4.04	--	93.97	--	Avg

Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.
3. Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK.
4. Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: Avg.
5. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

5. BAND EDGE TEST

5.1.Block Diagram of Test Setup



5.2.Test Limit

Please refer section15.249 and section 15.205.

249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

249(e) As show in section 15.35(b), for frequencies above 1000MHz,the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak filed strength shall not exceed 2500 millivolts/meter at 3meters along the antenna azimuth.

5.3.Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

（1） Setup the EUT as shown as Section 5.1.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode taking the test.

5.5.Test Procedure

（1） The EUT was placed on a non-metallic table, 150 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10: 2013 on Radiated Emission test.

（2） For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

（3） Test antenna was located 4m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.

(a) Change work frequency or channel of device if practicable.

(b) Change modulation type of device if practicable.

(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions

（5） The frequency range from above 1GHz is checked, the bandwidth of Signal Analyzer is set at 1MHz.

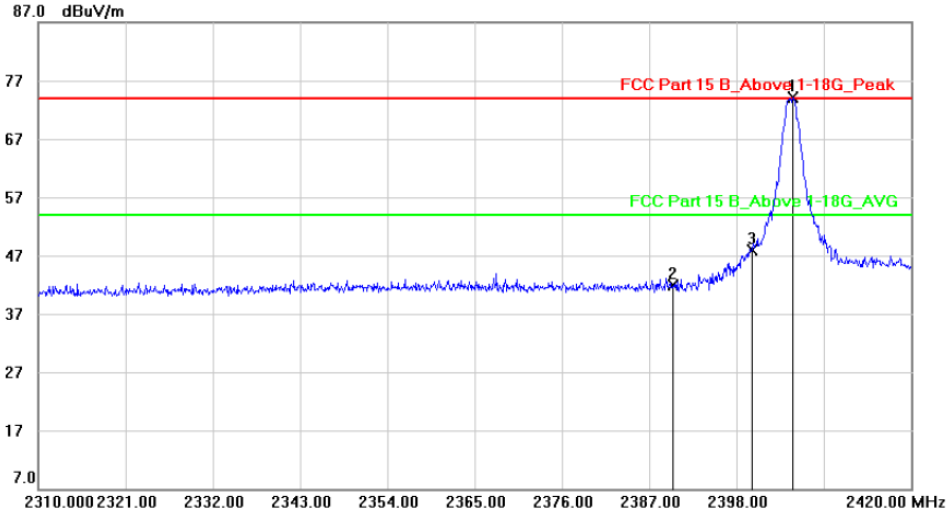
（6） The frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.

（7） Test for all x, y, z axes is performed and only the worst case of X xes was recorded in the test report.

（8） The test results are reported on Section 5.6.

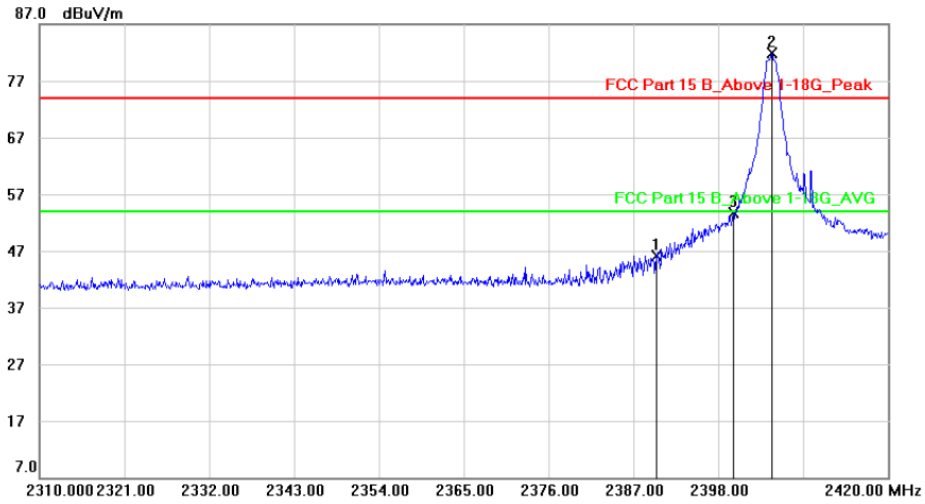
5.6.Test Results

Polarization: Vertical Test Mode: TX 2405MHz



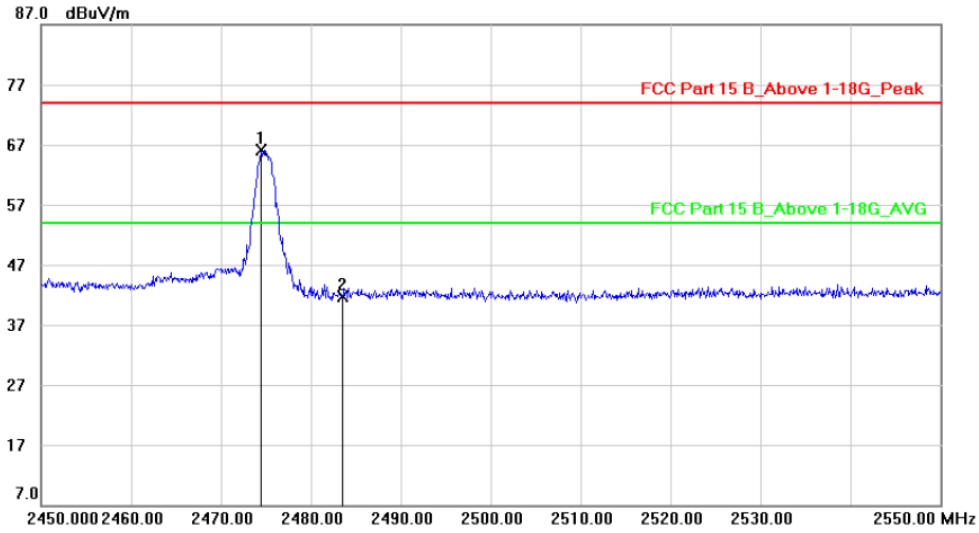
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2405.117	78.53	-4.45	74.08	74.00	0.08	peak			
2		2390.000	46.43	-4.54	41.89	74.00	-32.11	peak			
3		2400.000	52.39	-4.48	47.91	74.00	-26.09	peak			

Polarization: Horizontal Test Mode: TX 2405MHz



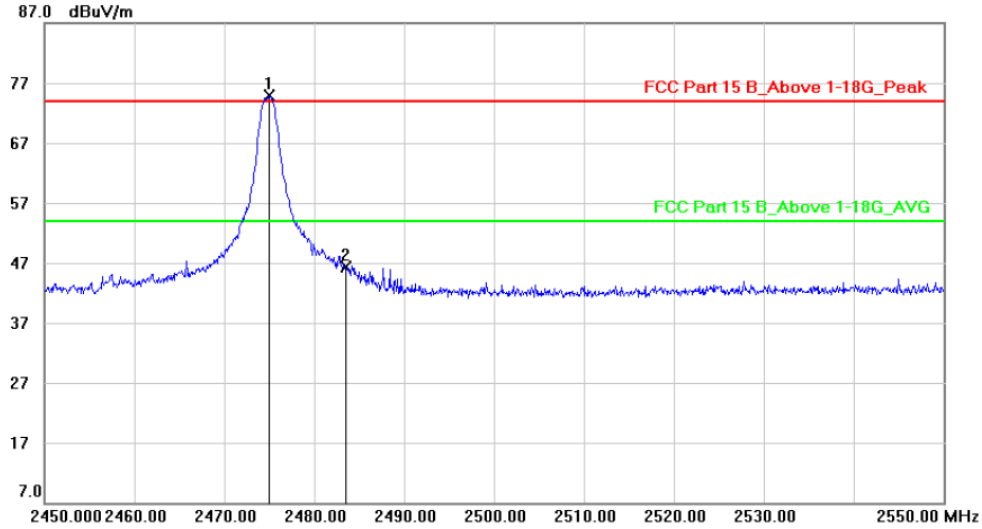
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.000	50.58	-4.54	46.04	74.00	-27.96	peak			
2	*	2404.930	86.33	-4.45	81.88	74.00	7.88	peak			
3		2400.000	58.10	-4.48	53.62	74.00	-20.38	peak			

Polarization: Vertical Test Mode: TX 2475MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2474.530	70.19	-4.04	66.15	74.00	-7.85	peak			
2		2483.500	45.63	-3.98	41.65	74.00	-32.35	peak			

Polarization: Horizontal Test Mode: TX 2475MHz

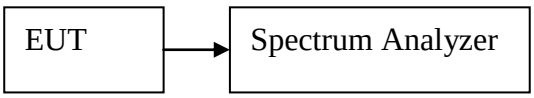


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2475.070	78.91	-4.04	74.87	74.00	0.87	peak			
2		2483.500	50.26	-3.98	46.28	74.00	-27.72	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

6. OCCUPIED BANDWIDTH TEST

6.1.Block Diagram of Test Setup



6.2.Test Limit

Please refer section15.249 and section 15.205.

6.3.Test Procedure

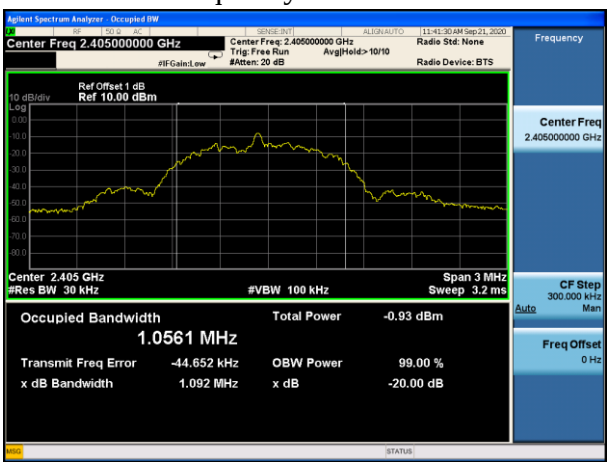
（1） The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

（2） The test receiver RBW set 30KHz,VBW set 100KHz,Sweep time set auto.

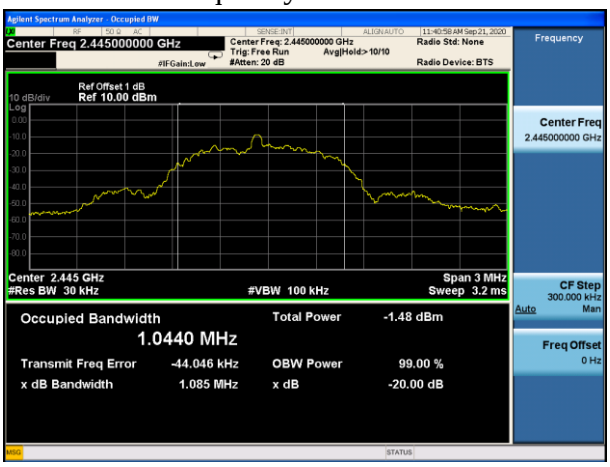
6.4.Test Results

Mode		Frequency MHz	20dB Bandwidth (MHz)	99% Bandwidth (KHz)	Limit (kHz)
GFSK	ANT1	2405	1.092	1.0561	/
		2445	1.085	1.0440	/
		2475	1.094	1.0470	/
Note: 1. The test results are listed in next pages.					

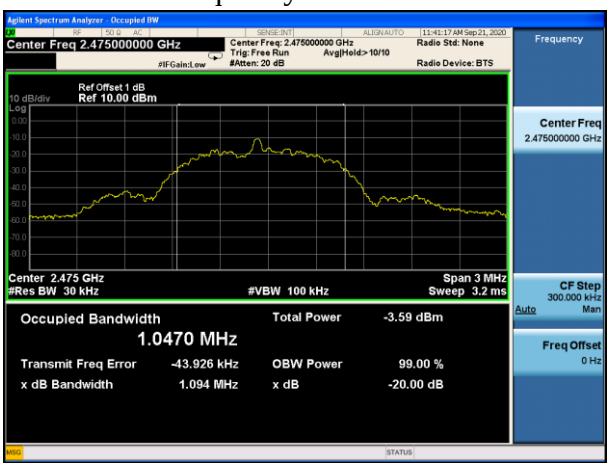
Frequency: 2405MHz



Frequency: 2445MHz



Frequency: 2475MHz



7. ANTENNA REQUIREMENT

7.1.Standard 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 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.

7.2.Antenna Connected Construction

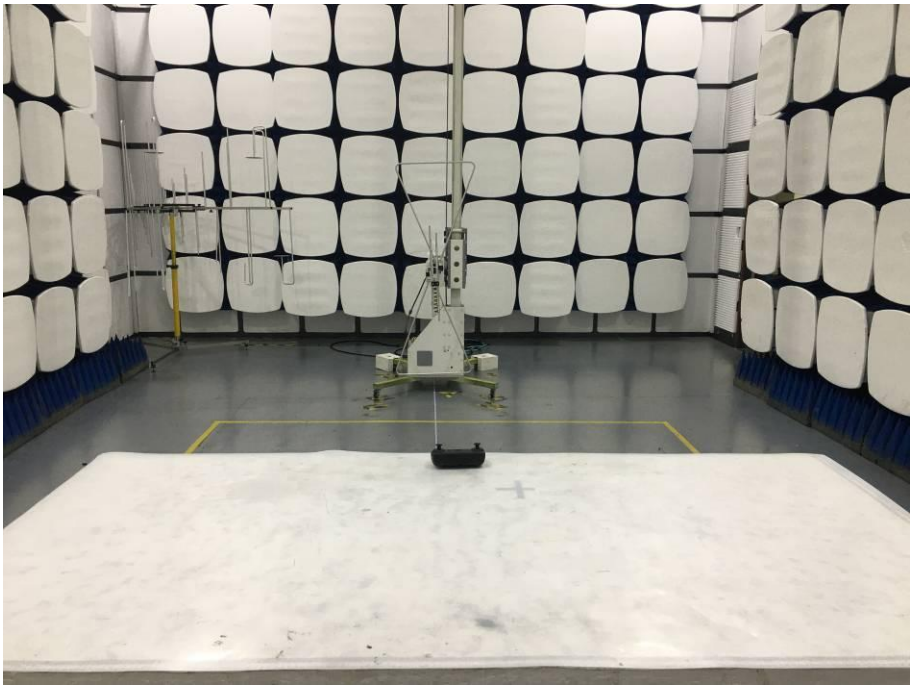
The directional gains of antenna used for transmitting is 3.8dBi, and the antenna is fixed antenna no consideration of replacement. Please see EUT photo for details.

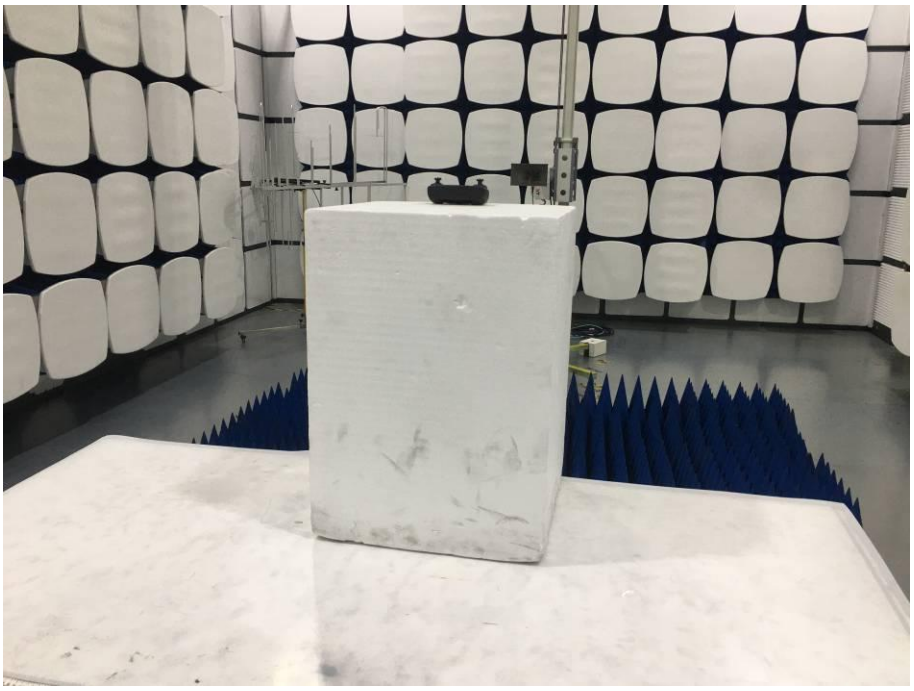
7.3.Results

The EUT antenna is Internal Antenna. It complies with the standard requirement.

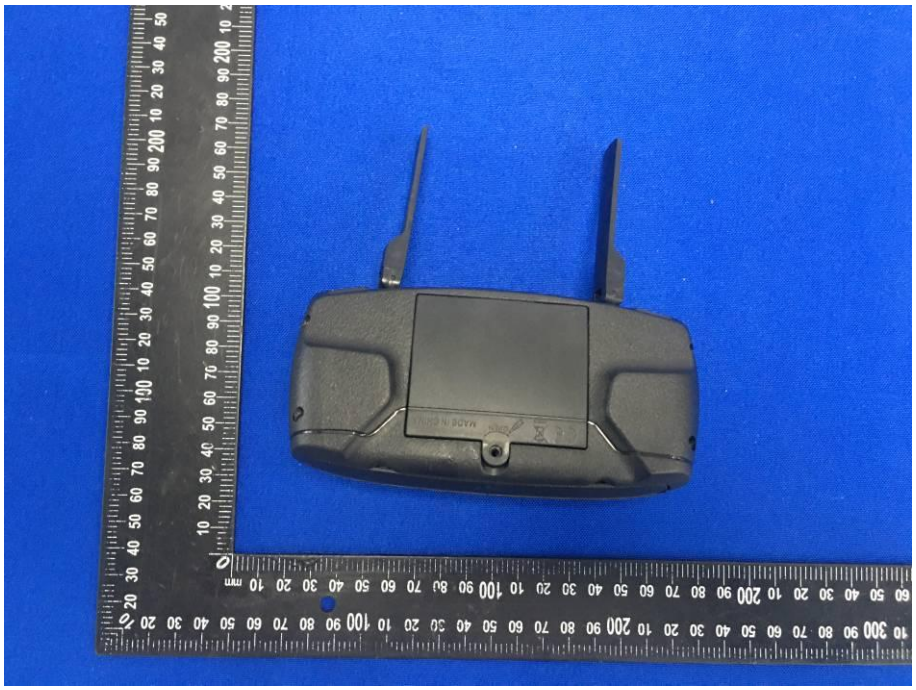
8. PHOTOGRAPH

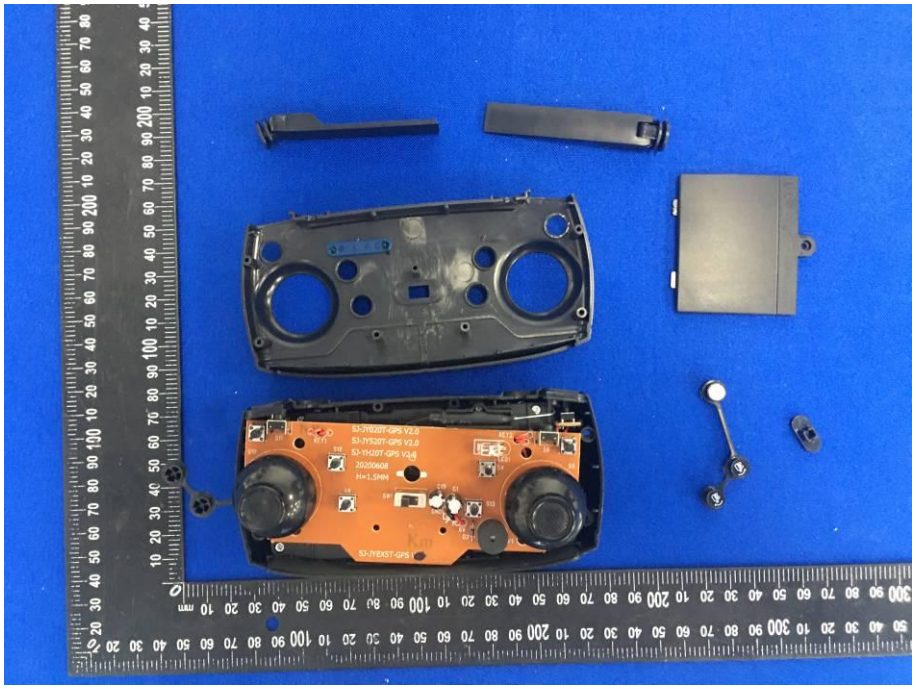
8.1.Photos of Radiated Emission Test

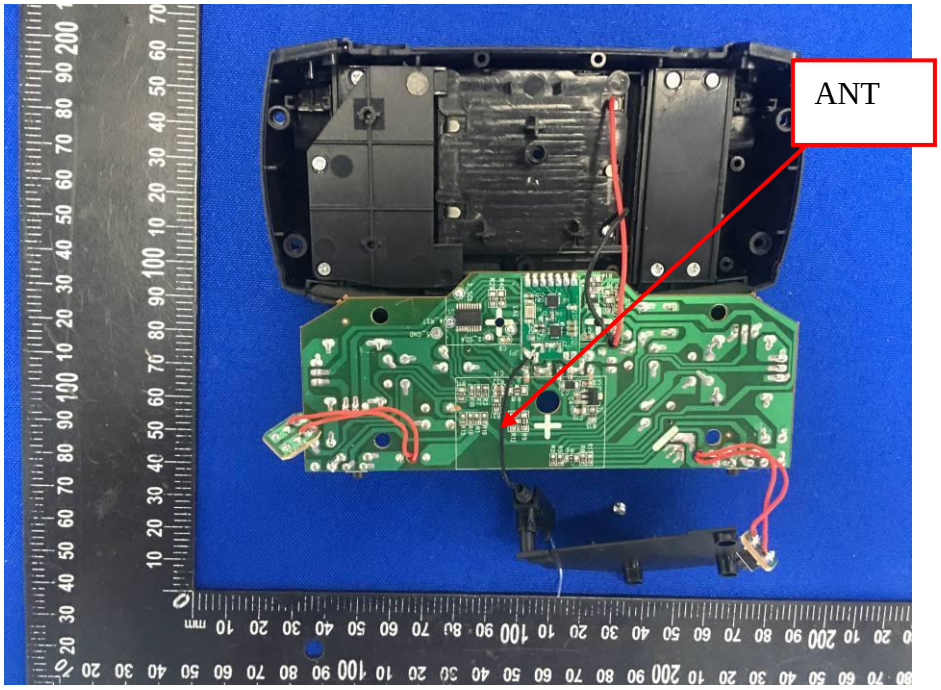


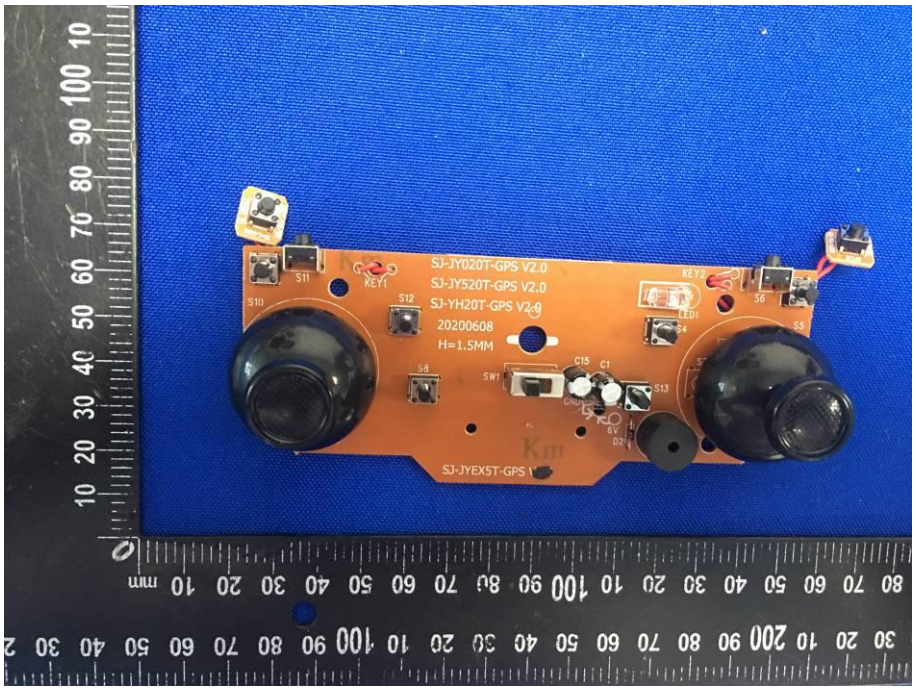


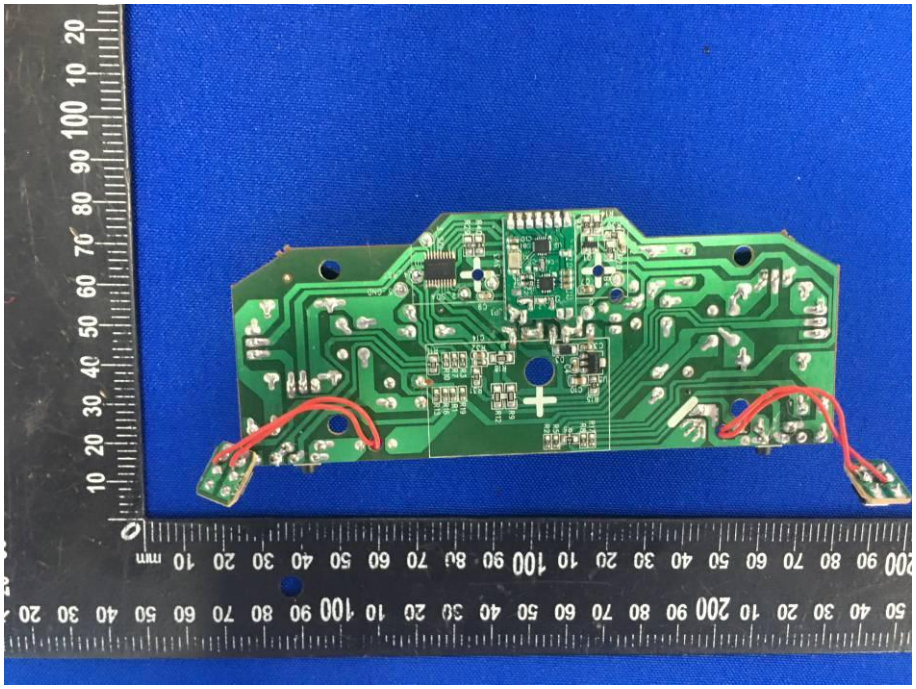
9. PHOTOS OF THE EUT

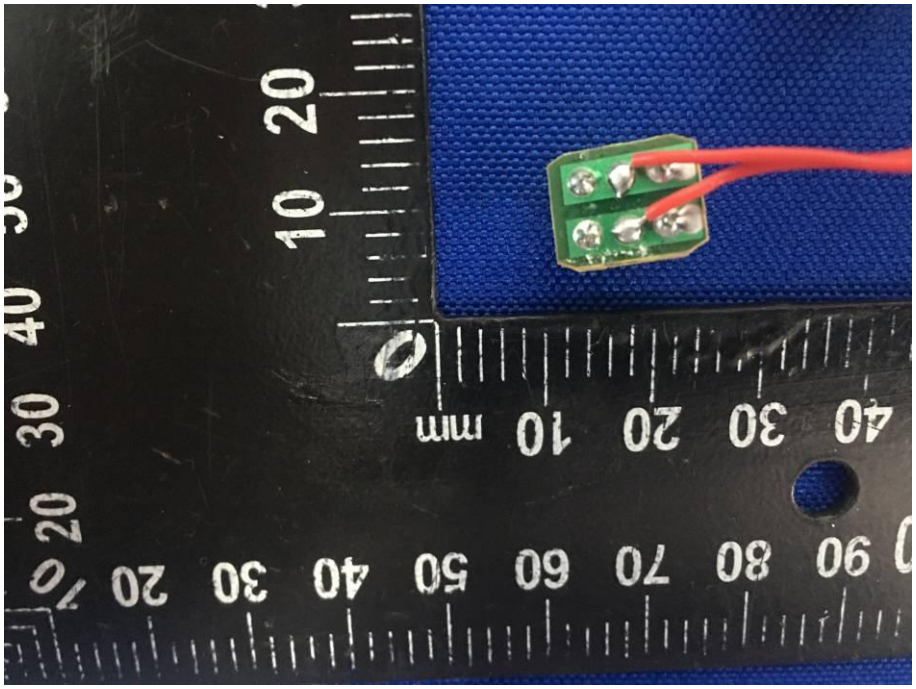


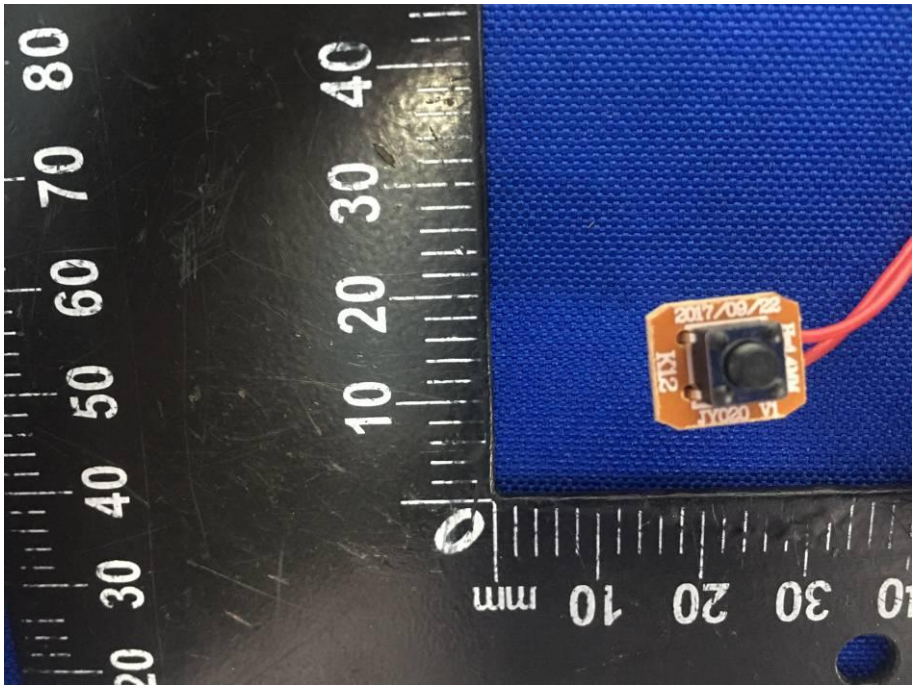


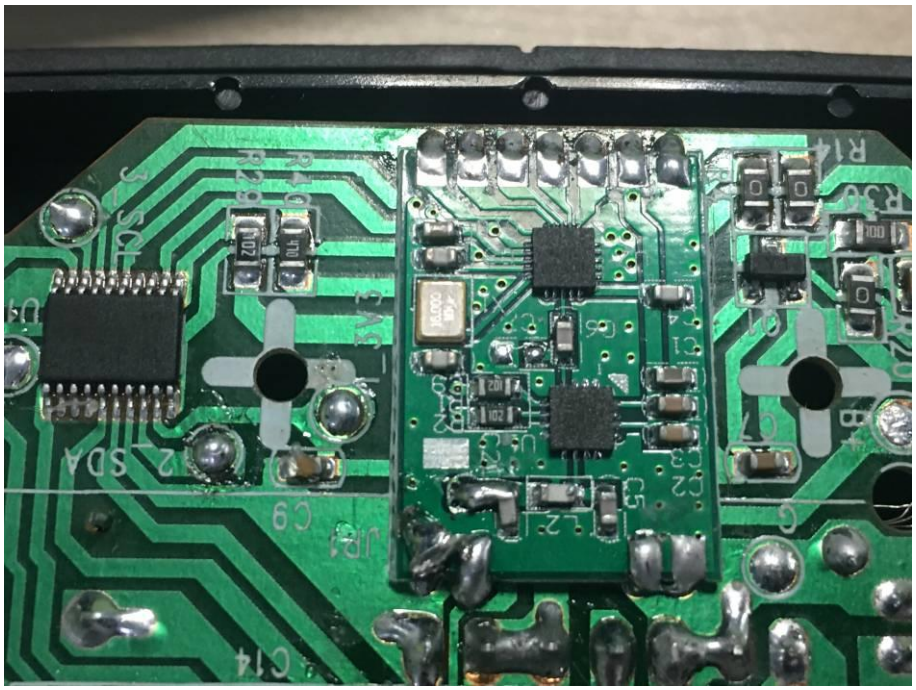

ANT


SJ-JY020T-GPS V2.0
SJ-JY520T-GPS V2.0
SJ-YH20T-GPS V2.0
20200608
H=1.5MM
SJ-JYEX5T-GPS









------THE END OF REPORT-------