

FCC TEST REPORT

For

HIGH HOPE INTERNATIONAL GROUP JIANGSU
NATIVE PRODUCE IMP EXP CORP LTD

4 Channel RC Car

Model No.: 0060

Prepared For : HIGH HOPE INTERNATIONAL GROUP JIANGSU NATIVE
PRODUCE IMP EXP CORP LTD

Address : 91 BAI XIA ROAD, NANJING, CHINA

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited

Address : 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan
District, Shenzhen, Guangdong, China

Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number : R0217060155W

Date of Test : Jun. 21~Jul. 04, 2017

Date of Report : Jul. 04, 2017

Contents

1. General Information.....	4
1.1. Client Information.....	4
1.2. Description of Device (EUT).....	4
1.3. Auxiliary Equipment Used During Test.....	4
1.4. Description of Test Modes.....	5
1.5. List of channels.....	5
1.6. Description Of Test Setup.....	6
1.7. Test Equipment List.....	7
1.8. Measurement Uncertainty.....	7
1.9. Description of Test Facility.....	8
2. Summary of Test Results.....	9
3. Conducted Emission Test.....	10
3.1. Test Standard and Limit.....	10
3.2. Test Setup.....	10
3.3. Test Procedure.....	10
3.4. Test Data.....	10
4. Radiation Spurious Emission and Band Edge.....	11
4.1. Test Standard and Limit.....	11
4.2. Test Setup.....	12
4.3. Test Procedure.....	13
4.4. Test Data.....	13
5. 20dB Occupy Bandwidth Test.....	19
5.1. Test Standard and Limit.....	19
5.2. Test Setup.....	19
5.3. Test Procedure.....	19
5.4. Test Data.....	19
6. Antenna Requirement.....	22
6.1. Test Standard and Requirement.....	22
6.2. Antenna Connected Construction.....	22
APPENDIX I -- TEST SETUP PHOTOGRAPH.....	23
APPENDIX II -- EXTERNAL PHOTOGRAPH.....	24
APPENDIX III -- INTERNAL PHOTOGRAPH.....	28

TEST REPORT

Applicant : HIGH HOPE INTERNATIONAL GROUP JIANGSU NATIVE PRODUCE IMP
EXP CORP LTD
Manufacturer : HIGH HOPE INTERNATIONAL GROUP JIANGSU NATIVE PRODUCE IMP
EXP CORP LTD
Product Name : 4 Channel RC Car
Model No. : 0060
Trade Mark : U.S.ARMY
Rating(s) : DC 3.0V by "AA" Battery*2

Test Standard(s) : FCC Part15 Subpart C 2016, Section 15.235

Test Method(s) : ANSI C63.10: 2013

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Jun. 21~Jul. 04, 2017

Prepared by :



Winkey Wang

(Tested Engineer / Winkey Wang)

Reviewer :

Dolly mo

(Project Manager / Dolly Mo)

Approved & Authorized Signer :

Tom Chen

(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	HIGH HOPE INTERNATIONAL GROUP JIANGSU NATIVE PRODUCE IMP EXP CORP LTD
Address	:	91 BAI XIA ROAD, NANJING, CHINA
Manufacturer	:	HIGH HOPE INTERNATIONAL GROUP JIANGSU NATIVE PRODUCE IMP EXP CORP LTD
Address	:	91 BAI XIA ROAD, NANJING, CHINA

1.2. Description of Device (EUT)

Product Name	:	4 Channel RC Car	
Model No.	:	0060	
Trade Mark	:	U.S.ARMY	
Test Power Supply	:	DC 3.0V by "AA" Battery*2	
Product Description	:	Operation Frequency:	49.865MHz
		Number of Channel:	1 Channels
		Modulation Type:	ASK
		Antenna Type:	Integral antenna.
		Antenna Gain(Peak):	4 dbi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

1.3. Auxiliary Equipment Used During Test

N/A	
-----	--

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Continuous transmission

For Radiated Emission	
Final Test Mode	Description
Mode 1	Continuous transmission

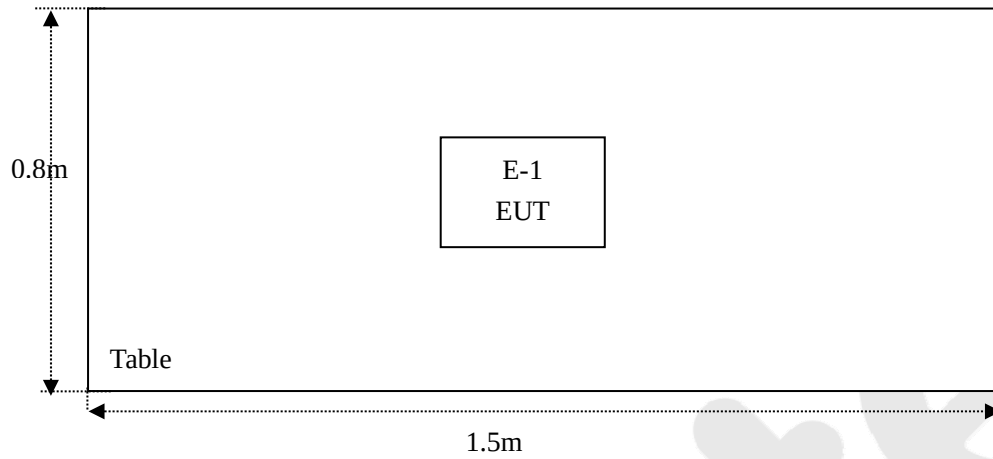
Note: During the test, the EUT was keeping continuous transmission.

1.5. List of channels

Channel	Freq. (MHz)
01	49.865

1.6. Description Of Test Setup

RE



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Jul. 19, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Jun. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Jun. 17, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Jul. 12, 2016	1 Year
5.	Preamplifier	Instruments corporation	EMC011830	980100	Jun. 17, 2017	1 Year
6.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Jun. 17, 2017	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	May 06, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 06, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519	012	May 11, 2017	1 Year
10.	Pre-amplifier	SONOMA	310N	186860	Jun. 17, 2017	1 Year
11.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
12.	Power Sensor	Agilent	KFSW150502	15I00041SN045	Jun. 17, 2017	1 Year
13.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Jun. 17, 2017	1 Year
14.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Jun. 17, 2017	1 Year
15.	Signal Generator	Agilent	E4421B	MY41000743	Jun. 17, 2017	1 Year
16.	DC Power supply	IV	IV-8080	YQSB0096	Jun. 17, 2017	1 Year
17.	TEMP&HUMI PROGRAMMABLE CHAMBER	Bell Group	BE-THK-150 M8	SE-0137	Jun. 17, 2017	1 Year

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1 dB (Horizontal)
		Ur = 4.3 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

1.9. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, June 13, 2016.

Test Location

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

2. Summary of Test Results

Standard Section	Test Item	Result
15.203/ 15.235(c)(3)	Antenna Requirement	PASS
15.207	Conducted Emission	N/A
15.205/15.209/15.235(a)(b)(c)1	Spurious Emission& Band Edges	PASS
15.215(c)	20dB Occupied Bandwidth	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

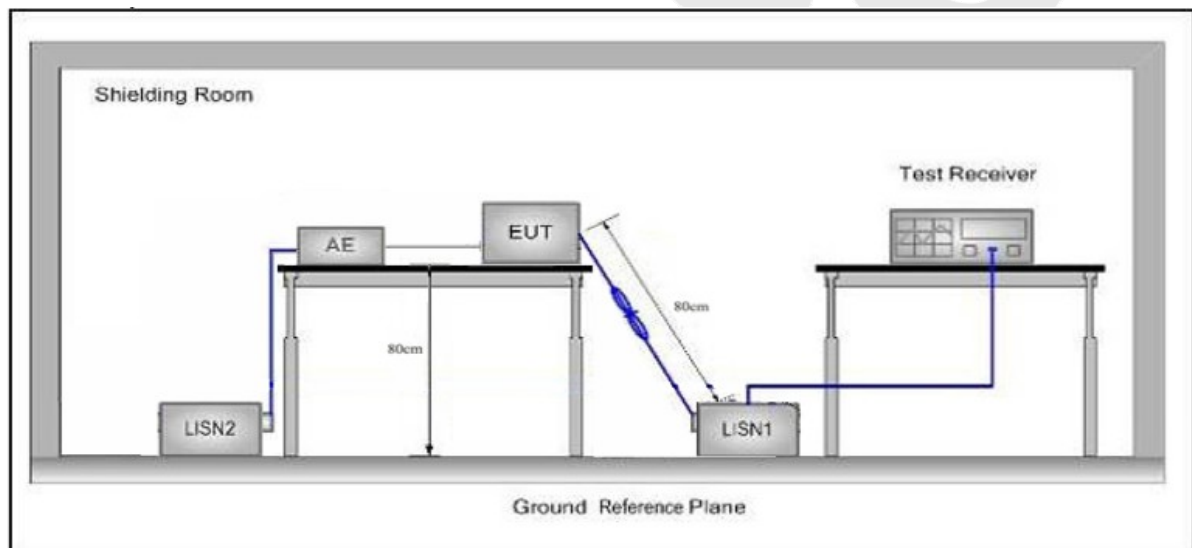
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

N/A

The EUT was power supplied by "AA" Battery*2 (DC 3.0V).

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209, 15.205 and 15.235(a)(b)(c)1				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3
Remark: (1)The lower limit shall apply at the transition frequency. (2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					

According to §15.235(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

$$\text{Emission Level (dBuV/m)} = 20 \log \text{Emission Level (uV/m)}$$

The field strength of emission limits have been calculated in below table:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)@3m
49.82~49.90	80.0 (AVG)
49.82~49.90	100.0 (Peak)

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

According to §15.235(b):

The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §15.209. All signals exceeding 20 microvolts/meter at 3 meters shall be reported in the application for certification.

4.2. Test Setup

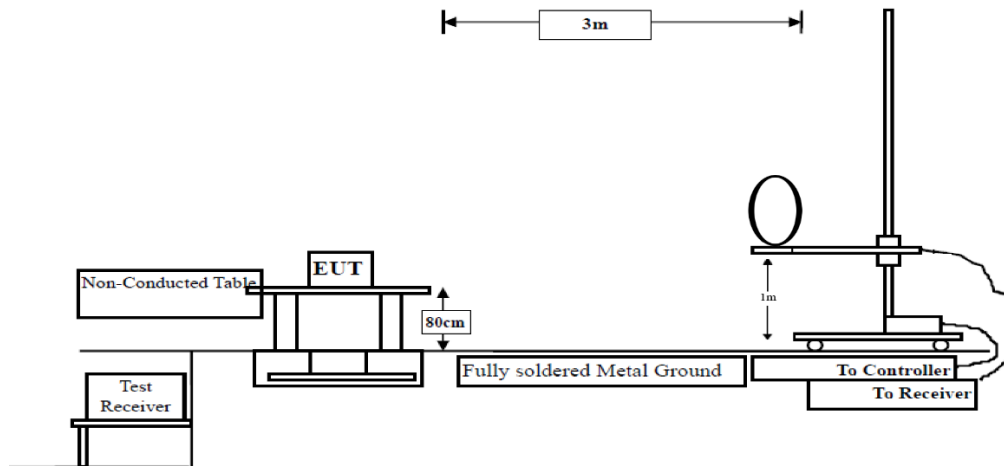


Figure 1. Below 30MHz

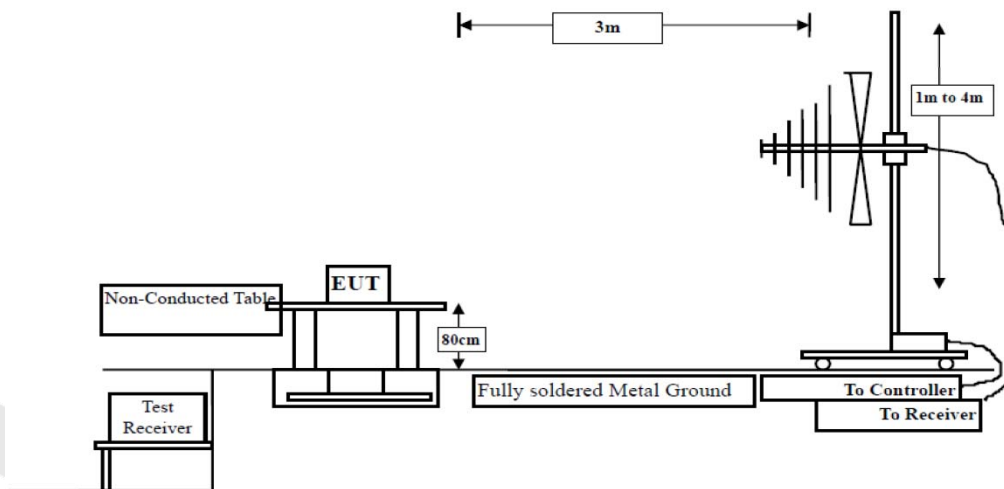


Figure 2. 30MHz to 1GHz

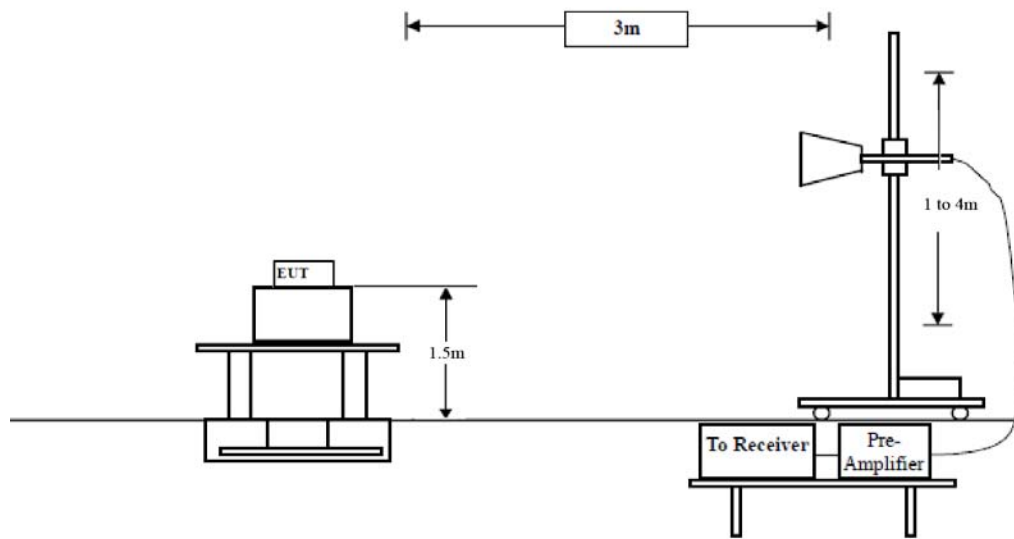


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Results (Fundamental 49.865MHz)

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Duty cycle Factor	Results	Limits	Det.
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	Mode
49.865	H	87.22	1.16	12.14	31.15	--	69.37	100.00	PK
49.865	H	87.22	1.16	12.14	31.15	-3.66	65.71	80.00	AV
49.865	V	89.61	1.16	12.14	31.15	--	71.76	100.00	PK
49.865	V	89.61	1.16	12.14	31.15	-3.66	68.10	80.00	AV

Remark :

1. Result = Reading + Cable Loss +Ant Factor –Amplifier + Duty cycle Factor

3. Duty Cycle Factor

Calculate Formula:

AV=PEAK +Duty Cycle Factor

Duty Cycle Factor=20log (Duty Cycle)

Duty Cycle= on time/ period

Test Data:

T on time=1.613ms*4+0.5467ms*10=11.919ms

T period=18.17ms

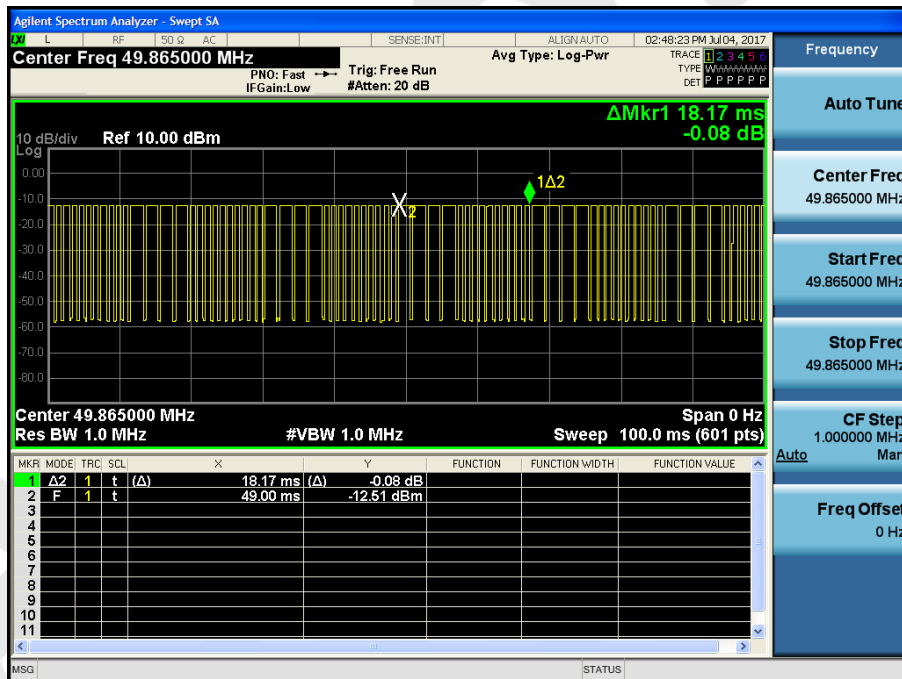
Duty Cycle=65.60%

Duty Cycle Factor =20log (Duty Cycle)=-3.66

T on time slot



T period



Test Results (Harmonics Emissions)

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Duty cycle Factor	Results	Limits	Det
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	Mode
99.730	H	78.46	1.27	12.21	31.18	--	60.76	100.00	PK
99.730	H	78.46	1.27	12.21	31.18	-3.66	57.10	80.00	AV
99.730	V	76.43	1.27	12.21	31.18	--	58.73	100.00	PK
99.730	V	76.43	1.27	12.21	31.18	-3.66	55.07	80.00	AV
149.595	H	61.42	1.35	12.28	31.22	--	43.83	100.00	PK
149.595	H	61.42	1.35	12.28	31.22	-3.66	40.17	80.00	AV
149.595	V	63.57	1.35	12.28	31.22	--	45.98	100.00	PK
149.595	V	63.57	1.35	12.28	31.22	-3.66	42.32	80.00	AV
199.460	H	*						100.00	PK
199.460	H	*						80.00	AV
199.460	V	*						100.00	PK
199.460	V	*						80.00	AV

Remark :

1. Result = Reading + Cable Loss +Ant Factor –Amplifier + Duty cycle Factor
3. Duty Cycle Factor=-3.66
4. “*”, means this data is the too weak instrument of signal is unable to test.

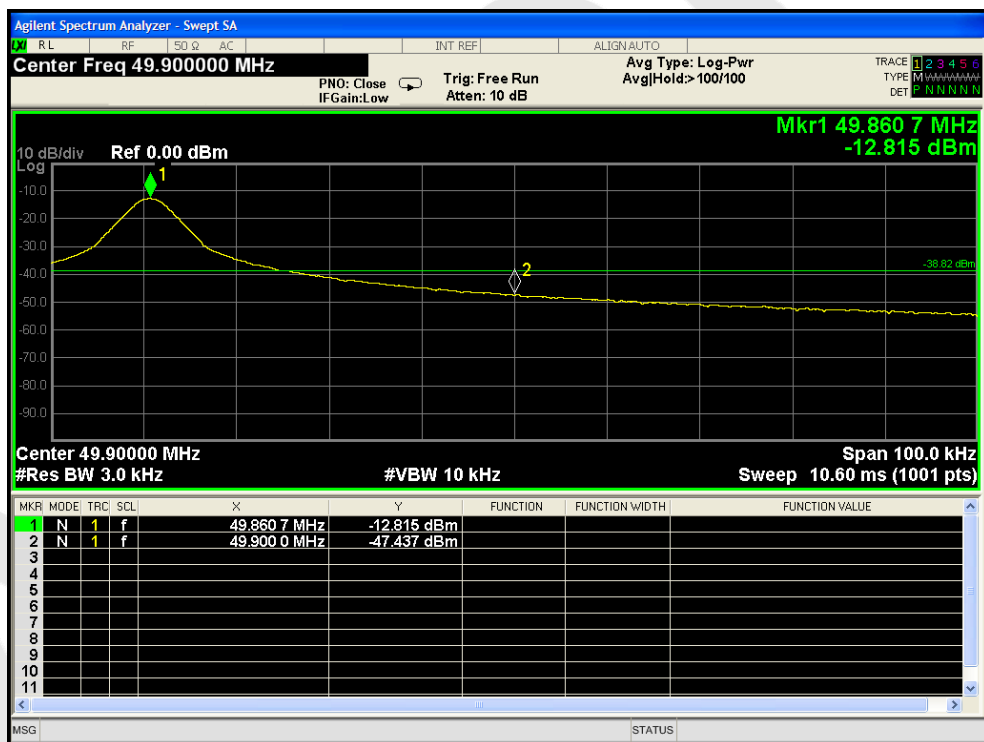
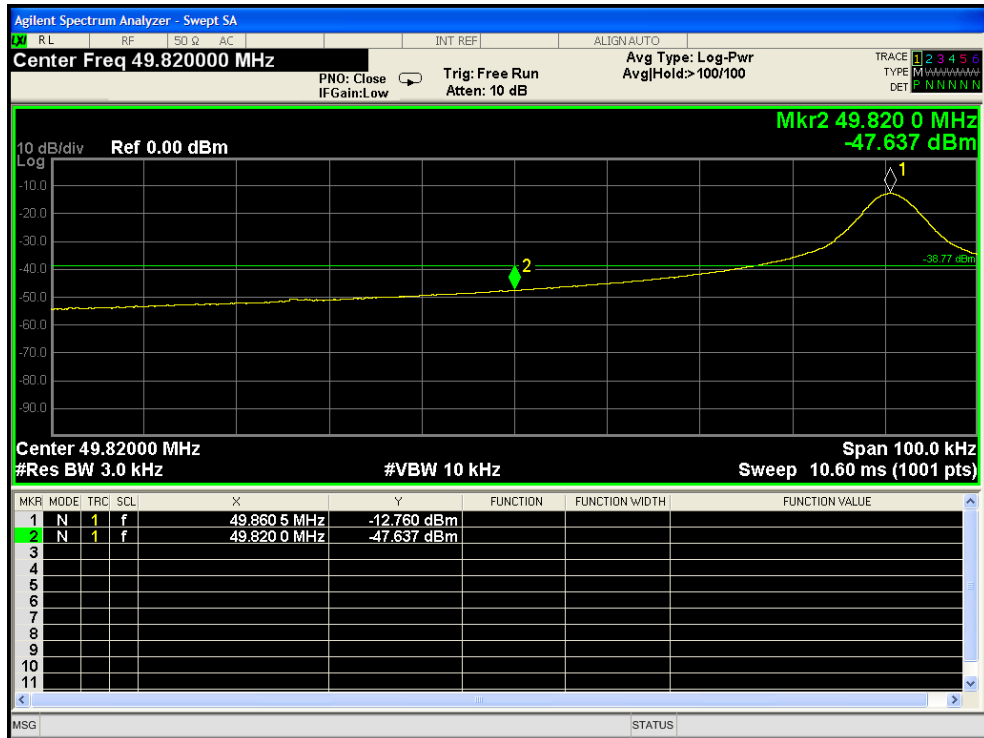
Test Results (Radiated Emission)

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Results	Limits	Margin	Det.
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Mode
72.19	H	43.25	1.18	12.27	30.74	25.96	40.00	-14.04	QP
136.24	H	46.78	1.24	12.25	30.48	29.79	43.50	-13.71	QP
718.17	H	42.23	1.73	13.76	31.27	26.45	46.00	-19.55	QP
72.19	V	45.41	1.18	12.27	30.74	28.12	40.00	-11.88	QP
136.24	V	47.55	1.24	12.25	30.48	30.56	43.50	-12.94	QP
718.17	V	43.45	1.73	13.76	31.27	27.67	46.00	-18.33	QP

Remark:

1. Results = Reading + Cable Loss +Ant Factor –Amplifier

Band Edges

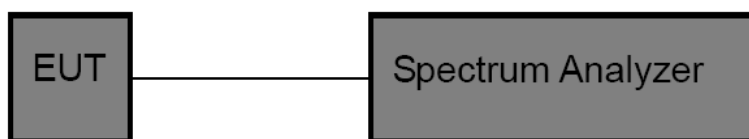


5. 20dB Occupy Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.215
Test Limit	15.215(c), Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.2. Test Setup



5.3. Test Procedure

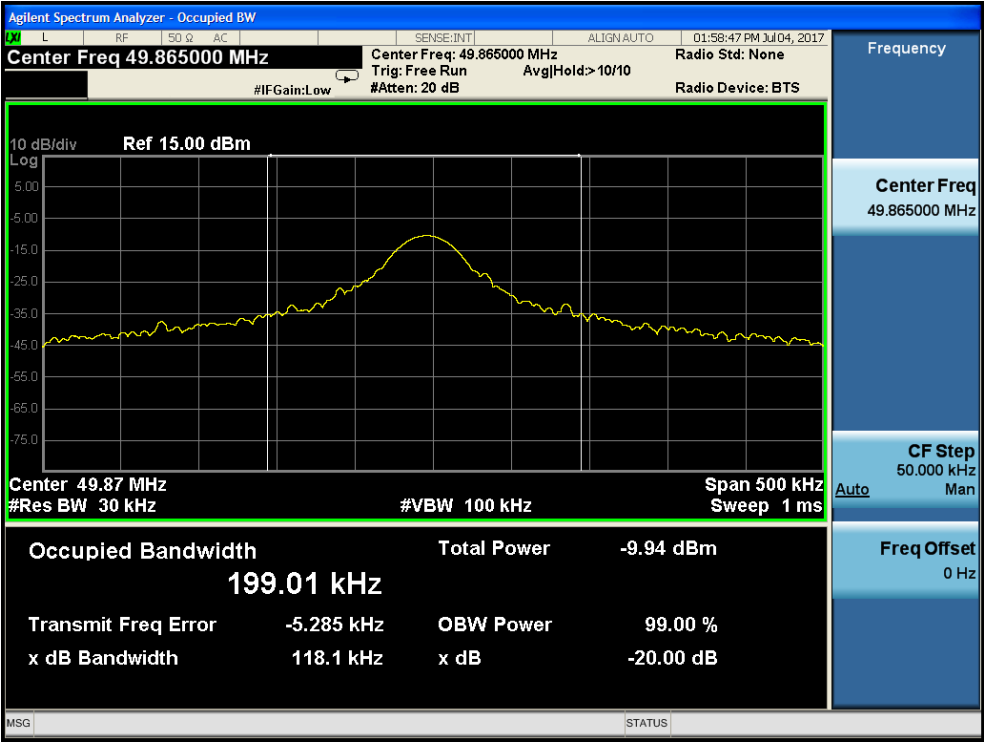
1. Place the EUT on the table and set it in the continuously transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
 RBW = 30kHz, VBW $\geq 3 \times$ RBW = 100kHz,
 Span= 500kHz
 Detector= Peak
 Trace mode= Max hold.
 Sweep- auto couple.
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

5.4. Test Data

Test Item : 20dB Bandwidth
Test Voltage : DC 3V
Test Result : PASS

Test Mode : Continuous
transmission
Temperature : 24℃
Humidity : 55%RH

Freq. (MHz)	Bandwidth (kHz)
49.865	118.1



20 dB BW

6. Antenna Requirement

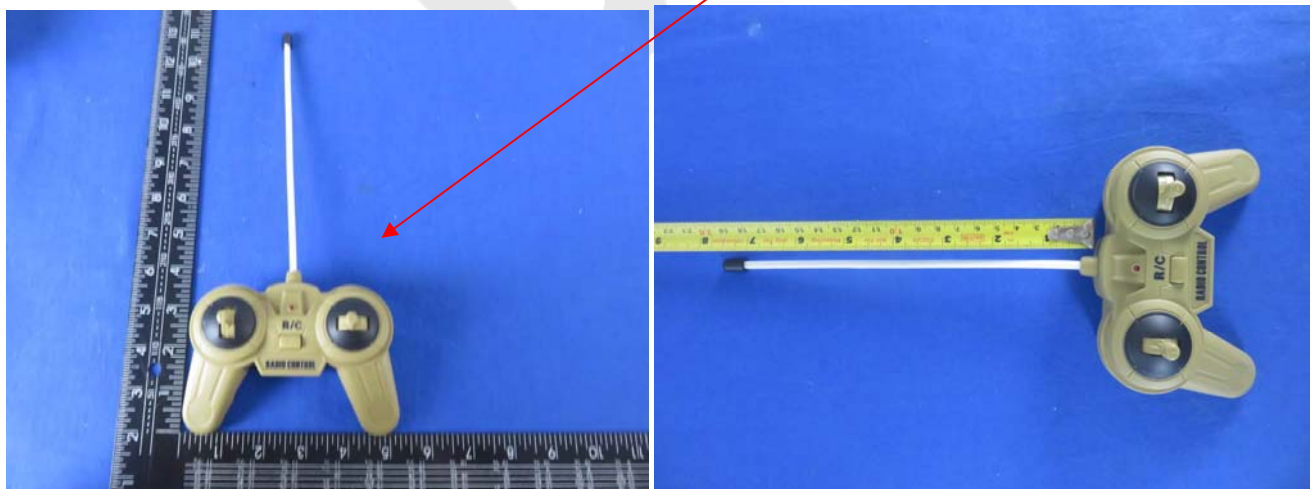
6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203/ 15.235(c)(3)
Requirement	1) 15.203 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. Antenna requirement must meet at least one of the following: 1) Antenna must be permanently attached to device. 2) The antenna must use a unique type of connector to attach to the device. 3) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device. 2) 15.235(c)(3) requirement: The antenna shall be a single element, one meter or less in length, permanently mounted on the enclosure containing the device.

6.2. Antenna Connected Construction

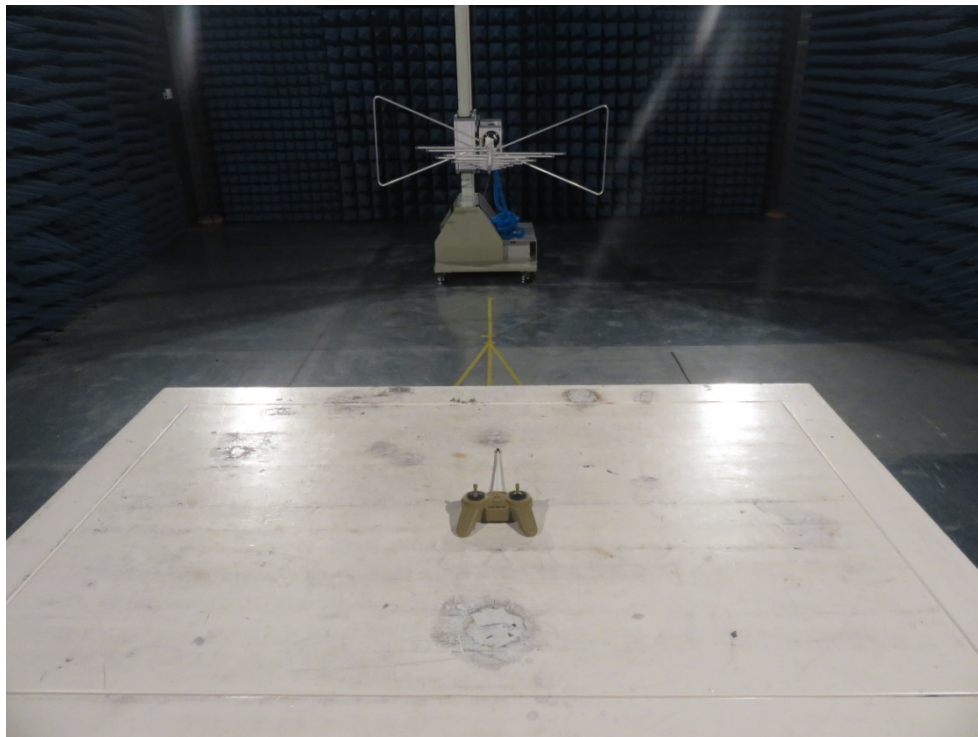
The RF antenna is a Integral antenna which permanently attached, and the best case gain of the antenna is 4 dBi. The length of the Antenna is 20 cm which is less than 1m. It complies with the standard requirement.

Antenna



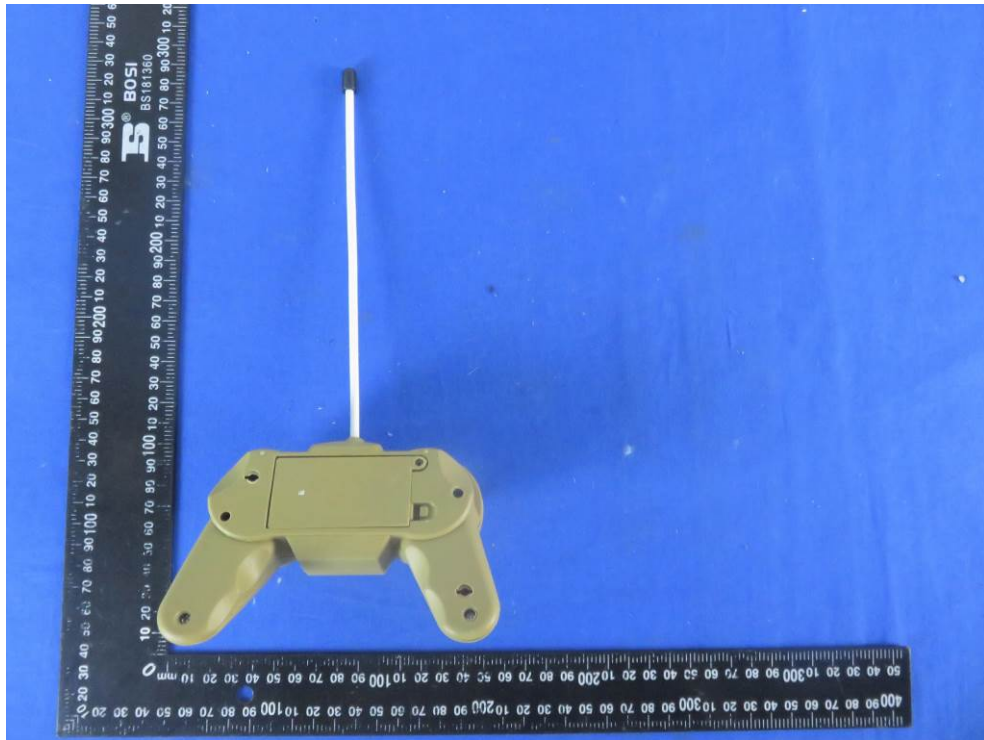
APPENDIX I -- TEST SETUP PHOTOGRAPH

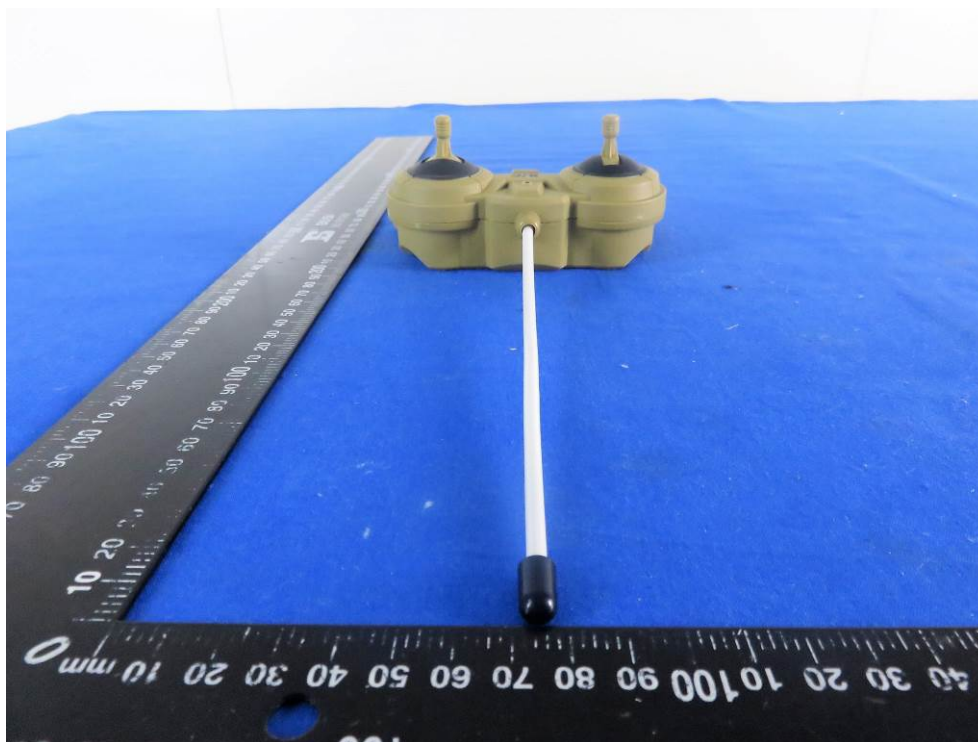
Photo of Radiation Emission Test



APPENDIX II -- EXTERNAL PHOTOGRAPH









APPENDIX III -- INTERNAL PHOTOGRAPH

