

FCC PART 15.249

MEASUREMENT AND TEST REPORT

FOR

DongGuan City FLYSKY Remote Model Co., Ltd.

No.41 Road West, BanHu Village, HuangJiang Town, DongGuan City,

GuangDong Porvince, China

FCC ID: VPOFLYSKY002

Report Concerns: Original Report	Equipment Type: 9ch radio control system
Model:	<u>FS-TH9X</u>
Report No.:	<u>STR07108046I</u>
Test/Witness Engineer:	<u>Lahm Peng</u>
Test Date:	<u>2007-10-17 to 2007-10-24</u>
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Approved & Authorized By:	 _____ Jandy So /PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: DongGuan City FLYSKY Remote Model Co., Ltd.
Address of applicant: No.4 Road West, BanHu Village, HuangJiang Town,
DongGuan City, GuangDong Province, China

Manufacturer: DongGuan City FLYSKY Remote Model Co., Ltd.
Address of applicant: No.4 Road West, BanHu Village, HuangJiang Town,
DongGuan City, GuangDong Province, China

General Description of E.U.T

Items	Description
EUT Description:	9ch radio control system
Trade Name:	FLYSKY
Model No.:	FS-TH9X
Rated Voltage:	DC 12V Battery
Output Power:	≤1mW
Frequency Range:	2402MHz(9CH)
Antenna Type:	Unique antenna
No. of Channel:	9 CH with different encode for identification
Size:	21.0x19.0x6.0 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data gathered are from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of DongGuan City FLYSKY Remote Model Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

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

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test is carried out under keeping transmitting, accordingly in reference to the Operating Instructions.

1.5 Test Facility

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

The 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 files which the Registration No.: **759397**.

Measurement required was performed at laboratory of Solid Industrial Co., Ltd. at 333 Bulong Highway Buji Longgang, Shenzhen, Guangdong, China.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software, provided by the customer, is started while the whole system is running.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
FLY SKY	Adaptor	FS-C100	N/A

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Cord/Without Cord
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203	Antenna Requirement	Compliant
§ 15.207	Conducted Emission	Compliant
§ 15.205	Restricted Band of Operation	Compliant
§ 15.209	Radiated Emission	Compliant
§ 15.249(a)	Field Strength	Compliant
§ 15.249(d)	Out of Band Emission	Compliant

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 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. 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.

3.2 Test Result

Antenna of this product is unique antenna and unchangeable; fulfill the requirement of this section.

4. §15.207 (a)- CONDUCTED EMISSION

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 0.5 dB.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2006-1-26	2008-1-25
AMN	Rohde & Schwarz	ESH2-Z5	100002	2006-1-26	2008-1-25
Limiter	Rohde & Schwarz	ESH3-Z2	357.8810.52	2006-1-26	2008-1-25
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2006-1-26	2008-1-25

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 Test Procedure

The setup of EUT is according with ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

4.4 Summary of Test Results/Plots

According to the data in section 4.4, the EUT complied with the EN61000-6-3 Conducted margin for a Class B device, with the *worst* margin reading of:

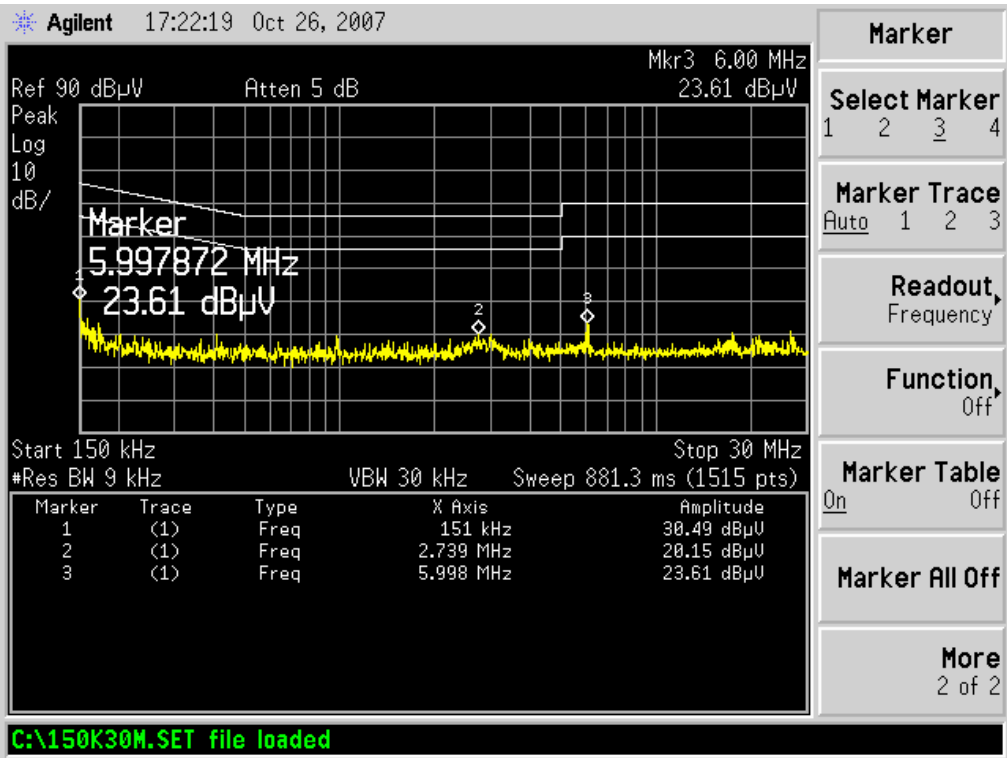
-31.70 dB μ V at 6.00 MHz in the Line of Charging mode, 0.15-30MHz

4.5 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
6.00	28.3	PK	Line	60	-31.7
2.58	21.6	PK	Line	56	-34.5
0.15	30.5	PK	Neutral	66	-35.5
2.74	20.2	PK	Neutral	56	-35.9
6.00	23.6	PK	Neutral	60	-36.4
0.15	28.7	PK	Line	66	-37.3

Since the peak reading is below the AV limit, the AV reading can be omitted.

Conducted Disturbance
EUT: 9ch radio control system
M/N: FS-TH9X
Operating Condition: Charging
Test Specification: N
Comment: AC120V/60Hz



Conducted Disturbance

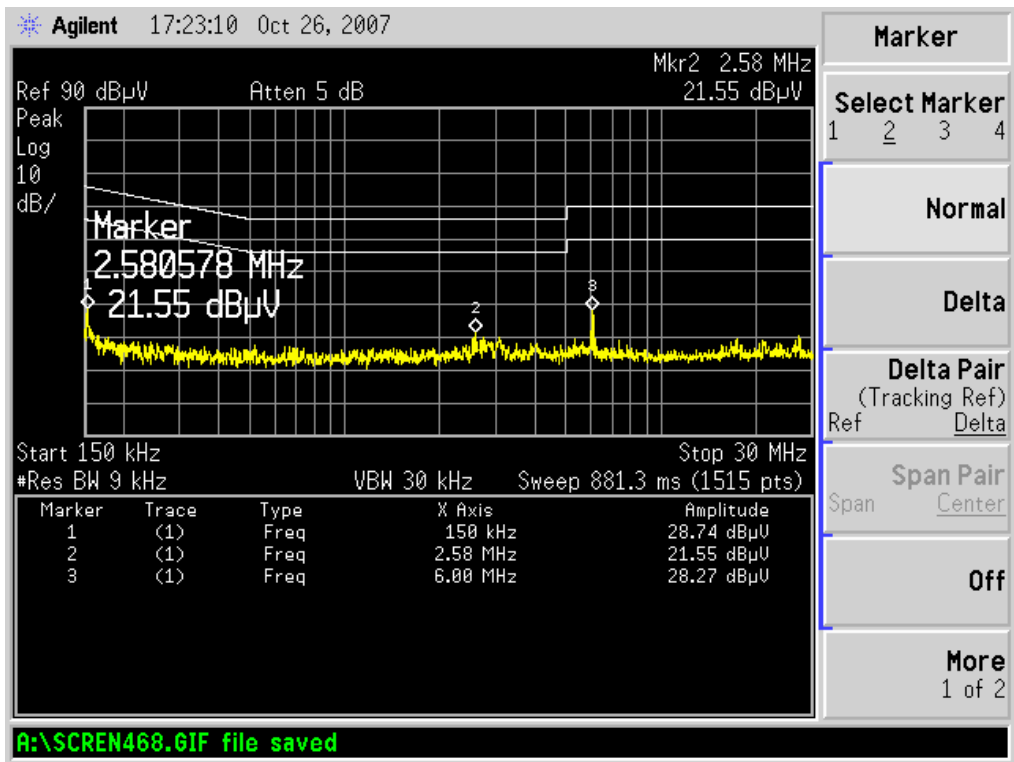
EUT: 9ch radio control system

M/N: FS-TH9X

Operating Condition: Charging

Test Specification: L

Comment: AC120V/60Hz



5. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

5.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 3.0 dB.

5.2 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of fundamental (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

According to §15.205 and §15.209 the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Section 15.209:

30 - 88 MHz 40 dBuV/m @3M

88 -216 MHz 43.5 dBuV/m @3M

216 -960 MHz 46 dBuV/m @3M

Above 960 MHz 54dBuV/m @3M

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	EMI Test Receiver	ESI26	830245/009	2007-1-26	2008-1-25
ETS	Multi_Device Controller	2090	57230	2007-1-26	2008-1-25
ETS	Receiver Antenna	2175	57337	2007-1-26	2008-1-25
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2007-1-26	2008-1-25
Rohde & Schwarz	Horn Antenna	HF906	100014	2007-1-26	2008-1-25

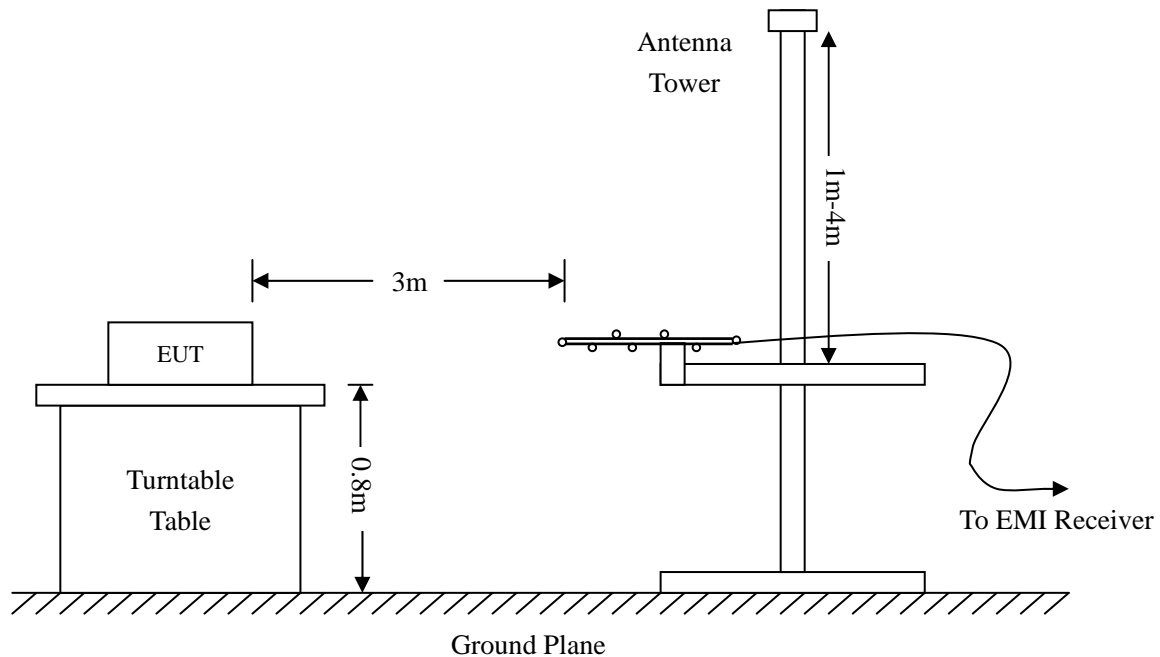
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



5.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

5.6 Environmental Conditions

Temperature:	26° C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

5.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

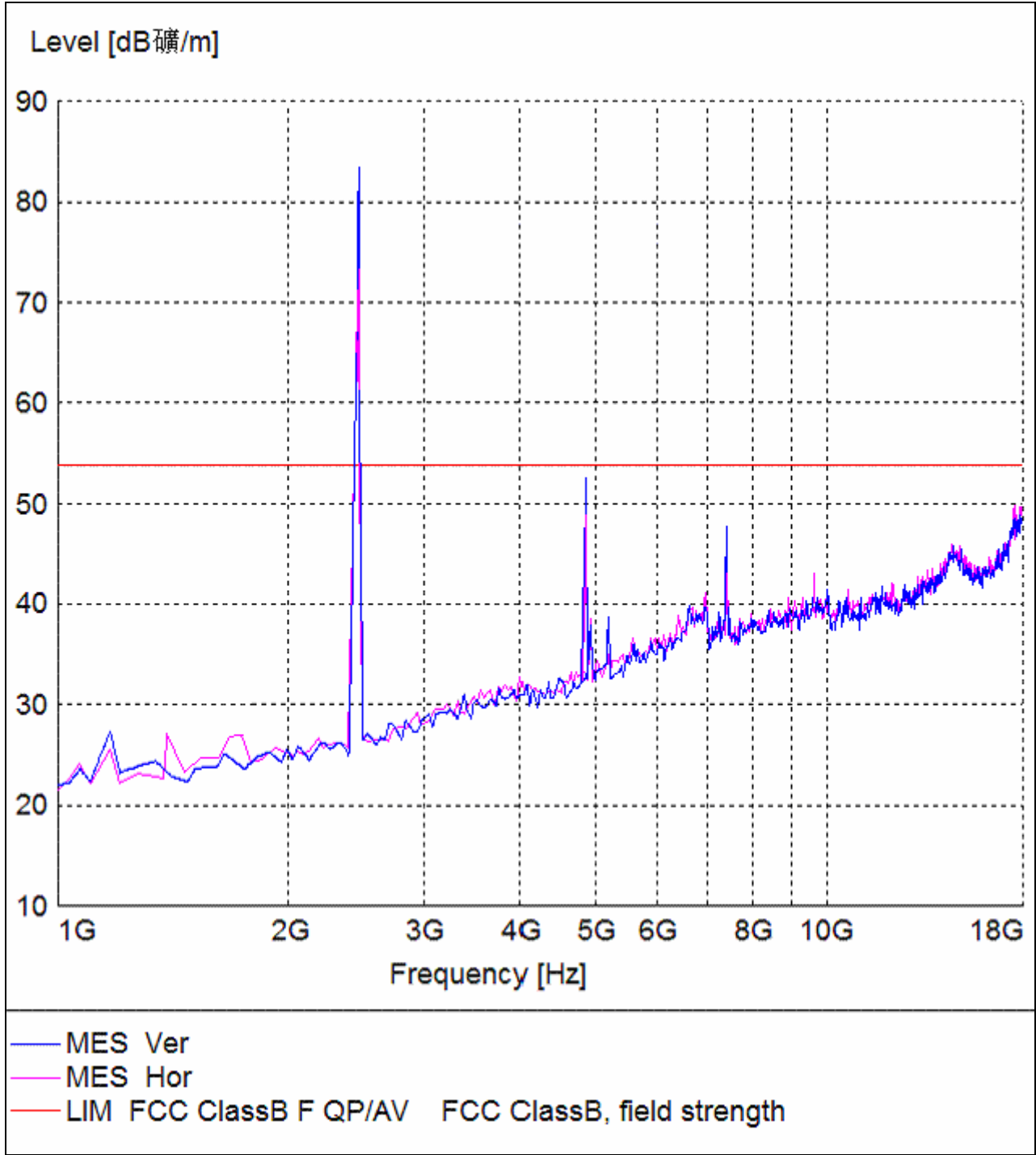
-1.20 dBμV at 4804MHz in the Vertical polarization, 30 MHz to 25 GHz, 3Meters

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.249 & 15.209	
MHz	dBuV	PK/ QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
Transmitting (2402MHz) (Above 1GHz)											
4804	44.4	AV	45	1.0	V	34.0	2.7	28.3	52.8	54	-1.2
4804	40.5	AV	0	2.0	H	34.0	2.7	28.3	48.9	54	-5.1
7206	36.1	AV	135	1.2	V	36.3	3.1	28.0	47.5	54	-6.5
7206	32.7	AV	90	1.4	H	36.3	3.1	28.0	44.1	54	-9.9
2402	78.0	AV(fund.)	60	1.2	V	32.2	1.9	28.5	83.6	94	-10.4
4804	44.4	Pk	45	1.0	V	34	2.7	28.3	55.1	74	-18.9
2402	68.9	AV(fund.)	50	1.3	H	32.2	1.9	28.5	74.5	94	-19.5
4804	40.5	Pk	0	2.0	H	34	2.7	28.3	52.3	74	-21.7
7206	36.1	Pk	135	1.2	V	36.3	3.1	28	49.8	74	-24.2
7206	32.7	Pk	90	1.4	H	36.3	3.1	28	48.4	74	-25.6
2402	78.0	Pk(fund.)	60	1.2	V	32.2	1.9	28.5	86.7	114	-27.3
2402	68.9	Pk(fund.)	50	1.3	H	32.2	1.9	28.5	77.5	114	-36.5
Radiation Emission (30M-1G)											
800.2	43.0	QP	56	1.4	V	22.0	3.3	25.06	43.2	46	-2.8
900.5	37.7	QP	45	1.2	V	22.9	3.5	24.55	39.5	46	-6.5
149.5	41.1	Pk	60	2	V	13.4	1.1	25.6	30.0	43.5	-13.5
438.5	38.3	Pk	43	1	H	16.8	2.2	25.51	31.8	46	-14.2
198.6	41.0	Pk	90	1.5	H	12.0	1.3	25.15	29.1	43.5	-14.4
250.2	38.5	Pk	45	1	H	12.3	1.3	24.86	27.2	46	-18.8

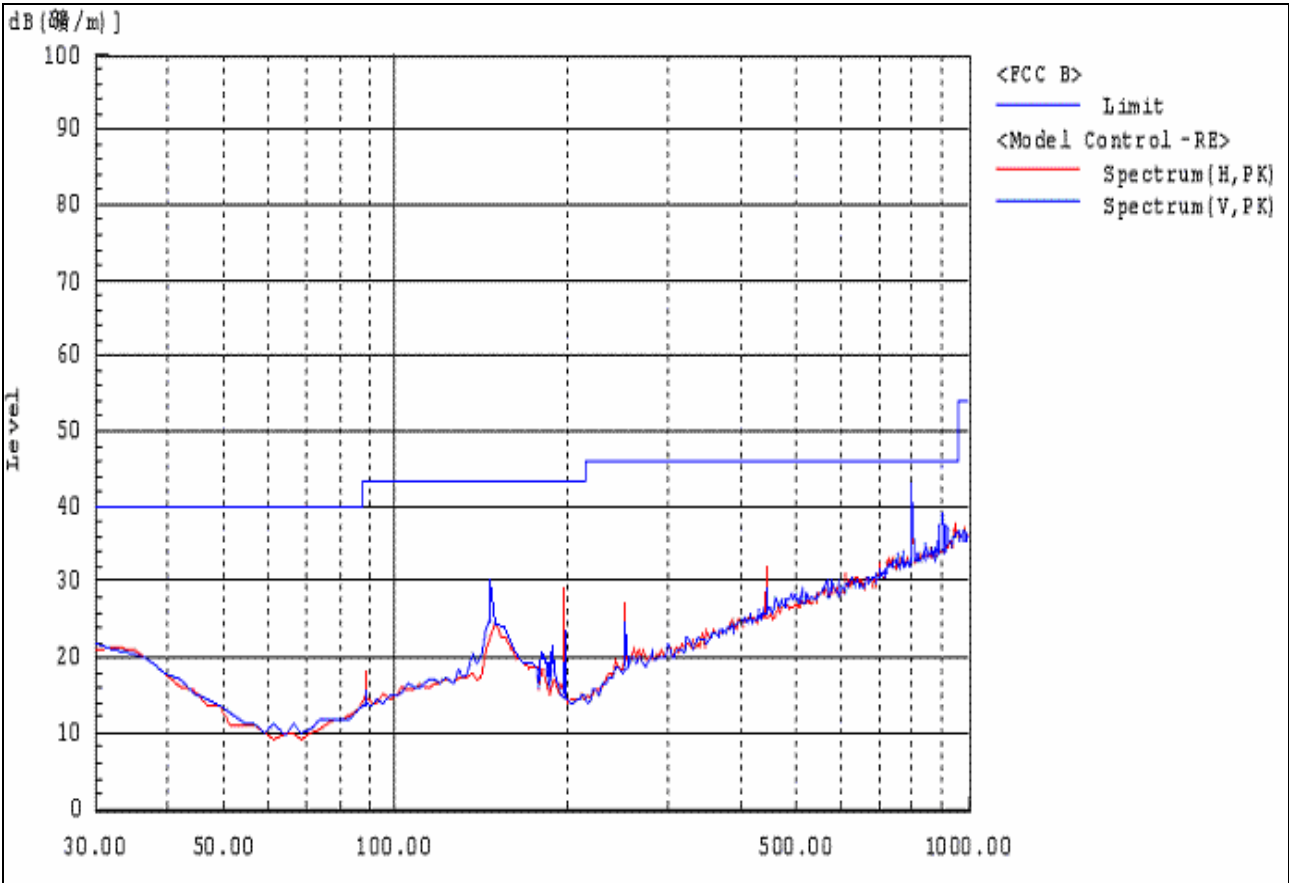
Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4. The detector bandwidth for measurements above 1 GHz was 1 MHz.

Plot of Radiation Emissions Test

Radiated Disturbance
EUT: 9CH Radio control system
M/N: FS-TH9X
Operating Condition: Transmitting above 1GHz
Test Specification: Vertical & Horizontal
Comment: DC 12V Battery



Radiated Disturbance
EUT: 9CH Radio control system
M/N: FS-TH9X
Operating Condition: Transmitting Below 1GHz
Test Specification: Vertical & Horizontal (worse case)
Comment: DC 12V Battery



6. §15.249(b) OUT OF BAND EMISSIONS

6.1 Standard Applicable

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 §15.209, whichever is the lesser attenuation.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2007-06-30	2008-06-29
ETS	Receiver Antenna	2175	57337	2007-1-26	2008-1-25
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2007-1-26	2008-1-25
Rohde & Schwarz	Horn Antenna	HF906	100014	2007-1-26	2008-1-25

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC rules.

6.4 Environmental Conditions

Temperature:	22° C
Relative Humidity:	54%
ATM Pressure:	1012 mbar

6.5 Summary of Test Results/Plots

Frequency MHz	Emission dB μ V/m	Limit dB μ V/m
2400	46.64	54
2438.5	26.86	54

Test Result Pass

Refer to the attached plots.

Bandedge Test Plot:

