

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

2.4GHz RC Helicopter

MODEL No.: EF136, mDX188, mDX189, mSP190

FCC ID: Z5B1361889MSP190

Trandemark: 

REPORT NO: ES110930161F

ISSUE DATE: October 15, 2011

Prepared for

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Prepared by
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VERIFICATION OF COMPLIANCE

| | |
|----------------------|---|
| Applicant: | SHENZHEN EFLY HOBBY TECH CO., LTD Room307, Qinghai Building, No.7043 Beihuan Road, Futian, Shenzhen, Guangdong, P.R.C. |
| Manufacturer: | SHENZHEN EFLY HOBBY TECH CO., LTD Room307, Qinghai Building, No.7043 Beihuan Road, Futian, Shenzhen, Guangdong, P.R.C. |
| Product Description: | 2.4GHz RC Helicopter |
| Model Number: | EF136, mDX188, mDX189, mSP190 (Note: all the models are the same, except their model number and appearance. We take mSP190 to test.) |
| File Number: | ES110930161F |
| Date of Test: | September 30, 2011 to October 14, 2011 |

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK 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 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209, 15.249.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : September 30, 2011 to October 14, 2011

Prepared by : 
(Engineer)

Approve & Authorized Signer : Chad Lee
(Manager)

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1. General Information

1.1 Product Description

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2405-2480MHz
- B). Modulation: GFSK
- D). Number of Channel: 16 Channels
- E). Max Data Rate: 500kbps
- F) Antenna Gain: 0dBi
- G). Antenna Type: PCB Antenna
- H). Power Supply: DC 9V from battery

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 1 | 2405 | 7 | 2435 | 13 | 2465 |
| 2 | 2410 | 8 | 2440 | 14 | 2470 |
| 3 | 2415 | 9 | 2445 | 15 | 2475 |
| 4 | 2420 | 10 | 2450 | 16 | 2480 |
| 5 | 2425 | 11 | 2455 | | |
| 6 | 2430 | 12 | 2460 | | |

Note:

1. This device is 2.4GHz RC Helicopter included 2.4GHz transceiver function.
2. Test of channel was included the lowest middle and highest frequency in lowest data rate and to perform the test, then record on this report.

1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: Z5B1361889MSP190 filing to comply with Section of the FCC Part 15, Subpart C Rules. The composite system (receiver) is compliance with Subpart B is authorized under a VOC procedure.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2009). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab.

: Accredited by CNAS, 2010.10.29
The certificate is valid until 2013.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01: 2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, October 28, 2010
The Certificate Registration Number is 406365.

Accredited by Industry Canada, March 05, 2010
The Certificate Registration Number is 46405-4480.

Name of Firm

: SHENZHEN EMTEK CO., LTD.

Site Location

: Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2009 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID | Series No. | Note |
|------|----------------------|------------|----------------|-------------------|------------|------|
| 1. | 2.4GHz RC Helicopter | EFLY HOBBY | mSP190 | Z5B1361889 MSP190 | N/A | EUT |

Note:

(1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

3. Description of Test Modes

The Transmitter of EUT is a 2.4GHz RC Helicopter and powered by host equipment. The equipment uses the GFSK Modulation to enable wireless communications between the host 2.4GHz RC Helicopter and Receiver.

1. For lowest channel : 2405MHz (Channel 1)
2. For middle channel : 2440MHz (Channel 8)
3. For highest channel: 2480MHz (Channel 16)

EUT operating conditions:

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to typical use, The exercise sequence is listed as below:

1. Setup the EUT and simulators as shown on 2.4.
2. Turn on the power of all equipments.
3. The EUT Ping with the wireless router.
4. Repeat the above steps.

4. Summary of Test Results

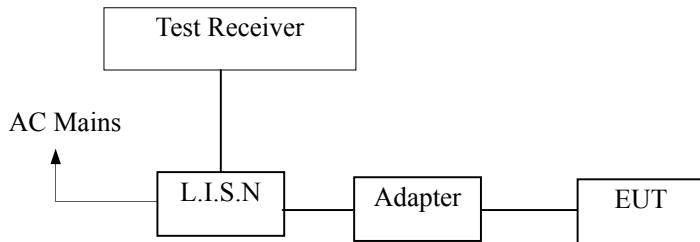
| FCC Rules | Description Of Test | Result |
|--------------------------|-----------------------------|----------------|
| §15.249(d) | Band edge test | Compliant |
| §15.207 | AC Power Conducted Emission | Not Applicable |
| §15.249(a,e), §15.209 | Radiated Emission | Compliant |
| §15.203 | Antenna requirement | Compliant |

5. Conducted Emissions Test

5.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used

| Conducted Emission Test Site | | | | | |
|------------------------------|-----------------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Test Receiver | Rohde & Schwarz | ESCS30 | 828985/018 | 05/29/2011 | 05/29/2012 |
| L.I.S.N. | Schwarzbeck | NNLK8129 | 8129203 | 05/29/2011 | 05/29/2012 |
| 50Ω Coaxial Switch | Anritsu | MP59B | M20531 | N/A | N/A |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100006 | 05/29/2011 | 05/29/2012 |
| Voltage Probe | Rohde & Schwarz | TK9416 | N/A | 05/29/2011 | 05/29/2012 |
| I.S.N | Rohde & Schwarz | ENY22 | 1109.9508.02 | 05/29/2011 | 05/29/2012 |

5.4 Conducted Emission Limit

| Conducted Emission | | |
|--------------------|------------|---------|
| Frequency(MHz) | Quasi-peak | Average |
| 0.15-0.5 | 66-56 | 56-46 |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

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

5.5 Measurement Result

Not Applicable.

Since the power of EUT from battery, it's not applicable.

5.6 Conducted Measurement Photo

Not Applicable.

6. Radiated Emission Test

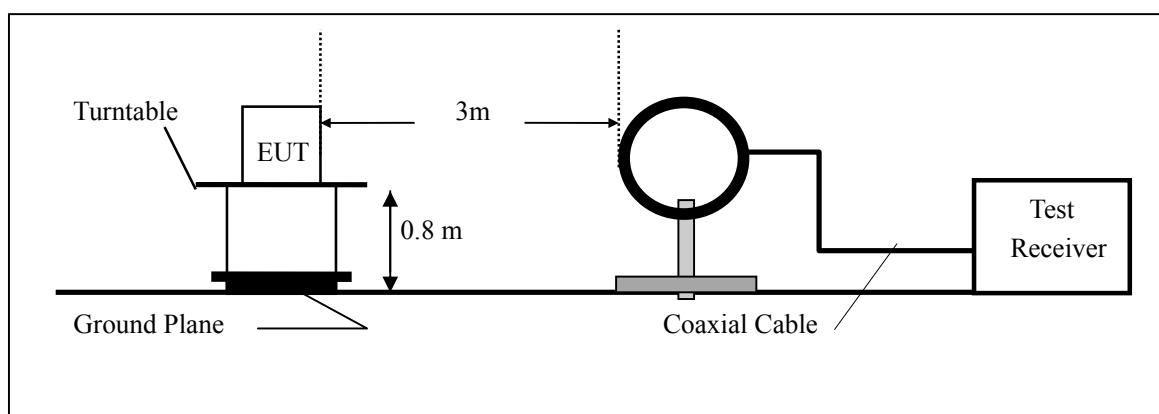
6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

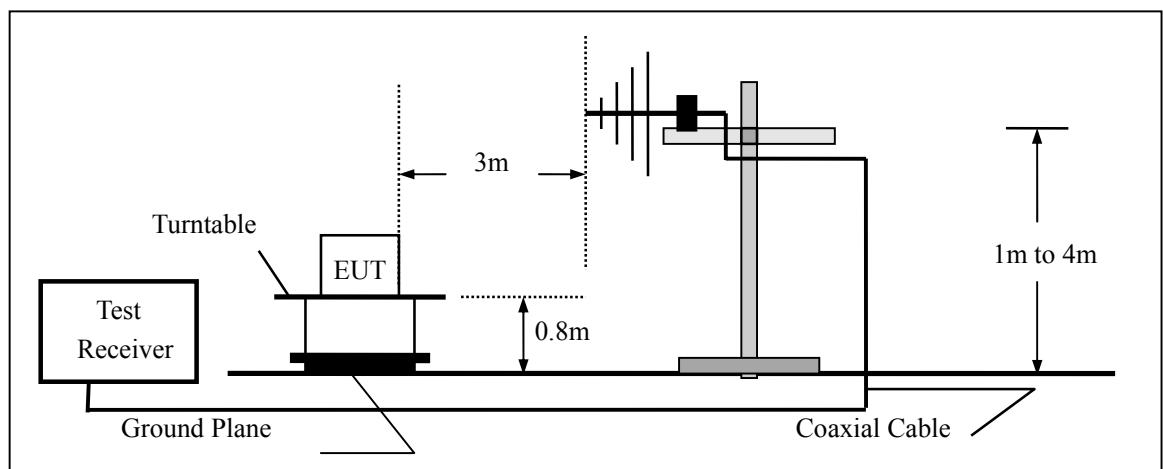
For Radiated emissions measurement, Set the bandwidth of the Spectrum's RBW at 1MHz above 1GHz and RBW 100KHz below 1GHz .

6.2 Test SET-UP (Block Diagram of Configuration)

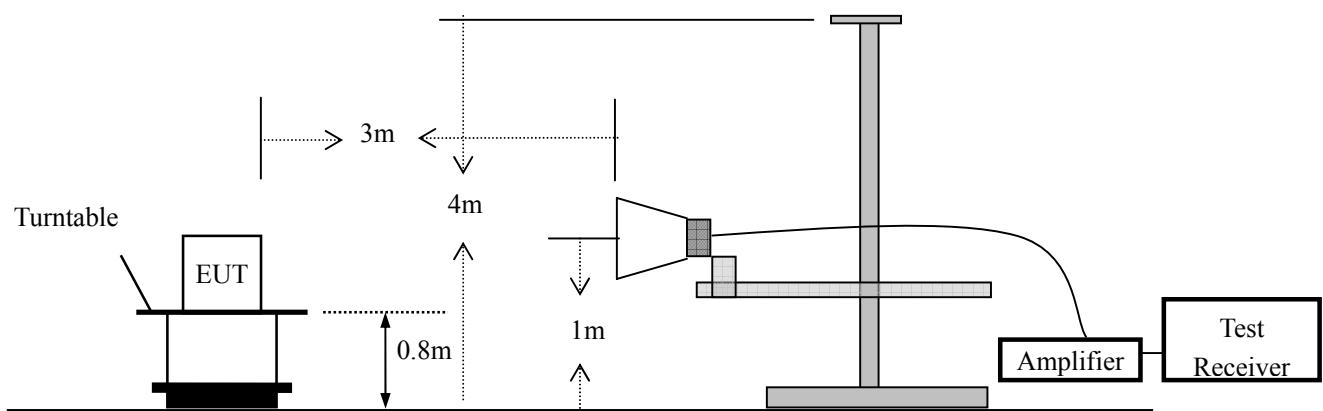
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



6.3 Measurement Equipment Used

| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
|-------------------|-----------------|--------------|---------------|--------------|------------|
| EMI Test Receiver | Rohde & Schwarz | ESU | 1302.6005.26 | May 29, 2011 | 05/29/2012 |
| Pre-Amplifier | HP | 8447D | 2944A07999 | May 29, 2011 | 05/29/2012 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 142 | May 29, 2011 | 05/29/2012 |
| Loop Antenna | ARA | PLA-1030/B | 1029 | May 29, 2011 | 05/29/2012 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170399 | May 29, 2011 | 05/29/2012 |
| Horn Antenna | Schwarzbeck | BBHA 9120 | D143 | May 29, 2011 | 05/29/2012 |
| Cable | Schwarzbeck | AK9513 | ACRX1 | May 29, 2011 | 05/29/2012 |
| Cable | Rosenberger | N/A | FP2RX2 | May 29, 2011 | 05/29/2012 |
| Cable | Schwarzbeck | AK9513 | CRPX1 | May 29, 2011 | 05/29/2012 |
| Cable | Schwarzbeck | AK9513 | CRRX2 | May 29, 2011 | 05/29/2012 |

6.4 Radiated Emission Limit

In the section 15.249(a): Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency | Field Strength of Fundamental Field Strength (mV/m) | Field Strength of Harmonics(μ V/m) |
|-----------------------|---|---|
| 902-928 MHz | 50 | 500 |
| 2400 - 2483.5 MHz | 50 | 500 |
| 5725 - 5875 MHz | 50 | 500 |
| 24.0 - 24.25 GHz | 250 | 2500 |

FCC Class B Limit at 3m:

| Frequency MHz | Distance Meter | Field Strength μ V/m | Field Strength dB μ V/m |
|------------------|-------------------|-----------------------------|--------------------------------|
| 30~88 | 3 | 100 | 40.0 |
| 88~216 | 3 | 150 | 43.5 |
| 216~960 | 3 | 200 | 46.0 |
| 960~1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74(Peak), 54(AVG) | |

Note: The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above maximum permitted average limit.

6.5 Measurement Result

Operation Mode: TX Channel Low Test Date : October 9, 2011
 Frequency Range: 30~1000MHz Temperature : 28°C
 Test Result: PASS Humidity : 65 %
 Measured Distance: 3m Test By: WOLF

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV) | Limit 3m (dBuV/m) | Over (dB) | Note |
|----------------|-----------------|--------------------------|----------------------|--------------|------|
| 30.00 | V | 20.66 | 40.00 | -19.34 | PK |
| 95.29 | V | 13.84 | 43.50 | -29.66 | PK |
| 193.22 | V | 14.52 | 43.50 | -28.98 | PK |
| 356.44 | V | 16.45 | 46.00 | -29.55 | PK |
| 713.97 | V | 25.28 | 46.00 | -20.72 | PK |
| 919.17 | V | 25.16 | 46.00 | -20.84 | PK |
| 30.00 | H | 21.32 | 40.00 | -18.68 | PK |
| 99.95 | H | 13.78 | 43.50 | -29.72 | PK |
| 258.51 | H | 15.65 | 46.00 | -30.35 | PK |
| 460.59 | H | 19.74 | 46.00 | -26.26 | PK |
| 707.76 | H | 23.28 | 46.00 | -22.72 | PK |
| 832.12 | H | 24.31 | 46.00 | -21.69 | PK |

Operation Mode: TX Channel Low Test Date : October 9, 2011
 Frequency Range: Above 1GHz Temperature : 28°C
 Test Result: PASS Humidity : 65 %
 Measured Distance: 3m Test By: WOLF

| Freq. (MHz) | Ant.Pol. H/V | Emission Level(dBuV) | | Limit 3m(dBuV/m) | | Over(dB) | |
|----------------|-----------------|----------------------|-------|------------------|-------|----------|--------|
| | | PK | AV | PK | AV | PK | AV |
| 2405 | V | 62.4 | 61.27 | 114.00 | 94.00 | -51.60 | -32.73 |
| 4807.69 | V | 63.13 | 44.01 | 74.00 | 54.00 | -10.87 | -9.99 |
| 7211.53 | V | 60.20 | 43.21 | 74.00 | 54.00 | -13.80 | -10.79 |
| 9615.38 | V | 57.34 | 44.31 | 74.00 | 54.00 | -16.66 | -9.69 |
| 2405 | H | 74.43 | 74.27 | 114.00 | 94.00 | -39.57 | -19.73 |
| 4807.69 | H | 60.95 | 42.12 | 74.00 | 54.00 | -13.05 | -11.88 |
| 7211.53 | H | 59.49 | 43.12 | 74.00 | 54.00 | -14.51 | -10.88 |
| 9615.38 | H | 57.10 | 44.08 | 74.00 | 54.00 | -16.90 | -9.92 |

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode: TX Channel Mid Test Date : October 9, 2011
 Frequency Range: 30~1000MHz Temperature : 28°C
 Test Result: PASS Humidity : 65 %
 Measured Distance: 3m Test By: WOLF

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV) | Limit 3m (dBuV/m) | Over (dB) | Note |
|----------------|-----------------|--------------------------|----------------------|--------------|------|
| 30.95 | V | 19.91 | 40.00 | -20.09 | PK |
| 94.81 | V | 14.19 | 43.50 | -29.31 | PK |
| 193.89 | V | 14.31 | 43.50 | -29.19 | PK |
| 358.49 | V | 17.68 | 46.00 | -28.32 | PK |
| 712.86 | V | 25.73 | 46.00 | -20.27 | PK |
| 918.00 | V | 24.89 | 46.00 | -21.11 | PK |
| 31.36 | H | 23.88 | 40.00 | -16.12 | PK |
| 97.87 | H | 14.56 | 43.50 | -28.94 | PK |
| 259.53 | H | 16.15 | 46.00 | -29.85 | PK |
| 461.80 | H | 19.23 | 46.00 | -26.77 | PK |
| 708.74 | H | 23.07 | 46.00 | -22.93 | PK |
| 832.96 | H | 23.86 | 46.00 | -22.14 | PK |

Operation Mode: TX Channel Mid Test Date : October 9, 2011
 Frequency Range: Above 1GHz Temperature : 28°C
 Test Result: PASS Humidity : 65 %
 Measured Distance: 3m Test By: WOLF

| Freq. (MHz) | Ant.Pol. H/V | Emission Level(dBuV) | | Limit 3m(dBuV/m) | | Over(dB) | |
|----------------|-----------------|----------------------|-------|------------------|-------|----------|--------|
| | | PK | AV | PK | AV | PK | AV |
| 2440 | V | 63.18 | 62.31 | 114.00 | 94.00 | -50.82 | -31.69 |
| 4888.32 | V | 62.52 | 43.67 | 74.00 | 54.00 | -11.48 | -10.33 |
| 7331.53 | V | 59.35 | 42.48 | 74.00 | 54.00 | -14.65 | -11.52 |
| 9775.38 | V | 58.69 | 44.98 | 74.00 | 54.00 | -15.31 | -9.02 |
| 2440 | H | 75.68 | 74.26 | 114.00 | 94.00 | -38.32 | -19.74 |
| 4888.32 | H | 60.50 | 41.85 | 74.00 | 54.00 | -13.50 | -12.15 |
| 7331.53 | H | 58.81 | 42.80 | 74.00 | 54.00 | -15.19 | -11.20 |
| 9775.38 | H | 55.87 | 43.15 | 74.00 | 54.00 | -18.13 | -10.85 |

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 (3) Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode: TX Channel High Test Date : October 9, 2011
 Frequency Range: 30~1000MHz Temperature : 28°C
 Test Result: PASS Humidity : 65 %
 Measured Distance: 3m Test By: WOLF

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV) | Limit 3m (dBuV/m) | Over (dB) | Note |
|----------------|-----------------|--------------------------|----------------------|--------------|------|
| 30.21 | V | 20.41 | 40.00 | -19.59 | PK |
| 96.27 | V | 13.09 | 43.50 | -30.41 | PK |
| 192.84 | V | 13.47 | 43.50 | -30.03 | PK |
| 354.39 | V | 15.14 | 46.00 | -30.86 | PK |
| 715.02 | V | 22.30 | 46.00 | -23.70 | PK |
| 917.91 | V | 21.45 | 46.00 | -24.55 | PK |
| 28.85 | H | 19.00 | 40.00 | -21.00 | PK |
| 102.28 | H | 13.09 | 43.50 | -30.41 | PK |
| 260.29 | H | 14.53 | 46.00 | -31.47 | PK |
| 458.54 | H | 18.60 | 46.00 | -27.40 | PK |
| 709.01 | H | 21.40 | 46.00 | -24.60 | PK |
| 833.35 | H | 23.52 | 46.00 | -22.48 | PK |

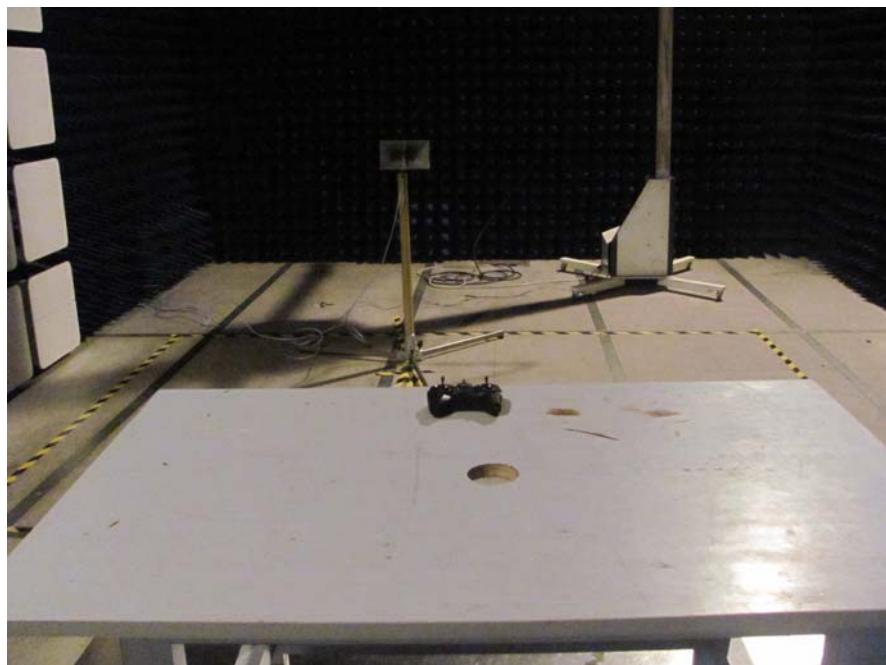
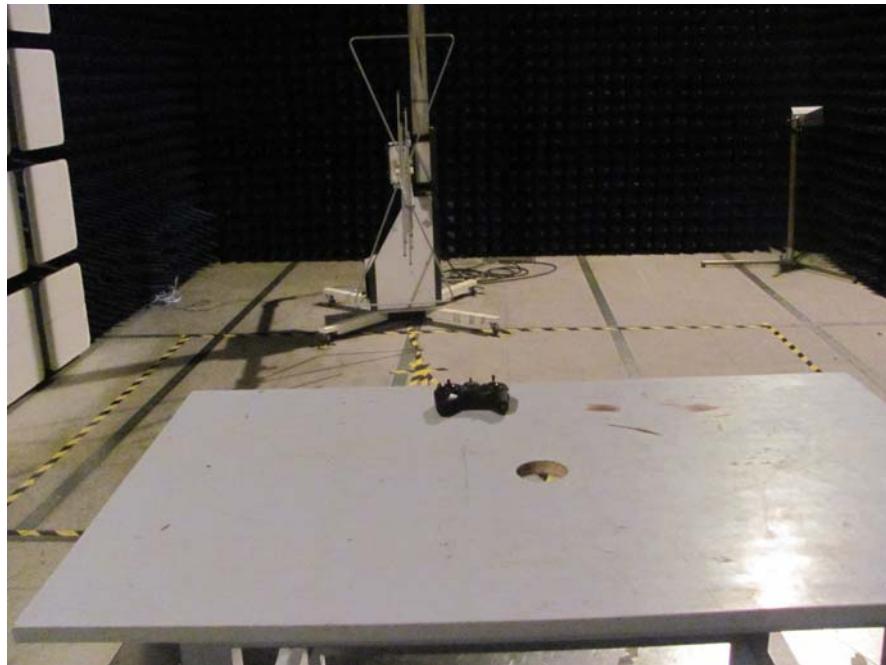
Operation Mode: TX Channel High Test Date : October 9, 2011
 Frequency Range: Above 1GHz Temperature : 28°C
 Test Result: PASS Humidity : 65 %
 Measured Distance: 3m Test By: WOLF

| Freq. (MHz) | Ant.Pol. H/V | Emission Level(dBuV) | | Limit 3m(dBuV/m) | | Over(dB) | |
|----------------|-----------------|----------------------|-------|------------------|-------|----------|--------|
| | | PK | AV | PK | AV | PK | AV |
| 2480 | V | 62.4 | 61.27 | 114.00 | 94.00 | -51.60 | -32.73 |
| 4967.69 | V | 62.22 | 43.12 | 74.00 | 54.00 | -11.78 | -10.88 |
| 7451.65 | V | 59.15 | 42.53 | 74.00 | 54.00 | -14.85 | -11.47 |
| 9935.43 | V | 57.71 | 43.95 | 74.00 | 54.00 | -16.29 | -10.05 |
| 2480 | H | 74.43 | 74.27 | 114.00 | 94.00 | -39.57 | -19.73 |
| 4967.71 | H | 61.90 | 42.41 | 74.00 | 54.00 | -12.10 | -11.59 |
| 7451.72 | H | 60.57 | 43.95 | 74.00 | 54.00 | -13.43 | -10.05 |
| 9935.49 | H | 56.25 | 43.52 | 74.00 | 54.00 | -17.75 | -10.48 |

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part .

Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 (3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

6.6 Radiated Measurement Photos



7. Band Edge Test

7.1 Measurement Procedure

1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

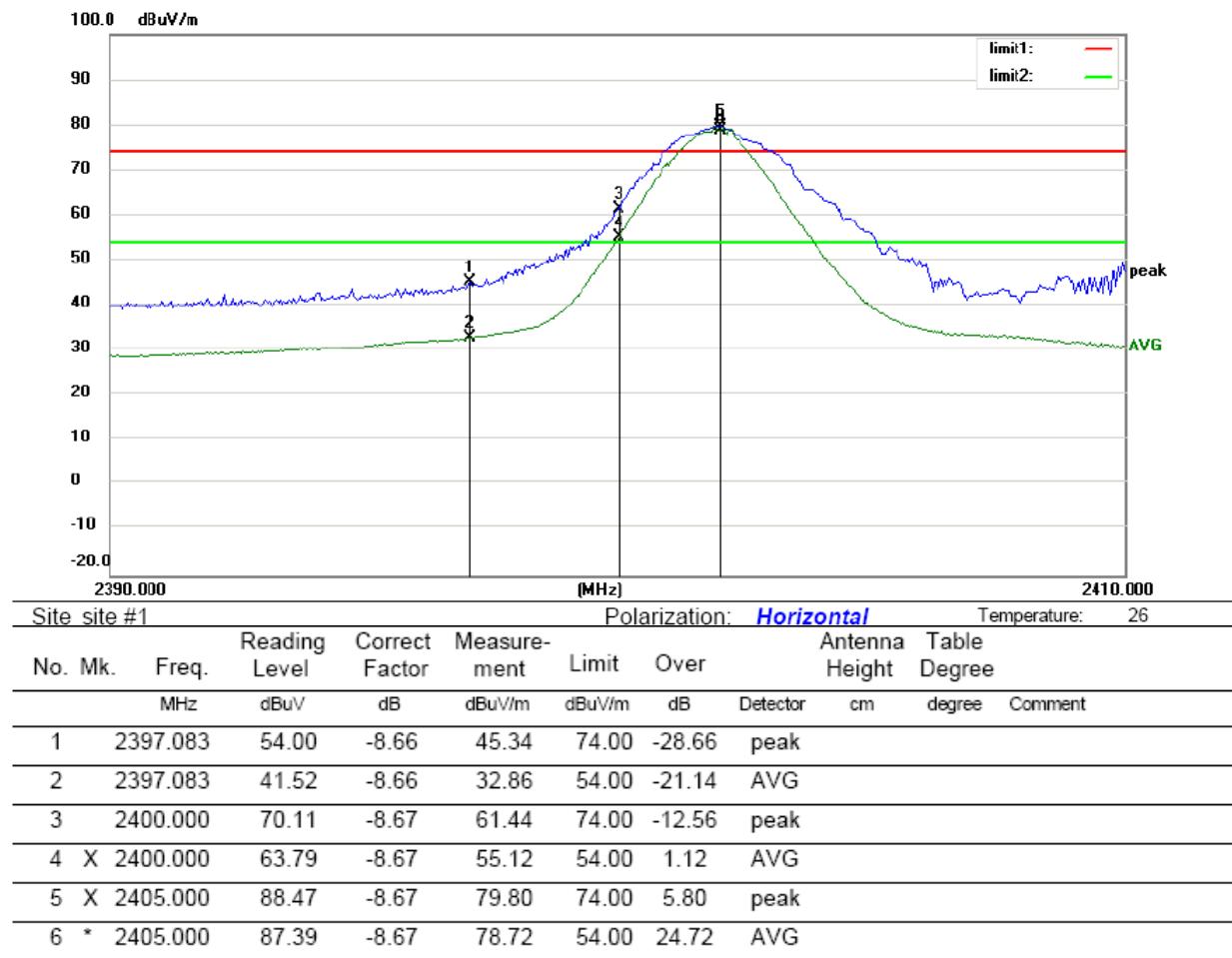
7.2 Test SET-UP (Block Diagram of Configuration)

As 6.2 Test set up (B) and (C)

7.3 Measurement Equipment Used

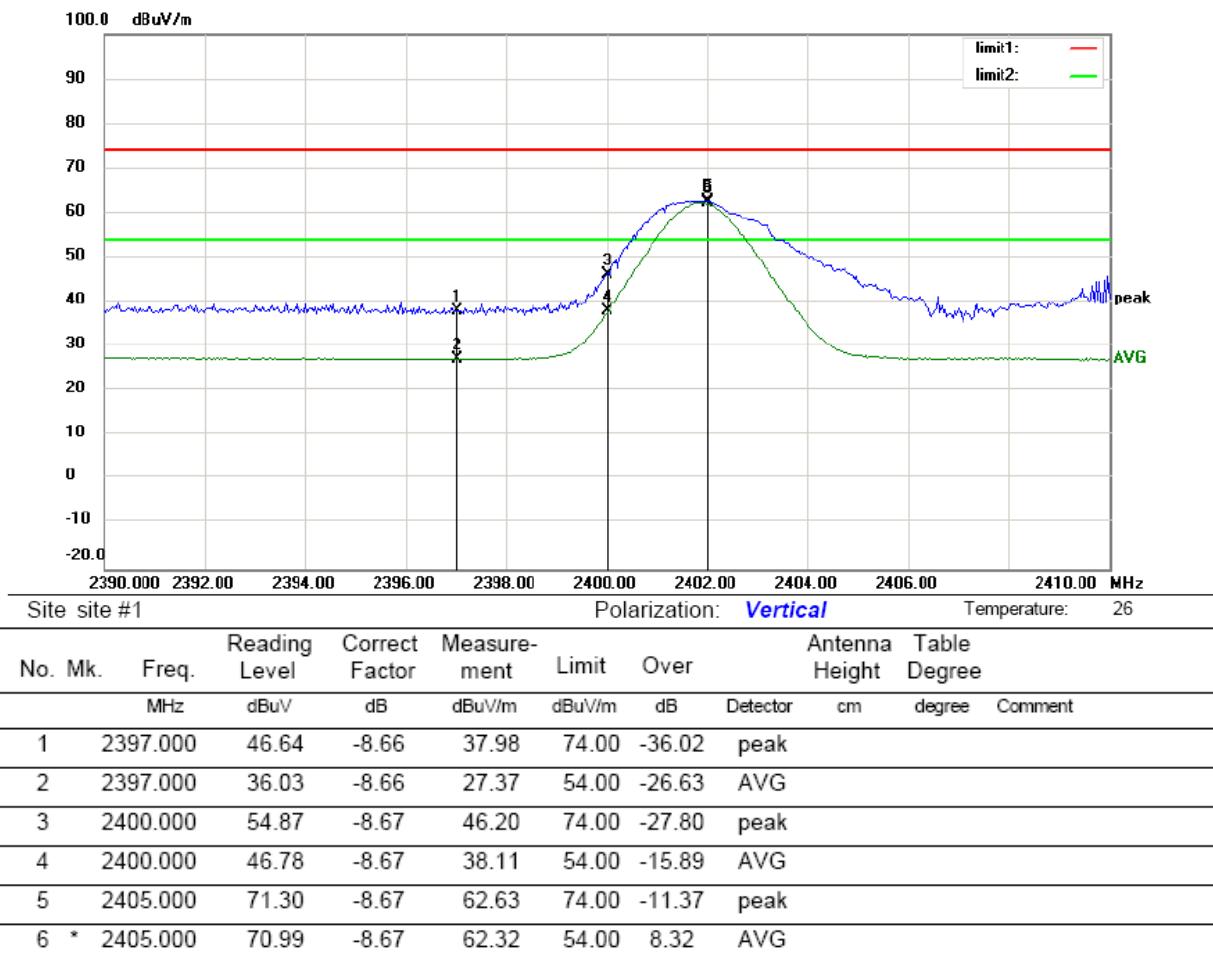
Same as 6.3 Radiated Emission Measurement.

7.4 Measurement Results



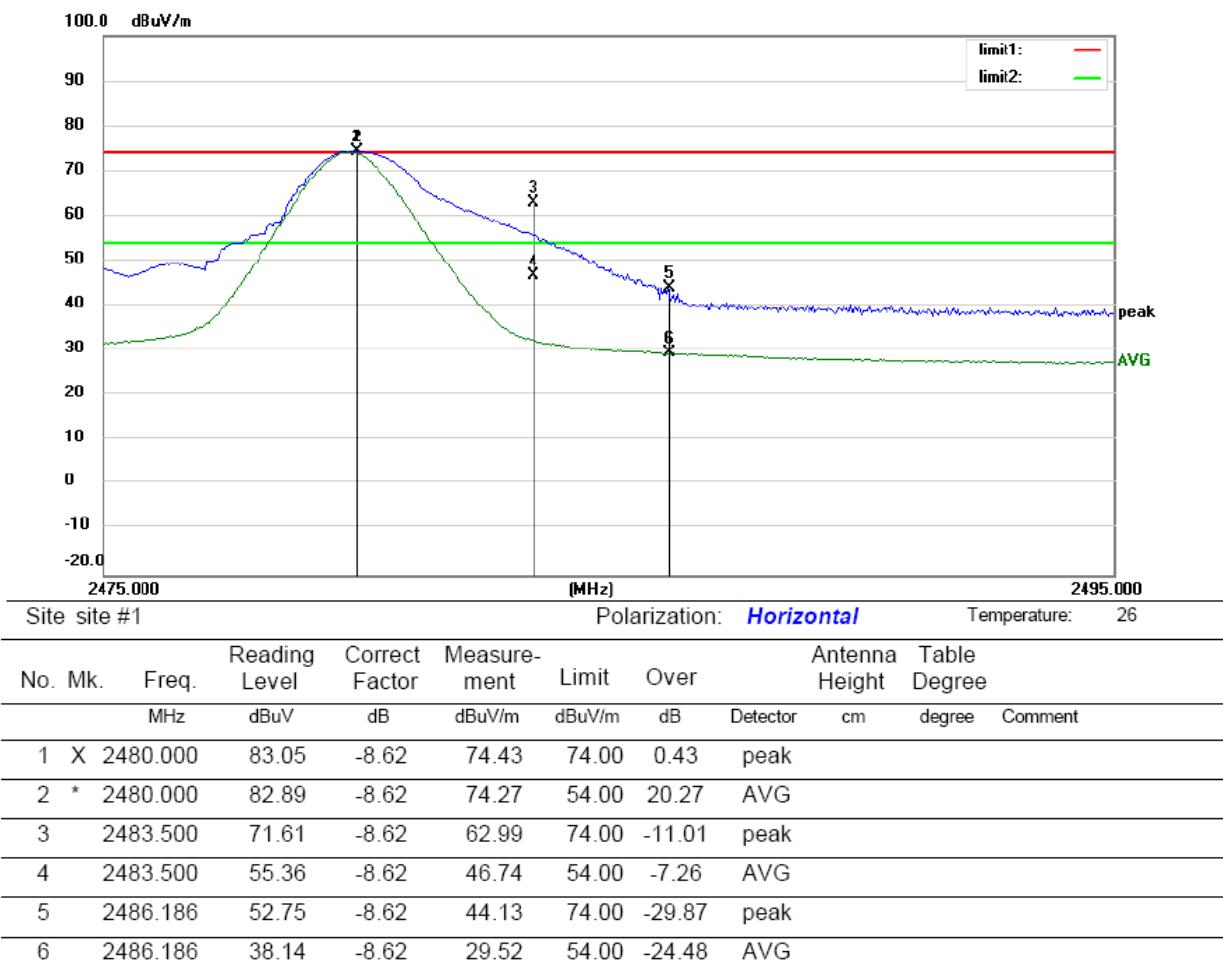
*:Maximum data x:Over limit !:over margin

Operator: WOLF



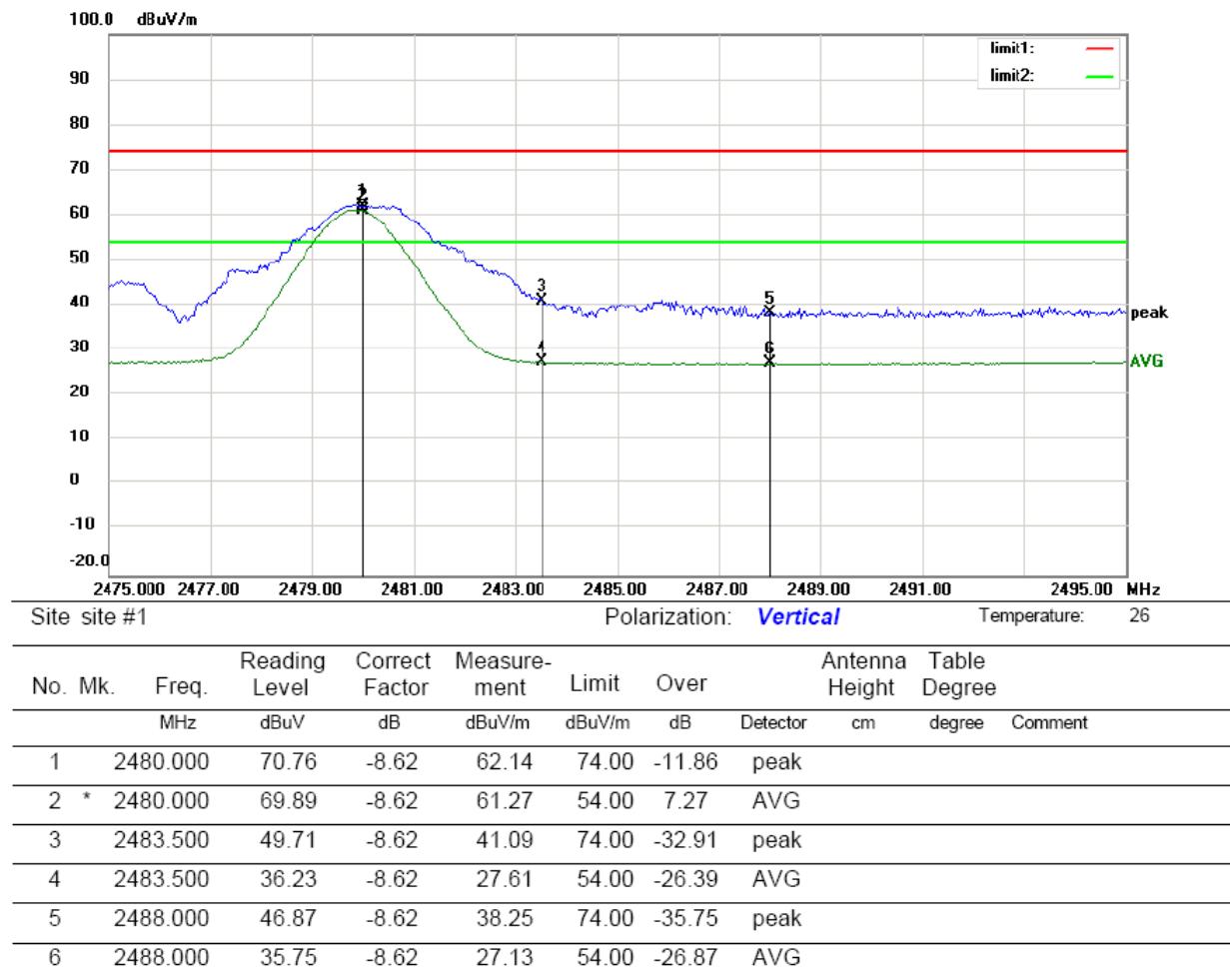
*:Maximum data x:Over limit !:over margin

Operator: WOLF



*:Maximum data x:Over limit !:over margin

Operator: WOLF



*:Maximum data x:Over limit !:over margin

Operator: WOLF

8. Antenna Application

12.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 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.

12.2 Result

The EUT'S antenna is PCB Antenna. The antenna's gain is 0dBi and meets the requirement.