



FCC ID:2AFR2HBX433RF

**AUDIX Technology (Shenzhen) Co., Ltd.**

**FCC PART 15C TEST REPORT FOR CERTIFICATION**  
**On Behalf of**

**Shenzhen Hotbroad Technology Co., Ltd.**

**Dc ceiling fan launchers**

**Model Number: DCFAN-433-01B**

**FCC ID: 2AFR2HBX433RF**

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Report Number : ACS-F16053  
Date of Test : Feb.19~Apr.12, 2016  
Date of Report : Apr.12, 2016

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AUDIX Technology (Shenzhen) Co., Ltd.

## TEST REPORT CERTIFICATION

Applicant : Shenzhen Hotbroad Technology Co., Ltd.

Manufacturer : Shenzhen Hotbroad Technology Co., Ltd.

EUT Description : Dc ceiling fan launchers

FCC ID : 2AFR2HBX433RF

(A) Model No. : DCFAN-433-01B

(B) Serial No. : N/A

(C) Power Supply : DC 3V

(D) Test Voltage : DC 3V

Tested for comply with:

FCC CFR 47 Part 15 Subpart C: 2014

Test procedure used:

ANSI C63.10: 2013

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Feb.19~Apr.12, 2016 Report of date: Apr.12, 2016

Prepared by : Cindy Zhu  
Cindy Zhu / Assistant

Reviewed by : [Signature]  
Sunny Lu / Assistant Manager

Approved & Authorized Signer :



## 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	Standard	Results
Conducted Emission Test	FCC Part 15C: 15.231 ANSI C63.10: 2013	N/A
Radiated Emission Test	FCC Part 15C: 15.231 ANSI C63.10: 2013	PASS
Stop Transmitting Time Test	FCC Part 15C: 15.231	PASS
20 dB Bandwidth Test	FCC Part 15C: 15.231	PASS
N/A is an abbreviation for Not Applicable.		

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

Product Name : Dc ceiling fan launchers

Model Number : DCFAN-433-01B

FCC ID : 2AFR2HBX433RF

Operation frequency : 433.92MHz

Applicant : Shenzhen Hotbroad Technology Co., Ltd.  
6B, A3 Bld., Huafeng Century Technology Park, Xixiang  
Baoan District, Shenzhen city, guangdong

Manufacturer : Shenzhen Hotbroad Technology Co., Ltd.  
6B, A3 Bld., Huafeng Century Technology Park, Xixiang  
Baoan District, Shenzhen city, guangdong

Antenna Type & Gain : PCB printing Antenna, 2dBi gain

Date of Test : Feb.19~Apr.12, 2016

Date of Receipt : Feb.17, 2016

Sample Type : Prototype production

### 2.2. EUT Configuration and operation conditions for test.

EUT
-----

**(EUT: Dc ceiling fan launchers)**

## 2.3. Test Facility

### Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park, Nantou, Shenzhen, Guangdong, China
3m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 90454 Valid Date: Dec.30, 2017
3m & 10m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 794232 Valid Date: Jul.12, 2016
EMC Lab.	:	Certificated by Industry Canada Registration Number: IC 5183A-1 Valid Date: May.14, 2017
	:	Certificated by DAkkS, Germany Registration No: D-PL-12151-01-00 Valid Date: Dec.15, 2016
	:	Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2017

## 2.4. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Radiation Emission test in 3m chamber	2.6dB(30~200MHz, Polarization: H)
	2.6dB(30~200MHz, Polarization: V)
	3.0dB(200M~1GHz, Polarization: H)
	2.8dB(200M~1GHz, Polarization: V)
Uncertainty for Radiation Emission test in 3m chamber (1GHz-18GHz)	6.3dB (1~6GHz, Distance: 3m)
	5.7dB (6~18GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.6dB
Uncertainty for Conduction Spurious emission test	2.0dB
Uncertainty for Output power test	0.8dB
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.1 %
Uncertainty for test site temperature and humidity	0.6
	3%



### **3. POWER LINE CONDUCTED EMISSION TEST**

According to Paragraph (c) of FCC Part 15 section 15.207, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

## 4. RADIATED EMISSION TEST

### 4.1. Test Equipment

Frequency range: 30~1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber	AUDIX	N/A	N/A	Mar.28,15	1 Year
2.	EMI Spectrum	Agilent	E4407B	MY41440292	Apr.28,15	1 Year
3.	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	Apr.28,15	1 Year
4.	Amplifier	HP	8447D	2648A04738	Apr.28,15	1 Year
5.	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-493	May.06,15	1 Year
6.	RF Cable	MIYAZAKI	CFD400-N W(3.5M)	No.3	Apr.28,15	1 Year
7.	RF Cable	MIYAZAKI	CFD400-L W(22M)	No.7	Apr.28,15	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397222	Apr.28,15	1 Year
9.	Test Software	AUDIX	E3	6.2009-5-21a(n)	N/A	N/A

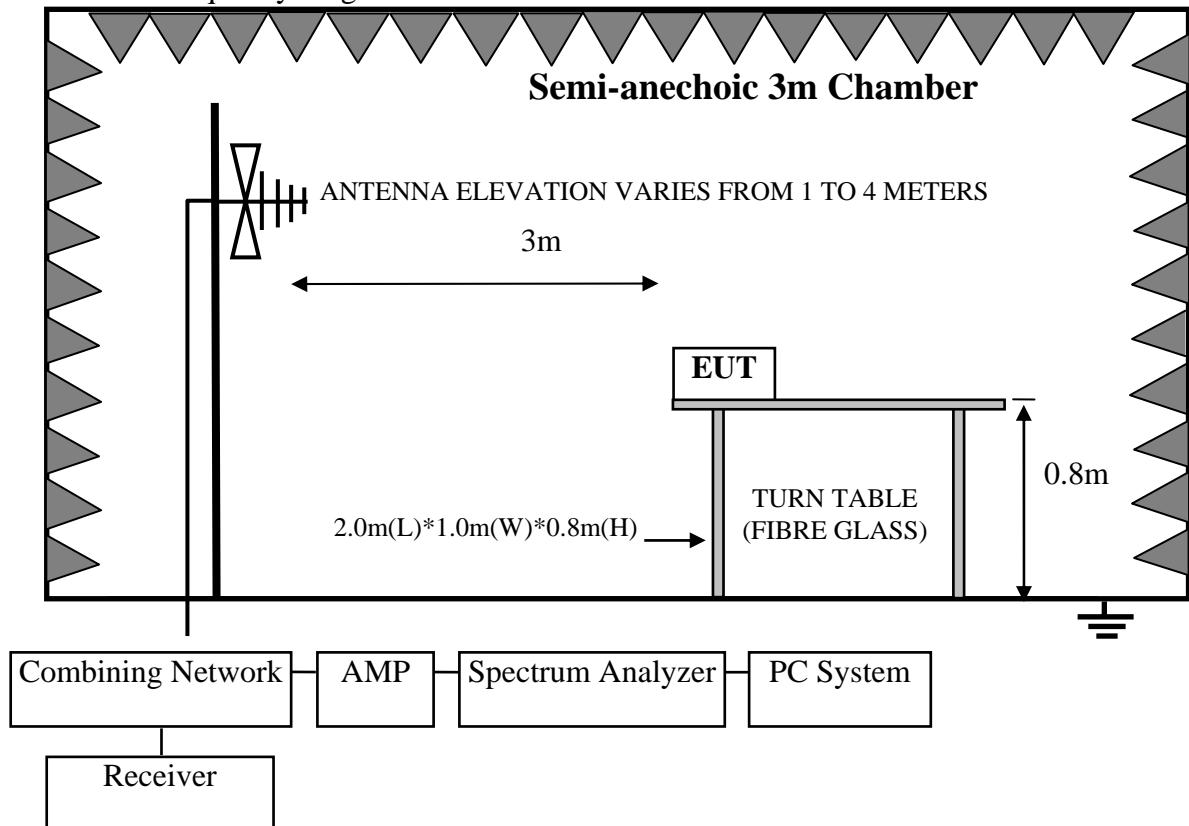
Frequency range: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	Apr.28,15	1 Year
2.	Horn Antenna	ETS	3115	9510-4877	Oct.15,15	1 Year
3.	Amplifier	Agilent	8449B	3008A02495	Apr.28,15	1 Year
4.	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	Apr.28,15	1 Year
5.	Horn Antenna	ETS	3116	00060088	Nov.18.15	1 Year
6.	Test Software	AUDIX	E3	6.2009-5-21a(n)	N/A	N/A

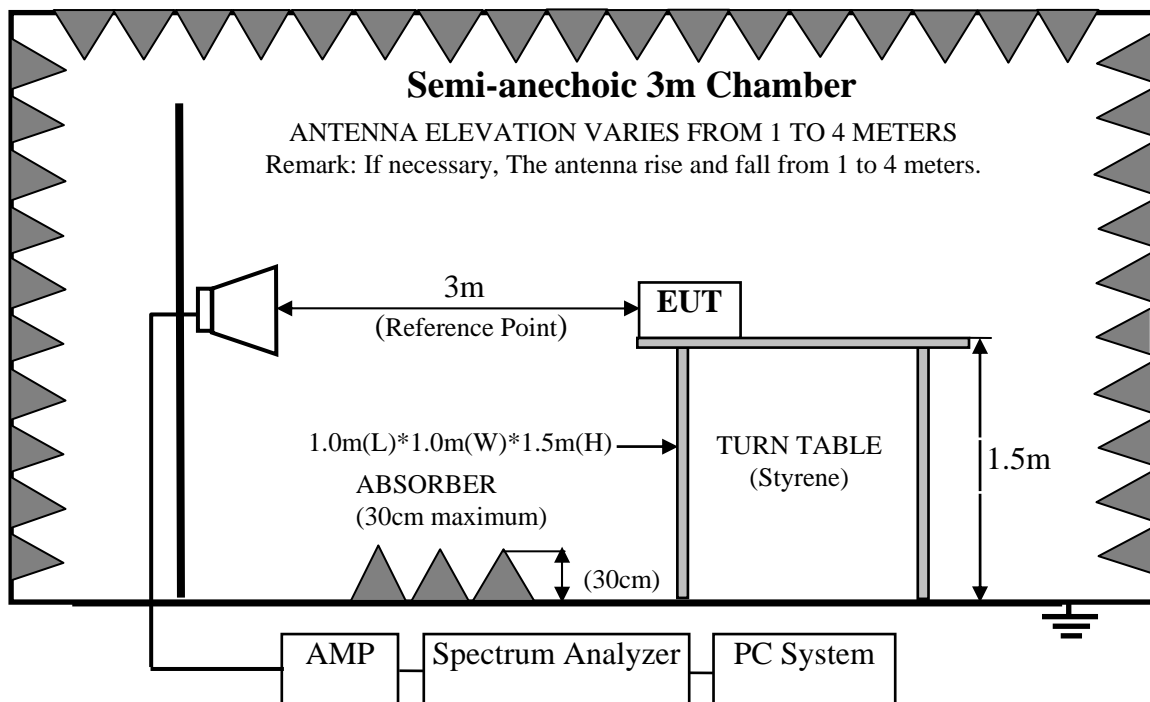


## 4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range above 1GHz



#### 4.3. Radiated Emission Limit Standard: FCC 15.209 and 15.231

Fundamental Frequency(MHz)	Field Strength of Fundamental	Field Strength of Spurious emissions
433.92	QP:80.83dBuV/m at 3m distance	AV:60.83dBuV/m at 3m distance (Above 1GHz) PK:80.83dBuV/m at 3m distance (Above 1GHz) QP:60.83dBuV/m at 3m distance (Below 1GHz)

Note: The spurious emissions appearing within the frequency band listed in 15.205  
Shall also comply with limits shown in section 15.209

#### 4.4.EUT Configuration on Test

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

#### 4.5.Operating Condition of EUT

- 4.5.1.Setup the EUT and simulator as shown as Section 4.2.
- 4.5.2.Turn on the power of all equipments.
- 4.5.3.Let EUT work in Tx mode.

#### 4.6.Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. 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 between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2013 on radiated emission Test.

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions.

After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation show in the test setup photos.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz

This device is pulse modulated; a duty cycle factor was used to calculate average level based measured peak level.

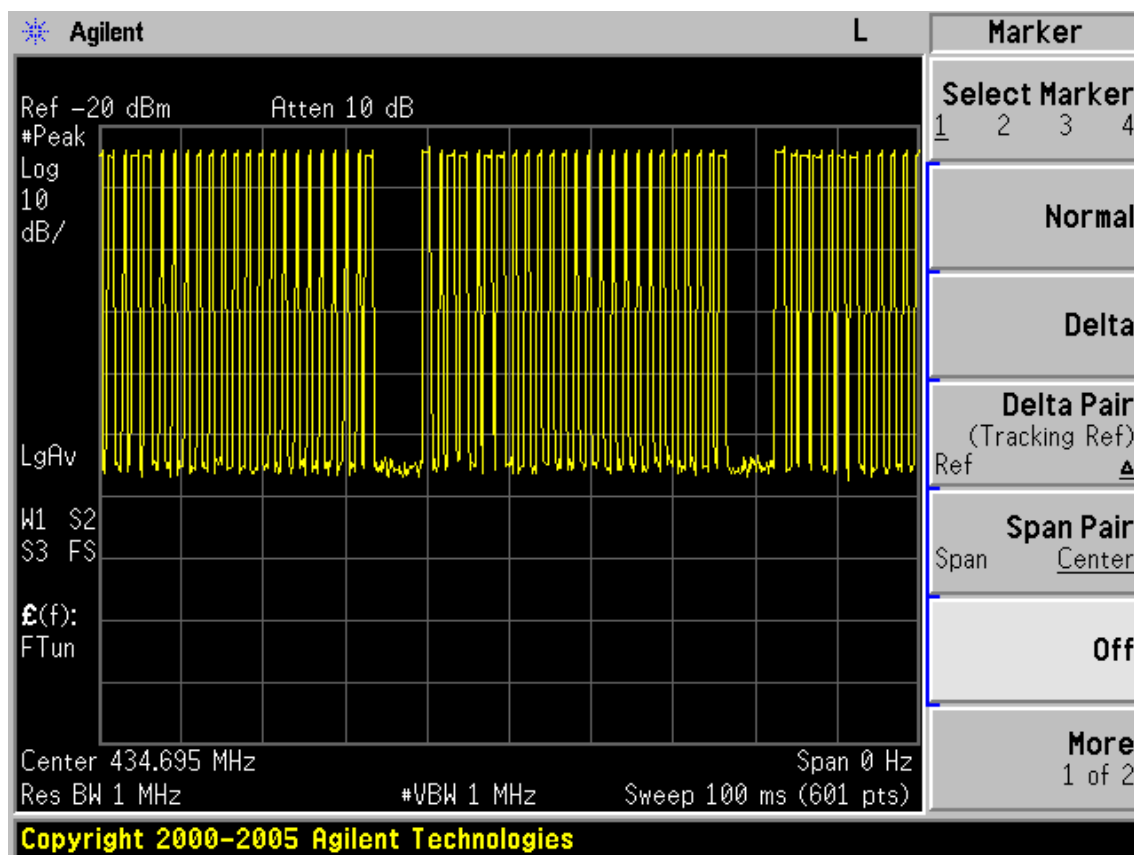
#### 4.7.Radiated Emission Test Results

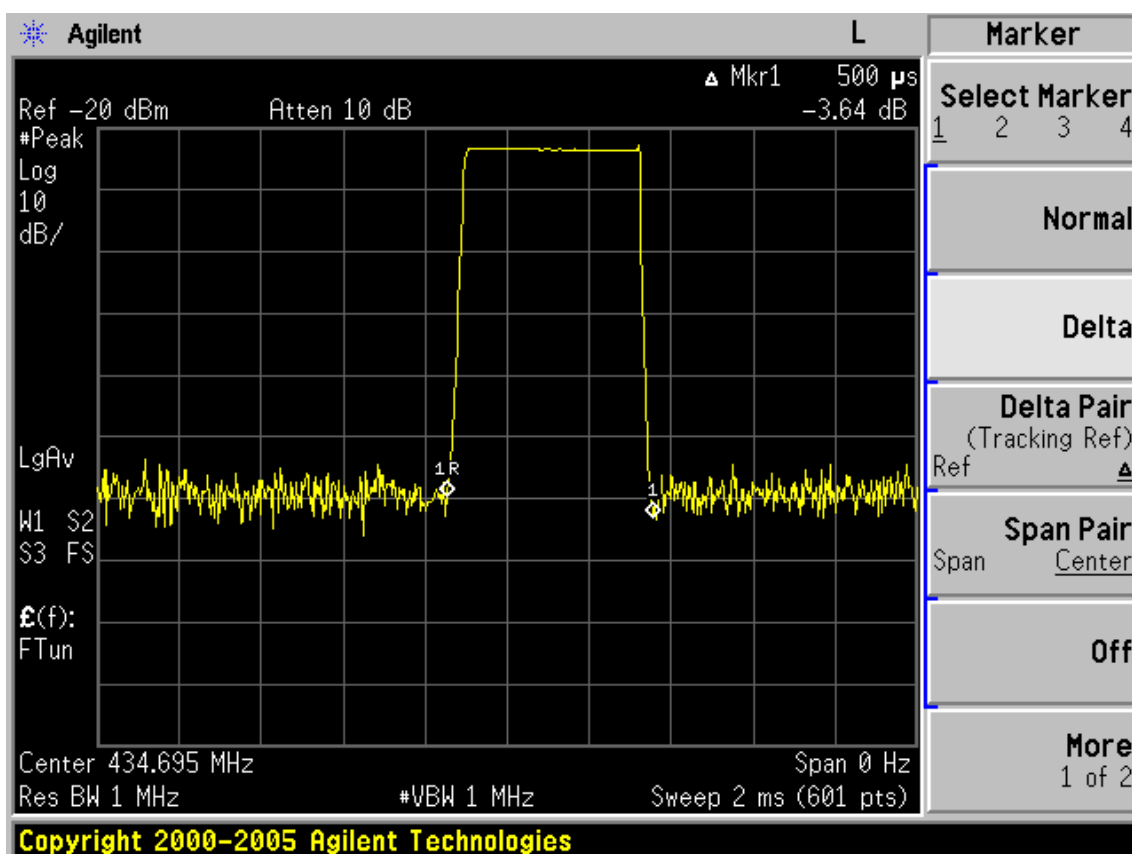
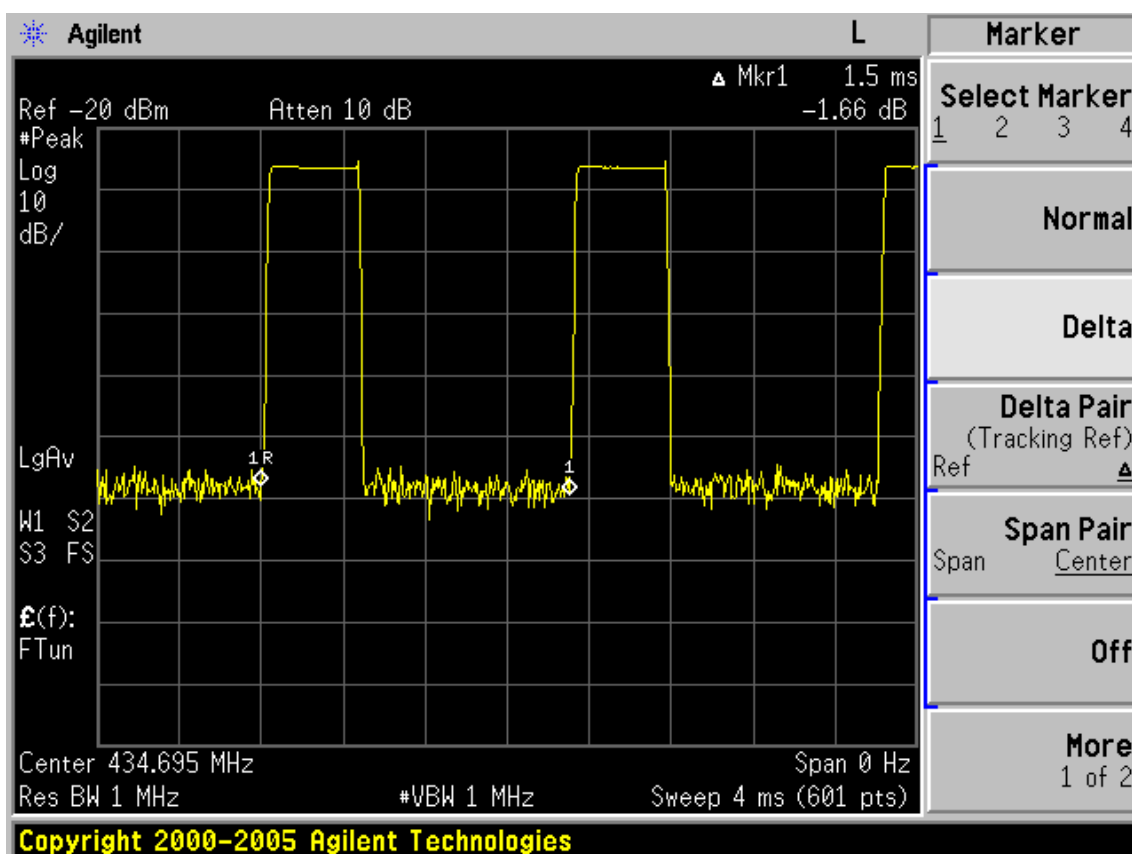
**PASS.**

Note: The emission in the restricted Bands in section 15.205 comply with the 15.209 general limit.

The frequency range from 30MHz to 5000MHz was investigated. When PK measured Levels comply with average limit, then the average levels were deemed to comply with Average limit. When PK measured levels exceed average limit, then the duty cycle factor of 100ms was used to calculate average level.

$$\text{Duty cycle factor} = 20 \log (\text{Tx On}/100\text{ms}) = 20 \log \{(59 * 0.5\text{ms})/100\text{ms}\} = -10.60$$



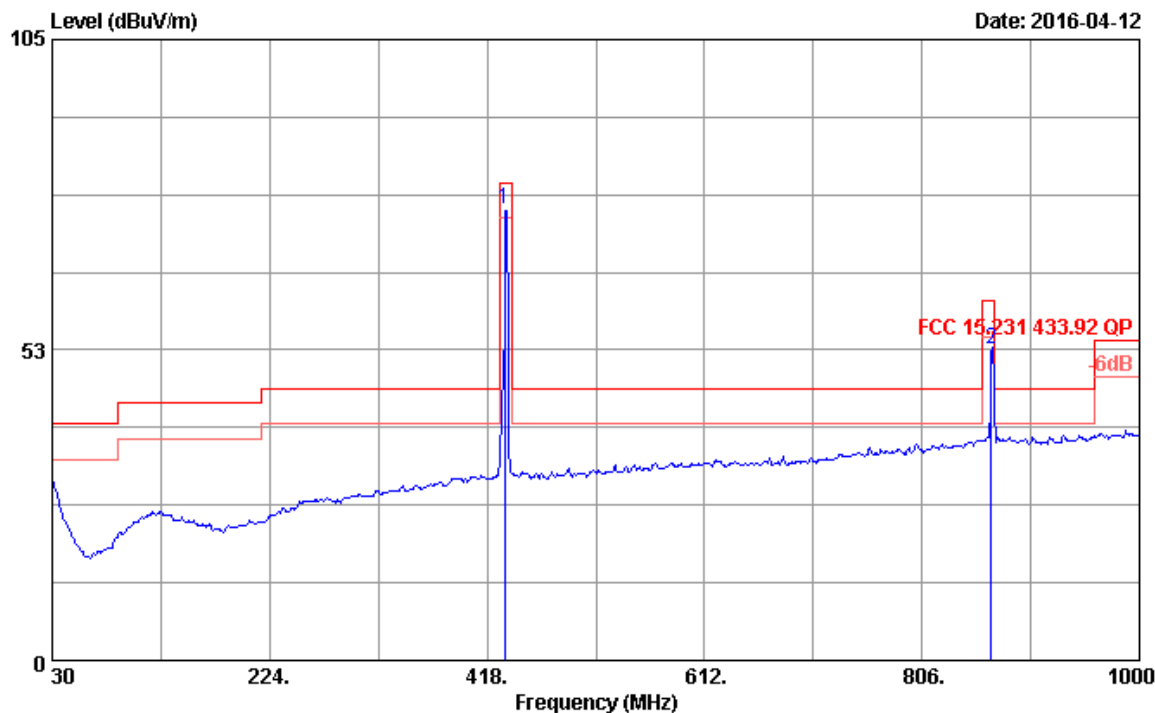


**Frequency: 30MHz~1GHz**

Data: 19

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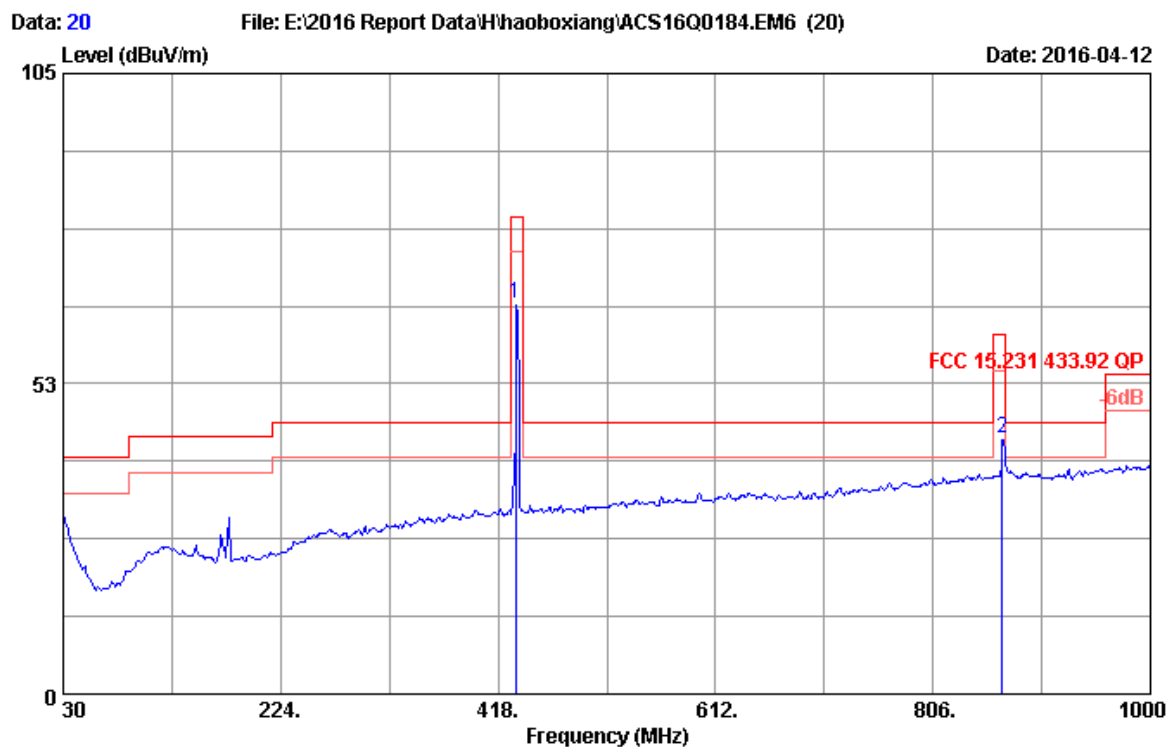
Date: 2016-04-12



Site no. : 3m Chamber Data no. : 19  
Dis. / Ant. : 3m 2015 CBL6112D 35375 Ant. pol. : HORIZONTAL  
Limit : FCC 15.231 433.92 QP  
Env. / Ins. : 23.3°C/64% Engineer : Frank  
EUT : Dc ceiling fan launchers  
Power rating : DC 3V  
Test Mode : TX Mode  
M/N:DCFAN-433-01B

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	433.920	17.40	2.31	56.61	76.32	80.83	4.51	QP
2	867.840	21.71	3.42	27.50	52.63	60.83	8.20	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 20  
 Dis. / Ant. : 3m 2015 CBL6112D 35375 Ant. pol. : VERTICAL  
 Limit : FCC 15.231 433.92 QP  
 Env. / Ins. : 23.3°C/64% Engineer : Frank  
 EUT : Dc ceiling fan launchers  
 Power rating : DC 3V  
 Test Mode : TX Mode  
 M/N:DCFAN-433-01B

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	433.920	17.40	2.31	46.51	66.22	80.83	14.61	QP
2	867.840	21.71	3.42	18.20	43.33	60.83	17.50	QP

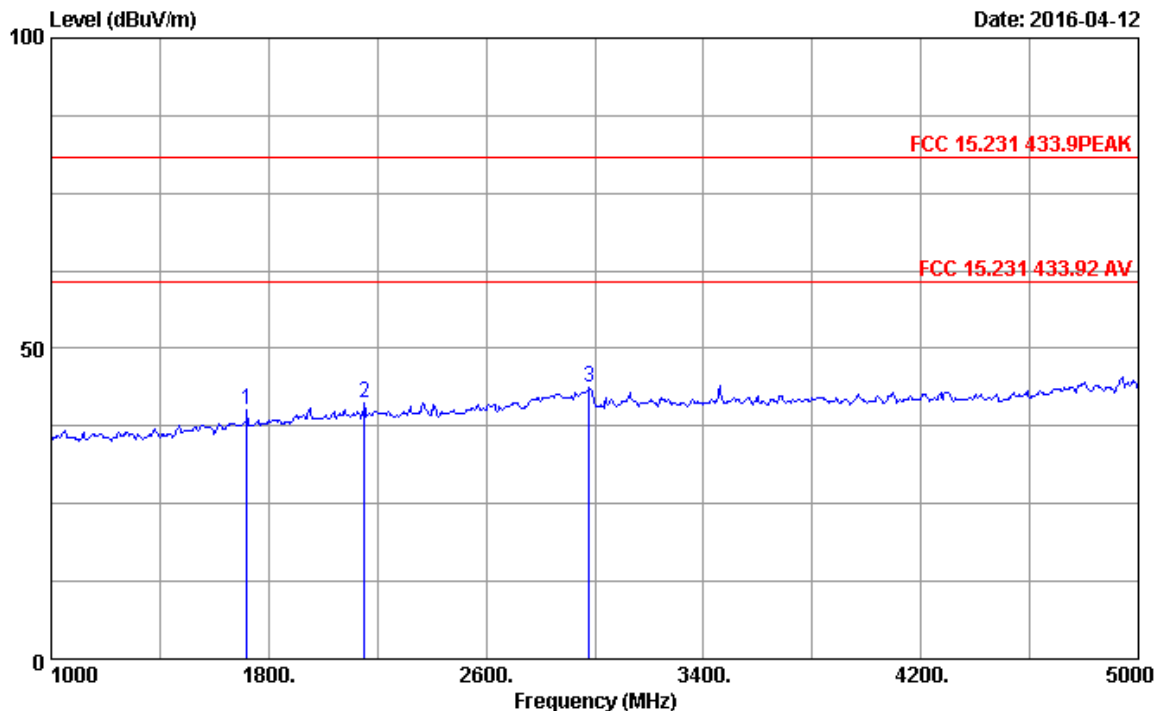
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

# Frequency: 1GHz~5GHz

Data: 22

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Date: 2016-04-12

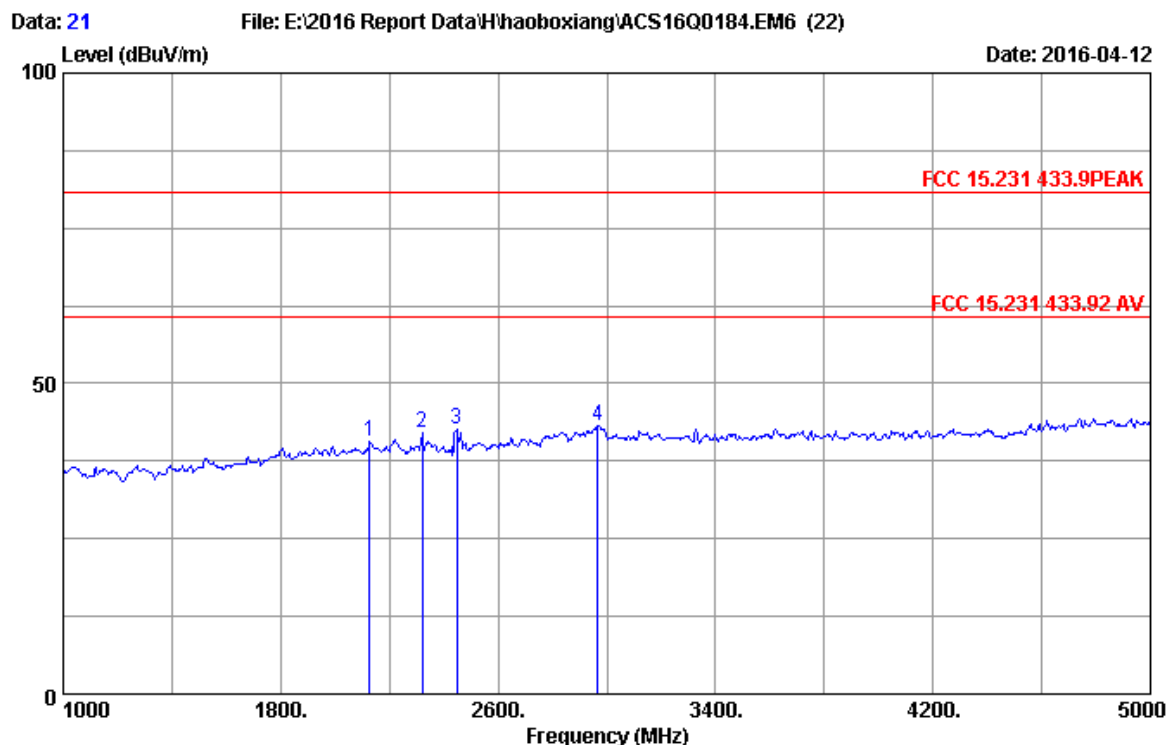


Site no. : 3m Chamber Data no. : 22  
Dis. / Ant. : 3m 2015 3115-4580 Ant. pol. : HORIZONTAL  
Limit : FCC 15.231 433.9PEAK  
Env. / Ins. : 23.3°C/64% Engineer : Frank  
EUT : Dc ceiling fan launchers  
Power rating : DC 3V  
Test Mode : TX Mode  
M/N: DCFAN-433-01B

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1720.00	26.81	2.56	35.01	45.74	40.10	80.83	40.73	Peak
2	2152.00	28.09	2.74	34.62	45.09	41.30	80.83	39.53	Peak
3	2980.00	29.70	3.11	34.32	45.37	43.86	80.83	36.97	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  
-amp factor.  
2. The emission levels that are 20dB below the official  
limit are not reported.





Site no. : 3m Chamber Data no. : 21  
 Dis. / Ant. : 3m 2015 3115-4580 Ant. pol. : VERTICAL  
 Limit : FCC 15.231 433.9PEAK  
 Env. / Ins. : 23.3°C/64% Engineer : Frank  
 EUT : Dc ceiling fan launchers  
 Power rating : DC 3V  
 Test Mode : TX Mode  
 M/N: DCFAN-433-01B

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2128.00	28.07	2.74	34.63	44.53	40.71	80.83	40.12	Peak
2	2320.00	28.20	2.75	34.56	45.70	42.09	80.83	38.74	Peak
3	2448.00	28.27	2.75	34.51	46.07	42.58	80.83	38.25	Peak
4	2968.00	29.70	3.11	34.32	44.79	43.28	80.83	37.55	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  
 -Amp factor.  
 2. The emission levels that are 20dB below the official  
 limit are not reported.

## 5. STOP TRANSMITTING TIME TEST

### 5.1. Test Equipment

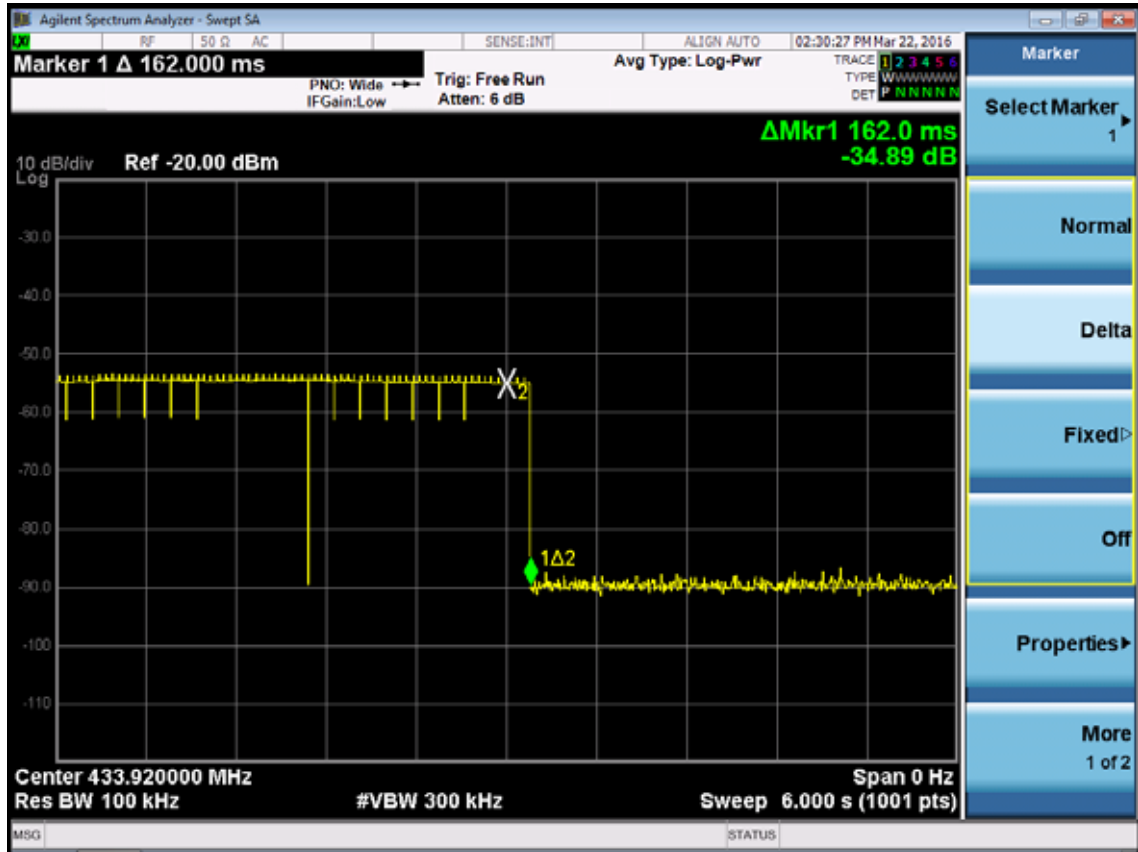
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.17,15	1Year

### 5.2. Limit

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### 5.3. Test Results

Frequency (MHz)	Stop Transmitting Time	Limit	Conclusion
433.900	162.0ms	5s	PASS



## 6. 20 DB BANDWIDTH TEST

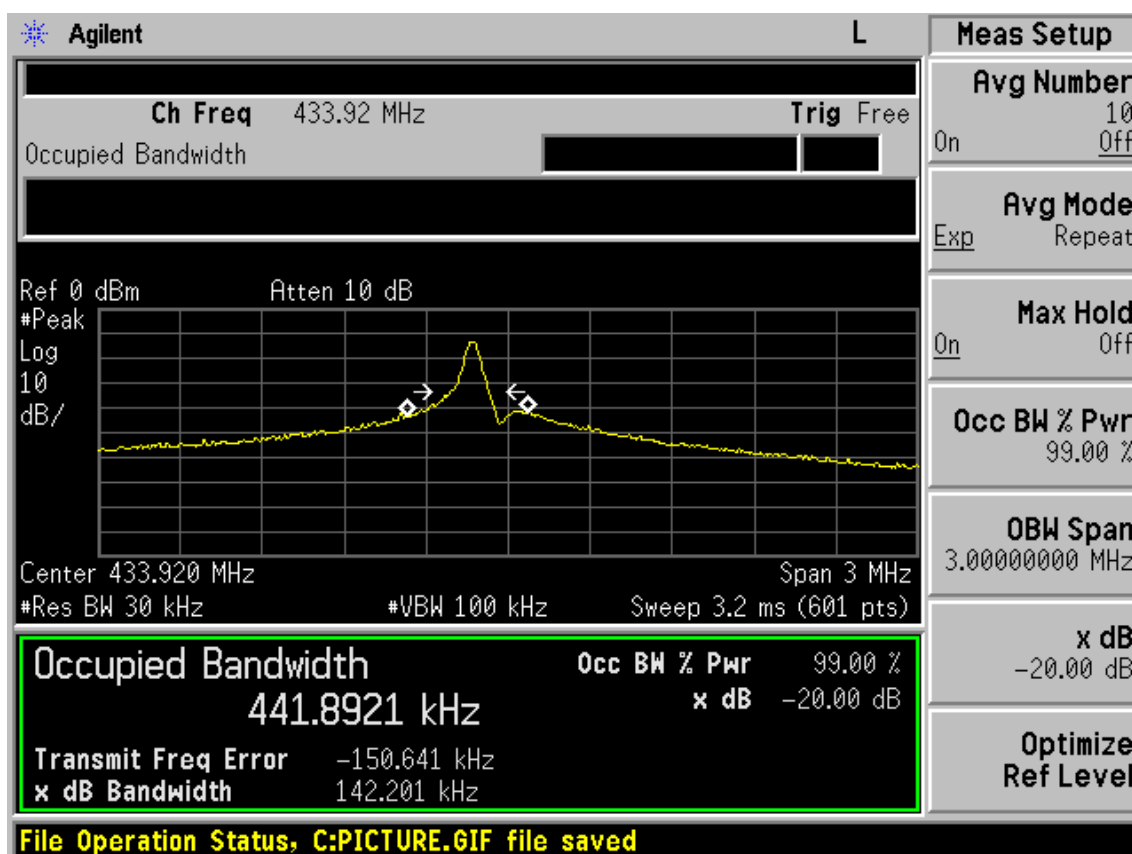
### 6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	Apr.28,15	1 Year
2.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr. 28,15	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	Apr. 28,15	1 Year

### 6.2. Test Results

EUT: Dc ceiling fan launchers		
M/N: DCFAN-433-01B		
Test date: 2016-02-19	Pressure: 101.1±1.0 kpa	Humidity: 51.9±3.0%
Tested by: Leo-Li	Test site: RF Site	Temperature: 22.3±0.6

Frequency (MHz)	20 dB Bandwidth (kHz)	Limit(kHz): No wider than 0.25% of the center frequency	Conclusion
433.900	441.8921	$433.9 \times 0.25\% = 1.08\text{MHz}$	PASS



## 7. ANTENNA REQUIREMENT

**RESULT** : **PASS**

Test Date : Feb.19~Apr.12, 2016

Test standard : FCC Part 15.231

Limit : the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 0dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply the provision.

## 8. RADIO FRFREQUENCY EXPOSURE COMPLIANCE

**RESULT : PASS**

Test standard : FCC KDB Publication 447498 D01 V05

Since maximum peak output power of the transmitter is  $<10\text{mW}$ , i.e.  $0.009346\text{mW} < 10\text{mW}$ , hence the EUT is excluded from SAR evaluation according to FCC KDB Publication 447498 D01:General RF Exposure Guidance V05.



## 9. DEVIATION TO TEST SPECIFICATIONS

[NONE]