

TEST REPORT FOR CERTIFICATION  
On Behalf of  
Chungear Industrial Co., Ltd  
Ceiling Fan Remote Controller (Transmitter)  
Model No.: TR222A  
FCC ID: KUJCE10320

Prepared for : Chungear Industrial Co., Ltd  
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Date of Report : 2014. 12. 26

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## TEST REPORT CERTIFICATION

Applicant : Chungear Industrial Co., Ltd  
Manufacturer #1 : Chungear Industrial Co., Ltd  
Manufacturer #2 : Satellite Electronic (Zhongshan) Ltd.  
Manufacturer #3 : Zhongshan Amity Electronic Ltd.  
EUT Description : Ceiling Fan Remote Controller (Transmitter)  
FCC ID : KUJCE10320  
(A) Model No. : TR222A  
(B) Serial No. : N/A  
(C) Power Supply : DC 6V  
(D) Test Voltage : DC 6V (Via Batteries)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, October 2013  
AND ANSI C63.4/2003

(FCC CFR 47 Part 15C, §15.207, §15.209 and §15.231)

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits both radiated and conducted emissions.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test : 2014. 12. 22 ~ 26 Date of Report : 2014. 12. 26

Producer :   
(Annie Yu/Administrator)

Signatory:   
(Ben Cheng/Manager)

## 1. DESCRIPTION OF VERSION

| Edition No. | Date of Rev. | Revision Summary | Report No. |
|-------------|--------------|------------------|------------|
| 0           | 2014. 12. 26 | Original Report. | EM-F140815 |

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

|                                                                                                                                                                                                               |                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product                                                                                                                                                                                                       | Ceiling Fan Remote Controller (Transmitter)                                                                                                                    |
| Model Number                                                                                                                                                                                                  | TR222A                                                                                                                                                         |
| Serial Number                                                                                                                                                                                                 | N/A                                                                                                                                                            |
| FCC ID                                                                                                                                                                                                        | KUJCE10320                                                                                                                                                     |
| Applicant                                                                                                                                                                                                     | Chungear Industrial Co., Ltd<br>106 Kanho Rd., Taichung, Taiwan                                                                                                |
| Manufacturer                                                                                                                                                                                                  | #1 Chungear Industrial Co., Ltd<br>106 Kanho Rd., Taichung, Taiwan                                                                                             |
|                                                                                                                                                                                                               | #2 Satellite Electronic (Zhongshan) Ltd.<br>No.15 Zhongshan Troch Hi-Tech Industrial Development<br>Zone , Zhongshan City, Guangdong Province 528437<br>China. |
|                                                                                                                                                                                                               | #3 Zhongshan Amity Electronic Ltd.<br>No. 16 Torch Hi-Tech Industrial Development Zone, Zhong<br>Shan City Guangdong Province China.                           |
| Power Supply                                                                                                                                                                                                  | DC 6V                                                                                                                                                          |
| Fundamental Range                                                                                                                                                                                             | 304.25MHz                                                                                                                                                      |
| Frequency Channel                                                                                                                                                                                             | 1 Channel                                                                                                                                                      |
| Radio Technology                                                                                                                                                                                              | ASK Modulation                                                                                                                                                 |
| Antenna Type                                                                                                                                                                                                  | PCB Antenna                                                                                                                                                    |
| Date of Receipt of Sample                                                                                                                                                                                     | 2014. 12. 16                                                                                                                                                   |
| Date of Test                                                                                                                                                                                                  | 2014. 12. 22 ~ 26                                                                                                                                              |
| <b>Remark:</b><br>Antenna requirement: This EUT's transmitter antenna is designed to be soldered on a printed circuit board, comply with §15.203 and inform to user that any change and modify is prohibited. |                                                                                                                                                                |

## \* Ceiling Fan Remote Controller (Receiver) - Receiver

- (1)Model No.: JY199, FCC by DoC
- (2)Model No.: JY326B, FCC by DoC
- (3)Model No.: JY326D, FCC by DoC
- (4)Model No.: MR36T, FCC by DoC
- (5)Model No.: MR36R, FCC by DoC
- (6)Model No.: MR58A, FCC by DoC
- (7)Model No.: MR56E, FCC by DoC
- (8)Model No.: MR101D, FCC by DoC
- (9)Model No.: MR101F, FCC by DoC
- (10)Model No.: MR101F-2, FCC by DoC
- (11)Model No.: MR62A, FCC by DoC
- (12)Model No.: MR76T, FCC by DoC

## 2.2. Description of Test Facility

|                        |   |                                                                                                                                                                                              |
|------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of Firm           | : | <b>AUDIX Technology Corporation<br/>EMC Department</b><br>No. 53-11, Dingfu, Linkou Dist.,<br>New Taipei City 244, Taiwan                                                                    |
| Test Site<br>(Semi-AC) | : | <b>Semi-Anechoic Chamber</b><br>No. 53-11, Dingfu, Linkou Dist.,<br>New Taipei City 244, Taiwan<br>Federal Communication Commission<br>Registration Number: 90993<br>Filing on: 2012. 05. 11 |
| NVLAP Lab. Code        | : | 200077-0                                                                                                                                                                                     |
| TAF Accreditation No   | : | 1724                                                                                                                                                                                         |

## 2.3. Measurement Uncertainty

| Test Item                        | Frequency Range | Uncertainty |
|----------------------------------|-----------------|-------------|
| Radiation Test<br>(Distance: 3m) | 30MHz~300MHz    | ± 3.64dB    |
|                                  | 300MHz~1000MHz  | ± 4.07dB    |
|                                  | Above 1GHz      | ± 2.94dB    |

Remark : Uncertainty =  $ku_c(y)$ 

| Test Item                 | Uncertainty |
|---------------------------|-------------|
| Emission Bandwidth (20dB) | ± 0.2kHz    |
| Periodic Operated         | ± 0.05s     |

### **3. CONDUCTED EMISSION MEASUREMENT**

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

## 4. RADIATED EMISSION MEASUREMENT

### 4.1. Test Equipment

The following test equipment was used during the radiated emission test:

#### 4.1.1. For Frequency Range 30MHz~1000MHz (Semi-Anechoic Chamber)

| Item | Type              | Manufacturer | Model No.  | Serial No. | Cal. Date    | Cal. Interval |
|------|-------------------|--------------|------------|------------|--------------|---------------|
| 1    | Spectrum Analyzer | Agilent      | N9010A-526 | MY53400071 | 2014. 09. 15 | 1 Year        |
| 2    | Test Receiver     | R & S        | ESCS30     | 100338     | 2014. 06. 24 | 1 Year        |
| 3    | Amplifier         | HP           | 8447D      | 2944A06305 | 2014. 02. 19 | 1 Year        |
| 4    | Bilog Antenna     | CHASE        | CBL6112D   | 33821      | 2014. 08. 02 | 1 Year        |

#### 4.1.2. For Frequency Range above 1GHz (Semi-Anechoic Chamber)

| Item | Type              | Manufacturer | Model No.  | Serial No. | Cal. Date    | Cal. Interval |
|------|-------------------|--------------|------------|------------|--------------|---------------|
| 1    | Spectrum Analyzer | Agilent      | N9010A-526 | MY53400071 | 2014. 09. 15 | 1 Year        |
| 2    | Amplifier         | Agilent      | 8449B      | 3008A02676 | 2014. 02. 21 | 1 Year        |
| 3    | Horn Antenna      | EMCO         | 3115       | 9609-4927  | 2014. 06. 17 | 1 Year        |

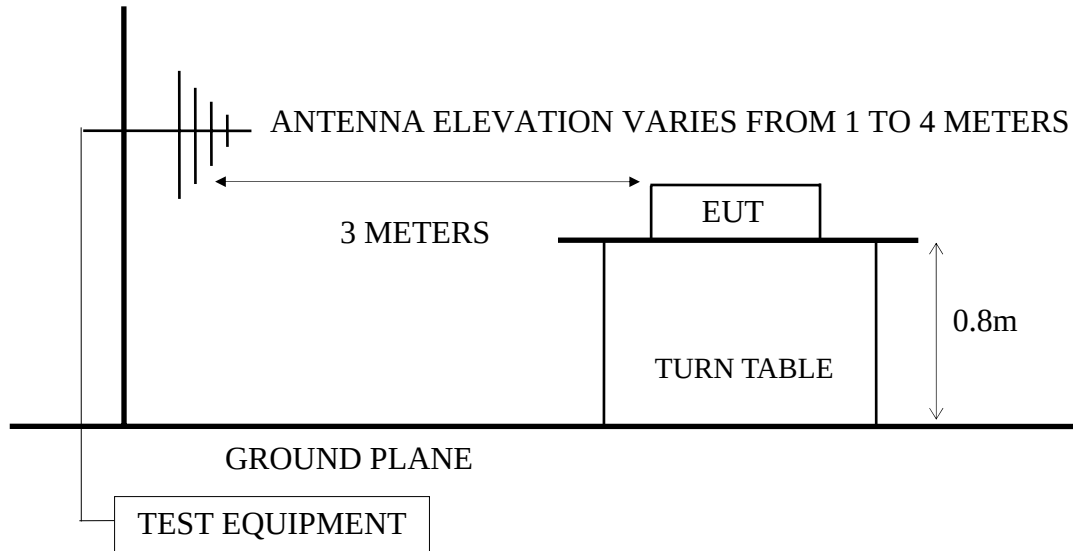
### 4.2. Test Setup

#### 4.2.1. Block Diagram of connection between EUT and simulators

**CEILING FAN REMOTE  
CONTROLLER (TRANSMITTER)  
(EUT)**

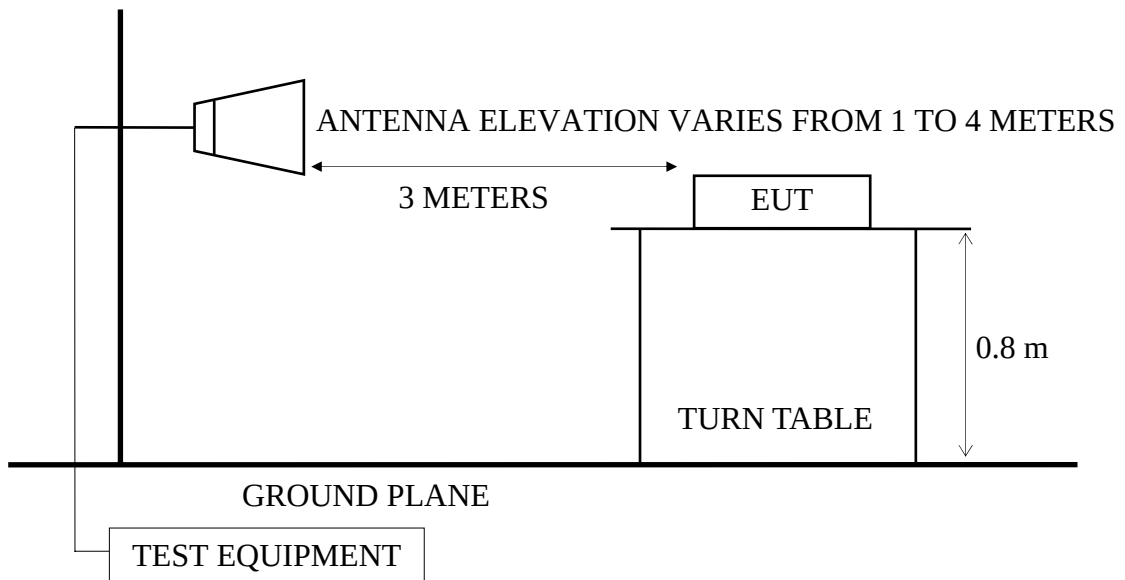
## 4.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz

ANTENNA TOWER



## 4.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz

ANTENNA TOWER



### 4.3. Radiation Emission Limits (§15.209)

| Frequency<br>MHz | Distance<br>Meters | Field Strengths Limits |                          |
|------------------|--------------------|------------------------|--------------------------|
|                  |                    | $\mu\text{V/m}$        | $\text{dB}\mu\text{V/m}$ |
| 30 - 88          | 3                  | 100                    | 40.00                    |
| 88 - 216         | 3                  | 150                    | 43.50                    |
| 216 - 960        | 3                  | 200                    | 46.00                    |
| Above 960        | 3                  | 500                    | 54.00                    |

Remarks : (1) Emission level ( $\text{dB}\mu\text{V/m}$ ) =  $20 \log$  Emission level ( $\mu\text{V/m}$ )  
 (2) The tighter limit applies at the edge between two frequency bands.  
 (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 4.4. Operating Condition of EUT

- 4.4.1. Set up the EUT and simulator as shown on 4.2.
- 4.4.2. The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions. (The worst mode is lying)
- 4.4.3. The EUT was operated on maximum transmitting status during all testing (lying condition).

### 4.5. Test Procedure

The EUT and was placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set to 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna could be moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003 regulation.

The bandwidth of test receiver was set at 120kHz for frequencies below 1GHz and resolution bandwidth of spectrum analyzer was set at 1MHz for frequencies above 1GHz.

The frequency range from 30MHz to 5GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked. 30MHz to 1000MHz was measured with Quasi-Peak detector. Pursuant to ANSI 63.4: 4.2, peak detector is an alternate option for frequency from 30MHz to 1000MHz.

Above 1GHz was measured with peak and average detector. For frequency from 4GHz to 5GHz, we checked it in 1 meter distance and with a shorter cable 2 meter instead of original's. There is no signal exist.

Pursuant to ANSI C63.4 8.3.1.2, when peak value complies with the average limit, we didn't perform measurement in average detector.

#### 4.6. Radiated Emission Noise Measurement Results

4.6.1. Frequency Range 30MHz to 1GHz Measurement Results: **PASSED.**

Date of Test : 2014. 12. 25 Temperature : 22°C

EUT : Ceiling Fan Remote Controller (Transmitter) Humidity : 36%

Test Mode : Transmit, Frequency: 304.25MHz

| Emission Frequency | Antenna Factor | Cable Loss | Meter Reading Horizontal | Emission Level Horizontal | Limits   | Margin |
|--------------------|----------------|------------|--------------------------|---------------------------|----------|--------|
| (MHz)              | (dB/m)         | (dB)       | (dBμV)                   | (dBμV/m)                  | (dBμV/m) | (dB)   |
| 101.78             | 11.03          | 3.23       | 11.03                    | 25.29                     | 43.50    | 18.21  |
| 303.54             | 13.22          | 4.70       | 15.90                    | 33.82                     | 46.00    | 12.18  |
| *912.70            | 20.65          | 7.62       | 20.67                    | 48.94                     | 74.95    | 26.01  |

Remark: 1. Emission Level = Ant. Factor + Cable Loss + Reading  
 2. "\*" is Harmonic Frequency, where limit of Harmonic Frequency is calculated by:  
 $41.6667 \times 304.25 - 7083.333 = 5593.7601 \mu\text{V/m}$   
 $20\log(5593.7601) = 94.95 \text{ dB}\mu\text{V/m}$  (Limit for fundamental frequency)  
 $94.95 - 20\text{dB} = 74.95 \text{ dB}\mu\text{V/m}$  (Limit for harmonic frequency)

| Emission Frequency | Antenna Factor | Cable Loss | Meter Reading Vertical | Emission Level Vertical | Limits   | Margin |
|--------------------|----------------|------------|------------------------|-------------------------|----------|--------|
| (MHz)              | (dB/m)         | (dB)       | (dBμV)                 | (dBμV/m)                | (dBμV/m) | (dB)   |
| 482.02             | 16.73          | 6.32       | 3.29                   | 26.34                   | 46.00    | 19.66  |
| 590.96             | 18.08          | 6.49       | 4.99                   | 29.56                   | 46.00    | 16.44  |
| *912.70            | 20.65          | 7.62       | 8.86                   | 37.13                   | 74.95    | 37.82  |

Remark: 1. Emission Level = Ant. Factor + Cable Loss + Reading  
 2. "\*" is Harmonic Frequency, where limit of Harmonic Frequency is calculated by:  
 $41.6667 \times 304.25 - 7083.333 = 5593.7601 \mu\text{V/m}$   
 $20\log(5593.7601) = 94.95 \text{ dB}\mu\text{V/m}$  (Limit for fundamental frequency)  
 $94.95 - 20\text{dB} = 74.95 \text{ dB}\mu\text{V/m}$  (Limit for harmonic frequency)

## 4.6.2. Frequency Range 1GHz to up to 10th harmonics Measurement Results:

Date of Test : 2014. 12. 25 Temperature : 23°C

EUT : Ceiling Fan Remote Controller  
(Transmitter) Humidity : 36%

Test Mode : Transmit, Frequency: 304.25MHz

| Emission<br>Frequency | Antenna<br>Factor | Cable<br>Loss | Meter<br>Reading<br>Horizontal | Emission<br>Level<br>Horizontal | Limits   | Margin |
|-----------------------|-------------------|---------------|--------------------------------|---------------------------------|----------|--------|
| (MHz)                 | (dB/m)            | (dB)          | (dBμV)                         | (dBμV/m)                        | (dBμV/m) | (dB)   |
| * 1218.40             | 25.70             | 2.45          | 19.09                          | 47.24                           | 54.00    | 6.76   |
| * 1522.48             | 25.71             | 1.83          | 23.32                          | 50.86                           | 54.00    | 3.14   |
| * 1826.56             | 27.10             | 3.71          | 21.39                          | 52.20                           | 54.00    | 1.80   |
| * 2130.64             | 27.94             | 4.86          | 12.74                          | 45.54                           | 54.00    | 8.46   |
| * 2434.72             | 28.24             | 5.30          | 13.17                          | 46.71                           | 54.00    | 7.29   |

- Remarks:
1. Emission level=Antenna Factor + Cable Loss + Reading.
  2. For measurements above 1GHz, the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.  
(According to ANSI C63.4-2003 section 8.3.1.2)
  3. "\*" is Harmonic Frequency

| Emission<br>Frequency | Antenna<br>Factor | Cable<br>Loss | Meter<br>Reading<br>Vertical | Emission<br>Level<br>Vertical | Limits   | Margin |
|-----------------------|-------------------|---------------|------------------------------|-------------------------------|----------|--------|
| (MHz)                 | (dB/m)            | (dB)          | (dBμV)                       | (dBμV/m)                      | (dBμV/m) | (dB)   |
| * 1522.48             | 25.71             | 1.83          | 14.87                        | 42.41                         | 54.00    | 11.59  |

- Remarks:
1. Emission level=Antenna Factor + Cable Loss + Reading.
  2. For measurements above 1GHz, the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.  
(According to ANSI C63.4-2003 section 8.3.1.2)
  3. "\*" is Harmonic Frequency

## 5. FUNDAMENTAL MEASUREMENT

### 5.1. Test Equipment

The following test equipment was used during the radiated emission test:

| Item | Type              | Manufacturer | Model No.  | Serial No. | Cal. Date    | Cal. Interval |
|------|-------------------|--------------|------------|------------|--------------|---------------|
| 1    | Spectrum Analyzer | Agilent      | N9010A-526 | MY53400071 | 2014. 09. 15 | 1 Year        |
| 2    | Test Receiver     | R & S        | ESCS30     | 100338     | 2014. 06. 24 | 1 Year        |
| 3    | Amplifier         | HP           | 8447D      | 2944A06305 | 2014. 02. 19 | 1 Year        |
| 4    | Bilog Antenna     | CHASE        | CBL6112D   | 33821      | 2014. 08. 02 | 1 Year        |

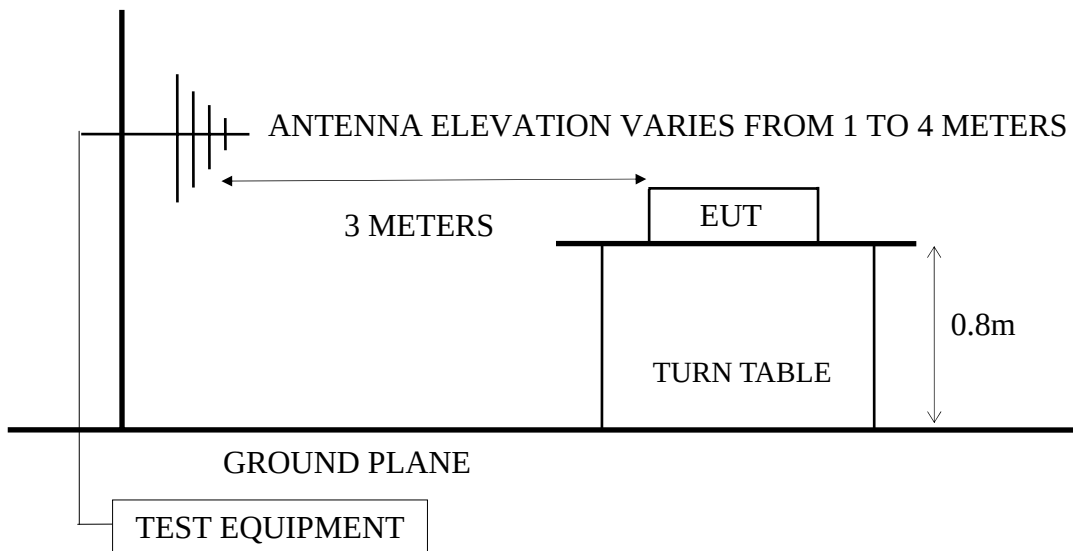
### 5.2. Test Setup

#### 5.2.1. Block Diagram of connection between EUT and simulators

**CEILING FAN REMOTE  
CONTROLLER (TRANSMITTER)  
(EUT)**

#### 5.2.2. Semi-Anechoic Chamber (3m) Setup Diagram

ANTENNA TOWER



### 5.3. Radiation Emission Limits (§15.231)

In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Fundamental frequency (MHz)         | Field strength of fundamental (microvolts/meter) | Field strength of spurious emissions (microvolts/meter) |
|-------------------------------------|--------------------------------------------------|---------------------------------------------------------|
| 40.66-40.70                         | 2,250                                            | 225                                                     |
| 70-130                              | 1,250                                            | 125                                                     |
| 130-174                             | <sup>1</sup> 1,250 to 3,750                      | <sup>1</sup> 125 to 375                                 |
| 174-260                             | 3,750                                            | 375                                                     |
| 260-470                             | <sup>1</sup> 3,750 to 12,500                     | <sup>1</sup> 375 to 1,250                               |
| Above 470                           | 12,500                                           | 1,250                                                   |
| <sup>1</sup> :Linear Interpolations |                                                  |                                                         |

- Remarks :
- (1) Emission level (dBμV/m) = 20 log Emission level (μV/m)
  - (2) The tighter limit applies at the edge between two frequency bands.
  - (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
  - (4) Where limit of Fundamental Freq. is calculated by:  
 $41.6667 \times 304.25 - 7083.3333 = 5593.7601 \mu\text{V/m} = 74.95 \text{dB}\mu\text{V/m}$
  - (5) The limits in this table are based on CFR 47 Part 15.231(b).

### 5.4. Operating Condition of EUT

- 5.4.1. Set up the EUT and simulator as shown on 5.2.
- 5.4.2. The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions. (The worst mode is lying)
- 5.4.3. The EUT was operated on maximum transmitting status during all testing (lying condition).

### 5.5. Test Procedure

The EUT and was placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set to 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna could be moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna is used as a receiving antenna. Both polarizations horizontal and vertical are set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003 regulation.

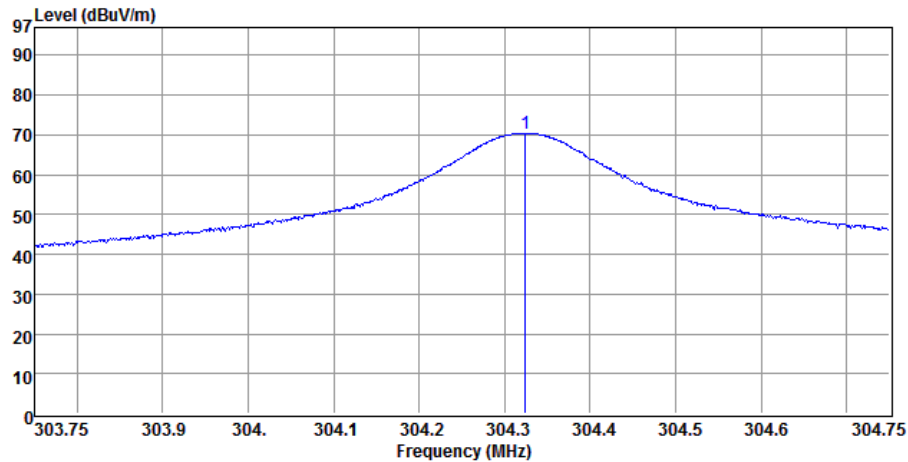
## 5.6. Fundamental Measurement Results

Test Date: 2014. 12. 25      Temperature: 22°C      Humidity: 36%



Data: 2

File: D:\Test DATA\report\2014\C1M1412241\_長益\_TR222A (304.25\_FCC)\304.25.EM6 (2)



Site no. : Audix NO.1 Chamber      Data no. : 2  
 Dis. / Ant. : 3m CBL6112D 33821      Ant. pol. : HORIZONTAL  
 Limit :  
 Env. / Ins. : 22°C/36% N9010A      Engineer : Sam  
 EUT : TR222A  
 Power Rating : DC 3V  
 Test Mode : Tx304.25MHz

|   | Freq.<br>(MHz) | Ant. Factor<br>(dB/m) | Cable Loss<br>(dB) | Reading<br>(dB μV) | Emission Level<br>(dB μV/m) | Limits<br>(dB μV/m) | Margin<br>(dB) | Remark |
|---|----------------|-----------------------|--------------------|--------------------|-----------------------------|---------------------|----------------|--------|
| 1 | 304.32         | 13.25                 | 4.71               | 52.46              | 70.42                       |                     |                | Peak   |

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

**Horizontal is the strongest polarization and Peak value has complied with limit, So Vertical won't be listed in test report.**

**Because RBW of spectrum is larger than PRF, thus PDCF is no need for finding true peak level.**

## 6. EMISSION BANDWIDTH MEASUREMENT

### 6.1. Test Equipment

The following test equipment was used during the Emission Bandwidth Test :

| Item | Type              | Manufacturer | Model No.  | Serial No. | Cal. Date    | Cal. Interval |
|------|-------------------|--------------|------------|------------|--------------|---------------|
| 1    | Spectrum Analyzer | Agilent      | N9030A-526 | MY53310269 | 2014. 11. 08 | 1 Year        |
| 2    | Wide Band Antenna | Diamond      | RH799      | N/A        | N.C.R        | N.C.R         |

### 6.2. Block Diagram of Test Setup



### 6.3. Specification Limits (§15.231-(c))

The bandwidth of emission shall be no wider than 0.25% of the center frequency for device operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

### 6.4. Emission Bandwidth Measurement Results

**PASSED.**

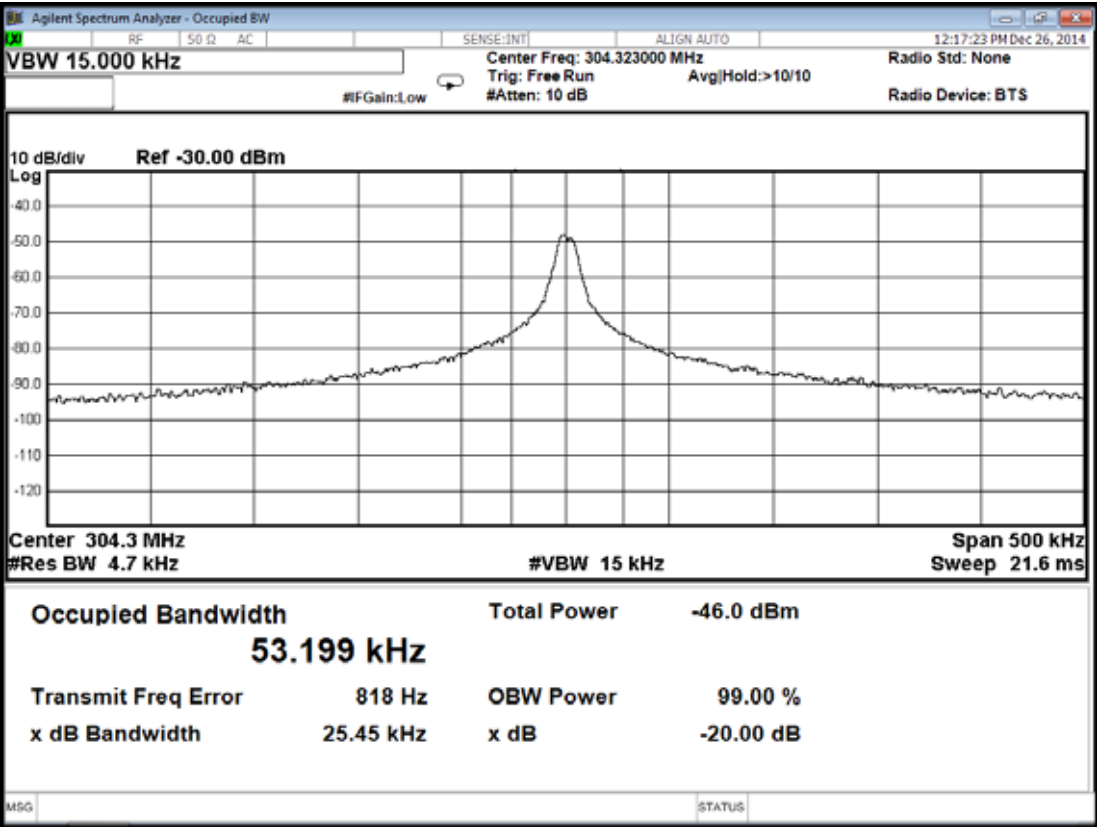
Fundamental Frequency: 304.25MHz

Test Date: 2014. 12. 26      Temperature: 25°C      Humidity: 55%

| No. | Center Frequency | Bandwidth          | Tolerance      | Limited       |
|-----|------------------|--------------------|----------------|---------------|
| 1.  | 304.25 MHz       | <b>0.02545 MHz</b> | <b>0.008 %</b> | <b>0.25 %</b> |

The bandwidth of emission was measured at the point 20dB down from the center frequency of modulated carrier.

Graph of Bandwidth Measurement



Note: “◇” The line is 20dB from the modulated carrier.

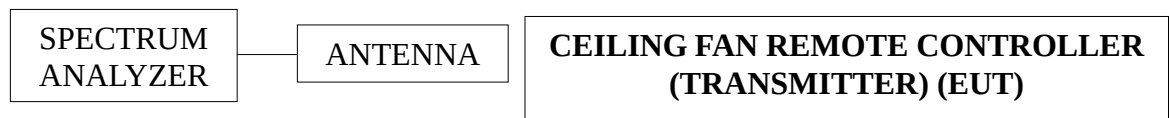
## 7. PERIODIC OPERATED MEASUREMENT

### 7.1. Test Equipment

The following test equipment was used during the periodic operated test :

| Item | Type              | Manufacturer | Model No.  | Serial No. | Cal. Date    | Cal. Interval |
|------|-------------------|--------------|------------|------------|--------------|---------------|
| 1    | Spectrum Analyzer | Agilent      | N9030A-526 | MY53310269 | 2014. 11. 08 | 1 Year        |
| 2    | Wide Band Antenna | Diamond      | RH799      | N/A        | N.C.R        | N.C.R         |

### 7.2. Block Diagram of Test Setup



### 7.3. Specification Limits [§15.231-(a)-(1)]

The operation of this device is manually operated transmitter that is automatically deactivated the transmitter within not more than 5 seconds of being released, Compliance with §15.231 (a)- (1).

### 7.4. Periodic Operated Measurement Results

**PASSED.**

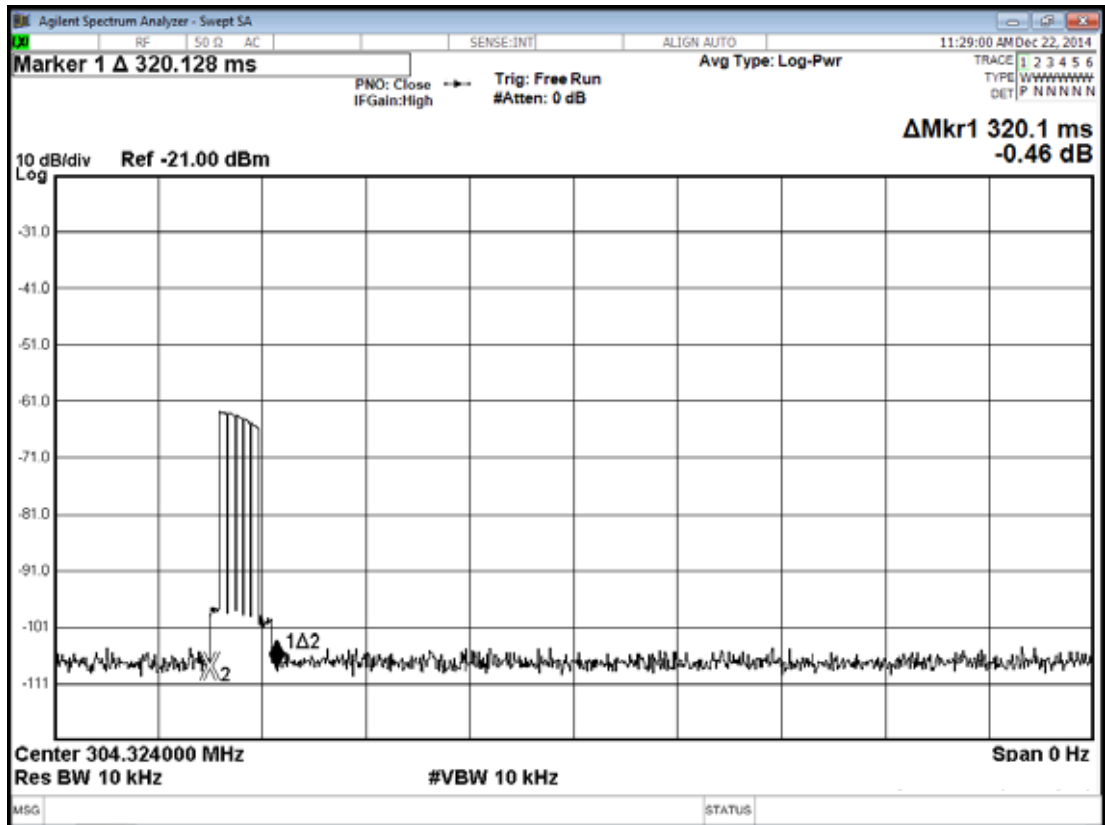
Fundamental Frequency: 304.25MHz

Test Date: 2014. 12. 22      Temperature: 25°C      Humidity: 50%

T = 0.32s. (< 5sec.)

The graph of testing is attached as below.

## Graph of Periodic Operated Measurement



## **8. DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**