AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

FCC 15.231
Report

for

Chungear Industrial Co., Ltd

106 Kanho Rd., Taichung, Taiwan

Product Name : Ceiling Fan Remote Controller (Transmitter)
Model Name : TR258A
FCC ID : KUJCE10512

Prepared by: : AUDIX Technology Corporation, EMC Department

AUDIX Technology Corp.
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New Taipei City244, Taiwan

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Fax: +886 2 26099303

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Fax: +886 2 26099303

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.
Product Name	:	Ceiling Fan Remote Controller (Transmitter)
Model No.	:	TR258A
Serial No.	:	N/A
Power Supply	:	DC 12V (Via Batteries)

Applicable Standards:

47 CFR FCC Part 15 Subpart C:2015
ANSI C63.10:2013

AUDIX Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. ***AUDIX Technology Corp.*** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Test: 2016. 07. 14 ~ 19 Date of Report: 2016. 07. 25

Producer: Annie Yu
(Annie Yu/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

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No. 53-11, Dingfu, Linkou, Dist.,
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1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2016. 07. 25	Original Report	EM-F160489

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**N/A, Note**
15.209/15.231(b)	Radiated Spurious Emission and Fundamental Frequency	**PASS**
15.231(c)	Emission Bandwidth	**PASS**
15.231(a)(1)	Periodic Operated	**PASS**
15.203	Antenna Requirement	**PASS**
Note: The EUT only employs battery power for operation, so it is unnecessary to test.		

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3. GENERAL INFORMATION

3.1. Description of EUT

Product	Ceiling Fan Remote Controller (Transmitter)
Model Number	TR258A
Serial Number	N/A
Applicant	Chungear Industrial Co., Ltd 106 Kanho Rd., Taichung, Taiwan
Manufacture#1	Chungear Industrial Co., Ltd 106 Kanho Rd., Taichung, Taiwan
Manufacture#2	SATELLITE ELECTRONIC (ZHONGSHAN)., LTD. 8 CHUANG YE RD.TORCH DEVELOPMENT ZONE. ZHONGSHAN.GUANGDONG.528437 CHINA
Manufacture#3	ZHONGSHAN AMITY ELECTRONIC LTD. NO.16,TORCH HI-TECH INDUSTRIAL DEVELOPMENT ZONE, ZHONGSHAN CITY GUANGDONG PROVINCE CHINA
Fundamental Frequency	304.25MHz
Date of Receipt of Sample	2016. 07. 14
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

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3.2. EUT Specifications Assessed in Current Report

Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (bps)
304.25	1	ASK	---

3.3. Antenna Information

Manufacture	Antenna Type
N/A	Internal

3.4. Setup Configuration

3.5. Operating Condition of EUT

To Set EUT on RF function under continues transmitting and choosing channel.

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3.6. Description of Test Facility

Test Firm Name	:	**AUDIX Technology Corporation** **EMC Department** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility	:	**Semi-Anechoic Chamber** **Fully Anechoic Chamber** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724
FCC OET Designation	:	TW1004 & TW1090

3.7. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~1000MHz	±3.68dB
	Above 1GHz	±5.82dB

Remark：Uncertainty = $ku_c(y)$

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

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4. MEASUREMENT EQUIPMENT LIST

4.1. Radiated Emission Measurement

4.1.1. 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	2015. 09. 14	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2016. 06. 23	1 Year
3.	Amplifier	HP	8447D	2944A06305	2016. 02. 23	1 Year
4.	Bilog Antenna	TESEQ	CBL6112D	33821	2016. 01. 30	1 Year
5.	Test Software	Audix	e3	V.6.1206197	N.C.R.	N.C.R.

4.1.2. Frequency Range Above 1GHz (Fully Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2015. 08. 20	1 Year
2.	Amplifier	Sonoma	310N	187161	2016. 06. 13	1 Year
3.	Horn Antenna	ETS-Lindgren	3117	00135902	2016. 03. 09	1 Year
4.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2016. 06. 07	1 Year
2.	Wide Band Antenna	Diamond	RH799	N/A	N.C.R	N.C.R

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5. CONDUCTED EMISSION MEASUREMET

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

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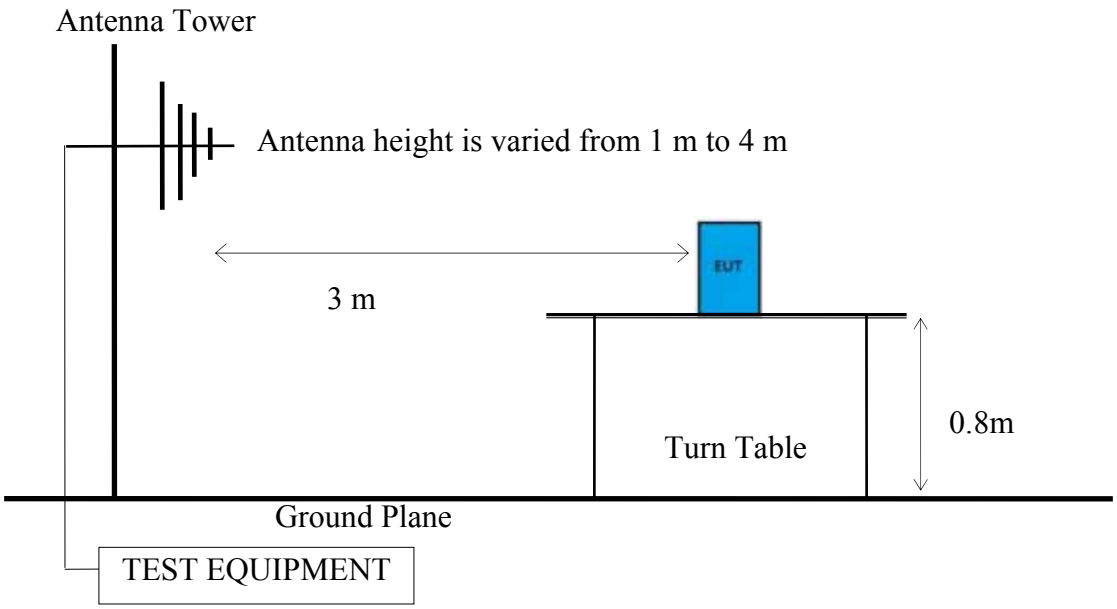
6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup

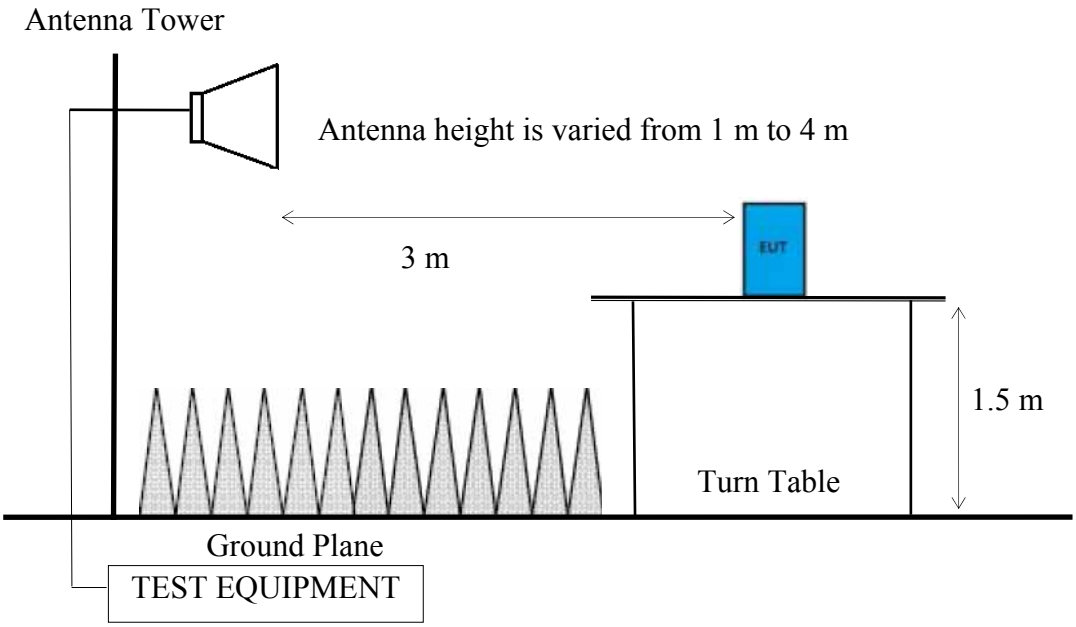
6.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.4

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



6.1.3. Fully Anechoic Chamber (3m) Setup Diagram for above 1GHz



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6.2. Radiated Emission Limits

6.2.1. General Limit

Any emission which falls in restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/m)

(2) The tighter limit applies to 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) Fundamental and emission fall within operation band are exempted from this section.

(5) Pursuant to ANSI C63.10: 6.6.4.3 if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.2.2. Limite for Fundamental Frequency

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	[1]1,250 to 3,750	[1]125 to 375
174-260	3,750	375
260-470	[1]3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250
[1]:Linear Interpolations		

Remark：(1) dBμV/m = 20 log (μV/m)

(2) The tighter limit applies to 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:

41.6667x304.25-7083.3333= 5593.76μV/m = 74.95dBμV/m

(5) The limits in this table are based on CFR 47 Part 15.231(b).

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6.3. Test Procedure

The EUT setup on the turn table which has 0.8 m (for 30-1000MHz) or 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1 GHz:
Spectrum Analyzer is used for pre-testing with following setting:

(1) RBW = 120KHz
(2) VBW ≥ 3 x RBW.
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes.
(7) When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

Frequency above 1GHz to 10th harmonic:

Peak Detector:

(1) RBW = 1MHz
(2) VBW ≥ 3 x RBW.
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes.
(7) When peak-detected value is lower than limit that the measurement using the average detector is not required. Otherwise using average detector for finally measurement.

Average Measurement:

☐Option 1:

(1) RBW = 1 MHz
(2) VBW =1/T
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes.

☐Option 2:

Average Emission Level= Peak Emission Level+ D.C.C.F.

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6.4. Measurement Result Explanation

■Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading
☐Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading
☐Average Emission Level= Peak Emission Level+ DCCF
Duty Cycle Correction Factor (DCCF)= 20log (TX_{on}/TX_{on+off}) presented in section 3.4
☐EPR= Peak Emission Level-95.2dB-2.14dB

6.5. Measurement Result Explanation

Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading

6.6. Test Results

PASSED.

The EUT emitted the fundamental frequency with data code at the stand, side and lie conditions.

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No. 53-11, Dingfu, Linkou, Dist.,
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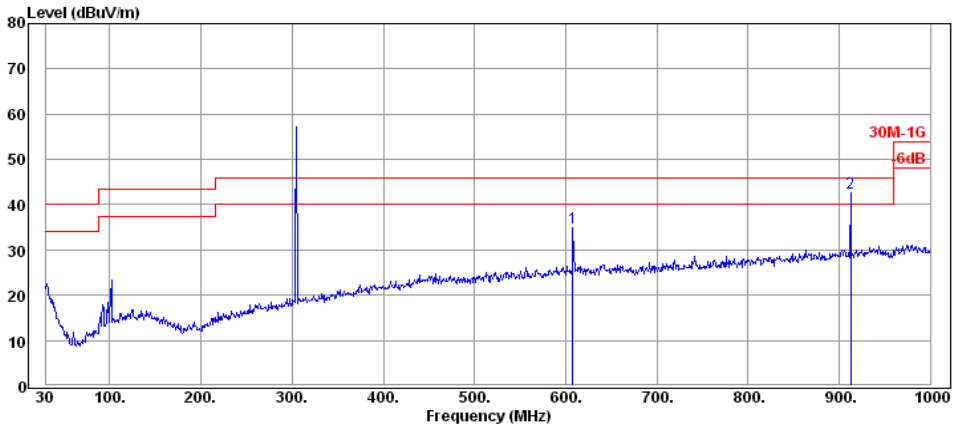
6.6.1. Emissions Applied to General Requirement

6.6.1.1. Frequency Below 1 GHz

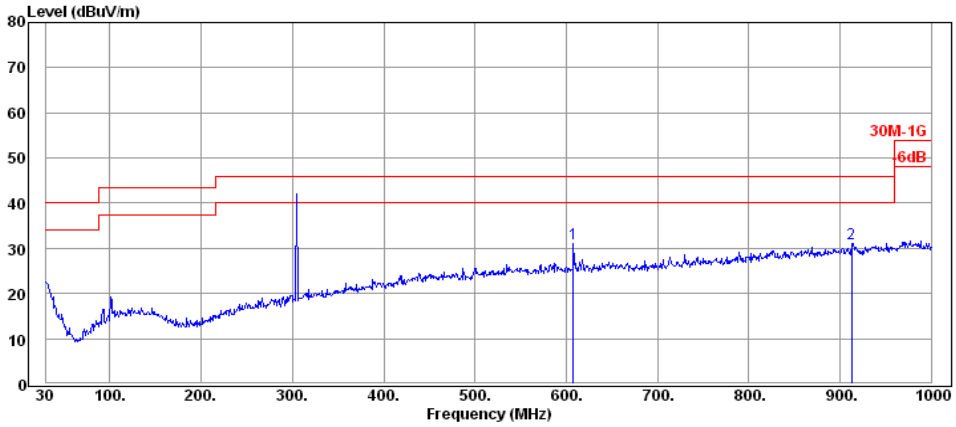
Test Date	2016/07/19	Temp./Hum.	23℃/53%
Test Voltage	DC 12V	Frequency	TX 304.25MHz

Antenna at Horizontal Polarization



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
608.12	18.42	6.78	9.61	34.81	46.00	11.19	Peak
912.70	20.55	8.26	13.80	42.61	46.00	3.39	Peak

Antenna at Vertical Polarization



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
608.12	18.42	6.78	5.91	31.11	46.00	14.89	Peak
912.70	20.55	8.26	2.38	31.19	46.00	14.81	Peak

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6.6.1.2. Frequencies above 1 GHz:
The emissions (up to 10th harmonics) not reported for there is no emission be found.

Frequency	TX 304.25MHz	EUT Position	lie

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
1216.00	28.06	4.06	6.51	38.63	54.00	15.37	Peak
1524.00	28.24	4.57	5.78	38.59	54.00	15.41	Peak
1824.00	30.28	5.00	3.21	38.49	54.00	15.51	Peak
2130.00	31.77	5.62	3.23	40.62	54.00	13.38	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
1216.00	28.06	4.06	5.98	38.10	54.00	15.90	Peak
1524.00	28.24	4.57	5.36	38.17	54.00	15.83	Peak
1824.00	30.28	5.00	4.52	39.80	54.00	14.20	Peak
2130.00	31.77	5.62	4.09	41.48	54.00	12.52	Peak

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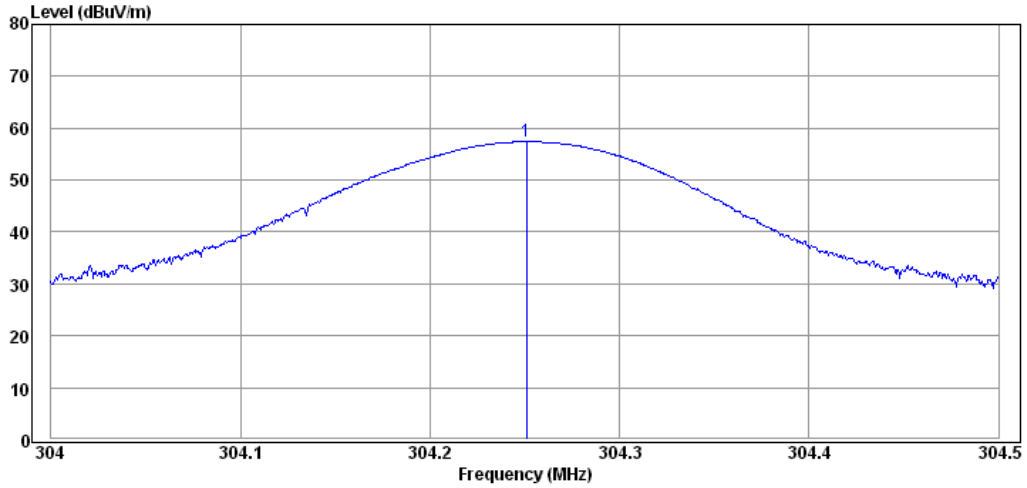
6.6.2. Fundamental Frequency:

Frequency	TX 304.25MHz	EUT Position	lie



Antenna at Horizontal Polarization

Emission Frequency	Antenna Factor	Cable Loss	Meter Reading	Emission Level	Limits	Margin	Detector
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
304.25	13.89	4.37	39.14	57.40	74.95	17.55	Peak

Remark: Horizontal is the strongest polarization and peak value has complied with average limit, so vertical won't be listed in test report.

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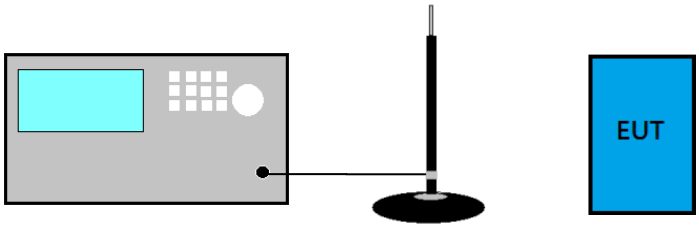
7. EMISSION BANDWIDTH MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Specification Limits

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.

7.3. Test Procedure

(1) Set RBW close to 1-5 % of OBW.
(2) Set VBW≥RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

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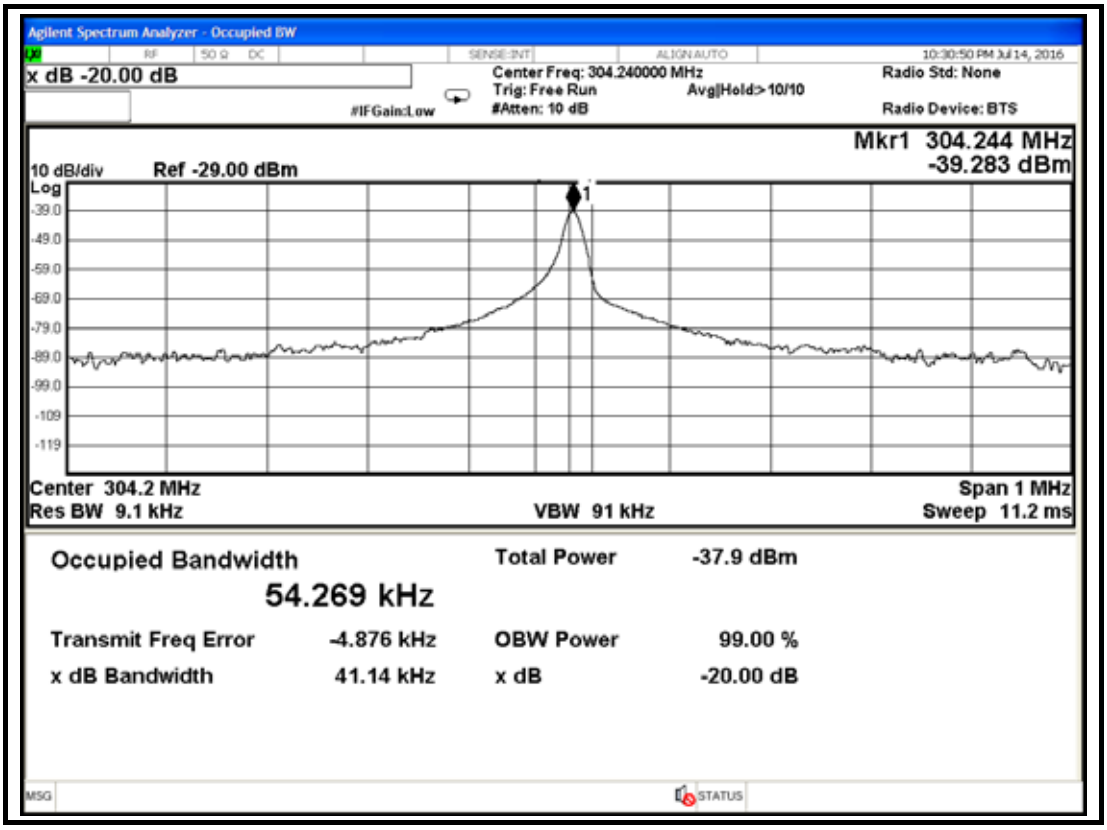
7.4. Test Results

Test Date	2016/07/14	Temp./Hum.	28℃/52%
Test Voltage	DC 12V	Frequency	TX 304.25MHz

7.4.1. Emission Bandwidth:

Center Frequency (MHz)	Occupied Bandwidth (MHz)	Tolerance (%)	Limit (%)
304.25	0.04114	0.014	0.25

7.4.2. Measurement Plot:



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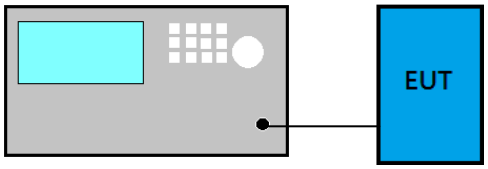
8. PERIODIC OPERATED MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Specification Limits

The operation of this device is manually operated transmitter that is automatically deactivated the transmitter within not more than 5 seconds of being released

8.3. Test Procedure

(1) Span = zero
(2) RBW ≥ 100kHz
(3) VBW≥ RBW
(4) Sweep = 5s
(5) Detector function = peak
(6) Trace = single sweep

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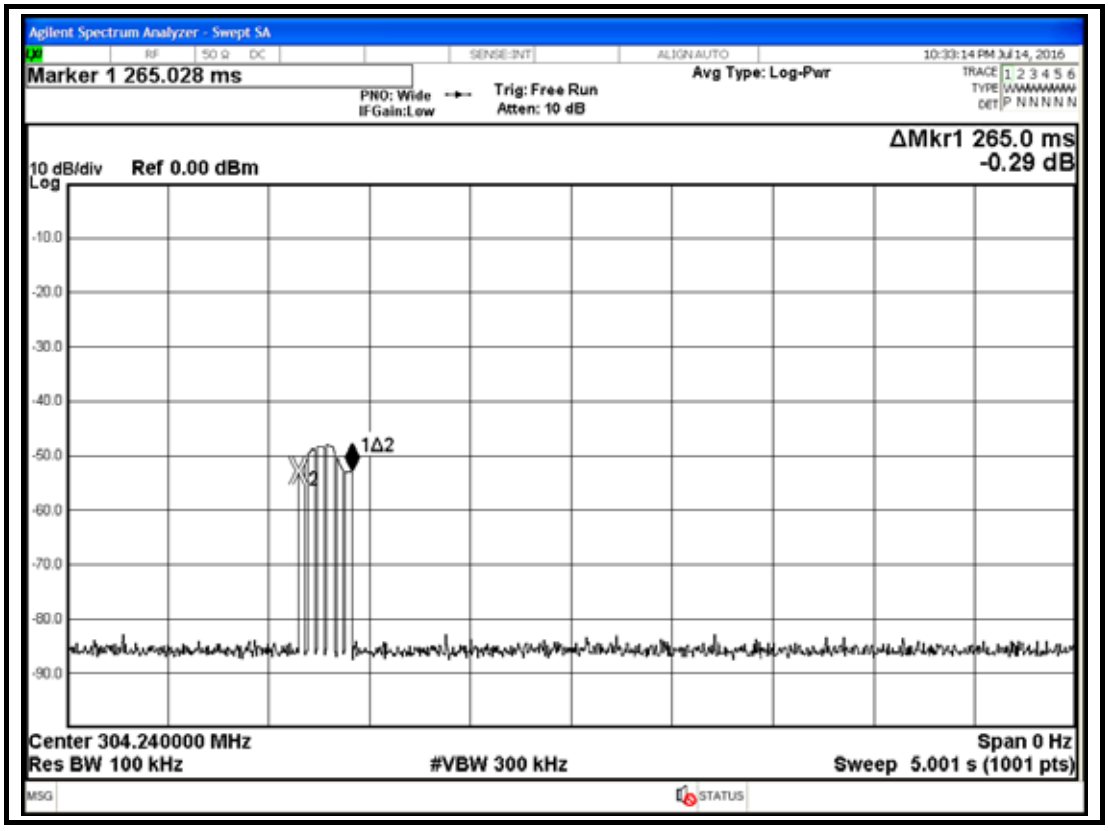
8.4. Test Results

Test Date	2016/07/14	Temp./Hum.	28℃/52%
Test Voltage	DC 12V	Frequency	TX 304.25MHz

8.4.1. Periodic Operated:

Center Frequency (MHz)	Time (Sec.)	Limit (Sec.)
304.25	0.265	< 5

8.4.2. Measurement Plot:



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9. DEVIATION TO TEST SPECIFICATIONS

【NONE】