

APPLICATION FOR CERTIFICATION
On Behalf of
Chungear Industrial Co., Ltd.

Fan/Light Remote Controller (Transmitter)

Model : JY166(BCF-0059X2)

FCC ID : KUJCE9102

Prepared for : Chungear Industrial Co., Ltd.
106 Kanho Rd., Taichung,
Taiwan, R.O.C.

Prepared by : Audix Corporation
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TEST REPORT CERTIFICATION

Applicant : Chungear Industrial Co., Ltd.
 Manufacturer : Chungear Industrial Co., Ltd.
 EUT Description : Fan/Light Remote Controller (Transmitter)
 FCC ID : KUJCE9102
 (A) MODEL NO. : JY166(BCF-0059X2)
 (B) SERIAL NO. : N/A
 (C) POWER SUPPLY : DC 9V

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, MAY 2002
AND ANSI C63.4/1992

The device described above was tested by AUDIX 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 and output signal levels.

The measurement results are contained in this test report and AUDIX 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 CORPORATION

Date of Test : Jul. 18 ~ 31, 2002

Prepared by : Cherry Wang 9/12/2003
 (Cherry Wang/Assistant Manager)

Test Engineer : Allen Wang Jun 14 2003
 (Allen Wang/Deputy Manager)

Approve & Authorized Signer : Leon Liu Jun. 14 2003
 (Leon Liu/Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Fan/Light Remote Controller (Transmitter)
Model Number	:	JY166(BCF-0059X2)
FCC ID	:	KUJCE9102
Applicant	:	Chungear Industrial Co., Ltd. 160 Kanho Rd., Taichung, Taiwan, R.O.C.
Manufacturer	:	Chungear Industrial Co., Ltd. 160 Kanho Rd., Taichung, Taiwan, R.O.C.
Fundamental Frequency	:	299.6MHz
Power Supply	:	DC 9V
Date of Receipt of Sample	:	Jul. 13, 2002
Date of Test	:	Jul. 18 ~ 31, 2002

Fan/Light Remote Controller -Receiver
 Model No.: JY326B
 FCC ID : By DoC

Fan/Light Remote Controller -Receiver
 Model No.: JY199
 FCC ID : By DoC

Remark:

Antenna requirement: This EUT's transmitter antenna is design in soldered to a printed circuit board, comply with §15.203 and inform to user that any change and modify is prohibited.

1.2. Description of Test Facility

Site Description (Semi-Anechoic Chamber)	:	May 16, 2003 Re-File on Federal Communication Commission Registration Number: 90993
Test Site	:	Semi-Anechoic Chamber
Name of Firm	:	Audix Corporation Technical Division EMC Department No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
Site Location #1	:	No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
Site Location #2	:	No. 67-4, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
NVLAP Lab. Code (NVLAP is a NATA accredited body under Mutual Recognition Agreement)	:	200077-0

1.3. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150KHz~30MHz	$\pm 2.66\text{dB}$
Radiation Test (Distance: 3m)	30MHz~300MHz	+4.26dB / -4.22dB
	300MHz~1000MHz	+5.28dB / -4.0dB

Remark : Uncertainty = $K_{\mu c}(y)$

2. POWERLINE CONDUCTED TEST

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

3. RADIATED EMISSION TEST

3.1. Test Equipment

The following test equipment are used during the radiated emission tests :

3.1.1. For 30MHz~1000MHz Frequency (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep. 04, 01'	1 Year
2.	Test Receiver	Rohde&Schwarz	ESVP	879691/036	Jun.09, 02'	1 Year
3.	Pre-Amplifier	HP	8447D	2944A06305	Mar.05, 02'	1 Year
4.	Broadband Antenna	Schwarzbeck	BBA 9106	A3L	Jan. 08, 02'	1 Year
5.	Broadband Antenna	Schwarzbeck	UHALP9108-A	0139	Jan. 08, 02'	1 Year

3.1.2. For 1GHz~3GHz frequency (at Semi-Anechoic Chamber)

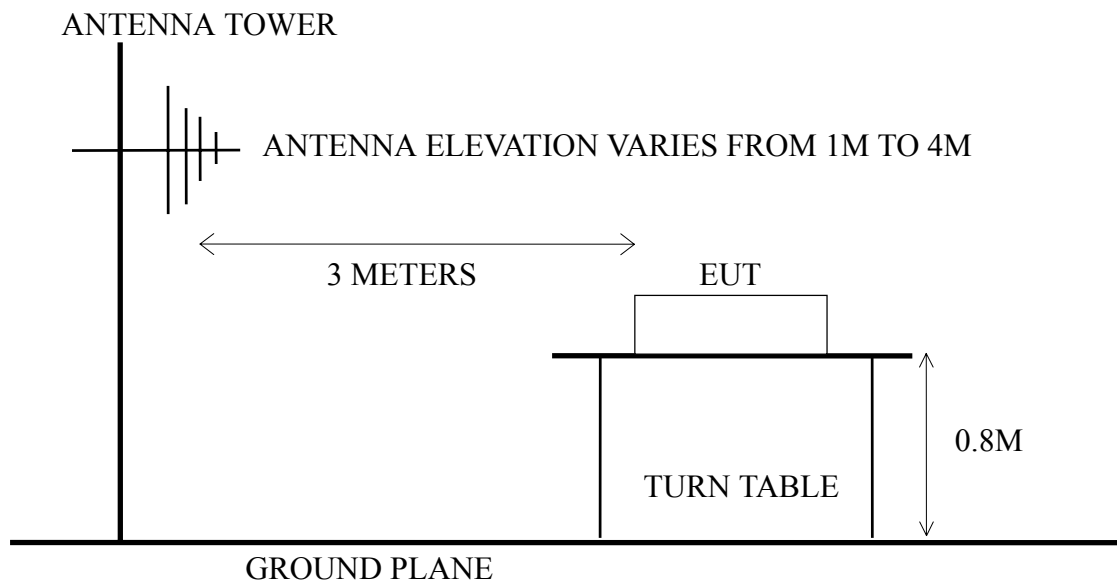
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep.04, 01'	1 Year
2.	Amplifier	HP	8449B	3008A00529	Jan.05, 02'	1 Year
3.	Horn Antenna	EMCO	3115	9112-3775	Apr.16, 02'	1 Year

3.2. Test Setup

3.2.1. Block Diagram of connection between EUT and simulators

**FAN/LIGHT REMOTE CONTROLLER (TRANSMITTER)
(EUT)**

3.2.2. Open Field Test Site (3M) Setup Diagram



3.3. Radiation Limit (§15.231)

3.3.1. Radiation Limit (§15.231)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
Fundamental Freq.	3	5400.0	74.64 (Quasi-Peak)
Spurious Emission	3	540.0	54.64 (Quasi-Peak)

- Remark :
- (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) Where limit of Fundamental Freq. is calculated by:
 $41.6667 \times 299.6 - 7083.3333 = 5400.0 \mu\text{V/m} = 74.64 \text{dB}\mu\text{V/m}$
limit of spurious emission is $74.64 \text{dB}\mu\text{V/m} - 20 \text{dB} = 54.64 \text{dB}\mu\text{V/m}$
 - (5) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a) and Part 15.231(b).

3.3.2. Radiated Emission Limits (§15.209, Class B)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

- Remark :
- (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.

3.4. EUT's Configuration during Compliance Measurement

The following equipment were installed on radiated measurement to meet the commission requirement and operating in a manner which tended to maximize its emission characteristics in a normal application.

3.4.1. Fan/Light Remote Controller (Transmitter) (EUT)

Model Number : JY166(BCF-0059X2)
Serial Number : N/A
Manufacturer : Chungear Industrial Co., Ltd.
Fundamental Frequency : 299.6MHz

3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT and simulator as shown on 3.2.
- 3.5.2. Turned on the power of all equipment.
- 3.5.3. The EUT (Fan/Light Remote Controller (Transmitter)) was emitted the fundamental frequency with data code.
- 3.5.4. The EUT was at worked on maximum transmitting status (high & Light on) during all testing.
- 3.5.5. Repeated the above procedures from 3.5.3 to 3.5.4.

3.6. Test Procedure

The EUT and its simulators were 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. For 30MHz to 3GHz frequency range, EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters for 30MHz to 3GHz frequency range 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 C63.4-1992 regulation.

The bandwidth of test receiver was set at 120KHz and resolution bandwidth of spectrum analyzer was set at 1MHz.

EUT with three kinds of position (on Stand 、 Side 、 Lie) were done during radiated measurement and all the test results are listed in section 3.8.

3.7. Test Results

PASSED. Please refer to the following pages.

3.8. Radiated Emission Noise Measurement Results

The frequency spectrum from 30 MHz to 3GHz is investigated. All the emissions not reported below are too low against the FCC Part 15 official limits.

Date of Test :	Jul. 31, 2002	Temperature :	22°C
EUT :	Fan/Light Remote Controller (Transmitter)	Humidity :	63%
Test Position :	EUT on Stand		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
Fundamental Freq. (Quasi-Peak Value)						
299.600	26.80	3.90	29.85	60.55	74.64	14.09
Spurious / Harmonic Freq. (Below 1000MHz, Quasi-Peak Value)						
599.200	19.50	6.30	18.56	44.36	54.64	10.28
898.300	23.00	7.30	8.50	38.80	54.64	15.84
Spurious / Harmonic Freq. (Above 1GHz, Average Value)						
* 1196.326	25.29	4.58	1.38	31.25	54.00	22.75
* 1496.888	25.40	5.41	2.17	32.98	54.00	21.02
1795.372	26.90	6.93	-1.81	32.02	54.64	22.62
2094.056	28.00	5.98	-0.79	33.19	54.64	21.45
2392.740	28.61	6.35	-1.73	33.23	54.64	21.41
* 2692.210	29.63	6.78	-2.58	33.83	54.00	20.17
2998.682	30.81	7.22	-4.90	33.13	54.64	21.51

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 10th harmonic (~3GHz), but the emissions level were too low against the official limit and not report.
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

Date of Test :	Jul. 31, 2002	Temperature :	22°C
EUT :	Fan/Light Remote Controller (Transmitter)	Humidity :	63%
Test Position :	EUT on Stand		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Fundamental Freq. (Quasi-Peak Value)						
299.600	26.66	3.90	28.52	59.08	74.64	15.56
Spurious / Harmonic Freq. (Below 1000MHz, Quasi-Peak Value)						
599.200	20.40	6.30	17.13	43.83	54.64	10.81
898.300	23.04	7.30	6.94	37.28	54.64	17.36
Spurious / Harmonic Freq. (Above 1GHz, Average Value)						
* 1196.326	25.29	4.58	2.61	32.48	54.00	21.52
* 1496.688	25.40	5.41	2.21	33.02	54.00	20.98
1795.372	26.90	6.93	0.05	33.88	54.64	20.76
2094.056	28.00	5.98	-1.21	32.77	54.64	21.87
2392.740	28.61	6.35	-1.46	33.50	54.64	21.14
* 2692.210	29.63	6.78	-2.92	33.49	54.00	20.51
2998.682	30.81	7.22	-3.23	34.80	54.64	19.84

- Remark :
1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Measurement was up to 10th harmonic (~3GHz), but the emissions level were too low against the official limit and not report.
 3. “*” The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

Date of Test :	<u>Jul. 31, 2002</u>	Temperature :	<u>22°C</u>
EUT :	<u>Fan/Light Remote Controller (Transmitter)</u>	Humidity :	<u>63%</u>
Test Position :	<u>EUT on Side</u>		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB

Fundamental Freq. (Quasi-Peak Value)						
299.600	26.80	3.90	22.86	53.56	74.64	21.08
Spurious / Harmonic Freq. (Below 1000MHz, Quasi-Peak Value)						
599.200	19.50	6.30	20.29	46.09	54.64	8.55
898.300	23.00	7.30	6.56	36.86	54.64	17.78
Spurious / Harmonic Freq. (Above 1GHz, Average Value)						
* 1196.326	25.29	4.58	2.87	32.74	54.00	21.26
* 1496.688	25.40	5.41	1.45	32.26	54.00	21.74
1795.372	26.90	6.93	0.30	34.13	54.64	20.51
2094.056	28.00	5.98	-0.08	33.90	54.64	20.74
2392.740	28.61	6.35	-1.86	33.10	54.64	21.54
* 2692.210	29.63	6.78	-3.39	33.02	54.00	20.98
2998.682	30.81	7.22	-4.55	33.48	54.64	21.16

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Measurement was up to 10th harmonic (~3GHz), but the emissions level were too low against the official limit and not report.
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

Date of Test :	Jul. 31, 2002	Temperature :	22°C
EUT :	Fan/Light Remote Controller (Transmitter)	Humidity :	63%
Test Position :	EUT on Side		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB

Fundamental Freq. (Quasi-Peak Value)						
299.600	26.66	3.90	31.89	62.45	74.64	12.19
Spurious / Harmonic Freq. (Below 1000MHz, Quasi-Peak Value)						
599.200	20.40	6.30	16.39	43.09	54.64	11.55
898.300	23.04	7.30	13.87	44.21	54.64	10.43
Spurious / Harmonic Freq. (Above 1GHz, Average Value)						
* 1196.326	25.29	4.58	2.97	32.84	54.00	21.16
* 1496.688	25.40	5.41	1.76	32.57	54.00	21.43
1795.372	26.90	6.93	-0.43	33.40	54.64	21.24
2094.056	28.00	5.98	-1.38	32.60	54.64	22.04
2392.740	28.61	6.35	-1.13	33.83	54.64	20.81
* 2692.210	29.63	6.78	-2.84	33.57	54.00	20.43
2998.682	30.81	7.22	-4.52	33.51	54.64	21.13

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 10th harmonic (~3GHz), but the emissions level were too low against the official limit and not report.
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

Date of Test :	<u>Jul. 31, 2002</u>	Temperature :	<u>22°C</u>
EUT :	<u>Fan/Light Remote Controller (Transmitter)</u>	Humidity :	<u>63%</u>
Test Position :	<u>EUT on Lie</u>		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB

Fundamental Freq. (Quasi-Peak Value)						
299.600	26.80	3.90	37.45	68.15	74.64	6.49
Spurious / Harmonic Freq. (Below 1000MHz, Quasi-Peak Value)						
599.200	19.50	6.30	18.72	44.52	54.64	10.12
898.300	23.00	7.30	13.53	43.83	54.64	10.81
Spurious / Harmonic Freq. (Above 1GHz, Average Value)						
* 1196.326	25.29	4.58	2.94	32.81	54.00	21.19
* 1496.688	25.40	5.41	2.16	32.97	54.00	21.03
1795.372	26.90	6.93	-0.33	33.50	54.64	21.14
2094.056	28.00	5.98	-1.51	32.47	54.64	22.17
2392.740	28.61	6.35	0.04	35.00	54.64	19.64
* 2692.210	29.63	6.78	-2.58	33.83	54.00	20.17
2998.682	30.81	7.22	-3.98	34.05	54.64	20.59

- Remark :
1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Measurement was up to 10th harmonic (~3GHz), but the emissions level were too low against the official limit and not report.
 3. “*” The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

Date of Test :	Jul. 31, 2002	Temperature :	22°C
EUT :	Fan/Light Remote Controller (Transmitter)	Humidity :	63%
Test Position :	EUT on Lie		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Fundamental Freq. (Quasi-Peak Value)						
299.600	26.66	3.90	32.69	63.25	74.64	11.39
Spurious / Harmonic Freq. (Below 1000MHz, Quasi-Peak Value)						
599.200	20.40	6.30	18.26	44.96	54.64	9.68
898.300	23.04	7.30	9.15	39.49	54.64	15.15
Spurious / Harmonic Freq. (Above 1GHz, Average Value)						
* 1196.326	25.29	4.58	1.38	31.25	54.00	22.75
* 1496.688	25.40	5.41	2.10	32.91	54.00	21.09
1795.372	26.90	6.93	-1.65	32.18	54.64	22.46
2094.056	28.00	5.98	-0.18	33.80	54.64	20.84
2392.740	28.61	6.35	-2.04	32.92	54.64	21.72
* 2692.210	29.63	6.78	-2.78	33.63	54.00	20.37
2998.682	30.81	7.22	-3.84	34.19	54.64	20.45

- Remark :
1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Measurement was up to 10th harmonic (~3GHz), but the emissions level were too low against the official limit and not report.
 3. “*” The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

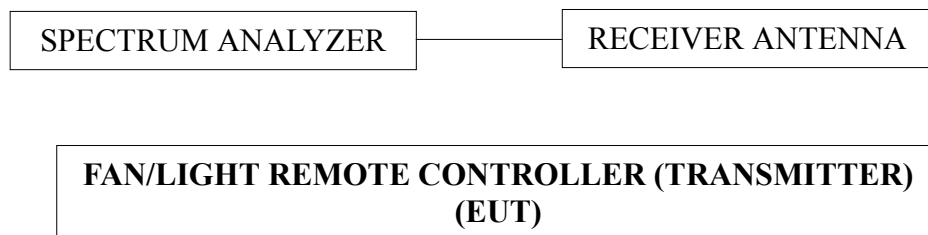
4. EMISSION BANDWIDTH TEST

4.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep. 04, 01'	1 Year

4.2. Block Diagram of Test Setup



4.3. 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.

4.4. EUT's Configuration during Compliance Measurement

The configuration of EUT were same as section 3.4.

4.5. Emission Bandwidth Measurement Results

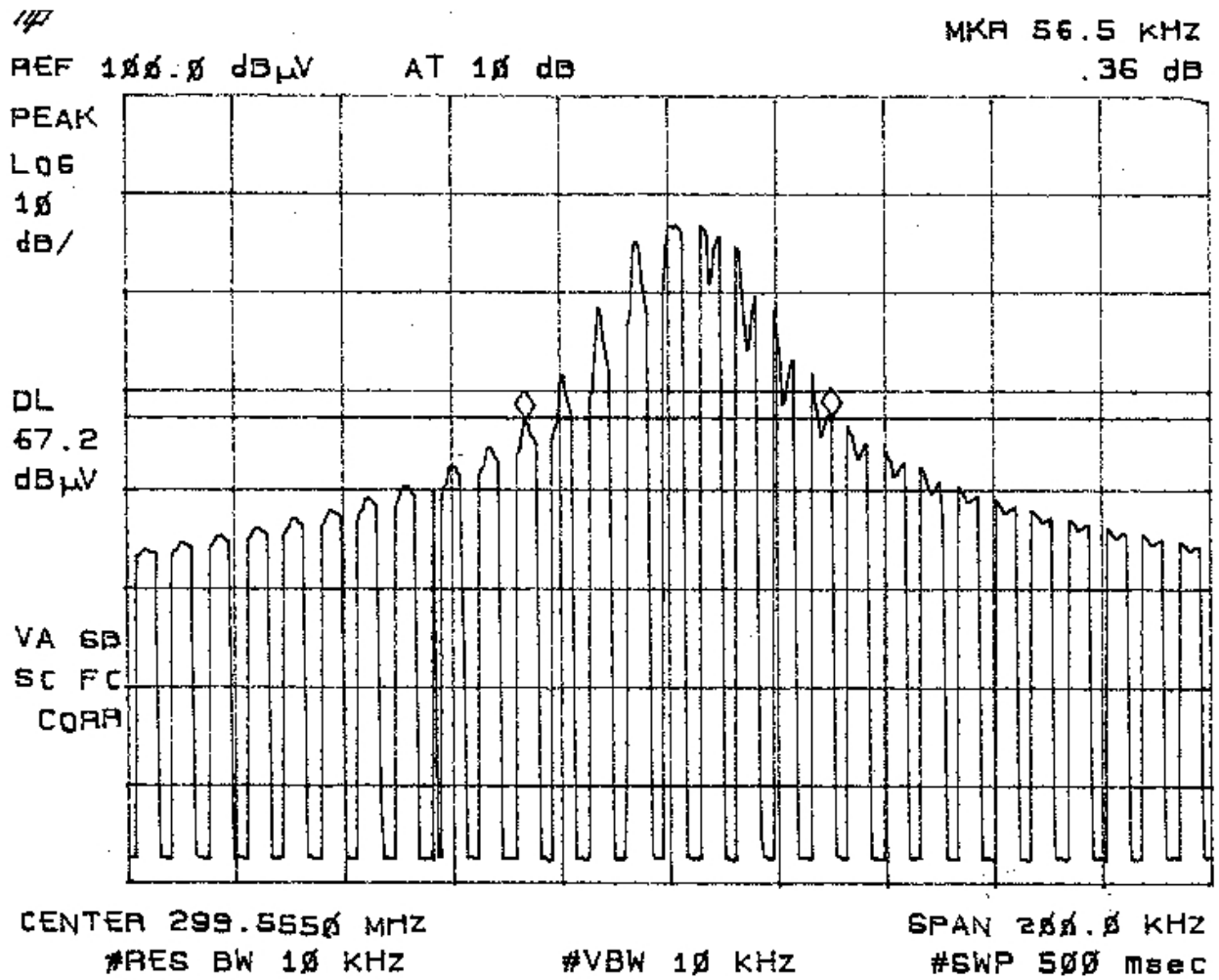
Fundamental Frequency: 299.6MHz

Date of Test: Jul. 18, 2002

No.	Center Frequency	Bandwidth	Tolerance (%)
1.	299.5550MHz	56.5kHz	0.0186%

The graph of bandwidth measured is attached in next page.

(Graph of Bandwidth Measurement)



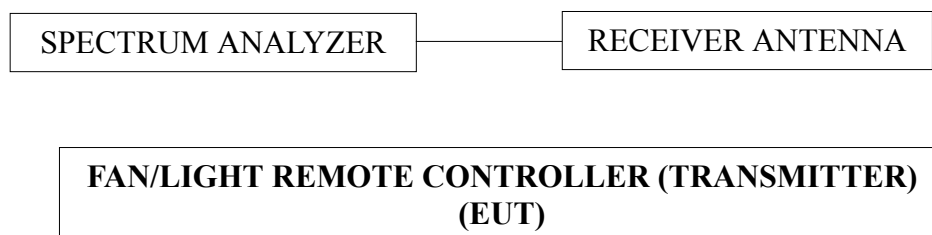
5. PERIODIC OPERATED TEST

5.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
2.	Spectrum Analyzer	HP	8593EM	3826A00248	Sep. 04, 01'	1 Year

5.2. Block Diagram of Test Setup



5.3. 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).

5.4. EUT's Configuration during Compliance Measurement

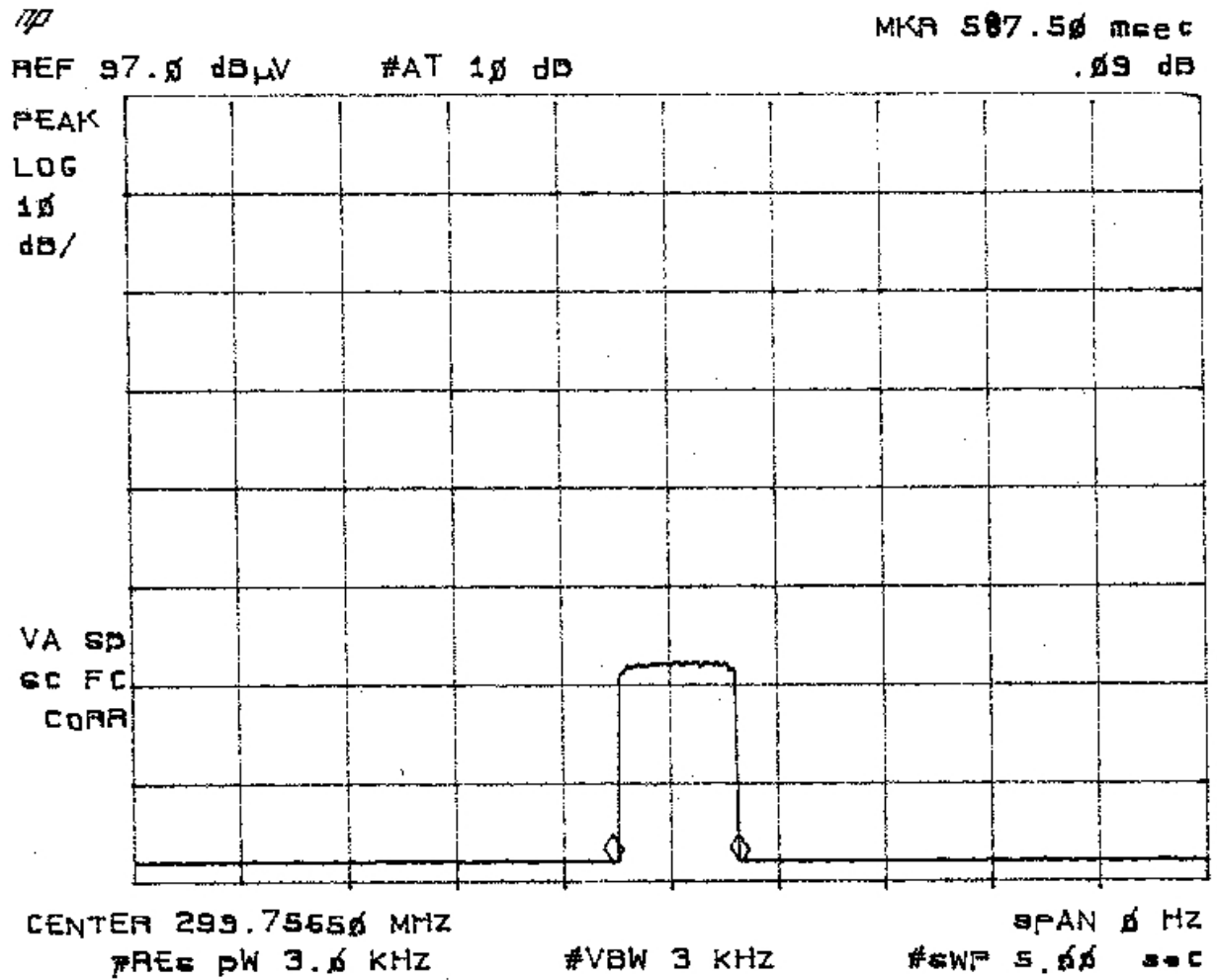
The configuration of EUT were same as section 3.4.

5.5. Periodic Operated Measurement Results

PASS. $T < 5\text{sec.}$

The graph of testing is attached in next page.

Graph of Periodic Operated Measurement



6. DEVIATION TO TEST SPECIFICATIONS

【NONE】