

Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

KING POINT LIGHTNG HARDWARE CO., LTD

Product description: Wireless DMX Controller

Brand Name: N/A

Model No.: LE-200

FCC ID: WUE-LE-200

Prepared for: King Point Lighting Hardware Co., Ltd

No.1, Shang Road Shang Jiao Managing District, Chang An
Town, Dong Guan City, Guang Dong, China

Prepared by: Bontek Compliance Testing Laboratory Ltd

1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East
Road, Nanshan, Shenzhen, China

Tel: 86-755-86337020

Fax: 86-755-86337028



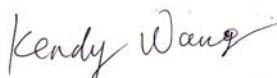
Report No.: BCT08JR-801E

Issue Date: November 19, 2008

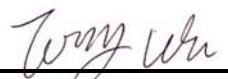
Test Date: October 20~November 13, 2008

Test by:

Reviewed By:



Kendy Wang



Tony Wu

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	King Point Lighting Hardware Co., Ltd
Address of applicant:	No.1, Shang Road Shang Jiao Managing District, Chang An Town, Dong Guan City, Guang Dong, China
Manufacturer:	King Point Lighting Hardware Co., Ltd
Address of manufacturer:	No.1, Shang Road Shang Jiao Managing District, Chang An Town, Dong Guan City, Guang Dong, China
EUT Description:	Wireless DMX Controller
Trade Name:	N/A
Model No.:	LE-200
Rated Voltage	DC 9V from AC/DC Adapter
Frequency range	903~927MHz
Number of channels	26
Channel Separation	1MHz
Product Class:	Low Power Communication Device Transmitter
Measurement Procedure	ANSI C63.4-2003

Remark: * The test data gathered are from the production sample provided by the manufacturer.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with Section 15.107 and 15.109 under the FCC Rules Part 15 Subpart B and Section 15.207, 15.209, 15.249 under the FCC Rules Part 15 Subpart C.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

IC Registration No.: 126111

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 126111 on March, 2008.

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

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 that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is placed on as turntable, which is 0.8 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2007/11/17	1 Year
2	EMI Test Receiver	R&S	ESPI	100097	2007/11/17	1 Year
3	Amplifier	HP	8447D	1937A024 92	2007/11/17	1 Year
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2007/11/17	1 Year
5	3 phase Artificial Mains (L.I.S.N)	SCHWARZBECK	NSLK 8128	8128247	2007/11/17	1 Year
6	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2007/11/17	1 Year
7	Horn Antenna	SCHWARZBECK	BBHA9120A	D69250	2007/11/17	1 Year
8	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2008/09/04	1 Year
9	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2008/09/04	1 Year
10	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2008/09/04	1 Year
11	Power Clamp	SCHWARZBECK	MDS-21	3812	2007/11/17	1 Year
12	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2007/11/17	1 Year
13	Teo Line Single Phase Module	FCC	FCC-LISN-50-25-2-01	06061	2007/11/17	1 Year

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.203	Antenna Requirement	Pass
15.207	Disturbance Voltage at The Mains Terminals	Pass
15.249	Band Edges Measurement	Pass
15.249	Spurious Emission	Pass

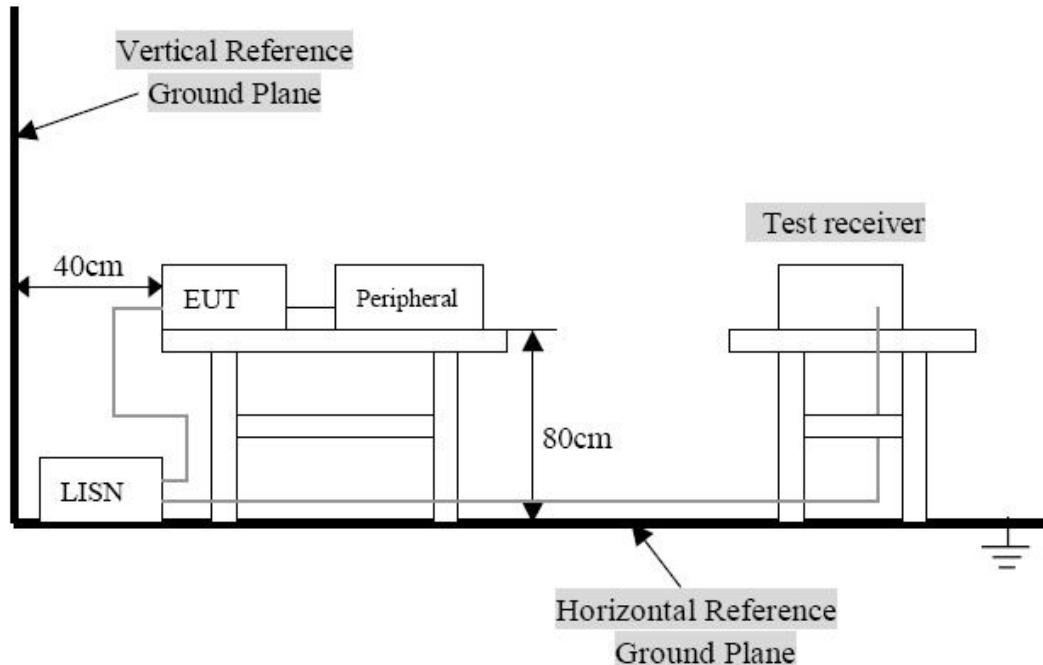
4. TEST OF CONDUCTED EMISSION

4.1 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

4.2 Test Setup Diagram



Remark: 1. The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC 15.207 limits.

2. The EUT was connected to a 120 VAC/ 60Hz power source.

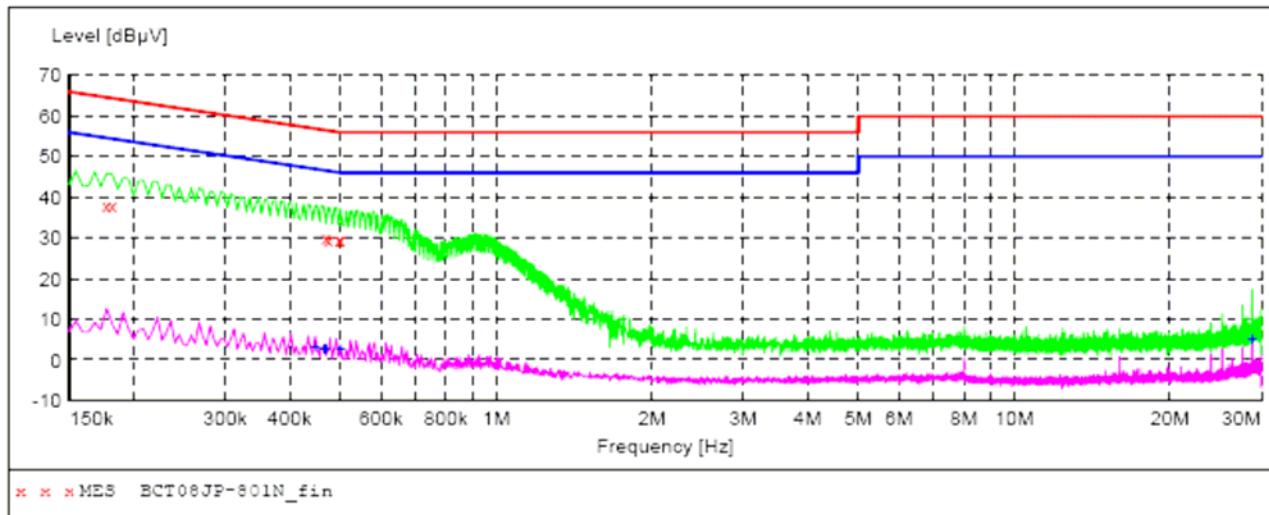
4.3 Test Result

Temperature (°C) : 22~23	EUT: Wireless DMX Controller
Humidity (%RH) : 50~54	M/N: LE-200
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal Operating

Conducted Emission:

EUT: Wireless DMX Controller
 M/N: LE-200
 Operating Condition: Continuous Transmitting
 Test Site: Shielded Room
 Operator: Andy
 Test Specification: DC 9V from AC/DC adapter (AC 120V/60Hz)
 Comment: Live Line Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "BCT08JP-801N_fin"

10/22/2008 17:16

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.177000	37.90	11.1	65	26.7	QP	N	GND
0.181500	37.80	11.0	64	26.6	QP	N	GND
0.469500	30.00	10.3	57	26.5	QP	N	GND
0.474000	29.90	10.3	56	26.5	QP	N	GND
0.496500	29.60	10.3	56	26.5	QP	N	GND
0.501000	29.50	10.2	56	26.5	QP	N	GND

MEASUREMENT RESULT: "BCT08JP-801N_fin2"

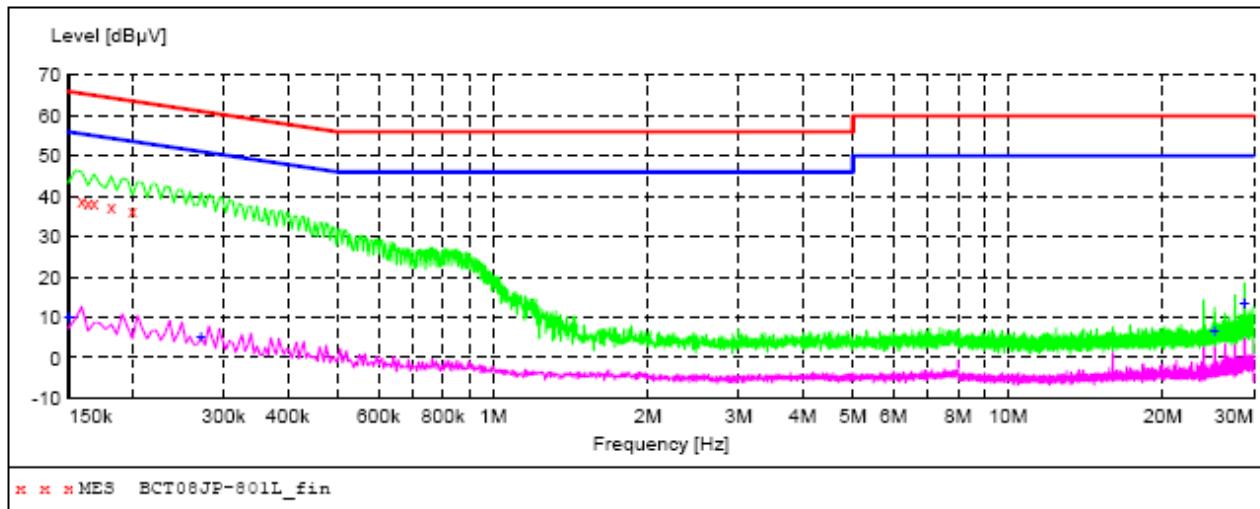
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Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.447000	3.10	10.3	47	43.8	AV	N	GND
0.465000	2.90	10.3	47	43.7	AV	N	GND
0.469500	2.90	10.3	47	43.6	AV	N	GND
0.501000	2.60	10.2	46	43.4	AV	N	GND
28.801500	5.10	11.1	50	44.9	AV	N	GND

Conducted Emission:

EUT: Wireless DMX Controller
 M/N: LE-200
 Operating Condition: Continuous Transmitting
 Test Site: Shielded Room
 Operator: Andy
 Test Specification: DC 9V from AC/DC adapter (AC 120V/60Hz)
 Comment: Live Line Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "BCT08JP-801L_fin"

10/22/2008 17:20	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.159000	38.70	11.3	66	26.8	QP	L1	GND
	0.163500	38.40	11.2	65	26.9	QP	L1	GND
	0.168000	38.20	11.2	65	26.9	QP	L1	GND
	0.181500	37.40	11.0	64	27.0	QP	L1	GND
	0.199500	36.30	10.8	64	27.3	QP	L1	GND

MEASUREMENT RESULT: "BCT08JP-801L_fin2"

10/22/2008 17:20	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.150000	9.90	11.4	56	46.1	AV	L1	GND
	0.271500	5.00	10.6	51	46.1	AV	L1	GND
	25.197000	6.60	10.9	50	43.4	AV	L1	GND
	28.797000	13.30	11.1	50	36.7	AV	L1	GND

5- BAND EDGES MEASUREMENT

5.1 Limit of Band Edges Measurement

1. In the above emission table, the tighter limit applies at the band edges.
2. As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength ($\text{dB}\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

5.2 EUT Setup

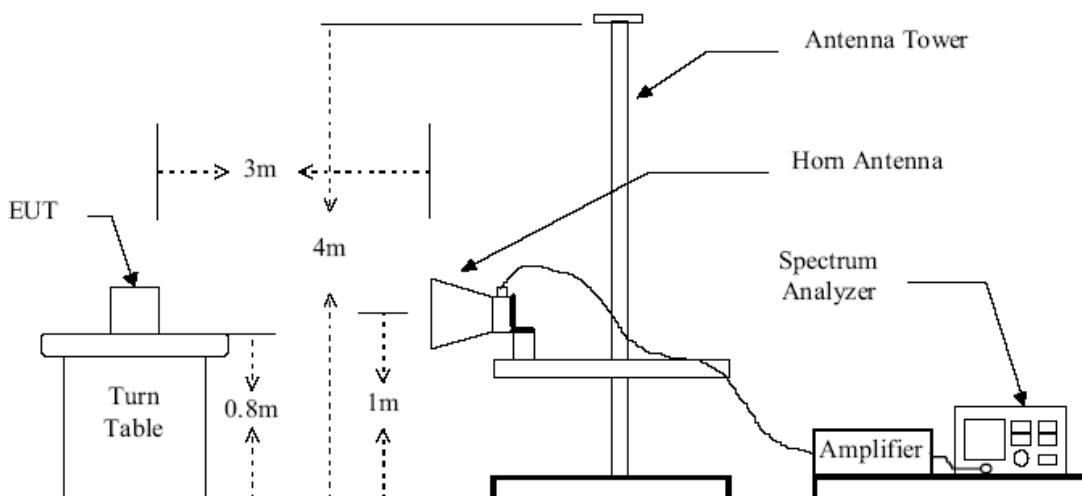


Figure 2 : Frequencies measured above 1 GHz configuration

5.3 Test Procedure

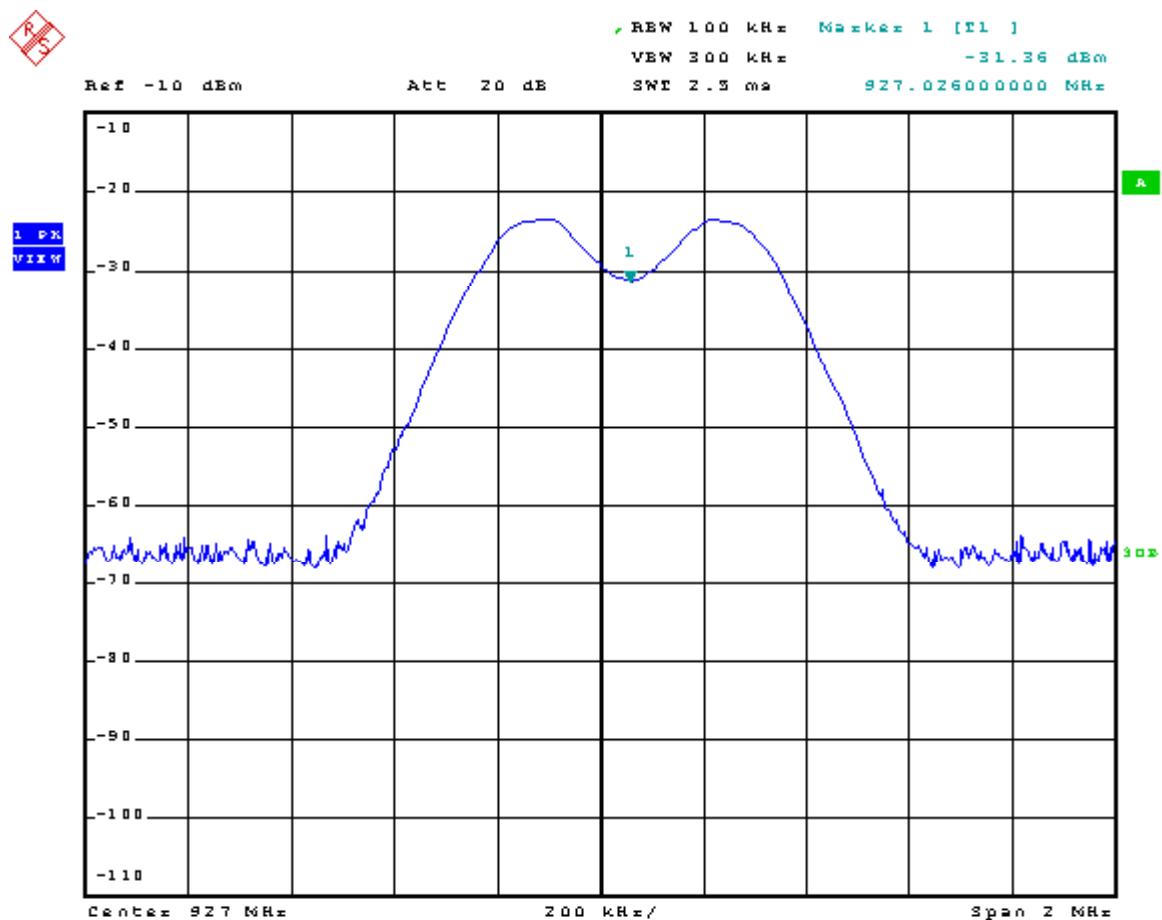
Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

- 1). Configure the EUT according to ANSI C63.4:2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The receiving antenna was placed 3 meters far away from the turntable.
- 4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 5). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

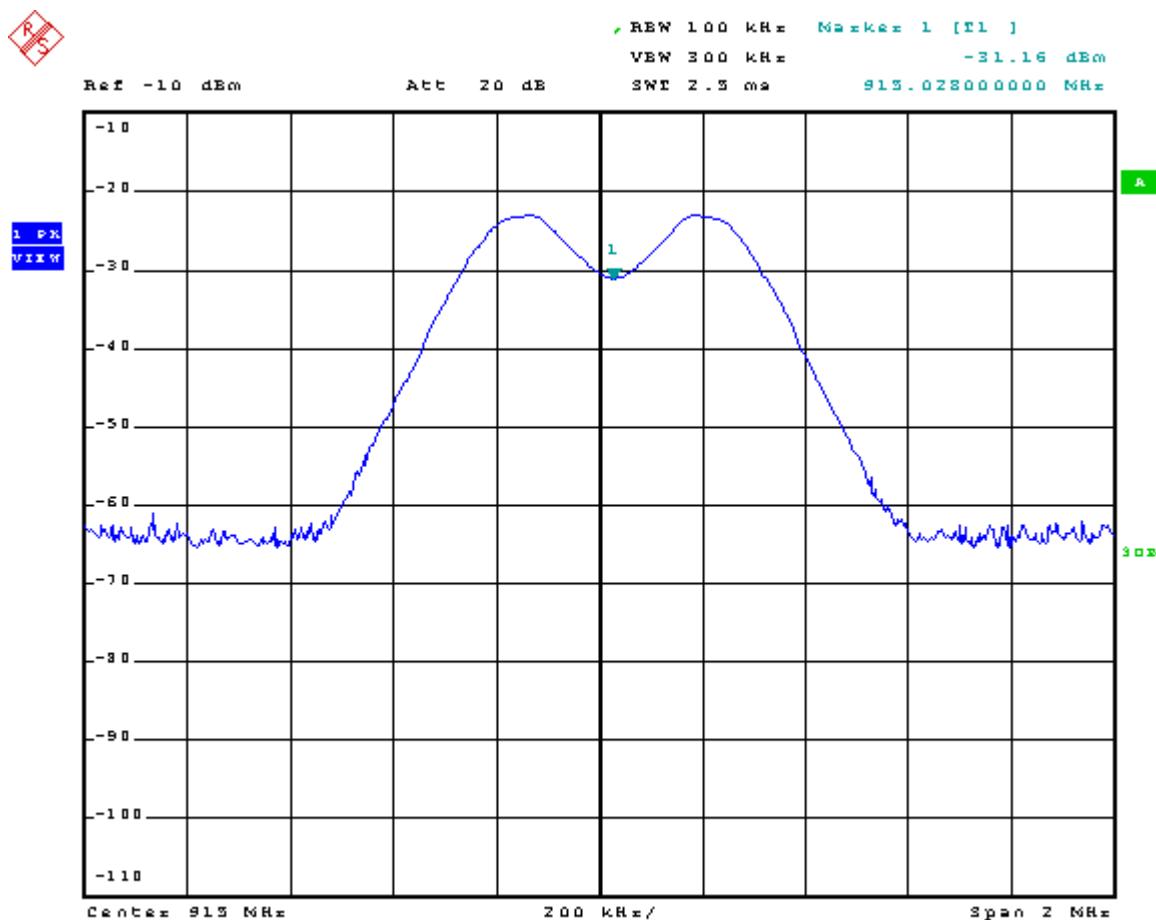
5.4 Test Result

Temperature (°C) : 22~23	EUT: Wireless DMX Controller
Humidity (%RH): 50~54	M/N: LE-200
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous Transmitting

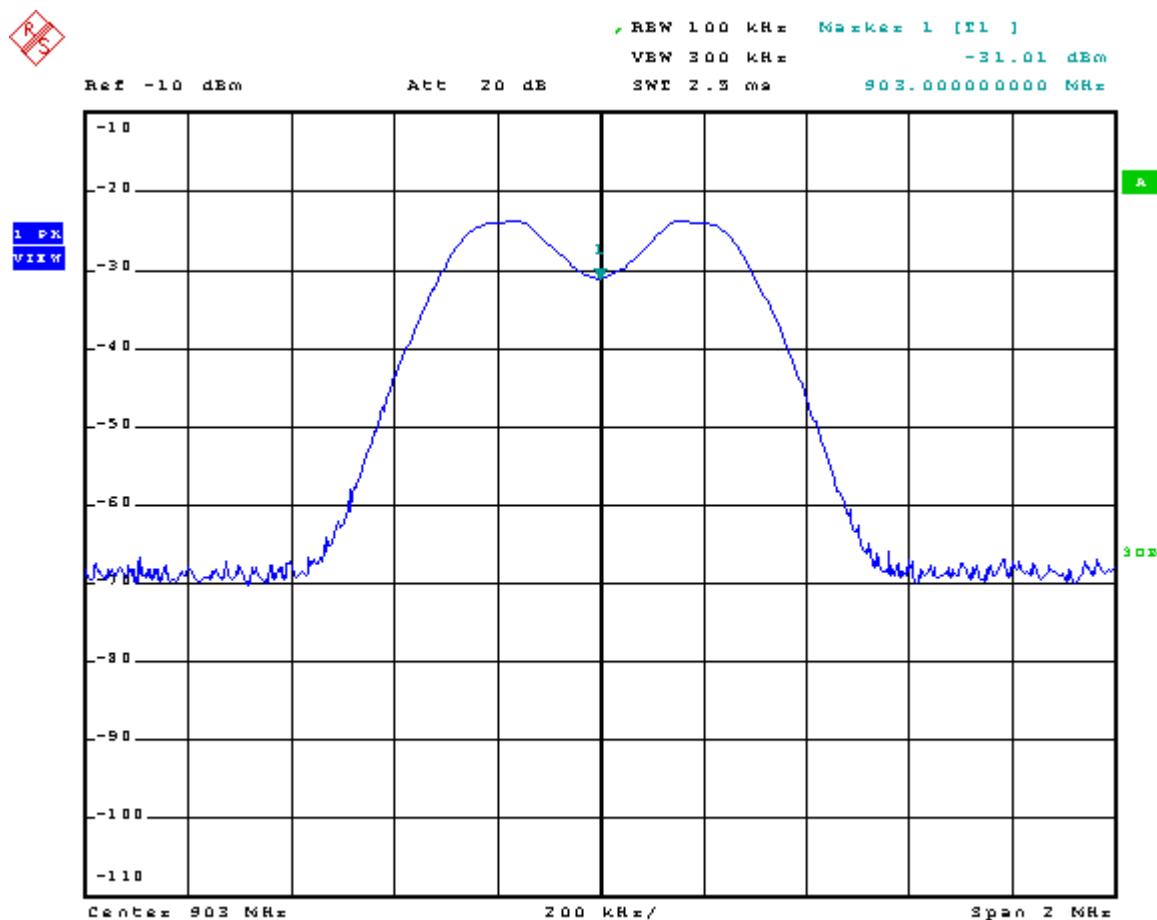
Channel High



Channel Middle



Channel Low



6- SPURIOUS EMISSIONS

6.1 Limit of Spurious Emissions

1. 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:
2. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

3. In the above emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.2 EUT Setup

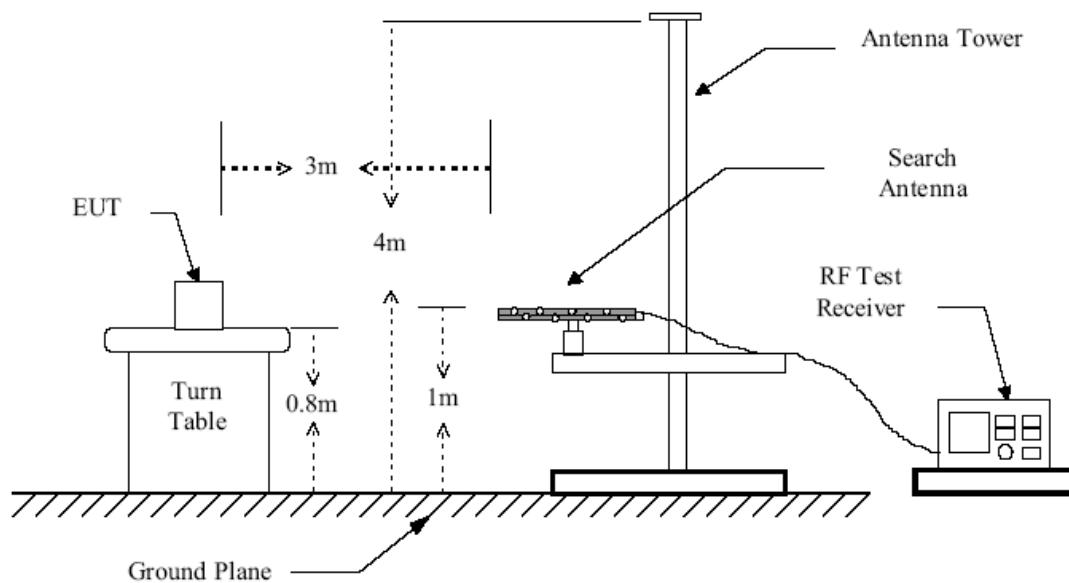


Figure 1 : Frequencies measured below 1 GHz configuration

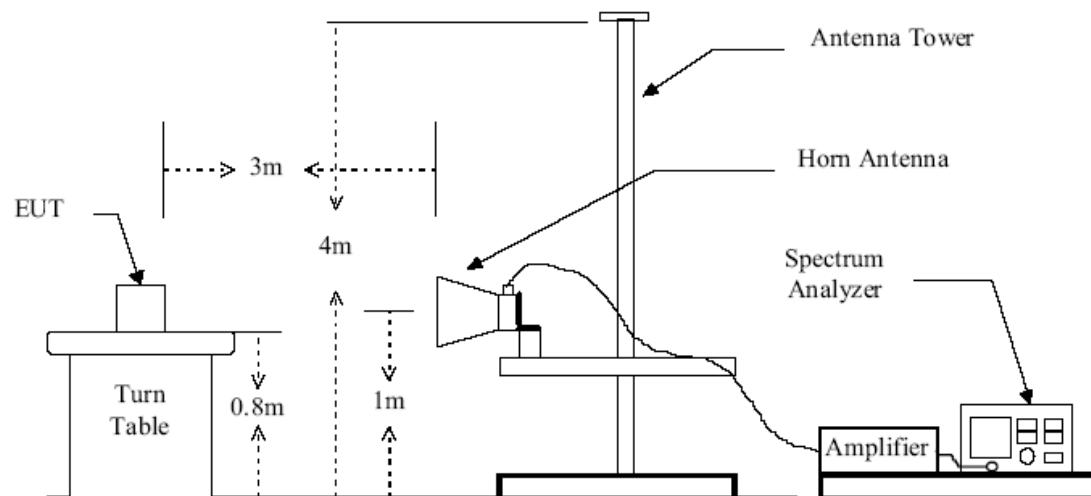


Figure 2 : Frequencies measured above 1 GHz configuration

6.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

- 1). Configure the EUT according to ANSI C63.4:2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The receiving antenna was placed 3 meters far away from the turntable.
- 4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 5). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

6.4 Spurious Emissions Test Result

Temperature (°C) : 22~23	EUT: Wireless DMX Controller
Humidity (%RH): 50~54	M/N: LE-200
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous Transmitting

Test plots see following:

Harmonics and Spurious Emissions

Channel High					
Maximum Frequency (MHz)	Polarity and Level			Limit	Margin
	Polarity	Transd	Result dB μ V/m	dB μ V/m	dB μ V/m
40.94	H	16.8	26.6	40.0	13.4
127.00	H	14.9	28.5	43.5	15.0
224.08	H	17.2	30.5	46.0	15.5
288.01	H	19.8	29.4	46.0	16.6
383.08	H	20.6	29.2	46.0	16.8
927.03	H	29.5	65.1	94.0	28.9
1854.06	H	30.3	45.3	54.0	8.7
2781.09	H	30.8	44.8	54.0	9.2
3708.12	H	31.1	39.8	54.0	14.2
4635.15	H	---	---	---	---
5562.18	H	---	---	---	---
7416.24	H	---	---	---	---
8343.27	H	---	---	---	---
9270.30	H	---	---	---	---
40.94	V	16.7	25.4	40.0	14.6
127.00	V	14.9	31.5	43.5	12.0
156.11	V	14.4	28.7	43.5	14.8
383.08	V	20.6	34.6	46.0	11.4
416.06	V	21.0	29.8	46.0	16.2
927.03	V	29.5	73.1	94.0	20.9
1854.06	V	30.3	45.7	54.0	8.3
2781.09	V	30.8	47.4	54.0	6.6
3708.12	V	31.1	43.1	54.0	10.9
4635.15	V	32.4	41.6	54.0	12.4
5562.18	V	---	---	---	---
7416.24	V	---	---	---	---
8343.27	V	---	---	---	---
9270.30	V	---	---	---	---
Remark: 1. Transd.=Antenna Factor+Cable Loss+Pre-amplifier 2. Datas 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.					

Channel Middle					
Maximum Frequency (MHz)	Polarity and Level			Limit	Margin
	Polarity	Transd	Result dB μ V/m	dB μ V/m	dB μ V/m
47.46	H	16.7	22.6	40.0	17.4
59.10	H	15.5	21.4	40.0	18.6
103.72	H	18.1	23.4	43.5	20.1
288.02	H	19.8	33.4	46.0	12.6
416.06	H	21.0	31.5	46.0	14.5
915.03	H	29.4	67.3	94.0	26.7
1830.06	H	30.3	43.2	54.0	10.8
2745.09	H	30.8	45.9	54.0	8.1
3660.12	H	31.2	42.4	54.0	11.6
4575.15	H	---	---	---	---
5490.18	H	---	---	---	---
6405.21	H	---	---	---	---
7320.24	H	---	---	---	---
8235.27	H	---	---	---	---
9150.30	H	---	---	---	---
127.00	V	14.9	32.1	43.5	11.4
156.10	V	14.4	28.5	43.5	15.0
367.56	V	20.8	30.8	46.0	15.2
383.08	V	20.6	36.3	46.0	9.7
416.06	V	21.0	35.1	46.0	10.9
915.03	V	29.4	71.7	94.0	22.3
1830.06	V	30.3	47.1	54.0	6.9
2745.09	V	30.7	49.5	54.0	4.5
3660.12	V	31.2	45.3	54.0	8.7
4575.15	V	32.2	44.1	54.0	9.9
5490.18	V	---	---	---	---
6405.21	V	---	---	---	---
7320.24	V	---	---	---	---
8235.27	V	---	---	---	---
9150.30	V	---	---	---	---
Remark: <ol style="list-style-type: none"> 1. Transd.=Antenna Factor+Cable Loss+Pre-amplifier 2. Datas 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. 					

Channel Low					
Maximum Frequency (MHz)	Polarity and Level			Limit	Margin
	Polarity	Transd	Result dB μ V/m	dB μ V/m	dB μ V/m
37.53	H	16.4	24.1	40.0	15.9
56.11	H	16.5	23.7	40.0	16.3
127.02	H	18.1	21.4	43.5	22.1
288.05	H	19.8	32.3	46.0	13.7
451.21	H	21.0	31.8	46.0	14.2
903.00	H	29.3	69.0	94.0	25.0
1806.00	H	30.2	42.5	54.0	11.5
2709.00	H	30.9	45.3	54.0	8.7
3612.00	H	31.1	41.4	54.0	12.6
4515.00	H	---	---	---	---
5418.00	H	---	---	---	---
6321.00	H	---	---	---	---
7224.00	H	---	---	---	---
8127.00	H	---	---	---	---
9030.00	H	---	---	---	---
35.82	V	15.7	26.4	40.0	13.6
127.02	V	14.9	32.1	43.5	11.4
156.11	V	14.4	26.2	43.5	17.3
383.08	V	20.6	35.2	46.0	10.8
416.06	V	21.0	31.0	46.0	15.0
903.00	V	29.3	76.3	94.0	17.7
1806.00	V	30.3	44.3	54.0	9.7
2709.00	V	30.7	47.1	54.0	6.9
3612.00	V	31.2	44.3	54.0	9.7
4515.00	V	32.2	43.2	54.0	10.8
5418.00	V	---	---	---	---
6321.00	V	---	---	---	---
7224.00	V	---	---	---	---
8127.00	V	---	---	---	---
9030.00	V	---	---	---	---

Remark: 1. Transd.=Antenna Factor+Cable Loss+Pre-amplifier
 2. Datas 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.