

FCC Test Report

Product Name : Digital Ballast

Model No. : Pro 600^e SE US 240,
Pro 6/750^e DE FLEX US 240,
Pro 1000^e DE US 240

FCC ID : 2ADC61860X42421

Applicant : GAVITA HOLLAND B.V.

Address : Oosteinderweg 127, 1432 AH Aalsmeer, The Netherlands

Date of Receipt : 2014/08/21

Issued Date : 2015/02/15

Report No. : 1530399R-ITUSP04V00

Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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Test Report Certification

Issued Date : 2015/02/15
Report No. : 1530399R-ITUSP04V00

Quietek

Product Name : Digital Ballast
Applicant : GAVITA HOLLAND B.V.
Address : Oosteinderweg 127, 1432 AH Aalsmeer, The Netherlands
Manufacturer : GAVITA HOLLAND B.V.
Address : Oosteinderweg 127, 1432 AH Aalsmeer, The Netherlands
Model No. : Pro 600^e SE US 240,
Pro 6/750^e DE FLEX US 240,
Pro 1000^e DE US 240
EUT Rated Voltage : AC 220V-240V / 50-60Hz
EUT Test Voltage : AC 240V / 60Hz
Trade Name : GAVITA
Applicable Standard : FCC CFR Title 47 Part 18: 2013
FCC/OET MP-5: 1986
Test Result : Complied
Performed Location : Quietek Corporation (Linkou Laboratory)
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Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scopes:

Taiwan R.O.C.	: BSMI, NCC, TAF
Norway	: Nemko, DNV
USA	: FCC
Japan	: VCCI

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : <http://tw.quietek.com/tw/emc/accreditations/accreditations.htm>
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site :

<http://www.quietek.com/>

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1. General Information

1.1. EUT Description

Product Name	Digital Ballast
Trade Name	GAVITA
Model No.	Pro 600 ^e SE US 240, Pro 6/750 ^e DE FLEX US 240, Pro 1000 ^e DE US 240

Note: This appendix report was based on Quietek report No. 1480482R, adds a power cable.

The different model name is only for different marketing required.

Pro 1000^e DE US 240 was selected as the test model and its test data was recorded in this report.

1.2. Mode of Operation

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	
Emission	Mode 1: Normal Operation

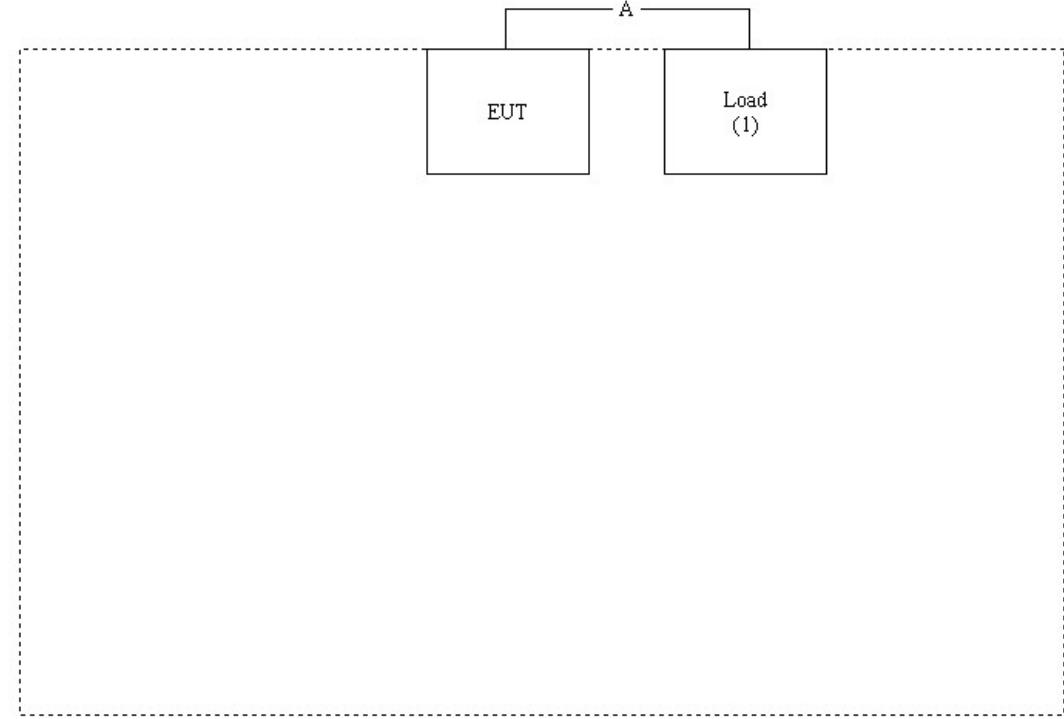
Note: The sample tested in this report has a 6-speed dimming and the test mode is the maximum brightness mode.

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord	FCC Approved
1 Load	N/A	N/A	N/A	Power by EUT	N/A

1.4. Configuration of Tested System

Connection Diagram	
	
Signal Cable Type	Signal cable Description
A Connecting Cable	Non-Shielded, 5m or Non-Shielded, 2.5m

1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the Power of all equipment.
3	Adjust the EUT to the maximum brightness.
4	Confirm the EUT working normally.
5	Start test.

2. Technical Test

2.1. Summary of Test Result

- No deviations from the test standards
- Deviations from the test standards as below description:

Emission			
Performed Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 18: 2013 FCC/OET MP-5: 1986	Yes	No
Radiated Emission	FCC CFR Title 47 Part 18: 2013 FCC/OET MP-5: 1986	Yes	No

2.2. List of Test Equipment

Conducted Emission / SR8

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
EMI Test Receiver	R&S	ESCS 30	100369	2014/09/14
LISN	R&S	ESH3-Z5	836679/017	2013/12/31
LISN	R&S	ENV216	100097	2013/12/30
Pulse Limiter	R&S	ESH3-Z2	100412	2014/09/04
Coaxial Cable	QTK(Arnist)	RG 214	LC002-RG	2014/06/17

Radiated Emission / CB7

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
EMI Test Receiver	R&S	ESU26	100433	2014/07/31
Bilog Antenna	Schaffner Chase	CBL6112B	2905	2014/06/13
Pre-Amplifier	QuieTek	AP-180C	CHM/071920	2014/06/24

2.3. Measurement Uncertainty

Conducted Emission

The measurement uncertainty is evaluated as \pm 2.26 dB.

Radiated Emission

The measurement uncertainty is evaluated as \pm 3.19 dB.

2.4. Test Environment

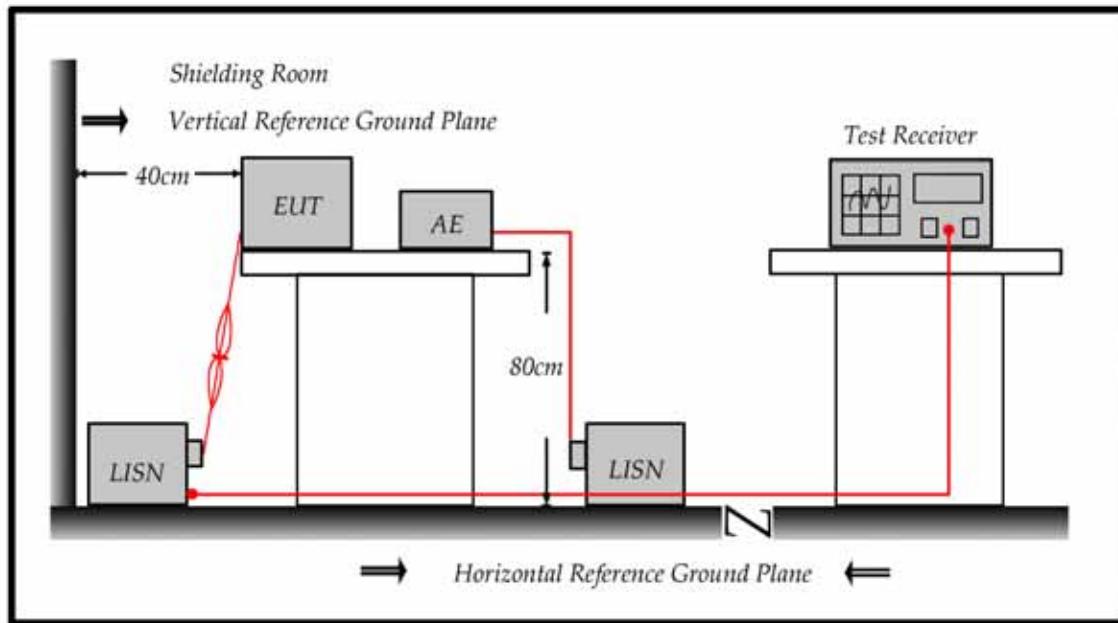
Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	15-35	24
	Humidity (%RH)	25-75	45
	Barometric pressure (mbar)	860-1060	950-1000
Radiated Emission	Temperature (°C)	15-35	23
	Humidity (%RH)	25-75	43
	Barometric pressure (mbar)	860-1060	950-1000

3. Conducted Emission

3.1. Test Specification

According to Standard: FCC Part 18 and FCC/OET MP-5

3.2. Test Setup



3.3. Limit

(a) All Induction cooking ranges and ultrasonic equipment:

Frequency MHz	Conducted limit (dBuV)	
	Quasi-peak	Average
0.009–0.05	110	–
0.05–0.15	90-80*	–
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

* Decreases with the logarithm of the frequency.

(b) All other part 18 consumer devices:

Frequency MHz	Conducted limit (dBuV)	
	Quasi-peak	Quasi-peak
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(c) RF lighting devices:

Non-consumer equipment:	
Frequency (MHz)	Maximum RF line voltage measured with a 50 uH/50 ohm LISN (uV)
0.45 to 1.6	1000
1.6 to 30	3000
Consumer equipment:	
0.45 to 2.51	250
2.51 to 3.0	3000
3.0 to 30	250

Note:

1. These conduction limits shall apply outside the bands specified in § 18.301.
2. For ultrasonic equipment, compliance with these conduction limits shall preclude the need to show compliance with unless requested by the Commission.
3. The tighter limits shall apply at the boundary between two frequency ranges.

3.4. Test Procedure

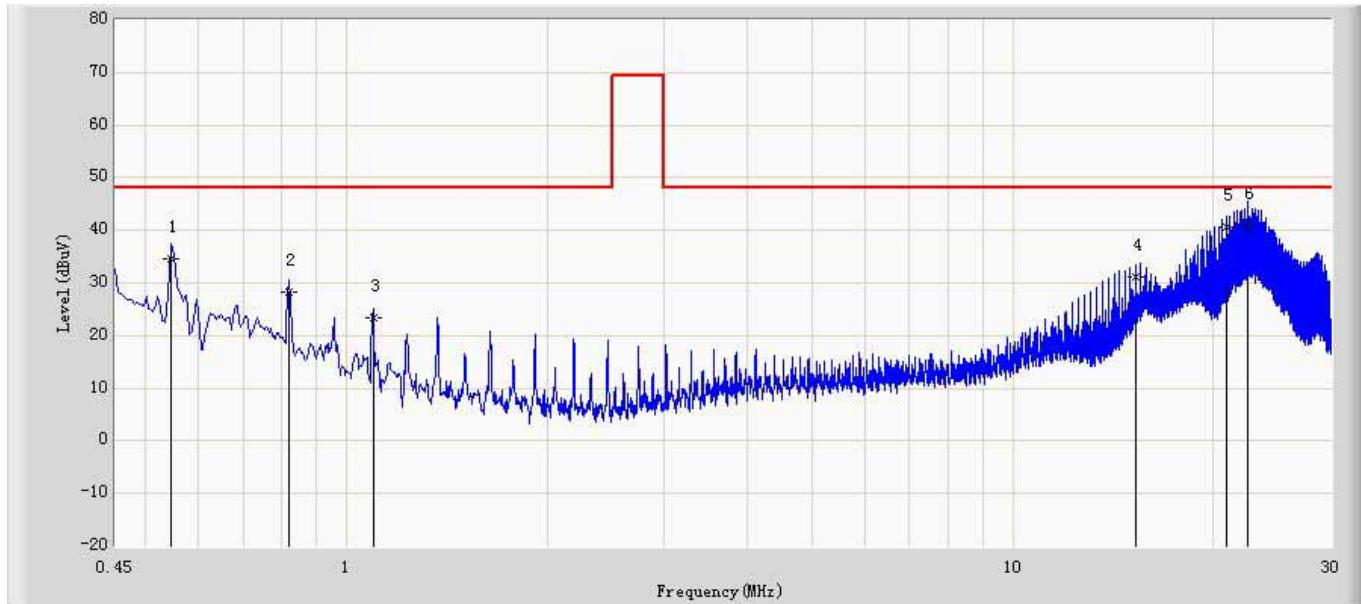
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH (50 ohm /50uH for RF lighting devices) coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/50uH (50 ohm /50uH for RF lighting devices) coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to FCC/OET MP-5: 1986 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.009MHz to 30MHz using a receiver bandwidth of 9kHz.

3.5. Test Result

Site: SR8	Time: 2014/10/28 - 14:17
Limit: FCC_Part18_Lighting Devices_CE_consumer	Margin: 0
Probe: ENV216-L1	Polarity: Line
EUT: Digital Ballast	Power: AC 240V/60Hz
Note: Mode 1: Normal Operation	

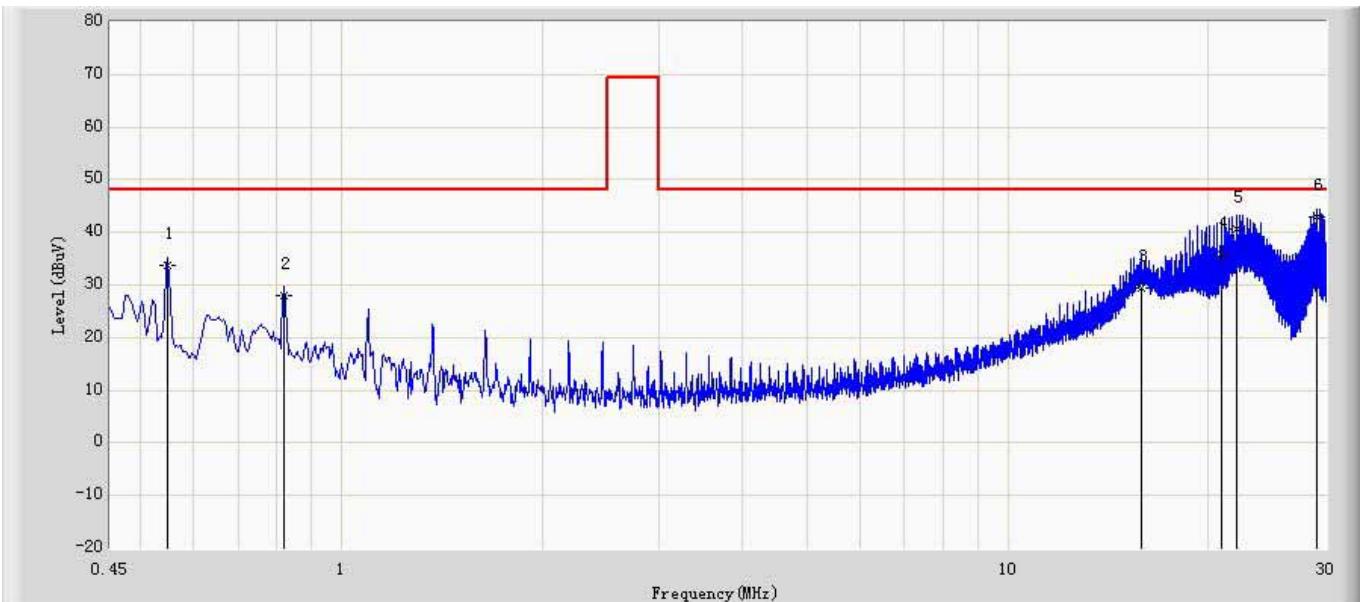


No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.546	34.622	24.922	-13.378	48.000	9.630	0.070	0.000	QP
2		0.822	28.341	18.651	-19.659	48.000	9.620	0.070	0.000	QP
3		1.098	23.273	13.563	-24.727	48.000	9.630	0.080	0.000	QP
4		15.278	31.123	20.913	-16.877	48.000	9.840	0.370	0.000	QP
5		20.894	40.512	30.332	-7.488	48.000	9.690	0.490	0.000	QP
6	*	22.542	41.056	30.841	-6.944	48.000	9.693	0.522	0.000	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable+Amp).

Site: SR8	Time: 2014/10/28 - 14:19
Limit: FCC_Part18_Lighting Devices_CE_consumer	Margin: 0
Probe: ENV216-N	Polarity: Neutral
EUT: Digital Ballast	Power: AC 240V/60Hz
Note: Mode 1: Normal Operation	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.550	33.676	23.976	-14.324	48.000	9.630	0.070	0.000	QP
2		0.822	27.929	18.219	-20.071	48.000	9.640	0.070	0.000	QP
3		15.862	29.463	19.233	-18.537	48.000	9.840	0.390	0.000	QP
4		20.914	35.713	25.463	-12.287	48.000	9.760	0.490	0.000	QP
5		22.002	40.768	30.598	-7.232	48.000	9.660	0.510	0.000	QP
6	*	29.058	42.929	32.359	-5.071	48.000	9.910	0.660	0.000	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable+Amp).

3.6. Test Photograph

Test Mode : Mode 1: Normal Operation

Description : Front View of Conducted Test



Test Mode : Mode 1: Normal Operation

Description : Back View of Conducted Test

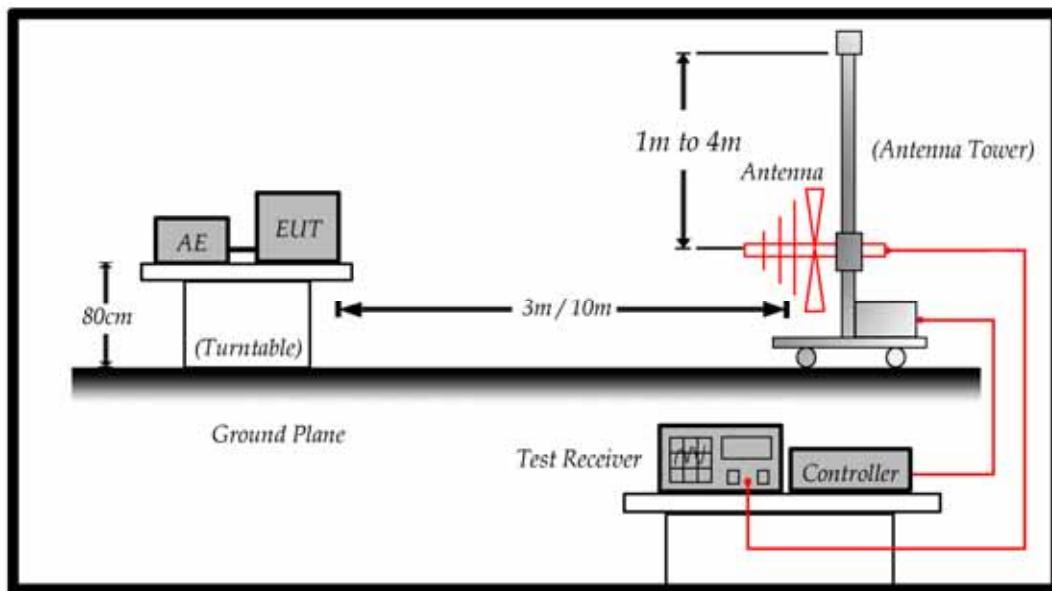


4. Radiated Emission

4.1. Test Specification

According to EMC Standard: FCC Part 18 and FCC/OET MP-5

4.2. Test Setup



4.3. Limit

(a) ISM equipment operating on a frequency specified in §18.301 is permitted unlimited radiated energy in the band specified for that frequency:

ISM frequency	Tolerance	ISM frequency	Tolerance	ISM frequency	Tolerance
6.78 MHz	± 15.0 kHz	13.56 MHz	± 7.0 kHz	27.12 MHz	± 163.0 kHz
40.68 MHz	± 20.0 kHz	915 MHz	± 13.0 MHz	2,450 MHz	± 50.0 MHz
5,800 MHz	± 75.0 MHz	24,125 MHz	± 125.0 MHz	61.25 GHz	± 250.0 MHz
122.50 GHz	± 500.0 MHz	245.00 GHz	± 1.0 GHz		

Remark:

The use of the 6.78 MHz ± 15.0 kHz frequency band is subject to the condition of footnote 524 of the Table of Allocations.

(b) The field strength level of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment (Watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous).	Any ISM frequency	Below 500 500 or more	25 25*SQRT(power/500)	300 1300
	Any Non-ISM frequency	Below 500 500 or more	15 15*SQRT(power/500)	300 1300
Industrial heaters and RF stabilized arc welders.	ON or below 5.725MHz Above 5.725MHz	Any Any	10 (2)	1600 (2)
Medical diathermy	Any ISM frequency Any Non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2400/F(kHz) 2400/F(kHz)* SQRT(power/500)	300 300
	490 to 1600 kHz Above 1600 kHz	Any Any	24000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1500 300	430 430

Remark:

1. Field strength may not exceed 10 uV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500watts.
2. Reduced to the greatest extend possible.
3. Field strength may not exceed 10 uV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500watts.
4. Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

(c) The field strength limits for RF lighting devices shall be the following:

Frequency (MHz)	Field strength limit at 30 meters (uV/m)	
	(uV/m)	(dBuV/m)
Non-consumer equipment:		
30 – 88	30	29.5
88 – 216	50	34
216 – 1000	70	36.9
Consumer equipment:		
30 – 88	10	20
88 – 216	15	23.5
216 – 1000	20	26

Remark:

1. The tighter limits shall apply at the boundary between two frequency ranges.
2. Testing for compliance with these limits may be made at closer distances, provided a sufficient number of measurements are taken to plot the radiation pattern, to determine the major lobes of radiation, and to determine the expected field strength level at 30, 300, or 1600 meters. Alternatively, if measurements are made at only one closer fixed distance, then the permissible field strength limits shall be adjusted using $1/d$ as attenuation factor.

4.4. Test Procedure

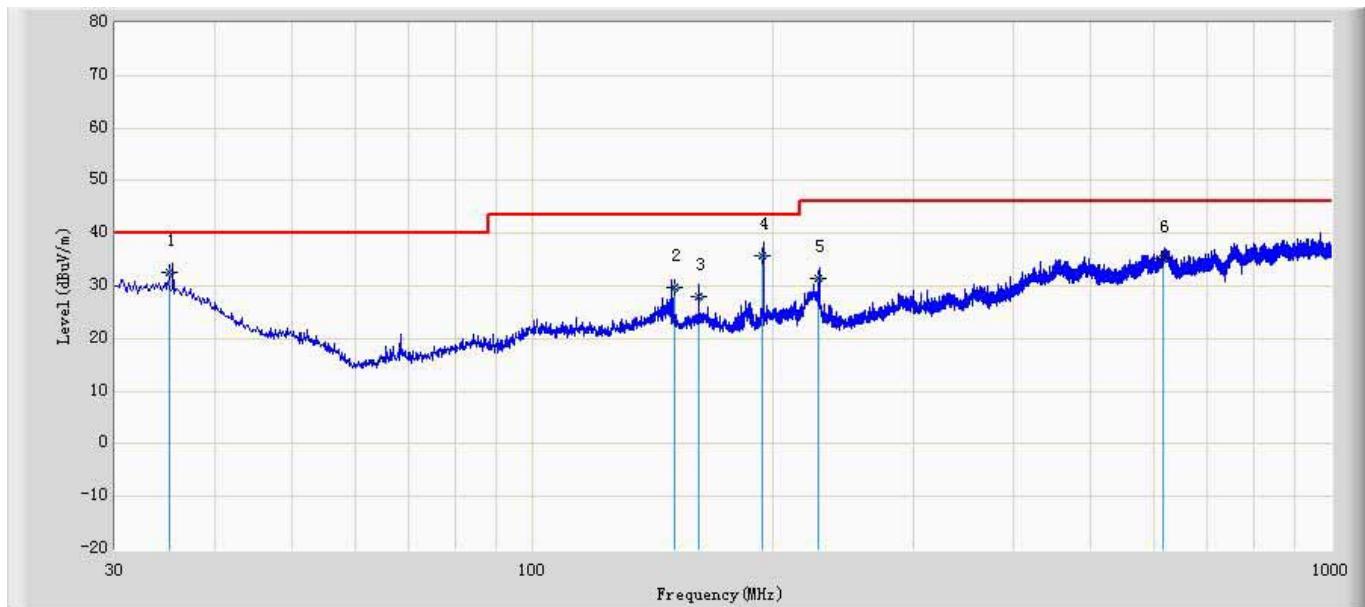
The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level and the antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

Radiated emissions were invested over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

4.5. Test Result

Site: CB7	Time: 2014/10/28 - 14:08
Limit: FCC_Part18_Lighting Devices_RE (3m)_consumer	Margin: 0
Probe: CB7_CBL6112_0726	Polarity: Horizontal
EUT: Digital Ballast	Power: AC 240V/60Hz
Note: Mode 1: Normal Operation	

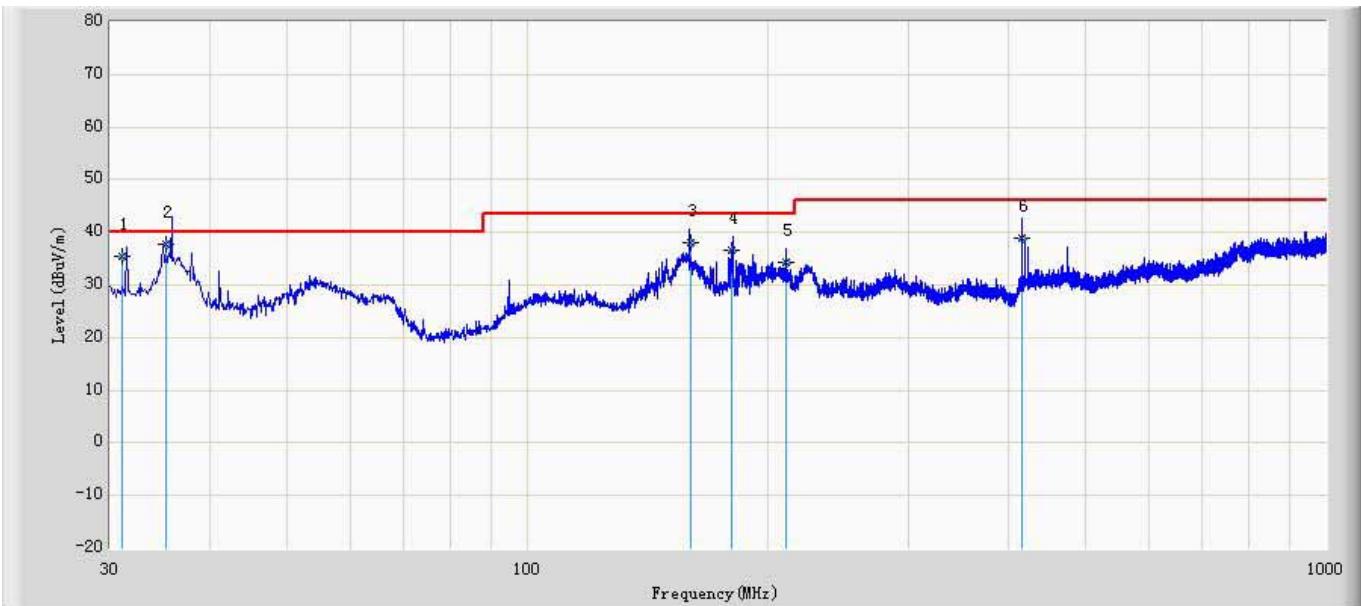


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1	*	35.032	32.629	39.278	-7.371	40.000	15.881	0.642	23.172	100	124	QP
2		150.326	29.602	40.792	-13.898	43.500	10.480	1.330	23.000	100	42	QP
3		161.236	27.870	39.674	-15.630	43.500	9.863	1.373	23.040	100	42	QP
4		194.032	35.670	47.998	-7.830	43.500	9.321	1.511	23.160	100	124	QP
5		228.103	31.463	42.983	-14.537	46.000	10.110	1.630	23.260	100	256	QP
6		617.032	35.217	36.125	-10.783	46.000	19.000	2.720	22.628	100	125	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable+Amp).

Site: CB7	Time: 2014/10/28 - 14:12
Limit: FCC_Part18_Lighting Devices_RE (3m)_consumer	Margin: 0
Probe: CB7_CBL6112_0726	Polarity: Vertical
EUT: Digital Ballast	Power: AC 240V/60Hz
Note: Mode 1: Normal Operation	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		31.032	35.322	39.612	-4.678	40.000	18.201	0.611	23.101	100	236	QP
2	*	35.260	37.891	44.672	-2.109	40.000	15.749	0.644	23.174	100	205	QP
3		160.032	38.120	49.881	-5.380	43.500	9.899	1.370	23.031	100	124	QP
4		180.032	36.586	48.932	-6.914	43.500	9.304	1.457	23.107	100	234	QP
5		210.652	34.397	46.831	-9.103	43.500	9.206	1.570	23.210	100	236	QP
6		416.032	38.967	43.347	-7.033	46.000	16.320	2.250	22.950	100	125	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable+Amp).

4.6. Test Photograph

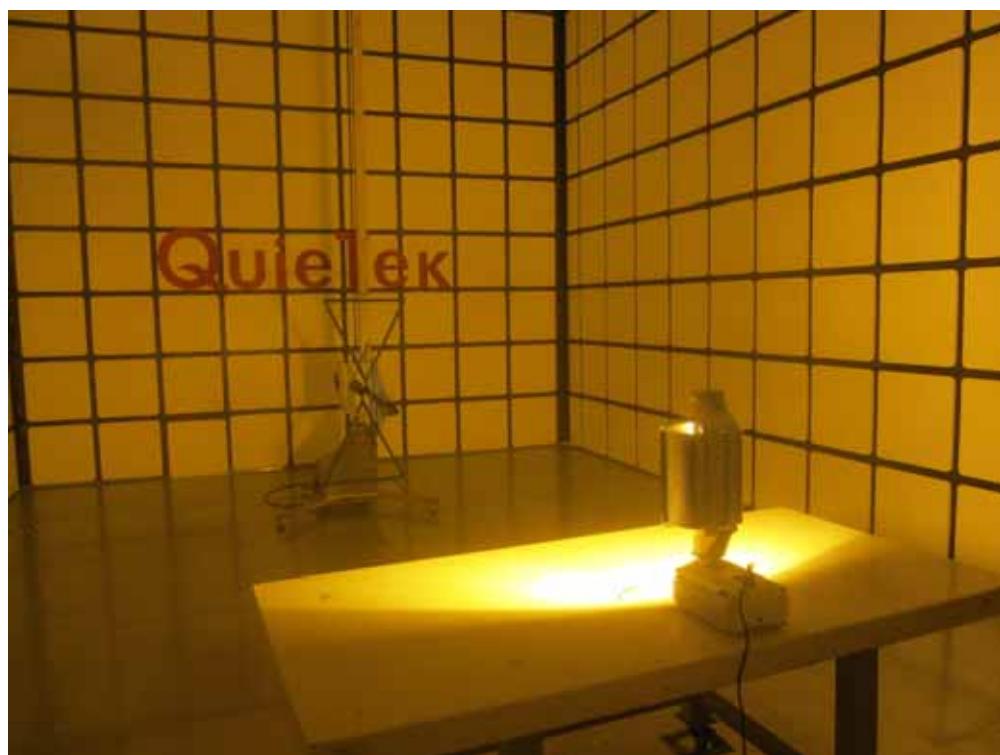
Test Mode : Mode 1: Normal Operation

Description : Front View of Radiated Test



Test Mode : Mode 1: Normal Operation

Description : Back View of Radiated Test



5. Attachment**➤ EUT Photograph**

(1) EUT Photo



(2) EUT Photo



(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



(6) EUT Photo

