



FCC TEST REPORT

According to

FCC CFR Title 47 Part 18

Applicant	: Liting Universal (Zhejiang) Co., Ltd
Address	: Jin sha Village, Quan tang industry zone, Ping hu city, Zhejiang Province
Equipment	: Neon lamp
Model No.	: NL-1201 NL-1202 NL-1203 NL-1204 NL-1205 NL-1206 NL-1207 NL-1208
FCC ID.	: OPW-2012080001

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- **NVLAP** or any agency of the Government.



Contents

1. Summary of Test Procedure and Test Result.....	5
2. Test Configuration of Equipment under Test	6
2.1. Factory	6
2.2. Feature of Equipment under Test.....	6
2.3. Test Manner	6
2.4. Description of Test System.....	6
2.5. General Information of Test.....	7
2.6. Measurement Uncertainty	7
3. Test of Conducted Emission.....	8
3.1. Test Limit	8
3.2. Test Procedures	9
3.3. Typical test Setup.....	10
3.4. Measurement Equipment.....	10
3.5. Test Result and Data	11
4. Test of Radiated Emission	13
4.1. Test Limit	13
4.2. Test Procedures	14
4.3. Typical test Setup.....	15
4.4. Measurement equipment	15
4.5. Test Result and Data	16

**History of this test report**

☒ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description



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FCC ID.	: OPW-2012080001

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2009** and the energy emitted by this equipment was **passed FCC Part 18** in both radiated and conducted emission class B limits. Testing was carried out on Aug 13, 2012 at CerpPASS Technology(Suzhou) Corp.

Signature

Miro Chueh/ Technical director



1. Summary of Test Procedure and Test Result

Test Item	Normative References	Test Result
Conducted Emission	ANSI C63.4-2009 FCC Part 18	PASS
Radiated Emission	ANSI C63.4-2009 FCC Part 18	PASS



2. Test Configuration of Equipment under Test

2.1. Factory

Li ting Universal (Zhejiang) Co., Ltd
Jin sha Village, Quan tang industry zone, Ping hu city, Zhejiang Province

2.2. Feature of Equipment under Test

Neon lamp	Model No:	NL-1201, NL-1202, NL-1203, NL-1204, NL-1205, NL-1206, NL-1207, NL-1208,
	Input:	12VDC 300mA.
	Power	3.6W
AC/DC ADAPTOR	Model No:	RK-1200300
	Input:	100-120V~ 60Hz 0.2A
	Output:	12V, 0.3A
Remark	The difference between all of the Family models is the outline and LED circuit of the products, the electrical is identical the same, so NL-1201 was selected as the test model and its data have been recorded in this report.	

2.3. Test Manner

Test Manner	
a	During testing, the interface cables and equipment positions were varied according to ANSIC63.4-2009
b	The complete test system included load, meter and EUT for EMI test.
c	Connect the Load, Meter and EUT, and then test.
The pre-test modes	
	Test Mode 1: Full Load
	Test Mode 2: Half Load
	Test Mode 3: No Load
Select the worst case of the pre-test modes as the final test mode	
	Test Mode 1: Full Load

2.4. Description of Test System

Item	Cable	Quantity	Description
A	DC Cable	1	Non-Shielded, 1.9m



2.5. General Information of Test

Test Site:	Cerpass Technology (Suzhou) Co.,Ltd
Test Site Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz
Frequency Range Investigated :	Conducted Emission Test: from 150kHz to 30 MHz Radiated Emission Test: from 30 MHz to 1,000 MHz
Test Distance :	The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

LABORATORY ACCREDITATION



2.6. Measurement Uncertainty

Conducted Emission		
The measurement uncertainty is evaluated as ± 2.71 dB.		
Radiated Emission		
(30MHz -1000MHz)	Horizontal	The measurement uncertainty is evaluated as ± 3.89 dB.
	Vertical	The measurement uncertainty is evaluated as ± 3.74 dB
(1G-6GHz)	Horizontal	The measurement uncertainty is evaluated as ± 2.31 dB.
	Vertical	The measurement uncertainty is evaluated as ± 2.15 dB.



3. Test of Conducted Emission

3.1. Test Limit

Conducted emissions were investigated over the frequency range from 0.009MHz to 30MHz using a receiver bandwidth of 9kHz. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions. These conduction limits shall apply FCC part 18 § 18.301.

All Induction cooking ranges and ultrasonic equipment

Frequency MHz	Limits dB(uV)	
	Quasi-peak	Average
0.009-0.05	110	-
0.05-0.15	90-80	-
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5	56	46
5 - 30	60	50

RF lighting devices:

Non-consumer equipment:

Frequency MHz	Maximum RF line voltage measured with a 50 uH/50 ohm LISN	
	uV	dBuV
0.45 – 1.6	1000	60
0.50 - 30	3000	69.5



RF lighting devices:

consumer equipment:

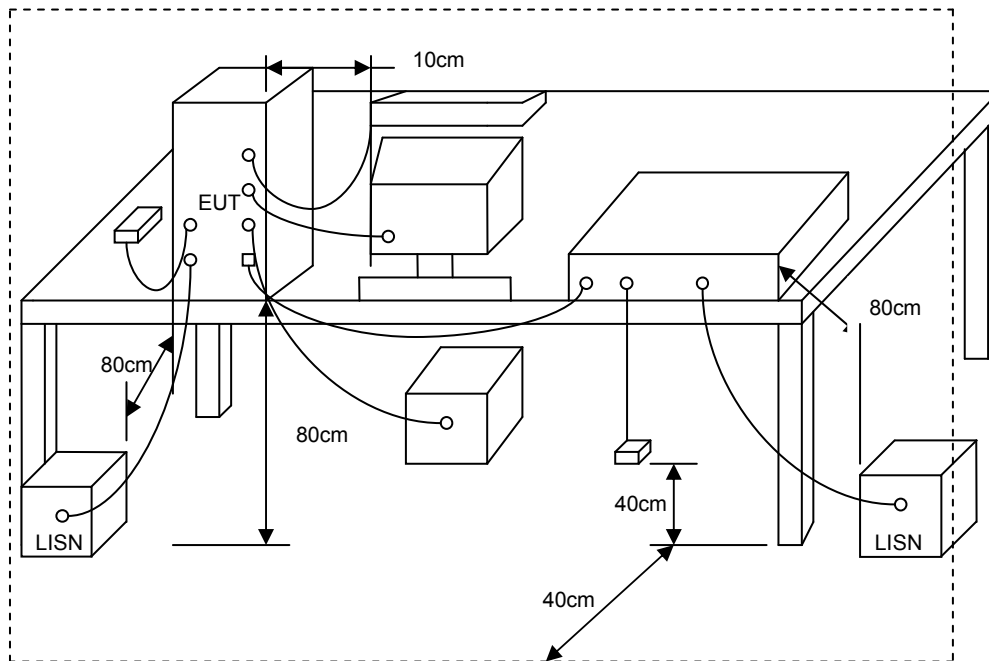
Frequency MHz	Maximum RF line voltage measured with a 50 uH/50 ohm LISN	
	uV	dBuV
0.45 to 2.51	250	48
2.51 to 3.0	3000	69.5
3.0 to 30	250	48

3.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



3.3. Typical test Setup



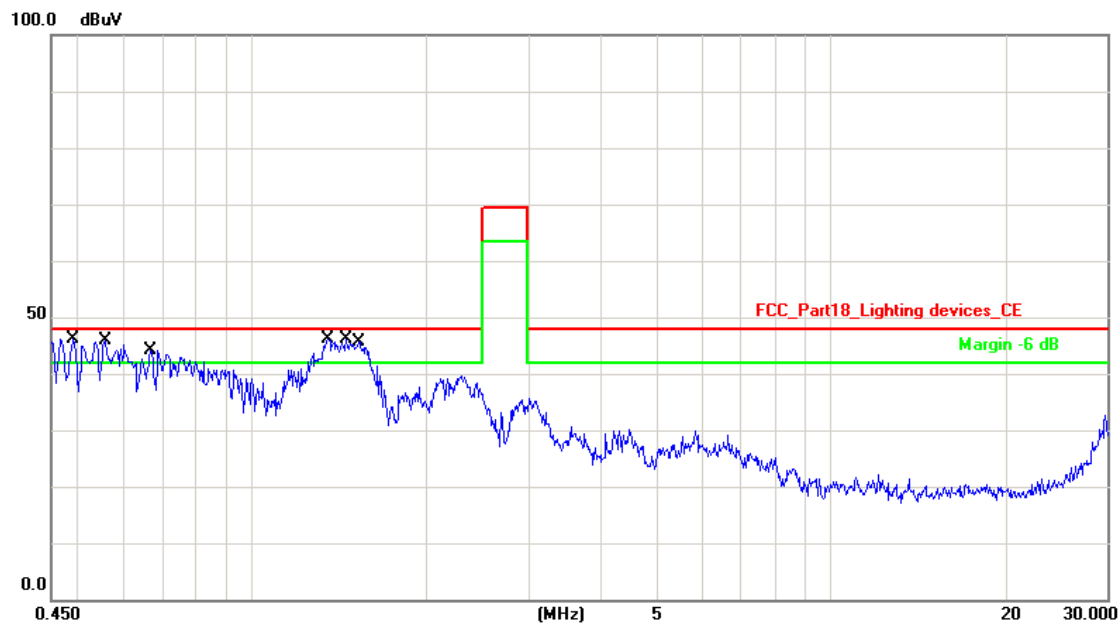
3.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2012.03.12	2013.03.11
AMN	R&S	ESH2-Z5	100182	2012.03.12	2013.03.11
Two-Line V-Network	R&S	ENV216	100325	2012.03.12	2013.03.11
ISN	FCC	FCC-TLISN-T2-02	20379	2011.12.09	2012.12.08
ISN	FCC	FCC-TLISN-T4-02	20380	2011.12.09	2012.12.08
ISN	FCC	FCC-TLISN-T8-02	20381	2011.12.09	2012.12.08
ISN	TESEQ	ISN ST08	30175	2011.09.14	2012.09.13
Current Probe	R&S	EZ-17	100303	2012.03.12	2013.03.11
Passive Voltage Probe	R&S	ESH2-Z3	100026	2012.03.12	2013.03.11
Attenuator	R&S	ESH3-Z2	100529	2012.03.12	2013.03.11
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2012.03.12	2013.03.11



3.5. Test Result and Data

Test Mode :	Mode 1: Full Load		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	22 °C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2012/08/14

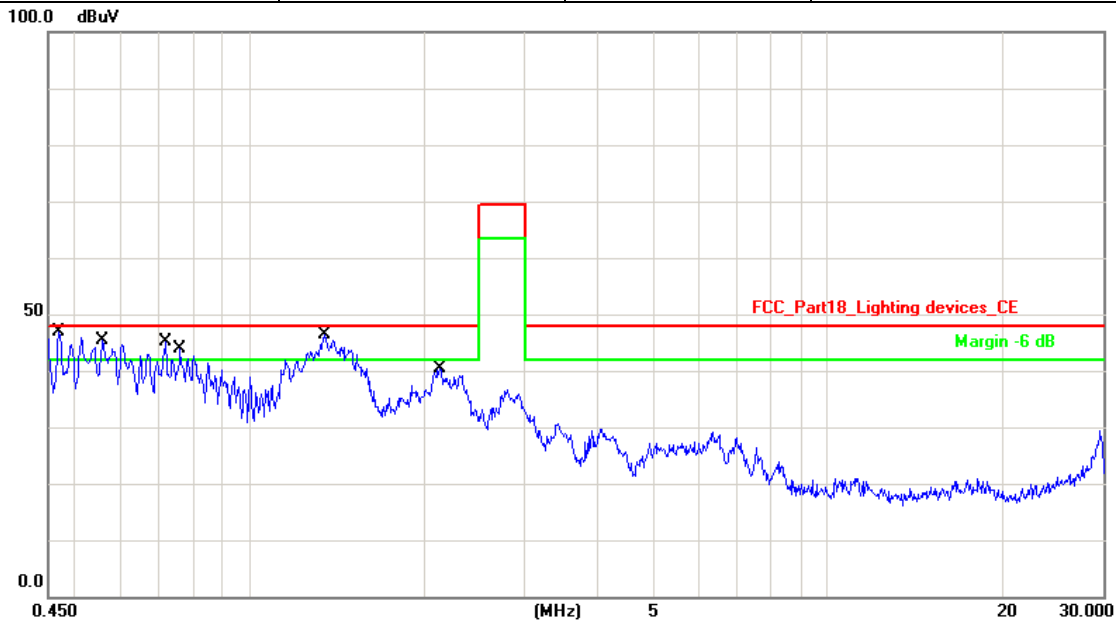


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4900	9.85	33.64	43.49	48.00	-4.51	QP
2	0.4900	9.85	27.88	37.73	48.00	-10.27	AVG
3	0.5580	9.85	32.61	42.46	48.00	-5.54	QP
4	0.5580	9.85	25.63	35.48	48.00	-12.52	AVG
5	0.6700	9.85	30.45	40.30	48.00	-7.70	QP
6	0.6700	9.85	24.57	34.42	48.00	-13.58	AVG
7	1.3540	9.74	33.99	43.73	48.00	-4.27	QP
8	1.3540	9.74	21.87	31.61	48.00	-16.39	AVG
9	1.4540	9.73	32.88	42.61	48.00	-5.39	QP
10	1.4540	9.73	22.00	31.73	48.00	-16.27	AVG
11	1.5300	9.73	30.47	40.20	48.00	-7.80	QP
12	1.5300	9.73	19.35	29.08	48.00	-18.92	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full Load		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	22 °C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2012/08/14



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4700	9.50	34.95	44.45	48.00	-3.55	QP
2	0.4700	9.50	27.43	36.93	48.00	-11.07	AVG
3	0.5580	9.50	33.05	42.55	48.00	-5.45	QP
4	0.5580	9.50	23.37	32.87	48.00	-15.13	AVG
5	0.7180	9.50	30.17	39.67	48.00	-8.33	QP
6	0.7180	9.50	23.85	33.35	48.00	-14.65	AVG
7	0.7620	9.48	31.18	40.66	48.00	-7.34	QP
8	0.7620	9.48	23.15	32.63	48.00	-15.37	AVG
9	1.3580	9.47	33.41	42.88	48.00	-5.12	QP
10	1.3580	9.47	21.49	30.96	48.00	-17.04	AVG
11	2.1420	9.52	27.28	36.80	48.00	-11.20	QP
12	2.1420	9.52	15.63	25.15	48.00	-22.85	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seben



4. Test of Radiated Emission

4.1. Test Limit

The EUT shall meet the limits of below Table when measured at the measuring distance R in accordance with the methods described in FCC part 18 § 18.301 . If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

The field strength levels 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 ¹ 300
	Any Non-ISM frequency	Below 500 500 or more	15 15*SQRT(power/500)	300 ¹ 300
Industrial heaters and RF stabilized arc welders.	On or below 5.725MHz Above 5.725MHz	Any Any	10 (2)	1,1600 (2)
Medical diathermy	Any ISM frequency	Any	25	300
	Any Non-ISM frequency	Any	15	300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2400/F(kHz) 2400/F(kHz)*	300 ³ 300
	490 to 1600 kHz	Any	SQRT(power/500)	30
	Above 1600 kHz	Any	24000/F(kHz) 15	30
Induction cooking ranges .	Below 90 kHz	Any	1500	⁴ 30
	On or above 90 kHz	Any	300	⁴ 30

1 Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

2 Reduced to the greatest extent possible.

3 Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

4 Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.



Frequency (MHz)	Field strength limit at 30 meters ($\mu\text{V/m}$)	Field strength limit at 3 meters (dB $\mu\text{V/m}$)
Non-consumer equip-ment:		
30–88	30	49.5
88-216	50	54
216 –1000	70	56.9
consumer equip-ment:		
30–88	10	40
88-216	15	43.5
216 –1000	20	46

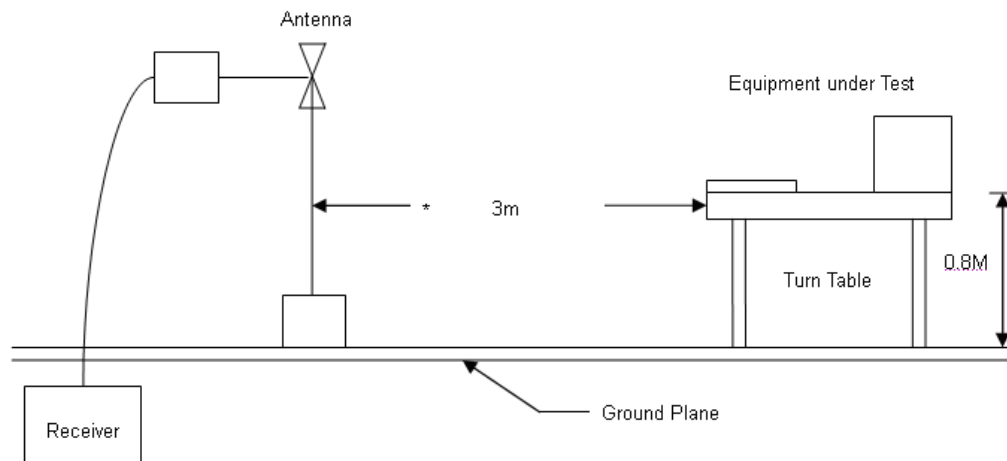
1. The tighter limit shall apply at the boundary between two frequency ranges.
2. Testing for compliance with these limits may be made at closer distances, provided a sufficient number of measurements are taken to plot the radiation pattern, to determine the major lobes of radiation, and to determine 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 an attenuation factor.

4.2. Test Procedures

- a. The EUT was placed on a relatable table top 0.8 meter above ground.
- b. The EUT was set such that distance from the interference receiving antenna to EUT was 10 meters for below 1GHz and 3 meters for above 1GHz. The antenna was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna for below 1GHz and horn antenna for above 1GHz, and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. The bandwidth below 1GHz setting on the strength meter is 120kHz and above 1GHz is 1MHz.



4.3. Typical test Setup



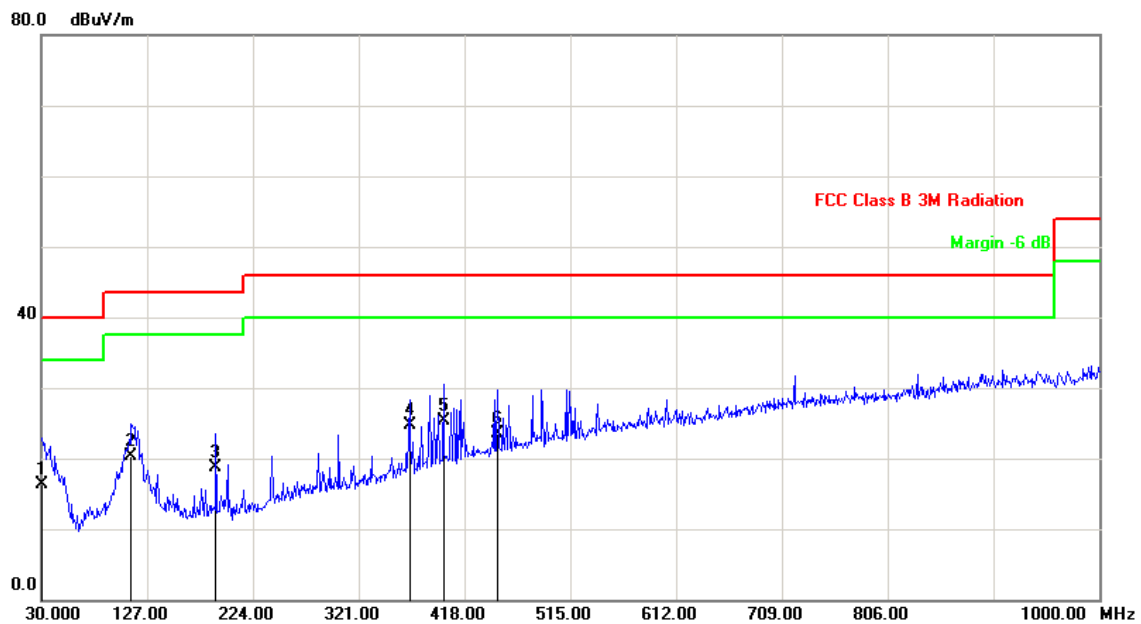
4.4. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	100563	2012.03.12	2013.03.11
H64 Preamplifier	HP	8447F	3113A05582	2012.03.12	2013.03.12
Preamplifier	Agilent	8449B	3008A02342	2012.03.12	2013.03.11
Ultra Broadband Antenna	R&S	HL562	100362	2012.05.03	2013.05.02
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2012.05.03	2013.05.02
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-347	2012.05.15	2013.05.15
Spectrum Analyzer	R&S	FSP40	100324	2012.03.12	2013.03.12
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2012.03.12	2013.03.11



4.5. Test Result and Data

Test Mode :	Mode 1: Full Load		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2012/08/13

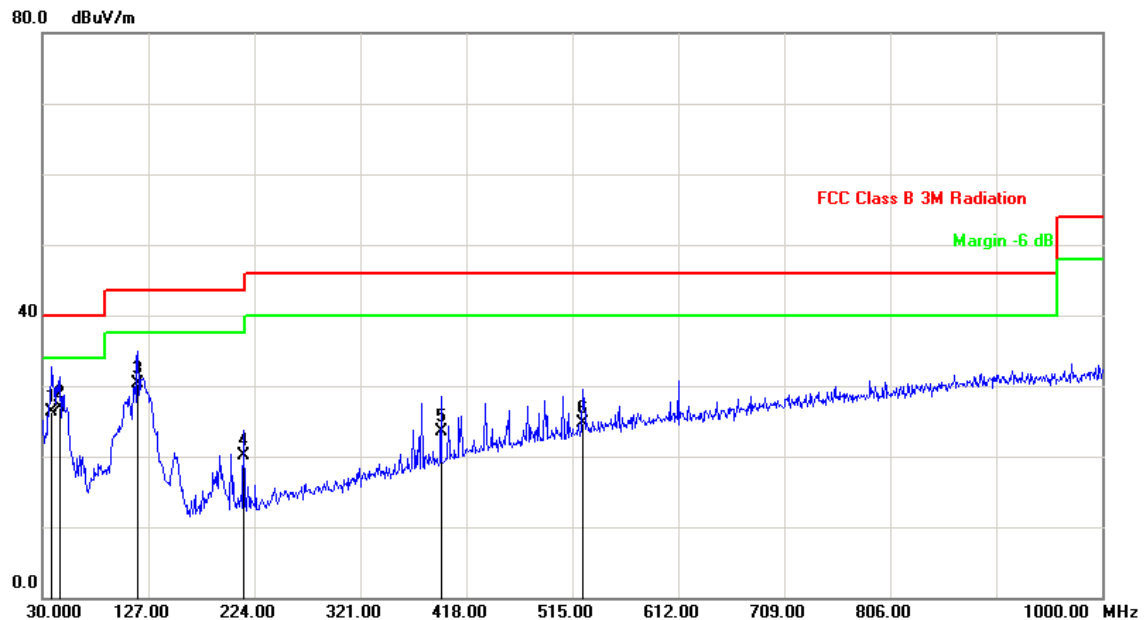


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.9699	-5.58	21.94	16.36	40.00	-23.64	QP	104	0
2	112.4500	-13.95	34.25	20.30	43.50	-23.20	QP	200	164
3	190.0500	-15.46	34.08	18.62	43.50	-24.88	QP	200	112
4	367.5600	-8.62	33.28	24.66	46.00	-21.34	QP	100	274
5	398.6000	-7.61	32.94	25.33	46.00	-20.67	QP	100	252
6	448.0699	-6.23	29.74	23.51	46.00	-22.49	QP	100	242

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full Load		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2012/08/13



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	38.7300	-10.65	36.97	26.32	40.00	-13.68	QP	100	1
2	46.4900	-15.12	41.96	26.84	40.00	-13.16	QP	121	0
3	117.3000	-13.76	43.98	30.22	43.50	-13.28	QP	200	193
4	214.3000	-14.53	34.66	20.13	43.50	-23.37	QP	108	0
5	394.7200	-7.73	31.24	23.51	46.00	-22.49	QP	200	48
6	524.7000	-4.28	28.90	24.62	46.00	-21.38	QP	200	104

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seben