

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E112R-027

AGR No : A100A-163

Applicant : Laserlighting Co., Ltd.  
Address : 606 Human Sky Valley, 959 Gosaek-Dong, Gwonseon-gu, Suwon, Gyeonggi-do, Korea

Manufacturer : Laserlighting Co., Ltd.  
Address : 606 Human Sky Valley, 959 Gosaek-Dong, Gwonseon-gu, Suwon, Gyeonggi-do, Korea

Type of Equipment : Converter for LED Lighting

FCC ID. : Y9D-LLC4850E

Model Name : LLC-0048-ER

Multiple Model Name : LLC-0050-ER

Serial number : None

Total page of Report : 27 pages (including this page)

Date of Incoming : January 11, 2011

Date of issue : February 21, 2011


## SUMMARY

The equipment complies with the regulation; **FCC Part 15 Subpart C Section 15.231.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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## CONTENTS

### PAGE

<b>1. VERIFICATION OF COMPLIANCE .....</b>	<b>4</b>
<b>2. GENERAL INFORMATION .....</b>	<b>5</b>
2.1 PRODUCT DESCRIPTION.....	5
2.2 MODEL DIFFERENCES .....	5
2.3 RELATED SUBMITTAL(S) / GRANT(S) .....	5
2.4 PURPOSE OF THE TEST .....	6
2.5 TEST METHODOLOGY .....	6
2.6 TEST FACILITY .....	6
<b>3. SYSTEM TEST CONFIGURATION .....</b>	<b>7</b>
3.1 JUSTIFICATION .....	7
3.2 PERIPHERAL EQUIPMENT .....	7
3.3 MODE OF OPERATION DURING THE TEST .....	7
3.4. EUT MODIFICATIONS .....	7
3.5 CONFIGURATION OF TEST SYSTEM .....	8
3.6 ANTENNA REQUIREMENT .....	8
<b>4. PRELIMINARY TEST .....</b>	<b>9</b>
4.1 AC POWER LINE CONDUCTED EMISSIONS TESTS .....	9
4.2 GENERAL RADIATED EMISSIONS TESTS .....	9
<b>5. FINAL RESULT OF MEASURMENT .....</b>	<b>10</b>
5.1 CONDUCTED EMISSION TEST .....	10
5.1.1 Operating Condition: Transmitting mode.....	10
5.1.2 Operating Condition: Receiving mode.....	14
5.2 FIELD STRENGTH OF THE CARRIER TEST .....	18
5.3 TRANSMITTER TRANSMISSION DURATION .....	19
5.4 SPURIOUS EMISSION TEST .....	20
5.4.1 Operating Condition: Transmitting mode.....	20
5.4.2 Operating Condition: Receiving mode.....	22
5.5 BANDWIDTH OF THE OPERATING FREQUENCY .....	24
<b>6. FIELD STRENGTH CALCULATION .....</b>	<b>26</b>
<b>7. LIST OF TEST EQUIPMENT .....</b>	<b>27</b>

**Revision History**

Issue Report No.	Issued Date	Revisions	Effect Section
E112R-027	February 21, 2011	Initial Release	All

## 1. VERIFICATION OF COMPLIANCE

Applicant : Laserlighting Co., Ltd.  
Address : 606 Human Sky Valley, 959 Gosaek-Dong, Gwonseon-gu, Suwon, Gyeonggi-do, Korea  
Contact Person : Mr. Ho-Yeon, Lee / Manager  
Telephone No. : +82-31-223-5647  
FCC ID : Y9D-LLC4850E  
Model Name : LLC-0048-ER  
Brand Name : N/A  
Serial Number : N/A  
Date : February 21, 2011

Equipment Class	<b>DSR – Low Power Communications Transmitter</b>
Kind of Equipment	Converter for LED Lighting
This Report Concerns	Original Grant
Measurement Procedures	ANSI C63.4: 2009
Type of Equipment Tested	Pre-Production
Kind of Equipment Authorization Requested	Certification
Equipment Will be operated under FCC Rules Part(s)	FCC PART 15 SUBPART C § 15.231
Modification on the Equipment to Achieve Compliance	Yes
Final Test was conducted on	3 m open area test site

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Product Description

The Laserlighting Co., Ltd., Model: LLC-0048-ER (referred to as the EUT in this report) is a Converter for LED Lighting that has infrared antenna and signal port for slave controller. The EUT received dimming signal from a personal computer through AP and then transports the equal dimming signal to the slave controller. Also the slave controller sends information of state to the EUT after working. The EUT gathers a status value of slave controllers and sends to PC through AP. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
TRANSMITTING FREQUENCY	433.92 MHz
MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1 MHz)	26 MHz and 7.372 8 MHz
ANTENNA TYPE	External Dipole Antenna
TRANSMISSION TIME	Not longer than 5 s
RATED SUPPLY VOLTAGE	LLC-0048-ER: 100-240 V~, MAX 0.5 A, 50/60 Hz, 48 W LLC-0050-ER: 100-240 V~, MAX 0.5 A, 50/60 Hz, 52 W
NUMBER OF LAYERS	2 Layers

### 2.2 Model Differences

-. The following lists consist of the added model name and their differences.

Model Name	Differences	Tested
LLC-0048-ER	Basic Model	<input checked="" type="checkbox"/>
LLC-0050-ER	This model is identical to basic model but used LED module is different.	<input type="checkbox"/>

*Note: 1. Applicant consigns only basic model to test, therefore this test report just guarantees the units which have been tested.*

*2. The Applicant/manufacture is responsible for the compliance of all variants.*

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

## 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 15.231.

## 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2009. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

## 2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. Description details of test facilities were submitted to the Commission on August 21, 2008. (Registration Number: 340658)

### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	Laserlighting Co., Ltd.	LL-10P	N/A
Control Board	Laserlighting Co., Ltd.	LL-10A	N/A
Driver Board	N/A	N/A	N/A
RF Board	N/A	N/A	N/A

#### 3.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
LLC-0048-ER	Laserlighting Co., Ltd.	Y9D-LLC4850E	Converter for LED Lighting (EUT)	-
LLC-0048-EN	Laserlighting Co., Ltd.	N/A	Converter for LED Lighting (Without wireless function)	EUT
N/A	Laserlighting Co., Ltd.	N/A	IR Remote Controller	N/A
N/A	N/A	N/A	LED Module	EUT

#### 3.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting mode is programmed.

The EUT has signal cable will be connected to another converter without wireless function, so the cable was connected to the converter and infrared antenna was connected to the EUT.

The EUT has 2 kinds of input wattage and divided model number by the wattage, so each model was tested and recorded the worst data in this report.

#### 3.4. EUT MODIFICATIONS

- A GND pattern was added on between C15(GND) and HS4 pin(Q12).
- A Y-capacitor was re-located from C8 to C9.
- A capacity of X-capacitor(C1) was changed from 0.1 uF to 0.47 uF.
- A discharged register(680 k, 1 W) was added on the both side of AC input line.

### 3.5 Configuration of Test System

**Line Conducted Test:** The EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line conducted emission test was performed by using the procedure in ANSI C63.4: 2009 7.3.3 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2009 8.3.1.1 and 13.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

**Occupied Bandwidth Measurement:**

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer. The plot is taken at 20 kHz/division frequency span, 10 kHz resolution bandwidth and 5 dB/division logarithmic display from the spectrum analyzer.

### 3.6 Antenna Requirement

According to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

**Antenna Construction:**

The antenna of the EUT shall be molded with the cover of the EUT at the manufacturer side, so no consideration of replacement by the user.



## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
RX Mode	-
TX Mode	X

### 4.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
RX Mode	-
TX Mode	X

## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 Conducted Emission Test

#### 5.1.1 Operating Condition: Transmitting mode

##### 5.1.1.1 Test data for LLC-0048-ER(48 W)

Humidity Level : 40 % R.H. Temperature: 23.4 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231  
 Type of Test : INTENTIONAL RADIATOR  
 Result : PASSED BY -13.12 dB at 3.72 MHz

EUT : Converter for LED Lighting Date: January 24, 2011  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBμV)		Margin (dB)
		Emission level	Limits	
0.20	N	50.03	63.61	-13.58
1.45	H	39.60	56.00	-16.40
1.80	N	40.63	56.00	-15.37
3.43	N	41.57	56.00	-14.43
3.71	H	42.21	56.00	-13.79
3.72	N	42.88	56.00	-13.12
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
-				
-				

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral Line

Average mode was not measured, because peak values were under the average limit.

See next page for an overview sweep performed with peak detector.



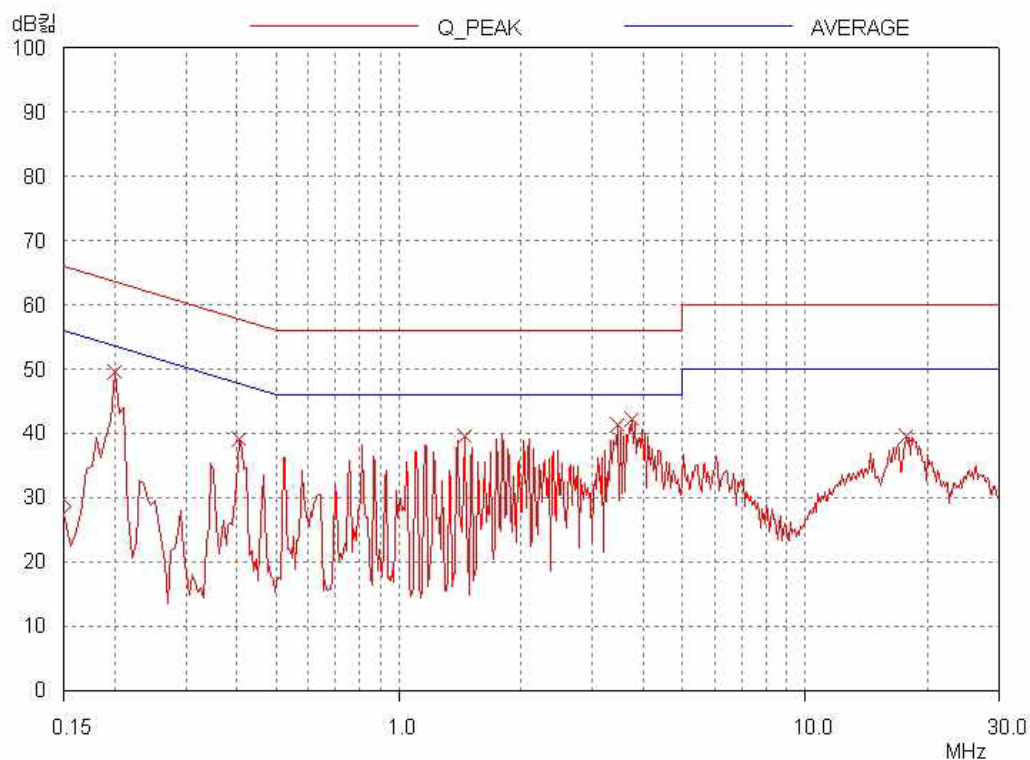
Tested by: Seung-Sik, Kim / Engineer

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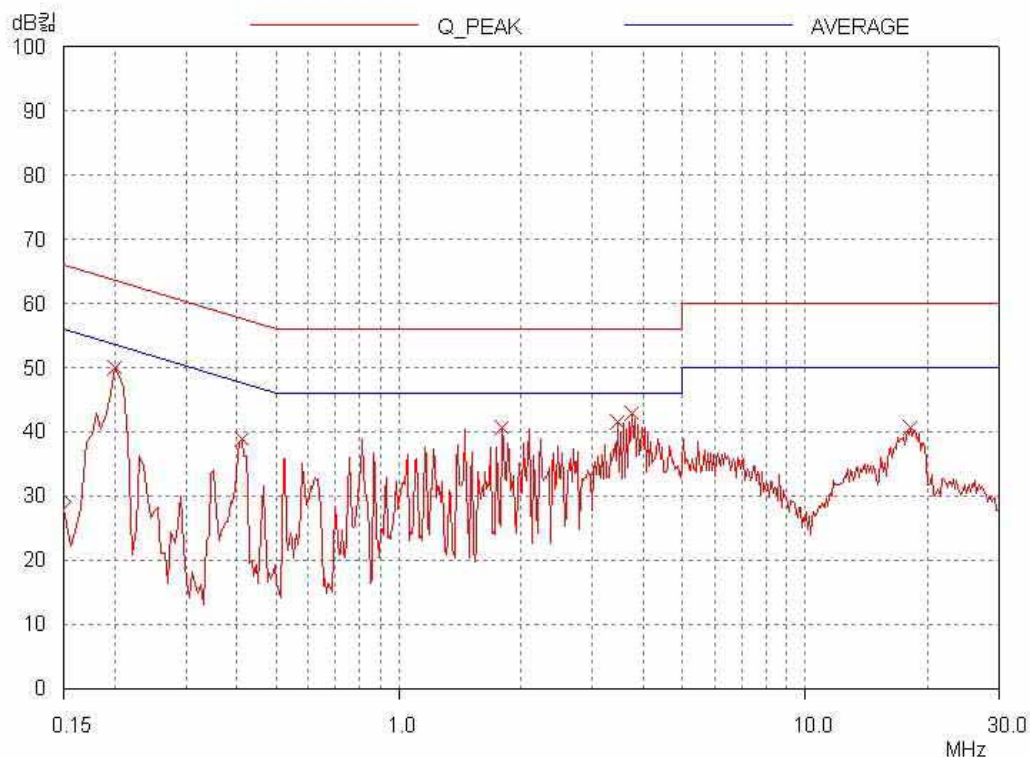
EMC-003(Rev.1)

HEAD OFFICE : #505 SK Apt. Factory, 223-28 Sangdaewon 1-dong, Jungwon-gu, Seongnam-si, Gyeonggi-do 462-121 Korea  
 (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea.(TEL: 82-31-765-8289 FAX: 82-31-766-2904)



### HOT LINE



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### 5.1.1.2 Test data for LLC-0050-ER(52 W)

Humidity Level : 40 % R.H.

Temperature: 23.4 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231

Type of Test : INTENTIONAL RADIATOR

Result : PASSED BY -13.12 dB at 3.78 MHz

EUT : Converter for LED Lighting

Date: January 24, 2011

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBμV)		Margin (dB)
		Emission level	Limits	
0.20	H	49.99	63.61	-13.62
0.81	H	40.04	56.00	-15.96
2.09	N	41.14	56.00	-14.86
3.72	N	42.11	56.00	-13.89
3.78	H	42.88	56.00	-13.12
3.95	N	42.07	56.00	-13.93
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
-				
-				

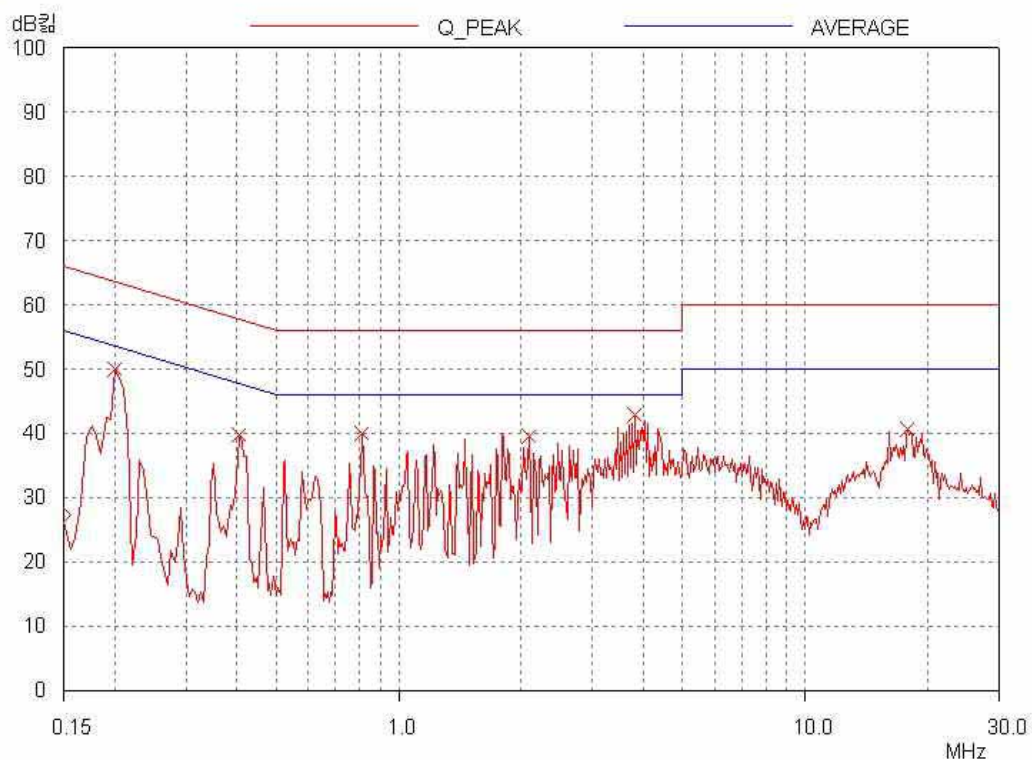
Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral Line

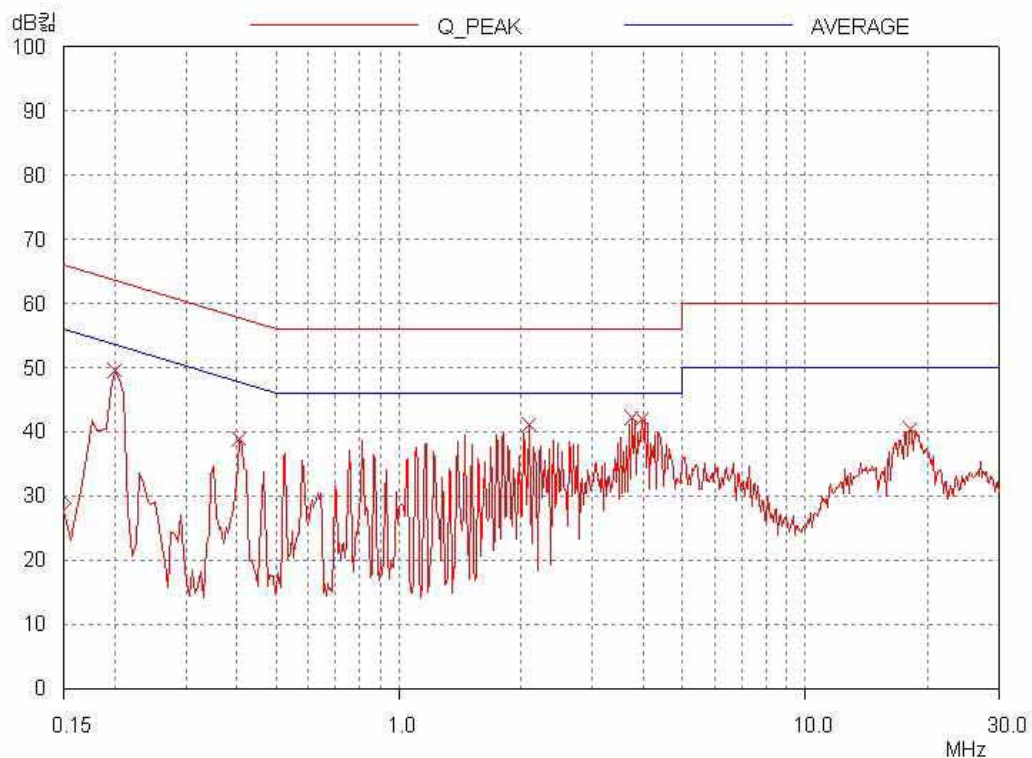
Average mode was not measured, because peak values were under the average limit.

See next page for an overview sweep performed with peak detector.

  
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## 5.1.2 Operating Condition: Receiving mode

### 5.1.2.1 Test data for LLC-0048-ER(48 W)

Humidity Level : 40 % R.H.

Temperature: 23.4 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231

Type of Test : INTENTIONAL RADIATOR

Result : PASSED BY -13.78 dB at 3.75 MHz

EUT : Converter for LED Lighting

Date: January 24, 2011

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBμV)		Margin (dB)
		Emission level	Limits	
0.77	H	38.68	56.00	-17.32
1.05	N	40.34	56.00	-15.66
1.84	H	39.36	56.00	-16.64
3.66	N	40.56	56.00	-15.44
3.75	H	42.22	56.00	-13.78
9.02	N	42.90	60.00	-17.10
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
-				
-				

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral Line

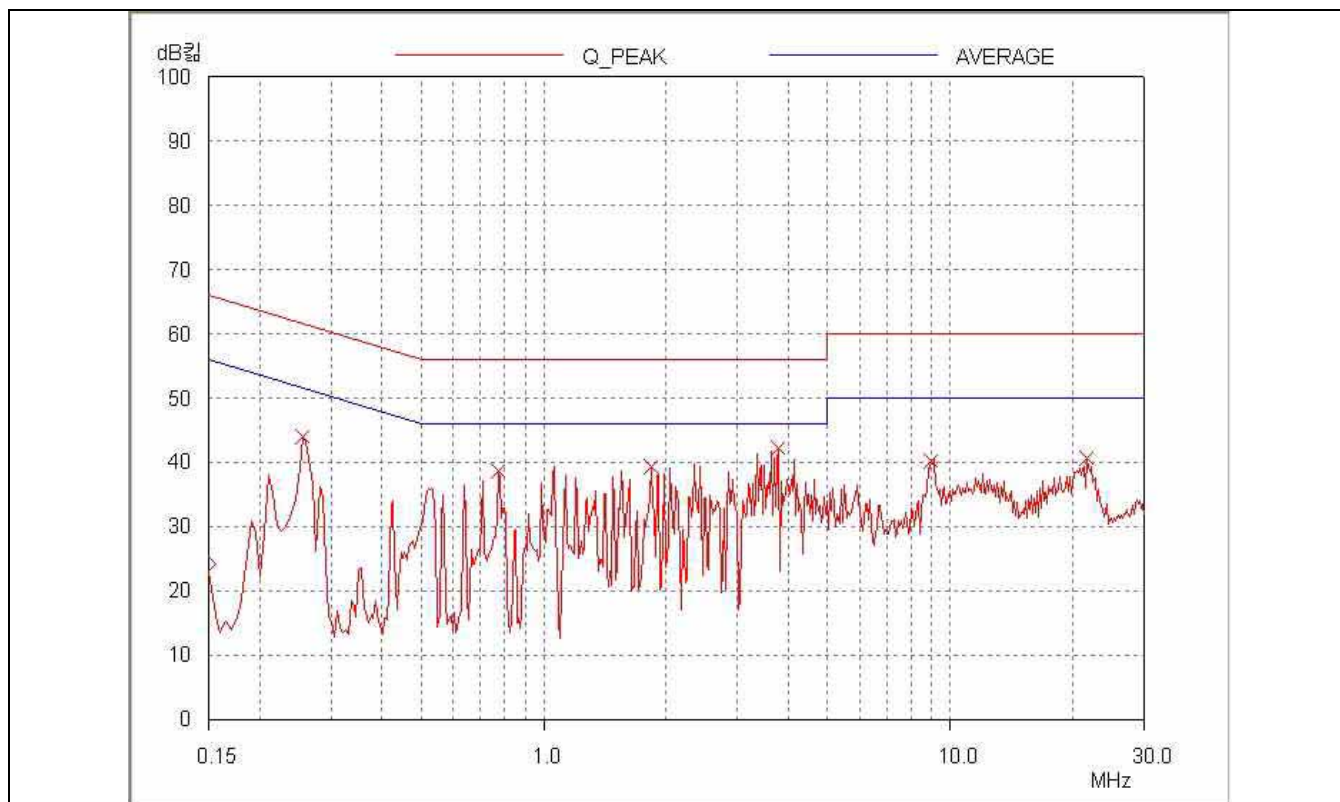
Average mode was not measured, because peak values were under the average limit.

See next page for an overview sweep performed with peak detector.

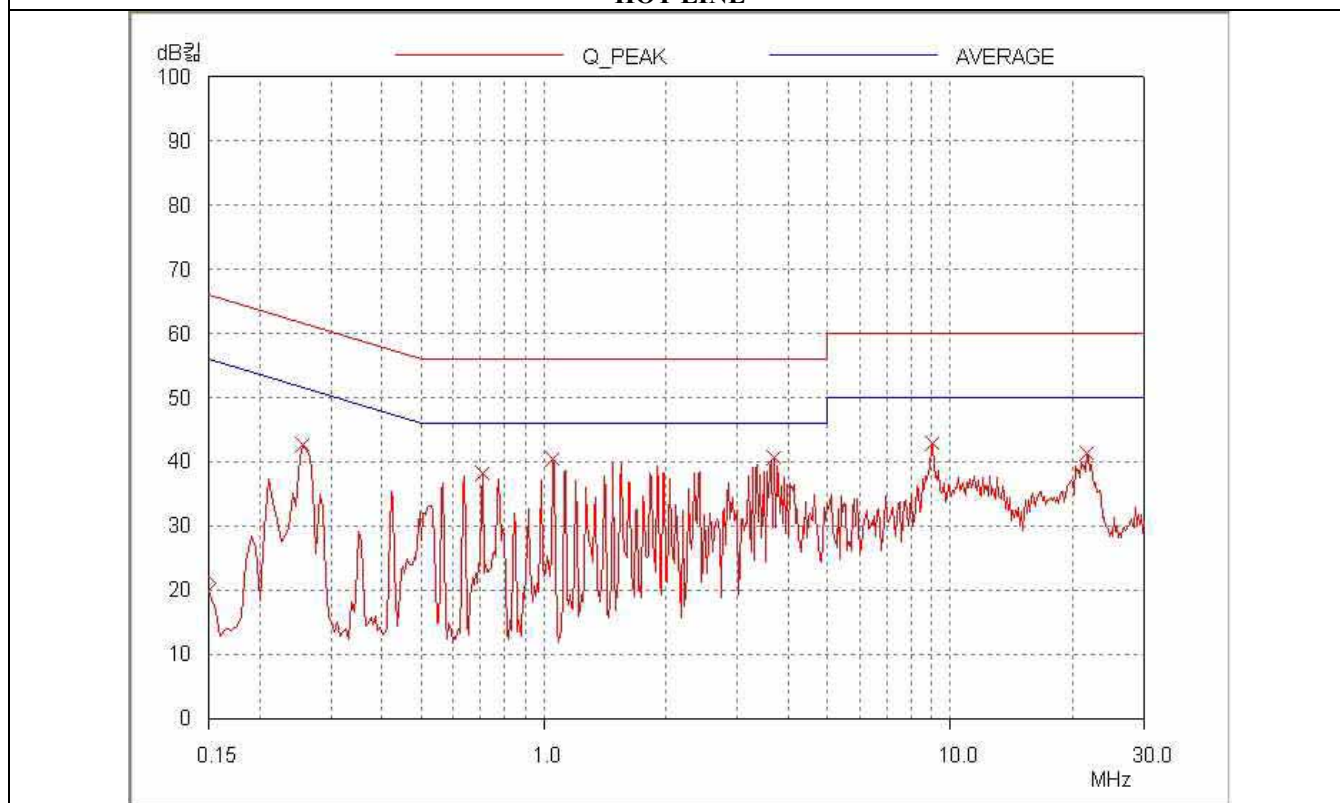


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### 5.1.2.2 Test data for LLC-0050-ER(52 W)

Humidity Level : 40 % R.H.

Temperature: 23.4 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231

Type of Test : INTENTIONAL RADIATOR

Result : PASSED BY -14.10 dB at 3.77 MHz

EUT : Converter for LED Lighting

Date: January 24, 2011

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBμV)		Margin (dB)
		Emission level	Limits	
0.26	N	43.44	61.43	-17.99
1.56	N	40.60	56.00	-15.40
1.62	H	39.35	56.00	-16.65
3.52	H	39.76	56.00	-16.24
3.77	N	41.90	56.00	-14.10
8.94	H	42.16	60.00	-17.84
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
-				
-				

Line Conducted Emission Tabulated Data

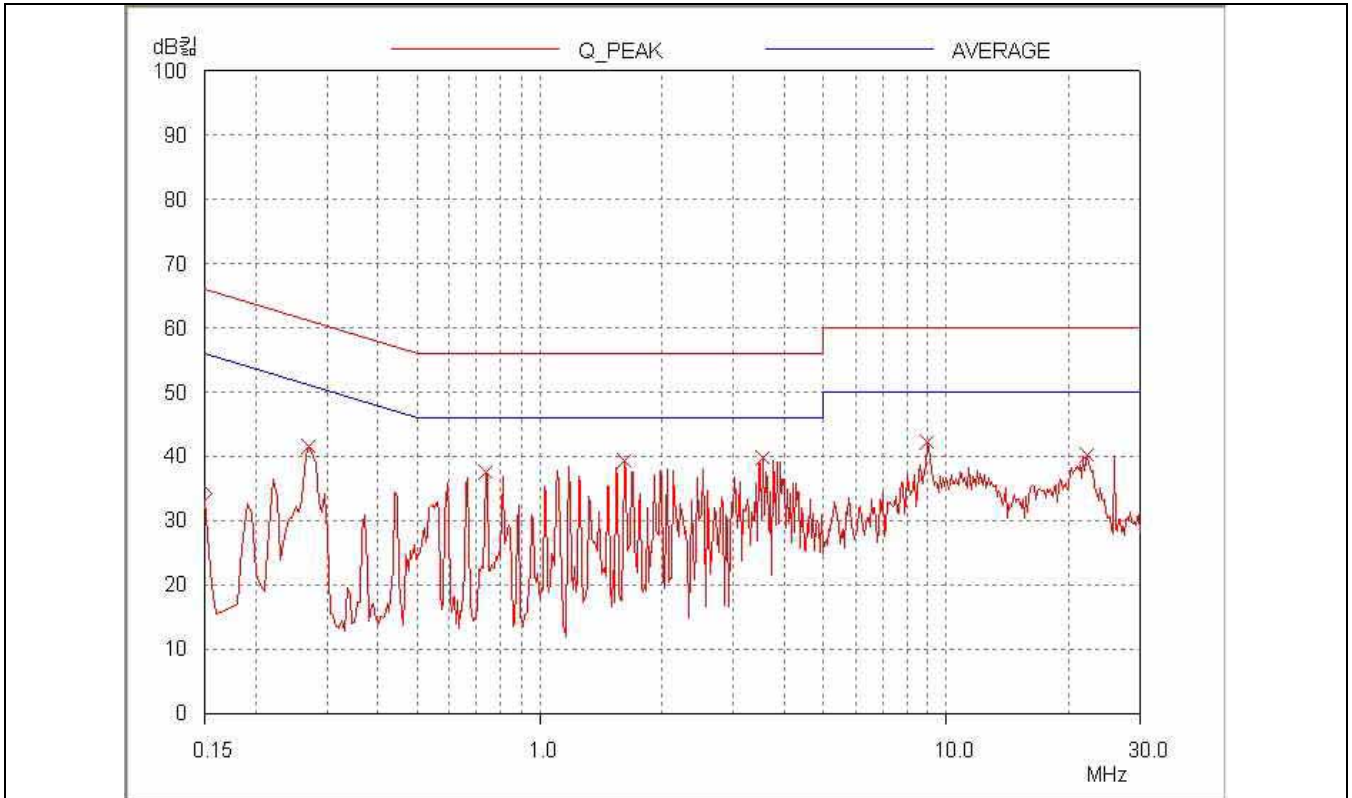
Remark : "H": Hot Line, "N": Neutral Line

Average mode was not measured, because peak values were under the average limit.

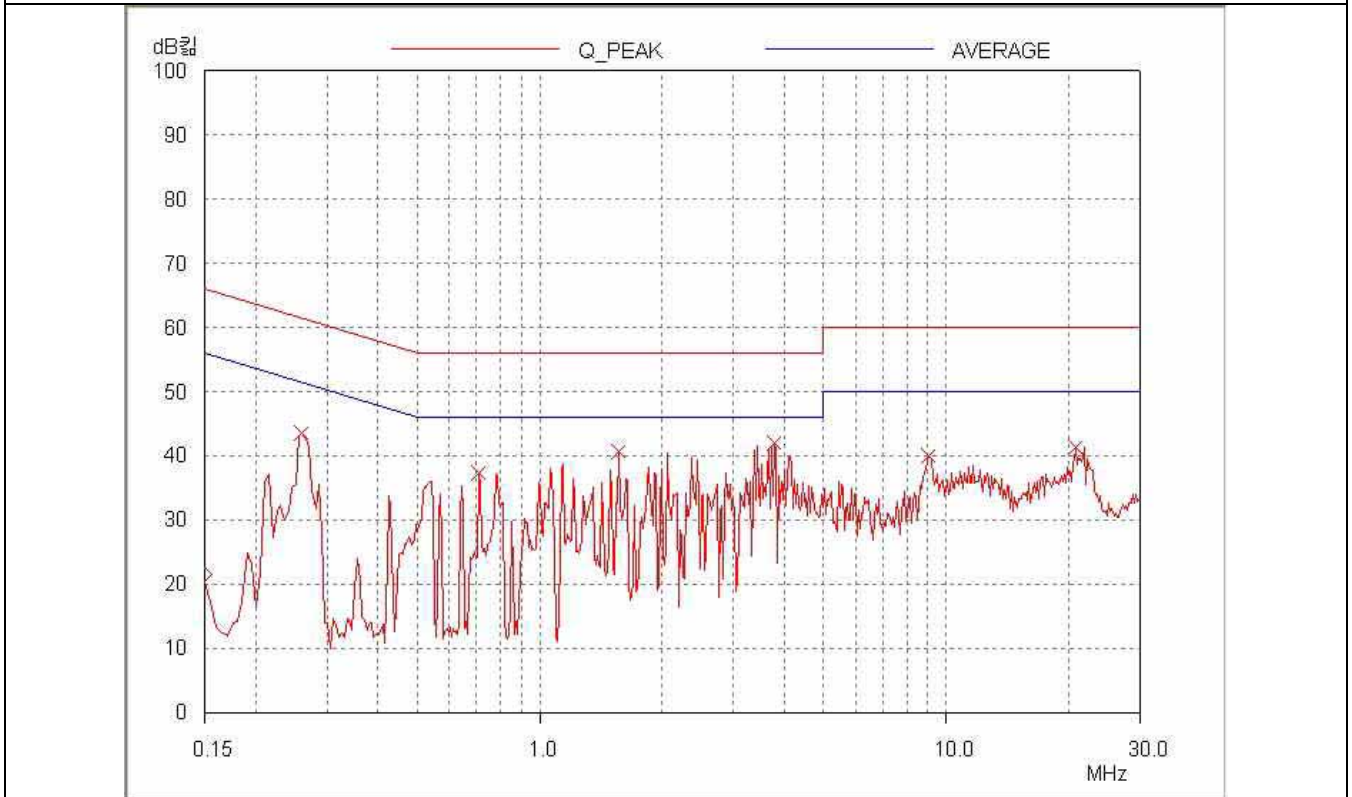
See next page for an overview sweep performed with peak detector.

  
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## 5.2 Field Strength of the Carrier Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 38 % R.H. Temperature: 23 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231  
 Type of Test : INTENTIONAL RADIATOR  
 Result : PASSED BY -6.06 dB

EUT : Converter for LED Lighting Date: January 21, 2011  
 Operating Condition : TX mode  
 Distance : 3 m

Radiated Emission			Ant		Turn	Correction Factors		Total	Limit	Margin
Freq. (MHz)	Amplitude (dBμV)	Detect Mode	Pol.	Height (m)	Table (°)	Ant. (dBμV/m)	Cable (dB)	Amplitude (dBμV/m)	(dBμV/m)	(dB)
433.92	52.30	Peak	H	1.30	280.00	18.10	4.37	74.77	100.83	-26.06
	48.30	Peak	V	1.60	350.00	18.10	4.37	70.77	100.83	-30.06
	50.80	Average	H	1.30	280.00	18.10	4.37	73.27	80.83	-7.56
	45.30	Average	V	1.60	350.00	18.10	4.37	67.77	80.83	-13.06
867.84	14.30	Peak	H	1.50	230.00	22.93	7.14	44.37	80.83	-36.46
	16.40	Peak	V	1.20	130.00	22.93	7.14	46.47	80.83	-34.36
	12.30	Average	H	1.50	230.00	22.93	7.14	42.37	60.83	-18.46
	14.00	Average	V	1.20	130.00	22.93	7.14	44.07	60.83	-16.76

Remark: "H": Horizontal Polarization, "V": Vertical Polarization

  
 Tested by: Seung-Sik, Kim / Engineer

### 5.3 Transmitter Transmission Duration

Humidity Level : 38 % R.H.

Temperature: 23 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (a)

Type of Test : INTENTIONAL RADIATOR

EUT : Converter for LED Lighting

Date: January 21, 2011

Operating Condition : TX mode

Manually Activated Duration (s)	Limit (s)	Margin (s)	Result
0.333	5.0	-4.667	Pass

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## 5.4 Spurious Emission Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

### 5.4.1 Operating Condition: Transmitting mode

#### 5.4.1.1 Test data for LLC-0048-ER(48 W)

Humidity Level : 34 % R.H. Temperature: 15 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)  
Type of Test : INTENTIONAL RADIATOR  
Detector Mode : Peak mode  
Result : PASSED BY -5.20 dB at 47.70 MHz


EUT : Converter for LED Lighting

Date: January 21, 2011

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
47.70	21.30	V	1.00	200.00	11.80	1.70	34.80	40.00	-5.20
53.90	22.40	V	1.00	150.00	10.32	1.54	34.26	40.00	-5.74
82.40	23.10	V	1.00	250.00	6.55	2.10	31.75	40.00	-8.25
111.60	19.30	V	1.00	230.00	12.24	2.43	33.97	43.52	-9.55
174.40	15.50	H	1.50	180.00	16.03	2.98	34.51	43.52	-9.01
256.10	16.30	H	1.40	230.00	17.66	3.40	37.36	46.02	-8.66
Other spurious frequencies were not found up to 4 340 MHz.									

\*Remark: "H": Horizontal Polarization, "V": Vertical Polarization



Tested by: Seung-Sik, Kim / Engineer

### 5.4.1.2 Test data for LLC-0050-ER(52 W)

Humidity Level : 34 % R.H. Temperature: 15 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)  
 Type of Test : INTENTIONAL RADIATOR  
 Detector Mode : Peak mode  
 Result : PASSED BY -5.53 dB at 47.80 MHz

EUT : Converter for LED Lighting

Date: January 21, 2011

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
47.80	21.00	V	1.00	200.00	11.77	1.70	34.47	40.00	-5.53
54.10	21.50	V	1.00	150.00	10.29	1.54	33.33	40.00	-6.67
82.40	24.00	V	1.00	220.00	6.55	2.10	32.65	40.00	-7.35
111.50	18.50	V	1.00	230.00	12.22	2.43	33.15	43.52	-10.37
174.50	16.50	H	1.40	180.00	16.03	2.98	35.51	43.52	-8.01
256.20	18.40	H	1.60	260.00	17.67	3.40	39.47	46.02	-6.55
Other spurious frequencies were not found up to 4 340 MHz.									

\*Remark: "H": Horizontal Polarization, "V": Vertical Polarization



Tested by: Seung-Sik, Kim / Engineer

## 5.4.2 Operating Condition: Receiving mode

### 5.4.2.1 Test data for LLC-0048-ER(48 W)

Humidity Level : 34 % R.H. Temperature: 15 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)  
Type of Test : INTENTIONAL RADIATOR  
Detector Mode : Peak mode  
Result : PASSED BY -6.11 dB at 53.82 MHz

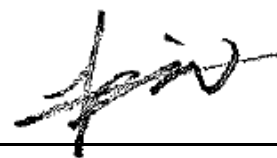
EUT : Converter for LED Lighting

Date: January 21, 2011

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
46.70	20.00	V	1.00	200.00	12.18	1.70	33.88	40.00	-6.12
53.82	22.00	V	1.00	140.00	10.34	1.55	33.89	40.00	-6.11
82.40	23.00	V	1.00	235.00	6.55	2.10	31.65	40.00	-8.35
111.50	19.00	V	1.00	230.00	12.22	2.43	33.65	43.52	-9.87
173.30	16.30	H	1.80	160.00	15.97	2.93	35.20	43.52	-8.32
256.20	16.40	H	1.40	240.00	17.67	3.40	37.47	46.02	-8.55
Other spurious frequencies were not found up to 4 340 MHz.									

\*Remark: "H": Horizontal Polarization, "V": Vertical Polarization



Tested by: Seung-Sik, Kim / Engineer

#### 5.4.2.2 Test data for LLC-0050-ER(52 W)

Humidity Level : 34 % R.H. Temperature: 15 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)  
Type of Test : INTENTIONAL RADIATOR  
Detector Mode : Peak mode  
Result : PASSED BY -7.19 dB at 49.55 MHz

EUT : Converter for LED Lighting

Date: January 21, 2011

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
49.55	20.00	V	1.00	130.00	11.11	1.70	32.81	40.00	-7.19
60.02	21.60	V	1.00	170.00	9.35	1.60	32.55	40.00	-7.45
108.24	20.70	V	1.00	100.00	11.68	2.38	34.76	43.52	-8.76
117.31	19.00	v	1.00	130.00	13.19	2.55	34.74	43.52	-8.78
119.75	18.30	V	1.00	180.00	13.60	2.60	34.50	43.52	-9.02
173.40	16.70	H	1.00	170.00	15.98	2.94	35.62	43.52	-7.90
Other spurious frequencies were not found up to 4 340 MHz.									

\*Remark: "H": Horizontal Polarization, "V": Vertical Polarization



Tested by: Seung-Sik, Kim / Engineer

### 5.5 Bandwidth of the operating frequency

Humidity Level : 38 % R.H. Temperature: 23 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231  
Type of Test : INTENTIONAL RADIATOR  
Result : PASSED

EUT : Converter for LED Lighting Date: January 21, 2011  
Operating Condition : TX mode  
Minimum Resolution  
Bandwidth : 1 kHz

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
433.92	9.25	1 084.80	<u>The point 20 dB down from the modulated carrier</u>

Remark: Please refer to Photo Data for bandwidth for test data.



Tested by: Seung-Sik, Kim / Engineer



Photo Data for bandwidth



## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dB $\mu$ V)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/m)
=	Corrected Reading	(dB $\mu$ V/m)
-	Specification Limit	(dB $\mu$ V/m)
=	dB Relative to Spec	( $\pm$ dB)

## 7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVD	838453/018	OCT/10	12MONTH	■
	Test receiver	R/S	ESU	100261	OCT/10	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/10	12MONTH	■
3.	Spectrum analyzer	HP	8566B	2421A00473	NOV/10	12MONTH	■
4.	Loop Antenna	R/S	HFH 2-Z2	889 285 / 26	NOV/10	24MONTH	
5.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 202	MAY/10	24MONTH	
6.	Biconical antenna	EMCO	3110	9003-1121	FEB/10	24MONTH	
		Schwarzbeck	VHA9103	91031852	MAR/10		■
7.	Log Periodic antenna	Schwarzbeck	9108-A(494)	62281001	MAR/10	24MONTH	■
8.	LISN	EMCO	3825/2	9109-1867	JUN/10	12MONTH	
				9109-1869	JUN/10		
		Schwarzbeck	NSLK 8128	8128-216	JUN/10		■
9.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
10.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
11.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■
12.	RF Amplifier	HP	8447D	2727A04987	JUN/10	12MONTH	■
13.	Horn Antenna	Schwarzbeck	BBHA9120D	BBHA9120D294	JUL/09	24MONTH	■
14.	Spectrum Analyzer	HP	8564E	3650A00756	JUN/10	12MONTH	■
15.	Isolation Transformer	Digitel Power	DPT	DPF-22027	N/A	N/A	■
16.	Isolation Transformer	Digitel Power	DPT	DPF-22028	N/A	N/A	■
17.	Frequency Converter	Digitel Power	VFS/DEFC	N/A	N/A	N/A	■