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Job Number:	1001123868
Project Number:	09CA27231
File Number:	MC16119
Date:	27 August 2009
Model:	LEC2400 and LRC2400
FCC ID:	XLB LRC-2400
Industry Canada ID:	8487A-LRC2400

Electromagnetic Compatibility Test Report

For

DOURBAL ELECTRIC INC

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Job Number: 1001123868 File Number: MC16119 Page 2 of 47
Model Number: LEC 2400-1 and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.
1285 Walt Whitman Rd.
Melville, NY 11747**

Tests Performed For: **DOURBAL ELECTRIC INC
SUITE 501-295
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PLAINSBORO, NJ 08536**

Applicant Contact: **PAUL DOURBAL**
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Test Report Date: **27 August 2009**

Product Type: **Luminaire Electronic Cap and Luminaire Remote Control**

Product standards: **FCC Part 15, Subpart C, 15.231, RSS-210, RSS-GEN**

Model Number: **LEC 2400 and LRC 2400**

Sample Serial Number: **Prototype**

EUT Category: **Periodic Low Power Transmitter**

Testing Start Date: **19 June 2009**

Date Testing Complete: **25 August 2009**

Overall Results: Compliant

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, NIST, A2LA, or any agency of the US government.

This report may contain test results that are not covered by the NVLAP or A2LA accreditation. The scope of accreditation is limited to the specific tests that are listed on the NVLAP and/or A2LA websites referenced at the end of this report.

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Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	-	-

1.0 GENERAL - Product Description

1.1 Equipment Description

The Luminaire control remotely controls battery powered flashlight such as "SureFire", "XenonLife", "LedWave", "Tactical", "Walther", etc.

The set consists of the following 2 components:
universal "electronic" cap with the standard attachment to the typical flashlights; wireless remote control module.

The flashlight can be turned ON or OFF either by pressing buttons on the remote control module or pressing a button on the "electronic" cap.

Universal "electronic" cap and remote control module have unique identification addresses permanently stored in their flash memory units at the time of production. Components from different sets are not compatible.

Remote control unit is powered by one type CR1632 lithium battery. When the battery is discharged, it must be replaced.

Per FCC Part 2.1093 (C) this device is not required to undergo testing for radio-frequency radiation exposure.

Antenna description: It is a permanently attached to the RF circuit board and the transmit antenna type is a PCB trace antenna.

1.2 Equipment Marking Plate

Not Applicable

1.3 Device Configuration During Test

The EUT orientation during the evaluation was deemed the worst-case emissions orientation.

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Luminaire Electronic Cap	DOURBAL ELECTRIC INC	LEC 2400	Receiver flashlight
EUT	Luminaire Remote Control	DOURBAL ELECTRIC INC	LRC 2400	Transmitter
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.3.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	DC	NO	NO	3 Volt Lithium Battery
Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

1.3.3 EUT Internal Operating Frequencies:

Frequency (MHz)	Description
27	Oscillator/Clock
2400	Operating frequency

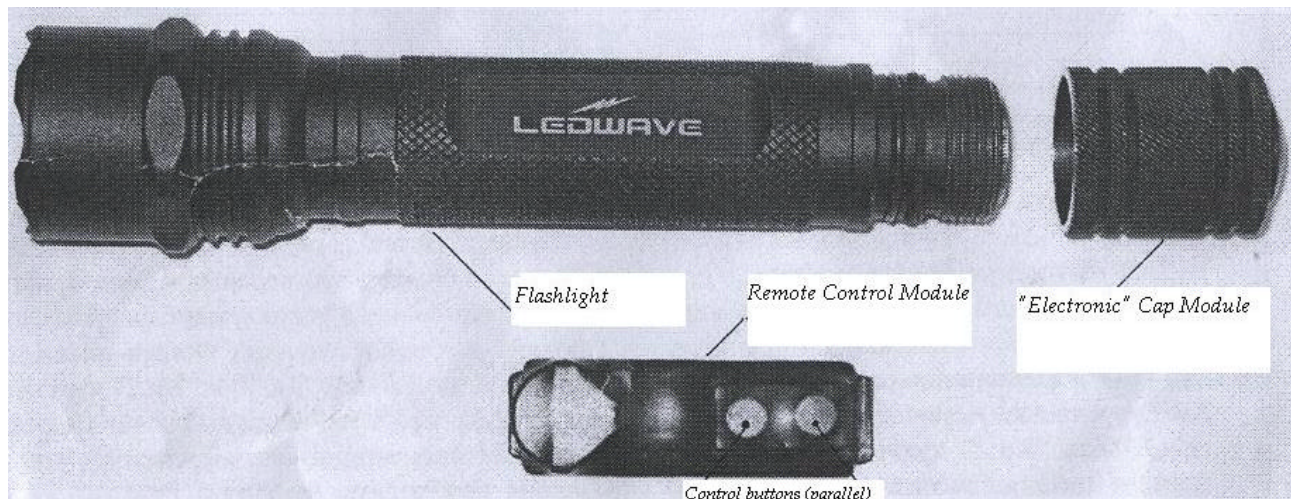
1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	Battery Operated	0.03	-	DC	-	Lithium Battery

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1.4 Diagram:

The diagram below illustrates the configuration of the equipment above.



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1.5 EUT Configurations

Mode #	Description
1	EUT is constantly transmitting packets (CW)
2	EUT is transmitting as intended modulation GFSK
3	EUT is in receive mode where flashlight is illuminated at is highest intensity (worst case).

1.6 EUT Operation Modes

Mode #	Description
1	Transmit CW
2	Transmit packets
3	Receiver

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
CFR 47	FCC Part 15, Subpart C, 15.31, 15.35, 15.207 & 15.209, & 15.231	2008
CFR 47	FCC Part 15, Subpart B, Class B Radio Frequency Devices	2008
ICES-003, Issue 4	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard: Digital Apparatus	2003
RSS- 210, Issue 7	Low-power License-exempt Radio communications Devices (All Frequency Bands): Category I Equipment sets out certification requirements for low-power license- exempt radio communication devices that are Category I equipment.	2008
RSS-GEN, Issue 2	General Requirements and Information for the Certification of Radio communication equipment.	2008

2.4 Results Summary

The transmitter is a low power periodic operating device.

Requirement – Test	Result
Fundamental Emissions	Compliant
Spurious Radiated Emissions 9KHz – 24GHz	Compliant
Pulse Train Measurement	Compliant
Occupied Bandwidth 20dB	Compliant
Occupied Bandwidth 99%	Compliant
Pulse Train - Averaging Factor	Compliant
Cease Operation	Compliant
Radiated Emissions – Unintentional 30-12000MHz	Compliant

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Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Test Engineer:



Joe Danisi (Ext.23055)
Lead Engineering Associate
International EMC Services
Conformity Assessment Services -

Reviewer:



Bob DeLisi (Ext.22345)
Senior Staff Engineer
International EMC Services
Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

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4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

----- United States -----

FCC Part 15, Subpart C, 15.207, 15.209, & 15.231	Code of Federal Regulations, Part 15, and Subpart C, Radio Frequency Devices: 2007.
FCC Part 15, Subpart B, 15.107 & 15.109	Code of Federal Regulations, Part 15, and Subpart B, Radio Frequency Devices: 2007.

----- Industry Canada -----

Radio Standards Specification 210, Issue 7	Low-power License-exempt Radio communications Devices (All Frequency Bands): Category I Equipment sets out certification requirements for low-power license- exempt radio communication devices that are Category I equipment. 2008
RSS-GEN, Issue 2	General Requirements and Information for the Certification of Radio communication Equipment.
ICES-003, Issue 4	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard: Digital Apparatus. 2004

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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4.1 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.		
Basic Standard		FCC Part 15 Subpart C Section 15.231	
Occupied Bandwidth Limits			
12MHz			

Table 1 Occupied Bandwidth Configuration Settings

Power Interface	EUT Configurations	EUT Operation
1	2	2
Supplementary information: None		

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth (MHz)	Occupied Bandwidth Requirements	
	dBc	%
0.1	-20	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Double Ridge Guide Antenna	EMCO	RGA-180	5565
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Multimeter	Fluke	87V	44547

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Figure 1 Test Setup for Occupied Bandwidth



Figure 2 Occupied Bandwidth Graph 20dB down

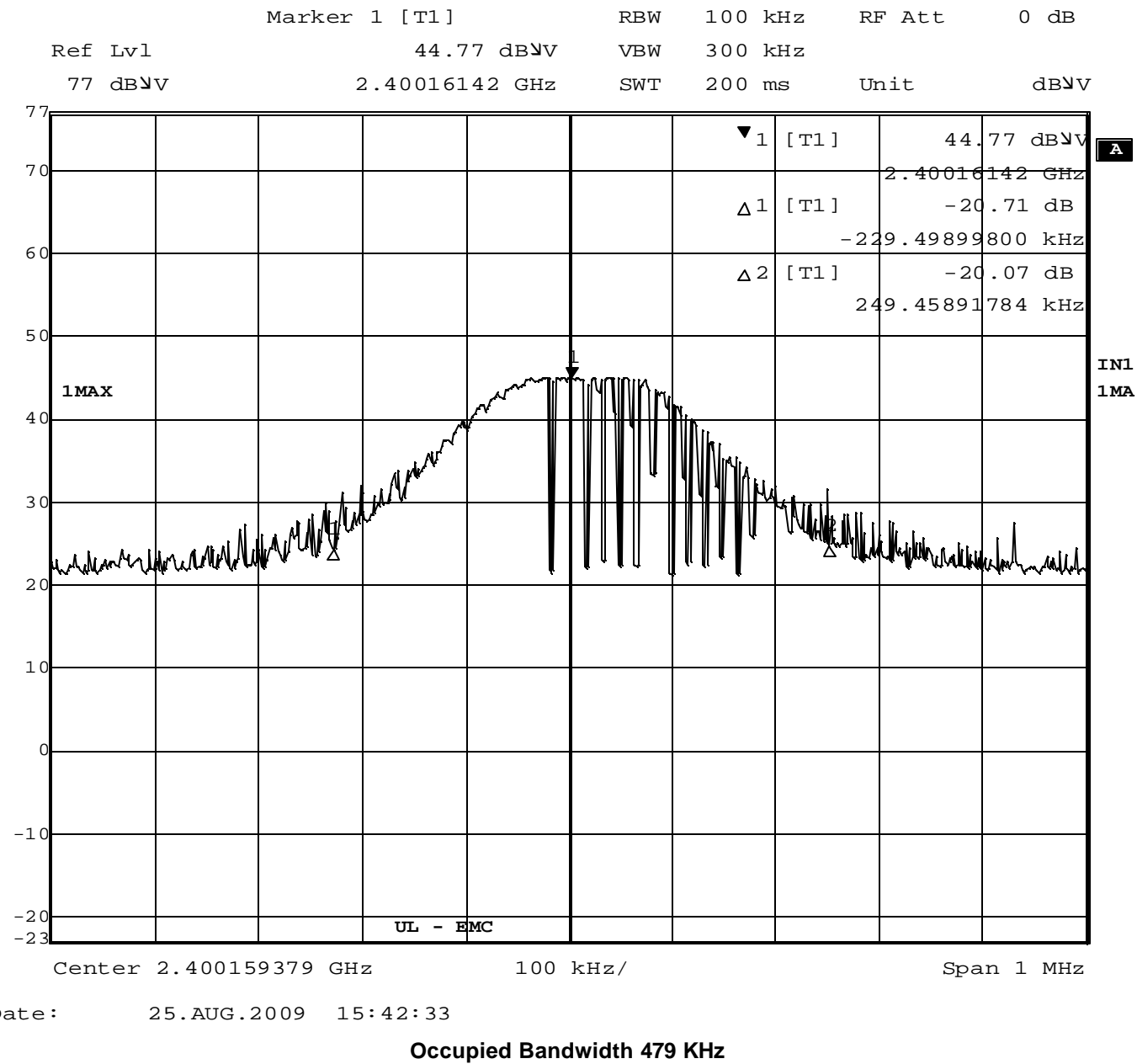
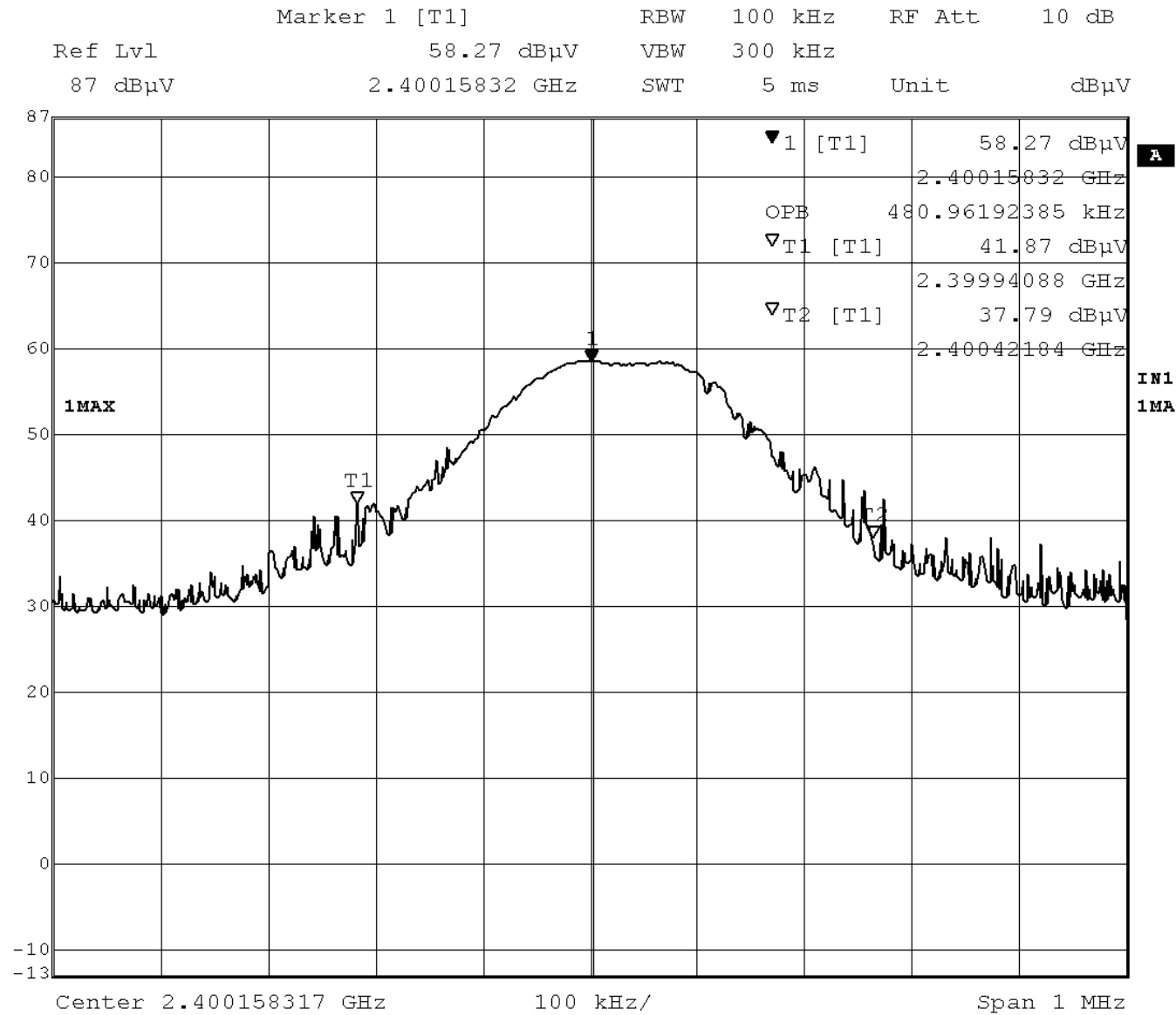


Figure 3 Occupied Bandwidth Graph 99%



Date: 17.JUN.2009 14:43:18

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4.2 Test Conditions and Results – Cease Operation

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart C Section 15.231
Cease Operation Limits	
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.	

Table 4 Cease Operation Configuration Settings

Power Interface	EUT Configurations	EUT Operation
1	2	2
Supplementary information: None		

Table 5 Cease Operation Test Equipment

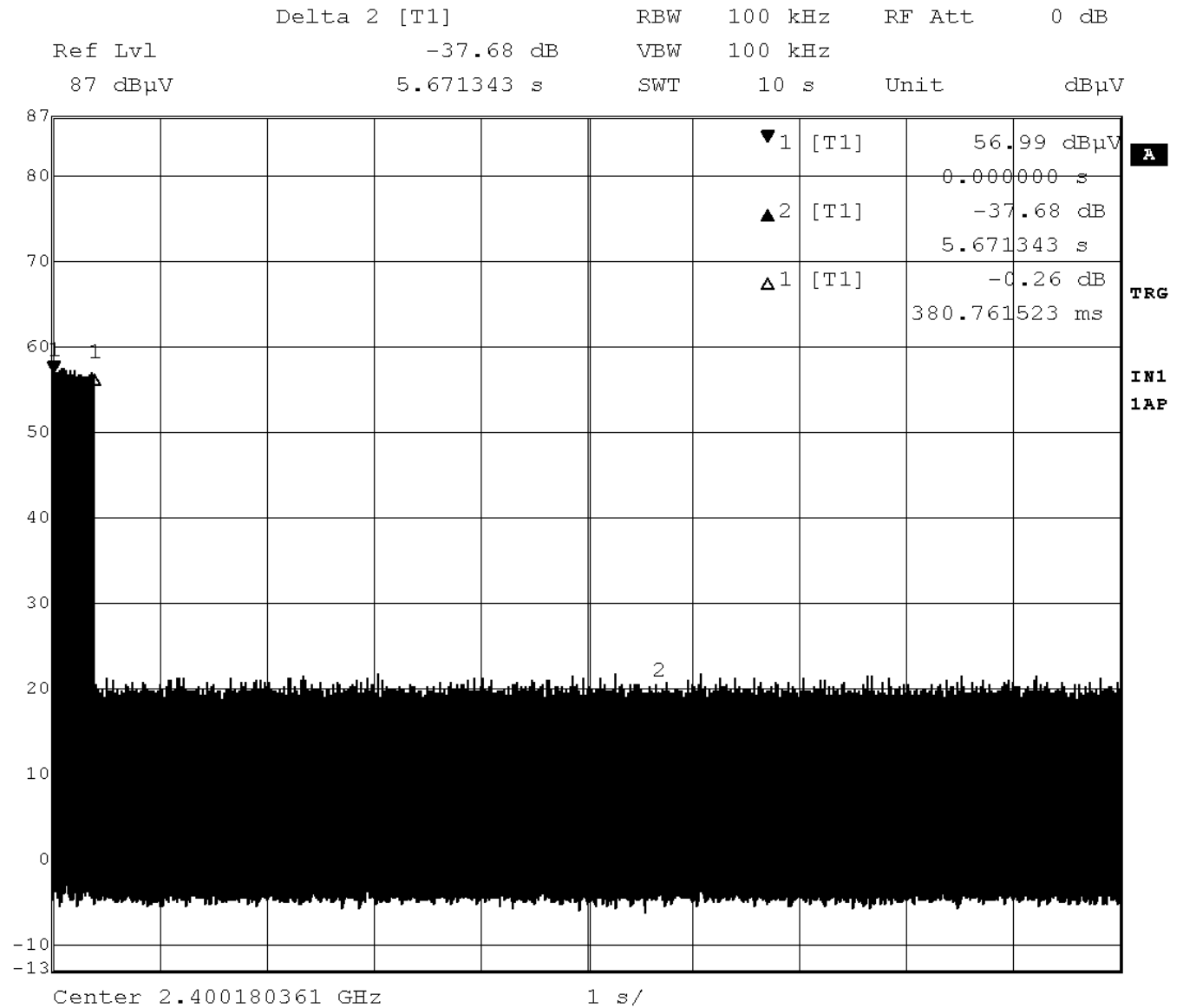
Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Double Ridge Guide Antenna	EMCO	RGA-180	5565
Oscilloscope	Tektronix	TDS 3052	012460
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Multimeter	Fluke	87V	44547

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Figure 4 Test Setup for Cease Operation



Figure 5 Cease Operation Graph



Date: 18.JUN.2009 13:55:35

4.3 Test Conditions and Results – Pulse Train

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.		
Basic Standard		FCC Part 15 Subpart A, 15.35	
Pulse Train Limits			
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.			

Table 6 Pulse Train Configuration Settings

Power Interface	EUT Configurations	EUT Operation
1	2	2
Supplementary information: None		

Table 7 Pulse Train Calculation

Pulse Width (mS)	Total Transmission time or 100ms which ever is lesser	Average Correction Factor (dB) $20 \log \left(\frac{PulseWidth}{TotalTransmissionTime} \right)$
234	100	0

Table 8 Pulse Train Test Equipment

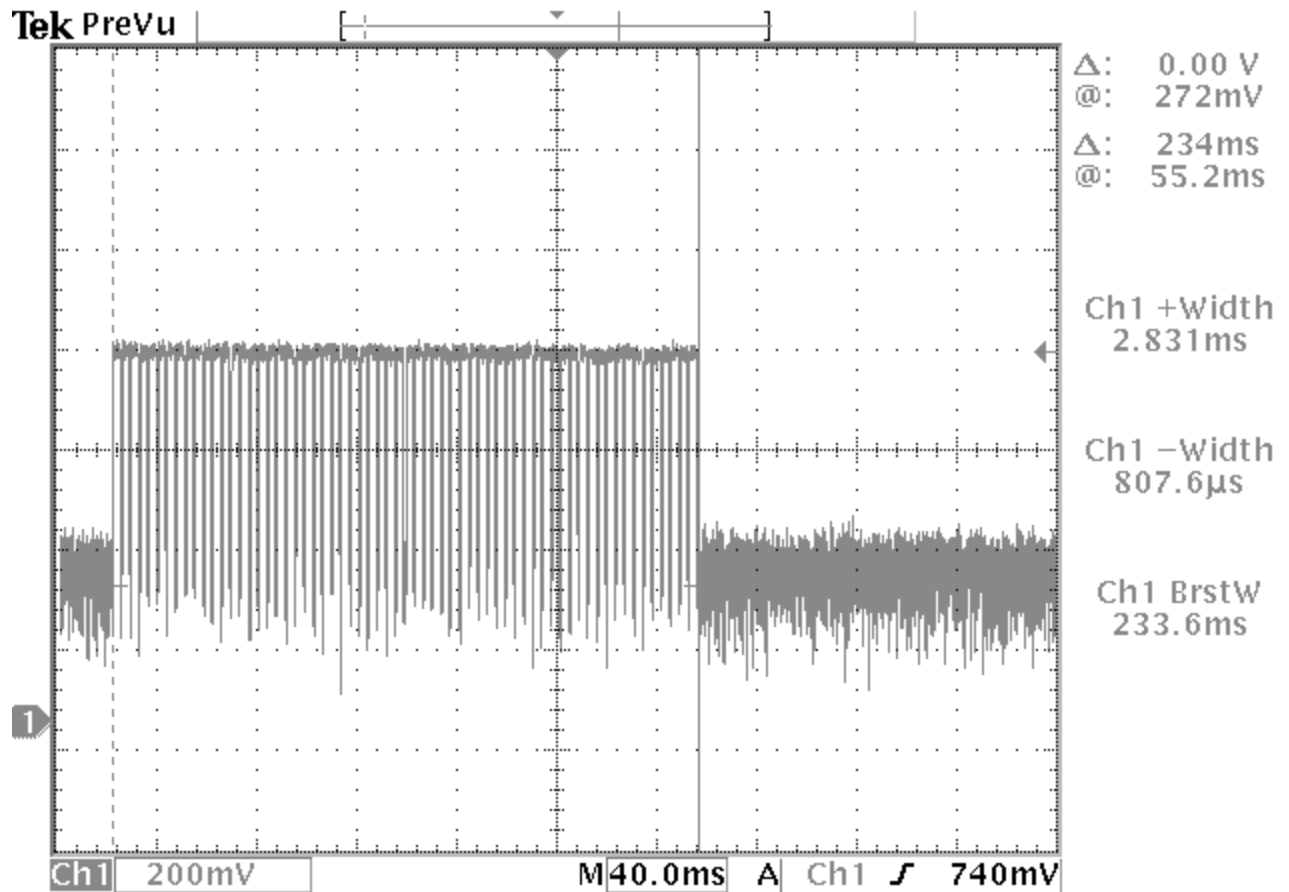
Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Double Ridge Guide Antenna	EMCO	RGA-180	5565
Oscilloscope	Tektronix	TDS 3052	012460
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Multimeter	Fluke	87V	44547

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Figure 6 Test Setup for Pulse Train



Figure 7 Pulse Train Graph



18 Jun 2009
 15:19:46

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4.4 Test Conditions and Results – RADIATED EMISSIONS

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Basic Standard		FCC Part 15, Subpart C, 15.231, RSS-210	
UL LPG		80-EM-S0029	
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	0.009 MHz – 30MHz	(3 meter measurement distance)	
Fully configured sample scanned over the following frequency range	30 MHz – 1GHz	(3 meter measurement distance)	
Fully configured sample scanned over the following frequency range	1GHz – 26.5 GHz	(3 meter measurement distance)	
Limits			
Frequency (MHz)	Limit (dBµV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
0.009 – 0.490	128.5 – 93.8	-	-
0.490 – 1.705	73.8 – 63	-	-
1.705 – 30	69.5	-	-
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	
960-24000	54	-	-
2400	-	81.9	
All > 2400	-	-	61.9
Supplementary information: Spurious limits are only applied against products of the transmitter. All other emissions must meet the general limits. Portable transmitters are to be checked in 3 orthogonal axis.			

Table 9 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 10 Radiated Emissions Test Equipment

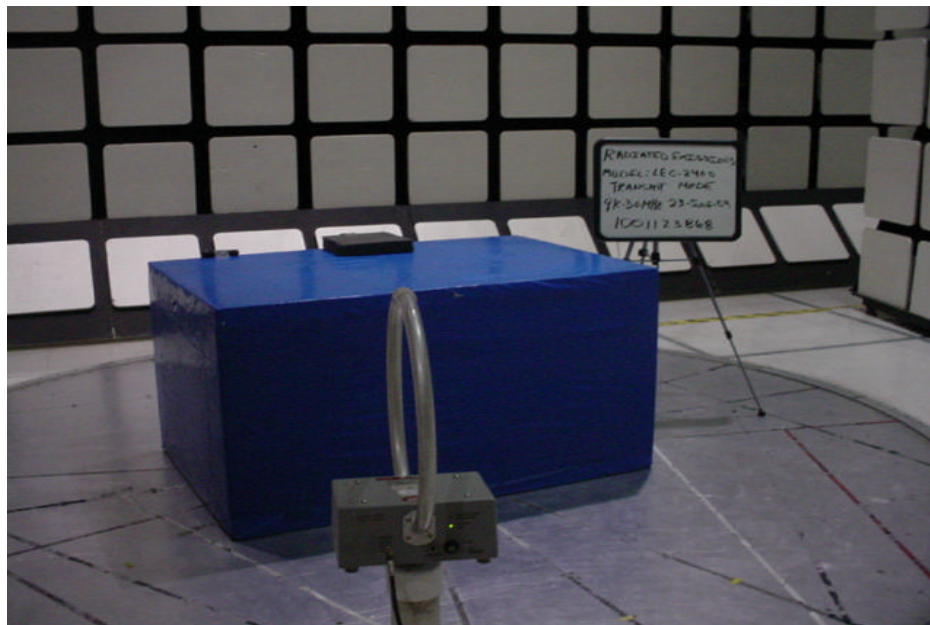
Test Equipment Used			
Description	Manufacturer	Model	Identifier
60Hz-30MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Active Loop Antenna	EMCO	6507	ME5A-288
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Bicon Antenna	Schaffner	VBA6106A	43441
Log-P Antenna	Schaffner	UPA6109	44067
Preamp	Miteq	AM-3A-000110-7687	44391
Preamp	Miteq	AM-3A-000110-7687	44394
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547
Above 1GHz (Band Optimized System)			
Spectrum Analyzer	Agilent	E7405A	19695
Horn Antenna (1-2 GHz)	ETS	3161-01	51442

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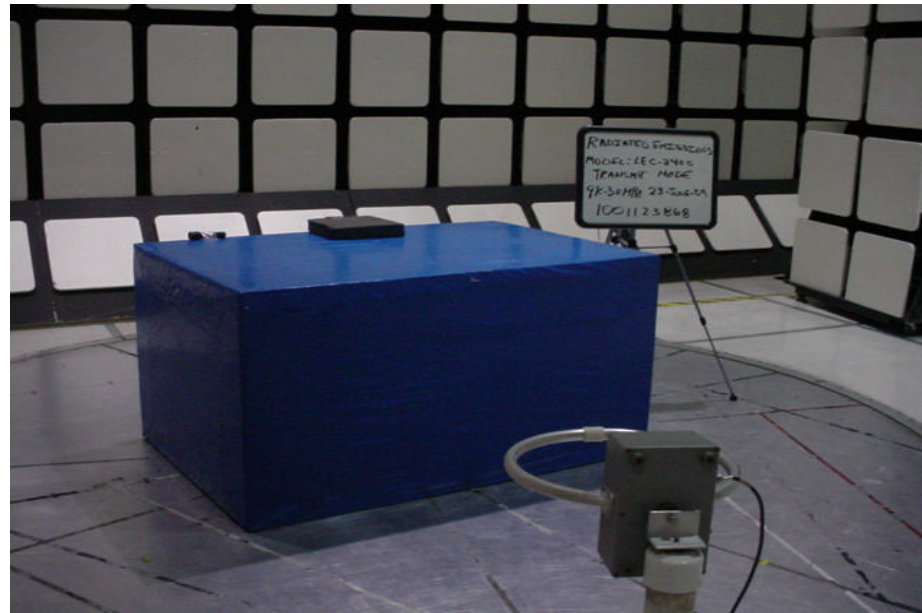
Test Equipment Used			
Description	Manufacturer	Model	Identifier
Horn Antenna (2-4 GHz)	ETS	3161-02	48107
Horn Antenna (12-18 GHz)	ETS	3160-08	8932
Horn Antenna (18-26.5 GHz)	ETS	3160-09	8947
Horn Antenna (4-8 GHz)	ETS	3161-03	48106
Horn Antenna (8-12 GHz)	ETS	3160-07	8933
Signal Path Controller	HP	11713A	50250
Gain Controller	HP	11713A	50251
RF Switch / Preamp Fixture	UL	BOMS1	50249
System Controller	UL	BOMS2	50252
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547

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Figure 8 Test setup for Radiated Emissions



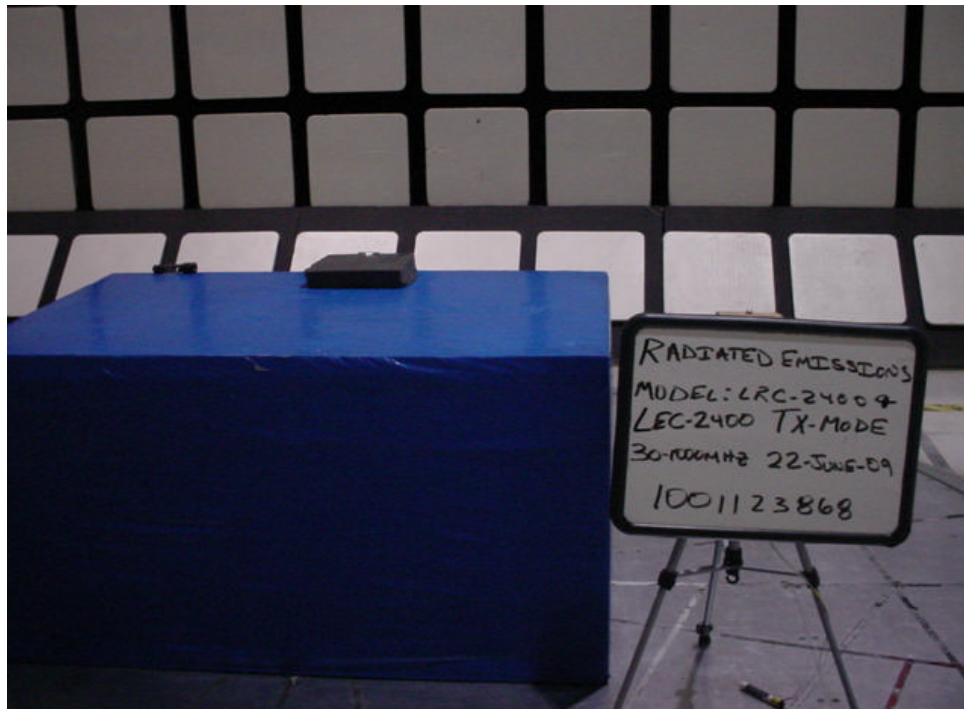
9KHz to 30MHz Front View



9KHz to 30MHz Rear View

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Figure 9 Test setup for Radiated Emissions



30MHz to 1000MHz Front View

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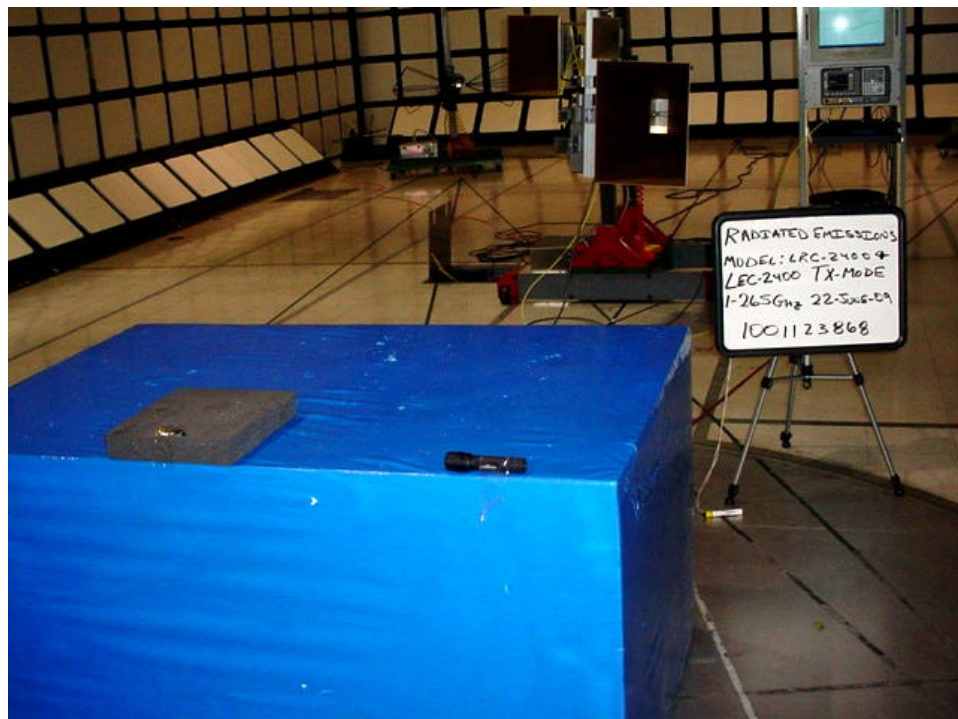


30MHz to 1000MHz Rear View

Figure 10 Test setup for Radiated Emissions

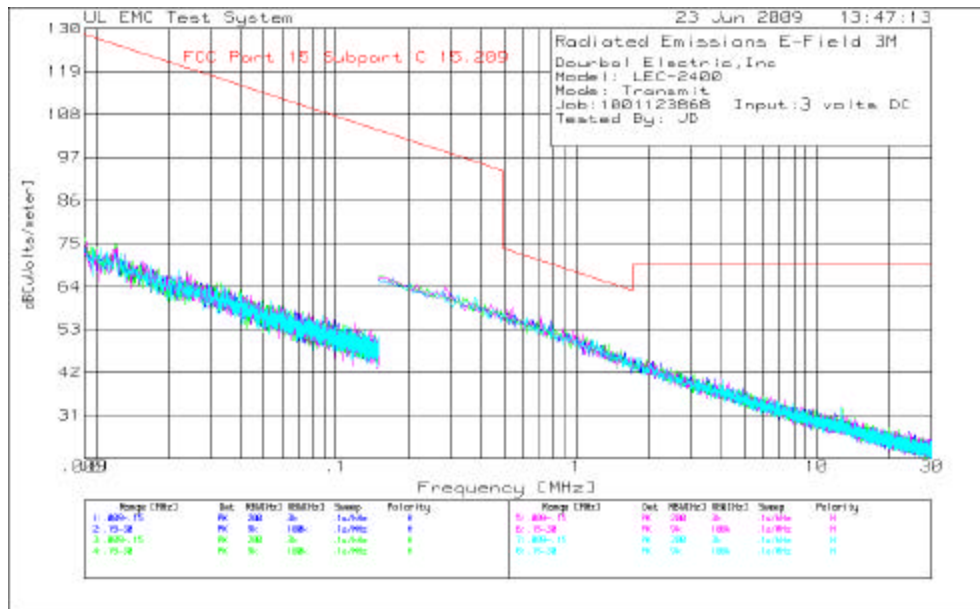


1GHz to 10GHz Front View

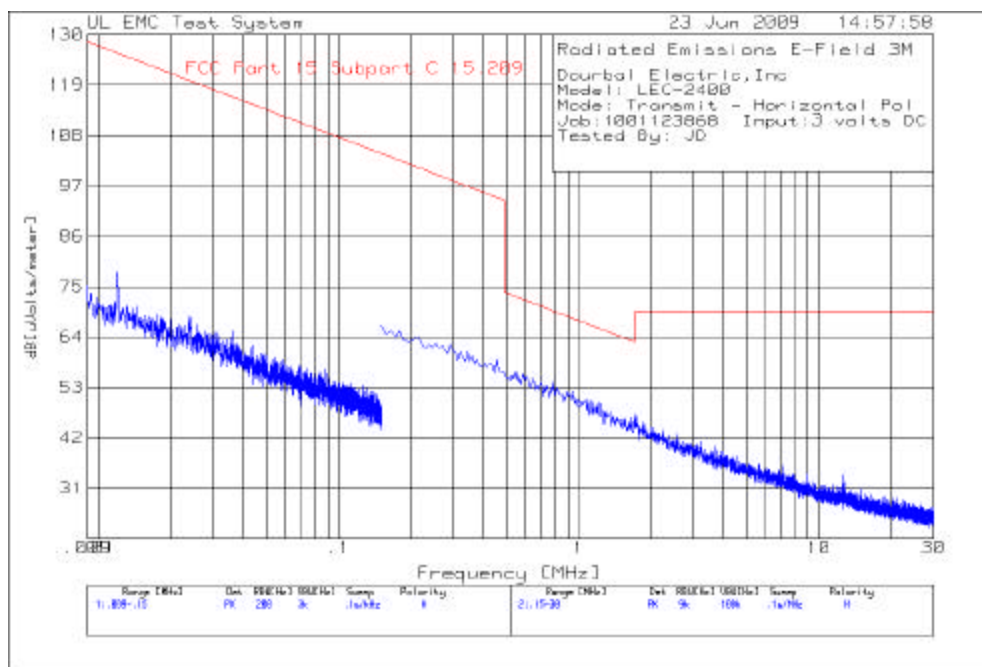


1GHz to 10GHz Rear View

Figure 11 Radiated Emissions Graph



Vertical Polarity



Horizontal Polarity

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Table 11 Radiated Emissions Data Points

Dourbal Electric, Inc
 Model: LRC-2400
 Mode: Transmit
 Job:1001123868 Input:3 volts DC
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
=====											
0°	.009 - .15MHz	-----									
1	.0121	45.6 pk	.1	28	73.7	125.9	-	-	-	-	-
	Azimuth:284	Height:100	Horz	Margin [dB]		-52.2	-	-	-	-	-
2	.02407	42.75 pk	0	22.6	65.35	120	-	-	-	-	-
	Azimuth:284	Height:100	Horz	Margin [dB]		-54.65	-	-	-	-	-
3	.0547	41.59 pk	0	17.6	59.19	112.8	-	-	-	-	-
	Azimuth:354	Height:100	Horz	Margin [dB]		-53.61	-	-	-	-	-
0°	.15 - 30MHz	-----									
4	.17239	50.26 pk	0	15.7	65.96	102.9	-	-	-	-	-
	Azimuth:6	Height:100	Horz	Margin [dB]		-36.94	-	-	-	-	-
45°	.15 - 30MHz	-----									
5	.41125	43.76 pk	0	15.5	59.26	95.3	-	-	-	-	-
	Azimuth:5	Height:120	Horz	Margin [dB]		-36.04	-	-	-	-	-
6	12.62296	17.04 pk	.2	15.7	32.94	69.5	-	-	-	-	-
	Azimuth:254	Height:120	Horz	Margin [dB]		-36.56	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

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 FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Table 12 Radiated Emissions Data Points

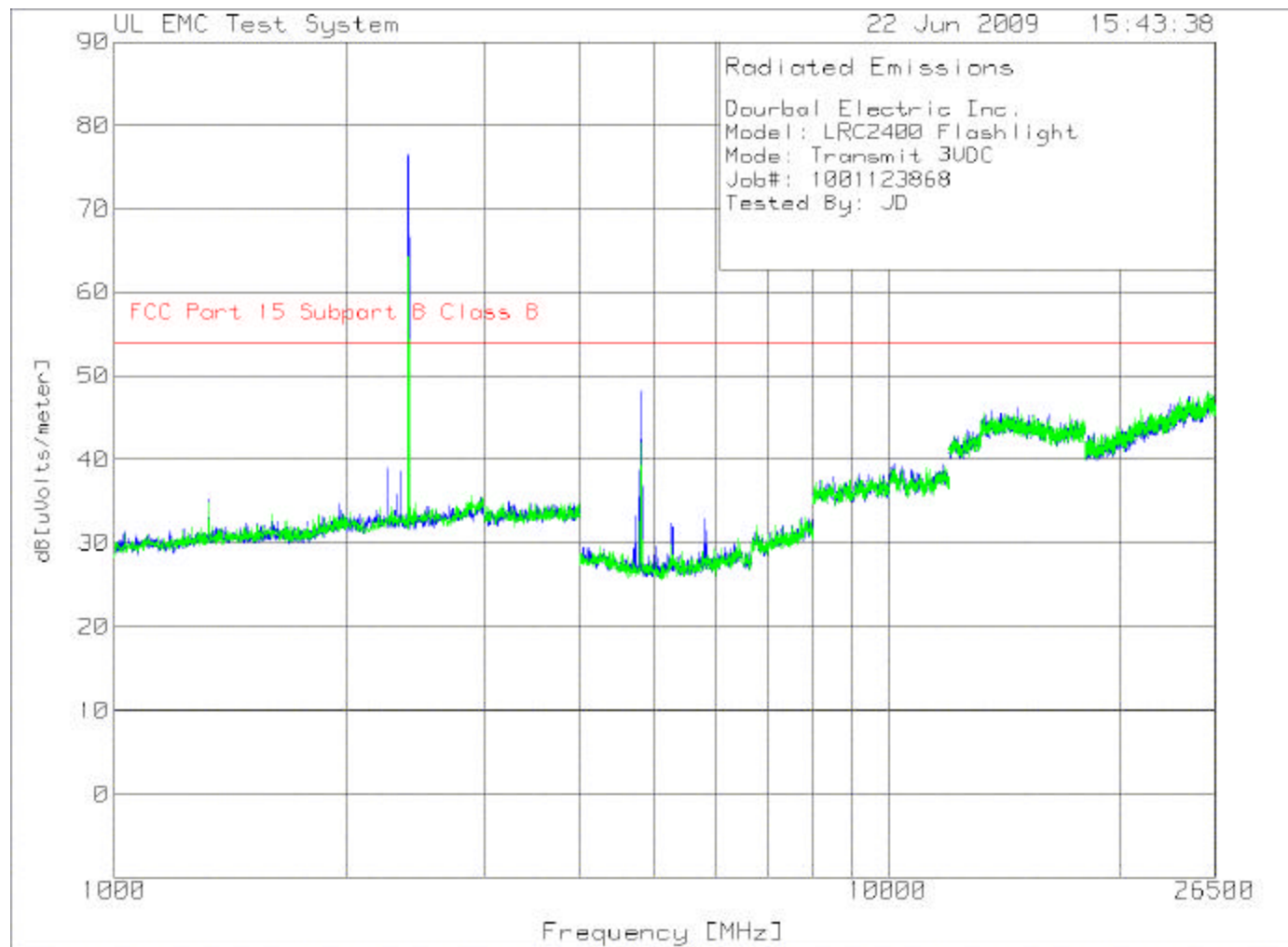
Dourbal Electric Inc.
 Model: LRC-2400
 Mode: Transmit mode
 Job#: 1001123868 Input: 3Volt DC
 Tested : JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
=====											
Horizontal 30 - 200MHz -----											
1	32.2122	11.73 pk	.4	17.6	29.73	40	-	-	-	-	-
	Azimuth:344	Height:100	Horz	Margin [dB]		-10.27	-	-	-	-	-
2	44.8048	11.7 pk	.4	12.3	24.4	40	-	-	-	-	-
	Azimuth:2	Height:100	Horz	Margin [dB]		-15.6	-	-	-	-	-
3	92.6226	13.71 pk	.6	9.5	23.81	43.5	-	-	-	-	-
	Azimuth:37	Height:100	Horz	Margin [dB]		-19.69	-	-	-	-	-
4	101.6416	14.3 pk	.7	10.8	25.8	43.5	-	-	-	-	-
	Azimuth:344	Height:100	Horz	Margin [dB]		-17.7	-	-	-	-	-
5	187.2372	14.63 pk	.9	15.7	31.23	43.5	-	-	-	-	-
	Azimuth:110	Height:400	Horz	Margin [dB]		-12.27	-	-	-	-	-
Vertical 30 - 200MHz -----											
7	34.9349	11.43 pk	.4	15	26.83	40	-	-	-	-	-
	Azimuth:3	Height:100	Vert	Margin [dB]		-13.17	-	-	-	-	-
8	79.8599	13.56 pk	.6	7.4	21.56	40	-	-	-	-	-
	Azimuth:110	Height:100	Vert	Margin [dB]		-18.44	-	-	-	-	-
9	130.5706	15.09 pk	.7	14	29.79	43.5	-	-	-	-	-
	Azimuth:74	Height:100	Vert	Margin [dB]		-13.71	-	-	-	-	-
10	200	14.6 pk	.9	16.2	31.7	43.5	-	-	-	-	-
	Azimuth:327	Height:100	Vert	Margin [dB]		-11.8	-	-	-	-	-
Horizontal 200 - 1000MHz -----											
6	918.3592	15.44 pk	1.9	23.3	40.64	46	-	-	-	-	-
	Azimuth:210	Height:400	Horz	Margin [dB]		-5.36	-	-	-	-	-
Vertical 200 - 1000MHz -----											
11	641.8209	15.18 pk	1.6	20.5	37.28	46	-	-	-	-	-
	Azimuth:100	Height:200	Vert	Margin [dB]		-8.72	-	-	-	-	-
12	965.5828	15.16 pk	1.9	24.6	41.66	54	-	-	-	-	-
	Azimuth:126	Height:300	Vert	Margin [dB]		-12.34	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

Figure 13 Radiated Emissions Graph



Job Number: 1001123868 File Number: MC16119 Page 33 of 47
Model Number: LEC 2400-1and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Table 13 Radiated Emissions Data Points

Dourbal Electric Inc.
Model: LRC2400 Flashlight
Mode: Transmit 3VDC
Job#: 1001123868
Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
=====											
Horizontal 1000 - 2000MHz -----											
1	1323.346	40.35 pk	-45.61	40.5	35.24	54	-	-	-	-	-
		Height:101 Horz		Margin [dB]		-18.76	-	-	-	-	-
Horizontal 2000 - 4000MHz -----											
3	2252.185	41.42 pk	-43.81	41.3	38.91	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-15.09	-	-	-	-	-
4	2319.6	38.46 pk	-43.69	41.1	35.87	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-18.13	-	-	-	-	-
5	2347.066	41.18 pk	-43.7	41.1	38.58	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-15.42	-	-	-	-	-
6	2399.501	78.95 pk	-43.63	41.1	76.42	54	81.9	-	-	-	-
						-5.48	-	-	-	-	-
Horizontal 4000 - 8000MHz -----											
8	4715.474	40.35 pk	-54.26	47.2	33.29	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-20.71	-	-	-	-	-
9	4758.735	42.8 pk	-54.39	47.1	35.51	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-18.49	-	-	-	-	-
10	4778.702	45.92 pk	-54.25	47.1	38.77	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-15.23	-	-	-	-	-
11	4785.358	49.65 pk	-54.34	47.1	42.41	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-11.59	-	-	-	-	-
12	4798.669	55.43 pk	-54.28	47.1	48.25	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-5.75	-	-	-	-	-
13	4815.308	44.21 pk	-54.48	47.1	36.83	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-17.17	-	-	-	-	-
17	5264.559	38.91 pk	-53.85	47.3	32.36	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-21.64	-	-	-	-	-
18	5793.677	38.95 pk	-53.63	47.6	32.92	54	-	-	-	-	-
		Height:99 Horz		Margin [dB]		-21.08	-	-	-	-	-
Vertical 1000 - 2000MHz -----											
2	1323.346	39.93 pk	-45.61	40.5	34.82	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-19.18	-	-	-	-	-
Vertical 2000 - 4000MHz -----											
7	2399.501	66.61 pk	-43.63	41.3	64.28	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		10.28	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart B Class B

LIMIT 2: FCC Part 15 Subpart C 15.231

PK - Peak detector

QP - Quasi-Peak detector

av - Linear average detector

avlg - Average log detector

AV - Average detector

CAV - CISPR Average detector

RMS - RMS detection

Job Number: 1001123868 File Number: MC16119 Page 34 of 47
Model Number: LEC 2400-1and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

CRMS - CISPR RMS detection

Job Number: 1001123868 File Number: MC16119 Page 35 of 47
 Model Number: LEC 2400-1and LRC2400
 Client Name: DOURBAL ELECTRIC INC
 FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Dourbal Electric Inc.
 Model: LRC2400 Flashlight
 Mode: Transmit 3VDC
 Job#: 1001123868
 Tested By: JD

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
=====										
Vertical 4000 - 8000MHz -----										
14	4785.358	45.12 pk	-54.34	47.2	37.98	54	-	-	-	-
		Height:150 Vert		Margin [dB]		-16.02	-	-	-	-
15	4798.669	49.09 pk	-54.28	47.3	42.11	54	-	-	-	-
		Height:150 Vert		Margin [dB]		-11.89	-	-	-	-
16	4811.98	41.42 pk	-54.44	47.3	34.28	54	-	-	-	-
		Height:99 Vert		Margin [dB]		-19.72	-	-	-	-
Horizontal 2000 - 4000MHz										
2400.1625	79.42 PK	-43.63	41.1	76.89	54	81.9	-	-	-	-
Azimuth:	184									
		Height:108 Horz		Margin [dB]:	22.89	-5.01	-	-	-	-
Vertical 2000 - 4000MHz										
2400.1875	65.49 PK	-43.63	41.3	63.16	54	81.9	-	-	-	-
Azimuth:	235									
		Height:204 Vert		Margin [dB]:	9.16	-18.74	-	-	-	-

LIMIT 1: FCC Part 15 Subpart B Class B
 LIMIT 2: FCC Part 15 Subpart C 15.231

PK - Peak detector
 QP - Quasi-Peak detector
 av - Linear average detector
 avlg - Average log detector
 AV - Average detector
 CAV - CISPR Average detector
 RMS - RMS detection
 CRMS - CISPR RMS detection

Job Number: 1001123868 File Number: MC16119 Page 36 of 47
 Model Number: LEC 2400-1 and LRC2400
 Client Name: DOURBAL ELECTRIC INC
 FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Test Conditions and Results – RADIATED EMISSIONS UNINTENTIONAL

Test Description	Measurements were made in a 103-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard	CISPR 22, ICES-003, Issue 4	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	(3 meter measurement distance)
	1GHz - 12GHz	(3 meter measurement distance)
Limits - Class B		
Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Average
30 to 230	30	NA
230 to 1000	37	NA
Above 960 (FCC)	NA	54 (at 3-meter)
Supplementary information: None		

Job Number: 1001123868 File Number: MC16119 Page 37 of 47
Model Number: LEC 2400-1and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

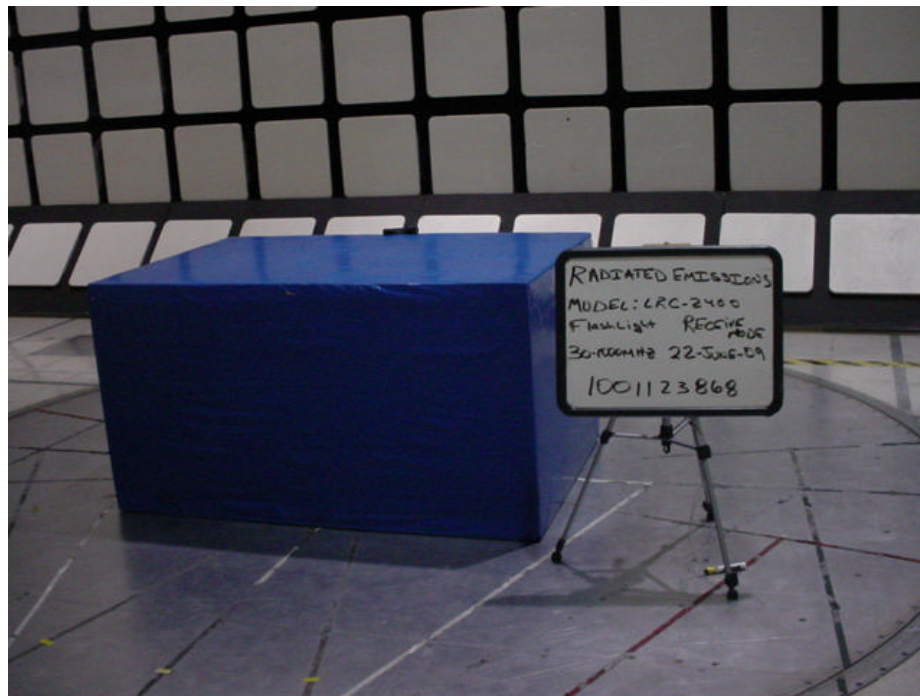
Table 14 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	3	3
Supplementary information: None		

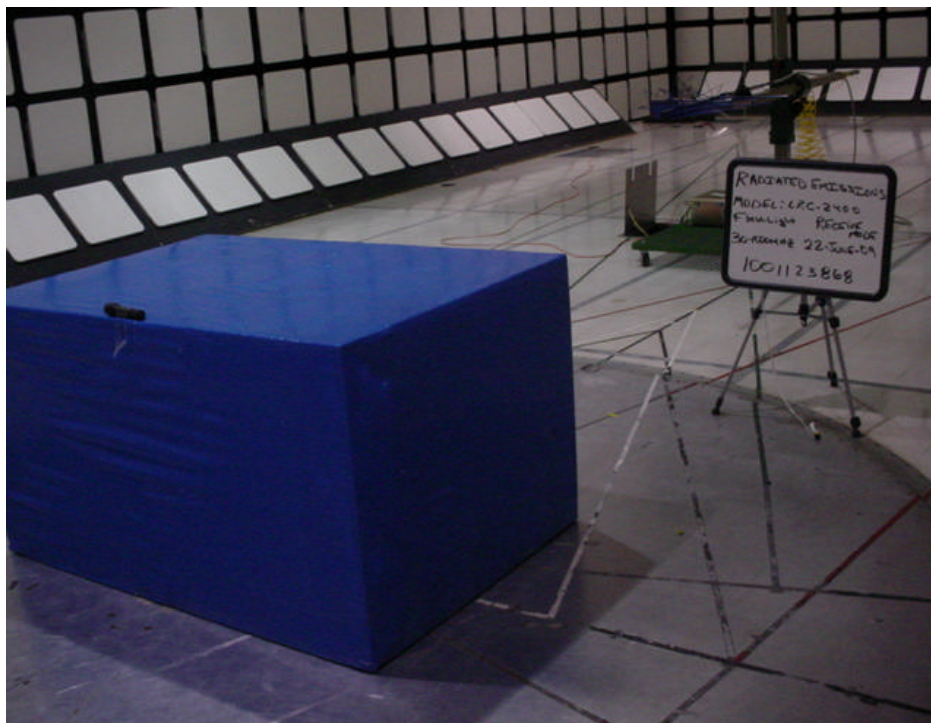
Table 15 Radiated Emissions Test Equipment

Test Equipment Used			
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Bicon Antenna	Schaffner	VBA6106A	43441
Log-P Antenna	Schaffner	UPA6109	44068
Preamp	Miteq	AM-3A-000110-7687	44391
Preamp	Miteq	AM-3A-000110-7687	44394
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547
Above 1GHz (Band Optimized System)			
Spectrum Analyzer	Agilent	E7405A	19695
Horn Antenna (1-2 GHz)	ETS	3161-01	51442
Horn Antenna (2-4 GHz)	ETS	3161-02	48107
Horn Antenna (4-8 GHz)	ETS	3161-03	48106
Horn Antenna (8-12 GHz)	ETS	3160-07	8933
Signal Path Controller	HP	11713A	50250
Gain Controller	HP	11713A	50251
RF Switch / Preamp Fixture	UL	BOMS1	50249
System Controller	UL	BOMS2	50252
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547

Figure 14 Test setup for Radiated Emissions



30-1000MHz Front Views

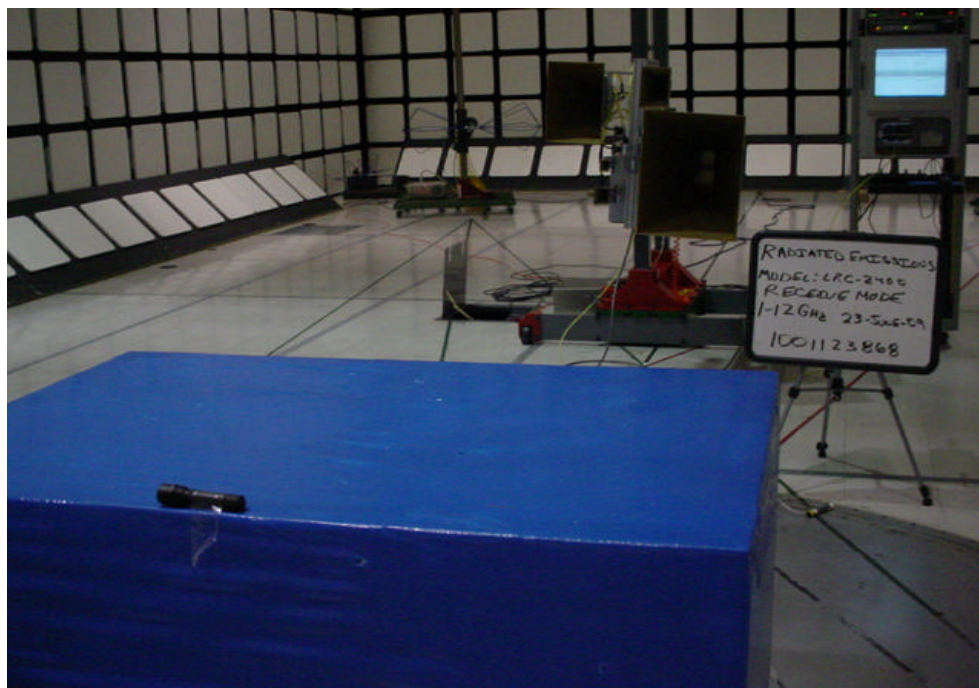


30-1000MHz Rear Views

Figure 15 Radiated Emissions Graph

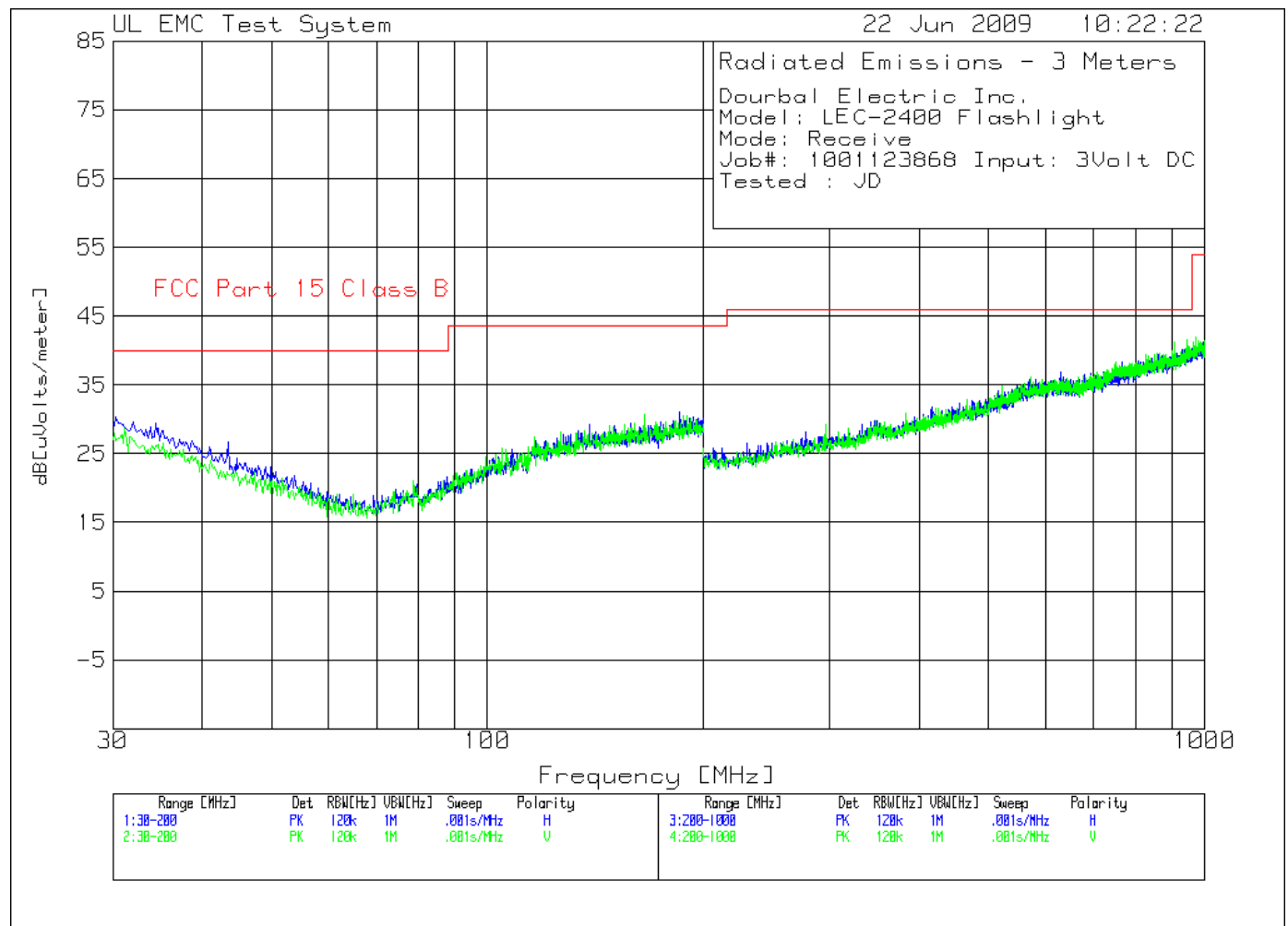


1-12GHz Front Views



1-12GHz Rear Views

Figure 16 Radiated Emissions Graph



Job Number: 1001123868 File Number: MC16119 Page 41 of 47
 Model Number: LEC 2400-1and LRC2400
 Client Name: DOURBAL ELECTRIC INC
 FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Table 16 Radiated Emissions Data Points

Dourbal Electric Inc.
 Model: LEC-2400 Flashlight
 Mode: Receive
 Job#: 1001123868 Input: 3Volt DC
 Tested : JD

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz -----											
1	30.3403	11.48 pk	.4	18.4	30.28	40	-	-	-	-	-
	Azimuth:357	Height:100	Horz	Margin [dB]		-9.72	-	-	-	-	-
2	32.042	11.58 pk	.4	17.7	29.68	40	-	-	-	-	-
	Azimuth:322	Height:400	Horz	Margin [dB]		-10.32	-	-	-	-	-
3	43.4434	13.46 pk	.4	12.8	26.66	40	-	-	-	-	-
	Azimuth:214	Height:100	Horz	Margin [dB]		-13.34	-	-	-	-	-
4	185.5355	14.5 pk	.9	15.7	31.1	43.5	-	-	-	-	-
	Azimuth:286	Height:250	Horz	Margin [dB]		-12.4	-	-	-	-	-
Vertical 30 - 200MHz -----											
6	31.1912	11.71 pk	.4	16.6	28.71	40	-	-	-	-	-
	Azimuth:178	Height:100	Vert	Margin [dB]		-11.29	-	-	-	-	-
7	78.8388	13.21 pk	.6	7.3	21.11	40	-	-	-	-	-
	Azimuth:357	Height:100	Vert	Margin [dB]		-18.89	-	-	-	-	-
8	116.2763	13.44 pk	.7	13.3	27.44	43.5	-	-	-	-	-
	Azimuth:178	Height:100	Vert	Margin [dB]		-16.06	-	-	-	-	-
9	165.6256	14.2 pk	.8	15.7	30.7	43.5	-	-	-	-	-
	Azimuth:105	Height:100	Vert	Margin [dB]		-12.8	-	-	-	-	-
Horizontal 200 - 1000MHz -----											
5	943.1716	15.42 pk	1.8	23.6	40.82	46	-	-	-	-	-
	Azimuth:140	Height:100	Horz	Margin [dB]		-5.18	-	-	-	-	-
Vertical 200 - 1000MHz -----											
10	520.5603	14.96 pk	1.4	18.6	34.96	46	-	-	-	-	-
	Azimuth:233	Height:300	Vert	Margin [dB]		-11.04	-	-	-	-	-
11	906.3532	16.27 pk	1.8	23.1	41.17	46	-	-	-	-	-
	Azimuth:315	Height:300	Vert	Margin [dB]		-4.83	-	-	-	-	-
12	971.5858	15.33 pk	1.8	24.8	41.93	54	-	-	-	-	-
	Azimuth:140	Height:400	Vert	Margin [dB]		-12.07	-	-	-	-	-

LIMIT 1: FCC Part 15 Class B

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

Job Number: 1001123868 File Number: MC16119 Page 42 of 47
 Model Number: LEC 2400-1and LRC2400
 Client Name: DOURBAL ELECTRIC INC
 FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

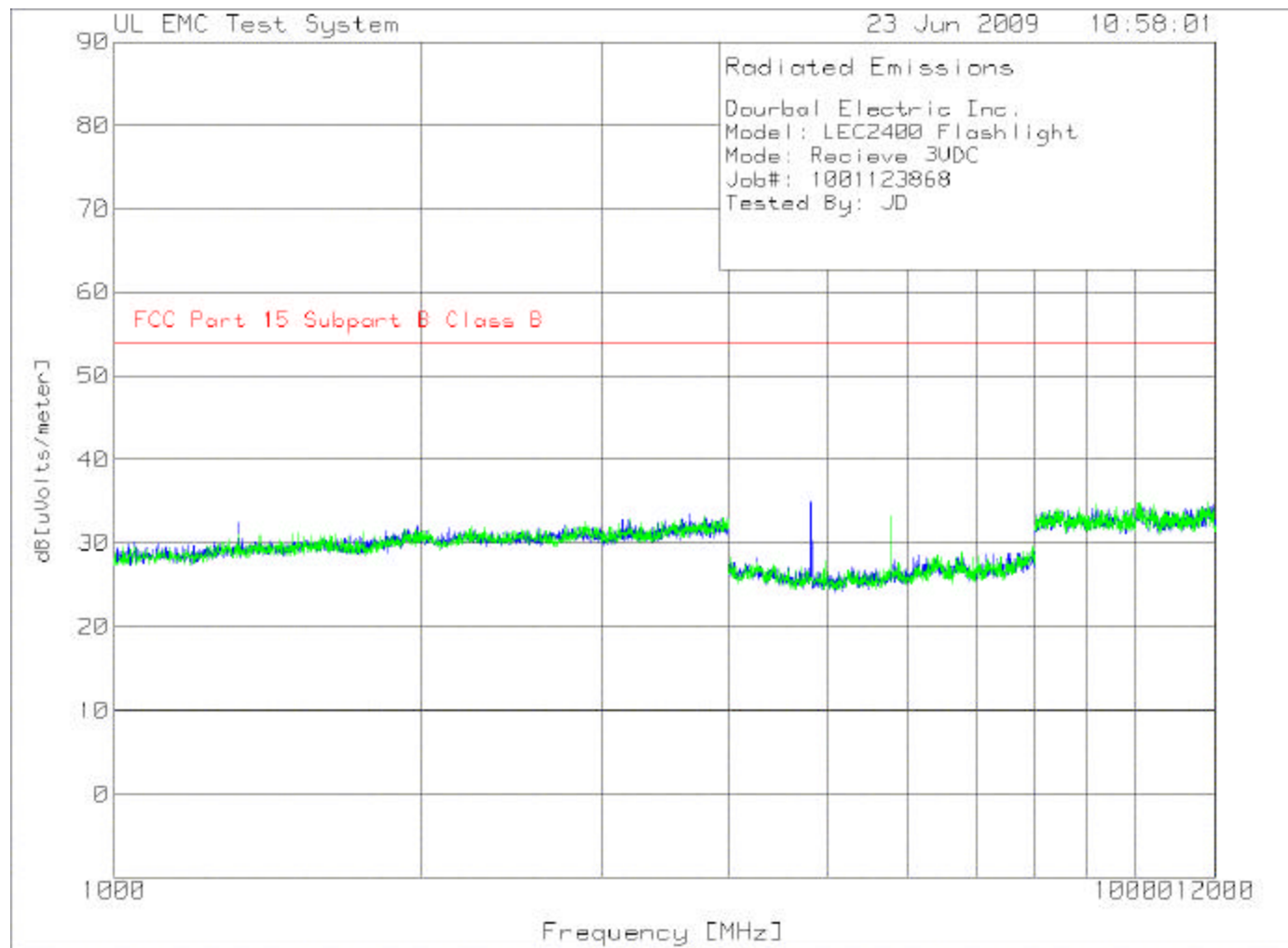
Dourbal Electric Inc.
 Model: LEC-2400 Flashlight
 Mode: Receive
 Job#: 1001123868 Input: 3Volt DC
 Tested : JD

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
=====										
Horizontal	200 - 1000MHz									
943.17	9.24 qp	1.8	23.6	34.64	46	-	-	-	-	-
Azimuth: 0	Height:100	Horz	Margin [dB]:	-11.36		-	-	-	-	-
943.17	9.2 qp	1.8	23.6	34.6	46	-	-	-	-	-
Azimuth: 290	Height:100	Horz	Margin [dB]:	-11.4		-	-	-	-	-
Vertical	200 - 1000MHz									
906.352	9.2 qp	1.8	23.1	34.1	46	-	-	-	-	-
Azimuth: 290	Height:100	Vert	Margin [dB]:	-11.9		-	-	-	-	-

LIMIT 1: FCC Part 15 Class B

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

Figure 17 Radiated Emissions Graph



Job Number: 1001123868 File Number: MC16119 Page 44 of 47
 Model Number: LEC 2400-1and LRC2400
 Client Name: DOURBAL ELECTRIC INC
 FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Table 17 Radiated Emissions Data Points

Dourbal Electric Inc.
 Model: LEC2400 Flashlight
 Mode: Receive 3VDC
 Job#: 1001123868
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
=====											
Horizontal 1000 - 2000MHz -----											
1	1323.346	57.55 pk	-45.61	20.5	32.44	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-21.56	-	-	-	-	-
2	1393.258	54.89 pk	-45.68	20.7	29.91	54	-	-	-	-	-
		Height:199 Horz		Margin [dB]		-24.09	-	-	-	-	-
Horizontal 4000 - 8000MHz -----											
3	4818.636	62.44 pk	-54.54	27.1	35	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-19	-	-	-	-	-
4	5833.611	53.79 pk	-53.39	27.6	28	54	-	-	-	-	-
		Height:199 Horz		Margin [dB]		-26	-	-	-	-	-
7	6149.75	53.96 pk	-52.87	27.5	28.59	54	-	-	-	-	-
		Height:199 Horz		Margin [dB]		-25.41	-	-	-	-	-
8	7204.659	52.76 pk	-52.9	27.9	27.76	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-26.24	-	-	-	-	-
Vertical 4000 - 8000MHz -----											
5	5777.038	59.74 pk	-53.99	27.6	33.35	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-20.65	-	-	-	-	-
6	6139.767	52.67 pk	-52.74	27.4	27.33	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-26.67	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart B Class B

PK - Peak detector
 QP - Quasi-Peak detector
 av - Linear average detector
 avlg - Average log detector
 AV - Average detector
 CAV - CISPR Average detector
 RMS - RMS detection
 CRMS - CISPR RMS detection

Job Number: 1001123868 File Number: MC16119 Page 45 of 47
Model Number: LEC 2400-1and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

5.0 Test Conditions and Results: Fundamental Frequency and Spurious Emissions Measurement Limit Calculations:

Limit Calculation

From table in section 15.209

Limit for Spurious Emissions = 20dB lower then fundamental = dBuV/m

Fundamental Frequency is 2400MHz

Limit = $20 \cdot \log(\mu\text{V/m})$

Limit = $20 \cdot \log(12500)$

Limit = 81.9dBuV

Radiated Emissions Limit conversion from mV/m to dBmV/m (accordance with paragraph 15.109)

Radiated Emissions Limit (dBμV/m) = $20 \cdot \log(\mu\text{V/m})$

Radiated Emissions Limit (dBμV/m) = $20 \cdot \log(90)$

Radiated Emissions Limit (dBμV/m) = 39.1

Radiated Emissions test data obtained during measurements.

Field Strength (dBμV/m) = Measured field strength (dBμV/m) + Antenna Factor (dB) + Cable Factor (dB)

Field Strength (dBμV/m) = 19.7dBμV/m + 12.5dB + 0.3dB

Field Strength (dBμV/m) = 32.5

Job Number: 1001123868 File Number: MC16119 Page 46 of 47
Model Number: LEC 2400-1and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400

Appendix A

Accreditations and Authorizations



NVLAP Lab code: 100255-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1002550.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91040).



Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2181



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: (Radiated Emissions) R-797, (Conducted Emissions) C-832, C-833, C-834 and (Conducted Emissions - Telecommunications Ports) T-267.

Job Number: 1001123868 File Number: MC16119 Page 47 of 47
Model Number: LEC 2400-1and LRC2400
Client Name: DOURBAL ELECTRIC INC
FCC ID: XLB LRC-2400 Industry Canada ID: 8487A-LRC2400



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6

Compliance Certificate

Company Name and Location: DOURBAL ELECTRIC INC
SUITE 501-295
10 SCHALK'S CROSSING RD PLAINSBORO, NJ 08536

File Number: MC16119

Date of Report: 13 August 2009

Product Description: Luminaire Electronic Cap and Luminaire Remote Control

Investigated in accordance with FCC Part 15, Subpart B & C, 15.231(2008)

Model Designation: LEC2400 and LRC2400

Serial Number: Prototype

Job Number: 1001045068

Project Number: 09CA27231

A sample of the product described above has been investigated by Underwriters Laboratories Inc. in accordance with the requirements indicated above and has been found in compliance with those requirements as shown in the Test Report Ref. No. 09CA27231 which forms part of this Certificate. It is the responsibility of the company shown above that the products it produces are in compliance with the applicable requirements.

The name of Underwriters Laboratories (UL), any abbreviation thereof, or any symbol shall not be used on or in connection with the product unless and until specifically authorized by UL.

Tested by:



Reviewed by:



Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories (UL) or any authorized licensee of UL.