NEBRASKA CENTER FOR EXCELLENCE IN ELECTRONICS
4740 Discovery Drive
Lincoln, NE 68521
402-472-5880

ACCREDITED
Certificate Number 1953-01

Test Report

Company: Lester Electrical
625 West A Street
Lincoln, NE, USA 68522
Contact: Joe Krause
Product: DCM Model #22240
FCC ID: OBH22240

Test Report No: R070902-01

APPROVED BY: Steve Cass
General Manager

Doug Kramer
Test Engineer

DATE: 12 July 2002
Total Pages: 9

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1.0 Summary of test results

1.1 Test Results

Test	Test Specification	Results
CFR 47, FCC Part 15.109, Rx verification	Part 15.109, Class B	Complies
CFR 47, FCC Part 15.203	Part 15.203	Complies
CFR 47, FCC Part 15.249	Part 15.249	Complies

1.2 Test Methods

1.2.1 Radiated Emissions

All measurements were taken at a distance of 3 meters using the methods outlined in ANSI/IEEE C63.4, 2001. Measurements were taken from 30MHz to 1Gz, then from 1GHz to 10GHz. The EUT was setup to provide a worst-case scenario. All data presented is the measured results with any applicable correction factors applied via the test software.

2.0 Description

2.1 Equipment under test

The data collection module is used to gather battery performance and vehicle utilization data and transmit that information back to a base station.

2.1.1 Identification: DCM Model #22240

2.1.2 EUT received date: 9 July 2002

2.1.3 EUT tested dates: 9th July 2002

2.1.4 Manufacturer: Lester Electrical

2.1.5 Serial number: *prototype*

2.2 Laboratory description

All testing was performed at the NCEE Lincoln facility, which is a FCC registered lab. This site has been fully described in a report submitted to the FCC, and accepted in a letter dated May 4, 2001. Laboratory environmental conditions varied slightly throughout the tests:

Relative humidity of 46 ± 5%

Temperature of 21 ± 3° Celsius

2.3 Special equipment or setup

The EUT was supplied with power via test leads from a battery of typical voltage. The normal voltage would be supplied via the larger gauge cabling as shown in Figure 3 from a battery with a higher storage capacity.

3.0 Test equipment used

Serial #	*Manufacturer*	*Model*	*Description*	*Last cal.*
1654	EMCO	3142B	Biconilog antenna	3-May-02
6415	EMCO	3115	DRG Horn	24-Oct-01
100037	Rohde & Schwarz	ESIB26	EMI Test Receiver	11-Jun-02
082001/003	Rohde & Schwarz	TS-PR18	Preamplifier	10-Aug-01
2575	Rohde & Schwarz	ES-K1	Software v1.60	N/A

4.0 Detailed Results

4.1 FCC Part 15.109 Radiated Emissions for Class 'B' devices, Rx

The emissions from the EUT while not transmitting were verified to be below the limits for Class B unintentional radiators as shown in 15.109.

4.2 FCC Part 15.203, Tx

The antenna is mounted to the circuit board internal to the unit with no external antenna jacks and thus still consistent with the original grant.

4.3 FCC Part 15.249 Radiated Emissions, Tx

The EUT was placed on a non-conducting table 80cm from the ground plane with the antenna positioned at a distance of 3m. The EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters. Measurements were made from 30 MHz to 10GHz in both horizontal and vertical polarizations. The setup can be seen in Figures 1 through 3. The occupied bandwidth, as shown in Appendix B, was less than 500kHz. The EUT typically operates at a carrier frequency of 916.5MHz the unit tested had a carrier frequency of 916.62MHz. The level at that frequency was 93.79dbµV/m. All measurements seen below were taken using a peak detector with 120kHz bandwidth this was done to provide an accurate comparison to the measurements in the original grant.

Frequency MHz	Level dBuV/m	Limit dBuV/m	Margin dB	Height cm	Azimuth deg	Polarization
916.62	93.79	94	0.2	118	340	V
1833.00	52.85	63.5	10.7	100	0	V
2749.50	42.61	63.5	20.9	100	0	V
3666.00	42.09	63.5	21.4	100	0	V
6415.50	44.45	63.5	19.1	100	0	V

All measurement results are located in the corresponding interval with a probability of approximately 95% (coverage factor k=2). The interval for these measurements is U_x (expanded uncertainty).

Radiated Emissions, 30MHz – 1GHz, 3m distance: U_x = +/- 3.4 dB

Radiated Emissions, 1GHz – 4GHz, 3m distance: U_x = +/- 3.6 dB

Appendix A

Test setup photos

Figure 1 Test setup

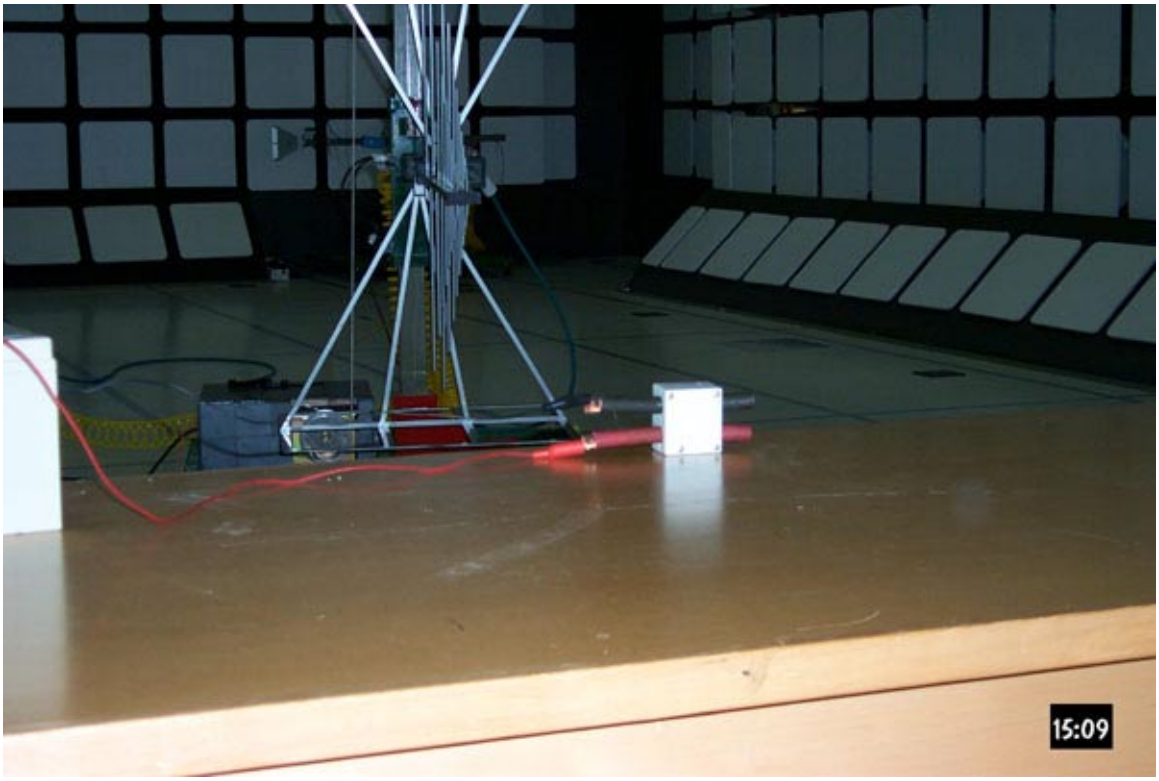
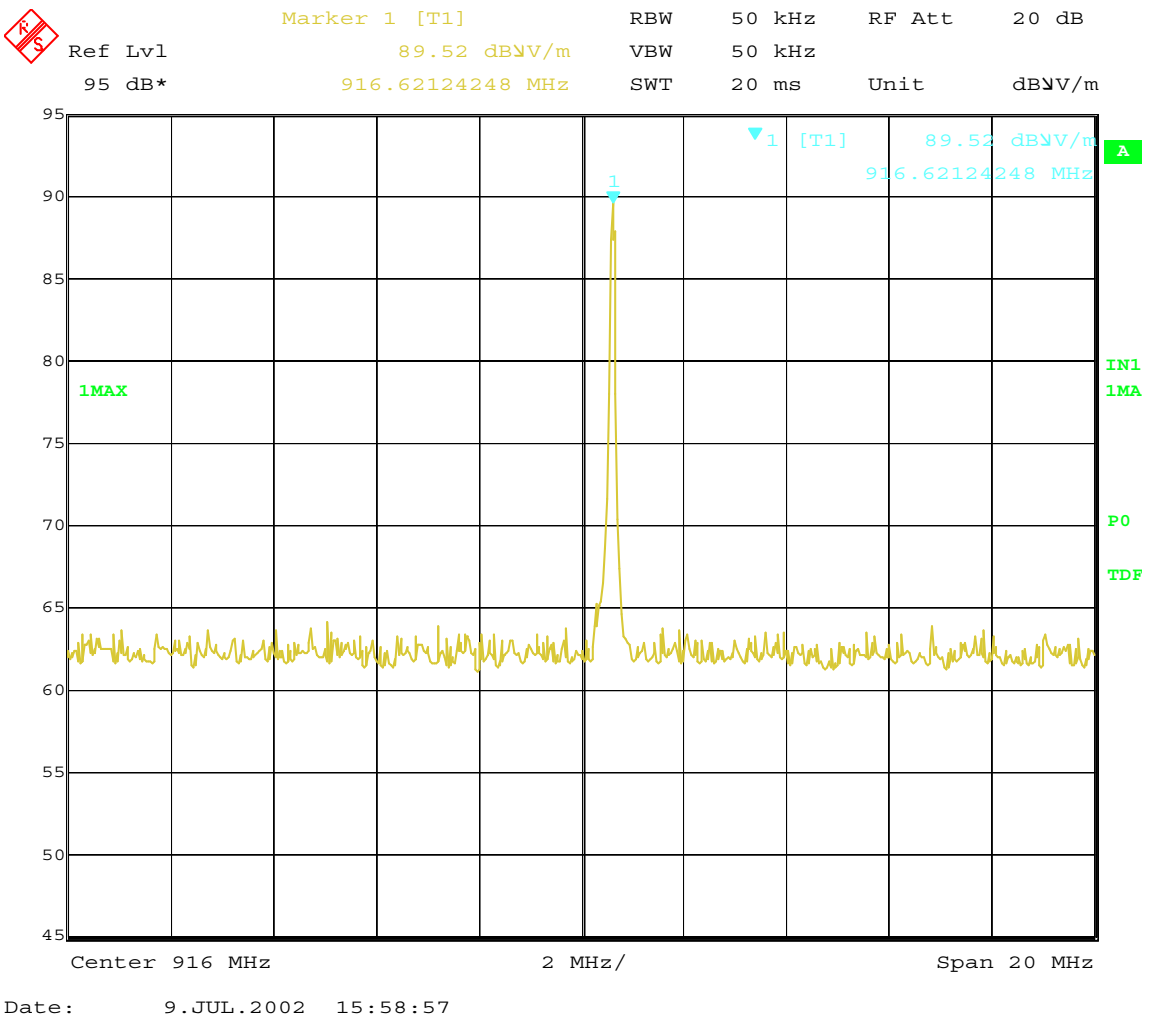


Figure 2 Test setup

Figure 3 EUT on non-conducting table

Appendix B

Bandwidth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VBW 50 kHz
95 dB*
916.62124248 MHz
SWT 20 ms
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