



Nemko Test Report: 16622RUS1

Applicant: Freshloc Sensor Systems
15443 Knoll Trail Drive
Suite 100
Dallas, Texas 75248
USA

**Equipment Under Test:
(E.U.T.)** 90-0116-002 Transceiver

In Accordance With: **FCC Part 15, Subpart C, 15.249**
Operation within the bands 902-928 MHz,
2400-2483.5 MHz, 5725-5875 MHz, and
24.0-24.25 GHz.

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY:



David Light, Senior Wireless Engineer

DATE: 10 March, 2009

APPROVED BY:



Tom Tidwell, Telecom Direct

DATE: 12 March, 2009

Total Number of Pages: 17

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Section 1. Summary Of Test Results

Manufacturer: Freshloc Sensor Systems

Model No.: 90-0116-002 Transceiver

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15.249. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated Emissions were made on an open area test site.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



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Nemko USA, Inc.

CFR 47, PART 15, SUBPART C, Paragraph 15.249

Operation within the bands 902-928 MHz,
2400-2483.5 MHz, 5725-5875 MHz,
and 24.0-24.25 GHz.

EQUIPMENT: 90-0116-002 Transceiver

PROJECT NO.:16622RUS1

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Conducted Emissions	15.207	Complies
Radiated Emissions	15.249	Complies

Footnotes:

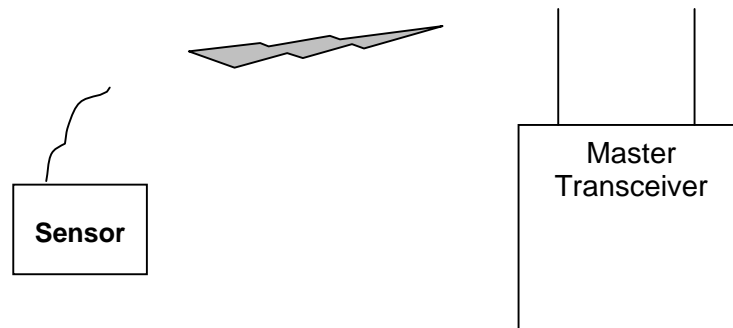
Section 2. General Equipment Specification

Frequency Band:	902 to 928 MHz				
Operating Frequency(ies) of Sample:	915.25 to 917.25 MHz				
User Frequency Adjustment:	Set at factory. Not adjustable by user.				
Supply Voltage:	120 Vac				
Integral Antenna	<table><tbody><tr><td>Yes</td><td>No</td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></tbody></table>	Yes	No	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Yes	No				
<input type="checkbox"/>	<input checked="" type="checkbox"/>				

Description of EUT

The EUT is a base transceiver that logs environmental data from remote sensors.

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: David Light	DATE: 29 October 2008

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Quasi-peak	Limit (dBmV)
		Average
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.

Test Results: Complies

Measurement Data: See attached graph(s).

Method of Measurement: (Procedure ANSI C63.4-2003)

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak Detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak Detector.

Power Supply Information:

Manufacturer: Tamura Group
Model No.: 420AS06090
Serial No.: None
Input: 120 Vac, 60 Hz
Output: 6.0 Vdc, 900 mA

Test Data – Powerline Conducted Emissions

L1

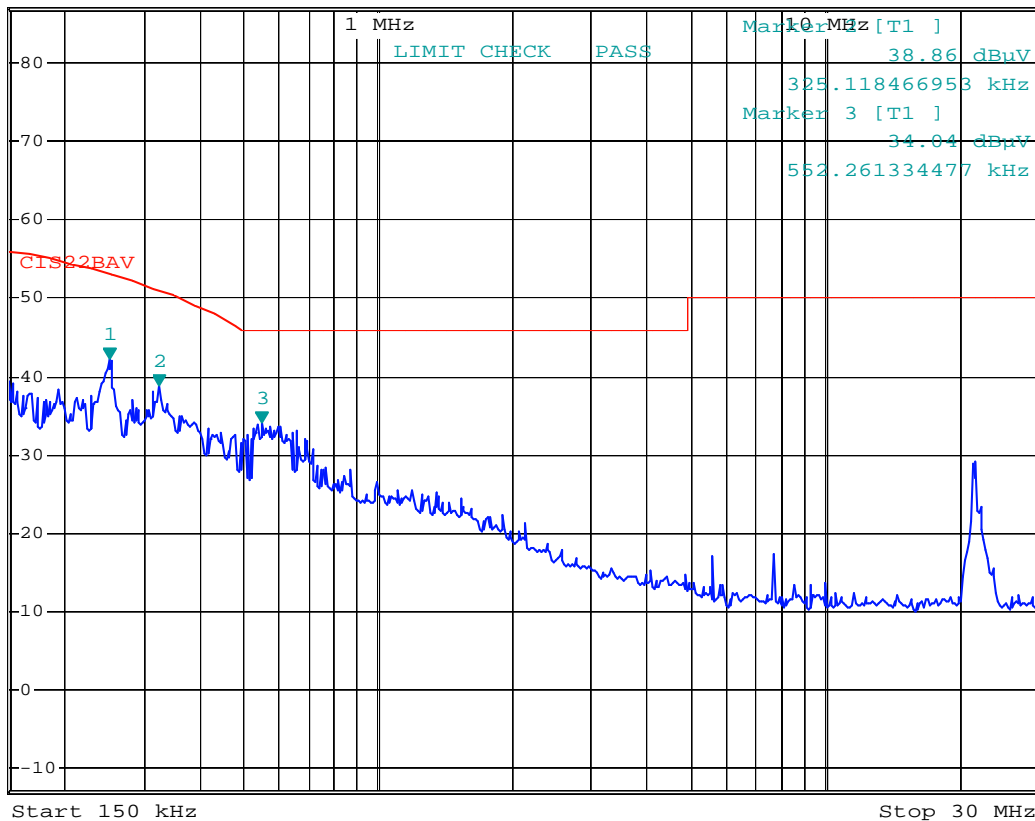


*RBW 10 kHz Marker 1 [T1]
VBW 30 kHz 42.19 dBuV
SWT 300 ms 253.214338782 kHz

Ref 87 dBuV

Att 10 dB

1 PK
VIEW



Date: 29.OCT.2008 10:22:48

Test Data – Powerline Conducted Emissions

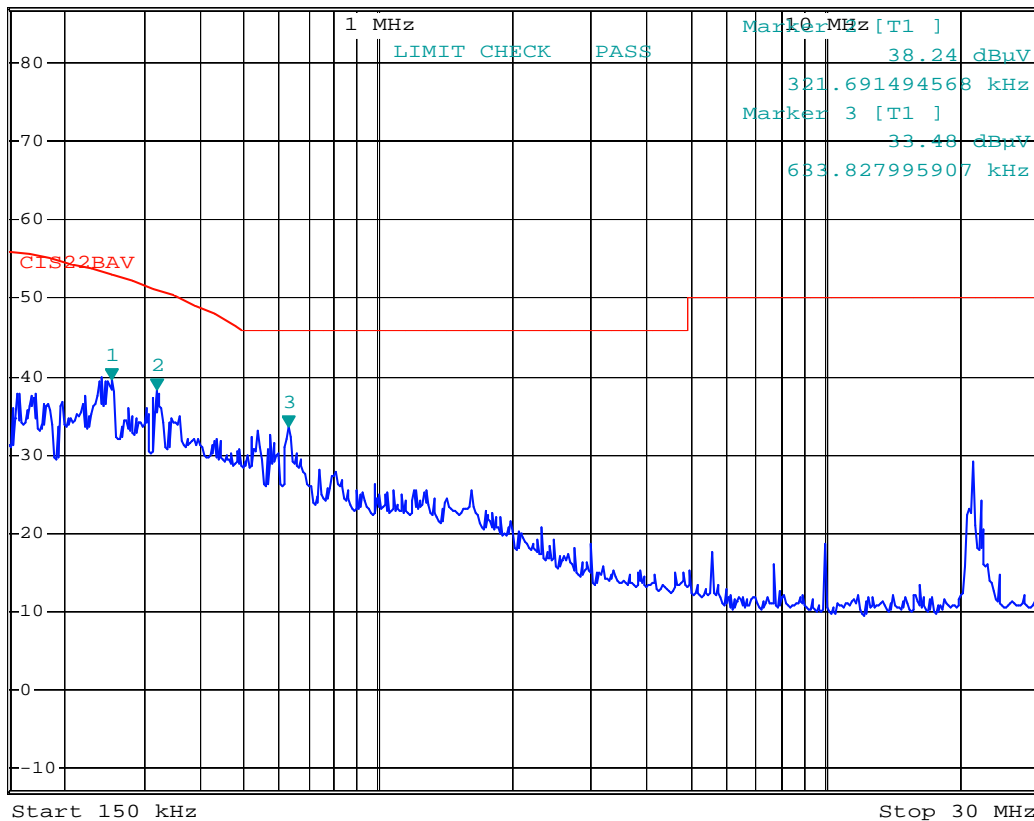
L2



MARKER 1
255.9118255 kHz
Ref 87 dBμV Att 10 dB

*RBW 10 kHz Marker 1 [T1]
VBW 30 kHz 39.53 dBμV
SWT 300 ms 255.911825539 kHz

1 PK
VIEW



Date: 29.OCT.2008 10:24:18

Test Equipment: 1663-545-1484

Section 3. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.249
TESTED BY: David Light	DATE: 09 March 2009

Minimum Standard: Para no. 15.249

(a) The field strengths shall not exceed the following:

Carrier (MHz)	Field Strength (mV/m)	Field Strength (dB μ V)	Harmonic (μ V/m)	Harmonic (dB μ V)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

(b) Field strength limits are specified at a distance of 3 metres.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limits of 15.209 whichever is the less attenuation.

(d) ...for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Test Results: Complies

Measurement Data: See attached table.

Test Data - Radiated Emissions**Spurious Data**

Frequency MHz	FCC B Limits	Peaks H_Peaks	Peaks Margin		Frequency MHz	FCC B Limits	Peaks V_Peaks	Peaks Margin
131.0	43.5	32.3	-11.2		119.4	43.5	30.5	-13.0
141.0	43.5	40.1	-3.4		131.0	43.5	30.6	-12.9
153.1	43.5	40.7	-2.8		141.0	43.5	35.5	-8.0
171.9	43.5	29.3	-14.2		152.6	43.5	35.6	-7.9
218.4	46.0	27.0	-19.0		230.0	46.0	28.9	-17.1
688.8	46.0	39.5	-6.5		688.8	46.0	43.8	-2.3
767.0	46.0	38.2	-7.8		865.8	46.0	42.8	-3.2
816.4	46.0	38.1	-7.9		908.4	46.0	41.9	-4.1
865.8	46.0	40.9	-5.1		965.0	54.0	40.2	-13.8
920.3	46.0	41.9	-4.1					

Carrier Data

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
											Mid Channel
916.25	V	0	64.6	23	3.8	0.0	91.4	94.0	-2.6	Pass	
916.25	H	0	58.4	23	3.8	0.0	85.2	94.0	-8.8	Pass	
											Low Channel
915.25	V	0	62.6	23	3.8	0.0	89.4	94.0	-4.6	Pass	
915.25	H	0	57.2	23	3.8	0.0	84.0	94.0	-10.0	Pass	
											High Channel
917.25	V	0	62.6	23	3.8	0.0	89.4	94.0	-4.6	Pass	
917.25	H	0	56.5	23	3.8	0.0	83.3	94.0	-10.7	Pass	

Analyzer Settings: <1000 MHz RBW=VBW=100 kHz Peak detector
 >1000 MHz RBW=VBW=1 MHz Peak detector

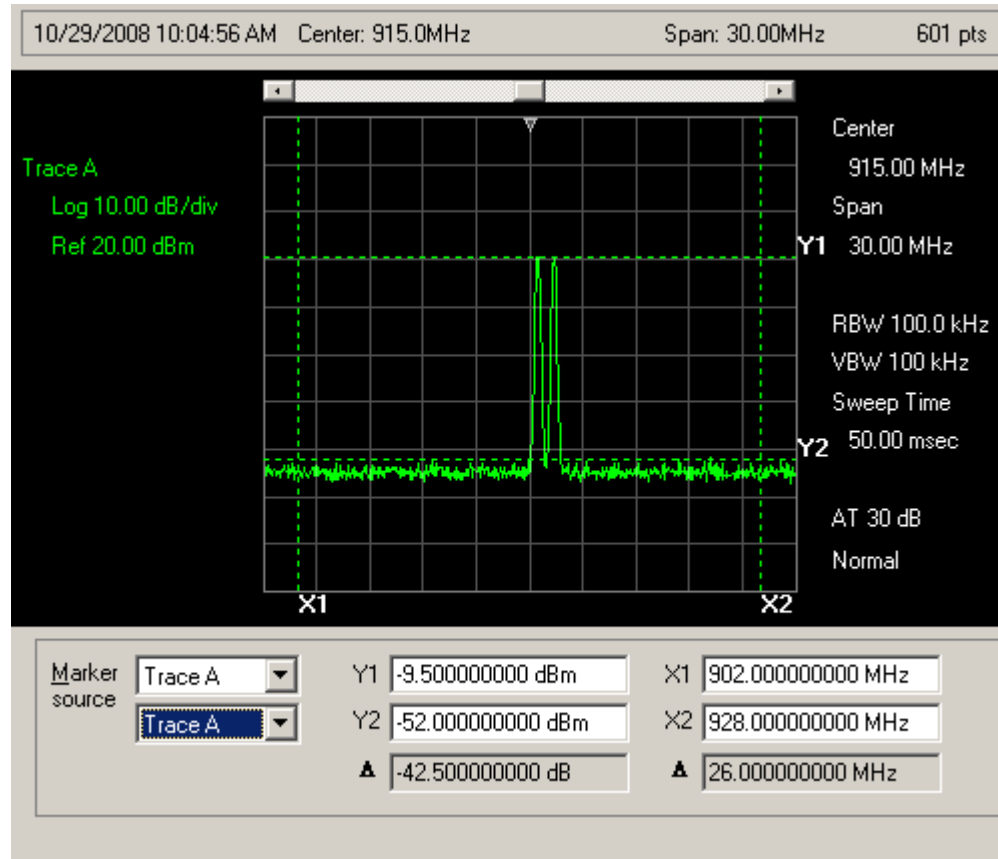
The spectrum was searched from 30 MHz to 10 GHz. All readings within 20 dB of the specification limit of 74 dBuV/m Peak and 54 dBuV/m Average are reported per 15.31(o). All readings are peak unless otherwise stated.

Input power was varied from 102 to 138 Vac with no effect on RF emissions.

Test Equipment: 1663-1763-1783-791-1016-1767-1304

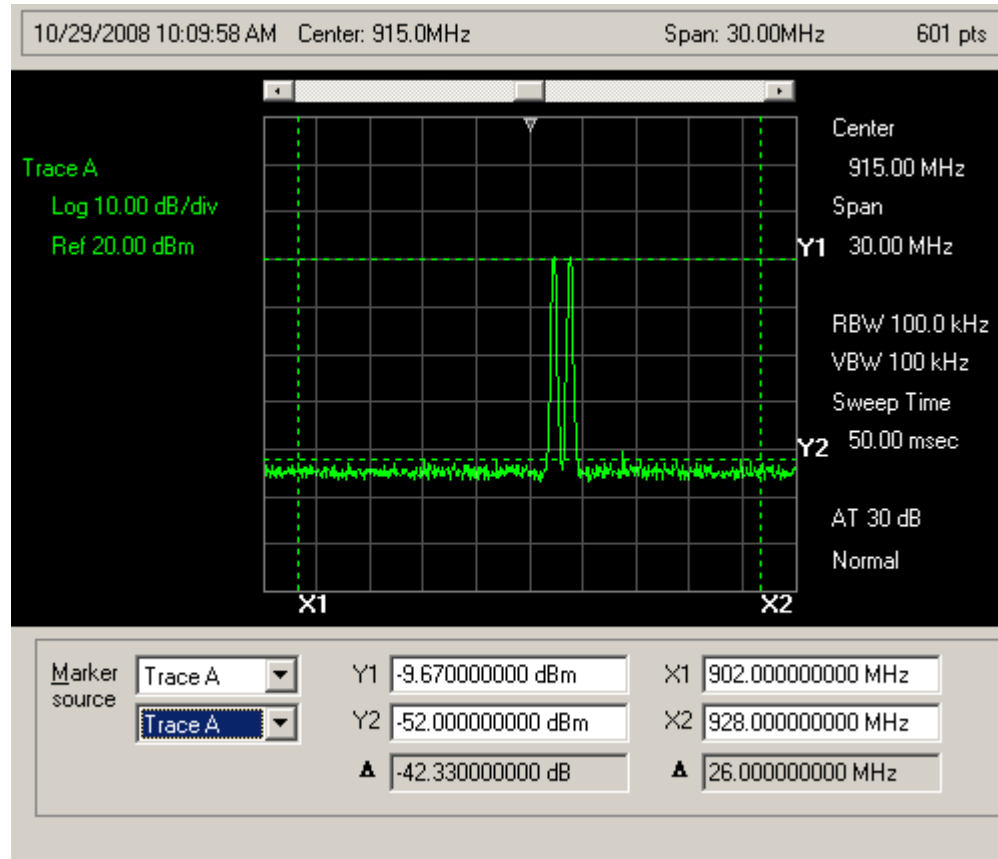
Band Edges

Lowest channel



Band Edges

Highest Channel



Section 4. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/27/09	02/28/11
1663	Spectrum Analyzer	Rhode & Schwarz FSP3	100073	06/03/08	06/03/09
1763	Bilog Antenna	Schaffner CBL 6111D	22926	11/04/08	11/04/09
1783	Cable	Nemko 0	0	06/12/08	06/12/09
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/07/08	05/07/09
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/07/08	05/07/09
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/09/08	09/10/10
545	LISN	Schwarz Beck 8120	8120350	08/05/08	08/05/09
1484	Cable	Storm PR90-010-072	N/A	05/07/08	05/07/09
1767	EMI Test Receiver 20Hz - 26.5 GHz	ROHDE & SCHWARZ ESIB26	837491/0002	09/20/07	09/20/09

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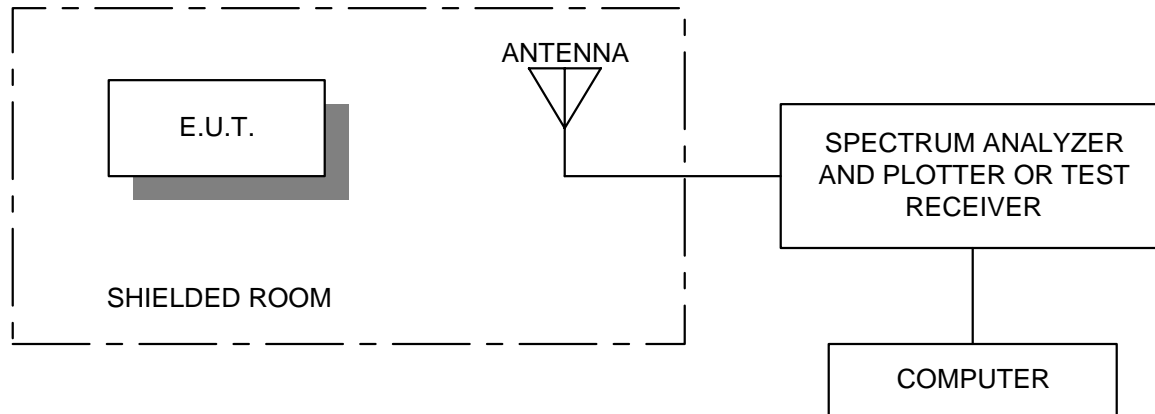
EQUIPMENT: 90-0116-002 Transceiver

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ANNEX A

TEST DIAGRAMS

Radiated Prescan



Test Site For Radiated Emissions

