Nemko Test Report:	14914RUS1
Applicant:	Dickson/Unigage, Inc. 930 S. Westwood Avenue Addison, IL 60101
Equipment Under Test: (E.U.T.)	Dickson Wizard Telemetry Transceiver Base Receiver/Repeater
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: _____ **DATE:** **13 May, 2008**

Tom Tidwell, Wireless Engineer

APPROVED BY: _____ **DATE:** **14 May, 2008**

Mike Cantwell, Frontline Manager

Total Number of Pages: 19

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Section 1. Summary Of Test Results

Manufacturer: Dickson/Unigage, Inc.

Model No.: Wizard

Serial No.: 0129

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".

NVLAP LAB CODE: 100426-0

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

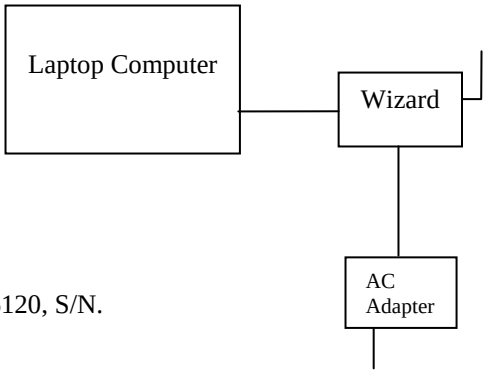
Frequency Range:	902 – 928 MHz 902.4 – 927.6 MHz
Operating Frequency(ies) of Sample:	902.4 MHz, 910.4 MHz, 927.6 MHz
Tunable Bands:	1
Number of Channels:	64
Occupied Bandwidth	200 kHz
Channel Spacing:	400 kHz
User Frequency Adjustment:	Not User adjustable

	Yes	No
Integral Antenna (Reverse SMA connector. Supplied with rubber ducky Antenna Factor M/N. ANT-916-CW-HWR-RPS.)	☐	☒

Description of EUT

The EUT is a short-range radio transmitter that is used to send telemetry data from a remote location to a central location where the data is logged.

System Diagram



Laptop: HP/Commpaq nc6120, S/N. CNU54709Q8

AC Adapter: CUI, Inc. M/N. EPS050100, S/N. 695382-001

Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY:	DATE: 18 May, 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 Limit (dBmV) Quasi-peak	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.

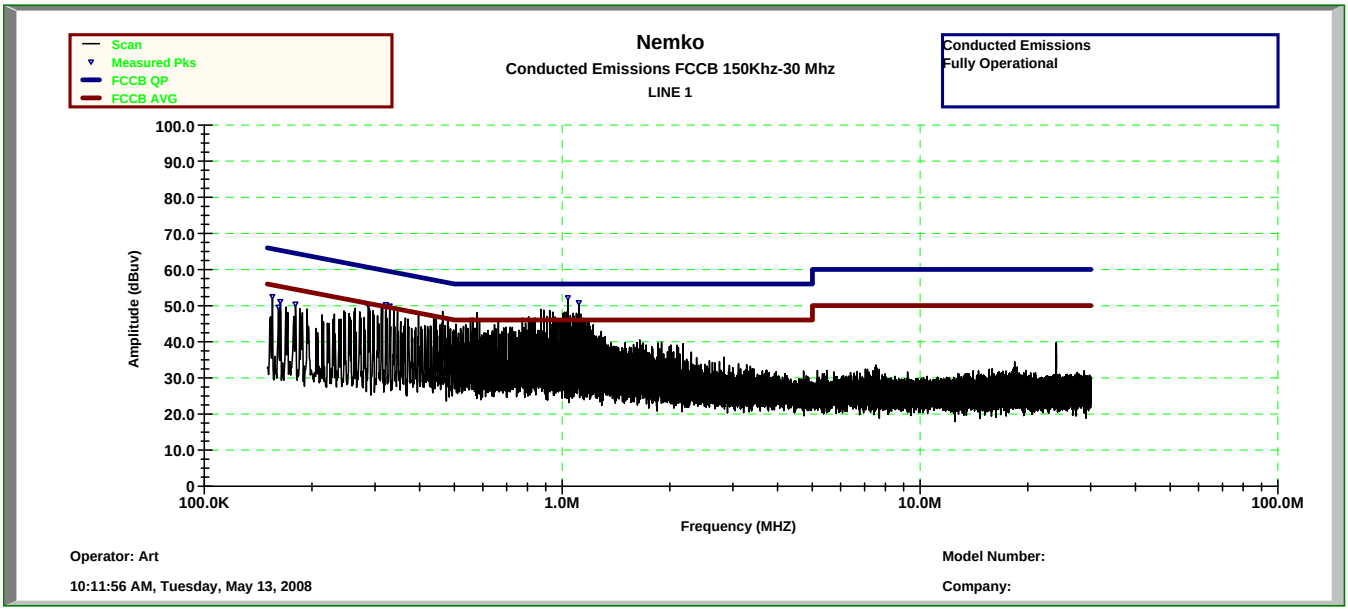
Test Results: Complies . See attached graphs and table.

Measurement Data: See attached graph(s).

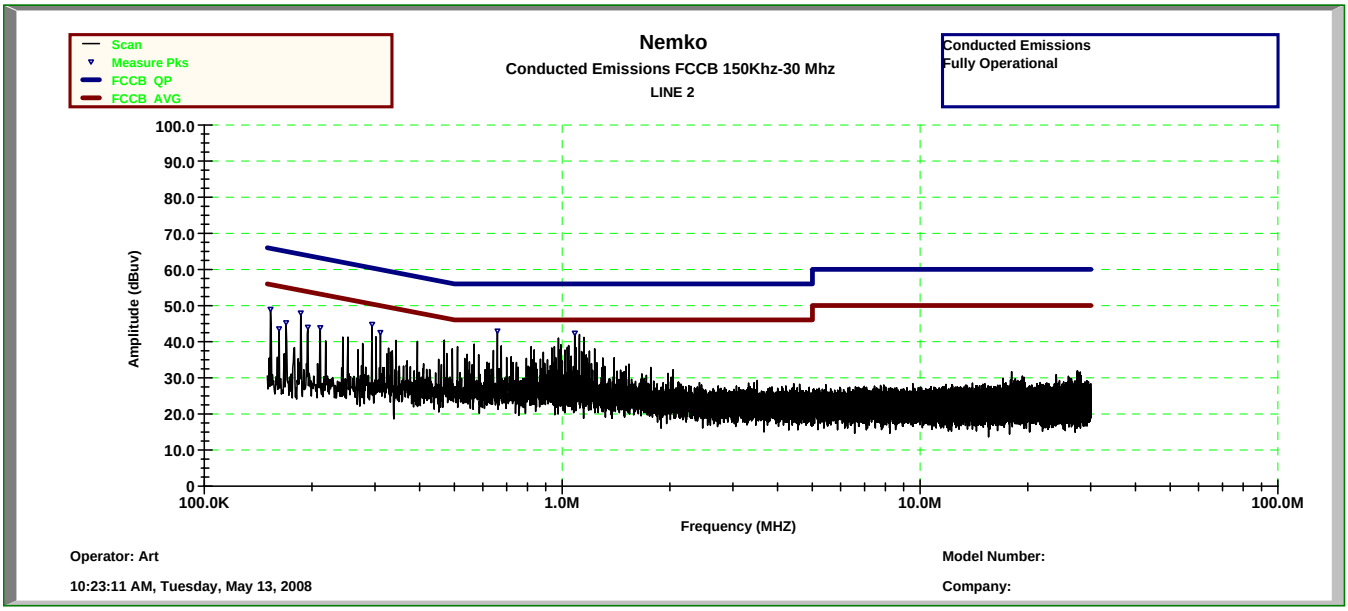
Method of Measurement: (Procedure ANSI C63.4-2003)

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.

Test Data – Powerline Conducted Emissions



NOTE: The above graph shows peak emissions. See table of CISPR QPk results for final measurement data.



NOTE: The peak emissions meet the average limit thus no QPk readings were taken.

Nemko USA, Inc.
Conducted Emissions Results
QP/AVG
LINE 1
Operator: Art Ruvalcaba
Company: Dickson/Unigage

Frequency	FCCB QP LIMIT	FCCB AVG LIMIT	AVG Meas	AVG Margin	QP Meas	QP Margin
282.09 kHz	62.23	52.23	26.65	-25.58	41.83	-20.40
320.9 kHz	61.12	51.12	26.57	-24.55	41.39	-19.73
326.85 kHz	60.95	50.95	28.17	-22.78	45.69	-15.26
331.53 kHz	60.81	50.81	28.12	-22.69	45.84	-14.97
1.0298 MHz	56.00	46.00	25.32	-20.68	41.21	-14.79
1.0985 MHz	56.00	46.00	25.92	-20.08	41.24	-14.76
1.0298 MHz	56.00	46.00	25.32	-20.68	41.21	-14.79
331.53 kHz	60.81	50.81	28.12	-22.69	45.84	-14.97
326.85 kHz	60.95	50.95	28.17	-22.78	45.69	-15.26
320.9 kHz	61.12	51.12	26.57	-24.55	41.39	-19.73
282.09 kHz	62.23	52.23	26.65	-25.58	41.83	-20.40

Conducted Photographs

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.249
TESTED BY: T. Tidwell	DATE: 1 May, 2008

Minimum Standard: Para no. 15.249

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

Carrier (MHz)	Field Strength (mV/m)	Field Strength (dBμV)	Harmonic (μV/m)	Harmonic (dBμV)
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.

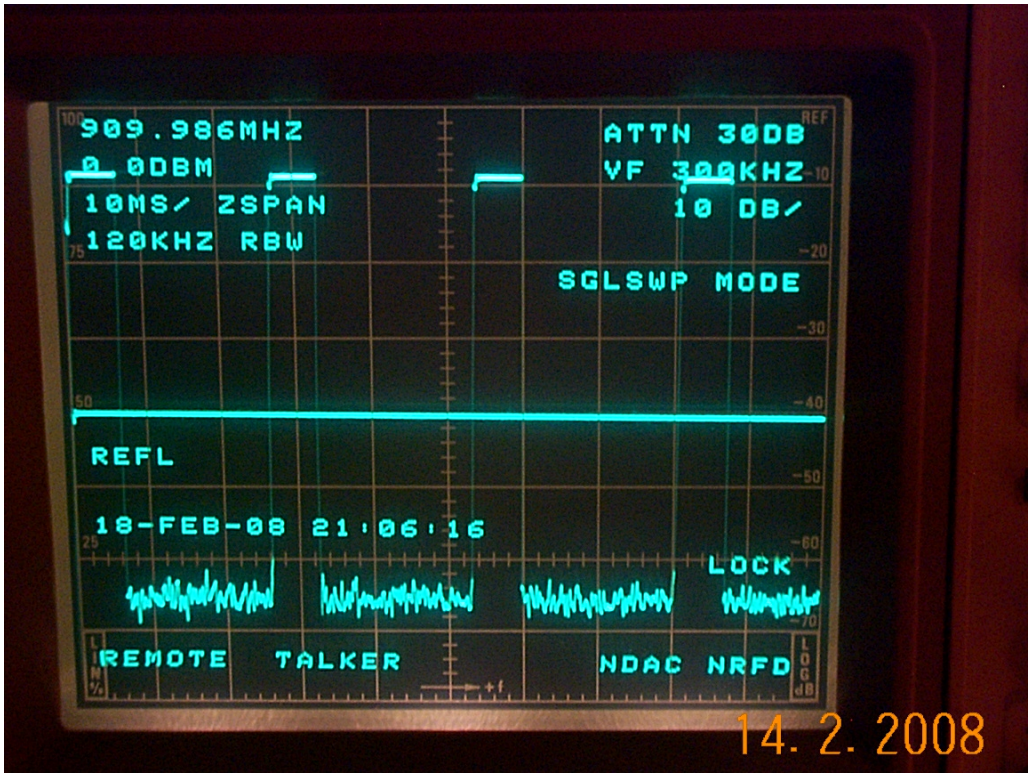
(c) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limits of 15.209 whichever is the less attenuation.

(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 tables.
NOTE: Field strength of the fundamental emission did not vary in amplitude when the power source was varied between 85% and 115% of nominal supply voltage (102 VAC – 138 VAC).

Test Data - Radiated Emissions



Worst-Case Duty Cycle

Duty Cycle Correction:

20 log(On Time/100msec)

20 log {(7x4)/100}

= 20 log (0.28)
= -11 dB

Radiated Spurious Emissions

Page 1 of 1 **FUNDAMENTAL**

Job No.: Date: 5/12/2008

Specification: 15.247/15.205 Temperature(°C): 22

Tested By: Tom Tidwell Relative Humidity(%) 40

E.U.T.: Base Repeater/Receiver

Configuration: Set to low, mid, and high channels (902.4 MHz, 910.4 MHz, and 927.6 MHz)

Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Polarity
902.40	64.6	23.0	3.6	0.0	91.2	94	-2.8	Vertical
902.40	59.8	23.0	3.6	0.0	86.4	94	-7.6	Horizontal
910.40	63.9	23.1	3.6	0.0	90.6	94	-3.4	Vertical
910.40	60.6	23.1	3.6	0.0	87.3	94	-6.7	Horizontal
927.60	63.3	23.0	3.6	0.0	89.9	94	-4.1	Vertical
927.60	60.7	23.1	3.6	0.0	87.4	94	-6.6	Horizontal

Notes: The measurments above were made using CISPR QPk detector

Radiated Emissions

Page 1 of 1

Job No.: 13119 Date: 5/1/2008

Specification: 15.249/15.205 Temperature(°C): 23

Tested By: Tom Tidwell Relative Humidity(%) 31

E.U.T.: Base Repeater/Receiver

Configuration: Set to low, mid, and high channels (902.4 MHz, 910.4 MHz, and 927.6

Sample Number:

Location: AC 3 RBW: 1 MHz (Avg. 1 MHz)

Detector Type: Peak VBW: 1 MHz (Avg. 10 Hz)

Test Equipment Used

Antenna: 993

Pre-Amp: 1016 Cable #1: 1484

Filter: 1060 Cable #2: 1485

Receiver: 1464 Cable #3: 1627

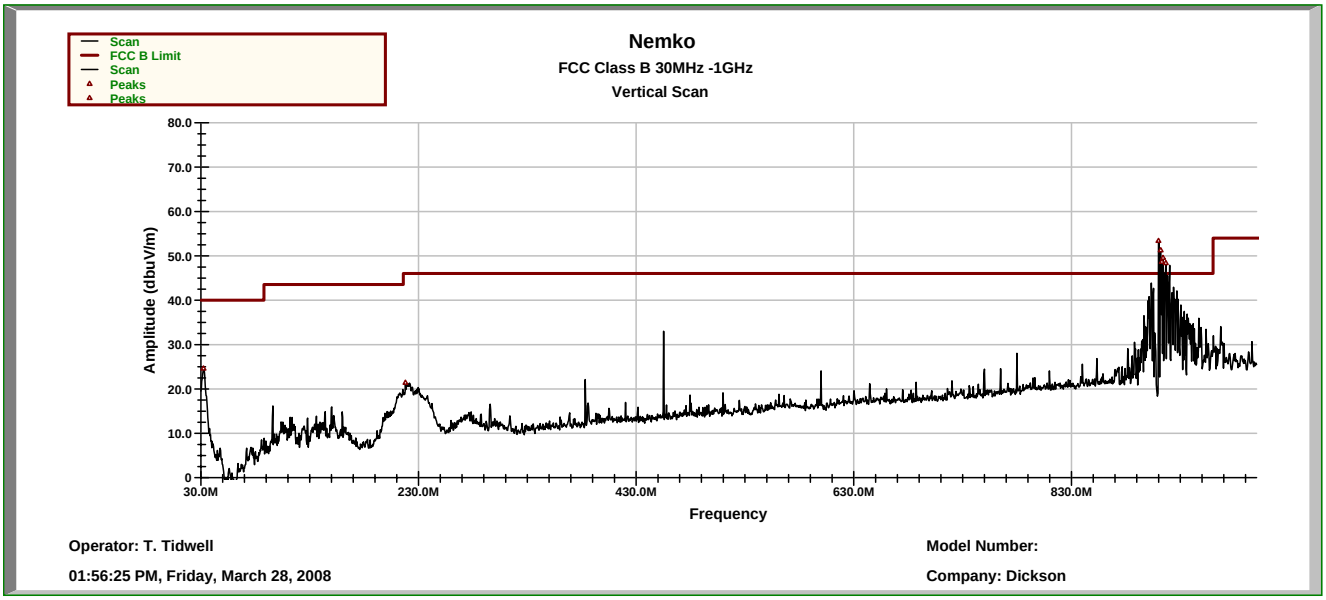
Attenuator #1 #N/A Cable #4: #N/A

Attenuator #2: #N/A Mixer: #N/A

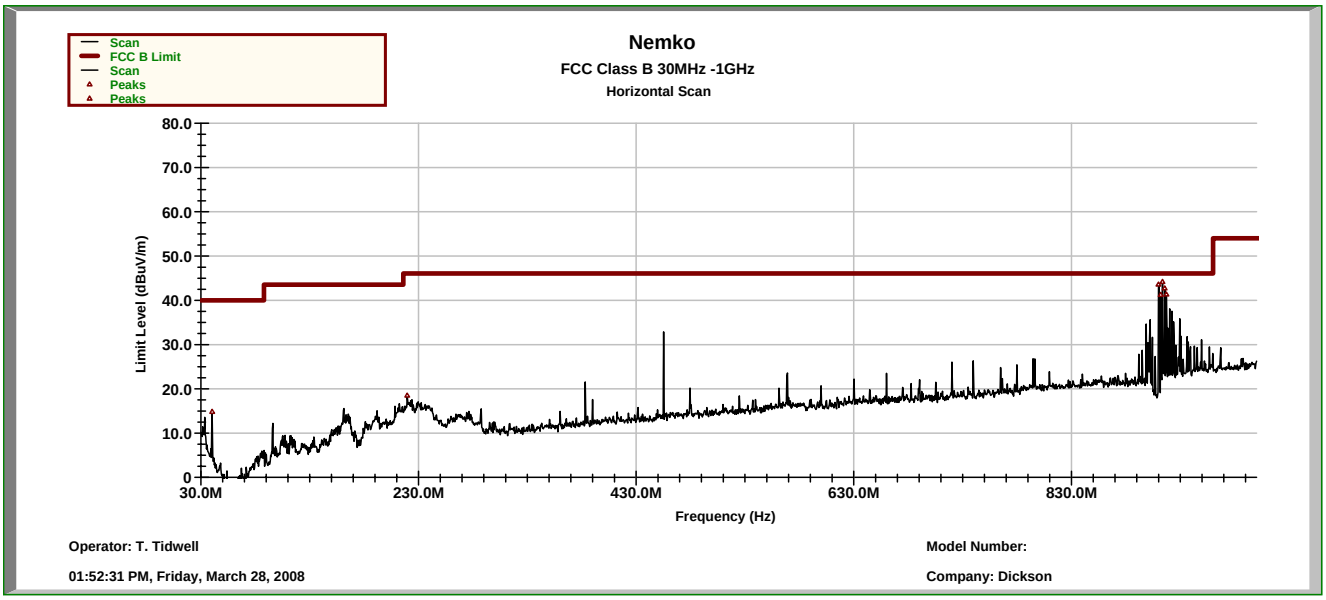
Measurement Uncertainty: +/- 3.6 dB

Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
1820.80	54.5	28.5	6.2	32.3	56.9	74	-	Peak/Horizontal
1820.80	42.3	28.5	6.2	32.3	44.7	-	54	Average/Horizontal
1820.80	57.0	28.5	6.2	32.3	59.4	74	-	Peak/Vertical
1820.80	42.8	28.5	6.2	32.3	45.2	-	54	Average/Vertical
2731.20	49.5	29.0	6.3	32.5	52.3	74	54	Peak/Horizontal
2731.20	53.3	29.0	6.3	32.5	56.1	74		Peak/Vertical
2731.20	40.7	29.0	6.3	32.5	43.5	-	54	Average/Vertical
3641.60	42.0	29.8	7.0	31.8	47.0	74	54	Peak/Horizontal
3641.60	34.8	29.8	7.0	31.8	39.8	74	54	Peak/Vertical
1855.20	58.6	28.5	6.2	32.4	60.9	74	-	Peak/Vertical
1855.20	44.5	28.5	6.2	32.4	46.8	-	54	Average/Vertical
2782.80	55.1	29.0	6.4	32.4	58.1	74	-	Peak/Vertical
2782.80	40.8	29.0	6.4	32.4	43.8	-	54	Average/Vertical
3710.40	41.0	29.9	7.3	31.7	46.5	74	-	Peak/Vertical
3710.40	37.1	29.9	7.3	31.7	42.6	-	54	Average/Vertical
1804.80	54.4	28.3	6.0	32.5	56.2	74	-	Peak/Vertical
1804.80	40.4	28.3	6.0	32.5	42.2	-	54	Average/Vertical
2707.20	53.2	29.0	6.1	32.6	55.7	74	-	Peak/Vertical
2707.20	41.1	29.0	6.1	32.6	43.6	-	54	Average/Vertical
3609.60	41.0	29.7	6.8	33.1	44.4	74	-	Peak/Vertical
3609.60	41.0	29.7	6.8	33.1	44.4	-	54	Average/Vertical

Radiated Emissions 30 MHz – 1000 MHz



NOTE: The emission that shows to be over the 15.209 Class B limit is the transmit carrier. A notch filter was used to reduce the amplitude so as not to overdrive the measurement receiver.



Radiated Photographs

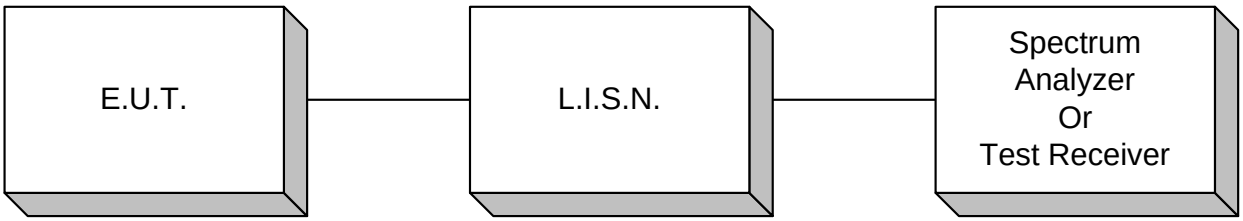
Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	05/26/06	05/26/08
1629	CABLE, 6 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A
1482	Band Pass Filter	K & L 11SH10-4000/T12000-0/0	2	Cal on Use	N/A
1033	Horn antenna	EMCO 3115	8812-3035	07/28/06	07/28/08
1767	EMI Test Receiver 20Hz - 26.5 GHz - 150 - +30 dBm LCD	ROHDE & SCHWARZ ESIB26	837491/0002	09/20/07	09/19/08
1310	Antenna horn	Electro Metrics RGA-60	6174	08/31/07	08/30/08
1763	Bilog Antenna	Schaffner CBL 6111D	22926	09/21/07	09/20/08
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/08
1484	Cable	Storm PR90-010-072	N/A	05/02/07	05/01/08
1485	Cable	Storm PR90-010-216	N/A	05/02/07	05/01/08

ANNEX A

TEST DIAGRAMS

Conducted Emissions



Test Site For Radiated Emissions