Nemko Test Report: 13810RUS1Rev1

Applicant: Weathermatic
3301 W. Kingsley Road
Garland, TX 75041
USA

Equipment Under Test: (E.U.T.) SLHUBRF

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:** **23 June, 2008**
David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **29 September, 2008**
Tom Tidwell, Telecom Direct

Total Number of Pages: 18

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Section 1. Summary Of Test Results

Manufacturer: Weathermatic

Model No.: SLHUBRF

Serial No.: HWM875104110004

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

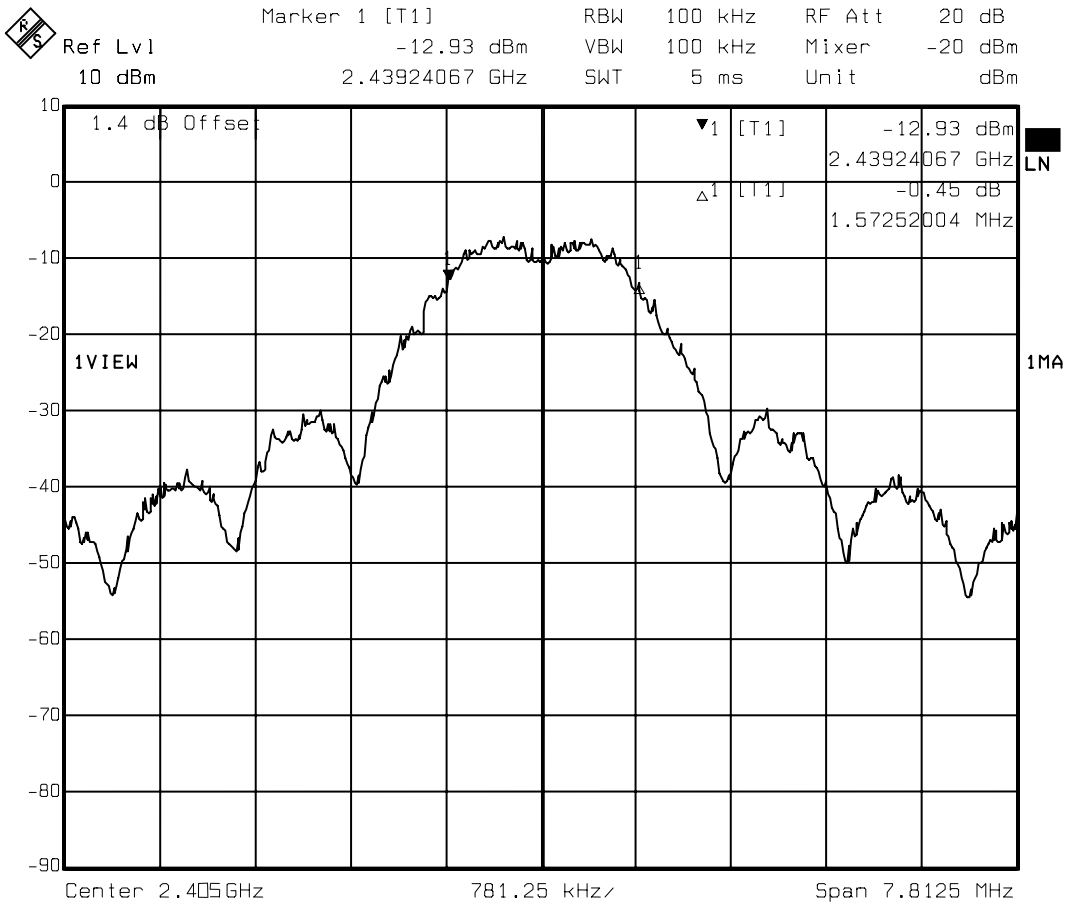
Footnotes For N/A's:

Section 2. General Equipment Specification

Frequency Range:	2405 Single channel
Operating Frequency(ies) of Sample:	2405 MHz
Supply Voltage:	120 Vac
Number of Channels:	1
Channel Spacing:	NA
User Frequency Adjustment:	NA

Integral Antenna **Yes** ☒ **No** ☐

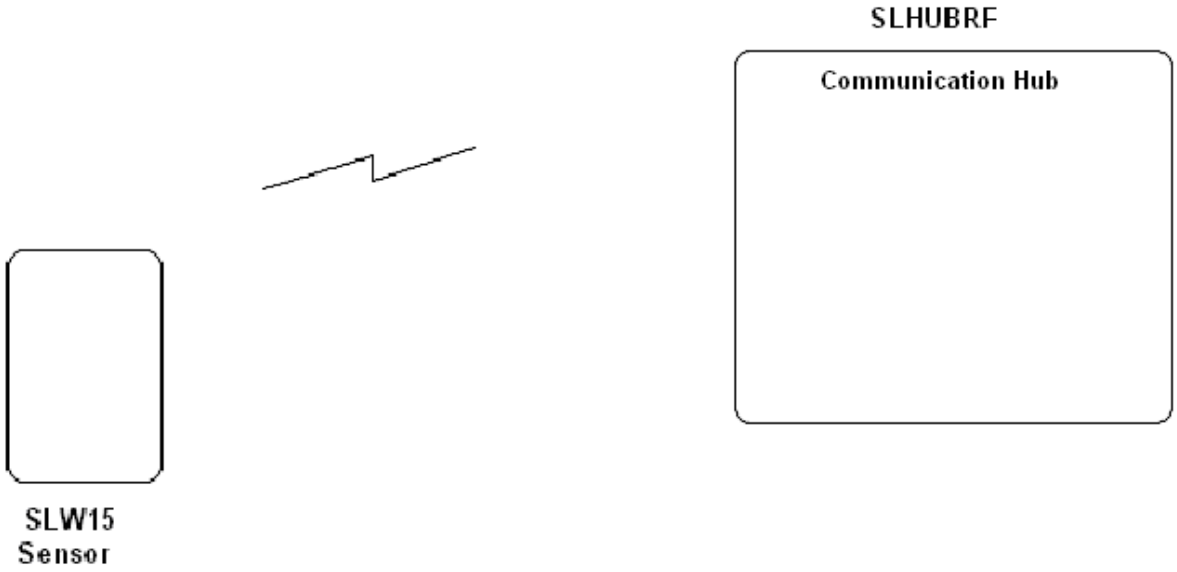
OCCUPIED BANDWIDTH



Description of EUT

The SLHUBRF is a wireless communication hub operating on a 2.4GHz frequency. Maximum range is 600 feet (182m) Line of Sight (LOS).

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: David Light	DATE: 23 june 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.

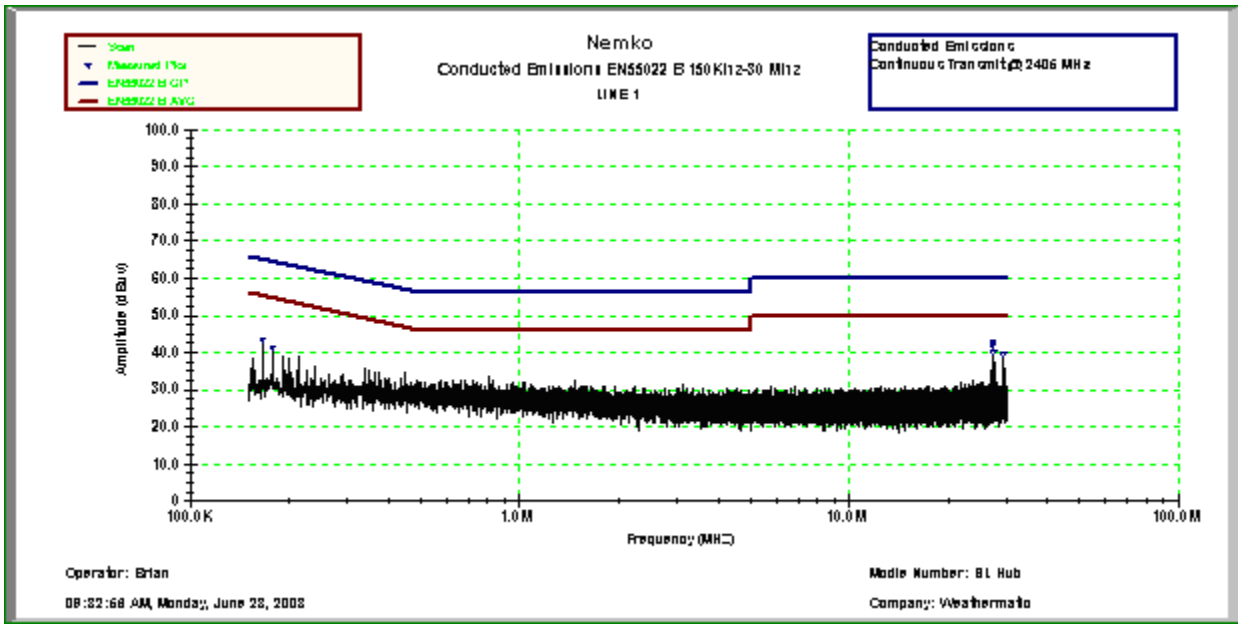
Test Results: Complies . See attached graph(s).

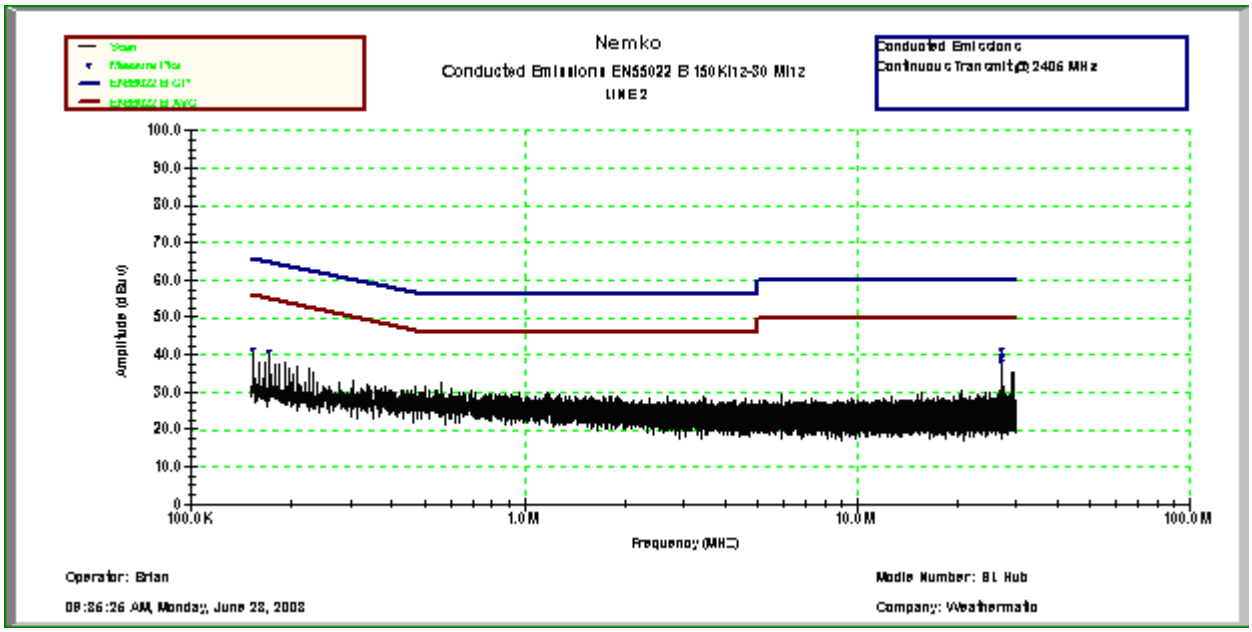
Measurement Data: See attached graph(s).

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





Test Data – Powerline Conducted Emissions

Modle Number: SL Hub
Company: Weathermatic
09:32:56 AM, Monday, June 23, 2008 Company: Weathermatic

Line 1

Frequency MHz	Peaks dBµV	Avg Limit dBµV	QP Limit dBµV	Margin dB	Margin dB
0.166	43.123	55.534	65.534	-12.410	-22.410
0.178	41.417	55.174	65.174	-13.756	-23.756
27.1503	42.282	50.000	60.000	-7.718	-17.718
27.1876	42.364	50.000	60.000	-7.636	-17.636
27.2249	41.983	50.000	60.000	-8.017	-18.017
27.2617	42.826	50.000	60.000	-7.174	-17.174
27.2995	42.119	50.000	60.000	-7.881	-17.881
27.3368	41.866	50.000	60.000	-8.134	-18.134
27.3746	40.285	50.000	60.000	-9.715	-19.715
29.3657	39.544	50.000	60.000	-10.456	-20.456

Line 2

0.152798	41.120	55.920	65.920	-14.800	-24.800
0.171455	40.501	55.387	65.387	-14.886	-24.886
271465	38.178	50.000	60.000	-11.822	-21.822
27.202	39.724	50.000	60.000	-10.276	-20.276
27.2207	39.789	50.000	60.000	-10.211	-20.211
27.2398	39.382	50.000	60.000	-10.618	-20.618
27.2767	41.033	50.000	60.000	-8.967	-18.967
27.2958	39.830	50.000	60.000	-10.170	-20.170
27.3331	39.735	50.000	60.000	-10.265	-20.265
27.3517	39.182	50.000	60.000	-10.818	-20.818

Conducted Photographs

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.249
TESTED BY: David Light	DATE: 23 June 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 table.

NOTE: There were no emissions detectable at the band edges (2400 MHz and 2483.5 MHz). The ambient noise floor is 20 dBuV/m @ 3m at these frequencies. This level is more than 20 dB below the specification limit of 54 dBuV/m @ 3m.

Test Data - Radiated Emissions

Freq MHz	Rdng dBµV	Cable Duty dB	Cable dB	Horn dB	Pre-A dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
2405.0	74.7	+0.7 +0.0	+2.3	+28.9	-0.0	+0.0	106.6	114.0	-7.4	Vert
2405.0 Ave	74.7	+0.7 -36.5	+2.3	+28.9	-0.0	+0.0	70.1	94.0	-23.9	Vert
12025.0	42.8	+1.8 +0.0	+5.5	+39.6	-35.2	+0.0	54.5	74.0	-19.5	Vert
12025.0 Ave	42.8	+1.8 -36.5	+5.5	+39.6	-35.2	+0.0	18.0	54.0	-36.0	Vert
14430.0	40.3	+1.6 +0.0	+5.6	+41.2	-31.6	+0.0	57.1	74.0	-16.9	Vert
14430.0 Ave	40.3	+1.6 -36.5	+5.6	+41.2	-31.6	+0.0	20.6	54.0	-33.4	Vert
16835.0	41.3	+2.0 +0.0	+6.3	+41.2	-33.8	+0.0	57.0	74.0	-17.0	Vert
16835.0 Ave	41.3	+2.0 -36.5	+6.3	+41.2	-33.8	+0.0	20.5	54.0	-33.5	Vert
2405.0	68.7	+0.7 +0.0	+2.3	+28.9	-0.0	+0.0	100.6	114.0	-13.4	Horiz
2405.0 Ave	68.7	+0.7 -36.5	+2.3	+28.9	-0.0	+0.0	64.1	94.0	-29.9	Horiz
12025.0	42.8	+1.8 +0.0	+5.5	+39.6	-35.2	+0.0	54.5	74.0	-19.5	Horiz
12025.0 Ave	42.8	+1.8 -36.5	+5.5	+39.6	-35.2	+0.0	18.0	54.0	-36.0	Horiz
14430.0	40.3	+1.6 +0.0	+5.6	+41.2	-31.6	+0.0	57.1	74.0	-16.9	Horiz
14430.0 Ave	40.3	+1.6 -36.5	+5.6	+41.2	-31.6	+0.0	20.6	54.0	-33.4	Horiz
16835.0	41.0	+2.0 +0.0	+6.3	+41.2	-33.8	+0.0	56.7	74.0	-17.3	Horiz
16835.0 Ave	41.0	+2.0 -36.5	+6.3	+41.2	-33.8	+0.0	20.2	54.0	-33.8	Horiz

Corrected Reading = Reading + Duty Cycle + AF + Cable Loss + PreAmp

All measurements are Peak unless otherwise indicated.

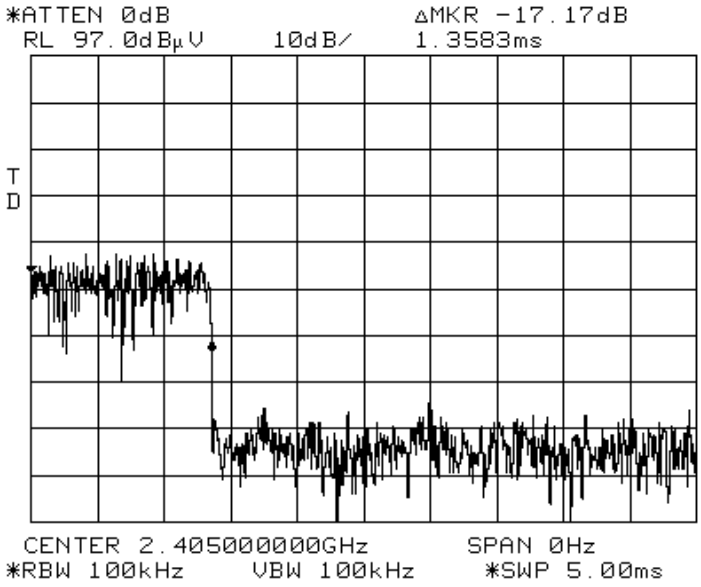
RBW = VBW = 1 MHz, Peak detector

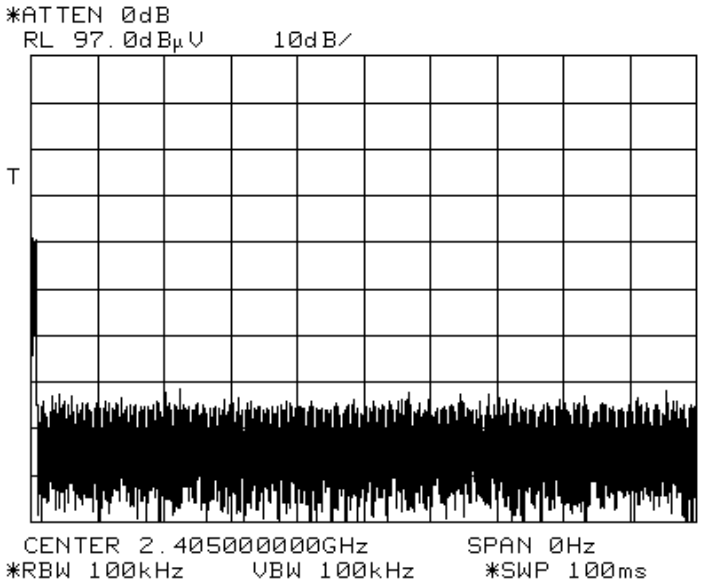
Measurement distance = 3 meters

Supply voltage was varied +/- 15% with no effect on output power.

The spectrum was searched from 30 MHz to 25 GHz.

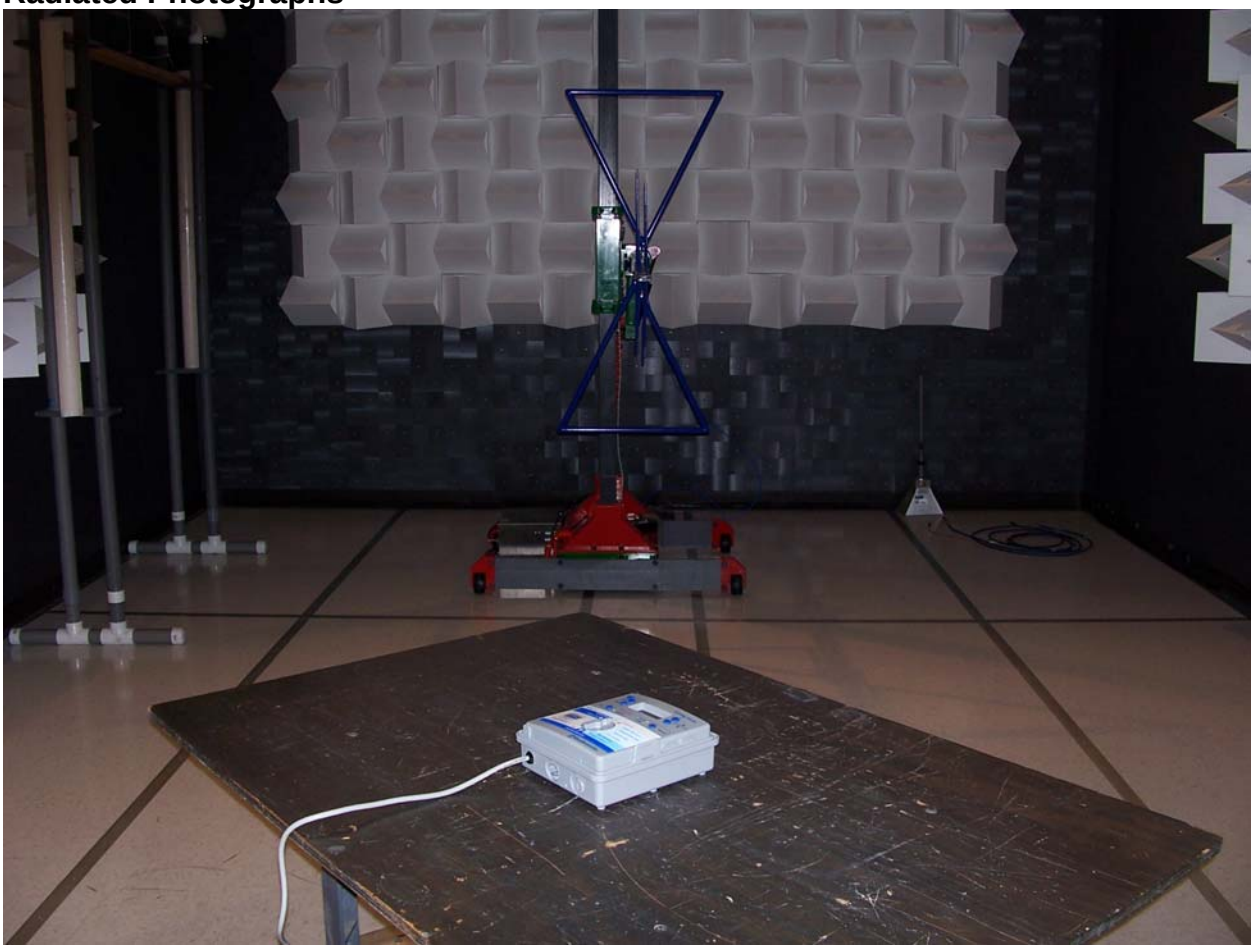
Duty Cycle Calculation





Duty Cycle = 20 log (1.3583/100) = -37.3 dB

Radiated Photographs



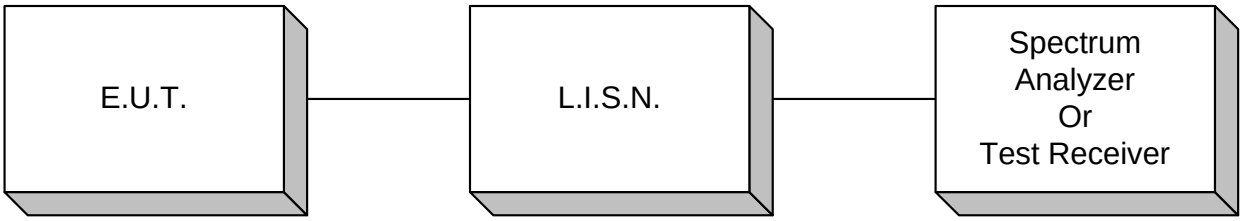
Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	05/07/08	05/07/09
1485	Cable	Storm PR90-010-216	N/A	05/07/08	05/07/09
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/07/08	05/07/09
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/08
1763	Bilog Antenna	Schaffner CBL 6111D	22926	09/21/07	09/20/08
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/07/08	05/07/09
703	LISN	Rohde & Schwarz ESH2-Z5	871884/048	02/06/08	02/05/09
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/24/07	01/24/09
674	LIMITER	HP 11947A	3107A02200	CBU	NA
1980	CABLE, 3.6m	Nemko USA, Inc. Semi-Flex Workhorse	N/A	11/27/07	11/26/08

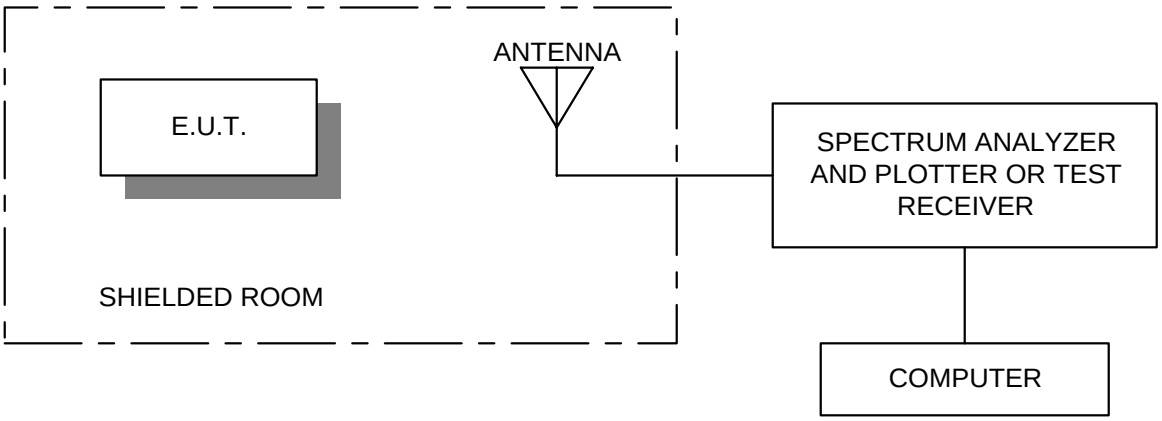
ANNEX A

TEST DIAGRAMS

Conducted Emissions



Radiated Prescan



Test Site For Radiated Emissions