

Nemko Test Report:

5L0570RUS1Rev3

Applicant:

Wavetronix
5314 North 250 West, #110
Provo, UT 84604
USA

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

SS125 - SmartSensor HD

In Accordance With:

FCC Part 15, Subpart C, 15.249
Transmitters

Tested By:

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

Authorized By:



Kevin Rose
Wireless Engineer

Date:

15 March, 2006

EQUIPMENT: SS125 - SmartSensor HD

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EQUIPMENT: SS125 - SmartSensor HD

Section 1. Summary Of Test Results

Manufacturer: Wavetronix

Model No.: SS125 - SmartSensor HD

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".



NVLAP LAB CODE: 100426-0

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EQUIPMENT: SS125 - SmartSensor HD

Summary Of Test Data

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

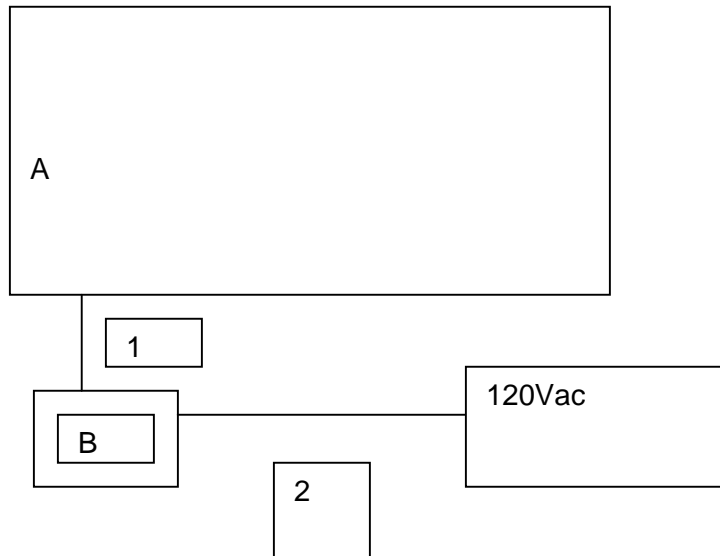
Description of Device Tested

The EUT is a wireless traffic monitoring device.

EQUIPMENT: SS125 - SmartSensor HD

Section 2. General Equipment Specification

Frequency Range: Single
 Operating Frequency(ies) of Sample: 24.125 GHz CF
 Tunable Bands: N/A
 User Frequency Adjustment: None
 Integral Antenna Yes No



- A EUT
- B: Power cube (elpac power systems) model FW1824 SN 004758
- 1 Custom cable one db 25 connector one db9 connector and 24vdc power cord
- 2 Standard power cord

EQUIPMENT: SS125 - SmartSensor HD

Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: David Light	DATE: 27 January 2006

Minimum Standard:

Limits for conducted disturbance at the mains ports

Frequency Range (MHz)	Quasi-peak Limits (dBuV)	Average Limits (dBuV)
0.15 to 0.50	66-56	56-46
0.50 to 5.00	56	46
5.00-30.0	60	50
The limit decreases with the logarithm of the frequency in the range 0.15MHz to 0.5 MHz		

Test Results: Complies The worst case emissions is 64.8 dB μ V at 0.150 MHz on the hot side of the line. This is 1.2 dB below the quasi-peak specification limit of 66 dB μ V.

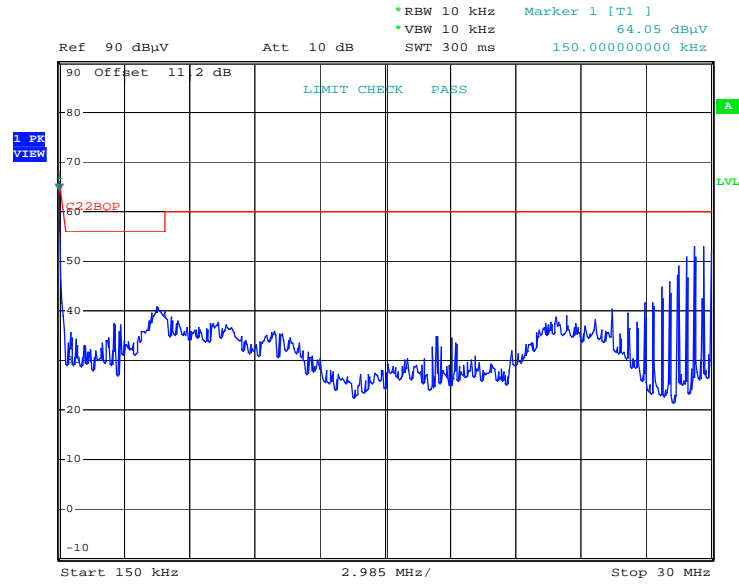
Measurement Data: See attached graph(s).

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.

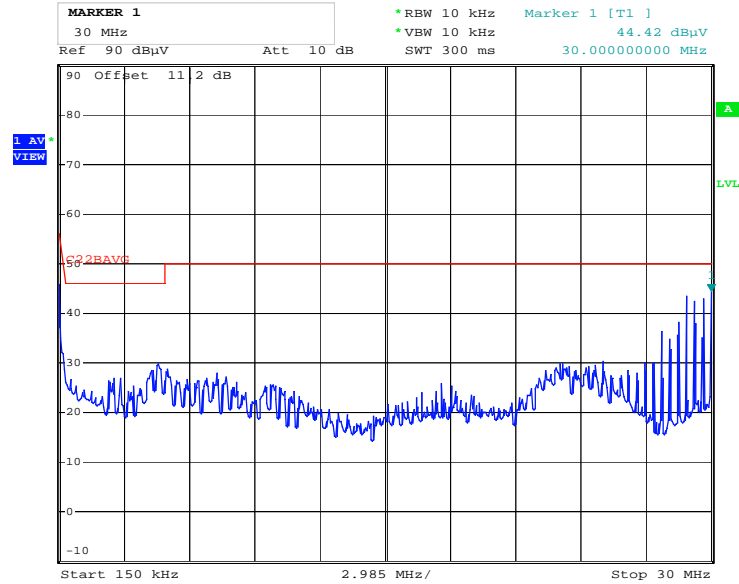
EQUIPMENT: SS125 - SmartSensor HD

Test Data – Powerline Conducted Emissions
Neutral side - Peak



Comment: Quasi Peak
Date: 27.JAN.2006 11:44:54

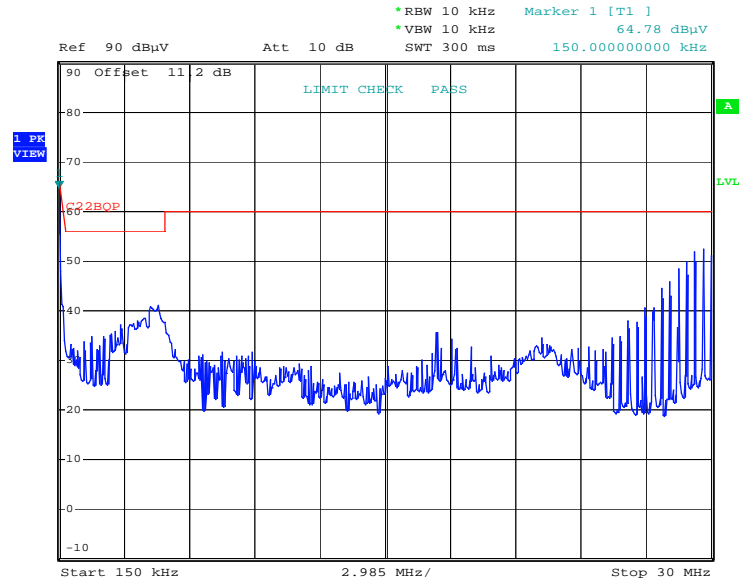
Neutral side Average



Comment: Quasi Peak
Date: 27.JAN.2006 11:46:41

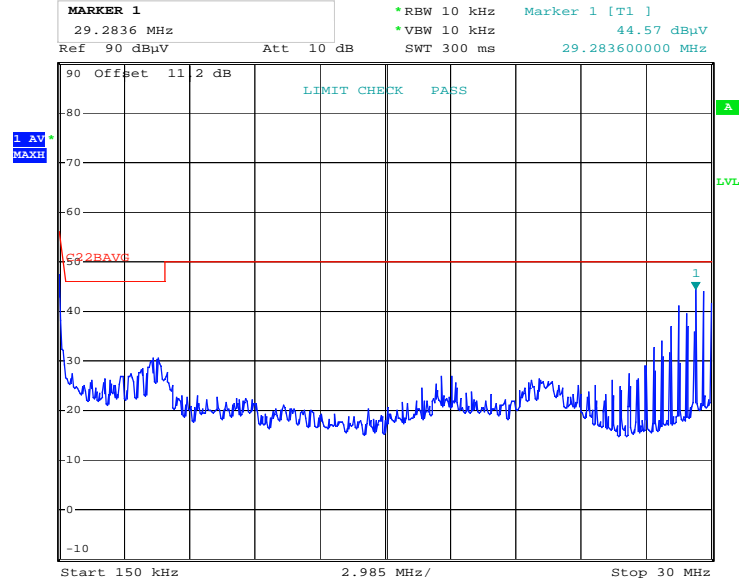
EQUIPMENT: SS125 - SmartSensor HD

Test Data – Powerline Conducted Emissions
Hot side - Peak



Comment: Quasi Peak
Date: 27.JAN.2006 11:43:43

Hot side Average



Comment: Quasi Peak
Date: 27.JAN.2006 11:42:14

EQUIPMENT: SS125 - SmartSensor HD

Test Setup Photographs



EQUIPMENT: SS125 - SmartSensor HD

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.249
TESTED BY: David Light	DATE: 25 January 2006

Minimum Standard: Para no. 15.249

The field strengths shall not exceed the following:

Fundamental (MHz)	Field Strength (mV/m)	Field Strength (dB μ V)	Harmonic (mV/m)	Harmonic (dB μ V)
902-928	50	94	0.5	54
2400-2483.5	50	94	0.5	54
24000-24250	250	108	2.500	68

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

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.

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.

EQUIPMENT: SS125 - SmartSensor HD

Test Data - Radiated Emissions

<u>Radiated Emissions</u>	
Page <u>1</u> of <u>1</u>	
Job No.:	5L0570
Date:	3/10/2006
Specification:	15.249
Temperature(°C):	<u>22</u>
Tested By:	<u>David Light</u>
Relative Humidity(%):	<u>35</u>
E.U.T.:	<u>Sensor</u>
Configuration:	<u>Tx</u>
Sample Number:	<u>1</u>
Location:	<u>AC 3</u>
RBW:	<u>1 MHz</u>
Detector Type:	<u>Peak</u>
VBW:	<u>1 MHz</u>
<u>Test Equipment Used</u>	
Antenna:	<u>993</u>
Directional Coupler:	<u>#N/A</u>
Pre-Amp:	<u>1016</u>
Cable #1:	<u>1484</u>
Filter:	<u>#N/A</u>
Cable #2:	<u>1485</u>
Receiver:	<u>1036</u>
Cable #3:	<u>#N/A</u>
Attenuator #1:	<u>#N/A</u>
Cable #4:	<u>#N/A</u>
Attenuator #2:	<u>#N/A</u>
Mixer:	<u>#N/A</u>
Measurement Uncertainty:	<u>+/- 3.7 dB</u>

Frequency (GHz)	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
12.063	44.0	39.7	7.3	35.1	55.9	74.0		Peak/Vertical/3m
12.063	28.0	39.7	7.3	35.1	39.9		54.0	Avg/Vertical/3m
12.063	42.3	39.7	7.3	35.1	54.2	74.0		Peak/Horizontal/3m
12.063	27.5	39.7	7.3	35.1	39.4		54.0	Avg/Horizontal/3m
24.125	106.0	40.4	4.0	49.8	100.6	137.5	117.5	Peak/Horizontal/1m
24.000	76.0	40.4	4.0	49.8	70.6	84.0		Peak/Horizontal/1m
24.000	62.0	40.4	4.0	49.8	56.6		64.0	Average/Horizontal/1m
24.250	76.0	40.4	4.0	49.8	70.6	84.0		Peak/Horizontal/1m
24.250	62.6	40.4	4.0	49.8	57.2		64.0	Average/Horizontal/1m
36.188	77.2	43.6	4.5	52.0	73.3	84.0		Peak/Horizontal/1m
36.188	60.6	43.6	4.5	52.0	56.7		64	Average/Horizontal/1m

Searched spectrum 30 MHz to 100 GHz. All emissions are reported.

Average measurements were made using an Average detector on spectrum analyzer.
 1 MHz RBW/10 MHz VBW

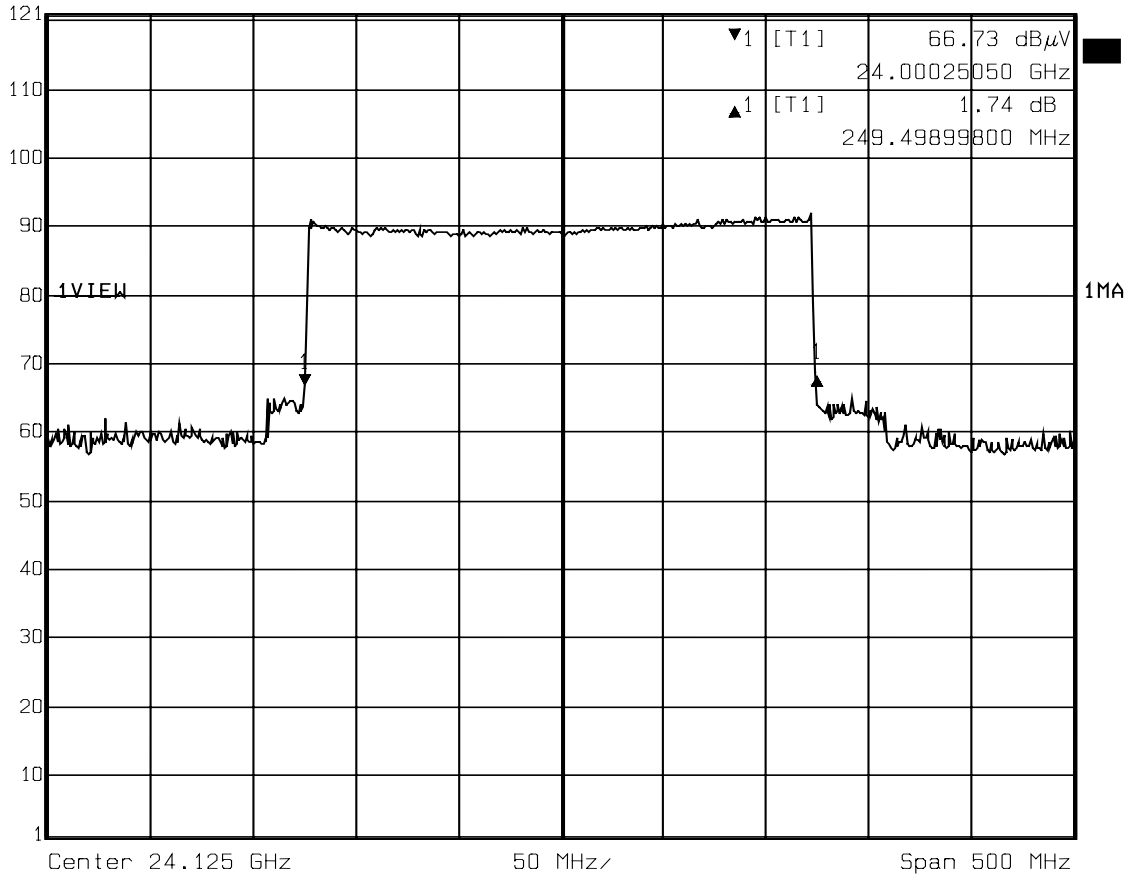
15.209 Limit applied at Bandedge

Fundamental emission was measured with input power varied ±15% with no noticeable change in output power.

EQUIPMENT: SS125 - SmartSensor HD

Test Data – 20 dB Bandwidth

	Delta 1 [T1]	RBW	100 kHz	RF Att	40 dB
	Ref Lvl	1.74 dB	VBW	100 kHz	
	121 dB μ V	249.49899800 MHz	SWT	125 ms	Unit dB μ V



Date: 13.MAR.2006 09:49:44

EQUIPMENT: SS125 - SmartSensor HD

Radiated Photographs



EQUIPMENT: SS125 - SmartSensor HD

Section 5. Test Equipment List

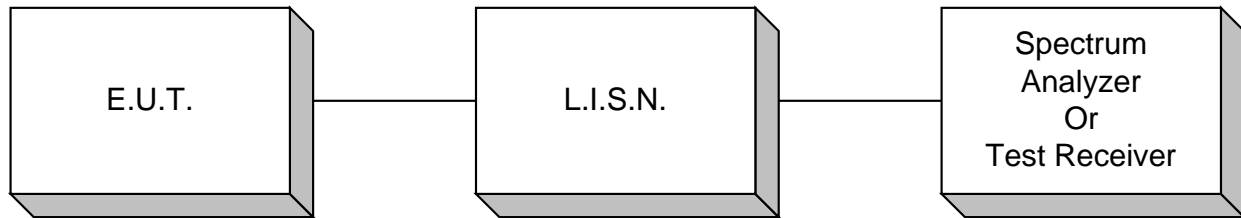
Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/05	11/12/06
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1484	Cable	Storm PR90-010-072	N/A	CBU	N/A
1485	Cable	Storm PR90-010-216	N/A	CBU	N/A
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	08/04/05	08/04/06
760	Antenna biconical	Electro Metrics MFC-25	477	08/04/05	08/04/06
791	PREAMP, 25dB	ICC LNA25	398	11/12/05	11/12/06
983	PRE-AMP, 18-40 GHz	KTL BB1	1	11/11/05	11/11/06
984	HORN ANTENNA	MILLITECH NONE	NONE	CNR	N/A
985	HORN ANTENNA	MILLITECH NONE	NONE	CNR	N/A
986	HARMONIC MIXER	Hewlett Packard 11970V	2521A01222	11/11/05	11/11/06
987	HARMONIC MIXER	Hewlett Packard 5356D	2521A00583	11/11/05	11/11/06
988	HARMONIC MIXER	Hewlett Packard 11970A	2332A01929	11/11/05	11/11/06
989	HARMONIC MIXER	Hewlett Packard 11970U	2332A00116	11/11/05	11/11/06
990	HORN ANTENNA	MILLITECH NONE	NONE	CNR	N/A
991	Horn antenna	EMCO 3160-10	9704-1049	CNR	N/A
992	Horn antenna	EMCO 3160-09	9705-1079	CNR	N/A
674	LIMITER	HP 11947A	3107A02200	CBU	N/A
1663	Spectrum Analyzer	Rhode & Schwarz FSP	973351	03/04/04	03/04/06
1534	CABLE, 9M	KTL RG223	NA	08/10/05	08/10/06
1555	Filter high pass 5KHz	Solar Electronics 7930-5.0	933125	04/20/05	04/20/06
545	LISN	Schwarz Beck 8120	8120350	01/30/05	01/30/06
1984	CABLE, 1m	KTL RG223	N/A	08/10/05	08/10/06

EQUIPMENT: SS125 - SmartSensor HD

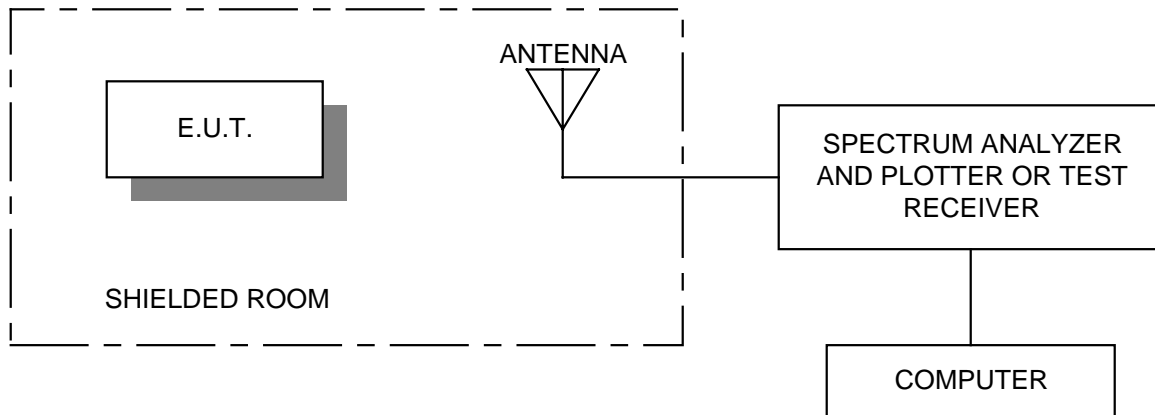
ANNEX A
TEST DIAGRAMS

EQUIPMENT: SS125 - SmartSensor HD

Conducted Emissions



Radiated Prescan



EQUIPMENT: SS125 - SmartSensor HD

Test Site For Radiated Emissions

