Nemko Test Report:	4L0715RUS1Rev2
Applicant:	AvaLAN WirelessSystems, Inc. 2400 El Camino Real Suite 317 Mountain View, CA 94040
Equipment Under Test: (E.U.T.)	AW900 Wireless Ethernet Link
FCC ID:	R4N-AW900
In Accordance With:	**FCC Part 15, Subpart C, 15.247**
Tested By:	Nemko Dallas Inc. 802 N. Kealy Lewisville, Texas 75057-3136
Authorized By:	 Tom Tidwell, Frontline Group Manager
Date:	13 Dec. 2004

Table of Contents

Section 1. Summary of Test Results

Manufacturer: AvaLAN Wireless Systems, Inc.

Model No.: AW900 ver2

Serial No.: 000022

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 Part 15, Subpart C, Paragraph 15.247 for Direct Sequence Spread Spectrum devices. Radiated tests were conducted is accordance with ANSI C63.4-2004. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☐	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. NONE

NVLAP LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
Powerline Conducted Emissions	15.207(a)	48 dBµV	NA
Minimum 6 dB Bandwidth	15.247(a)(2)	>500 kHz	NA
Maximum Peak Power Output	15.247(b)(1)	<1 Watt	NA
Spurious Emissions (Antenna Conducted)	15.247(c)	-20 dBc/100kHz	NA
Spurious Emissions (Restricted Bands)	15.247(c)	< 74 dBuV/m Peak < 54 dBuV/m Avg	COMPLIES
Peak Power Spectral Density	15.247(d)	+8 dBm/3kHz	NA

Footnotes:

The change being made for Class II is to include a new antenna, therefore radiated emissions in the restricted bands was the only testing performed.

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Band: 902 to 928 MHz

Description of Modification for Modification Filing

A 15 dBi gain Yagi antenna is now being offered for extended coverage outdoors.

Operational Description

The AvaLAN Wireless Systems AW900 is designed to operate as a plug-and-play high speed wireless Ethernet link. The AW900 operates as a 900 MHz digital spread spectrum link with data rates as high as 1.5 Mb/s, making it an ideal replacement for traditional wired DSL/TI internet connections, as well as other high data rate secure communication applications.

The AW900 is typically used in pairs, and is powered by a standard wall type transformer supplying 6.0 VDC @ 500 mA. The AW900 is equipped with an ‘RJ-45’ type jack as the data access port, and uses a “Nearson” model S467AH-915S whip antenna or a 15 dBi Yagi.

Section 3. Spurious Emissions (Restricted Bands)

NAME OF TEST: Spurious Emissions (Restricted Bands)	PARA. NO.: 15.247 (c)
TESTED BY: David Light	DATE: 12/6/04

Test Results: Complies.

Measurement Data: See attached table.

Duty Cycle Calculation:

Duty Cycle correction factor(dB) = 20 log (rf_{ON} in ms/100ms)

On time in 100 msec. = 57.6 msec.

20 log (57/100) = -4.8 dB

Equipment Used: 1484-1485-1304-1464-1016-1983-791-759-760

Measurement Uncertainty: +/- 3.6 dB

Temperature: 22 °C

Relative Humidity: 45 %

Radiated Data

Low channel

Radiated Emissions

Page 1 of 3

Job No.: 4L0715 Date: 12/6/2004
Specification: 15.247/15.205 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 45
E.U.T.: 900 MHz DSSS Radio
Configuration: Tx
Sample Number: 1
Location: AC 3 RBW: 1 MHz
Detector Type: Peak VBW: 1 MHz

Test Equipment Used

Antenna: 1304 Directional Coupler: #N/A
Pre-Amp: 1016 Cable #1: 1484
Filter: 1481 Cable #2: 1485
Receiver: 1036 Cable #3: #N/A
Attenuator #1 #N/A Cable #4: #N/A
Attenuator #2: #N/A Mixer: #N/A
Measurement Uncertainty: +/- 3.6 dB

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
2.709	58.3	29.0	3.6	32.7	58.2	74	54	Peak / Vertical
2.709	53.5	29.0	3.6	32.7	53.4	74	54	Average / Vertical
3.612	52.5	30.7	3.6	32.4	54.4	74	54	Peak / Vertical
3.612	47.7	30.7	3.6	32.4	49.6	74	54	Average / Vertical
4.515	46.8	32.3	4.1	31.6	51.6	74	54	Peak / Vertical
4.515	42.0	32.3	4.1	31.6	46.8	74	54	Average / Vertical
7.224	40.5	36.0	5.2	32.1	49.6	74	54	Peak / Vertical
7.224	35.7	36.0	5.2	32.1	44.8	74	54	Average / Vertical
2.709	55.3	29.0	3.6	32.7	55.2	74	54	Peak / Horizontal
2.709	50.5	29.0	3.6	32.7	50.4	74	54	Average / Horizontal
3.612	52.8	30.7	3.6	32.4	54.7	74	54	Peak / Horizontal
3.612	48.0	30.7	3.6	32.4	49.9	74	54	Average / Horizontal
4.515	46.5	32.3	4.1	31.6	51.3	74	54	Peak / Horizontal
4.515	41.7	32.3	4.1	31.6	46.5	74	54	Average / Horizontal
7.224	44.2	36.0	5.2	32.1	53.3	74	54	Peak / Horizontal
7.224	39.4	36.0	5.2	32.1	48.5	74	54	Average / Horizontal

Test Data – Continued

High Channel

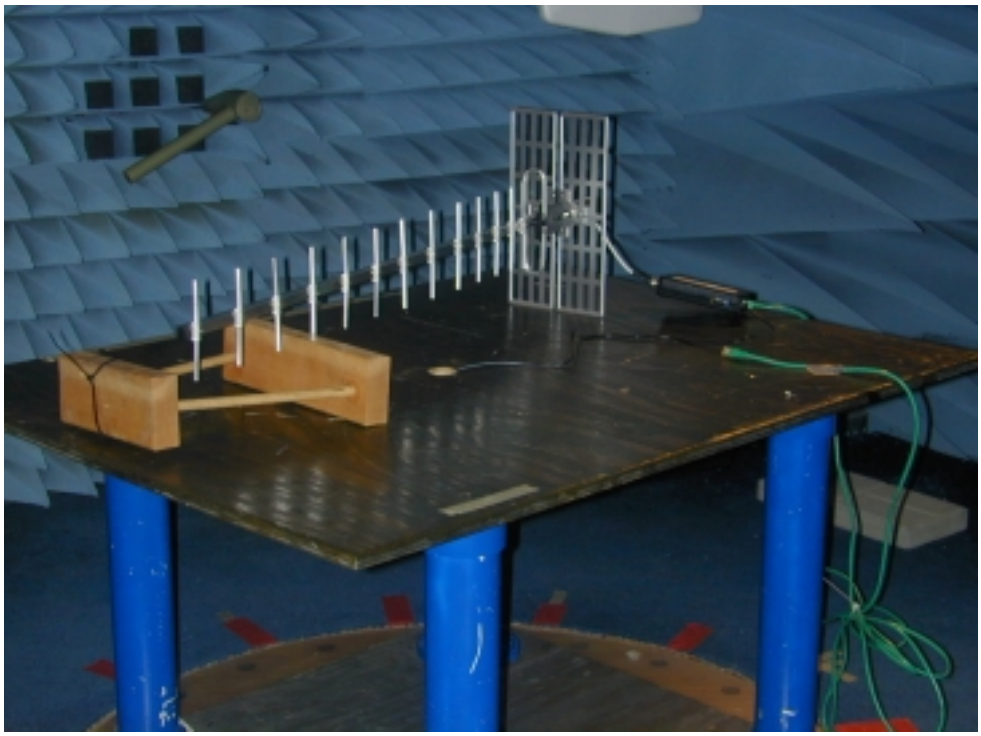
Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
2.778	56.0	29.0	3.6	32.7	55.9	74	54	Peak/Horizontal
2.778	51.2	29.0	3.6	32.7	51.1	74	54	Average/Horizontal
3.704	51.0	30.7	3.6	32.4	52.9	74	54	Peak/Horizontal
4.630	47.2	32.3	4.1	31.6	52.0	74	54	Peak/Horizontal
2.778	57.8	29.0	3.6	32.7	57.7	74	54	Peak/Vertical
2.778	53.0	29.0	3.6	32.7	52.9	74	54	Average/vertical
3.704	49.0	30.7	3.6	32.4	50.9	74	54	Peak/Vertical
4.630	45.0	32.3	4.1	31.6	49.8	74	54	Peak/Vertical
6.482	56.7	34.7	5.2	30.8	65.8	74	54	Peak/Vertical

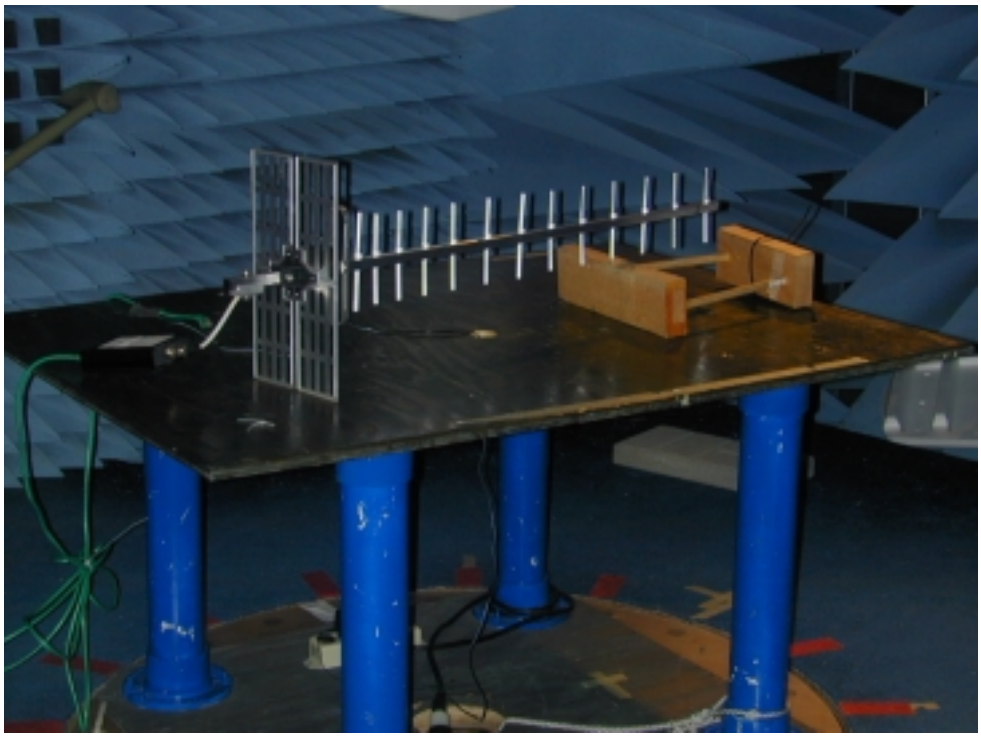
Mid channel

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
2.741	55.0	29.0	3.6	32.7	54.9	74	54	Peak/Horizonta
2.741	50.2	29.0	3.6	32.7	50.1	74	54	Average/Horizonta
3.654	50.7	30.7	3.6	32.4	52.6	74	54	Peak/Horizonta
4.568	45.3	32.3	4.1	31.6	50.1	74	54	Peak/Horizonta
2.741	57.0	29.0	3.6	32.7	56.9	74	54	Peak/Vertical
2.741	52.2	29.0	3.6	32.7	52.1	74	54	Average/vertica
3.654	48.8	30.7	3.6	32.4	50.7	74	54	Peak/Vertical
4.568	45.0	32.3	4.1	31.6	49.8	74	54	Peak/Vertical

Notes:	The spectrum was searched to 10 GHz
	The device was tested at 903, 914 and 926 MHz

Test Setup Photos





Section 4. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1481	Microwave Highpass Filter	K & L 3DH1-2000/T8000-0/0	4	Cal B4 Use	N/A
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	08/26/04	08/26/05
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	08/02/04	08/02/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/04	11/12/05
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	07/30/04	07/31/06
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	07/23/04	07/23/05
760	Antenna biconical	Electro Metrics MFC-25	477	06/22/04	06/22/05
791	PREAMP, 25dB	ICC LNA25	398	11/12/04	11/12/05
1983	CABLE	KTL Site A OATS	N/A	03/11/04	03/11/05

ANNEX A - TEST DETAILS

NAME OF TEST: Radiated Spurious Emissions PARA. NO.: 15.247(c)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

ANNEX B - TEST DIAGRAMS

Test Site For Radiated Emissions