Nemko Test Report:	4L0715RUS1Rev4
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-AW900M
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:	27 August, 2005

Table of Contents

Section 1. Summary of Test Results

Manufacturer: AvaLAN Wireless Systems, Inc.

Model No.: AW900 ver2

Serial No.: 00013

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 C63.4-2003. 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 radio module is identical to the AW900 device referenced in test report 304224 TX TCB Rev. 1 produced by L. S. Compliance, Inc. May, 2004. The testing performed for this report is to apply for certification as a full modular device. The EUT was originally tested in a plastic enclosure (ref. Test Report 304224 TX TCB Rev. 1 produced by L. S. Compliance, Inc. May, 2004). Radiated tests in this report were performed with no enclosure.

Antenna Type	Gain	Report Ref.
Nearson Whip S467AH-915S	2 dBi	304224 TX TCB Rev. 1
Carant MG5025	8 dBi	4L0715RUS1Rev.4
Carant Yagi ACY15L	15 dBi	4L0715RUS1Rev.2

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

General Equipment Information

Frequency Band: 902 to 928 MHz

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 or a 8 dBi carant monopole antenna. **Reference Test Report Number: 304224 TX TCB Rev. 1 for power measurements. With maximum peak rf output power of +20.91 dBm and maximum antenna gain of 15 dBi (Carant ACY15L from test report 304224), the maximum eirp is +35.91 dBm.**

Antenna connection: All external antennas are provided with unique connectors (reverse gender). See antenna data sheets provided.

CHANNEL	CENTER FREQ (MHz)	LIMIT (dBm)	MEASURED POWER (dBm)	MARGIN (dB)
Low (06C6)	903.125	+ 30.0	+ 20.91	9.09
Mid (06DD)	915.104	+ 30.0	+ 20.84	9.16
High (06F3)	926.563	+ 30.0	+ 20.88	9.12

Block Diagram

Section 3. Spurious Emissions (Restricted Bands)

NAME OF TEST: Spurious Emissions (Restricted Bands)	PARA. NO.: 15.247 (c)
TESTED BY: Kevin Rose	DATE: 06/01/05

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

This is the normal worst-case duty cycle of the device. For testing purposes the device was set to operate with a 100% duty cycle in order to obtain a constant rf envelope. See attached plots

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

Measurement Uncertainty: +/- 3.6 dB

Temperature: 23 °C

Relative Humidity: 51 %

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — Time of Occupancy

Page 1 of 2 — Complete: X — Preliminary:

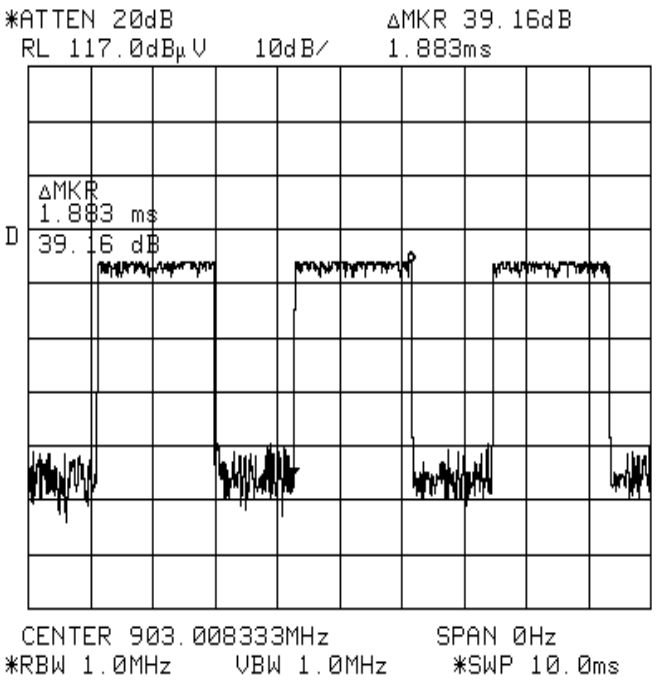
Job No.:	4L0715R	Date:	6/2/2005		
Specification:	15.247	Temperature(°C):	21		
Tested By:	Kevin Rose	Relative Humidity(%)	42		
E.U.T.:					
Configuration:	TX				
Sample Number:					
Location:	AC 3	RBW:	Refer to plots	Measurement Distance:	3 m
Detector Type:	Peak	VBW:	Refer to plots		

Test Equipment Used

Antenna:	1480	Directional Coupler:	
Pre-Amp:		Cable #1:	1484
Filter:		Cable #2:	1485
Receiver:	1464	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



duty cycle plot 1

Notes:

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — Time of Occupancy

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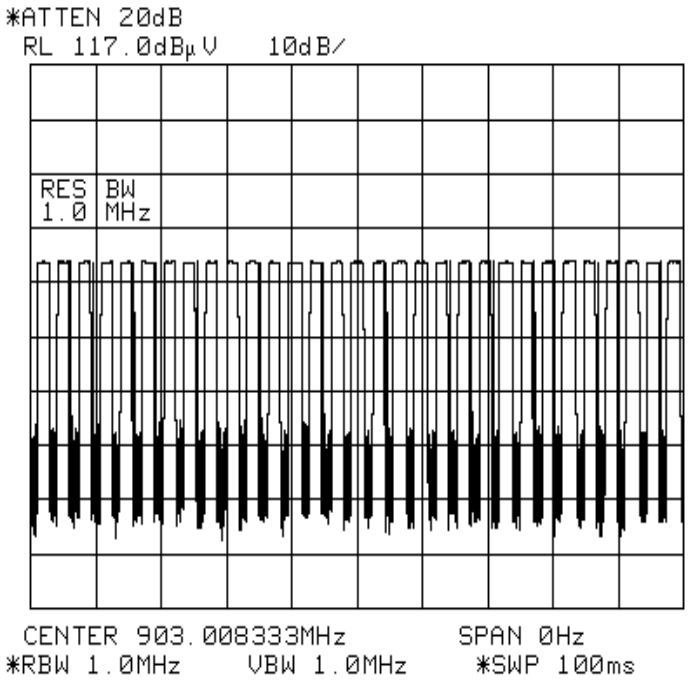
Job No.:	4L0715R	Date:	6/2/2005
Specification:	15.2	Temperature(°C):	21
Tested By:	Kevin Rose	Relative Humidity(%)	42
E.U.T.:			
Configuration:	TX		



duty cycle plot 2

Notes:

Radiated Data

Low channel – 903.125 MHz

Nemko Dallas, Inc.

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802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Radiated Emissions

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Job No.: 4L0715 Date: 6/2/2005
Specification: 15.247/15.205 Temperature(°C): 21
Tested By: Kevin Rose Relative Humidity(%) 42
E.U.T.: 900 MHz DSSS Radio MonoPole antenna
Configuration: **Tx ON >98%**
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: 1464 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	64.6	29.0	3.6	32.7	64.5	74	54	Peak / Vertical cw
2.709	51.7	29.0	3.6	32.7	51.6	74	54	**Average / Vertical 10Hz VBW PLUS DUTY CYCLE CORR.**
3.612	50.2	30.7	3.6	32.4	52.1	74	54	PEAK
3.612	45.4	30.7	3.6	32.4	47.3	74	54	AVERAGE
4.515	48.3	32.3	4.1	31.6	53.1	74	54	PEAK
4.515	43.5	32.3	4.1	31.6	48.3	74	54	AVERAGE
6.321	46.2	36.0	5.2	32.1	55.3	74	54	PEAK
6.321	41.4	36.0	5.2	32.1	50.5	74	54	AVERAGE
2.709	55.2	29.0	3.6	32.7	55.1	74	54	Peak / Horizontal
2.709	50.4	29.0	3.6	32.7	50.3	74	54	Average / Horizontal
3.612	48.0	30.7	3.6	32.4	49.9	74	54	Peak / Horizontal
3.612	43.2	30.7	3.6	32.4	45.1	74	54	Average / Horizontal
4.515	43.7	32.3	4.1	31.6	48.5	74	54	Peak / Horizontal
4.515	38.9	32.3	4.1	31.6	43.7	74	54	Average / Horizontal
7.224	42.3	36.0	5.2	32.1	51.4	74	54	Peak / Horizontal
7.224	37.5	36.0	5.2	32.1	46.6	74	54	Average / Horizontal

Test Data – Continued

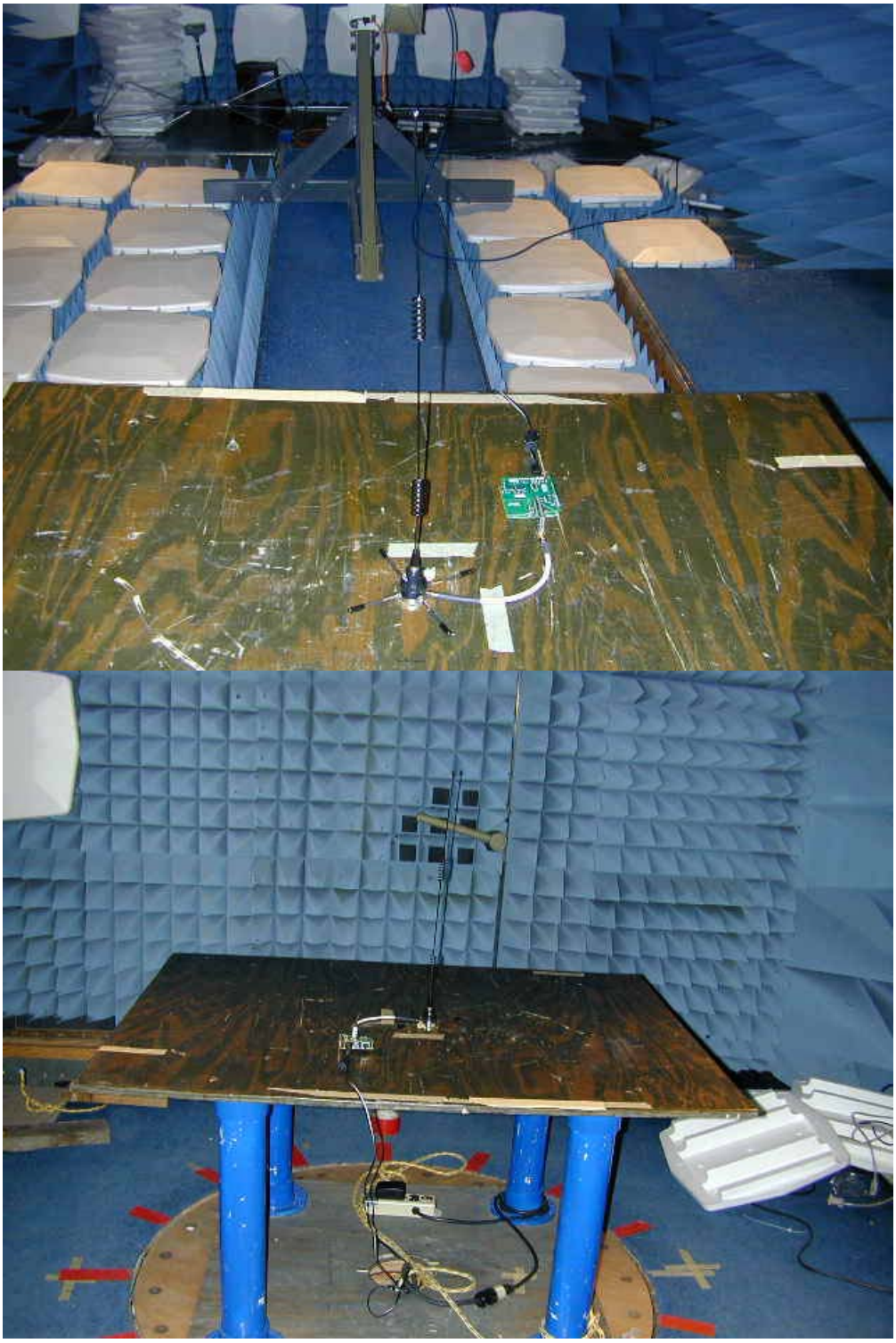
High Channel – 926.563 MHz

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	53.3	29.0	3.6	32.7	53.2	74	54	Peak/Horizontal
2.778	48.5	29.0	3.6	32.7	48.4	74	54	Average/Horizontal
3.704	44.5	30.7	3.6	32.4	46.4	74	54	Peak/Horizontal
4.630	45.0	32.3	4.1	31.6	49.8	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	46.9	30.7	3.6	32.4	48.8	74	54	Peak/Vertical
4.630	49.3	32.3	4.1	31.6	54.1	74	54	Peak/Vertical
4.630	44.5	32.3	4.1	31.6	49.3	74	54	Average/vertical
6.482	54.7	34.7	5.2	30.8	63.8	74	54	Peak/Vertical
6.482	38.9	34.7	5.2	30.8	48.0	74	54	Average/vertical
Notes:	The spectrum was searched to 10 GHz							

Mid channel – 915.104 MHz

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	53.7	29.0	3.6	32.7	53.6	74	54	Peak/Horizontal
2.741	48.9	29.0	3.6	32.7	48.8	74	54	Average/Horizontal
3.654	48.6	30.7	3.6	32.4	50.5	74	54	Peak/Horizontal
4.568	44.3	32.3	4.1	31.6	49.1	74	54	Peak/Horizontal
2.741	63.2	29.0	3.6	32.7	63.1	74	54	Peak/Vertical
2.741	49.5	29.0	3.6	32.7	49.4	74	54	Average/vertical +DC
3.654	44.7	30.7	3.6	32.4	46.6	74	54	Peak/Vertical
4.568	49.5	32.3	4.1	31.6	54.3	74	54	Peak/Vertical
4.568	44.7	32.3	4.1	31.6	49.5	74	54	Average/vertical
Notes:	The spectrum was searched to 10 GHz							

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	03/11/05	03/11/06

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