



Test Report: 4W08175.3

Applicant: BelAir Networks
603 March Road,
Ottawa Ont.
K2K 2M5

**Equipment Under Test:
(EUT)** Wireless LAN Access Radio Module (ARM)
2.4GHz Band

FCC ID: RAR20000001

In Accordance With: **FCC Part 15, Subpart C, Class II Permissive Change**
Digitally Modulated Transmitters, 2400-2483.5MHz

Tested By: Nemko Canada Inc.
303 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By: Kevin Carr, Wireless/EMC Specialist

Date: 26 August 2004

Total Number of Pages: 24

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EQUIPMENT: Wireless LAN ARM

Section 1. Summary Of Test Results

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, Subpart C, Paragraph 15.247 for Digitally Modulated Transmitters.

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".



TESTED BY: _____
Glen Westwell, Wireless Specialist.

DATE: 20 August 2004

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This report applies only to the items tested.

EQUIPMENT: Wireless LAN ARM

Summary Of Test Data

Name Of Test	Para. No.	Result
Powerline Conducted Emissions	15.207 (a)	N/A 1
Occupied Bandwidth	15.247 (a)(2)	N/A 2
Peak Power Output	15.247 (b)(3)	Complies
Spurious Emissions (Antenna Conducted)	15.247 (c)	Complies
Spurious Emissions (Radiated)	15.247 (c)	Complies
Transmitter Power Density	15.247 (d)	Complies

Notes:

This submission for Class II Permissive Change is to add 2 new antennas to the originally certified 2.4GHz 802.11b radio module. The module has not been changed in anyway from the original submission, and as such only relevant test data has been provided to support compliance (N/A 1&2).

The maximum rated conducted power remains the same as the original certification as well as the maximum EIRP. The conducted power has been decreased to allow for the new 11.5dBi antenna configurations. The RF safety exhibit as originally submitted remains the same due to no change in the maximum conducted power and EIRP.

The radio module was previously approved under FCC ID.# RAR20000001 & Industry Canada Certification # 4674A-0000001.

Test Conditions:

Indoor Temperature: 23°C
 Humidity: 41%

Outdoor Temperature: 22°C
 Humidity: 44%

EQUIPMENT: Wireless LAN ARM

Section 2. General Equipment Specification

Manufacturer:	BelAir Networks
Model No.:	Wireless LAN 2.4GHz ARM
Serial No.:	K000686441
Date Received In Laboratory:	19 July 2004
Nemko Identification No.:	#19
Modulation:	802.11b 1-11Mb/s, BPSK-CCK
Transmitter Output Power (max.rated):	27dBm @ 8.5dBi antenna 24dBm @ 11.5dBi antenna
Transmit Frequency:	2400-2483.5MHz (Band) 2412-2462MHz (DUT)
Antenna Gain:	8.5dBi integral – original certification
New Antenna(s):	8.5dBi OMNI 11.5dBi integral

EQUIPMENT: Wireless LAN ARM

Section 3. Peak Power Output

Para. No.: 15.247(b)(3)

Test Performed By: Glen Westwell	Date of Test: 26 July 2004
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Test Results:

The maximum peak power output of the transmitter is 0.468W.

Limit: 1W, (30dBm)

Measurement Data: The conducted power was verified over all data rates. The worst case found was at 1Mb/s and presented.

Conducted Output Power

Antenna	Ch.1 (dBm)	Ch.6 (dBm)	Ch.11 (dBm)
8.5dBi	26.7	26.5	26.0
11.5dBi	23.9	24.0	23.9

EQUIPMENT: Wireless LAN ARM

Section 4. Spurious Emissions (Antenna Conducted)

Para. No.: 15.247 (c)

Test Performed By: Glen Westwell	Date of Test: 27 July 2004
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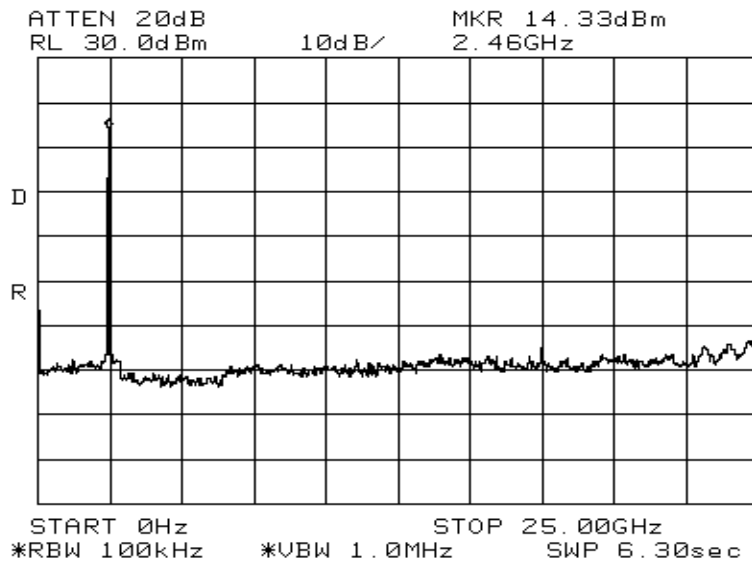
Test Results: Complies.

Limit: 20dBc

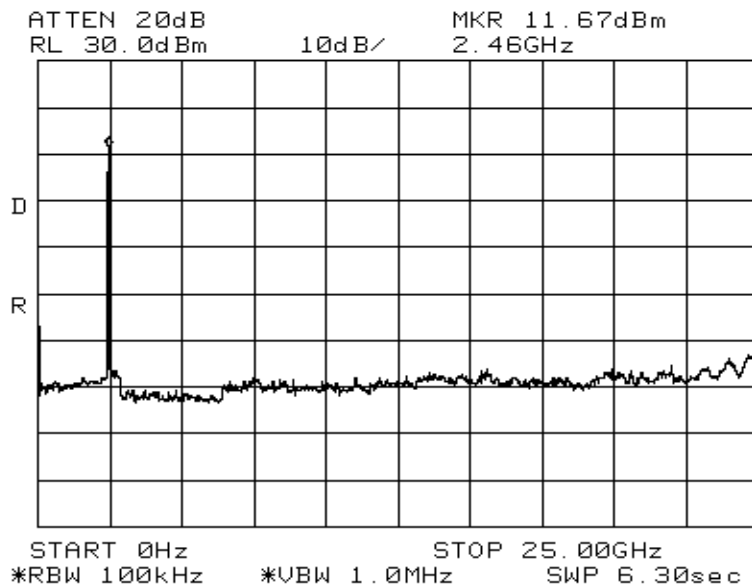
Measurement Data: See attached plots.

Worst case = 43.5dBc

EQUIPMENT: Wireless LAN ARM



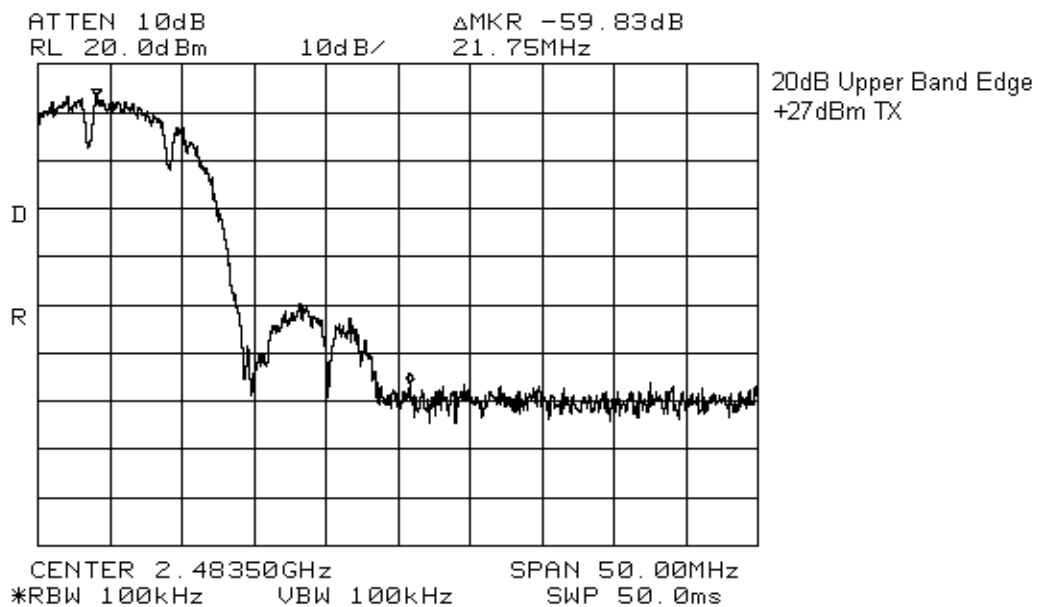
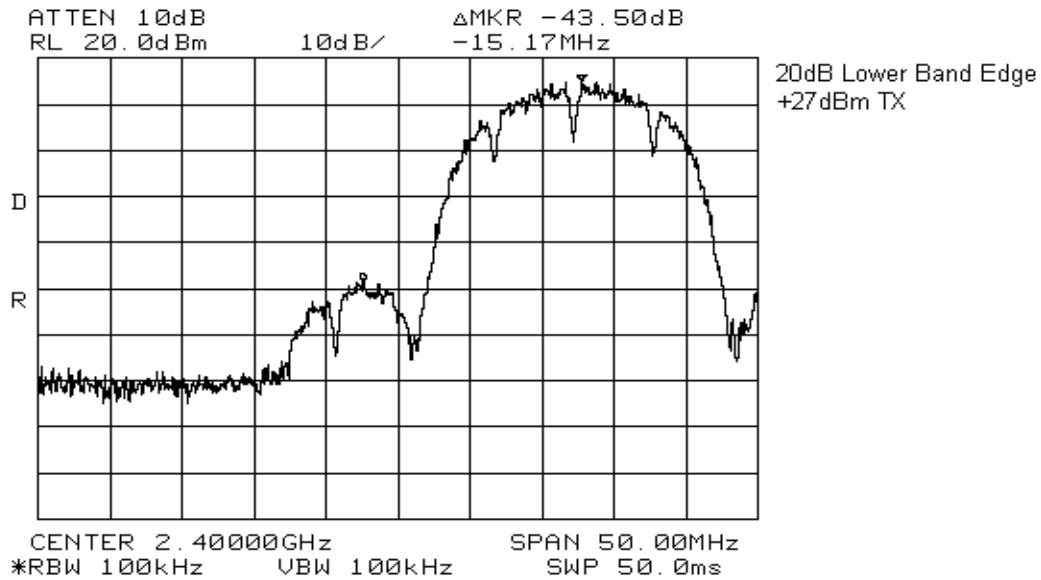
Conducted Spurious
TX at +27dBm,
8.5dBi Omni Antenna.



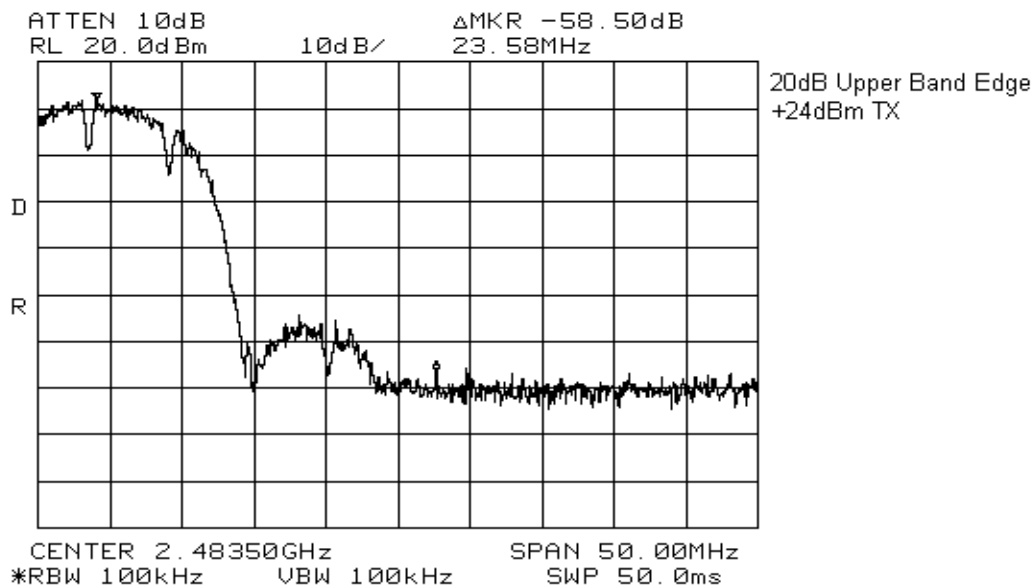
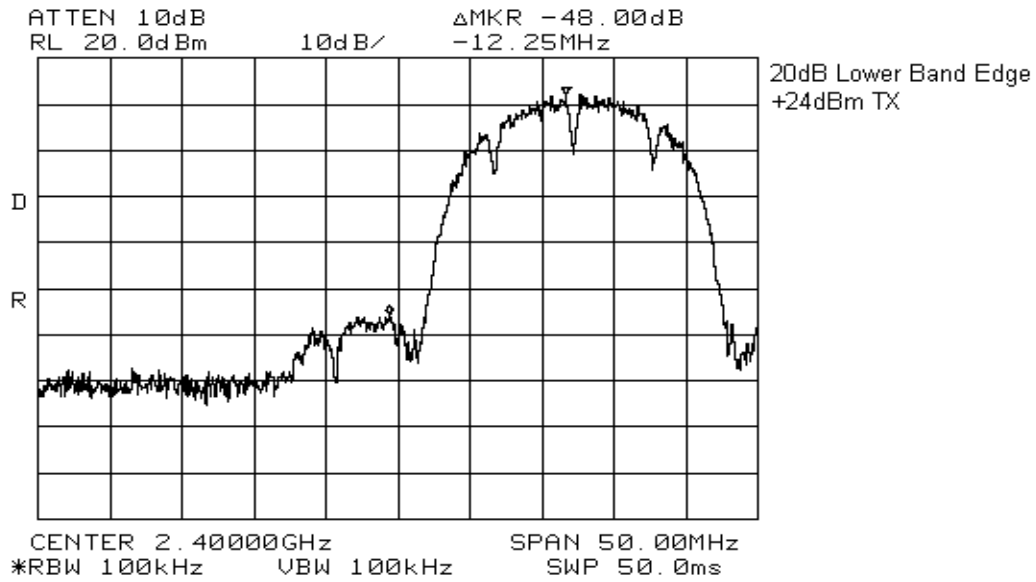
Conducted Spurious
TX at +24dBm
11.5dBi Gain Antenna

EQUIPMENT: Wireless LAN ARM

20dB Bandedge



EQUIPMENT: Wireless LAN ARM



EQUIPMENT: Wireless LAN ARM

Section 5. Spurious Emissions (Radiated)

Para. No.: 15.247(c)

Test Performed By:Glen Westwell	Date of Test: 27 July 2004
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Test Results: Complies.

Measurement Data: See attached plots and table.

The DUT was searched to the 10th harmonic. No Harmonic emissions were detected.

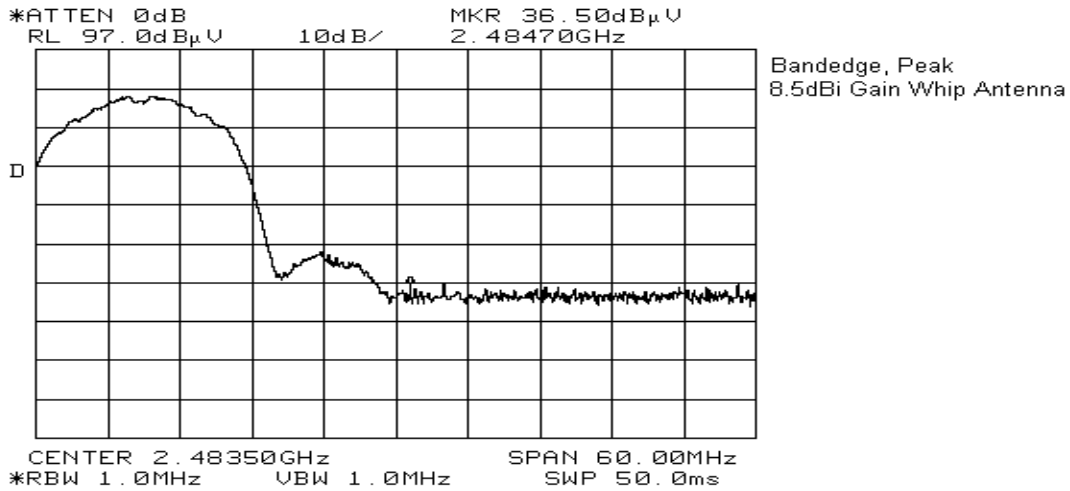
The power supply source was varied +/-15% to verify worst case emissions.

Worst case emissions were verified on 3 orthogonal axis where applicable.

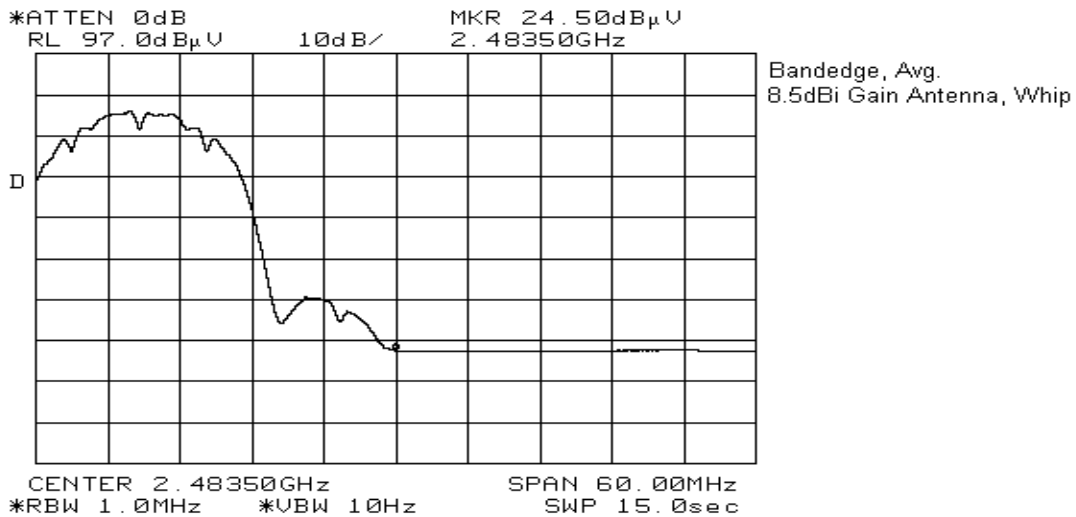
EQUIPMENT: Wireless LAN ARM

8.5dBi Whip Antenna

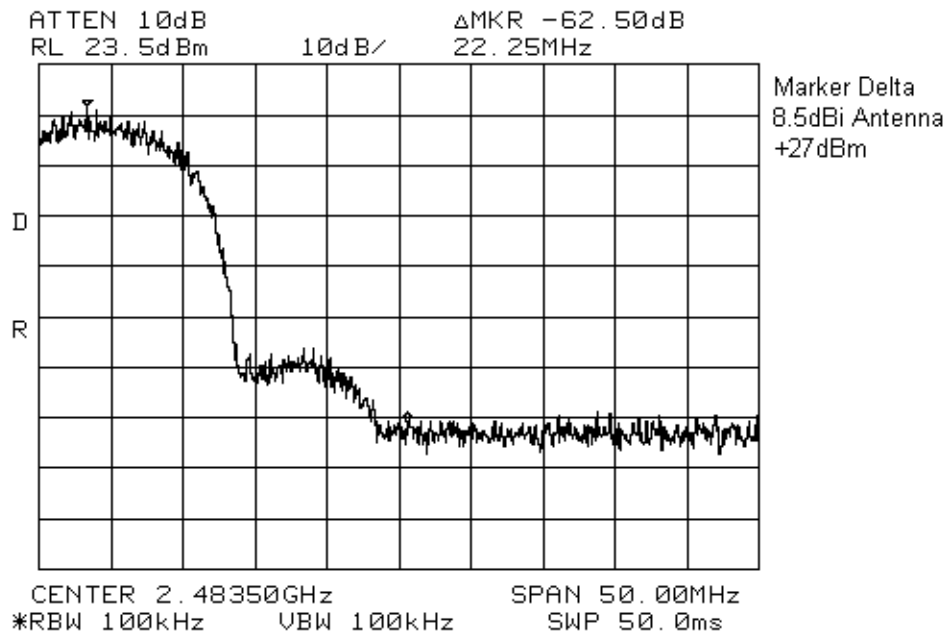
Band Edge Level (PK)	Af	Level	Limit
36.5dBuV	33.8	70.3dBuV	74dBuV



Band Edge Level (Avg)	Af	Marker-Delta Correction	Level	Limit
82.0dBuV	33.8dB	-62.5dB	53.3dBuV	54dBuV

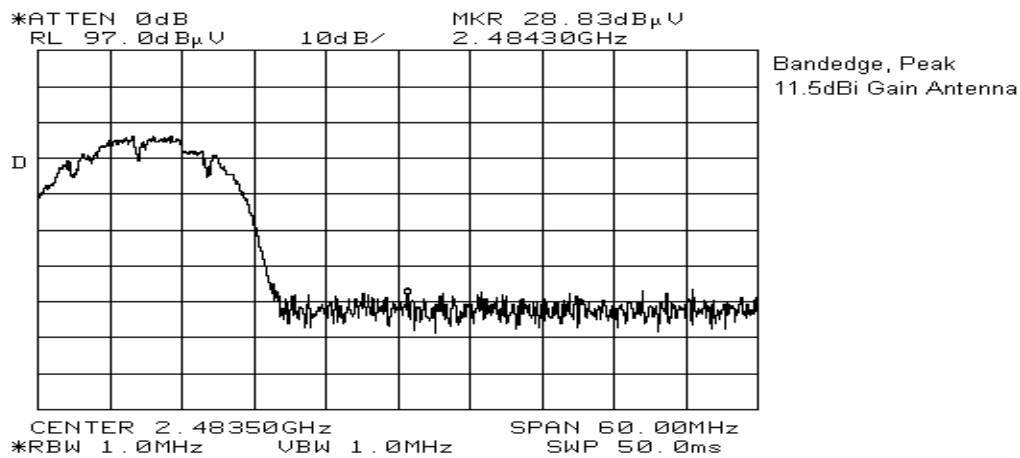


EQUIPMENT: Wireless LAN ARM

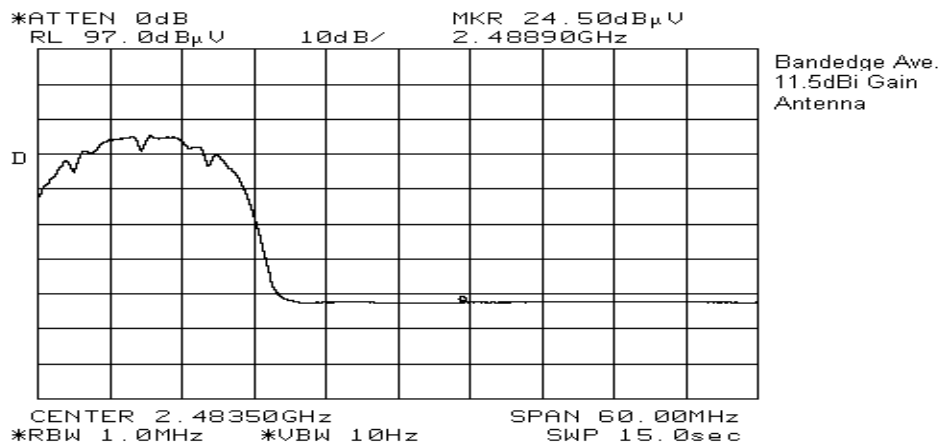


*EQUIPMENT: Wireless LAN ARM***11.5dBi Antenna**

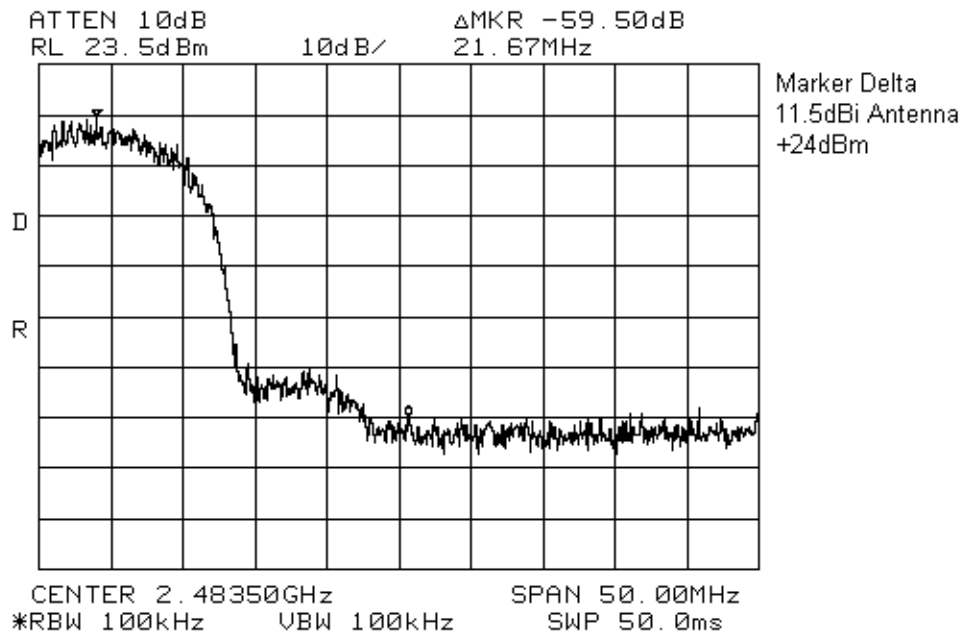
Band Edge Level (PK)	Af	Level	Limit
28.8dBuV	33.8	62.6dBuV	74dBuV



Band Edge Level (Avg)	Af	Marker-Delta Correction	Level	Limit
73.0dBuV	33.8dB	-59.5dB	47.3dBuV	54dBuV

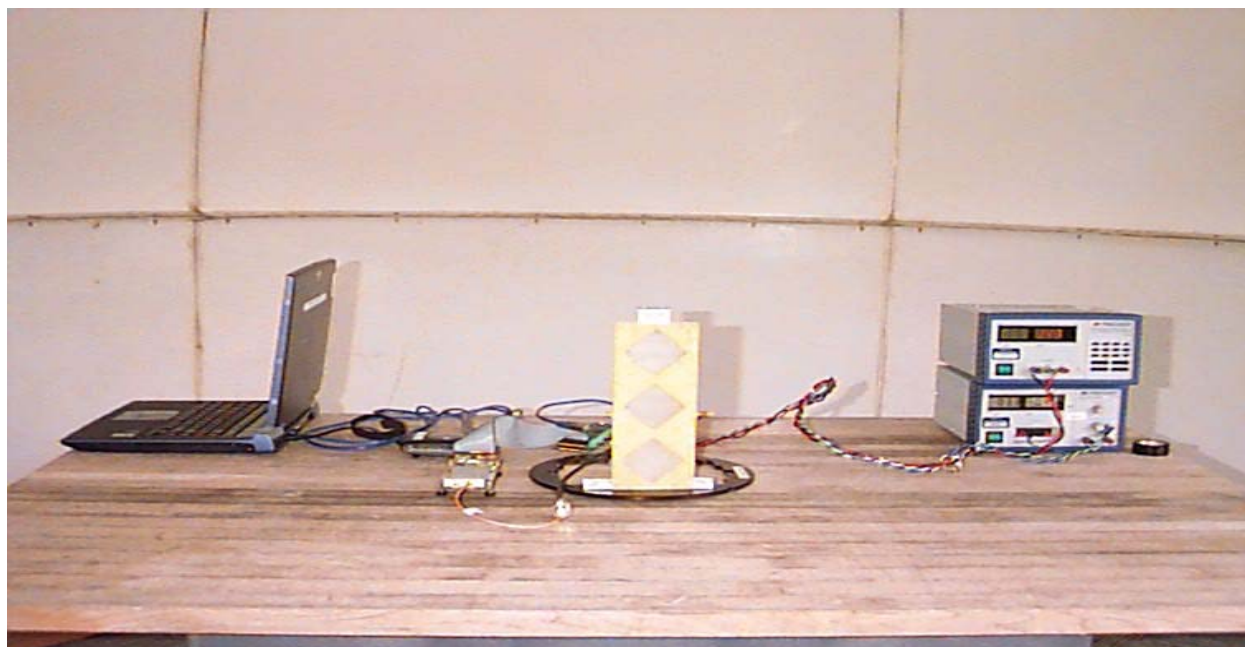


EQUIPMENT: Wireless LAN ARM

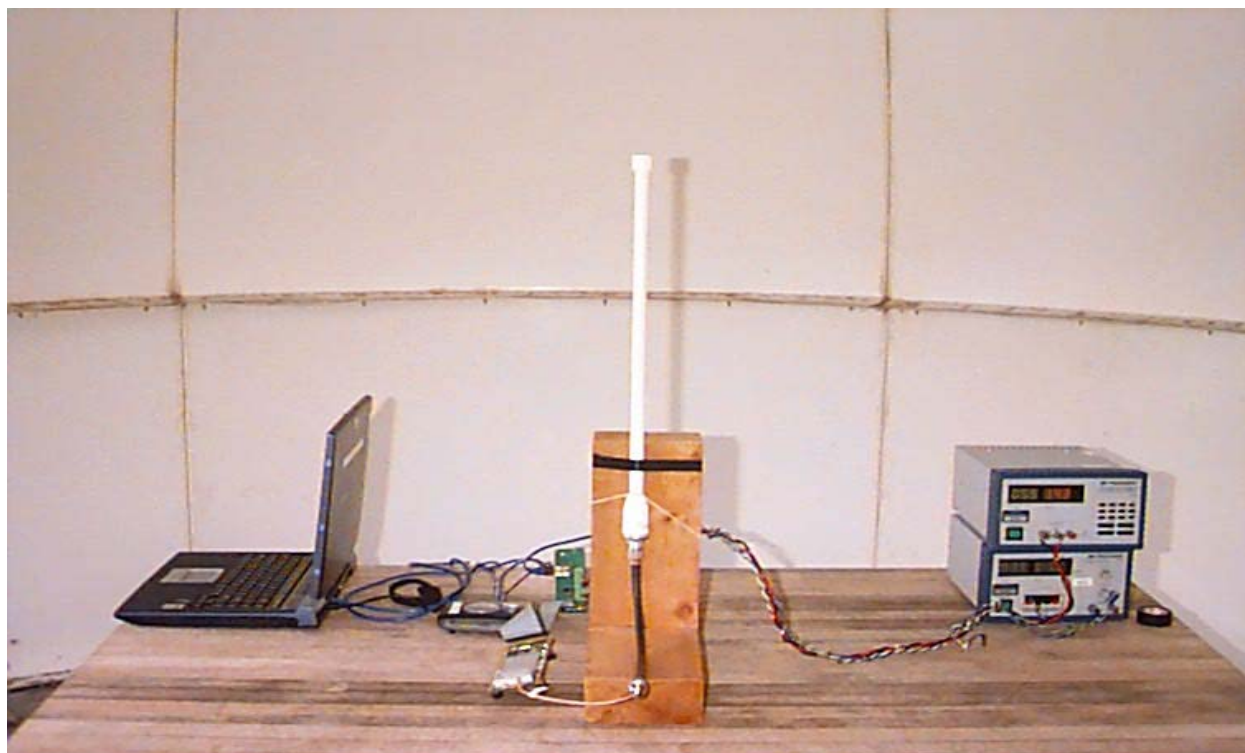


EQUIPMENT: Wireless LAN ARM

Radiated Set Up Photos
11.5dBi Gain Antenna



8.5dBi Gain Whip Antenna



EQUIPMENT: Wireless LAN ARM

Section 6. Transmitter Power Density

Para. No.: 15.247(d)

Test Performed By: Glen Westwell	Date of Test: 27 July 2004
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Test Results: Complies

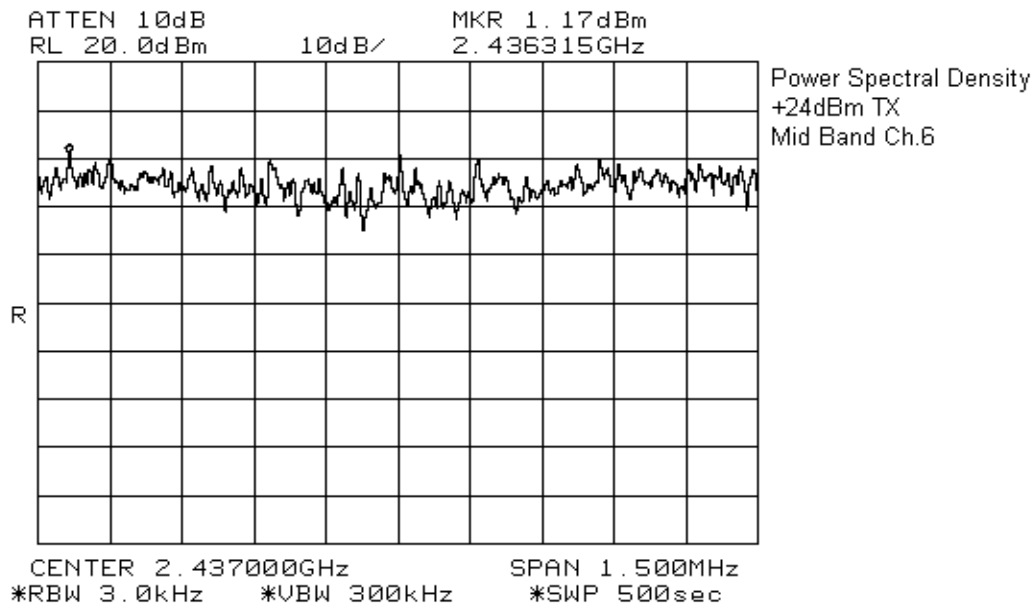
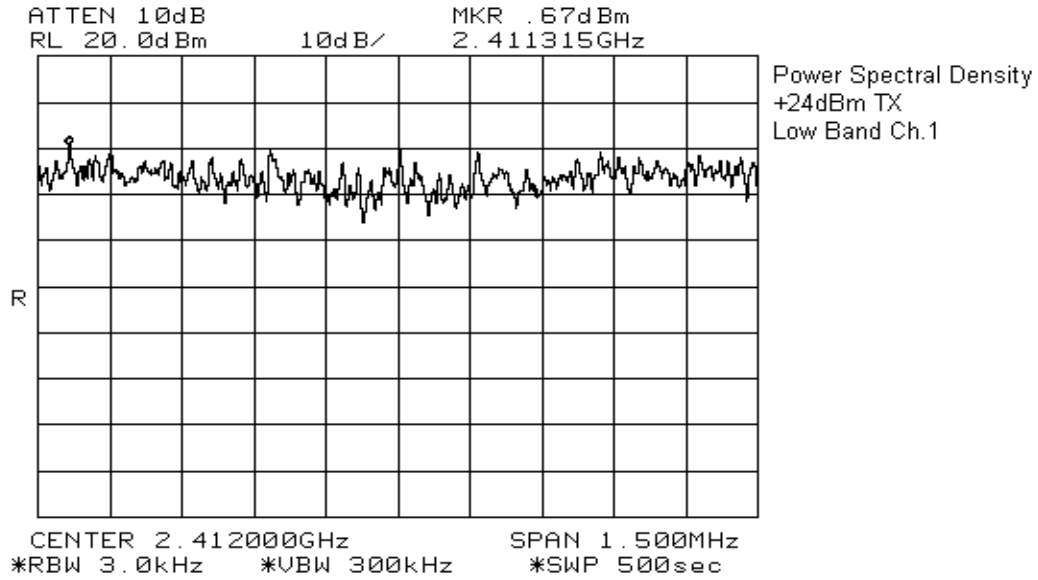
Limit: +8dBm

Measurement Data: See attached graphs.

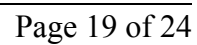
Channel	Conducted Power & Antenna Gain	Power Spectral Density (dBm)
Ch.1	+24dBm, 11.5dBi	0.7
Ch.6		1.2
Ch.11		0.5
Ch.1	+27dBm, 8.5dBi	3.3
Ch.6		3.2
Ch.11		2.0

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11.5dBi Gain Antenna, Conducted Power Density

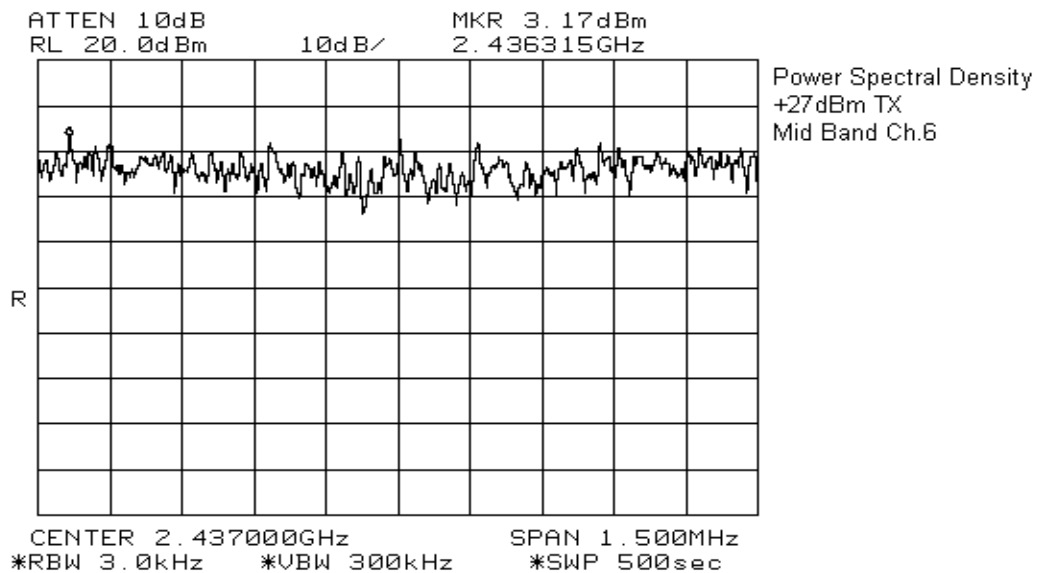
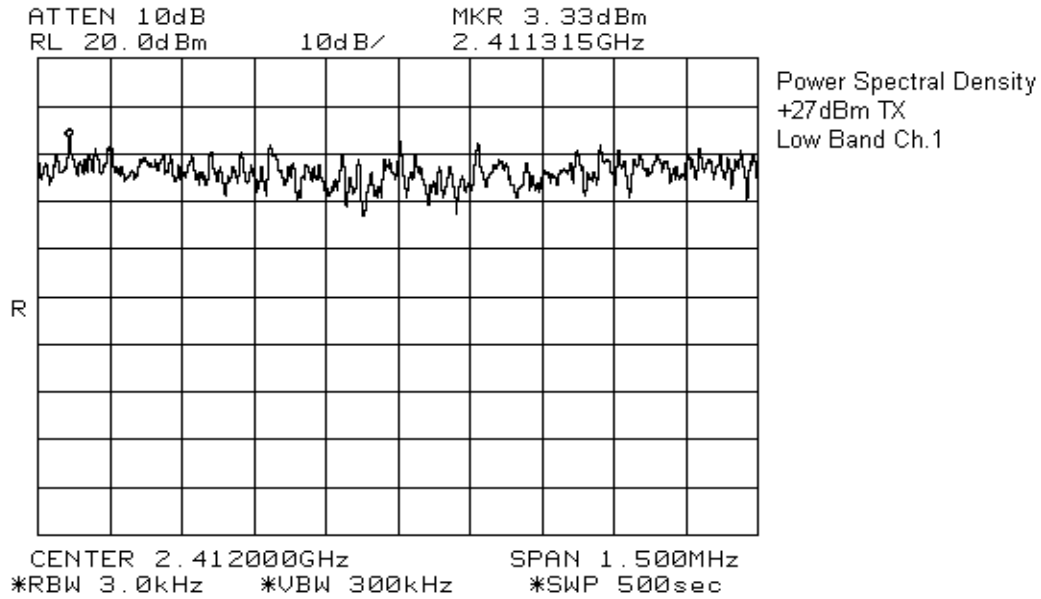


EQUIPMENT: Wireless LAN ARM



EQUIPMENT: Wireless LAN ARM

8.5dBi Gain Whip Antenna, Conducted Power Density

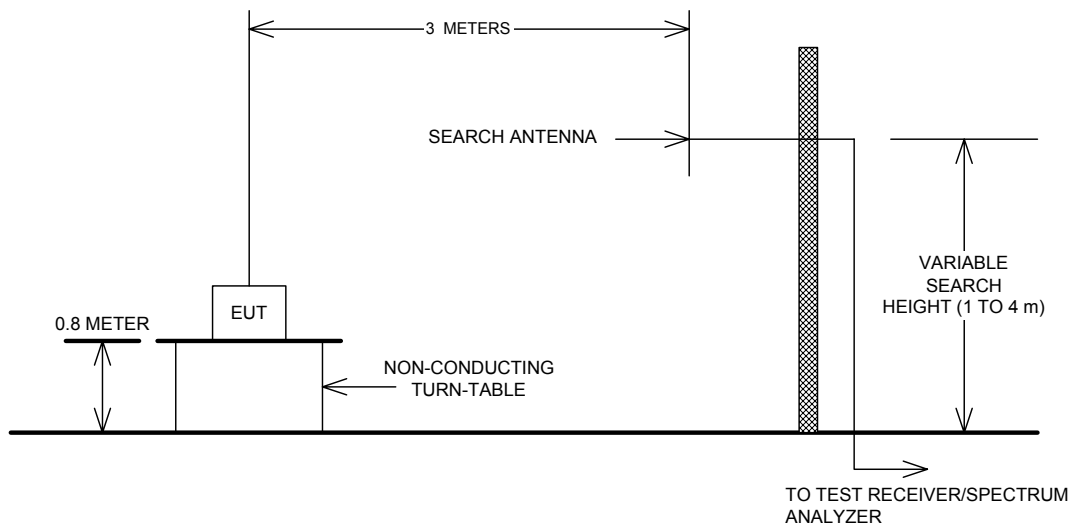


EQUIPMENT: Wireless LAN ARM



Section 7. Block Diagrams

Test Site For Radiated Emissions



Below 1 GHz

Peak detector.

RBW = 100 kHz

Above 1 GHz For Peak Emission Levels

Peak detector

RBW = 1 MHz

VBW = >RBW

Above 1 GHz For Average Emission Levels

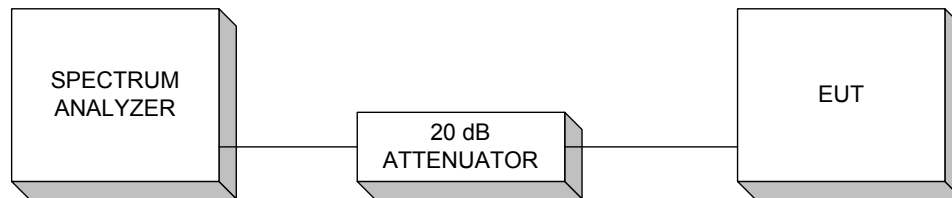
Peak detector

RBW = 1 MHz

VBW = 10 Hz

EQUIPMENT: Wireless LAN ARM

Transmitter Power Density & Peak Power At Antenna Terminals



EQUIPMENT: Wireless LAN ARM

Section8. Test Equipment List**Equipment List**

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	31 May 04	31 May 05
1 Year	Signal Generator	Rohde & Schwarz	SM1Q06B	FA001878	18 May 04	18 May 05
1 Year	Power Sensor	Hewlett Packard	8487A	FA001741	09 Jun 04	09 Jun 05
1 Year	Power Meter	Hewlett Packard	E4418B	FA001413	26 May 04	26 May 05
1 Year	RF AMP	JCA	4-8 GHz	FA001497	18 June 04	18 June 05
1 Year	Horn Antenna	EMCO #1	3115	FA000649	18 Dec 03	18 Dec 04
1 Year	High Pass Filter (3.9GHz)	K&L	11SH10-4000	FA001340	COU	COU

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use.