TEST REPORT OF A 2.4 GHz RLAN ACCESS POINT TRANSCEIVER, BRAND NOWIRESNEEDED, TYPE 11 Mbps WIRELESS LAN ACCESS POINT, IN CONFORMITY WITH FCC PART 15 AND ANSI C63.4-1992

FCC report layout endorsed by the FCC by Public Notice of March 11, 1992.

Accredited by	:	STERLAB accreditation number L029 D.A.R., TTI-P-G.127/96-00
Competent body	:	Article 10-2 EMC Directive
Notified body	:	Article 10-5 EMC Directive Low Voltage Directive Number 0122 TTE Directive
Designated laboratory	:	TTE Directive
Notified test service	:	Automotive Directive
FCC listed	:	31040/SIT
VCCI listed	:	R 592 and C 507
Certification body	:	Electrical Products Safety Regulation Hong Kong

Nederlands Meetinstituut

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NMi B.V. (Chamber of Commerce Haaglanden No. 27228701)

Offices: Delft, Bergum, Dordrecht, Niekerk, Utrecht,
Tinton Falls NJ (USA), Kawasaki (Japan), Hortolândia SP (Brazil)

Subsidiary companies:
NMi Certin B.V. (27233418)
NMi Van Swinden Laboratorium B.V. (27228703)
NMi International B.V. (27239176)

MEASUREMENT/TECHNICAL REPORT

NoWiresNeeded B.V.

Modelnumber : 11 Mbps WLAN ACCESS POINT

FCC ID: OGD10410208

April 28, 2000

This report concerns (check one):	Original grant	~~Class II change~~
Equipment type: Direct Sequence Spread Spectrum Transceiver		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	~~Yes~~	no
If yes defer until: _____		
NoWiresNeeded, Rembrandtlaan 1a, 3723 BG Bilthoven, The Netherlands agrees to notify the Commission by _____ of the intended date of announcement of the product so that the grant can be issued on that date.		
Transition Rules Request per 15.37	~~yes~~	no
If no, assumed Part 15, Subpart B for unintentional radiators – the new 47 CFR (10-1-90 Edition) provision.		

Report prepared by:	Name	: D. S. Sariredjo BSc. E.E.
	Company name	: NMi Certin B.V.
	Address	: Smidshornerweg 18
	Telephone number	: + 31-59450-50 05
	Telefax number	: + 31-59450-48 04
	Mailing address	: P.O. Box 15
	City/Place/Postal cd.	: 9822 ZG NIEKERK
	Country	: The Netherlands

The data taken for this test and report herein was done in accordance with FCC Part 15 and measurement Procedures of ANSI C63.4-1992 and were relevant the procedures as specified in the sheets from the FCC attached to this test report. NMi Certin B.V. at Niekerk, The Netherlands, certifies that the data is accurate and contains a true representation of the emission-profile of the Equipment Under Test (EUT) on the date of the test noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: April 28, 2000 Signature:

P.A.J.M. Robben BSc EE
Department EMC and Telecommunication

Date
May 01, 2000

Your reference
-

Our reference
2K0418

Subject
Explanatory note

Federal Communications Commission
Attn: To whom it may concern
Office of Engineering and Technology
445 12TH ST SW
Washington DC 20554
U.S.A.

Dear Mr./Ms.,

This letter is being attached as an explanatory note regarding the application for FCC ID: OGD10410208 and contains an example Grant and a copy of our designation as CAB/TCB.

The information as contained in this letter is related to our recently obtained designation as CAB/TCB for 47 CFR Part 15 and 18 of the FCC rules. As required by the transitional period, and as defined in the EU-USA MRA, we herewith submit an example of the Grant for FCC ID: OGD10410208, as we would have issued it after the transitional period, in order to have this document reviewed by the FCC.

Also included in this letter is a copy of our designation certificate with reference number NLUSAMRARDR001.

By submitting this information to this application we want to make use of the transitional (or "confidence building") period for CAB/TCB's as defined in the MRA and as agreed upon in meetings between the US and EU.

Yours sincerely,
NMi Certin B.V.

Pieter A.J.M. Robben, B.Sc.E.E.
Manager
Department of EMC, Telecommunications and Electrical Safety

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Salesoffice USA: East Haddam CT

Subsidiary companies:
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NMi Van Swinden Laboratorium B.V. (Nr. 27228703)

RDR

DESIGNATION OF A CONFORMITY ASSESSMENT BODY (CAB) FROM THE NETHERLANDS PURSUANT TO A MUTUAL RECOGNITION AGREEMENT BETWEEN THE EUROPEAN UNION AND THE UNITED STATES OF AMERICA.

1. **Name of CAB, (Acronym), Contact Person, Address, Telephone, Fax, e-mail:**

NMi Certin B.V. **(NMi)**	Tel: + 31 594 50 50 05
PO Box 15	Fax: + 31 594 50 48 04
NL-9822 ZG NIEKERK	e-mail: probben@nmi.nl
The Netherlands	
Contact: Mr. Pieter Robben - Manager	

2. **References:**

EU-USA MRA Sectoral Annexes:	
1. Electromagnetic Compatibility	2. Telecommunication Equipment

3. **Scope:**

47 CFR Part 15 & 18 Equipment Unlicensed Radio Frequency Devices

4. **Period of validity of this Designation:** December 1, 2002

5. **Technical Qualifications of the Conformity Assessment Body:**

NMi fulfils the requirements specified in the MRA Sectoral Annexes on Electromagnetic Compatibility & Telecommunication Equipment based on the following criteria:

NMi is:

- **Competent Body** under the EMC Directive
- **Notified Body** nr. 0122 under the EMC Directive & TTE Directive
- **Accredited** according to ISO/IEC Guide 25: 1996 **(EN 45001)** by RvA, under nr: L029
  Issue date of RvA Certificate of Accreditation: 22-02-1991
  Expire date of RvA Certificate of Accreditation: 22-02-2000
- **Accredited** according to ISO/IEC Guide 65:1996 **(EN 45011)** by RvA, under nr: C081
  Issue date of RvA Certificate of Accreditation: 14-07-1995
  Expire date of RvA Certificate of Accreditation: 14-07-2002
- **Designated TTE Test Laboratory under the TTE Directive**
- **Radio Type Approval Test Laboratory for The Netherlands national regulations.**
- **FCC listed (3 & 10 meter OATS)** on 30-09-1997 (Expire date: 30-09-2000)

6. **Designation Procedure used to determine the competence of the proposed CAB to apply conformity assessment requirements and procedures identified in the legislative, regulatory and administrative provisions in the USA.**

A. **NMi** was assessed by RvA (The Dutch Accreditation Council) to conform with the requirements of EN 45001(ISO Guide 25) and EN 45011 (ISO Guide 65). This assessment covered most of the technical requirements as given in:

1. *Technical Assessor Checklist provided by the FCC to be used for in-site audits of Test Laboratories performing FCC EMC measurements to show compliance of equipment subject to the FCC EMC regulations contained in 47 CFR Part 2, 15 & 18, including ANSI C63.2 - 1992, ANSI C63.4 - 1996 ANSI C63.7 - 1992 & FCC MP-5-1986.*
2. *Accreditation Requirements for Telecommunication Certification Bodies according to FCC Public Notice DA 99-1640 of August 17, 1999 and FCC's Report and Order in GEN Docket 98-68 (FCC 98-338) of December 17, 1998, related to Unlicensed Radio frequency Devices (Attachment IIIA).*

B. **NMi** was assessed by the "Radiocommunications Agency of the Netherlands " (The CAB Designating Authority in the Netherlands for EMC & Telecommunications) on November 22, 1999 by ing. Jan D. Coenraads and Jarig H. Tilstra to conform with:

1. *Specific requirements as laid down in:*
   a. 47 CFR Parts 2, 15 & 18 and ANSI C63.4 - 1992;
   b. FCC Public Notice DA 99-1640;
2. *Expert knowledge of FCC Rules, including equipment authorisation program, electronic filing and access to the FCC Internet database and ability to apply FCC interpretations.*

7. **Tasks to be performed by NMi as CAB in respect to the USA market:**

1. FCC Declaration of Conformity Process on EMC aspects of all products addressed by Parts 15 & 18 of the FCC Rules;
2. FCC Equipment Certification Process of Unlicensed Radio Frequency Devices under Part 2 of the FCC Rules.
   (Note: The Core Radiated Emissions tests above 1 GHz are limited to 26.5 GHz)

on behalf of
STATE SECRETARY FOR TRANSPORT, PUBLIC WORKS AND WATER MANAGEMENT,

THE DIRECTOR RADIOCOMMUNICATIONS AGENCY,

C.G.H.M. Dijkmans
Date: December 20, 1999 **N° of Designation: NLUSAMRARDR001**

Bilthoven, April 28, 2000

To: National Radio Type Approval Authority

Dear National Radio Type Approval Authority Representative,

This letter confirms our agreement that NMi Certin B.V. is authorized as an agent for:

NoWiresNeeded B.V.
Rembrandtlaan 1a, Bilthoven, 3723 BG, The Netherlands
Tel: +31 30 2296060 Fax: +31 30 2296061
Contact person: Remi Blokker
Email: Remi.Blokker@nwn.com
Web site: www.NWN.com

to file and handle applications before National Radio Type Approval Authority on NoWiresNeeded ‘s behalf, and to receive and exchange data between NoWiresNeeded and the National Radio Type Approval Authority in connection with the certification of the following NoWiresNeeded product pursuant to National Radio Type Approval and Certification:

Product: Low Power 2.4 GHz RLAN Access Point Transceiver
Manufacturer: NoWiresNeeded B.V.
Brand/Trade name: NoWiresNeeded
Type/Model number: NoWiresNeeded 11 Mbps WLAN Access Point

Sincerely,

Remi Blokker
Vice President operations
NoWiresNeeded B.V.

Grant of equipment authorization

Certification

APPLICANT DETAILS

Company name	:	NoWiresNeeded B.V.
For the attention of	:	Mr. R. Blokker
Address	:	Rembrandtlaan 1a 3723 BG Bilthoven The Netherlands

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER	:	**OGD10410208**
NAME OF GRANTEE	:	**NoWiresNeeded B.V.**

GRANT DETAILS

Equipment Class	:	Part 15, Spread Spectrum Transmitter
Notes	:	WLAN Access Point Transceiver
Grant Notes	:	-
FCC Rules Parts	:	15
Frequency Range (MHz)	:	2412 - 2462
Output Watts	:	0.063
Frequency Tolerance	:	-
Emission Designator	:	-
Date of application	:	April 28, 2000
Project number	:	10117200.R01
Date of grant	:	May 1, 2000
On behalf of	:	The Director of NMi Certin B.V.
Signature	:	
Name	:	P. de Beer

Nederlands Meetinstituut
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NMi International B.V. (27239176)

This grant is issued by NMi Certin B.V.

CAB/TCB no.: NLUSAMRARDR001

Designated by: NL Radiocommunications Agency, on behalf of the State Secretary for transport, public works and water management

12 Processing gain

12.1 Processing gain at 11.0 Mbps

The processing gain is measured using the CW jamming margin method. A signal generator is stepped in 50 kHz increments across the pass band of the system. At each point the generator level required to produce a Bit Error Rate equivalent to BER=1.0 x 10E-5 is recorded as the Jammer level (J).
The output power of the transmitter is measured at the same point and recorded as Signal (S).
The Jammer to Signal ratio (J/S) is then calculated with 20% of the worst datapoints discarded.
The lowest remaining J/S ratio is used to calculate the processing gain using formula:

$$Gp = (S/N)o + Mj + Lsys$$

with:
(S/N)o = 20.7 dB for 11.0 Mbps (obtained from manufacturer's specification of spreading processor Harris semiconductor model HFA3861)

Lsys = 2.0 dB

Measured lowest remaining J/S = Mj = -6.8 dB

Gp = 20.7 dB + (-6.8 dB) + 2.0 dB = 15.9 dB (for 11.0 Mbps modulation)

Test engineer:

Signature : Date: March 23, 2000

Printed name : O.H. Hoekstra

12.2 Block diagram CW Jamming test setup

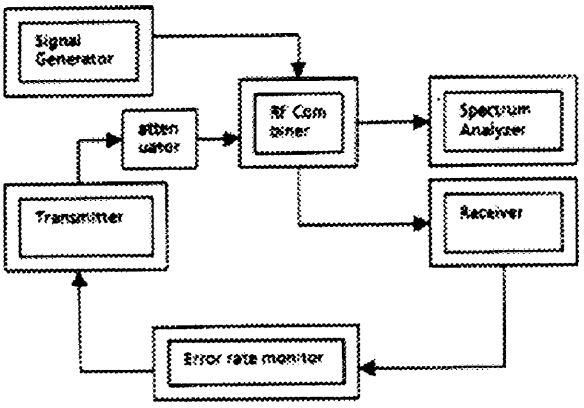


figure 12.1: block diagram of test setup

12.3 Processing Gain at 11Mps test results tables

pass band = fo ± 5MHz (5000 kHz = 100 x 50 kHz)
channel: 07 = 2442.0 MHz 1 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
100.0	2447.00	-58.2	-57.0	-1.2
99.0	2446.95	-57.9	-57.0	-0.9
98.0	2446.90	-58.7	-57.0	-1.7
97.0	2446.85	-58.3	-57.0	-1.3
96.0	2446.80	-59.7	-57.0	-2.7
95.0	2446.75	-60.0	-57.0	-3.0
94.0	2446.70	-59.3	-57.0	-2.3
93.0	2446.65	-59.5	-57.0	-2.5
92.0	2446.60	-59.3	-57.0	-2.3
91.0	2446.55	-59.2	-57.0	-2.2
90.0	2446.50	-59.0	-57.0	-2.0
89.0	2446.45	-58.5	-57.0	-1.5
88.0	2446.40	-58.0	-57.0	-1.0
87.0	2446.35	-57.8	-57.0	-0.8
86.0	2446.30	-58.2	-57.0	-1.2
85.0	2446.25	-58.5	-57.0	-1.5
84.0	2446.20	-58.9	-57.0	-1.9
83.0	2446.15	-59.4	-57.0	-2.4
82.0	2446.10	-61.0	-57.0	-4.0
81.0	2446.05	-60.2	-57.0	-3.2
80.0	2446.00	-60.6	-57.0	-3.6
79.0	2445.95	-60.9	-57.0	-3.9
78.0	2445.90	-61.0	-57.0	-4.0
77.0	2445.85	-61.4	-57.0	-4.4
76.0	2445.80	-61.7	-57.0	-4.7
75.0	2445.75	-61.5	-57.0	-4.5
74.0	2445.70	-61.7	-57.0	-4.7
73.0	2445.65	-61.9	-57.0	-4.9
72.0	2445.60	-62.2	-57.0	-5.2
71.0	2445.55	-62.5	-57.0	-5.5
70.0	2445.50	-63.7	-57.0	-6.7
69.0	2445.45	-64.0	-57.0	-7.0
68.0	2445.40	-62.5	-57.0	-5.5
67.0	2445.35	-62.7	-57.0	-5.7
66.0	2445.30	-63.6	-57.0	-6.6
65.0	2445.25	-63.4	-57.0	-6.4
64.0	2445.20	-63.4	-57.0	-6.4
63.0	2445.15	-63.3	-57.0	-6.3
62.0	2445.10	-63.1	-57.0	-6.1
61.0	2445.05	-62.8	-57.0	-5.8
60.0	2445.00	-63.5	-57.0	-6.5

Table 12.1 : Processing gain testresults for 11.0 Mbps

channel: 07 = 2442.0 MHz **2 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)**

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
59.0	2444.95	-63.5	-57.0	-6.5
58.0	2444.90	-63.0	-57.0	-6.0
57.0	2444.85	-63.0	-57.0	-6.0
56.0	2444.80	-63.6	-57.0	-6.6
55.0	2444.75	-62.6	-57.0	-5.6
54.0	2444.70	-61.7	-57.0	-4.7
53.0	2444.65	-61.7	-57.0	-4.7
52.0	2444.60	-61.3	-57.0	-4.3
51.0	2444.55	-61.4	-57.0	-4.4
50.0	2444.50	-61.9	-57.0	-4.9
49.0	2444.45	-61.8	-57.0	-4.8
48.0	2444.40	-62.5	-57.0	-5.5
47.0	2444.35	-62.8	-57.0	-5.8
46.0	2444.30	-63.0	-57.0	-6.0
45.0	2444.25	-62.8	-57.0	-5.8
44.0	2444.20	-62.7	-57.0	-5.7
43.0	2444.15	-62.6	-57.0	-5.6
42.0	2444.10	-62.6	-57.0	-5.6
41.0	2444.05	-62.2	-57.0	-5.2
40.0	2444.00	-61.7	-57.0	-4.7
39.0	2443.95	-61.8	-57.0	-4.8
38.0	2443.90	-61.5	-57.0	-4.5
37.0	2443.85	-60.7	-57.0	-3.7
36.0	2443.80	-61.5	-57.0	-4.5
35.0	2443.75	-60.9	-57.0	-3.9
34.0	2443.70	-61.2	-57.0	-4.2
33.0	2443.65	-61.5	-57.0	-4.5
32.0	2443.60	-61.9	-57.0	-4.9
31.0	2443.55	-61.8	-57.0	-4.8
30.0	2443.50	-62.4	-57.0	-5.4
29.0	2443.45	-62.9	-57.0	-5.9
28.0	2443.40	-62.7	-57.0	-5.7
27.0	2443.35	-63.5	-57.0	-6.5
26.0	2443.30	-62.7	-57.0	-5.7
25.0	2443.25	-62.8	-57.0	-5.8
24.0	2443.20	-63.0	-57.0	-6.0
23.0	2443.15	-62.5	-57.0	-5.5
22.0	2443.10	-62.8	-57.0	-5.8
21.0	2443.05	-62.6	-57.0	-5.6
20.0	2443.00	-61.8	-57.0	-4.8

Table 12.2 : Processing gain testresults for 11.0 Mbps

channel: 07 = 2442.0 MHz **3 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)**

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
19.0	2442.95	-62.9	-57.0	-5.9
18.0	2442.90	-62.8	-57.0	-5.8
17.0	2442.85	-63.4	-57.0	-6.4
16.0	2442.80	-64.7	-57.0	-7.7
15.0	2442.75	-65.5	-57.0	-8.5
14.0	2442.70	-66.1	-57.0	-9.1
13.0	2442.65	-63.6	-57.0	-6.6
12.0	2442.60	-64.3	-57.0	-7.3
11.0	2442.55	-64.6	-57.0	-7.6
10.0	2442.50	-63.8	-57.0	-6.8
9.0	2442.45	-63.8	-57.0	-6.8
8.0	2442.40	-62.9	-57.0	-5.9
7.0	2442.35	-62.1	-57.0	-5.1
6.0	2442.30	-62.1	-57.0	-5.1
5.0	2442.25	-62.0	-57.0	-5.0
4.0	2442.20	-62.0	-57.0	-5.0
3.0	2442.15	-62.1	-57.0	-5.1
2.0	2442.10	-62.8	-57.0	-5.8
1.0	2442.05	-64.3	-57.0	-7.3
0.0	2442.00	-64.5	-57.0	-7.5
-1.0	2441.95	-63.9	-57.0	-6.9
-2.0	2441.90	-64.2	-57.0	-7.2
-3.0	2441.85	-63.0	-57.0	-6.0
-4.0	2441.80	-63.1	-57.0	-6.1
-5.0	2441.75	-62.5	-57.0	-5.5
-6.0	2441.70	-62.6	-57.0	-5.6
-7.0	2441.65	-62.7	-57.0	-5.7
-8.0	2441.60	-62.6	-57.0	-5.6
-9.0	2441.55	-63.2	-57.0	-6.2
-10.0	2441.50	-63.5	-57.0	-6.5
-11.0	2441.45	-64.0	-57.0	-7.0
-12.0	2441.40	-63.9	-57.0	-6.9
-13.0	2441.35	-64.5	-57.0	-7.5
-14.0	2441.30	-63.6	-57.0	-6.6
-15.0	2441.25	-65.5	-57.0	-8.5
-16.0	2441.20	-66.5	-57.0	-9.5
-17.0	2441.15	-64.8	-57.0	-7.8
-18.0	2441.10	-64.3	-57.0	-7.3
-19.0	2441.05	-63.9	-57.0	-6.9
-20.0	2441.00	-63.8	-57.0	-6.8

Table 12.3 : Processing gain testresults for 11.0 Mbps

channel: 07 = 2442.0 MHz 4 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
-21.0	2440.95	-63.6	-57.0	-6.6
-22.0	2440.90	-63.6	-57.0	-6.6
-23.0	2440.85	-63.9	-57.0	-6.9
-24.0	2440.80	-62.8	-57.0	-5.8
-25.0	2440.75	-63.3	-57.0	-6.3
-26.0	2440.70	-63.6	-57.0	-6.6
-27.0	2440.65	-64.2	-57.0	-7.2
-28.0	2440.60	-63.4	-57.0	-6.4
-29.0	2440.55	-64.0	-57.0	-7.0
-30.0	2440.50	-64.4	-57.0	-7.4
-31.0	2440.45	-64.9	-57.0	-7.9
-32.0	2440.40	-64.9	-57.0	-7.9
-33.0	2440.35	-65.0	-57.0	-8.0
-34.0	2440.30	-65.2	-57.0	-8.2
-35.0	2440.25	-64.7	-57.0	-7.7
-36.0	2440.20	-64.4	-57.0	-7.4
-37.0	2440.15	-64.1	-57.0	-7.1
-38.0	2440.10	-63.6	-57.0	-6.6
-39.0	2440.05	-63.3	-57.0	-6.3
-40.0	2440.00	-62.9	-57.0	-5.9
-41.0	2439.95	-62.5	-57.0	-5.5
-42.0	2439.90	-61.9	-57.0	-4.9
-43.0	2439.85	-61.0	-57.0	-4.0
-44.0	2439.80	-61.3	-57.0	-4.3
-45.0	2439.75	-61.0	-57.0	-4.0
-46.0	2439.70	-61.3	-57.0	-4.3
-47.0	2439.65	-61.9	-57.0	-4.9
-48.0	2439.60	-62.2	-57.0	-5.2
-49.0	2439.55	-63.2	-57.0	-6.2
-50.0	2439.50	-62.0	-57.0	-5.0
-51.0	2439.45	-62.6	-57.0	-5.6
-52.0	2439.40	-61.7	-57.0	-4.7
-53.0	2439.35	-62.4	-57.0	-5.4
-54.0	2439.30	-63.0	-57.0	-6.0
-55.0	2439.25	-62.6	-57.0	-5.6
-56.0	2439.20	-62.6	-57.0	-5.6
-57.0	2439.15	-63.3	-57.0	-6.3
-58.0	2439.10	-62.8	-57.0	-5.8
-59.0	2439.05	-62.6	-57.0	-5.6
-60.0	2439.00	-62.5	-57.0	-5.5

Table 12.4 : Processing gain testresults for 11.0 Mbps

channel: 07 = 2442.0 MHz **5 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)**

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
-61.0	2438.95	-62.8	-57.0	-5.8
-62.0	2438.90	-63.2	-57.0	-6.2
-63.0	2438.85	-63.5	-57.0	-6.5
-64.0	2438.80	-64.2	-57.0	-7.2
-65.0	2438.75	-64.9	-57.0	-7.9
-66.0	2438.70	-64.6	-57.0	-7.6
-67.0	2438.65	-64.7	-57.0	-7.7
-68.0	2438.60	-65.2	-57.0	-8.2
-69.0	2438.55	-63.9	-57.0	-6.9
-70.0	2438.50	-65.5	-57.0	-8.5
-71.0	2438.45	-65.5	-57.0	-8.5
-72.0	2438.40	-63.8	-57.0	-6.8
-73.0	2438.35	-63.3	-57.0	-6.3
-74.0	2438.30	-61.7	-57.0	-4.7
-75.0	2438.25	-61.8	-57.0	-4.8
-76.0	2438.20	-60.8	-57.0	-3.8
-77.0	2438.15	-61.7	-57.0	-4.7
-78.0	2438.10	-62.2	-57.0	-5.2
-79.0	2438.05	-62.2	-57.0	-5.2
-80.0	2438.00	-62.2	-57.0	-5.2
-81.0	2437.95	-62.8	-57.0	-5.8
-82.0	2437.90	-62.6	-57.0	-5.6
-83.0	2437.85	-62.3	-57.0	-5.3
-84.0	2437.80	-62.0	-57.0	-5.0
-85.0	2437.75	-61.4	-57.0	-4.4
-86.0	2437.70	-61.6	-57.0	-4.6
-87.0	2437.65	-61.2	-57.0	-4.2
-88.0	2437.60	-61.1	-57.0	-4.1
-89.0	2437.55	-60.8	-57.0	-3.8
-90.0	2437.50	-60.6	-57.0	-3.6
-91.0	2437.45	-61.5	-57.0	-4.5
-92.0	2437.40	-60.7	-57.0	-3.7
-93.0	2437.35	-61.0	-57.0	-4.0
-94.0	2437.30	-60.4	-57.0	-3.4
-95.0	2437.25	-60.4	-57.0	-3.4
-96.0	2437.20	-60.8	-57.0	-3.8
-97.0	2437.15	-61.6	-57.0	-4.6
-98.0	2437.10	-60.2	-57.0	-3.2
-99.0	2437.05	-60.1	-57.0	-3.1
-100.0	2437.00	-59.4	-57.0	-2.4

Table 12.5 : Processing gain testresults for 11.0 Mbps

12.4 Processing gain at 2.0 Mbps

The processing gain is measured using the CW jamming margin method. A signal generator is stepped in 50 kHz increments across the passband of the system. At each point the generator level required to produce a Bit Error Rate equivalent to BER=10E-5 is recorded as the Jammer level (J). The output power of the transmitter is measured at the same point and recorded as Signal (S).
The Jammer to Signal ratio (J/S) is then calculated with 20% of the worst datapoints discarded.
The lowest remaining J/S ratio is used to calculate the processing gain using formula:

$$\mathbf{Gp = (S/N)o + Mj + Lsys}$$

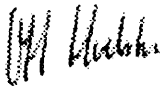
with:
(S/N)0 = 21.0 dB for 2.0 Mbps (obtained from manufacturer's specification of spreading processor Harris semiconductor model HFA3861)

Lsys = 2.0 dB

Measured lowest remaining J/S = Mj = -1.2 dB

Gp = 21.0 dB +(-1.2) dB + 2.0 dB = 21.8 dB (for 2.0 Mbps modulation)

Test engineer:

Signature :  Date: March 23, 2000

Printed name : O.H. Hoekstra

12.5 Processing Gain at 2.0 Mbps testresults tables

pass band = fo ± 5MHz (5000 kHz = 100 x 50 kHz)
channel: 07 = 2442.0 MHz 1 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
100	2447.00	-55.8	-57.0	1.2
99	2446.95	-56.5	-57.0	0.5
98	2446.90	-56.4	-57.0	0.6
97	2446.85	-56.6	-57.0	0.4
96	2446.80	-56.8	-57.0	0.2
95	2446.75	-57.6	-57.0	-0.6
94	2446.70	-58.1	-57.0	-1.1
93	2446.65	-57.3	-57.0	-0.3
92	2446.60	-56.8	-57.0	0.2
91	2446.55	-56.1	-57.0	0.9
90	2446.50	-56.7	-57.0	0.3
89	2446.45	-57.4	-57.0	-0.4
88	2446.40	-55.9	-57.0	1.1
87	2446.35	-54.2	-57.0	2.8
86	2446.30	-54.9	-57.0	2.1
85	2446.25	-55.4	-57.0	1.6
84	2446.20	-55.5	-57.0	1.5
83	2446.15	-55.6	-57.0	1.4
82	2446.10	-55.8	-57.0	1.2
81	2446.05	-56.3	-57.0	0.7
80	2446.00	-57.3	-57.0	-0.3
79	2445.95	-58.5	-57.0	-1.5
78	2445.90	-58.0	-57.0	-1.0
77	2445.85	-57.9	-57.0	-0.9
76	2445.80	-57.9	-57.0	-0.9
75	2445.75	-57.7	-57.0	-0.7
74	2445.70	-58.2	-57.0	-1.2
73	2445.65	-57.9	-57.0	-0.9
72	2445.60	-56.3	-57.0	0.7
71	2445.55	-56.1	-57.0	0.9
70	2445.50	-57.9	-57.0	-0.9
69	2445.45	-58.1	-57.0	-1.1
68	2445.40	-54.7	-57.0	2.3
67	2445.35	-55.5	-57.0	1.5
66	2445.30	-56.6	-57.0	0.4
65	2445.25	-56.0	-57.0	1.0
64	2445.20	-56.8	-57.0	0.2
63	2445.15	-57.1	-57.0	-0.1
62	2445.10	-57.3	-57.0	-0.3
61	2445.05	-57.5	-57.0	-0.5
60	2445.00	-58.9	-57.0	-1.9

Table 12.6 : Processing gain testresults for 2.0 Mbps

channel: 07 = 2442.0 MHz **2 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)**

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
59	2444.95	-58.5	-57.0	-1.5
58	2444.90	-58.3	-57.0	-1.3
57	2444.85	-57.9	-57.0	-0.9
56	2444.80	-58.2	-57.0	-1.2
55	2444.75	-58.2	-57.0	-1.2
54	2444.70	-58.1	-57.0	-1.1
53	2444.65	-57.4	-57.0	-0.4
52	2444.60	-56.1	-57.0	0.9
51	2444.55	-56.7	-57.0	0.3
50	2444.50	-58.5	-57.0	-1.5
49	2444.45	-58.7	-57.0	-1.7
48	2444.40	-58.7	-57.0	-1.7
47	2444.35	-57.5	-57.0	-0.5
46	2444.30	-58.8	-57.0	-1.8
45	2444.25	-57.8	-57.0	-0.8
44	2444.20	-57.9	-57.0	-0.9
43	2444.15	-58.0	-57.0	-1.0
42	2444.10	-58.0	-57.0	-1.0
41	2444.05	-57.2	-57.0	-0.2
40	2444.00	-57.6	-57.0	-0.6
39	2443.95	-57.6	-57.0	-0.6
38	2443.90	-57.3	-57.0	-0.3
37	2443.85	-57.5	-57.0	-0.5
36	2443.80	-57.4	-57.0	-0.4
35	2443.75	-57.5	-57.0	-0.5
34	2443.70	-58.0	-57.0	-1.0
33	2443.65	-57.4	-57.0	-0.4
32	2443.60	-57.2	-57.0	-0.2
31	2443.55	-57.5	-57.0	-0.5
30	2443.50	-57.4	-57.0	-0.4
29	2443.45	-58.8	-57.0	-1.8
28	2443.40	-58.4	-57.0	-1.4
27	2443.35	-58.4	-57.0	-1.4
26	2443.30	-58.9	-57.0	-1.9
25	2443.25	-57.5	-57.0	-0.5
24	2443.20	-57.1	-57.0	-0.1
23	2443.15	-57.9	-57.0	-0.9
22	2443.10	-57.7	-57.0	-0.7
21	2443.05	-57.4	-57.0	-0.4
20	2443.00	-57.5	-57.0	-0.5

Table 12.7 : Processing gain testresults for 2.0 Mbps

channel: 07 = 2442.0 MHz **4 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)**

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
-21	2440.95	-58.0	-57.0	-1.0
-22	2440.90	-57.9	-57.0	-0.9
-23	2440.85	-56.7	-57.0	0.3
-24	2440.80	-56.9	-57.0	0.1
-25	2440.75	-57.4	-57.0	-0.4
-26	2440.70	-56.9	-57.0	0.1
-27	2440.65	-56.6	-57.0	0.4
-28	2440.60	-56.4	-57.0	0.6
-29	2440.55	-57.2	-57.0	-0.2
-30	2440.50	-55.7	-57.0	1.3
-31	2440.45	-57.0	-57.0	0.0
-32	2440.40	-57.6	-57.0	-0.6
-33	2440.35	-58.7	-57.0	-1.7
-34	2440.30	-60.0	-57.0	-3.0
-35	2440.25	-58.1	-57.0	-1.1
-36	2440.20	-58.1	-57.0	-1.1
-37	2440.15	-58.4	-57.0	-1.4
-38	2440.10	-58.6	-57.0	-1.6
-39	2440.05	-57.7	-57.0	-0.7
-40	2440.00	-58.2	-57.0	-1.2
-41	2439.95	-57.6	-57.0	-0.6
-42	2439.90	-57.0	-57.0	0.0
-43	2439.85	-57.1	-57.0	-0.1
-44	2439.80	-57.2	-57.0	-0.2
-45	2439.75	-57.7	-57.0	-0.7
-46	2439.70	-57.6	-57.0	-0.6
-47	2439.65	-56.9	-57.0	0.1
-48	2439.60	-56.4	-57.0	0.6
-49	2439.55	-57.3	-57.0	-0.3
-50	2439.50	-60.2	-57.0	-3.2
-51	2439.45	-60.3	-57.0	-3.3
-52	2439.40	-58.3	-57.0	-1.3
-53	2439.35	-57.3	-57.0	-0.3
-54	2439.30	-58.5	-57.0	-1.5
-55	2439.25	-57.5	-57.0	-0.5
-56	2439.20	-57.2	-57.0	-0.2
-57	2439.15	-57.2	-57.0	-0.2
-58	2439.10	-57.3	-57.0	-0.3
-59	2439.05	-57.4	-57.0	-0.4
-60	2439.00	-57.9	-57.0	-0.9

Table 12.9 : Processing gain testresults for 2.0 Mbps

channel: 07 = 2442.0 MHz **5 of 5 (11Mbps WLAN PC card to 11Mbps WLAN Access Point)**

Step	Freq.(MHz)	J(dBm)	S(dBm)	J/S(dB)
-61	2438.95	-57.9	-57.0	-0.9
-62	2438.90	-57.6	-57.0	-0.6
-63	2438.85	-57.2	-57.0	-0.2
-64	2438.80	-57.5	-57.0	-0.5
-65	2438.75	-57.7	-57.0	-0.7
-66	2438.70	-58.3	-57.0	-1.3
-67	2438.65	-58.1	-57.0	-1.1
-68	2438.60	-56.7	-57.0	0.3
-69	2438.55	-56.4	-57.0	0.6
-70	2438.50	-58.1	-57.0	-1.1
-71	2438.45	-59.2	-57.0	-2.2
-72	2438.40	-58.3	-57.0	-1.3
-73	2438.35	-56.9	-57.0	0.1
-74	2438.30	-56.8	-57.0	0.2
-75	2438.25	-57.9	-57.0	-0.9
-76	2438.20	-57.8	-57.0	-0.8
-77	2438.15	-58.3	-57.0	-1.3
-78	2438.10	-58.9	-57.0	-1.9
-79	2438.05	-57.1	-57.0	-0.1
-80	2438.00	-58.1	-57.0	-1.1
-81	2437.95	-58.8	-57.0	-1.8
-82	2437.90	-57.5	-57.0	-0.5
-83	2437.85	-57.3	-57.0	-0.3
-84	2437.80	-56.7	-57.0	0.3
-85	2437.75	-57.1	-57.0	-0.1
-86	2437.70	-56.7	-57.0	0.3
-87	2437.65	-57.1	-57.0	-0.1
-88	2437.60	-55.3	-57.0	1.7
-89	2437.55	-54.6	-57.0	2.4
-90	2437.50	-56.2	-57.0	0.8
-91	2437.45	-57.3	-57.0	-0.3
-92	2437.40	-56.8	-57.0	0.2
-93	2437.35	-55.6	-57.0	1.4
-94	2437.30	-56.8	-57.0	0.2
-95	2437.25	-58.2	-57.0	-1.2
-96	2437.20	-58.5	-57.0	-1.5
-97	2437.15	-58.3	-57.0	-1.3
-98	2437.10	-58.0	-57.0	-1.0
-99	2437.05	-57.7	-57.0	-0.7
-100	2437.00	-57.9	-57.0	-0.9

Table 12.10 : Processing gain testresults for 2.0 Mbps

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b):

Requirements

For antennas with gains of 6 dBi or less , maximum allowed transmitter output is 1 watt (+30 dBm).
For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6) dBm.

Procedure

[X] The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

[ ] The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for maximum RES BW and power was read directly in dBm. External attenuation and cable loss were compensated for using the OFFSET function of the analyzer.

Test Equipment

Hewlett Packard Peak Power Meter, Model: 8900D, Serial: 3607U00673, Calibration Due: 7/31/2000
Hewlett Packard Power Sensor, Model: 84811A, Serial: 33A8Ao5091, Calibration Due: 12/19/2000

Test Result

Antenna gain = 2.5 dBi		
Frequency (MHz)	**Output in dBm (includes Antenna gain)**	**Output in mWatt**
2412.0	15.61	36.4
2437.0	15.73	37.4
2462.0	15.92	39.1

Cable loss: 0.7 dB External Attenuation: 0 dB

Cable loss, external attenuation: [ ] included in OFFSET function
[X] added to SA raw reading

Antenna Gain 2.5 dBi + measured max output level 13.42 dBm (includes cable loss) = 15.92 dBm