



**TEST REPORT OF A 2.4 GHZ LOW POWER RLAN
MINIPCI CARD, BRAND AGERE, TYPE MPC13A-20/R,
BUILT INTO NOTEBOOK TYPE LATITUDE X200,
BRAND DELL, IN CONFORMITY WITH
CFR 47 PART 15.107, 15.109, 15.205, 15.207 AND
15.209 (2001-5-24)**

TNO Physics and Electronics Laboratory
P.O. Box 15
9822 ZG Niekerk (NL)
Smidshornerweg 18
9822 TL Niekerk (NL)

Telephone: +31 594 505005
Telefax: +31 594 504804

E-mail: eps@certi.tno.nl



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power WLAN MiniPCI card
built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

MEASUREMENT/TECHNICAL REPORT

Agere Systems Nederland B.V.

Model : MPC13A-20/R

FCC ID: IMRMPCIDE3

March 18, 2002

This report concerns (strike out one): Original grant/certification Class 2 change Verification		
Equipment type: Direct Sequence Spread Spectrum Transceiver		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii) ? Yes No		
Report prepared by:	Name	: D.H. Kruiter, B.Sc. E.E., B.Sc. T.M.
	Company name	: TNO Certification EPS
	Address	: Smidshornerweg 18
	Postal code/city	: 9822 ZG Niekerk
	Mailing address	: P.O. Box 15
	Postal code/city	: 9822 TL Niekerk
	Country	: The Netherlands
	Telephone number	: + 31 594 505 005
	Telefax number	: + 31 594 504 804
	E-mail	: eps@certi.tno.nl

The data taken for this test and report herein was done in accordance with CFR 47 Part 15 and the measurement procedures of ANSI C63.4-1992. TNO Certification EPS 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 as 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: March 18, 2002

Signature:

P. de Beer
TNO Certification EPS



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power RLAN MiniPCI card
built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

Description of test item

Test item : 2.4 GHz low power RLAN MiniPCI card built into
notebook type Latitude X200, brand Dell
Manufacturer : Agere Systems Nederland B.V.
Brand : Agere
Type : MPC13A-20/R
Revision : 8U354
Receipt number : 2
Receipt date : March 13, 2002

Applicant information

Applicant's representative : Mr. W. Kerkhof
Company : Agere Systems Nederland B.V.
Address : Zadelstede 1-10
Postal code : 3431 JZ
City : Nieuwegein
PO-box : 755
Postal code : 3430 AP
City : Nieuwegein
Country : The Netherlands
Telephone number : +31 30 609 7534
Telefax number : +31 30 609 7556

Test(s) performed

Location : Niekerk
Test(s) started : March 14, 2002
Test(s) completed : March 17, 2002
Purpose of test(s) : Type approval / certification
Test specification(s) : CFR 47 Part 15.107, 15.109, 15.205, 15.207 and 15.209 (2001-5-24)

Test engineer : P.A.J.M. Robben, B.Sc.E.E.
Project leader : P.A.J.M. Robben, B.Sc.E.E.
Report written by : D.H. Kruiter, B.Sc. E.E., B.Sc. T.M.
Report approved by : P.A.J.M. Robben, B.Sc.E.E.
Report date : March 18, 2002

This report is in conformity with EN 45001.

This report shall not be reproduced, except in full, without the written permission of TNO Physics and Electronics Laboratory.
The test results relate only to the item(s) tested.



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power RLAN MiniPCI card
built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

Table of contents

1	General information.....	5
1.1	Product description	5
1.2	Related submittal(s) and/or Grant(s).....	5
1.3	Tested system details	5
1.4	Test methodology	6
1.5	Test facility	6
1.6	Product labeling	6
1.7	System test configuration.....	7
1.7.1	Justification	7
1.7.2	EUT exercise software.....	7
1.8	Special accessories	7
1.9	Equipment modifications.....	8
1.10	Configuration of the tested system	8
1.11	Block diagram(s) of the EUT	8
2	Radiated emission data.....	9
2.1	Test results with EUT operating in receive mode on channel 1	9
2.2	Test results with EUT operating in receive mode on channel 6	10
2.3	Test results with EUT operating in receive mode on channel 11	11
2.4	Test results with EUT operating in transmit mode on channel 1.....	12
2.5	Test results with EUT operating in transmit mode on channel 6.....	13
2.6	Test results with EUT operating in transmit mode on channel 11.....	14
3	Conducted emission data.....	15
4	List of utilized test equipment.....	16



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power RLAN MiniPCI card
built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

1 General information

1.1 Product description

The 2.4 GHz low power RLAN MiniPCI card, brand Agere, type MPC13A-20/R, is designed to operate in the 2.4 GHz ISM frequency band, channels 1 to 11 (2412 MHz to 2462 MHz), as specified by the Federal Communications Commission in the USA.

The 2.4 GHz low power RLAN MiniPCI card, brand Agere, type MPC13A-20/R, utilizes Direct Sequence Spread Spectrum (DSSS) technology.

The 2.4 GHz low power RLAN MiniPCI card, brand Agere, type MPC13A-20/R, is intended for use in notebooks with a factory installed integrated antenna. Only antennas, which have been certified by the Federal Communications Commission for use with this specific 2.4 GHz low power RLAN MiniPCI card, may be connected to the antenna connector of this device.

1.2 Related submittal(s) and/or Grant(s)

Not applicable.

1.3 Tested system details

Details and an overview of the system and all its components, as it has been tested, can be found in table 1 below. FCC ID's are stated in this overview where applicable. The EUT is listed in the first row of this table 1.

Description	Type number	Serial number	FCC ID	Cable descriptions
2.4 GHz low power RLAN MiniPCI card	MPC13A-20/R	-	-	Coaxial antenna cable connected to a factory installed integrated antenna, having a gain of 0.9 dBi
Notebook computer	Latitude X200	KR-07J510-36521-218-2068	n.a. (DoC)	Unshielded DC power cord to AC/DC adapter Shielded parallel cable to printer
Dell AC/DC power adapter 100-240 VAC/1.2 Amps to +20 VDC/2.5 Amps	ADP-50FH, PA-8 family	TH-08H051-17971-1CR-1RC7	n.a. (DoC)	Unshielded DC power cord to notebook computer Unshielded power cord to AC mains
Factory installed integrated antenna, brand Amphenol KAE, having a gain of 0.9 dBi	PIFA	n.a.	n.a.	Coaxial antenna cable to EUT
HP DeskJet 895Cxi	C6410A	ES8B42307H	n.a. (DoC)	Unshielded DC power cord to AC/DC adapter Shielded parallel cable to notebook computer
HP AC/DC power adapter 100-240 VAC/1 Amps to +18 VDC/1.1 Amps	C6409-60014	n.a.	n.a. (DoC)	Unshielded DC power cord to printer Unshielded power cord to AC mains

Table 1 - Tested system details overview.



Test specification(s):	CFR 47 Part 15 (2001-5-24)
Description of EUT:	2.4 GHz low power WLAN MiniPCI card built into notebook type Latitude X200
Manufacturer:	Agere Systems Nederland B.V.
Brand mark:	Agere
Type:	MPCI3A-20/R
FCC ID:	IMRMPCIDE3

1.4 Test methodology

The test methodology used is based on the requirements of CFR 47 Part 15, issue of May 24, 2001, sections 15.107, 15.109, 15.205, 15.207 and 15.209.

The test methods, which have been used, are based on ANSI C63.4: 1992.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters. Below 30 MHz the radiated emission tests were carried out at measurement distances of 3 and 10 meters. The test results regarding the radiated emission tests on frequencies below 30 MHz have been extrapolated in order to determine the field strength of the measured values at measurement distances of 30 and 300 meters (as required by CFR 47 Part 15).

Radiated emission tests on frequencies above 1 GHz were performed with appropriate pre-amplifiers, antennas and a spectrum analyzer. At frequencies on which radiated emissions were found the level at the input of the pre-amplifier was reproduced by means of a RF signal generator. The output level of the signal generator was then increased with the antenna factor in order to obtain the actual field strength value for each individual frequency on which radiated emissions were found.

1.5 Test facility

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at TNO Certification EPS, located in Niekerk, 9822 TL Smidshornerweg 18, The Netherlands, and has found these test facilities to be in compliance with the requirements of CFR 47 Part 15, section 2.948, per October 23, 2000.

The description of the test facilities has been filed at the Office of the Federal Communications Commission. The facility has been added to the list of those laboratories performing these test services for the public on a fee basis.

The list of all public test facilities is available on the Internet at <http://www.fcc.gov>.

1.6 Product labeling

In accordance with CFR 47 Part 15.19 (a)(3) the following text shall be placed on a label, which is attached to the notebook computer (host-system), in which the EUT is built-in:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The FCC ID of the EUT must be placed on a label, which is attached to the notebook computer (host-system), in which the EUT is built-in.

For further details about the labeling requirements (size, legibility, etc.) as set by the Federal Communications Commission see CFR 47 Part 15.19 (a)(3), CFR 47 Part 15.19 (b)(2), CFR 47 Part 15.19 (b)(4), CFR 47 Part 2.925 and CFR 47 Part 2.926.



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power WLAN MiniPCI card
built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

1.7 System test configuration

1.7.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4: 1992.

Tests were performed at the lowest operating frequency (channel 1: 2412 MHz), the operating frequency in the middle of the specified frequency band (channel 6: 2437 MHz) and the highest operating frequency (channel 11: 2462 MHz). Further details may be found in table 2 below.

Channel	Operating frequencies (MHz)	Rated output power (dBm)	Test performed
1	2412	+15	yes
2	2417	+15	no
3	2422	+15	no
4	2427	+15	no
5	2432	+15	no
6	2437	+15	yes
7	2442	+15	no
8	2447	+15	no
9	2452	+15	no
10	2457	+15	no
11	2462	+15	yes

Table 2 - Specification of channels and rated maximum output power (excluding antenna gain of 0.9 dBi).

The EUT was tested in a notebook computer with a factory installed integrated antenna, having a declared gain of 0.9 dBi, connected to the antenna port. Only radiated emission measurements and conducted emission measurements on the AC mains connection terminals of the notebook computer were carried out. The results of all other measurements, as required by CFR 47 Part 15.247, may be found in the "base" test report with reference number 02031401.r00.

1.7.2 EUT exercise software

The EUT could be enabled to transmit or receive continuously on channels 1 (2412 MHz), 6 (2437 MHz) and 11 (2462 MHz) by means of test software, which was supplied by the manufacturer of the EUT. Furthermore, the utilized test software also enables various transmission bit-rate settings in the range of 1 Mbit/s, 2 Mbit/s, 5.5 Mbit/s and 11 Mbit/s.

1.8 Special accessories

No special accessories are used and/or needed to achieve compliance with the appropriate sections of CFR 47 Part 15.



Test specification(s):	CFR 47 Part 15 (2001-5-24)
Description of EUT:	2.4 GHz low power RLAN MiniPCI card built into notebook type Latitude X200
Manufacturer:	Agere Systems Nederland B.V.
Brand mark:	Agere
Type:	MPCI3A-20/R
FCC ID:	IMRMPCIDE3

1.9 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the appropriate sections of CFR 47 Part 15.

1.10 Configuration of the tested system

Not applicable. See table 1 in section 1.3 of this test report and the test setup photographs, which are available in an addendum (with reference number 02031401.r06) to this test report.

1.11 Block diagram(s) of the EUT

The block diagram is available as part of the documentation which is to be submitted to the FCC/TCB.



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power WLAN MiniPCI card
built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

2 Radiated emission data

2.1 Test results with EUT operating in receive mode on channel 1

The results of the radiated emission tests, carried out in accordance with CFR 47 Part 15.109 and CFR 47 Part 15.209 with the EUT operating in receive mode on channel 1 (2412 MHz), are depicted in table 3.

Frequency (MHz)	Test results quasi peak (dB μ V/m)		Test results average (dB μ V/m)		Test results peak (dB μ V/m)		Resolution bandwidth (kHz)	Quasi peak limits (dB μ V/m)	Average limits (dB μ V/m)	Peak limits (dB μ V/m)
	V	H	V	H	V	H				
66.600	14.0	7.3	-	-	-	-	120	40.0	-	-
71.560	15.6	19.2	-	-	-	-	120	40.0	-	-
83.690	22.3	10.0	-	-	-	-	120	40.0	-	-
98.300	26.9	22.4	-	-	-	-	120	43.5	-	-
229.080	23.7	24.8	-	-	-	-	120	46.0	-	-
233.460	25.4	27.6	-	-	-	-	120	46.0	-	-
245.750	29.5	32.3	-	-	-	-	120	46.0	-	-
260.820	26.6	31.5	-	-	-	-	120	46.0	-	-
300.700	31.0	28.8	-	-	-	-	120	46.0	-	-
313.480	31.5	39.1	-	-	-	-	120	46.0	-	-
325.040	33.0	40.3	-	-	-	-	120	46.0	-	-
330.000	27.9	32.9	-	-	-	-	120	46.0	-	-
333.020	34.9	38.8	-	-	-	-	120	46.0	-	-
391.170	30.4	25.4	-	-	-	-	120	46.0	-	-
429.920	35.7	37.7	-	-	-	-	120	46.0	-	-
456.410	28.4	26.9	-	-	-	-	120	46.0	-	-
480.070	37.0	34.0	-	-	-	-	120	46.0	-	-
501.170	35.6	31.3	-	-	-	-	120	46.0	-	-
720.110	37.9	32.0	-	-	-	-	120	46.0	-	-
732.510	40.9	30.0	-	-	-	-	120	46.0	-	-
768.110	37.4	30.7	-	-	-	-	120	46.0	-	-
785.870	34.0	30.7	-	-	-	-	120	46.0	-	-
816.120	36.8	31.3	-	-	-	-	120	46.0	-	-
884.720	35.0	39.9	-	-	-	-	120	46.0	-	-
912.900	34.9	33.3	-	-	-	-	120	46.0	-	-
983.000	38.8	40.4	-	-	-	-	120	54.0	-	-
1056.000	-	-	n.t.	n.t.	41.3	42.8	1000	-	54.0	74.0
1196.000	-	-	n.t.	n.t.	41.5	40.8	1000	-	54.0	74.0
1238.000	-	-	n.t.	n.t.	33.0	41.5	1000	-	54.0	74.0
1333.000	-	-	n.t.	n.t.	42.3	37.4	1000	-	54.0	74.0
1462.000	-	-	n.t.	n.t.	42.9	41.0	1000	-	54.0	74.0
1592.000	-	-	n.t.	n.t.	43.3	38.0	1000	-	54.0	74.0
1732.000	-	-	n.t.	n.t.	38.5	34.1	1000	-	54.0	74.0
1865.000	-	-	n.t.	n.t.	39.9	<30.0	1000	-	54.0	74.0
2208.000	-	-	n.t.	n.t.	40.3	<30.0	1000	-	54.0	74.0
2274.000	-	-	n.t.	n.t.	39.2	<30.0	1000	-	54.0	74.0

Table 3 - Test results with the EUT operating in receive mode on channel 1 (2412 MHz).

Note: Above 1 GHz, all measured values of the spurious emissions with the detector in peak mode are below the applicable limits which are valid when using an average detector.

Therefore, all spurious emissions above 1 GHz have been measured with the peak detector only (n.t. = not tested).

Note: Field strength values of radiated emissions at frequencies not listed in table 3 are more than 20 dB below the applicable limit.

Test engineer

Signature

Name : P.A.J.M. Robben, B.Sc.E.E.

Date : March 18, 2002



Test specification(s): CFR 47 Part 15 (2001-5-24)
 Description of EUT: 2.4 GHz low power RLAN MiniPCI card built into notebook type Latitude X200
 Manufacturer: Agere Systems Nederland B.V.
 Brand mark: Agere
 Type: MPC13A-20/R
 FCC ID: IMRMPCIDE3

2.2 Test results with EUT operating in receive mode on channel 6

The results of the radiated emission tests, carried out in accordance with CFR 47 Part 15.109 and CFR 47 Part 15.209 with the EUT operating in receive mode on channel 6 (2437 MHz), are depicted in table 4.

Frequency (MHz)	Test results quasi peak (dBµV/m)		Test results average (dBµV/m)		Test results peak (dBµV/m)		Resolution bandwidth (kHz)	Quasi peak limits (dBµV/m)	Average limits (dBµV/m)	Peak limits (dBµV/m)
	V	H	V	H	V	H				
66.600	14.0	7.3	-	-	-	-	120	40.0	-	-
71.560	15.6	19.2	-	-	-	-	120	40.0	-	-
83.690	22.3	10.0	-	-	-	-	120	40.0	-	-
98.300	26.9	22.4	-	-	-	-	120	43.5	-	-
229.080	23.7	24.8	-	-	-	-	120	46.0	-	-
233.460	25.4	27.6	-	-	-	-	120	46.0	-	-
245.750	29.5	32.3	-	-	-	-	120	46.0	-	-
260.820	26.6	31.5	-	-	-	-	120	46.0	-	-
300.700	31.0	28.8	-	-	-	-	120	46.0	-	-
313.480	31.5	39.1	-	-	-	-	120	46.0	-	-
325.040	33.0	40.3	-	-	-	-	120	46.0	-	-
330.000	27.9	32.9	-	-	-	-	120	46.0	-	-
333.020	34.9	38.8	-	-	-	-	120	46.0	-	-
391.170	30.4	25.4	-	-	-	-	120	46.0	-	-
429.920	35.7	37.7	-	-	-	-	120	46.0	-	-
456.410	28.4	26.9	-	-	-	-	120	46.0	-	-
480.070	37.0	34.0	-	-	-	-	120	46.0	-	-
501.170	35.6	31.3	-	-	-	-	120	46.0	-	-
720.110	37.9	32.0	-	-	-	-	120	46.0	-	-
732.510	40.9	30.0	-	-	-	-	120	46.0	-	-
768.110	37.4	30.7	-	-	-	-	120	46.0	-	-
785.870	34.0	30.7	-	-	-	-	120	46.0	-	-
816.120	36.8	31.3	-	-	-	-	120	46.0	-	-
884.720	35.0	39.9	-	-	-	-	120	46.0	-	-
912.900	34.9	33.3	-	-	-	-	120	46.0	-	-
983.000	38.8	40.4	-	-	-	-	120	54.0	-	-
1060.000	-	-	n.t.	n.t.	42.6	43.6	1000	-	54.0	74.0
1200.000	-	-	n.t.	n.t.	42.2	36.4	1000	-	54.0	74.0
1333.000	-	-	n.t.	n.t.	42.3	38.0	1000	-	54.0	74.0
1469.000	-	-	n.t.	n.t.	44.0	40.7	1000	-	54.0	74.0
1595.000	-	-	n.t.	n.t.	40.0	37.0	1000	-	54.0	74.0
1739.000	-	-	n.t.	n.t.	40.0	34.6	1000	-	54.0	74.0
1865.000	-	-	n.t.	n.t.	41.4	31.6	1000	-	54.0	74.0

Table 4 - Test results with the EUT operating in receive mode on channel 6 (2437 MHz).

Note: Above 1 GHz, all measured values of the spurious emissions with the detector in peak mode are below the applicable limits which are valid when using an average detector. Therefore, all spurious emissions above 1 GHz have been measured with the peak detector only (n.t. = not tested).

Note: Field strength values of radiated emissions at frequencies not listed in table 4 are more than 20 dB below the applicable limit.

Test engineer

Signature : 

Name : P.A.J.M. Robben, B.Sc.E.E.

Date : March 18, 2002



Test specification(s): CFR 47 Part 15 (2001-5-24)
Description of EUT: 2.4 GHz low power RLAN MiniPCI card built into notebook type Latitude X200
Manufacturer: Agere Systems Nederland B.V.
Brand mark: Agere
Type: MPC13A-20/R
FCC ID: IMRMPCIDE3

2.3 Test results with EUT operating in receive mode on channel 11

The results of the radiated emission tests, carried out in accordance with CFR 47 Part 15.109 and CFR 47 Part 15.209 with the EUT operating in receive mode on channel 11 (2462 MHz), are depicted in table 5.

Frequency (MHz)	Test results quasi peak (dB μ V/m)		Test results average (dB μ V/m)		Test results peak (dB μ V/m)		Resolution bandwidth (kHz)	Quasi peak limits (dB μ V/m)	Average limits (dB μ V/m)	Peak limits (dB μ V/m)
	V	H	V	H	V	H				
66.600	14.0	7.3	-	-	-	-	120	40.0	-	-
71.560	15.6	19.2	-	-	-	-	120	40.0	-	-
83.690	22.3	10.0	-	-	-	-	120	40.0	-	-
98.300	26.9	22.4	-	-	-	-	120	43.5	-	-
229.080	23.7	24.8	-	-	-	-	120	46.0	-	-
233.460	25.4	27.6	-	-	-	-	120	46.0	-	-
245.750	29.5	32.3	-	-	-	-	120	46.0	-	-
260.820	26.6	31.5	-	-	-	-	120	46.0	-	-
300.700	31.0	28.8	-	-	-	-	120	46.0	-	-
313.480	31.5	39.1	-	-	-	-	120	46.0	-	-
325.040	33.0	40.3	-	-	-	-	120	46.0	-	-
330.000	27.9	32.9	-	-	-	-	120	46.0	-	-
333.020	34.9	38.8	-	-	-	-	120	46.0	-	-
391.170	30.4	25.4	-	-	-	-	120	46.0	-	-
429.920	35.7	37.7	-	-	-	-	120	46.0	-	-
456.410	28.4	26.9	-	-	-	-	120	46.0	-	-
480.070	37.0	34.0	-	-	-	-	120	46.0	-	-
501.170	35.6	31.3	-	-	-	-	120	46.0	-	-
720.110	37.9	32.0	-	-	-	-	120	46.0	-	-
732.510	40.9	30.0	-	-	-	-	120	46.0	-	-
768.110	37.4	30.7	-	-	-	-	120	46.0	-	-
785.870	34.0	30.7	-	-	-	-	120	46.0	-	-
816.120	36.8	31.3	-	-	-	-	120	46.0	-	-
884.720	35.0	39.9	-	-	-	-	120	46.0	-	-
912.900	34.9	33.3	-	-	-	-	120	46.0	-	-
983.000	38.8	40.4	-	-	-	-	120	54.0	-	-
1066.000	-	-	n.t.	n.t.	40.8	43.6	1000	-	54.0	74.0
1197.000	-	-	n.t.	n.t.	37.2	36.2	1000	-	54.0	74.0
1327.000	-	-	n.t.	n.t.	43.1	38.0	1000	-	54.0	74.0
1465.000	-	-	n.t.	n.t.	38.1	40.7	1000	-	54.0	74.0
1593.000	-	-	n.t.	n.t.	32.4	37.0	1000	-	54.0	74.0

Table 5 - Test results with the EUT operating in receive mode on channel 11 (2462 MHz).

Note: Above 1 GHz, all measured values of the spurious emissions with the detector in peak mode are below the applicable limits which are valid when using an average detector. Therefore, all spurious emissions above 1 GHz have been measured with the peak detector only (n.t. = not tested).

Note: Field strength values of radiated emissions at frequencies not listed in table 5 are more than 20 dB below the applicable limit.

Test engineer

Signature :

Name : P.A.J.M. Robben, B.Sc.E.E.

Date : March 18, 2002



Test specification(s): CFR 47 Part 15 (2001-5-24)
 Description of EUT: 2.4 GHz low power WLAN MiniPCI card built into notebook type Latitude X200
 Manufacturer: Agere Systems Nederland B.V.
 Brand mark: Agere
 Type: MPC13A-20/R
 FCC ID: IMRMPCIDE3

2.4 Test results with EUT operating in transmit mode on channel 1.

The results of the radiated emission tests, carried out in accordance with CFR 47 Part 15.205 (restricted bands of operation) with the EUT operating in transmit mode on channel 1 (2412 MHz), are depicted in table 6.

Frequency (MHz)	Test results quasi peak (dBµV/m)		Test results average (dBµV/m)		Test results peak (dBµV/m)		Resolution bandwidth (kHz)	Quasi peak limits (dBµV/m)	Average limits (dBµV/m)	Peak limits (dBµV/m)
	V	H	V	H	V	H				
66.600	19.3	14.6	-	-	-	-	120	40.0	-	-
71.590	16.3	7.8	-	-	-	-	120	40.0	-	-
83.690	22.3	10.0	-	-	-	-	120	40.0	-	-
98.300	27.0	22.2	-	-	-	-	120	43.5	-	-
100.230	39.2	12.1	-	-	-	-	120	43.5	-	-
229.080	26.3	24.0	-	-	-	-	120	46.0	-	-
233.460	26.7	28.3	-	-	-	-	120	46.0	-	-
235.750	28.9	22.7	-	-	-	-	120	46.0	-	-
260.820	26.4	31.7	-	-	-	-	120	46.0	-	-
286.360	30.6	35.1	-	-	-	-	120	46.0	-	-
294.910	32.4	35.1	-	-	-	-	120	46.0	-	-
300.700	31.0	28.4	-	-	-	-	120	46.0	-	-
325.040	35.1	34.7	-	-	-	-	120	46.0	-	-
331.320	35.1	33.8	-	-	-	-	120	46.0	-	-
480.000	37.8	35.9	-	-	-	-	120	46.0	-	-
501.170	35.8	32.3	-	-	-	-	120	46.0	-	-
639.250	34.8	27.7	-	-	-	-	120	46.0	-	-
732.510	41.0	32.1	-	-	-	-	120	46.0	-	-
768.410	36.1	30.7	-	-	-	-	120	46.0	-	-
786.420	39.8	34.1	-	-	-	-	120	46.0	-	-
816.120	36.1	31.3	-	-	-	-	120	46.0	-	-
884.720	34.7	38.3	-	-	-	-	120	46.0	-	-
1058.000	-	-	n.t.	n.t.	41.3	42.8	1000	-	54.0	74.0
1200.000	-	-	n.t.	n.t.	41.6	40.9	1000	-	54.0	74.0
1326.000	-	-	n.t.	n.t.	33.3	41.7	1000	-	54.0	74.0
1465.000	-	-	n.t.	n.t.	42.7	37.8	1000	-	54.0	74.0
4825.000	-	-	n.t.	n.t.	40.7	37.0	1000	-	54.0	74.0
7236.000	-	-	n.t.	n.t.	40.3	40.7	1000	-	54.0	74.0

Table 6 - Test results with the EUT operating in transmit mode on channel 1 (2412 MHz).

Note: Radiated emission tests have been performed with all possible transmission bit-rates (1 Mbit/s, 2 Mbit/s, 5.5 Mbit/s and 11 Mbit/s) in transmit mode. The highest values measured of the spurious emission components are reported by means of table 6.

Note: Above 1 GHz, all measured values of the spurious emissions with the detector in peak mode are below the applicable limits which are valid when using an average detector. Therefore, all spurious emissions above 1 GHz have been measured with the peak detector only (n.t. = not tested).

Note: Field strength values of radiated emissions at frequencies not listed in table 6 are more than 20 dB below the applicable limit.

Test engineer

Signature :

Name : P.A.J.M. Robben, B.Sc.E.E.

Date : March 18, 2002



Test specification(s): CFR 47 Part 15 (2001-5-24)
 Description of EUT: 2.4 GHz low power WLAN MiniPCI card built into notebook type Latitude X200
 Manufacturer: Agere Systems Nederland B.V.
 Brand mark: Agere
 Type: MPC13A-20/R
 FCC ID: IMRMPCIDE3

2.5 Test results with EUT operating in transmit mode on channel 6.

The results of the radiated emission tests, carried out in accordance with CFR 47 Part 15.205 (restricted bands of operation) with the EUT operating in transmit mode on channel 6 (2437 MHz), are depicted in table 7.

Frequency (MHz)	Test results quasi peak (dBµV/m)		Test results average (dBµV/m)		Test results peak (dBµV/m)		Resolution bandwidth (kHz)	Quasi peak limits (dBµV/m)	Average limits (dBµV/m)	Peak limits (dBµV/m)
	V	H	V	H	V	H				
66.600	19.3	14.6	-	-	-	-	120	40.0	-	-
71.590	16.3	7.8	-	-	-	-	120	40.0	-	-
83.690	22.3	10.0	-	-	-	-	120	40.0	-	-
98.300	27.0	22.2	-	-	-	-	120	43.5	-	-
100.230	39.2	12.1	-	-	-	-	120	43.5	-	-
229.080	26.3	24.0	-	-	-	-	120	46.0	-	-
233.460	26.7	28.3	-	-	-	-	120	46.0	-	-
235.750	28.9	22.7	-	-	-	-	120	46.0	-	-
260.820	26.4	31.7	-	-	-	-	120	46.0	-	-
286.360	30.6	35.1	-	-	-	-	120	46.0	-	-
294.910	32.4	35.1	-	-	-	-	120	46.0	-	-
300.700	31.0	28.4	-	-	-	-	120	46.0	-	-
325.040	35.1	34.7	-	-	-	-	120	46.0	-	-
331.320	35.1	33.8	-	-	-	-	120	46.0	-	-
480.000	37.8	35.9	-	-	-	-	120	46.0	-	-
501.170	35.8	32.3	-	-	-	-	120	46.0	-	-
639.250	34.8	27.7	-	-	-	-	120	46.0	-	-
732.510	41.0	32.1	-	-	-	-	120	46.0	-	-
768.410	36.1	30.7	-	-	-	-	120	46.0	-	-
786.420	39.8	34.1	-	-	-	-	120	46.0	-	-
816.120	36.1	31.3	-	-	-	-	120	46.0	-	-
884.720	34.7	38.3	-	-	-	-	120	46.0	-	-
1058.000	-	-	n.t.	n.t.	38.4	42.1	1000	-	54.0	74.0
1198.000	-	-	n.t.	n.t.	35.5	34.0	1000	-	54.0	74.0
1325.000	-	-	n.t.	n.t.	43.3	38.5	1000	-	54.0	74.0
1459.000	-	-	n.t.	n.t.	38.3	34.8	1000	-	54.0	74.0
4874.000	-	-	n.t.	n.t.	38.4	34.9	1000	-	54.0	74.0
7310.000	-	-	n.t.	n.t.	37.1	36.4	1000	-	54.0	74.0

Table 7 - Test results with the EUT operating in transmit mode on channel 6 (2437 MHz).

Note: Radiated emission tests have been performed with all possible transmission bit-rates (1 Mbit/s, 2 Mbit/s, 5.5 Mbit/s and 11 Mbit/s) in transmit mode. The highest values measured of the spurious emission components are reported by means of table 7.

Note: Above 1 GHz, all measured values of the spurious emissions with the detector in peak mode are below the applicable limits which are valid when using an average detector. Therefore, all spurious emissions above 1 GHz have been measured with the peak detector only (n.t. = not tested).

Note: Field strength values of radiated emissions at frequencies not listed in table 7 are more than 20 dB below the applicable limit.

Test engineer

Signature :

Name : P.A.J.M. Robben, B.Sc.E.E.

Date : March 18, 2002



Test specification(s): CFR 47 Part 15 (2001-5-24)
 Description of EUT: 2.4 GHz low power RLAN MiniPCI card built into notebook type Latitude X200
 Manufacturer: Agere Systems Nederland B.V.
 Brand mark: Agere
 Type: MPC13A-20/R
 FCC ID: IMRMPCIDE3

2.6 Test results with EUT operating in transmit mode on channel 11.

The results of the radiated emission tests, carried out in accordance with CFR 47 Part 15.205 (restricted bands of operation) with the EUT operating in transmit mode on channel 11 (2462 MHz), are depicted in table 8.

Frequency (MHz)	Test results quasi peak (dBµV/m)		Test results average (dBµV/m)		Test results peak (dBµV/m)		Resolution bandwidth (kHz)	Quasi peak limits (dBµV/m)	Average limits (dBµV/m)	Peak limits (dBµV/m)
	V	H	V	H	V	H				
66.600	19.3	14.6	-	-	-	-	120	40.0	-	-
71.590	16.3	7.8	-	-	-	-	120	40.0	-	-
83.690	22.3	10.0	-	-	-	-	120	40.0	-	-
98.300	27.0	22.2	-	-	-	-	120	43.5	-	-
100.230	39.2	12.1	-	-	-	-	120	43.5	-	-
229.080	26.3	24.0	-	-	-	-	120	46.0	-	-
233.460	26.7	28.3	-	-	-	-	120	46.0	-	-
235.750	28.9	22.7	-	-	-	-	120	46.0	-	-
260.820	26.4	31.7	-	-	-	-	120	46.0	-	-
286.360	30.6	35.1	-	-	-	-	120	46.0	-	-
294.910	32.4	35.1	-	-	-	-	120	46.0	-	-
300.700	31.0	28.4	-	-	-	-	120	46.0	-	-
325.040	35.1	34.7	-	-	-	-	120	46.0	-	-
331.320	35.1	33.8	-	-	-	-	120	46.0	-	-
480.000	37.8	35.9	-	-	-	-	120	46.0	-	-
501.170	35.8	32.3	-	-	-	-	120	46.0	-	-
639.250	34.8	27.7	-	-	-	-	120	46.0	-	-
732.510	41.0	32.1	-	-	-	-	120	46.0	-	-
768.410	36.1	30.7	-	-	-	-	120	46.0	-	-
786.420	39.8	34.1	-	-	-	-	120	46.0	-	-
816.120	36.1	31.3	-	-	-	-	120	46.0	-	-
884.720	34.7	38.3	-	-	-	-	120	46.0	-	-
1066.000	-	-	n.t.	n.t.	40.7	42.2	1000	-	54.0	74.0
1201.000	-	-	n.t.	n.t.	36.5	34.2	1000	-	54.0	74.0
1327.000	-	-	n.t.	n.t.	43.1	38.1	1000	-	54.0	74.0
1469.000	-	-	n.t.	n.t.	38.5	35.0	1000	-	54.0	74.0
1602.000	-	-	n.t.	n.t.	39.2	33.5	1000	-	54.0	74.0
4825.000	-	-	n.t.	n.t.	40.7	37.0	1000	-	54.0	74.0
7236.000	-	-	n.t.	n.t.	40.3	40.7	1000	-	54.0	74.0

Table 8 - Test results with the EUT operating in transmit mode on channel 11 (2462 MHz).

Note: Radiated emission tests have been performed with all possible transmission bit-rates (1 Mbit/s, 2 Mbit/s, 5.5 Mbit/s and 11 Mbit/s) in transmit mode. The highest values measured of the spurious emission components are reported by means of table 8.

Note: Above 1 GHz, all measured values of the spurious emissions with the detector in peak mode are below the applicable limits which are valid when using an average detector. Therefore, all spurious emissions above 1 GHz have been measured with the peak detector only (n.t. = not tested).

Note: Field strength values of radiated emissions at frequencies not listed in table 8 are more than 20 dB below the applicable limit.

Test engineer

Signature

Name

: P.A.J.M. Robben, B.Sc.E.E.

Date

: March 18, 2002

3 Conducted emission data

The (worst-case) results of the conducted emission tests at the 110 Volts AC mains connection terminals of the notebook computer in which the EUT is built-in, carried out in accordance with CFR 47 Part 15.107 and CFR 47 Part 15.207 with the EUT operating in transmit and/or receive mode on channels 1 (2412 MHz), 6 (2437 MHz) and 11 (2462 MHz) while utilizing all possible transmission bit-rates (1 Mbit/s, 2 Mbit/s, 5.5 Mbit/s and 11 Mbit/s), are depicted in table 9.

Frequency (MHz)	Measurement results dB(μV) Neutral	Measurement results dB(μV) Line 1	Limits dB(μV)	Margin (dB) Neutral	Margin (dB) Line 1	Result
	QP	QP	QP	QP	QP	
0.511	34.4	35.0	48.0	-13.6	-13.0	PASS
0.600	34.5	33.3	48.0	-13.5	-14.7	PASS
0.685	34.5	31.5	48.0	-13.5	-16.5	PASS
5.121	36.4	34.6	48.0	-11.6	-13.4	PASS
5.555	36.4	34.2	48.0	-11.6	-13.8	PASS
5.642	35.0	31.1	48.0	-13.0	-16.9	PASS
10.095	34.6	34.6	48.0	-13.4	-13.4	PASS
10.443	34.6	34.9	48.0	-13.4	-13.1	PASS
10.531	34.5	35.1	48.0	-13.5	-12.9	PASS
10.964	34.7	35.0	48.0	-13.3	-13.0	PASS
11.310	35.1	35.1	48.0	-12.9	-12.9	PASS
11.398	35.1	35.0	48.0	-12.9	-13.0	PASS
11.486	34.9	35.1	48.0	-13.1	-12.9	PASS
11.573	35.1	34.8	48.0	-12.9	-13.2	PASS
11.662	35.3	34.6	48.0	-12.7	-13.4	PASS
11.835	35.4	34.1	48.0	-12.6	-13.9	PASS
11.923	35.1	34.7	48.0	-12.9	-13.3	PASS
12.097	35.1	34.1	48.0	-12.9	-13.9	PASS
12.185	35.1	33.9	48.0	-12.9	-14.1	PASS
12.273	34.7	33.6	48.0	-13.3	-14.4	PASS

Table 9 - Test results with the EUT operating in transmit/receive mode.

Note: Disturbance voltage values of conducted emissions at frequencies not listed in table 9 are more than 20 dB below the applicable limit.

Test engineer

Signature : 

Name : P.A.J.M. Robben, B.Sc.E.E.

Date : March 18, 2002

4 List of utilized test equipment

Inventory number	Description	Brand	Type
12471	Biconical antenna 20MHz-200MHz	EATON	94455-1
12473	Log-per antenna 200-1000MHz	EATON	96005
12476	Antenna mast	EMCO	TR3
12477	Antenna mast 1-4 mtr	Poelstra	--
12482	Loop antenna	EMCO	6507
12483	Guidehorn	EMCO	3115
12484	Guidehorn	EMCO	3115
12488	Guidehorn 18 - 26.5 GHz	EMCO	RA42-K-F-4B-C
12533	Signalgenerator	MARCONI	2032
12559	Digital storage oscilloscope	Le Croy	9310M
12561	DC Power Supply 20A/70V	DELTA	SM7020D
12567	Plotter	HP	7440A
12605	calibrated dipole 28MHz-1GHz	Emco	3121c
12608	HF milliwattmeter	Hewlett Packard	HP435a
12609	Power sensor 10MHz-18GHz	Hewlett Packard	HP8481A
12636	Polyester chamber	Polyforce	--
12640	Temperature chamber	Heraeus	VEM03/500
13664	Spectrum analyzer	HP	HP8593E
13078	Preamplifier 0.1 GHz - 12 GHz	Miteq	AMF-3D-001120-35-14p
13452	Digital multi meter	HP	34401A
13526	Signalgenerator 20 GHz	Hewlett & Packard	83620A
13594	Preamplifier 10 GHz - 25 GHz	Miteq	AMF-6D-100250-10p
13886	Open Area testsite	Comtest	--
14051	Anechoic room	Comtest	--
14450	2.4 GHz bandrejectfilter	BSC	XN-1783
15633	Biconilog Testantenna	Chase	CBL 6111B
15667	Measuring receiver	R&S	ESCS 30
99045	DC Power Supply 3A/30V	DELTA	E030/3
99055	Non-conducting support	NMi	--
99061	Non-conducting support 150cm	NMi	--
99068	Detector N-F/BNC-F	Radiall	R451576000
99069	Cable 5m RG214	NMi	--
99071	Cable 10m RG214	NMi	--
99076	Bandpassfilter 4 - 10 GHz	Reactel	7AS-7G-6G-511
99077	Regulating trafo	RFT	LTS006
99112	Tripod	Chase	--
99136	Bandpassfilter 10 - 26.5 GHz	Reactel	9HS-10G/26.5G-S11