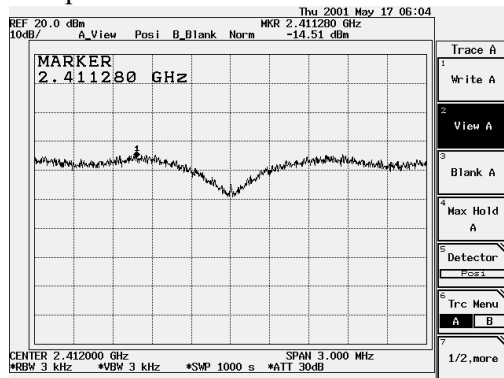


6.5. Test Result of Transmitter Power Density

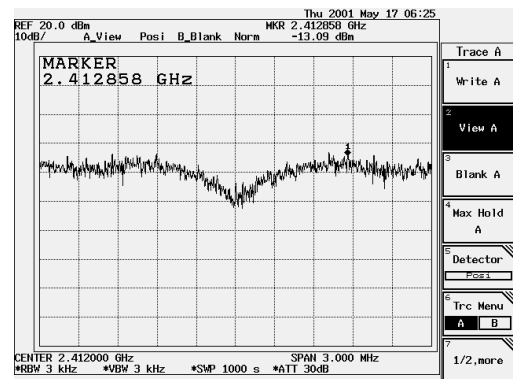
Product : Mozart
Test Item : Transmitter Power Density Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (1Mbps)	2411.991	-14.51dBm	< 8dBm	Pass
1 (2Mbps)	2411.991	-13.09dBm	< 8dBm	Pass
1 (5.5Mbps)	2411.991	-13.69dBm	< 8dBm	Pass
1 (11Mbps)	2411.991	-11.56dBm	< 8dBm	Pass

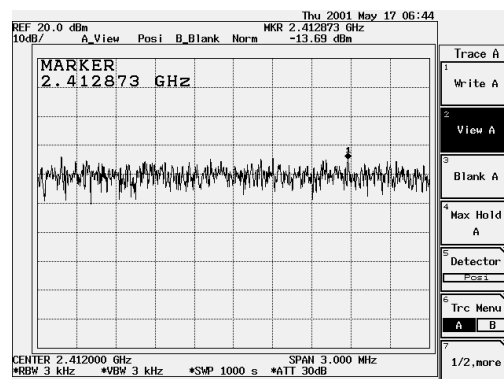
1Mbps



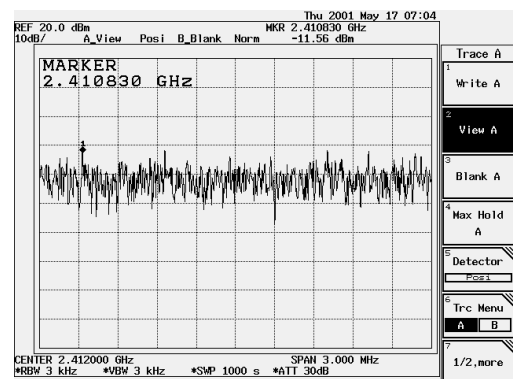
2Mbps



5.5Mbps



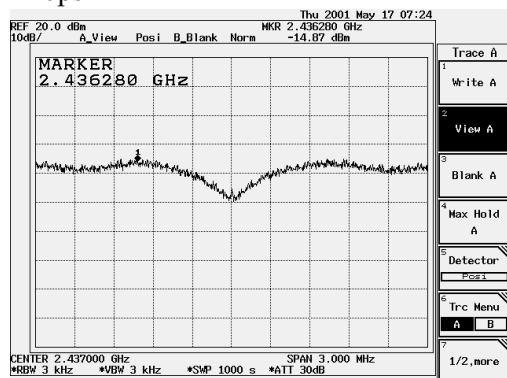
11Mbps



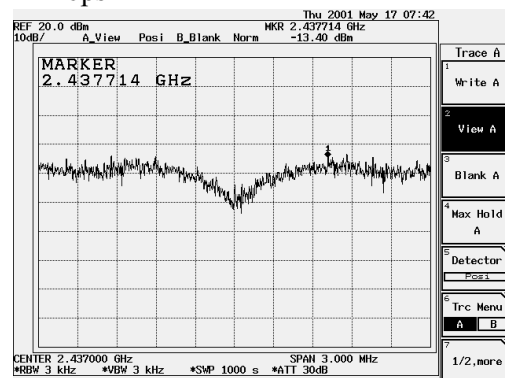
Product : Mozart
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (1Mbps)	2441.991	-14.87dBm	< 8dBm	Pass
6 (2Mbps)	2441.991	-13.40dBm	< 8dBm	Pass
6(5.5Mbps)	2441.991	-13.95dBm	< 8dBm	Pass
6 (11Mbps)	2441.991	-11.95dBm	< 8dBm	Pass

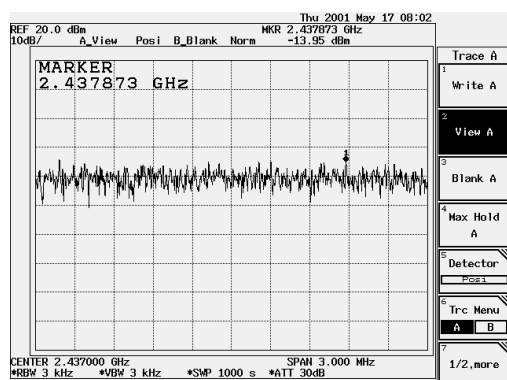
1Mbps



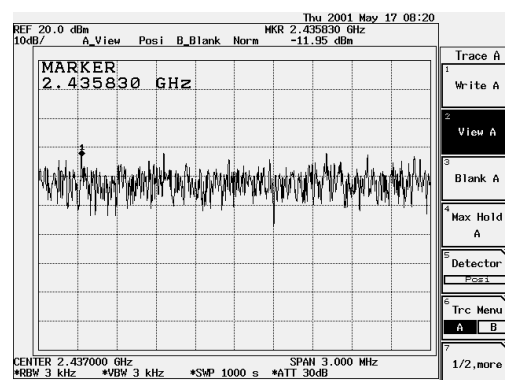
2Mbps



5.5Mbps



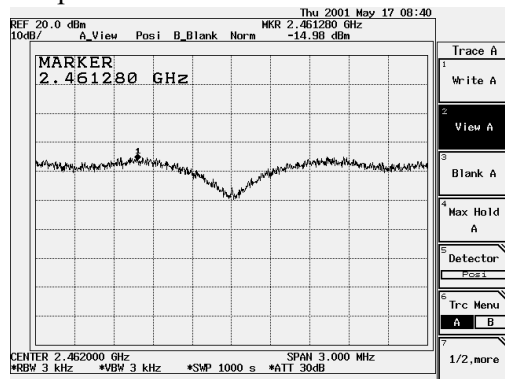
11Mbps



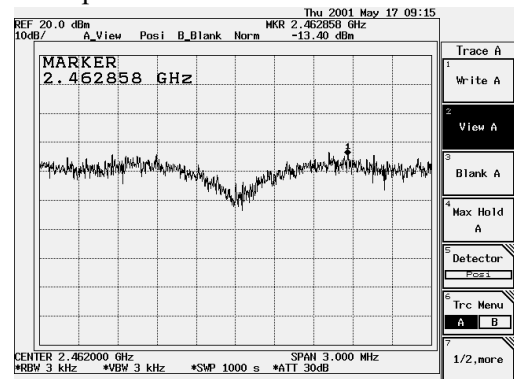
Product : Mozart
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (1Mbps)	2471.991	-14.98dBm	< 8dBm	Pass
11 (2Mbps)	2471.991	-13.40dBm	< 8dBm	Pass
11 (5.5Mbps)	2471.991	-13.99dBm	< 8dBm	Pass
11 (11Mbps)	2471.991	-11.95dBm	< 8dBm	Pass

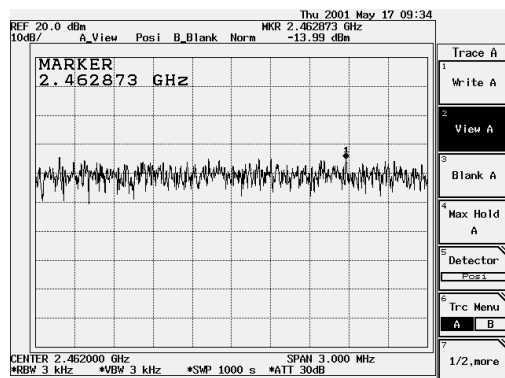
1Mbps



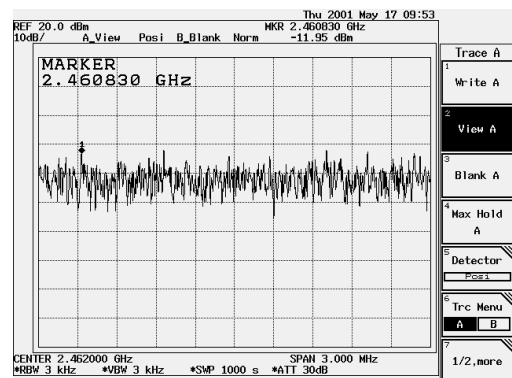
2Mbps



5.5Mbps



11Mbps



7. Processing Gain

7.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

7.2. Minimum Standard

The processing gain shall be at least 10 dB.

7.3. Method of Measurement

The processing gain of this spread spectrum was measured the CW jamming method. The Section 9.1 illustrates the measurement setup. The output power of the spread spectrum transmitter is fixed and the output power of jammer is adjustable. The frequency of jammer was stopped through the pass band of nominal channel in 50kHz steps. In each frequency step of the jammed, the output power of jammed is adjusted to cause the Bit Error Rate (BER) to be 1.0×10^{-6} . The power levels are recorded to calculate the J/S as shown in Table 1.

7.4. Calculation of Processing Gain:

The processing gain was determined by measuring the jamming margin of the EUT and using the following formula:

$$G_p = (S/N)_o + M_j + L_{sys}$$

Where $(S/N)_o$ is the required signal to noise ratio at the receiver output

M_j is the jammer to signal ratio (J/S)

L_{sys} is the system loss

The $(S/N)_o$ is calculated from:

$$P_e = 1/2 \exp(-1/2(S/N)_o) \quad ; P_e = \text{probability of error (BER)}$$

For the $P_e(\text{BER}) = 1.0 \times 10^{-6}$, the required $(S/N)_o$ is 14.2dB

From Measurement, the minimum J/S(M_j) is -3.4dB

We assume the system loss is 1dB.

Therefore the processing gain is calculated below:

$$G_p = (S/N)_o + M_j + L_{sys} = 14.2 + (-3.4) + 1 = 11.8 \text{ (dB)}$$

7.5. Test Result of Processing Gain

8. EMI Reduction Method During Compliance Testing

No modification was made during testing.

9. Attachment

Attachment 1: EUT Test Photographs	Number of Pages :	3
Attachment 2: EUT Detailed Photographs	Number of Pages :	11
Attachment 3: Processing Gain Test Report	Number of Pages :	30

Attachment 1 : EUT Test Photographs

Attachment 2 : EUT Detailed Photographs

Attachment 3 : Processing Gain Test Report



PROCESSING GAIN TEST REPORT

REPORT NO.: RF90022613

MODEL NO.: WarpLink 2411

RECEIVED: February 26, 2001

TESTED: March 6, 2001

APPLICANT: Acer NeWeb Corporation

ADDRESS: 6F, No.110, Sec. 2, Tung Ta Road,
Hsinchu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 13-1, Lane 19, Wen Shan 3rd St., Kweishan,
Taoyuan Hsien, Taiwan, R.O.C.

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Accredited Laboratory



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ANNEX : PHOTO OF TEST CONFIGURATION		



1 CERTIFICATION

PRODUCT : 11Mbps Wireless LAN PCMCIA Card
BRAND NAME : Acer
MODEL NO. : WarpLink 2411
APPLICANT : Acer NeWeb Corporation
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247 e2),
SITE REGISTRATION NO : 90422 (FCC)
IC 3789-5 (Canada IC)

We, **Advance Data Technology Corporation**, hereby certify that one sample WA3001A of the designation has been tested in our facility on March 6, 2001.

The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

Tested by : Steven Lu , Date: March 6, 2001
Steven Lu

Prepared by : Demi Chen , Date: March 6, 2001
Demi Chen

Approved by : Alan Lane , Date: Mar. 6, 2001
Dr. Alan Lane, Manager



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
STANDARD PARAGRAPH	TEST REQUIREMENTS	RESULT	REMARK
15.247(e)	Processing Gain of Direct Sequence Spread Spectrum System Spec.: min. 10 dB	PASS	20% points lower than 10dB is allowed



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	11Mbps Wireless LAN PCMCIA Card
MODEL NO.	WarpLink 2411
POWER SUPPLY	3.3VDC
DATA CABLE	
I/O PORTS	NA
MODULATION TYPE	DSSS BPSK/QPSK/CCK
TRANSFER RATE	11/5.5/2/1Mbps
FREQUENCY RANGE	2412 ~ 2462MHz
NUMBER OF CHANNEL	11
ANTENNA TYPE	
ASSOCIATED DEVICES	NA
DESCRIPTION BETWEEN MODELS	NA

3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided in this EUT.

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

Note: Since the processing gain of data rate 11Mbps is lower than that of the other data rates, so only 11Mbps is shown in this test report.



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 11Mbps Wireless LAN PCMCIA Card, according to the specifications of the manufacturers, it must comply with the requirements of the following standards:

FCC CFR 47 Part 15, Subpart C. (15.247 e2)

All tests have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No	Product	Brand	Model No.	Serial No.	I/O Cable
1	NOTEBOOK	DELL	Inspiron 5000e	TW-012JXN-12961- 0139-2192	Nonshielded Power (1.8m)
2	NOTEBOOK	DELL	PPX	99125	Nonshielded Power (1.8m)

4 TEST PROCEDURES AND RESULTS

4.1 LIMITS OF PROCESSING GAIN OF A DIRECT SEQUENCE SPREAD SPECTRUM MEASUREMENT

Discard the worst 20%, the limit is 10dB.

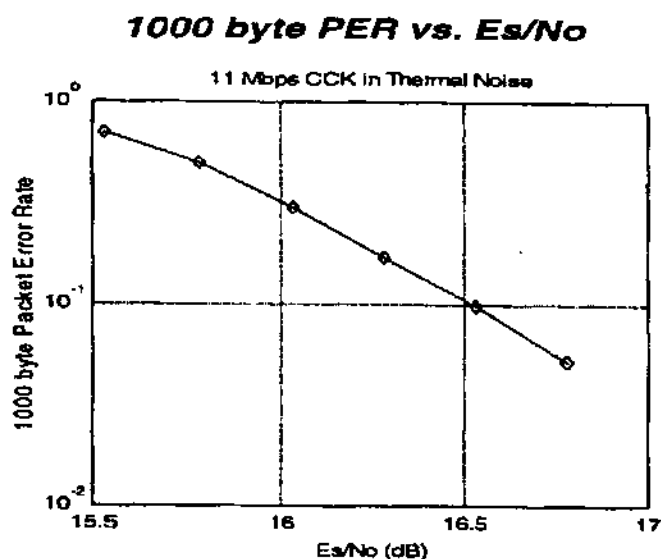
4.2 TEST INSTRUMENTS & SUPPORT UNIT

Description & Manufacturer	Model No.	Serial No.
Anritsu Spectrum Analyzer, 9kHz to 30GHz	MS2667C	M10281
Anritsu Signal Generator, 10kHz to 20GHz	68247B	984703
Hewlett Packard Power Meter,	HP438A	2743A04416
Hewlett Packard Power Sensor, -30 to 20dBm	8485A	2942A08387
Hewlett Packard Step Attenuator, 10dB steps	HP8496B	3247A18505
Mini-Circuits Power Splitter	ZN2PD-9G	NA
DELL Laptop Computer	Inspiron 5000e	TW-012JXN-12961-0139-2192
DELL Laptop Computer	PPX	99125

4.3 METHOD OF MEASUREMENT

The processing gain may be measured using the CW jamming margin method. Section 4.4 shows the test configuration. The test consists of stepping a signal generator in 50 kHz increments across the passband of the system. At each point, the generator level required to produce the recommended Bit Error Rate (BER) is recorded. This level is jammer level. The output power of the transmitting unit is measured at the same point. The jammer to Signal (J/S) ratio is then calculated. Discard the worst 20% of the J/S data points. The lowest remaining J/S ratio is used when calculating the Process Gain.

The reference PER is specified as 8%. The corresponding Es/No (signal to noise ratio per symbol) is 16.4 dB. The curve is attached as below.



This value and the measured J/S ratio are used in the following equation to calculate the Process Gain (Gp) of the system.

$$G_p = (S/N)_o + M_j + L_{sys}$$

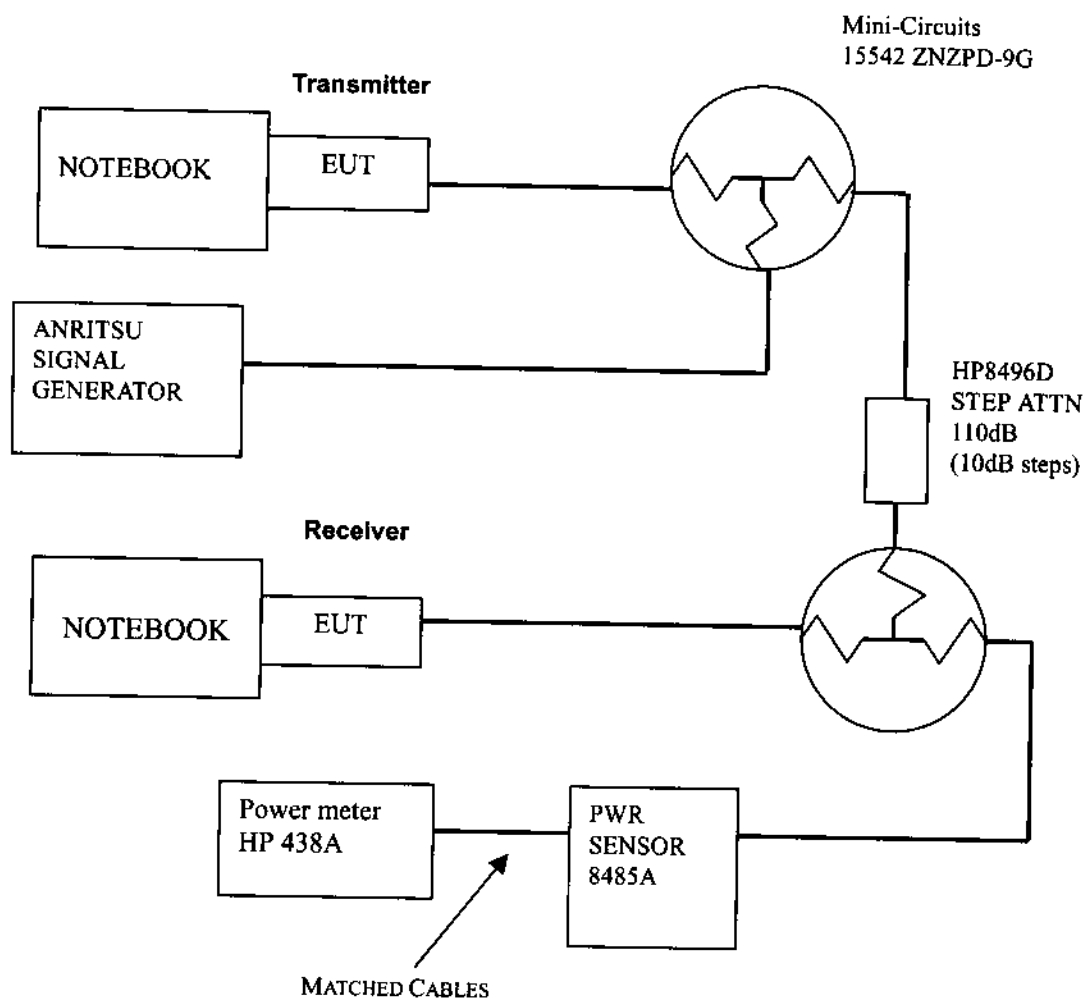
Where:

(S/N)₀: Signal to noise ratio for the chosen BER.

M_j : Maximum jammer to Signal Ratio recorded at the detected BER.

L_{sys} : System losses . We assume 1dB as the system Loss (maximum 2dB is allowed).

4.4 TEST SETUP





4.5 TEST PROCEDURES

Obtain the simplex link shown. Perform all independent instrumentation calibrations prior to this procedure. Set operating power levels using fixed and variable attenuators in system to meet the following objectives:

Signal Power at receiver approximately -55dBm (above thermal sensitivity such that thermal noise does not cause bit errors).

Signal Power at power meter between -20 and -30dBm for optimal linearity.

Use spectrum analyzer to monitor test.

Ensure that CW Jammer generator RF output is disabled and measure the power at the power meter port using the power meter. This is the relative signal power, S_r .

Disable Transmitter, and set CW Jammer generator RF output frequency equal to the carrier frequency and enable generator output. Set reference CW Jammer power level at power meter port 8.4dB below S_r (minimum J/S, or 10dB processing gain reference level). Note the power level setting on the generator, this is the reference CW Jammer power setting, J_r .

Disable CW Jammer, re-establish link. PER test should be operating essentially error -free.

Enable CW Jammer at the reference power level and verify that the PER test indicates a PER of less than 8%.

Alternatively, adjust the CW Jammer level to that which causes 8% PER and verify that the S/J is less than 8.4dB .

Repeat step 7 for uniform steps in frequency increments of 50 kHz across the receiver passband with the CW Jammer. In this case the receiver passband is $\pm 8.5\text{ MHz}$ over carrier frequency.

The numerical data associated with the following radio channel is tabulated and presented for Channel 1, 6, and 11.

4.6 EUT OPERATING CONDITION

The software provided by client to set the EUT to transmit at lowest, middle and highest channel.