

EMC TEST REPORT

Report No. : EME-040909
Model No. : XI-835
Issued Date : Oct. 4, 2004

Applicant : Z-COM, Inc.
7F-2, No. 9, Prosperity 1st RD., Science-Based
Industrial Park, Hsinchu, Taiwan

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

This test report consists of 17 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Intertek Laboratory. The test result(s) in this report only applies to the tested sample(s).

Project Engineer

Jackey Chiu

Jackey Chiu

Reviewed By

Jerry Liu

Jerry Liu

Table of Contents

Summary of Tests.....	3
1. General information	4
1.1 Identification of the EUT	4
1.2 Additional information about the EUT	4
1.3 Antenna description	5
1.4 Peripherals equipment.....	5
2. Test specifications	6
2.1 Test standard	6
2.2 Operation mode	6
2.3 Test equipment.....	7
3. Maximum Output Power test.....	8
3.1 Operating environment	8
3.2 Test setup & procedure.....	8
3.3 Measured data of Maximum Output Power test results.....	8
4. Radiated Emission test	9
4.1 Operating environment	9
4.2 Test setup & procedure.....	9
4.3 Emission limits	10
4.4 Radiated spurious emission test data	11
4.4.1 Measurement results: frequencies equal to or less than 1 GHz.....	11
4.4.2 Measurement results: frequency above 1GHz.....	12
5. Emission on the band edge §FCC 15.247(C)	13
5.1 Band-edge (Radiated method).....	14

Summary of Tests

**Wireless LAN Card-Model: XI-835
FCC ID: M4Y-0835C**

Test	Reference	Results
Radiated Spurious Emission test	15.205, 15.209	Complies

1. General information

1.1 Identification of the EUT

Applicant	: Z-COM, Inc.
Product	: Wireless LAN Card
Model No.	: XI-835
FCC ID.	: M4Y-0835C
Frequency Range	: 2412~2462 MHz
Channel Number	: 11 Channels
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: CCK (11Mps, 5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Rated Power	: 3.3Vdc from notebook
Power Cord	: N/A
Sample Received	: Sep. 20, 2004
Test Date(s)	: Sep. 22, 2004 ~ Sep. 23, 2004

1.2 Additional information about the EUT

The EUT can be operated in Ad-Hoc or Infrastructure network configurations. *Ad-Hoc mode* allows 11Mbps Wireless LAN CF Card users to join a Basic Service Set (i.e., peer-to-peer mode, without access point). *Infrastructure mode* allows 11Mbps Wireless LAN CF Card users to join an Extended Basic Service Set (i.e., connect to access point).

We verified that XI-835 is series model to XI-835C (EUT), for the model is identical in hardware aspect, and the different is in 128 Flash listed below.

Model	128 Flash
XI-835C	w.
XI-835	w /o

For more detail features, please refer to User's manual.

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 0dBi

Antenna Type : PIFA

Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	PP01L	CN-03P83-48643-33O-3930	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205 、 §15.207 、 §15.209 、 §15.247 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

During Radiated Emission test, the EUT worked in the status of continuously transmitting.

After verifying the maximum output power, we found the maximum output power was occurred at 11Mbps data rate. The final test was executed under this condition and recorded in this report individually.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	07/14/2005
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/13/2005
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	09/18/2004
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	05/20/2005
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	4/14/2005
Controller	HDGmbH	N/A	HD 100	EP317-1	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP317-2	N/A
Turn Table	HDGmbH	N/A	DS 420S	EP317-3	N/A

Note: The above equipments are within the valid calibration period.

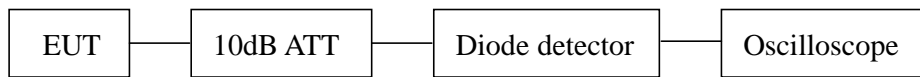
3. Maximum Output Power test

3.1 Operating environment

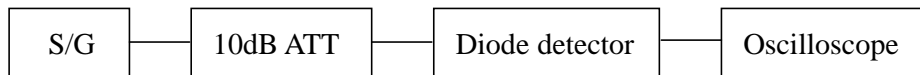
Temperature: 20 °C
 Relative Humidity: 52 %
 Atmospheric Pressure 1023 hPa

3.2 Test setup & procedure

A:



B:



1. The output of the transmitter via a 10 dB attenuator and coupled to a diode detector.
2. The output of the diode detector connected to the vertical channel of an oscilloscope. The observed trace of the oscilloscope shall be recorded as “A”.
3. The transmitter replaced by a signal generator. The output frequency of the signal made equal to the center of the frequency range occupied by the transmitter and unmodulated.
4. The output of the signal generator raised to reach the peak of trace “A” named X.
5. The signal generator output level X (dBm) is the transmitter peak output power.

3.3 Measured data of Maximum Output Power test results

Channel	Frequency (MHz)	Reading (dBm)	Output Power		Limit (dBm)
			(dBm)	(mW)	
1	2412	16.64	16.64	46.13	30
6	2437	16.45	16.45	44.15	30
11	2462	16.11	16.11	40.83	30

Remark:

Reading (dBm) = The signal generator output level (X)

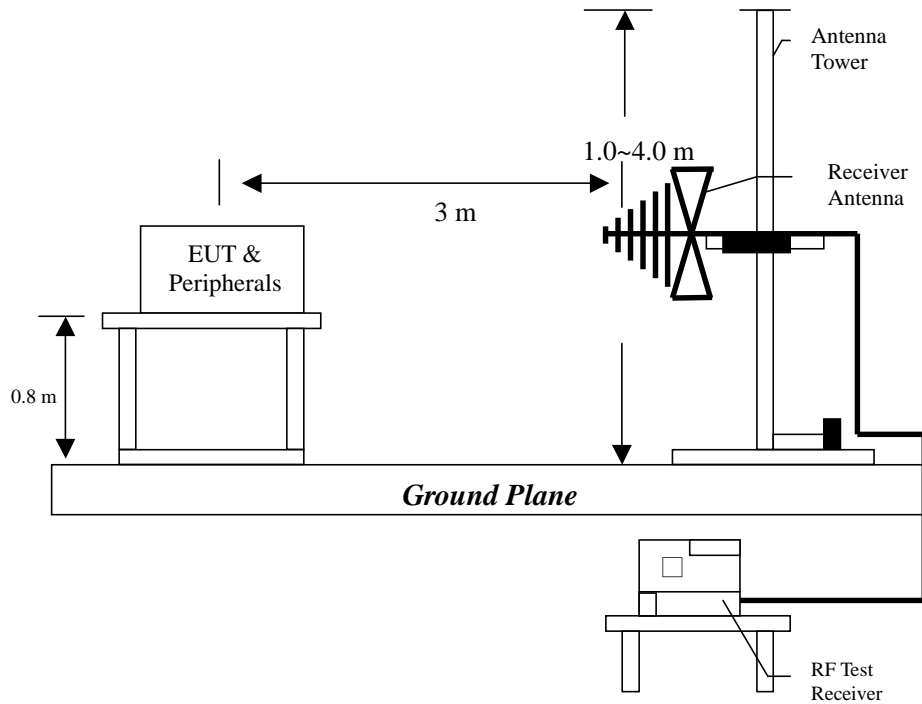
4. Radiated Emission test

4.1 Operating environment

Temperature:	23	°C	(10-40°C)
Relative Humidity:	58	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

4.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

4.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.98 dB.

4.4 Radiated spurious emission test data

4.4.1 Measurement results: frequencies equal to or less than 1 GHz

EUT : XI-835

Worst Case Condition : Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
130.900	QP	V	13.34	13.10	26.44	43.50	-17.06	108.00	258.00
198.980	QP	V	12.03	16.60	28.63	43.50	-14.87	113.00	221.00
212.430	QP	V	11.52	13.70	25.22	43.50	-18.28	165.00	28.00
288.000	QP	V	14.07	13.40	27.47	46.00	-18.53	104.00	169.00
301.680	QP	V	14.45	13.60	28.05	46.00	-17.95	100.00	194.00
332.650	QP	V	14.99	11.54	26.53	46.00	-19.47	136.00	163.00
132.890	QP	H	13.34	13.40	26.74	43.50	-16.76	228.00	247.00
198.980	QP	H	12.03	22.20	34.23	43.50	-9.27	165.00	333.00
288.000	QP	H	14.07	15.40	29.47	46.00	-16.53	169.00	258.00
332.690	QP	H	14.99	16.90	31.89	46.00	-14.11	167.00	69.00
372.010	QP	H	15.81	20.30	36.11	46.00	-9.89	194.00	144.00
398.990	QP	H	16.40	16.50	32.90	46.00	-13.10	164.00	98.00

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

4.4.2 Measurement results: frequency above 1GHz

EUT : XI-835

Test Condition : 802.11b Tx at channel 1, 6, 11

Test Result:

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

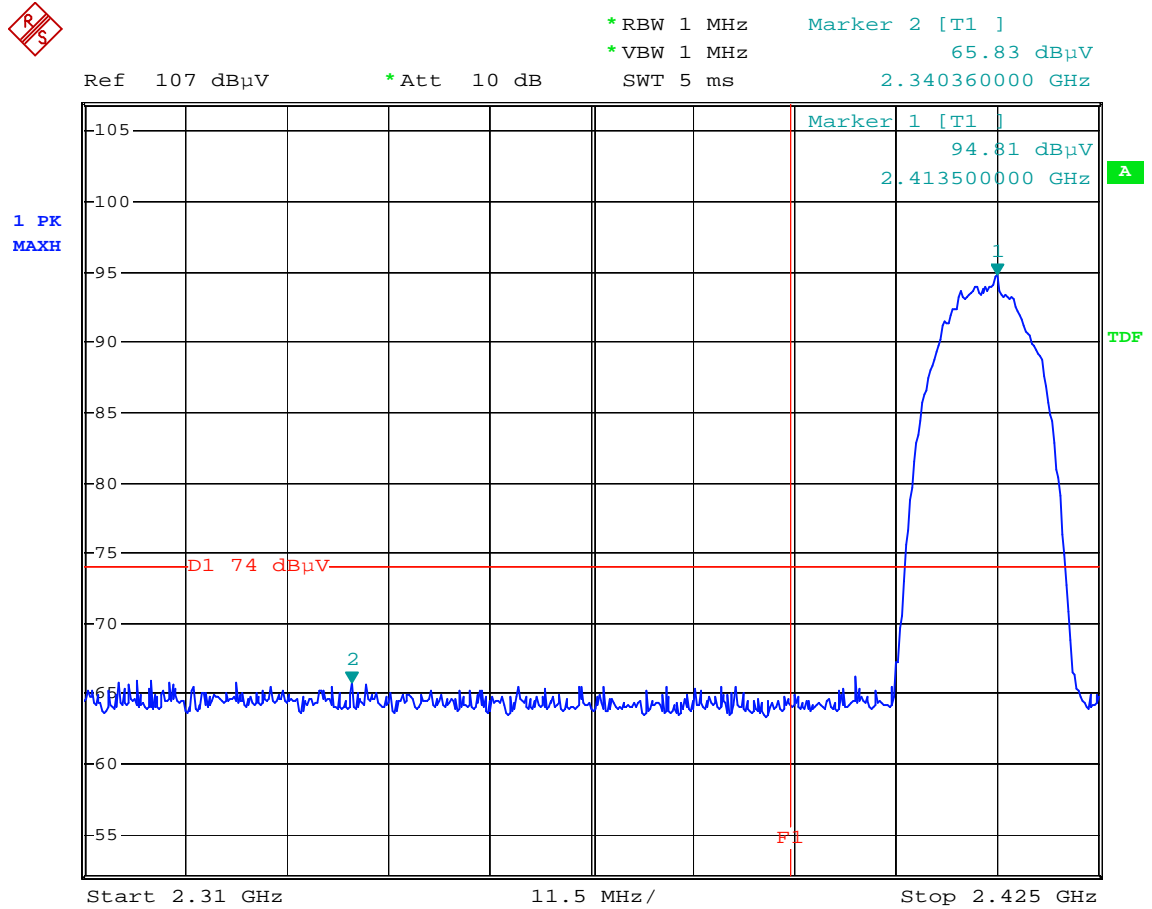
14GHz-26.5GHz: 28dBuV

5. Emission on the band edge §FCC 15.247(C)

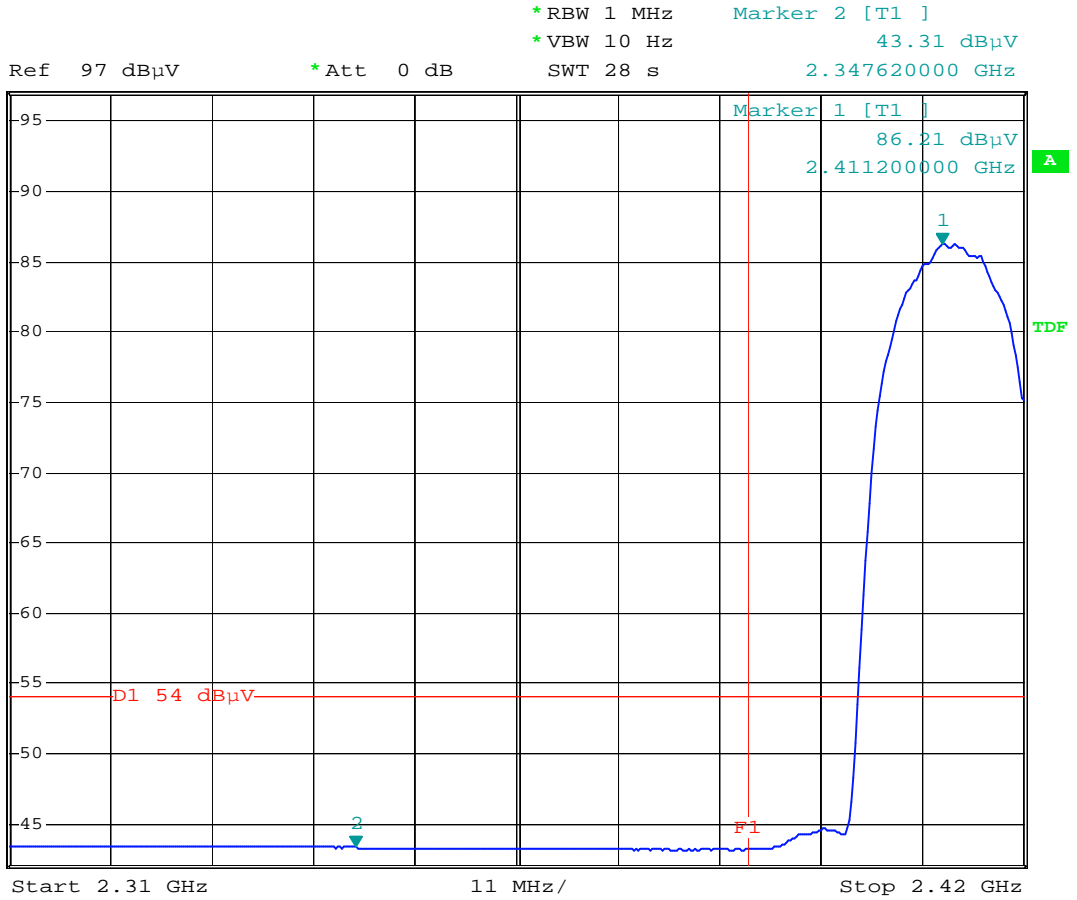
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Please see the plot below.

5.1 Band-edge (Radiated method)



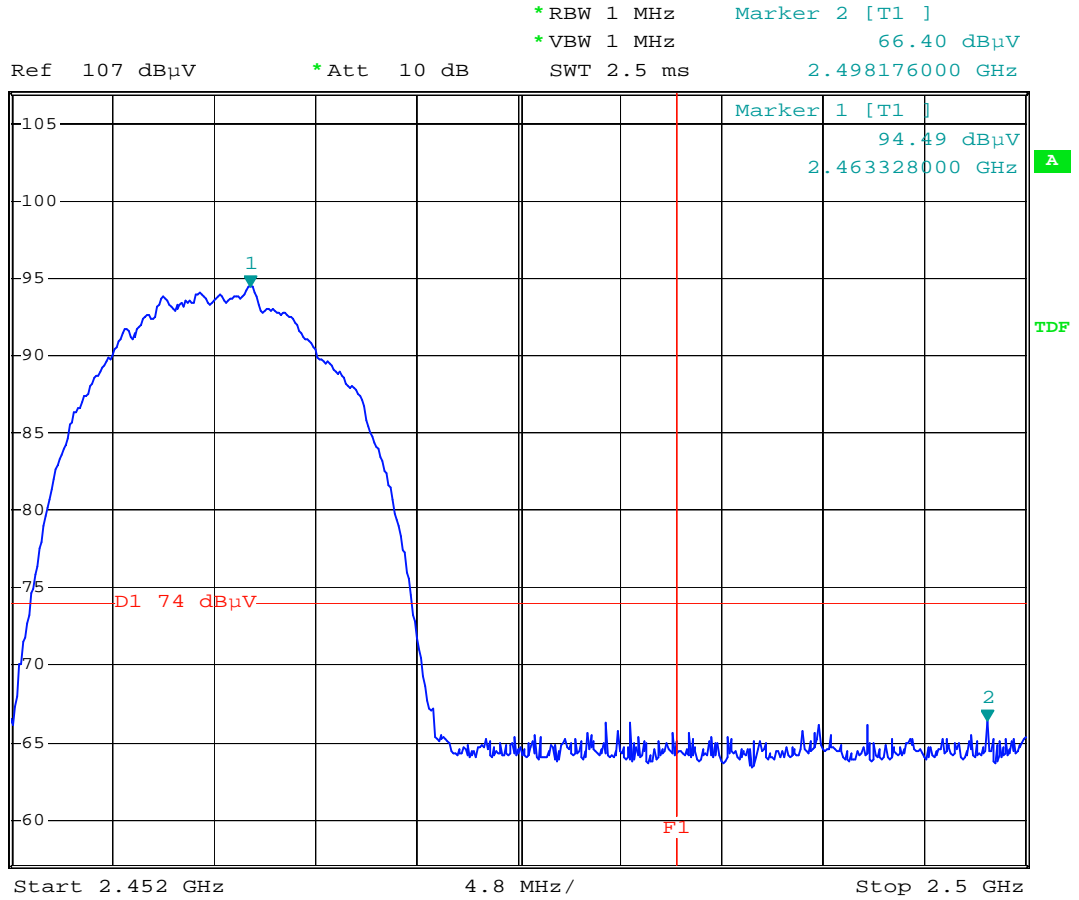
Comment: Band-edge test at low channel
 Comment: Peak detector F1=2390MHz
 Date: 23.SEP.2004 11:39:18



Comment: Band-edge test at low channel

Comment: Average detector F1=2390MHz

Date: 23.SEP.2004 11:40:11



Comment: Band-edge test at high channel

Comment: Peak detector F1=2483.5MHz

Date: 23.SEP.2004 11:33:49

