

EMC TEST REPORT

Report No. : EME-050861**Model No. : XI-835****Issued Date : Aug. 9, 2005**

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

Test By : Intertek Testing Services Taiwan Ltd.
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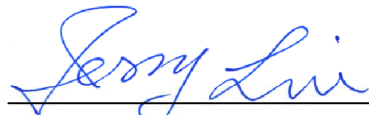
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Project Engineer



Marx Yan

Reviewed By



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)	15
5.1 Band-edge (Radiated method)	16

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 (11Mbps, 5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Rated Power	: 3.3Vdc from notebook
Power Cord	: N/A
Sample Received	: July 8, 2005
Test Date(s)	: July 8, 2005 ~ Aug. 9, 2005

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).

Intertek verified that XI-835 is series model to XI-835C (EUT), for the model is identical in hardware aspect, and the difference is in the power amplifier.

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	08/07/2006
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/24/2006
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	08/16/2007
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	02/20/2006
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	12/30/2005
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

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (1.2 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

3.3 Measured data of Maximum Output Power test results

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412	1.2	14.93	16.13	41.02	1
6 (middle)	2437	1.2	15.16	16.36	43.25	1
11 (highest)	2462	1.2	15.25	16.45	44.16	1

Remark:

Conducted Peak Output Power = Reading + C.L.

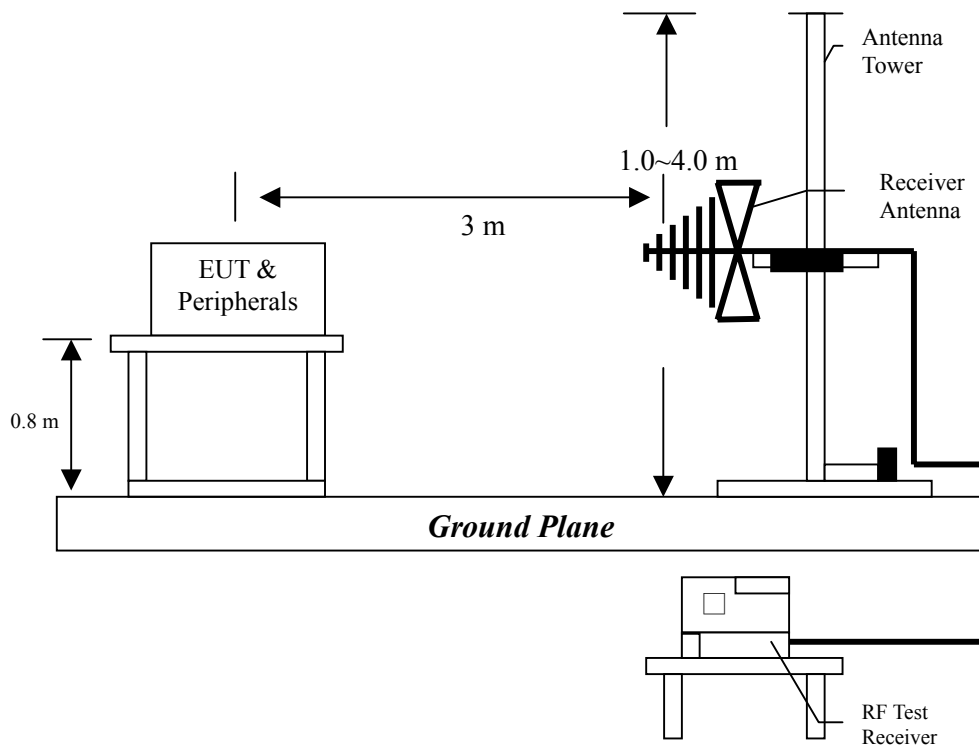
4. Radiated Emission test

4.1 Operating environment

Temperature:	23	°C
Relative Humidity:	58	%
Atmospheric Pressure	1023	hPa

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 threemeter 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

The test was performed on EUT under continuously transmitting mode. Channel 1, 6, 11 were verified. The worst case occurred at Tx channel 1.

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)
134.760	QP	V	12.76	14.93	27.69	43.50	-15.81	100.00	264.00
161.920	QP	V	15.56	13.53	29.09	43.50	-14.41	100.00	206.00
187.140	QP	V	12.31	21.27	33.58	43.50	-9.92	100.00	265.00
198.780	QP	V	11.58	21.55	33.13	43.50	-10.37	100.00	359.00
214.300	QP	V	11.83	20.41	32.24	43.50	-11.26	100.00	239.00
398.600	QP	V	16.43	14.61	31.04	46.00	-14.96	100.00	155.00
270.560	QP	H	13.24	16.63	29.87	46.00	-16.13	367.00	90.00
307.420	QP	H	14.49	14.15	28.64	46.00	-17.36	299.00	13.00
332.640	QP	H	15.07	14.90	29.97	46.00	-16.03	277.00	350.00
396.660	QP	H	16.72	19.66	36.38	46.00	-9.62	230.00	29.00
483.960	QP	H	18.57	13.04	31.61	46.00	-14.39	193.00	23.00
662.440	QP	H	21.75	12.60	34.35	46.00	-11.65	141.00	299.00

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 : Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4920.000	PK	V	36.07	37.77	45.25	46.95	74.00	-27.05	166.29	35.94
4920.000	AV	V	36.07	37.77	33.72	35.42	54.00	-18.58	166.29	35.94

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is :

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : XI-835

Test Condition : Tx at channel 6

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

EUT : XI-835

Test Condition : Tx at channel 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

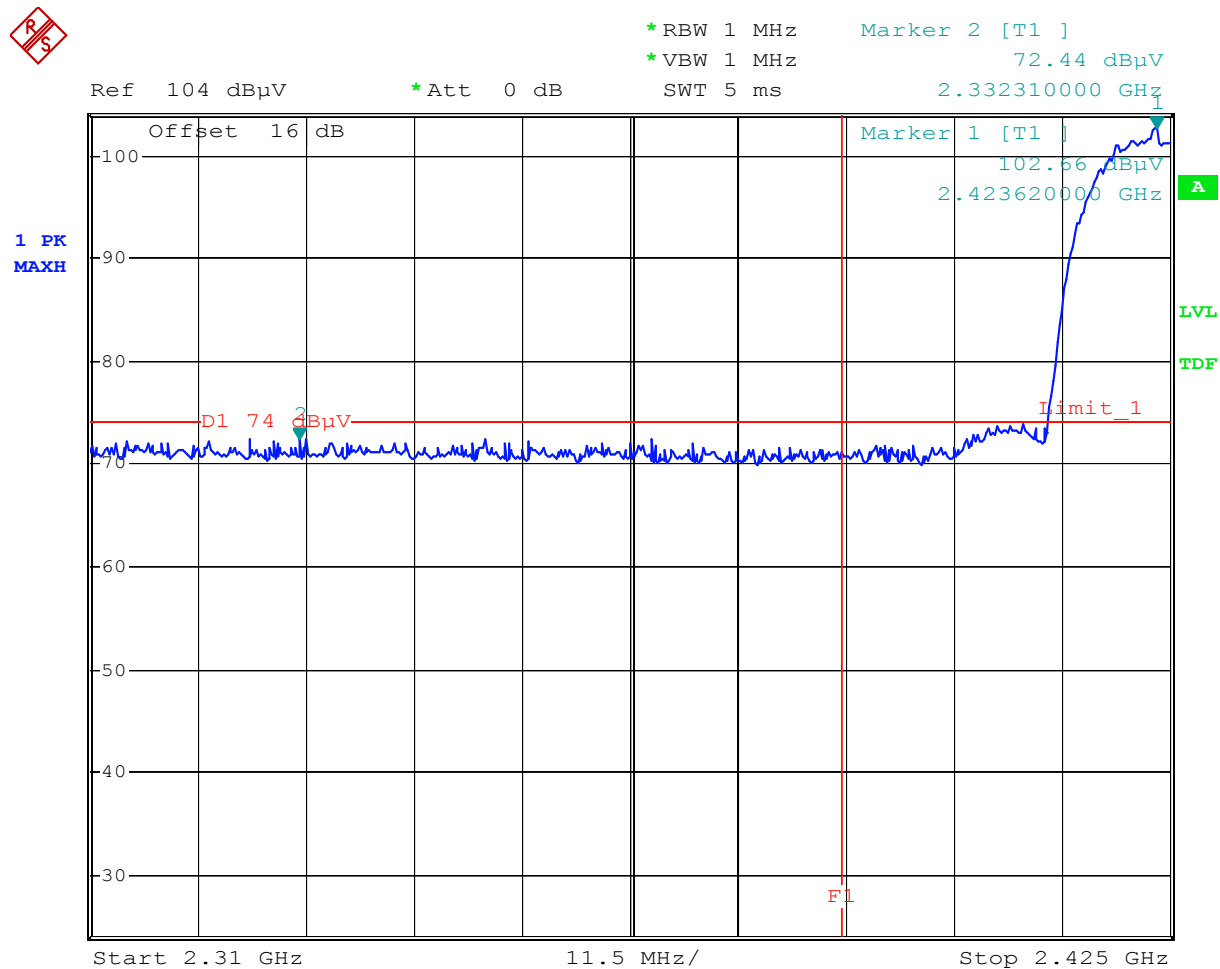
14GHz-26.5GHz: 28dBuV

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.

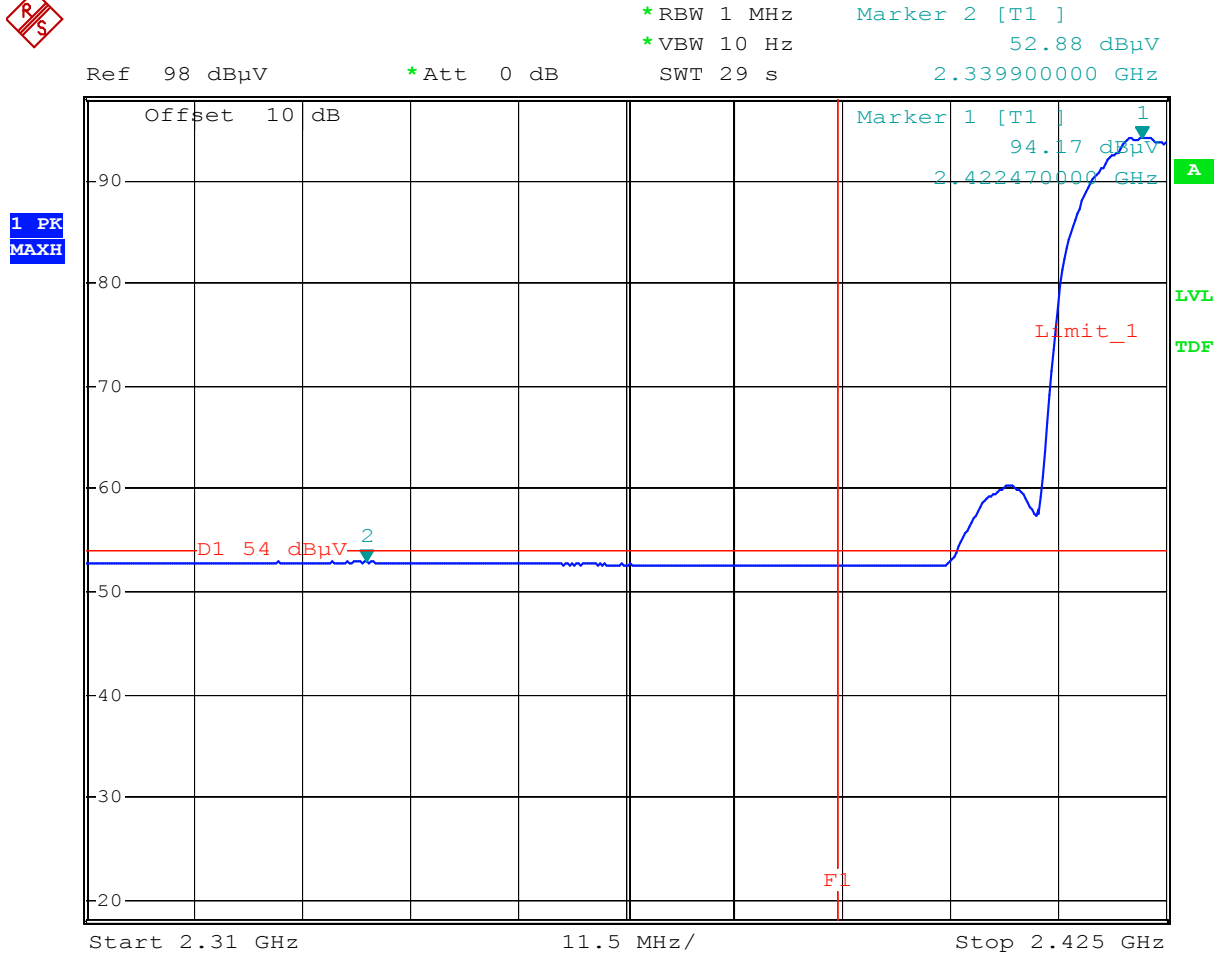
5.1 Band-edge (Radiated method)



Comment: Band-Edge test at low channel

Comment: Peak detector F1=2390MHz EXternal ATT=16dB

Date: 14.JUL.2005 11:19:42



Comment: Band-Edge test at low channel

Comment: Avg. detector F1=2390MHz EXternal ATT=10dB

Date: 14.JUL.2005 11:22:00



```
*RBW 1 MHz      Marker 2 [T1 ]
*VBW 1 MHz      72.19 dBμV
SWT 2.5 ms      2.492512000 GHz
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Ref 107 dB μ V *Att 0 dB SWT 2.5 ms 2.492512000 GHz

1 PK
MAXH

Offset 16 dB				Marker 1 [T1]	
				105.09 dBμV	
				2.463232000 GHz	

A

LVL

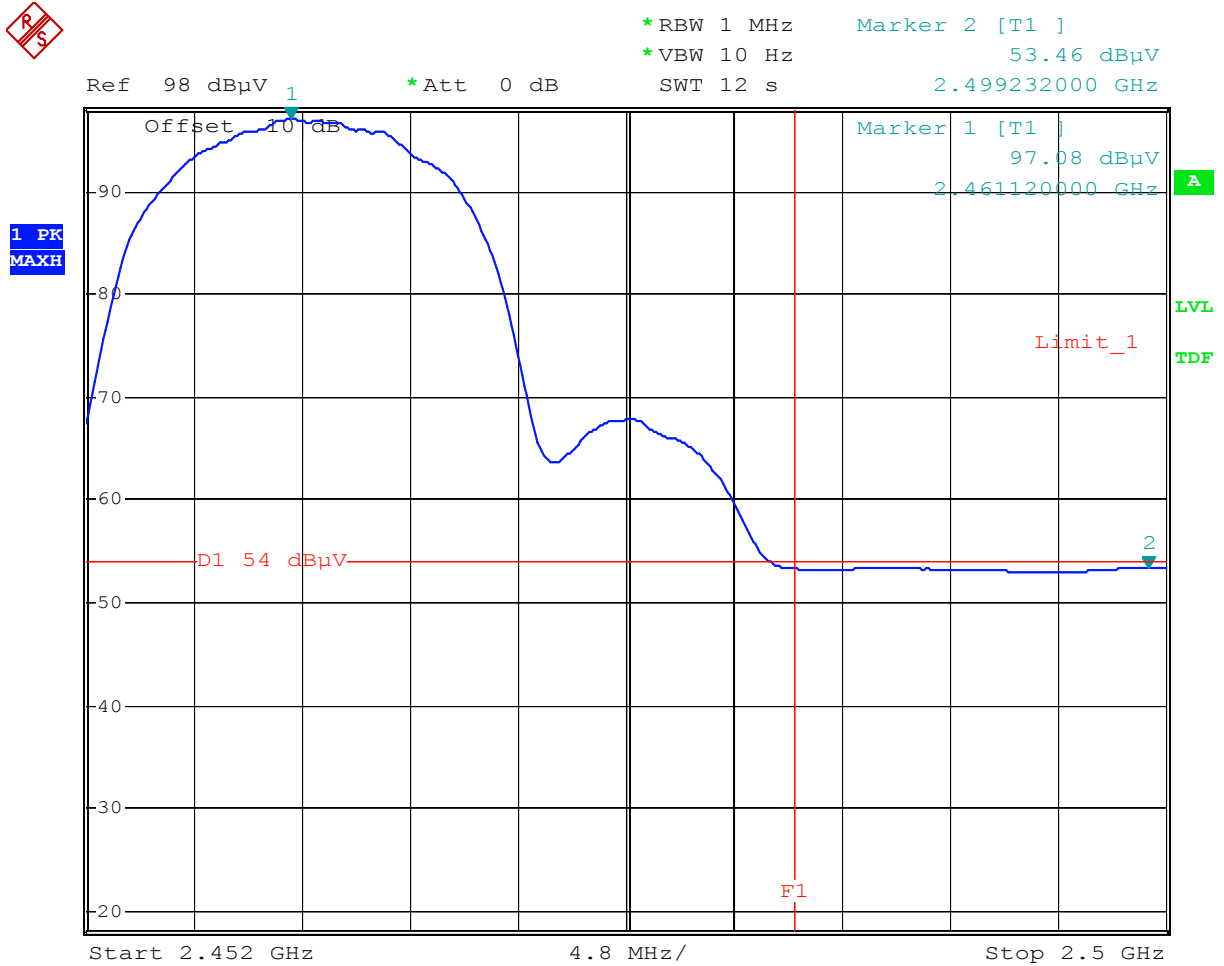
TDF

Start 2.452 GHz	4.8 MHz/	Stop 2.5 GHz
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Comment: Band-Edge test at high channel

Comment: Peak detector F1=2483.5MHz EXternal ATT=10dB

Date: 14.JUL.2005 11:27:47



Comment: Band-Edge test at high channel

Comment: Avg. detector F1=2483.5MHz EXternal ATT=10dB

Date: 14.JUL.2005 11:25:15