

EMC TEST REPORT

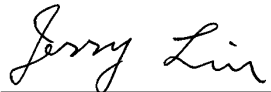
Report No. : EME-031039
Model No. : WLC-100M
Issued Date : Sep. 29, 2003

Applicant : Cellvision Systems Inc.
18F-7, No. 79 Sec. 1, Hsin Taiwu Road, Hsichih,
Taipei, 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

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Project Engineer



Jerry Liu

Reviewed By



Elton Chen

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Summary of Tests

**Wireless ISA module-Model: WLC-100M
FCC ID: QTRWLC10001**

Test	Reference	Results
Radiated Spurious Emission test	15.205, 15.209	Complies

1. General information

1.1 Identification of the EUT

Applicant	: Cellvision Systems Inc.
Product	: Wireless ISA module
Model No.	: WLC-100M
FCC ID.	: QTRWLC10001
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 PC/Notebook
Power Cord	: N/A
Sample Received	: Sep. 9, 2003
Test Date(s)	: Sep. 10, 2003

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

WLC-100M is designed for Printer Server series, IP Camera series and Internet Video Server gives user wireless access the web and network resource without the wire.

It provides high-speed access to network resources and has built-in 40/64-bit and 128 bit of WEP (Wired Equivalent Privacy) data encryption. With Direct Spread Spectrum Signaling (DSSS), domain access control, WEP encryption and group security, the modules will safeguard all user's wireless data transmissions from user's nosy neighbors.

For more detail features, please refer to user's Manual.

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 2.0 dBi Typical (Peak)

Antenna Type : $1/4 \lambda$ Monopole Sleeve

Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
PC	N/A	N/A	N/A	N/A
Key Board	IBM	37L2548	0095996	FCC DoC Approved
Monitor	IBM	6331-0LN	23-NW855	ARSCM560S
Mouse	Logitech	850693-0001	LAZ82706831	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved

Remark: Client provided The PC.

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 C63.4/1992.

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

The EUT was operated in the status of continuously transmit during the test.

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.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	Feb. 18, 2003
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2003
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100186	Oct. 9, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Sep. 19, 2002
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 21, 2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3133	Feb. 21, 2003
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2002
Crystal Detector	Agilent	10MHz~18GHz	8472B	MY42240243	N/A
Signal Generator	Rohde & Schwarz	20MHz~27GHz	SMR27	100036	Aug. 15, 2003
Two Channel Digital Storage Oscilloscope	Tektronix	N/A	TDS1012	C031679	Aug. 16, 2003

Note:

1. The calibration interval of the above instruments is 12 months.

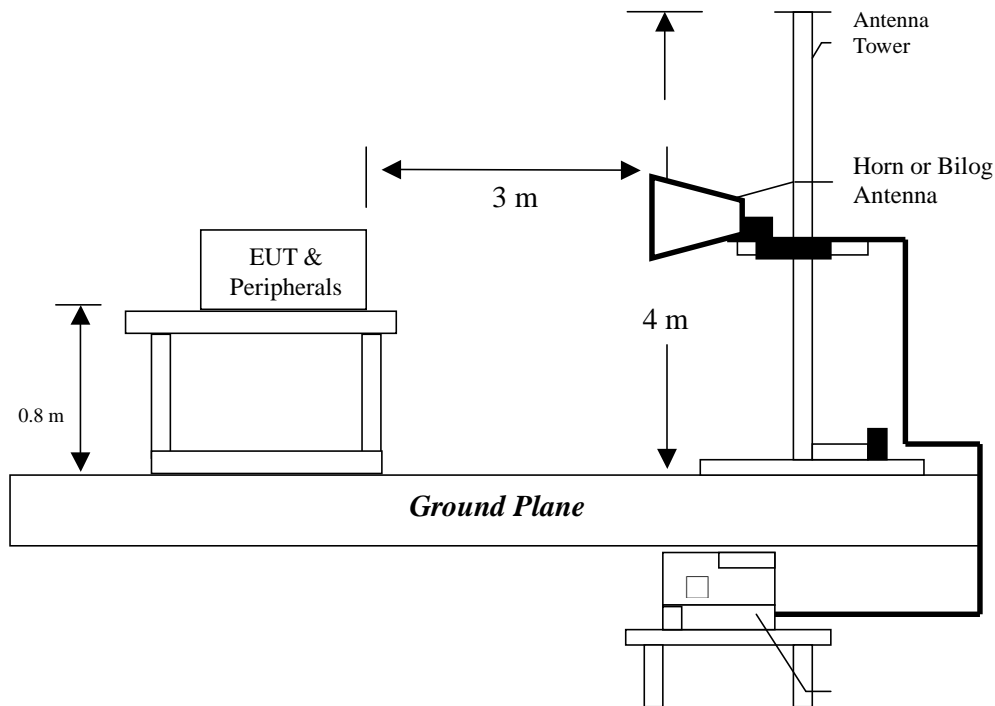
3. Radiated Emission test

3.1 Operating environment

Temperature:	26	°C	(10-40°C)
Relative Humidity:	54	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

3.2 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”.

3.3 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.

Expanded uncertainty (k=2) of conducted emission measurement is ± 2.02 dB.

3.4 Radiated spurious emission test data

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

EUT : WLC-100M

Worst Case Condition : Tx at low channel

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)
220.0000	QP	V	10.40	11.00	21.40	30.00	-8.60	229	0
264.0000	QP	V	15.32	11.20	26.52	37.00	-10.48	365	202
308.0000	QP	V	15.90	6.80	22.70	37.00	-14.30	246	242
299.0000	QP	V	15.49	16.30	31.79	37.00	-5.21	100	360
500.0000	QP	V	19.60	1.00	20.60	37.00	-16.40	105	0
802.0000	QP	V	23.80	-2.50	21.30	37.00	-15.70	229	150
220.0000	QP	H	10.40	12.00	22.40	30.00	-7.60	333	121
264.0000	QP	H	15.32	18.20	33.52	37.00	-3.48	275	270
308.0000	QP	H	15.90	15.00	30.90	37.00	-6.10	210	146
352.0000	QP	H	17.14	0.20	17.34	37.00	-19.66	149	222
299.0460	QP	H	15.49	2.60	18.09	37.00	-18.91	333	0
500.2500	QP	H	19.62	4.00	23.62	37.00	-13.38	400	178

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

3.4.2 Measurement results: frequency above 1GHz

EUT : WLC-100M

Test Condition : Tx at low, middle and high channel

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: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

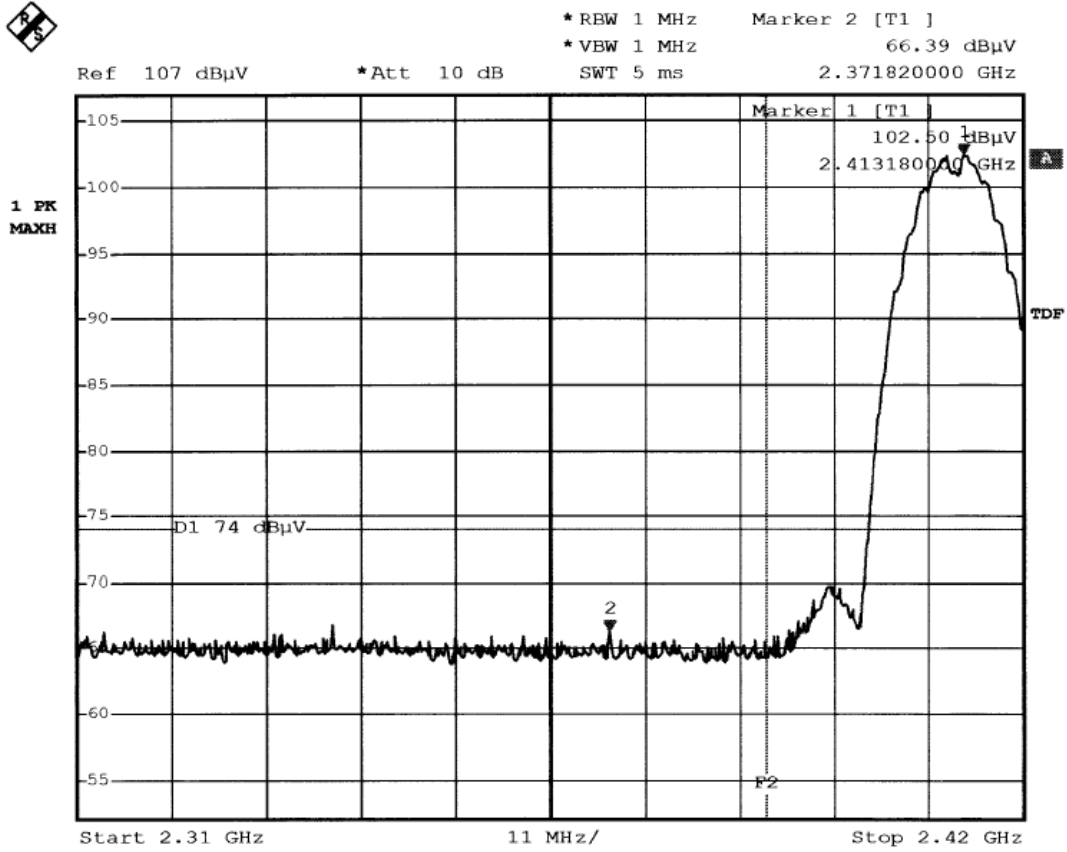
14GHz-26.5GHz: 46.5dBuV

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

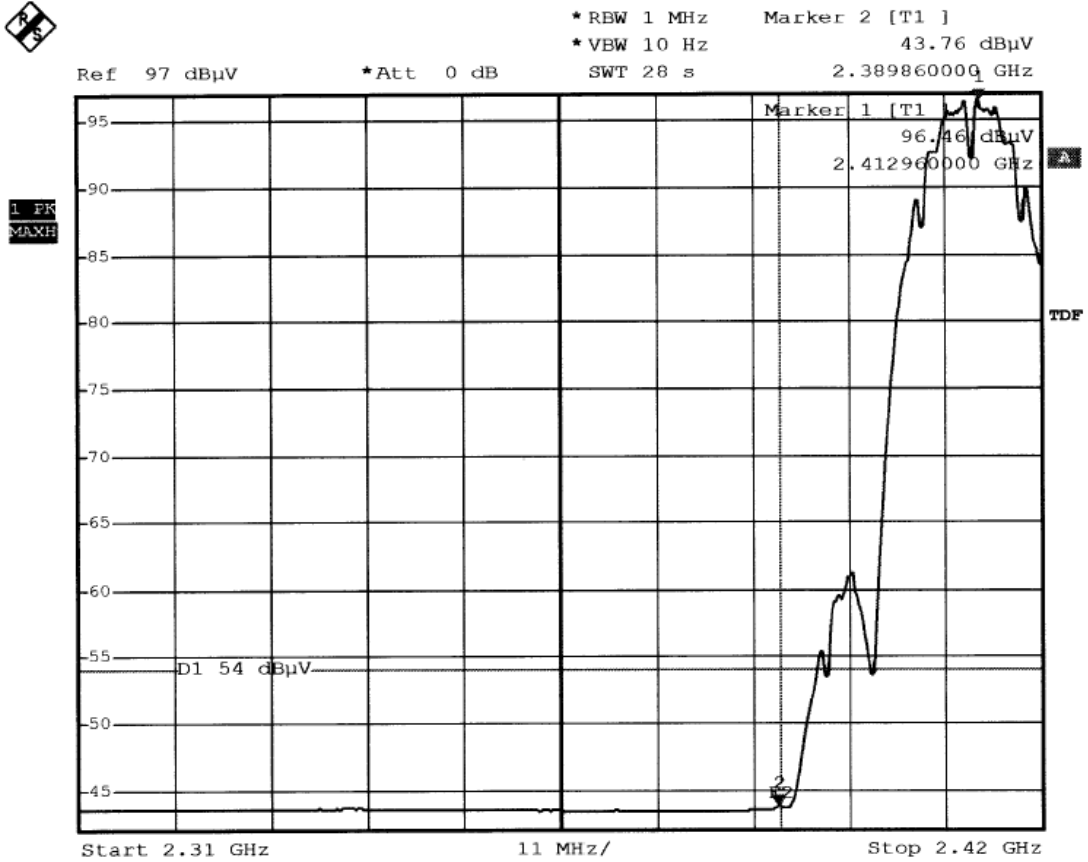
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the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

Please see the plot below.

4.1 Band-edge (Radiated method)



Comment A: Band-edge test at low channel EN B
 Peak detector F2=2390MHz ATT=10dB

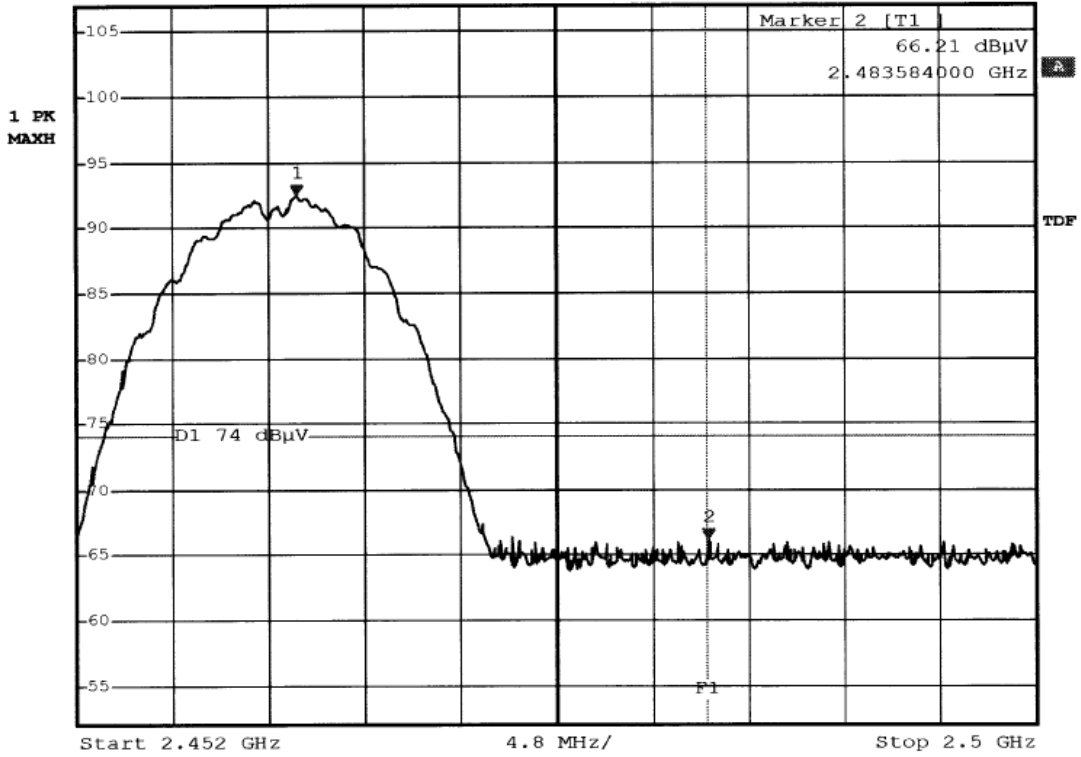


Comment A: Band-edge test at low channel1 **ATT=10dB**
 Average detector F2=2390MHz

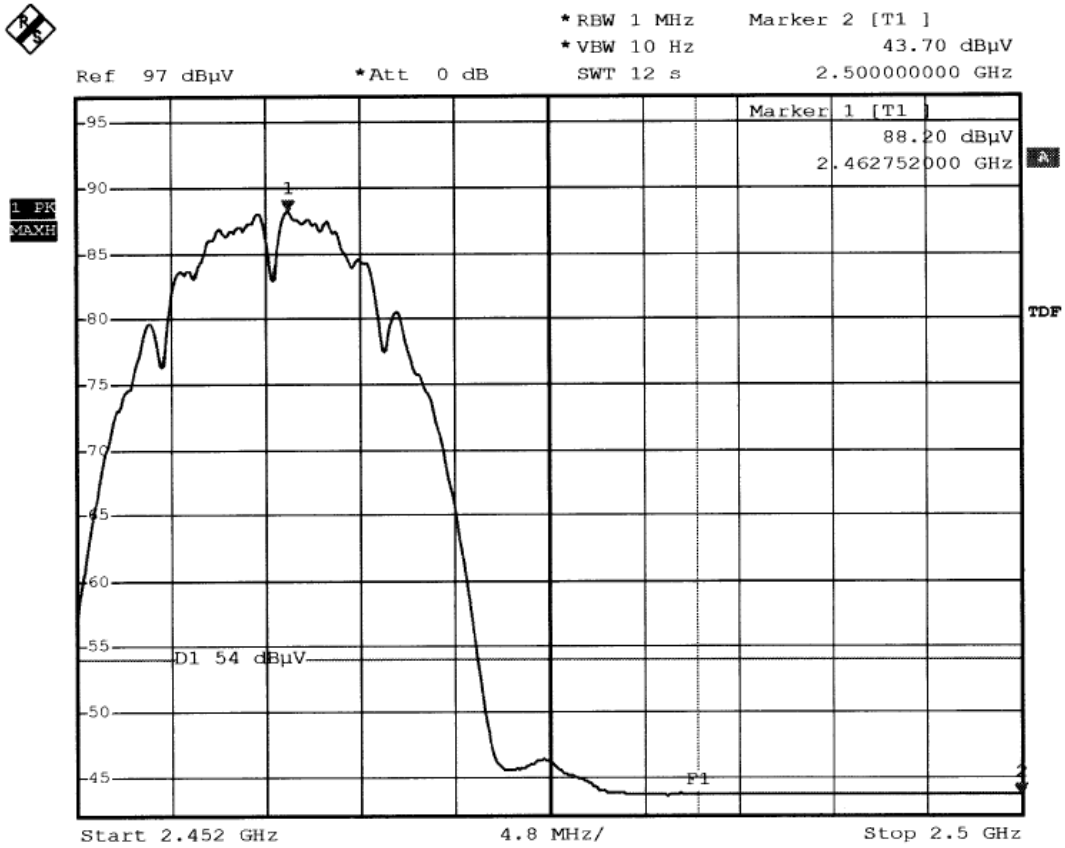


*RBW 1 MHz Marker 1 [T1]
 *VBW 1 MHz 92.43 dBμV
 *Att 10 dB SWT 2.5 ms 2.463070000 GHz

Ref 107 dBμV



Comment A: Band-edge test at high channel B
 Peak detector F1=2483.5MHz ATT=10dB



Comment A: Band-edge test at high channel B
 Average detector F1=2483.5MHz ATT=10dB