

DATE: 10 June 2004

I.T.L. (PRODUCT TESTING) LTD.

FCC EMC Test Report

**(Equipment Authorization Under FCC Verification Process)
for**

EMTS Inc.

Equipment under test:

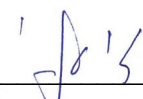
IntegerAlarm Control Panel

(Receiver Section)

IA-CP1

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1. General Information

1.1 Administrative Information

Manufacturer:	EMTS Inc.
Manufacturer's Address:	300 Alden Road Markham, Ontario L3E4C1 Canada Tel: +1-905-946-8589 Fax: +1-905-947-0138
Manufacturer's Representative:	Doron Lavee Nick Rizzuto
Equipment Under Test (E.U.T):	IntegerAlarm Control Panel
Equipment Model No.:	IA-CP1
Equipment Serial No.: Note: See description of technical change on page 10.	Not designated
Date of Receipt of E.U.T:	09.06.04
Start of Test:	09.06.04
End of Test:	09.06.04
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	See Section 2

1.2 Abbreviations and Symbols

The following abbreviations and symbols are applicable to this test report:

AC	alternating current
ARA	Antenna Research Associates
Aux	auxiliary
Avg	average
CDN	coupling-decoupling network
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB μ V	decibel referred to one microvolt
dB μ V/m	decibel referred to one microvolt per meter
DC	direct current
EMC	electromagnetic compatibility
E.U.T.	equipment under test
GHz	gigahertz
HP	Hewlett Packard
Hz	Hertz
kHz	kilohertz
kV	kilovolt
LED	light emitting diode
LISN	line impedance stabilization network
m	meter
mHn	millihenry
MHz	megahertz
msec	millisecond
N/A	not applicable
QP	quasi-peak
PC	personal computer
RF	radio frequency
RE	radiated emission
sec	second
V	volt

1.3 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

2. Applicable Documents

- | | | |
|-----|---|---|
| 2.1 | Code of Federal Regulations Title 47,
Federal Communications Commission
Part 15, Subpart B.
Rev. December 03, FCC Site | <i>Unintentional Radiators.</i> |
| 2.2 | ANSI C63.4-2001 | <i>American National Standards for
Methods of Measurement of Radio-
Noise Emissions from Low-Voltage
Electrical and Electronic Equipment
in the Range of 9 kHz to 40 GHz.</i> |
| 2.3 | CISPR 16-1: 1999 | <i>Specification for Radio Disturbance
and Immunity Measuring Apparatus
and Methods, Part 1. Radio
Disturbance and Immunity Measuring
Apparatus</i> |
| 2.4 | CISPR 16-2: 1999 | <i>Specification for Radio Disturbance
and Immunity Measuring Apparatus
and Methods, Part 2. Methods of
measurement of disturbances and
immunity</i> |

3. Test Site Description

3.1 Location

The Electromagnetic Compatibility Test Facility of I.T.L. (PRODUCT TESTING) LTD. is located at Kfar Bin Nun, Israel 99780 (FCC Registration No. 90715)
Telephone: + 972-8-9797799, Fax: + 972-8-9797702

3.2 Shielded Room

A Modular Shielded Room, Type S81, manufactured by Rayproof, consisting of a Main Room and a Control Room.

The dimensions of the Main Room are: length: 7.4 m, width: 4.35 m, height: 3.75 m.

The dimensions of the Control Room are: length: 3.12 m, width: 2.5 m, height: 2.5 m.

The shielding performance is:

magnetic field: 60 dB at 10 kHz rising linearly to 100 dB at 100 kHz,

electric field: better than 110 dB between 50 MHz and 1 GHz,

plane wave: 110 dB between 50 MHz and 1 GHz.

All the power lines entering both shielded rooms are filtered.

3.3 Open Test Site

Consists of 3 meter and 10 meter ranges, using a 7x14 meter solid metal ground plane, a remote controlled turntable and an antenna mast. The turntable and the tested equipment that is placed on it are environment protected. All the power, control and signal lines are routed under the ground plane.

3.4 Antenna Mast

Type AAM-4/A, manufactured by Antenna Research Associates (ARA). The antenna position and polarization are remotely controlled via Fiber Optical Link using ARA Dual Controller Type ACU-2/5, and pressurized air.

The antenna position is adjustable between 1-4 meters.

3.5 Turntable

Type ART-1001/4, manufactured by ARA. The position of the turntable is remotely controlled via a Fibre Optic Link, using ARA Dual Controller Type ACU-2/5. The turntable is mounted in a pit and its surface is flush with the Open Site Ground Plane.

3.6 EMI Receiver

Type HP8542E, including HP85420E R.F. filter manufactured by Hewlett-Packard, being in full compliance with CISPR 16 requirements.

3.7 Test Equipment

See details in Section 6.

4. Summary of Test Results

Test	Results
Radiated Emissions FCC Part 15, Subpart B Class B	The E.U.T met the performance requirements of the specification. The margin between the emission level and the specification limit is 10.4 dB in the worst case at the frequency of 903.53 MHz, vertical polarization for the operating frequency of 903.5MHz. The margin between the emission level and the specification limit is 11.2 dB in the worst case at the frequency of 913.53 MHz, vertical polarization for the operating frequency of 913.5MHz.

5. Equipment Under Test (E.U.T.) Description

The IntegrAlarm wireless security system consisting of a Control Panel and a number of wireless peripheral units. This is a two way system operating on the ISM wireless band of 902-928 MHz, in frequency hopping mode, transmitting short (about 10 ms) packets of data, with each packet transmitted on a different frequency. Every packet is validated by means of a 16 bits CRC and ARQ (Automatic Repeat Request) ensure a new concept of reliability in wireless security systems. Time and frequency synchronization is maintained by a synchronization signal transmitted by the system Control Panel to the various peripherals every 3 minutes. The system operates on 56 pseudo random selected channels.

The IntegrAlarm Control Panel includes a digital communicator for reporting of events to the Central Station and a voice communicator for reporting of events to up to six regular PSTN subscribers.

The IntegrAlarm System offers several options for access to the operational system functions:

By means of the control panel keypad and display.

By means of a hand-held remote control (with up to five functions).

By means of any local or remote PSTN telephone.

By means of a local PC.

By means of a remote PC.

Voice guidance and voice help (optional dual-language) ensure ease of system operation in all access options listed above. A voice mailbox is also available.

The IntegrAlarm is designed for easy and quick installation; it can be programmed by any person with minimal computer skills, on a local PC with IntegrAlarm programming software. The system can also be installed and programmed by means of the Control Panel keypad and display. Technical assistance for installation and programming can be obtained from the Central Station service provider or the EMTS company web site. Upload/download of the complete Control Panel setup may be implemented by the Central Station or by a PC with the IntegrAlarm software package.

In its present configuration, the system includes five types of peripheral units:

Door / window sensor IntegrAlarm model IA-DWC1.

PIR sensor IntegrAlarm model IA-PIR1.

Smoke detector IntegrAlarm model IA-SMK1.

Handheld 5 functions keyfob IntegrAlarm model IA-FOB1.

Remote siren IntegrAlarm model IA-SRN1.

Installation instructions for the IntegrAlarm peripherals appear in the User and Installer Manuals for the respective units.

The Control Panel consists of an RF transceiver, a micro-controller, a non-volatile memory, a power supply, a user interface, a siren, a buzzer, a tamper switch and a battery.

The Control Panel is composed of the following principal parts:

Mounting plate.

Control Panel unit with keypad, display, electronic assembly, siren, speaker, microphone, 4 LEDs and battery compartment.

6 NiCd size AA batteries.

Wall mounted AC adapter (120 VAC to 9 VAC insulation transformer)

Operating frequency range – 903.5-913.5 MHz (Receiver)
916.5-926.5 MHz (Transmitter).

Description of Technical Change:

The dipole antenna of this unit was replaced by a loaded monopole antenna with -6db gain.

6. List of Test Equipment

6.1 Emission Tests

The equipment indicated below by an "X" was used for testing Conducted Emission (CE) and Radiated Emission (RE)

Test equipment calibration is in accordance with ITL Q.A. Procedure PM 110 "Calibration Control Procedure", which complies with ISO 9002 and ISO/IEC Guide 17025.

Instrument	Manufacturer	Model	Serial No.	Used in Test	
				CE	RE
Dipole Antenna Set	CDI	A100	597		
Signal Generator	Marconi	2022D	119196015		
LISN	Fischer	FCC-LISN-2A	127		
LISN	Fischer	FCC-LISN-2A	128		
Spectrum Analyzer	HP	8591E	3414U01226		
RF Amplifier	HP	8447F	3113A04961		
Close Field Probe	HP	HP11941A	2807A03046		
Close Field Probe	HP	HP11940A	2650A04587		
Receiver	HP	85420E/85422E	3427A00103/34		X
Antenna - Biconical	ARA	BCD-235/B	1041		X
Antenna - Log Periodic	ARA	LPD-2010/A	1037		
Antenna - Log Periodic	ARA	LPD-2010/A	1038		X
Antenna - Log Periodic	A.H. Systems	SAS-200/511	253		X
Antenna Mast	ARA	AAM-4A			X
Turntable	ARA	ART-1001/4			X
Mast & Table Controller	ARA	ACU-2/5	1001		X
Standard Impedance Network	Xitron	2520	7002		
Power Analysis System	Xitron	2503A	2005		
AC Power Source	Behlman	ACP			X

7. E.U.T. Performance Verification

7.1 Mode of Operation

The E.U.T. was operated in “Receive” mode.

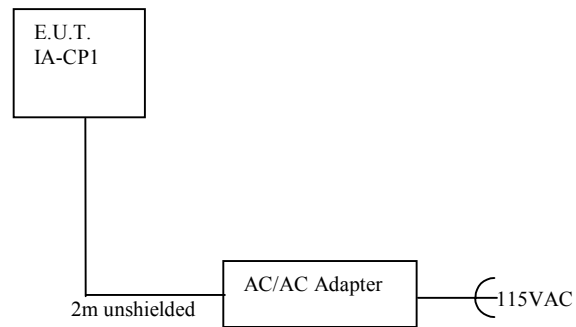


Figure 1. Test Set-up

8. Radiated Emission

8.1 Test Specification

30-5000 MHz, FCC Part 15, Subpart B, CLASS B

8.2 Test Procedure

The E.U.T operation mode and test set-up are as described in section 7.1.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The E.U.T. highest frequency source or used frequency is 913.5 MHz.

The frequency range 30-5000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

- Turning the E.U.T on and off.

- Using a frequency span less than 10 MHz.

- Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

The emissions were measured at a distance of 3 meters.

The E.U.T. was operated at the frequencies of 903.5MHz and 913.5MHz

8.3 Test Results

The E.U.T met the requirements of the FCC Part 15, Subpart B ,Class B specification.

The margin between the emission level and the specification limit is 10.4 dB in the worst case at the frequency of 903.53 MHz, vertical polarization for the operating frequency of 903.5MHz.

The margin between the emission level and the specification limit is 11.2 dB in the worst case at the frequency of 913.53 MHz, vertical polarization for the operating frequency of 913.5MHz.

The signals in the band 1.0 – 5.0 GHz at the operating frequencies of 903.5 and 913.5 MHz were below the spectrum analyzer noise level which is at least 6dB below the specification limit.

The details of the highest emissions are given in *Figure 2* to *Figure 13*.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 903.5 and 913.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dB)
53.33	34.3	25.0	10.5	40.0	-15.0
58.66	30.1	25.1	10.6	40.0	-14.9
125.32	31.3	26.3	11.3	43.5	-17.2
127.99	31.5	26.1	11.3	43.5	-17.4
181.32	31.5	26.5	11.7	43.5	-17.0
183.98	32.0	27.0	11.7	43.5	-16.5

**Figure 2. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detectors: Peak, Quasi-peak**

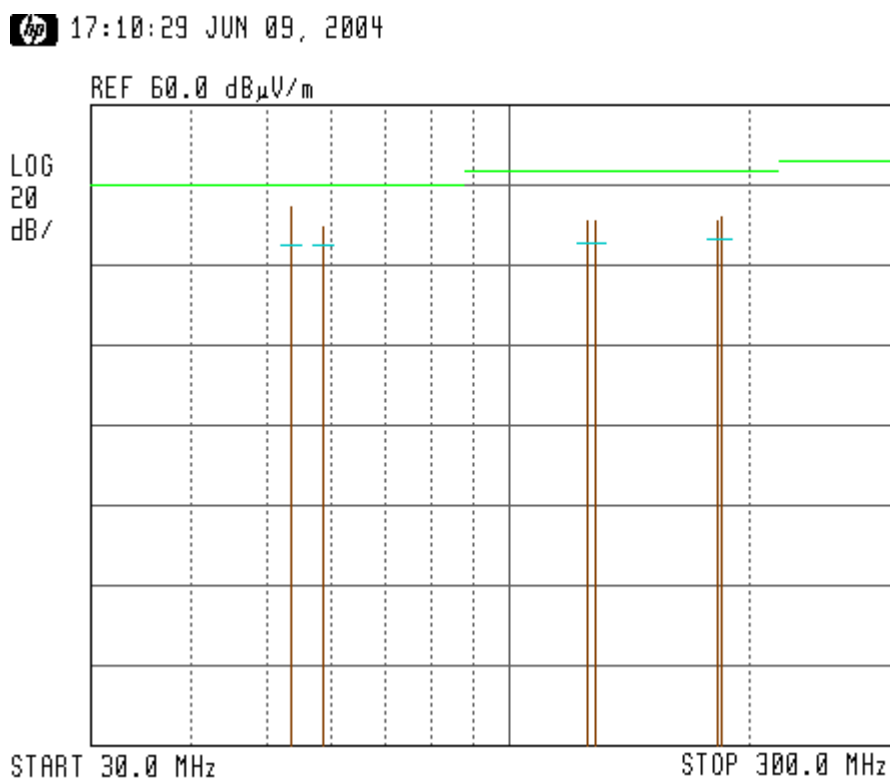
Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 903.5 and 913.5 MHz



**Figure 3. Radiated Emission. Antenna Polarization: HORIZONTAL
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 903.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dB)
312.00	34.5	30.0	15.2	46.0	-16.0
351.00	37.9	31.4	16.7	46.0	-14.6
390.00	38.1	33.0	18.1	46.0	-13.0
429.00	39.5	33.9	18.9	46.0	-12.1
468.00	40.6	34.4	19.4	46.0	-11.6
903.53	38.3	35.6	31.7	46.0	-10.4

**Figure 4. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

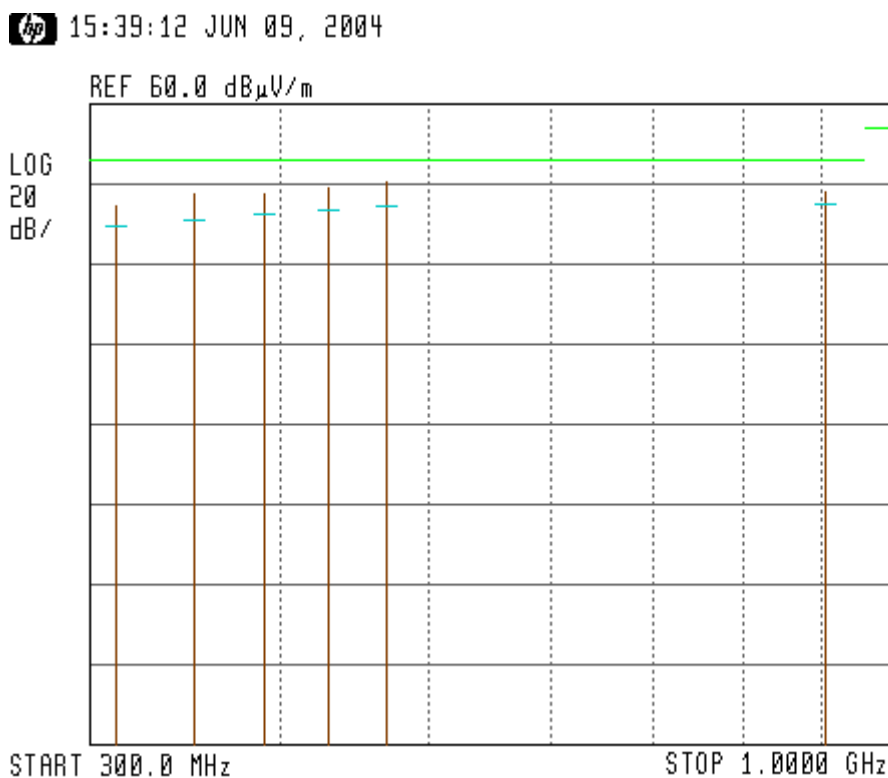
Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
 Antenna: 3 meters distance
 Operating Frequency: 903.5 MHz

Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak



**Figure 5. Radiated Emission. Antenna Polarization: HORIZONTAL
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 913.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dB)
312.00	34.8	30.0	15.2	46.0	-16.0
351.00	35.8	31.3	16.7	46.0	-14.7
390.00	38.4	32.9	18.1	46.0	-13.1
429.00	39.6	33.9	18.9	46.0	-12.1
468.00	39.9	34.7	19.4	46.0	-11.3
913.53	37.6	34.8	31.9	46.0	-11.2

**Figure 6. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

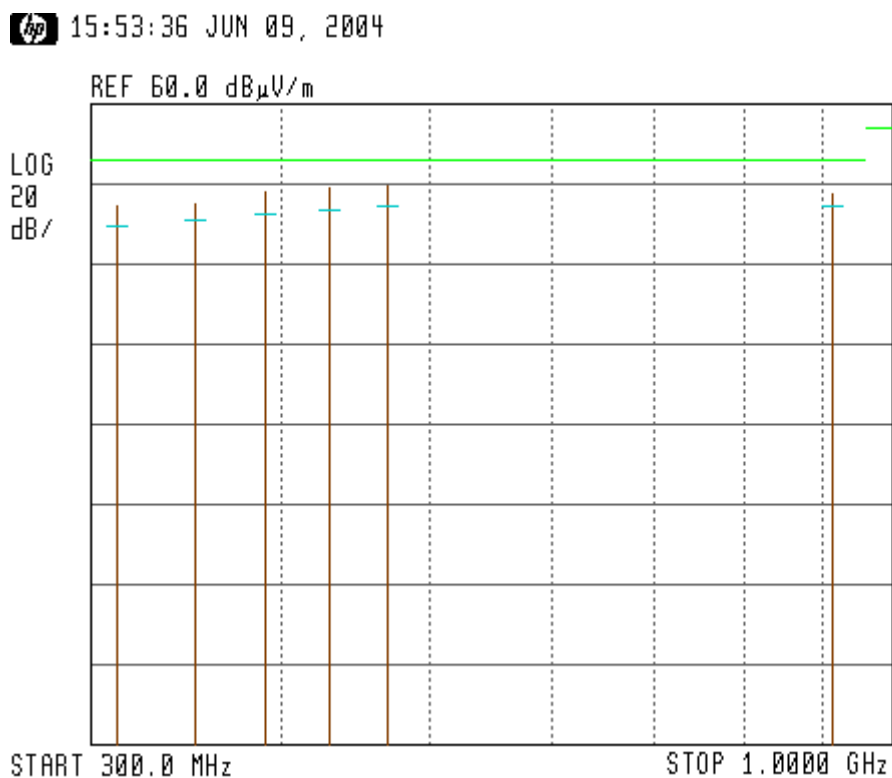
Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
 Antenna: 3 meters distance
 Operating Frequency: 913.5 MHz

Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak



**Figure 7. Radiated Emission. Antenna Polarization: HORIZONTAL
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 903.5 and 913.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dB)
53.33	31.3	25.7	10.5	40.0	-14.3
58.66	35.1	27.0	10.6	40.0	-13.0
157.32	32.7	26.6	11.5	43.5	-16.9
178.65	31.0	26.4	11.7	43.5	-17.1
181.32	31.8	26.2	11.7	43.5	-17.3
183.98	31.1	26.6	11.7	43.5	-16.9

**Figure 8. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

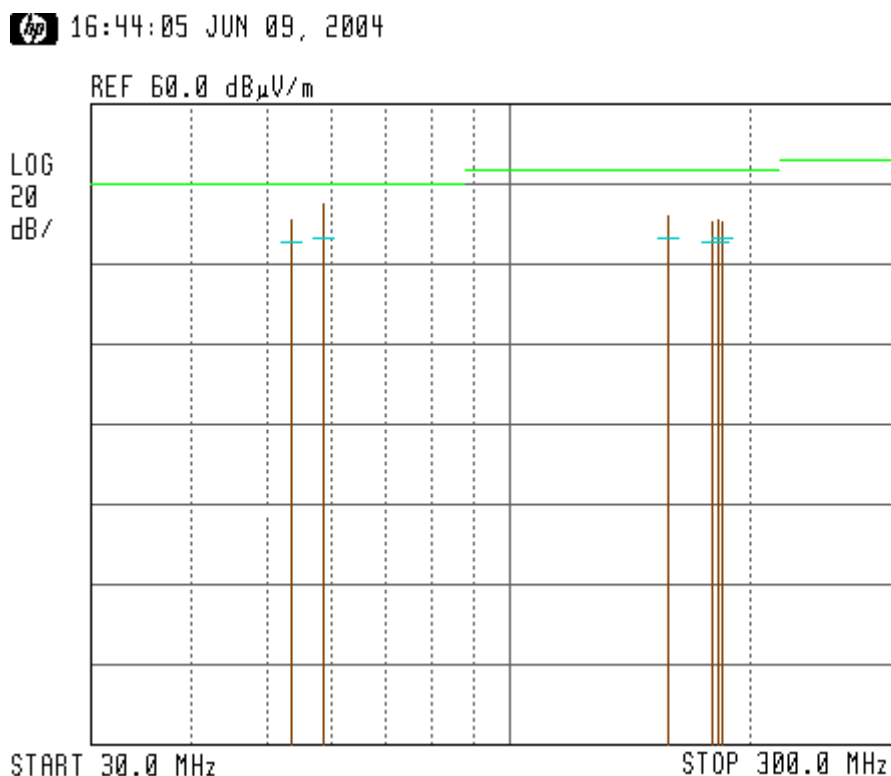
Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 903.5 and 913.5 MHz



**Figure 9. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 903.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dB)
311.97	35.2	29.9	15.2	46.0	-16.1
351.00	37.5	31.4	16.7	46.0	-14.6
390.00	38.0	33.2	18.1	46.0	-12.8
429.00	38.7	33.9	18.9	46.0	-12.1
468.00	39.3	34.4	19.4	46.0	-11.6
903.53	37.2	34.4	31.7	46.0	-11.6

**Figure 10. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

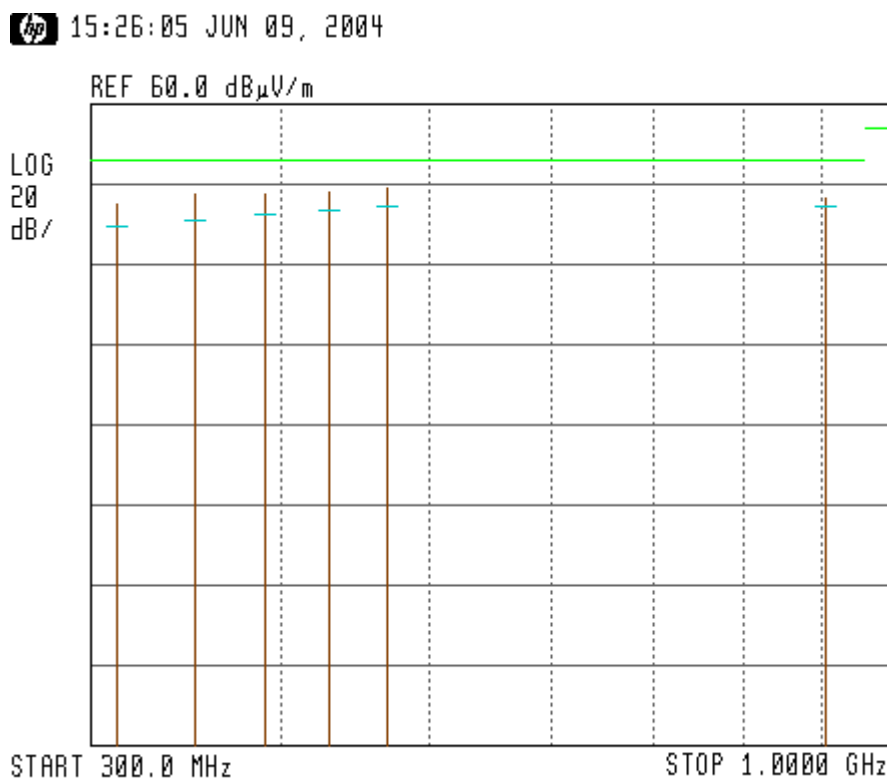
Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
 Antenna: 3 meters distance
 Operating Frequency: 903.5 MHz
 Frequency range: 300 MHz to 1 GHz
 Detectors: Peak, Quasi-peak



**Figure 11. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
 Antenna: 3 meters distance Detectors: Peak, Quasi-peak
 Operating Frequency: 913.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dB)
312.00	35.1	30.0	15.2	46.0	-16.0
351.00	36.3	31.3	16.7	46.0	-14.7
390.00	37.6	33.2	18.1	46.0	-12.8
429.00	38.1	33.9	18.9	46.0	-12.1
468.00	39.8	34.6	19.4	46.0	-11.4
913.53	34.3	30.5	31.9	46.0	-15.5

**Figure 12. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description IntegerAlarm Control Panel
 Type IA-CP1
 Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical

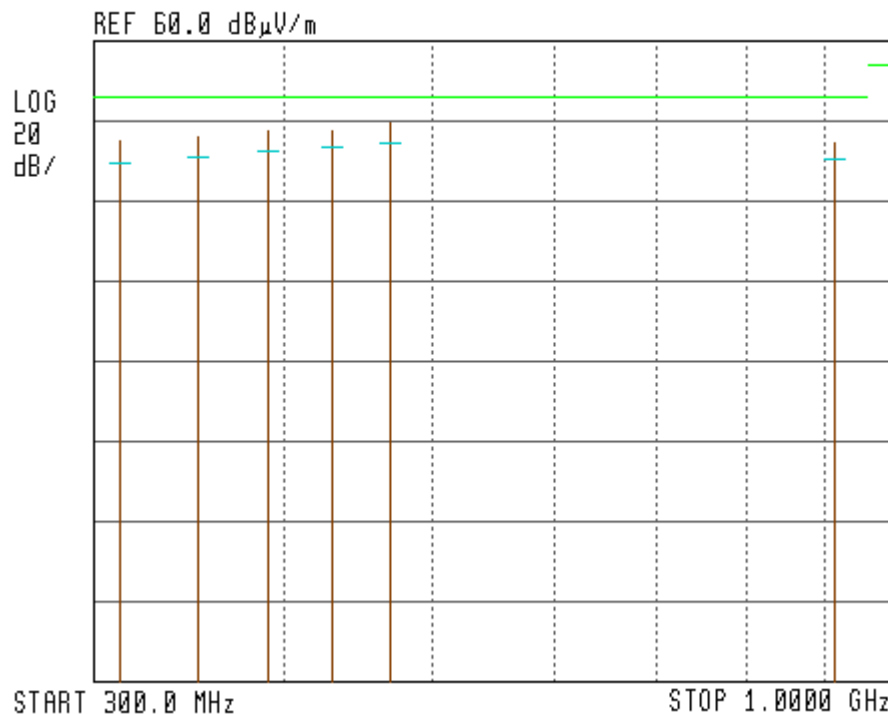
Frequency range: 300 MHz to 1 GHz

Antenna: 3 meters distance

Detectors: Peak, Quasi-peak

Operating Frequency: 913.5 MHz

16:10:59 JUN 09, 2004



**Figure 13. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/m).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.

9. Signatures of the E.U.T's Test Engineers

Test	Test Engineer Name	Signature	Date
Radiated Emissions	E. Pitt		10.06.04

10. APPENDIX A - CORRECTION FACTORS

10.1 Correction factors for CABLE from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.5	1200.0	7.5
20.0	0.7	1400.0	8.2
30.0	1.0	1600.0	9.0
40.0	1.2	1800.0	9.6
50.0	1.3	2000.0	10.7
60.0	1.5	2300.0	11.1
70.0	1.6	2600.0	11.8
80.0	1.7	2900.0	12.8
90.0	1.8		
100.0	1.9		
150.0	2.4		
200.0	2.7		
250.0	3.0		
300.0	3.3		
350.0	3.7		
400.0	4.0		
450.0	4.3		
500.0	4.7		
600.0	4.9		
700.0	5.4		
800.0	5.8		
900.0	6.3		
1000.0	6.7		

NOTES:

- 1. The cable type is RG-214.*
- 2. The overall length of the cable is 27 meters.*
- 3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".*

10.2 Correction factors for CABLE
from EMI receiver
to test antenna
at 3 meter range.

FREQUENCY	CORRECTION
(GHz)	FACTOR
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

- 1. The cable type is RG-8.*
- 2. The overall length of the cable is 10 meters.*

10.3 Correction factors for

CABLE

from EMI receiver
to test antenna

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.1	1200.0	1.4
20.0	0.1	1400.0	1.5
30.0	0.2	1600.0	1.5
40.0	0.2	1800.0	1.7
50.0	0.2	2000.0	1.7
60.0	0.2	2300.0	2.0
70.0	0.3	2600.0	2.1
80.0	0.3	2900.0	2.2
90.0	0.3		
100.0	0.3		
150.0	0.4		
200.0	0.4		
250.0	0.4		
300.0	0.5		
350.0	0.6		
400.0	0.6		
450.0	0.6		
500.0	0.7		
600.0	0.8		
700.0	0.8		
800.0	1.0		
900.0	1.1		
1000.0	1.1		

NOTES:

- 1. The cable type is RG-214.*
- 2. The overall length of the cable is 5.5 meters.*

10.4 Correction factors for CABLE

from EMI receiver
to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.
2. The cable is used for measurements above 2.9 GHz.
3. The overall length of the cable is 10 meters.

10.5 Correction factors for CABLE

from EMI receiver
to test antenna
at 10 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.6	1200.0	9.7
20.0	1.1	1400.0	10.5
30.0	1.3	1600.0	11.5
40.0	1.6	1800.0	12.6
50.0	1.7	2000.0	13.5
60.0	1.9	2300.0	14.3
70.0	2.0	2600.0	15.5
80.0	2.2	2900.0	16.4
90.0	2.3		
100.0	2.4		
150.0	3.1		
200.0	3.6		
250.0	4.2		
300.0	4.5		
350.0	4.8		
400.0	5.2		
450.0	5.5		
500.0	6.2		
600.0	6.4		
700.0	7.0		
800.0	7.5		
900.0	8.1		
1000.0	8.6		

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 34 meters.
3. The above data is located in file 34M10MO.CBL on the disk marked "Radiated Emissions Tests EMI Receiver".

10.6 Correction factors for

LOG PERIODIC ANTENNA

Type LPD 2010/A

at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	11.4
400.0	14.5
500.0	15.2
600.0	17.3
700.0	19.0
850.0	20.1
1000.0	22.2

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.2
400.0	14.4
500.0	15.2
600.0	17.2
700.0	19.0
850.0	20.1
1000.0	22.1

NOTES:

1. Antenna serial number is 1038.
2. The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.
3. The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".

10.7 Correction factors for

LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.
2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.
3. The files mentioned above are located on the disk marked "Antenna Factors".

10.8 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

10.9 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, 10 meter range

FREQUENCY (MHz)	AFE (dB/m)
30.0	12.1
40.0	10.6
50.0	10.6
60.0	8.9
70.0	8.5
80.0	9.6
90.0	9.4
100.0	9.6
110.0	10.3
120.0	10.7
130.0	12.6
140.0	12.7
150.0	12.7
160.0	13.8
170.0	13.7
180.0	14.9
190.0	13.4
200.0	13.1
210.0	14.0
220.0	14.5
230.0	15.8
240.0	16.0
250.0	16.6
260.0	16.7
270.0	18.3
280.0	18.5
290.0	19.3
300.0	20.9

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 41BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

10.10 Correction factors for BICONICAL ANTENNA

Type 3109, 1.0 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	11.1
30.0	12.0
40.0	12.0
50.0	11.4
60.0	10.3
70.0	10.7
80.0	8.3
90.0	9.0
100.0	10.0
110.0	11.6
120.0	13.6
130.0	14.2
140.0	13.5
150.0	12.7
160.0	12.7
170.0	13.6
180.0	15.3
190.0	14.6
200.0	14.7
210.0	15.3
220.0	15.8
230.0	17.0
240.0	18.0
250.0	18.1
260.0	18.0
270.0	17.5
280.0	18.2
290.0	19.7
300.0	21.8

NOTES:

1. Antenna serial number is 3244.
2. The above list is located in file 44BIC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver"

10.11 Correction factors for BICONICAL ANTENNA

**Type 3109,
3 meter range**

FREQUENCY (MHz)	AFE (dB/m)
20.0	18.4
30.0	14.0
40.0	12.3
50.0	10.6
60.0	8.3
70.0	8.7
80.0	7.2
90.0	8.6
100.0	10.1
110.0	11.2
120.0	11.8
130.0	12.3
140.0	12.7
150.0	12.5
160.0	12.4
170.0	12.1
180.0	12.2
190.0	12.8
200.0	13.7
210.0	14.5
220.0	15.4
230.0	15.9
240.0	16.3
250.0	16.7
260.0	17.1
270.0	17.2
280.0	17.5
290.0	18.1
300.0	18.9

NOTES:

1. Antenna serial number is 3244.
2. The above list is located in file 44BIC3M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver"

11. APPENDIX B - MEASUREMENT UNCERTAINTY

11.1 Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2001. In accordance with Paragraph 5.4.6.1 of this standard this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

11.2 Conducted Emission

The uncertainty for this test is ± 2 dB.

12. Appendix C - FCC Verification Process Instructions

- Label

Prepare Label

- Design a FCC compliance label that will be affixed to all units marketed.
- The label must include the compliance statement below.

Example of Label:

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.

Note - The label may also contain other information, such as the model number, the country of origin, etc. (The country of origin information is required by Customs and the Federal Trade Commission for imports to the U.S.)

Small Products:

If the product is too small for a label containing the statement above, the information paragraph required must be placed in a prominent location in the instruction manual or, alternatively, the information can be placed on the container in which the product is marketed.

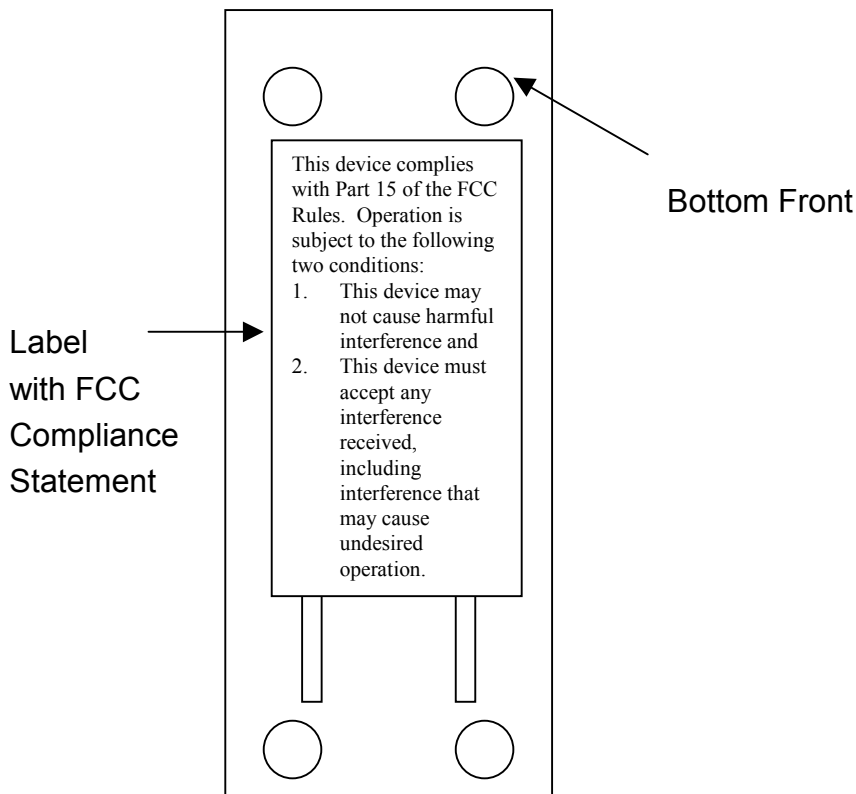
- **Label**

The FCC requires that the compliance statement above be placed in a “conspicuous location on the device.”

The following are the FCC Rules about how the label will be permanently attached.:

The label is expected to last the life of the product. It must be permanently marked (etched, engraved, indelibly printed, etc.) either directly on the device, or on a tag that is permanently affixed (riveted, welded, etc.) to the device.

Example of Product with Label:



- **FCC Compliance Statement**

FCC Compliance Statement in User's Manual

For a Class A or Class B digital device or peripheral, the instructions given to the user shall include the following, or a similar, statement that should be placed in a prominent location in the text of the manual. (from FCC Rules 15.105)

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. (from FCC Rules 15.21)

Information about any special accessories needed to ensure FCC compliance must also be included.

Sample User Information for a Class A digital device:

The FCC Wants You to Know

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

Sample User Information for a Class B digital device:

The FCC Wants You to Know

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- a) Reorient or relocate the receiving antenna.
- b) Increase the separation between the equipment and receiver.
- c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- d) Consult the dealer or an experienced radio/TV technician.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.