Cert. No. 1152.01
Electrical (EMC)

DATE: 06 June 2007

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

FCC EMC/Radio Test Report

for

Visonic Ltd.

Equipment under test:

GSM Modem

GSM Modem (USA) for Powermax+

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
E. Pitt, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Cert. No. 1152.01
Electrical (EMC)

Measurement/Technical Report for

Visonic Ltd.

GSM Modem

GSM Modem (USA) for Powermax+

FCC ID: GSAGSMEXTMODEM

06 June 2007

This report concerns: Original Grant __ Class II change: X

Class B verification ___ Class A verification_____Class I change

Equipment type:

Request Issue of Grant:
__**x**__Immediately upon completion of review

Limits used:
CISPR 22 _____ Parts 15, 22 x

Measurement procedure used is ANSI C63.4-2003.
Substitution Method used as in ANSI/TIA-603-B: 2002

Application for Certification prepared by:
Ishaishou Raz
ITL (Product Testing) Ltd.
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Israel
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Applicant for this device: (different from "prepared by")
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1. General Information

1.1 Administrative Information

Manufacturer:	Visonic Ltd.
Manufacturer's Address:	30 Habarzel St. P.O.B. 22020 Tel-Aviv, 61220 Israel Tel: +972-3-645-6714 Fax: +972-8-645-6788
Manufacturer's Representative:	Arick Elshtein
Equipment Under Test (E.U.T):	GSM Modem
Equipment Model No.:	GSM Modem (USA) for Powermax+
Catalogue No.:	0-5926-3
Date of Receipt of E.U.T:	21.01.07
Start of Test:	23.01.07
End of Test:	24.01.07
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Sub-part B FCC Part 22 Sub-part H

1.2 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.

1.3 Product Description

See details Original Grant application of the Enfora Inc., modem FCC ID: MIVGSM108.

The change to the original module is:

A new printed antenna is used

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing August 22, 2006).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. 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.

2. Product Labeling

GSM MODEM

P/N:90-YYYYYY REV:A

Plug-In Adaptor AC/AC 120V AC, 60Hz

Power: 9 VAC, 1 A

Rechargeable Battery Pack:

Size AA. 7.2V/ 1300mA minimum

FCC ID: GSAGSMEXTMODEM

IC: 1467C -GSMEXTMODEM

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.

S/N: WWYYXXXXXX

S-200**** REV.0

Size: 60 X 35 mm

3. System Test Configuration

3.1 Justification

See details Original Grant application of the Enfora Inc., modem FCC ID: MIVGSM108.

Radiated Spurious Emission and Radiated Emission per FCC Part 15, Sub-part B, were re-tested.

3.2 EUT Exercise Software

See details in original application of the Enfora Inc., modem FCC ID: MIVGSM0108.

3.3 Special Accessories

See details in original application of the Enfora Inc., modem FCC ID: MIVGSM0108.

3.4 Equipment Modifications

See details in original application of the Enfora Inc., modem FCC ID: MIVGSM0108.

3.5 Configuration of Tested System

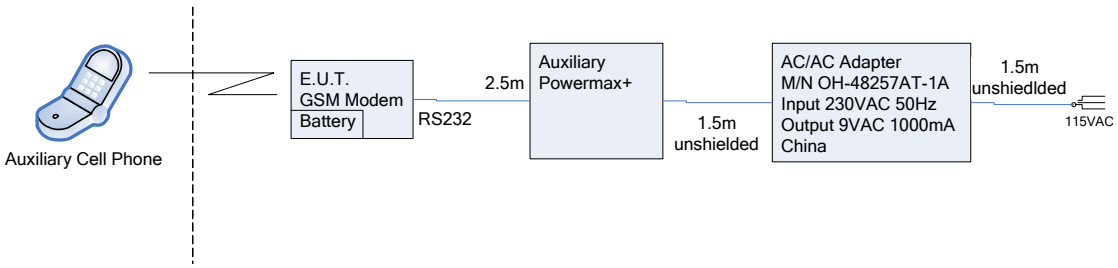

Figure 1. Tests Set-up

4. Block Diagram

4.1 Schematic Block/Connection Diagram

See details in original application of the Enfora Inc., modem FCC ID: MIVGSM0108.

4.2 Theory of Operation

See details in original application of the Enfora Inc., modem FCC ID: MIVGSM0108.

5. Spurious Radiated Emission

5.1 Test Specification

FCC, Part 22, Section 22.917

5.2 Test Procedure

(a) The E.U.T. operation mode and test set-up are as described in Section 3. 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, 1.5 meters above the ground. The configuration tested is shown in Figure 3.5.
The frequency range 30 MHz-9.0 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(b) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P (dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dBi)
P = Equivalent Isotropic Radiated Power.
P_g = Signal Generator Output Level.

5.3 Test Data

JUDGEMENT: Passed

The E.U.T met the requirements of the FCC, Part 22, Section 22.917 specifications.

TEST PERSONNEL:

Tester Signature: _____ Date: 04.03.07

Typed/Printed Name: E. Pitt

Radiated Emission

E.U.T Description GSM Modem
Type GSM Modem (USA) for Powermax+
Catalogue Number: 0-5926-3

Specification: FCC Part 22, Section 22.917

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 MHz to 9000 MHz
Antenna: 3 meters distance
Operating Mode: Tx

Freq. (MHz)	E (dBµV /m)	Ant.pol. V /H	Power Output Generator dBm	Cable Loss dB	Gain Antenna. dBi	EIRP (dBm)	Spec. (dBm)	Margin (dB)
1823.50	67.5	V	-39.2	6.1	8.3	-37.0	-13.0	-24.0
2717.35	68.0	H	-38.5	7.6	9.7	-36.4	-13.0	-23.4

Figure 2. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL.

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.

5.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 22, 2006	1 year
RF Section	HP	85420E	3705A00248	November 22, 2006	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 30, 2006	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 04, 2005	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	October 16, 2005	1 year
Spectrum Analyzer	HP	8592L	3926A01204	November 21, 2006	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200		N/A	N/A

6. Conducted Emission From AC Mains

6.1 Test Specification

0.15 - 30 MHz, FCC Part 15, Subpart B, CLASS B

6.2 Test Procedure

The E.U.T operation mode and test configuration are as described in Section 4. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T.'s AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying to CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

6.3 Test Data

JUDGEMENT: Passed

In the band 0.15 – 30 MHz, the emission levels were more than 20 dB below the specification limit.

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

The details of the highest emissions are given in *Figure 3* to *Figure 4*.

Conducted Emission

E.U.T Description	GSM Modem
Type	GSM Modem (USA) for Powermax+
Serial Number:	0-5926-3

Specification: FCC Part 15, Subpart B, Class **B**
Lead: Phase
Detectors: Peak, Quasi-peak, Average

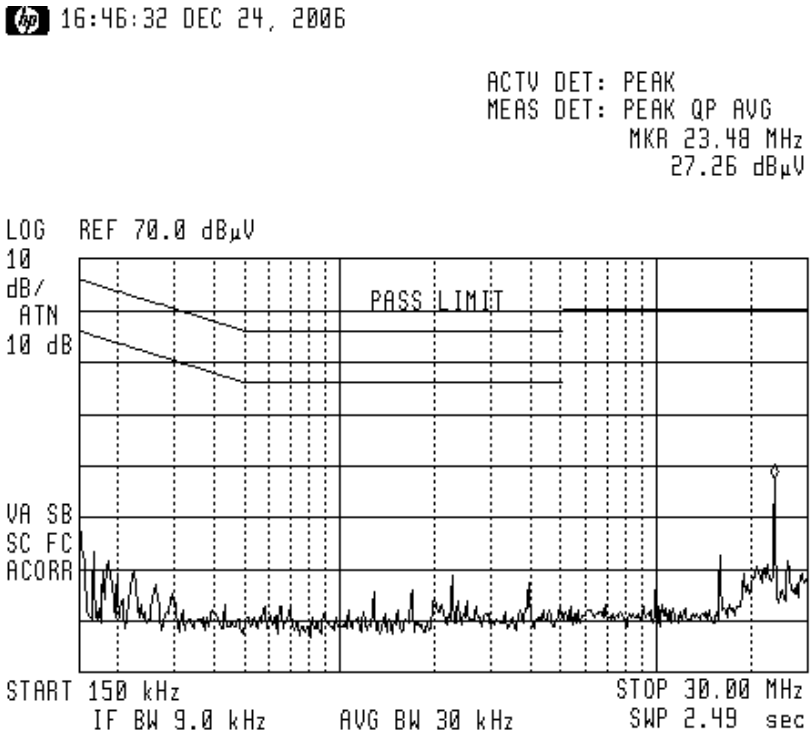

Figure 3. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	GSM Modem
Type	GSM Modem (USA) for Powermax+
Serial Number:	0-5926-3

Specification:	FCC Part 15, Subpart B, Class **B**
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average

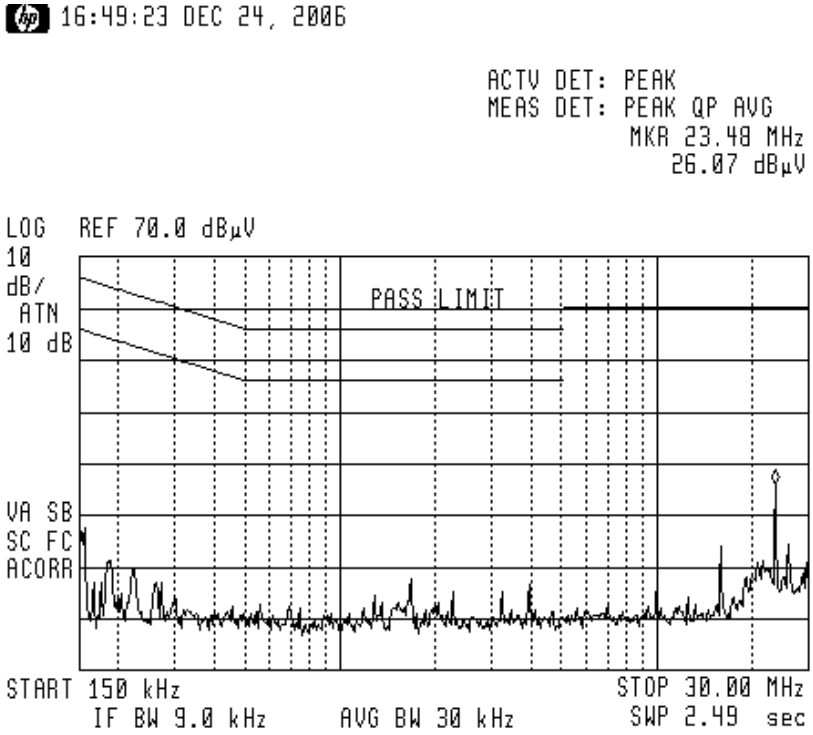

Figure 4 Conducted Emission: NEUTRAL
Detectors: Peak, Quasi-peak, Average

6.4 Test Instrumentation Used, Conducted Measurement

Instrument	Manufacturer	Model	Serial No.	Calibration	Period
LISN	Fischer	FCC-LISN-2A	127	March 20, 2006	1 Year
LISN	Fischer	FCC-LISN-2A	127	March 20, 2006	1 Year
EMI Receiver	HP	85422E	3906A00276	November 22, 2006	1Year
RF Filter Section	HP	85420E	3705A00248	November 22, 2006	1Year

7. Radiated Emission Per FCC Part 15 Sub-Part B Test Data

7.1 Test Specification

30-1000 MHz, FCC Part 15, Subpart B, CLASS B

7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 4.

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 configuration tested is shown in *Figure 1. Tests Set-up*.

The frequency range 30-1000 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.

7.3 Test Data

JUDGEMENT: Passed by dB

The EUT met the requirements of the F.C.C. Part 15, Subpart B, specification.

The details of the highest emissions are given in *Figure 5* to *Figure 8*.

Radiated Emission

E.U.T Description	GSM Modem
Type	GSM Modem (USA) for Powermax+
Catalogue Number:	0-5926-3

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance
Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Avg dBuV/m	Av Delta L 2 (dB)	Corr (dB)
1	182.000260	33.6	28.4	-15.1			15.8
2	234.000000	37.2	32.3	-13.7			18.9
3	247.000210	38.5	33.9	-12.1			20.0
4	300.014800	25.4	20.0	-26.0			15.6

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

Note: QP Delta 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	GSM Modem
Type	GSM Modem (USA) for Powermax+
Catalogue Number:	0-5926-3

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

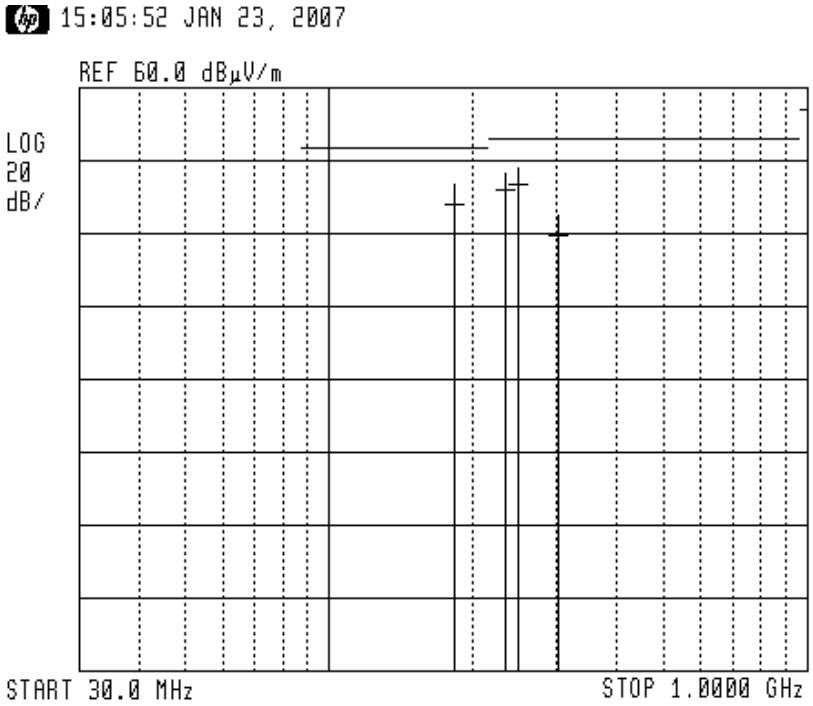

Figure 6. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/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 GSM Modem
Type GSM Modem (USA) for Powermax+
Catalogue Number: 0-5926-3

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
Antenna: 3 meters distance
Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Avg dBuV/m	Av Delta L 2 (dB)	Corr (dB)
1	227.820072	27.0	21.9	-24.1			18.6
2	130.000144	25.4	22.3	-21.2			13.6
3	182.000140	29.1	24.0	-19.5			15.8
4	234.000250	32.5	24.0	-22.0			18.9
5	247.000210	31.0	21.8	-24.2			20.0
6	300.001000	29.2	24.0	-22.0			23.0

Figure 7. 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	GSM Modem
Type	GSM Modem (USA) for Powermax+
Catalogue Number:	0-5926-3

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

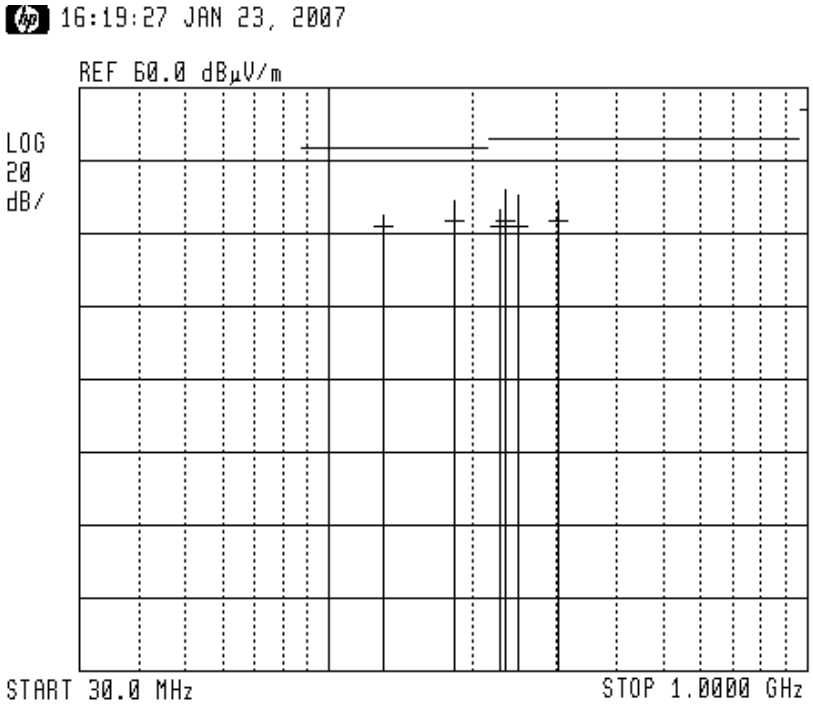

Figure 8. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/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.*

7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 22, 2006	1 year
RF Section	HP	85420E	3705A00248	November 22, 2006	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 30, 2006	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A

7.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

8. APPENDIX A - CORRECTION FACTORS

8.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

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".

8.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
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.

12.6 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	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

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".*

8.8 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".