DATE: 13 March 2011

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

FCC Radio Test Report

for

Card Guard Scientific Survival Ltd.

Equipment under test:

CG-6108 ACT - 1 Lead

FG-00065

Written by: _____
D. Shidlowsky, Documentation

Approved by: For/_____
R. Gotfrid, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Measurement/Technical Report for

Card Guard Scientific Survival Ltd.

CG-6108 ACT - 1 Lead

FG-00065

FCC ID: YB8ACT1

This report concerns:	Original Grant:	X
	Class I Change:	
	Class II Change:	
Equipment type:	Frequency Hopping Spread Spectrum	

Limits used:
47CFR15 Section 15.247

Measurement procedure used is ANSI C63.4-2003.

Application for Certification prepared by:

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Applicant for this device:
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1. General Information

1.1 Administrative Information

Manufacturer:	Card Guard Scientific Survival Ltd.
Manufacturer's Address:	2 Pekeris St., Rabin Science Park Rechovot Israel Tel: 08-9484000 Fax: 08-9484044
Manufacturer's Representative:	Aleksandr Merzon
Equipment Under Test (E.U.T):	CG-6108 ACT - 1 Lead
Equipment Model No.:	FG-00065
Equipment Serial No.:	0109680006
Date of Receipt of E.U.T:	13.07.10
Start of Test:	13.07.10
End of Test:	15.07.10
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	See Section 2

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), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.

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

The CG-6108 ACT-1L Continuous ECG Monitor and Arrhythmia Detector (ACT-1L) is designed for self-testing by patients at home and for analysis by medical professionals at a remote Monitoring Center.

The ECG chest-worn sensor is used for the acquisition and transmission of the ECG signal. The sensor is equipped with three electrode leads (electrodes contacts) on a harness intended to connect with FDA cleared ECG electrodes. The sensor works in conjunction with a hand held cellular device which contains the arrhythmia detection software application.

The sensor houses a 3.6V AA lithium-thionyl chloride battery, an ECG channel circuit, an impedance measurement circuit, a pacemaker detection circuit, a 2-hour flash buffer memory, a Bluetooth transceiver and a buzzer. The ECG signals are received, filtered and amplified in the input circuit, stored in the flash memory buffer and transmitted via Bluetooth to the hand held device (cellular smart phone). The hand held device runs a proprietary application that is configured to process and transmit the ECG recordings (via cellular network) that are also stored along with the detected physiological events on a micro-SD memory card. When a physiological event is detected, the handheld device transmits the recorded ECG automatically, via cellular link, to a Monitoring Center for professional analysis. If the patient is out of the cellular network coverage area, the hand-held device will send all events that were stored when the cellular link is re-established. The hand held device can also transmit ECG alarms via landline telephone through an optional landline Bluetooth modem.

1.4 Test Methodology

Radiated testing was 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 September 03 2009).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 5.2 dB

Note: See ITL Procedure No. PM 198.

2. System Test Configuration

2.1 Justification

Radiated emission screening was performed in 3 orthogonal orientations. The worst case orientation was the vertical position.

2.2 EUT Exercise Software

FW version 01.g was used.

2.3 Special Accessories

No special accessories were needed to achieve compliance.

2.4 Equipment Modifications

No modifications were necessary in order o achieve compliance.

2.5 Configuration of Tested System

Figure 1. Configuration of Tested System

3. Test Set-up Photos

Figure 2.

Figure 3.

4. Number of Hopping Frequencies

4.1 Test Specification

FCC Part 15, Subpart C Section 15.247(a)(1)(iii)

4.2 Test Procedure

The E.U.T. was set to hopping mode.
The spectrum analyzer was set to the following parameters:
Span: Every 40 MHz Frequency
Band of Operation: 2402-2480 MHz
RBW: 100kHz
VBW: 300kHz
Detector Function: Peak
Trace: Maximum Hold
The number of hopping frequencies is 20+20+20+19 = 79 (See following plots).

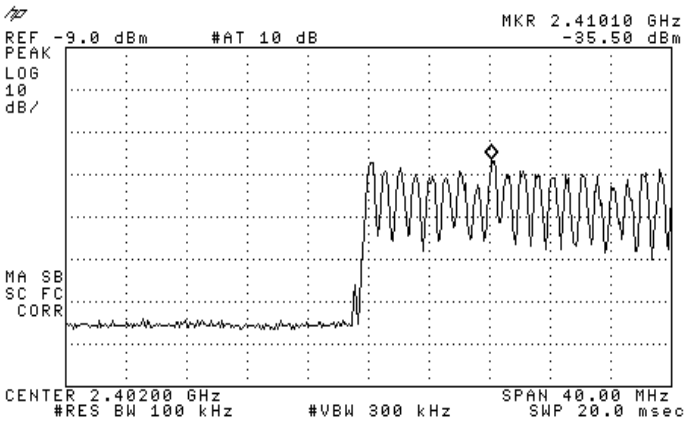


Figure 4 — 2402 - 2422 GHz

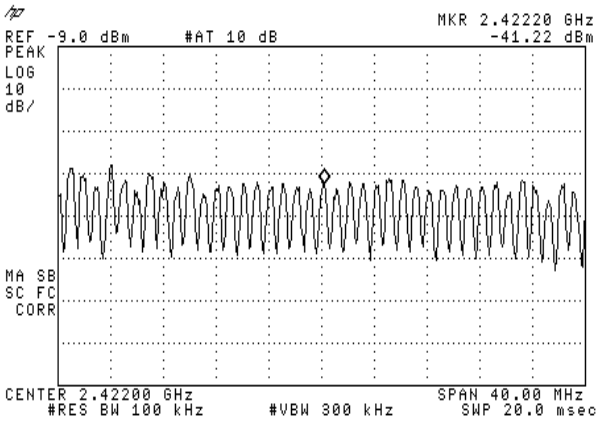


Figure 5 — 2423 - 2442 GHz

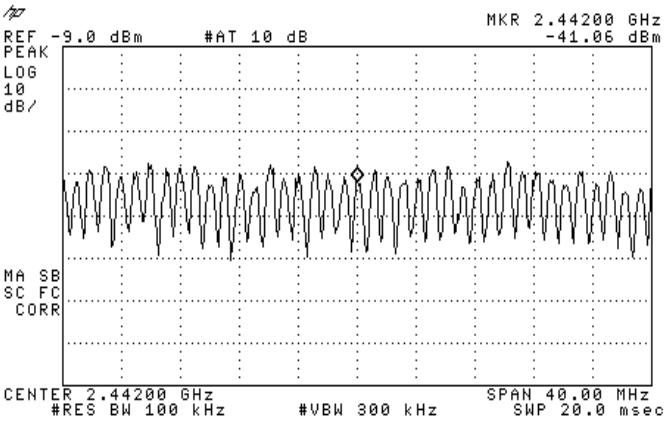


Figure 6 — 2443 -2462 GHz

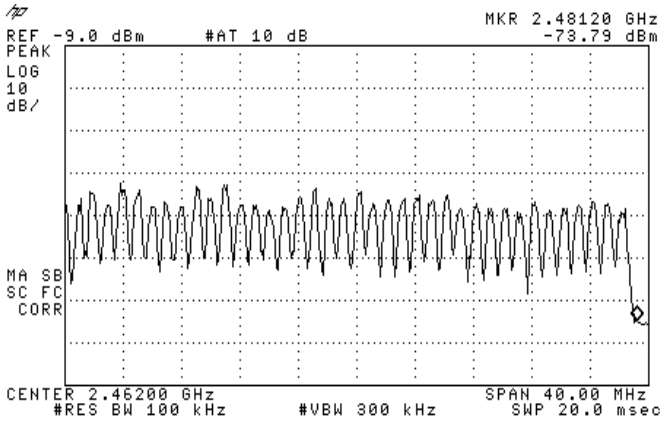


Figure 7 — 2463 - 2480 GHz

4.3 Results table

E.U.T Description: CG-6108 ACT - 1 Lead
Model No.: FG-00065
Serial Number: 0109680006
Specification: F.C.C. Part 15, Subpart C: 15.247(a)(1)(iii)

Band1 = 2402 – 2422 (MHz) =21
Band2 = 2423 – 2442 (MHz) = 20
Band3 = 2443 – 2462 (MHz) = 20
Band4 = 2463 – 2480 (MHz) = 18

Number of Hopping Frequencies	Specification
79	>75

Figure 8 Number of Hopping Frequencies

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: For/_____ Date: 10.03.11

Typed/Printed Name: R. Gotfrid

4.4 Test Equipment Used.

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3313U00346	March 10, 2010	1 year

Figure 9 Test Equipment Used

5. Channel Frequency Separation

5.1 Test Specification

FCC Part 15, Subpart C, 15.247(a) (1)

5.2 Test procedure

The E.U.T. was set to hopping mode.
The spectrum analyzer was set to the following parameters:

Span: 2 MHz
RBW: 10kHz
VBW: 10kHz
Detector Function: Peak
Trace: Maximum Hold

The marker delta function to determine the separation between the peaks of the adjacent channels was used.

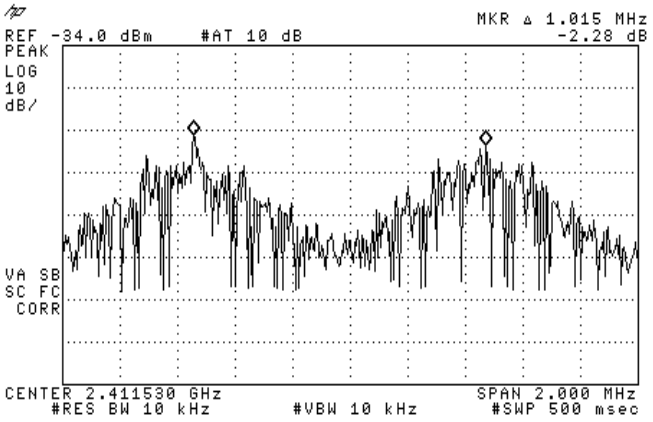


Figure 10. 2.4115 GHz.

5.3 Results table

E.U.T. Description: CG-6108 ACT - 1 Lead
Model No.: FG-00065
Serial Number: 0109680006
Specification: FCC Part 15, Subpart C, 15.247(a) (1)

Channel Frequency Separation (kHz)	Specification (kHz)	Margin (kHz)
1015	>810	205

Figure 11 Channel Frequency Separation

JUDGEMENT: Passed by 2 05kHz

TEST PERSONNEL:
Tester Signature: For/_____ Date: 10.03.11
Typed/Printed Name: R. Gotfrid

5.4 Test Equipment Used.

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3313U00346	March 10, 2010	1 year

Figure 12 Test Equipment Used

6. Radiated Power Output

6.1 Test Specification

F.C.C. Part 15, Subpart C: 15.247(b)

6.2 Test procedure

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters.
The transmitter unit operated with normal modulation. The EMI receiver was set to 1 MHz resolution BW. The EUT was set up as shown in Figure 3, and its proper operation was checked.

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

Radiated output power levels were measured at selected operation frequencies and the results were converted to power level according to the formula as shown below:

$$P = \frac{(E_{V/m} \times d)^2}{(30 \times G)} \text{ [W]}$$

The E.U.T. was tested at 2402, 2441, and 2480 MHz with GFSK (Gaussian Frequency Shift Keying) modulation.

6.3 Results Calculation

E.U.T. Description: CG-6108 ACT - 1 Lead
Model No.: FG-00065
Serial Number: 0109680006
Specification: F.C.C. Part 15, Subpart C

Frequency	Pol	E	E	Antenna Gain	Antenna Distance	Calculated Results	Limit	Margin
(MHz)		(dbµV/m	(V/m)	(dBi)	(m)	(mW)	(W)	(mW)
2402.00	V	90.11	0.032	4.1	3	0.1195	1	880.5
2402.00	H	91.93	0.039	4.1	3	0.1775	1	882.5
2441.00	V	89.42	0.029	4.1	3	0.098	1	902.0
2441.00	H	91.26	0.036	4.1	3	0.1512	1	848.8
2480.00	V	87.21	0.022	4.1	3	0.05649	1	943.51
2480.00	H	87.99	0.025	4.1	3	0.07294	1	927.06

JUDGEMENT: Passed by 880.5 mW

TEST PERSONNEL:

Tester Signature: For/_____ Date: 10.03.11

Typed/Printed Name: R. Gotfrid

6.4 Test Equipment Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3906A00276		1 year
RF Section	HP	85420E	3705A00248		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	JPKGC19982	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253		2 years

Figure 13 Test Equipment Used

7. Dwell Time on Each Channel

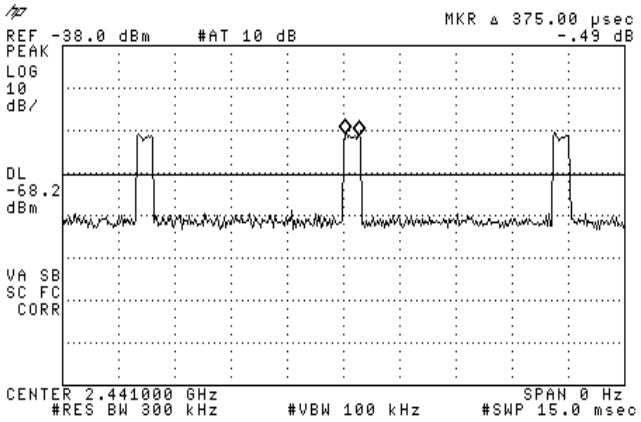
7.1 Test Specification

FCC Part 15, Section 15.247(a)(1)(iii)

7.2 Test Procedure

The E.U.T. was tested in radiated mode using the substitution antenna. The spectrum analyzer was set to 100 kHz RBW and 100 kHz VBW.

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed



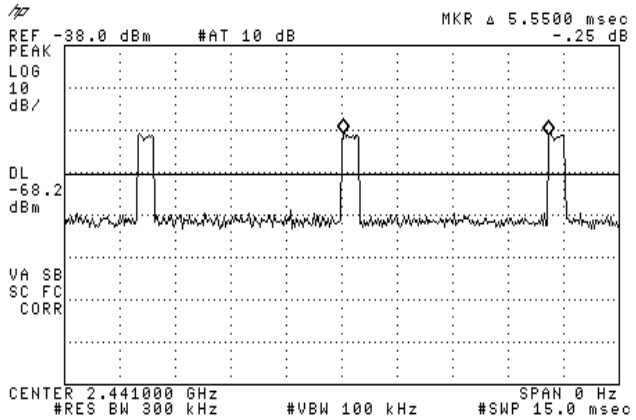


Figure 14 — T=5.55msec, Ton=0.375msec, D.C=6.756%

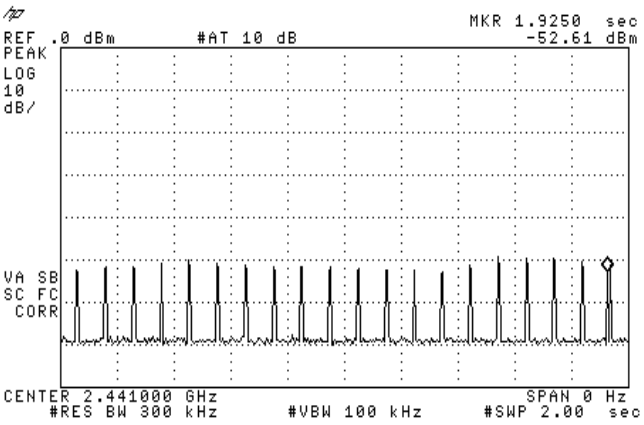


Figure 15 — Number of channels in 2 sec. =20

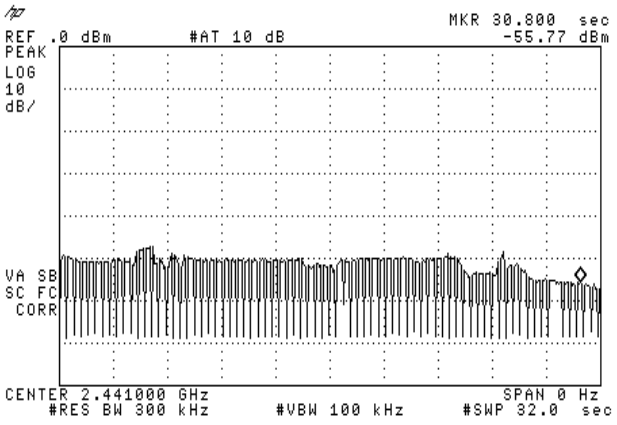


Figure 16 — Dwell time at 2.441GHz

[32/2=16, 20 x 16 =320, 320 x 0.375msec = 0.12 sec, spec. = 0.4 sec]

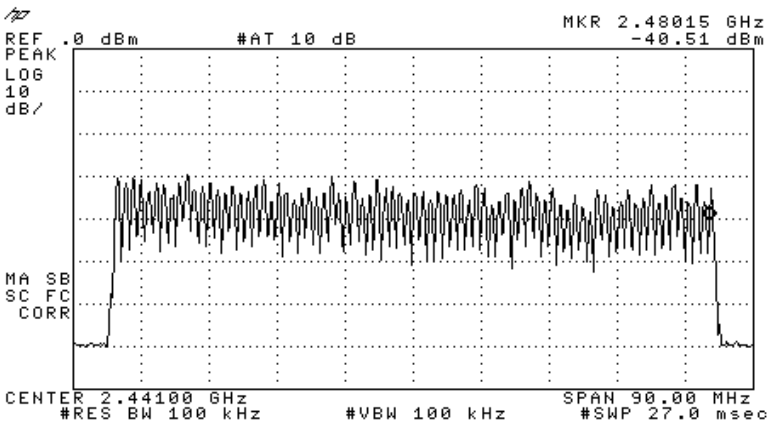


Figure 17 — Entire 79 Channels Display

7.3 Results table

E.U.T Description: CG-6108 ACT - 1 Lead
Model No.: FG-00065
Serial Number: 0109680006
Specification: F.C.C. Part 15, Subpart C (15.247)

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: For/_____ Date: 10.03.11

Typed/Printed Name: R. Gotfrid

7.4 Test Equipment Used.

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8594E	3313U00346	March 10, 2010	1 year

Figure 18 Test Equipment Used

8. 20dB Bandwidth

8.1 Test Specification

FCC Part 15, Subpart C: 15.247(a)(2)

8.2 Test procedure

The E.U.T. was set to the applicable test frequency. The spectrum analyzer was set to 30 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 20 dB below maximum peak power was measured and recorded.

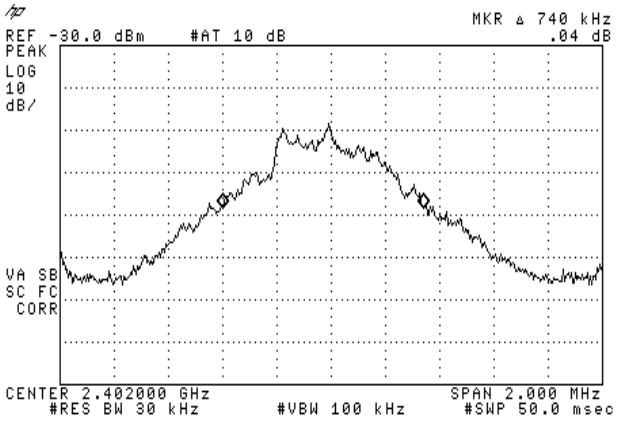


Figure 19. 2402.00 MHz

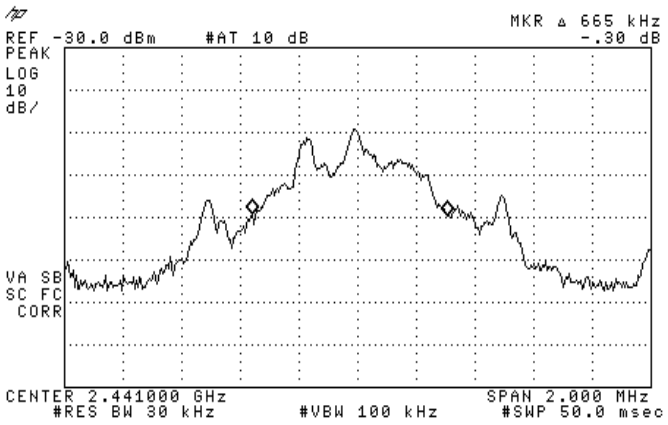


Figure 20. 2441.00 MHz

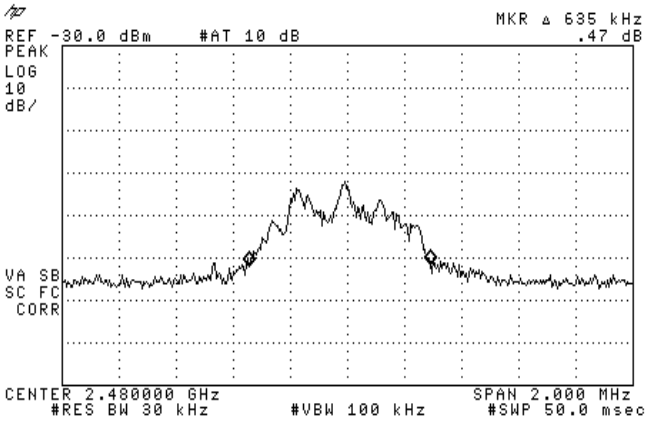


Figure 21. 2480.00 MHz

8.3 Test Results

E.U.T Description: CG-6108 ACT - 1 Lead
Model: FG-00065
Serial Number: 0109680006

Operation Frequency (MHz)	Bandwidth Reading (MHz)
2402	740
2441	665
2480	635

Figure 22 20 dB Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:
Tester Signature: For/_____ Date: 10.03.11
Typed/Printed Name: R. Gotfrid

8.4 Test Equipment Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Spectrum Analyzer	HP	8594E	3313U00346	March 10, 2010	1 year

Figure 23 Test Equipment Used

9. Band Edge

9.1 Test Specification

FCC Part 15, Subpart C: 15.247(d)

9.2 Test procedure

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters.

The transmitter unit operated with normal modulation. The EMI receiver was set to 1 MHz resolution BW. The EUT was set up as shown in *Figure 1*, and its proper operation was checked.

The EMI receiver was adjusted to the transmission channel at the maximum radiated level. The display line was set to 20 dBc and the EMI receiver was set to the band edge frequencies.
Maximum power level below 2400 MHz and above 2483.5 MHz was measured relative to power level at 2402 MHz, and 2480 MHz correspondingly.

The E.U.T. was tested in 2 operating channels and frequencies
(1 (2.402 GHz); 14 (2.480 GHz)).

The E.U.T. was tested at 2402 and 2480 MHz with GFSK (Gaussian Frequency Shift Keying) modulation.

9.3 Results table

E.U.T. Description: CG-6108 ACT - 1 Lead
Model No.: FG-00065
Serial Number: 0109680006
Specification: F.C.C. Part 15, Subpart C (15.247 (d))

Operation Frequency (MHz)	Band Edge Frequency (MHz)	Spectrum Level (dBuV/m)	Specification (dBuV/m)	Margin (dB)
2480	2484	56.27	74.0	-17.73
2402	2390	53.5	74.0	-20.5

Figure 24 Band Edge Peak Detector

Operation Frequency (MHz)	Band Edge Frequency (MHz)	Spectrum Level (dBuV/m)	Specification (dBuV/m)	Margin (dB)
2480	2484	47.28	54.0	-6.72
2402	2390	40.8	54.0	-13.2

Figure 25 Band Edge Average Detector

JUDGEMENT: Passed by 6.72 dB

TEST PERSONNEL:

Tester Signature: For/_____ Date: 10.03.11

Typed/Printed Name: R. Gotfrid

9.4 Test Equipment Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	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	JPKGC19982	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 29, 2009	2 years

Figure 26 Test Equipment Used

10. Radiated Emission, 9 kHz – 30 MHz

10.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

10.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 2.

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 configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-30 MHz was scanned.

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.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was operated at the frequency of 10 MHz. This frequency was measured using a peak detector.
The E.U.T. was tested in three operating channels and frequencies
(1 (2.402 GHz); 8 (2.441 GHz; 14 (2.480 GHz))

10.3 Measured Data

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 specification.

The results for all three channels were the same.

No signals were detected in the frequency range of 9 kHz – 30 MHz.

TEST PERSONNEL:

Tester Signature: For/_____ Date: 10.03.11

Typed/Printed Name: R. Gotfrid

10.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2009	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	JPKGC19982	N/A	N/A

10.5 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]

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

11. Spurious Radiated Emission 30 – 25000 MHz

11.1 Test Specification

30 MHz-25000 MHz, F.C.C., Part 15, Subpart C

11.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

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 configuration tested is shown in Figure 1.

The frequency range 30 MHz-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

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.
In the frequency range 30 MHz-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used.
In the frequency range 2.9-25.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.
The test distance was 3 meters.
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 E.U.T. was tested in three operating channels and frequencies (1 (2.402 GHz); 8 (2.441 GHz; 14 (2.480 GHz)).

11.3 Test Data

JUDGEMENT: Passed by 15.5 dB

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

The results for all three operation channels were the same.

For the operation channel (2.402 GHz), the margin between the emission level and the specification limit is 15.51 dB in the worst case at the frequency of 4804.00 MHz, vertical polarization.

For the operation channel (2.441 GHz), the margin between the emission level and the specification limit is 19.4 dB in the worst case at the frequency of 4882.00 MHz, horizontal polarization.

For the operation channel (2.480 GHz), the margin between the emission level and the specification limit is 20.5 dB in the worst case at the frequency of 4950.00 MHz, horizontal and vertical polarizations.

Only 2nd harmonic frequencies were detected on all three operating frequencies.

The details of the highest emissions are given in Figure 27 to Figure 32.

TEST PERSONNEL:

Tester Signature: For/_____ Date: 10.03.11

Typed/Printed Name: R. Gotfrid

Radiated Emission Above 1 GHz

E.U.T Description	CG-6108 ACT - 1 Lead
Type	FG-00065
Serial Number:	0109680006

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 GHz to 25.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 2402 MHz

Freq. (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
2390.00	H	60.0	74.0	-14
2390.00	V	59.1	74.0	-14.9
4804.00	H	45.88	74.0	-28.12
4804.00	V	46.15	74.0	-27.85

Figure 27. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

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.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description CG-6108 ACT - 1 Lead
Type FG-00065
Serial Number: 0109680006

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 MHz to 25.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 2402 MHz

Freq. (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
2390.00	H	46.6	54.0	-7.4
2390.00	V	46.6	54.0	-7.4
4804.00	H	38.58	54.0	-15.42
4804.00	H	37.74	54.0	-16.26

Figure 28. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

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.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	CG-6108 ACT - 1 Lead
Type	FG-00065
Serial Number:	0109680006

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 MHz to 25.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 2441 MHz

Freq. (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
4882.00	H	47.5	74.0	-26.5
4882.00	V	46.18	74.0	-27.82

Figure 29. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

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.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description CG-6108 ACT - 1 Lead
Type FG-00065
Serial Number: 0109680006

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 2441 MHz

Freq. (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
4882.00	H	37.65	54.0	-16.35
4882.00	V	38.15	54.0	-15.85

Figure 30. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

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.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description	CG-6108 ACT - 1 Lead
Type	FG-00065
Serial Number:	0109680006

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 2480 MHz

Freq. (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
2483.50	H	55.36	74.0	-18.64
2483.50	V	56.01	74.0	-17.99
4960.00	H	48.26	74.0	-25.74
4960.00	V	48.62	74.0	-25.38

Figure 31. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

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.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

**"Correction Factor" = Antenna Factor + Cable Loss

Radiated Emission Above 1 GHz

E.U.T Description CG-6108 ACT - 1 Lead
Type FG-00065
Serial Number: 0109680006

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 MHz to 25.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 2480 MHz

Freq. (MHz)	Polarity (H/V)	Average Amp (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
2483.50	H	47.12	54.0	-6.88
2483.50	V	46.25	54.0	-7.75
4960.00	H	38.32	54.0	-15.68
4960.00	V	38.42	54.0	-15.58

Figure 32. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

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.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

**"Correction Factor" = Antenna Factor + Cable Loss

11.4 Field Strength Calculation below 1 GHz

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

$$[dB\mu v/m]\ FS = RA + AF + CF$$

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

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

11.5 Test Instrumentation Used

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1Year
RF Filter Section	HP	85420E	3705A00248	November 10, 2009	1Year
Antenna Biconical	ARA	BCD 235/B	1041	March 25, 2009	1Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 26, 2009	1 Year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 29, 2009	2 Years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 16, 2008	2 Years
Horn Antenna	ARA	SWH-28	1008	December 8, 2006	2 Years
Horn Antenna	Narda	V637	0410	December 8, 2006	2 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	January 7, 2009	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 9, 2009	1 Year
Low Noise Amplifier	MK Milliwave	MKT6-3000 4000-30-13P	A0399	January 15, 2009	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 Year
Spectrum Analyzer	HP	8546E	3442A00275	December 15, 2008	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	JPKGC19982	N/A	N/A

12. Antenna Gain/Information

The antenna gain is 4.1 dBi.

13. R.F Exposure/Safety

The CG-6108 ACT-1L Continuous ECG Monitor and Arrhythmia Detector (ACT-1L) is designed for self-testing by patients at home and for analysis by medical professionals at a remote Monitoring Center.

The ECG signals are received, filtered and amplified in the input circuit, stored in the flash memory buffer and transmitted via Bluetooth to the hand held device (cellular smart phone). The handheld device transmits the recorded ECG automatically, via cellular link, to a Monitoring Center for professional analysis. If the patient is out of the cellular network coverage area, the hand-held device will send all events that were stored when the cellular link is re-established. The hand held device can also transmit ECG alarms via landline telephone through an optional landline Bluetooth modem. Typical distance between the antenna and user is 2 cm.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at MHz is: $1\frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t- Transmitted Power 0.18 mw (calculated) = -7.45 dBm

G_T- Antenna Gain is included in the Transmitted Power measurement

R- Distance from Transmitter using 2 m worst case

(c) Transmitter peak power using source based time averaging of 20% maximum, 20 msec “ON” time, “OFF” + “ON” time 100 msec:

$$Pt = \frac{0.18 \times 20}{100} = 0.036mW$$

(d) The peak power density (time averaging) is :

$$S_p = \frac{0.036}{4\pi(2)^2} = 0.0007\frac{mW}{cm^2}$$

(f) This is below the FCC limit.

14. APPENDIX A - CORRECTION FACTORS

14.1 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".*

14.2 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.

14.3 Correction factors for CABLE

from spectrum analyzer 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.

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".*

14.4 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".*

14.5 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".

14.6 Correction factors for Double-Ridged Waveguide Horn

Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			

14.7 Correction factors for Horn Antenna

Model: SWH-28
at 1 meter range.

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
18.0	40.3	16.1
19.0	40.3	16.3
20.0	40.3	16.1
21.0	40.3	16.3
22.0	40.4	16.8
23.0	40.5	16.4
24.0	40.5	16.6
25.0	40.5	16.7
26.0	40.6	16.4

14.8 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2