



ELECTROMAGNETIC EMISSIONS TEST REPORT
ACCORDING TO FCC PART 15, SUBPART C, §15.231

FOR
FIRST ACCESS Ltd.

EQUIPMENT UNDER TEST
AUTHENTICATION SENSOR (READER)
Model SA108

Prepared by: Cherniavsky
Mrs. M. Cherniavsky, certif. engineer
Hermon Labs

Approved by: Mr. A. Usoskin
Mr. A. Usoskin, QA manager
Hermon Labs

Approved by: Dr. E. Usoskin
Dr. E. Usoskin, C.E.O.
Hermon Labs

Approved by: Amir Daskal
Mr. A. Daskal, VP hardware development
First Access Ltd.

Hermon Laboratories Ltd.
P.O.Box 23
Binyamina 30550, Israel
Tel.+972-6628-8001
Fax.+972-6628-8277
Email:hermon@Netvision.net.il





HERMON LABORATORIES

Test Report:FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

***This test report must not be reproduced
in any form except in full, with the approval
of Hermon Laboratories Ltd.***



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Description of equipment under test

Test items	Transceiver of an authentication system reader (sensor) FCC ID: OC8SA108
Manufacturer	First Access Ltd.
Brand Mark	First Access
Type (Model)	SA108

Applicant information

Applicant's representative & Responsible person	Mr. Amos Daskal, Vice President hardware development
Company	First Access Ltd.
Address	10 Markoni St.
P.O. Box	25084
Postal code	31253
City	Haifa
Country	Israel
Telephone number	011-972-4840-3322
Telefax number	011-972-4840-3399

Test performance

Project Number	13120, 13221
Location of the test	Hermon Laboratories, Binyamina, Israel
Test started	October 20, 1998
Test completed	December 22, 1998
Purpose of test	The EUT certification in accordance with CFR 47, part 2, §2.1033
Test specification(s)	FCC part 15 subpart C §15.231, §15.207, §15.209 subpart B, §15.107, §15.109

Through this report a point is used as the decimal separator and the thousands are counted with a comma.

This report is in conformity with EN 45001 and ISO GUIDE 25.

The test results relate only to the items tested.



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Table of Contents

1	GENERAL INFORMATION.....	5
1.1	ABBREVIATIONS AND ACRONYMS	5
1.2	SPECIFICATION REFERENCES	6
1.3	EUT DESCRIPTION	6
1.4	EUT TEST CONFIGURATION	7
1.5	STATEMENT OF MANUFACTURER	9
2	TEST FACILITY DESCRIPTION.....	10
2.1	GENERAL.....	10
2.2	EQUIPMENT CALIBRATION.....	10
2.2.1	<i>Uncertainty in Hermon Labs Measurements.</i>	10
2.3	LABORATORY PERSONNEL	11
2.4	STATEMENT OF QUALIFICATION	11
3	RADIATED EMISSION MEASUREMENTS.....	12
3.1	FIELD STRENGTH OF EMISSIONS ACCORDING TO § 15.231 (B)	12
3.1.1	<i>Specified limits at 3 m distance</i>	12
3.1.2	<i>Test Procedure and Results</i>	12
3.2	BANDWIDTH OF EMISSION ACCORDING TO § 15.231 (C)	19
3.2.1	<i>Specified Limits</i>	19
3.2.2	<i>Test Procedure and Results</i>	19
3.3	PERIODIC OPERATION REQUIREMENT §15.231(A)(1)	21
3.4	UNINTENTIONAL RADIATED EMISSIONS TEST ACCORDING TO §15.109, §15.209.....	22
3.4.1	<i>Definition of the test</i>	22
3.4.2	<i>The test set-up configuration</i>	22
3.5	CONDUCTED EMISSION MEASUREMENTS ACCORDING TO §15.107, §15.207	25
3.5.1	<i>Definition of the test</i>	25
3.5.2	<i>The test set-up configuration</i>	25
4	SUMMARY AND SIGNATURES.....	35
	APPENDIX A – TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS.....	36
	APPENDIX B-TEST EQUIPMENT CORRECTION FACTORS.....	37
	APPENDIX C- A2LA ACCREDITATION.....	40



HERMON LABORATORIES

1 General Information

1.1 Abbreviations and Acronyms

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

AC	alternating current
AVRG	average (detector)
BW	bandwidth
CE	conducted emissions
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μA)	decibel referred to one microampere
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
DC	direct current
EMC	Electromagnetic Compatibility
EUT	Equipment Under Test
GHz	gigahertz
H	height
HL	Hermon Laboratories
HP	Hewlett Packard
Hz	hertz
IF	intermediate frequency
IR	infra red
kHz	kilohertz
kV	kilovolt
L	length
LISN	Line Impedance Stabilization Network
m	meter
mm	millimeter
MHz	megahertz
msec	millisecond
NA	Not Applicable
NARTE	National Association of Radio and Telecommunications Engineers, Inc.
pF	picofarad
QP	quasi-peak (detector)
PC	personal computer
RBW	resolution bandwidth
RF	Radio Frequency
RE	radiated emission
RMS	root-mean-square
sec	second
V	volt
V/m	volt per meter
W	watt
USB	Universal Serial Bus



HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

1.2 Specification References

CFR 47 part 15: October 1997	Radio Frequency Devices.
ANSI C63.2:06/1987	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4:1992	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

1.3 EUT Description

The EUT, First Access Sensor, model SA108, is a part of hardware kit of vicinity authentication system. The EUT is an equivalent of the standard smart card reader. The sensor is connected via serial port (RS232) to the PC and is capable of:

- vicinity detection
- multiple-card identification
- card initialization.

Utilizing wireless technology, the sensor is able to detect the presence of a First Access Card over a distance of several meters. The SA108 sensor functions as a superheterodyne transceiver, operating at 433.92 MHz and controlled by a microcontroller. For cards initialization the sensor uses an infra red transmitter. The sensor can not perform the IR and RF functions together, it receipts the command from the PC.

The sensor uses two kinds of antenna:

- 1) helical antenna, soldered to the printed circuit board
- 2) the RS232 cable shielding, connected through the inductor to the ground.

The EUT is powered through the PC RS232 cable (12 V DC).

During the conducted emissions test the power supply was applied to the EUT

- 1) through PC RS232 cable
- 2) via adapter from the mains.





HERMON LABORATORIES

Test Report:FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

1.4 EUT Test Configuration

The EUT configuration and operation during the tests were defined by the customer. The equipment used throughout the testing is given in Table 1.1. The test configuration is shown in Figure 1.1.

Table 1.1
EUT Support Equipment

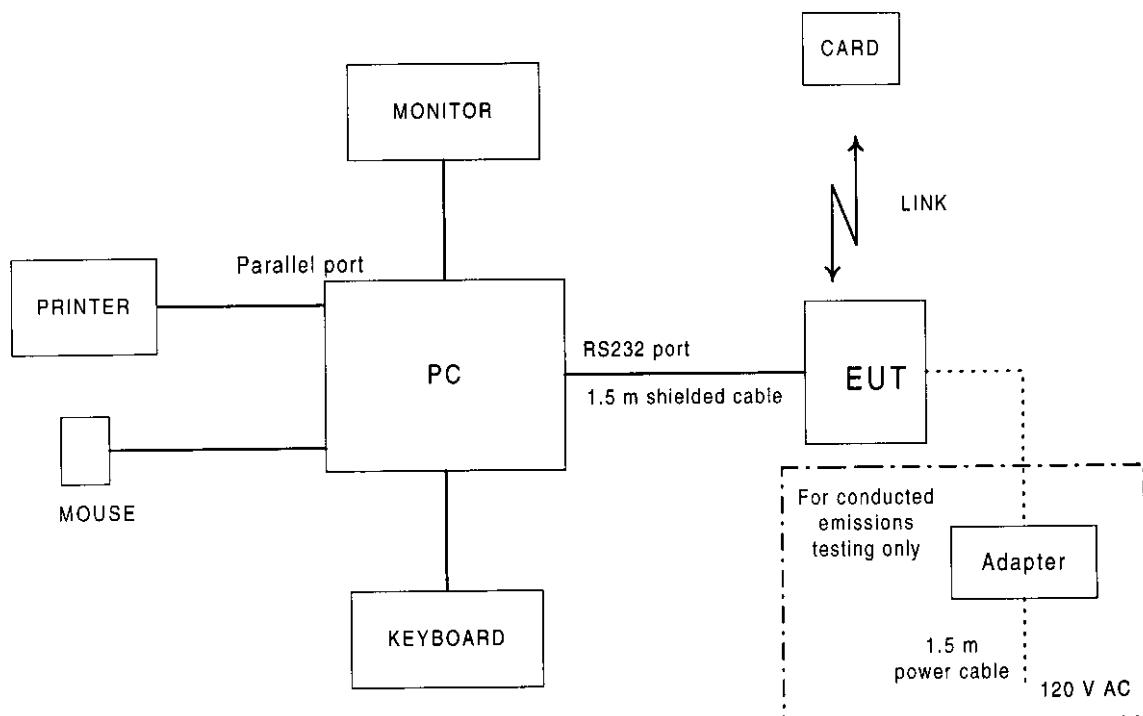
Description	Model number	Serial number	FCC ID Number
Computer Siemens Nixdorf	QK028799	7341	HSSSCENICM501
Monitor Siemens Nixdorf	MCM1503	BW397726	GWGPAXCAX14154
Keyboard Siemens Nixdorf	0482N404M	526381-K252- L188	N/A
Printer Epson LX-810	P805A	44B1127035	BKM9A8P805A
Mouse Microsoft	90741	03235314	C3KKMP3



HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

Figure 1.1
EUT Test Configuration





HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

1.5 Statement of Manufacturer

I, Amos Daskal, Vice President hardware development of First Access Ltd., declare that the SA108 sensor transciever, FCC ID:OC8SA108 was tested from October 20 to December 22, 1998 by Hermon Laboratories and which this test report applies to, is identical of the equipment that will be marketed.

The term identical means identical within the variations that can be expected to arise as a result of quantity production technique.

Amos Daskal, Vice President hardware development
First Access Ltd.

Signature: Amos Dask

Date: January 18, 1999

2 Test Facility Description

2.1 General

Tests were performed at Hermon Laboratories, which is a fully independent, private EMC, Safety and Telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47), listed by Industry Canada for radiated measurements (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), recognized by VDE (Germany) for witness test, certified by VCCI (Japan), assessed by NMI Certin B.V. (Netherlands) for a number of EMC, Telecommunications and Safety standards, recognized by TUV Sudwest (Germany) for Safety testing, and Accredited by AMTAC (UK) for safety of Medical Devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO GUIDE 25/EN 45001 for EMC, Telecommunications and Product Safety Information Technology Equipment (Certificate No. 839.01).

Address: PO Box 23, Binyamina 30550, Israel.
 Telephone: +972-6-628-8001
 Fax: +972-6-628-8277

Person for contact: Mr. Alex Usoskin, testing and QA manager.

2.2 Equipment Calibration

The test equipment has been calibrated according to its recommended procedures and is within the manufacturer's published limit of error. The standards and instruments used in the calibration system conform to the present requirements of MIL-STD-45662A.

The laboratory standards are calibrated by the third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements.

2.2.1 Uncertainty in Hermon Labs Measurements.

Conducted Emissions (95% Confidence)	<p>9 KHz to 150 KHz : ± 1.09 dB Combined standard uncertainty ± 2.18 dB Expanded uncertainty</p> <p>150 KHz to 30 MHz : ± 1.21 dB Combined standard uncertainty ± 2.42 dB Expanded uncertainty</p>
Radiated Emissions (95% Confidence)	<p>Biconical Antenna: 3m measuring distance : + 2.032 dB Combined standard uncertainty + 4.06 dB Expanded uncertainty - 1.99 dB Combined standard uncertainty - 3.98 dB Expanded uncertainty</p> <p>10m measuring distance : + 1.99 dB Combined standard uncertainty + 3.98 dB Expanded uncertainty - 2.04 dB Combined standard uncertainty - 4.08 dB Expanded uncertainty</p> <p>Log periodic Antenna: 3m measuring distance : + 2.37 dB Combined standard uncertainty + 4.74 dB Expanded uncertainty - 1.63 dB Combined standard uncertainty - 3.26 dB Expanded uncertainty</p> <p>10 m measuring distance : + 3.06 dB Expanded uncertainty + 1.53 dB Combined standard uncertainty - 3.00 dB Expanded uncertainty - 1.50 dB Combined standard uncertainty</p>



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

2.3 Laboratory Personnel

The three people of Hermon Laboratories that have participated in measurements and documentation preparation are: Dr. Edward Usoskin - C.E.O., Mr. Michael Feldman, test technician, and Mrs. Marina Cherniavsky - certification engineer.

Dr. E. Usoskin is an EMC specialist and M. Cherniavsky is a telecommunication engineer certified by the National Association of Radio and Telecommunications Engineers (NARTE, USA.).

The Hermon Laboratories' personnel that participated in this project have more than 90 years combined experience time in EMC measurements and electronic products design.

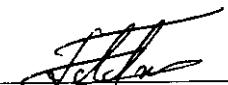
2.4 Statement of Qualification

The test measurement data supplied in this test measurement report having been received by me, is hereby duly certified. The following is a statement of my qualifications: I am a technician, have obtained 30 years experience in electronics and measurements. I have been with Hermon Laboratories since 1995.

Name: Mr. Michael Feldman
Position: test technician

Signature:

Date:


January 10, 1999

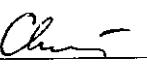
I hereby certify that this test measurement report was prepared by me and is hereby duly certified. The following is a statement of my qualifications.

I am an engineer, graduated from University in 1971, with an MScEE degree, have obtained 26 years experience in electronic products design and development and have been with Hermon Laboratories since 1991. Also, I am a Telecommunication Class II engineer certified by the National Association of Radio and Telecommunications Engineers, Inc. (USA.), the certificate no. is E2-03410.

Name: Mrs. Marina Cherniavsky
Position: certif. engineer

Signature:

Date:


January 10, 1999

I hereby certify that this test measurement report was prepared under my direction and that to the best of my knowledge and belief, the facts set in the report and accompanying technical data are true and correct.

The following is a statement of my qualifications.

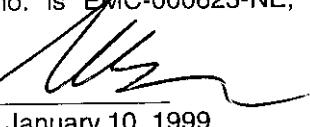
I have a Ph.D. degree in electronics, have obtained more than 42 years of experience in EMC measurements and electronic product design and have been with Hermon Laboratories since 1986.

Also, I am an EMC engineer certified by the National Association of Radio and Telecommunications Engineers, Inc. (USA). The certificate no. is EMC-000623-NE, Senior Member.

Name: Dr. Edward Usoskin
Position: General Manager

Signature:

Date:


January 10, 1999



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

3 Emission Measurements

3.1 Field Strength of Emissions according to § 15.231 (b)

3.1.1 Specified limits at 3 m distance

Fundamental Frequency MHz	Field Strength of Fundamental dB (μ V/m)	Field Strength of Spurious Emissions dB (μ V/m)
260 - 470	71.5 to 82*	51.5 to 62*
above 470	82	62

* - Linear interpolations

3.1.2 Test Procedure and Results

The test was performed in the Hermon Labs anechoic chamber at 3 meter test distance, i.e. the distance between measuring antenna and EUT boundary.

The EUT was placed on the wooden turntable, as shown in Figure 3.1, Photographs 3.1.1 and 3.1.2. The EUT was operated in continuous transmitting mode during the testing. The frequency range from 30 MHz up to 10th harmonic was investigated.

Biconilog and Double Ridged Guide antennas were used. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

The peak and quasi-peak detectors (resolution bandwidth 120 kHz) were used at frequencies below 1 GHz. Above 1 GHz the peak detector with resolution bandwidth (IF BW) = 1 MHz and video bandwidth (AVR BW) = 1 MHz was used.

The test results were recorded into Table 3.1 and are shown in Plots 3.1.1, 3.1.2.

Reference numbers of test equipment used

HL 0041	HL 0181	HL 0275	HL 0465	HL 0507	HL 0521	HL 0593
HL 0594	HL 0604	HL 0815	HL 0816			

Full description is given in Appendix A.



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Table 3.1

**Radiated Emission Measurements - Test Results
(Field strength of fundamental frequency)**

TEST SPECIFICATION: FCC part 15 subpart C § 15.231
COMPANY: First Access Ltd.
EUT: SA108 transciever
DATE: December 20, 1998
RELATIVE HUMIDITY: 50%
AMBIENT TEMPERATURE: 20°C

MEASUREMENTS PERFORMED AT 3 METRES DISTANCE

Frequency (MHz)	Resolution Bandwidth	Ant. Type.	Measured Result dB (μ V)	Average Factor dB	Radiated Emissions dB (μ V/m)	Spec. Limit dB (μ V/m)	Spec. Margin dB	Pass/ Fail
433.92	120 kHz	BL	83.9	-28	55.9	80.8	24.9	Pass
867.8	120 kHz	BL	47.0	-28	19.0	62.0	43.0	Pass

Notes to table:

Peak detector was used.

Antenna polarization = horizontal.

Radiated Emission dB(μ V/m) = Measured Results {dB(μ V)} + Average Factor (dB).

Average Factor = $20 \log (4/100) = -28$, where 4 msec is transmitting time of each 100 msec (refer to Plot 3.1.2)

Specified Limit in accordance with § 15.231(b)

Table abbreviations:

Ant. Type - = Antenna type (BL -biconilog).

Spec. Margin = Specification Margins = dB below (negative if above) specification limit.

Test Performed by:

Mr. Michael Feldman, test technician

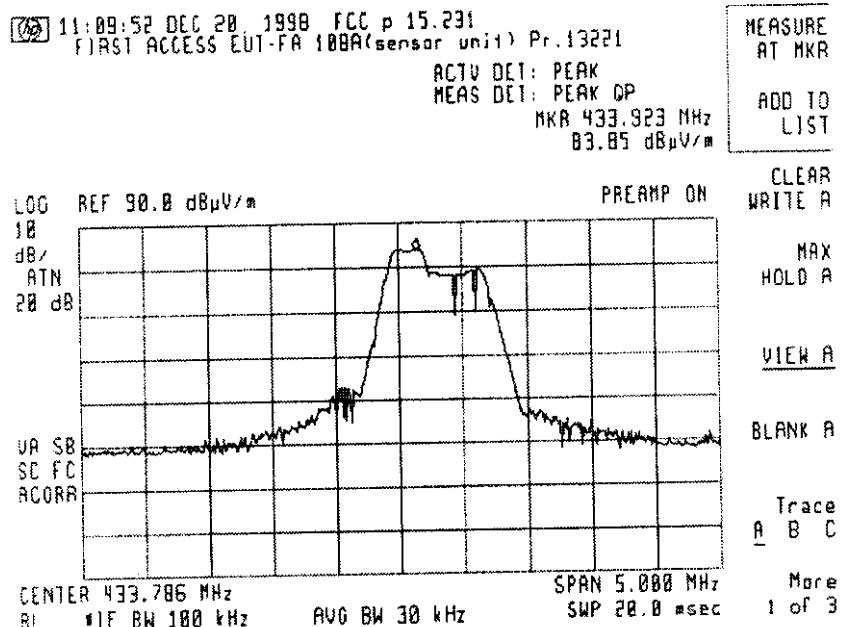
Hermon Labs



HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

Plot 3.1.1
Radiated Emission Measurement Results





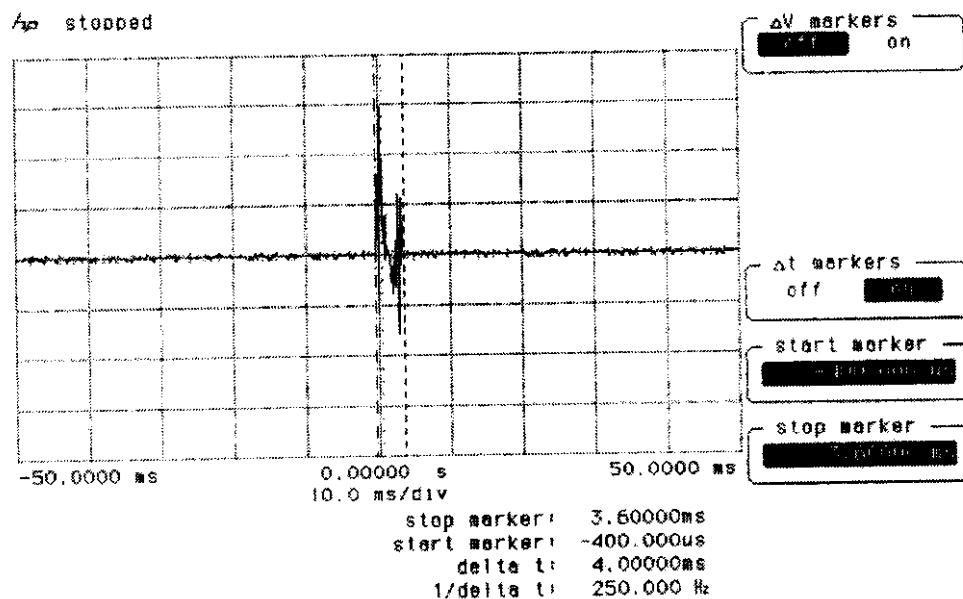
HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Plot 3.1.2
Average Factor Measurement

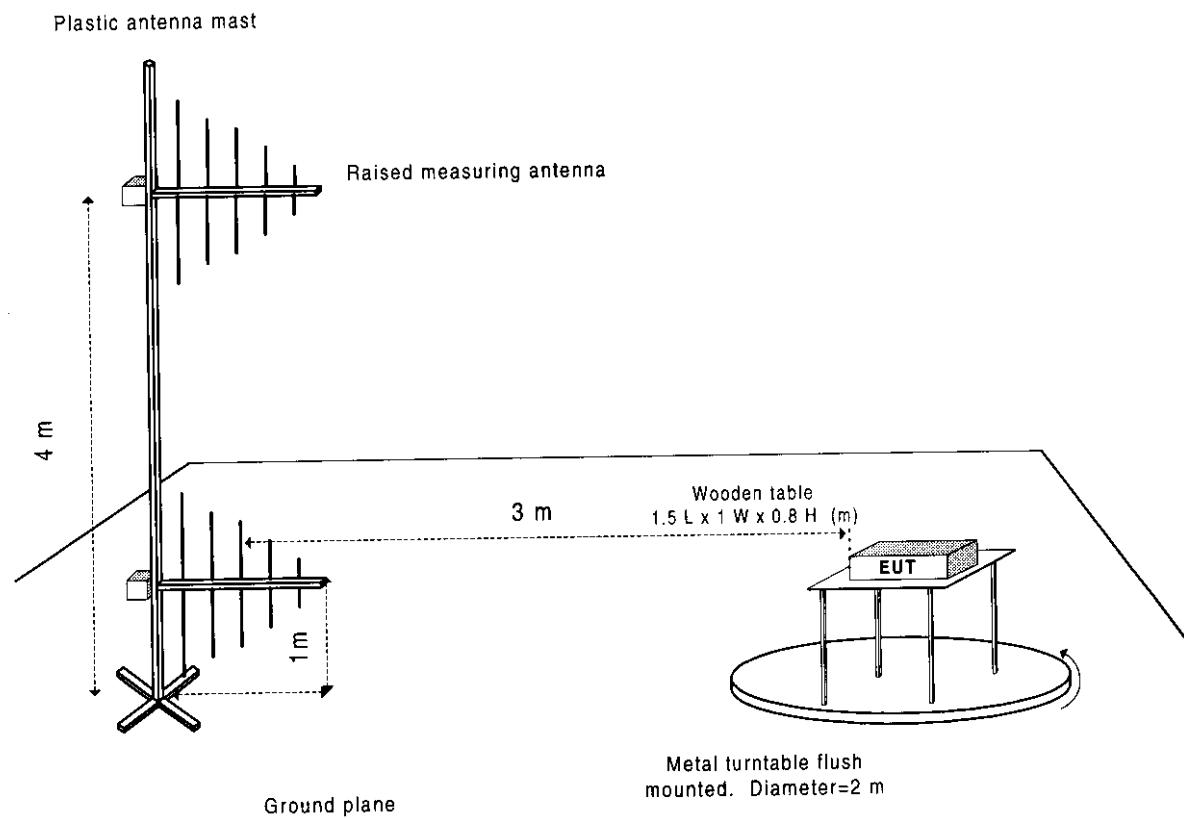




HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

Figure 3.1
Radiated Emission Test Setup





HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

3.2 Bandwidth of Emission according to § 15.231 (c)

3.2.1 Specified Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

3.2.2 Test Procedure and Results

The maximum allowed occupied bandwidth was calculated as 0.0025 of the center frequency:

$$0.0025 \times 433.92 \text{ MHz} = 1.085 \text{ MHz}$$

The spectrum trace data around transmitter fundamental frequency was obtained with the Spectrum Analyzer in "Max Hold" mode. The bandwidth value was determined between two points 20 dB down from the center frequency. The occupied bandwidth of 0.975 MHz was measured which is narrower than required 1.085 MHz.

The test results are shown in Plot 3.2.1.

Reference numbers of test equipment used

HL 0275	HL 0521	HL 0593	HL 0594	HL 0604		
---------	---------	---------	---------	---------	--	--

Full description is given in Appendix A.



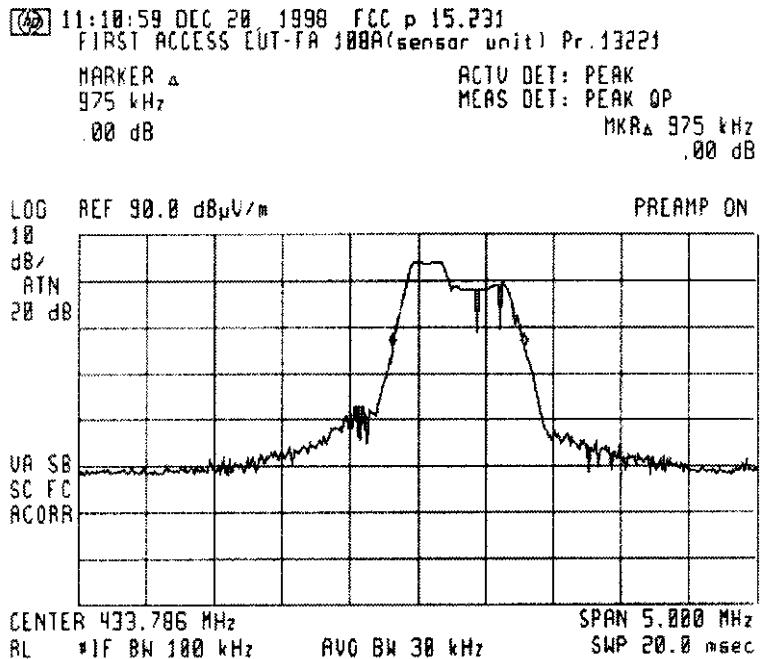
HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Plot 3.2.1
Emission Bandwidth Measurement Results
Occupied bandwidth = 975 kHz





HERMON LABORATORIES

Test Report:FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

CONFIDENTIAL

3.3 Periodic Operation Requirement §15.231(a)(1)

The card issues periodic announcements of its identity. These signals consist of six bytes, including an indication that the message is an identity announcement, the card identity number, secure validation of this identity, and error detection codes. Messages other than identity announcements between the card and the sensor will be of variable length. The maximum message length will be 128 bytes. These announcements are spaced on average 1.75 seconds apart. The interval is varied randomly from 1.5 to 2 seconds to prevent repeated overlap collisions between the announcements sent by different cards.

Every transmission is for duration of 1 to 30 milliseconds (this meets the requirement of the FCC that the transmission ceases within five seconds after the initiation).

In its usual state the sensor is quiet and listening. It will receive card identity announcements and other messages and forward these to the host.

listening and message loaded for card

A card is attentive to RF for only a brief period following its announcement. When the host wishes to address a message to a particular card it loads the sensor with this message, along with the identity of the card (addressee). The sensor then waits for this card to announce itself and consequently transmits the message. The sensor then returns to its listening state.

While the sensor has a message loaded it will remain listening, forwarding any messages it receives to the host.

command response

An exchange with a card may be initiated by triggering a message loaded for that card. This exchange may last for up to 3 back and forth messages (3 messages each for sensor and card). Whether an exchange takes place depends on the context of the transaction being executed between the card and the host. The host will request the sensor to send a message immediately when it is engaging in an exchange of messages with a card. From the point of view of the sensor, it enters its listening state after sending its loaded message, and from this state will send messages when requested to by the host.



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

3.4 Unintentional Radiated emissions test according to §15.109, §15.209

3.4.1 Definition of the test

This test was performed to measure radiated emissions from the receiver portion and incorporated digital device of the EUT and also to verify the EUT full compliance with §15.109, §15.209.

3.4.2 The test set-up configuration

The radiated emissions measurements of the EUT incorporated digital device and the receiver portion were performed in the anechoic chamber at 3 meters measuring distance in the frequency range from 30 MHz to 2 GHz. The EUT was powered through PC RS232 cable or via adapter and placed on the wooden table as shown in Figure 3.1 and Photographs 3.1.1, 3.1.2. The biconilog antenna was used. To find maximum radiation the turntable was rotated 360°, the cables position was varied, the measuring antenna height changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

The measurements from 30 MHz to 1 GHz were performed with the EMI receiver settings: RBW=120 kHz, quasi-peak detector.

The results of measurements were recorded into Table 3.4.1 and shown in Plot 3.4.1.

The receiver radiated emissions measurements from 1 GHz up to 2 GHz were performed with the spectrum analyzer settings: RBW = VBW = 1 MHz, peak detector.

All the found emissions were at least 20 dB below limit.

Reference numbers of test equipment used

HL 0041	HL 0275	HL 0287	HL 0465	HL 0521	HL 0593	HL 0594
HL 0604						

Full description is given in Appendix A.



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Table 3.4.1
Radiated Emission Measurements Test Results
frequency range 30 MHz - 1 GHz

TEST SPECIFICATION: FCC part 15 subpart B § 15.109, 15.209
COMPANY: First Access Ltd.
EUT: SA108 transciever
DATE: December 22, 1998
Relative Humidity: 48%
Ambient Temperature: 21°C

MEASUREMENTS PERFORMED AT 3 METRES DISTANCE

Frequency (MHz)	Radiated Emissions dB (μ V/m)	Spec. Limit dB (μ V/m)	Spec. Margin dB	Pass/ Fail
39.322	24.58	40.0	15.42	Pass
67.724	31.55	40.0	8.45	Pass
108.562	31.39	43.5	12.11	Pass
423.215	34.40	46	11.60	Pass
423.218	30.57	46	15.43	Pass

Notes to table calculations:

The worst test results were obtained during measurements with biconilog antenna in vertical polarization and quasi-peak detector.

Resolution bandwidth = 120 kHz

Spec. Margin = Specification Margins = dB below (negative if above) specification limit.

Test Performed by:
Mr. Michael Feldman, test technician

Hermon Labs



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

Plot 3.4.1 Radiated Emission Measurement Results

09:14:36 DEC 22, 1998
FIRST ACCESS CUT-F108 A Pr. 13221

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 423.0 MHz
29.43 dB μ V/m

MEASURE
AT MKR

ADD TO
LIST

CLEAR
WRITE A

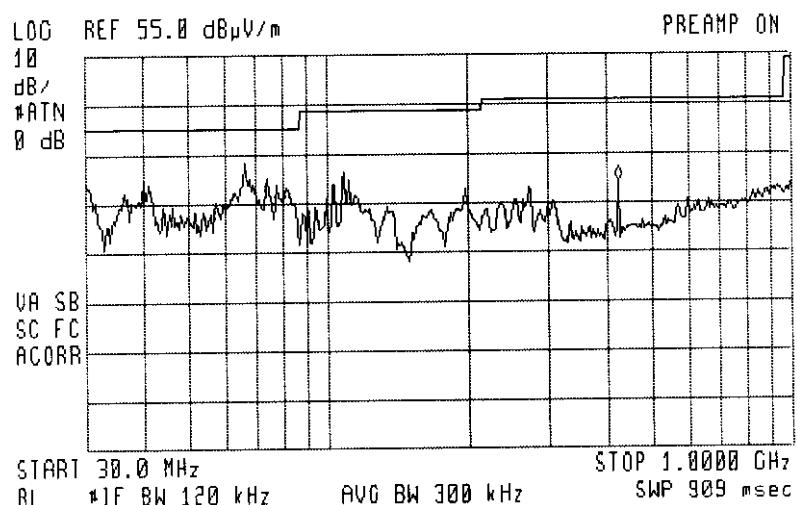
MAX
HOLD A

VIEW A

BLANK A

Trace
A B C

More
1 of 3



Project number: 13130-13231

Page 24 of 41

111



HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

3.5 Conducted Emission Measurements according to §15.107, §15.207

3.5.1 Definition of the test

This test was performed to measure conducted emissions.

3.5.2 The test set-up configuration

The test was performed in the shielded room. The EUT was setup as shown in Figure 3.5.1 and Photographs 3.5.1 to 3.5.3 (powered through PC RS232 cable or via adapter).

The frequency range from 450 kHz to 30 MHz was investigated.

The measurements were performed on the 120 V AC power lines (both neutral and phase) by means of the LISN, connected to the spectrum analyzer. The unused 50 Ω connector of the LISN was resistively terminated in 50 Ω when not connected to the measuring instrument. The position of the EUT cables was varied to determine maximum emission level. The quasi-peak detector (resolution bandwidth = 9 kHz) was used. The test results were recorded in Tables 3.5.1, 3.5.2 and are shown in Plots 3.5.1 to 3.5.3.

Reference numbers of test equipment used

HL 0163	HL 0185	HL 0466	HL 0521	HL 0817		
---------	---------	---------	---------	---------	--	--

Full description is given in Appendix A.



HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Table 3.5.1

Conducted emission measurements on EUT power lines (EUT powered from PC)

Frequency range : 450 kHz - 30 MHz

Detector : quasi peak

TEST SPECIFICATION: FCC part 15 subpart B Class B
COMPANY: First Access Ltd.
EUT: SA108 sensor
DATE: November 2, 1998
RELATIVE HUMIDITY: 50%
AMBIENT TEMPERATURE: 21°C

Frequency MHz	Line ID	Measured Conducted Emissions dB (μ V)	Spec. Limit dB (μ V)	Spec. Limit Margins dB	Pass / Fail
0.474	Ph	33.70	48	14.30	Pass
9.933	N	35.83	48	12.17	Pass
12.709	Ph	34.06	48	13.94	Pass
13.402	N	33.64	48	14.36	Pass
23.651	Ph	31.76	48	16.24	Pass

Test parameters:

Detector type = QP (quasi peak).

Resolution bandwidth = 9 kHz.

Table calculations and abbreviations:

Conducted emission = EMI meter reading ($\text{dB}\mu\text{V}$) + Cable Loss (dB) + LISN correction factor (dB). (For LISN correction factor refer to Appendix B).

Spec. limit = specification limit.

Spec. margin = dB below (negative if above) specification limit.

Line ID = Line Identification (Ph - phase, N - neutral).

Test performed by:

Mr. Michael Feldman, test technician



Hermon Labs



HER MON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Table 3.5.2

Conducted emission measurements on EUT power lines (EUT powered from mains via AC/DC adapter)

Frequency range : 450 kHz - 30 MHz

Detector : quasi peak

TEST SPECIFICATION: FCC part 15 subpart B Class B
COMPANY: First Access Ltd.
EUT: SA108 sensor
DATE: November 2, 1998
RELATIVE HUMIDITY: 50%
AMBIENT TEMPERATURE: 21°C

Frequency MHz	Line ID	Measured Conducted Emissions dB (μ V)	Spec. Limit dB (μ V)	Spec. Limit Margins dB	Pass / Fail
19.488	Ph	30.61	48	17.39	Pass
20.371	N	30.11	48	17.89	Pass

Test parameters:

Detector type = QP (quasi peak).

Resolution bandwidth = 9 kHz.

Table calculations and abbreviations:

Conducted emission = EMI meter reading ($\text{dB}\mu\text{V}$) + Cable Loss (dB) + LISN correction factor (dB). (For LISN correction factor refer to Appendix B).

Spec. limit = specification limit.

Spec. margin = dB below (negative if above) specification limit.

Line ID = Line Identification (Ph - phase, N - neutral).

Test performed by:

Mr. Michael Feldman, test technician

Hermon Labs



HERMON LABORATORIES

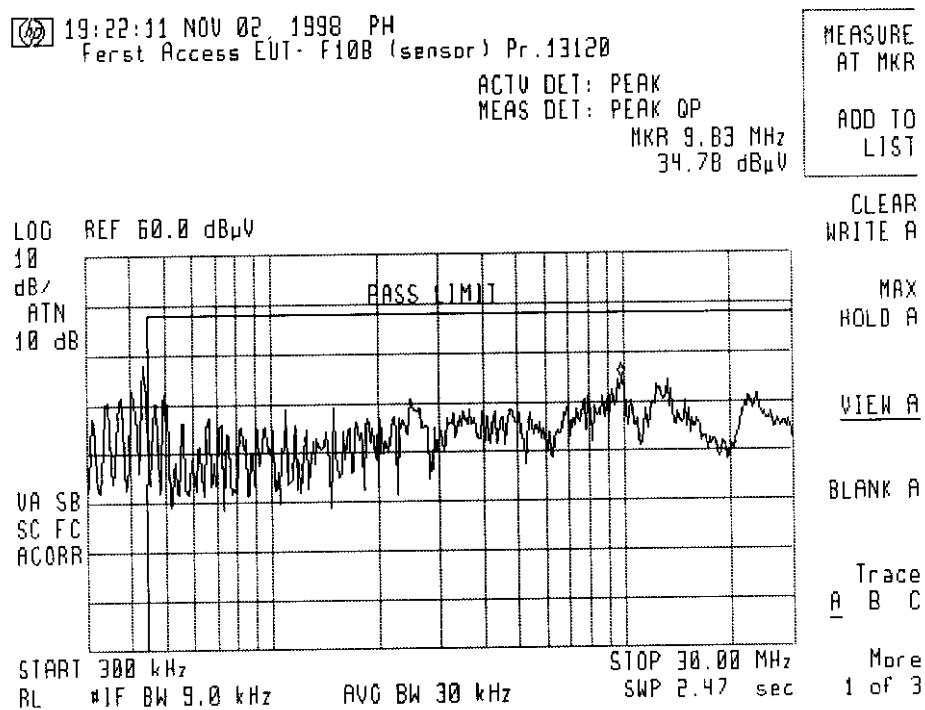
Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Plot 3.5.1

Test Specification: § 15.107, § 15.207
Conducted Emission Measurements on PC power line
Frequency range: 450 kHz-30 MHz
Line: phase
Detector: peak





HERMON LABORATORIES

Test Report:FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

Plot 3.5.2

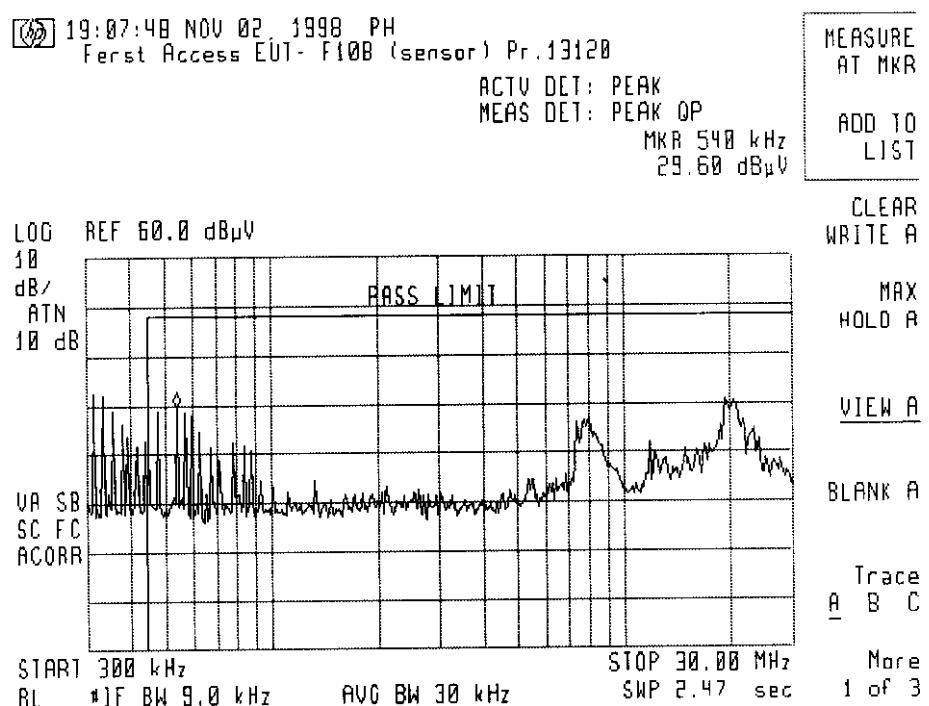
Test Specification: § 15.107, § 15.207

Conducted Emission Measurements on adapter power line

Frequency range: 450 kHz-30 MHz

Line: phase

Detector: quasi-peak





HERMON LABORATORIES

Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

Plot 3.5.3

Test Specification: § 15.107, § 15.207
Conducted Emission Measurements on adapter power line
Frequency range: 450 kHz-30 MHz
Line: neutral
Detector: quasi-peak

19:01:20 NOV 02, 1998 N
First Access EUT- F10B (sensor) Pr.13120

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 19.54 MHz
32.92 dBuV

MEASURE
AT MKR

ADD TO
LIST

CLEAR
WRITE A

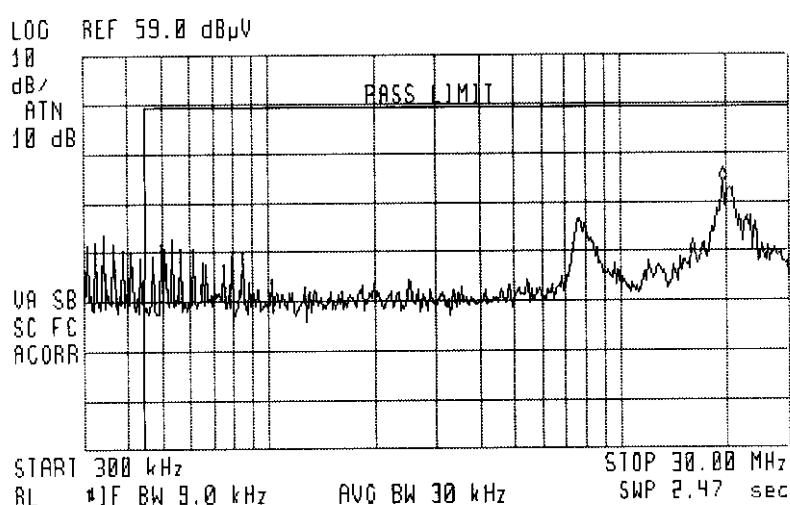
MAX
HOLD A

VIEW A

BLANK A

Traces
A B C

More
1 of 3



~~100~~
- Schlo



HERMON LABORATORIES

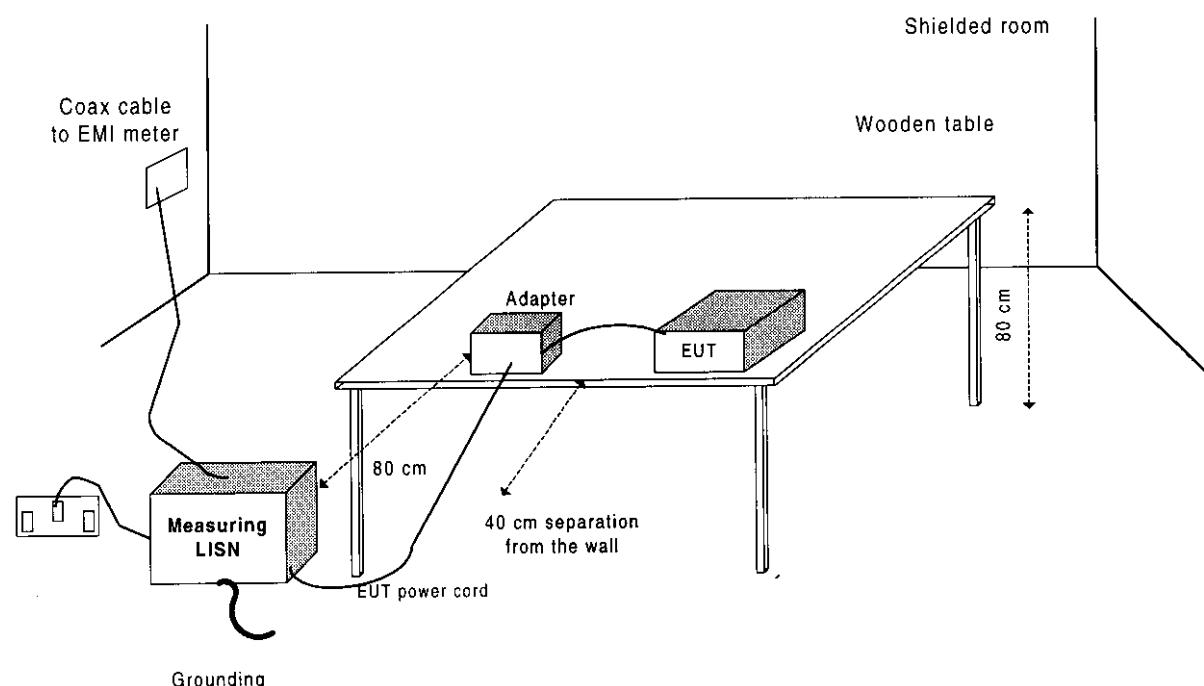
Test Report: FAFCC.13120_1

Date: January, 1999

FCC ID: OC8SA108

Figure 3.5.1

Conducted Emission Test Setup





HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

4 Summary and Signatures

The SA108 sensor transceiver, FCC ID:OC8SA108 was found to be in compliance with the requirements of FCC part 15 subpart C §§ 15.231, 15.207, 15.209 and subpart B §§ 15.107, 15.109.

Test performed by:

Mr. Michael Feldman, test technician

Approved by:

Dr. Edward Usoskin, C.E.O.

Responsible Person from First Access Ltd.

Mr. Amos Daskal, VP hardware development



HERMON LABORATORIES

Test Report: FAFCC.13120_1
Date: January, 1999
FCC ID: OC8SA108

APPENDIX A – Test equipment and ancillaries used for tests

HL Serial No.	Serial No.	Description	Manufacturer	Model No.	Due Calibr.
0041	2811	Double Ridged Guide Antenna, 1-18 GHz	Electro-Metrics	RGA 50/60	8/99
0163	1314	LISN, 9 kHz-100 MHz	Electro-Metrics	ANS-25/2	4/99
0181	3950	Oscilloscope, Digitizing, 100 MHz	Hewlett Packard	54501A	11/99
0185	1765	Graphics Plotter	Hewlett Packard	7475A	NA
0275	040	Table non-metallic, 1.5 x 1.0 x 0.8 m	Hermon Labs	WT-1	3/99 Check
0465	023	Anechoic Chamber 9 (L) x 6.5 (W) x 5.5 (H) m	Hermon Labs	AC-1	10/99
0466	024	Shielded Room 3 (L) x 3 (W) x 2.4 (H) m	Hermon Labs	SR-1	5/99 Check
0507	0162	Spectrum Analyzer, 9 kHz - 1.8 GHz	Hewlett Packard	8591A	4/99
0521	0319	Spectrum Analyzer with RF filter section (EMI Receiver 9 kHz – 6.5 GHz)	Hewlett Packard	8546A	7/99
0593	101	Antenna Mast, 1-4 m/ 1-6 m, pneumatic	Hermon Labs	AM-F1	4/99 Check
0594	102	Turntable for Anechoic Chamber, flush mounted, d=1.2 m, pneumatic	Hermon Labs	WDC1	11/99
0604	1011	Antenna Log-Periodic/T Bow-Tie, 26 – 2000 MHz	EMCO	3141	12/99
0815	151	Cable, coax, RG-214, 7.3 m, N-type connectors, inside anechoic chamber	Hermon Labs	C214-7	8/99
0816	152	Cable, coax, RG-214, 8 m, N-type connectors, outside anechoic chamber	Hermon Labs	C214-8	8/99
0817	153	Cable, coax, RG-58, 8 m, N-type connectors	Hermon Labs	C58-8	8/99

APPENDIX B-Test Equipment Correction Factors

Correction Factor
Line Impedance Stabilization Network
Model ANS-25/2
Electro-Metrics

Frequency, kHz	Correction Factor
10	4.9
15	2.86
20	1.83
25	1.25
30	0.91
35	0.69
40	0.53
50	0.35
60	0.25
70	0.18
80	0.14
90	0.11
100	0.09
125	0.06
150	0.04

The correction factor dB is to be added to the meter readings (dB/ μ V) of the interference analyzer or spectrum analyzer.



HERMON LABORATORIES

Test Report:FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

Antenna Factor at 3m calibration
Biconilog Antenna EMCO Model 3141
Ser.No.1011

Frequency, MHz	Antenna Factor, dB(1/m)
26	7.8
28	7.8
30	7.8
40	7.2
60	7.1
70	8.5
80	9.4
90	9.8
100	9.7
110	9.3
120	8.8
130	8.7
140	9.2
150	9.8
160	10.2
170	10.4
180	10.4
190	10.3
200	10.6
220	11.6
240	12.4
260	12.8
280	13.7
300	14.7
320	15.2
340	15.4
360	16.1
380	16.4
400	16.6
420	16.7
440	17.0
460	17.7
480	18.1
500	18.5
520	19.1
540	19.5
560	19.8
580	20.6
600	21.3
620	21.5
640	21.2
660	21.4
680	21.9
700	22.2
720	22.2
740	22.1
760	22.3
780	22.6
800	22.7
820	22.9
840	23.1
860	23.4
880	23.8
900	24.1
920	24.1

Frequency, MHz	Antenna Factor, dB(1/m)
940	24.0
960	24.1
980	24.5
1000	24.9
1020	25.0
1040	25.2
1060	25.4
1080	25.6
1100	25.7
1120	26.0
1140	26.4
1160	27.0
1180	27.0
1200	26.7
1220	26.5
1240	26.5
1260	26.5
1280	26.6
1300	27.0
1320	27.8
1340	28.3
1360	28.2
1380	27.9
1400	27.9
1420	27.9
1440	27.8
1460	27.8
1480	28.0
1500	28.5
1520	28.9
1540	29.6
1560	29.8
1580	29.6
1600	29.5
1620	29.3
1640	29.2
1660	29.4
1680	29.6
1700	29.8
1720	30.3
1740	30.8
1760	31.1
1780	31.0
1800	30.9
1820	30.7
1840	30.6
1860	30.6
1880	30.6
1900	30.6
1920	30.7
1940	30.9
1960	31.2
1980	31.6
2000	32.0

Antenna factor is to be added to receiver meter reading in dB(μ V) to convert to field intensity in dB(μ V/meter).

Antenna Factor
Double Ridged Guide Antenna
Electro-Metrics, Model RGA-50/60
Ser.No.2811

Frequency, MHz	Antenna Factor, dB(1/m)
1000	24.3
1500	25.4
2000	28.4
2500	29.2
3000	30.5
3500	31.6
4000	33.7
4500	32.2
5000	34.5
5500	34.5
6000	34.6
6500	35.3
7000	35.5
7500	35.9
8000	36.6
8500	37.3
9000	37.7
9500	37.7
10,000	38.2
10,500	38.5
11,000	39.0
11,500	40.1
12,000	40.2
12,500	39.3
13,000	39.9
13,500	40.6
14,000	41.1
14,500	40.5
15,000	39.9
15,500	37.8
16,000	39.1
16,500	41.1
17,000	41.7
17,500	45.1
18,000	44.3

Antenna factor dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/meter)



HERMON LABORATORIES

Test Report:FAFCC.13120_1

Date: January, 1999

FCC ID:OC8SA108

APPENDIX C- A2LA Accreditation

