FCC requirements § 2.1033 (b)(6)

TEST MEASUREMENT REPORT

Contains 33 pages and follows this page.

ELECTROMAGNETIC EMISSIONS TEST REPORT

ACCORDING TO FCC PART 15, SUBPART C, §15.231

FOR

FIRST ACCESS Ltd.

EQUIPMENT UNDER TEST

AUTHENTICATION CARD

Model CA108

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

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

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

Approved by: _____
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

ACCREDITED
839.01

Description of equipment under test

Test items	Transceiver of an authentication system card FCC ID:OC8CA108
Manufacturer	First Access Ltd.
Brand Mark	First Access
Type (Model)	CA108

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
Location of the test	Hermon Laboratories, Binyamina, Israel
Test started	October 29, 1998
Test completed	November 11, 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, §15.209 subpart B, §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.

Table of Contents

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

1.2 Specification References

CFR 47 part 15: October 1997	Radio Frequency Devices.
ANSI C63.2:06/1987	American National Standard for Instrumantation-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 Card, model CA108, is a part of hardware kit of vicinity authentication system. The EUT is a vicinity smart card communicating with a sensor (reader) from a distance of several meters. The sensor is connected to the PC. The CA108 card 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 and the card has an infra red detector. The card has a helical antenna, soldered to the printed circuit board.
The EUT is powered by 3 V internal battery.

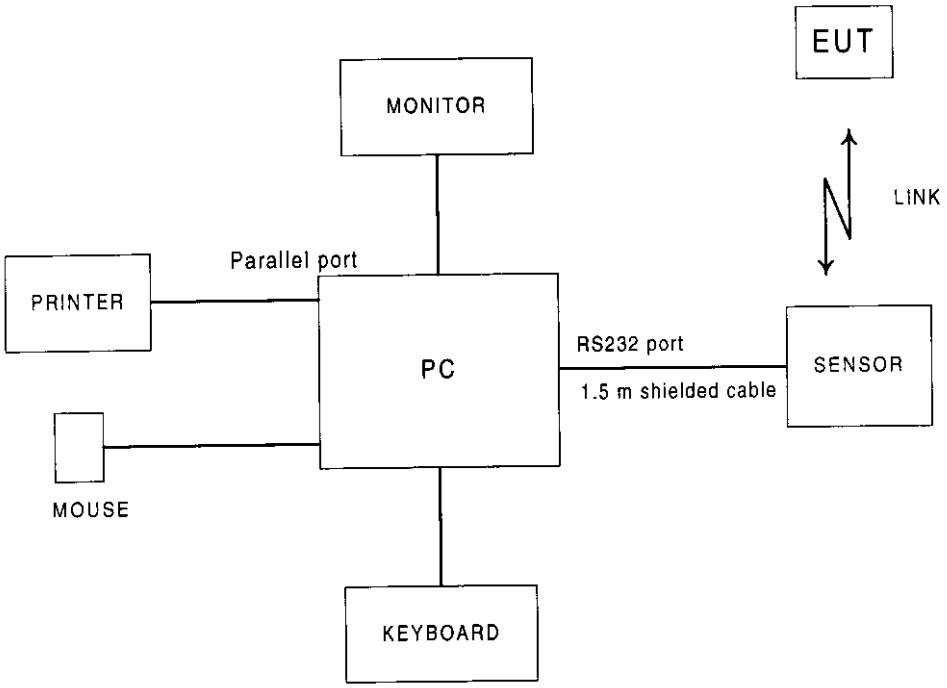
1.4 EUT Test Configuration

The equipment used throughout the testing is given in Table 1.1.The test configuration is shown in Figure 1.1.

Table 1.1
Test 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

Figure 1.1
EUT Test Configuration



1.5 Statement of Manufacturer

I, Amos Daskal, Vice President hardware development of First Access Ltd., declare that the CA108 card transciever, FCC ID:OC8CA108 was tested from October 29 to November 11, 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)	9 KHz to 150 KHz : ± 1.09 dB Combined standard uncertainty ± 2.18 dB Expanded uncertainty 150 KHz to 30 MHz : ± 1.21 dB Combined standard uncertainty ±2.42 dB Expanded uncertainty
Radiated Emissions (95% Confidence)	Biconical Antenna: 3 m measuring distance : + 2.032 dB Combined standard uncertainty + 4.06 dB Expanded uncertainty - 1.99 dB Combined standard uncertainty - 3.98 dB Expanded uncertainty 10 m measuring distance : + 1.99 dB Combined standard uncertainty + 3.98 dB Expanded uncertainty - 2.04 dB Combined standard uncertainty - 4.08 dB Expanded uncertainty Log periodic Antenna: 3 m measuring distance : + 2.37 dB Combined standard uncertainty + 4.74 dB Expanded uncertainty - 1.63 dB Combined standard uncertainty - 3.26 dB Expanded uncertainty 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

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 Signature:
Position: test technician Date: January 12, 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 Signature
Position: certif. engineer Date: January 12, 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 Signature:
Position: General Manager Date: January 12, 1999

3 Radiated 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 (μV/m)	Field Strength of Spurious Emissions dB (μV/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^{o}, 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 was used.
The test results were recorded into Table 3.1 and are shown in Plots 3.1.1 to 3.1.5.

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.

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:	CA108 transciever
DATE:	October 29, November 10, 1998
RELATIVE HUMIDITY:	50%
AMBIENT TEMPERATURE:	20°C

MEASUREMENTS PERFORMED AT 3 METRES DISTANCE

Frequency (MHz)	Resolution Bandwidth	Ant. Type.	Measured Result dB (μV)	Average Factor dB	Radiated Emissions dB (μV/m)	Spec. Limit dB (μV/m)	Spec. Margin dB	Pass/ Fail
433.92	120 kHz	BL	73.1	-28	45.1	80.8	35.7	Pass
867.83	120 kHz	BL	53.8	-28	25.8	62.0	36.2	Pass
1301.74	1 MHz	BL	44.2	-28	16.2	62.0	45.8	Pass

Notes to table:

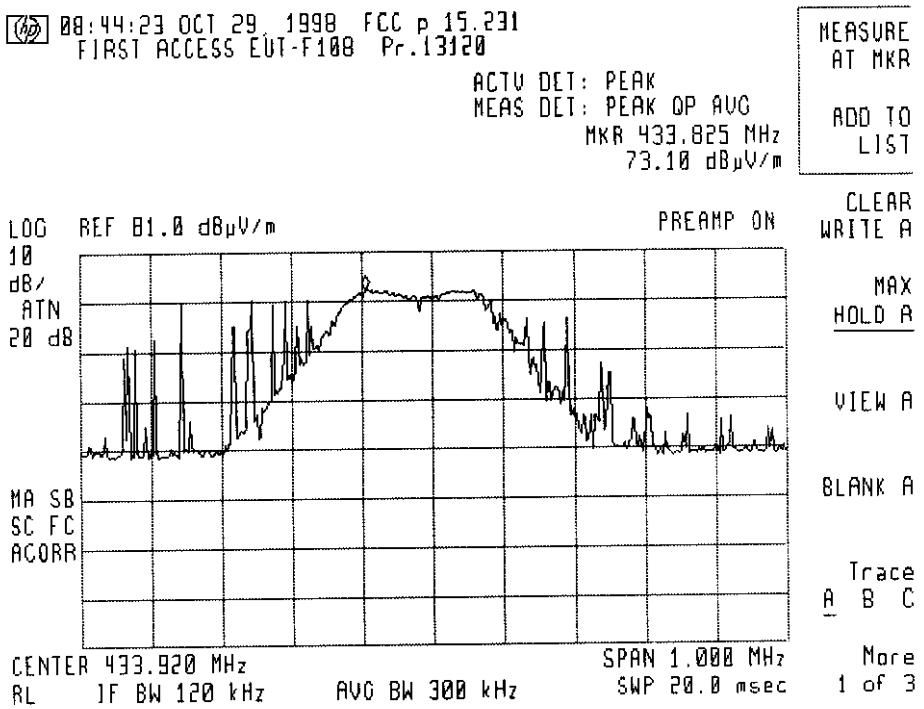
Peak detector was used.
Antenna polarization = horizontal.
Radiated Emission dB(μV/m) = Measured Results {dB(μV)} + Average Factor (dB).
Average Factor = 20 log (4/100) = -28, where 4 msec is transmitting time of each 100 msec (refer to Plot 3.1.5)
Specified Limit in accordance with § 15.231(b)

Table abbreviations:
Ant. Type - = Antenna type (BL -biconilog).
Spec. Margin = Specification Margins = dB below (negative if above) specification limit.

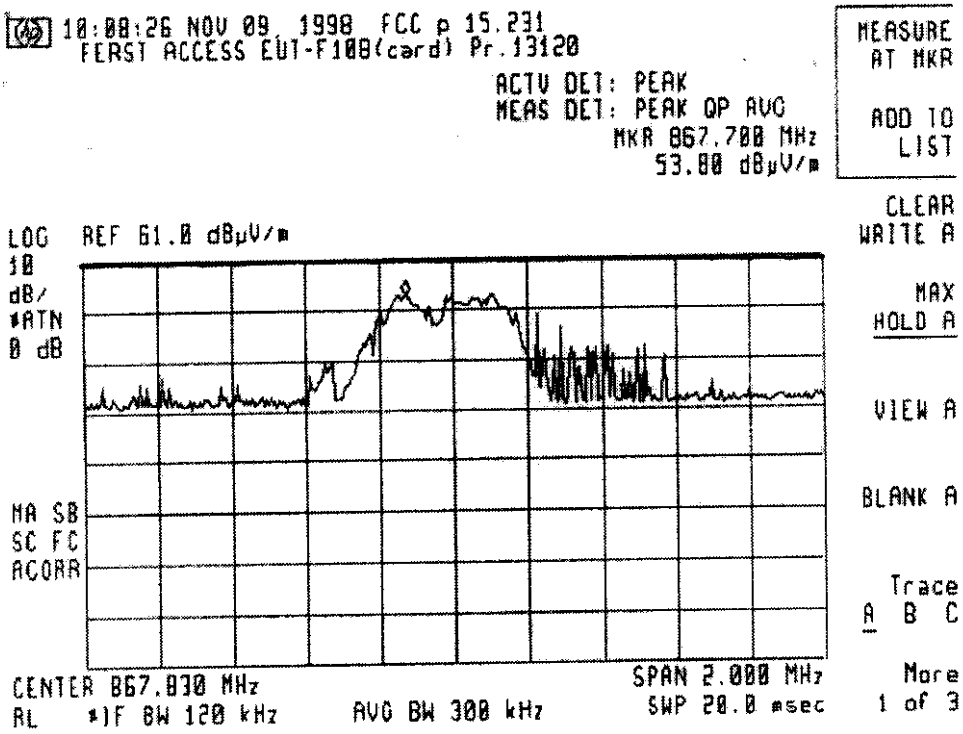
Test Performed by:
Mr. Michael Feldman, test technician

Hermon Labs

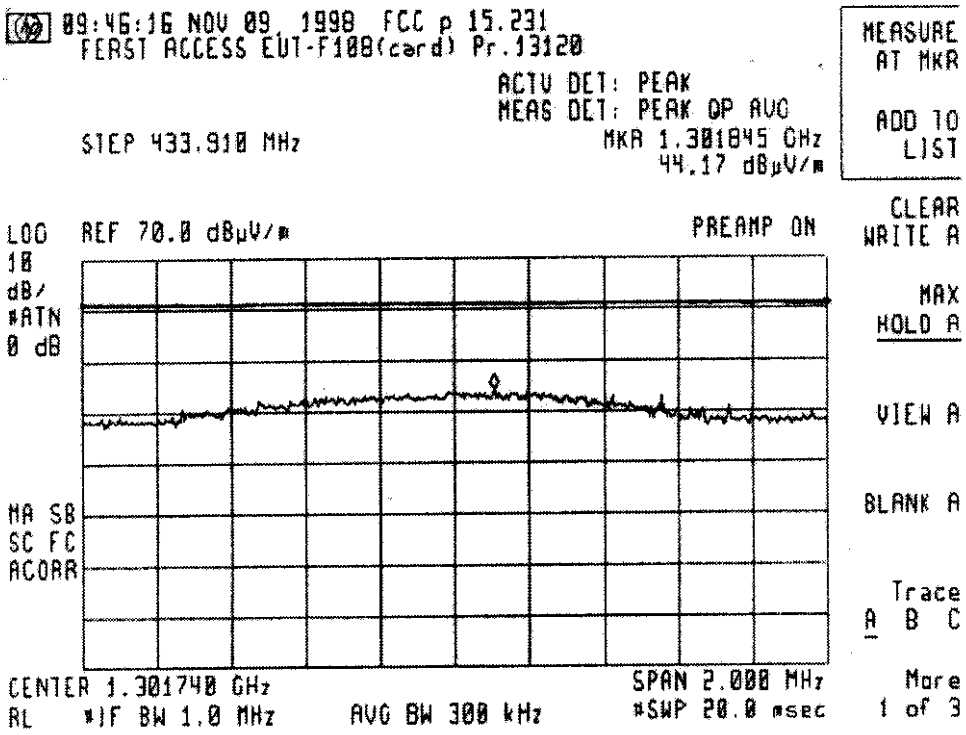
Plot 3.1.1
Radiated Emission Measurement Results



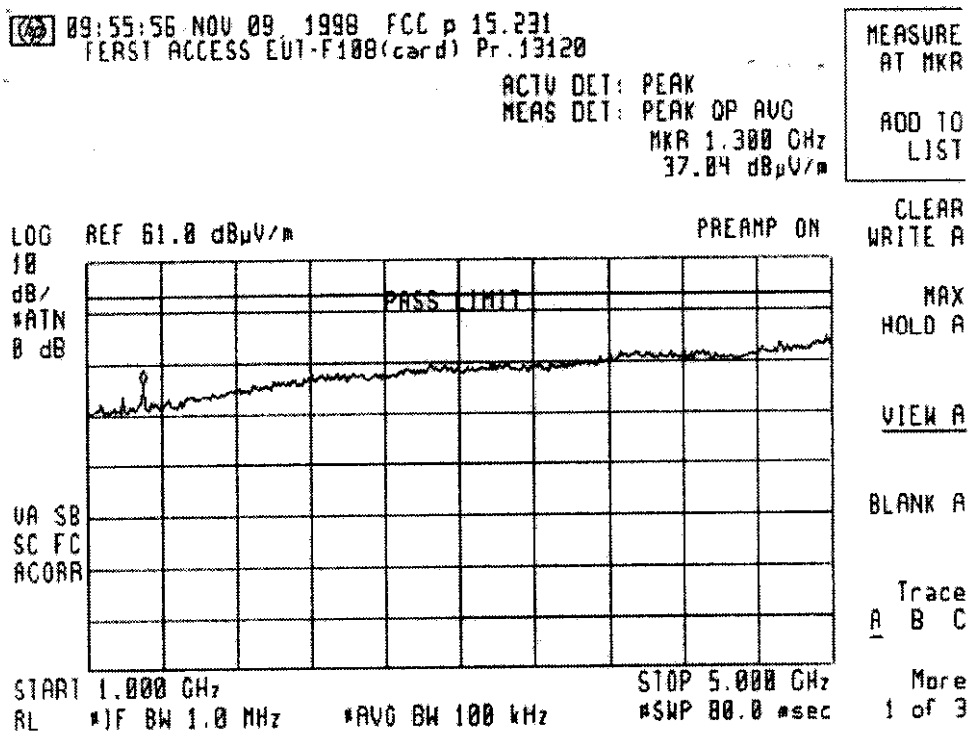
Plot 3.1.2
Radiated Emission Measurement Results



Plot 3.1.3
Radiated Emission Measurement Results



Plot 3.1.4
Radiated Emission Measurement Results



Plot 3.1.5
Average Factor Measurement

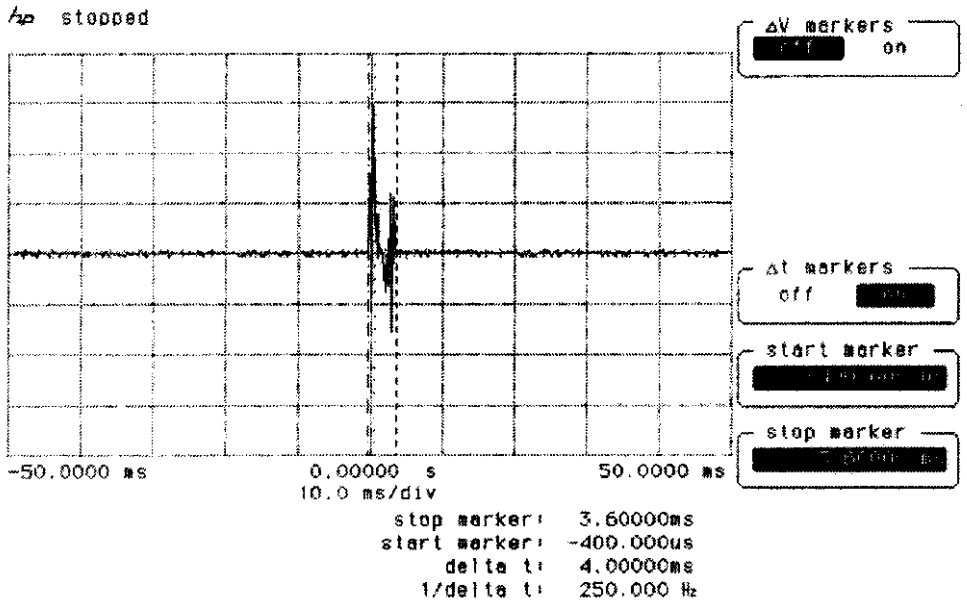
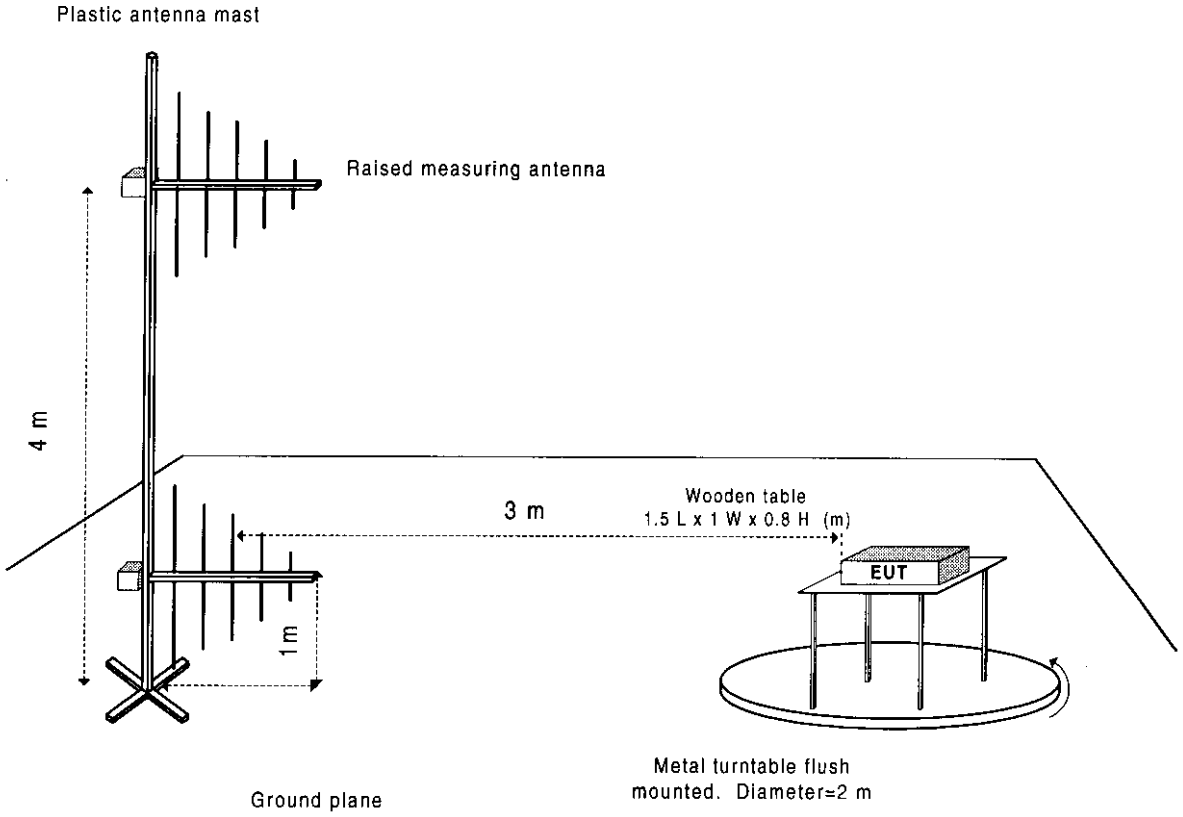


Figure 3.1
Radiated Emission Test Setup



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 x 433.92 MHz = 1.085 MHz

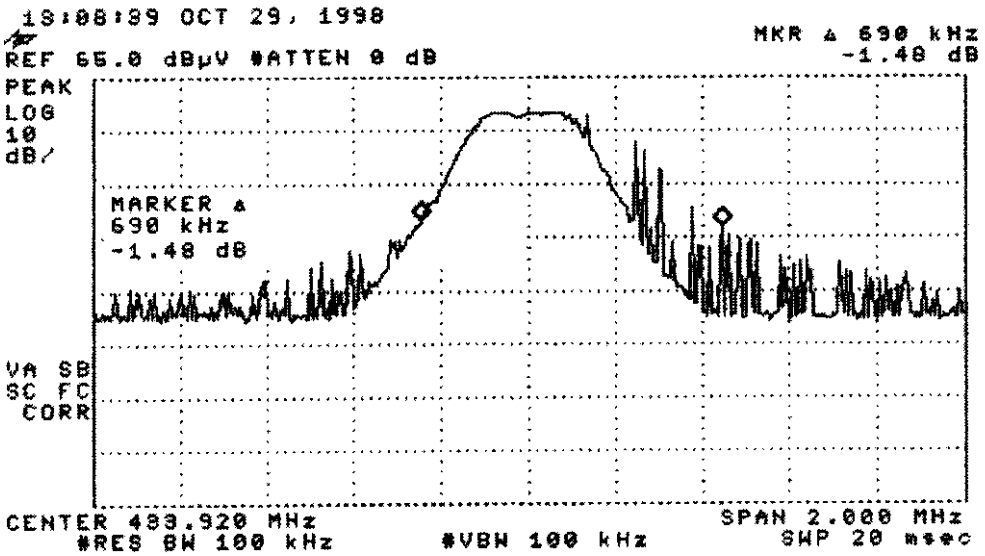
The spectrum trace data around transmitter fundamental frequency was obtained with the Spectrum Analyzer in "Max Hold" mode. The bandwidth value was determined between two points 20 dB down from the center frequency. The occupied bandwidth of 0.690 MHz was measured which is narrower than required 1.085 MHz.
The test results are shown in Plot 3.2.1.

Reference numbers of test equipment used

HL 0275	HL 0507	HL 0593	HL 0594	HL 0604		

Full description is given in Appendix A.

Plot 3.2.1
Emission Bandwidth Measurement Results
Occupied bandwidth = 690 kHz



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 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.

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: CA108 transciever
DATE: October 29, 1998
Relative Humidity: 48%
Ambient Temperature: 21°C

MEASUREMENTS PERFORMED AT 3 METRES DISTANCE

Frequency (MHz)	Ant. Pol.	TT Pos. (°)	Radiated Emissions dB (µV/m)	Spec. Limit dB (µV/m)	Spec. Margin dB	Pass/ Fail
423.208	H	138	34.94	46	11.06	Pass
846.412	V	16	32.17	46	13.83	Pass

Notes to table calculations:

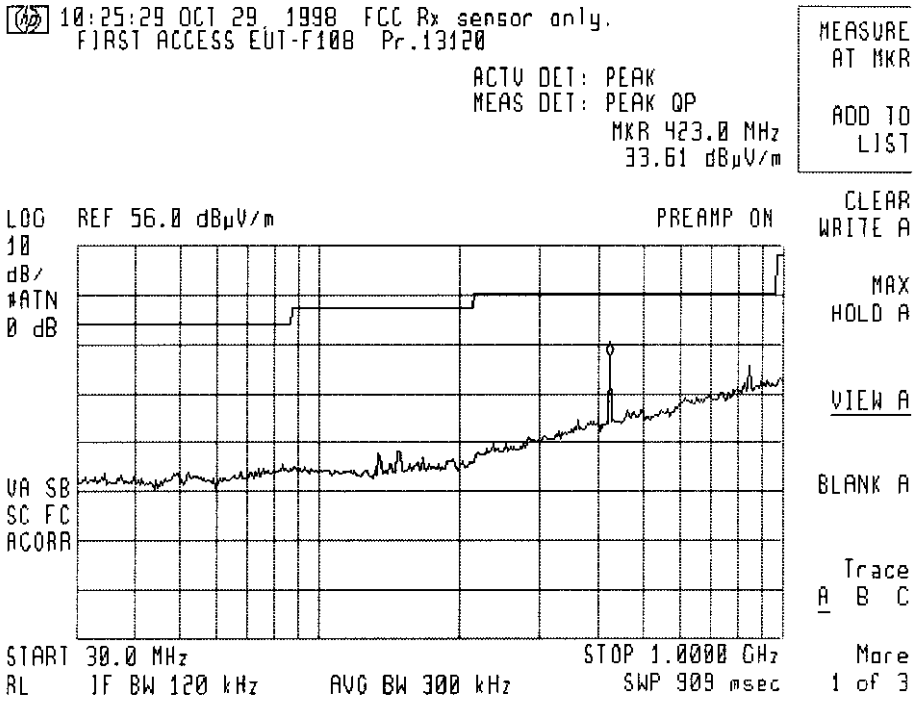
The worst test results were obtained during measurements with biconilog antenna @ 1 m height and quasi-peak detector.
Resolution bandwidth = 120 kHz

Ant. Pol. = Antenna polarization – (V – vertical, H – horizontal)
TT Pos. = Turntable position in degrees, (EUT front panel = 0°)
Spec. Margin = Specification Margins = dB below (negative if above) specification limit.

Test Performed by:
Mr. Michael Feldman, test technician

Hermon Labs

Plot 3.4.1
Radiated Emission Measurement Results



4 Summary and Signatures

The CA108 card transceiver, FCC ID:OC8CA108 was found to be in compliance with the requirements of FCC part 15 subpart C §§ 15.231, 15.209 and subpart B §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

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
0181	3950	Oscilloscope, Digitizing, 100 MHz	Hewlett Packard	54501A	11/99
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
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

APPENDIX B-Test Equipment Correction Factors

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

Frequency, MHz	Antenna Factor, dB(1/m)	Frequency, MHz	Antenna Factor, dB(1/m)
26	7.8	940	24.0
28	7.8	960	24.1
30	7.8	980	24.5
40	7.2	1000	24.9
60	7.1	1020	25.0
70	8.5	1040	25.2
80	9.4	1060	25.4
90	9.8	1080	25.6
100	9.7	1100	25.7
110	9.3	1120	26.0
120	8.8	1140	26.4
130	8.7	1160	27.0
140	9.2	1180	27.0
150	9.8	1200	26.7
160	10.2	1220	26.5
170	10.4	1240	26.5
180	10.4	1260	26.5
190	10.3	1280	26.6
200	10.6	1300	27.0
220	11.6	1320	27.8
240	12.4	1340	28.3
260	12.8	1360	28.2
280	13.7	1380	27.9
300	14.7	1400	27.9
320	15.2	1420	27.9
340	15.4	1440	27.8
360	16.1	1460	27.8
380	16.4	1480	28.0
400	16.6	1500	28.5
420	16.7	1520	28.9
440	17.0	1540	29.6
460	17.7	1560	29.8
480	18.1	1580	29.6
500	18.5	1600	29.5
520	19.1	1620	29.3
540	19.5	1640	29.2
560	19.8	1660	29.4
580	20.6	1680	29.6
600	21.3	1700	29.8
620	21.5	1720	30.3
640	21.2	1740	30.8
660	21.4	1760	31.1
680	21.9	1780	31.0
700	22.2	1800	30.9
720	22.2	1820	30.7
740	22.1	1840	30.6
760	22.3	1860	30.6
780	22.6	1880	30.6
800	22.7	1900	30.6
820	22.9	1920	30.7
840	23.1	1940	30.9
860	23.4	1960	31.2
880	23.8	1980	31.6
900	24.1	2000	32.0
920	24.1		

Antenna factor is to be added to receiver meter reading in dB(μV) to convert to field intensity in dB(μV/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(μV) to convert it into field intensity in dB(μV/meter)

APPENDIX C- A2LA Accreditation

THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

HERMON LABORATORIES
Binyamina, ISRAEL

for technical competence in the field of

Electrical (EMC) Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards and EN 45001) and any additional program requirements in the identified field of testing.

Presented this 27th day of February, 1997.

President
For the Accreditation Council
Certificate Number 839.01
Valid to March 31, 1999

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation

American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25:1990 (EN 45001)

HERMON LABORATORIES
P.O. Box 23
Binyamina 30550, Israel
Edward Usoskin Phone: 972 6 6288 001

ELECTRICAL (EMC)

Valid to: March 31, 1999 Certificate Number: 0839.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

Electromagnetic Compatibility
- Radiated Emissions Tests
- Conducted Emissions Tests

Product Safety Testing

Heat Resistance	Flammability
Impulse	Overload
Clearance & Creepage Distance	Leakage Current
Temperature Rise	Hot Wire Ignition
High Current Arching Ignition	Dielectric Withstanding
Bonding Resistance	

Telecommunications Testing

Longitudinal Balance	Return Losses
Environmental Stresses, Surges	Hazardous Voltages
DTMF & Pulse Dialing	Hearing Aids
On Hook, Off Hook DC/AC Impedances	Billing Protection
In-Band, Out of Band Signals	

On the following equipment:
Information Technology Equipment (ITE); Industrial, Scientific and Medical Equipment (ISM); Telecommunications Equipment; Electrical Appliances: Portable Tools; Motors; Transformers; and Similar Electrical Apparatus

Using the following test methods/specifications/standards:
FCC Part 15 using ANSI C63.4 - 1992
ANSI/UL 1950 - 1994
AS 3260
AS/NZS 1044, AS/NZS 2064, AS/NZS 3548
CISPR 11 - 1990, CISPR 14, CISPR 22 - 1993
EN 55011 - 1991, EN 55014 - 1987, EN 55022 - 1994, EN 60950 - 1993
IEC 950 - 1996
Israeli Ministry of Communications Specification No. 023/96
TS 001, TS 002, TS 004
US Code of Federal Regulation (CFR) 47 Parts 15, 18, and 68

Revised 06/25/97

Ranna J Haas

656 Quince Orchard Road, #620 • Gaithersburg,MD 20878-1409 • Phone: 301 670 1377 • FAX: 869 1495