Svenska EMC Lab
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Phone: +46 45580290, Fax: +46 45510288
www.emclab.se e-mail: info@emclab.se

TEST REPORT

REPORT CERTIFICATE issued by a FCC listed Test Laboratory

CUSTOMER AND MANUFACTURER: Precise Biometrics AB
Scheelevägen 19 C
SE-223 70 Lund
Sweden

Project no: 05255

EQUIPMENT UNDER TEST (EUT): Combined Fingerprint and Smart Card Reader,
Type Precise 250MC, MS 010 114 R1B, s/n 41.

TEST SPEC: 47 Cfr Ch. 1 (10-1-05 Edition):
Part 15, Subpart B, Class B.
§15.107: Conducted Emission, AC power line
§15.109: Radiated Emission

DATE OF TEST: December 9 - 14, 2005

TEST SITE: Svenska EMC Lab AB, Karlskrona, Sweden.
FCC registration number: 90967.

CONFORMITY: The EUT (Equipment Under Test), did pass the above mentioned tests. The test result shows full compliance with the technical specification for Class B Digital Devices.

Approved, Karlskrona December 15, 2005

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Hans Östergren
Manager Svenska EMC Lab AB

DATE OF RECEIPT:

December 9, 2005

CONDITION OF EUT:

No remarks. Operates as intended.

TEST PERSONNEL:

Svenska EMC Lab AB: Hans Östergren

ASSISTANT PERSONNEL:

Precise Biometrics AB: Per Ola Olsson.

EUT DESCRIPTION:

EUT is a combined fingerprint reader and smart card reader. Its primary use is logical access.
EUT has only one fixed cable for connection to USB port. EUT is powered through the USB cable.

CALIBRATION DECLARATION:

The test equipment is calibrated with tractability to national or international standards.
All instruments were within the calibration interval. Before starting the tests, the conducted emission test system and the radiated emission test system were checked with Generator
CNE III as reference source.

ESTIMATED UNCERTAINTY:

Expanded uncertainty (k = 2):

Conducted Emission, 0.45 – 30 MHz:	± 1.1 dB
Field Strength, emission 30 – 300 MHz:	± 2.2 dB
Field Strength, emission 300 – 700 MHz:	± 2.3 dB
Field Strength, emission 700 – 2000 MHz:	± 2.4 dB
Field Strength, emission 1 to 2 GHz:	± 3.0 dB
Frequency:	± 100 Hz

The uncertainties are for a confidence level of not less than 95 %.

TEST EQUIPMENT LIST:

Type/Manufacturer/Bandwidth	s/n	Calibration information	
		Date	Interval
EMI Test System, Monitor EZM, Rohde & Schwarz EP-6, 20 Hz - 1300 MHz	860157/014	2005-07	12 months
Test Receiver, Rohde & Schwarz ESH-3, 9 kHz - 30 MHz	894979/013	2005-07	12 months
Test Receiver, Rohde & Schwarz ESVP, 20 - 1300 MHz	893497/006	2005-07	12 months
Pulse Limiter, Rohde & Schwarz ESH3-Z2 DC - 30 MHz	357881052	2005-07	12 months
Plotter, Rohde & Schwarz DOP 2	893117/0108	NA	NA
Spectrum Analyzer Tektronix 2755AP, 10 kHz - 21 GHz	B010111	2005-07	12 months
Preamplifier, Mini-Circuits ZHL-42, 0.7 – 4.2 GHz	860701	2005-02	12 months
LISN 50 OHM/50 µH, Electro Metrics EM-7820 10 kHz - 30 MHz, 16 A	2771	2005-07	12 months
LISN 50 OHM/50 µH, MEB NNB-4/200 0.15 - 30 MHz, 200 A	C96001/3	2004-07	12 months
Cable to Test Receiver, RG 223	006	2005-08	12 months
Cable to LISN, RG 223	015	2005-08	12 months
Biconical Antenna, Schwarzbeck BBA9106 30 - 300 MHz	93-92196.1	2005-07	24 months
Log-periodic Antenna, Schwarzbeck UHALP9107, 300 - 1000 MHz	91071205	2004-07	24 months
Double Ridged Guide Antenna, EMCO 3115, 1 - 18 GHz	2338	2003-07	36 months
Antenna Cable, RG 214	001	2005-08	12 months
Antenna Cable, Sucoflex 104	171288/4	2005-08	12 months
Antenna Mast System, Jyske EMC, h = 1 - 4 m	02	NA	NA
Turn Table, Jyske EMC, h = 1 m	01	NA	NA
Anechoic Chamber, 8 x 4.5 x 3 m	1	2003-04	36 months
Open Area Test Site for 3 m antenna distance	1	2003-12	36 months

TEST SET-UP AND PROCEDURE:

As laid out in ANSI C.63.4:2003 Document. Tested as tabletop equipment.
See Appendix 1 and 2.

TEST CONDITIONS:

Rating:
- PC: 115 VAC, 50-60 Hz, 0.7 A. Class I.
- EUT: 5 VDC, 0.5 A.

Clock Frequency: 7.38 MHz, 12.0 MHz, 192.0 MHz.
Measured frequency range: 0.15 – 2 000 MHz.
Configuration: See Appendix 3. A minimum system was configured with a PC and its peripherals. EUT was connected to the USB port, other devices to the serial and parallel ports (15.31(i)).
The system consists of:
- PC, IBM Thinkpad 600E, Type 2645-4BG, s/n 5528TVC02/99, FCC ID: Tested to comply with FCC regulations.
- AC/DC Adapter, IBM IZORV 860 PF, Type OZK6543, s/n 2M04T7782PF, FCC ID: Tested to comply with FCC regulations.
- Printer, HP DeskJet 895cxi, Type C6410A, s/n HU0151N087, FCC ID: Tested to comply with FCC regulations.
- AC/DC Adapter to Printer, Type C6409-60014, s/n T5844428252, FCC ID: Tested to comply with FCC regulations.
- Mouse, Microsoft Wheelhouse, Type X05-51692, s/n 0304842-00000, FCC ID: Tested to comply with FCC regulations.

Cables:
- Unshielded mains cable of 1.8 m length with safety ground to the AC/DC Adapter (PC).
- Shielded DC cable of 1.8 m length without safety ground from AC/DC Adapter to PC.
- Shielded USB (signal and power) cable of 2 m length from EUT 250MC to the PC (USB port). This cable is with two ferrites of same type, one in each cable end.
- Shielded Printer cable of 1.8 m length from PC to Printer (parallel port).
- Unshielded mains cable of 1.8 m length without safety ground to the AC/DC Adapter (Printer).
- Shielded DC cable of 2 m length without safety ground from AC/DC Adapter to Printer.
- Shielded Mouse cable of 1.8 m length from PC to external Mouse (serial port).

See also Appendix 3.
Operating Conditions: Operating in a test application with continuous reading of the smart card and scanning the fingerprints, and with communication between the PC and the peripherals.
Ambient Humidity: 31 % RH
Ambient temperature: 21 °C.
Mains voltage at test: 115 VAC.

TEST PERFORMANCE:

§15.107: Conducted Emission test, AC power line:
The conducted emission was measured on the 115 VAC power input terminals (PC Power Supply) through a 50 ohm 50 micro-Henry LISN (Line Impedance Stabilization Network) in the frequency range 0.15 to 30 MHz. The two lines were measured with a quasi-peak detector and also with an average detector. Worst cases were recorded. See Appendix 4 and 5.

§15.109: Radiated Emission:
Pre-test: Tested in the Anechoic Chamber at 3 m antenna distance with vertical and horizontal antenna polarizations to find the radiating frequencies in the range 30 – 2 000 MHz.

Final test: Measured in the frequency range 30 MHz – 2 000 MHz at an antenna distance of 3 m, on the open area test site. The emission was maximized by rotating the table, varying the antenna height 1 – 4 m and the antenna polarization. Measured with CISPR quasi-peak detector. The 6 highest levels were recorded. See Appendix 6 and 7.

SUMMARY OF RESULTS:

§15.107: Conducted Emission test, AC power line. See Appendix 4 and 5.
The margin to limit was – 17.4 dB(QP) at 0.1878 MHz, and – 9.6 dB(AV.) at 0.4378 MHz.

§15.109: Radiated Emission. See Appendix 6 and 7.
The margin to limit was – 10.1 dB(QP) at 338.7 MHz.

The Combined Fingerprint and Smart Card Reader, Type Precise 250MC, MS 010 114 R1B, s/n 41, did pass the above mentioned tests for Class B Digital Devices.

REMARK:

The above test results relates to the tested item only.

Karlskrona December 15, 2005

Hans Östergren
Test Engineer
Manager Svenska EMC Lab AB
Sr. EMC Engineer

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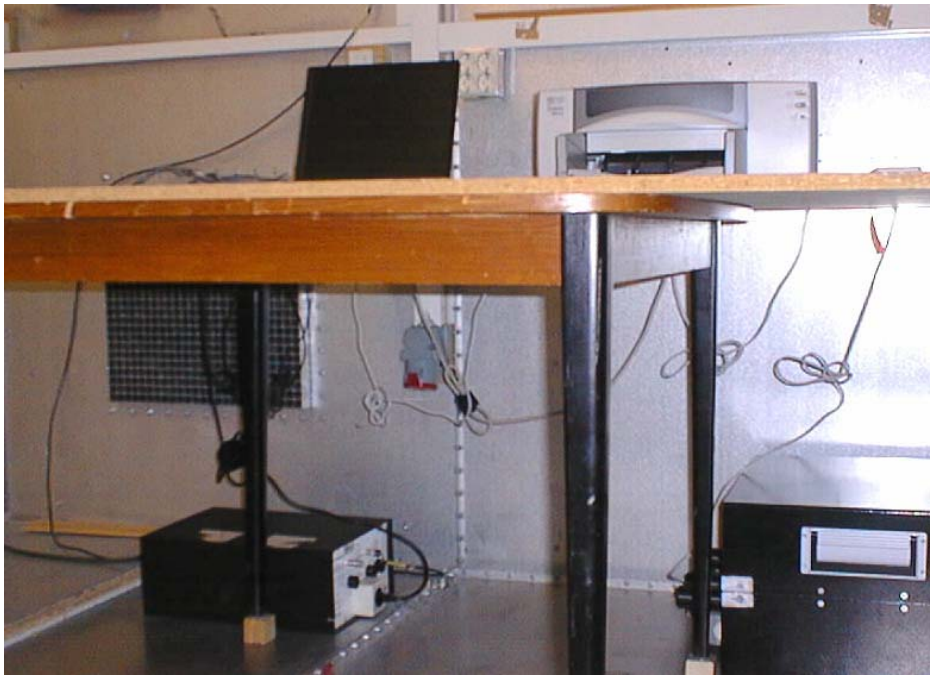
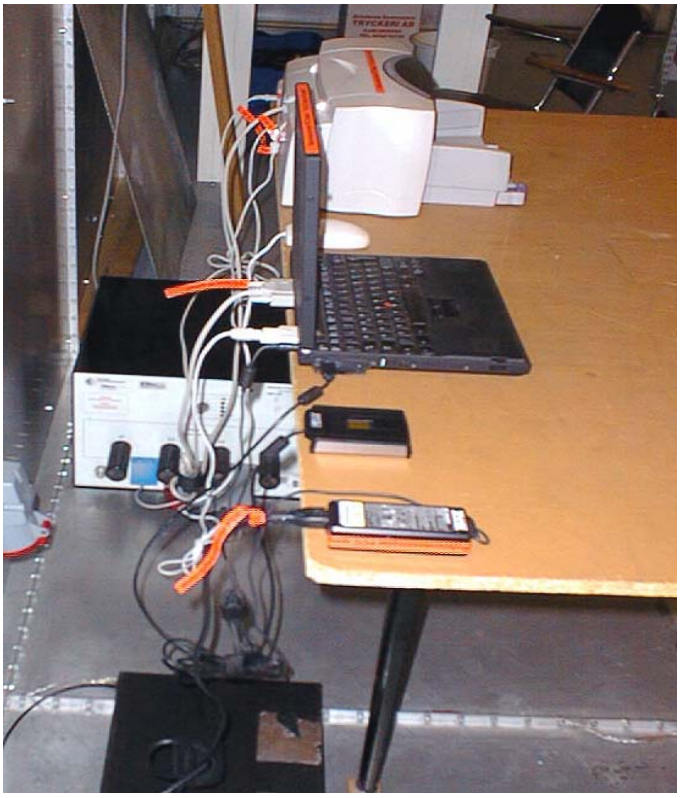
Test set-up, Conducted Emission



Test set-up, Conducted Emission



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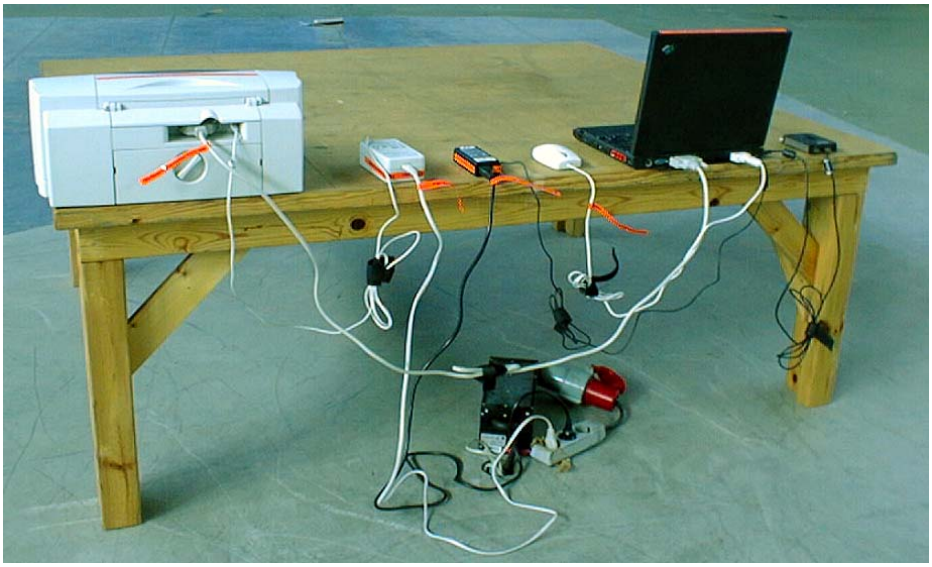
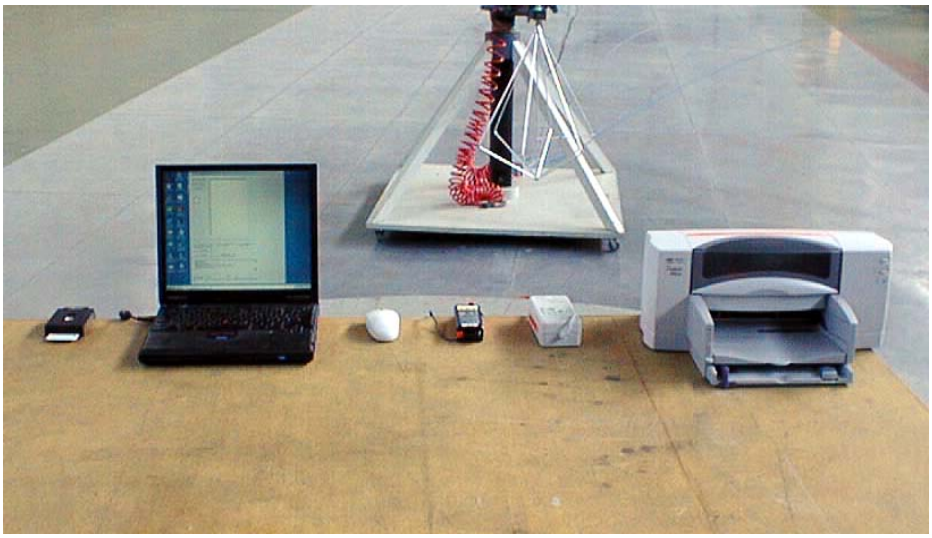
Test set-up, Radiated Emission



Test set-up, Radiated Emission



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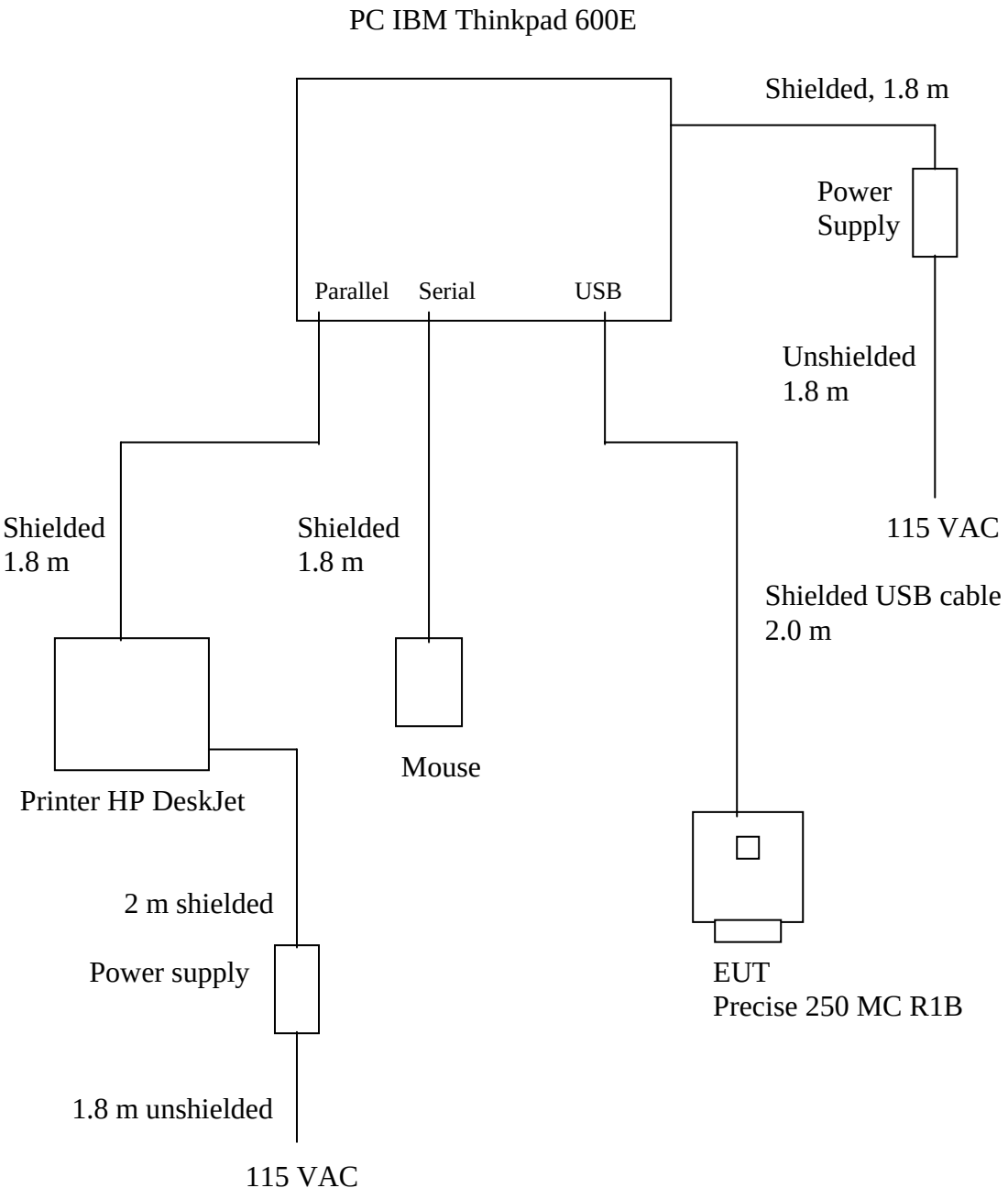
Configuration



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PRECISE BIOMETRICS AB
Conducted Emission Test

Start of Test: 09.DEC'05 , 16:49
E.U.T.: 250 MC R1B
Oper. Condition: ACTIVE
Operator: HANS OSTERGREN

Test Spec:
FCC Part 15, Subpart B Conducted RFI, Class B. 04 Ed

Start Fr. MHz	Stop Fr. MHz	IF-BW KHz	Display Mode	Att. dB	Transducer type
0.1500	30.0000	10.00	Max Hold	0	EM7820L1

Frequency MHz	Average dBuV	AV-Margin dBuV	Quasi Peak dBuV	QP-Margin dBuV
0.1545	22.4	-33.4	43.2	-22.6
0.1675	37.2	-17.0	41.8	-22.4
0.6878	35.3	-10.7	36.0	-20.0
1.4377	31.2	-14.8	36.1	-19.9
3.1986	26.1	-19.9	36.1	-20.0
8.4788	23.3	-26.7	39.4	-20.6
16.5328	23.4	-26.6	31.7	-28.3

* Limit exceeded

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PRECISE BIOMETRICS AB
Conducted Emission Test

Start of Test: 09.DEC'05 . 17:21
E.U.T.: 250 MC R1B
Oper. Condition: ACTIVE
Operator: HANS ÖSTERBERG
Test Spec:
FCC Part 15, Subpart B Conducted RFI, Class B. 04 Ed

Start Fr. MHz | Stop Fr. MHz | IF-BW KHz | Display Mode | Att. dB | Transducer type
0.1500 | 30.0000 | 10.00 | Max Hold | 0 | EM7820L2

Frequency MHz	Average dBuV	AV-Margin dBuV	Quasi Peak dBuV	QP-Margin dBuV
0.1609	24.1	-31.1	47.5	-17.7
0.1878	40.3	-13.9	48.8	-17.4
0.3128	38.5	-11.5	40.0	-19.2
0.4378	37.5	-9.6	38.6	-18.6
0.6881	35.5	-10.4	36.0	-19.7
0.8136	34.8	-11.2	36.3	-19.7
8.4940	23.4	-26.6	37.7	-22.3

* Limit exceeded

L2 115 V WITH CABLE WITH 2 FERRITES

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PRECISE BIOMETRICS AB

OATS

Start of Test: 9 DEC. '05

E.U.T.: 250 MC R1B

Oper. Condition: ACTIVE

Operator: HANS OSTERBREN

Test Spec:
FCC Part 15, Subpart B. Class B. 3 m OATS

Start Fr. MHz	Stop Fr. MHz	IF-BW kHz	Detec tor	Att. dB	Meas.T. s	Trened. type
30.0000	299.9999	120	Peak	LN	0.020	LON9106
300.0000	1000.0000	120	Peak	LN	0.020	LON9107

Frequency MHz	Measured Level dBuV/m	Margin dB	Pol h/v	System Height m	Azimuth deg.
32.5840	25.2	-14.8	V	1.00	270
66.3690	22.3	-17.7	V	1.00	90
144.0110	28.8	-13.7	V	1.000	45
335.1170	34.8	-11.2	H	1.000	90
336.6840	35.9	-10.1	H	1.000	45
599.9890	33.7	-12.3	H	1.00	45

* Limit exceeded

3 M CABLE WITH 2 FERRITES

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Radiated Fieldstrength Test. Calculation of Final Emission Levels

EUT: Combined Fingerprint and Smart Card Reader,
Type Precise 250MC, MS 010 114 R1B, s/n 41.

TEST SPEC: 47 Cfr Ch. 1 (10-1-05 Edition):
Part 15, Subpart B, Class B.
§15.109: Radiated Emission
3 m antenna distance.

DATE OF TEST: December 9, 2005

OPERATION: Active with continuous transmitting of data at highest speed.

Field strength (dBµV/m) = Amplitude (dBµV) + Antenna factor (dB/m) + cable loss (dB)

Tested frequency range: 30 – 2 000 MHz

Measured quasi-peak values of the 6 highest levels in the frequency range 30 – 2 000 MHz.

Freq.	Level	Cable loss	Antenna factor	Field strength	Limit	Distance	Margin	Antenna height	Antenna polaris.
MHz	dBµV	dB	dB	dBµV/m	dBµV/m	m	dB	m	V/H
32.6	6.0	1.4	17.8	25.2	40.0	3	- 14.8	1.0	V
66.4	13.9	2.1	6.3	22.3	40.0	3	- 17.7	1.0	V
144.0	11.7	3.3	14.8	29.8	43.5	3	- 13.7	1.0	V
325.1	13.9	5.0	15.9	34.8	46.0	3	- 11.2	1.0	H
338.7	14.6	5.2	16.1	35.9	46.0	3	- 10.1	1.0	H
600.0	4.0	7.2	22.5	33.7	46.0	3	- 12.3	1.0	H