

Test Report



DANAK
Reg. no. 19

EMC test of Precise 100 MC

Performed for Precise Biometrics AB

DANAK-196163

Project no.: K222311-1 - Rev. A

Page 1 of 16

6 annexes

2002-05-13

DELTA

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Title	EMC test of Precise 100 MC
Test object	Precise 100 MC fingerprint reader
Report no.	DANAK-196163
Project no.	K222311-1 - Rev. A
Test period	2002-03-15 to 2002-05-03
Client	Precise Biometrics AB Dag Hammerskjöldsväg S-224 64 Lund Sweden Telephone: +46 46 311100 Fax: +46 46 311101
Contact person	Mr. Jörgen Lindell
Manufacturer	Precise Biometrics AB
Specifications	EN 55022:1998 FCC Rules and Regulations, Part 15, Subpart B, demon- strated by compliance with EN 55022:1998 EN 55024:1998
Results	During the performed immunity tests, comprising test of immunity to radiated electromagnetic field, burst transients and electrostatic discharges, no malfunctions were detected. The criteria for compliance are listed in <i>section 3.2.</i> The AC mains conducted emission and radiated electro- magnetic field were within the specifications.
Test personnel	Poul Nørgaard Jesper Nielsen

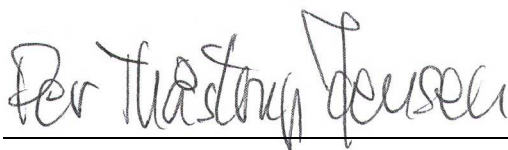
Date 2002-05-13

Project manager



Per Hansen
Facility Manager - EMC
DELTA

Responsible



Per Thåstrup Jensen
Project Manager - EMC
DELTA

<i>Table of contents</i>	<i>Page</i>
1. Summary of test	5
2. Test specimens	6
2.1 Test object - Precise 100 MC	6
2.2 AUX equipment - Laptop PC	6
2.3 AUX equipment - AC adapter	6
3. General test conditions	7
3.1 Test set-up	7
3.2 Criteria for compliance during immunity tests	8
3.3 Monitoring during immunity tests	8
4. Test and results	9
4.1 Immunity to radiated electromagnetic field - EN 61000-4-3:1996 + A1	9
4.2 Immunity to electrostatic discharge (ESD) - EN 61000-4-2:1995 + A1	10
4.3 Immunity to electrical fast transients (Burst) - EN 61000-4-4:1995	12
4.4 Radiated electromagnetic field - EN 55022:1998, Class B	13
4.5 Radiated electromagnetic field - FCC Rules and Regulations Part 15:1998 Subpart B, Class B demonstrated by compliance with EN 55022 (CISPR22)	14
4.6 AC mains conducted emission - EN 55022:1998, Class B	15
4.7 AC mains conducted emission - FCC Rules and Regulations Part 15:1998 Subpart B, Class B demonstrated by compliance with EN 55022 (CISPR22)	16

Annex 1 List of instruments (1 page)

Annex 2 Photos regarding immunity tests (5 pages)

Annex 3 Test record sheets and photos regarding measurements of radiated electromagnetic fields
EN 55022 (6 pages)

Annex 4 Test record sheets and photos regarding measurements of radiated electromagnetic fields
FCC (6 pages)

Annex 5 Test record sheets and photos regarding measurements of AC mains conducted emission
EN 55022 (6 pages)

Annex 6 Test record sheets and photos regarding measurements of AC mains conducted emission
FCC (6 pages)

1. **Summary of test**

Test	Test method	Comments
Radio frequency electromagnetic field	EN 61000-4-3:1996+A1	Passed
Electrostatic discharges	EN 61000-4-2:1995+A1	Passed
Electrical fast transients	EN 61000-4-4:1995	Passed
Radiated electromagnetic field	EN 55022:1998, Class B (CISPR22:1997), Class B	Passed
Radiated electromagnetic field	FCC Rules and Regulations, Part 15, Subpart B, Class B	Passed
AC mains conducted emission	EN 55022:1998, Class B (CISPR22:1997), Class B	Passed
AC mains conducted emission	FCC Rules and Regulations, Part 15, Subpart B, Class B	Passed

Conclusion

The test object mentioned in this report meets the requirements of the standards stated below.

- EN 55022:1998, Class B
- FCC Rules and Regulations, Part 15, Subpart B, Class B
- EN 55024:1998 (in part).

The test results relate only to the specimen tested.

2. **Test specimens**

2.1 **Test object - Precise 100 MC**

Category	Fingerprint reader
Manufacturer	Precise Biometrics AB
Model / type	Precise 100 MC
Part no.	-
Serial no.	#2
FCC ID	-
Supply voltage	5.0 VDC. Power was supplied through the USB cable from the laptop PC. During the immunity tests the laptop PC was power supplied with 230 VAC. During the AC mains conducted emission test and radiated electromagnetic field test the PC was power supplied with 115 VAC.
Operational mode	Tests were performed in 2 modes: 1) Scanning fingerprint mode 2) Reading smartcard mode.
Software	The laptop PC was running a software reading from fingerprint reader and registering the read fingerprint. For each registered fingerprint an indication was given on the laptop PC monitor. This indication was one stroke per registration (/\\//\\// etc).
Comments	During the tests in scanning fingerprint mode an artificial finger was used to ensure continuous activity of the scanning procedure.

2.2 **AUX equipment - Laptop PC**

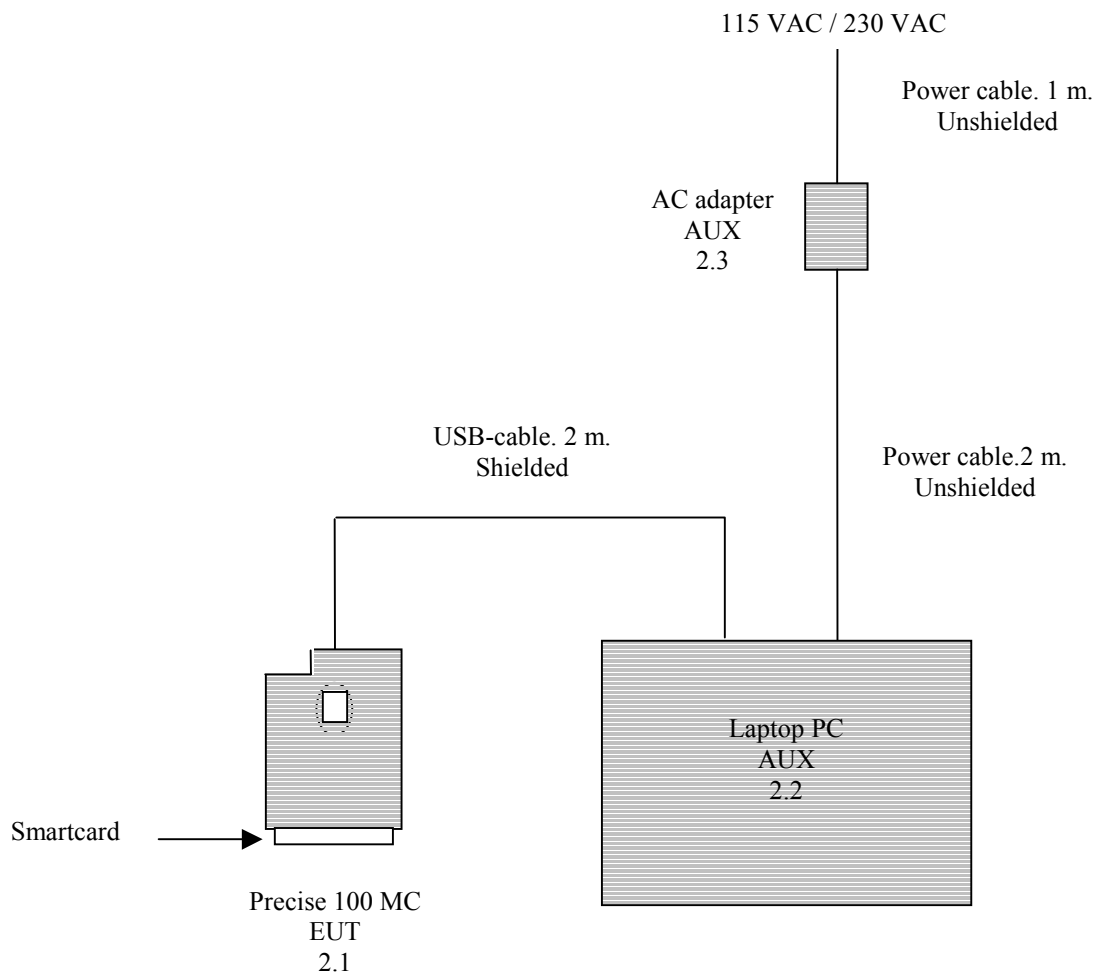
Manufacturer	IBM
Model / type	2545-4BG
Part no.	-
Serial no.	5528TVC 02/99
FCC ID	Tested to comply with FCC standards

2.3 **AUX equipment - AC adapter**

Manufacturer	IBM
Model / type	1ZORV860PF
Part no.	-
Serial no.	-
FCC ID	Tested to comply with FCC standards

3. General test conditions

3.1 Test set-up



3.2 *Criteria for compliance during immunity tests*

During test in fingerprint scanning mode the scanning process shall continue to operate. During test in smartcard reading mode the registration of card information must not fail. Generally no degradation of performance is allowed in either modes.

3.3 *Monitoring during immunity tests*

The operator was monitoring the fingerprint registration activities on the laptop PC monitor. During the radiated electromagnetic field test a video camera was used inside the shielded room. The video camera was connected to a monitor outside the test room.

Before and after each test, functional tests were performed to ensure that the test object was in working condition.

4. Test and results

4.1 Immunity to radiated electromagnetic field - EN 61000-4-3:1996 + A1

Client	Precise Biometrics AB	Sheet	A - 1-1
Item	Fingerprint reader	Project no.	K222311 - 1
Manufacturer	Precise Biometrics AB	Date	2002-03-18
Type	Precise 100 MC	Sign.	PFN
Serial no.	#2	Test site	Room B
Test method(s)	EN 61000-4-3:1996+A1		
Temperature	22.7°C	Humidity	31.5% R.H.

Frequency range	Modulation	Polarisation	Not susceptible at	Remarks (Description of reaction)
80-1000 MHz	80% AM - 1 kHz	Vertical	3V/m	Antenna against the front of the front. EUT in smart-card mode
80-1000 MHz	80% AM - 1 kHz	Horizontal	3V/m	Antenna against the front of the front. EUT in smart-card mode
900 MHz	200 Hz pulse 50% duty cycle	Vertical	3V/m	Antenna against the front of the front. EUT in smart-card mode
900 MHz	200 Hz pulse 50% duty cycle	Horizontal	3V/m	Antenna against the front of the front. EUT in smart-card mode
80-1000 MHz	80% AM - 1 kHz	Vertical	3V/m	Antenna against the front of the front. EUT in fingerprint mode
80-1000 MHz	80% AM - 1 kHz	Horizontal	3V/m	Antenna against the front of the front. EUT in fingerprint mode
900 MHz	200 Hz pulse 50% duty cycle	Vertical	3V/m	Antenna against the front of the front. EUT in fingerprint mode
900 MHz	200 Hz pulse 50% duty cycle	Horizontal	3V/m	Antenna against the front of the front. EUT in fingerprint mode

Compliant	Yes	Additional performance criteria (if any)
Comment(s)	Tests were performed in 2 modes: 1) Scanning fingerprint 3) Reading smartcard.	

Uncertainty on test level	+/-1.7 dB
Criteria for compliance	See section 3.2
Results	No malfunction was detected

4.2 Immunity to electrostatic discharge (ESD) - EN 61000-4-2:1995 + A1

Client	Precise Biometrics AB	Sheet	E - 1-1
Item	Fingerprint reader	Project no.	K222311 - 1
Manufacturer	Precise Biometrics AB	Date	2002-03-18
Type	Precise 100 MC	Sign.	PFN
Serial no.	#2	Test site	Midilab
Test method(s)	EN 61000-4-2:1995+A1		
Temperature	24.6°C	Humidity	31.7% R.H.

Surface under test	Amplitude [kV]	Discharge type (Air / Contact)	Coupling plane (HCP / VCP)	Polarity (+ / -)	Susceptible (Yes / No)	Remarks (Description of reaction)
Sensor frame	2, 4	Contact	-	+/-	No	Smartcard mode At 4 kV the communication lock up, when using the test software. In normal mode no malfunction was observed
Case	2, 4, 8	Air	-	+/-	No	Smartcard mode
VCP	2, 4	Contact	VCP	+/-	No	Smartcard mode
HCP	2, 4	Contact	HCP	+/-	No	Smartcard mode
Sensor frame	2, 4	Contact	-	+/-	No	Fingerprint mode At 4 kV the communication lock up, when using the test software. In normal mode no malfunction was observed
Case	2, 4, 8	Air	-	+/-	No	Fingerprint mode
VCP	2, 4	Contact	VCP	+/-	No	Fingerprint mode
HCP	2, 4	Contact	HCP	+/-	No	Fingerprint mode

Compliant	Yes	Additional performance criteria (if any)
Comment(s)	Number of discharges on each of the areas is given below: Air: 10(-) and 10(+). Contact: 10(-) and 10(+). Identification of discharge areas: Contact discharges were applied around sensor plate and at vertical and horizontal coupling planes. Air discharges were applied around enclosure openings, assembly edges and connector. Tests were performed in 2 modes: 1) Scanning fingerprint 2) Reading smartcard.	
Uncertainty on test level		+/-0.5 dB
Criteria for compliance		See <i>section 3.2</i>
Results		No malfunction was detected

4.3 Immunity to electrical fast transients (Burst) - EN 61000-4-4:1995

Client	Precise Biometrics AB	Sheet	L - 1-1
Item	Fingerprint reader	Project no.	K222311 - 1
Manufacturer	Precise Biometrics AB	Date	2002-03-18
Type	Precise 100 MC	Sign.	PFN
Serial no.	#2	Test site	Midilab
Test method(s)	EN 61000-4-4:1995		
Temperature	24.6°C	Humidity	31.7% R.H.

Test characteristics

Burst duration	15 ms
Spike repetition frequency	5 kHz

Line / terminal under test	Cable designation	Injection mode	Amplitude [kV]	Polarity (+ /-)	Susceptible (Yes / No)	Remarks (Description of reaction)
AC port - 230 VAC	AC Power, PC adapter	L1-GP, L2-GP	0.5, 1	+/-	No	Smartcard mode
AC port - 230 VAC	AC Power, PC adapter	L1-GP, L2-GP	0.5, 1	+/-	No	Fingerprint mode

Compliant	Yes	Additional performance criteria (if any)
Comment(s)	Tests were performed in 2 modes: 1) Scanning fingerprint 2) Reading smartcard.	

Uncertainty on test level	+/-1.1 dB
Criteria for compliance	See <i>section 3.2</i>
Results	No malfunction was detected

4.4 Radiated electromagnetic field - EN 55022:1998, Class B

Client	Precise Biometrics AB	Sheets	See <i>annex 3</i>
Item	Fingerprint reader	Project no.	K222311-1
Manufacturer	Precise Biometrics AB	Date	2002-03-15
Type	Precise 100 MC	Sign.	HEN
Serial no.	#2	Test site	Room 5
Test method(s)	EN 55022:1998 (CISPR22:1997)		
Temperature	22.5°C	Humidity	27.2 % R.H.

Measuring distance	10 m	
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Limit using quasi-peak detector	30-230 MHz:	30 dBµV/m
	230-1000 MHz:	37 dBµV/m

Results	The emission was within the specified limits
Comments	Tests were performed in 2 modes: 1) Scanning fingerprint 2) Reading smartcard.

4.5 Radiated electromagnetic field - FCC Rules and Regulations Part 15:1998 Subpart B, Class B demonstrated by compliance with EN 55022 (CISPR22)

Client	Precise Biometrics AB	Sheets	See <i>annex 4</i>
Item	Fingerprint reader	Project no.	K222311-1
Manufacturer	Precise Biometrics AB	Date	2002-03-15
Type	Precise 100 MC	Sign.	HEN
Serial no.	#2	Test site	Room 5
Test method(s)	FCC Rules and Regulations Part 15:1998 Subpart B (CISPR22)		
Temperature	22.5°C	Humidity	27.2% R.H.

Measuring distance	10 m	
--------------------	------	--

Limit using quasi-peak detector	30-230 MHz:	30 dBµV/m
	230-1000 MHz:	37 dBµV/m

Results The emission was within the specified limits

Comments Tests were performed in 2 modes:

- 1) Scanning fingerprint
- 2) Reading smartcard.

4.6 AC mains conducted emission - EN 55022:1998, Class B

Client	Precise Biometrics AB	Sheets	See <i>annex 5</i>
Item	Fingerprint reader	Project no.	K222311-1
Manufacturer	Precise Biometrics AB	Date	2002-05-03
Type	Precise 100 MC	Sign.	JN
Serial no.	#2	Test site	Room 5
Test method(s)	EN 55022:1998 (CISPR22:1997)		
Temperature	22.5°C	Humidity	44.5% R.H.

Limit using quasi-peak detector	0.15-0.50 MHz:	66-56 dBμV
	(decreasing lin. with log. of freq.)	
	0.50-5 MHz:	56 dBμV
	5-30 MHz:	60 dBμV
Limit using average detector	0.15-0.50 MHz:	56-46 dBμV
	(decreasing in. with log. of freq.)	
	0.50-5 MHz:	46 dBμV
	5-30 MHz:	50 dBμV

Tested terminals AC power input, 115 VAC (at Laptop)

Results The emission was within the specified limits
Tests were performed in 2 modes:
1) Scanning fingerprint
2) Reading smartcard.

4.7 AC mains conducted emission - FCC Rules and Regulations Part 15:1998 Subpart B, Class B demonstrated by compliance with EN 55022 (CISPR22)

Client	Precise Biometrics AB	Sheets	See <i>annex 6</i>
Item	Fingerprint reader	Project no.	K222311-1
Manufacturer	Precise Biometrics AB	Date	2002-05-03
Type	Precise 100 MC	Sign.	JN
Serial no.	#2	Test site	Room 5
Test method(s)	FCC Rules and Regulations Part 15: 1998 Subpart B (CISPR22)		
Temperature	22.5°C	Humidity	44.5% R.H.

Limit using quasi-peak detector	0.15-0.50 MHz:	66-56 dBµV
	(decreasing lin. with log. of freq.)	
	0.50-5 MHz:	56 dBµV
	5-30 MHz:	60 dBµV
Limit using average detector	0.15-0.50 MHz:	56-46 dBµV
	(decreasing in. with log. of freq.)	
	0.50-5 MHz:	46 dBµV
	5-30 MHz:	50 dBµV

Tested terminals AC power input, 115 VAC (at Laptop)

Results The emission was within the specified limits
Tests were performed in 2 modes:
1) Scanning fingerprint
2) Reading smartcard.

Annex 1

List of instruments

(1 page)

LIST OF INSTRUMENTS

NO.	DESCRIPTION	MANUFACTURER	TYPE NO.
29806	BROADBAND POWER AMPLIFIER, 10 kHz-220 MHz, 75 W	AMPLIFIER RESEARCH	75A220
29614	ESD GENERATOR, AIR AND CONTACT DISCHARGE	KEYTEK	MZ-15
29913	ELECTRICAL FAST TRANSIENT (BURST) GENERATOR	EM TEST	ETF500
29754	RF POWER ATTENUATOR, 50 ohm, 6dB, 150W	NARDA	769-6
29856	DIGITAL MULTIMETER W.HPIB	HEWLETT-PACKARD	34401A
29842	-40 dBc VOLTAGE SAMPLER, DC-100MHz	DELTA EMC DEPT.	SAMPLER VERS_2
29908	INSTRUMENTATION PC WITH MONITOR AND GPIB	BANZHAF	BOSTON
29911	DIGITAL MULTIMETER W. HPIB	HEWLETT-PACKARD	34401A
29898	3-LINE DCN NETWORK, IEC 61000-4-6	MEB	M3
308	GENERATOR	MARCONI	2024
321	POWER METER	BIRD	4421
324	AMPLIFIER	AR	100W1000M1
319	ANTENNA	AR	AT1080
251	GENERATOR	MARCONI	2024
387	CABLE	SUHNER	RG214U
327	POWER SENSOR	BIRD	4022

Annex 2

Photos regarding immunity tests

(5 pages)

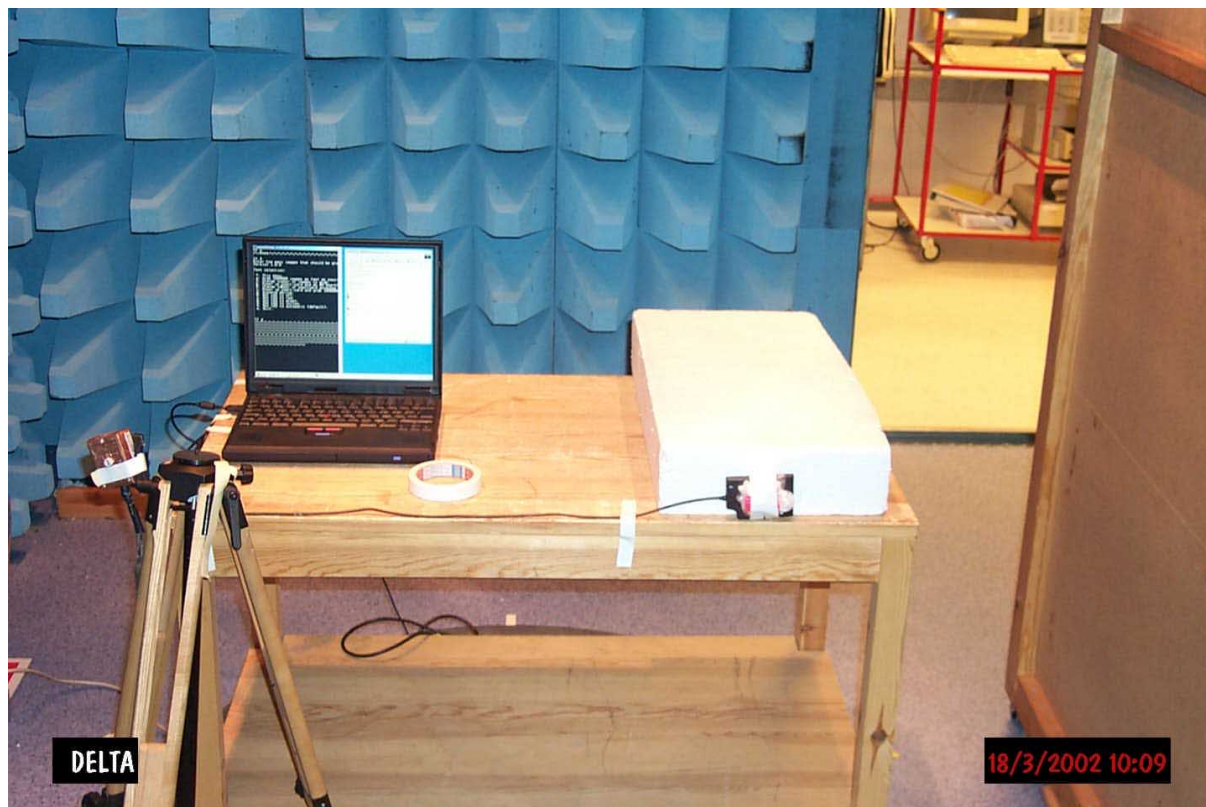


Photo A2.1 Radiated electromagnetic field test with test object in fingerprint scanning mode

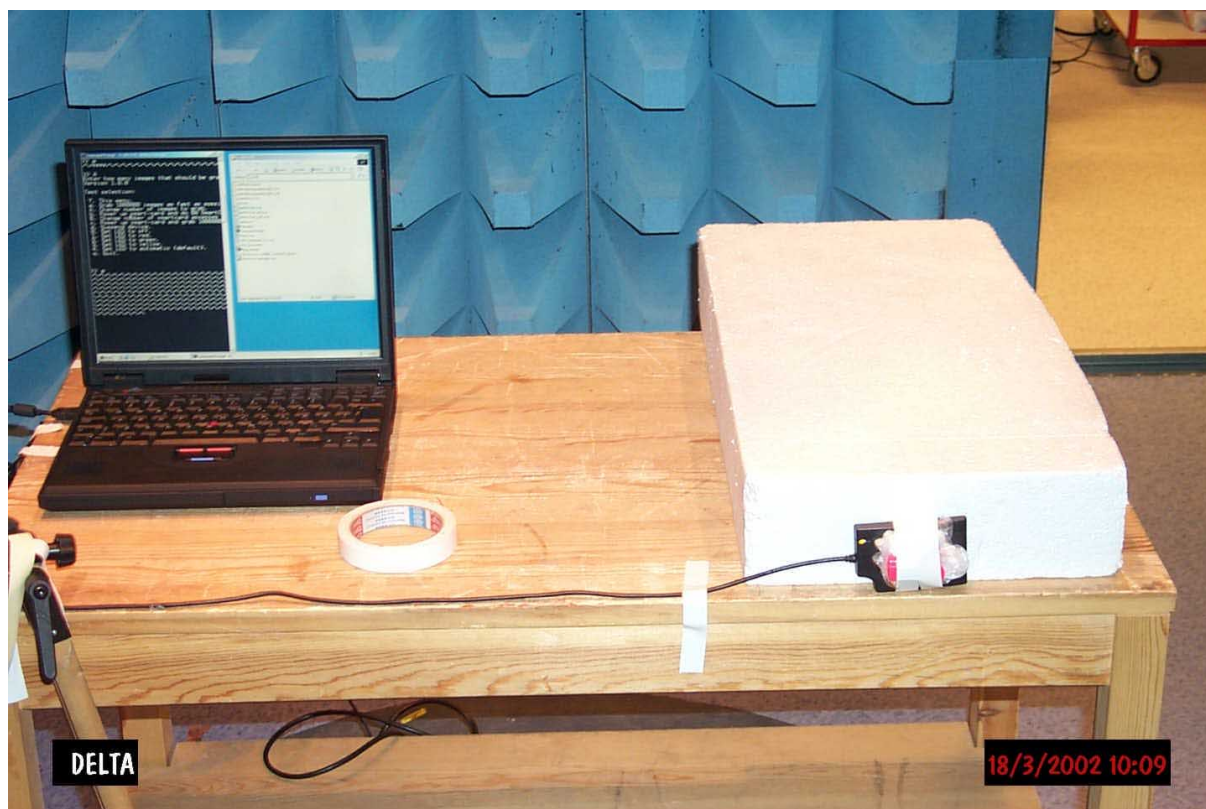


Photo A2.2 Radiated electromagnetic field test with test object in fingerprint scanning mode

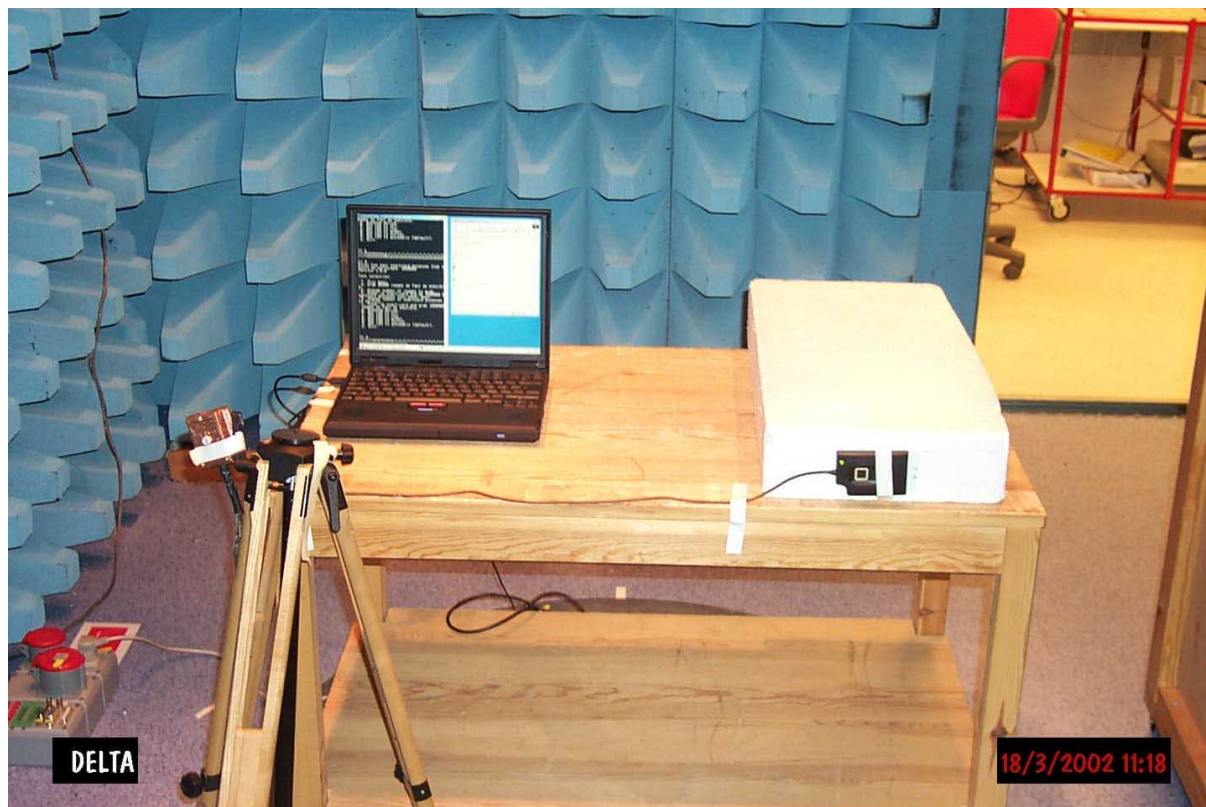


Photo A2.3 Radiated electromagnetic field test with test object in smartcard mode

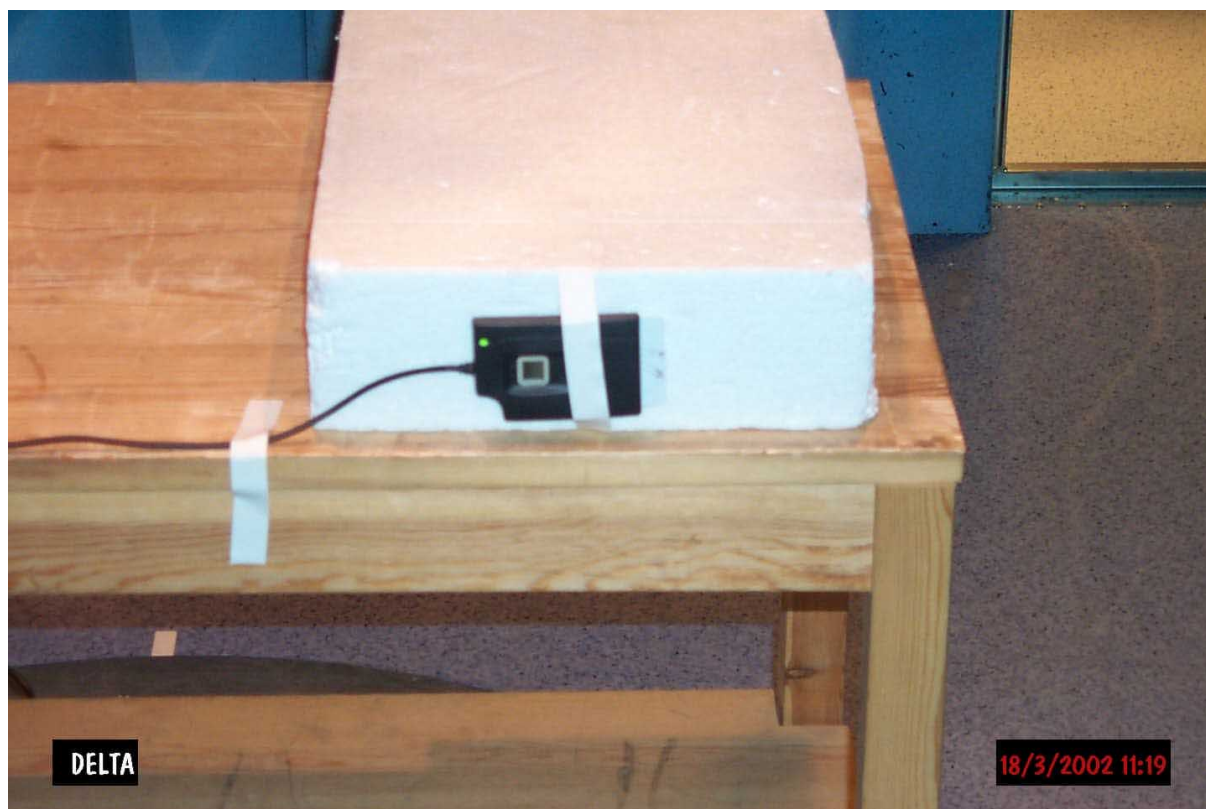


Photo A2.4 Radiated electromagnetic field test with test object in smartcard mode



Photo A2.5 Burst transient test

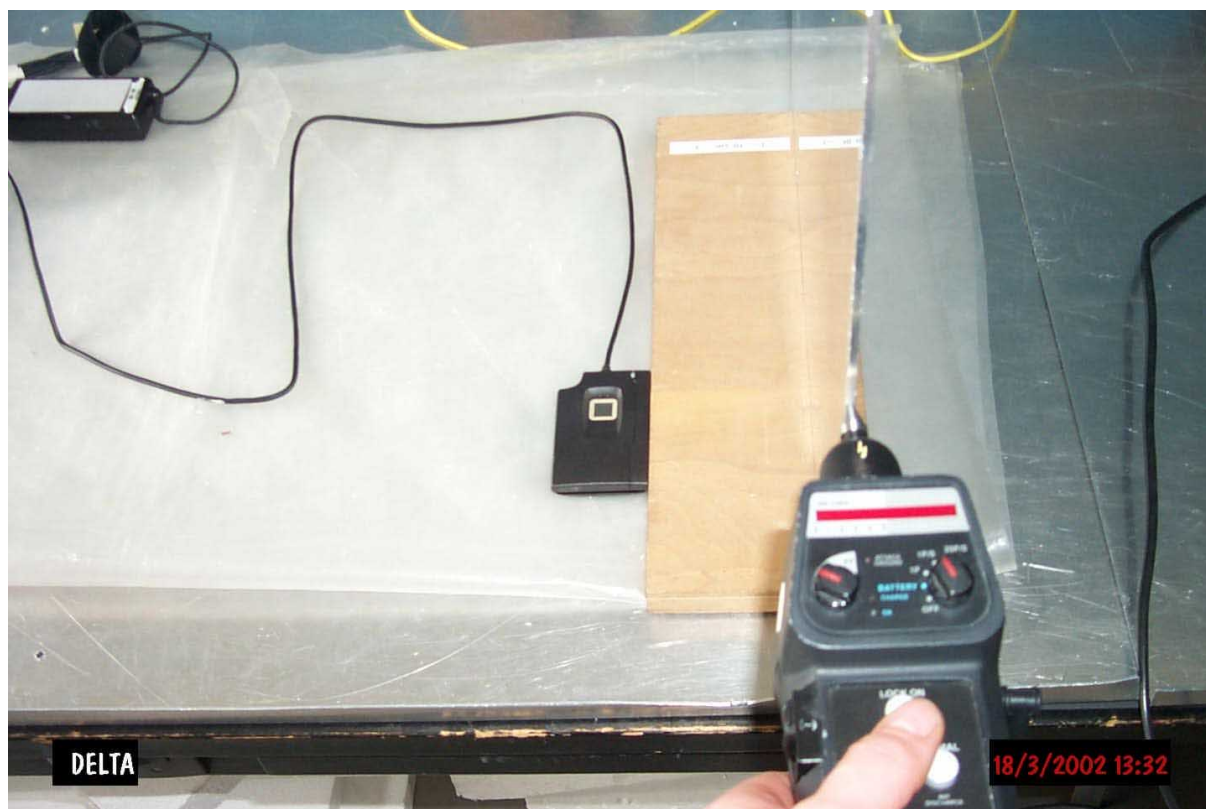


Photo A2.6 Electrostatic discharges on vertical coupling plane

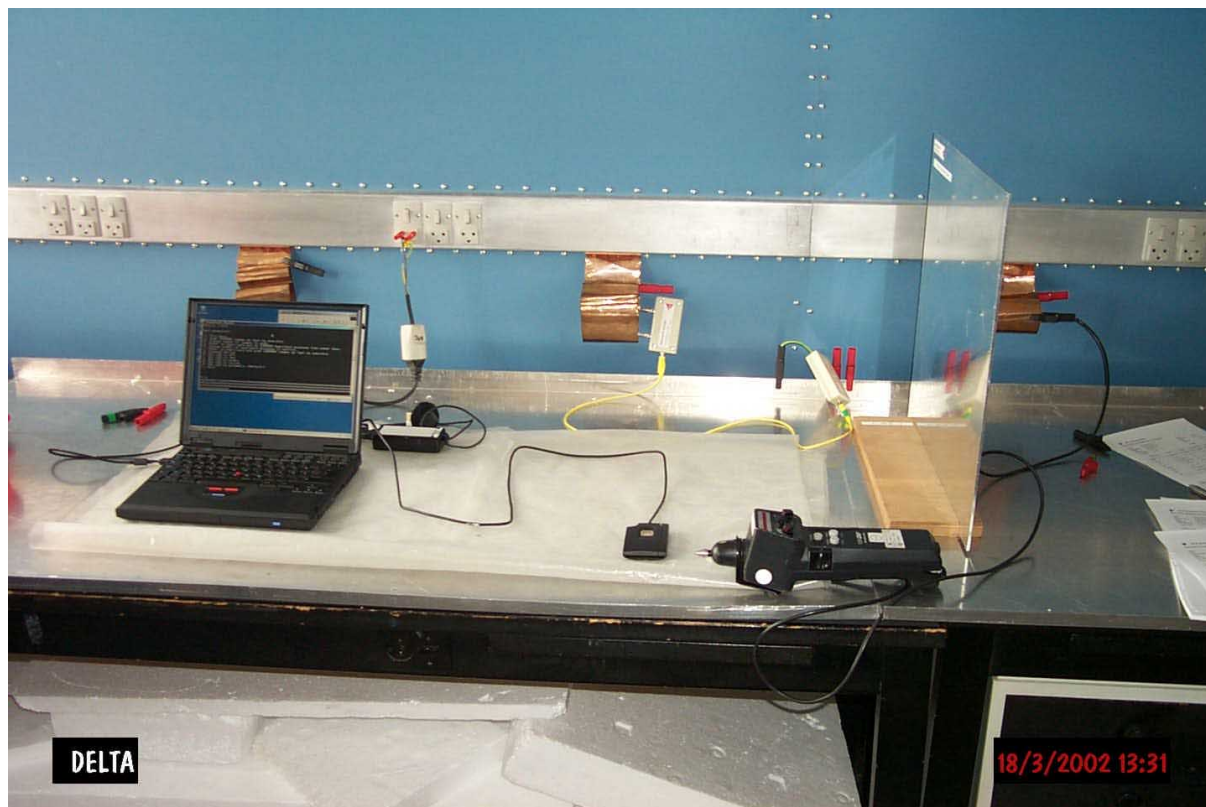


Photo A2.7 Electrostatic discharges general test set-up

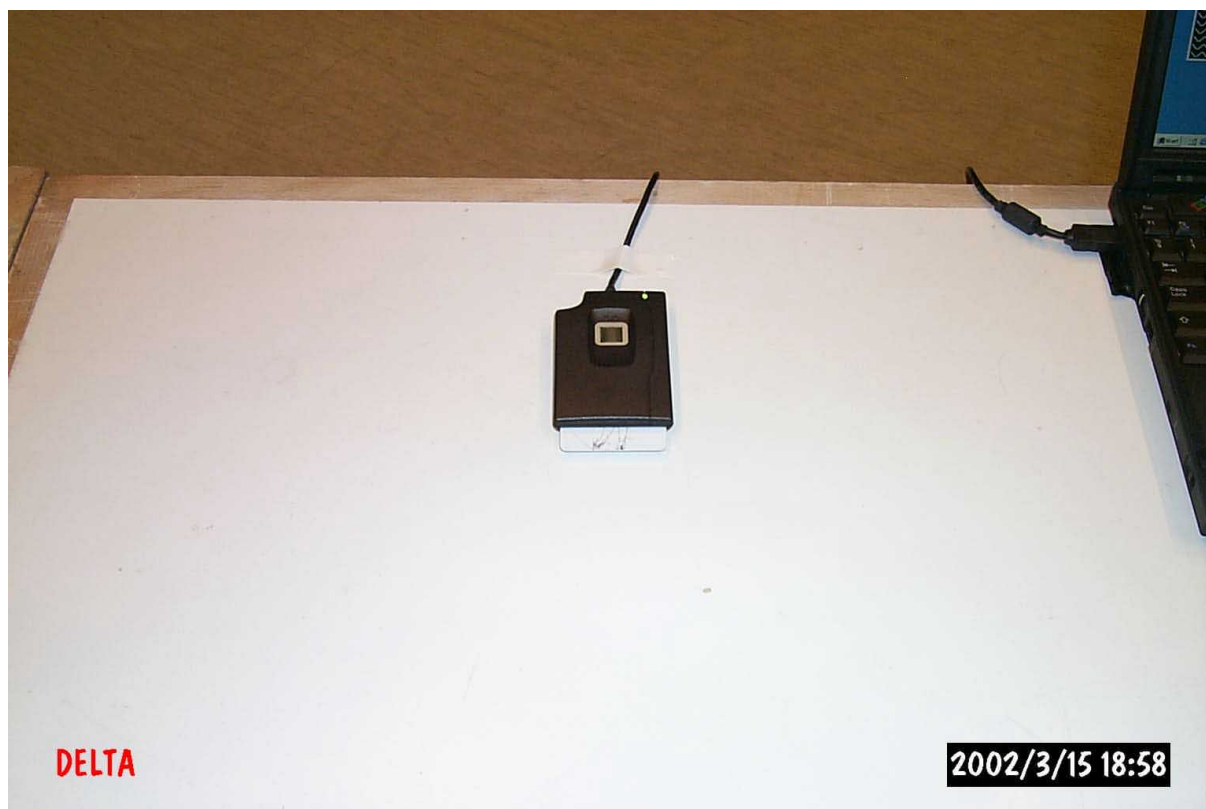


Photo A2.8 Test object in smartcard reading mode



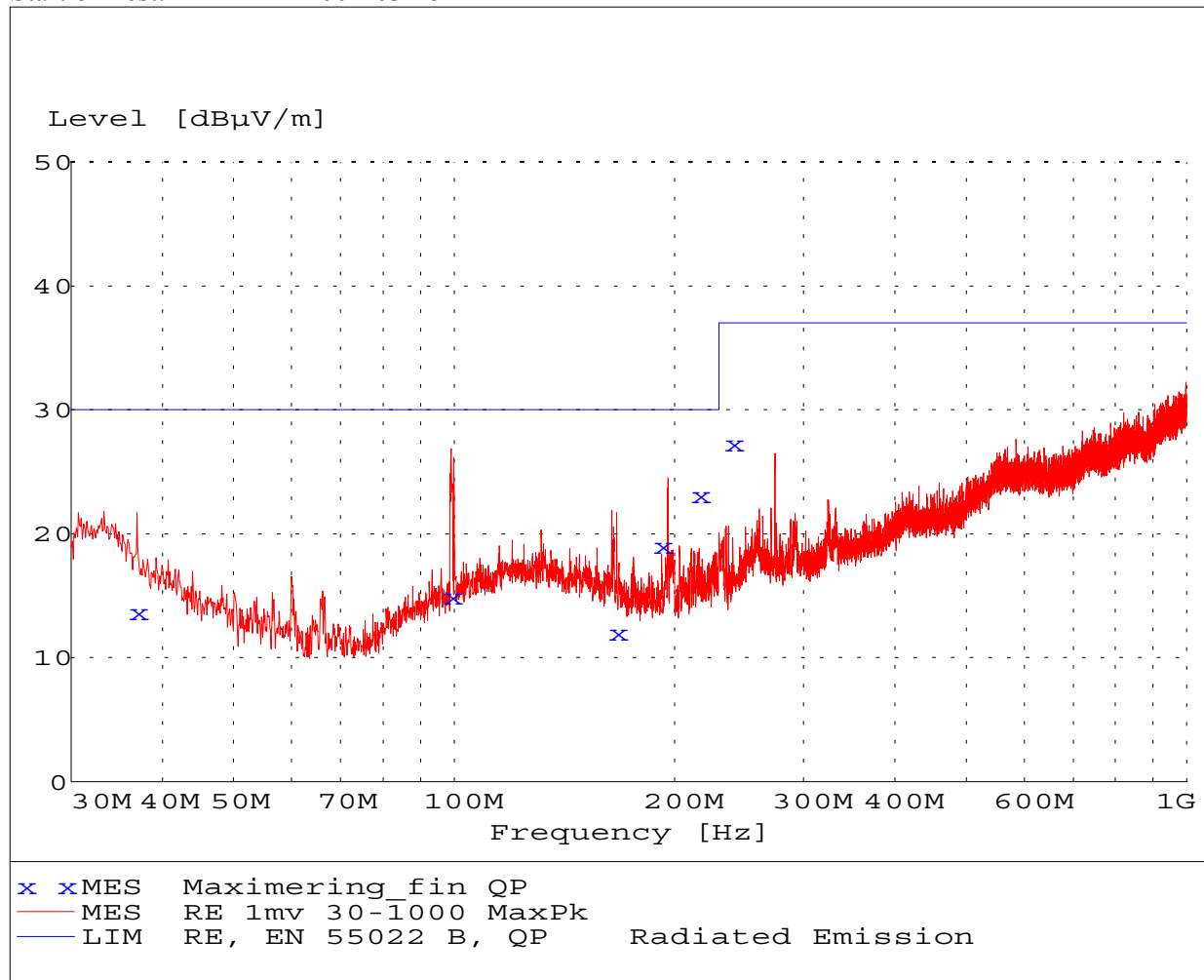
Photo A2.9 Test object in fingerprint scanning mode

Annex 3

***Test record sheets and photos
regarding measurements of radiated electromagnetic fields
EN 55022***

(6 pages)

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 1 meter vertical. 115 VAC. Fingerprint scanning mode.
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: EN 55022 Class B
 Comment: Sheet 1
 Start of Test: 2002-03-15

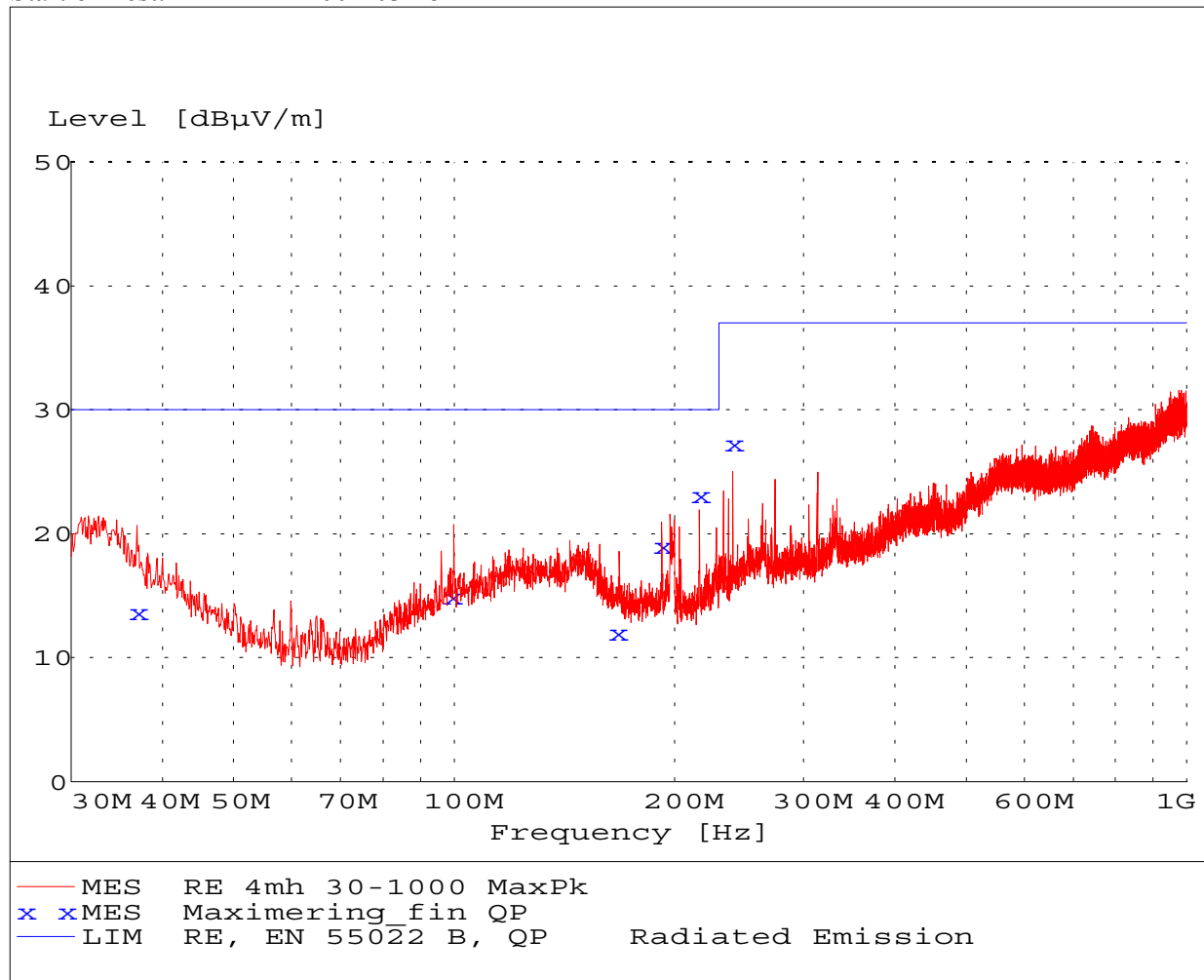


MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 17:17

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
36.87	13.70	15.40	30.00	16.30	111.00	59.00	Vertical
99.10	14.90	11.10	30.00	15.10	111.00	42.00	Vertical
166.60	12.00	11.10	30.00	18.00	111.00	138.00	Vertical
192.02	19.00	10.70	30.00	11.00	320.00	129.00	Horizontal
216.00	23.10	11.40	30.00	6.90	381.00	256.00	Horizontal
240.00	27.30	13.20	37.00	9.70	387.00	234.00	Horizontal

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 4 meter horizontal. 115 VAC. Fingerprint scanning mode.
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: EN 55022 Class B
 Comment: Sheet 2
 Start of Test: 2002-03-15

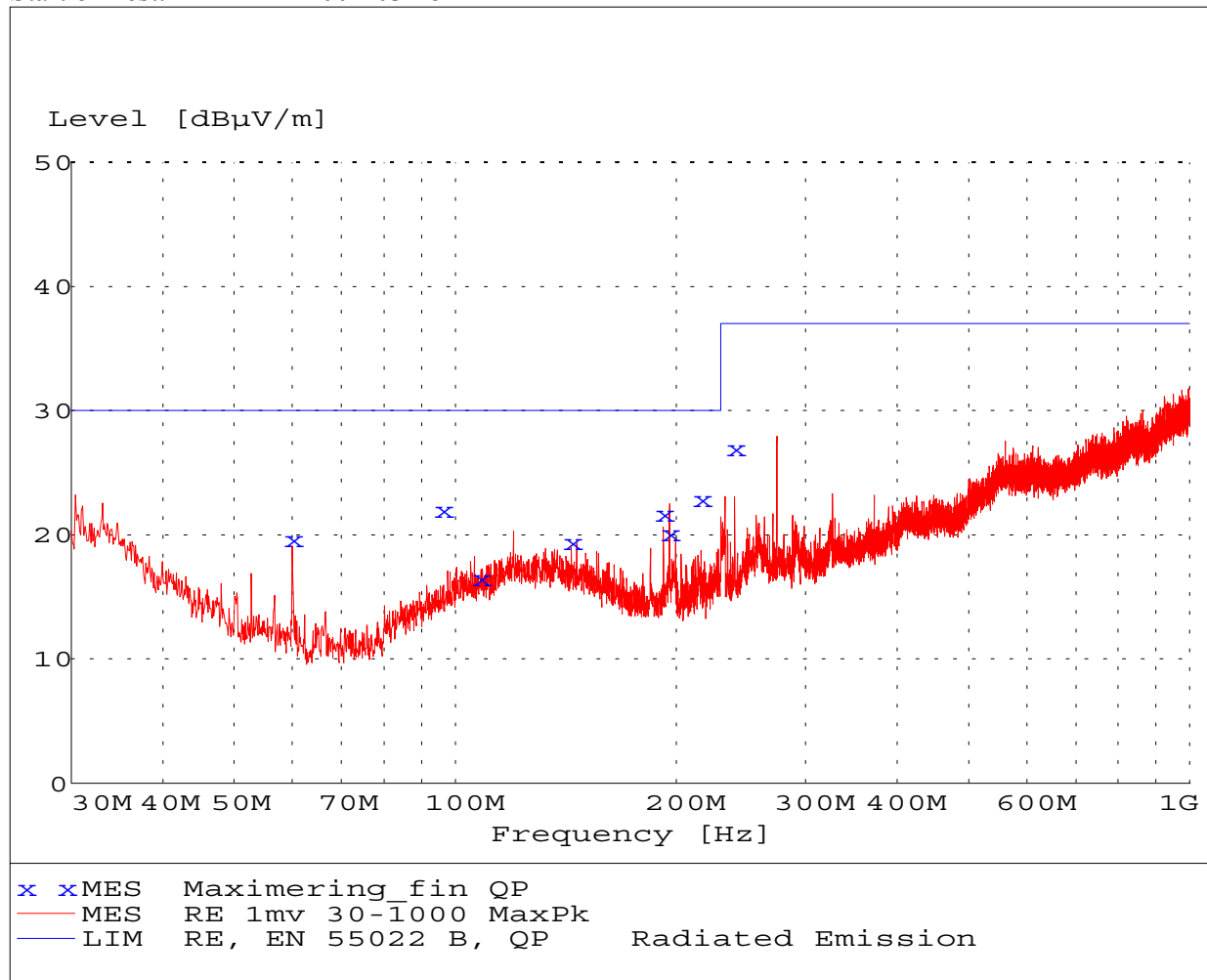


MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 17:17

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
36.87	13.70	15.40	30.00	16.30	111.00	59.00	Vertical
99.10	14.90	11.10	30.00	15.10	111.00	42.00	Vertical
166.60	12.00	11.10	30.00	18.00	111.00	138.00	Vertical
192.02	19.00	10.70	30.00	11.00	320.00	129.00	Horizontal
216.00	23.10	11.40	30.00	6.90	381.00	256.00	Horizontal
240.00	27.30	13.20	37.00	9.70	387.00	234.00	Horizontal

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 1 meter vertical. 115 VAC. Reading smartcard mode
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: EN 55022 Class B
 Comment: Sheet 3
 Start of Test: 2002-03-15

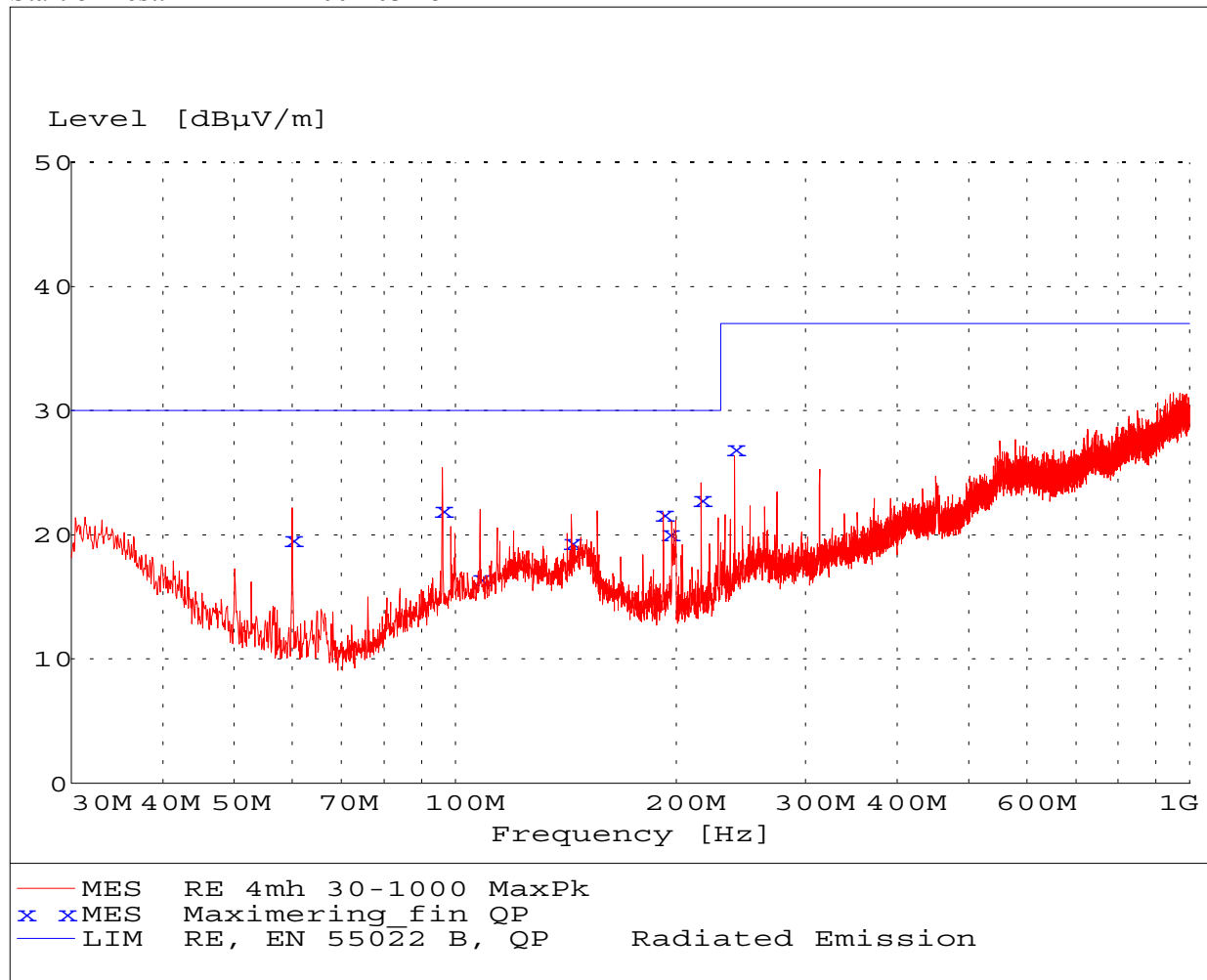


MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 18:54

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
60.00	19.60	7.30	30.00	10.40	308.00	4.00	Vertical
96.00	22.00	10.50	30.00	8.00	391.00	172.00	Horizontal
108.00	16.50	11.80	30.00	13.50	285.00	15.00	Horizontal
144.01	19.40	12.30	30.00	10.60	353.00	29.00	Horizontal
192.02	21.70	10.70	30.00	9.30	354.00	45.00	Horizontal
195.66	20.10	10.90	30.00	9.90	110.00	148.00	Vertical
216.00	22.90	11.40	30.00	7.10	387.00	46.00	Horizontal
240.02	26.90	13.20	37.00	10.10	390.00	30.00	Horizontal

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 4 meter horizontal. 115 VAC. Reading smartcard mode
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: EN 55022 Class B
 Comment: Sheet 4
 Start of Test: 2002-03-15



MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 18:54

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
60.00	19.60	7.30	30.00	10.40	308.00	4.00	Vertical
96.00	22.00	10.50	30.00	8.00	391.00	172.00	Horizontal
108.00	16.50	11.80	30.00	13.50	285.00	15.00	Horizontal
144.01	19.40	12.30	30.00	10.60	353.00	29.00	Horizontal
192.02	21.70	10.70	30.00	9.30	354.00	45.00	Horizontal
195.66	20.10	10.90	30.00	9.90	110.00	148.00	Vertical
216.00	22.90	11.40	30.00	7.10	387.00	46.00	Horizontal
240.02	26.90	13.20	37.00	10.10	390.00	30.00	Horizontal

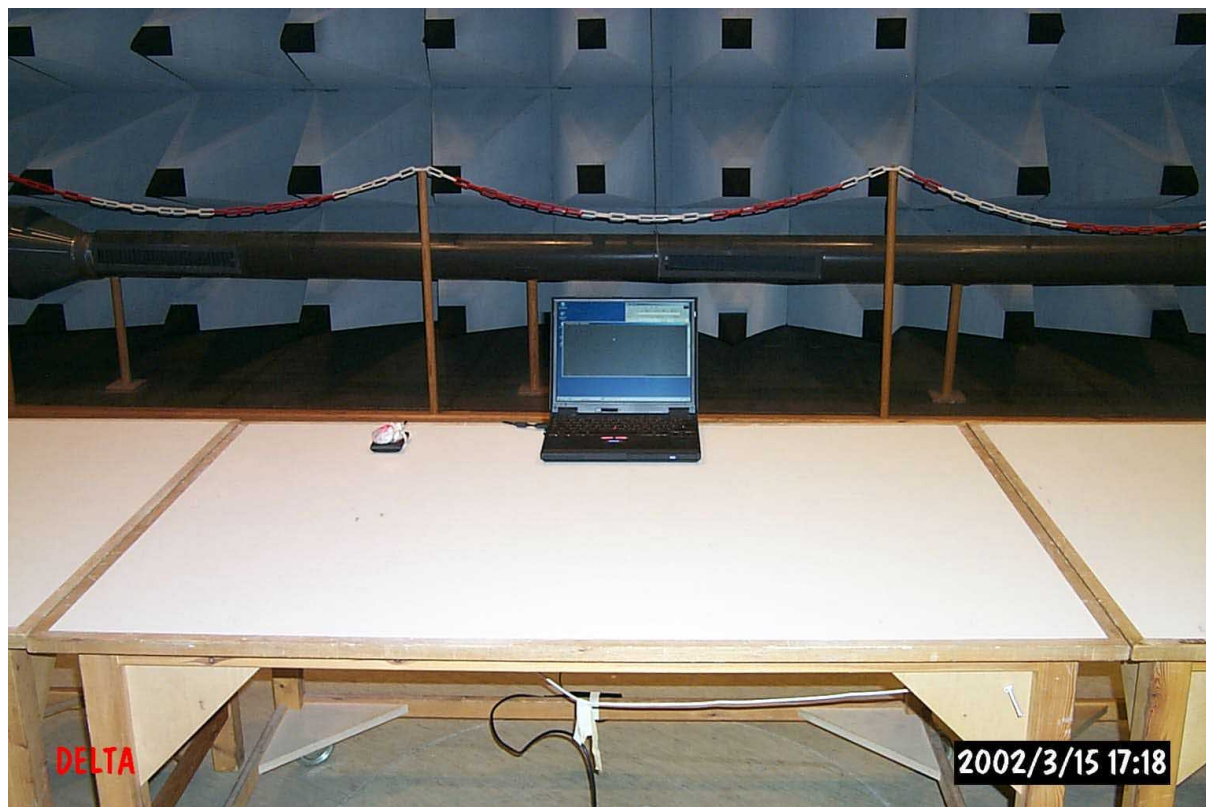


Photo A3.1 Radiated electromagnetic field test. Test object in fingerprint scanning mode

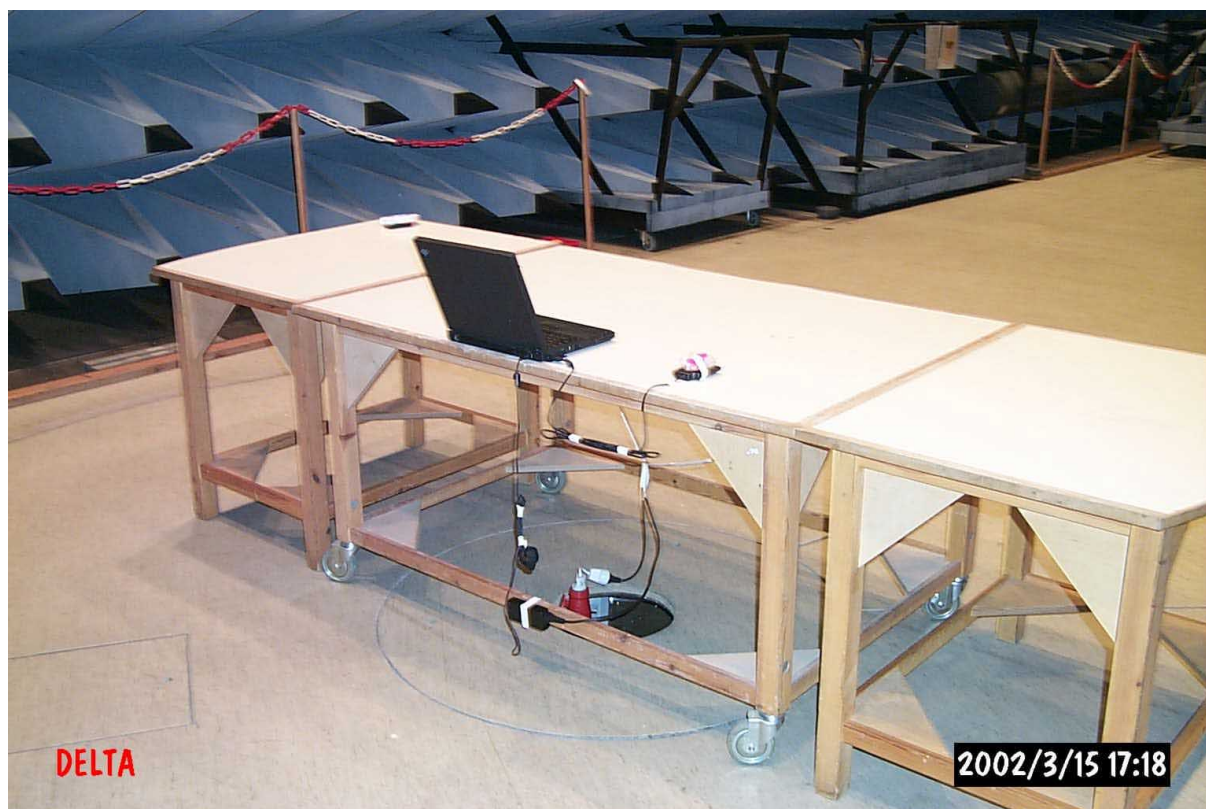


Photo A3.2 Radiated electromagnetic field test. Test object in fingerprint scanning mode

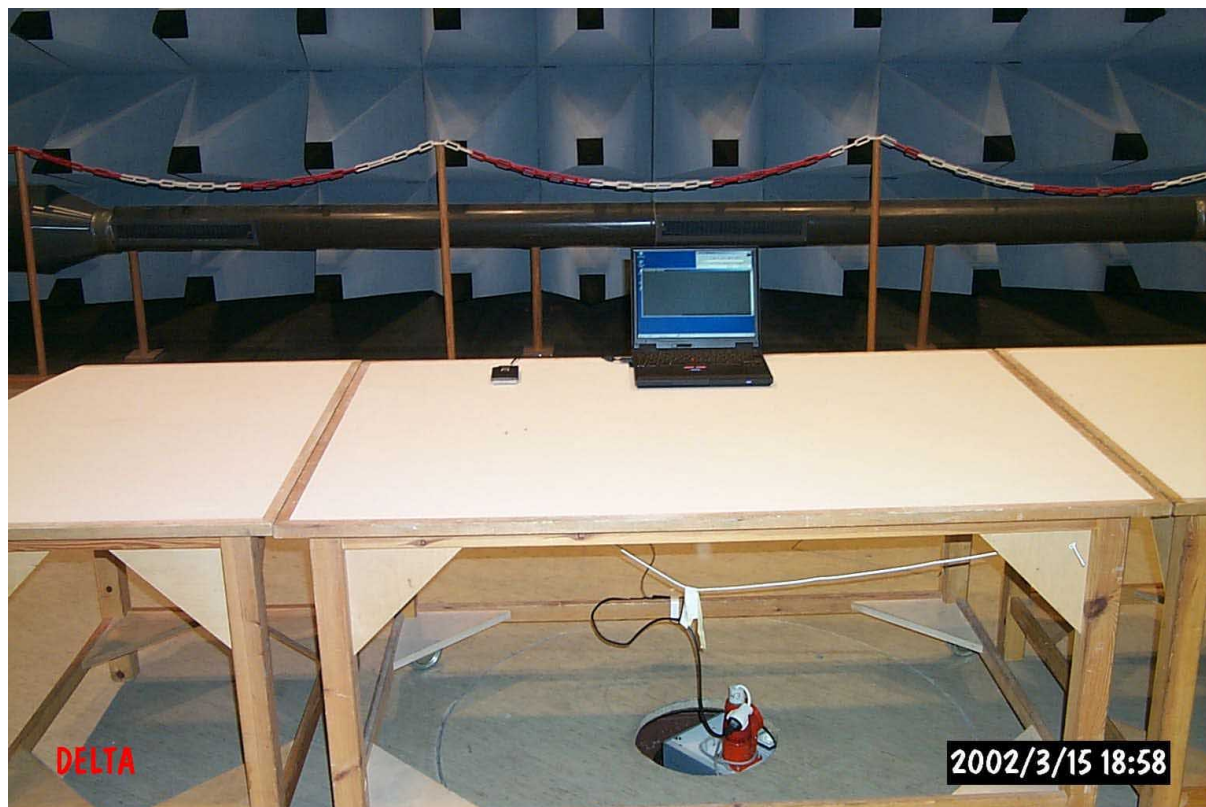


Photo A3.3 Radiated electromagnetic field test. Test object in smartcard reading mode

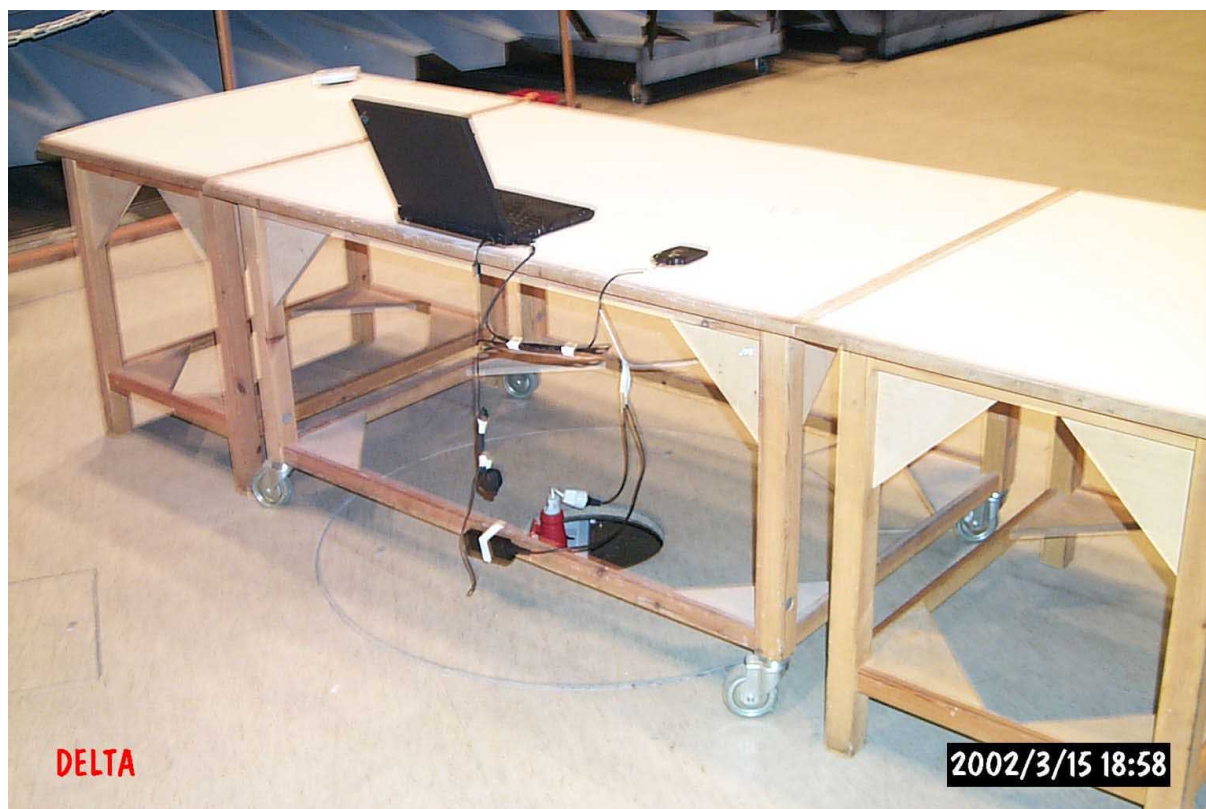


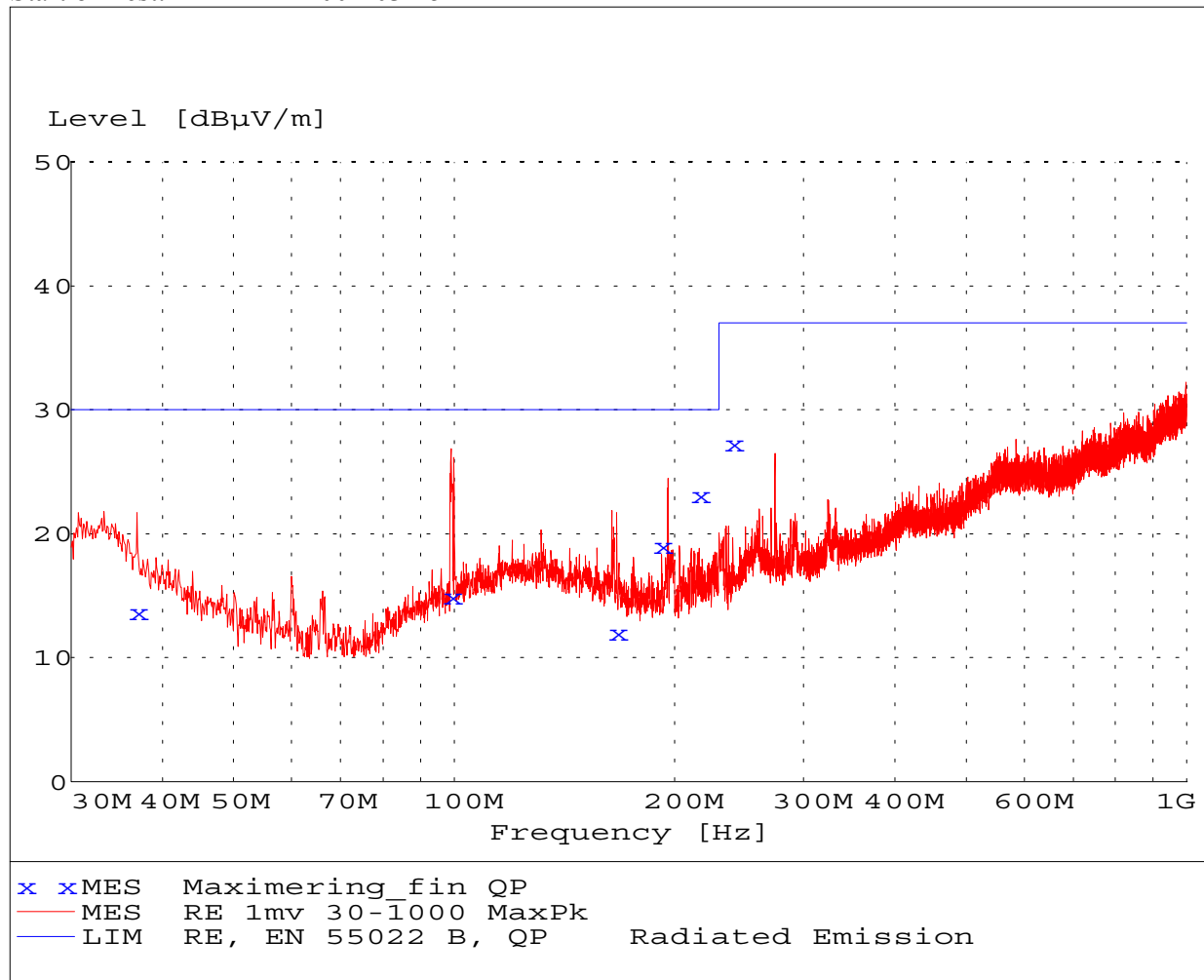
Photo A3.4 Radiated electromagnetic field test. Test object in smartcard reading mode

Annex 4

***Test record sheets and photos
regarding measurements of radiated electromagnetic fields
FCC***

(6 pages)

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 1 meter vertical. 115 VAC. Fingerprint scanning mode
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: FCC Class B demonstrated by compliance with EN 55022 (CISPR22)
 Comment: Sheet 1
 Start of Test: 2002-03-15

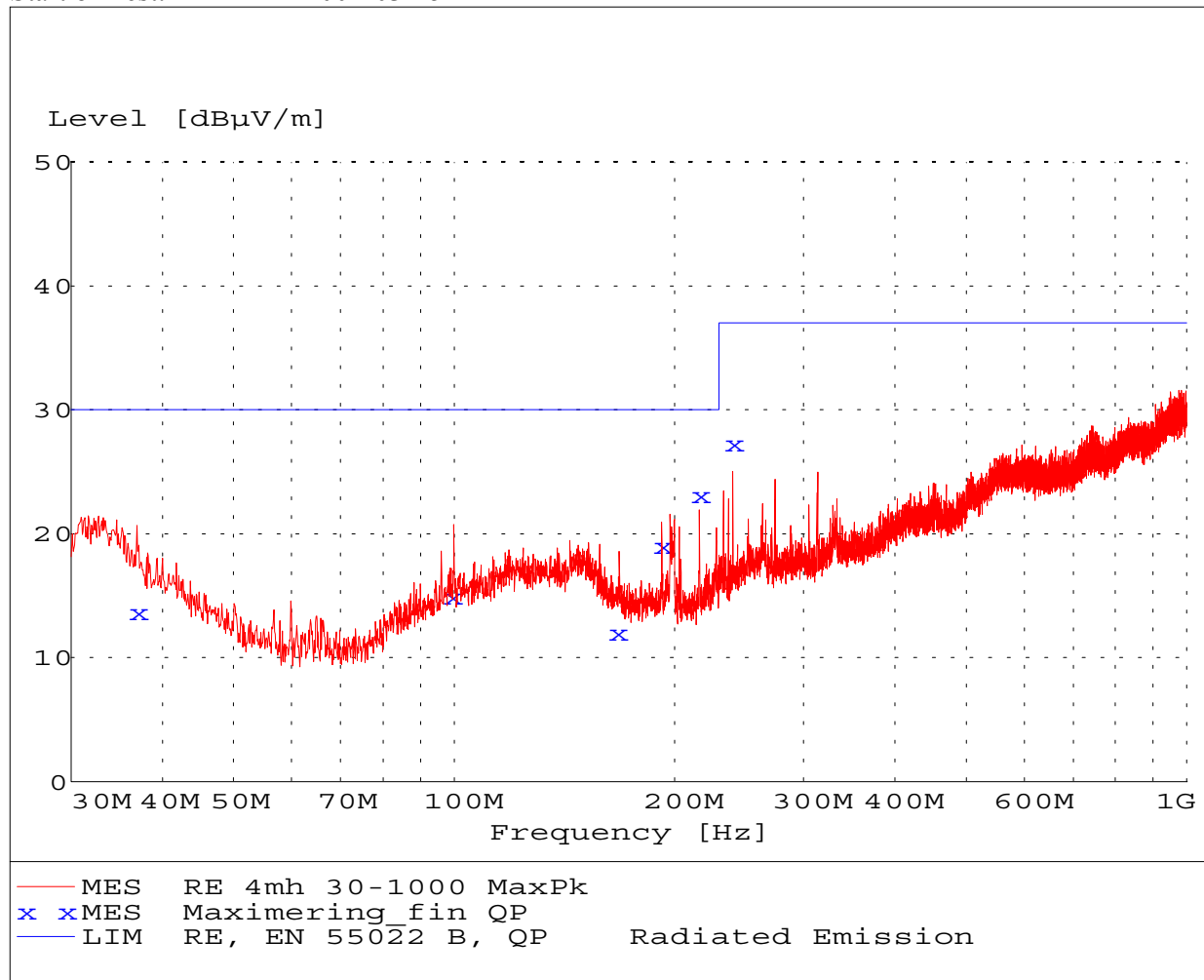


MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 17:17

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
36.87	13.70	15.40	30.00	16.30	111.00	59.00	Vertical
99.10	14.90	11.10	30.00	15.10	111.00	42.00	Vertical
166.60	12.00	11.10	30.00	18.00	111.00	138.00	Vertical
192.02	19.00	10.70	30.00	11.00	320.00	129.00	Horizontal
216.00	23.10	11.40	30.00	6.90	381.00	256.00	Horizontal
240.00	27.30	13.20	37.00	9.70	387.00	234.00	Horizontal

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 4 meter horizontal. 115 VAC. Fingerprint scanning mode
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: FCC Class B demonstrated by compliance with EN 55022 (CISPR22)
 Comment: Sheet 2
 Start of Test: 2002-03-15

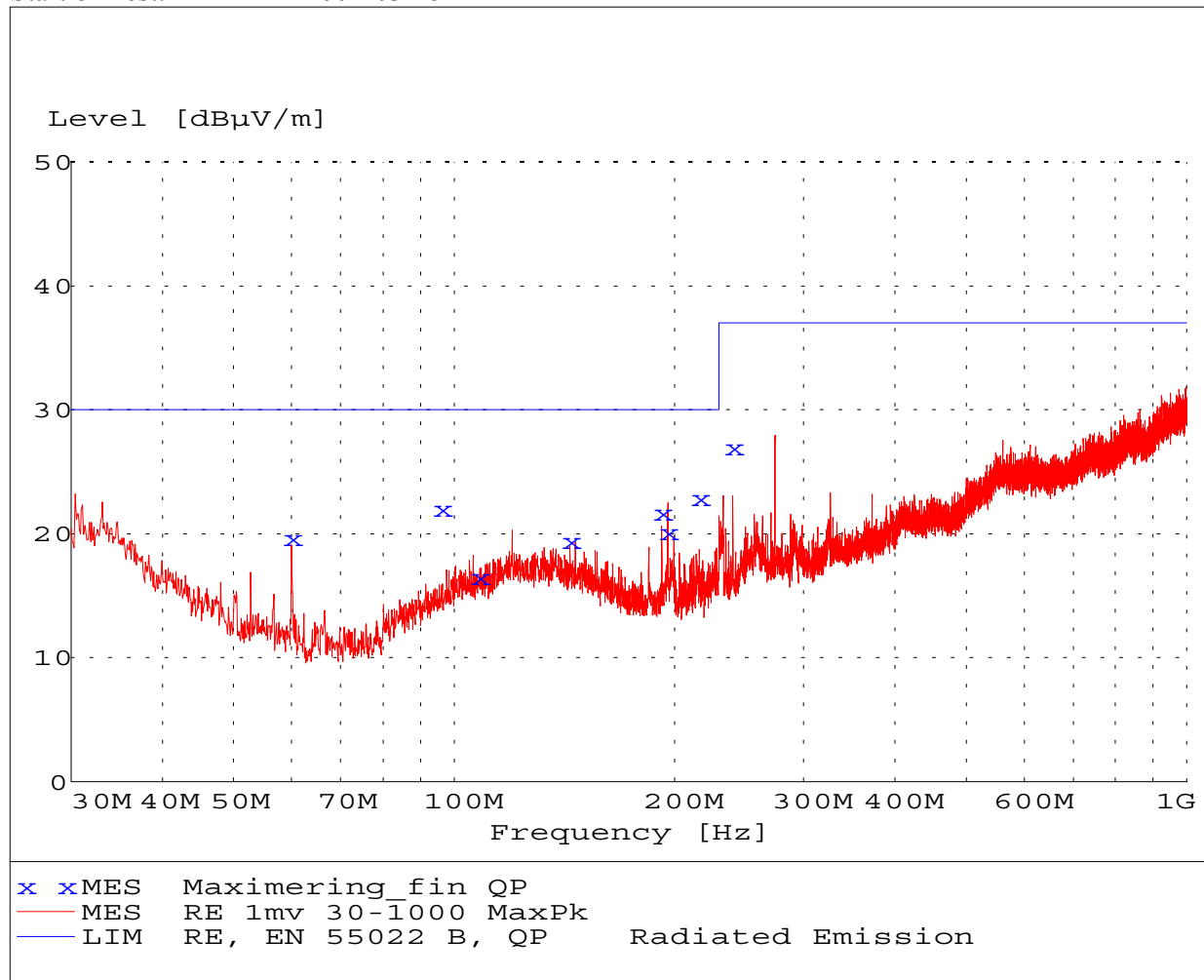


MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 17:17

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
36.87	13.70	15.40	30.00	16.30	111.00	59.00	Vertical
99.10	14.90	11.10	30.00	15.10	111.00	42.00	Vertical
166.60	12.00	11.10	30.00	18.00	111.00	138.00	Vertical
192.02	19.00	10.70	30.00	11.00	320.00	129.00	Horizontal
216.00	23.10	11.40	30.00	6.90	381.00	256.00	Horizontal
240.00	27.30	13.20	37.00	9.70	387.00	234.00	Horizontal

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 1 meter vertical. 115 VAC. Reading smartcard mode
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: FCC Class B demonstrated by compliance with EN 55022 (CISPR22)
 Comment: Sheet 3
 Start of Test: 2002-03-15

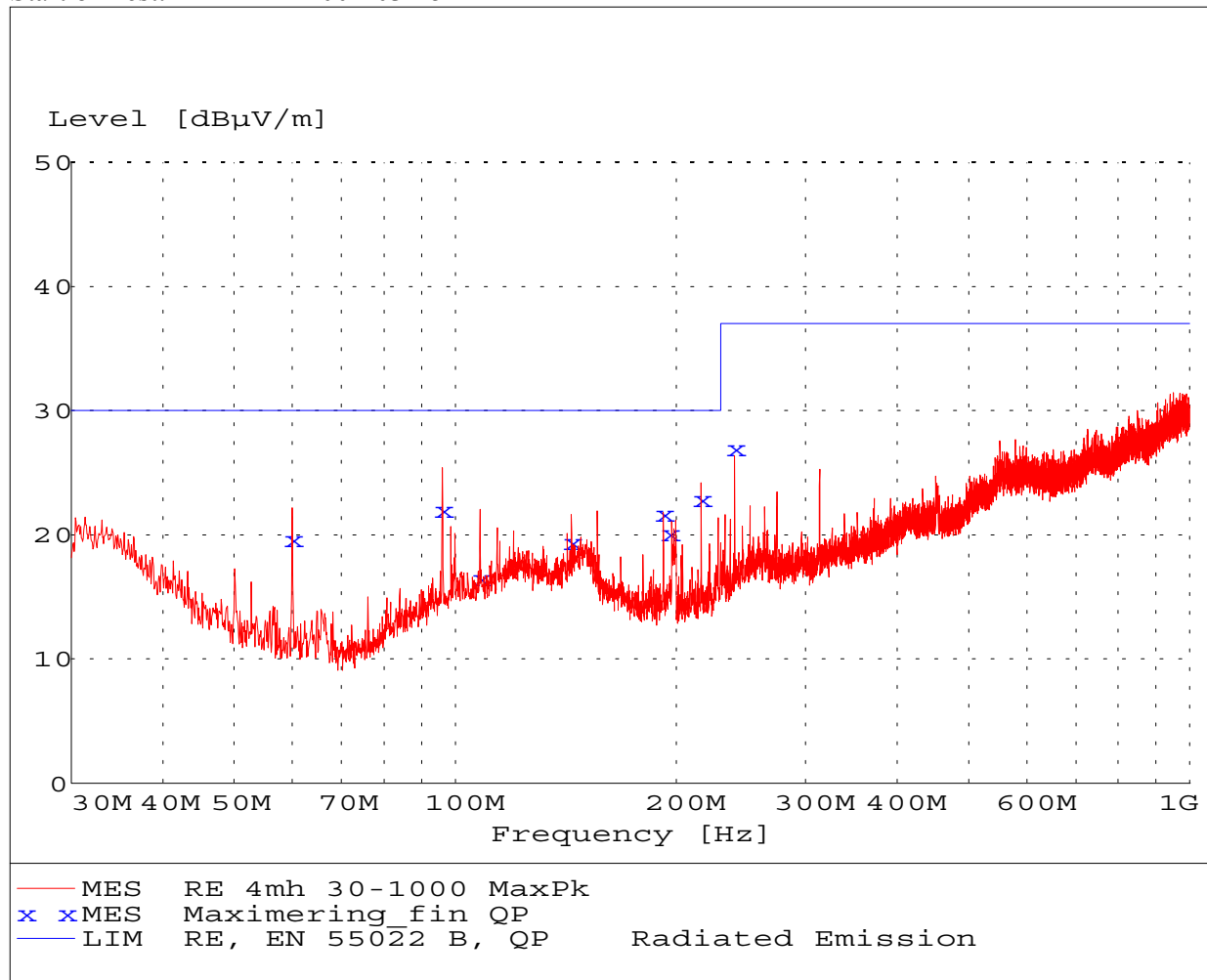


MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 18:54

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
60.00	19.60	7.30	30.00	10.40	308.00	4.00	Vertical
96.00	22.00	10.50	30.00	8.00	391.00	172.00	Horizontal
108.00	16.50	11.80	30.00	13.50	285.00	15.00	Horizontal
144.01	19.40	12.30	30.00	10.60	353.00	29.00	Horizontal
192.02	21.70	10.70	30.00	8.30	354.00	45.00	Horizontal
195.66	20.10	10.90	30.00	9.90	110.00	148.00	Vertical
216.00	22.90	11.40	30.00	7.10	387.00	46.00	Horizontal
240.02	26.90	13.20	37.00	10.10	390.00	30.00	Horizontal

EUT: Precise 100 MC (serial# 2)
 Manufacturer: Precise Biometrics AB
 Operating Condition: Ant. 4 meter horizontal. 115 VAC. Reading smartcard mode
 Test Site: EMC-5
 Operator: JN - K222311
 Test Specification: FCC Class B demonstrated by compliance with EN 55022 (CISPR22)
 Comment: Sheet 4
 Start of Test: 2002-03-15



MEASUREMENT RESULT: "Maximering_fin QP"

03/15/2002 18:54

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
60.00	19.60	7.30	30.00	10.40	308.00	4.00	Vertical
96.00	22.00	10.50	30.00	8.00	391.00	172.00	Horizontal
108.00	16.50	11.80	30.00	13.50	285.00	15.00	Horizontal
144.01	19.40	12.30	30.00	10.60	353.00	29.00	Horizontal
192.02	21.70	10.70	30.00	8.30	354.00	45.00	Horizontal
195.66	20.10	10.90	30.00	9.90	110.00	148.00	Vertical
216.00	22.90	11.40	30.00	7.10	387.00	46.00	Horizontal
240.020	26.90	13.20	37.00	10.10	390.00	30.00	Horizontal

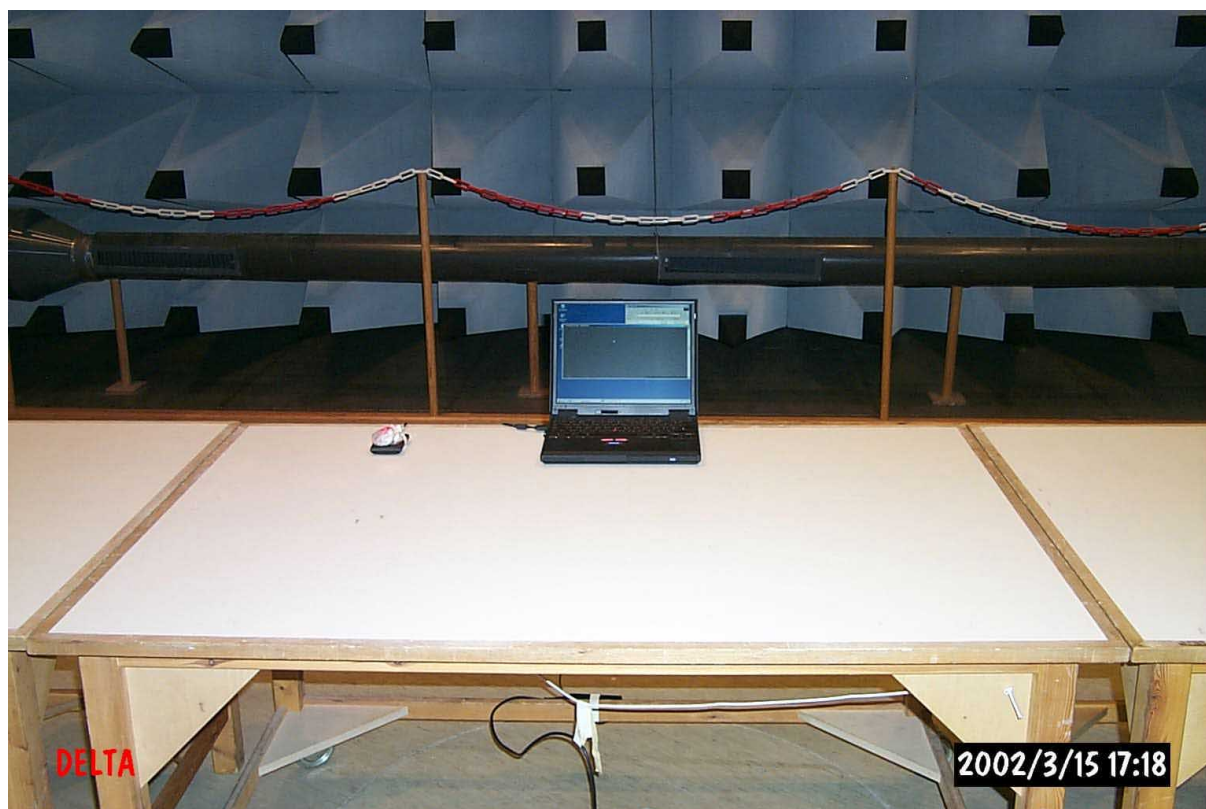


Photo A4.1 Radiated electromagnetic field test. Test object in fingerprint scanning mode

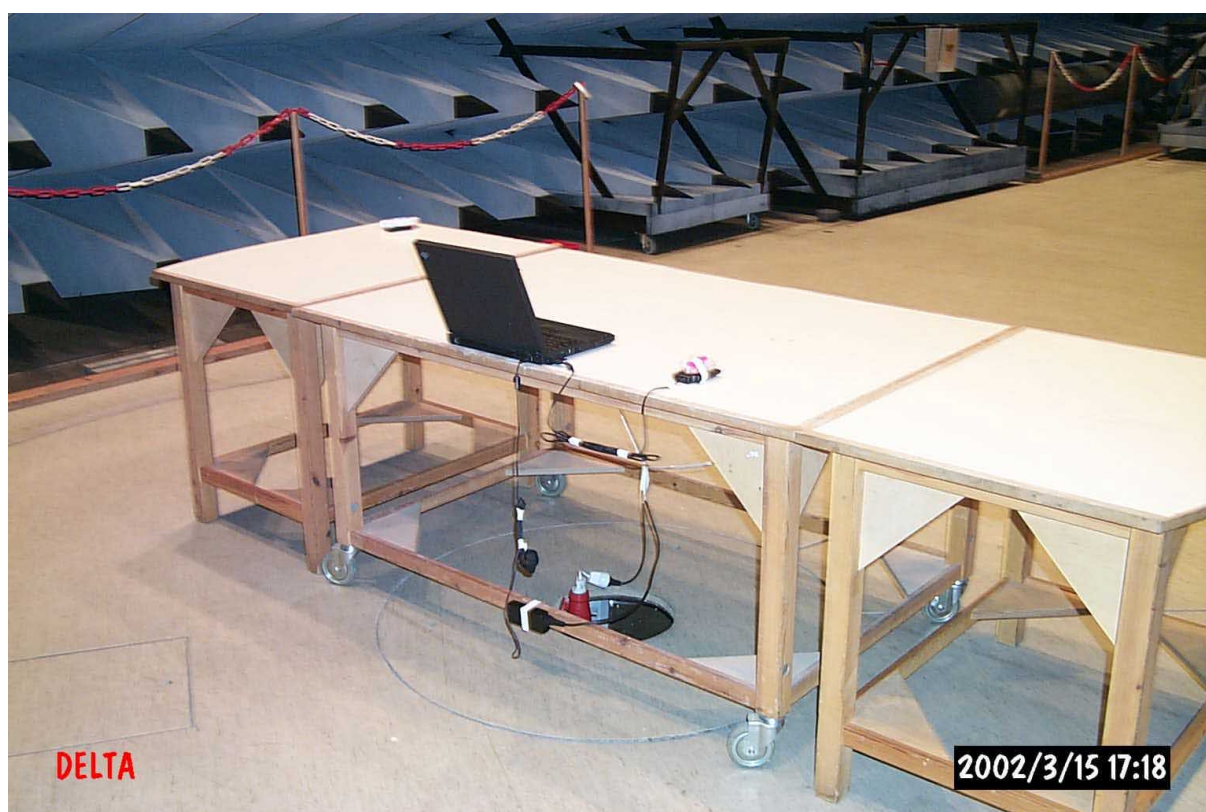


Photo A4.2 Radiated electromagnetic field test. Test object in fingerprint scanning mode

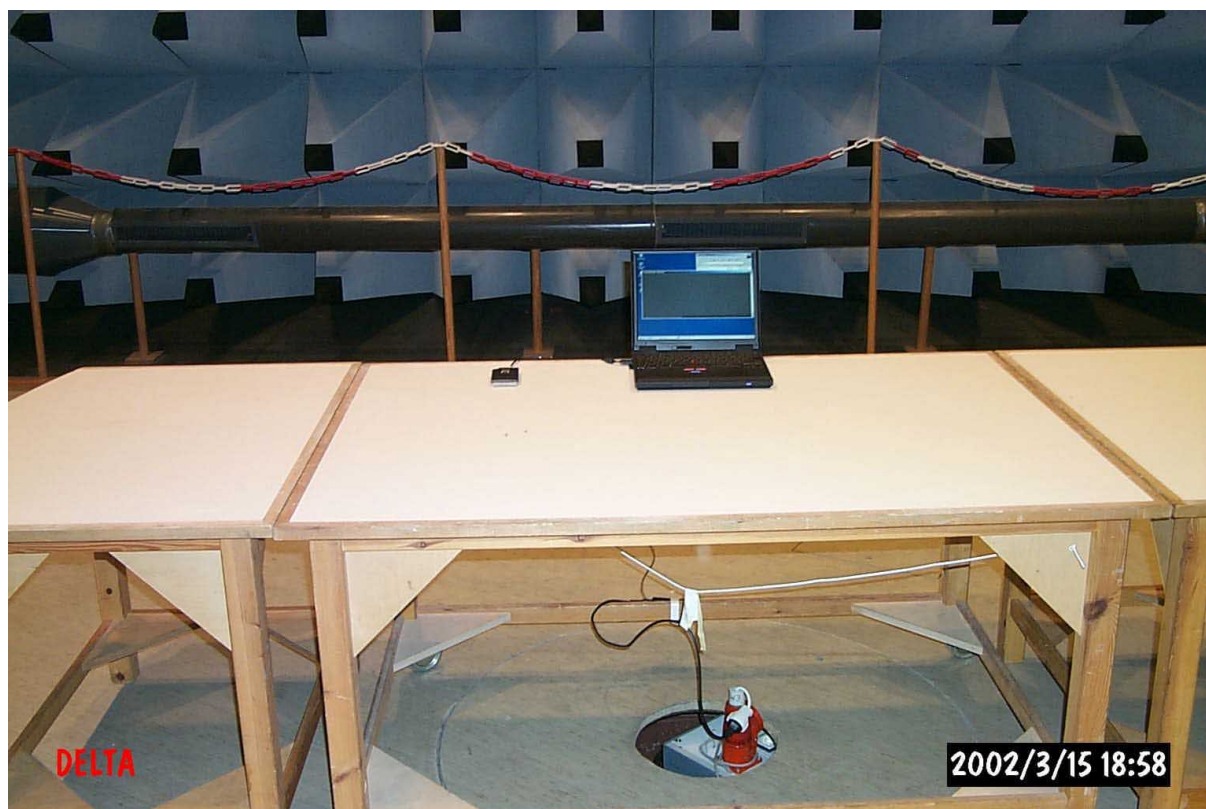


Photo A4.3 Radiated electromagnetic field test. Test object in smartcard reading mode

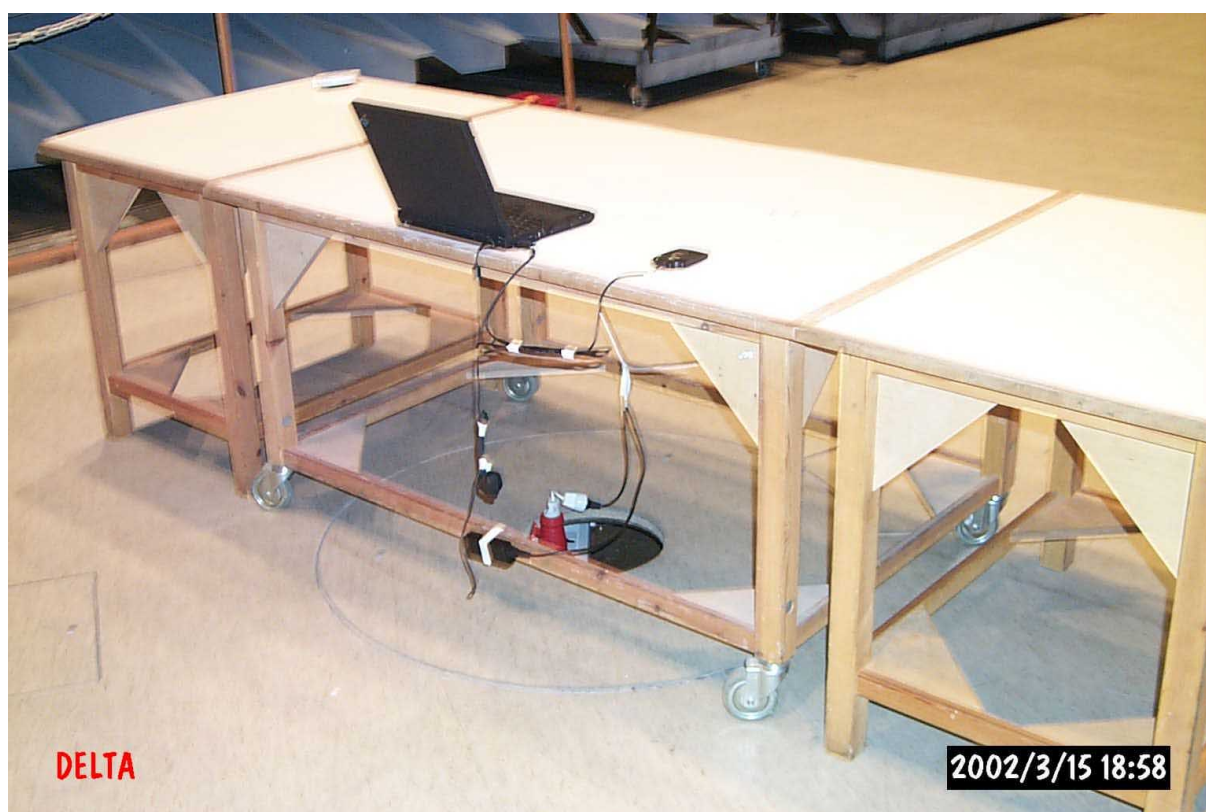


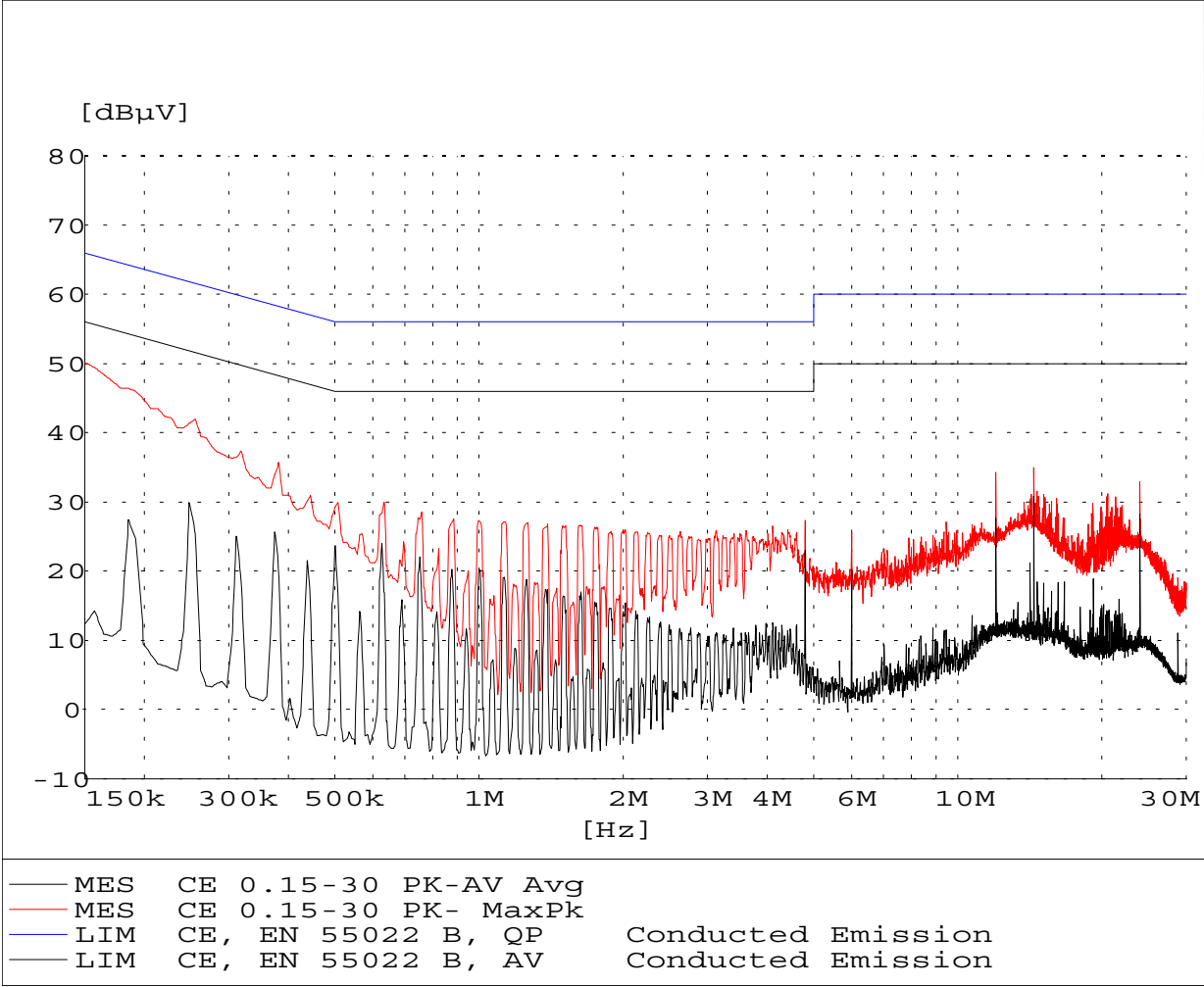
Photo A4.4 Radiated electromagnetic field test. Test object in smartcard reading mode

Annex 5

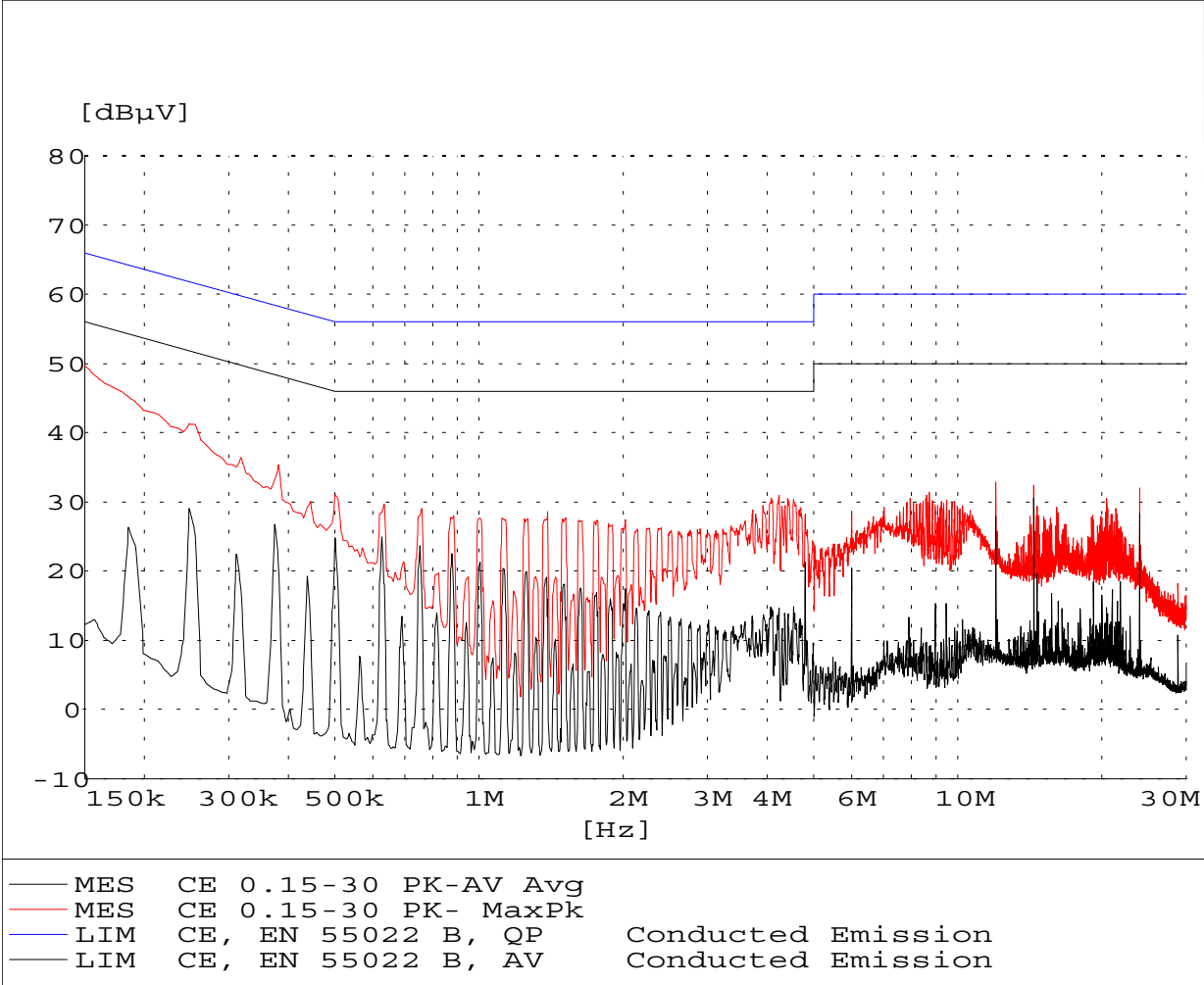
***Test record sheets and photos
regarding measurements of AC mains conducted emission
EN 55022***

(6 pages)

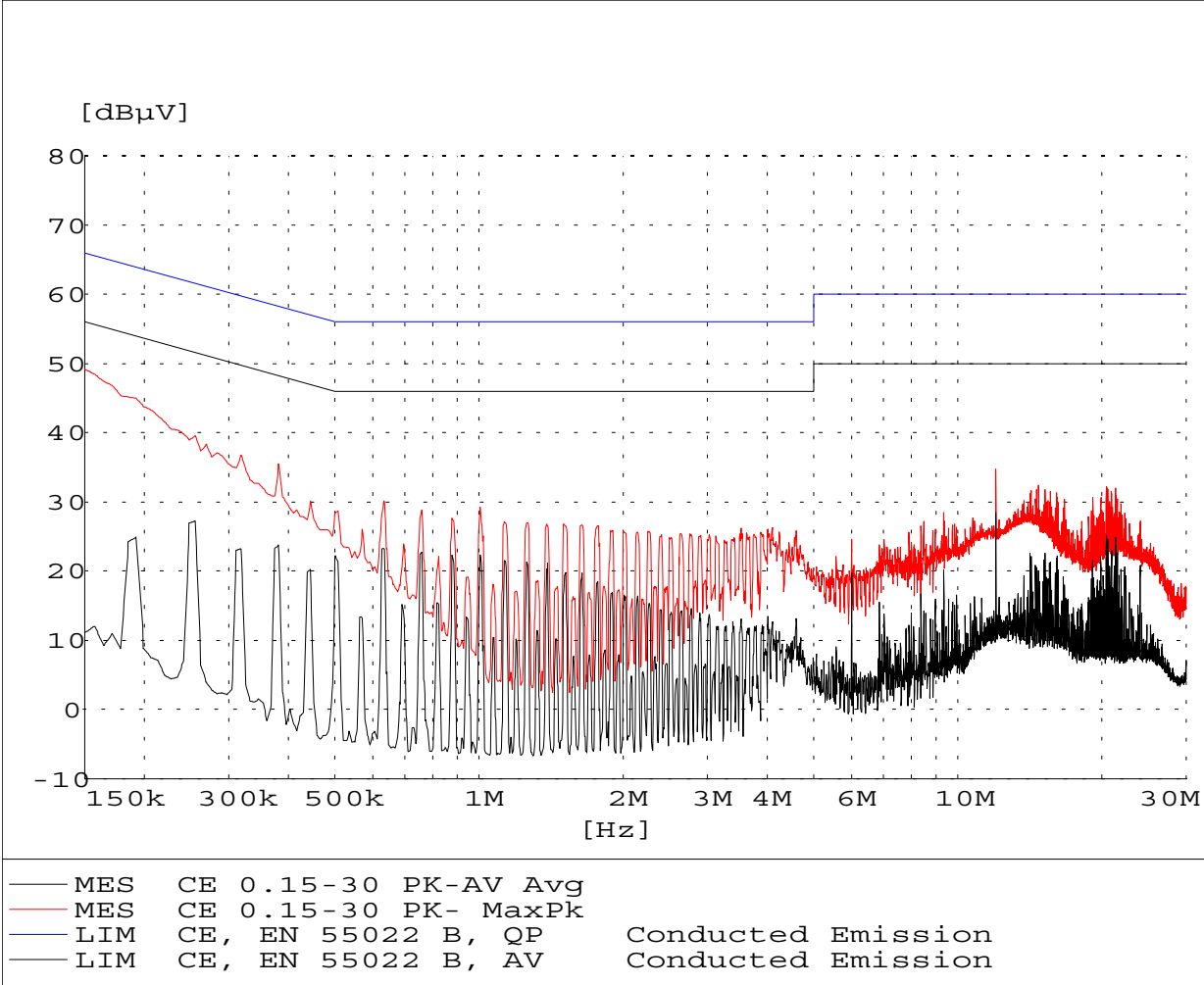
EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Neutral. 115 VAC. Reading smartcard mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: EN 55022 Class B
Comment: Sheet 1
Start of Test: 2002-05-03



EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Line 1. 115 VAC. Reading smartcard mode.
Test Site: EMC-5
Operator: JN - K222311
Test Specification: EN 55022 class B
Comment: Sheet 2
Start of Test: 2002-05-03



EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Neutral. 115 VAC. Fingerprint scanning mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: EN 55022 Class B
Comment: Sheet 3
Start of Test: 2002-05-03



EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Line 1. 115 VAC. Fingerprint scanning mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: EN 55022 Class B
Comment: Sheet 4
Start of Test: 2002-05-03

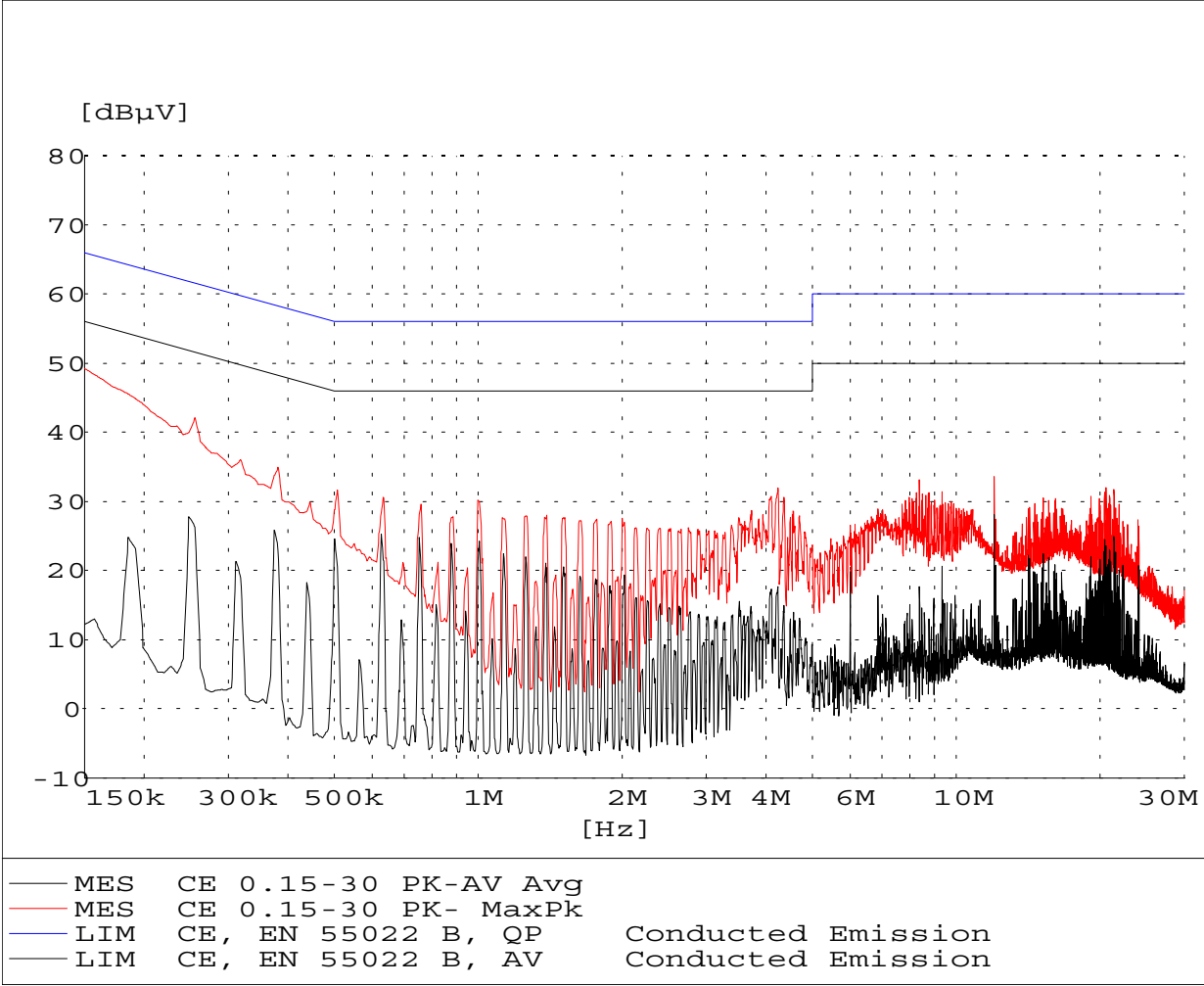




Photo A5.1 AC mains conducted emission. Test object in smartcard reading mode



Photo A5.2 AC mains conducted emission. Test object in smartcard reading mode



Photo A5.3 AC mains conducted emission. Test object in fingerprint scanning mode



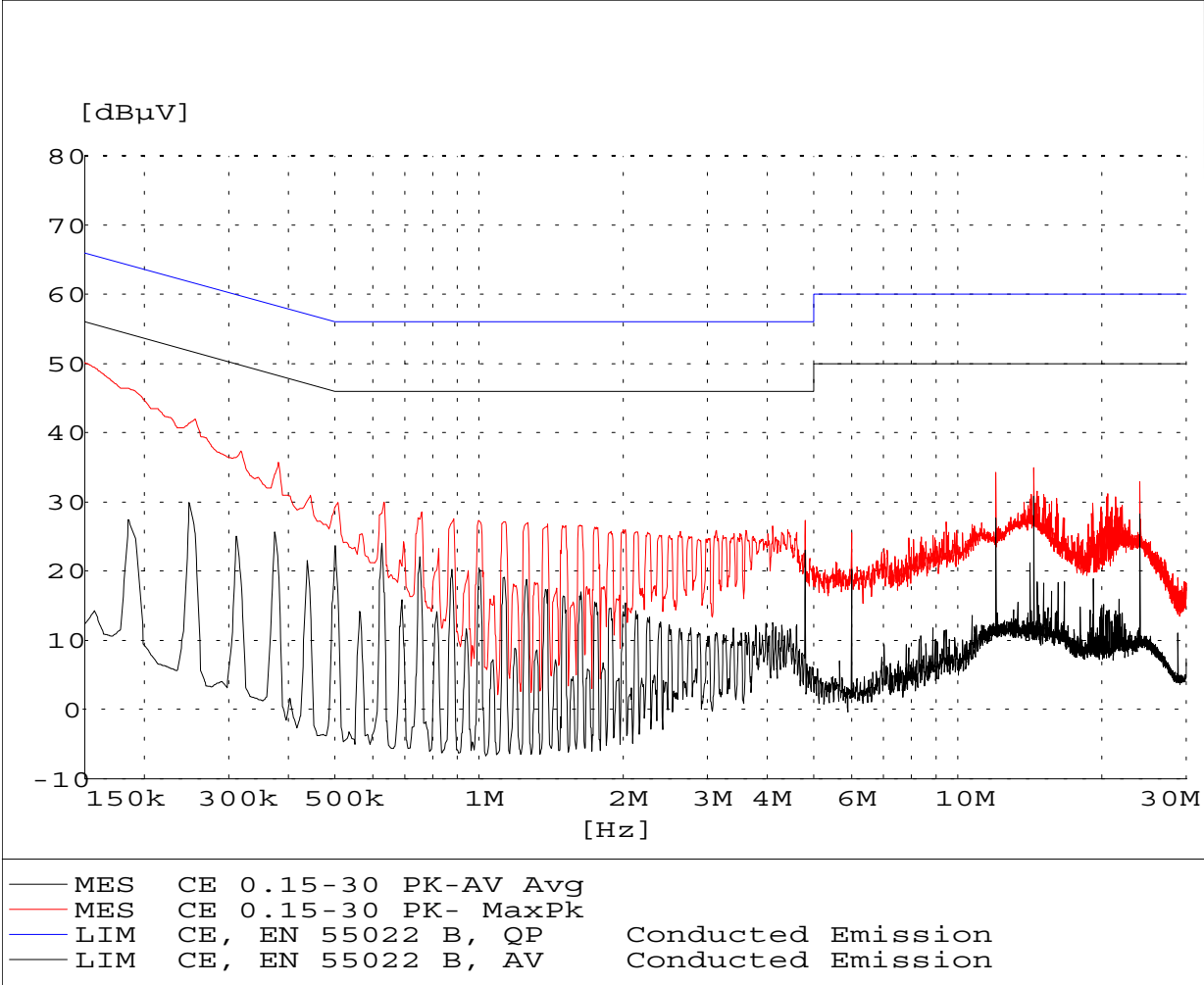
Photo A5.4 AC mains conducted emission. Test object in fingerprint scanning mode

Annex 6

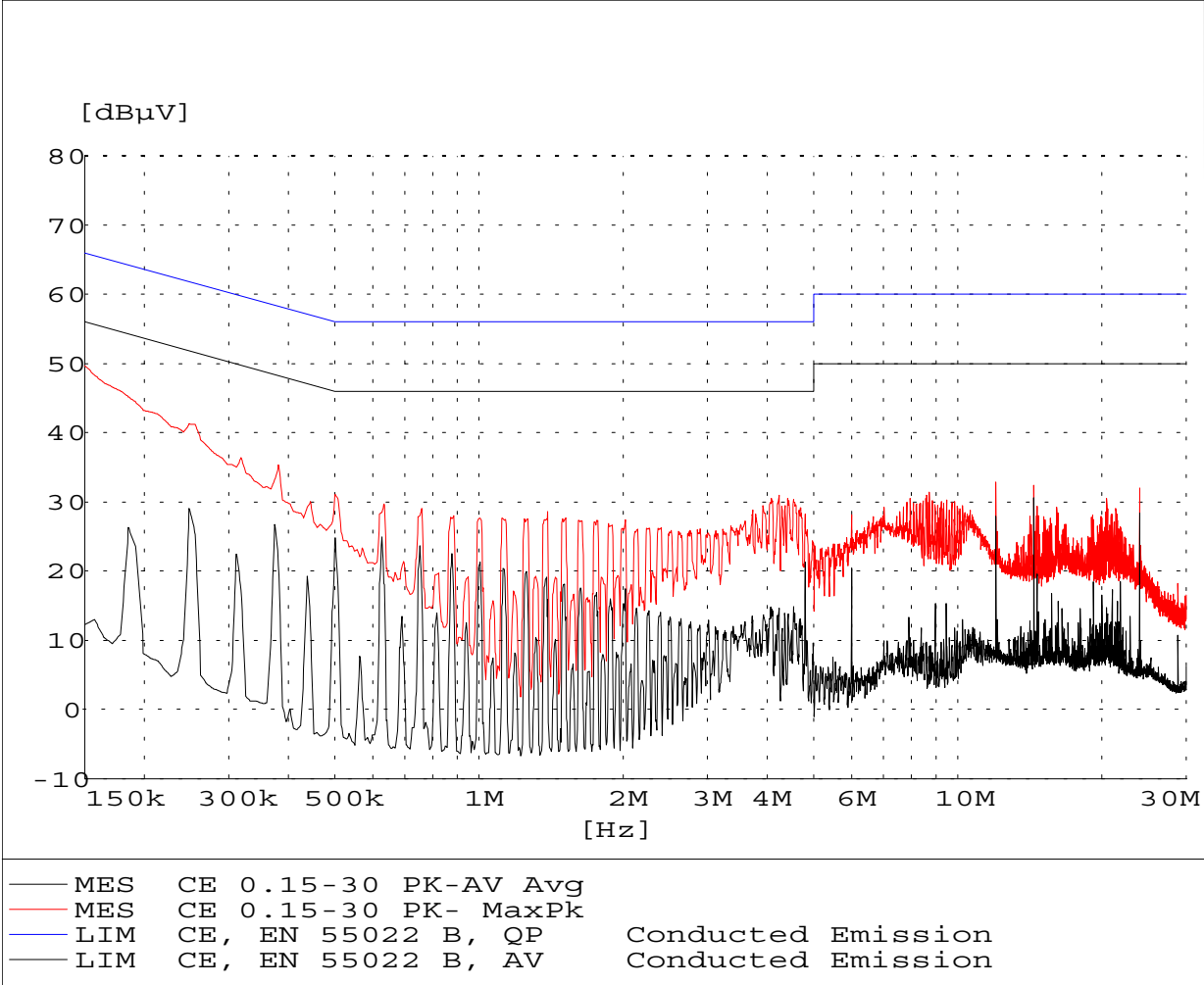
***Test record sheets and photos
regarding measurements of AC mains conducted emission
FCC***

(6 pages)

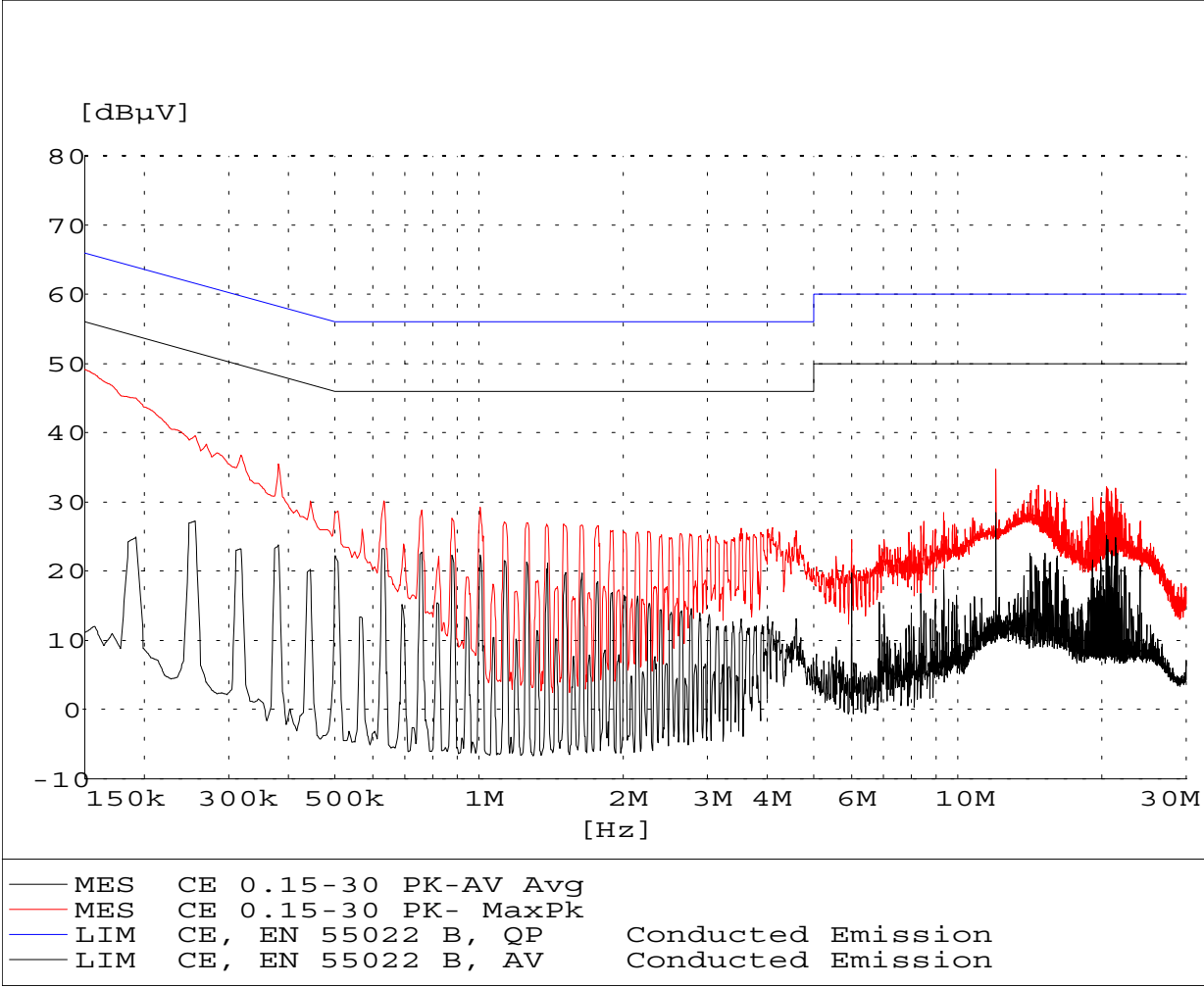
EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Neutral. 115 VAC. Reading smartcard mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: FCC Class B (EN 55022 Class B)
Comment: Sheet 1
Start of Test: 2002-05-03



EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Line 1. 115 VAC. Reading smartcard mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: FCC Class B (EN 55022 Class B)
Comment: Sheet 2
Start of Test: 2002-05-03



EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Neutral. 115 VAC. Fingerprint scanning mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: FCC Class B (EN 55022 Class B)
Comment: Sheet 3
Start of Test: 2002-05-03



EUT: Precise 100 MC (serial# 2)
Manufacturer: Precise Biometrics AB
Operating Condition: Line no: Line 1. 115 VAC. Fingerprint scanning mode
Test Site: EMC-5
Operator: JN - K222311
Test Specification: FCC Class B (EN 55022 Class B)
Comment: Sheet 4
Start of Test: 2002-05-03

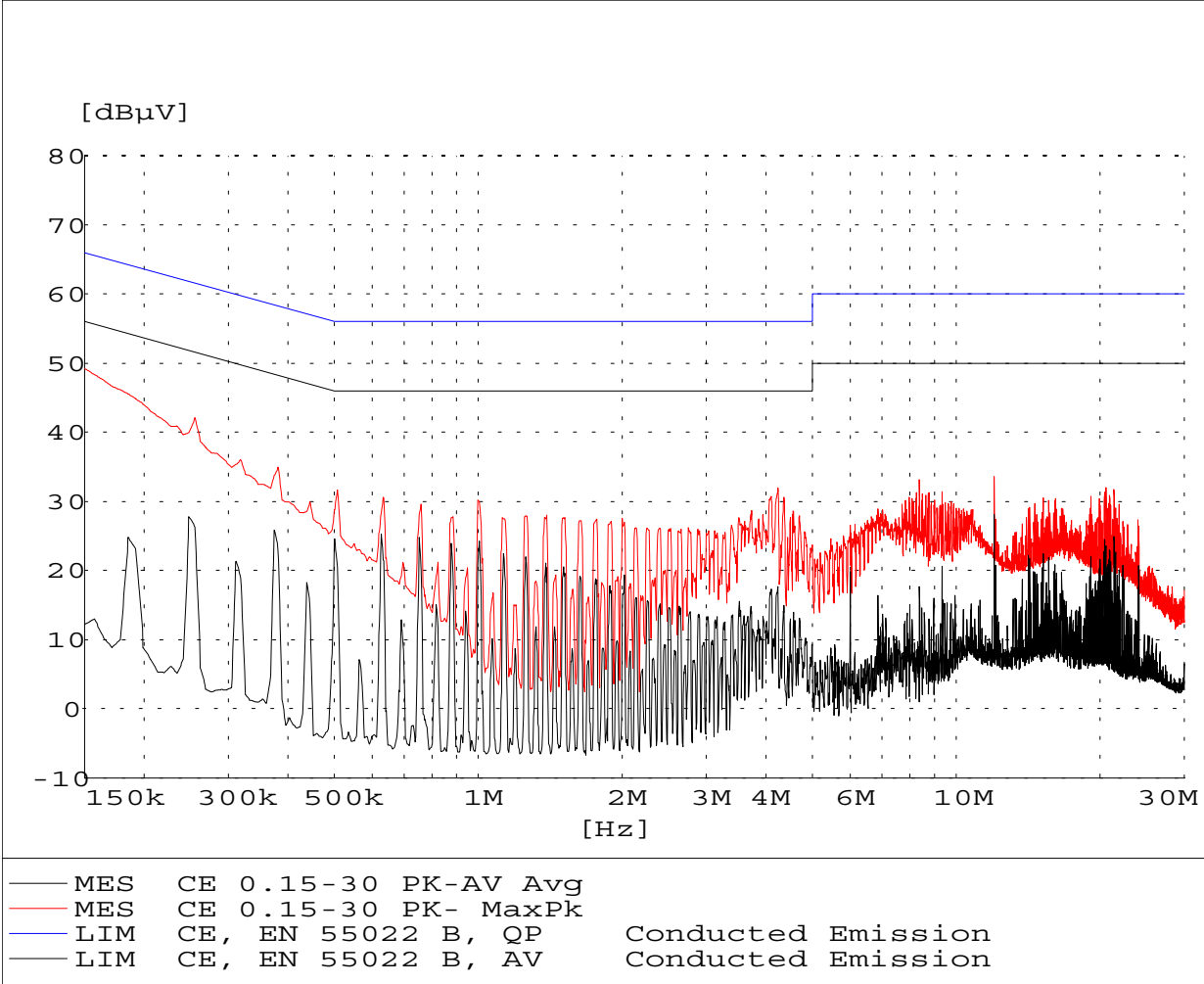




Photo A6.1 AC mains conducted emission. Test object in smartcard reading mode

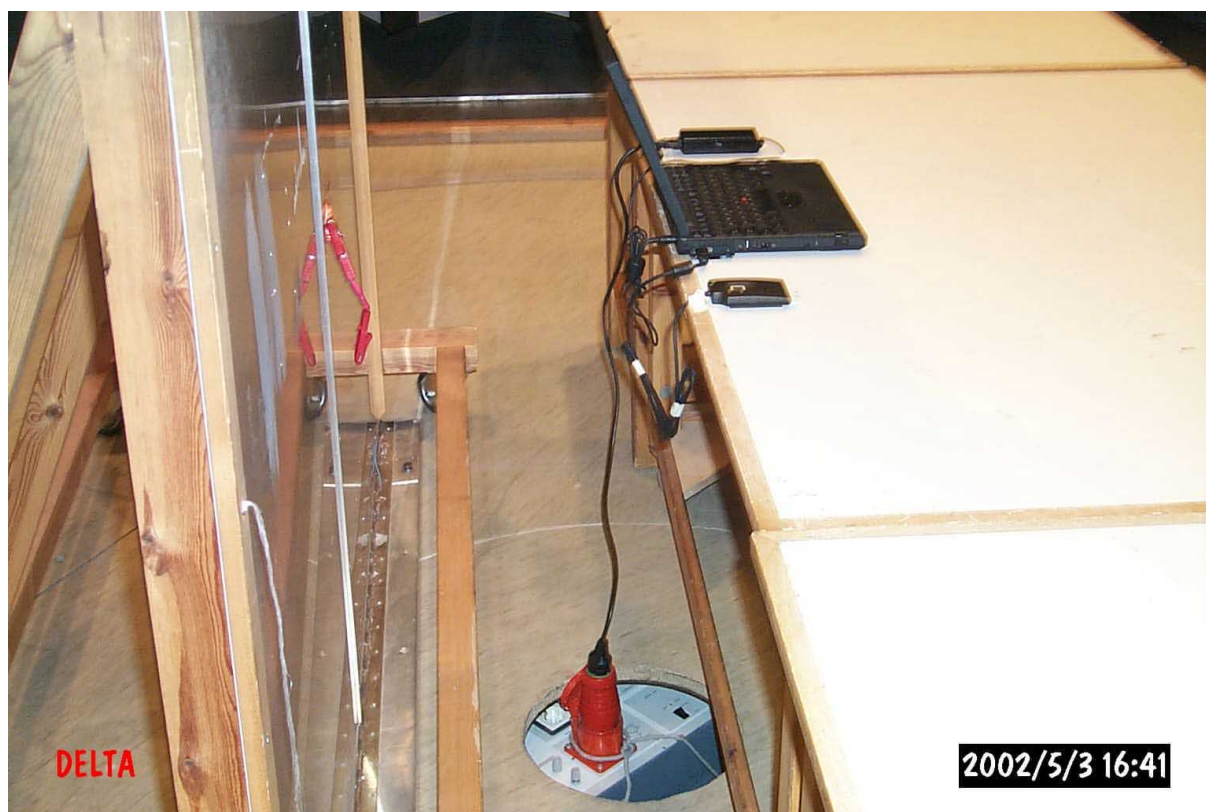


Photo A6.2 AC mains conducted emission. Test object in smartcard reading mode



Photo A6.3 AC mains conducted emission. Test object in fingerprint scanning mode



Photo A6.4 AC mains conducted emission. Test object in fingerprint scanning mode