# 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

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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<br>Dag Hammerskjöldsväg<br>S-224 64 Lund<br>Sweden<br><br>Telephone: +46 46 311100<br>Fax: +46 46 311101 |
| ***Contact person*** | Mr. Jörgen Lindell |
| ***Manufacturer*** | Precise Biometrics AB |
| ***Specifications*** | EN 55022:1998<br>FCC Rules and Regulations, Part 15, Subpart B, demonstrated by compliance with EN 55022:1998<br>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 *section 3.2.*<br><br>The AC mains conducted emission and radiated electromagnetic field were within the specifications. |
| ***Test personnel*** | Poul Nørgaard<br>Jesper Nielsen |

***Date*** 2002-05-13

***Project manager***

Per Hansen
Facility Manager - EMC
DELTA

***Responsible***

Per Thåstrup Jensen
Project Manager - EMC
DELTA

***Table of contents*** ***Page***

| | | |
|---|---|---|
| **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.<br>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:<br>1) Scanning fingerprint mode<br>2) Reading smartcard mode. |
| Software | The laptop PC was running a software reading from fingerprint reader and registrating 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

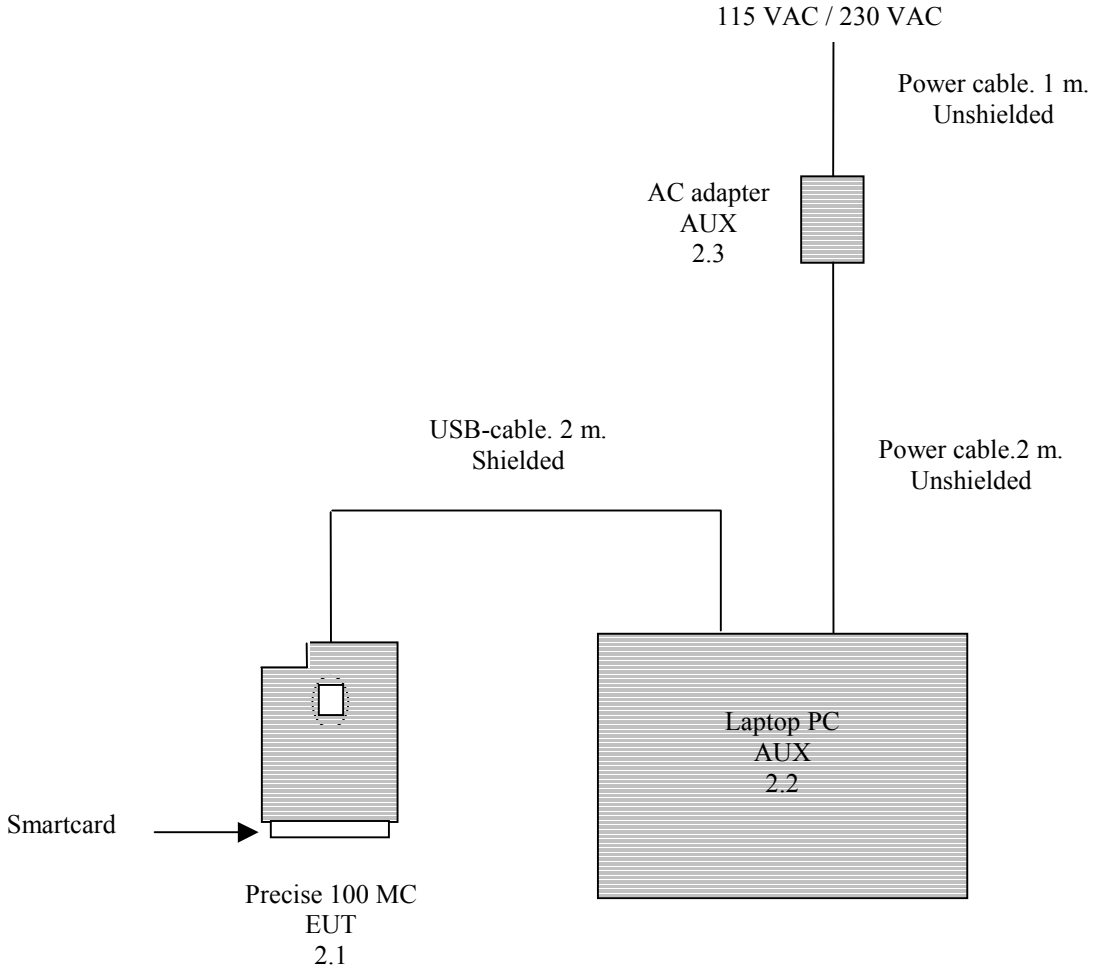
| | |
|---|---|
| Manufacturer | IBM |
| Model / type | 2545-4BG |
| Part no. | - |
| Serial no. | 5528TVC 02/99 |
| FCC ID | Tested to comply with FCC standards |

## 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




Illustrated with smartcard inserted

### *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 finger-print mode |
| 80-1000 MHz | 80% AM - 1 kHz | Horizontal | 3V/m | Antenna against the front of the front. EUT in finger-print mode |
| 900 MHz | 200 Hz pulse 50% duty cycle | Vertical | 3V/m | Antenna against the front of the front. EUT in finger-print mode |
| 900 MHz | 200 Hz pulse 50% duty cycle | Horizontal | 3V/m | Antenna against the front of the front. EUT in finger-print mode |

| | | | |
|---|---|---|---|
| **Compliant** | Yes | **Additional performance criteria (if any)** | |
| **Comment(s)** | Tests were performed in 2 modes:<br>1) Scanning fingerprint<br>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:<br>Air: 10(-) and 10(+).<br>Contact: 10(-) and 10(+).<br>Identification of discharge areas:<br>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.<br><br>Tests were performed in 2 modes:<br>1) Scanning fingerprint<br>2) Reading smartcard. | |

| | |
|---|---|
| **Uncertainty on test level** | +/-0.5 dB |
| **Criteria for compliance** | See *section 3.2* |
| **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 designa-tion | 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 *section 3.2*
**Results** No malfunction was detected

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

| | | | |
|---|---|---|---|
| **Client** | Precise Biometrics AB | **Sheets** | See *annex 3* |
| **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 | |

| | | |
|---|---|---|
| Limit using quasi-peak detector | 30-230 MHz:<br>230-1000 MHz: | 30 dBµV/m<br>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 *annex 4* |
| **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:<br>230-1000 MHz: | 30 dBµV/m<br>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 *annex 5* |
| **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:<br>(decreasing lin. with log. of freq.)<br>0.50-5 MHz:<br>5-30 MHz: | 66-56 dBµV<br><br><br>56 dBµV<br>60 dBµV |

| | | |
|---|---|---|
| Limit using average detector | 0.15-0.50 MHz:<br>(decreasing in. with log. of freq.)<br>0.50-5 MHz:<br>5-30 MHz: | 56-46 dBµV<br><br><br>46 dBµV<br>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 *annex 6* |
| **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:<br>(decreasing lin. with log. of freq.)<br>0.50-5 MHz:<br>5-30 MHz: | 66-56 dBµV<br><br><br>56 dBµV<br>60 dBµV |

| | | |
|---|---|---|
| Limit using average detector | 0.15-0.50 MHz:<br>(decreasing in. with log. of freq.)<br>0.50-5 MHz:<br>5-30 MHz: | 56-46 dBµV<br><br><br>46 dBµV<br>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)*

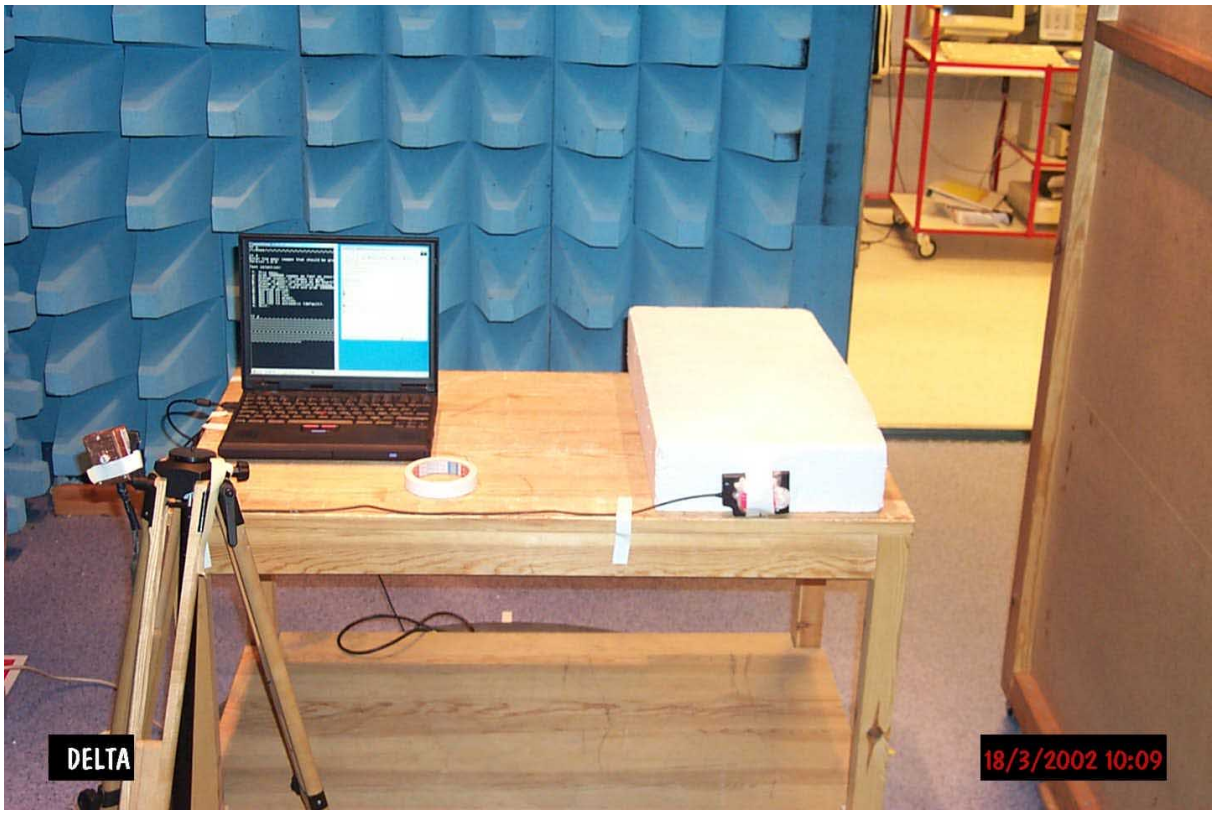



Photo A2.1 Radiated electromagnetic field test with test object in fingerprint scanning mode

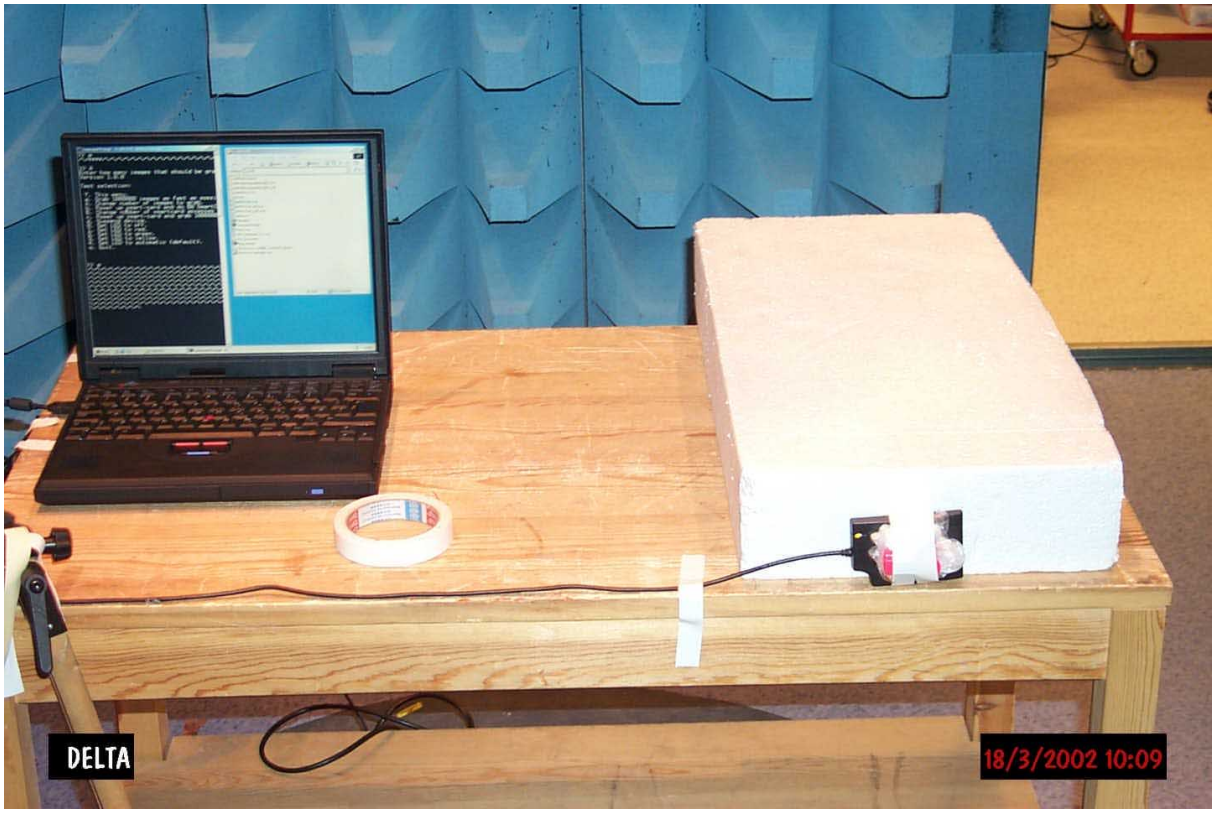



Photo A2.2 Radiated electromagnetic field test with test object in fingerprint scanning mode

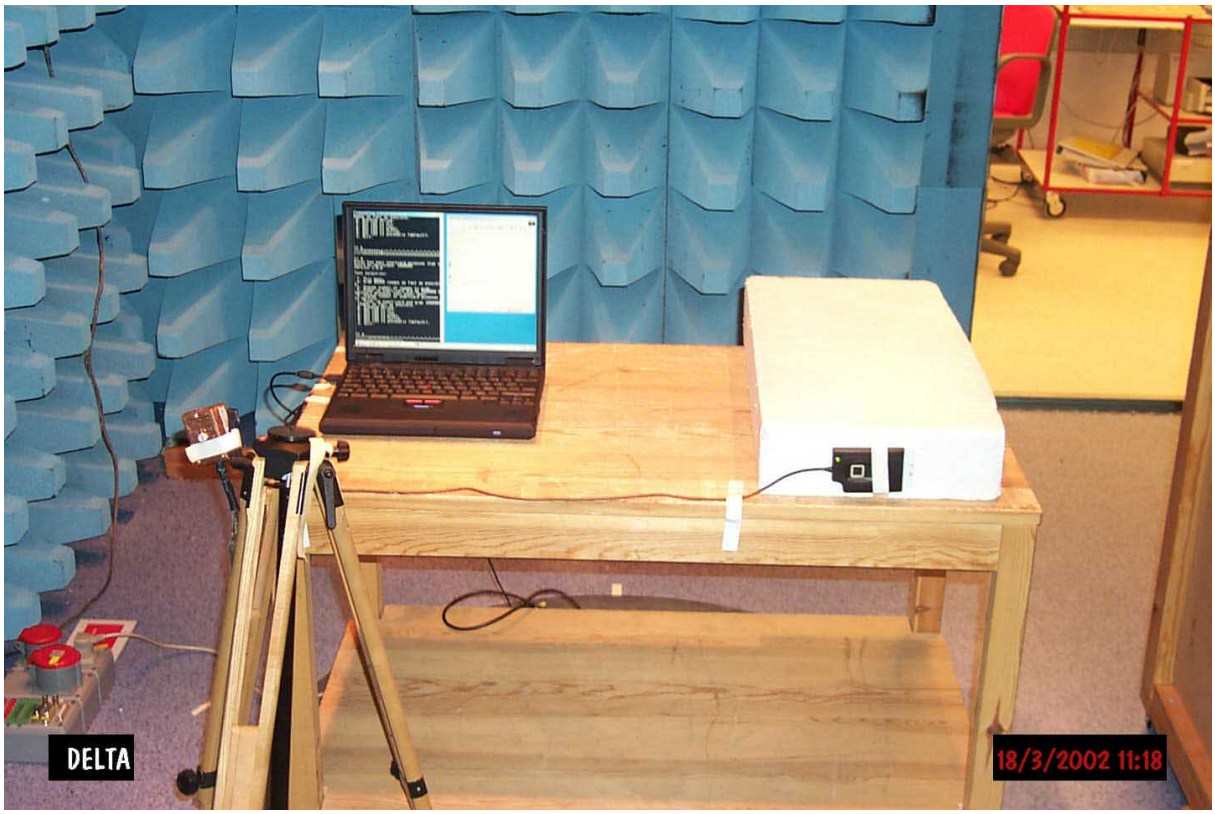



Photo A2.3 Radiated electromagnetic field test with test object in smartcard mode

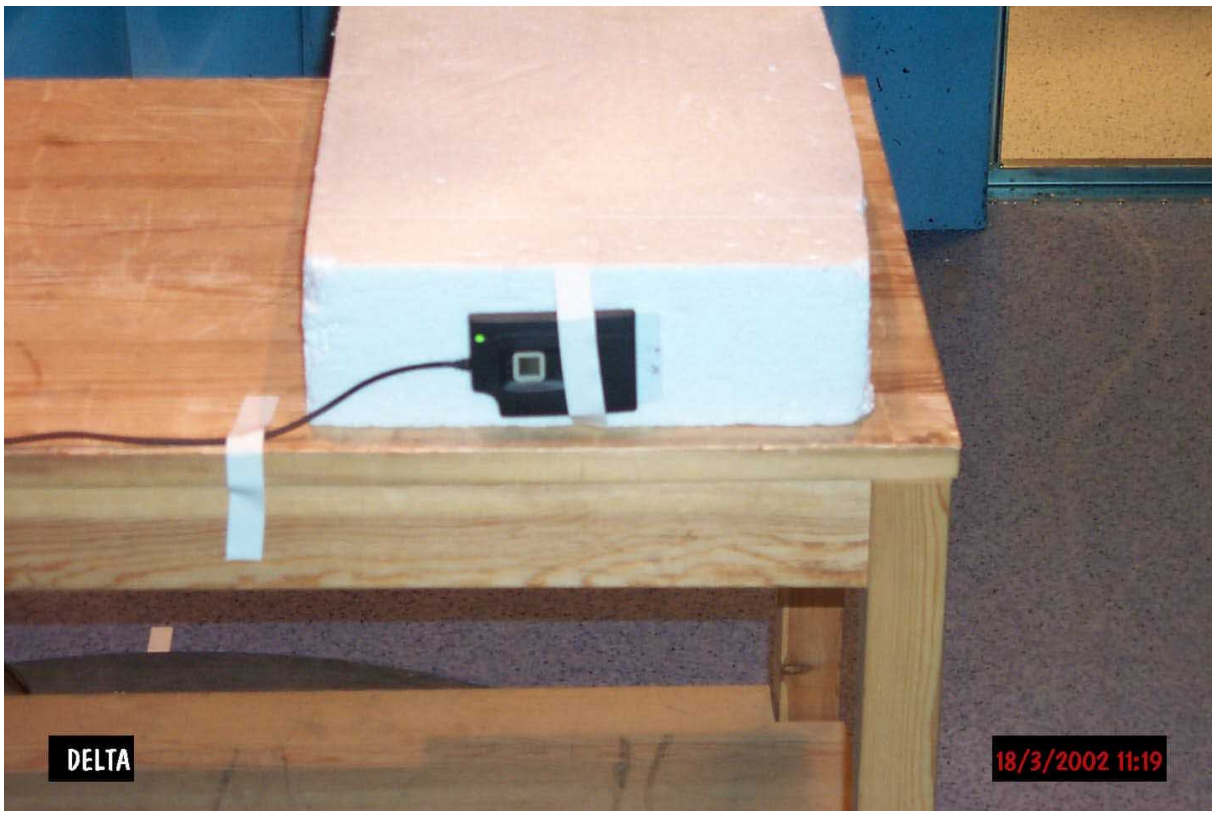



Photo A2.4 Radiated electromagnetic field test with test object in smartcard mode

Photo A2.5 Burst transient test

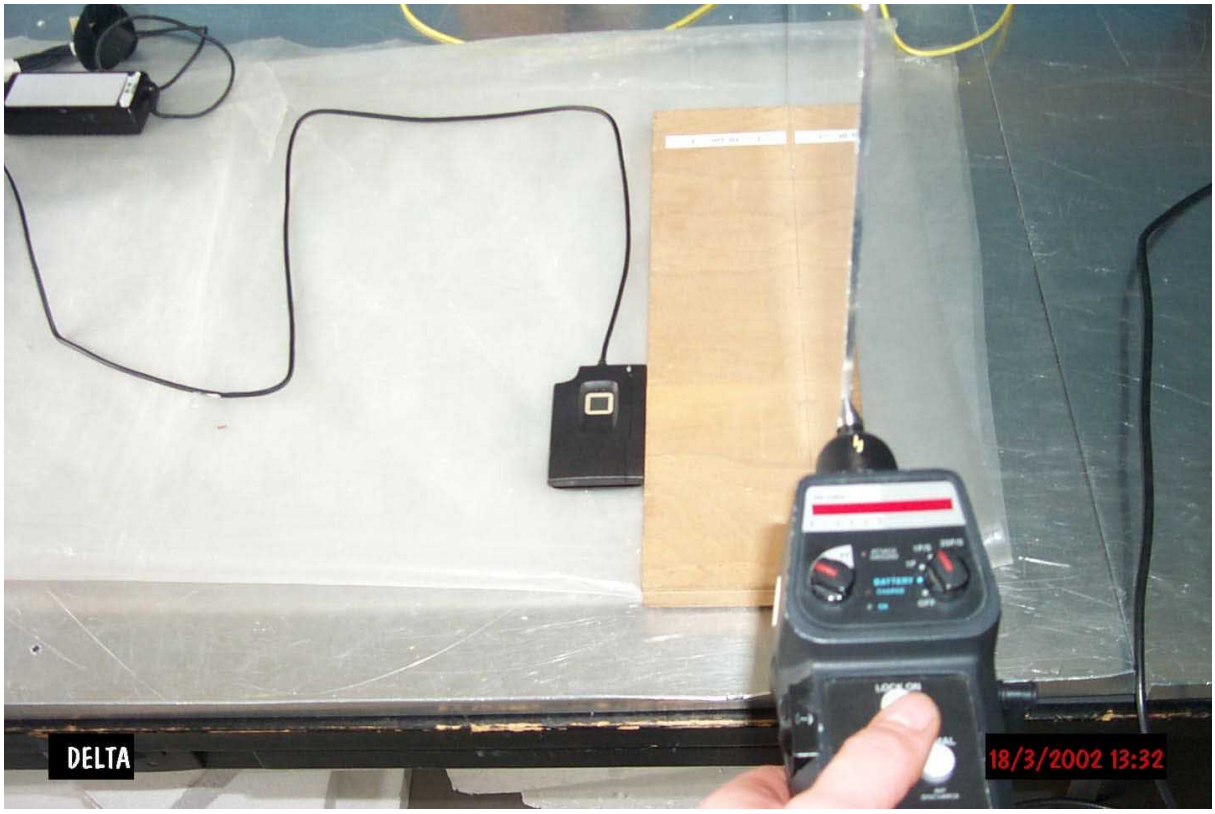



Photo A2.6 Electrostatic discharges on vertical coupling plane

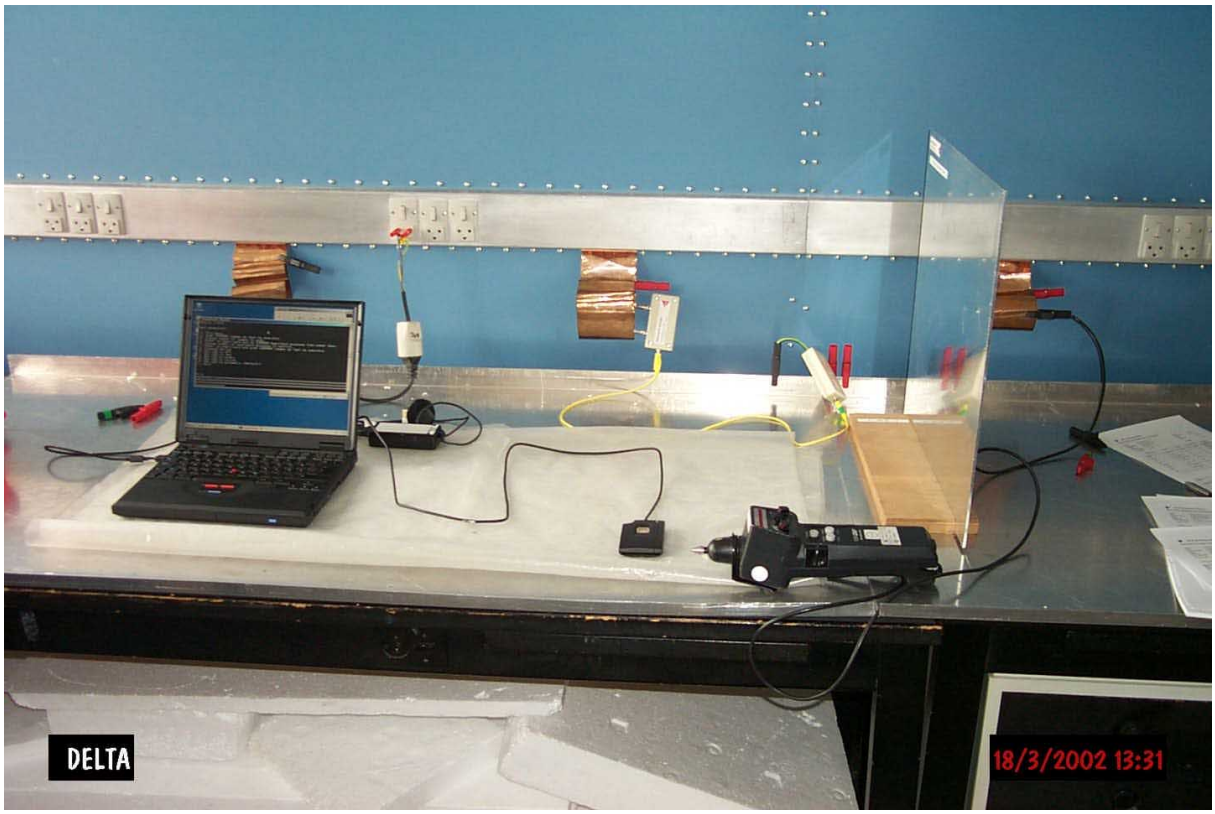



Photo A2.7 Electrostatic discharges general test set-up

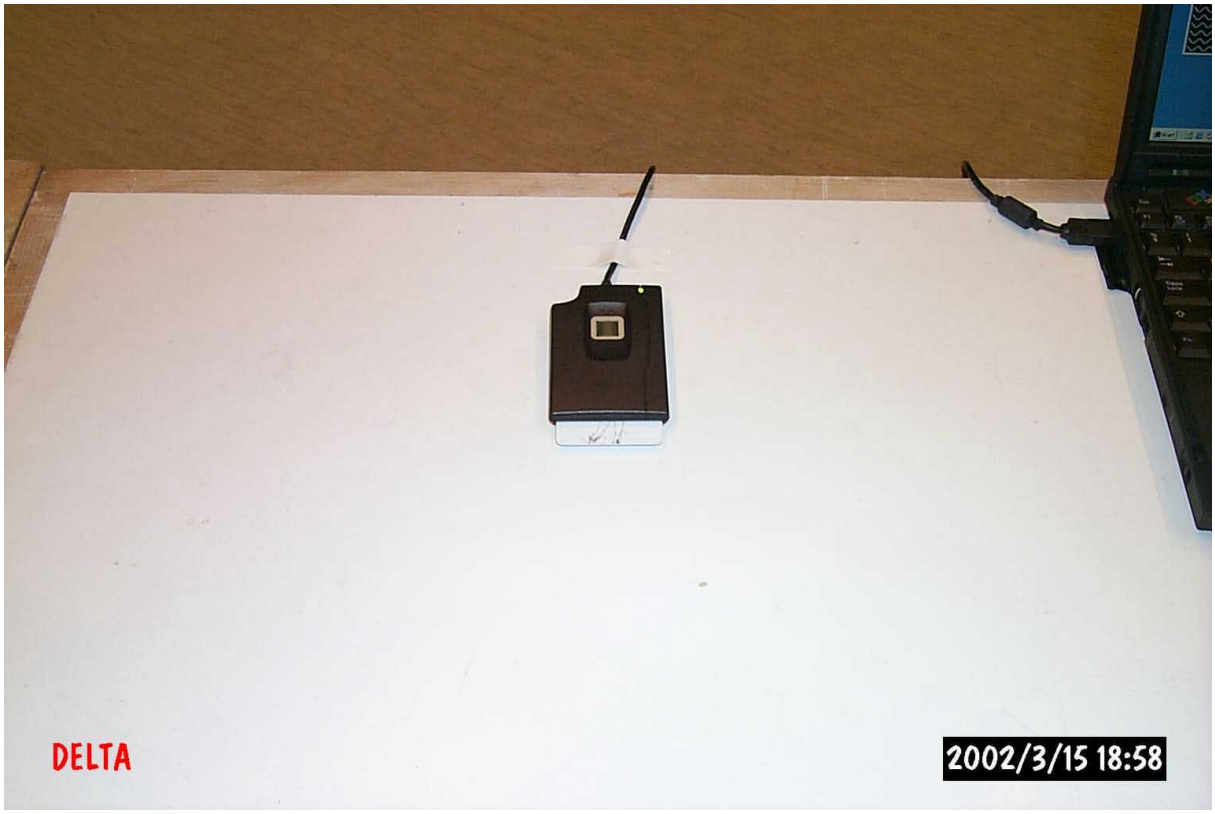



Photo A2.8 Test object in smartcard reading mode

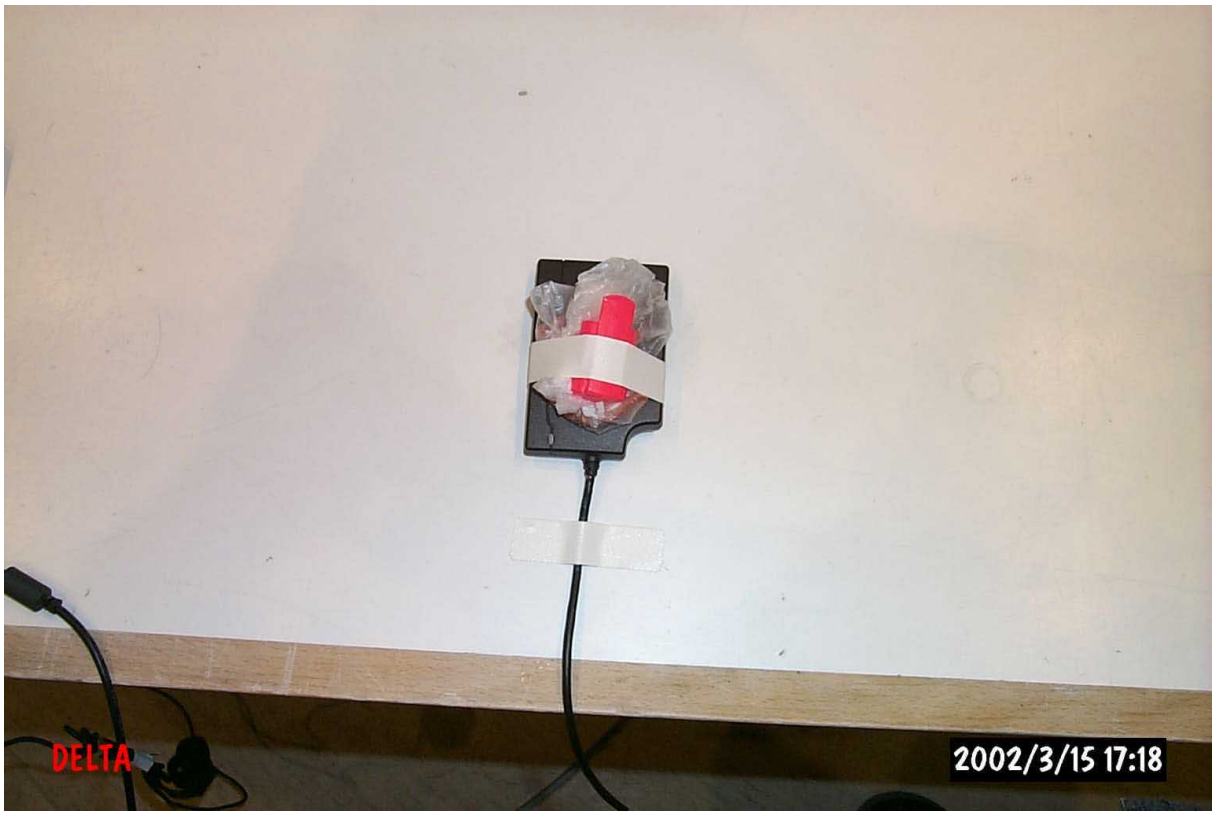


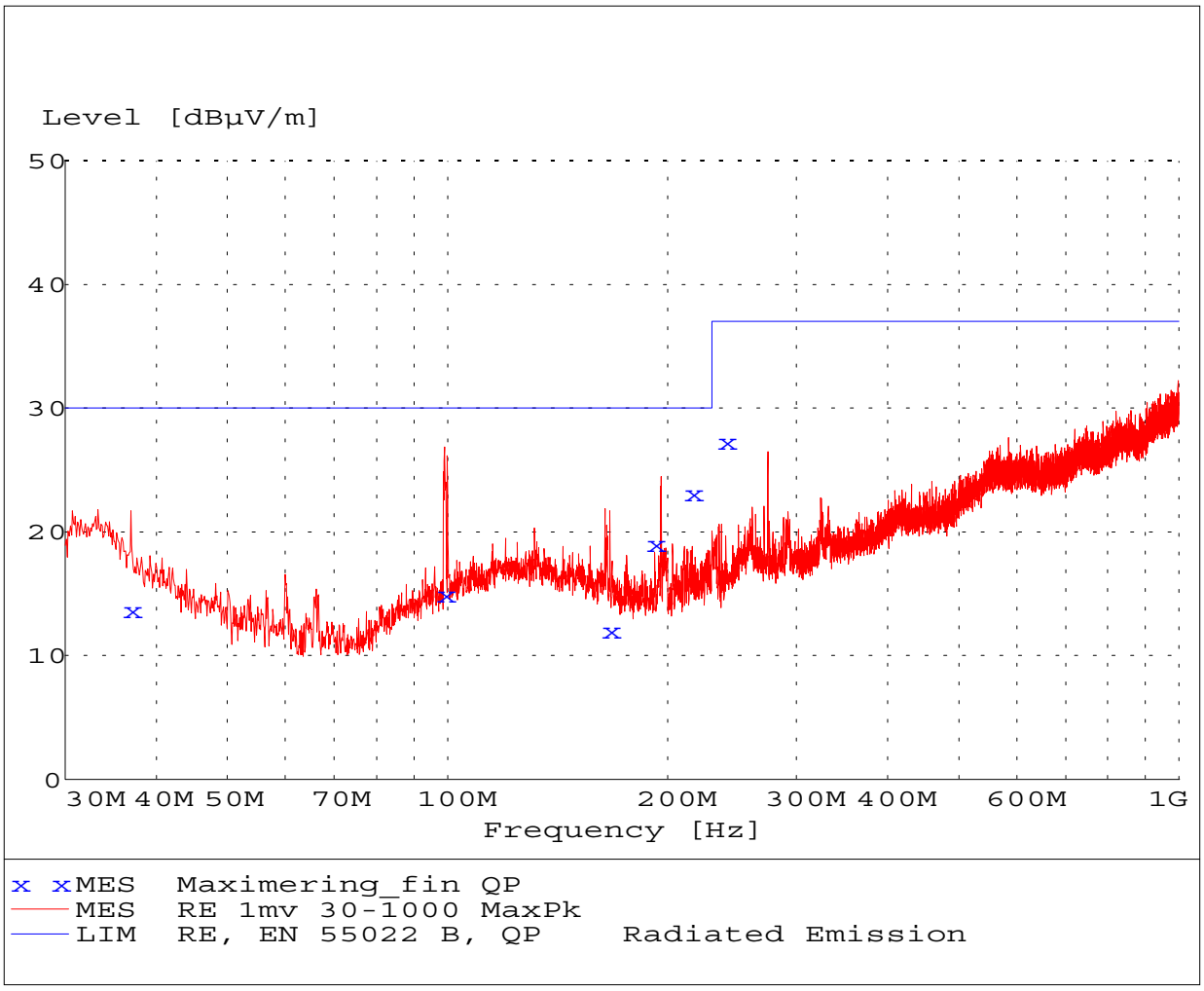

Photo A2.9 Test object in fingerprint scanning mode

# *Annex 3*

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

*(6 pages)*

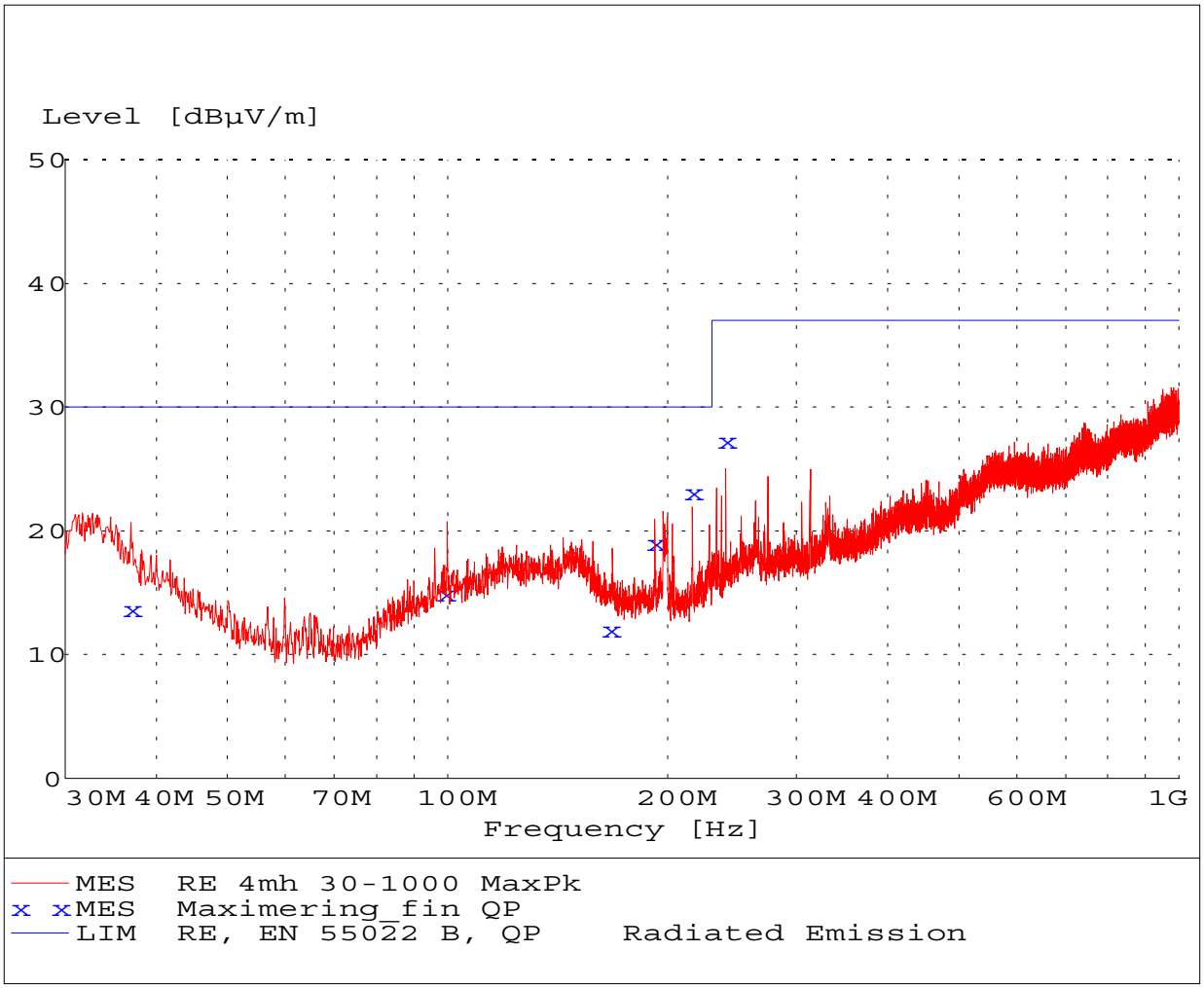
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Ant. 1 meter vertical. 115 VAC. Fingerprint scanning mode. |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | EN 55022 Class B |
| Comment: | Sheet 1 |
|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

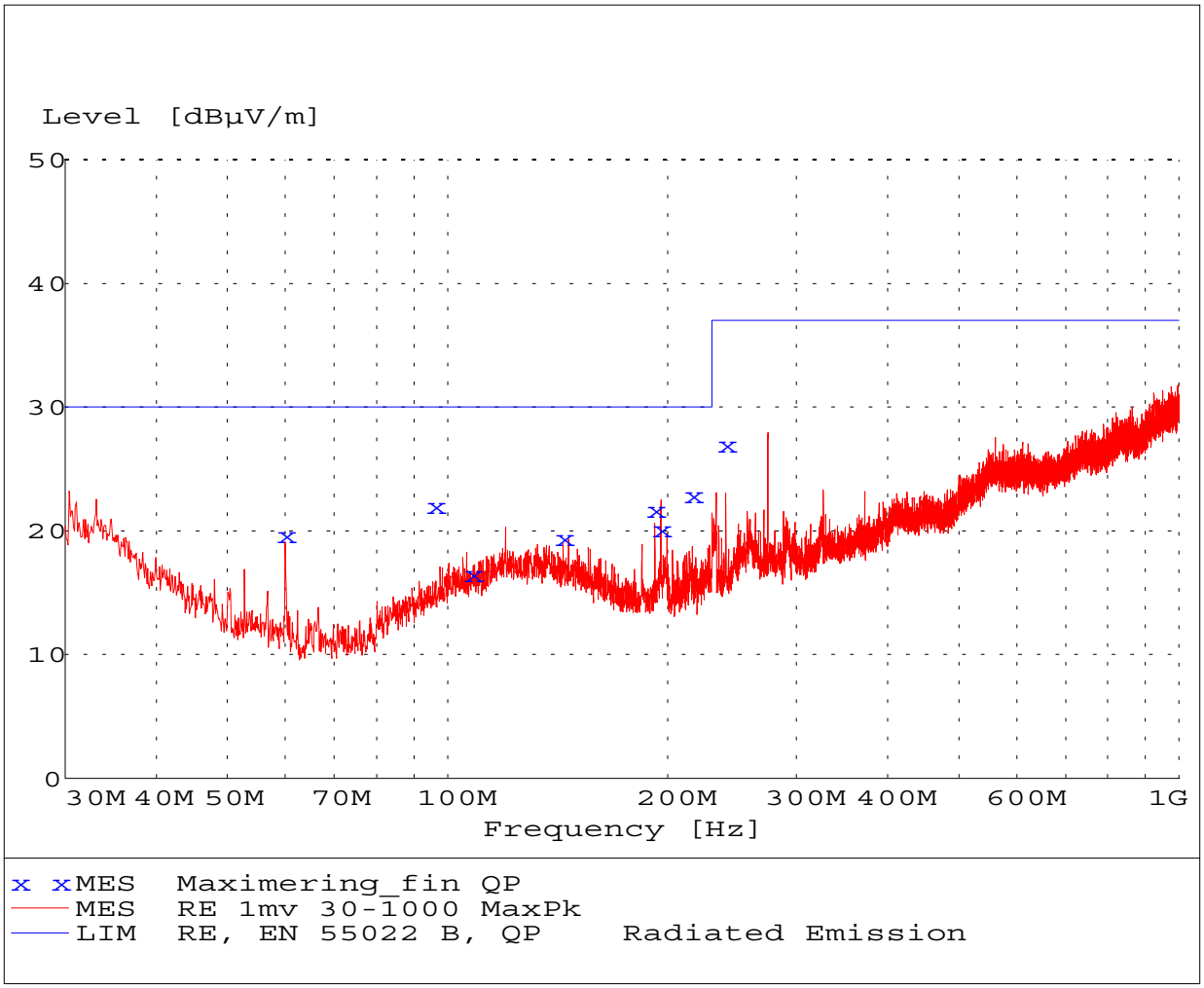
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Ant. 4 meter horizontal. 115 VAC. Fingerprint scanning mode. |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | EN 55022 Class B |
| Comment: | Sheet 2 |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

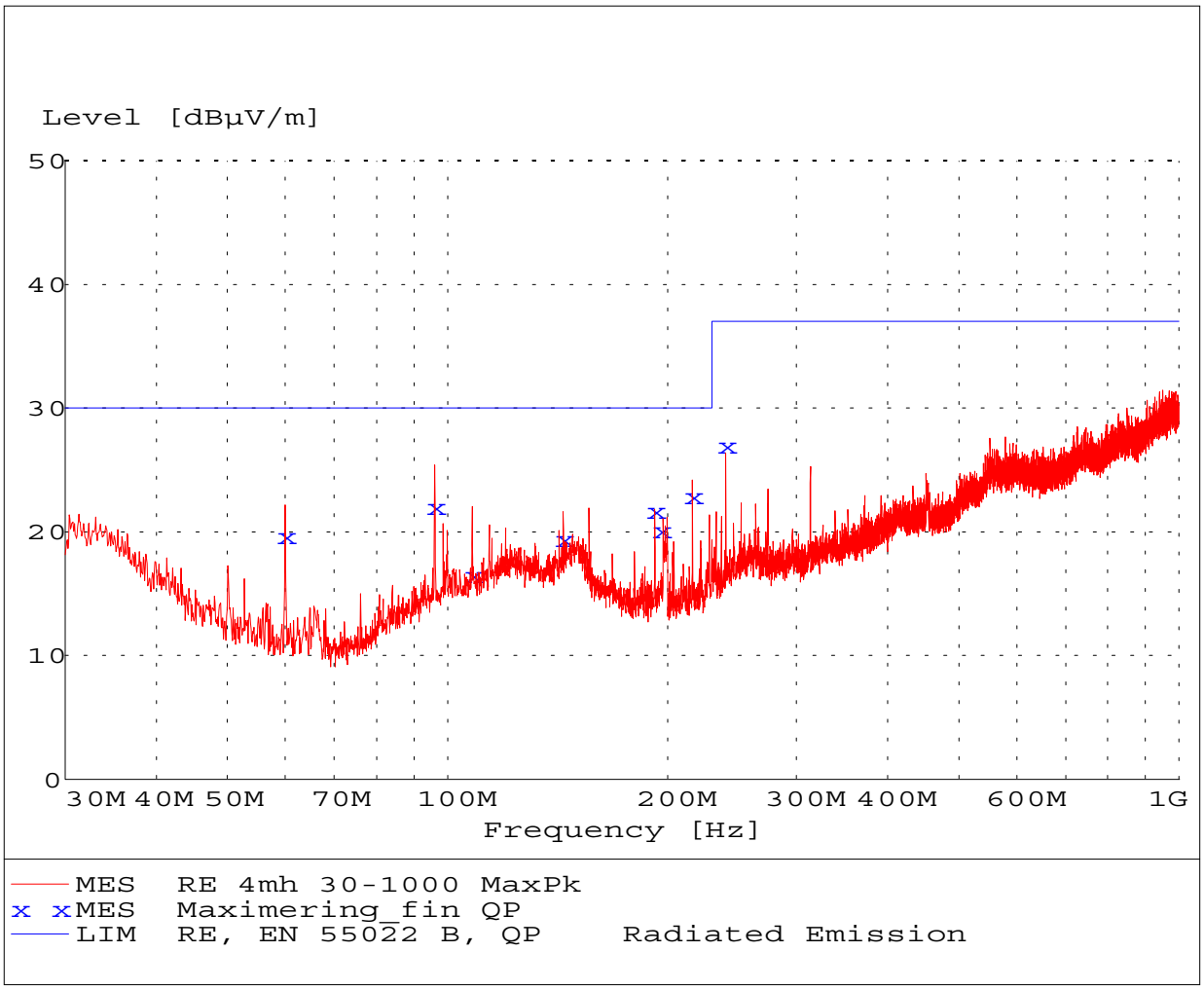
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Ant. 1 meter vertical. 115 VAC. Reading smartcard mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | EN 55022 Class B |
| Comment: | Sheet 3 |
| Start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

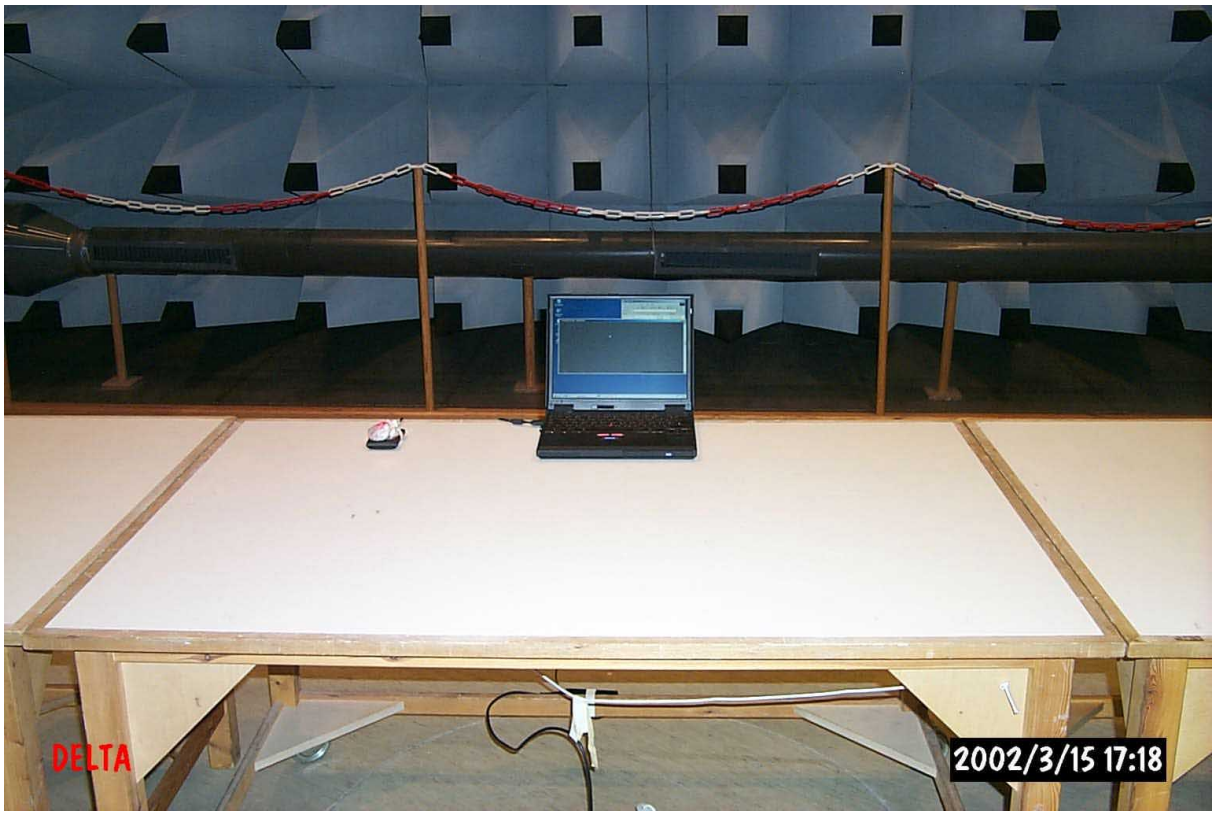



Photo A3.1 Radiated electromagnetic field test. Test object in fingerprint scanning mode

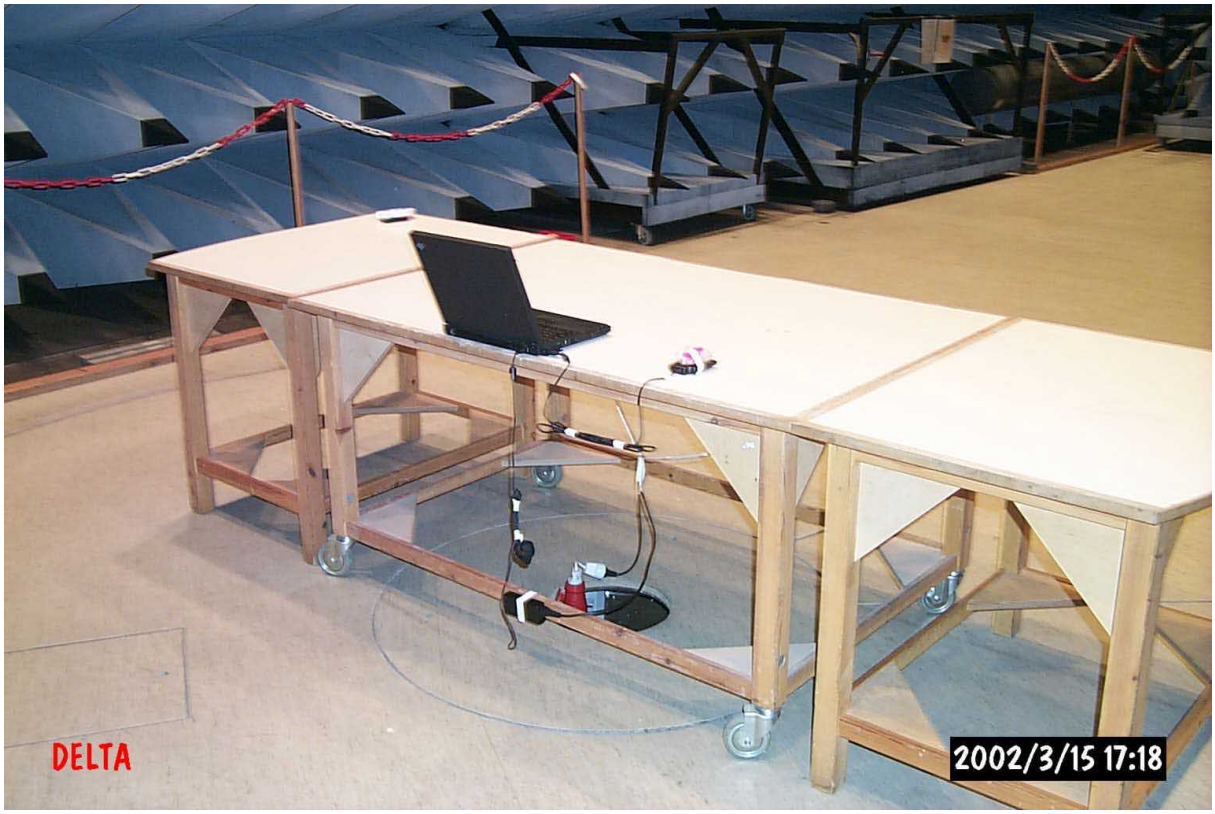



Photo A3.2 Radiated electromagnetic field test. Test object in fingerprint scanning mode

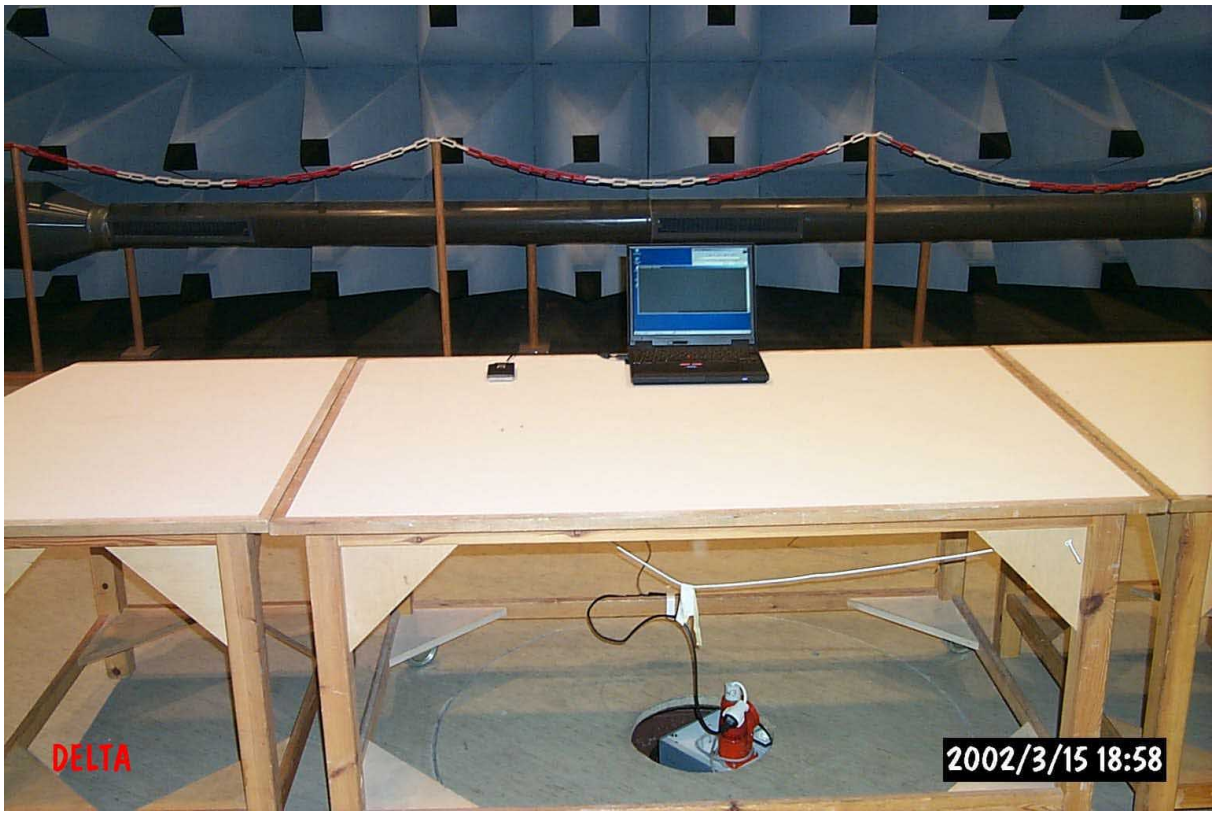



Photo A3.3 Radiated electromagnetic field test. Test object in smartcard reading mode

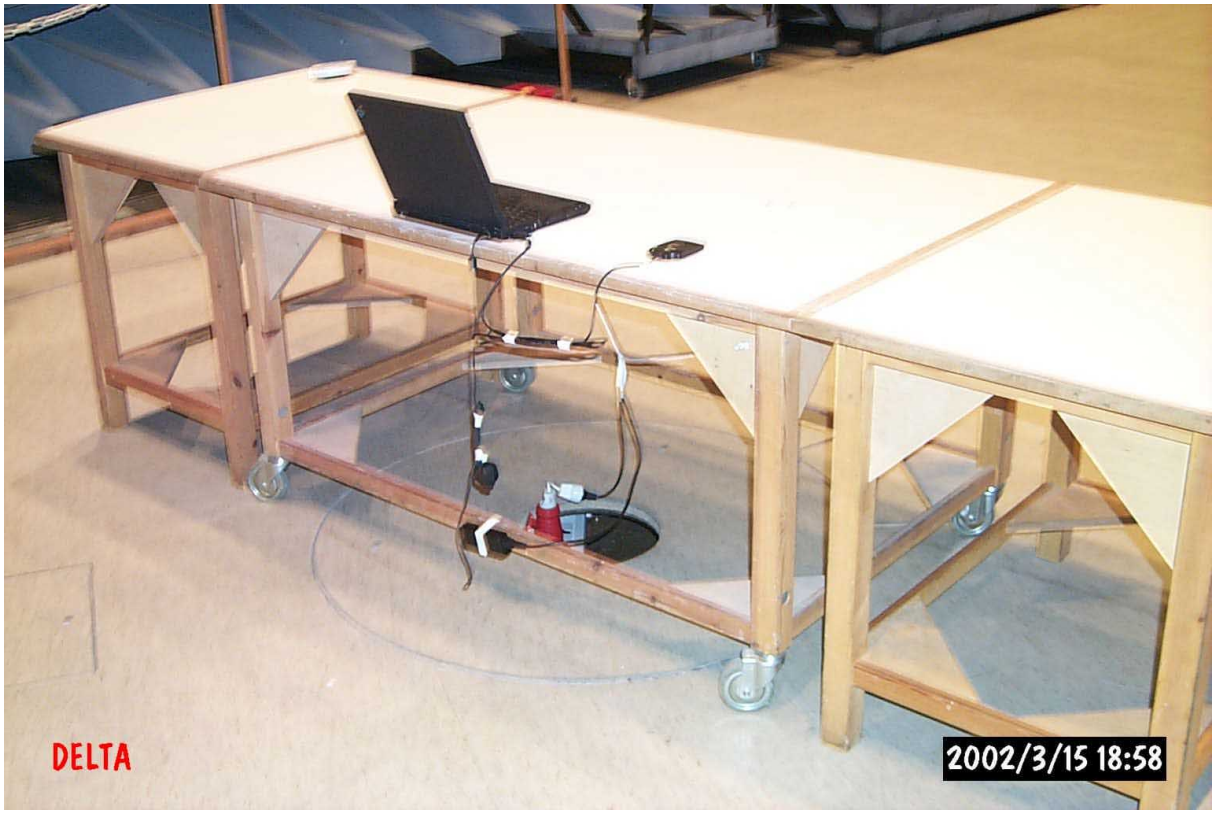


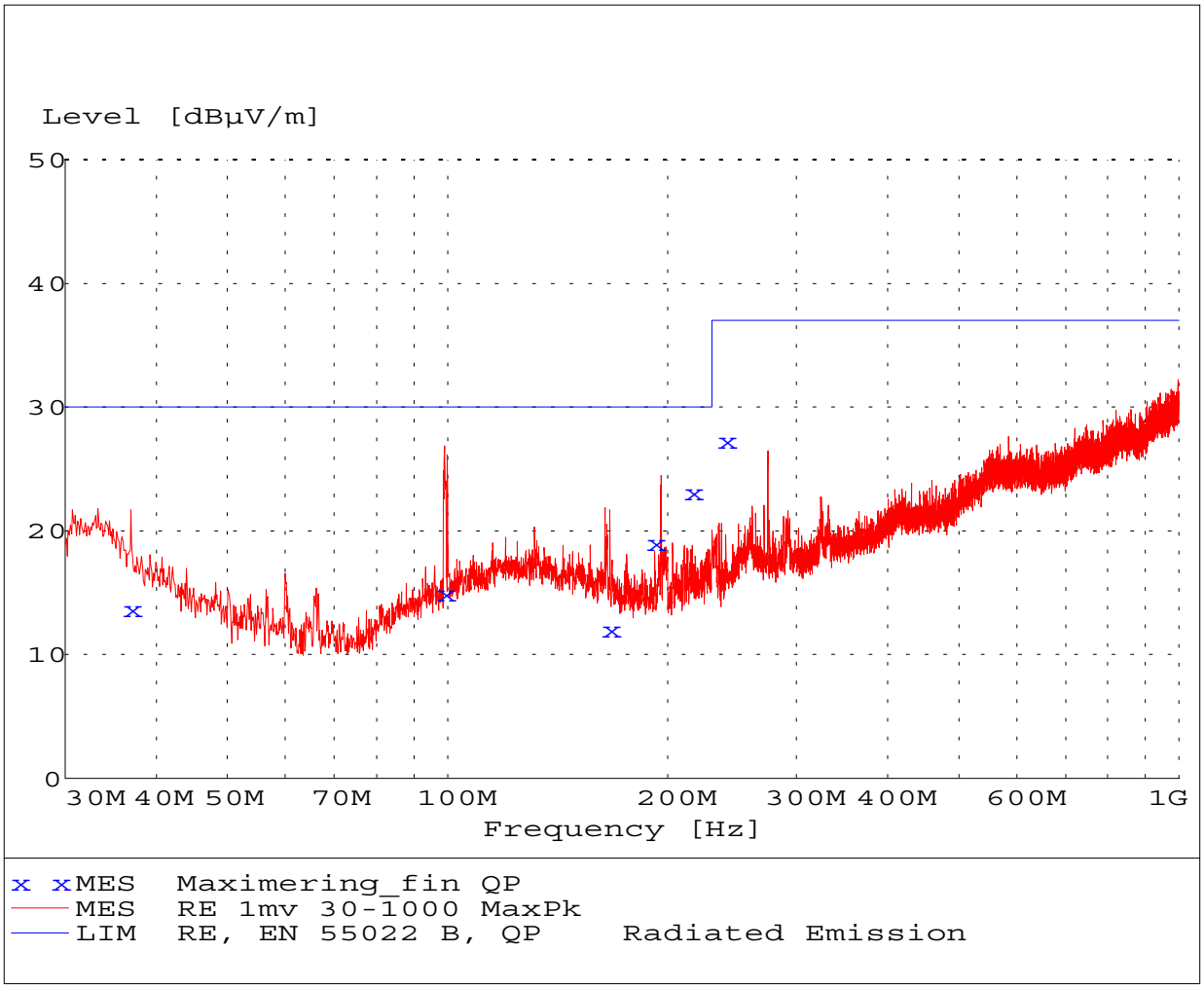

Photo A3.4 Radiated electromagnetic field test. Test object in smartcard reading mode

# *Annex 4*

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

*(6 pages)*

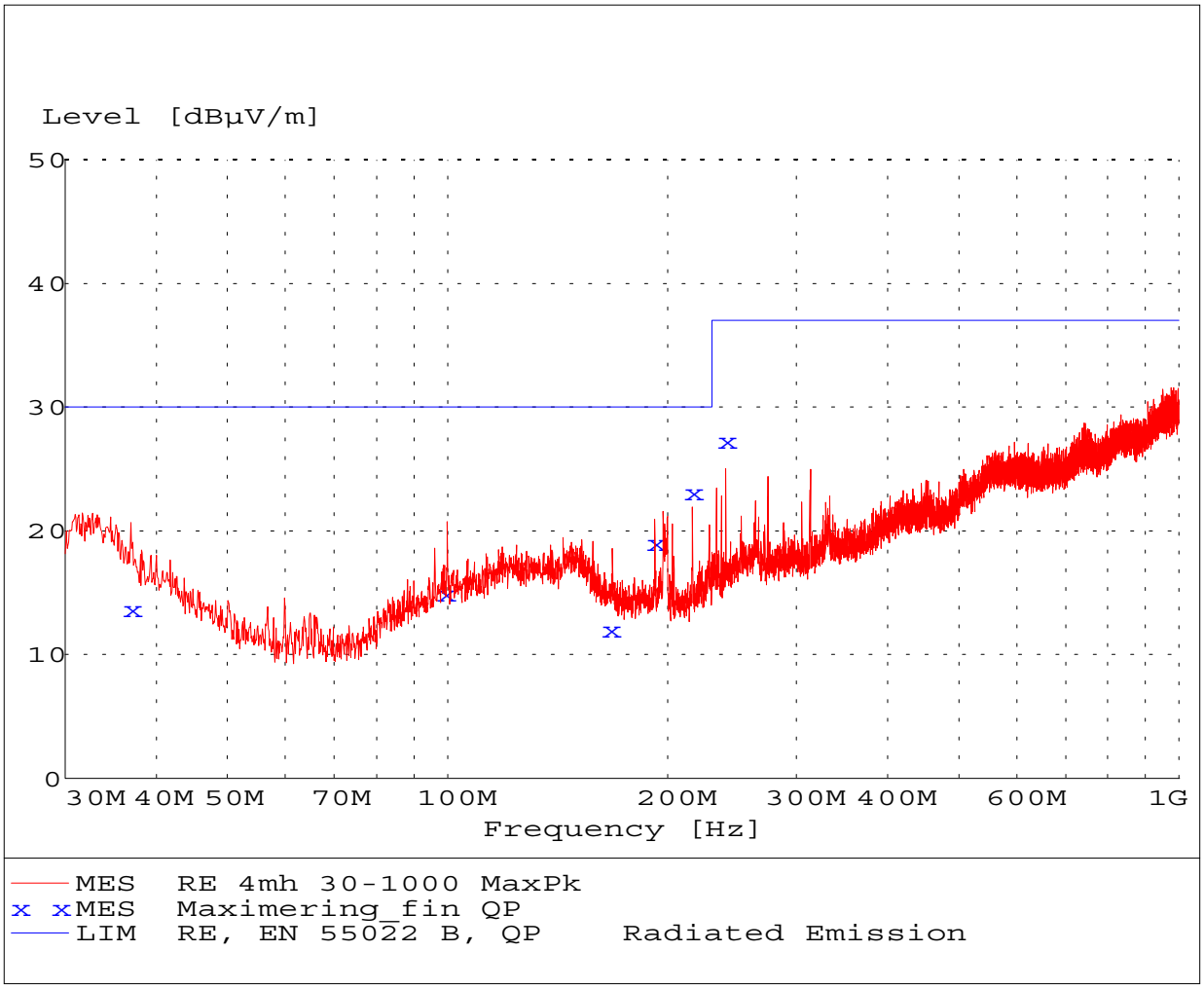
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Ant. 1 meter vertical. 115 VAC. Fingerprint scanning mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | FCC Class B demonstrated by compliance with 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 |

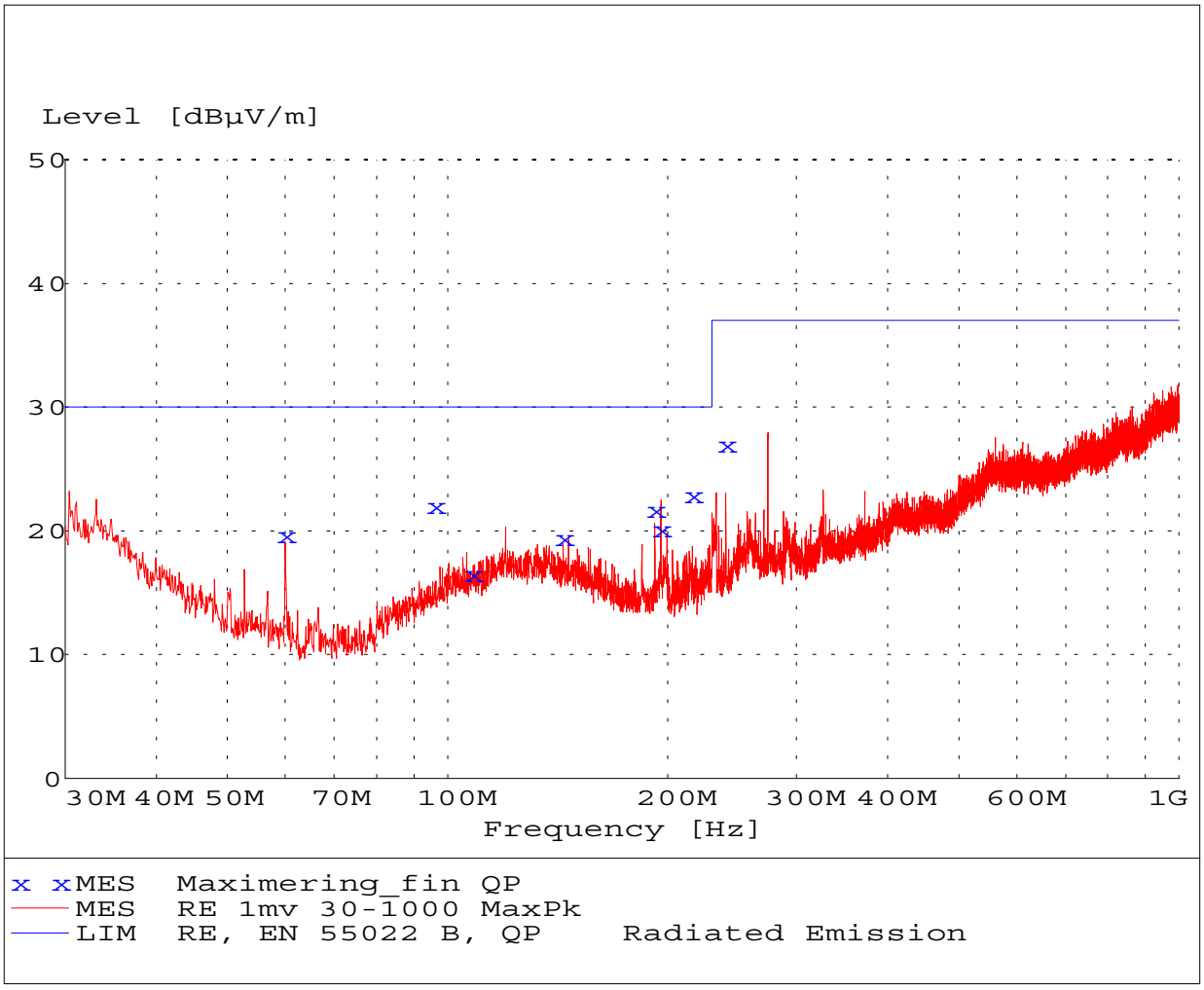
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Ant. 4 meter horizontal. 115 VAC. Fingerprint scanning mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | FCC Class B demonstrated by compliance with 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 |

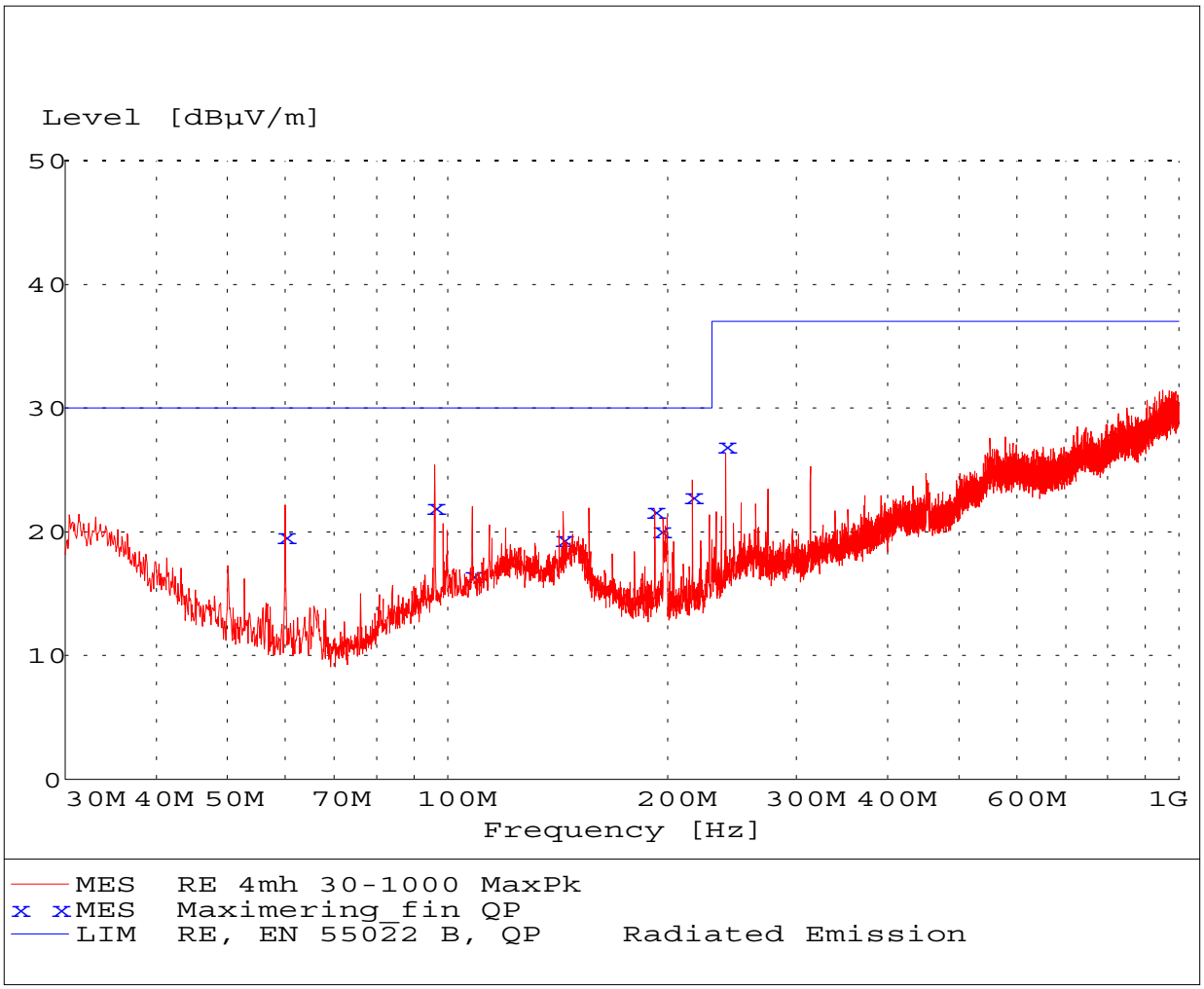
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Ant. 1 meter vertical. 115 VAC. Reading smartcard mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | FCC Class B demonstrated by compliance with EN 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 |

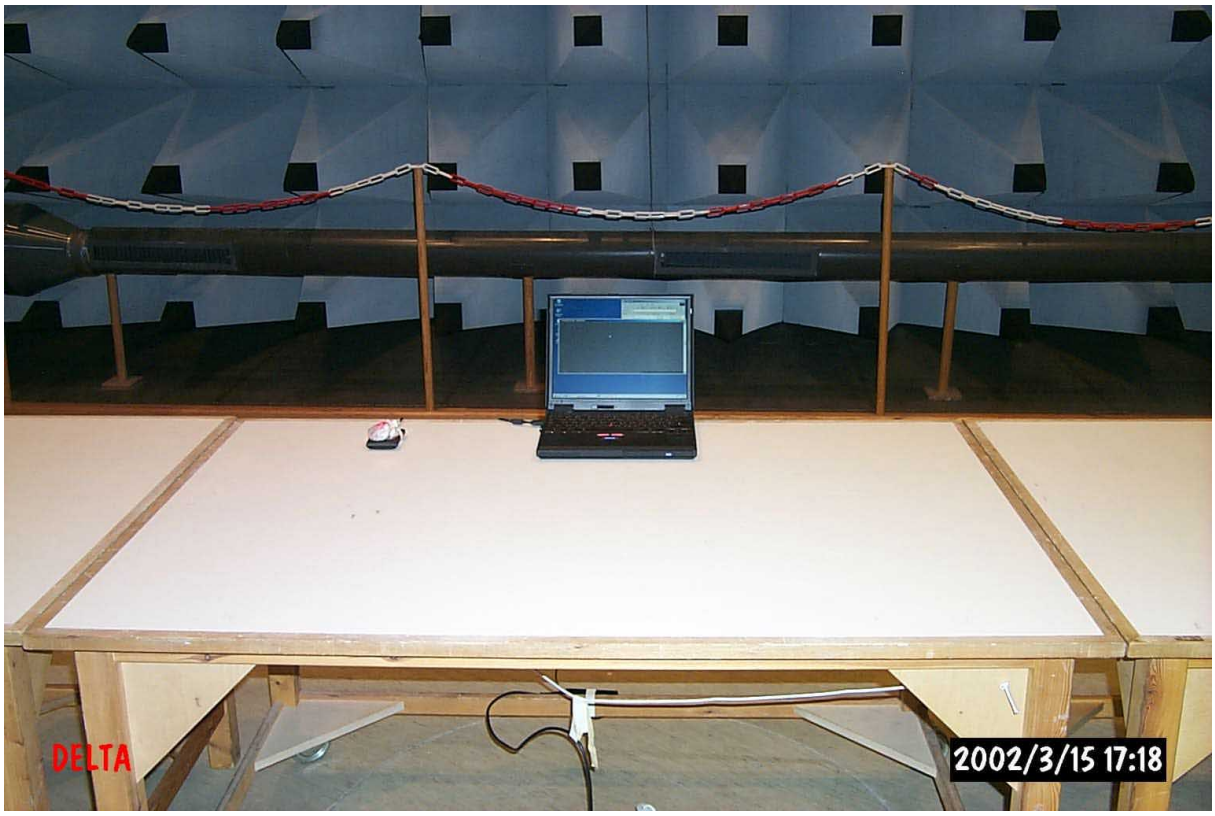



Photo A4.1 Radiated electromagnetic field test. Test object in fingerprint scanning mode

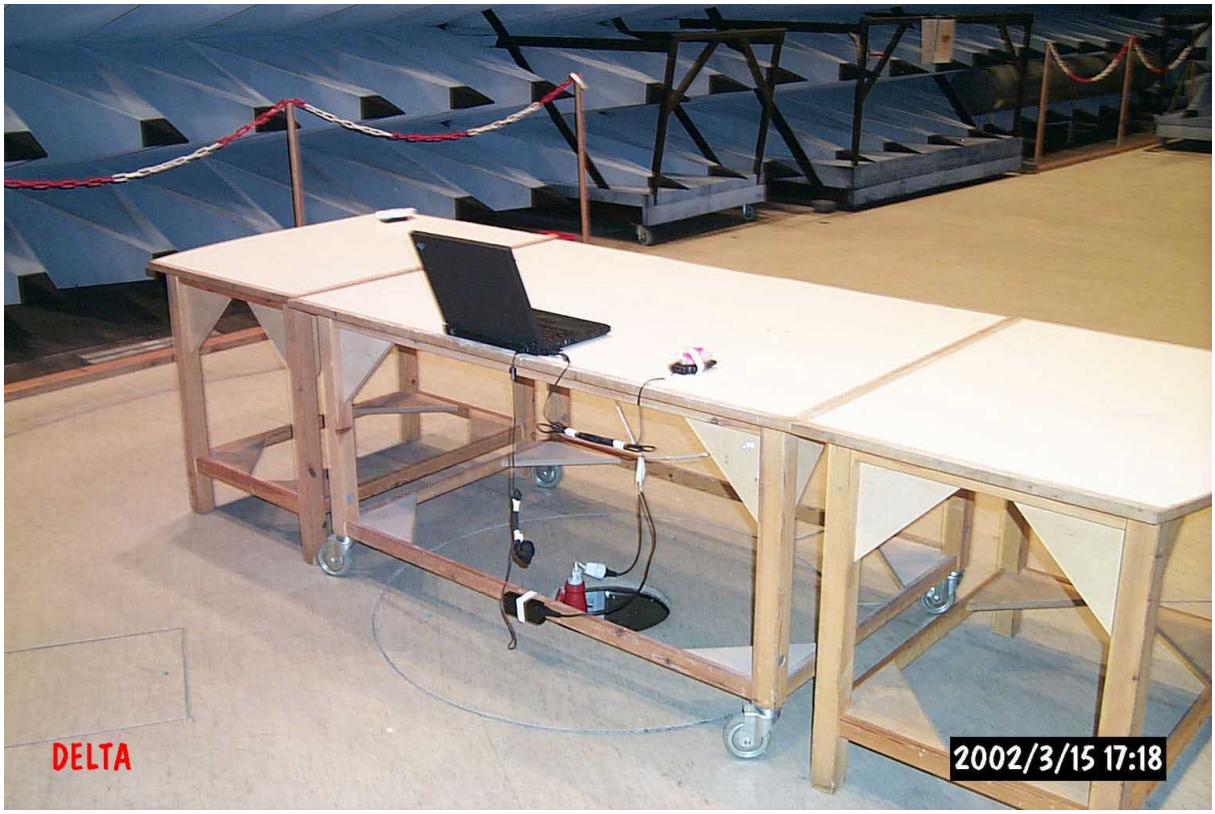



Photo A4.2 Radiated electromagnetic field test. Test object in fingerprint scanning mode

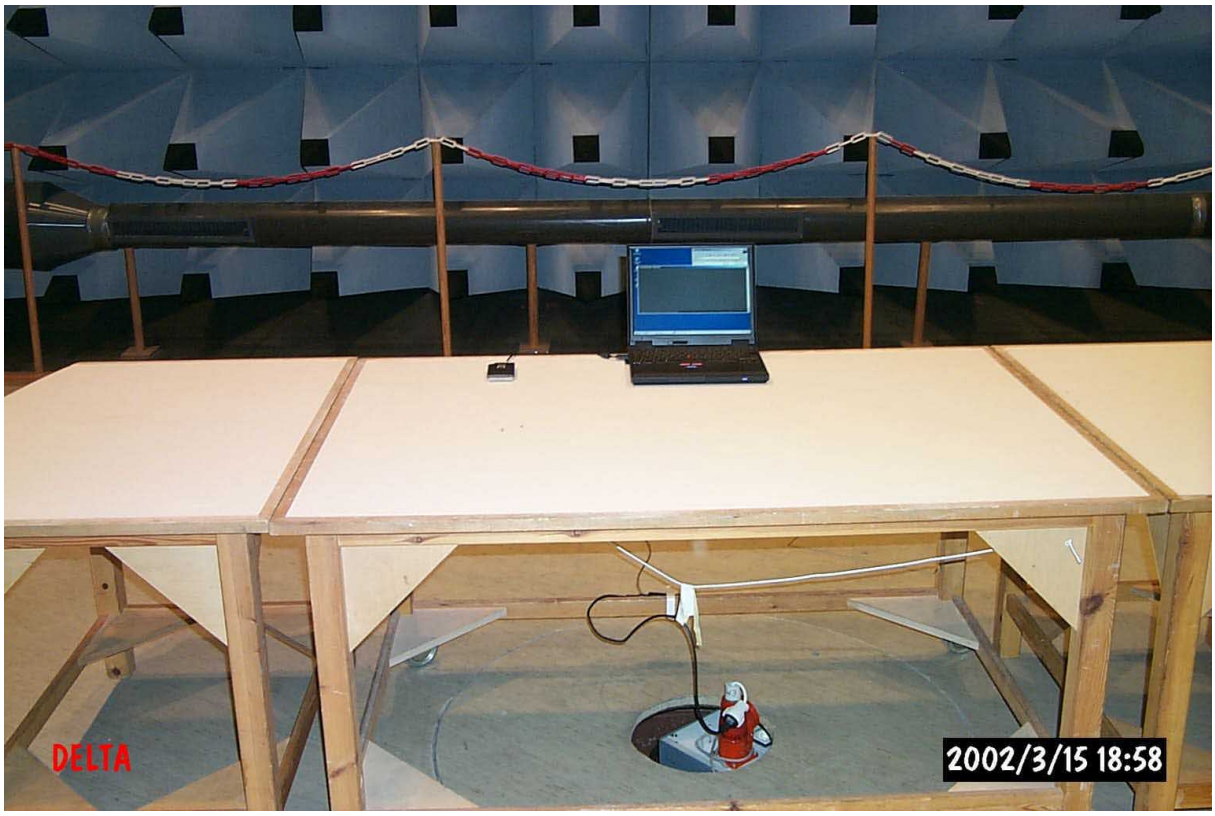



Photo A4.3 Radiated electromagnetic field test. Test object in smartcard reading mode

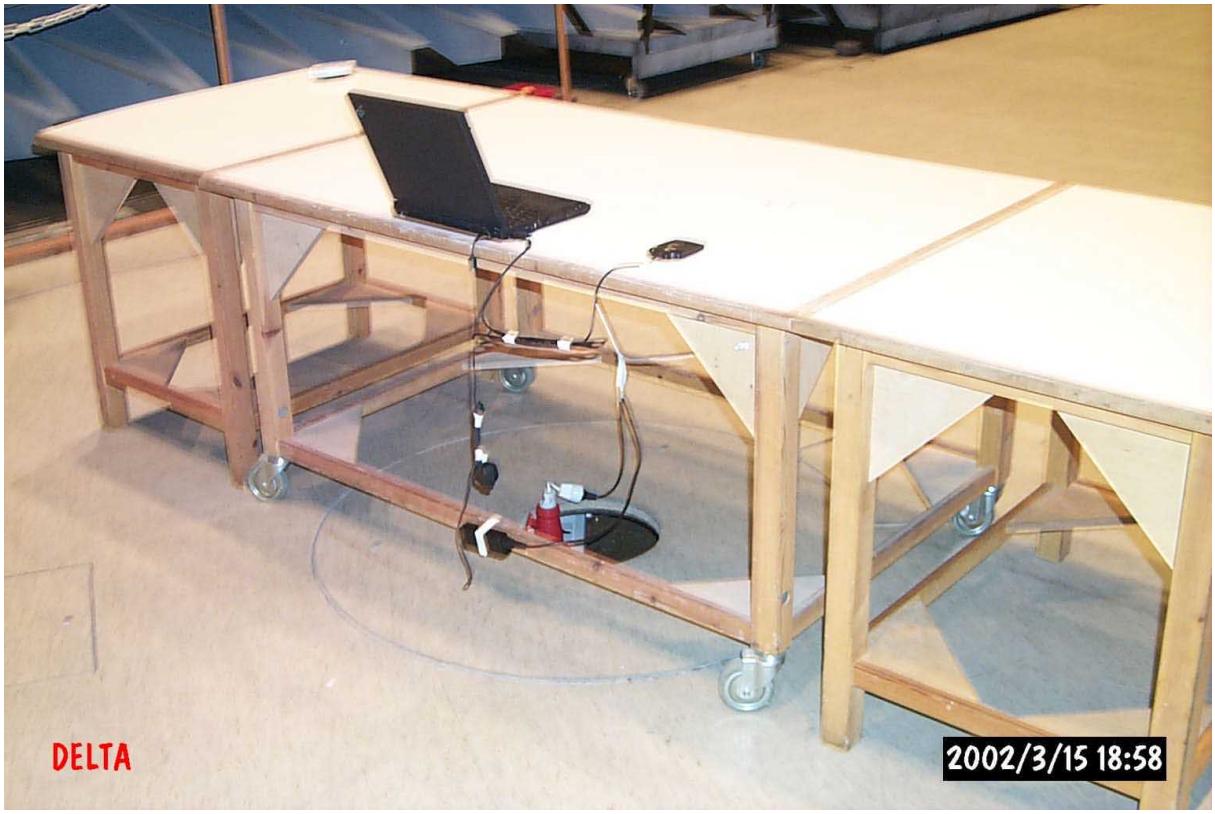


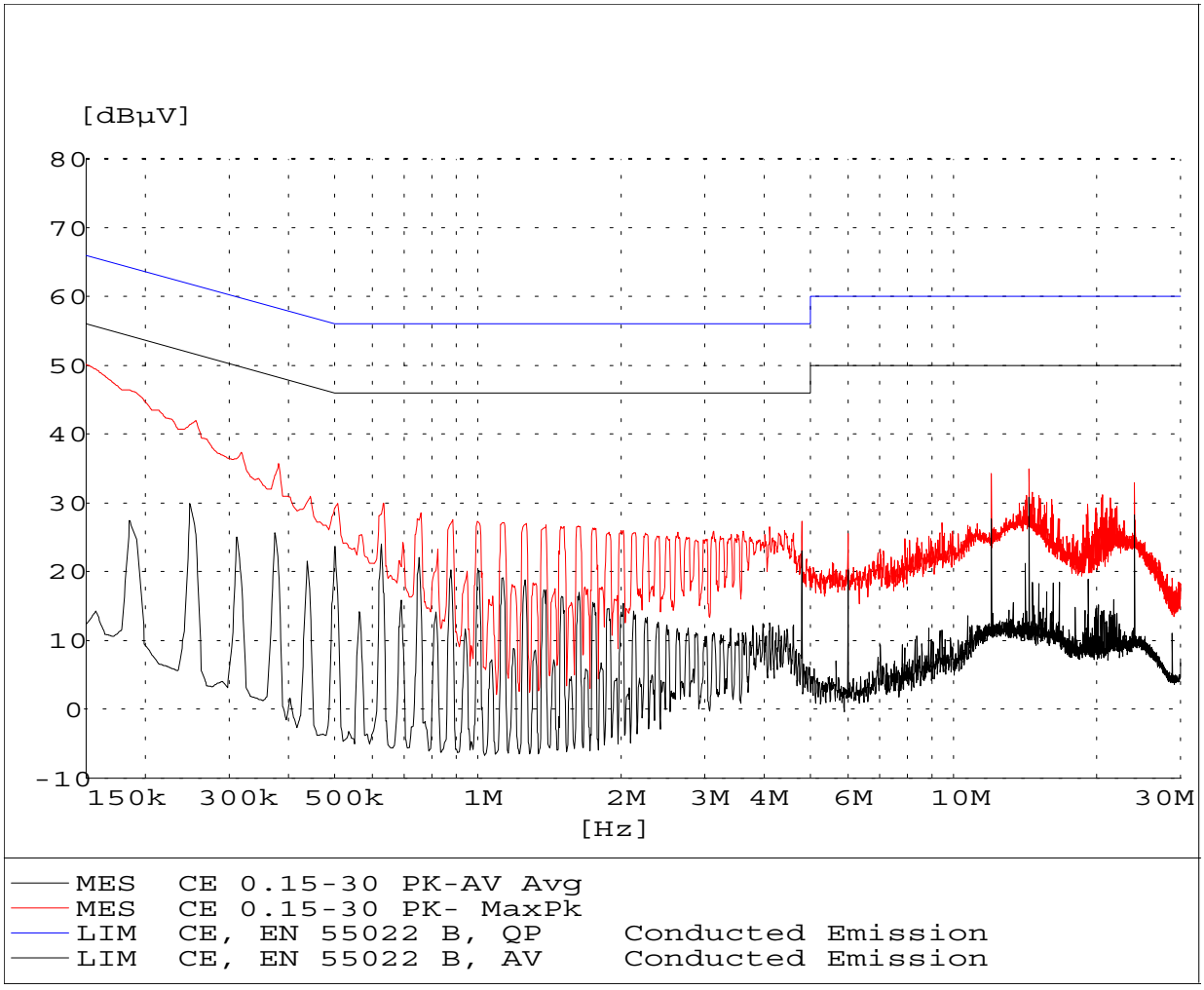

Photo A4.4 Radiated electromagnetic field test. Test object in smartcard reading mode

# *Annex 5*

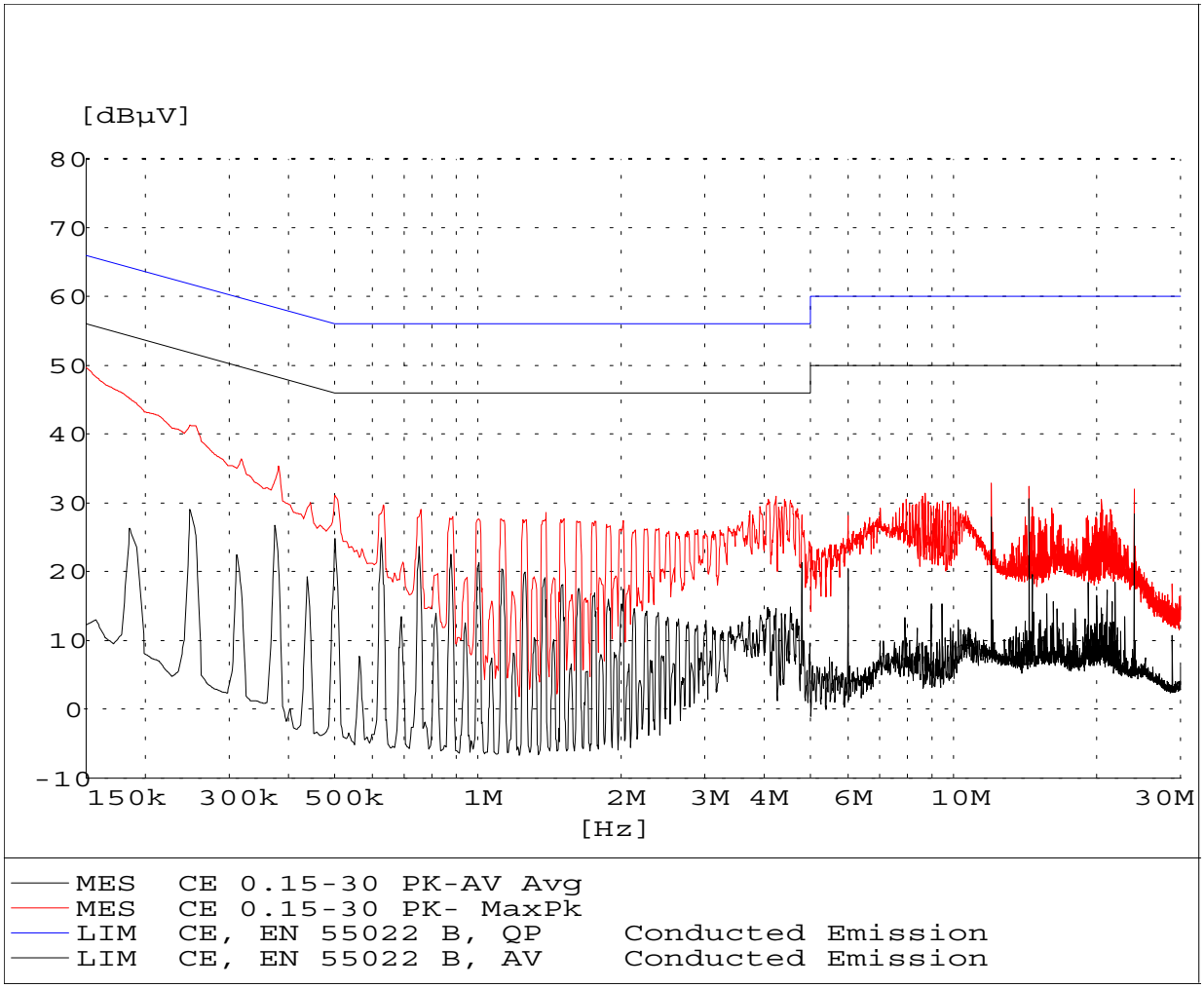
## *Test record sheets and photos regarding measurements of AC mains conducted emission EN 55022*

*(6 pages)*

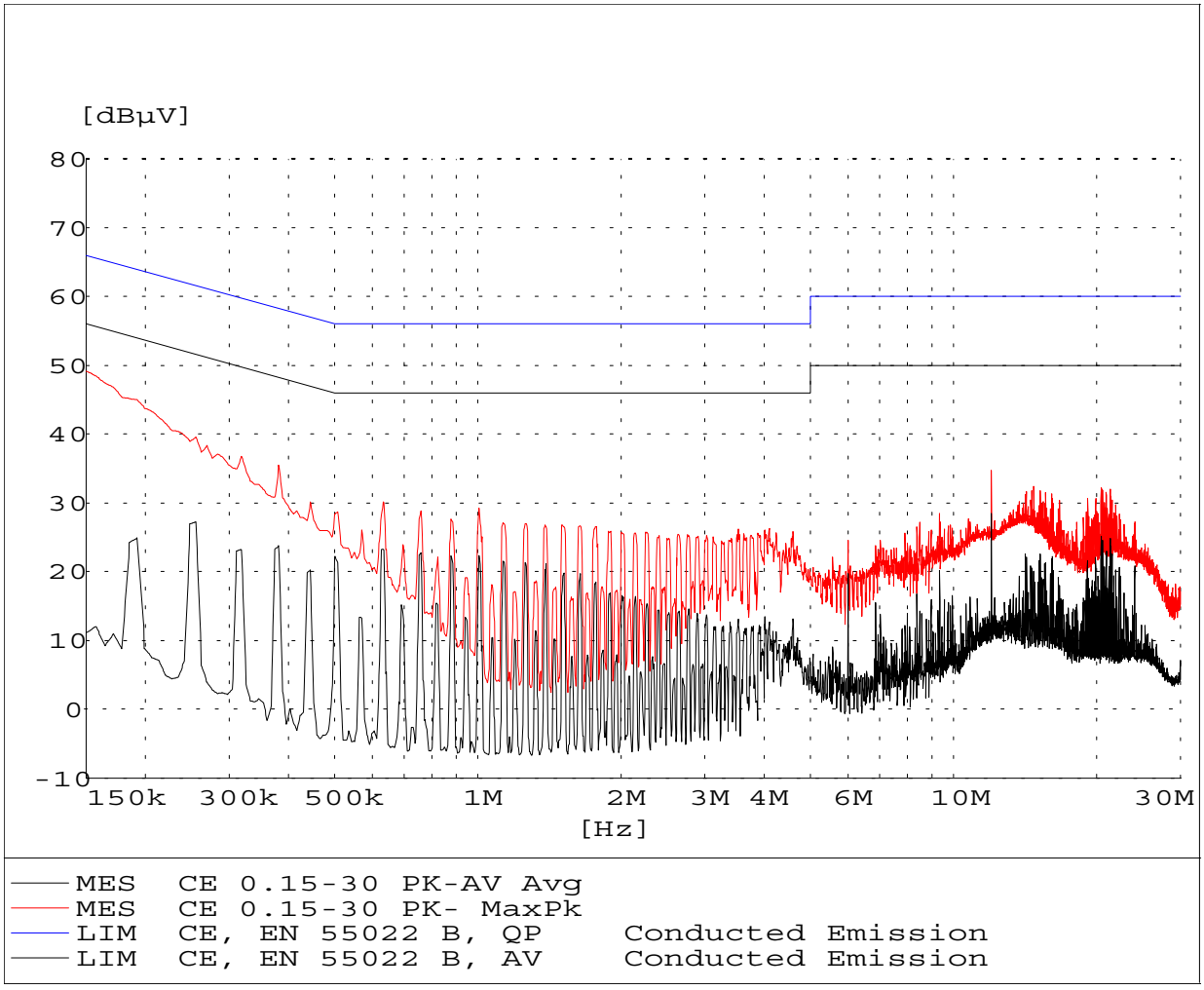
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Line no: Neutral. 115 VAC. Reading smartcard mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | EN 55022 Class B |
| Comment: | Sheet 1 |
| Start of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



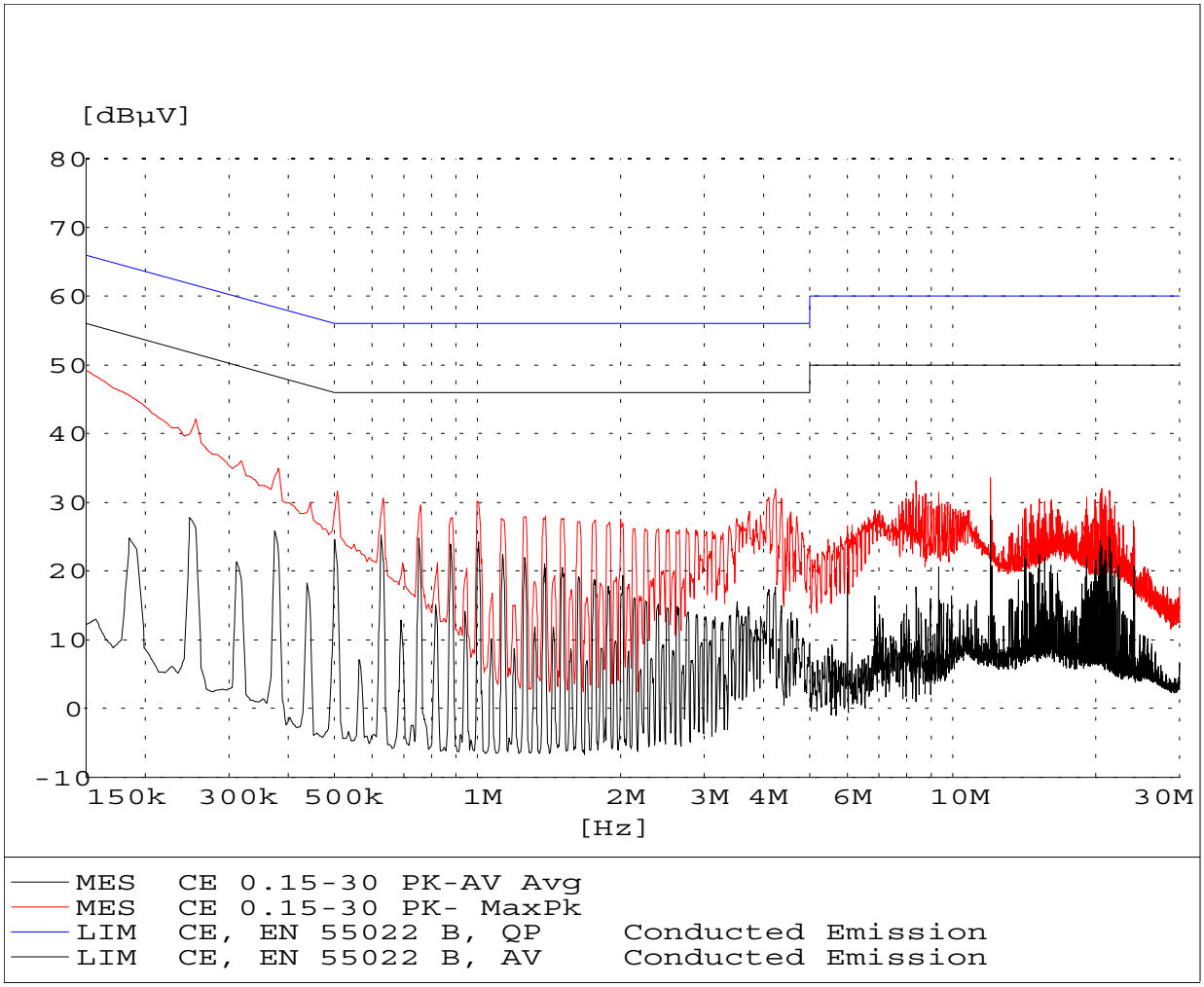
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Line no: Line 1. 115 VAC. Reading smartcard mode. |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | EN 55022 class B |
| Comment: | Sheet 2 |
| Start of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



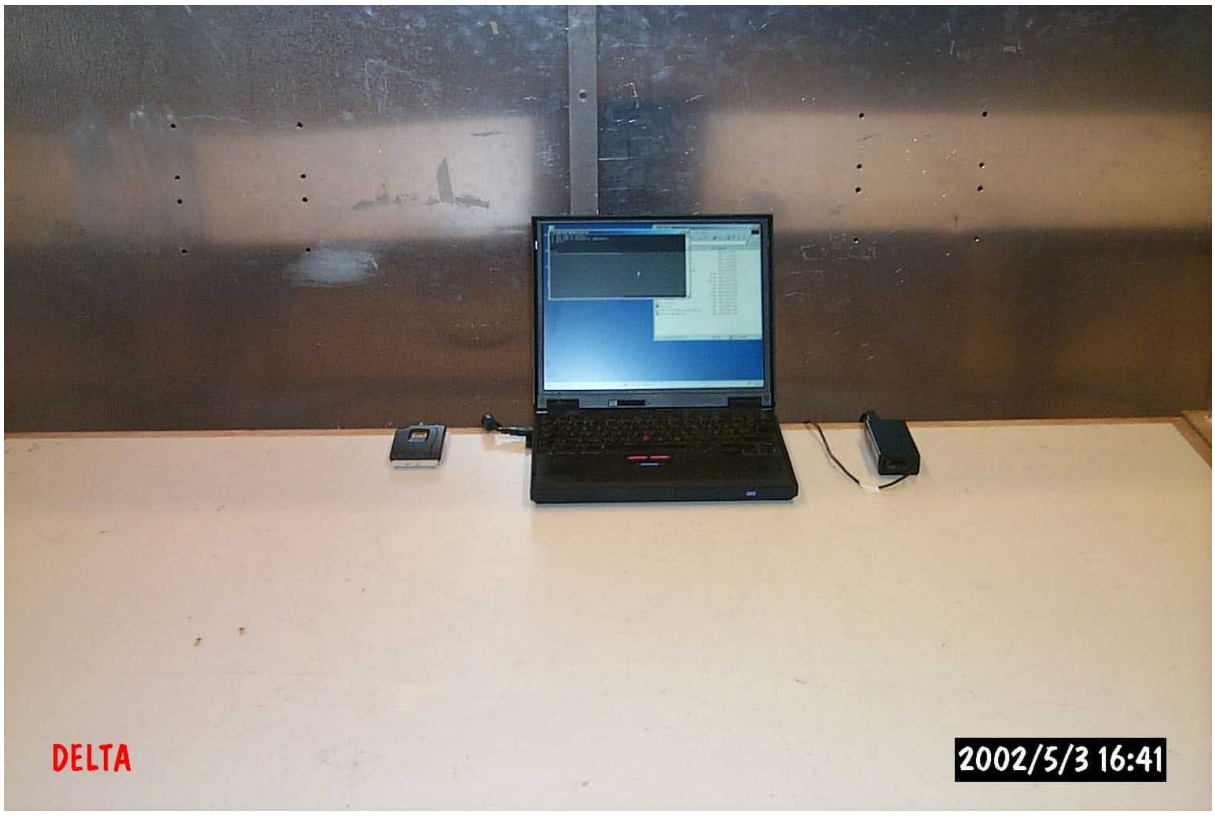



Photo A5.1 AC mains conducted emission. Test object in smartcard reading mode

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

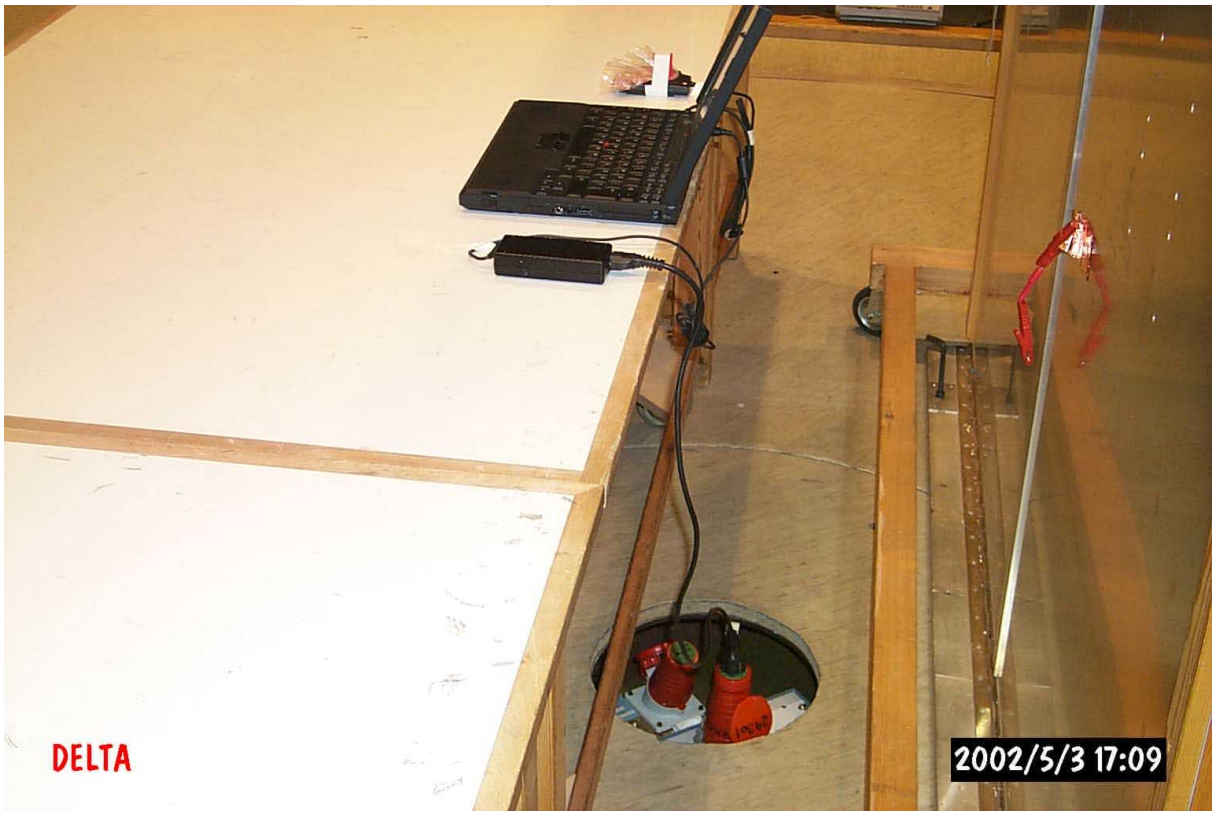


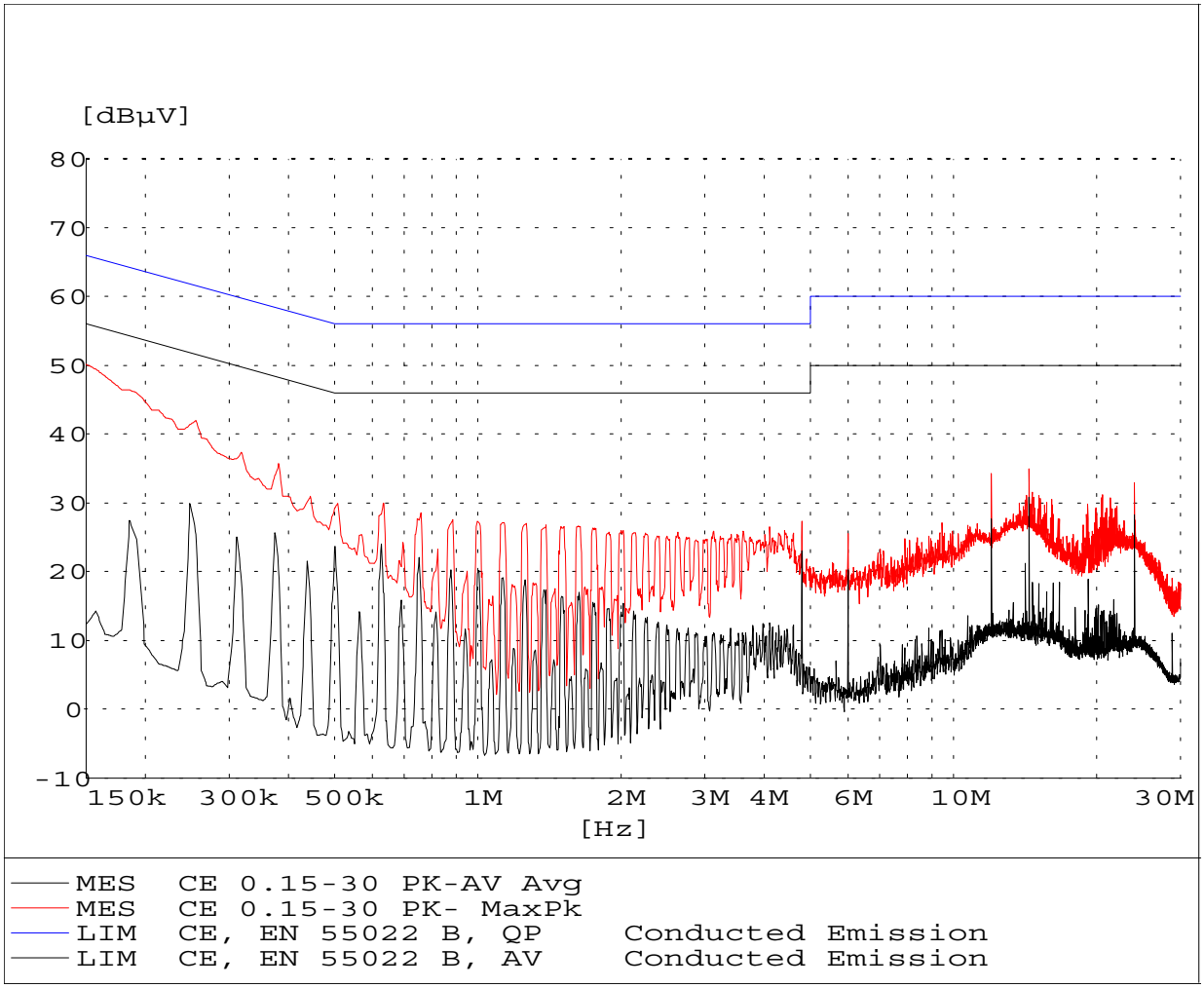

Photo A5.4 AC mains conducted emission. Test object in fingerprint scanning mode

***Annex 6***

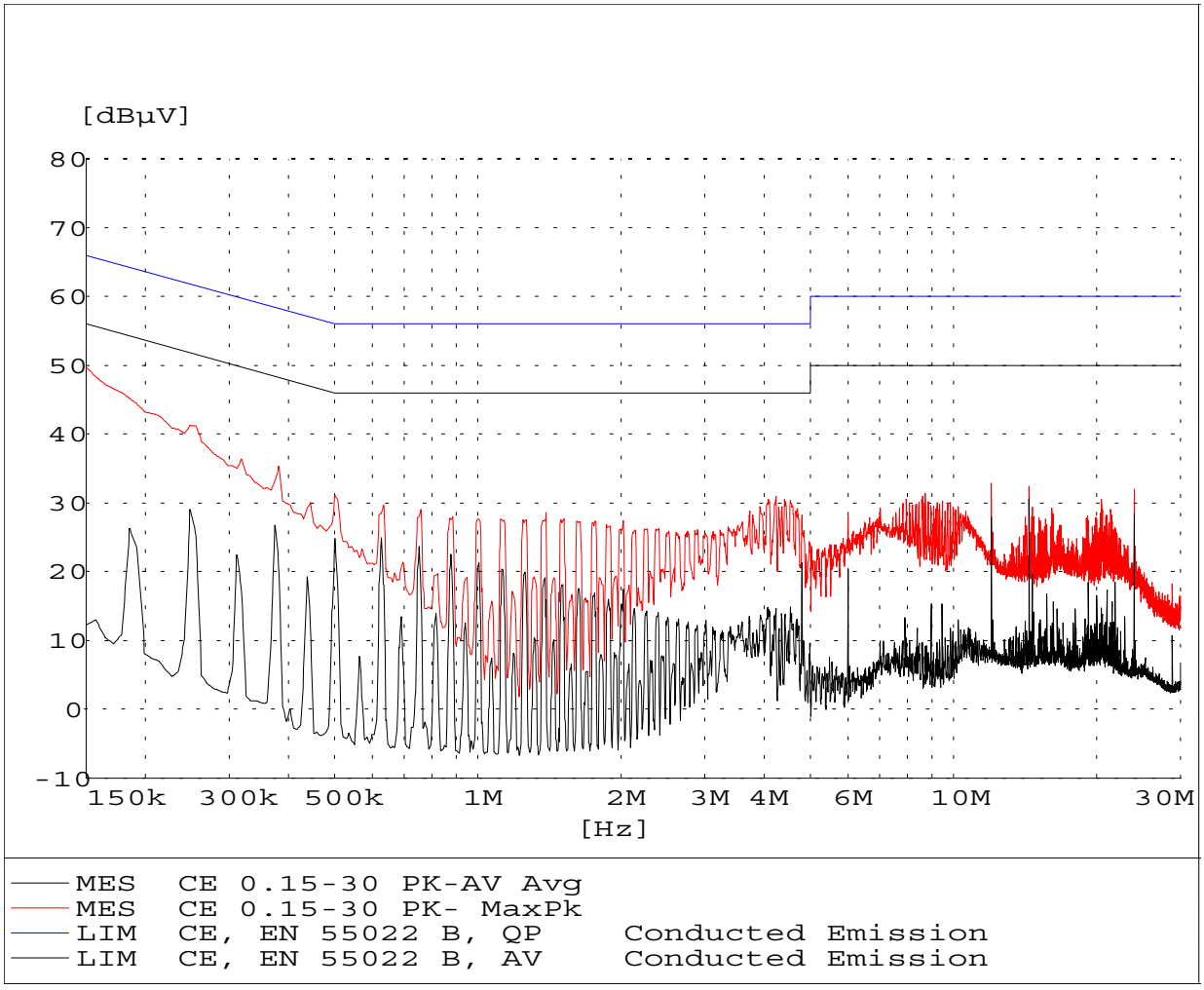
***Test record sheets and photos***
***regarding measurements of AC mains conducted emission***
***FCC***

***(6 pages)***

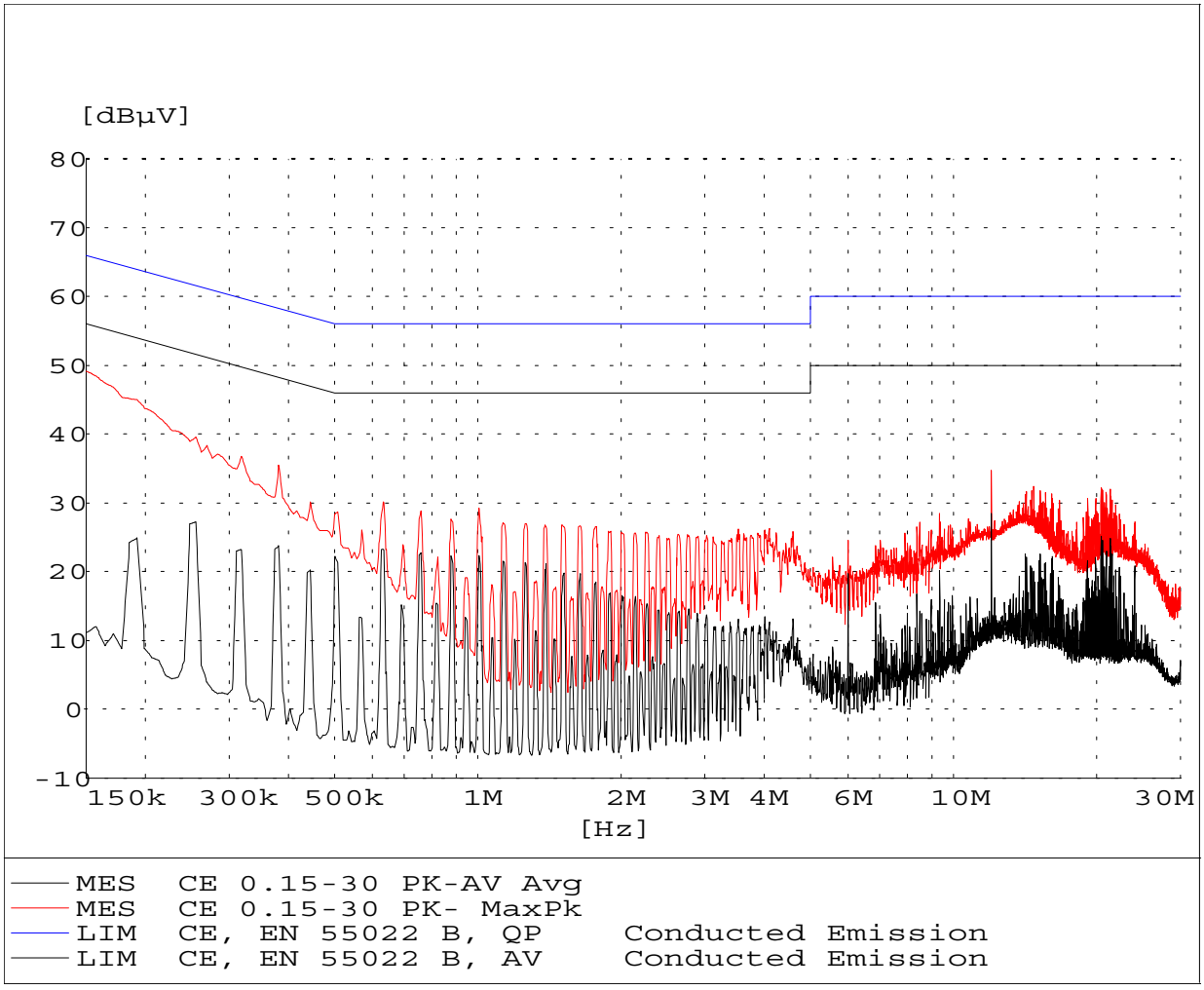
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Line no: Neutral. 115 VAC. Reading smartcard mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | FCC Class B (EN 55022 Class B) |
| Comment: | Sheet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



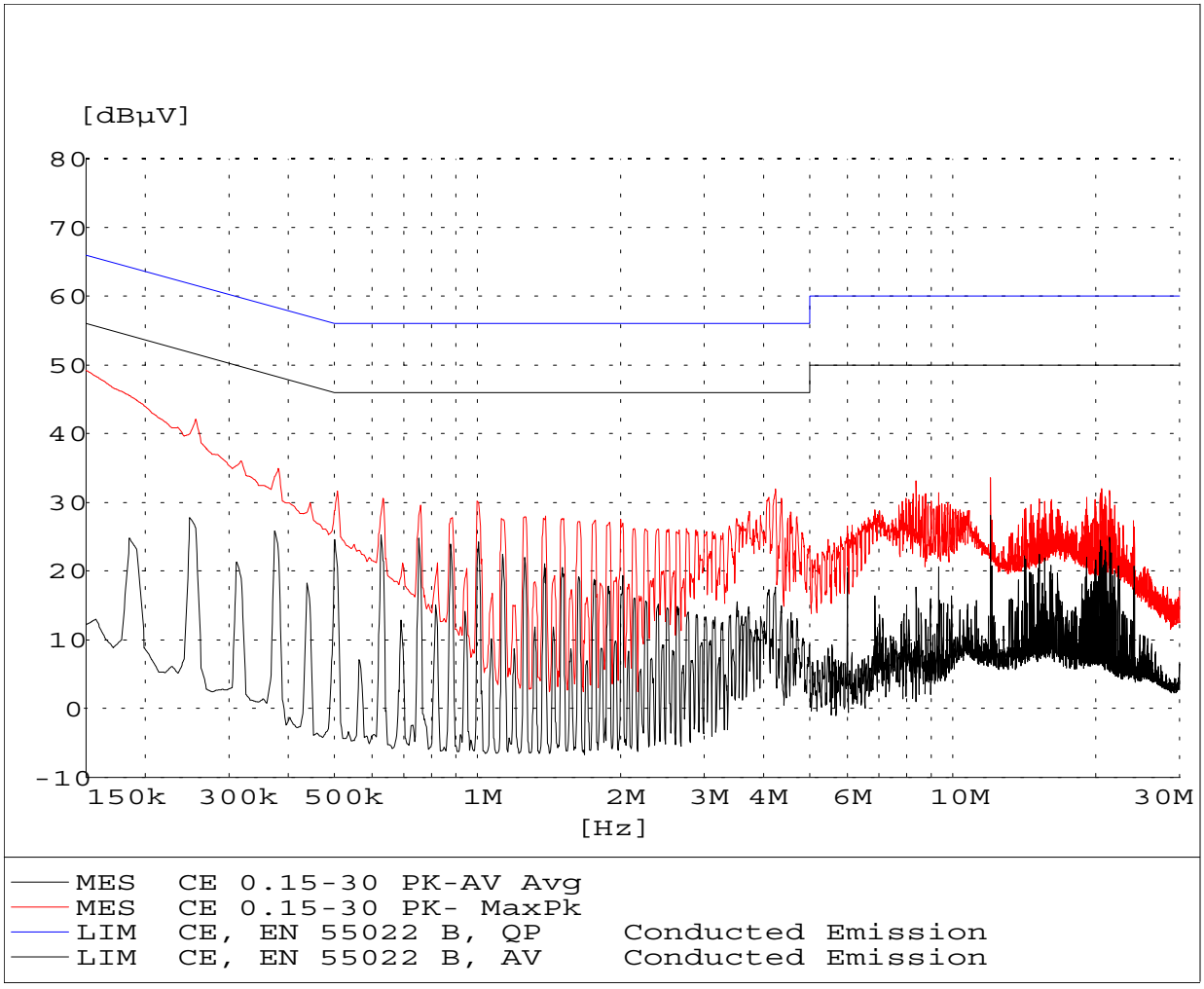
| | |
|---|---|
| EUT: | Precise 100 MC (serial# 2) |
| Manufacturer: | Precise Biometrics AB |
| Operating Condition: | Line no: Line 1. 115 VAC. Reading smartcard mode |
| Test Site: | EMC-5 |
| Operator: | JN - K222311 |
| Test Specification: | FCC Class B (EN 55022 Class B) |
| Comment: | Sheet 2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



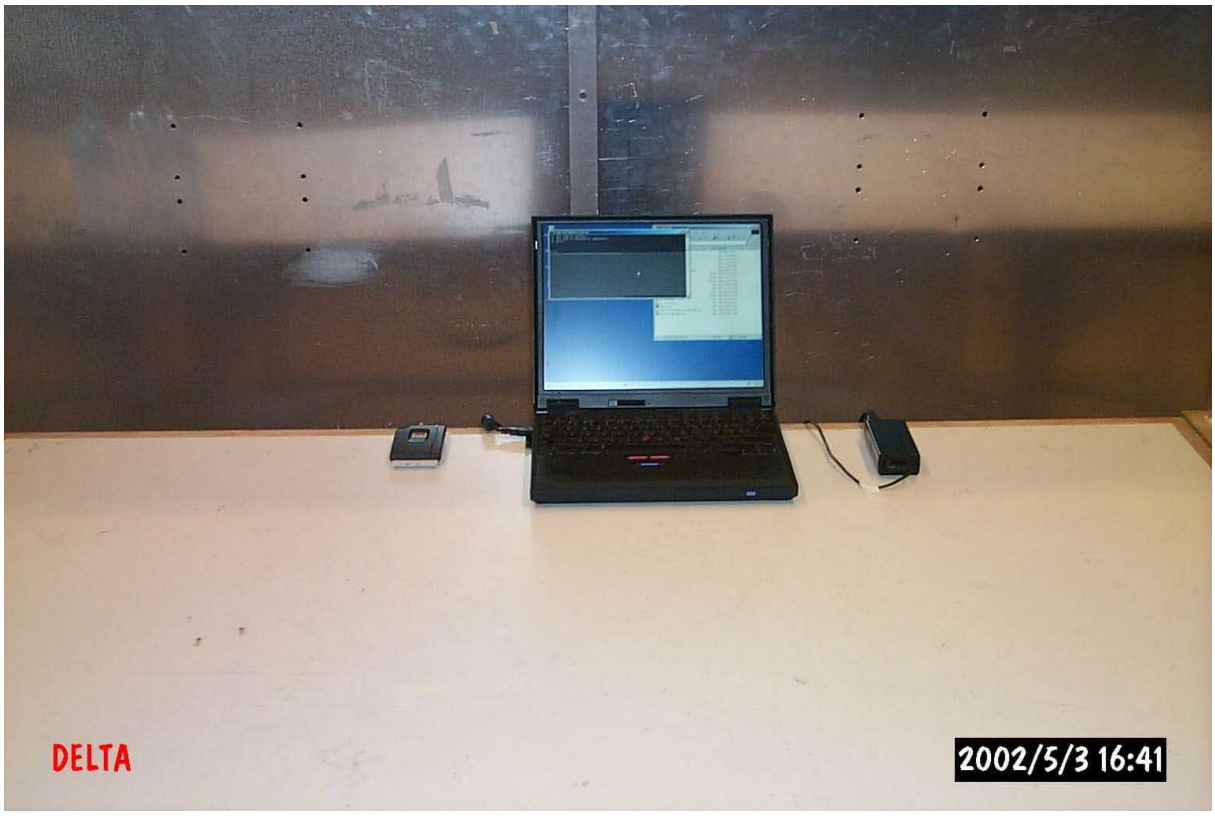



Photo A6.1 AC mains conducted emission. Test object in smartcard reading mode

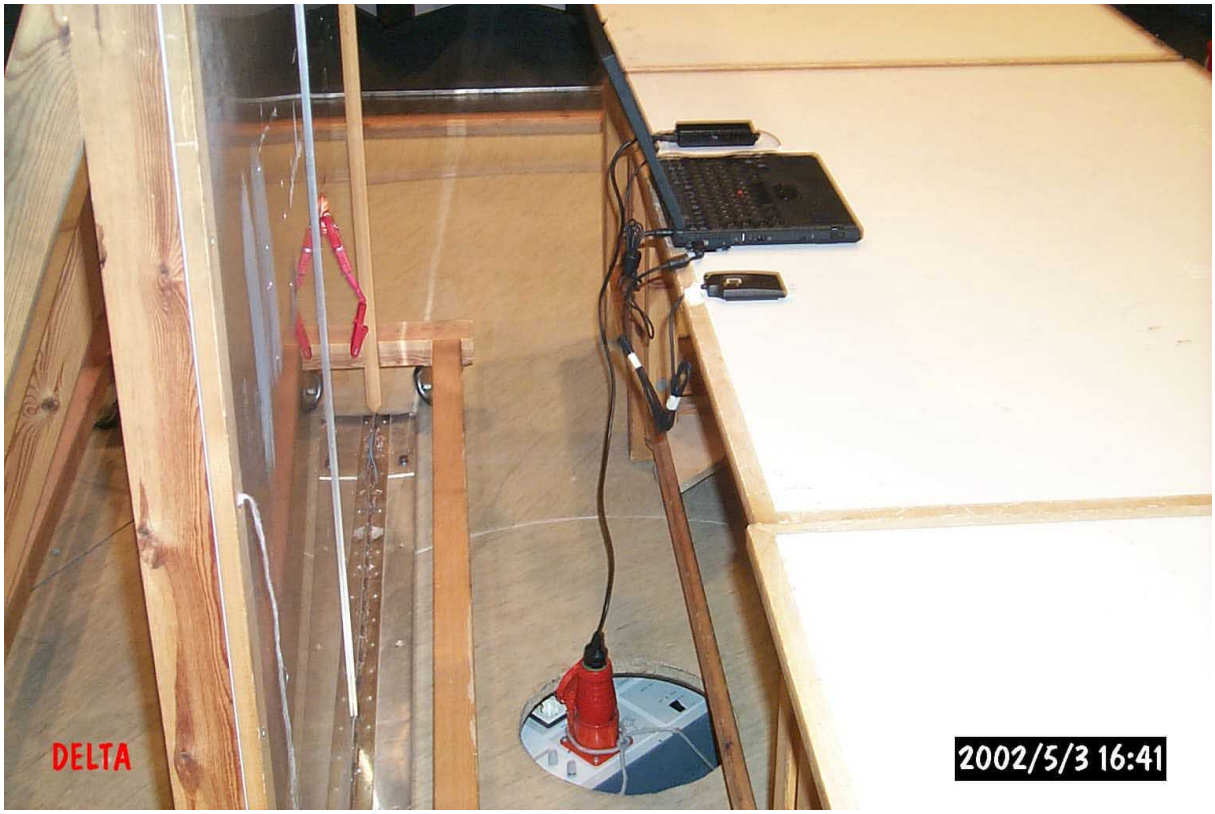



Photo A6.2 AC mains conducted emission. Test object in smartcard reading mode

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