TEST REPORT

DANAK
Reg. no. 19

DELTA
Danish Electronics,
Light & Acoustics

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Measurements of radio frequency interference from Fingerprint Reader Precise 100 A USB Veridicom Performed for Precise Biometrics AB

Project no.: K221128-7
Date: 2000-10-09

LIABILITY

The following provisions shall apply in respect of accredited testing and calibration tasks conducted by DELTA Danish Electronics, Light & Acoustics (herein- after DELTA) and of test reports and calibration certificates issued by DELTA.

1. DELTA shall not be liable for any loss or damage unless it is established that such loss or damage results from negligence or breach of duty on the part of DELTA.

2. The procedures used for testing/calibration and the preparation of the present test report/calibration certificate are based on the knowledge and techniques available to DELTA at the time of testing/calibration. DELTA shall not be held liable should subsequent technical developments indicate that such knowledge or techniques were inadequate or incorrect.

3. DELTA shall not be liable for loss or damage

- in cases where the product causing such loss or damage has not been tested by DELTA, except where it is established that such product is identical to one tested or examined by DELTA, or

- in cases where such loss or damage results from a property of a product or of a use, to which such product is put, which either has not been tested or examined and described in the present report or differs from DELTA's description in that report of the properties of the product or of uses to which it might be put.

4. DELTA will in no event be liable for consequential losses such as, but not limited to, loss of profit.

5. Should a third party enter a claim for compensation which exceeds the limits for DELTA's liability as set out in § 1-4 above, then defence against any such claim shall be the responsibility of the Client if DELTA so requires, and all costs of such defence and of any litigation in connection therewith shall be borne by the Client. Should DELTA be held liable or otherwise be ordered to make payments in excess of the limits set out in § 1-4, then the Client shall be obliged to indemnify and hold DELTA harmless in respect of such excess.

6. Any dispute arising out of or relating to this Test Report shall be referred to Copenhagen Arbitration. The interpretation and performance of this Test Report shall be governed by and construed in accordance with the laws of Denmark.

DANAK (DANISH ACCREDITATION)

DANAK was established in 1991 in pursuance of the Industry and Trade Promotion Act No. 394 of 13 June 1990. The scheme is a continuation of the accreditation scheme established in 1973 under the auspices of the former Danish National Testing Board (STP).

The requirements to the accredited testing laboratories are laid down in the Danish Agency for Development of Trade and Industry Statutory Order No. 258 of 11 April 1994 on accreditation of laboratories to perform technical testing etc.

The standards DS/EN 45001 „General criteria for the operation of testing laboratories" and DS/EN 45002 „General criteria for the assessment of testing laboratories" are integrated parts of the statutory order.

In order to obtain accreditation to perform technical testing it is, among other things, required:

- that the testing laboratory and its personnel are free from any commercial, financial and other pressures which might influence their technical judgement.

- that the testing laboratory operates a quality system which is documented.

- that the testing laboratory is furnished with items of equipment required for correct performance of the tests and measurements which the laboratory is accredited to perform.

- that the testing laboratory has sufficient personnel, having the necessary education, training, technical knowledge and experience for their assigned functions.

- that the testing laboratory has procedures for traceable calibration of equipment used for accredited testing.

- that accredited testing is performed after fully documented methods.

- that the testing laboratory has records which contain sufficient information to permit repetition of the test.

- that the testing laboratory is assessed and surveyed by DANAK on a regular basis.

- that the accredited laboratory shall take out an insurance which will cover liability in connection with accredited testing

Test reports carrying the logo of DANAK are used to report accredited testing and the logo shows that the testing has been performed in accordance with the rules of accreditation.

Title	Measurements of radio frequency interference from Fingerprint Reader Precise 100 A USB Veridicom
Test object	Precise 100 A USB Veridicom
Report no.	DANAK-195236
Project no.	K221128-7
Date of test	2000-04-10
Client	Precise Biometrics AB Dag Hamerskjölds väg 2 S – 224 64 Lund Sweden Telephone: +46 46 311100 Telefax: +46 46 311101
Contact person	Mr. Håkan Lohmander
Manufacturer	Precise Biometrics AB
Specifications	EN 55022:1994 (CISPR 22:1993 + A1:1995 + A2:1996) class B + A1:1995 + A2:1997 FCC part 15 Subpart B class B demonstrated by compliance with EN 55022:1994, class B.
Results	The emission from the test object was below the limit of the above specifications.
Test personnel	Henrik Egeberg Nielsen
Date	2000-10-09
Project manager	Per Hansen, Facility Manager, EMC DELTA
Responsible	Jørgen Duvald Christensen, Department Manager, EMC DELTA

The client has received this report in electronic form. DELTA keeps a paper copy of the report.

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1. Summary of test results

The results of the emission tests can be summarised as follows:

Emission tests	**EN 55022:1994 (CISPR 22:1993 + A1:1995 + A2:1996) class B + A1:1995 + A2:1997**	**FCC part 15 Subpart B class B, demonstrated by compliance with EN 55022:1994, class B**
Conducted emission, AC mains	Passed	Passed
Radiated electromagnetic field	Passed	Passed

Abbreviations :

Passed	:	The emission was below the limit.
Not done	:	No test was performed.
N/A	:	Not applicable.
Not relevant	:	The test was not relevant for the test object.

The test results relate only to the specimen tested.

2. Test specimen

Category	:	Electronic identification equipment
Manufacturer	:	Precise Biometrics AB
Model/Type	:	Precise 100 A USB Veridicom
Part no.	:	MS010015
Serial no.	:	0001
Supply voltage	:	5.0 VDC supplied from the LapTop PC to the test object. 115 VAC and 230 VAC supplied to the LapTop PC power adapter.
Operational mode	:	Normal (a test programme was executing all functions).
Comments	:	PCB rev. C installed.

3. General test conditions

3.1 Test set-up

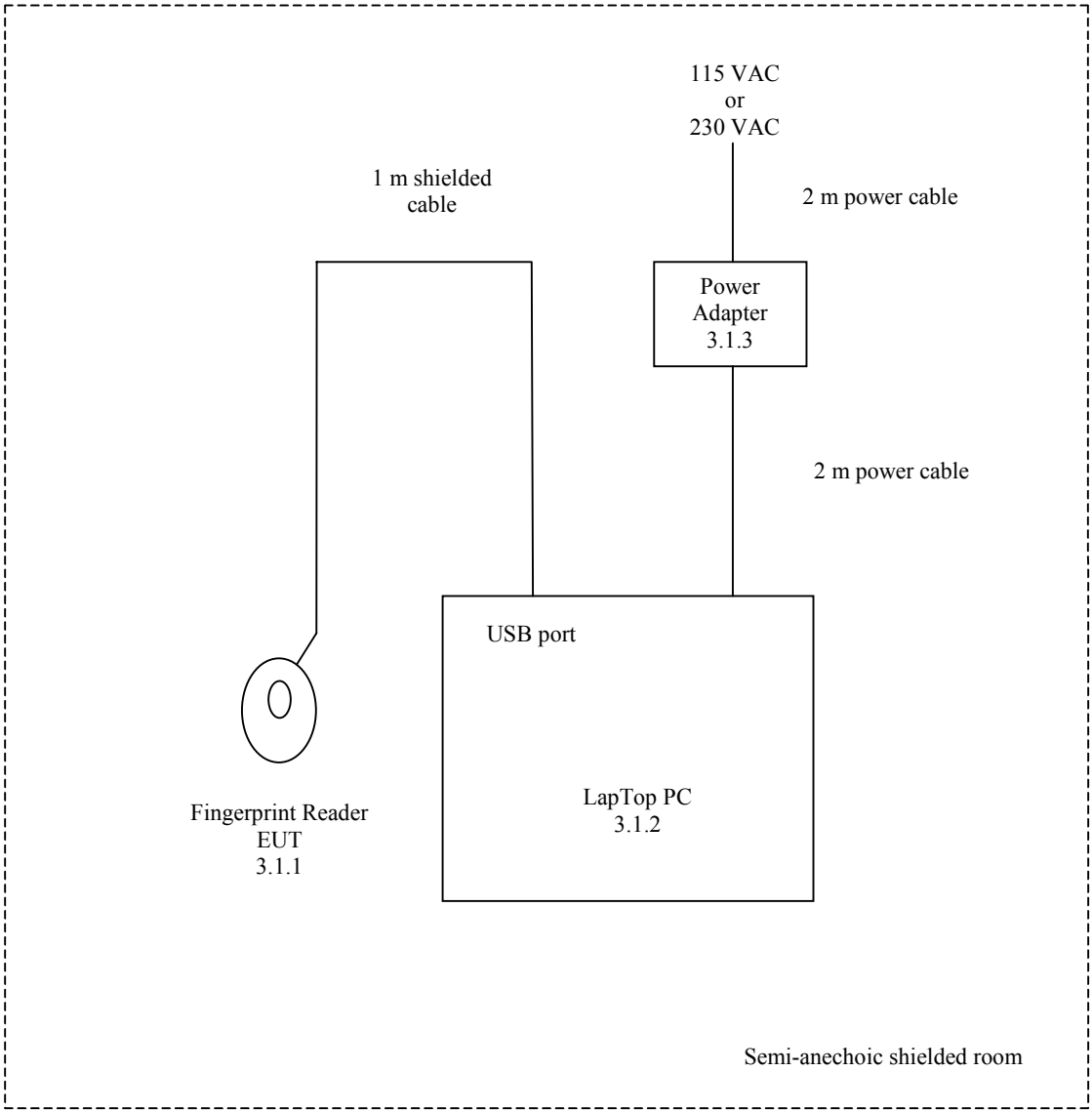


FIG. 1 Test configuration including test object and peripheral equipment

The complete system used during the tests consisted of the following units:

3.1.1 Fingerprint Reader EUT

Manufacturer	:	Precise Biometrics AB
Model/type	:	Precise 100 A USB Veridicom
Part no.	:	MS010015
Serial no.	:	0001
FCC ID	:	-

3.1.2 LapTop PC AUX

Manufacturer	:	IBM
Model/type	:	ThinkPad 600E
Part no.	:	2645-4BG
Serial no.	:	5528 TVC
FCC ID	:	DOC

3.1.3 Power adapter AUX

Manufacturer	:	IBM
Model/type	:	Adapter 100 – 240 VAC / 16 VDC
Part no.	:	02K7006
Serial no.	:	J15JK580002
FCC ID	:	-

4. Tests and results

4.1 Conducted emission, AC mains (EN 55022, class B)

	Requirements	
Specification	EN 50081-1:1992	
Test method	EN 55022:1994 (CISPR 22:1993 + A1:1995 + A2:1996) class B + A1:1995 + A2:1997	
Frequency range	0.15 - 30 MHz	
Limit: (quasi-peak)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.)	66-56 dBµV
	0.50-5 MHz:	56 dBµV
	5-30 MHz:	60 dBµV
Limit: (average)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.)	56-46 dBµV
	0.50-5 MHz:	46 dBµV
	5-30 MHz:	50 dBµV
Test record sheets and photos		*Annex 2*

Results:

The emission was within the specified limits.

Climatic conditions:

21.0°C and 52.0 %RH

Comments:

The conducted emission was measured on the AC-mains to the LapTop PC power adapter. 230 VAC supply power.

4.2 Radiated electromagnetic field (EN 55022, class B)

	Requirements	
Specification	EN 50081-1:1992	
Test method	EN 55022:1994 (CISPR 22:1993 + A1:1995 + A2:1996) class B + A1:1995 + A2:1997	
Measuring distance	10 m	
Frequency range	30 - 1000 MHz	
Limit: (quasi-peak)	30-230 MHz: 230-1000 MHz:	30 dBµV/m 37 dBµV/m
Test record sheets and photos		*Annex 3*

Results:

The emission was within the specified limits.

Climatic conditions:

21.0°C and 52.0 %RH

Comments:

115 VAC supply power to LapTop PC power adapter.

4.3 Conducted emission, AC mains (FCC, class B / EN 55022, class B)

	Requirements	
Specification	FCC Rules and Regulations:1997, part 15, subpart B class B, demonstrated by compliance with EN 55022:1994, class B	
Test method	CISPR 22:1993 + A1:1995 + A2:1996	
Frequency range	0.15 - 30 MHz	
Test set-up	ANSI C63.4:1992	
Limit: (quasi-peak)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.) 0.50-5 MHz: 5-30 MHz:	66-56 dBµV 56 dBµV 60 dBµV
Limit: (average)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.) 0.50-5 MHz: 5-30 MHz:	56-46 dBµV 46 dBµV 50 dBµV
Test record sheets and photos		*Annex 4*

Results:

The emission was within the specified limits.

Climatic conditions:

21.0°C and 52.0 %RH

Comments:

The conducted emission was measured on the AC-mains to the LapTop PC power adaptor. 115 VAC supply power to LapTop power adapter.

4.4 Radiated electromagnetic field (FCC, class B / EN 55022, class B)

	Requirements	
Specification	FCC Rules and Regulations:1997, part 15, subpart B, class B, demonstrated by compliance with EN 55022:1994, class B	
Test method	CISPR 22:1993 + A1:1995 + A2:1996	
Test set-up	ANSI C63.4:1992	
Measuring distance	10 m	
Frequency range	30 – 1000 MHz	
Limit: (quasi-peak)	30-230 MHz: 230-1000 MHz:	30 dBµV/m 37 dBµV/m
Test record sheets and photos		*Annex 5*

Results:

The emission was within the specified limits.

Climatic conditions:

21.0°C and 52.0 %RH

Comments:

115 VAC supply power to LapTop PC power adapter.

Annex 1

List of instruments

(1 page)

List of instruments

EC NO.	INSTRUMENT	MANUFACTURER	TYPE
29797	BILOG ANTENNA, 30-1000 MHz	CHASE	CBL 6111A
29301	ARTIFICIAL MAINS NETWORK	ROHDE & SCHWARZ	ESH2-Z5
29916	AUTOMATIC EMI RECEIVER	ROHDE & SCHWARZ	ESCS-30
29861	EMI-SOFTWARE Ver. 1.6	ROHDE & SCHWARZ	ES-K1

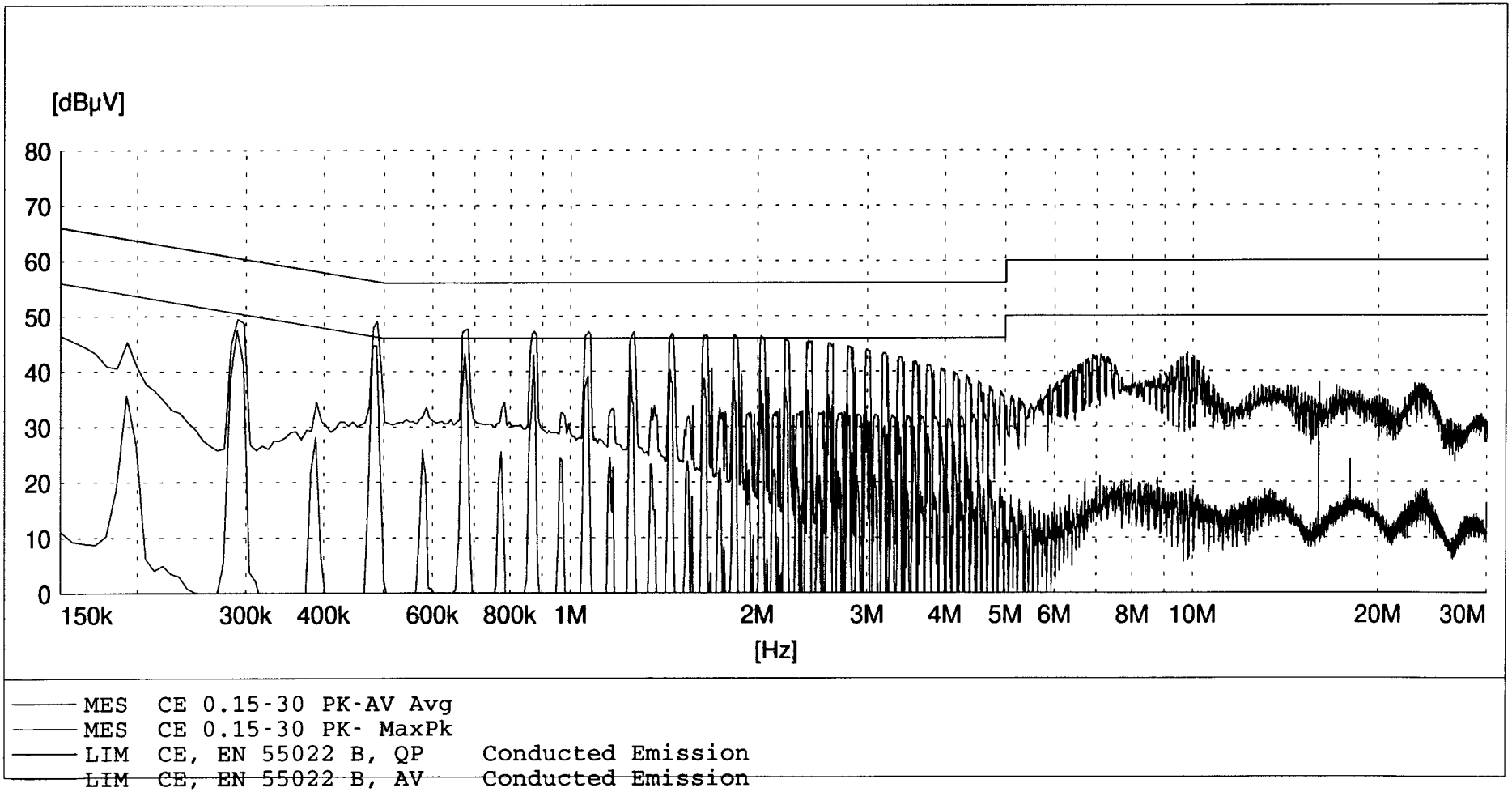
Annex 2

Test record sheets and photos regarding conducted emission, AC mains (EN 55022, class B)

(3 pages)

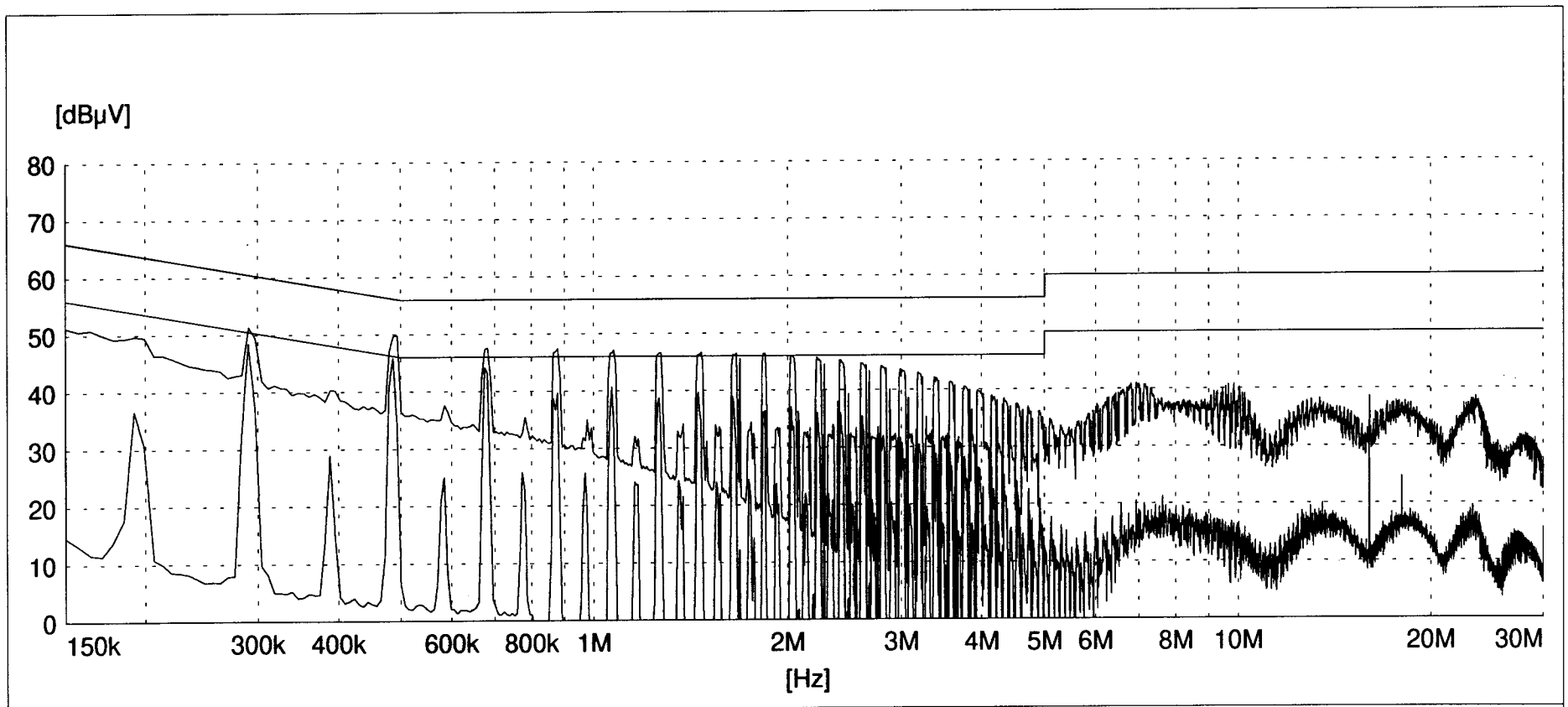
DELTA Electronics Testing

EUT:	Precise 100A USB.
Manufacturer:	Precise Biometrics AB.
Operating Condition:	Line no.: Neutra. 230 VAC.
Test Site:	EMC-5
Operator:	HEN - K221128
Test Specification:	EN 55022 B. / Fcc class B
Comment:	Sheet 3
Start of Test:	2000-04-10



DELTA Electronics Testing

EUT:	Precise 100A USB.
Manufacturer:	Precise Biometrics AB.
Operating Condition:	Line no.: Line 1. 230 VAC.
Test Site:	EMC-5
Operator:	HEN - K221128
Test Specification:	EN 55022 B. / FCC class B
Comment:	Sheet 4
Start of Test:	2000-04-10



MES CE 0.15-30 PK-AV Avg
MES CE 0.15-30 PK- MaxPk
LIM CE, EN 55022 B, QP Conducted Emission
LIM CE, EN 55022 B, AV Conducted Emission

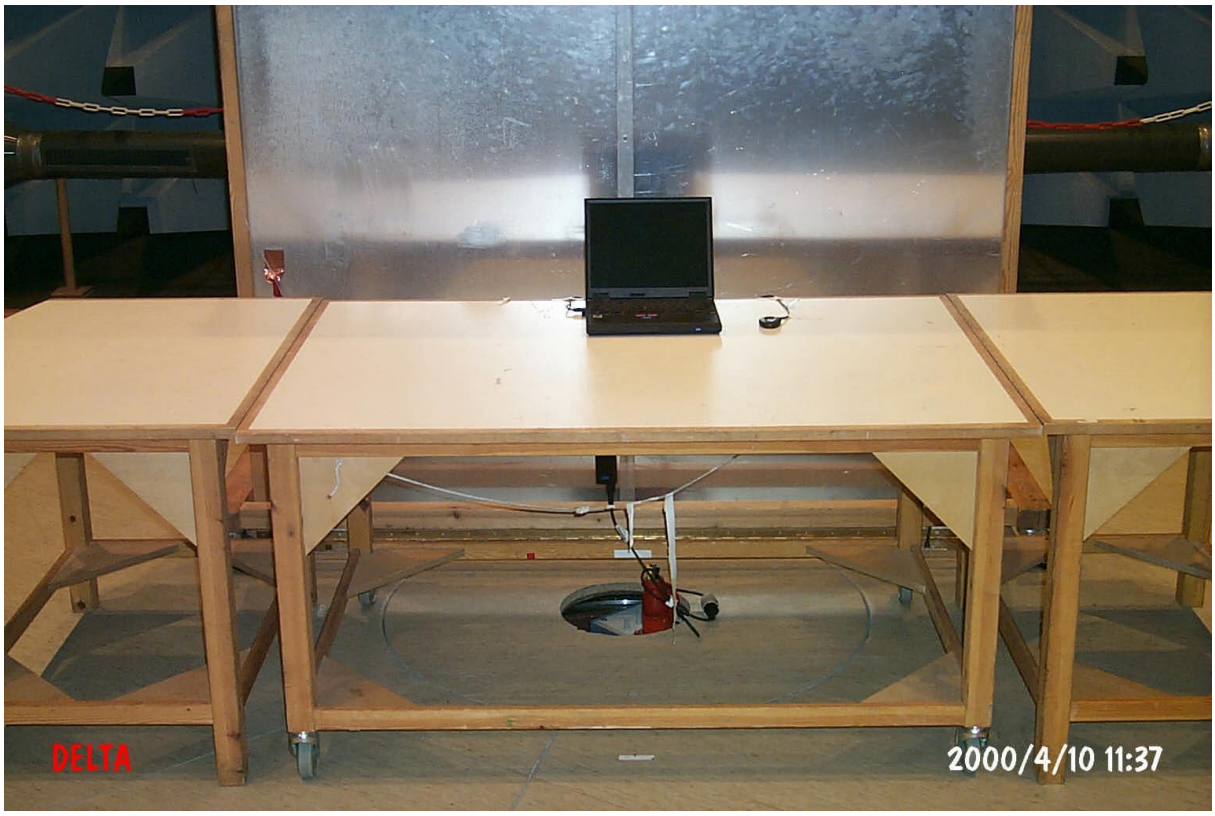


PHOTO A2.1

PHOTO A2.2

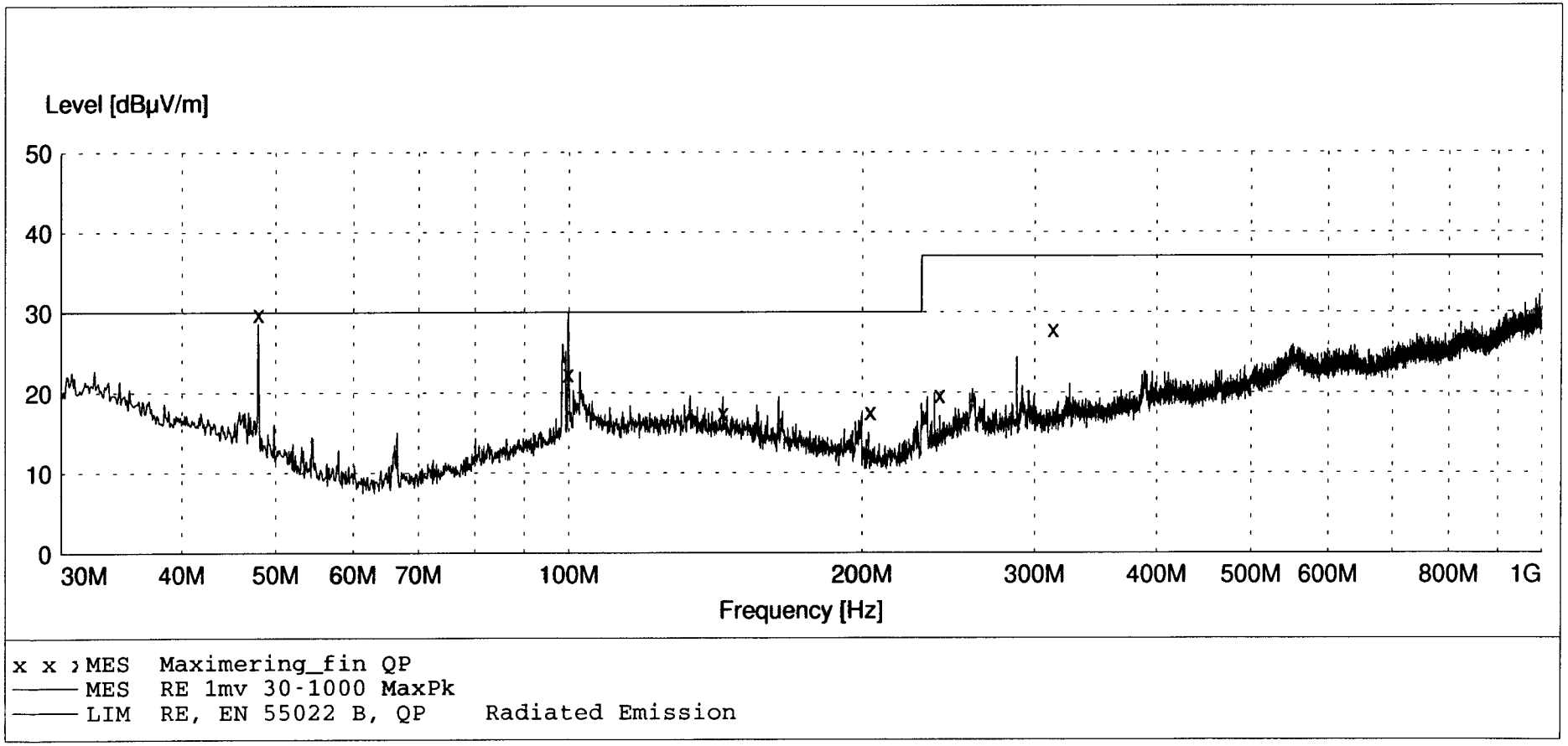
Annex 3

Test record sheets and photos regarding radiated electromagnetic field (EN 55022, class B)

(3 pages)

DELTA Electronics Testing

EUT:	Precise 100A USB.
Manufacturer:	Precise Biometrics AB.
Operating Condition:	Ant. 1 m vertical.
Test Site:	EMC-5
Operator:	HEN - K221128
Test Specification:	EN 55022 B. / FCC class B
Comment:	Sheet 1
Start of Test:	2000-04-10



MEASUREMENT RESULT: "Maximering_fin QP"

10-04-00 11:35

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
48.000000	29.90	9.7	30.0	0.1	101.0	155.00	VERTICAL
99.900000	22.40	10.4	30.0	7.6	150.0	58.00	VERTICAL
144.000000	17.50	11.6	30.0	12.5	111.0	160.00	VERTICAL
203.990000	17.60	9.1	30.0	12.4	353.0	0.00	HORIZONTAL
239.985000	19.70	11.7	37.0	17.3	313.0	0.00	HORIZONTAL
313.400000	27.90	14.0	37.0	9.1	388.0	202.00	HORIZONTAL

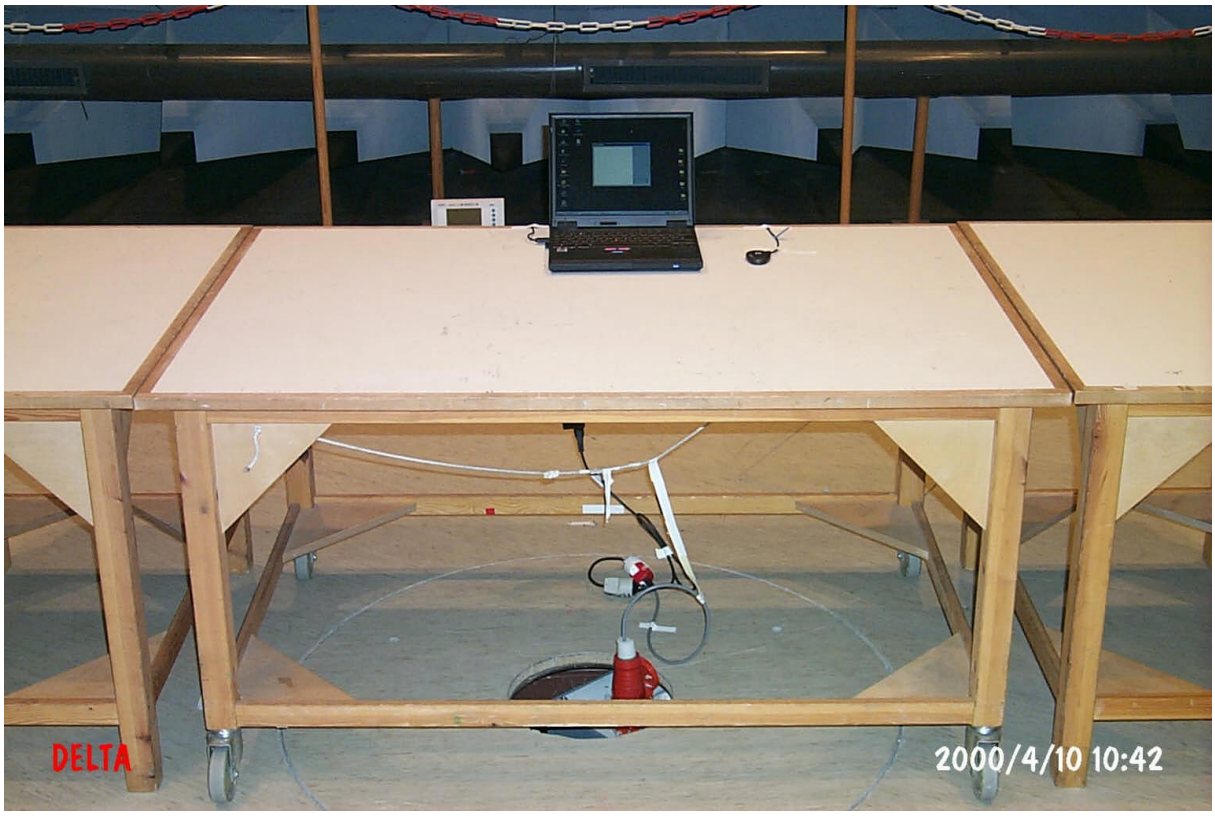


PHOTO A3.1

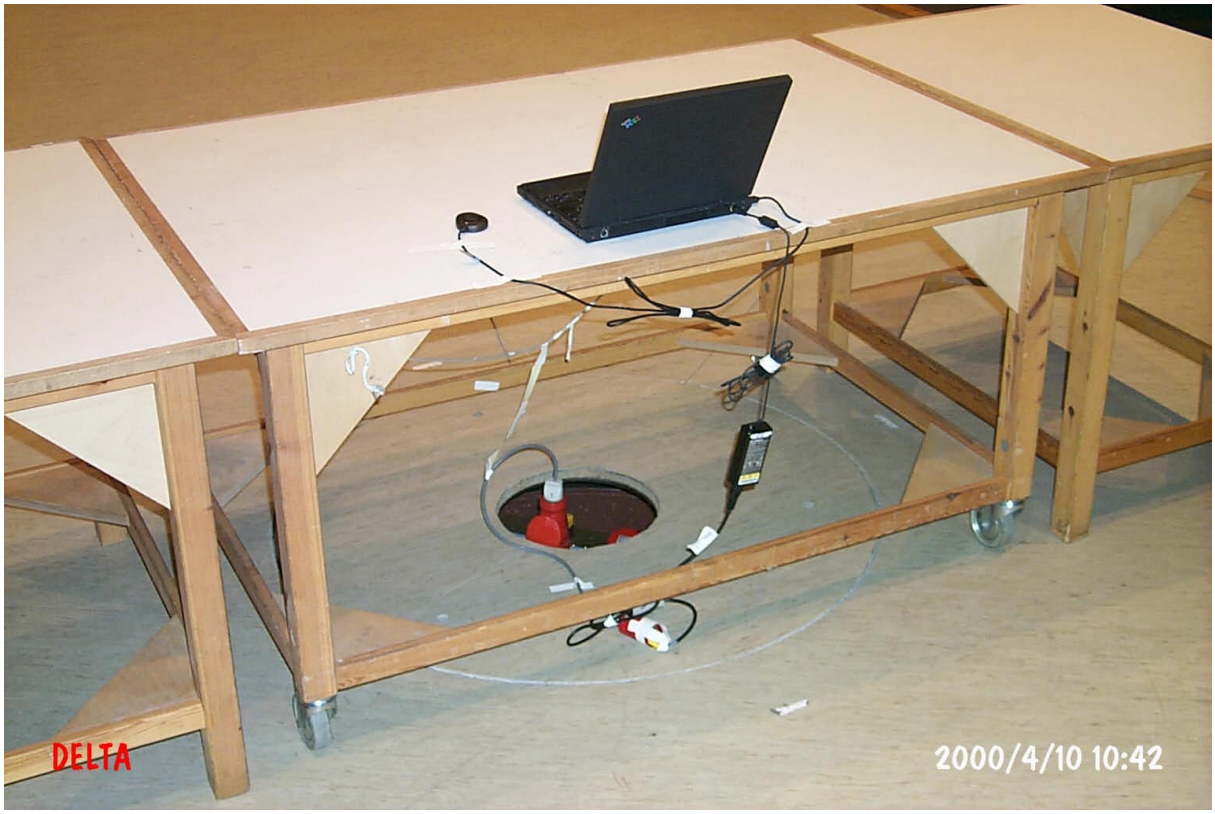


PHOTO A3.2

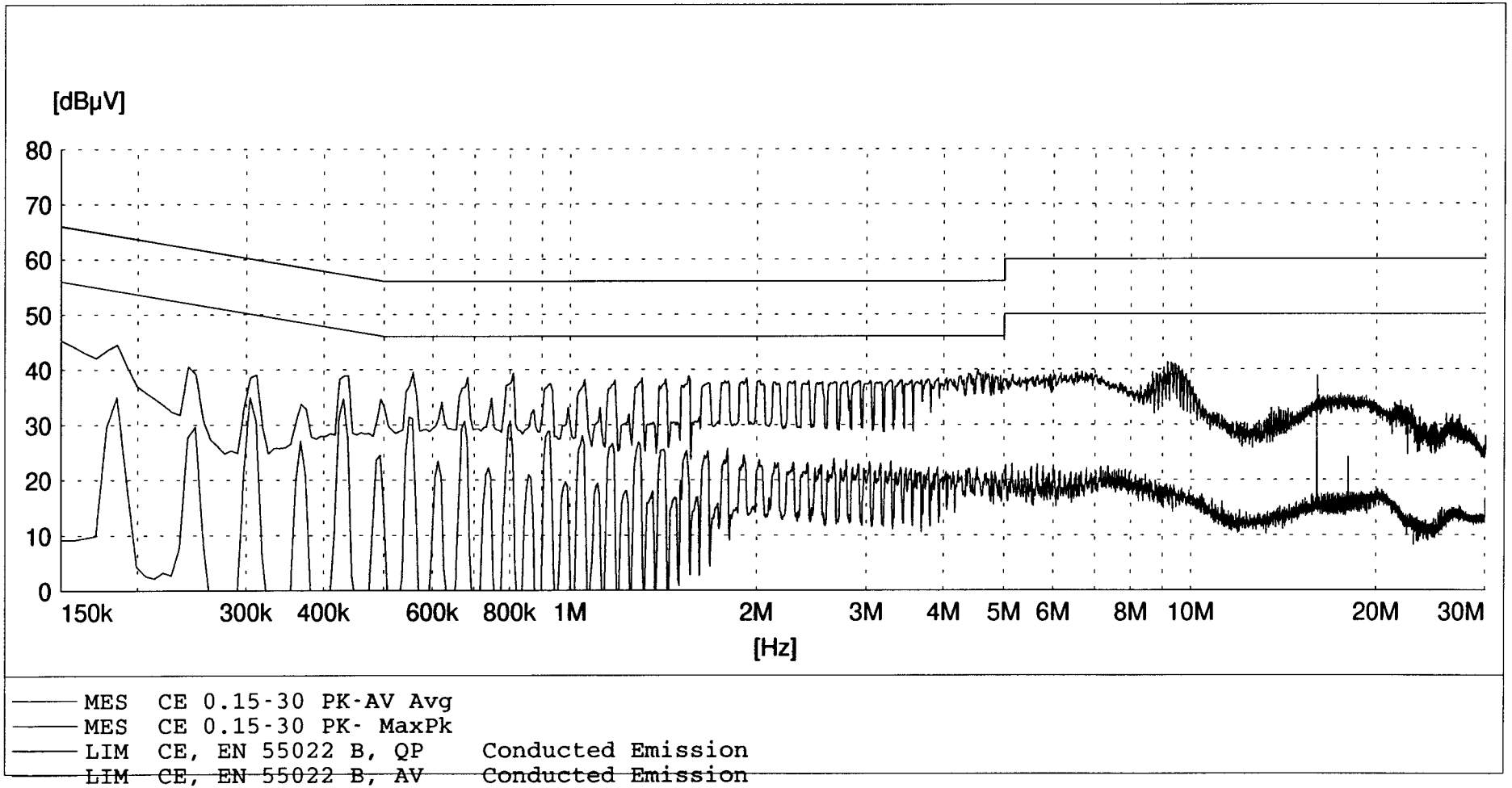
Annex 4

Test record sheets and photos regarding conducted emission, AC mains (FCC class B / EN 55022 class B)

(3 pages)

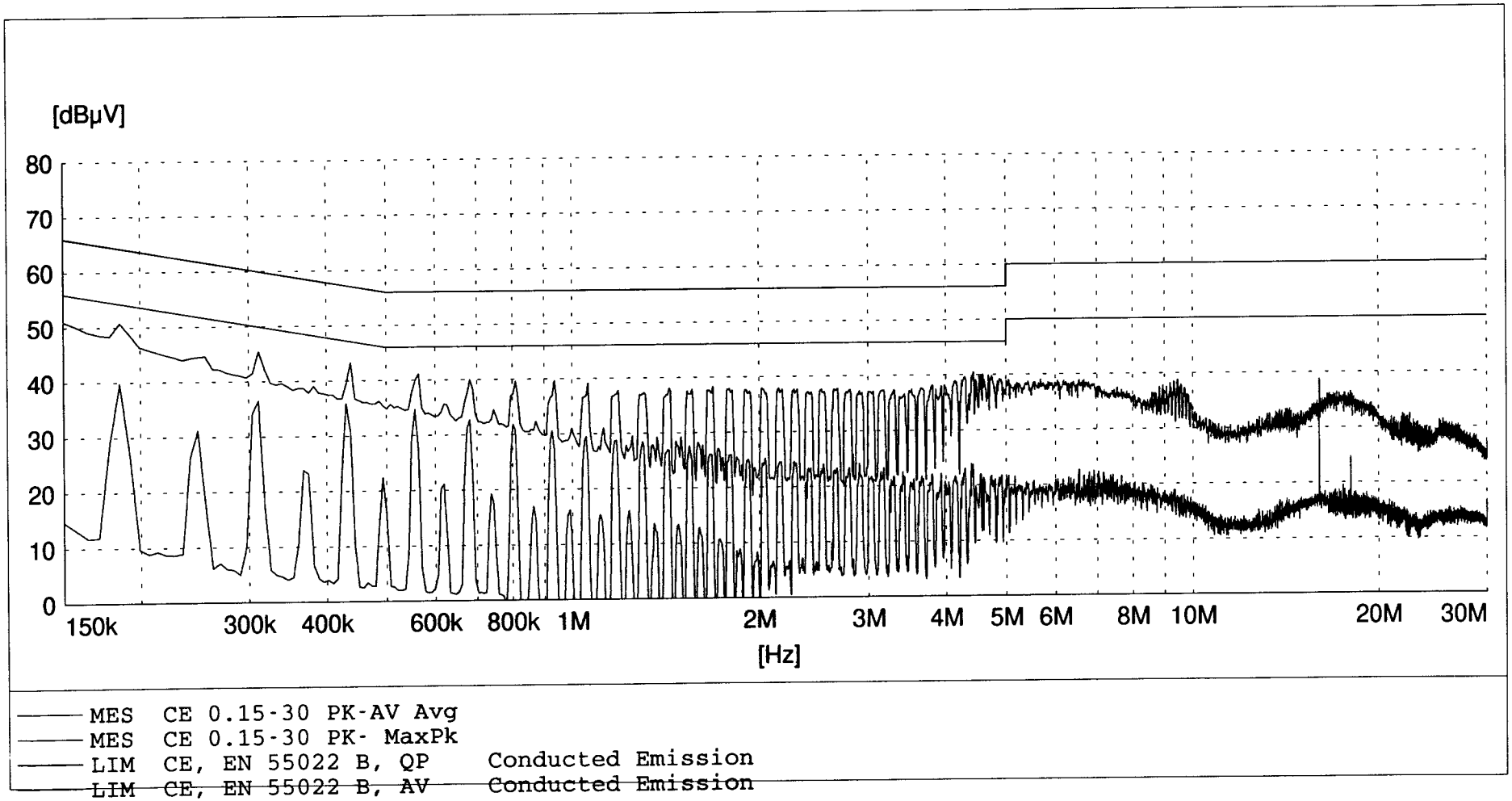
DELTA Electronics Testing

EUT:	Precise 100A USB. Veridicom
Manufacturer:	Precise Biometrics AB.
Operating Condition:	Line no.: Neutral. 115 VAC.
Test Site:	EMC-5
Operator:	HEN - K221128
Test Specification:	EN 55022 B. / Fcc class B
Comment:	Sheet 5
Start of Test:	2000-04-10



DELTA Electronics Testing

EUT:	Precise 100A USB. Veridicom
Manufacturer:	Precise Biometrics AB.
Operating Condition:	Line no.: Line 1. 115 VAC.
Test Site:	EMC-5
Operator:	HEN - K221128
Test Specification:	EN 55022 B. / FCC class B
Comment:	Sheet 6
Start of Test:	2000-04-10



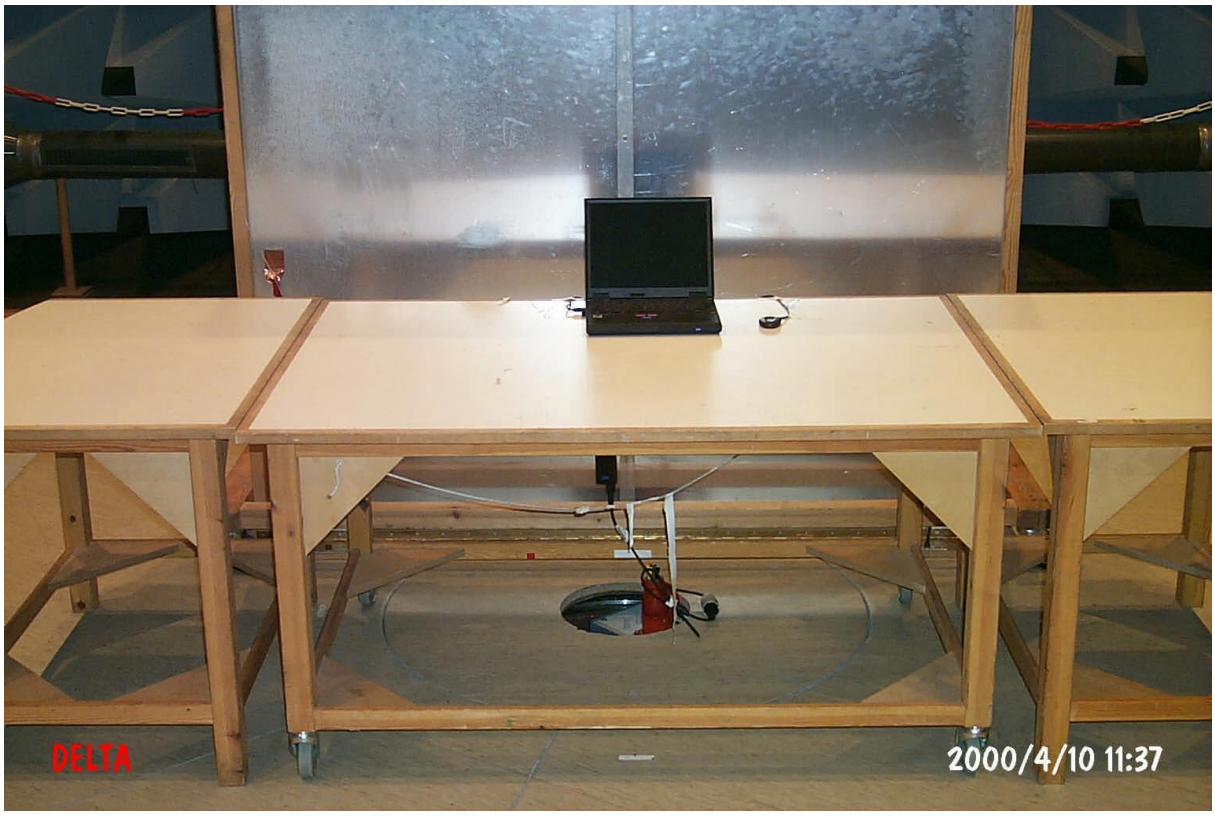


PHOTO A4.1

PHOTO A4.2

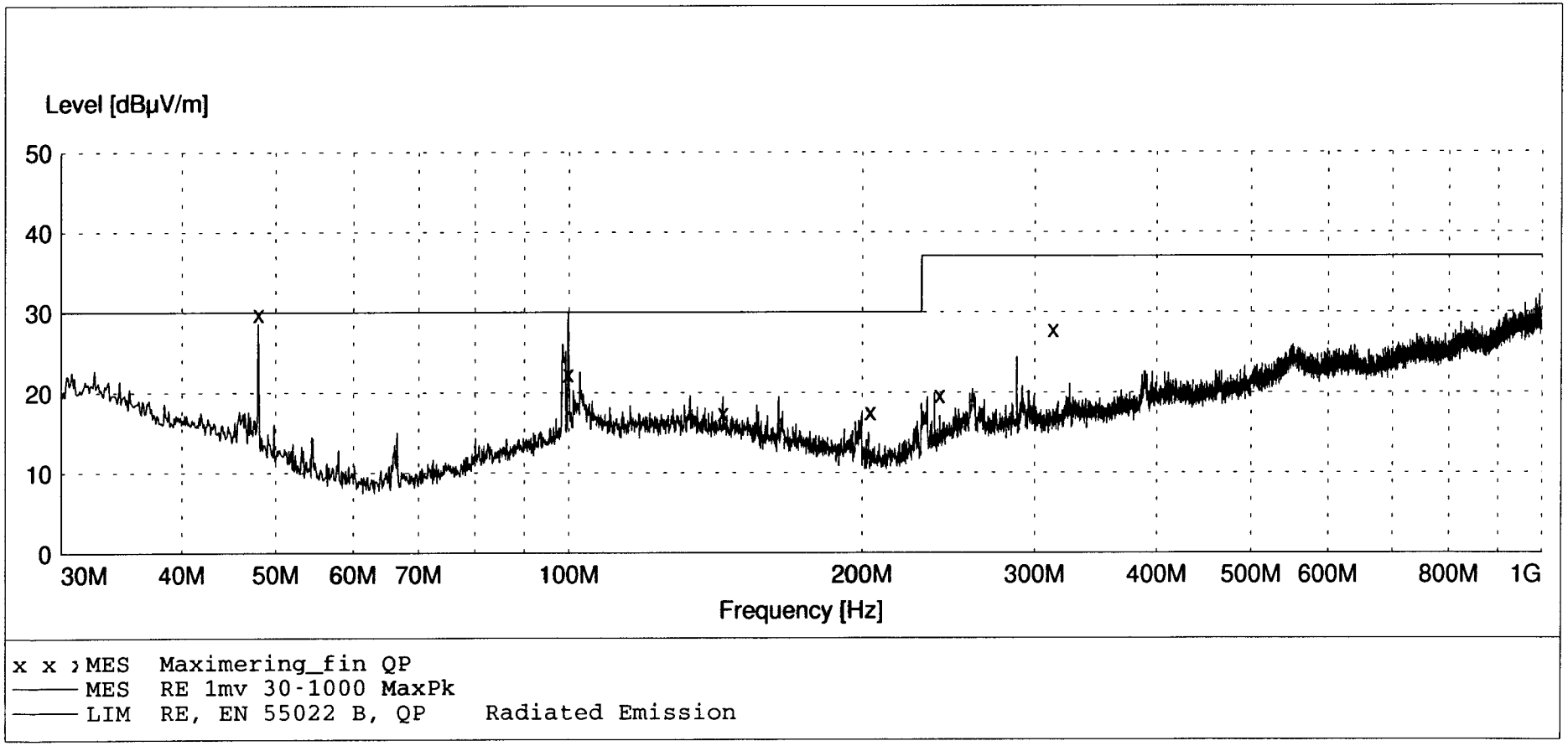
Annex 5

Test record sheets and photos regarding radiated electromagnetic field (FCC, class B / EN 55022, class B)

(3 pages)

DELTA Electronics Testing

EUT:	Precise 100A USB.
Manufacturer:	Precise Biometrics AB.
Operating Condition:	Ant. 1 m vertical.
Test Site:	EMC-5
Operator:	HEN - K221128
Test Specification:	EN 55022 B. / FCC class B
Comment:	Sheet 1
Start of Test:	2000-04-10



MEASUREMENT RESULT: "Maximering_fin QP"

10-04-00 11:35

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
48.000000	29.90	9.7	30.0	0.1	101.0	155.00	VERTICAL
99.900000	22.40	10.4	30.0	7.6	150.0	58.00	VERTICAL
144.000000	17.50	11.6	30.0	12.5	111.0	160.00	VERTICAL
203.990000	17.60	9.1	30.0	12.4	353.0	0.00	HORIZONTAL
239.985000	19.70	11.7	37.0	17.3	313.0	0.00	HORIZONTAL
313.400000	27.90	14.0	37.0	9.1	388.0	202.00	HORIZONTAL

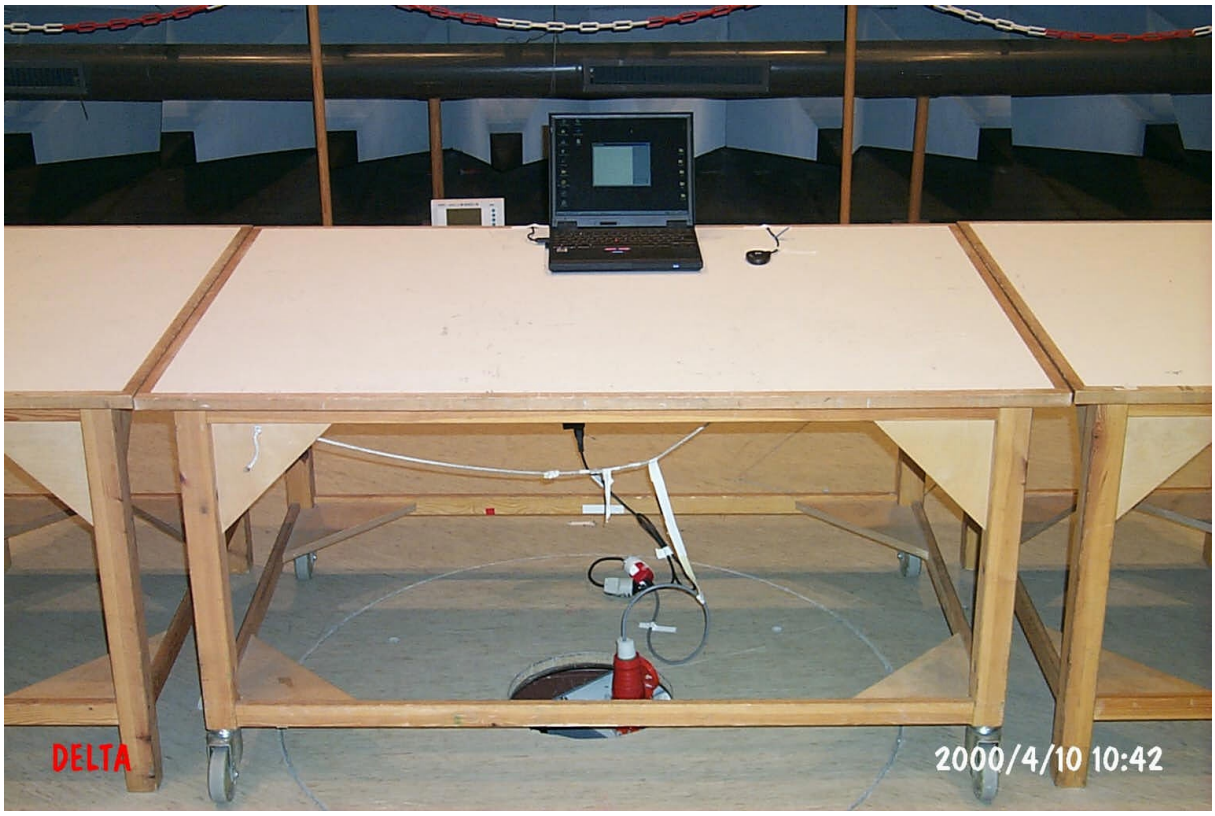


PHOTO A5.1

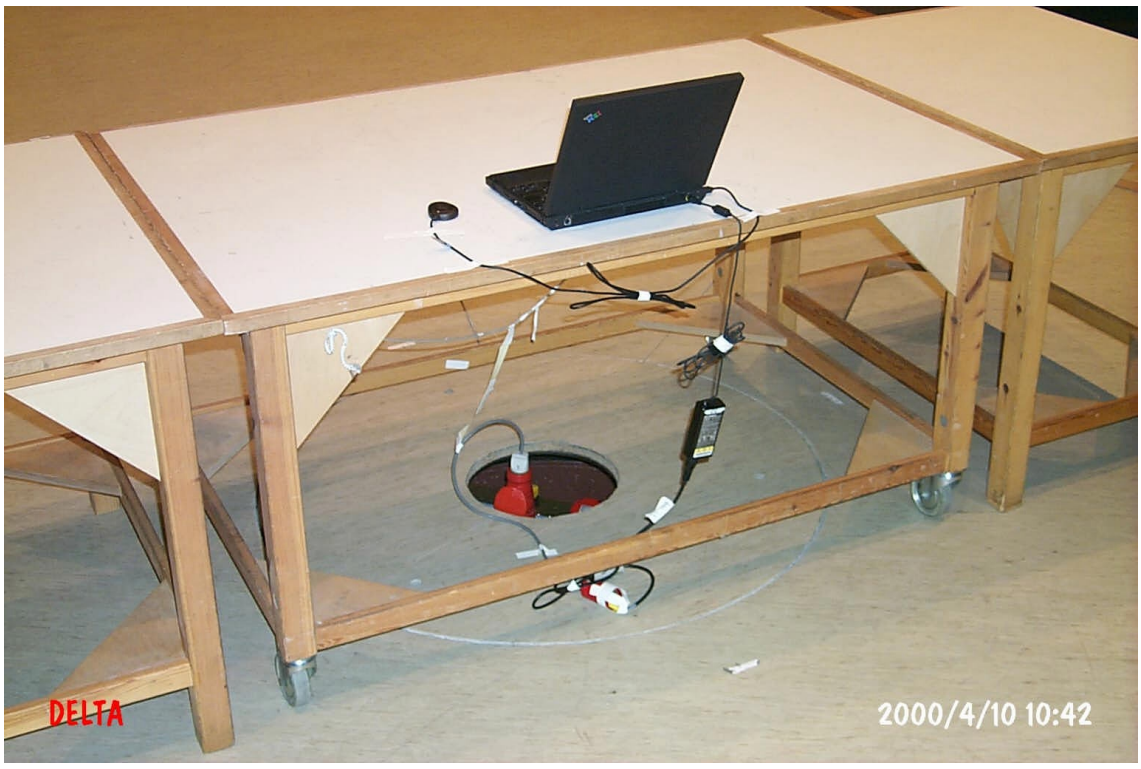


PHOTO A5.2

Annex 6

Photo of test object

(1 page)

PHOTO A6.1