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# DELTA Test Report

***TEST REPORT issued by an Accredited Testing Laboratory***

1688
ISO/IEC 17025

## EMC emission test of Sense X-S

## Performed for Precise Biometrics AB

REC-E703141_2F
Project no.: E703141


19 Feb.2012

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| | |
|---|---|
| **Title** | EMC emission test of Sense X-S |
| **Test object** | Sense X-S |
| **Report no.** | REC-E703141_2F |
| **Project no.** | E703141 |
| **Test period** | 15 Feb. 2012 |
| **Client** | Precise Biometrics AB<br>Scheelevägen 30<br>SE-220 07 Lund<br>Sweden<br>Tel.: 046-311100 |
| **Contact person** | Lena Strutz<br>E-mail: Lena.strutz@precisebiometrics.com |
| **Manufacturer** | Precise Biometrics AB |
| **Specifications** | FCC Part 15 Subpart B |
| **Results** | The test object was found to be in compliance with the specifications, as listed in Section 1 |
| **Test personnel** | Daniela Coman |
| **Date** | 19 Feb. 2012 |

**Project Manager**

Daniela Coman
DELTA

**Responsible**

Ulf Bjerke Technical Manager
DELTA

## Table of contents

# 1. Summary of tests

| Tests | Test methods | Results |
|---|---|---|
| Measurement of radio frequency voltage on mains | ANSI C63.4:2009 | Passed |
| Measurement of radio frequency electromagnetic field | ANSI C63.4:2009 | Passed |

**Conclusion**

The test object(s) mentioned in this report meet(s) the requirements of the standard(s) stated below.

- 47 CFR – Telecommunication, Chapter I – FCC Part 15 – Radio Frequency Devices - Subpart B: Unintentional radiators

The test results relate only to the object(s) tested.

# 2. Test object(s) and auxiliary equipment

## 2.1 Test object(s)

### Test object 2.1.1

| | |
|---|---|
| Name of test object | Sense X-S |
| Model / type | Precise Sense X-S |
| Part no. | SAA 103 1002 |
| Serial no. | 0-1 |
| Manufacturer | Precise Biometrics AB |
| Supply voltage | 5V |
| Software version | N/A |
| Hardware version | R2A |
| Highest frequency generated or used | 12 MHz |
| Comment | |


Photo 2.1.1 Precise Sense X-S

## 2.2 Auxiliary equipment

### Auxiliary equipment 2.2.1

| | |
|---|---|
| Name of auxiliary equipment | Computer |
| Model / type | Thinkpad 600E |
| Part no. | 2645-8BG |
| Serial no. | 5537CNN 02/99 |
| Sw version | SPA 123 1004 R2A |
| Manufacturer | IBM |
| Supply voltage | 230V |
| | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

### Auxiliary equipment 2.2.2

| | |
|---|---|
| Name of auxiliary equipment | Desktop Printer |
| Model / type | Deskjet895Cxi |
| Part no. | C6410A |
| Serial no. | HU0151N087 |
| Manufacturer | Hewlett Packard |
| Supply voltage | 230V |
| | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

### Auxiliary equipment 2.2.3

| | |
|---|---|
| Name of auxiliary equipment | Computer Mouse |
| Model / type | Wheel Mouse |
| Part no. | 83351-576 |
| Serial no. | 0304842 |
| Manufacturer | Microsoft |
| Supply voltage | 5V |
| | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

# 3. General test conditions

## 3.1 Test setup during test

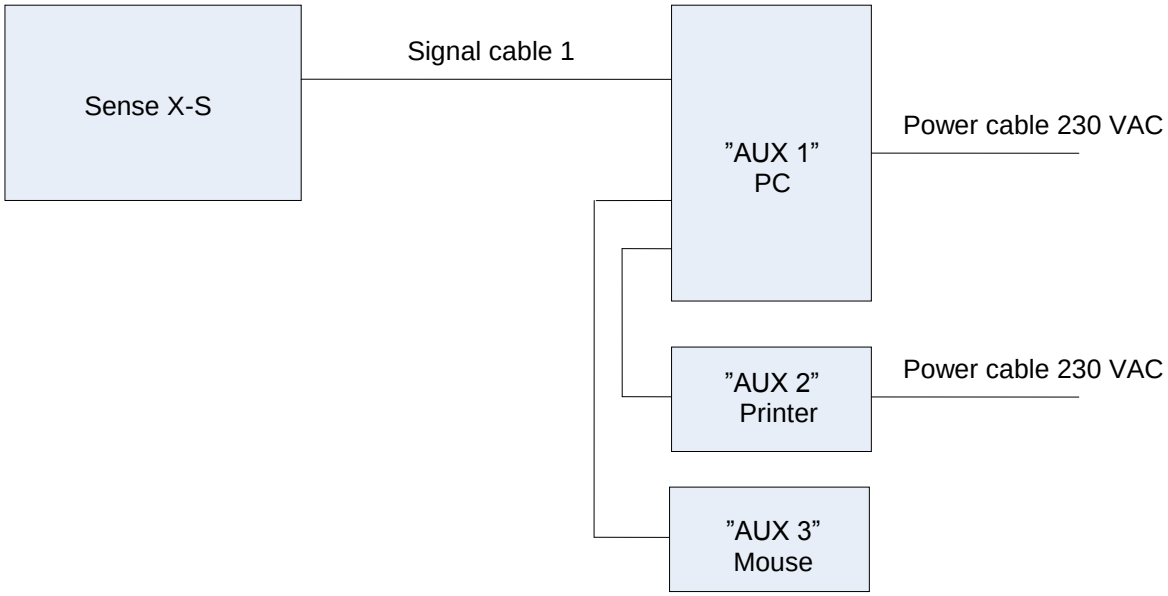



Figure 3.1.1 Block diagram of test object(s) with cables and auxiliary equipment.

| Name | Cat. | Type | Max. Length |
|---|---|---|---|
| Signal Cable 1 | Shielded | USB Cable with ferrite | 1.5 m |
| Power cable | Unshielded | 3 x 1.5 $mm^2$ | 1.8 m |
| Power cable | Unshielded | 3 x 1.5 $mm^2$ | 1.8 m |
| Printer cable | Shielded | | 1.9 m |

### 3.1.1 Description and intended use of test object

Fingerprint reader intended for office or personal use.

### 3.1.2 Test modes during emission tests

Continuous fingerprint sensor image capture.

### 3.1.3 Nominal power consumption

< 120 mA

## 3.2 Modifications of the test object

No modification was implemented to the test object.

## 3.3 Test sequence

The tests described in this test report were performed in the following sequence:

1. Measurement of radio frequency electromagnetic field
2. Measurement of radio frequency voltage on mains

# 4. Test results

## 4.1 Measurement of radio frequency voltage on mains

| | | | |
|---|---|---|---|
| Test object | Sense X-S | Sheet | CE-2 |
| Type | Precise Sense X-S | Project no. | E703141 |
| Serial no. | 0-1 | Date | 13 Feb. 2012 |
| Client | Precise Biometrics AB | Initials | DAC |
| Specification | FCC Part 15 Subpart B, Class B | Frequency | 0.15-30 MHz |

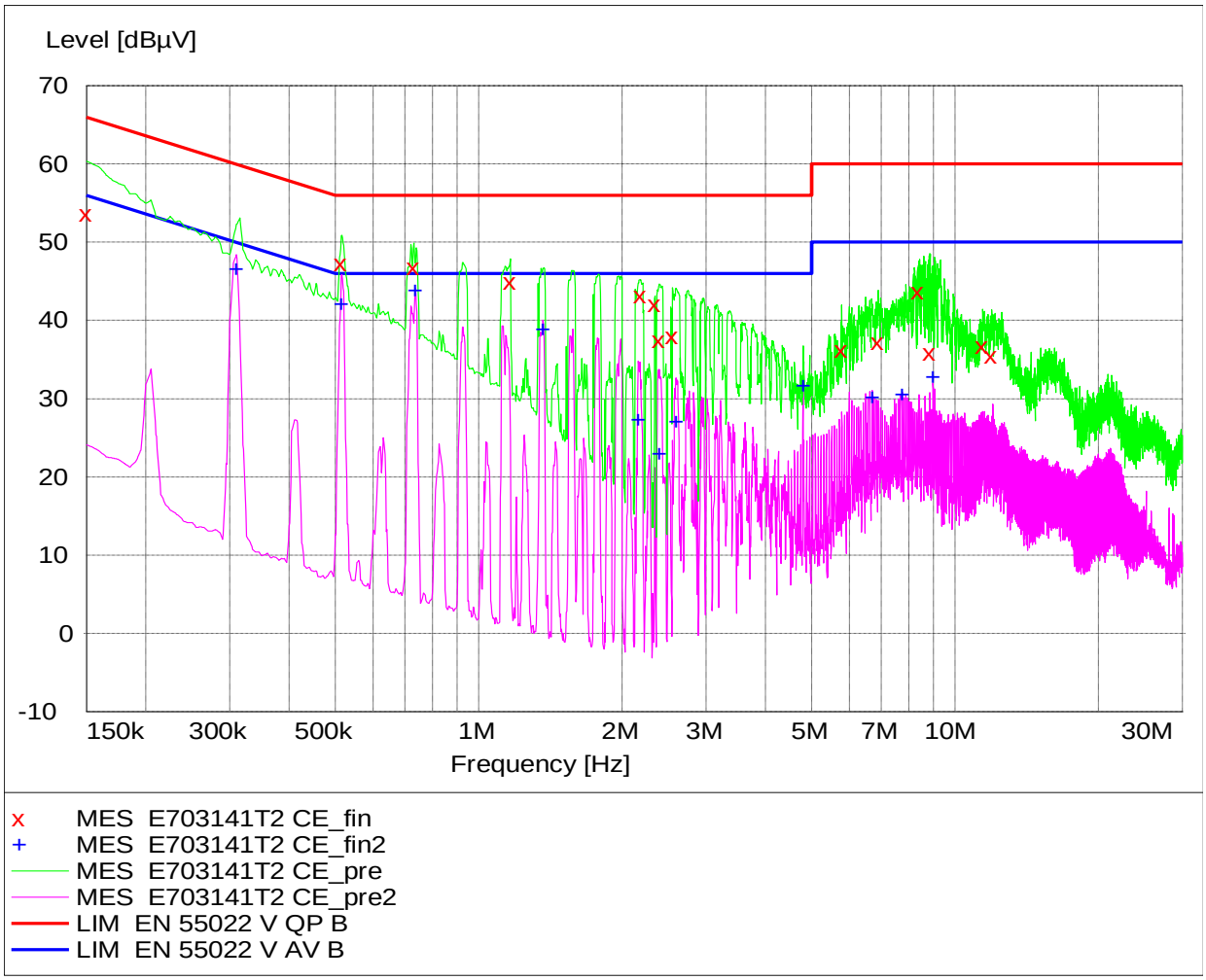
| | | | |
|---|---|---|---|
| Test method<br>Characteristics | ANSI C63.4:2009<br>Artificial mains network: 50 Ω, 50 µH | Temperature<br>Humidity | 21 °C<br>31 % RH |
| Detector | Peak, quasi peak, and average | Bandwidth | 9 kHz |
| Test equipm. | EMC Hall A Västerås Setup VEA1 | Uncertainty | 1.8 dB |

| | |
|---|---|
| Line under test | Maximum of Line and Neutral |
| Test result | The measured voltages were below the limit of Class B equipment. |
| Compliant | Yes |
| Comments | Mains voltage: 230 VAC to the personal computer to which Sense X-S is connected.<br>During test an artificial hand<br>was applied to the test object, please see photo |

***Conducted emission 2012-02-13***

***Complete measurement 0.15 - 30 MHz***

EUT: Sense X-S 01
Manufacturer: Precise Biometrics AB
Operating Condition: 230 VAC 50Hz
Test Site: Delta Development Technology AB
Operator: Daniela Coman
Test Specification: FCC Part 15 Subpart B. Class B



***MEASUREMENT RESULT: "E703141T2 CE_fin"***

13-02-2012 14:23

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.150000 | 53.60 | 0.3 | 66 | 12.4 | QP | N | FLO |
| 0.515000 | 47.30 | 0.3 | 56 | 8.7 | QP | N | FLO |
| 0.730000 | 46.80 | 0.3 | 56 | 9.2 | QP | L1 | FLO |
| 1.165000 | 44.90 | 0.4 | 56 | 11.1 | QP | L1 | FLO |
| 2.190000 | 43.20 | 0.6 | 56 | 12.8 | QP | N | FLO |
| 2.345000 | 42.10 | 0.5 | 56 | 13.9 | QP | L1 | FLO |
| 2.390000 | 37.40 | 0.6 | 56 | 18.6 | QP | N | FLO |
| 2.550000 | 38.00 | 0.5 | 56 | 18.0 | QP | L1 | FLO |
| 8.380000 | 43.70 | 0.9 | 60 | 16.3 | QP | L1 | FLO |

***MEASUREMENT RESULT: "E703141T2 CE_fin2"***

13-02-2012 14:23

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.310000 | 46.60 | 0.2 | 50 | 3.4 | AV | L1 | FLO |
| 0.515000 | 42.10 | 0.2 | 46 | 3.9 | AV | L1 | FLO |
| 0.735000 | 43.80 | 0.3 | 46 | 2.2 | AV | L1 | FLO |
| 1.365000 | 38.90 | 0.4 | 46 | 7.1 | AV | L1 | FLO |
| 2.160000 | 27.20 | 0.5 | 46 | 18.8 | AV | L1 | FLO |
| 2.595000 | 27.10 | 0.5 | 46 | 18.9 | AV | L1 | FLO |
| 4.795000 | 31.60 | 0.8 | 46 | 14.4 | AV | N | FLO |
| 6.695000 | 30.20 | 1.0 | 50 | 19.8 | AV | N | FLO |
| 7.740000 | 30.50 | 0.9 | 50 | 19.5 | AV | L1 | FLO |
| 8.990000 | 32.70 | 0.9 | 50 | 17.3 | AV | L1 | FLO |

Photo 4.1.1 Test setup regarding measurement of radio frequency voltage on mains.

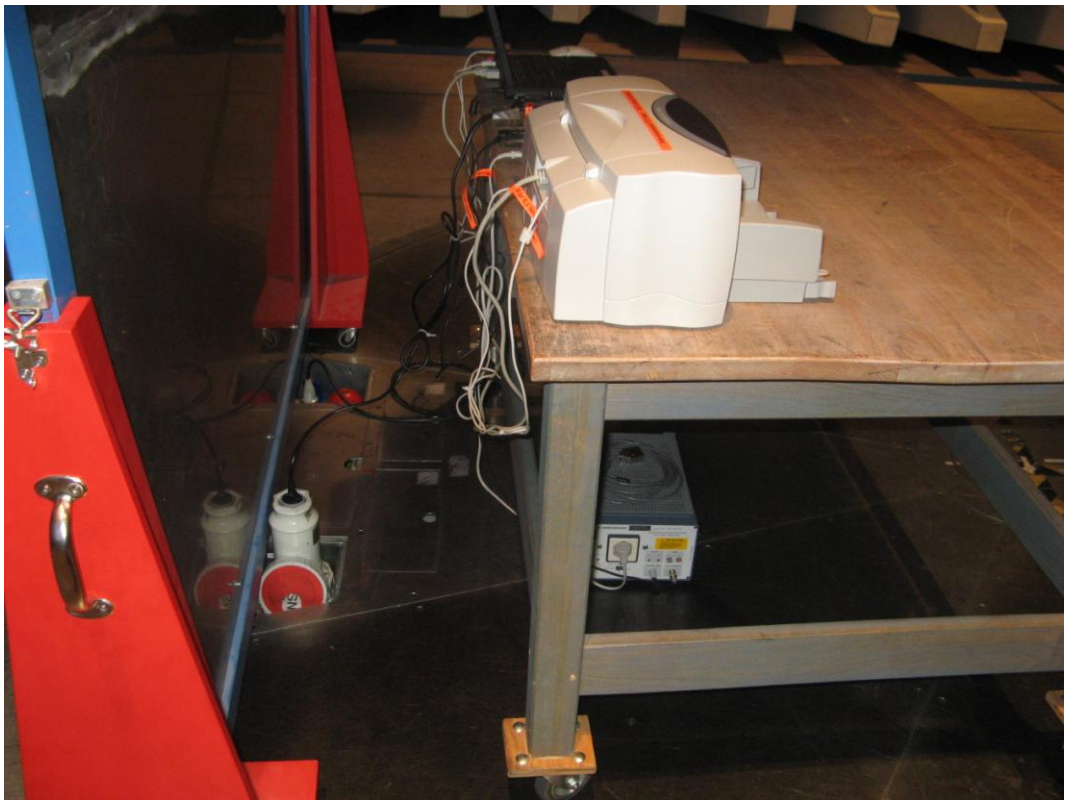


Photo 4.1.2 Test setup regarding measurement of radio frequency voltage on mains, view from left side.

## 4.2 Measurement of radio frequency electromagnetic field

| | | | |
|---|---|---|---|
| Test object | Sense X-S | Sheet | RE-2 |
| Type | Precise Sense X-S | Project no. | E703141 |
| Serial no. | 0-1 | Date | 13 Feb. 2012 |
| Client | Precise Biometrics AB | Initials | DAC |
| Specification | FCC Part 15 Subpart B, Class B | Frequency | 30-1000 MHz |

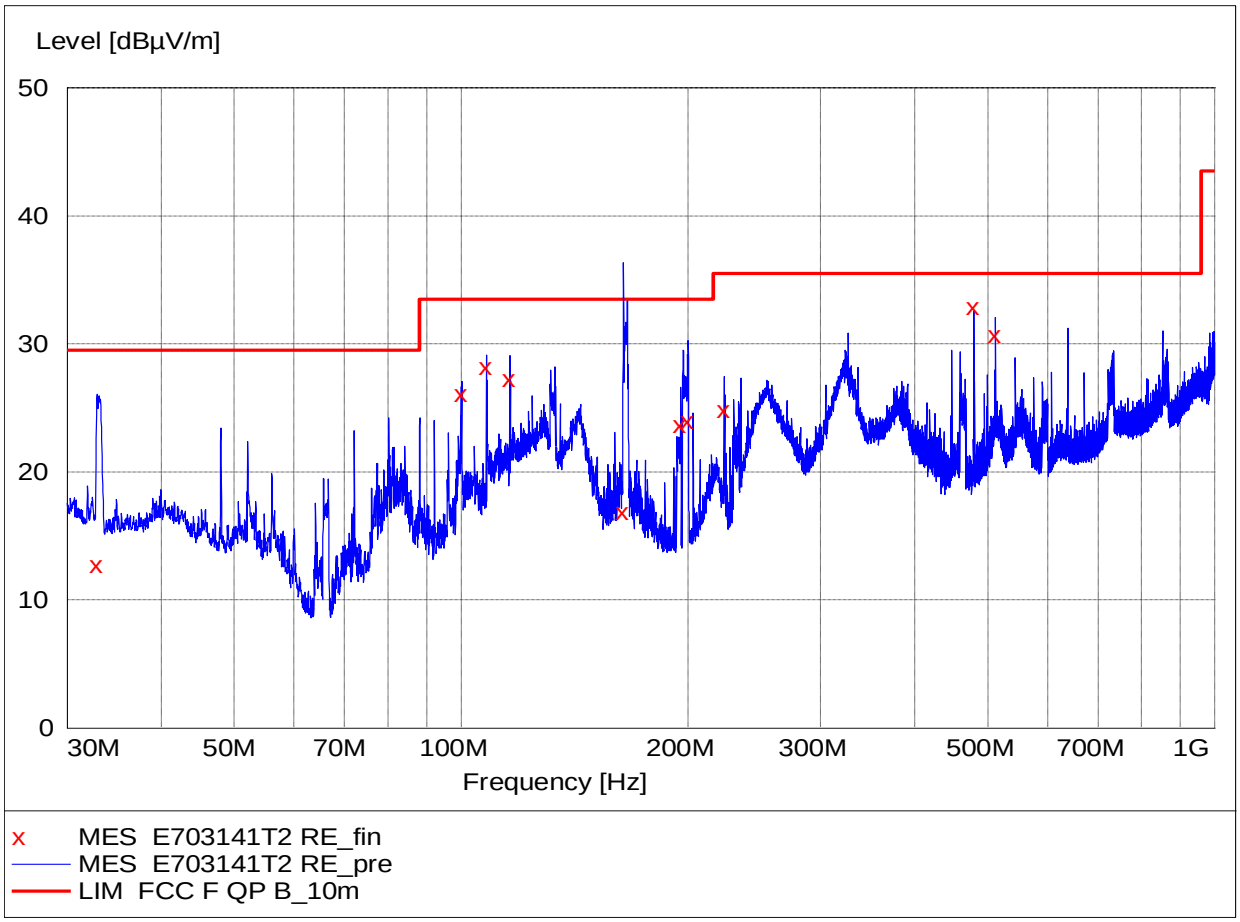
| | | | |
|---|---|---|---|
| Test method<br>Characteristics | ANSI C63.4:2009<br>Complete test, height: 1-4 m, v/h pol. | Temperature<br>Humidity | 22 °C<br>31 % RH |
| Detector | Peak and quasi peak | Bandwidth | 120 kHz |
| Test equipm. | EMC Hall A Västerås Setup VEC1 | Uncertainty | 5.1 dB |

| | |
|---|---|
| Test result | The measured field strengths are below the limit of Class B equipment. |
| Compliant | Yes |
| Comments | Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation |

***Radiated emission 2012-02-13***

***Complete measurement 30-1000 MHz***

EUT: X-S 0-1
Manufacturer: Precise Biometrics AB
Operating Condition: Powered via USB from PC
Test Site: DELTA Development Technology AB
Operator: Daniela Coman
Test Specification: FCC Part 15B Class B
Comment: Measured at 10 m measuring distance.




***MEASUREMENT RESULT: "E703141T2 RE_fin"***

13-02-2012 10:53

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 32.880000 | 12.70 | -9.6 | 29.5 | 16.8 | QP | 153.0 | 278.00 | VERTICAL |
| 100.170000 | 26.10 | -15.9 | 33.1 | 7.0 | QP | 111.0 | 337.00 | VERTICAL |
| 108.180000 | 28.20 | -15.2 | 33.1 | 4.9 | QP | 100.0 | 324.00 | VERTICAL |
| 116.190000 | 27.30 | -14.5 | 33.1 | 5.8 | QP | 103.0 | 0.00 | VERTICAL |
| 164.190000 | 16.90 | -15.4 | 33.1 | 16.2 | QP | 200.0 | 316.00 | VERTICAL |
| 195.660000 | 23.70 | -17.0 | 33.1 | 9.4 | QP | 100.0 | 285.00 | VERTICAL |
| 199.890000 | 24.00 | -16.8 | 33.1 | 9.1 | QP | 100.0 | 292.00 | VERTICAL |
| 223.680000 | 24.80 | -15.5 | 35.5 | 10.7 | QP | 114.0 | 157.00 | VERTICAL |
| 479.310000 | 32.90 | -8.2 | 35.5 | 2.6 | QP | 200.0 | 87.00 | HORIZONTAL |
| 511.290000 | 30.70 | -7.6 | 35.5 | 4.8 | QP | 101.0 | 311.00 | VERTICAL |

Photo 4.2.1 Test setup regarding measurement of radio frequency electromagnetic field. Front view.

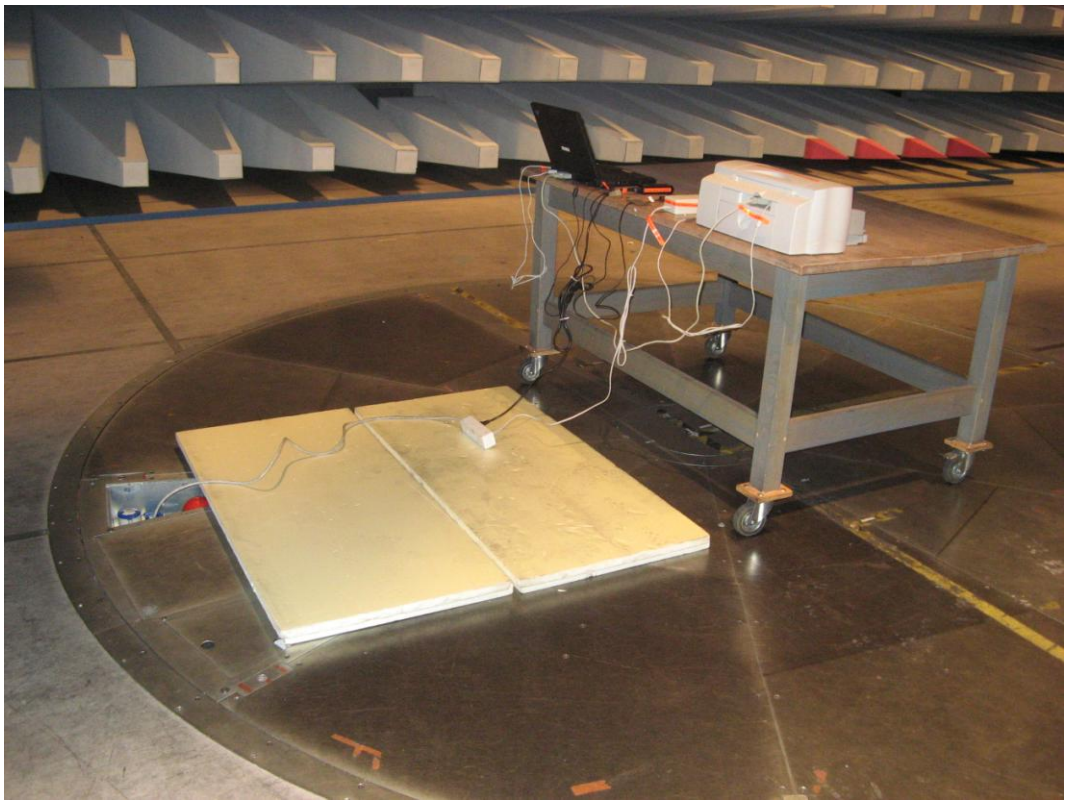


Photo 4.2.2 Test setup regarding measurement of radio frequency electromagnetic field. Side view.

# 5. National registrations and accreditations

## 5.1 FCC Registrations

**Organization:** Federal Communications Commission, USA

**Registration Number:** 516880

**Facilities:** EMC chamber A, 3 m and 10 m

## 5.2 SWEDAC Accreditation

**Organization:** Swedish Board for Accreditation and Conformity Assessment - SWEDAC, see www.swedac.se and www.ilac.org

**Registration Number:** 1688

SWEDAC is part of ILAC (International Laboratory Accreditation Cooperation) including its MRA (Mutual Recognition Arrangement).

# 6. List of instruments

| Setup VEA1 | | | | | |
|---|---|---|---|---|---|
| **Measurement of radio frequency voltage on mains** | | | | | |
| ***Used*** | ***ID no.*** | ***Description*** | ***Manufacturer*** | ***Type no.*** | ***Setup uncertainty*** |
| ☒ | 36032 | Software | Rohde & Schwarz | ES-K1 ver 1.71 SP2 | 1.8 dB |
| ☒ | 36020 | Measuring receiver | Rohde & Schwarz | ESU26 | |
| ☒ | IE-B918 | LISN 4 x 100 A 800 V | Schwarzbeck | NNLK 8129 | |
| ☒ | IE-B919 | LISN 2 x 10 A 250 V | Rohde & Schwarz | ESH3-Z5 | |

| Setup VEC1 | | | | | |
|---|---|---|---|---|---|
| **Measurement of radio frequency electromagnetic field** | | | | | |
| ***Used*** | ***ID no.*** | ***Description*** | ***Manufacturer*** | ***Type no.*** | ***Setup uncertainty*** |
| ☒ | 36032 | Software | Rohde & Schwarz | ES-K1 ver 1.71 SP2 | 5.1 dB |
| ☒ | 36020 | Measuring receiver | Rohde & Schwarz | ESU26 | |
| ☒ | IE-B928 | Antenna Bilog | Chase | CBL6111A | |
| ☒ | IE-B758 | Preamplifier | HP | 8447F | |
| ☒ | IE-B918 | LISN 4 x 100 A 800 V | Schwarzbeck | NNLK 8129 | |
| ☒ | IE-B920 | Controller | Heinrich Deisel | HD 100 | |
| ☒ | | Turntable | Heinrich Deisel | DT 440 | |
| ☒ | | Antenna mast | Heinrich Deisel | MA 240 | |

| Other instruments used | | | | | |
|---|---|---|---|---|---|
| ***Used*** | ***ID no.*** | ***Description*** | ***Manufacturer*** | ***Type no.*** | ***Setup uncertainty*** |
| ☒ | IM-A308 | Temperature- and hygrometer | Vaisala | HMI31 | |