

# DELTA Test Report

*TEST REPORT issued by an Accredited Testing Laboratory*



## EMC emission test of Sense MC-S

Performed for Precise Biometrics AB

REC-E703141\_1F

Project no.: E703141

Page 1 of 17

19 Feb.2012

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**DELTA Development**

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is a subsidiary company of

**DELTA**

**Title** EMC emission test of Sense MC-S

**Test object** Sense MC-S

**Report no.** REC-E703141\_1F

**Project no.** E703141

**Test period** 15 Feb. 2012

**Client** Precise Biometrics AB  
Scheelevägen 30  
SE-220 07 Lund  
Sweden  
Tel.: 046-311100

**Contact person** Lena Strutz  
E-mail: Lena.strutz@precisebiometrics.com

**Manufacturer** Precise Biometrics AB

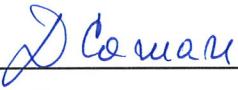
**Specifications** FCC Part 15 Subpart B

**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

|           | <b>Table of contents</b>                             | <b>Page</b> |
|-----------|--|-------------|
| <b>1.</b> | <b>Summary of tests</b>                              | <b>4</b>    |
| <b>2.</b> | <b>Test object(s) and auxiliary equipment</b>        | <b>5</b>    |
| 2.1       | Test object(s)                                       | 5           |
| 2.2       | Auxiliary equipment                                  | 6           |
| <b>3.</b> | <b>General test conditions</b>                       | <b>7</b>    |
| 3.1       | Test setup during test                               | 7           |
| 3.1.1     | Description and intended use of test object          | 7           |
| 3.1.2     | Test modes during emission tests                     | 7           |
| 3.1.3     | Nominal power consumption                            | 7           |
| 3.2       | Modifications of the test object                     | 8           |
| 3.3       | Test sequence  | 8           |
| <b>4.</b> | <b>Test results</b>                                  | <b>9</b>    |
| 4.1       | Measurement of radio frequency voltage on mains      | 9           |
| 4.2       | Measurement of radio frequency electromagnetic field | 13          |
| <b>5.</b> | <b>National registrations and accreditations</b>     | <b>16</b>   |
| 5.1       | FCC Registrations                                    | 16          |
| 5.2       | SWEDAC Accreditation                                 | 16          |
| <b>6.</b> | <b>List of instruments</b>                           | <b>17</b>   |

## 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 MC-S            |
| Model / type                        | Precise Sense MC-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 MC-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  |
| Software 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

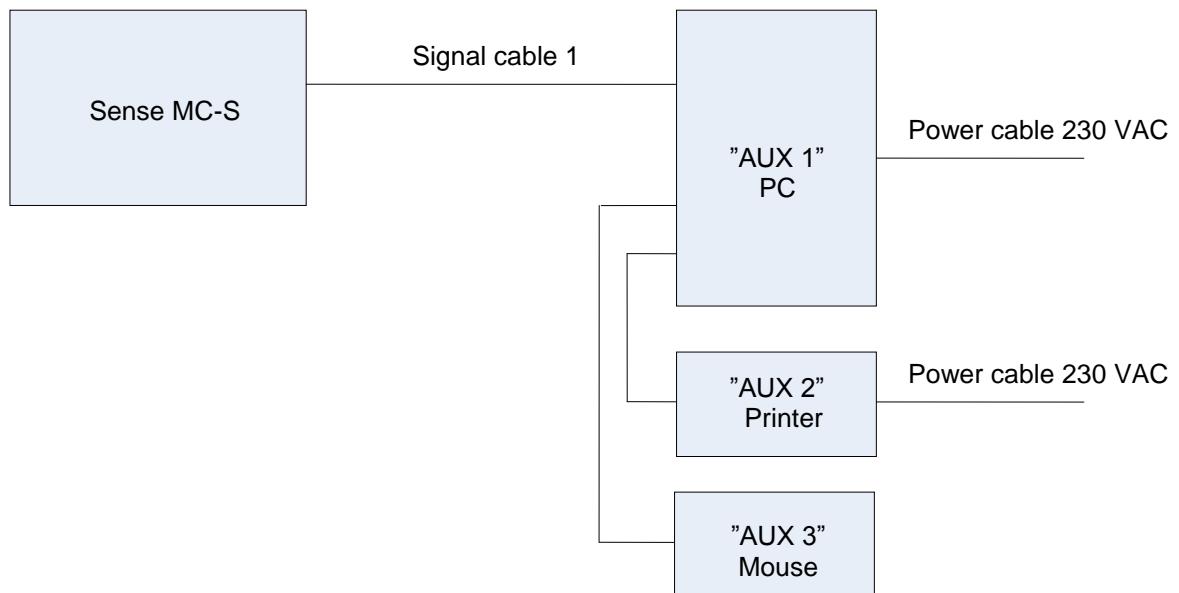


Figure 3.1.1 Block diagram of test object(s) with cables and auxiliary equipment.

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

##### 3.1.1 Description and intended use of test object

Combined fingerprint and smart card reader intended for office or personal use.

##### 3.1.2 Test modes during emission tests

Continuous fingerprint sensor image capture and smart card communication.

##### 3.1.3 Nominal power consumption

< 150 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 MC-S                     | Sheet       | CE-1         |
| Type          | Precise Sense MC-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  |

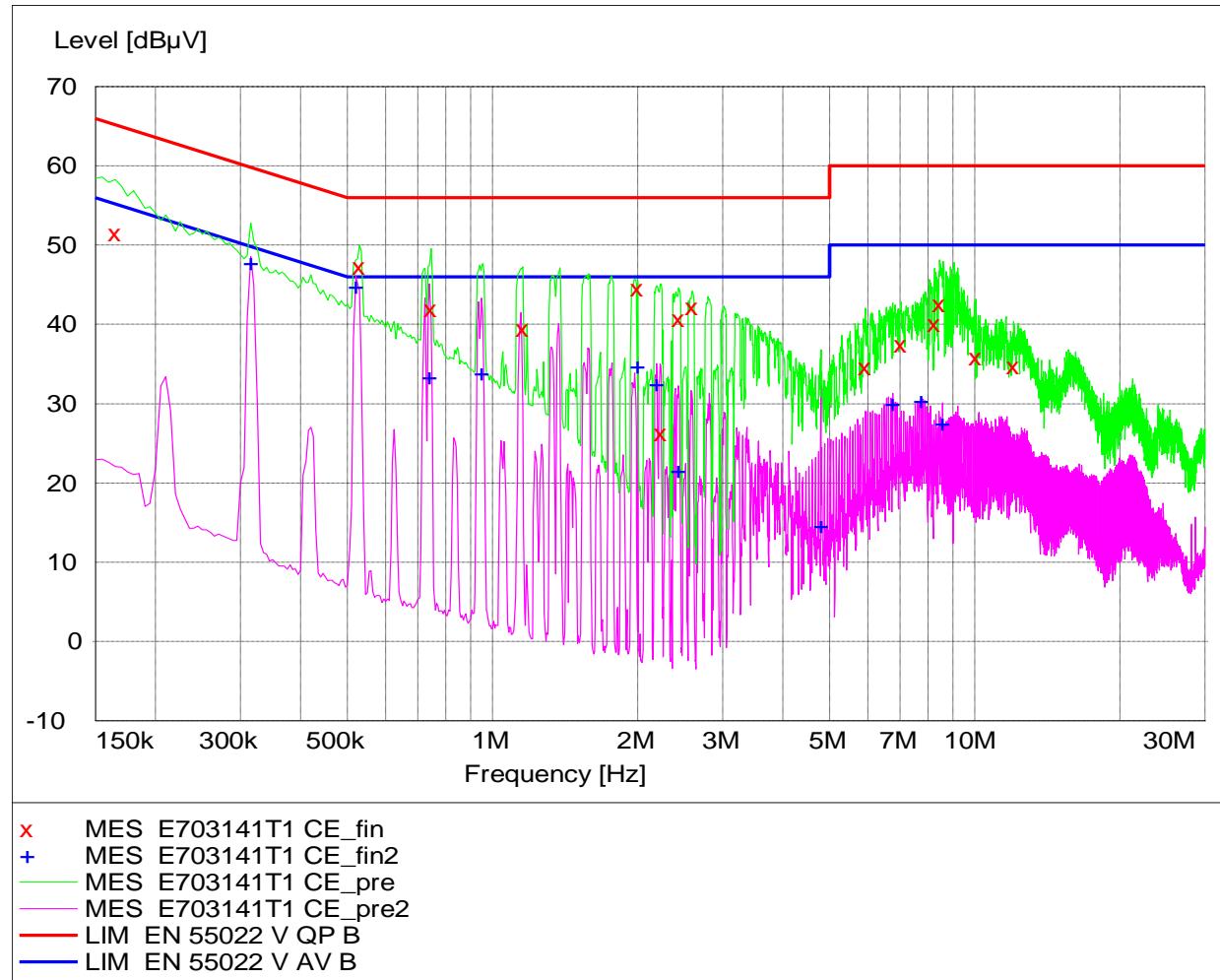
|                 |                                       |             |         |
|-----------------|---------------------------------------|-------------|---------|
| Test method     | ANSI C63.4:2009                       | Temperature | 21 °C   |
| Characteristics | Artificial mains network: 50 Ω, 50 µH | Humidity    | 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 MC-S is connected.<br><br>During test an artificial hand was applied to the test object, please see photo |

**Conducted emission 2012-02-13**

**Complete measurement 0.15 - 30 MHz**

EUT: Sense MC-S 0-1  
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: "E703141T1 CE\_fin"***

13-02-2012 14:11

| Frequency<br>MHz | Level<br>dB $\mu$ V | Transd<br>dB | Limit<br>dB $\mu$ V | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------------|--------------|---------------------|--------------|----------|------|-----|
| 0.165000         | 51.50               | 0.3          | 65                  | 13.7         | QP       | N    | FLO |
| 0.530000         | 47.30               | 0.2          | 56                  | 8.7          | QP       | L1   | FLO |
| 0.745000         | 42.00               | 0.4          | 56                  | 14.0         | QP       | N    | FLO |
| 1.155000         | 39.50               | 0.3          | 56                  | 16.5         | QP       | L1   | FLO |
| 2.000000         | 44.60               | 0.5          | 56                  | 11.4         | QP       | L1   | FLO |
| 2.435000         | 40.60               | 0.5          | 56                  | 15.4         | QP       | L1   | FLO |
| 2.595000         | 42.20               | 0.5          | 56                  | 13.8         | QP       | L1   | FLO |
| 8.455000         | 42.50               | 1.1          | 60                  | 17.5         | QP       | N    | FLO |

***MEASUREMENT RESULT: "E703141T1 CE\_fin2"***

13-02-2012 14:11

| Frequency<br>MHz | Level<br>dB $\mu$ V | Transd<br>dB | Limit<br>dB $\mu$ V | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------------|--------------|---------------------|--------------|----------|------|-----|
| 0.315000         | 47.80               | 0.2          | 50                  | 2.0          | AV       | L1   | FLO |
| 0.520000         | 44.70               | 0.3          | 46                  | 1.3          | AV       | N    | FLO |
| 0.740000         | 33.40               | 0.3          | 46                  | 12.6         | AV       | L1   | FLO |
| 0.950000         | 33.80               | 0.3          | 46                  | 12.2         | AV       | L1   | FLO |
| 2.000000         | 34.70               | 0.5          | 46                  | 11.3         | AV       | L1   | FLO |
| 2.190000         | 32.50               | 0.6          | 46                  | 13.5         | AV       | N    | FLO |
| 7.740000         | 30.40               | 0.9          | 50                  | 19.6         | AV       | L1   | FLO |



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

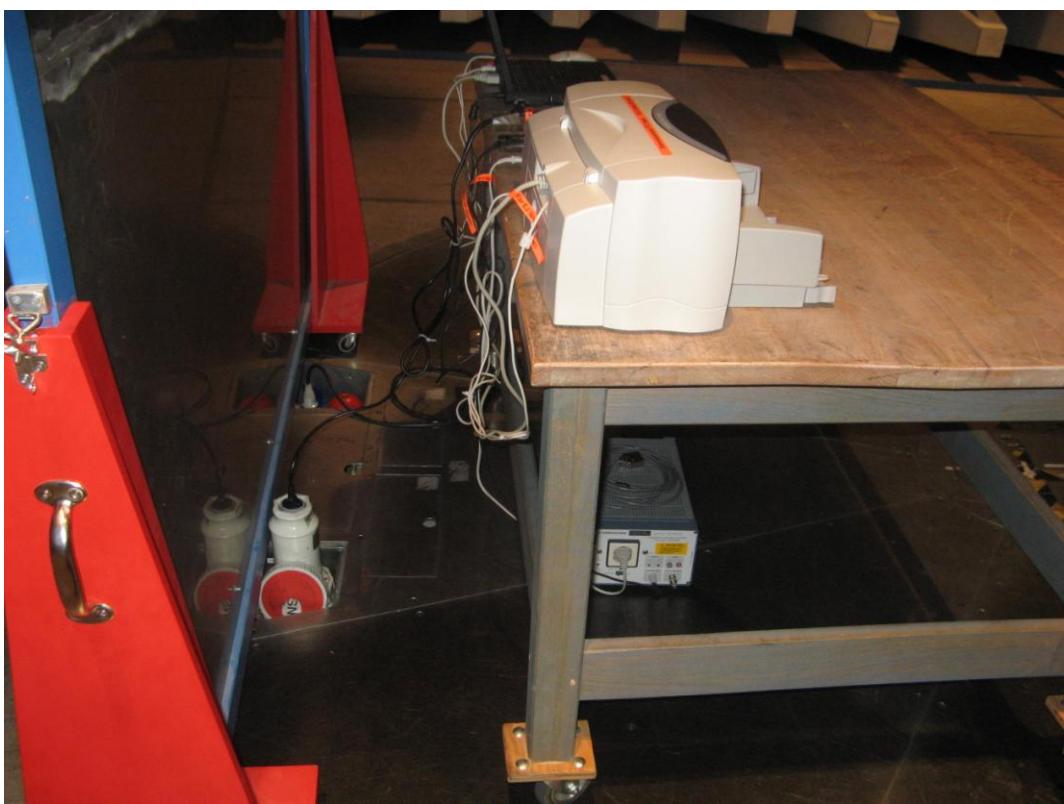


Photo 4.1.2 Test setup regarding measurement of radio frequency voltage on mains.

## 4.2 Measurement of radio frequency electromagnetic field

|               |                                |             |              |
|---------------|--------------------------------|-------------|--------------|
| Test object   | Sense MC-S                     | Sheet       | RE-1         |
| Type          | Precise Sense MC-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     | ANSI C63.4:2009                        | Temperature | 22 °C   |
| Characteristics | Complete test, height: 1-4 m, v/h pol. | Humidity    | 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.

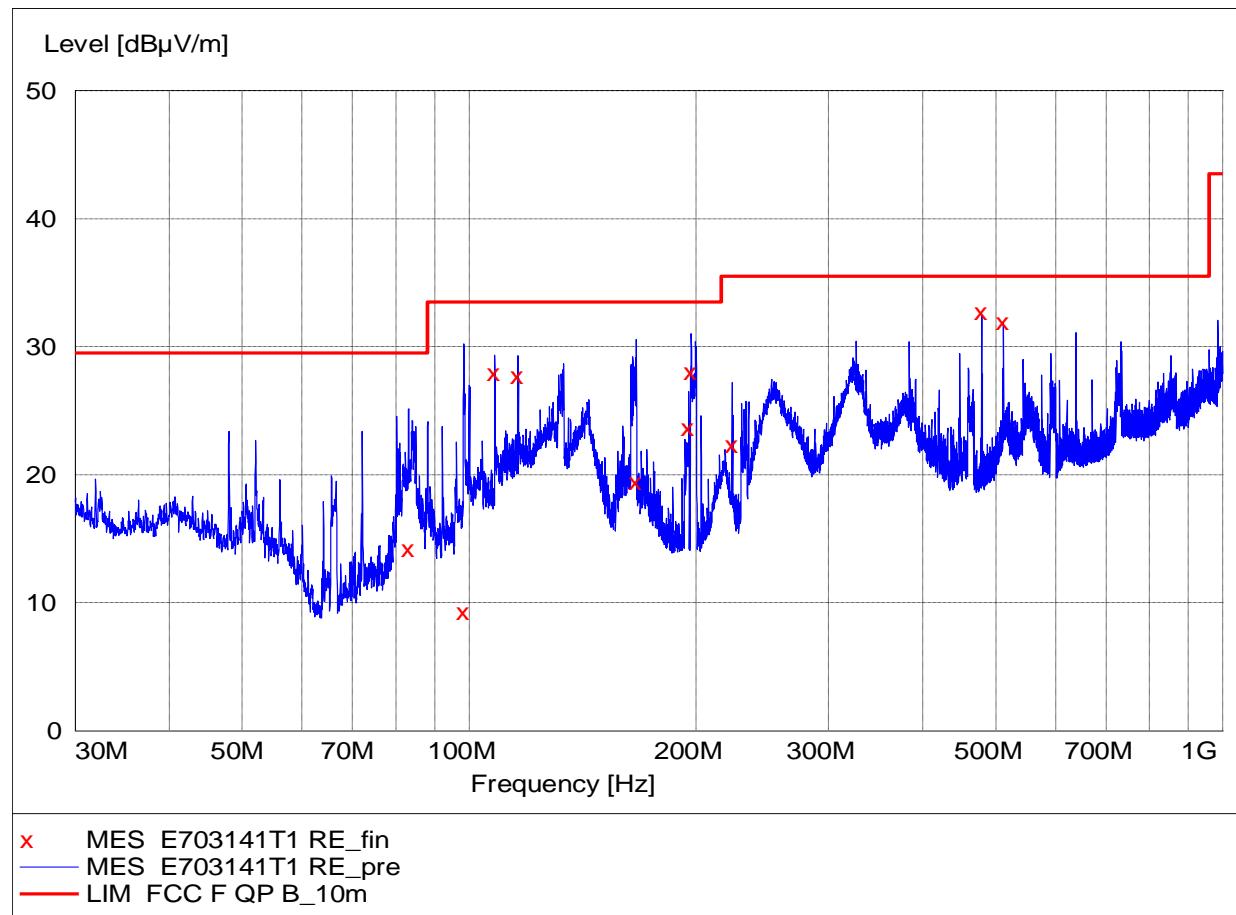
Compliant Yes

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: Sense MC-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: "E703141T1 RE\_fin"**

13-02-2012 09:57

| Frequency<br>MHz | Level<br>dB $\mu$ V/m | Transd<br>dB | Limit<br>dB $\mu$ V/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|------|--------------|----------------|--------------|
| 83.160000        | 14.20                 | -18.3        | 29.5                  | 15.3         | QP   | 250.0        | 256.00         | VERTICAL     |
| 98.460000        | 9.30                  | -16.2        | 33.1                  | 23.8         | QP   | 107.0        | 229.00         | VERTICAL     |
| 108.150000       | 27.90                 | -15.2        | 33.1                  | 5.2          | QP   | 119.0        | 342.00         | VERTICAL     |
| 116.190000       | 27.70                 | -14.5        | 33.2                  | 5.4          | QP   | 117.0        | 356.00         | VERTICAL     |
| 166.650000       | 19.40                 | -15.7        | 33.1                  | 13.7         | QP   | 111.0        | 220.00         | VERTICAL     |
| 195.660000       | 23.70                 | -17.0        | 33.1                  | 9.4          | QP   | 105.0        | 286.00         | VERTICAL     |
| 197.010000       | 28.00                 | -17.0        | 33.1                  | 5.1          | QP   | 100.0        | 284.00         | VERTICAL     |
| 223.680000       | 22.30                 | -15.5        | 35.5                  | 13.2         | QP   | 150.0        | 224.00         | VERTICAL     |
| 479.310000       | 32.70                 | -8.2         | 35.5                  | 2.8          | QP   | 222.0        | 86.00          | HORIZONTAL   |
| 511.260000       | 31.90                 | -7.6         | 35.5                  | 3.6          | QP   | 100.0        | 202.00         | VERTICAL     |

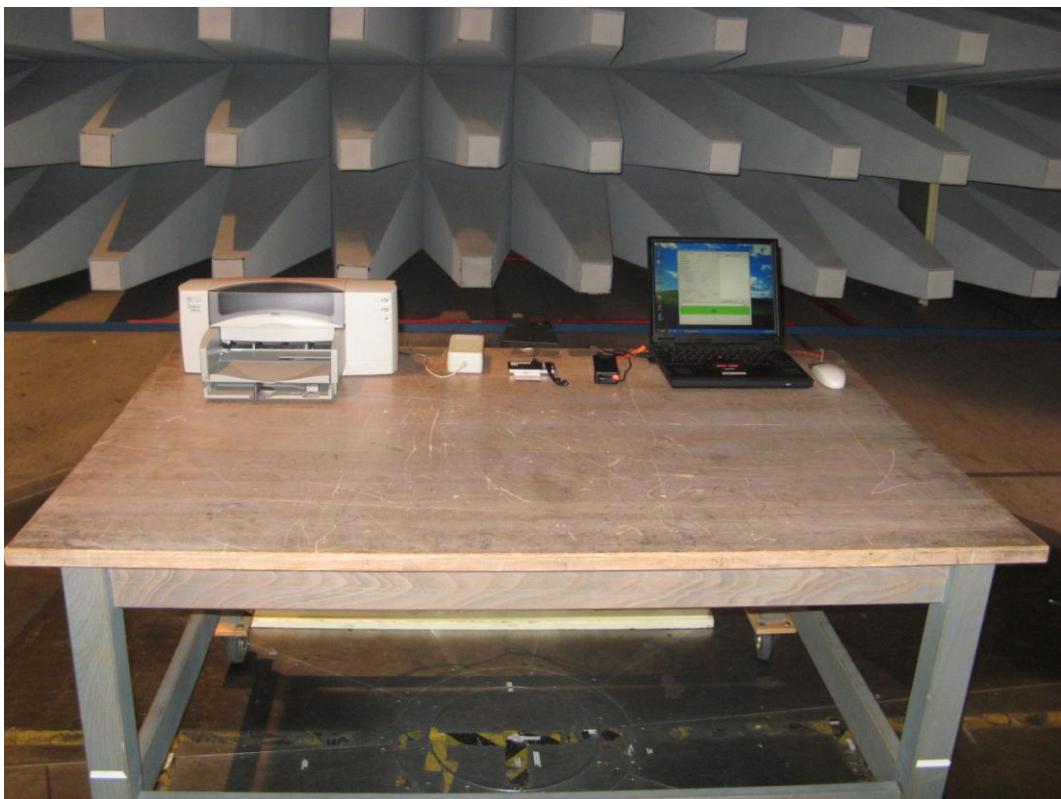


Photo 4.2.1 Test setup regarding measurement of radio frequency electromagnetic field.  
Front view.



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](http://www.swedac.se) and [www.ilac.org](http://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

| <b>Setup VEA1</b>                                    |               |                             |                     |                    |                          |  |
|--|---------------|-----------------------------|---------------------|--------------------|--------------------------|--|
| Measurement of radio frequency voltage on mains      |               |                             |                     |                    |                          |  |
| <i>Used</i>  | <i>ID no.</i> | <i>Description</i>          | <i>Manufacturer</i> | <i>Type no.</i>    | <i>Setup uncertainty</i> |  |
| <input checked="" type="checkbox"/>                  | 36032         | Software                    | Rohde & Schwarz     | ES-K1 ver 1.71 SP2 | 1.8 dB                   |  |
| <input checked="" type="checkbox"/>                  | 36020         | Measuring receiver          | Rohde & Schwarz     | ESU26              |                          |  |
| <input checked="" type="checkbox"/>                  | IE-B918       | LISN 4 x 100 A 800 V        | Schwarzbeck         | NNLK 8129          |                          |  |
| <input checked="" type="checkbox"/>                  | IE-B919       | LISN 2 x 10 A 250 V         | Rohde & Schwarz     | ESH3-Z5            |                          |  |
| <b>Setup VEC1</b>                                    |               |                             |                     |                    |                          |  |
| Measurement of radio frequency electromagnetic field |               |                             |                     |                    |                          |  |
| <i>Used</i>  | <i>ID no.</i> | <i>Description</i>          | <i>Manufacturer</i> | <i>Type no.</i>    | <i>Setup uncertainty</i> |  |
| <input checked="" type="checkbox"/>                  | 36032         | Software                    | Rohde & Schwarz     | ES-K1 ver 1.71 SP2 | 5.1 dB                   |  |
| <input checked="" type="checkbox"/>                  | 36020         | Measuring receiver          | Rohde & Schwarz     | ESU26              |                          |  |
| <input checked="" type="checkbox"/>                  | IE-B928       | Antenna Bilog               | Chase               | CBL6111A           |                          |  |
| <input checked="" type="checkbox"/>                  | IE-B758       | Preamplifier                | HP                  | 8447F              |                          |  |
| <input checked="" type="checkbox"/>                  | IE-B918       | LISN 4 x 100 A 800 V        | Schwarzbeck         | NNLK 8129          |                          |  |
| <input checked="" type="checkbox"/>                  | IE-B920       | Controller                  | Heinrich Deisel     | HD 100             |                          |  |
| <input checked="" type="checkbox"/>                  |               | Turntable                   | Heinrich Deisel     | DT 440             |                          |  |
| <input checked="" type="checkbox"/>                  |               | Antenna mast                | Heinrich Deisel     | MA 240             |                          |  |
| <b>Other instruments used</b>                        |               |                             |                     |                    |                          |  |
| <i>Used</i>  | <i>ID no.</i> | <i>Description</i>          | <i>Manufacturer</i> | <i>Type no.</i>    | <i>Setup uncertainty</i> |  |
| <input checked="" type="checkbox"/>                  | IM-A308       | Temperature- and hygrometer | Vaisala             | HMI31              |                          |  |