



DELTA Test Report

TEST REPORT issued by an Accredited Testing Laboratory



EMC emission test of Sense MC-S

Performed for Precise Biometrics AB

REC-E702894_2

Project no.: E702894

Page 1 of 18

27 April 2011

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Title EMC emission test of Sense MC-S

Test object Sense MC-S

Report no. REC-E702894_2

Project no. E702894

Test period 28 March 2011

Client Precise Biometrics AB
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Contact person Oscar Fogelberg
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Manufacturer Precise Biometrics AB

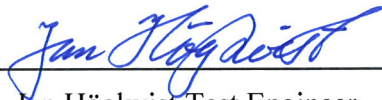
Specifications FCC Part 15 Subpart B

Results The test object was found to be in compliance with the specifications, as listed in Section 1

Test personnel Jan Högvist

Date 27 April 2011

Project Manager



Jan Högvist Test Engineer
DELTA

Responsible



Ulf Bjerke Technical Manager
DELTA



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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.	3-114
Manufacturer	Precise Biometrics AB
Supply voltage	5V
Software version	N/A
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
Manufacturer	IBM
Supply voltage	230V

Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up.

Comment

Auxiliary equipment 2.2.2

Name of auxiliary equipment	Desktop Printer
Model / type	Deskjet895Cxi
Part no.	C6410A
Serial no.	HU0151N087
Manufacturer	Hewlet Packard
Supply voltage	230V

Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up.

Comment

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.

Comment



3. General test conditions

3.1 Test setup during test

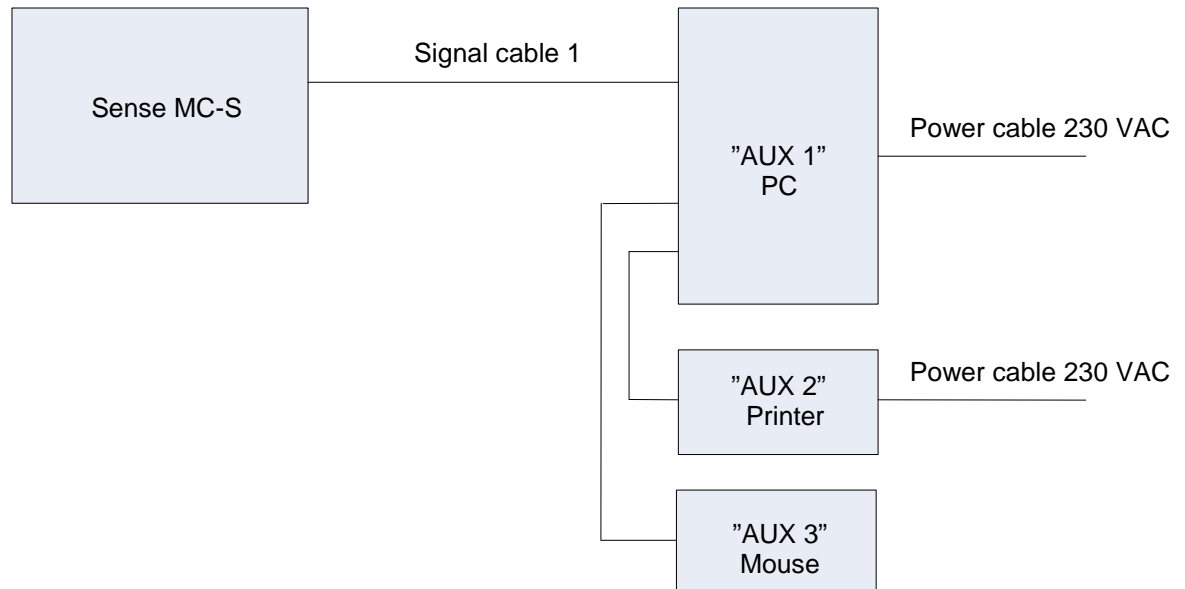


Figure 3.1.1 Block diagram of test object(s) with cables and auxiliary equipment.

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

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

200 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:

- | |
|--|
| <ol style="list-style-type: none">1. Measurement of radio frequency electromagnetic field2. 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.	E702894
Serial no.	3-114	Date	28 Mar. 2011
Client	Precise Biometrics AB	Initials	JANH
Specification	FCC Part 15 Subpart B, Class B	Frequency	0.15-30 MHz

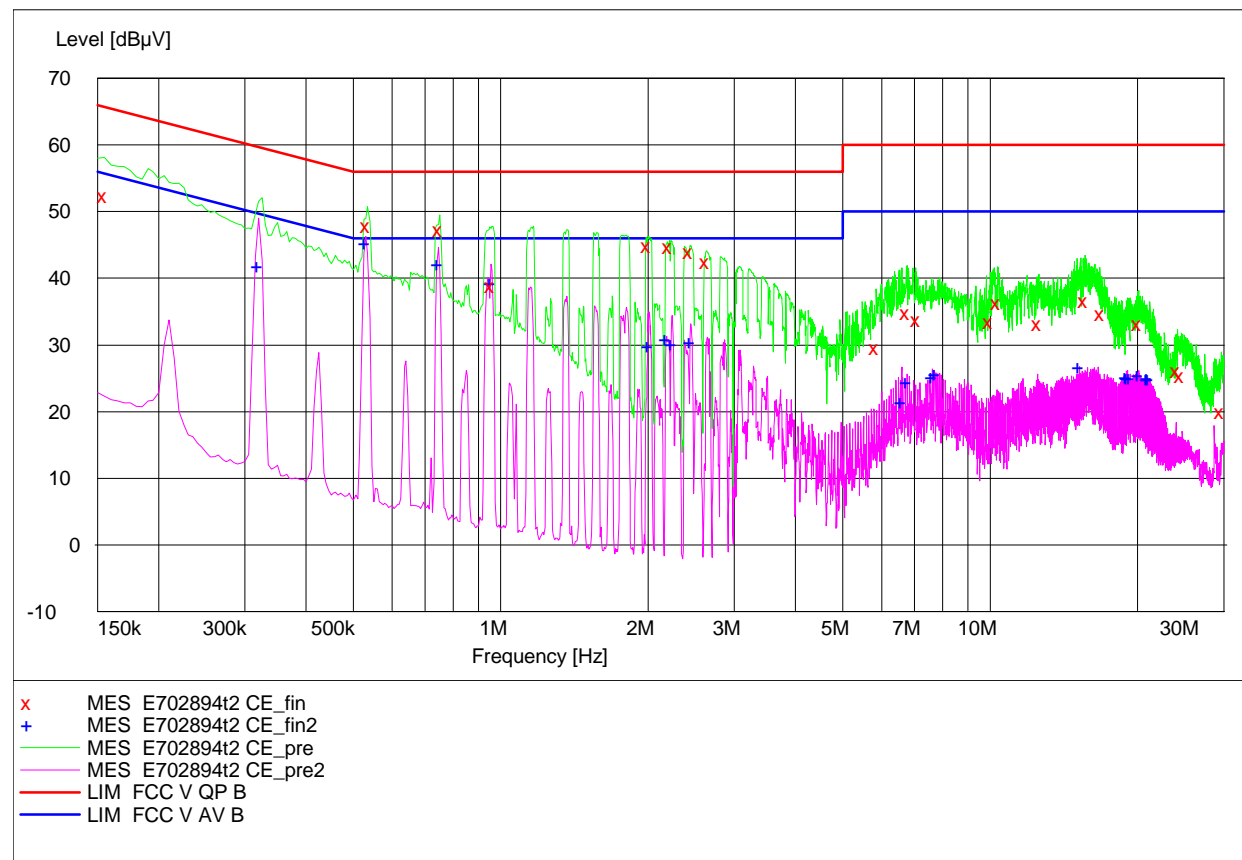
Test method	ANSI C63.4:2009	Temperature	22 °C
Characteristics	Artificial mains network: 50 Ω , 50 μ H	Humidity	48 % RH
Detector	Peak, quasi peak, and average	Bandwidth	9 kHz
Test equipm.	EMC Hall A Västerås Setup VEA1	Uncertainty	1.8 dB

Line under test	Maximum of Line and Neutral
Test result	The measured voltages were below the limit
Compliant	Yes
Comments	Mains voltage: 230 VAC During test an artificial hand was applied to the test object, please see photo

Conducted emission 2011-03-28

Complete measurement 0.15-30 MHz

EUT: Sense MC-S
Manufacturer: Precise Biometrics AB
Operating Condition: 230 VAC (PC power)
Test Site: DELTA Development Technology AB
Operator: Jan Högvist
Test Specification: FCC Part 15 Subpart B, Class B
Comment: LISN: NNLK 8129
Start of Test: 2011-03-28 / 11:37:24



MEASUREMENT RESULT: "E702894t2 CE_fin"

2011-03-28 11:44

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.155000	52.30	0.2	66	13.4	QP	L1	FLO
0.535000	47.80	0.2	56	8.2	QP	L1	FLO
0.750000	47.30	0.4	56	8.7	QP	N	FLO
0.960000	38.90	0.4	56	17.1	QP	N	FLO
2.000000	44.80	0.6	56	11.2	QP	N	FLO
2.215000	44.70	0.6	56	11.3	QP	N	FLO
2.435000	43.90	0.6	56	12.1	QP	N	FLO
2.635000	42.40	0.6	56	13.6	QP	N	FLO
5.850000	29.60	0.7	60	30.4	QP	L1	FLO
6.750000	34.80	1.0	60	25.2	QP	N	FLO
7.110000	33.70	1.0	60	26.3	QP	N	FLO
10.000000	33.50	1.3	60	26.5	QP	N	FLO
10.360000	36.30	1.3	60	23.7	QP	N	FLO
12.570000	33.20	1.6	60	26.8	QP	N	FLO
15.640000	36.60	1.3	60	23.4	QP	L1	FLO
16.885000	34.70	2.1	60	25.3	QP	N	FLO
20.080000	33.20	2.6	60	26.8	QP	N	FLO
24.110000	26.10	1.9	60	33.9	QP	L1	FLO
24.575000	25.40	3.1	60	34.6	QP	N	FLO
29.685000	19.90	3.7	60	40.1	QP	N	FLO

MEASUREMENT RESULT: "E702894t2 CE_fin2"

2011-03-28 11:45

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.320000	41.90	0.3	50	7.8	AV	N	FLO
0.530000	45.30	0.3	46	0.7	AV	N	FLO
0.745000	42.10	0.4	46	3.9	AV	N	FLO
0.955000	39.20	0.4	46	6.8	AV	N	FLO
2.005000	29.80	0.6	46	16.2	AV	N	FLO
2.180000	31.00	0.5	46	15.0	AV	L1	FLO
2.235000	30.20	0.6	46	15.8	AV	N	FLO
2.445000	30.50	0.6	46	15.5	AV	N	FLO
6.595000	21.50	1.0	50	28.5	AV	N	FLO
6.765000	24.50	0.8	50	25.5	AV	L1	FLO
7.600000	25.20	0.9	50	24.8	AV	L1	FLO
7.740000	25.70	0.9	50	24.3	AV	L1	FLO
15.200000	26.70	1.9	50	23.3	AV	N	FLO
18.965000	25.20	2.3	50	24.8	AV	N	FLO
19.105000	25.10	2.3	50	24.9	AV	N	FLO
19.315000	25.10	2.4	50	24.9	AV	N	FLO
20.080000	25.50	2.6	50	24.5	AV	N	FLO
20.915000	24.90	2.7	50	25.1	AV	N	FLO
20.985000	25.00	2.7	50	25.0	AV	N	FLO
21.125000	24.90	2.7	50	25.1	AV	N	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 with an artificial hand applied to the test object.



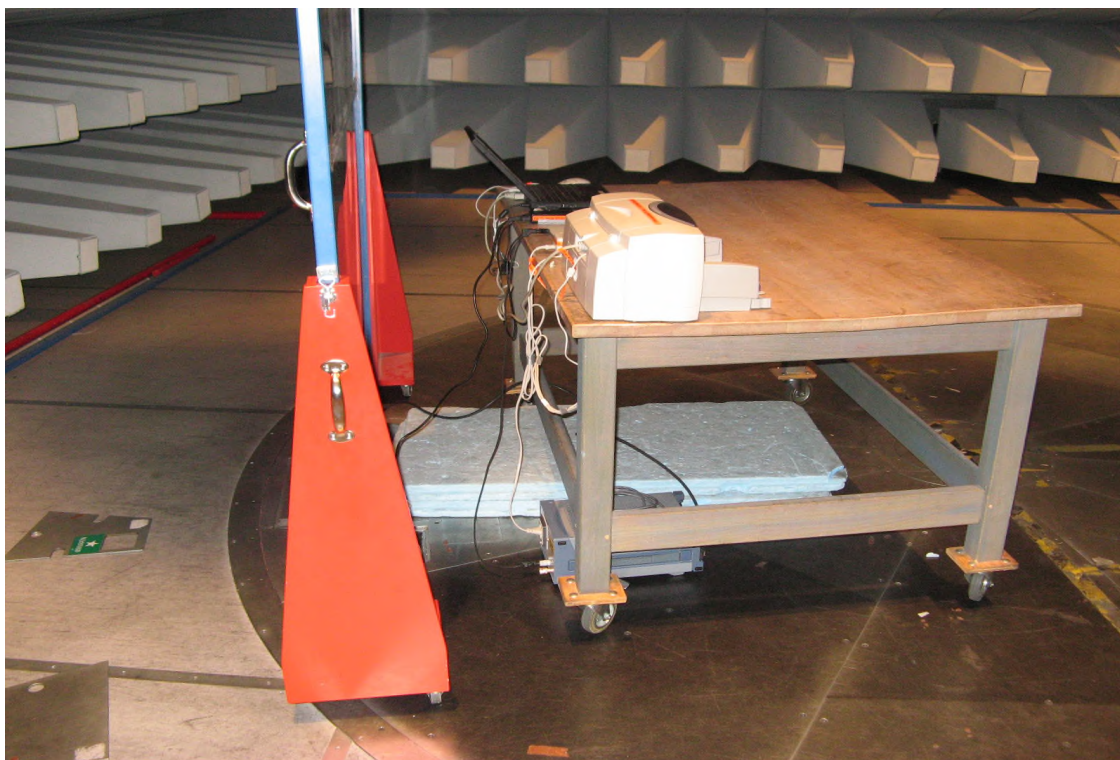


Photo 4.1.3 Test setup regarding measurement of radio frequency voltage on mains.

4.2 Measurement of radio frequency electromagnetic field

Test object	Sense MC-S	Sheet	RE-1
Type	Precise Sense MC-S	Project no.	E702894
Serial no.	3-114	Date	28 Mar. 2011
Client	Precise Biometrics AB	Initials	JANH
Specification	FCC Part 15 Subpart B, Class B	Frequency	30-1000 MHz

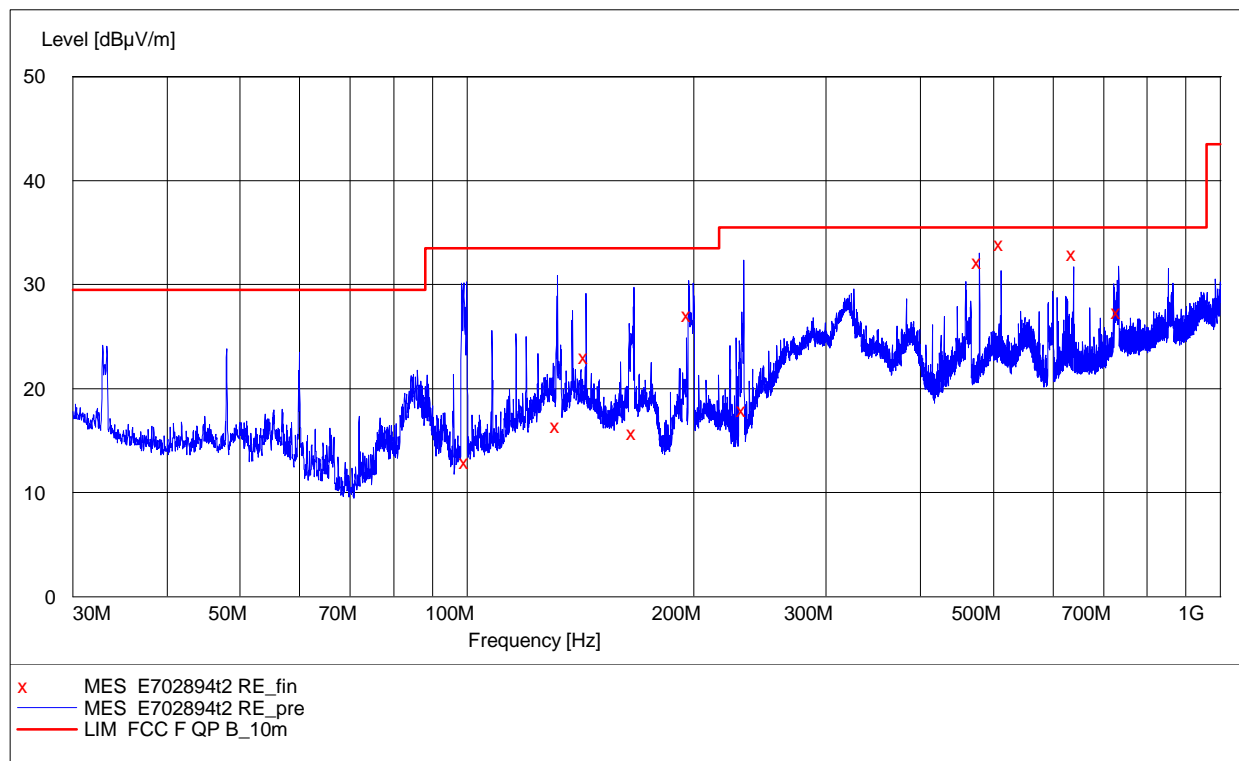
Test method	ANSI C63.4:2009	Temperature	22 °C
Characteristics	Peak search ant. at 10 m, height: 1-4 m, v/h pol.	Humidity	48 % RH
Detector	Peak and quasi peak	Bandwidth	120 kHz
Test equipm.	EMC Hall A Västerås Setup VEC1	Uncertainty	4.9 dB

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

Radiated emission 2011-03-28

Complete measurement 30-1000 MHz

EUT: Sense MC-S
Manufacturer: Precise Biometrics AB
Operating Condition: 5 VDC (USB)
Test Site: DELTA Development Technology AB
Operator: Jan Högvist
Test Specification: FCC Part 15 Subpart B, Class B
Comment:
Start of Test: 2011-03-28 / 11:55:54



MEASUREMENT RESULT: "E702894t2 RE_fin"

24-04-2011 11:07

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
99.870000	12.90	-15.6	33.1	20.2	QP	376.0	0.00	VERTICAL
131.880000	16.40	-13.8	33.1	16.7	QP	278.0	181.00	VERTICAL
143.850000	23.00	-14.1	33.1	10.1	QP	250.0	183.00	VERTICAL
166.560000	15.70	-15.3	33.1	17.4	QP	400.0	29.00	HORIZONTAL
197.130000	27.10	-17.0	33.1	6.0	QP	114.0	278.00	VERTICAL
233.040000	18.00	-15.1	35.6	17.6	QP	322.0	357.00	HORIZONTAL
479.310000	32.20	-7.6	35.6	3.4	QP	197.0	330.00	HORIZONTAL
511.260000	33.90	-7.1	35.6	1.7	QP	188.0	330.00	HORIZONTAL
639.090000	33.00	-4.6	35.6	2.4	QP	131.0	125.00	HORIZONTAL
733.620000	27.40	-2.3	35.6	8.2	QP	231.0	276.00	VERTICAL



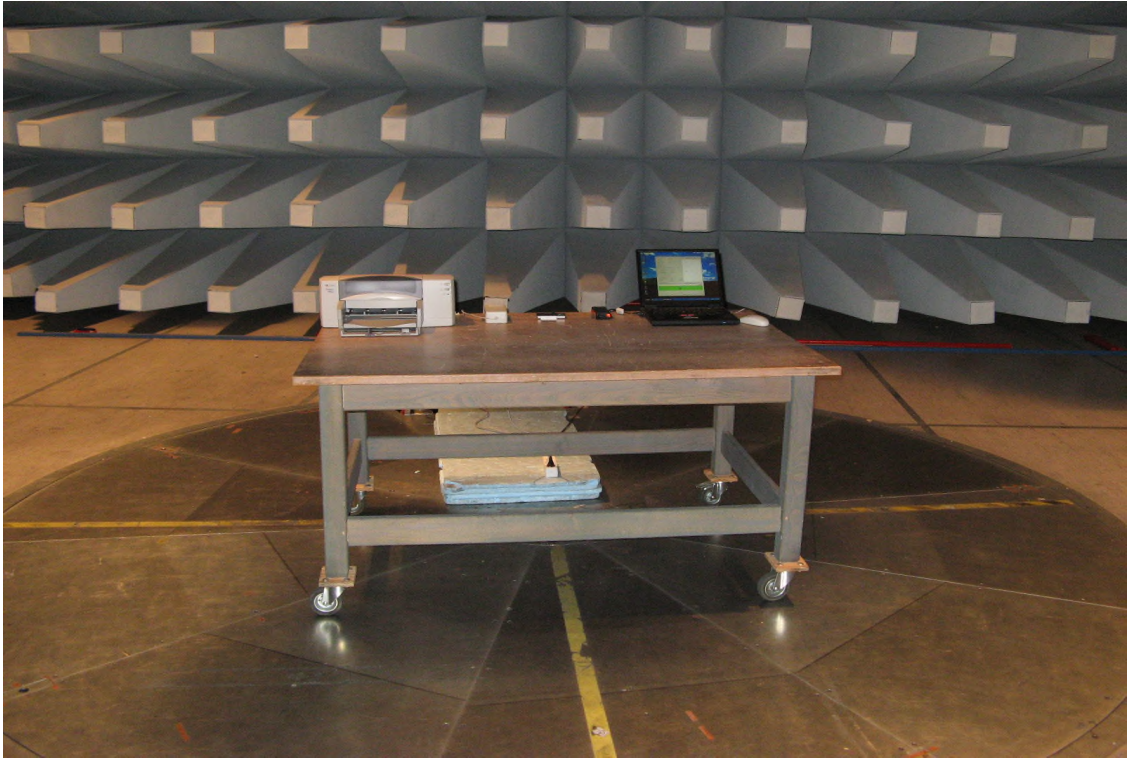


Photo 4.2.1 Test setup regarding measurement of radio frequency electromagnetic field.
Front view.

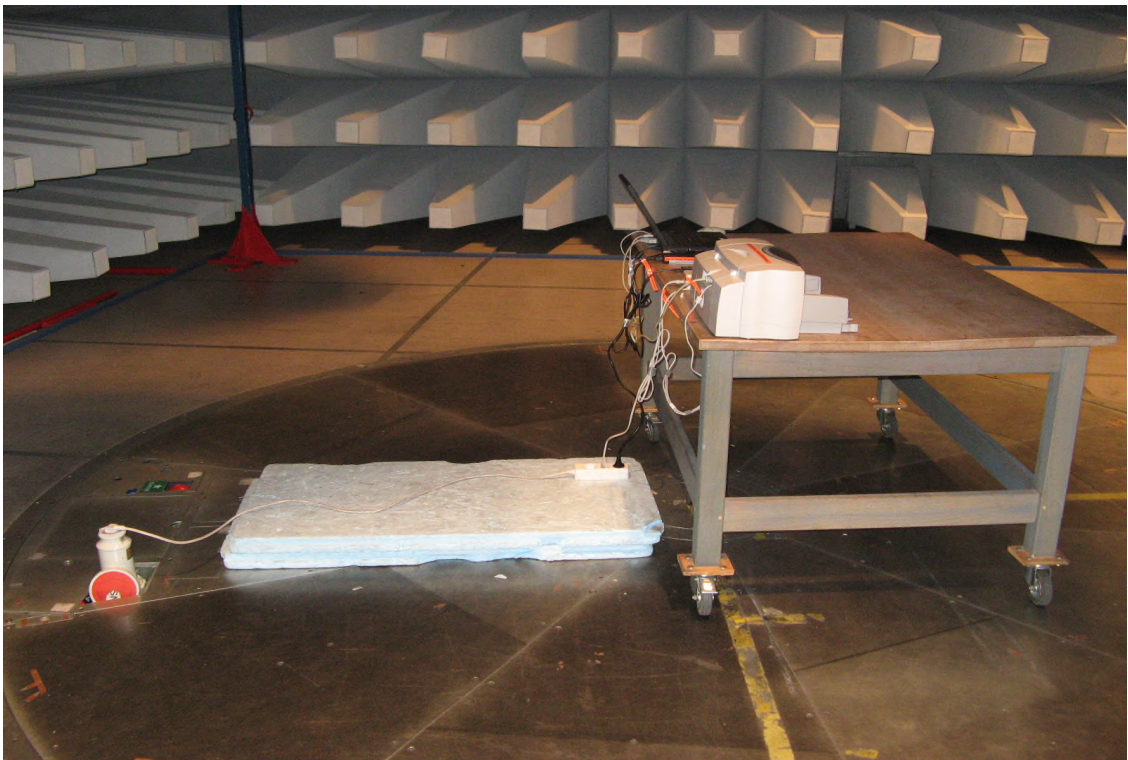


Photo 4.2.2 Test setup regarding measurement of radio frequency electromagnetic field.
Side view.

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
<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	

Setup VEC1					
Measurement of radio frequency electromagnetic field					
Used	ID no.	Description	Manufacturer	Type no.	Setup uncertainty
<input checked="" type="checkbox"/>	36032	Software	Rohde & Schwarz	ES-K1 ver 1.71 SP2	4.9 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	

Other instruments used					
Used	ID no.	Description	Manufacturer	Type no.	Setup uncertainty
<input checked="" type="checkbox"/>	IM-A308	Temperature- and hygrometer	Vaisala	HMI31	