

# DELTA Test Report

*TEST REPORT issued by an Accredited Testing Laboratory*



## EMC emission test of Sense MC

Performed for Precise Biometrics AB

REC-E702894\_1

Project no.: E702894

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27 April 2011

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**DELTA Development**

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is a subsidiary company of

**DELTA**

**Title** EMC emission test of Sense MC

**Test object** Sense MC

**Report no.** REC-E702894\_1

**Project no.** E702894

**Test period** 28 March 2011

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

**Contact person** Oscar Fogelberg  
E-mail: oscar.fogelberg@precisebiometrics.com

**Manufacturer** Precise Biometrics AB

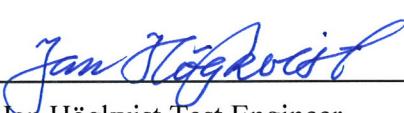
**Specifications** FCC Part 15 Subpart B

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

**Test personnel** 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
Model / type	Precise Sense MC
Part no.	SAA 103 1001
Serial no.	3-123
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

## 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
Comment	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	Hewlet Packard
Supply voltage	230V
Comment	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
Comment	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

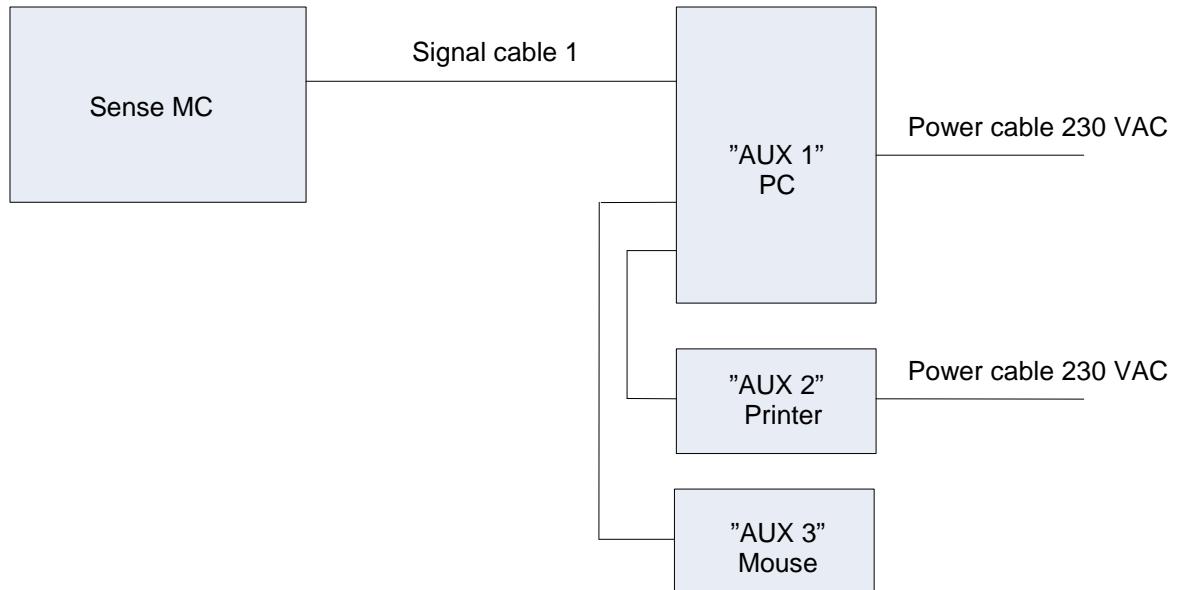


Figure 3.1.1 Block diagram of test object(s) with cables and auxiliary equipment.

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

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:

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	Sheet	CE-1
Type	Precise Sense MC	Project no.	E702894
Serial no.	3-123	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 µH	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

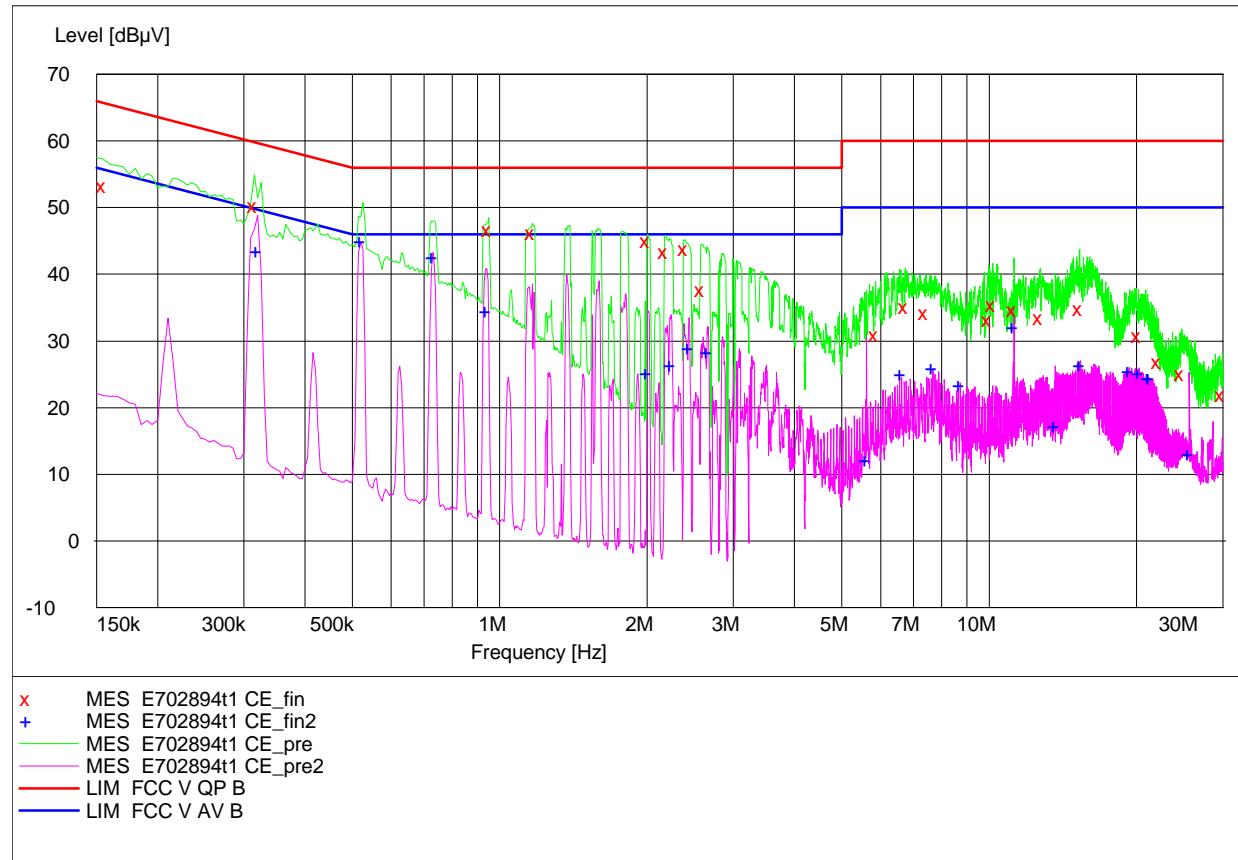
Comments Mains voltage: 230 VAC

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  
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 / 11:25:51



**MEASUREMENT RESULT: "E702894t1 CE\_fin"**

2011-03-28 11:33

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.155000	53.30	0.2	66	12.4	QP	L1	FLO
0.315000	50.30	0.2	60	9.5	QP	L1	FLO
0.950000	46.70	0.3	56	9.3	QP	L1	FLO
1.165000	46.20	0.4	56	9.8	QP	N	FLO
2.000000	45.00	0.6	56	11.0	QP	N	FLO
2.175000	43.30	0.5	56	12.7	QP	L1	FLO
2.390000	43.80	0.6	56	12.2	QP	N	FLO
2.585000	37.60	0.5	56	18.4	QP	L1	FLO
5.855000	30.90	0.9	60	29.1	QP	N	FLO
6.730000	35.10	1.0	60	24.9	QP	N	FLO
7.415000	34.10	1.0	60	25.9	QP	N	FLO
9.975000	33.10	1.3	60	26.9	QP	N	FLO
10.185000	35.30	1.3	60	24.7	QP	N	FLO
11.215000	34.60	1.5	60	25.4	QP	N	FLO
12.710000	33.50	1.2	60	26.5	QP	L1	FLO
15.325000	34.80	1.9	60	25.2	QP	N	FLO
20.155000	30.80	2.6	60	29.2	QP	N	FLO
22.175000	26.80	2.9	60	33.2	QP	N	FLO
24.730000	25.10	3.1	60	34.9	QP	N	FLO
29.925000	21.90	2.2	60	38.1	QP	L1	FLO

**MEASUREMENT RESULT: "E702894t1 CE\_fin2"**

2011-03-28 11:33

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.320000	43.50	0.3	50	6.2	AV	N	FLO
0.520000	44.90	0.2	46	1.1	AV	L1	FLO
0.730000	42.60	0.3	46	3.4	AV	L1	FLO
0.940000	34.50	0.3	46	11.5	AV	L1	FLO
2.000000	25.20	0.5	46	20.8	AV	L1	FLO
2.235000	26.40	0.6	46	19.6	AV	N	FLO
2.435000	28.90	0.6	46	17.1	AV	N	FLO
2.665000	28.30	0.6	46	17.7	AV	N	FLO
5.610000	12.20	0.7	50	37.8	AV	L1	FLO
6.625000	25.00	0.8	50	25.0	AV	L1	FLO
7.670000	25.90	0.9	50	24.1	AV	L1	FLO
8.715000	23.40	0.9	50	26.6	AV	L1	FLO
11.215000	32.10	1.5	50	17.9	AV	N	FLO
13.615000	17.20	1.2	50	32.8	AV	L1	FLO
15.340000	26.40	1.9	50	23.6	AV	N	FLO
19.315000	25.50	2.4	50	24.5	AV	N	FLO
20.220000	25.20	1.5	50	24.8	AV	L1	FLO
21.195000	24.50	2.7	50	25.5	AV	N	FLO
21.335000	24.50	2.7	50	25.5	AV	N	FLO
25.610000	13.10	3.2	50	36.9	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.



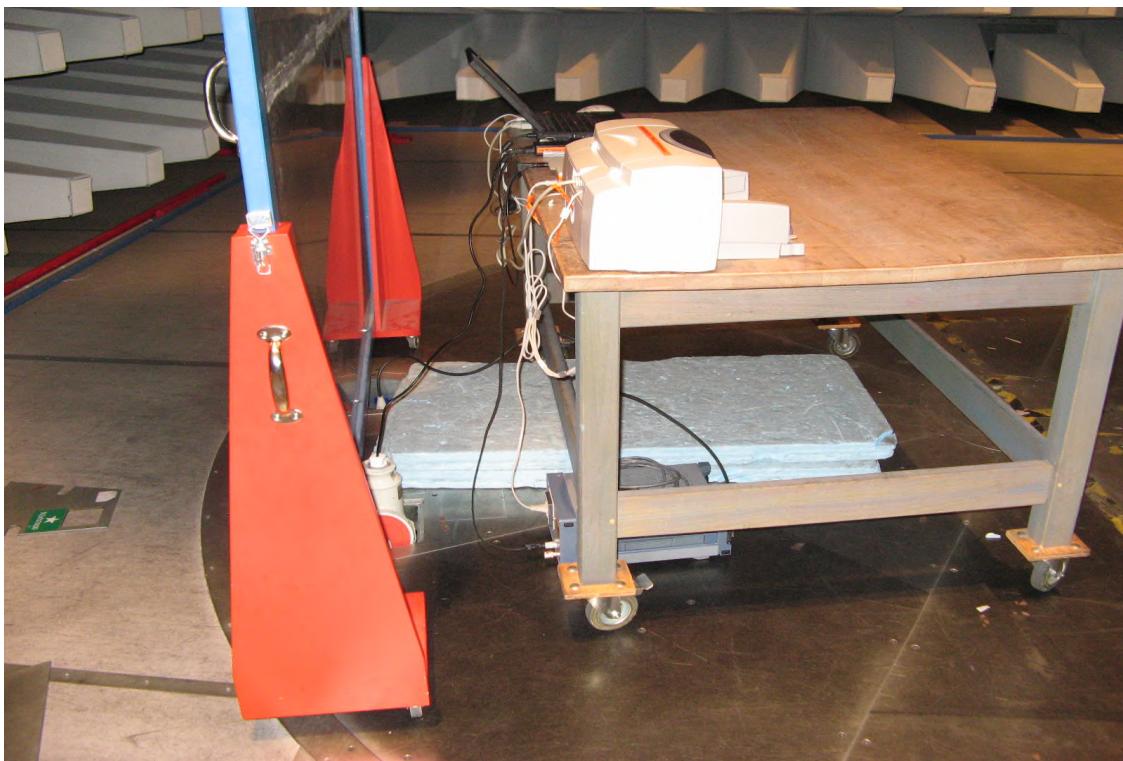


Photo 4.1.3 Test setup regarding measurement of radio frequency voltage on mains.

## 4.2 Measurement of radio frequency electromagnetic field

Test object	Sense MC	Sheet	RE-1
Type	Precise Sense MC	Project no.	E702894
Serial no.	3-123	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

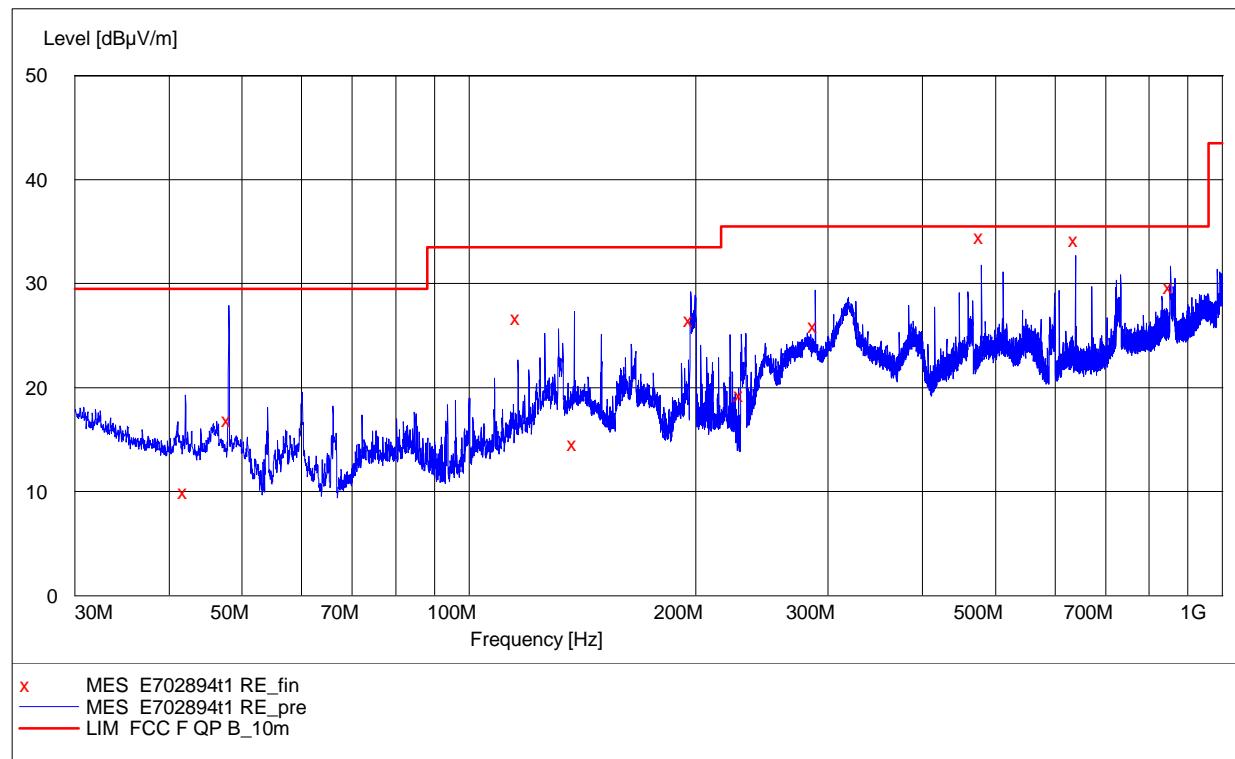
Compliant Yes

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  
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 / 09:53:13



**MEASUREMENT RESULT: "E702894t1 RE\_fin"**

14-04-2011 13:42

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
42.030000	10.00	-13.9	29.5	19.5	QP	221.0	149.00	VERTICAL
48.030000	16.90	-16.9	29.5	12.6	QP	186.0	150.00	VERTICAL
116.190000	26.70	-14.0	33.1	6.4	QP	397.0	184.00	HORIZONTAL
138.120000	14.60	-13.7	33.1	18.5	QP	150.0	185.00	VERTICAL
197.190000	26.50	-17.0	33.1	6.6	QP	108.0	300.00	VERTICAL
229.980000	19.30	-15.2	35.6	16.3	QP	124.0	89.00	VERTICAL
288.300000	25.90	-11.4	35.6	9.7	QP	100.0	324.00	VERTICAL
479.310000	34.50	-7.6	35.6	1.1	QP	182.0	105.00	HORIZONTAL
639.060000	34.20	-4.6	35.6	1.4	QP	145.0	87.00	HORIZONTAL
853.230000	29.70	-1.0	35.6	5.9	QP	224.0	295.00	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	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	

<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	