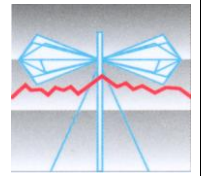




Deutsche  
Akkreditierungsstelle  
D-PL-12113-01-01

**EMC TestHaus Dr. Schreiber GmbH**  
Eiserfelderstr. 316, 57080 Siegen

**TEST REPORT 22 / 200**



**TEST OBJECT: RAKSA iDet**

tested on

**Electromagnetic Compatibility**

**EMC Requirements**

**FULFILLED:**

**EN 301 489-1 V1.9.2**

**Emission and Immunity**

**YES**

**CUSTOMER**

**TS-Market Ltd.**

**Mr. Maxim Ushakov**

**B.10-1 Sosnovaya alleya**

**Zelenograd Moscow 124489**

**Russian Federation**

**EMC TestHaus Dr. Schreiber GmbH, Siegen**  
**EMC Testlaboratory accredited acc. ISO/IEC 17025**

Tel: 49(0)271 382702  
Fax: 49(0)271 382758  
Mail: 0271382702@t-online.de

**Dr.-Ing. Dieter Schreiber**  
General Manager

**Dipl.-Ing. Christoph Haubrich**  
General Manager, Testlaboratory

Date of receipt: June 22<sup>nd</sup>, 2012  
Test finished: July 09<sup>th</sup>, 2012  
Date of Distribution: July 16<sup>th</sup>, 2012

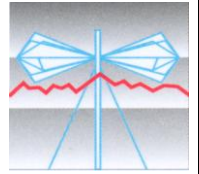
Without written permission of EMC TestHaus the report may not be reproduced in **parts**.



Deutsche  
Akkreditierungsstelle  
D-PL-12113-01-01

EMC TestHaus Dr. Schreiber GmbH  
Eiserfelderstr. 316, 57080 Siegen

TEST REPORT 22 / 200



TEST OBJECT: RAKSA iDet

TABLE OF CONTENTS / SURVEY OF TESTS

Testplan and criteria	page 3
Configuration	page 5

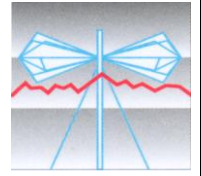
Test passed:

EN 301 489-1 Immunity

EN 61000-4-2:2009	Electrostatic Discharge	page 6	YES
EN 61000-4-3:2006+A1, A2	Rad. Immunity E-field	page 12	YES

EN 301 489-1 Emission

EN 55022, cl. B	Rad. Emission < 1 GHz	page 19	YES
EN 301 489-1	Rad. Emission > 1 GHz	page 25	YES



**TEST OBJECT:** RAKSA iDet

Testplan

**Applied harmonized European Standards under R&TTE Directive 1999/5/EC:**

EN 301 489-1 V1.9.2:

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;  
Part 1: Common technical requirements

Regarding emission < 1 GHz the standard refers to the requirements of:

EN 55022:2010

Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement  
class B: for use in home / residential area.

**Subject of test and test conditions:**

The unit under test is a Selective RF Detector.

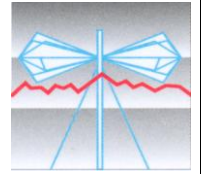
**Emission:**

Condition under test: Normal operating condition, search mode

**Immunity:**

Condition under test: Normal operating condition, search mode

During the tests the specimens' performance is monitored.



**TEST OBJECT: RAKSA iDet**

**Performance criteria concerning immunity testing**

**Criterion A - continuous mode**

During and after the test the specimen has to work without failure keeping the functional specification according description of the manufacturer. A loss of function is acceptable in the exclusion bands. Also acceptable are narrowband distortions. Narrowband means narrower than the 2.5-fold of the receivers' ZF bandwidth.

**Criterion B – discontinuous mode**

After the test the specimen has to work without failure keeping the function according specification of the manufacturer. During the test the working behaviour may be changed but without ongoing change or loss of the working conditions and data. The users` manual has to contain what is promised to the customer.

**Criterion C – supply interruption mode**

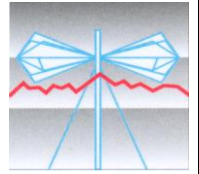
During the test temporary loss of the function is allowed. The operator may restart the system by normal means, no service access is allowed to continue the operation.

**Testequipment:**

The used devices are maintained and calibrated according handbook of quality system of EMC TestHaus.

**About the results:**

The results are valid only for the sample tested. The manufacturer is responsible for the documentation of the tested configuration.



**TEST OBJECT:**

**RAKSA iDet**

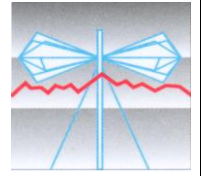
**Configuration**

EUT:

**RAKSA iDet**

**Model: 120  
Version: 2.08  
S/N: 21107**

Dimension of sample under test: < 8 cm x 5 cm x 2 cm



**TEST OBJECT: RAKSA iDet**

**Immunity to Electrostatic Discharge**

**Testprocedure according EN 61000-4-2**

The unit under test is placed on an isolated sheet on a wooden table containing a via two 470 k $\Omega$  resistors grounded metal sheet on top. The unit under test is configured and connected according to product specification or operator manual.

Components of the system, which are not subject to the test, must not be influenced by the field of the discharge, to be sure, that errors, if they occur, are caused by the unit under test. If the auxiliary devices are not decoupled from the unit under test, in case of errors it has to be investigated by special tests, whether the unit under test or the auxiliary devices are causing the negative result.

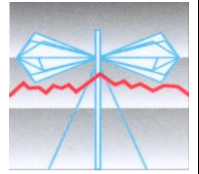
Every by the user accessible point of the unit under test has to be checked. Parts of isolating material are tested with the air discharge module, parts of conductive material have to be tested with the contact discharge module.

At every essential point the test has to be repeated with 10 discharges (positive and negative) in single mode. The test of one special point is considered to be passed, if those single discharges produce no irrecoverable error. In total 200 discharges are required.

Lower levels of air discharge voltage have to be included.

**Used equipment**

Inv.No.	EMC test device	Manufacturer
I1.4	SESD 2000 ESD Generator 30 kV	Schlöder
X3	Faraday Cabin	Siemens



**TEST OBJECT: RAKSA iDet**

**Immunity - ESD**

**Requirements acc. EN 301 489-1:**

**Testlevel air discharge: up to 8 kV**

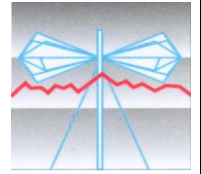
**Testlevel contact discharge: 4 kV**

**Criterion B – discontinuous mode**

After the test the specimen has to work without failure keeping the function according specification of the manufacturer. During the test the working behaviour may be changed but without ongoing change or loss of the working conditions and data. The users` manual has to contain what is promised to the customer.

<b>Testconditions</b>	Date:	July 09 <sup>th</sup> , 2012
	Temperature:	28°C
	Air pressure:	1023 hPa
	Relative Humidity:	45 %
	Operator:	A.E./A.T.

**Test Mode** see testplan



**TEST OBJECT: RAKSA iDet**

**Immunity - ESD**

A decoupling of auxiliary devices is not performed.

**Results**

Photo Item	Placement of discharge	Pol.	Voltage in kV	Type of discharge	Reaction	Crit. req.	Crit. met	Test passed
1	vertical coupling plate	+/-	4	Contact	no reaction	B	A	Ja
2	horizontal coupling plate	+/-	4	Contact	no reaction	B	A	Ja
3	housing	+/-	2, 4, 8	Air	no reaction	B	A	Ja
4	display	+/-	2, 4, 8	Air	no reaction	B	A	Ja
5	keys	+/-	2, 4, 8	Air	no reaction	B	A	Ja

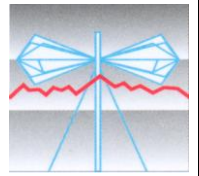
No performance degradation is seen after the impact.

**Final result:**

**ESD test according EN 301 489-1:**

**PASSED**



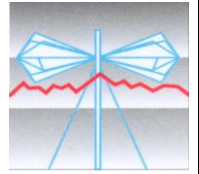


**TEST OBJECT:**

**RAKSA iDet**



Specimen during ESD, points of discharge

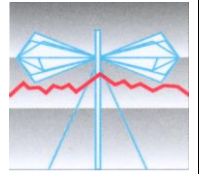


TEST OBJECT:

RAKSA iDet



Specimen during ESD, points of discharge

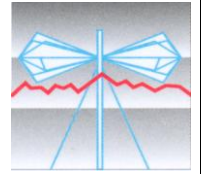


**TEST OBJECT:**

**RAKSA iDet**



Specimen during ESD, points of discharge



**TEST OBJECT: RAKSA iDet**

**Immunity to Radiated Electromagnetic Fields**

**Testprocedure according EN 61000-4-3**

The unit under test is placed on a wooden support.

The unit under test is configured and connected according to product specification or operator manual.

Components of the system, which are not subject to the test, must not be influenced by the field, to be sure, that errors, if they occur, are caused by the unit under test. The antenna distance is usually 1m, depending on dimensions of EUT appropriate 2m.

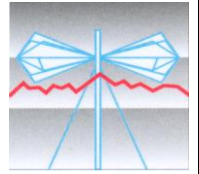
If the auxiliary devices are not decoupled from the unit under test, in case of errors it has to be investigated by special tests, whether the unit under test or the auxiliary devices are causing the negative result.

The antenna has to be directed at least to each of the 4 sides of the unit under test.

The field is not measured during the test. The antenna power is controlled; the frequency dependend power level is determined in advance without the presence of the unit under test. The dwell time is set to 1.5 sec., if the reaction time of the unit under test does not require a longer time. The clockrate is under consideration separately if it is included in the range of radiated immunity test.

**Used equipment**

Inv.No.	EMC test device	Manufacturer
G3 / G4	SMY / ESG D3000A - Generator	R & S / HP Agilent
I37 / I39	5127FE 200 W / RUP15050-12 50 W amplifier	Ophir / RFHIC
Kal 10	HI6005 Fielddetector	Holaday
E15	URV55 Millivoltmeter	R & S
E14.2 / E15.5	URV Z2 / NRVZ5 - probe	R & S / R & S
E22 / E15.2	DC3001M2 / 30611 – directional coupler	Ampl. Res. / Narda
X2 / X5	Absorber cab. 1/ cab. 2	MPE
I5.4 / E53	VULP 9118E / BBHA9120E /Antenna	Schwarzbeck / dto.



TEST OBJECT: RAKSA iDet

**Immunity - Radiated Immunity**

**Requirements acc. EN 301 489-1:**

**Range: 80 MHz - 1000 MHz; 1.4 - 2.7 GHz**

**Level: 3 V/m; 3 V/m**

**80 % AM, 1 kHz / 1 % frequency steps**

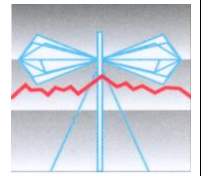
**Criterion A - continuous mode**

During and after the test the specimen has to work without failure keeping the functional specification according description of the manufacturer. A loss of function is acceptable in the exclusion bands. Also acceptable are narrowband distortions. Narrowband means narrower than the 2.5-fold of the receivers' ZF bandwidth.

<b>Testconditions</b>	Date:	July 05 <sup>th</sup> , 2012
	Temperature:	30°C
	Air pressure:	1020 hPa
	Relative Humidity:	50 %
	Operator:	A.E./A.T.

**Test Mode** see testplan





**TEST OBJECT: RAKSA iDet**

**Immunity - Radiated Immunity**

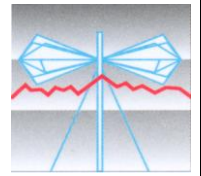
A decoupling of auxiliary devices is not performed.

**Results**

The test is done with vertical and horizontal antenna orientation and in 4 directions of the device (0°, 90°, 180°, 270°). The antenna distance is 1 m.

Frequency in MHz	Step	Antenna-Polarisation	Direction of radiation	Level in V/m	Reaction of unit under test	Test passed, Crit. A
80 - 1000	1 %	horizontal	0°	3	no reaction	Yes
80 - 1000	1 %	vertikal	0°	3	no reaction	Yes
80 - 1000	1 %	horizontal	90°	3	no reaction	Yes
80 - 1000	1 %	vertikal	90°	3	no reaction	Yes
80 - 1000	1 %	horizontal	180°	3	no reaction	Yes
80 - 1000	1 %	vertikal	180°	3	no reaction	Yes
80 - 1000	1 %	horizontal	270°	3	no reaction	Yes
80 - 1000	1 %	vertikal	270°	3	no reaction	Yes

No performance degradation is seen after the impact.



TEST OBJECT: RAKSA iDet

**Immunity - Radiated Immunity**

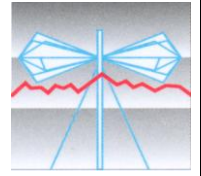
A decoupling of auxiliary devices is not performed.

**Results**

The test is done with vertical and horizontal antenna orientation and in 4 directions of the device (0°, 90°, 180°, 270°). The antenna distance is 1 m.

Frequency in GHz	Step	Antenna-Polarisation	Direction of radiation	Level in V/m	Reaction of unit under test	Test passed, Crit. A
1.4 - 2	1 %	horizontal	0°	3	no reaction	Yes
1.4 - 2	1 %	vertikal	0°	3	no reaction	Yes
1.4 - 2	1 %	horizontal	90°	3	no reaction	Yes
1.4 - 2	1 %	vertikal	90°	3	no reaction	Yes
1.4 - 2	1 %	horizontal	180°	3	no reaction	Yes
1.4 - 2	1 %	vertikal	180°	3	no reaction	Yes
1.4 - 2	1 %	horizontal	270°	3	no reaction	Yes
1.4 - 2	1 %	vertikal	270°	3	no reaction	Yes

No performance degradation is seen after the impact.



TEST OBJECT: RAKSA iDet

**Immunity - Radiated Immunity**

A decoupling of auxiliary devices is not performed.

**Results**

The test is done with vertical and horizontal antenna orientation and in 4 directions of the device (0°, 90°, 180°, 270°). The antenna distance is 1 m.

Frequency in GHz	Step	Antenna-Polarisation	Direction of radiation	Level in V/m	Reaction of unit under test	Test passed, Crit. A
2 - 2.7	1 %	horizontal	0°	3	no reaction	Yes
2 - 2.7	1 %	vertikal	0°	3	no reaction	Yes
2 - 2.7	1 %	horizontal	90°	3	no reaction	Yes
2 - 2.7	1 %	vertikal	90°	3	no reaction	Yes
2 - 2.7	1 %	horizontal	180°	3	no reaction	Yes
2 - 2.7	1 %	vertikal	180°	3	no reaction	Yes
2 - 2.7	1 %	horizontal	270°	3	no reaction	Yes
2 - 2.7	1 %	vertikal	270°	3	no reaction	Yes

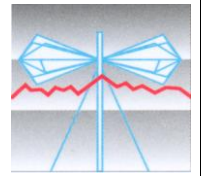
No performance degradation is seen after the impact.

Final result:

Radiated Immunity acc. EN 301 489-1:

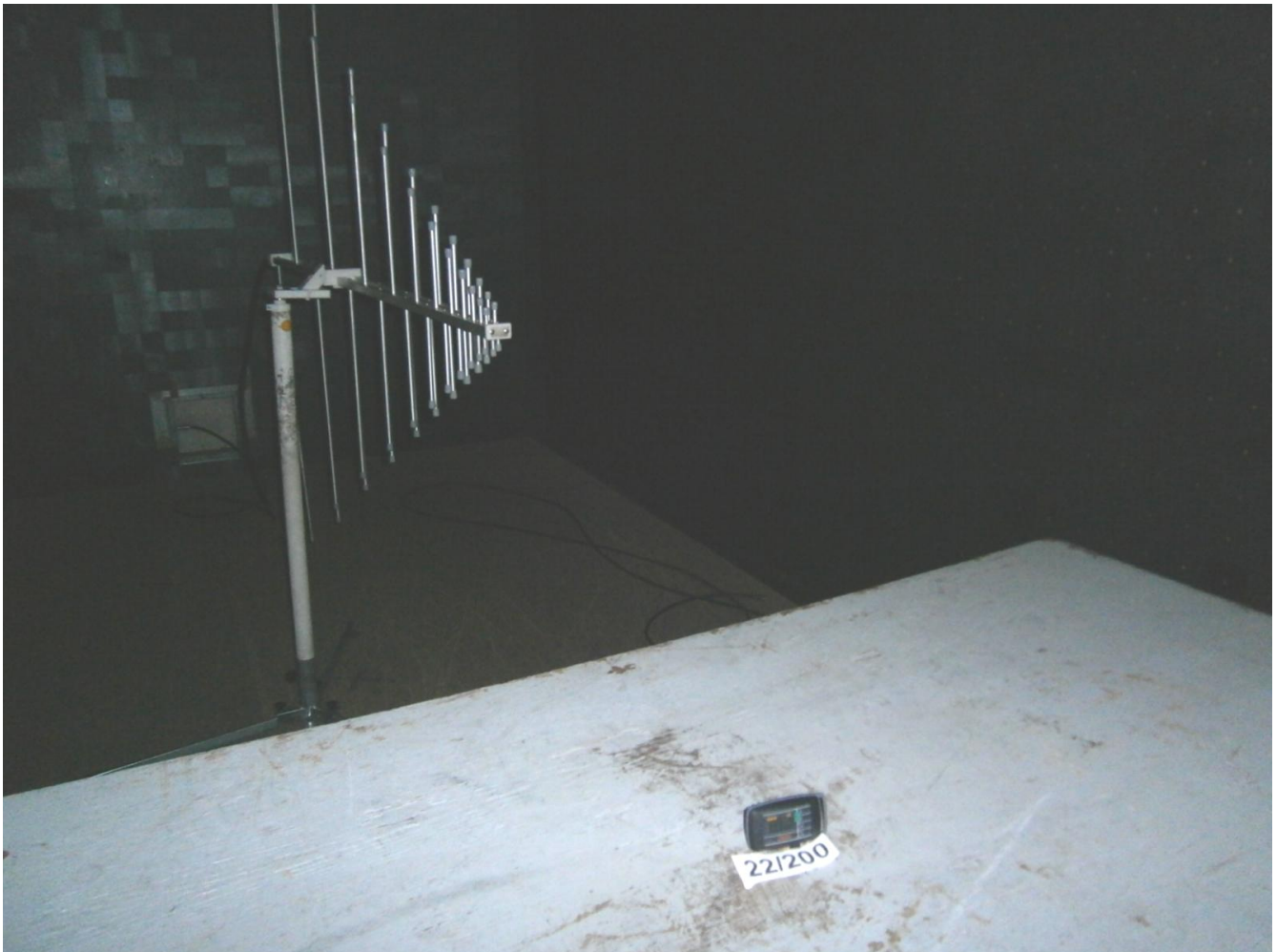
PASSED



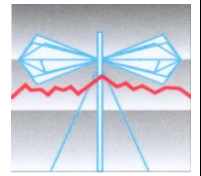


**TEST OBJECT:**

**RAKSA iDet**

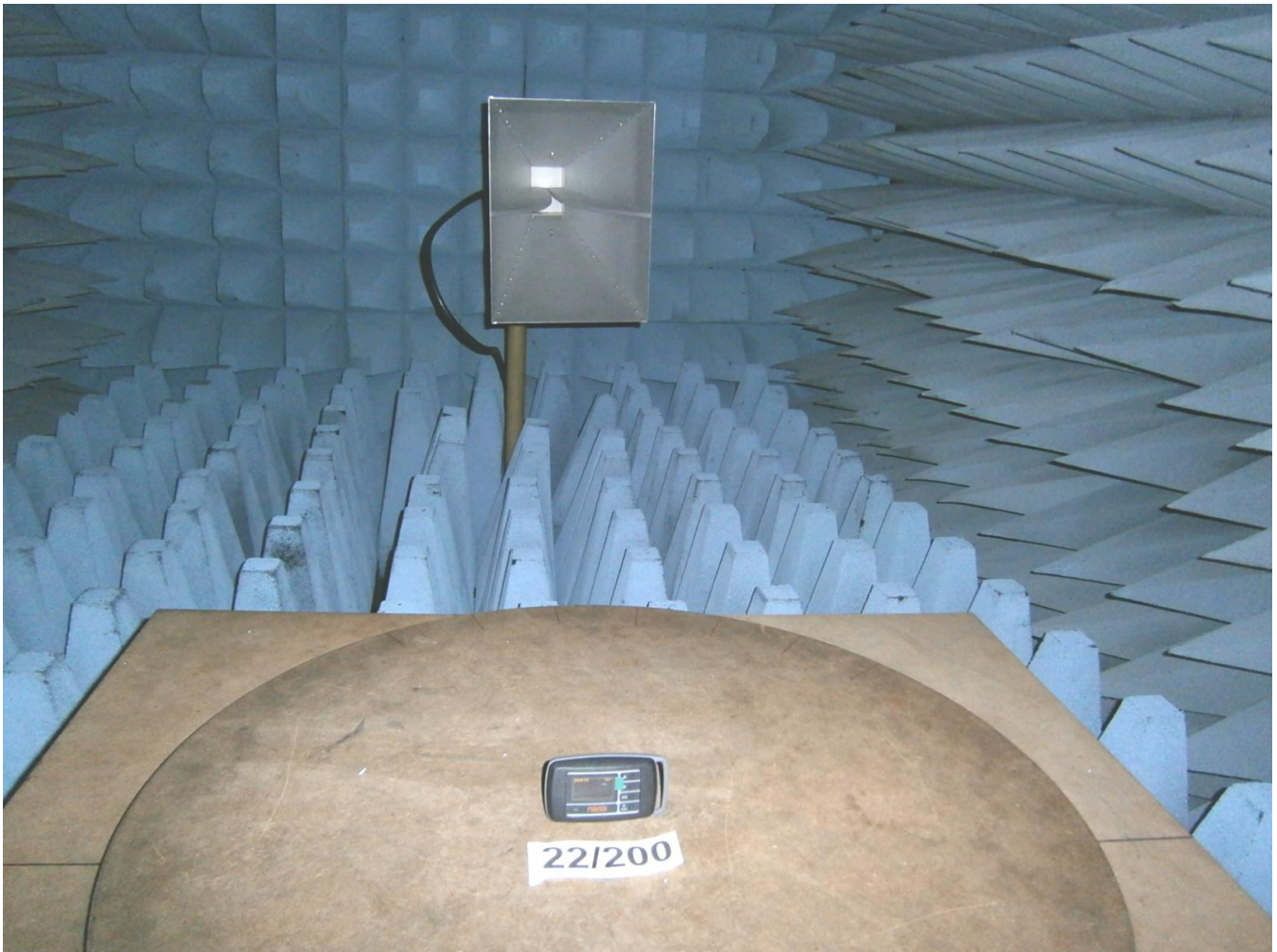


Specimen during Radiated immunity < 1 GHz

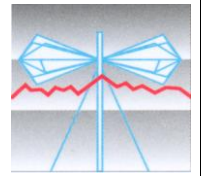


**TEST OBJECT:**

**RAKSA iDet**



Specimen during Radiated immunity > 1 GHz



**TEST OBJECT: RAKSA iDet**

**Emission**

**Radiated Emission E-Field acc. EN 55022, cl. B**

**Measurement procedure below 1 GHz**

The frequency range is 30 MHz to 1GHz.

A premeasurement is done in the absorber cabin with an antenna distance of 3 m; the unit under test is rotated during that measurement. Emissions, which are 6 dB above the noise are documented and investigated in the free field.

The measurement distance is 10 m in the free field. The object under test is rotated by 360° at each relevant frequency during final E-field measurement. Antenna polarisation is changed (vertical/horizontal). Antenna height is varied (at the angle of maximum output) between 1 and 4 m for searching a further maximum value. The listed values are Quasi-Peak values.

**Used Equipment**

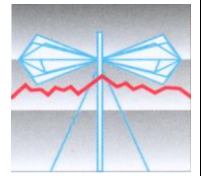
Inv.No.	EMC Measurement Device	Manufacturer
E49	ESVD receiver	R & S
E3.1	8568B Spectrum Analyser	HP
E3.2	85685A Preselector	HP
E11.2	VHA9103+ BBA9106, 9023 Bikoni Ant. shortn. 7/16" 30 - 300 MHz	Schwarzbeck
E11.3	VHA9103 + BBA9106, SN 9051 Bikoni Antenna N	Schwarzbeck
E12.1	UHALP9107 Log per Antenna N	Schwarzbeck
E12.3	UHALP 9108A shortn. 7/16" FF	Schwarzbeck
X1	free field	
X2	anechoic chamber	MPE
Measurement uncertainty cumulative		5.5 dB



Deutsche  
Akkreditierungsstelle  
D-PL-12113-01-01

EMC TestHaus Dr. Schreiber GmbH  
Eiserfelderstr. 316, 57080 Siegen

TEST REPORT 22 / 200



TEST OBJECT: RAKSA iDet

EMISSION - Premeasurement result with 3 m antenna distance

Absorbercabin

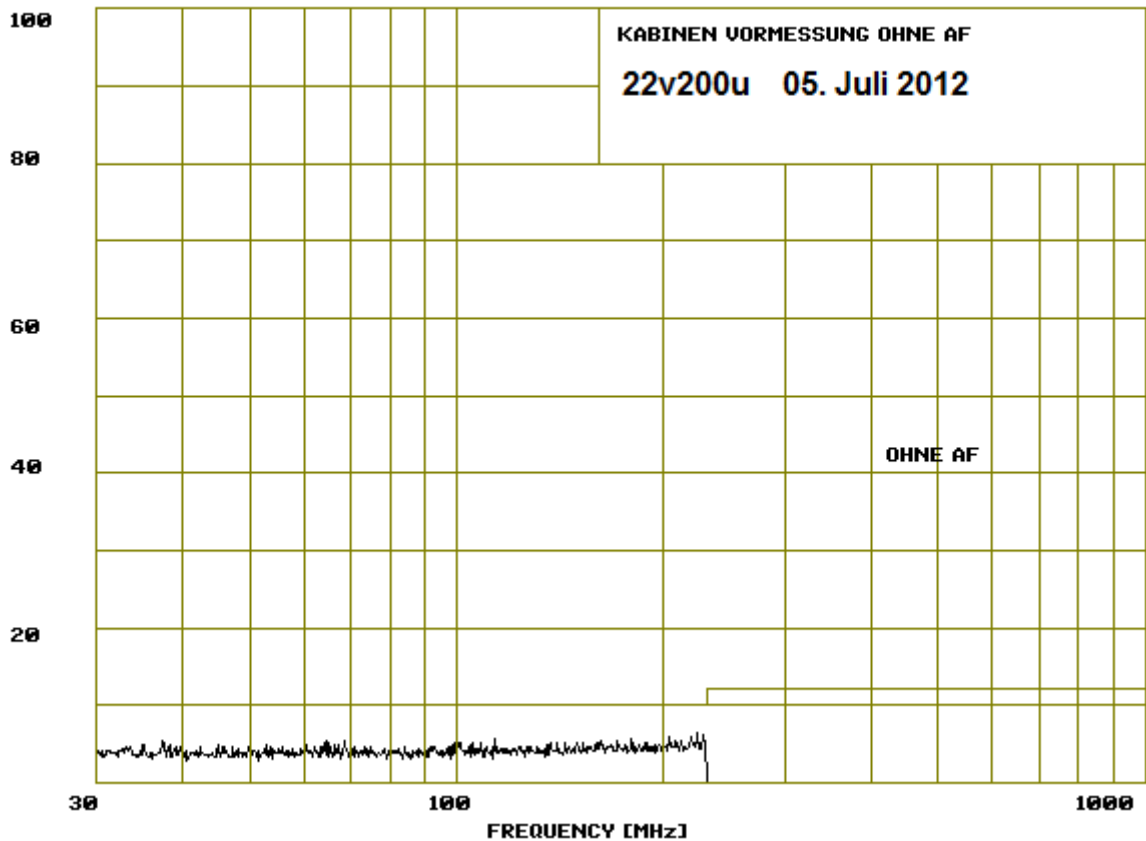
Operator: A.E./R.P.

Result range 30 - 230 MHz

hp

EMC TestHaus SIEGEN

EMISSION LEVEL [ dBuV ]

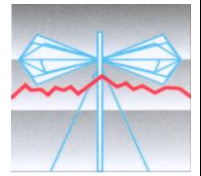




Deutsche  
Akkreditierungsstelle  
D-PL-12113-01-01

EMC TestHaus Dr. Schreiber GmbH  
Eiserfelderstr. 316, 57080 Siegen

TEST REPORT 22 / 200



TEST OBJECT: RAKSA iDet

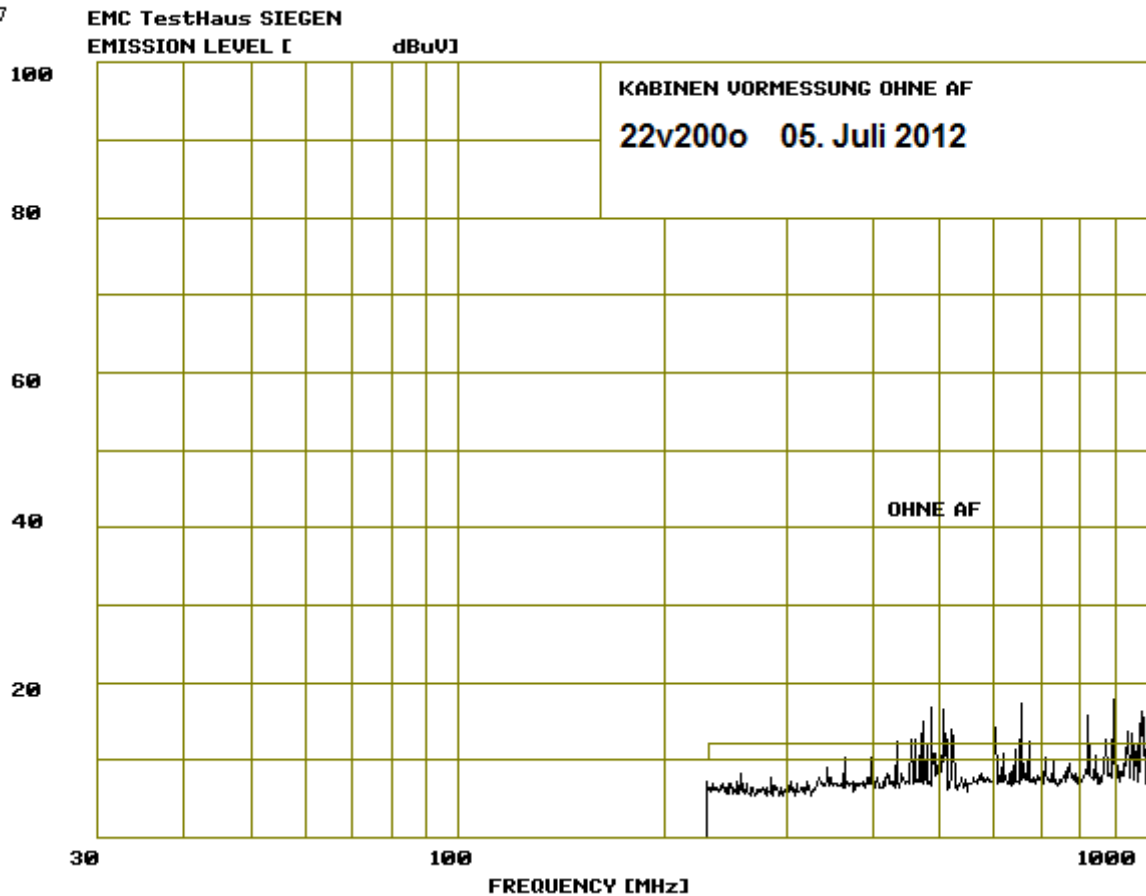
EMISSION - Premeasurement result with 3 m antenna distance

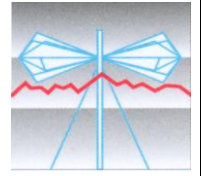
Absorbercabin

Operator: A.E./R.P.

Result range 230 - 1000 MHz

hp





**TEST OBJECT: RAKSA iDet**

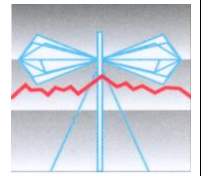
**EMISSION - measurement with 10 m antenna distance results open site**

Limits of EN 55022 class B

Frequency in MHz	Emission in dB $\mu$ V/m	Limit in dB $\mu$ V/m	Margin in dB	Antenna- height in m	Angle	Antenna- polarisation
435.71	< 23	37	14	1.5	0	v
455.27	< 31	37	6	1	0	h
473.53	< 22.5	37	14.5	1	0	h
488.89	29.5	37	7.5	1	100	h
493.25	24.5	37	12.5	1	100	h
503.51	33	37	4	2	80	h
507.07	31	37	6	2	80	h
513.23	24	37	13	2	100	h
604.76	< 25.5	37	11.5	2	0	h
654.12	< 26.8	37	10.2	2	0	h
677.66	< 27.3	37	9.7	1.5	0	h
824.84	28	37	9	1	220	h
871.64	< 24	37	13	1	0	h
894.44	< 25.63	37	11.37	1	0	h
926.02	< 25	37	12	1	0	h
972.1	< 32.5	37	4.5	1	0	h
982.44	< 33	37	4	1	0	h

File: 22W200





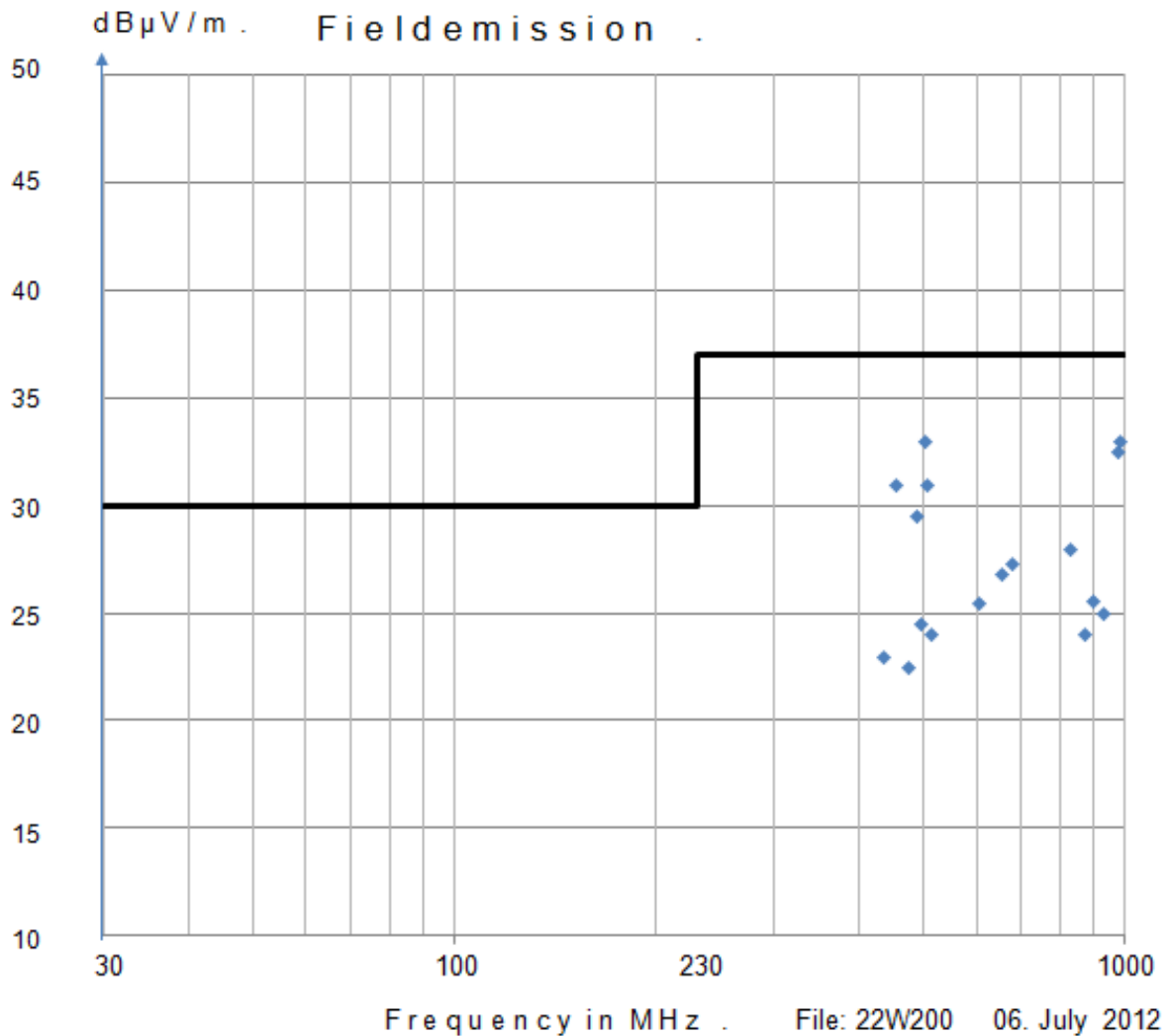
**TEST OBJECT: RAKSA iDet**

**EMISSION - measurement with 10 m antenna distance**

**Graphic**

Date: July 06<sup>th</sup>, 2012 / Operator: A.E./R.P.

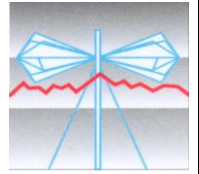
Limits of EN 55022 class B



**Ergebnis:**

**Emission E-Field acc. EN 55022, cl. B:**

**PASSED**



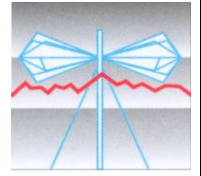
**TEST OBJECT:**

**RAKSA iDet**



EUT during Emission E-field measurement < 1 GHz





**TEST OBJECT:**

**RAKSA iDet**

**Emission**

**Radiated Emission E-Field acc. EN 301 489-1**

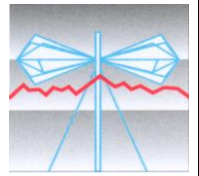
**Measurement procedure above 1 GHz**

A premeasurement is done in the absorber cabin with an antenna distance of 3 m; the unit under test is rotated during that measurement. Emissions, which are within the noise are not investigated in the free field.

The measurement distance is 3 m in the free field. The object under test is rotated by 360° at each relevant frequency during final E-field measurement. Antenna polarisation is changed (vertical/horizontal) for searching a further maximum value. The listed values are Peak and average values.

**Used Equipment**

Inv.No.	EMC Measurement Device	Hersteller
E3.4	HP8569B Spectrum Analyzer	HP
E53	BBHA 9120E Hornantenna	Schwarzbeck
X1.2	free field	
X2/X5	anechoic chamber 1/2	MPE
	Measurement uncertainty cumulative	5 dB

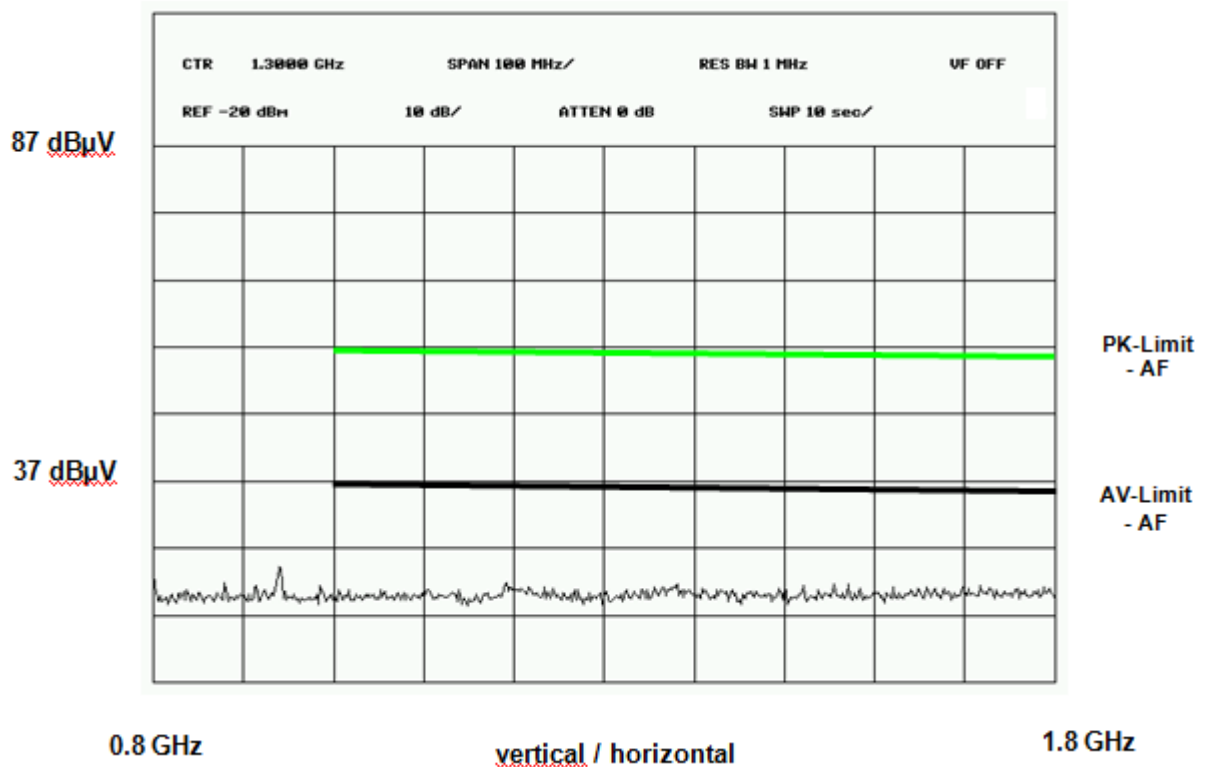


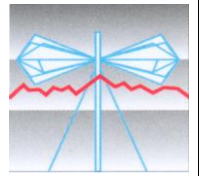
**TEST OBJECT: RAKSA iDet**

**E-Field Premeasurement with 3 m antenna distance** **Absorbercabin**

Operator: A.E./R.P. / Date: July 05<sup>th</sup>, 2012

Frequency range: 800 - 1800 MHz



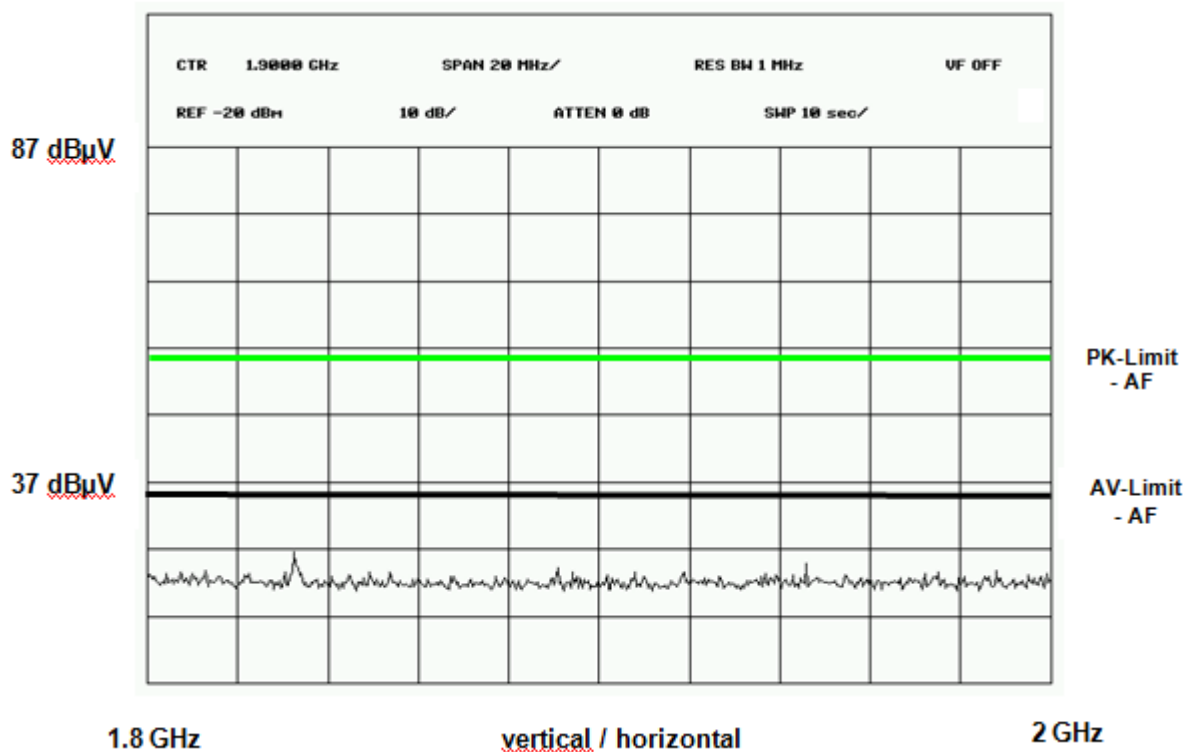


**TEST OBJECT: RAKSA iDet**

**E-Field Premeasurement with 3 m antenna distance** **Absorbercabin**

Operator: A.E./R.P. / Date: July 05<sup>th</sup>, 2012

Frequency range: 1800 - 2000 MHz

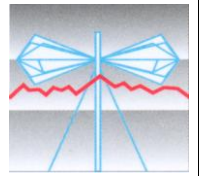




Deutsche  
Akkreditierungsstelle  
D-PL-12113-01-01

EMC TestHaus Dr. Schreiber GmbH  
Eiserfelderstr. 316, 57080 Siegen

TEST REPORT 22 / 200

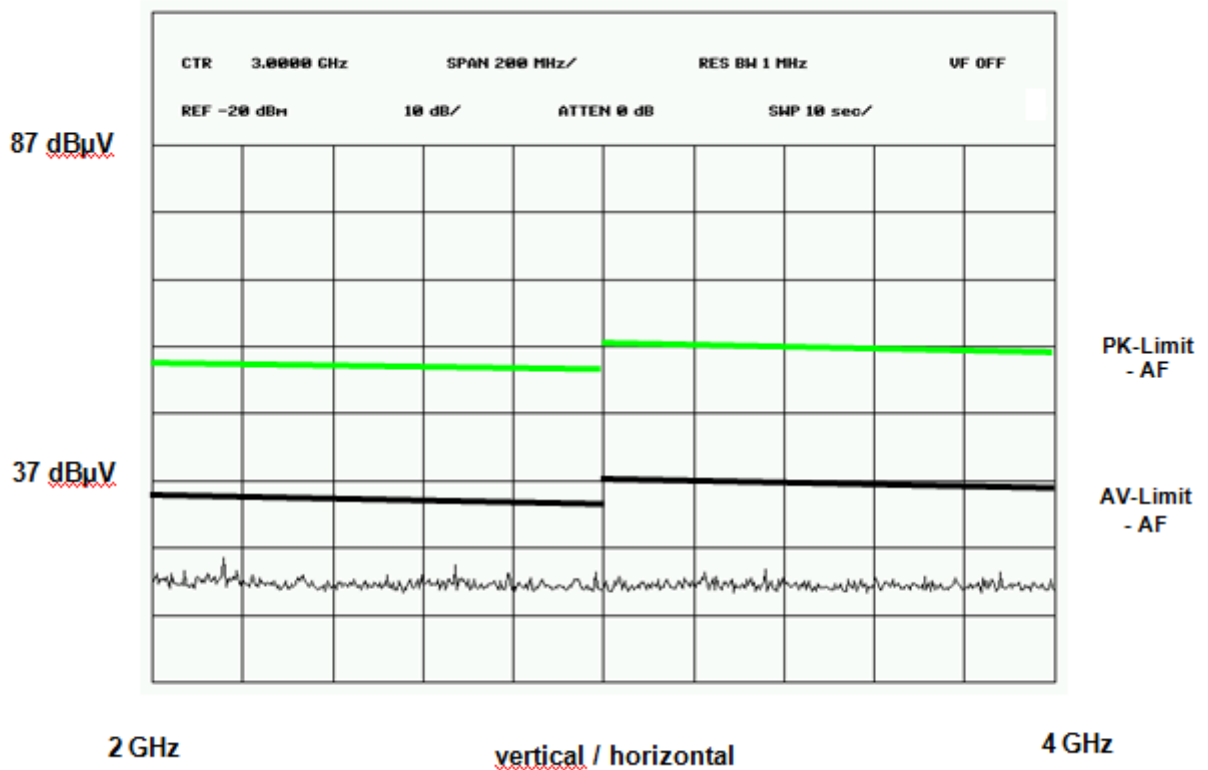


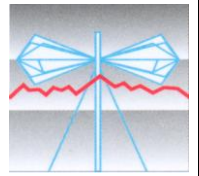
TEST OBJECT: RAKSA iDet

E-Field Premeasurement with 3 m antenna distance Absorbercabin

Operator: A.E./R.P. / Date: July 05<sup>th</sup>, 2012

Frequency range: 2000 - 4000 MHz





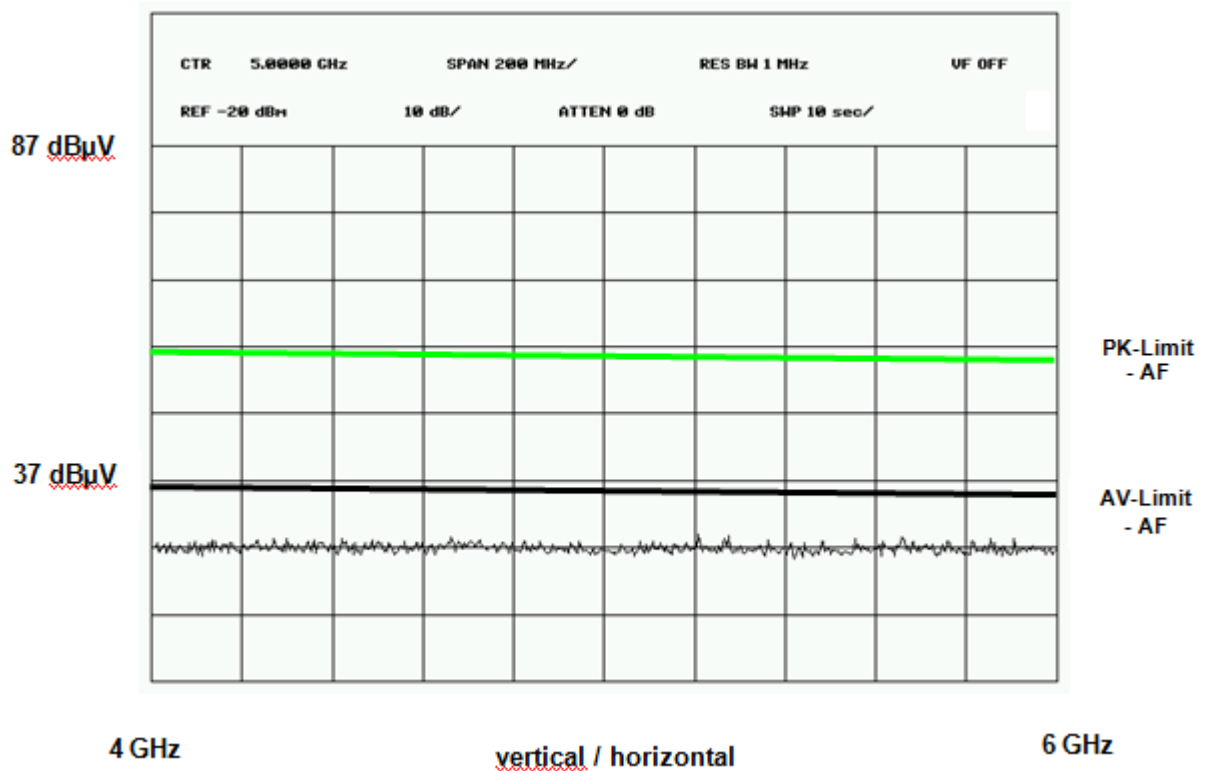
**TEST OBJECT: RAKSA iDet**

**E-Field Premeasurement with 3 m antenna distance**

**Absorbercabin**

Operator: A.E./R.P. / Date: July 05<sup>th</sup>, 2012

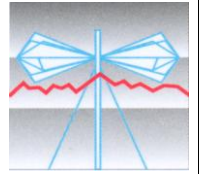
Frequency range: 4000 - 6000 MHz



**Ergebnis:**

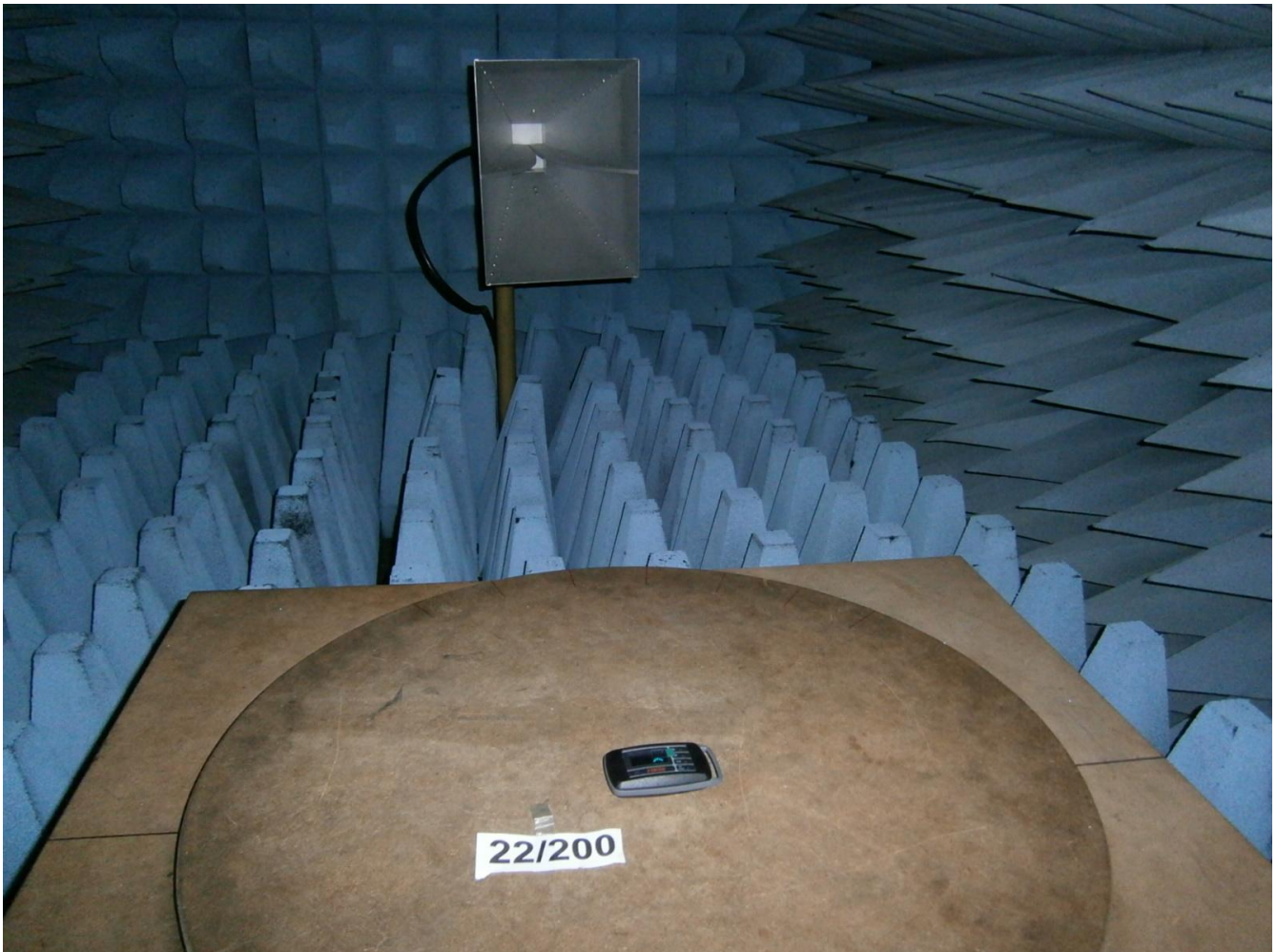
**Emission E-Field acc. EN 301 489-1:**

**PASSED**



**TEST OBJECT:**

**RAKSA iDet**



EUT during Emission E-field measurement > 1 GHz