Deutscher Akkreditierungs Rat
DAT-P-153/98-01

EMCE GmbH

Test report

AIE15_06

EUT:	RFID Reader / Short range device
Trade name:	ARE i2
Tested type:	ARE i2 – 1X / PFB with Antenna AAN X2L
FCC Identifier:	Pending
Production level:	03/2008
S/N:	004 865
Responsible party:	AEG Identifikationssysteme GmbH Hörvelsinger Weg 47 89081 Ulm / Germany
Test remit:	FCC Rules CFR 47 Part 15 – Subpart C Section 15.209
The standards were:	☒ kept* ☐ not kept*
***Remark:**	☒ Validation covered by the accredited scope ☐ Validation not covered by the accredited scope according:_____
Applicant:	AEG Identifikationssysteme GmbH Hörvelsinger Weg 47 89081 Ulm / Germany
EUT-	
Date of arrival:	2008-03-14
Test ID:	PRE11_08
Date(s) of test:	2008-03-31; 2008-04-04

Burgrieden, 2008-04-14

Released by:

Principal engineer - Christian Vogelmann

Test laboratory:	☒ EMCE GmbH Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung Untere Wiesen 1 / 88483 Burgrieden DAR-Registration No.: DAT-P-153/98-01 CAB-Registration No.: BnetzA-CAB-02/21-01/1 FCC-Registration No.: 90568 ☐ Hochschule Ulm Eberhard-Finckh-Str. 11 / 89075 Ulm The susceptibility test according EN 61000-4-3 carried out in the EMC-testing laboratory of the Hochschule Ulm
Responsible inspector:	Mr. Hauser EMCE GmbH Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung
Contact person:	Mr. Kösler AEG Identifikationssysteme GmbH Hörvelsinger Weg 47 89081 Ulm / Germany
EUT-	
Description:	RFID Reader with detachable antenna and Profibus interface. For connecting the antenna a special plug is provided. The reader is merchandised without a power supply and is arranged for DC-supply.
Voltage supply:	9-30VDC
Frequency list:	Fundamental Frequency 125kHz ±1kHz Crystal frequencies: 16 MHz; 48MHz
Temperature range:	xx
Size:	Approximately 90x58x37 mm (LxWxH)

Supplied / used equipment:

Designation	S/N	FCC-ID	Manufacturer
PC Dimension 4500	xx	xx	Dell
Keyboard MF2 LC	S26381-K252-V120	xx	Siemens Nixdorf Informationssysteme AG
Mouse CA-93-6MD	LU078901396	DZL6QBCM	Logitech
Monitor PK786	FPIJ120055414	IJE772	Proview
Power Supply	F1454A	xx	Hewlett Packard
Antenna AAN X2L	000 049	xx	AEG ID GmbH
Adjustable power supply DPS-4005	005601		Voltcraft

Configuration:

☒ As-delivered condition
☐ Modified*
*_____

Cable designation	Type	Length	Remarks
DC Power lead	Unshielded	150cm	xx
RS 232 lead	Shielded	150cm	xx
Antenna lead	Unshielded	200cm	Rigid lead

Remarks: xx

State of revision:

Source document	New Document	Date / Reviser	Modifications

Test equipment list of EMCE GmbH:

Inv.-No.	Designation	Type	Manufacturer	S/N	Calibration: interval / valid until:
001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008	1 year / 01/2008
002	Probe	ESH2-Z3	Rohde & Schwarz	-	1 year / 08/2007
003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007	1 year / 08/2007
004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003	1 year / 08/2007
005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015	1 year / 07/2007
007	Absorbing clamp	MDS 21	Schwarzbeck	942436	1 year / 08/2007
008	Antenna 9kHz - 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002	3 years / 05/2010
009	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435	1 year / 08/2007
010	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	108	1 year / 08/2007
011	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94	1 year / 08/2007
012	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	166	1 year / 08/2007
013	Antenna 9kHz - 30 MHz	Loop antenna 1.5m ∅	EMCE GmbH	-	1 year / 08/2007
014	OATS	3m	EMCE GmbH	-	3 years / 09/2007
015	OATS	10m	EMCE GmbH	-	1 year / 08/2007
020	Coupling clamp	IP4A	Haefely	082672-13	1 year / 08/2007
022	ESD-Gun	NSG 435	Schaffner	577	1 year / 08/2007
024	HF-Generator	SMY01	Rohde & Schwarz	844146/046	1 year / 08/2007

Inv.-No.	Designation	Type	Manufacturer	S/N	Calibration: interval / valid until:
025	Current clamp BCI	F-120-2	FCC	47	1 year / 08/2007
026	Coupling device network	CDN 801-M3-25	FCC	92	1 year / 08/2007
030	Coupling device network	CDN-S9	EMCE GmbH	-	1 year / 08/2007
031	Coupling device network	CDN-S9	EMCE GmbH	-	1 year / 08/2007
032	HF Amplifier	75A250	Amplifier Research	22789	1 year / 08/2007
033	Coupling device network	CDN-AF2	EMCE GmbH		1 year / 08/2007
034	Coupling device network	CDN-AF2	EMCE GmbH		1 year / 08/2007
035	3-φ- Coupling network	CDN-1000	EMC-Partner AG	CDN-1000-45	1 year / 08/2007
036	Coupling device network	CDN-M5-25	EMCE GmbH		1 year / 08/2007
037	Coupling device network	CDN-S1	EMCE GmbH		1 year / 08/2007
038	Helmholtz coil	Rectangular 1x1m	EMCE GmbH		1 year / 08/2007
039	Helmholtz coil	Rectangular 1x1m	EMCE GmbH		1 year / 08/2007
040	Current transformer		EMCE GmbH		1 year / 08/2007
041	HZ-10	Shielded coil	Rohde & Schwarz	849788/020	3 years / 05/2010
042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/ 0 0501	2 years / 09/2007
xx	Test equipment according DIN EN 61000-4-3	Full anechoic chamber 3m Test site	Siemens	xx	1 year / 06/2008
043	Receiver	3DH/E Field meter ESM-100	Maschek	971521	3 years / 12/2007
044	CDN	CN-U	EMC-Partner AG	86	3 years / 09/2008

Inv.-No.	Designation	Type	Manufacturer	S/N	Calibration: interval / valid until:
045	CDN	DN-HF	EMC-Partner AG	86	3 years / 09/2008
046	CDN	DN-LF2	EMC-Partner AG	86	3 years / 09/2008
047	CDN	DN-LF1	EMC-Partner AG	86	3 years / 09/2008
048	ESD-/Burst-/Surge-Generator	Transient 2000	EMC-Partner AG	561	1 year / 08/2007
050	Data Acquisition/Switch Unit	Agilent 34970A	Agilent Technologies Inc.	MY41019453	3 years / 11/2009
051	20 Channel Multiplexer	Agilent 34901A	Agilent Technologies Inc.	MY41013531	3 years / 11/2009
052	Function / Arbitrary Waveform Generator	Agilent 33220A	Agilent Technologies Inc.	MY43002650	3 years / 11/2009
054	Helmholtz coil	Rectangular 1.25x1.25m	EMCE GmbH		1 year / 08/2007
055	Helmholtz coil	Rectangular 1.25x1.25m	EMCE GmbH		1 year / 08/2007
057	Field probe	HI-6005	Holaday	34274	1 year / 04/2008
058	Receiver	ESIB 40	Rohde & Schwarz	100200	3 years / 08/2007
060	HF Coupling clamp	KEMA 801	Schaffner	20808	3 years / 11/2007

Scope:

1 EMC-Test(s)

1.1 EMI Report FCC Rules 47 CFR Part 15 – Subpart C – Technical standards

1.1.1 Terminal voltage according 47 CFR Part 15 – Subpart C

☒ Full compliance
☐ Precompliance
☐ Test not requested
☐ Test not carried out*

*____

Test location

☒	Inv.-No.	Designation	Type (LxWxH)	Manufacturer	Location
☒	504	Shielded room #1	6.4 x 4.0 x 2.3m	Frankonia EMV-Messsysteme GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	588	Shielded room #2	8.3/5.8 x 5.5/2.9 x 3.4m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	584	Shielded room #3	3.6 x 3.6 x 2.5m	Siemens AG	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	061	Semi anechoic chamber #1	4.0 x 4.0 x 3.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	062	Semi anechoic chamber #2	13.5 x 6.1 x 5.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
		Alternative test site			

1.1.1.1 Test set up

According 47 CFR Part 15 – Subpart C

Used test equipment

☒	Inv.-No.	Designation	Type	Manufacturer	S/N
☒	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	002	Probe	ESH2-Z3	Rohde & Schwarz	-
☒	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
☒	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
☒	042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/ 0 0501
	058	Test receiver	ESIB 40	Rohde & Schwarz	100200
	060	HF coupling clamp	KEMA 801	Schaffner	20808

All used test equipment are checked resp. calibrated periodically.

☒ Test equipment was checked and complied to the requirements

Test / Measurement uncertainty

The measurement uncertainty in the test met the guideline of CISPR16-4-2 or better.

Measurement uncertainty of the terminal voltage with an extended coverage factor of k=2:

Frequency	Measurement uncertainty
9kHz – 150kHz	4.0dB
150kHz – 30MHz	3.6dB

1.1.1.2 Test

Regulation

FCC Rules 47 CFR Part 15 – Subpart C

☐ 9kHz - 30MHz ☒ 150kHz - 30MHz

Limits: ☐ Class B ☐ Class A
☒ Section 15.207

Operation mode

EUT arrangement: ☒ Tabletop ☐ Floor standing
Power supply: ☐ 230V/50Hz ☒ 115V/60Hz

Port #	Leads	Remarks
#1	AC power line – ARE i2	L1/N
#2	AC power line – PC + Monitor	L1/N/PE
#3		

Continuous operation of the system. The ARE i2 was supplied with the HP F1454A power supply. The tag was placed in half reading range of the antenna. A continuous reading of the tag was exercised with a terminal program running on the PC-System.

Environmental conditions

Temperature:	15 - 35 °C
Humidity:	30 - 60 %
Air pressure:	860 - 1060 hPa

Environmental conditions during the test:
☒ kept
☐ not kept

Test - / Measurement procedure

Measurements are made with a receiver according CISPR guidelines. The required frequency range is scanned in an automatically operation. If the emanation is closer than 6dB to the limits or more, the receiver will stop and measure the exact value with quasipeak or average detector. The frequency, the maximum reading and the limit will be printed out.

Test result

Limits for continuous disturbances:
☒ kept
☐ not kept

Evidence of conformity,
evaluated statistically with __ devices:
☐ kept
☐ not kept
☒ not carried out

Remarks: xx

Protocol scope

☒ Readings - continuous emanation
☒ Diagram - continuous emanation

EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 09:50

Conducted emission - Terminal voltage

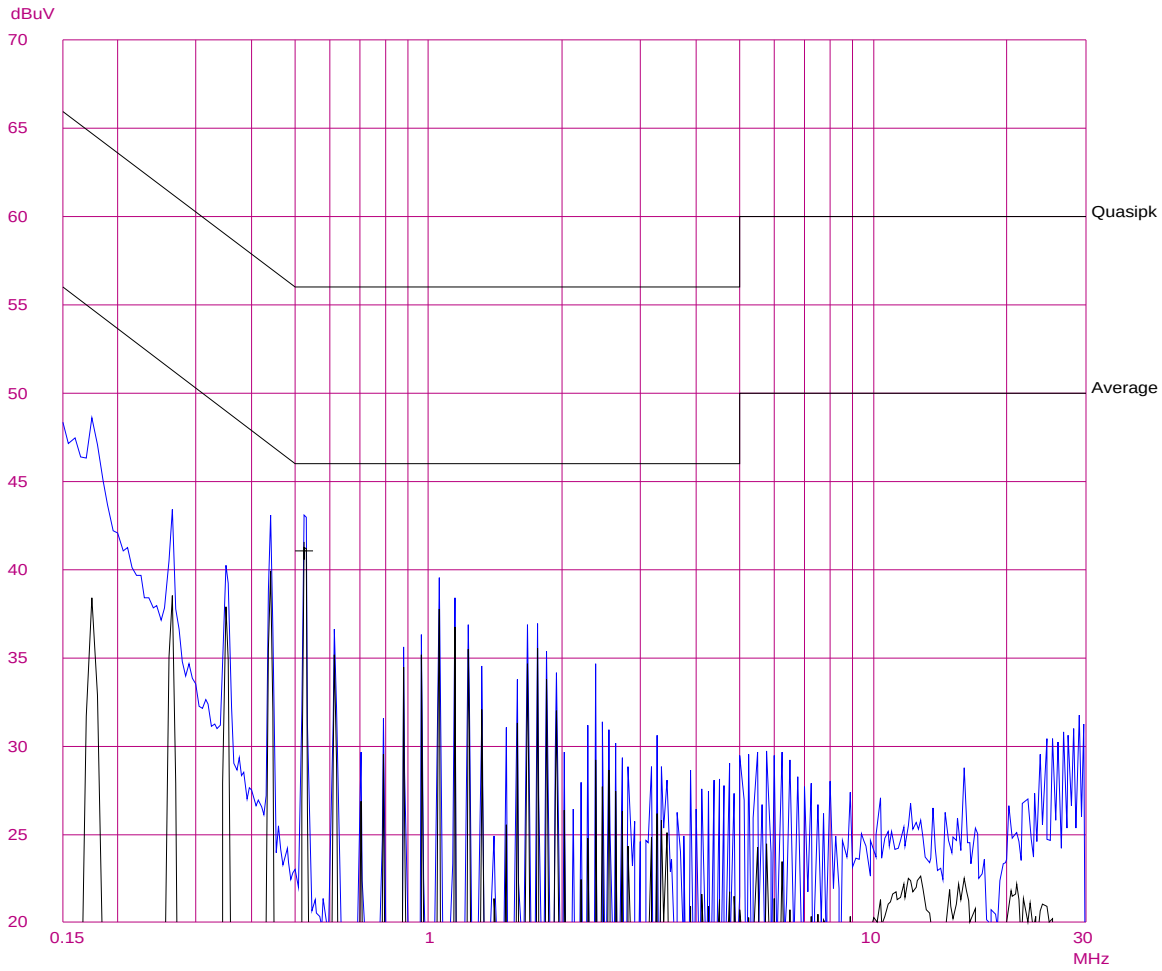
EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_75, Port L1 - ARE i2

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 09:50

Conducted emission - Terminal voltage

EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_75, Port L1 - ARE i2

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV

no Results

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.52500	41.0	46.0

* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 10:05

Conducted emission - Terminal voltage

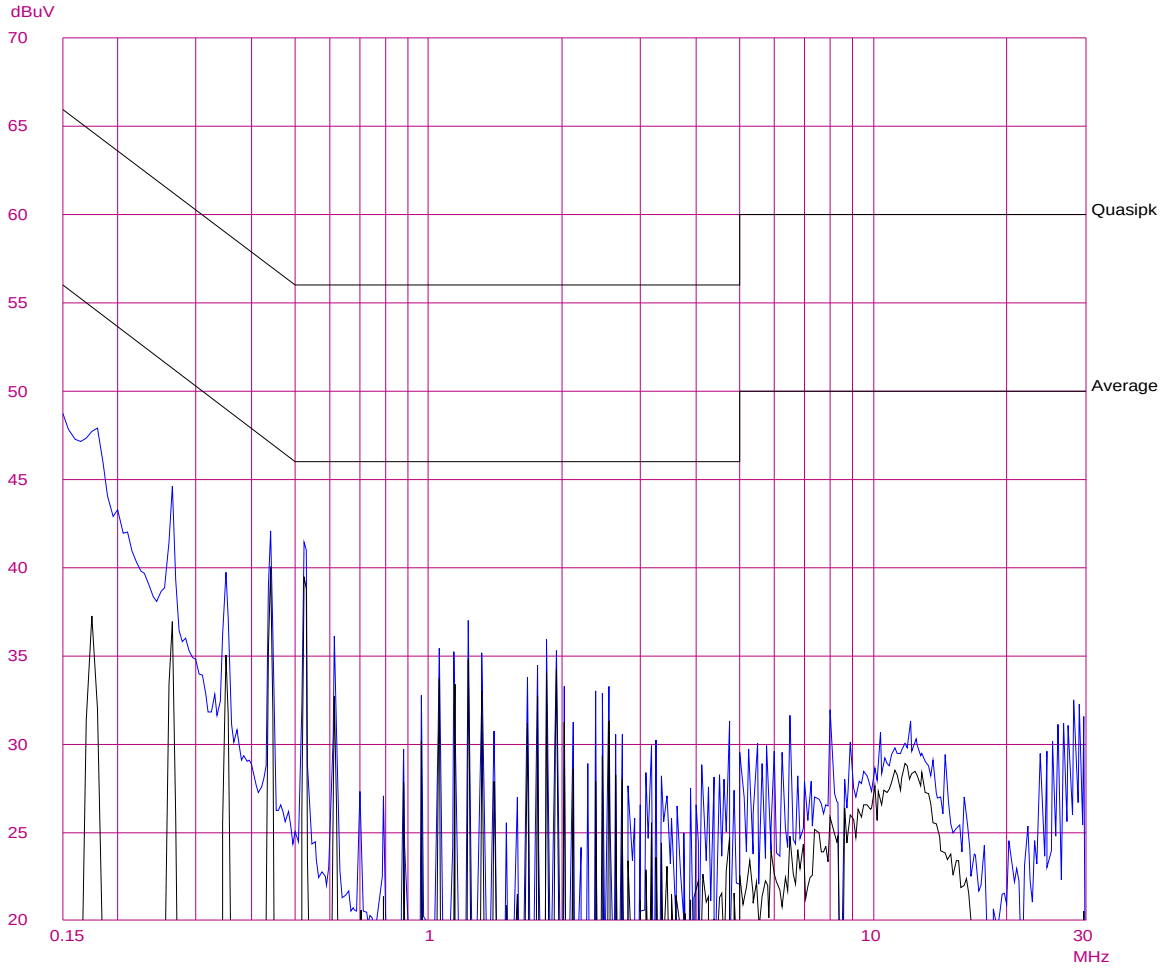
EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_76, Port N - ARE i2

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 10:05

Conducted emission - Terminal voltage

EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_76, Port N - ARE i2

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement Results:

no Results

EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 10:15

Conducted emission - Terminal voltage

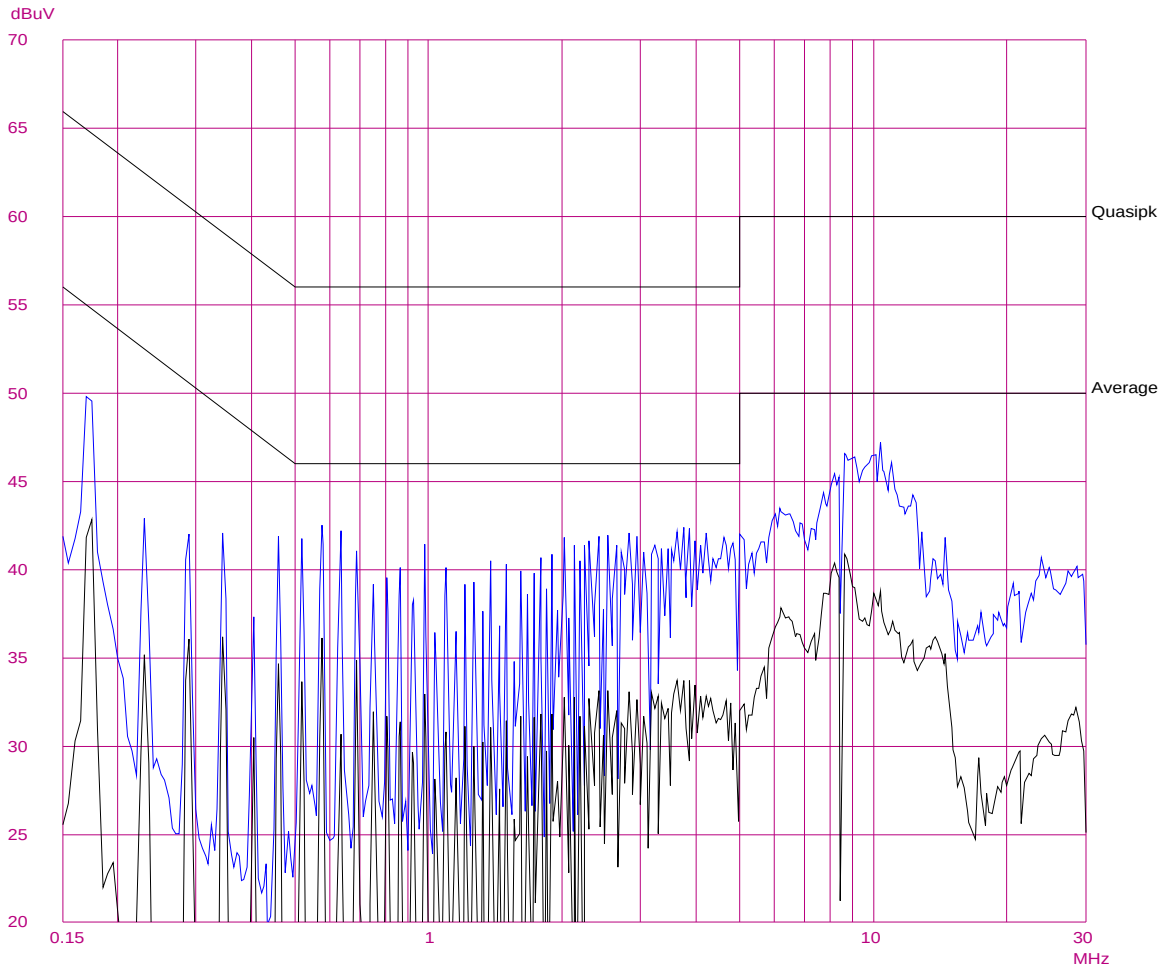
EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_77, Port L1 - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 10:15

Conducted emission - Terminal voltage

EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_77, Port L1 - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO LN OFF 60dB

Final Measurement Results:

no Results

EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 10:25

Conducted emission - Terminal voltage

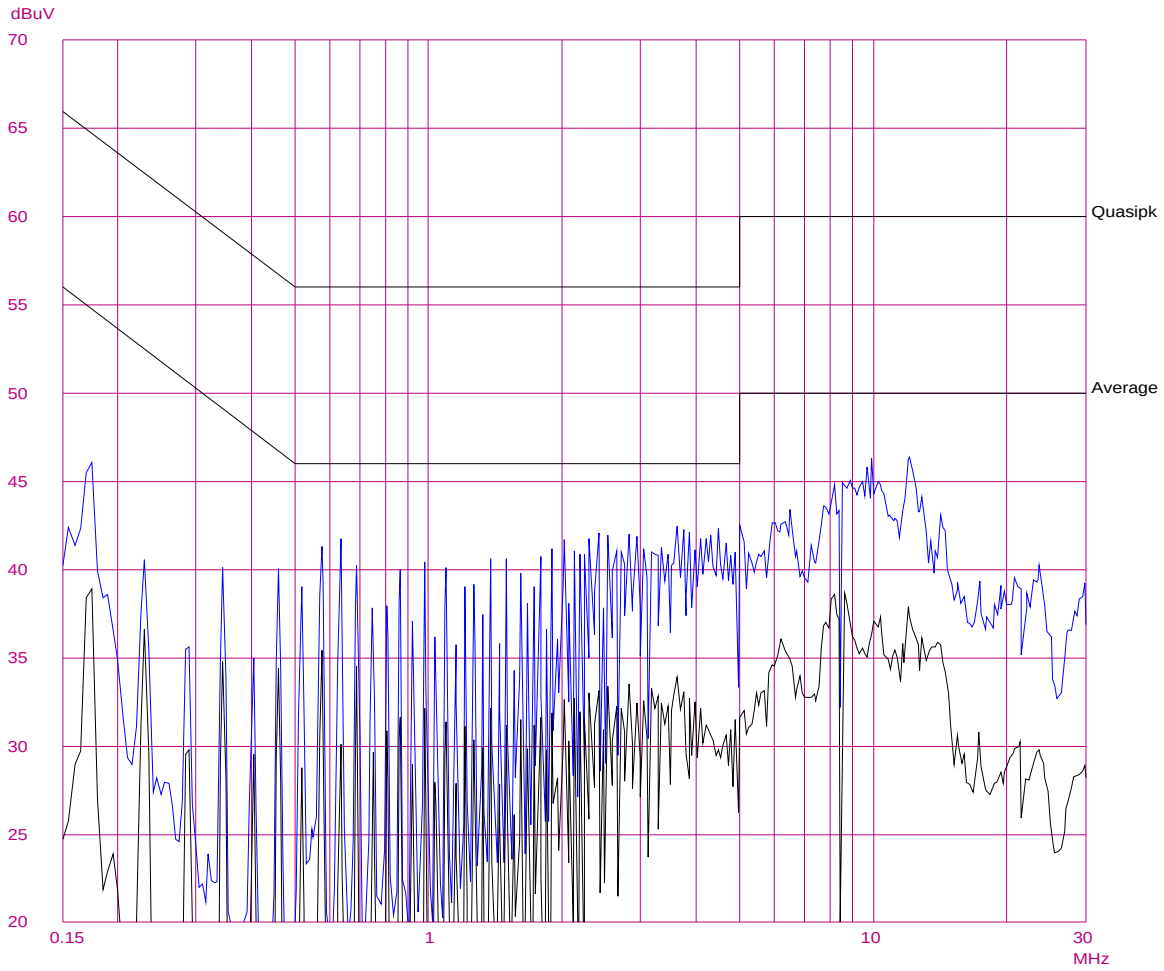
EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_78, Port N - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1Hz	1000M	Kabel_6m



EMCE GmbH Ing_buero fuer EMV_Pruefungen

01. Apr 08 10:25

Conducted emission - Terminal voltage

EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	115V/60Hz, half reading range
Operator:	Mr. Hauser
Test Spec:	47 CFR Part 15 Subpart C
Comment:	Test_ID EUT PRE11_08
	AIE14_78, Port N - PC+Monitor

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time Atten Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms AUTO LN OFF	60dB

Final Measurement Results:

no Results

1.1.2 Radio disturbances according 47 CFR Part 15 – Subpart C

☒ Full compliance
☐ Precompliance
☐ Test not requested
☐ Test not carried out*

*

Test location

☒	Inv.-No.	Designation	Type (LxBxH)	Manufacturer	Location
	504	Shielded room #1	6.4 x 4.0 x 2.3m	Frankonia EMV-Messsysteme GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	588	Shielded room #2	8.3/5.8 x 5.5/2.9 x 3.4m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	584	Shielded room #3	3.6 x 3.6 x 2.5m	Siemens AG	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	061	Semi anechoic chamber #1	4.0 x 4.0 x 3.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	062	Semi anechoic chamber #2	13.5 x 6.1 x 5.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	807	Semi anechoic chamber #3	7.6 x 4.6 x 3.6m	Siemens AG	Hochschule Ulm Eberhard-Finck-Str. 11 89075 Ulm
☒	014	OATS	3m – Test distance	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
☒	015	OATS	10m – Test distance	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	066	OATS	30m – Test distance	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
		Alternative test site			

1.1.2.1 Test set up

According 47 CFR Part 15 – Subpart C


EMCE

Used test equipment

☒	Inv.-No.	Designation	Type	Manfacturer	S/N
☒	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
☒	008	Antenna 9kHz - 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002
	009	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435
	010	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	108
	011	Antenna 30 - 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94
	012	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	166
	013	Antenna 9kHz - 30 MHz	Loop antenna 1.5m ∅	EMCE GmbH	-
	041	HZ-10	Shielded coil	Rohde & Schwarz	849788/020
☒	042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/ 0 0501
	058	Test receiver	ESIB 40	Rohde & Schwarz	100200
	059	Logper. Antenna	HL050	Rohde & Schwarz	100006
	060	HF coupling clamp	KEMA 801	Schaffner	20808
	063	Logper. Antenna	HL023 A2	Rohde & Schwarz	

All used test equipment are checked resp. calibrated periodically.

☒ Test equipment was checked and complied to the requirements

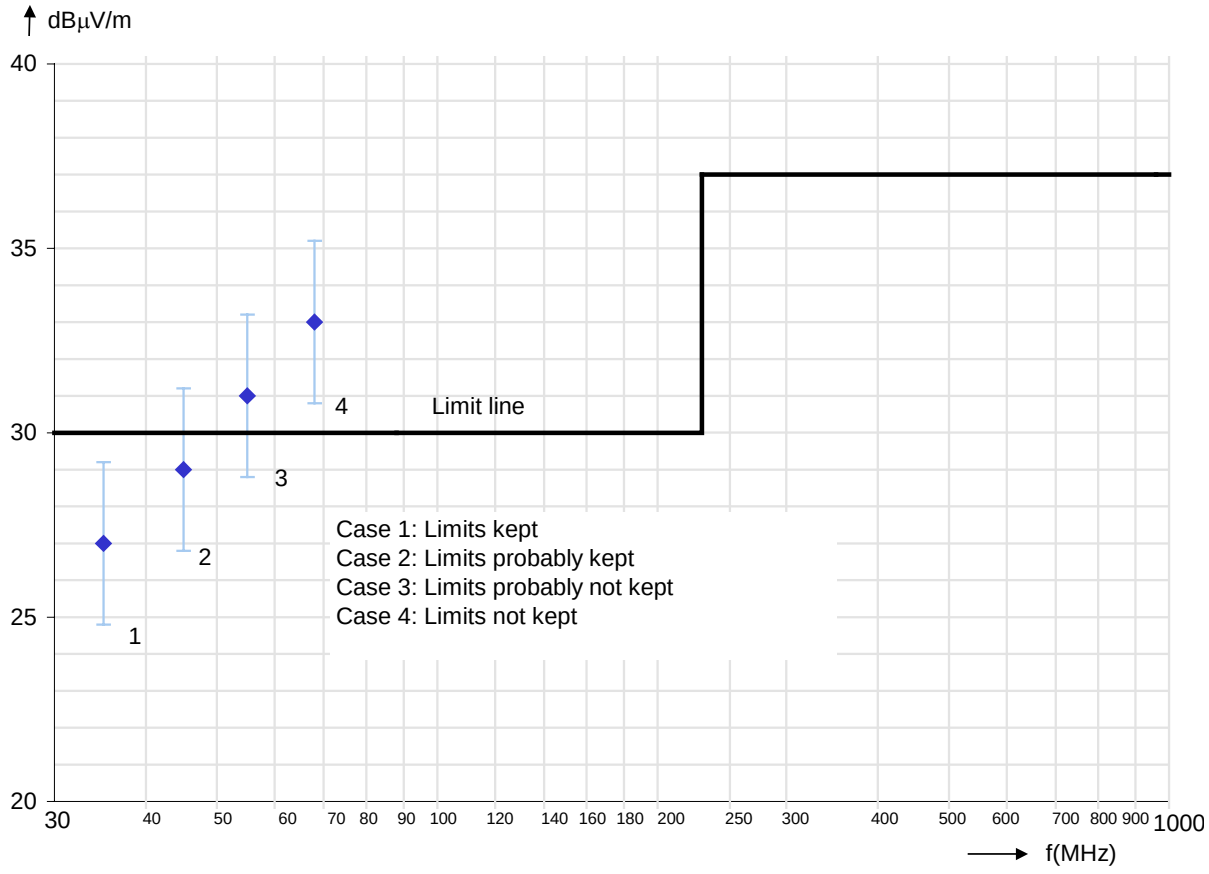
Test / Measurement uncertainty

The measurement uncertainty in the test met the guideline of CISPR16-4-2 or better.

Measurement uncertainty of the radiated emission with an extended coverage factor of k=2

Frequency	Measurement uncertainty
9kHz – 30MHz	on request
30MHz – 300MHz	4.4dB
300MHz – 1GHz	3.4dB
1GHz – 18GHz	on request

Annotation of the diagram



1.1.2.2 Test – intentional radiator

Regulation

47 CFR Part 15 – Subpart C

	☒ 9kHz - 30MHz	☐ 150kHz – 1GHz
	☐ 30MHz - 1000MHz	☐ 1 – 18GHz
Limits:	☒ Section 15.209	☐ __
Antennena distance:	☐ 3m	☐ 5m
	☒ 10m	☐ 30m

Operation mode

EUT arrangement:	☒ Tabletop	☐ Floor standing
Power supply:	☐ 230V/50Hz	☒ 115V/60Hz

Continuous operation of the system while the DC-supply for the device was set to 9VDC and 30VDC. The ARE i2 was supplied with a adjustable power supply. The tag was placed in half reading range of the antenna. A continuous reading of the tag was exercised with a terminal program running on the PC-System.

Environmental conditions

Temperature:	15 - 35 °C
Humidity:	30 - 60 %
Air pressure:	860 - 1060 hPa

Environmental conditions during the test:
☒ were kept
☐ were not kept

Test - / Measurement procedure

The test was performed at an antenna to EUT distance of 10m. Measurements were made with a CISPR receiver with quasi-peak. The average detector is used in the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. For pulse modulated devices with a pulse repetition frequency of 20Hz or less, peak detector is used (15.35a Note). The frequency, the measured value, antenna information and the limit will be printed out. At frequencies below 30MHz, measurements may be performed at a distance other than what is specified in the regulation. The results were extrapolated to the specified distance by using the square of an inverse linear distance extrapolation factor (40dB/decade). For intentional radiators the supply voltage range is varied between 85% and 115% of the nominal rated voltage.

Test result

Limits for radiated disturbances:
☒ kept
☐ not kept

The level of any unwanted emissions from an intentional radiator shall not exceed the level of the fundamental wave:
☒ kept
☐ not kept

Remarks: There were no impact from the DC power supply of the device to the radiated level.

Protocol scope

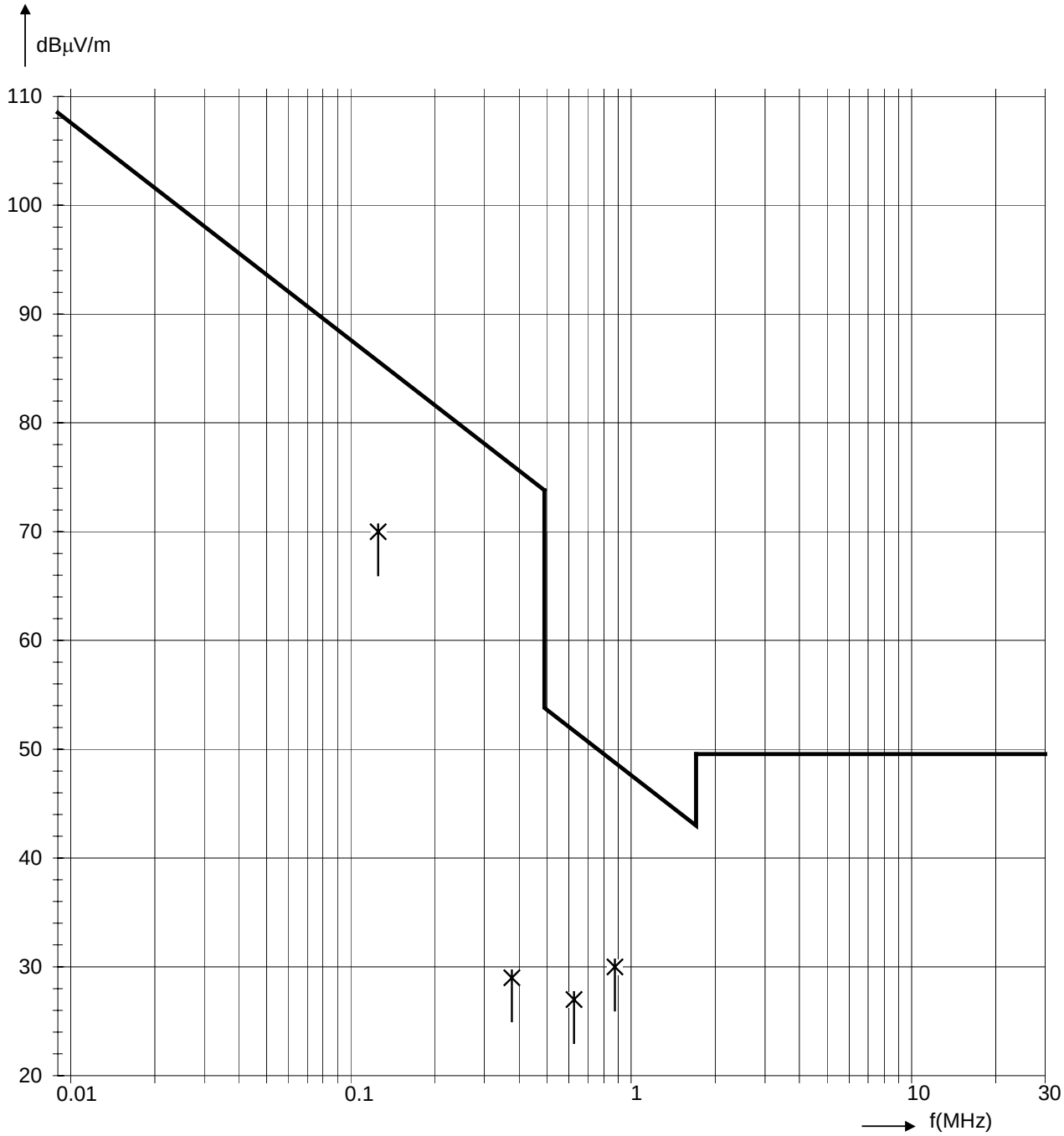
☐ Readings - Antenna horizontal polarized.
☐ Diagram - Antenna horizontal polarized.
☒ Readings - Antenna vertical polarized.
☒ Diagram - Antenna vertical polarized.
☒ Bandwidth plot – Frequency response vs. supply voltage 9VDC/30VDC
☐ Precompliance measurement(s).

Readings - Antenna vertical polarized, Antenna loop center height 1m

Frequency	Reading	Limit	Margin	Ant.-	Ant.-	Detector	Receiver
	U			Distance	Polar.	Peak /	6dB BW
MHz	dBµV	dBµV/m	dBµV	m	H/V	QP / AV	kHz
0.12505	70.0	85.7	15.7	10.0	V	Peak	0.2
0.37515	29.0	76.1	47.1	10.0	V	Peak	10
0.62525	27.0	51.7	24.7	10.0	V	Peak	10
0.87535	30.0	48.8	18.8	10.0	V	Peak	10

Diagram - Antenna vertical polarized

Limits according FCC Rules CFR 47 Part 15 – Subpart C
☒ Section 15.209 and 15.31 f(2)



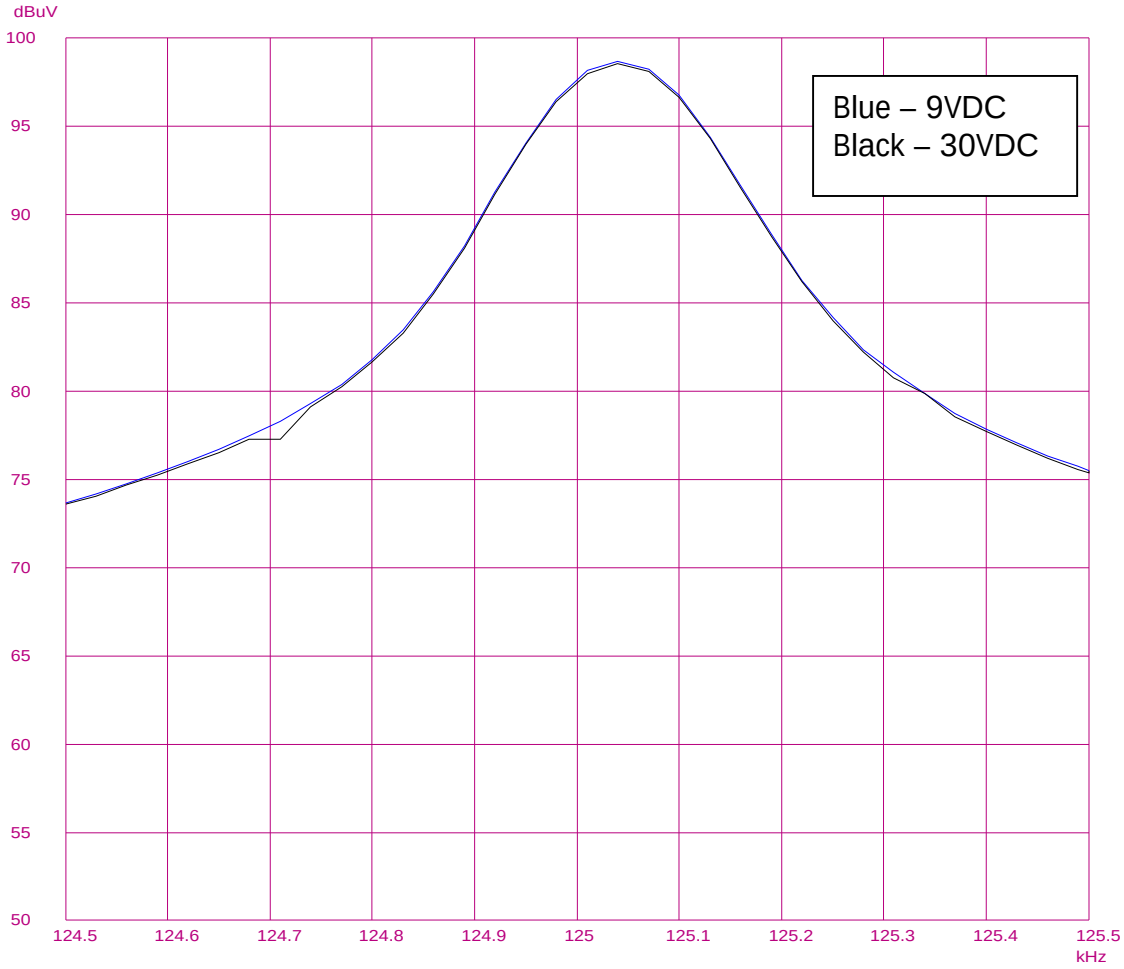
EMCE GmbH Ing_buero fuer EMV_Pruefungen 31. Mar 08 14:20

Frequency response

EUT:	A1PFB / AANX2L
Manuf:	AEG ID GmbH
Op Cond:	Half reading distance
Operator:	Mr. Hauser
Test Spec:	Frequency response vs. supply voltage
Comment:	Test_ID EUT PRE11_08
	AIE14_47, 9VDC/30VDC supply voltage

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
124.5k	125.5k	30Hz	200Hz	PK	100ms	AUTO	LN ON	60dB



1.1.2.3 Test – unintentional radiation

Regulation

47 CFR Part 15 – Subpart C

	☐ 9kHz - 30MHz	☐ 150kHz – 1GHz
	☒ 30MHz - 1000MHz	☐ 1 – 18GHz
Limits:	☒ Section 15.209	☐ __
Antennena distance:	☒ 3m	☐ 5m
	☐ 10m	☐ 30m

Operation mode

EUT arrangement:	☒ Tabletop	☐ Floor standing
Power supply:	☐ 230V/50Hz	☒ 115V/60Hz

Continuous operation of the system. The ARE i2 was supplied with the HP F1454A power supply. The tag was placed in half reading range of the antenna. A continuous reading of the tag was exercised with a terminal program running on the PC-System.

Environmental conditions

Temperature:	15 - 35 °C
Humidity:	30 - 60 %
Air pressure:	860 - 1060 hPa

Environmental conditions during the test:
☒ were kept
☐ were not kept

Test - / Measurement procedure

The test was performed at an antenna to EUT distance of 10m. Measurements were made with a CISPR receiver with quasi-peak. The average detector is used in the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. For pulse modulated devices with a pulse repetition frequency of 20Hz or less, peak detector is used (15.35a Note). The frequency, the measured value, antenna information and the limit will be printed out.

Test result

Limits for radiated disturbances:
☒ kept
☐ not kept

Remarks: Radio disturbances below the limit line with a margin >10dB to the limit are generally not listed.

Protocol scope

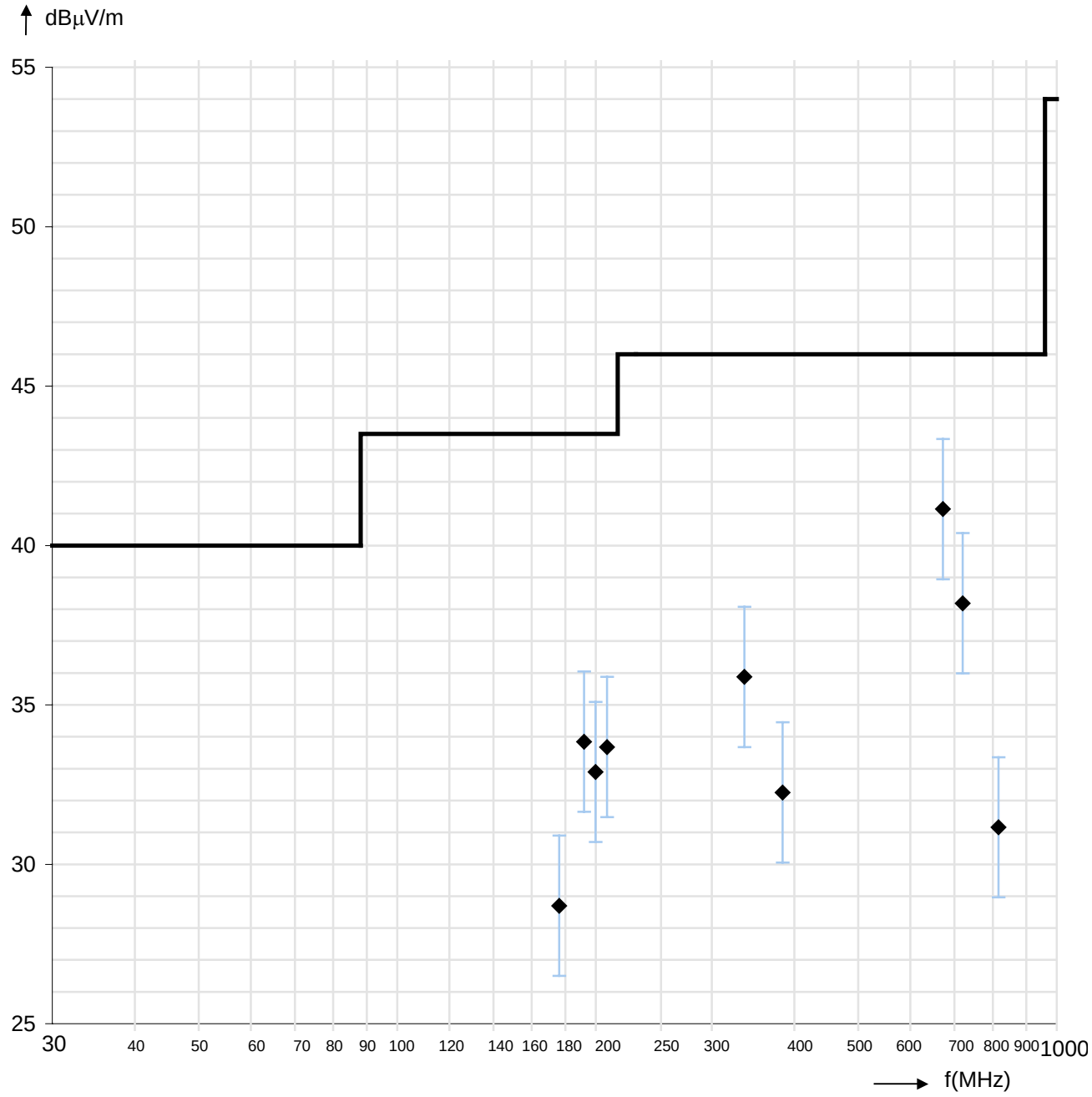
☒ Readings - Antenna horizontal polarised
☒ Diagram radio disturbances - Antenna horizontal polarised
☒ Readings - Antenna vertical polarised
☒ Diagram radio disturbances - Antenna vertical polarised
☐ Precompliance measurement(s) in the shielded room

Readings - Antenna horizontal polarised

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna-Height	Antenna-Polarisation
MHz	dBµV	dB/m	dB	dBµV/m	dBµV/m	dB	m	hor./ver.
192.030	16.3	14.6	2.9	33.8	43.5	9.7	1.8	H
208.090	15.2	15.4	3.1	33.7	43.5	9.8	1.6	H
672.000	16.0	19.8	5.3	41.1	46.0	4.9	1.6	H
720.000	12.4	20.3	5.5	38.2	46.0	7.8	1.6	H

Diagram radio disturbances – Antenna horizontal polarised

Limits: ☒ Section 15.209

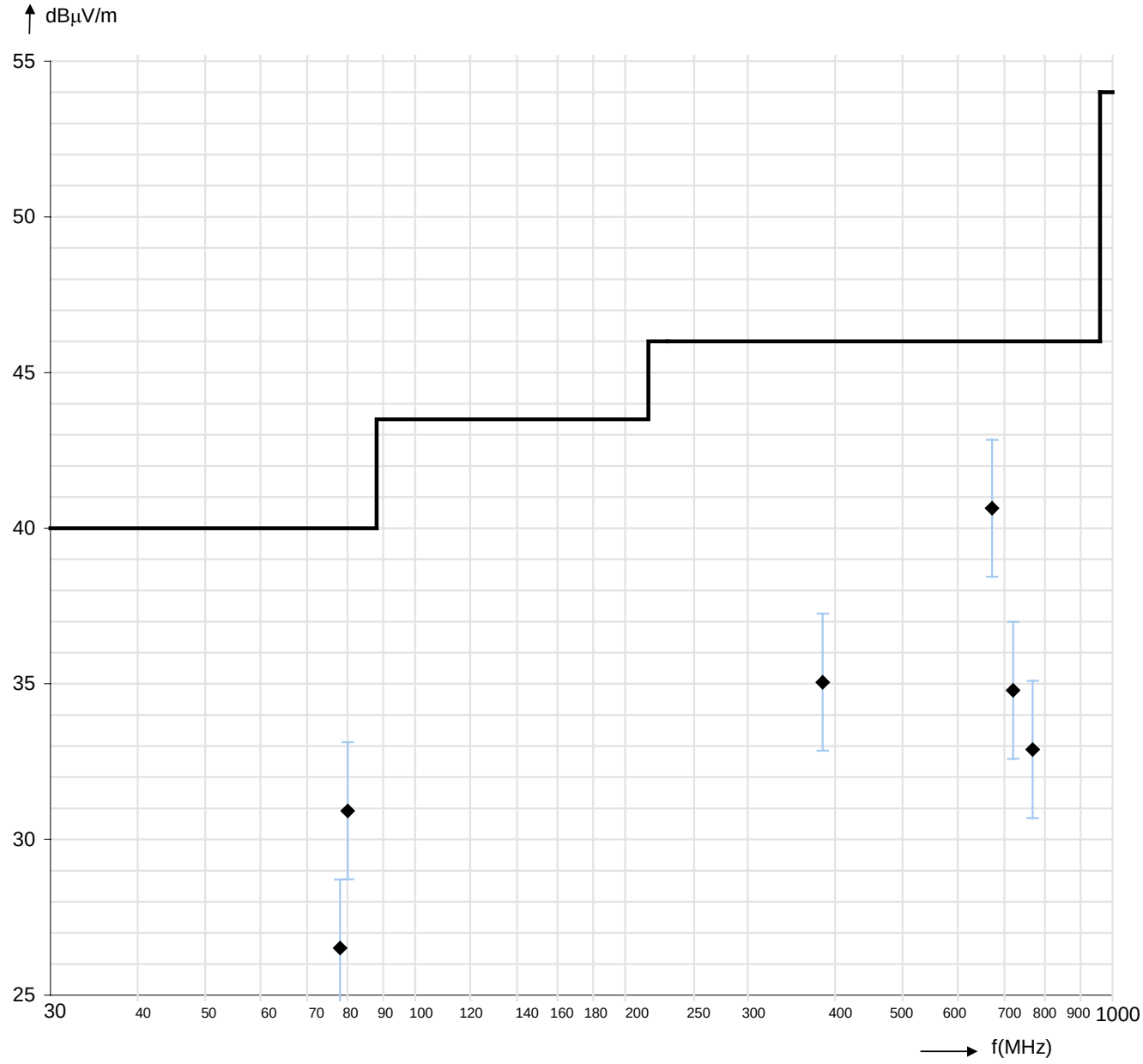


Readings - Antenna vertical polarised

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna-Height	Antenna-Polarisation
MHz	dBµV	dB/m	dB	dBµV/m	dBµV/m	dB	m	hor./ver.
80.020	20.2	8.9	1.8	30.9	40.0	9.1	1.0	V
672.000	15.5	19.8	5.3	40.6	46.0	5.4	1.5	V

Diagram radio disturbances – Antenna horizontal polarised

Limits: ☒ Section 15.209



2 Summary

Regulation	Class / Test level	Result	Remark(s)
FCC Rules CFR 47 Part 15 Subpart C			
Terminal voltage 0.15-30MHz	Section 15.207	Limits kept	
Radiated emissions 0.009-30MHz	Section 15.209	Limits kept	Intentional / unwanted emissions
Radiated emissions 30-1000MHz	Section 15.209	Limits kept	Unintentional emissions

Burgrieden, 2008-04-16

Report generated by:

Responsible Tester – Peter Hauser