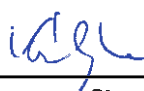
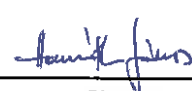


Test Report No.:	28220293 001			Page 1 of 33
Client:	AC TRUP Kft. H-6000 Kecskemét, Budai Hegy 121/B., Hungary			
Manufacturer:	AC TRUP Kft. H-6000 Kecskemét, Budai Hegy 121/B., Hungary			
Test item:	Heat pump			
Identification:	BES 5 VV, BES 12 VV, BES 18 VV, BES 25 VV, BES 35 VV (see page 2.)	Serial No.:	16.10.12	
Receipt No.:	93339889	Date of receipt:	---	
Testing location:	AC TRUP Kft. H-6000 Kecskemét, Budai Hegy 121/B., Hungary			
Test specification:	EN 61000-6-3:2007+A1:2011 EN 61000-3-2:2006+A1:2009+A2:2009 EN 61000-3-3:2008 EN 61000-6-1:2007 EN 61000-4-2:2009 EN 61000-4-3:2006 + A1:2008 + A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2006 EN 61000-4-6:2009 EN 61000-4-11:2004			
Test result:	The test item passed the test specification(s).			
Testing laboratory	TÜV Rheinland InterCert Kft. H-1132 Budapest, Váci út 48/A-B., Hungary			
Tested by:	Reviewed by:			
2013-12-09	Imre Király		2013-12-09	János Horváth
Date	Name	Signature	Date	Name
				
				Signature
Other Aspects:	Rated data: 3N, 400 V, 50 Hz, 7.8 kW, heating capacity: 36 kW			
Abbreviations:	P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested			
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.				

Note(s):

The equipment under test uses the heat of the earth in order to make heating. The product family includes five types such as BES 5 VV, BES 12 VV, BES 18 VV, BES 25 VV and BES 35 VV. The types are differing in heating power. The electronic parts are the same, the only difference is the power of the heat pump. The tests were carried out on the highest power type, BES 35VV.

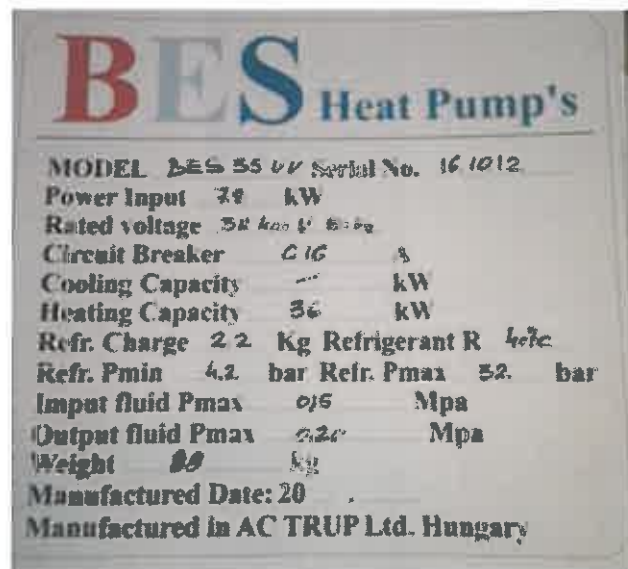
Test was not carried out according to standard **EN 61000-4-8:2010**, as the EUT does not contain any devices susceptible to magnetic fields.

The **EN 61000-3-3:2008** test was not carried out on the EUT as the standard tells that test shall not be made on equipment, which is unlikely to produce significant voltage fluctuations or flicker.

There is a warning in the manual of the EUT that the impedance of the power line should be less than 0,1 Ohm. Therefore the voltage fluctuations are considered to be under the limit.

Place of manufacture:

AC TRUP Kft. H-6000 Kecskemét, Budai Hegy 121/B., Hungary

Photo(s):

Contents:

Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments.....	3
Harmonic current.....	10
Immunity against electrostatic discharges.....	14
Radiated, radio-frequency, electromagnetic field immunity test.....	18
Electrical fast transient/burst immunity test.....	21
Immunity against surges.....	24
Immunity to conducted disturbances, induced by radio-frequency fields.....	28
Immunity against voltage dips, short interruptions and voltage variations.....	31

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments
Date of measurement:	2013-10-16
Ambient conditions:	
Ambient temperature:	18 °C
Relative humidity:	60 %
Air pressure	1006 hPa
Test setup:	
Laboratory test <input type="checkbox"/>	Post-installation test <input checked="" type="checkbox"/>
Classification of equipment:	---
Measuring method:	Tested:
Disturbance voltage Frequency range 150 kHz - 30 MHz (see measurement results on page 4-7)	<input checked="" type="checkbox"/>
Radiated disturbance Frequency range 30 MHz - 1000 MHz (could not be measured, see on page 8)	<input checked="" type="checkbox"/>
Calculated measurement uncertainty for Disturbance voltage: ± 2.34 dB k= 1.744 Radiated disturbances (30 MHz – 200 MHz): ± 4.73 dB k= 2 Radiated disturbance (200 MHz – 1000 MHz): ± 4.86 dB k= 2	
Evaluation based on the test results:	
Passed <input checked="" type="checkbox"/>	Failed <input type="checkbox"/>
Note(s): <i>The measurement was performed on the place of applicant.</i>	

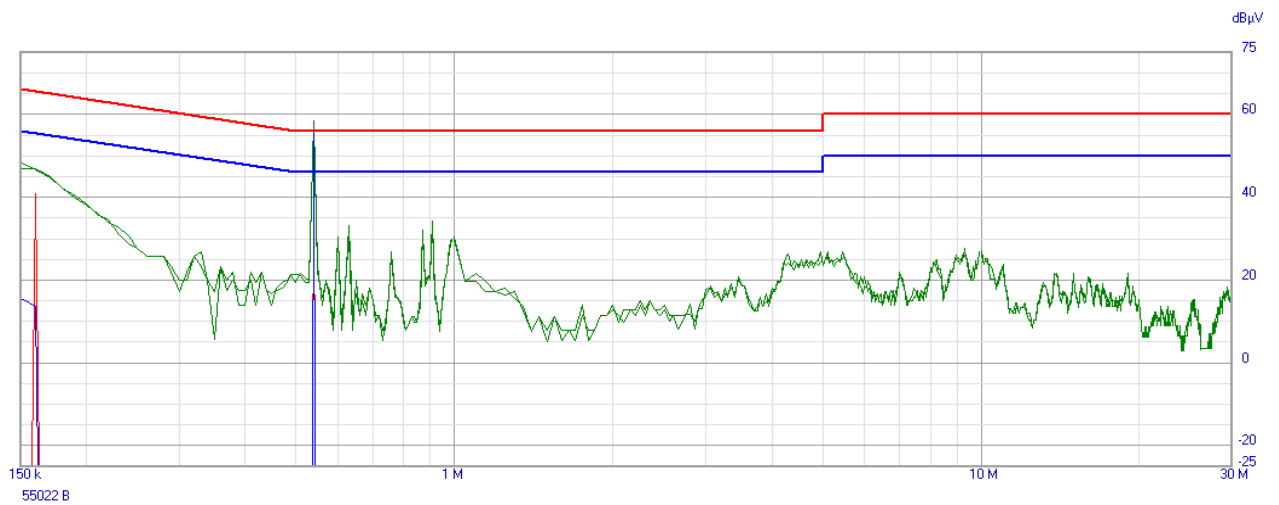
Measurement ref. No.: 28220293 001	Standard applied: EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments
---------------------------------------	--

Measurement of disturbance voltage in the frequency range between 150 kHz and 30 MHz:

Description of operating conditions applied for testing of the product (settings, load, program, etc.): *The test sample was continuously operated*

Test point: *AC power port – Line L1*

Disturbance voltage diagram:



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	1	10 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
2	0.15	1	10 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
3	1	10	50 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
4	1	10	50 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
5	10	30	100 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
6	10	30	100 kHz	S P A 022av-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...

Ancillary = L3 PMM

Limits:

022qp-b

022av-b

Factors:

ESH322

Peak

QPeak

Avg

As the measurement was not performed in a shielded chamber, there are peaks shown on diagram, which derive not from EUT (which derive from external source). The peak on 540 kHz for example is a broadcasting radostation.

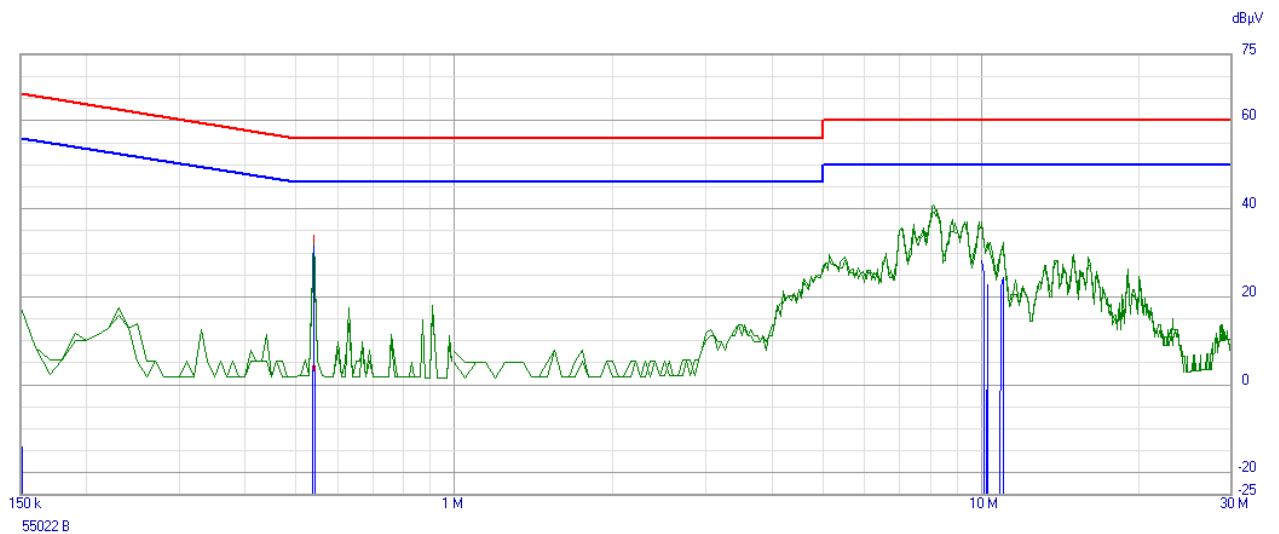
Measurement ref. No.: 28220293 001	Standard applied: EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments
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Measurement of disturbance voltage in the frequency range between 150 kHz and 30 MHz:

Description of operating conditions applied for testing of the product (settings, load, program, etc.): *The test sample was continuously operated*

Test point: *AC power port – Line L2*

Disturbance voltage diagram:



Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary	
1	0.15	1	10 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
2	0.15	1	10 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
3	1	10	50 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
4	1	10	50 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
5	10	30	100 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
6	10	30	100 kHz	S P A 022av-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...

Ancillary = L3 PMM

Limits:
022qp-b
022av-b

Factors:
ESH322

Peak ———
QPeak ———
Avg ———

As the measurement was not performed in a shielded chamber, there are peaks shown on diagram, which derive not from EUT (which derive from external source). The peak on 540 kHz for example is a broadcasting radostation.

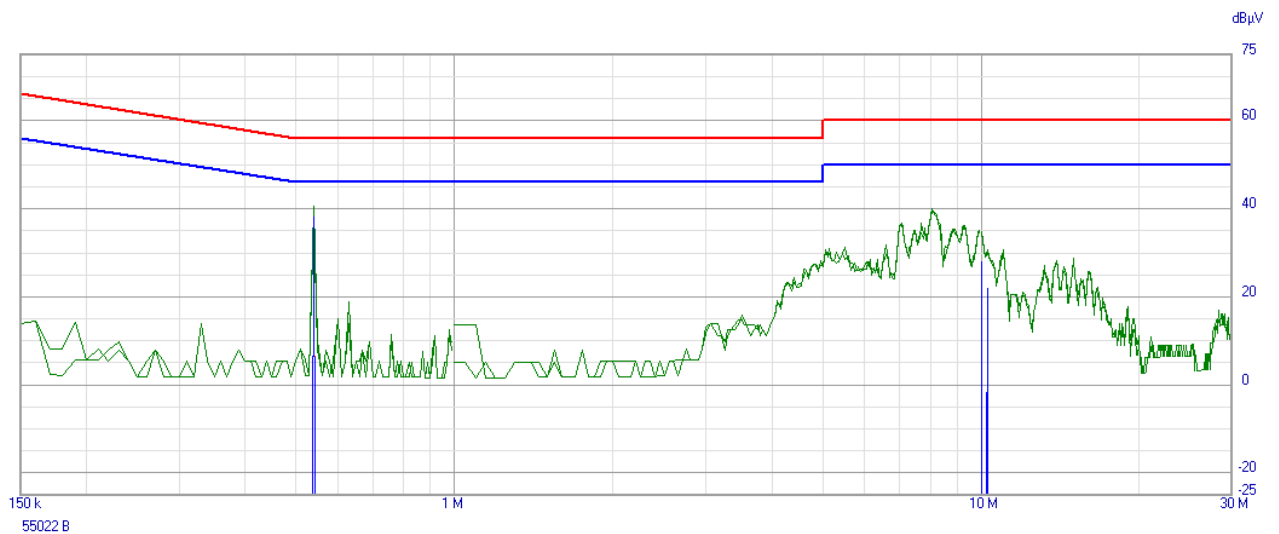
Measurement ref. No.: 28220293 001	Standard applied: EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments
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Measurement of disturbance voltage in the frequency range between 150 kHz and 30 MHz:

Description of operating conditions applied for testing of the product (settings, load, program, etc.): *The test sample was continuously operated*

Test point: *AC power port – Line L3*

Disturbance voltage diagram:



Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary	
1	0.15	1	10 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
2	0.15	1	10 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
3	1	10	50 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
4	1	10	50 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
5	10	30	100 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
6	10	30	100 kHz	S P A 022av-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...

Ancillary = L3 PMM

Limits:
022qp-b
022av-b

Factors:
ESH322

Peak ——— green
QPeak ——— red
Avg ——— blue

As the measurement was not performed in a shielded chamber, there are peaks shown on diagram, which derive not from EUT (which derive from external source). The peak on 540 kHz for example is a broadcasting radostation.

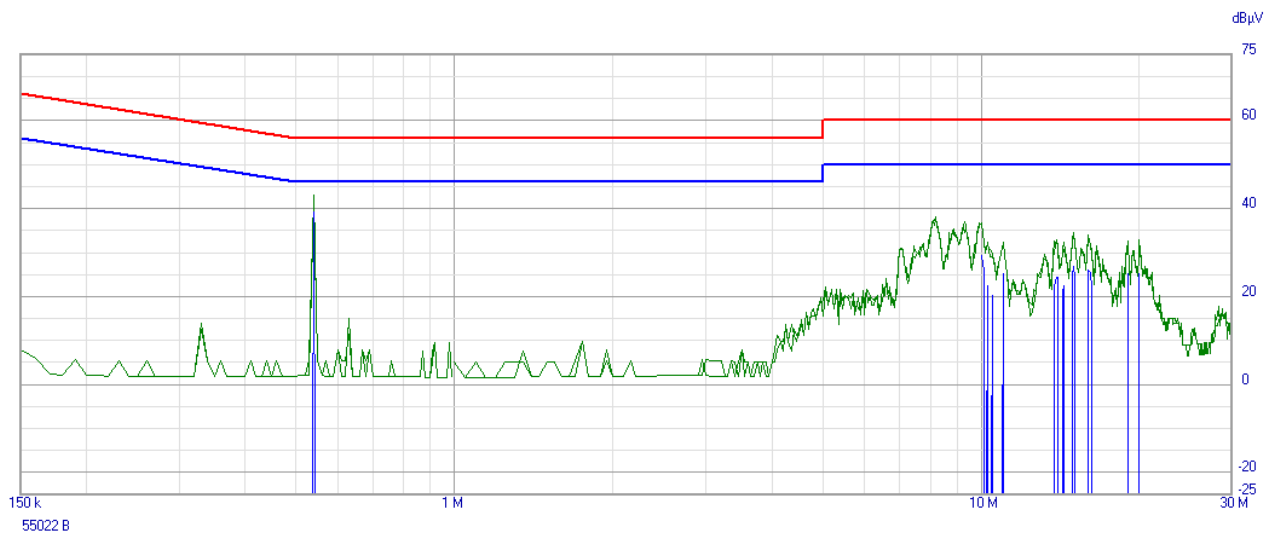
Measurement ref. No.: 28220293 001	Standard applied: EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments
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Measurement of disturbance voltage in the frequency range between 150 kHz and 30 MHz:

Description of operating conditions applied for testing of the product (settings, load, program, etc.): *The test sample was continuously operated*

Test point: *AC power port – Neutral*

Disturbance voltage diagram:



Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary	
1	0.15	1	10 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
2	0.15	1	10 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
3	1	10	50 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
4	1	10	50 kHz	S P A 022av-b Margin 9 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
5	10	30	100 kHz	S P Q 022qp-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...
6	10	30	100 kHz	S P A 022av-b Margin 19 dB	Scan 20 ms Peak 20 ms	9 kHz	0	ON	ON	...	...

Ancillary = L3 PMM
 Limits: —
 022qp-b
 022av-b

Factors: —
 ESH:322

Peak —
 QPeak —
 Avg —

As the measurement was not performed in a shielded chamber, there are peaks shown on diagram, which derive not from EUT (which derive from external source). The peak on 540 kHz for example is a broadcasting radostation.

Measurement ref. No.: <p style="text-align: center;">28220293 001</p>	Standard applied: <p style="text-align: center;">EN 61000-6-3:2007+A1:2011</p> Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments																																																																																																																																								
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Test point: <i>Enclosure port.</i>																																																																																																																																									
Description of measurement area: <i>The measurement was carried out on site, at the place of manufacturer</i>																																																																																																																																									
Measurement distance: <i>10 m</i>																																																																																																																																									
Height of antenna: <i>1-4 m</i>																																																																																																																																									
Polarisation of antenna: <i>Vertical, horizontal.</i>																																																																																																																																									
Description of cables: <i>Power supply cable, 5x6 mm², 8 m long</i>																																																																																																																																									
Measurement results: <i>Valuable disturbance field strength could not be measured.</i>																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 15%;">Frequency MHz</th> <th style="width: 15%;">Measured value dBµV</th> <th style="width: 15%;">Ambient noise dBµV/m</th> <th style="width: 15%;">Actual disturbance level dBµV/m</th> <th style="width: 15%;">Limit value (for 10 m) dBµV/m</th> <th style="width: 20%;">Polarisation of the antenna v / h</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>						Frequency MHz	Measured value dBµV	Ambient noise dBµV/m	Actual disturbance level dBµV/m	Limit value (for 10 m) dBµV/m	Polarisation of the antenna v / h	-	-	-	-	-	-																																																																																																																								
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-	-	-	-	-	-																																																																																																																																				
Note(s): ---																																																																																																																																									

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility – Emission standard for residential, commercial and light-industrial environments
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Measuring receiver	R & S	ESCS30	836858/003	2014-07	<input type="checkbox"/>
Measuring receiver	NARDA	9010 – 9060	495WX10801+ 001WX00809	2014-03	<input checked="" type="checkbox"/>
Artificial mains network	R & S	ESH3-Z5	827729/018	2016-02	<input type="checkbox"/>
Artificial mains network	Schwarzbeck	NNLK 8129	8129-201	2016-05	<input checked="" type="checkbox"/>
Pulse limiter	R & S	ESH3-Z2	-	2016-03	<input checked="" type="checkbox"/>
Biconical antenna	Emco	3104	4672	2014-06	<input type="checkbox"/>
Log.-per. antenna	Emco	3146	3902	2014-06	<input type="checkbox"/>
Biconilog antenna	ETS-Lindgren	3142 c	00035886	2015-10	<input checked="" type="checkbox"/>

Photo(s) on the measuring arrangement:



Measurement ref. No.: 28220293 001	Standard applied: EN 61000-3-2:2006+A1:2009+A2:2009 Harmonic current
Date of measurement: 2013-10-17	
Ambient conditions: Ambient temperature: 21 °C Relative humidity: 53 % Air pressure: 1013 hPa	
Test setup: Laboratory test: <input type="checkbox"/> Post-installation test: <input checked="" type="checkbox"/>	
Calculated measurement uncertainty for harmonic current: $\pm 0.25\%$ k= 2	
Evaluation based on the test results: Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/>	
Note: <i>The measurement was performed on the place of applicant.</i>	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-3-2:2006+A1:2009+A2:2009 Harmonic current
---------------------------------------	--

Operating conditions:

Description of operating conditions applied for testing of the product (settings, load, program, etc.):
 The test sample was continuously operated

Allowed max. values of harmonic current of class „A” equipment:

Harmonic No.		Limit for harmonic current
	Odd harmonics	
3		2.30
5		1.14
7		0.77
9		0.40
11		0.33
13		0.21
$15 \leq n \leq 39$		$0.15 \times (15 / n)$
	Even harmonics	
2		1.08
4		0.43
6		0.3
$8 \leq n \leq 40$		$0.23 \times (8 / n)$

Test point: *mains connection*

Note(s): ---

Measurement ref. No.:

28220293 001

 Standard applied: **EN 61000-3-2:2006+A1:2009+A2:2009**
Harmonic current
Measuring on main terminal Neutral

Voltage = 234.761 V	Voltage Distortion = 2.69 %
Current = 15.356 A	Current Distortion = 5.37 %
Power = -2724.793 W	Apparent Power = 3604.917 VA
CosPhi(1) = -0.757	Power Factor = -0.756
Phase = L1	

Hn	I rms	Percentage	Phase	Limits	FAIL
DC	-0.068 A	-0.45 %	-----	no limit	
1	15.330 A	100.00 %	+139.22°	no limit	
2	0.162 A	1.06 %	+123.24°	1.080 A	
3	0.258 A	1.68 %	+6.31°	2.300 A	
4	0.024 A	0.16 %	+62.87°	0.430 A	
5	0.643 A	4.19 %	-58.31°	1.140 A	
6	0.017 A	0.11 %	+44.64°	0.300 A	
7	0.396 A	2.59 %	+125.73°	0.770 A	
8	0.017 A	0.11 %	+29.47°	0.230 A	
9	0.015 A	0.10 %	-142.02°	0.400 A	
10	0.020 A	0.13 %	+7.35°	0.184 A	
11	0.012 A	0.08 %	+90.16°	0.330 A	
12	0.017 A	0.11 %	-13.29°	0.153 A	
13	0.067 A	0.44 %	+117.63°	0.210 A	
14	0.017 A	0.11 %	-31.20°	0.131 A	
15	0.014 A	0.09 %	+156.79°	0.150 A	
16	0.017 A	0.11 %	-50.34°	0.115 A	
17	0.038 A	0.25 %	+95.87°	0.132 A	
18	0.017 A	0.11 %	-66.38°	0.102 A	
19	0.024 A	0.15 %	+107.22°	0.118 A	
20	0.017 A	0.11 %	-84.26°	0.092 A	
21	0.009 A	0.06 %	+71.51°	0.107 A	
22	0.015 A	0.10 %	-90.38°	0.084 A	
23	0.025 A	0.16 %	+69.38°	0.098 A	
24	0.022 A	0.15 %	-99.85°	0.077 A	
25	0.015 A	0.10 %	+52.08°	0.090 A	
26	0.014 A	0.09 %	-148.47°	0.071 A	
27	0.013 A	0.08 %	+20.62°	0.083 A	
28	0.012 A	0.08 %	+114.12°	0.066 A	
29	0.012 A	0.08 %	+26.08°	0.078 A	
30	0.015 A	0.10 %	-173.47°	0.061 A	
31	0.006 A	0.04 %	-19.54°	0.073 A	
32	0.010 A	0.07 %	+165.23°	0.058 A	
33	0.011 A	0.07 %	-38.70°	0.068 A	
34	0.011 A	0.07 %	+145.22°	0.054 A	
35	0.008 A	0.05 %	-51.22°	0.064 A	
36	0.009 A	0.06 %	+119.78°	0.051 A	
37	0.007 A	0.04 %	-56.42°	0.061 A	
38	0.008 A	0.05 %	+96.21°	0.048 A	
39	0.006 A	0.04 %	-97.84°	0.058 A	
40	0.008 A	0.05 %	+77.00°	0.046 A	
41	0.007 A	0.05 %	-124.82°	no limit	
42	0.008 A	0.05 %	+52.86°	no limit	
43	0.008 A	0.05 %	-123.63°	no limit	
44	0.007 A	0.05 %	+30.03°	no limit	
45	0.005 A	0.03 %	-158.42°	no limit	
46	0.006 A	0.04 %	+9.04°	no limit	
47	0.006 A	0.04 %	-178.09°	no limit	
48	0.006 A	0.04 %	-14.60°	no limit	
49	0.006 A	0.04 %	+156.92°	no limit	
50	0.005 A	0.03 %	-35.84°	no limit	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-3-2:2006+A1:2009+A2:2009 Harmonic current
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Digital flickermeter- Real time harmonic analyser	PMM	PMM 1000	H90598	2014-05	<input checked="" type="checkbox"/>
Power supply	Kikusui	PCR 2000L	A0000233	2014-06	<input type="checkbox"/>
Power supply	Kikusui	PCR 2000L	A0000448	2014-06	<input type="checkbox"/>
Power supply	Kikusui	PCR 2000L	A0000449	2014-06	<input type="checkbox"/>
Digital multimeter	Norma	MP 14	X529116C	2014-08	<input checked="" type="checkbox"/>
Clamp on probe	HIOKI	9018	040435909	2014-05	<input type="checkbox"/>





Additional information:


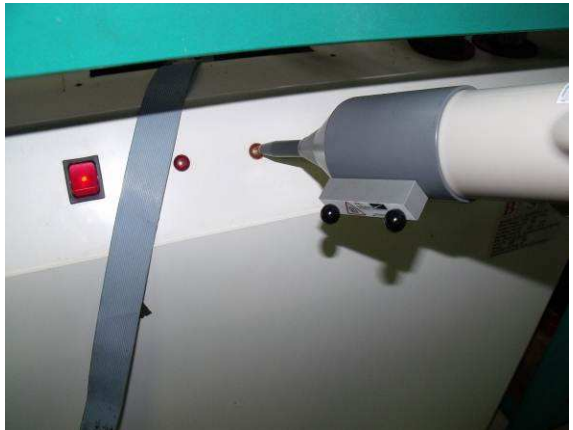

* The power supplies are not calibrated instruments. Their output parameters are checked during each measurement.

Photo(s) on the measuring arrangement:



Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-2:2009 Immunity against electrostatic discharges
Date of measurement:	2013-10-16
Ambient conditions:	
Ambient temperature:	18 °C
Relative humidity:	60 %
Air pressure	1006 hPa
Test setup:	
Laboratory test <input type="checkbox"/>	Post-installation test <input checked="" type="checkbox"/>
Calculated measurement uncertainty measurement uncertainty of current measurement: 2,5 %, k= 2 measurement uncertainty of time measurement: ± 110ps, k= 2	
Evaluation based on the test results:	
Passed <input checked="" type="checkbox"/>	Failed <input type="checkbox"/>
Note(s): <i>The measurement was performed on the place of applicant.</i>	

Measurement ref. No.: <p style="text-align: center;">28220293 001</p>	Standard applied: <p style="text-align: center;">EN 61000-4-2:2009</p> <p style="text-align: center;">Immunity against electrostatic discharges</p>
Operating conditions: Description of operating conditions applied for testing of the product (settings, load, program, etc.): <p style="margin-left: 20px;"><i>The test sample was continuously operated</i></p>	
Performance criterion	<input type="checkbox"/> A Normal operation within the prescribed limits. <input checked="" type="checkbox"/> B After a temporary degradation or failure of function the normal operation is restored automatically. <input type="checkbox"/> C After a temporary degradation or failure of function the normal operation is restored by the operator's action.
Test voltage:	4 kV
Number of discharges:	10 positive + 10 negative, each of tested points.
Method of discharges:	Direct and indirect contact discharge.
Place of discharges (tested points):	Metallic parts of EUT, vertical and horizontal coupling plane.
Operation of the EUT during the test:	No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.
Note(s): Test level and performance criterion are specified in EN 61000-6-1:2007 standard.	
Photo(s) on the measuring arrangement:	
	
	

Measurement ref. No.: 28220293 001		Standard applied: EN 61000-4-2:2009 Immunity against electrostatic discharges	
Operating conditions: Description of operating conditions applied for testing of the product (settings, load, program, etc.): <i>The test sample was continuously operated</i>			
Performance criterion	<input type="checkbox"/>	A	Normal operation within the prescribed limits.
	<input checked="" type="checkbox"/>	B	After a temporary degradation or failure of function the normal operation is restored automatically.
	<input type="checkbox"/>	C	After a temporary degradation or failure of function the normal operation is restored by the operator's action.
Test voltage:	8 kV		
Number of discharges:	10 positive + 10 negative, each of tested points.		
Method of discharges:	Air discharge.		
Place of discharges (tested points):	Display and the plastic enclosure of the appliance.		
Operation of the EUT during the test:	<i>No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.</i>		
Note(s): <i>Test level and performance criterion are specified in EN 61000-6-1:2007 standard.</i>			
Photo(s) on the measuring arrangement:			
			
			

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-2:2009 Immunity against electrostatic discharges
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
ESD generator	EMC-Partner	ESD3000	497	2014-05	<input checked="" type="checkbox"/>

Note(s): ---

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-3:2006 + A1:2008 + A2:2010 Radiated, radio-frequency, electromagnetic field immunity test
Date of measurement:	2013-10-16
Ambient conditions:	
Ambient temperature:	18 °C
Relative humidity:	59 %
Air pressure	1006 hPa
Test setup:	
Laboratory test <input type="checkbox"/>	Post-installation test <input checked="" type="checkbox"/>
Calculated measurement uncertainty for radiated, radio-frequency electromagnetic fields: ± 1.52 dBm k=1.64	
Evaluation based on the test results:	
Passed <input checked="" type="checkbox"/>	Failed <input type="checkbox"/>
Note(s): <i>The measurement was performed on the place of applicant.</i>	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-3:2006 + A1:2008 + A2:2010 Radiated, radio-frequency, electromagnetic field immunity test
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Operating conditions:

Description of operating conditions applied for testing of the product (settings, load, program, etc.): *The test sample was continuously operated*

Performance criterion	<input checked="" type="checkbox"/>	A	Normal operation within the prescribed limits.
	<input type="checkbox"/>	B	After a temporary degradation or failure of function the normal operation is restored automatically.
	<input type="checkbox"/>	C	After a temporary degradation or failure of function the normal operation is restored by the operator's action.

	1.	2.	3.
Frequency range:	80-1000 MHz	1.4 - 2 GHz	2 – 2.7 GHz
Field strength:	3 V/m	3 V/m	1 V/m
Modulation:	80 % AM; 1kHz	80 % AM; 1kHz	80 % AM; 1kHz
Frequency step:	0.25 %	0.25 %	0.25 %
Dwell time	1 s	1 s	1 s

Operation of the EUT during the test: *No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.*

Note(s):

Test level and performance criterion are specified in EN 61000-6-1:2007 standard.

Photo(s) on the measuring arrangement:



Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-3:2006 + A1:2008 + A2:2010 Radiated, radio-frequency, electromagnetic field immunity test
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Semi anechoic chamber	T-Network	3, 10 m	---	2015-01	<input type="checkbox"/>
Signal generator	R&S	SMT 06	100634	2014-05	<input checked="" type="checkbox"/>
Signal generator	R&S	SMY 02	838219/008	2014-02	<input type="checkbox"/>
Power amplifier	AR	25A250A	18727	2014-05	<input type="checkbox"/>
Power amplifier	Ophir	5127F	1029	2014-05	<input checked="" type="checkbox"/>
Power amplifier	Bonn	BSA0122-10	943848B	2014-03	<input type="checkbox"/>
Power amplifier	Bonn	BLWA2010-10	943848B	2014-03	<input type="checkbox"/>
Power amplifier	Bonn	BLMA1020-50	004781	2014-05	<input checked="" type="checkbox"/>
Power Amplifier	Bonn	BLMA2040-60	045731	2014-05	<input checked="" type="checkbox"/>
Portable field strength meter	PMM	8051	0110J70307	2014-06	<input checked="" type="checkbox"/>
Antenna for measurement of field strength	PMM	BA 01	02010J70303	2014-06	<input checked="" type="checkbox"/>
Optic repeater (for BA01)	PMM	OR 01	0210K70306	2014-06	<input checked="" type="checkbox"/>
Biconical antenna	Emco	3104	4672	2014-06	<input type="checkbox"/>
Log.-per. antenna	Emco	3146	3902	2014-06	<input type="checkbox"/>
Biconilog antenna	ETS-Lindgren	3142 c	00035886	2015-10	<input checked="" type="checkbox"/>

Note(s): ---

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-4:2012 Electrical fast transient/burst immunity test
Date of measurement:	2013-10-16
Ambient conditions:	
Ambient temperature:	22 °C
Relative humidity:	46 %
Air pressure	1013 hPa
Test setup:	
Laboratory test <input type="checkbox"/>	Post-installation test <input checked="" type="checkbox"/>
Evaluation based on the test results:	
Passed <input checked="" type="checkbox"/>	Failed <input type="checkbox"/>
Note(s): <i>The measurement was performed on the place of applicant.</i>	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-4:2012 Electrical fast transient/burst immunity test
Operating conditions: Description of operating conditions applied for testing of the product (settings, load, program, etc.): <i>The test sample was continuously operated. The test was carried out on the mains wires of the control electronics only.</i>	
Performance criterion	<input type="checkbox"/> A Normal operation within the prescribed limits. <input checked="" type="checkbox"/> B After a temporary degradation or failure of function the normal operation is restored automatically. <input type="checkbox"/> C After a temporary degradation or failure of function the normal operation is restored by the operator's action.
Test voltage:	1 kV
Test pulse (T _r /T _h):	5 / 50 ns
Repetition frequency:	5 kHz
Burst duration:	15 ms
Burst period:	300 ms
Polarity:	Positive, then negative.
Duration of test:	120 s (positive) + 120 s (negative).
Coupling method:	CDN (built in)
Place of coupling:	AC power port – mains connection
Operation of the EUT during the test:	<i>No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.</i>
Note(s): <i>Test level and performance criterion are specified in EN 61000-6-1:2007 standard.</i>	
Photo on the measuring arrangement: 	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-4:2012 Electrical fast transient/burst immunity test
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Combined generator	EM test	UCS 500	0596-55	2014-05	<input checked="" type="checkbox"/>
3-phase CDN	Schaffner	CDN 300	189	2016-05	<input type="checkbox"/>
3-phase CDN	Haefely	FP 16/3-1	082632-019	2014-06	<input type="checkbox"/>
Capacitive coupler	Haefely	093506.1	082963-25	2016-05	<input type="checkbox"/>

Note(s): ---

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-5:2006 Immunity against surges
Date of measurement:	2013-10-16
Ambient conditions:	
Ambient temperature:	22 °C
Relative humidity:	46 %
Air pressure	1013 hPa
Test setup:	
Laboratory test <input type="checkbox"/>	Post-installation test <input checked="" type="checkbox"/>
Evaluation based on the test results:	
Passed <input checked="" type="checkbox"/>	Failed <input type="checkbox"/>
Note(s): <i>The measurement was performed on the place of applicant.</i>	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-5:2006 Immunity against surges
Operating conditions:	
Description of operating conditions applied for testing of the product (settings, load, program, etc.):	<i>The test sample was continuously operated. The test was carried out on the mains wires of the control electronics only.</i>
Performance criterion	<input type="checkbox"/> A Normal operation within the prescribed limits. <input checked="" type="checkbox"/> B After a temporary degradation or failure of function the normal operation is restored automatically. <input type="checkbox"/> C After a temporary degradation or failure of function the normal operation is restored by the operator's action.
Test voltage:	1 kV
Test pulse (open circuit, T_r/T_n):	1.2 / 50 μ s
Test pulse (short circuit, T_r/T_n):	8 / 20 μ s
Number of pulses:	10 positive + 10 negative each at 0°, 90°, 180°, 27 0°
Time between impulses	60 s
Coupling method:	CDN (built in).
Place of coupling:	AC power port – mains connection: L ↔ N (differential mode).
Operation of the EUT during the test:	<i>No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.</i>
Note(s): <i>Test level and performance criterion are specified in EN 61000-6-1:2007 standard.</i>	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-5:2006 Immunity against surges
Operating conditions: Description of operating conditions applied for testing of the product (settings, load, program, etc.): <p><i>The test sample was continuously operated. The test was carried out on the mains wires of the control electronics only.</i></p>	
Performance criterion	<input type="checkbox"/> A Normal operation within the prescribed limits. <input checked="" type="checkbox"/> B After a temporary degradation or failure of function the normal operation is restored automatically. <input type="checkbox"/> C After a temporary degradation or failure of function the normal operation is restored by the operator's action.
Test voltage:	2 kV
Test pulse (open circuit, T _r /T _n):	1.2 / 50 μs
Test pulse (short circuit, T _r /T _n):	8 / 20 μs
Number of pulses:	10 positive + 10 negative each at 0°, 90°, 180°, 27 0°
Time between impulses	60 s
Coupling method:	CDN (built in).
Place of coupling:	AC power port – mains connection: L+N ↔ PE (common mode).
Operation of the EUT during the test:	<i>No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.</i>
Note(s): Test level and performance criterion are specified in EN 61000-6-1:2007 standard.	

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-5:2006 Immunity against surges
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Combined generator	EM test	UCS 500	0596-55	2014-05	<input checked="" type="checkbox"/>

Note(s): ---

Photo(s) on the measuring arrangement:



Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-6:2009 Immunity to conducted disturbances, induced by radio-frequency fields
Date of measurement:	2013-10-17
Ambient conditions:	
Ambient temperature:	18 °C
Relative humidity:	56 %
Air pressure	1013 hPa
Test setup:	Laboratory test <input type="checkbox"/> Post-installation test <input checked="" type="checkbox"/>
Evaluation based on the test results:	Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/>
Note(s):	<i>The measurement was performed on the place of applicant.</i>

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-6:2009 Immunity to conducted disturbances, induced by radio-frequency fields		
Operating conditions: Description of operating conditions applied for testing of the product (settings, load, program, etc.): <i>The test sample was continuously operated. The test was carried out on the mains wires of the control electronics only.</i>			
Performance criterion	<input checked="" type="checkbox"/>	A	Normal operation within the prescribed limits.
	<input type="checkbox"/>	B	After a temporary degradation or failure of function the normal operation is restored automatically.
	<input type="checkbox"/>	C	After a temporary degradation or failure of function the normal operation is restored by the operator's action.
Frequency range:	1.	2.	3.
	0.15 – 80 MHz		
RF voltage:	3 V		
Step size:	0.25 %		
Dwell time:	1 s		
Modulation:	80 % AM; 1 kHz		
Coupling method:	CDN type M3		
Place of coupling:	AC power port – mains connection.		
Operation of the EUT during the test:	<i>No change was observed in the operation of the equipment. Performance criterion is complied with 'A'.</i>		
Note(s): <i>Test level and performance criterion are specified in EN 61000-6-1:2007 standard.</i>			

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-6:2009 Immunity to conducted disturbances, induced by radio-frequency fields
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Signal generator	Rhode & Schwarz	SMY 01	844146 / 052	2014-02	<input checked="" type="checkbox"/>
Amplifier	Amplifier Research	25A250A	18727	2014-05	<input checked="" type="checkbox"/>
RF millivoltmeter	Rhode & Schwarz	URV 5	894296/004	2014-05	<input checked="" type="checkbox"/>
CDN	MEB	AF2	12516	2016-06	<input type="checkbox"/>
CDN	MEB	M2	12114	2016-06	<input type="checkbox"/>
CDN	MEB	M3	13225	2016-06	<input checked="" type="checkbox"/>

Note(s): ---

Photo(s) on the measuring arrangement:



Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-11:2004 Immunity against voltage dips, short interruptions and voltage variations
Date of measurement:	2013-10-17
Ambient conditions:	
Ambient temperature:	21 °C
Relative humidity:	47 %
Air pressure	1013 hPa
Test setup:	
Laboratory test <input type="checkbox"/>	Post-installation test <input checked="" type="checkbox"/>
Evaluation based on the test results:	
Passed <input checked="" type="checkbox"/>	Failed <input type="checkbox"/>
Note(s): <i>The measurement was performed on the place of applicant.</i>	

Measurement ref. No.: 28220293 001		Standard applied: EN 61000-4-11:2004 Immunity against voltage dips, short interruptions and voltage variations		
Operating conditions: Description of operating conditions applied for testing of the product (settings, load, program, etc.):				
		<i>The test sample was continuously operated. The test was carried out on the mains wires of the control electronics only.</i>		
Performance criteria	A	Normal operation within the prescribed limits.		
	B	After a temporary degradation or failure of function the normal operation is restored automatically.		
	C	After a temporary degradation or failure of function the normal operation is restored by the operator's action.		
Immunity to voltage dips				
Test voltage (U _T):	230V	230V	230V	230V
Method of supply:				
Voltage dip (ΔU):	100%	60%	30%	100%
Reduced voltage:	0V	0V	161V	0V
Duration of voltage dip:	10ms	20ms	500ms	5s
Number of voltage dip:	4	4	4	4
Performance criterion:	B	B	C	C
Operation of the EUT during the test:	A No change was observed	A No change was observed	A No change was observed	B Automatically restarted
Note(s): <i>Test level and performance criterion are specified in EN 61000-6-1:2007 standard.</i>				

Measurement ref. No.: 28220293 001	Standard applied: EN 61000-4-11:2004 Immunity against voltage dips, short interruptions and voltage variations
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Test instruments used:

Denomination	Manufacturer	Type	Serial No.	Next calibration	Applied
Combined generator	EM Test	UCS 500	0596-55	2014-05	<input checked="" type="checkbox"/>
Power supply	Kikusui	PCR 2000L	A0000233	2014-06	<input type="checkbox"/>
Power supply	Kikusui	PCR 2000L	A0000448	2014-06	<input type="checkbox"/>
Power supply	Kikusui	PCR 2000L	A0000449	2014-06	<input type="checkbox"/>
Multimeter	Hioki	3257-50	040418901	2014-05	<input checked="" type="checkbox"/>
Multimeter	Norma	MP 14	X324871C	2014-08	<input type="checkbox"/>

Note(s): ---

Photo(s) on the measuring arrangement:

