

EMC TEST REPORT

Oina VV AB

Dispenser system

Accurate speedcontrol BLDC/

Report no: 09007



Prepared by
Ulf Heiding

Ulf Heiding

Approved by

Tobias Gustavsson *Tobias Gustavsson*

Date

2009-01-23

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Head information

<i>Report no</i> 09007	<i>Date</i> 2009-01-23	<i>Prepared by</i> Ulf Heiding
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<i>Postal address</i> Stäksholmen, SE-139 90 Värmdö, Sweden	
<i>Tel</i> +46 8 773 34 35	<i>Fax</i> +46 8 571 60 145

<i>Type of apparatus</i> Dispenser system			
<i>Type no</i> Accurate speedcontrol BLDC/			
<i>Voltage</i> 230 Vac	<i>No of phases</i> 1	<i>Current</i> - A	<i>Power</i> 35 W
<input type="checkbox"/> Class I, earthed <input checked="" type="checkbox"/> Class II, double insulated <input type="checkbox"/> DC application			

<i>Tested acc to</i> Emission: EN 61000-6-3:2007 Immunity: EN 61000-6-2:2005, EN 61000-4-2, -3, -4, -5, -6, -11

<i>Test result</i> <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Not approved
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<i>Note</i> The test results in this report apply only to the tested sample of EUT. Mains adapter used: Nordic power model 0055 AC to DC adapter, 24Vdc, 1.5A. Criteria for normal performance: No noticeable change of motor speed, no change of state, no accidental starts or stops were allowed. Immunity tests made with speed 10%, internal control.

Test summary

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Emission according to EN 61000-6-3:2007 *			
Environmental phenomena	Basic Standard	Result	Comments
Conducted disturbance	EN 61000-6-3:2007	Passed	*
Radiated disturbance	EN 61000-6-3:2007	Passed	*
Harmonics	EN 61000-3-2: 2001	Not applicable	< 75W
Flicker	EN 61000-3-3: 1995, A1: 2001	Not applicable	< 75W

Immunity according to EN 61000-6-2:2005 *				
Environmental phenomena	Basic Standard	Test specifications	Result	Comments
Electrostatic discharge (ESD)	EN 61000-4-2: 1995	Contact discharge 2, 4 kV Air discharge 2, 4, 8 kV	Passed Passed	
Radio-frequency electromagnetic field	EN 61000-4-3: 1997	80 - 2 700 MHz 10 V/m AM 80%, 1 kHz sinus	Passed	* Tested with + 20 %
Fast transients	EN 61000-4-4: 1995	Coupling network 2 kV Capacitive clamp 1 kV	Passed Passed	
Surges	EN 61000-4-5: 1995	Line to line 0.5, 1 kV Line to earth - kV	Passed Not applicable	Class II
Induced radio-frequency field	EN 61000-4-6: 1996	0.15 - 80 MHz 10 V _{RMS} AM 80%, 1 kHz sinus	Passed	* Tested with + 20 %
Power frequency magnetic field	EN 61000-4-8: 1994	- A/m 50 Hz	Not applicable	**
Voltage dips and interruptions	EN 61000-4-11: 1995	Residual voltage Time 0 % 20 ms 40 % 200 ms 70 % 500 ms 0 % 5 s	Passed Passed Passed Passed	

* Test not within the scope of the accreditation.

** Not applicable since the EUT does not contain any devices that are sensitive to the specified level of magnetic field.

Measurements uncertainties

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The reported expanded uncertainty U_{lab} is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

The uncertainty evaluation has been carried out in accordance with the documents CISPR16-4-2 and UKAS LAB34.

Conducted disturbance, mains terminals $\pm 2,9$ dB

Radiated disturbance measured in Semi Anechoic Chamber (SAC)

30-200 MHz	horizontal polarisation	$\pm 9,0$ dB
	vertical polarisation	$\pm 7,7$ dB
200-1 000 MHz	horizontal polarisation	$\pm 3,7$ dB
	vertical polarisation	$\pm 5,3$ dB

Radiated disturbance measured in Weather Protected Open Area Test Site (OATS)

30-200 MHz	horizontal polarisation	$\pm 3,5$ dB
	vertical polarisation	$\pm 5,6$ dB
200-1 000 MHz	horizontal polarisation	$\pm 3,9$ dB
	vertical polarisation	$\pm 5,1$ dB

Compliance or non-compliance with a disturbance limit is determined according to the following, quoted from CISPR 16-4-2:2003.

If U_{lab} is less or equal to U_{cispr} then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} then:

- compliance is deemed to occur if no measured disturbance, increased by $(U_{lab}-U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, $(U_{lab}-U_{cispr})$, exceeds the disturbance limit.

The expanded uncertainty U_{cispr} is for:

- conducted disturbance, mains port 150 kHz – 30 MHz $\pm 3,6$ dB
- radiated disturbance, 30 – 1 000 MHz $\pm 5,2$ dB

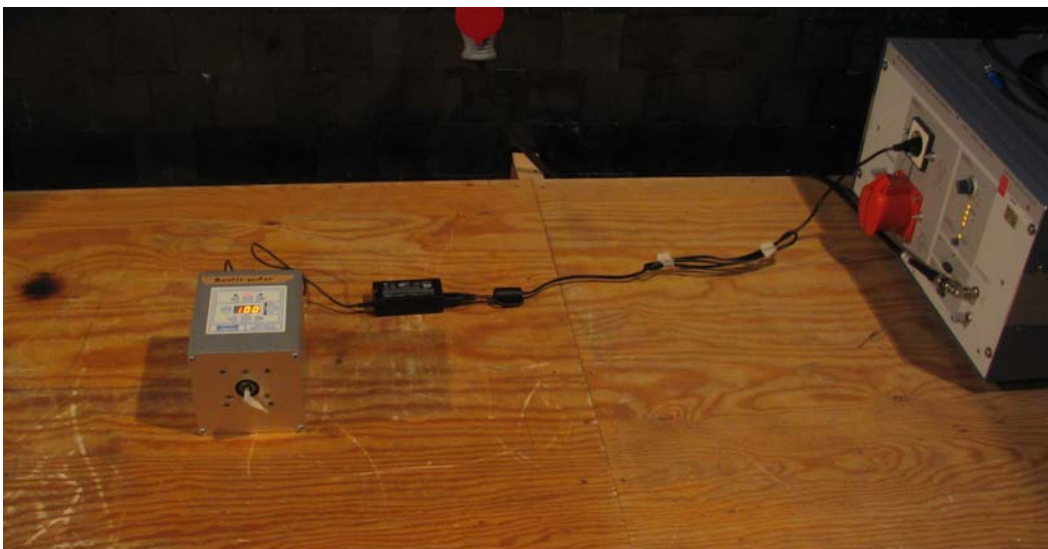
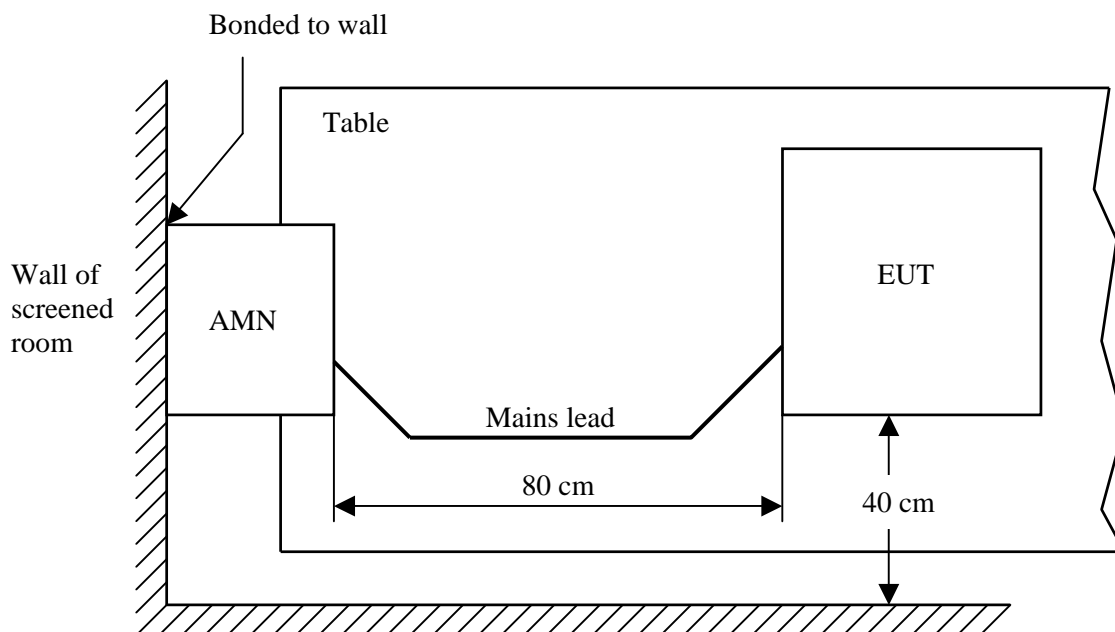
Conducted disturbance test set-up

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Dispenser system Accurate speedcontrol BLDC/

Measuring performed in Semi Anechoic Chamber (SAC)

Plan view for tabletop equipment



Radiated disturbance test set-up

Report no: 09007

Dispenser system Accurate speedcontrol BLDC/



Measuring is performed in Semi Anechoic Chamber (SAC) with antenna distance 3 m.

Left picture shows front view and corresponds to azimuth 0°. Rotation is made clockwise up to 360° at peak search.

Pre-scan with PK-detector is made at antenna height 1.3 m, 0° and 90° azimuth and horizontal and vertical antenna polarisation. Worst-case is shown in graph.

The reported QP-values in the table represents worst-case found by rotating the EUT between 0° and 360° azimuth and varying the antenna height between 1 and 4 m and changing the antenna polarisation between horizontal and vertical.

Deviation from standard:

The used SAC is non-compliant with the NSA requirements of ± 4 db according to CISPR 16-1 in the frequency range 30-200 MHz.

Immunity test equipment

Report no **09007**

Used

Signal generator 9 kHz - 2.4 GHz		Marconi 2024	<input checked="" type="checkbox"/>
Signal generator 9 kHz - 3.3 GHz		Rohde & Schwarz SML03	<input checked="" type="checkbox"/>
RF power amplifier 10 kHz - 250 MHz, 75 W		Amplifier Research 75A250	<input checked="" type="checkbox"/>
RF power amplifier 25 - 1 000 MHz, 30 W		Amplifier Research 30W1000M7	<input checked="" type="checkbox"/>
HF power amplifier dual band 1 - 4 GHz, 30/17 W		Milmega AS0104-3017	<input checked="" type="checkbox"/>
Electromagnetic field strength meter 20 Hz - 18 GHz		PMM 8051	<input checked="" type="checkbox"/>
Optical repeater		PMM 8051 OR-1	<input checked="" type="checkbox"/>
E-field probe 500 kHz - 3 GHz, max 120 V/m		PMM BA-01	<input checked="" type="checkbox"/>
E-field probe 10 MHz - 1 GHz, max 30 V/m		PMM BA-05	<input checked="" type="checkbox"/>
Level control 10 kHz - 1 GHz		Amplifier Research 888	<input checked="" type="checkbox"/>
Bilog antenna 30 MHz - 1GHz		Chase CBL 6111B	<input type="checkbox"/>
Bilog antenna 30 MHz - 3 GHz		Chase CBL 6112A	<input checked="" type="checkbox"/>
Double ridged broadband horn antenna 0.7 – 6.5 GHz		Schwarzbeck BBHA 9120 LFA	<input type="checkbox"/>
ESD simulator 0.2 - 16.5 kV	(EN 61000-4-2)	Schaffner NSG 435	<input checked="" type="checkbox"/>
Fast transient/burst generator	(EN 61000-4-4)	Schaffner NSG 2025	<input checked="" type="checkbox"/>
Capacitive clamp	(EN 61000-4-4)	Schaffner CDN 126	<input checked="" type="checkbox"/>
Surge pulse generator, 1.2/50, 8/20	(EN 61000-4-5)	Schaffner NSG 2050 / PNW 2050	<input checked="" type="checkbox"/>
Pulse coupling network, 1 & 3 phase	(EN 61000-4-5)	Schaffner CDN 131/133	<input checked="" type="checkbox"/>
Pulse coupling network, signal line 40 Ω	(EN 61000-4-5)	Schaffner CDN 116	<input type="checkbox"/>
Coupling network 150 kHz - 230 MHz	(EN 61000-4-6)	Schaffner CDN 516S	<input checked="" type="checkbox"/>
EM injection clamp 10 kHz - 1 GHz	(EN 61000-4-6)	FCC F2031 S/N 215	<input checked="" type="checkbox"/>
Power frequency and pulse magnetic field	(EN 61000-4-8/9)	Magnetic coil / Schaffner NSG 2050	<input type="checkbox"/> / <input type="checkbox"/>
Combi generator, burst, surge, voltage dips	(EN 61000-4-11)	Schaffner Best Plus	<input checked="" type="checkbox"/>
Pulse coupling network	(EN 61000-4-4, -5)	Schaffner CDN 135	<input type="checkbox"/>
5 kVA AC power source	(EN 61000-3-13)	Schaffner NSG 1007	<input type="checkbox"/>
Load dump pulse generator	(ISO 7637-2 test pulse 5)		<input type="checkbox"/>
Temperature and humidity measurement instrument		Testo 615	<input checked="" type="checkbox"/>
Oscilloscope DC - 100 MHz, 500Ms		Tektronix THS720 STD	<input type="checkbox"/>
Oscilloscope DC - 300 MHz, 2,5 Gs		Tektronix TDS 3032	<input type="checkbox"/>
Linear power supply 24 Vdc 10 A		SF 10A-230	<input type="checkbox"/>
Rotating table / Moving antenna		±180°/ 1-4 m, hor & vert polarisation	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/>
Screen room 1.8 x 1.8 x 2.4 m for measuring equipment		Siemens	<input checked="" type="checkbox"/>
SAC, Semi Anechoic Chamber		10 x 5 x 5 m	<input checked="" type="checkbox"/>
OATS, Open Area Test Site		8 x 15 x 5 m	<input type="checkbox"/>
In situ measurement at			<input type="checkbox"/>

Emission test equipment

Report no **09007**

Used

		Used
Measuring system 5 Hz - 1 GHz	Rohde & Schwarz ESS	<input checked="" type="checkbox"/>
Measuring system 9 kHz – 2.5 GHz	Rohde & Schwarz ESPC	<input type="checkbox"/>
Spectrum analyser 9 kHz - 1.8 GHz	Tektronix 2712	<input type="checkbox"/>
Mains equivalent 5 µH//50 Ω, 160 A	Rohde & Schwarz ESH 3-Z6	<input type="checkbox"/>
Mains equivalent 50 µH//50 Ω, 2 x 16 A	Rohde & Schwarz ESH 3-Z5	<input type="checkbox"/>
Mains equivalent 50 µH//50 Ω, 4 x 25 A	Rohde & Schwarz SH 2-Z5	<input checked="" type="checkbox"/>
Mains equivalent 50 µH//50 Ω, 4 x 100 A	FCC-LISN-50-100-4	<input type="checkbox"/>
Absorbing clamp 30 - 1000 MHz	Rohde & Schwarz MDS-21, s/n 893668/012	<input type="checkbox"/>
Absorbing clamp 30 - 300 MHz	R&S MDS 9, s/n 69087	<input type="checkbox"/>
Bilog antenna 30 MHz - 1 GHz	Chase CBL6111B	<input type="checkbox"/>
Bilog antenna 30 MHz - 3 GHz	Chase CBL6112A	<input checked="" type="checkbox"/>
Double ridged broadband horn antenna 0,7 – 6,5 GHz	Schwarzbeck BBHA 9120 LFA	<input type="checkbox"/>
Active antenna 30Hz - 50 MHz	Emco 3301B	<input type="checkbox"/>
Triple loop antenna 2M, 9 kHz - 30 MHz	Rohde & Schwarz HM 020	<input type="checkbox"/>
Control unit	Rohde & Schwarz BG 020	<input type="checkbox"/>
Balance-to-unbalance transformer, 150 kHz - 1.605 MHz	Acc to CISPR 15 Fig A.2a	<input type="checkbox"/>
Pulse limiter 10 dB	Rohde & Schwarz ESH 3-Z2	<input checked="" type="checkbox"/>
Current probe, 9 kHz - 30 MHz	Rohde & Schwarz ESH 2-Z1	<input type="checkbox"/>
Voltage probe 1500 Ω, 9 kHz - 30 MHz, -29 dB	Emco 3701 Line Probe acc. to CISPR	<input type="checkbox"/>
Harmonics & flicker test system (EN 61000-3-2, -3)	Schaffner ProfLine 2100 (CCN 1000 + NSG1007)	<input type="checkbox"/>
Harmonic current meter (EN 61000-3-2)	Fluke 41 / 43	<input type="checkbox"/> / <input type="checkbox"/>
Measuring receiver 85 kHz - 30 MHz	Schwarzbeck FSME 1515	<input type="checkbox"/>
Discontinuous interference analyzer	Chase DIA 1500, Ser. No. 1523	<input type="checkbox"/>
Oscilloscope DC - 100 MHz, 500 Ms	Tektronix THS720STD	<input type="checkbox"/>
Oscilloscope DC - 300 MHz, 2,5 Gs	Tektronix TDS 3032	<input type="checkbox"/>
Linear DC power supply 0 - 350 V, 7 A	NT-97	<input type="checkbox"/>
Power supply 0-30 Vdc 10 A (SMPS)	Delta Elektronika MST 030-10	<input type="checkbox"/>
Power supply 24 Vdc 10 A (Linear)	SF 10A-230	<input type="checkbox"/>
Battery	12 V 60 Ah / 12 V 60 Ah	<input type="checkbox"/> / <input type="checkbox"/>
Rotating table / Moving antenna	± 180° / Height 1-4 m, hor & vert polarization	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/>
Screen room 1.8 x 1.8 x 2.4 m for measuring equipment	Siemens	<input checked="" type="checkbox"/>
SAC, Semi Anechoic Chamber	10 x 5 x 5 m	<input checked="" type="checkbox"/>
OATS, Open Area Test Site	8 x 15 x 5 m	<input type="checkbox"/>
In situ measurement at		<input type="checkbox"/>

EN 61000-4-2: Electrostatic discharge (ESD) immunity test

Report no 09007

EUT	Dispenser system Accurate speedcontrol BLDC/
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Test voltage (kV) Contact discharge	Test voltage (kV) Air discharge	Note
<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 2	10 discharges each of positive and negative polarity. Temperature 23 °C (15-35 °C) Relative humidity 28 % * (30-60 %) *) Outside specified range according to the standard.
<input checked="" type="checkbox"/> 4	<input checked="" type="checkbox"/> 4	
<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 8	
<input type="checkbox"/> 8	<input type="checkbox"/> 15	
<input type="checkbox"/> Special	<input type="checkbox"/> Special	

Test result

The test results may be classified on the basis of the operating conditions and the functional specifications of the equipment under test, according to the following performance criteria:

- A. Normal performance within the specification limits.
- B. Temporary degradation or loss of function or performance, which is recoverable.
- C. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
- D. Degradation or loss of function, which is not recoverable, due to damage of equipment (components).

Required criterion for compliance: B Passed Not passed

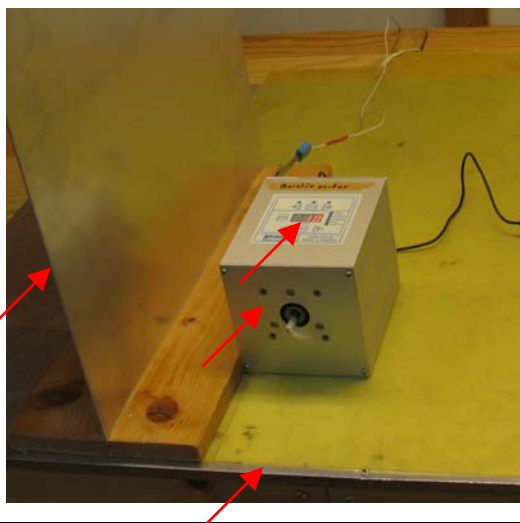
Notes

It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95% confidence.

Visual control of function of EUT.

Criteria for normal performance: See head note.

Test points shown in picture.



Tested by Tobias Gustavsson

Date 2009-01-23

EN 61000-4-3: Radiated radio frequency electromagnetic field immunity test

Report no **09007**

<i>EUT</i>	Dispenser system Accurate speedcontrol BLDC/
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Test field strength	Frequency range	Frequency step	Dwell time
10 V/m	80 - 2 700 MHz	1 %	3 s

<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Vertical and horizontal polarisation. Amplitude modulation 80 %, 1 kHz, sinusoidal. Pulse modulation 100 %, 200 Hz (850 - 950 MHz, GSM). Level 20 V/m. Pulse modulation 100 %, 1 Hz, 50% duty cycle.
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Test result

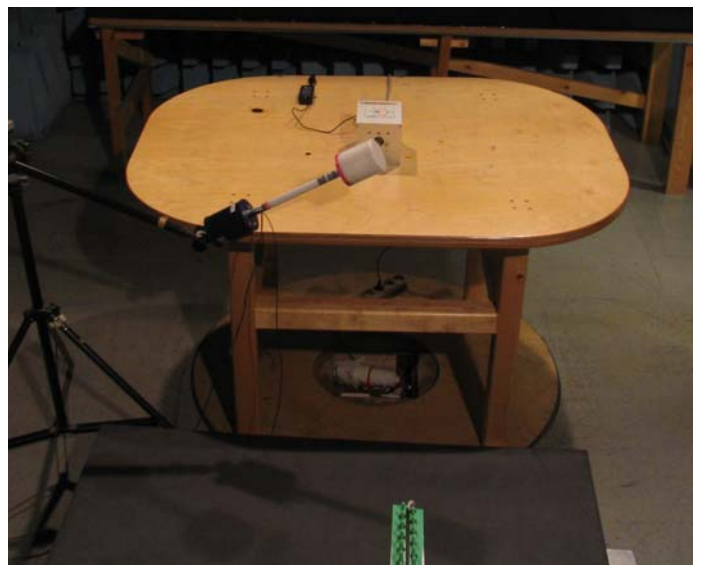
The test results may be classified on the basis of the operating conditions and the functional specifications of the equipment under test, according to the following performance criteria:

- A. Normal performance within the specification limits.
- B. Temporary degradation or loss of function or performance, which is recoverable.
- C. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
- D. Degradation or loss of function, which is not recoverable, due to damage of equipment (components).

Required criterion for compliance: A Passed Not passed

Notes

All tests performed with 2 V/m above specified test level.
 Visual control of function of EUT with video camera.
 Criteria for normal performance: See head note.



<i>Tested by</i> Tobias Gustavsson	<i>Date</i> 2009-01-22
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EN 61000-4-4: Electrical fast transient/burst immunity test

Report no 09007

<i>EUT</i>	Dispenser system Accurate speedcontrol BLDC/
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Test voltage	Couplers	Note
2 kV	N+L1	Duration 1 min Frequency 5 kHz
1 kV	Capacitive clamp	Repetition rate 300 ms Positive and negative polarity

Test result

The test results may be classified on the basis of the operating conditions and the functional specifications of the equipment under test, according to the following performance criteria:

- A. Normal performance within the specification limits.
- B. Temporary degradation or loss of function or performance, which is recoverable.
- C. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
- D. Degradation or loss of function, which is not recoverable, due to damage of equipment (components).

Required criterion for compliance: B Passed Not passed

Notes

It has been demonstrated that the burst generator meets the specified requirements in the standard with at least a 95% confidence.

Visual control of function of EUT.

Criteria for normal performance: See head note.

Mains input tested in coupling unit.

Remote control cable tested in capacitive clamp.



<i>Tested by</i> Ulf Heiding	<i>Date</i> 2009-01-22
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EN 61000-4-5: Surge immunity test

Report no 09007

<i>EUT</i>	Dispenser system Accurate speedcontrol BLDC/
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Test voltage	Couplers	Note
0.5 kV, 1 kV (line to line, R _I 2 Ω)	L1-N	5 positive and 5 negative surges Synchronous at 90, 180 and 270 degrees Repetition rate 10 s * (* deviation from standard)
- kV (line to earth, R _I 12 Ω)	-	

Test result

The test results may be classified on the basis of the operating conditions and the functional specifications of the equipment under test, according to the following performance criteria:

- A. Normal performance within the specification limits.
- B. Temporary degradation or loss of function or performance, which is recoverable.
- C. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
- D. Degradation or loss of function, which is not recoverable, due to damage of equipment (components).

Required criterion for compliance: B Passed Not passed

Notes

It has been demonstrated that the surge generator meets the specified requirements in the standard with at least a 95% confidence.

Visual control of function of EUT.

Criteria for normal performance: See head note.



<i>Tested by</i> Ulf Heiding	<i>Date</i> 2009-01-22
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EN 61000-4-6: Induced radio frequency field immunity test

Report no 09007

EUT Dispenser system Accurate speedcontrol BLDC/

Test field strength	Frequency range	Frequency step	Dwell time
10 V	0,15 - 80 MHz	1 %	3 s

- Continuous wave.
 Amplitude modulation 80 %, 1 kHz, sinusoidal.
 Pulse modulation 100 %, 1 Hz, 50% duty cycle.

Test result

The test results may be classified on the basis of the operating conditions and the functional specifications of the equipment under test, according to the following performance criteria:

- A. Normal performance within the specification limits.
 B. Temporary degradation or loss of function or performance, which is recoverable.
 C. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
 D. Degradation or loss of function, which is not recoverable, due to damage of equipment (components).

Required criterion for compliance: A Passed Not passed

Notes

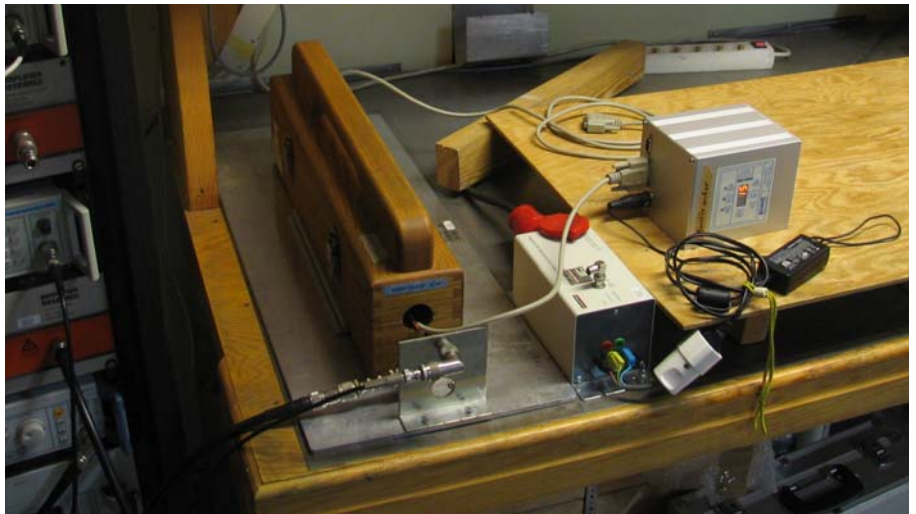
All tests performed with 2 V above chosen test level.

Visual control of function of EUT.

Criteria for normal performance: See head note.

Mains input tested in CDN516.

Remote control cable tested in EM-clamp.



Tested by Tobias Gustavsson

Date 2009-01-22

EN 61000-4-11: Voltage dips and short interruptions immunity test

Report no 09007

EUT Dispenser system Accurate speedcontrol BLDC/

Residual voltage	Cycles	Time	Required performance criterion	Test result criterion
0 %	1	20 ms	B	A
40 %	10	200 ms	C	A
70 %	25	500 ms	C	A
0 %	250	5 s	C	C

Each test repeated 3 times with 30 seconds interval.

Test result

The test results may be classified on the basis of the operating conditions and the functional specifications of the equipment under test, according to the following performance criteria:

- A. Normal performance within the specification limits.
- B. Temporary degradation or loss of function or performance, which is recoverable.
- C. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
- D. Degradation or loss of function, which is not recoverable, due to damage of equipment (components).

Required criterion for compliance: See above Passed Not passed

Notes

Visual control of function of EUT. Mains = 229,3 Vac.

Criteria for normal performance: See head note.

Tested by Ulf Heiding

Date 2009-01-22

RFI Voltage Report No: 09007-01

EUT: Accurate Speedcontrol BM/FMI, Brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, < 36 W, speed: 100%, free running
 Operator: Tobias Gustavsson
 Test Spec: EN 61000-6-3
 Comment: Nordic power model 0055 24Vdc, 1,5A

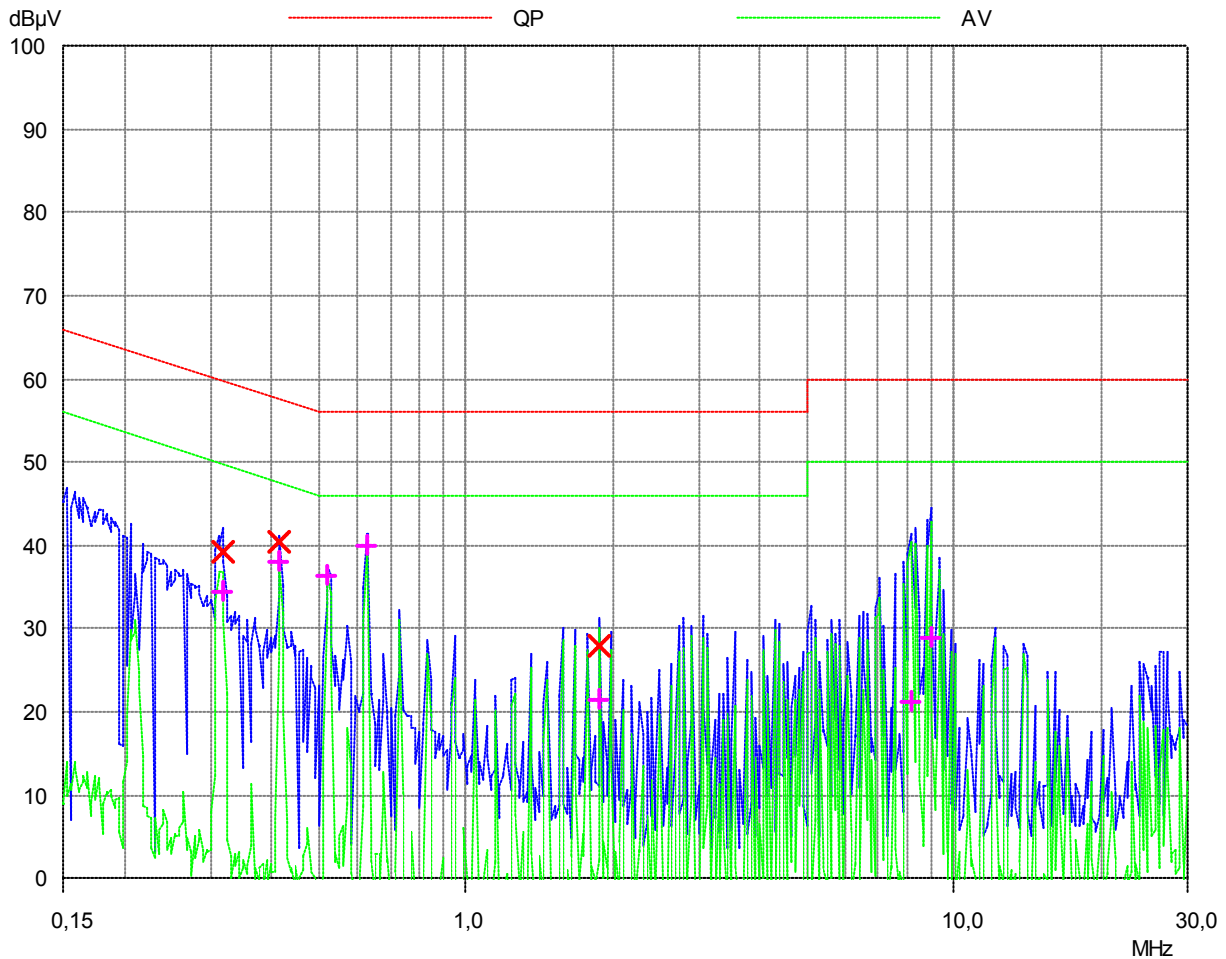
Result File: 09007-01.dat : Oina VV AB, Accurate speedcontrol BM/FMI, cond

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0,8%	10kHz	PK+AV	2msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	P_limiter_13
	2	9kHz	30MHz	Cable_46_48
	21	9kHz	30MHz	LISN_14_1_fas

Final Measurement: Detectors: X QP / + AV
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 10 dB



RFI Voltage Report No: 09007-01

EUT: Accurate Speedcontrol BM/FMI, Brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, < 36 W, speed: 100%, free running
 Operator: Tobias Gustavsson
 Test Spec: EN 61000-6-3
 Comment: Nordic power model 0055 24Vdc, 1,5A

Result File: 09007-01.dat : Oina VV AB, Accurate speedcontrol BM/FMI, cond

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0,8%	10kHz	PK+AV	2msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	P_limiter_13
	2	9kHz	30MHz	Cable_46_48
	21	9kHz	30MHz	LISN_14_1_fas

Final Measurement: Detectors: X QP / + AV
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase	PE
0,31471	39,33	59,85	20,52	N	fl
0,41594	40,34	57,53	17,19	L1	fl
1,87533	28,02	56,00	27,98	L1	fl

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase	PE
0,31471	34,53	49,85	15,32	N	fl
0,41594	37,94	47,53	9,59	L1	fl
0,51991	36,39	46,00	9,61	L1	fl
0,62449	39,90	46,00	6,10	L1	fl
1,87533	21,51	46,00	24,49	L1	fl
8,12489	21,33	50,00	28,67	N	fl
8,94013	29,01	50,00	20,99	L1	fl

* limit exceeded

Indicated Phase/PE shows Configuration of max. Emission

RFI Voltage Report No: 09007-02

EUT: Accurate Speedcontrol BM/FMI, Brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, < 36 W, speed: 50%, free running
 Operator: Tobias Gustavsson
 Test Spec: EN 61000-6-3
 Comment: Nordic power model 0055 24Vdc, 1,5A

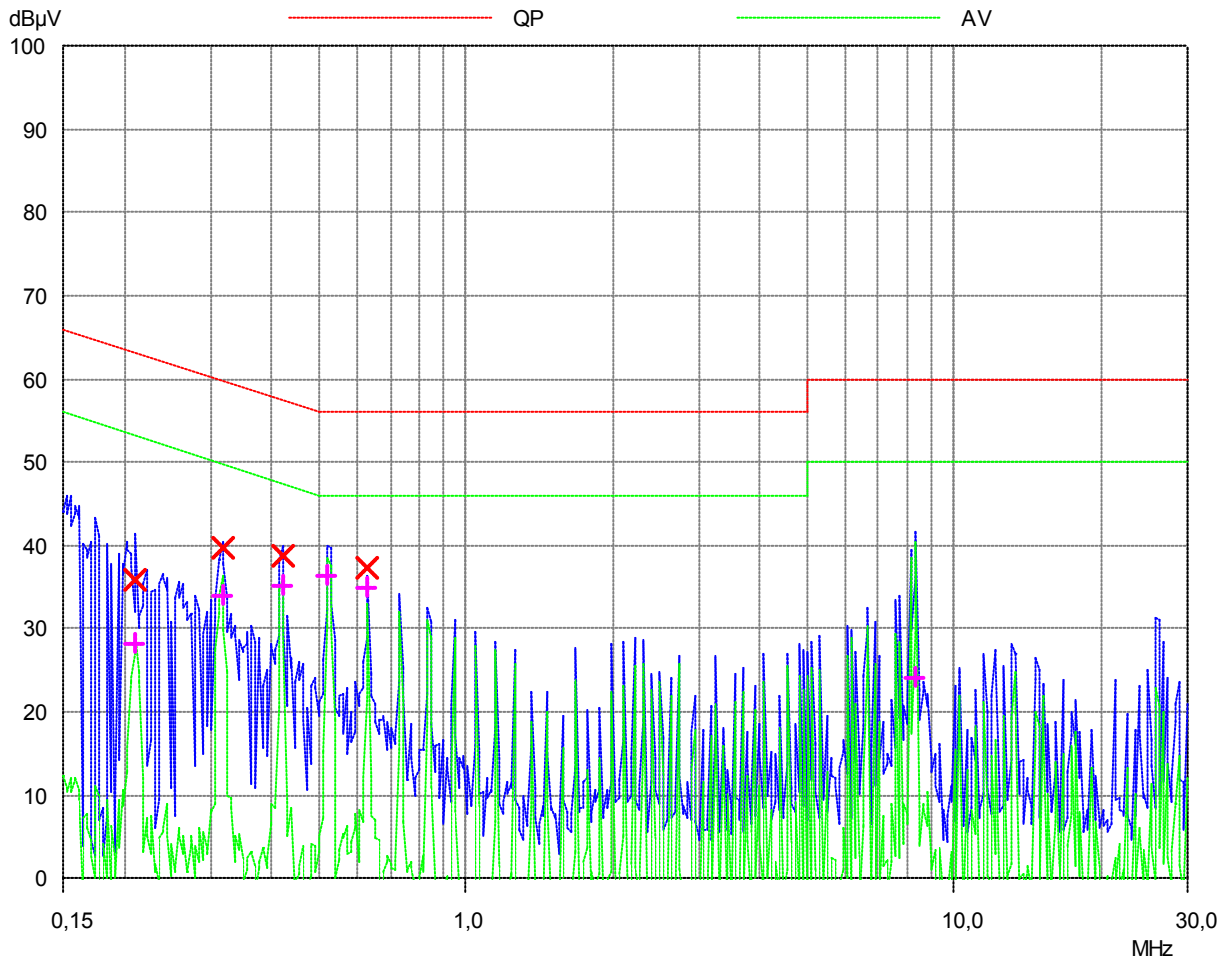
Result File: 09007-02.dat : Oina VV AB, Accurate speedcontrol BM/FMI, cond

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0,8%	10kHz	PK+AV	2msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	P_limiter_13
	2	9kHz	30MHz	Cable_46_48
	21	9kHz	30MHz	LISN_14_1_fas

Final Measurement: Detectors: X QP / + AV
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 10 dB



RFI Voltage Report No: 09007-02

EUT: Accurate Speedcontrol BM/FMI, Brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, < 36 W, speed: 50%, free running
 Operator: Tobias Gustavsson
 Test Spec: EN 61000-6-3
 Comment: Nordic power model 0055 24Vdc, 1,5A

Result File: 09007-02.dat : Oina VV AB, Accurate speedcontrol BM/FMI, cond

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0,8%	10kHz	PK+AV	2msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	P_limiter_13
	2	9kHz	30MHz	Cable_46_48
	21	9kHz	30MHz	LISN_14_1_fas

Final Measurement: Detectors: X QP / + AV
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 10 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase	PE
0,20962	35,86	63,22	27,36	N	fl
0,31471	39,65	59,85	20,20	N	fl
0,41927	38,70	57,46	18,76	L1	fl
0,62449	37,40	56,00	18,60	L1	fl

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase	PE
0,20962	28,22	53,22	25,00	N	fl
0,31471	34,08	49,85	15,77	N	fl
0,41927	35,20	47,46	12,26	L1	fl
0,51991	36,39	46,00	9,61	L1	fl
0,62449	34,95	46,00	11,05	L1	fl
8,32145	24,19	50,00	25,81	L1	fl

* limit exceeded

Indicated Phase/PE shows Configuration of max. Emission

RFI Field Report No: 09007-11

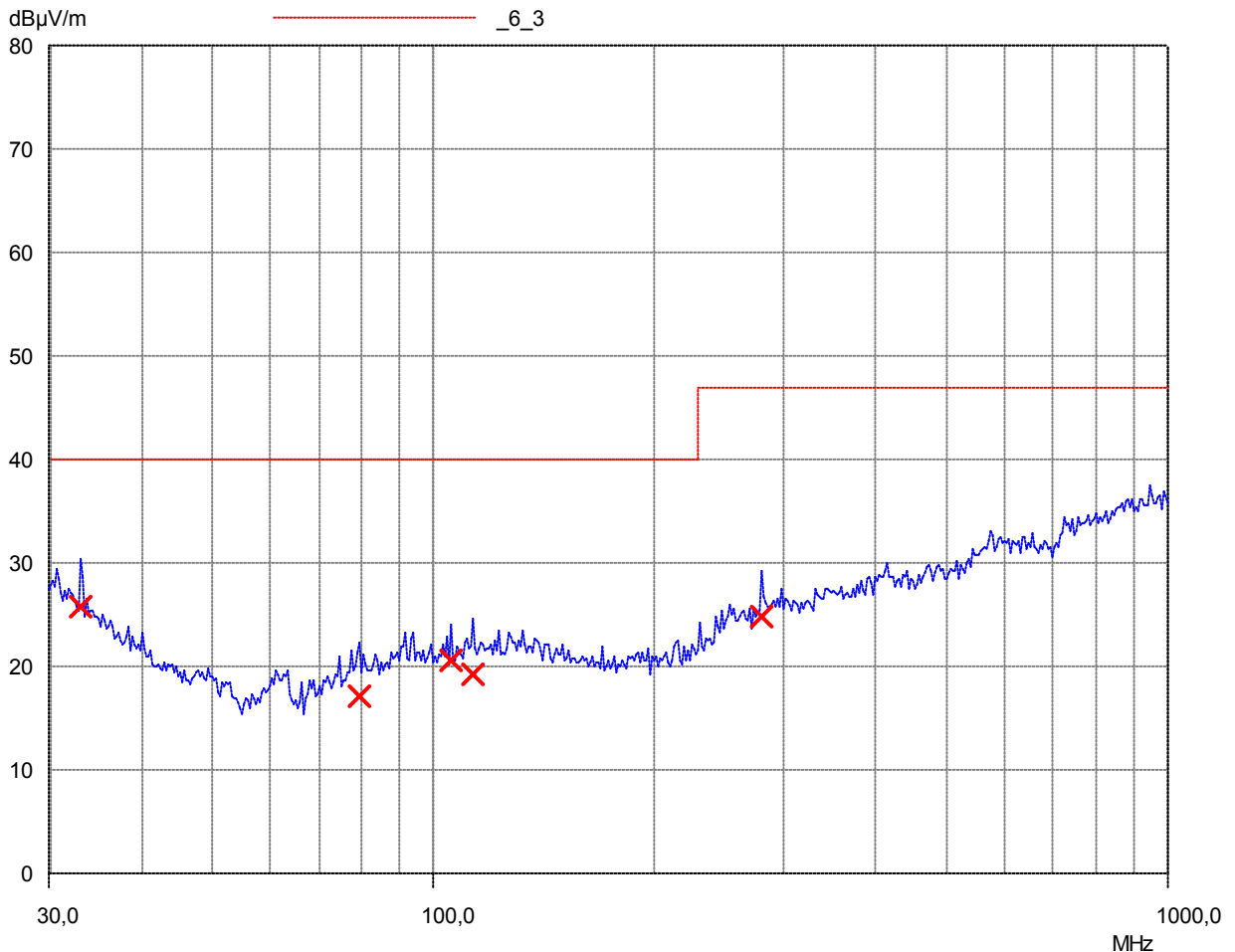
EUT: Accurate Speedcontrol BM/FMI, brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, <36W, speed 100%, free running
 Operator: Ulf Heiding
 Test Spec: EN 61000-6-3
 Comment: QP-values are measured at worst case regarding to antenna height, polarization and EUT azimuth.
 Field measuring in screened room damped with ferrites and absorbers. Dist. 3 m.
 Result File: 09007-11.dat : Oina VV AB, Accurate speedcontrol BM/FMI, rad

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	0,1%	120kHz	PK	1msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	30MHz	1000MHz	Cables_47_49
	21	30MHz	1000MHz	CBL6112_d

Final Measurement: Detector: X QP
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 12 dB



Dectron EMC-Lab
RFI Field Report No: 09007-11

20 jan 2009 16:05

EUT: Accurate Speedcontrol BM/FMI, brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, <36W, speed 100%, free running
 Operator: Ulf Heiding
 Test Spec: EN 61000-6-3
 Comment: QP-values are measured at worst case regarding to antenna height, polarization and EUT azimuth.
 Field measuring in screened room damped with ferrites and absorbers. Dist. 3 m.
 Result File: 09007-11.dat : Oina VV AB, Accurate speedcontrol BM/FMI, rad

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	0,1%	120kHz	PK	1msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	30MHz	1000MHz	Cables_47_49
	21	30MHz	1000MHz	CBL6112_d

Final Measurement: Detector: X QP
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 12 dB

Final Measurement Results

Frequency MHz	QP Level dBµV/m	QP Limit dBµV/m	QP Delta dB	EUT Azimuth deg	Ant. height m	Ant. pol.
32,8894	25,88	40,00	14,12	10	1,0	ver
78,7844	17,13	40,00	22,87	40	1,0	ver
105,485	20,71	40,00	19,29	30	1,0	ver
112,6782	19,29	40,00	20,71	100	3,1	hor
279,5222	24,88	47,00	22,12	80	1,1	hor

* limit exceeded

RFI Field Report No: 09007-12

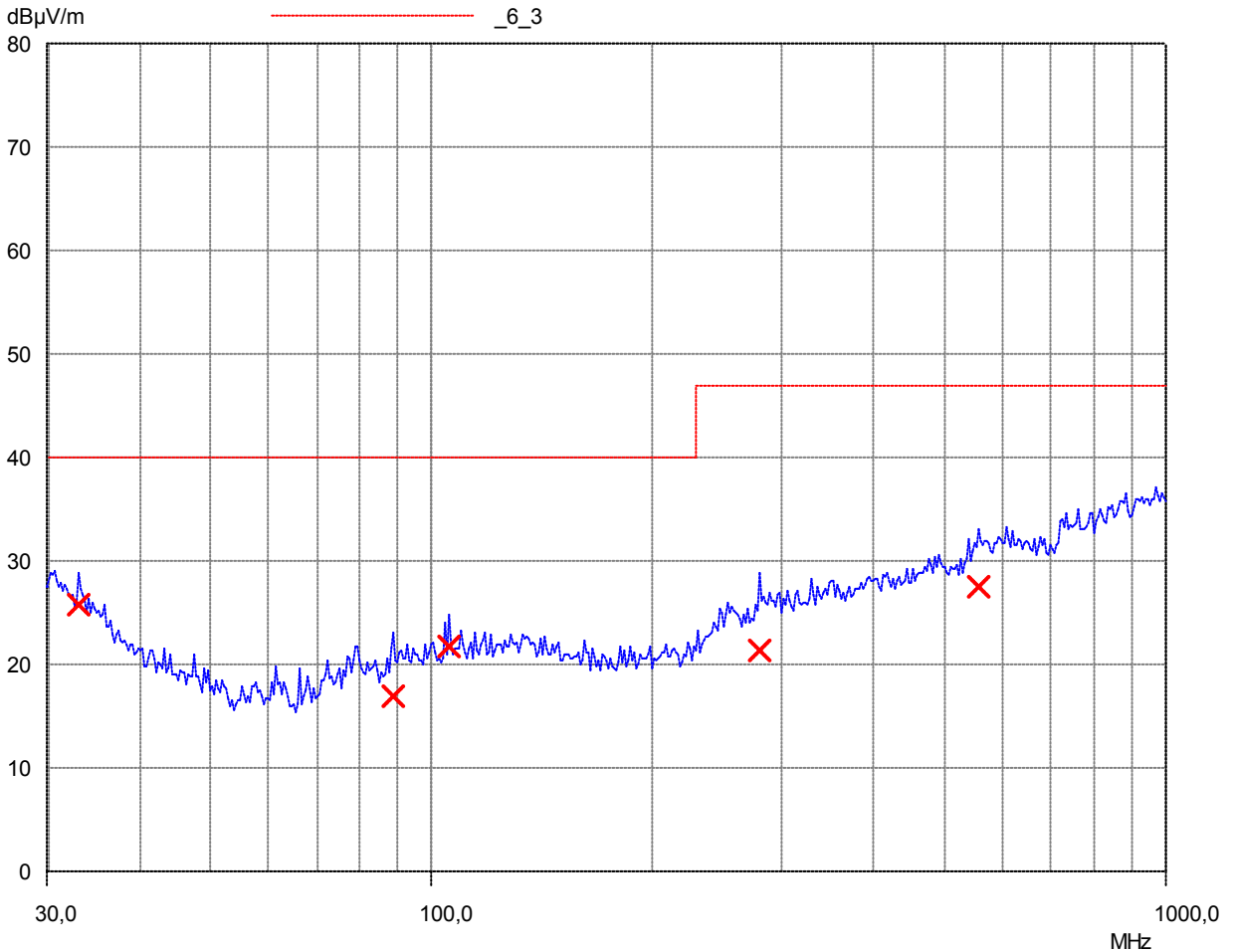
EUT: Accurate Speedcontrol BM/FMI, brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, <36W, speed 50%, free running
 Operator: Ulf Heiding
 Test Spec: EN 61000-6-3
 Comment: QP-values are measured at worst case regarding to antenna height, polarization and EUT azimuth.
 Field measuring in screened room damped with ferrites and absorbers. Dist. 3 m.
 Result File: 09007-12.dat : Oina VV AB, Accurate speedcontrol BM/FMI, rad

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	0,1%	120kHz	PK	1msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	30MHz	1000MHz	Cables_47_49
	21	30MHz	1000MHz	CBL6112_d

Final Measurement: Detector: X QP
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 12 dB



RFI Field Report No: 09007-12

EUT: Accurate Speedcontrol BM/FMI, brushless motor
 Manuf: Oina VV AB
 Op Cond: 230 Vac 50 Hz, <36W, speed 50%, free running
 Operator: Ulf Heiding
 Test Spec: EN 61000-6-3
 Comment: QP-values are measured at worst case regarding to antenna height, polarization and EUT azimuth.
 Field measuring in screened room damped with ferrites and absorbers. Dist. 3 m.
 Result File: 09007-12.dat : Oina VV AB, Accurate speedcontrol BM/FMI, rad

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	0,1%	120kHz	PK	1msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	1	30MHz	1000MHz	Cables_47_49
	21	30MHz	1000MHz	CBL6112_d

Final Measurement: Detector: X QP
 Meas Time: 1sec
 Subranges: 25
 Acc Margin: 12 dB

Final Measurement Results

Frequency MHz	QP Level dBµV/m	QP Limit dBµV/m	QP Delta dB	EUT Azimuth deg	Ant. height m	Ant. pol.
32,8894	25,86	40,00	14,14	20	1,0	ver
88,381	16,96	40,00	23,04	35	2,1	ver
105,3796	21,83	40,00	18,17	20	1,0	ver
279,5222	21,33	47,00	25,67	95	3,1	hor
558,2103	27,47	47,00	19,53	0	1,2	hor

* limit exceeded