

Electromagnetic Compatibility (EMC)

TEST REPORT

TR_2018469_1

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Test Report

Electromagnetic Compatibility (EMC)

Report Number : TR_2018469_1

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of tests

: 09.01.2017-24.01.2017

Total number of pages : 32

Test item description: Oven

Model/Type reference : TN 1001 , TN 1002, TN 2001, TN 2002, TN 2003 , TN 3001, TN 3002,

TN 3003

Trade Mark : AKSOY, REKAZ ALKHAFJİ

Manufacturer : Aksoy Elektrikli Ev Aletleri İthalat İhracat A.Ş.

Address Karpuzseki Mah. 51. Cad. No: 6 Hacılar Kayseri, Turkey

Applicant's name

Address

: Same as manufacturer

Tested by (name + signature)

Serkan Kalafat Eldaş A.Ş. Approved by (name + signature)

Füsun Aksaz SGS Turkey

The report was signed electronically



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1 DOCUMENTATION

1.1 Test Standards

The Equipment Under Test Complies With Following Standard(s)

Title of the standard	Reference standard	Publication Year	Amendment(s) of the standard
Emission-Product family standard -Household appliances, electric tools and similar apparatus	EN 55014-1	(2017)	
	CISPR 14-1	2016	
Immunity-Product family standard -Household appliances, electric tools and similar apparatus	EN 55014-2	(2015)	
	CISPR 14-2:	2015	
Product family standard -Harmonic current emissions	EN 61000-3-2	(2014)	
	IEC 61000-3-	2014	
Product family standard -Voltage fluctuations and flicker sensation	EN 61000-3-3	(2013)	
	IEC 61000-3-	2013	A1:2017

1.2 Overview of Test Results

Emission tests	
Conducted Emissions In The Frequency Range	
Radiated Power In The Frequency Range	
Discontinuous Interference (click)	
Harmonic Currents Emissions	
Voltage Fluctuation And Flicker Sensation	

Immunity tests	
Electrostatic Discharge Immunity (ESD)	N/A
Electrical Fast Transient Immunity (EFT)	
Surge Immunity Test	
RF-Electromagnetic Conducted Immunity	
Voltage Dips And Short Interruptions Immunity	
Radiated, Radio Frequency, Electromagnetic Field Immunity	

Possible test case verdicts:	
- test case does not apply to the test object	: N/A
- test object does meet the requirement	: P (Pass)
- test object does not meet the requirement	: F (Fail)



1.3 Testing Location/address

Note: All tests have been performed Eldaş Elektrik Elektronik Sanayi Ve Ticaret A.Ş. under supervision of SGS Engineer. The address of test location as below;

Organize Sanayi Bölgesi Büyük Selçuklu Blv. No:2 Sincan 06930 ANKARA / TURKEY

Türkak Accreditation Number: AB-0045-T

2 PRODUCT DESCRIPTION

2.1 Equipment Under Test (EUT) Information

Test item description : Oven

Model/Type reference : See table

Rated Voltage : See table

Rated Frequency : See table

Rated Power/Current : See table

Model TN 3001 has been tested and this model is representative of the range. They shared the similar construction except for appearance and power. The applicant declares that the models given table enclose similar electrical components with the tested model.

The EUT tested 50 Hz.

		Supply voltage	
Trademark	Model	and frequency	Power
	TN 1001	220-240 VAC 50/ 60 Hz	1240-1430 W
	TN 1002	220-240 VAC 50/60 Hz	1240-1430 W
11/00/	TN 2001	220-240 VAC 50/60 Hz	1750-2000 W
AKSOY, BEKAZ ALKHAFJİ	TN 2002	220-240 VAC 50/60 Hz	1750-2000 W
HENAZ ALKHAFJI	TN 2003	220-240 VAC 50/60 Hz	1750-2000 W
	TN 3001	220-240 VAC 50/60 Hz	2200-2400 W
	TN 3002	220-240 VAC 50/60 Hz	2200-2400 W
	TN 3003	220-240 VAC 50/60 Hz	2200-2400 W

This test report is update of EMC test report TR_2017018_1.

¹⁻The standards have been updated by the new standards listed in this report, and there is no difference on this kind of products between the new standard and the old one. No additional testing is required accordingly 2- Manufacturer's name have been updated.



Classification of EUT according to EN 55014-2:		
The EUT is classified as	Category I	\boxtimes
	Category II	
	Category III	
	Category IV	



3 TEST CONDITIONS

3.1 Performance Criteria A for Immunity Testing

During testing the EUT shall operate without any degradation of performance.

3.2 Performance Criteria B for Immunity Testing

During testing temporary degradation of performance or loss of function, which is self-recovered are allowed.

3.3 Performance Criteria C for Immunity Testing

Temporary loss of function is allowed if the function is self-recoverable or can be restored by the operation of controls.

3.4 EUT Test Conditions During EMC-Testing

Configuration of the EUT will be made corresponding and actual assembling conditions as far as possible. During tests the temperature control will be set to max. position. Before the tests EUT will be pre-cooled until the steady state has been reached.

Behaviour of the EUT will be monitored during the immunity tests.

3.5 Environmental Conditions

Tests have been performed in a controlled laboratory environment, where the environmental conditions are maintained with in the applicable ranges.

Ambient temperature	15 °C - 35 °C
Relative Humidity	30% - 60%



4 TEST RESULTS AND CONDITIONS

4.1 Emission Test Results

4.1.1 Conducted Emissions In The Frequency Range

Standard	EN 55014-1

Frequency [MHz]	QP [dB(µV)]	AV [dB(μV)]
0,15 – 0,50	66 – 56	59 – 46
0,50 – 5	56	46
5 – 30	60	50

Test Plan/Test Description

Conducted disturbance voltage will be measured with an artificial main network from 150 kHz to 30 MHz with 5 kHz steps and a resolution bandwidth of 10 kHz. Measurements will be carried out with Peak- and Average-detectors from Phase-line and Neutral-line.

If the Peak-values are more than 6 dB below the Quasi Peak-limit no final Quasi Peak-measurement will be made otherwise Quasi Peak-values and Average-values will be recorded from the worst points. Rest of the sub ranges will be measured by using the same procedure.

This measurement will be made from the AC-mains lines. The EUT is working as described in the section "EUT Test Conditions". Test results are presented at the next page.

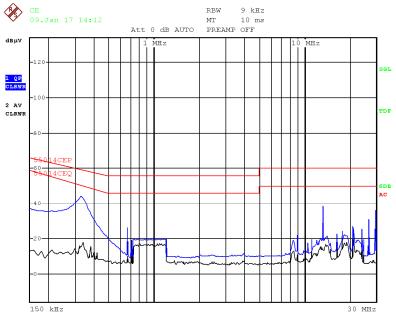
Operating mode

Measurements were performed at max. position.



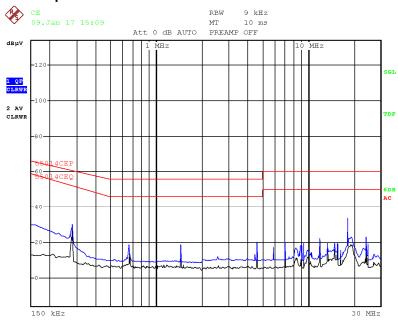
Test Result





HOUSEHOLD ELECTRICAL COCKER LINE Date: 9.JAN.2017 14:12:51

Neutral port



HOUSEHOLD ELECTRICAL COCKER NOTR Date: 9.JAN.2017 15:09:29



Test setup : Conducted Emissions In The Frequency Range



TEST SUMMARY

The EUT fulfils the requirements of the EN 55014-1 Conducted Emission part.

Ρ



4.1.2 Radiated Power In The Frequency Range

Standard	EN 55014-1
----------	------------

Frequency [MHz]	QP [dB(µW)]	AV [dB(μW)]
30 – 300	45 – 55	35 – 45
Margin		
200 - 300	0 – 10	-

Test plan/Test Description

Radiated absorbing power will be measured with an absorbing clamp from 30 MHz to 300 MHz with 100 kHz steps using the resolution bandwidth of 120 kHz. The maximum interference level will be found by moving the clamp along the cable. Final measurements will be made from the worst peaks only with QuasiPeak-detector and Average-detector. No QuasiPeak- or Average-measurements will be made if the Peak-values are more than 10 dB below the QP-limit.

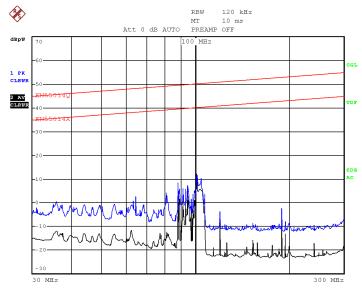
This measurement will be made from the AC-mains.

The EUT is working as described in the section "EUT Test Conditions".

Operating mode

Measurements were performed at max. position.

Test Results



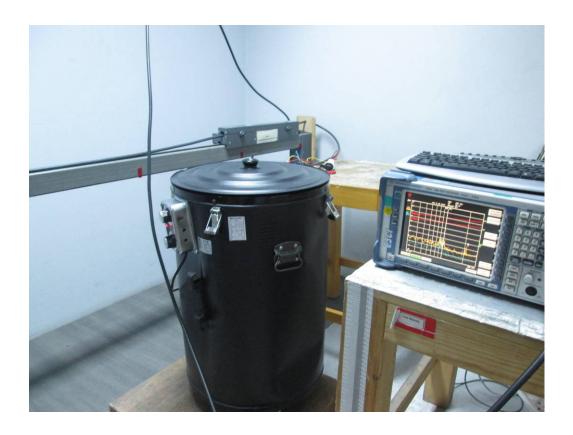
ISIK GORKEM HAUSEHOLD ELEKTRIKALCOCKER ADIM5

Date: 24.JAN.2017 09:35:09

According to clause 4.1.2.3.2 procedure (a) of the EN 55014-1 standard the EUT is deemed to comply in the frequency range from **300 MHz to 1000 MHz** without further measurements.



Test setup : Radiated Power



TEST SUMMARY F

The EUT fulfils the requirements of the EN 55014-1 radiated power part.



4.1.3 Discontinuous Interference (click)

Standard	EN 55014-1
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Frequency [MHz]	QP [dB(μV)]
0,15	66
0,50	56
1,40	56
30,00	60

Test plan/Test Description

The EUT will be exercised as intended for. The click rate analysis will be made with four frequencies and with different continuous interference limits (e.g. sensitivity ($dB\mu V$)). Measured frequencies will be 0.15 MHz, 0.50 MHz, 1.40 MHz and 30 MHz. The limits are 66 $dB\mu V$ for 0.15 MHz, 56 $dB\mu V$ for both 0.50 MHz and 1.40 MHz and 60 $dB\mu V$ for 30 MHz at the first test run (Run A).

The test time (T) is 120 min. If the total number of switching operations (n_2) is measured to be 40 before the time of 120 min is passed, the test shall be interrupted and the test time will be recorded. After that the test will be repeated with the new sensitivity limits. If the click rate $N \le 5$, all click durations are ≤ 20 ms and 90 % of the click durations are ≤ 10 ms, repeating the test is not necessary.

The sensitivity of the second test run will be calculated from the following formula:

Sensitivity (Run B) = Run A + 20 * log (30/(Run A switching operations * 0.5)).

The time for second test run will be the same as the time taken for the first test run.

If the total number of the counted clicks (run B) will be $\leq 0.25 \times n_1$ and the click duration will not exceed 200 ms during the test, EUT fulfils the requirements of the standard.

Test will be made with all the operations of the EUT, which are controlled by either the thermostat or the energy regulators. Different operations will be tested separately. Both lines (neutral and phase L) will be tested separately.

The click rate N is half of the number of switching operations per minute for duty cycle $50 \pm 10\%$ of the control devices.

The test results are shown on the following pages.

Operating mode

Measurements were performed at max. position.



Test results

Test results, measured phase L

Table 3. Run A

Used frequencies [MHz]:	0,15	0,5	1,4	30
Sensitivity [dB(μV)]:	66	56	56	60
Number of counted clicks, (short):	0	0	0	0
Number of counted clicks, (long):	0	0	0	0
Total number of clicks (n ₁):	0	0	0	0

Duration over 200 ms [s]	0	0	0	0
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Switching operations rate

0

Total time of run (T):

960 minutes

Table 4. Run B

Sensitivity dB(μV) (L+Lq)	-	-	-	-
Number of clicks allowed above permitted limits:	-	-	-	-
Number of counted clicks, (short):	-	-	-	-
Number of counted clicks, (long):	-	-	-	-
Total number of clicks (n ₁):	-	-	ı	1

Click rate used:

Total time of run (T): -

Test result: PASS

Remarks: No click emission detected.

Test results, measured phase N

Table 5. Run A

Used frequencies [MHz]:	0,15	0,5	1,4	30
Sensitivity [dB(μV)]:	66	56	56	60
Number of counted clicks, (short):	0	0	0	0
Number of counted clicks, (long):	0	0	0	0
Total number of clicks (n ₁):	0	0	0	0

Duration over 200 ms [s]	Λ	Λ	Λ	Λ
Duration over 200 ms [S]	U	0	U	0

Switching operations rate

C

Total time of run (T):

960 minutes



Table 6. Run B

Sensitivity $dB(\mu V)$ (L+L _q)	-	-	-	-
Number of clicks allowed above permitted limits:	-	-	-	-
Number of counted clicks, (short):	-	-	-	-
Number of counted clicks, (long):	-	-	-	-
Total number of clicks (n ₁):	-	-	-	-

Click rate used: Total time of run (T): -

TEST SUMMARY P

The EUT fulfils the requirements of EN 55014-1 discontinuous part.



4.1.4 Harmonic Currents Emissions

Standard	EN 61000-3-2
Stariuaru	LI4 0 1000-3-2

Test Plan/Test Description

Depending on the type of EUT, the test class will be determined by the test engineer.

Concerning all products the maximum peak current A (pk), the fundamental current and power factor (PF) will be measured prior to measurement. These values are used in order to set the limits in actual test depending on the class.

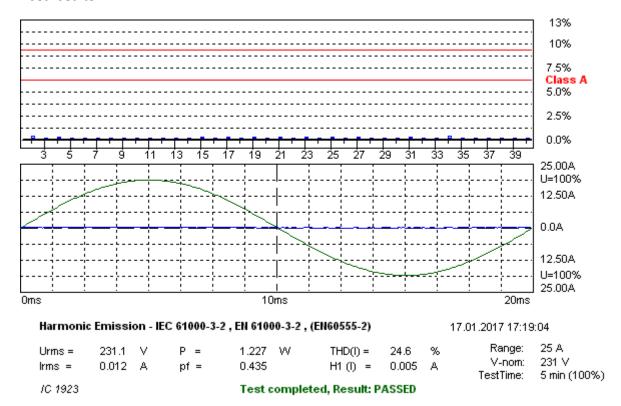
Preliminary measurements will be made in order to find out the state, which produces the maximum amount of harmonics. Harmonics up to 40 will be measured.

Test time 5 Minutes Equipment Class A

Operating mode

Measurements were performed at max. position.

Test results



HAR-1000 EMC-Partner



Measurement

Urms = 231.1V Freq = 50.013 Range: 25 A Irms = 0.012A P = 1.227W THDi = 24.6 % 0.012A lpk = 1.227W S = 0.073A cf = 2.821VA pf = 6.000 0.435

THDu = 0.10 % Class A

Test - Time : 5min (100%)

Test completed, Result: PASSED

Order	Freq. [Hz]	Irms [A]	lmax [A]	Limit [A]	Status
1 2	50 100	0.0046 0.0000	10.339 0.0305	1.0800	
3	150	0.0000	0.0303	2.3000	
4	200	0.0000	0.0046	0.4300	
5	250	0.0000	0.0031	1.1400	
6	300	0.0000	0.0015	0.3000	
7	350	0.0000	0.0031	0.7700	
8	400	0.0000	0.0015	0.2300	
9	450	0.0000	0.0031	0.4000	
10	500	0.0000	0.0000	0.1840	
11	550	0.0000	0.0015	0.3300	
12 13	600 650	0.0000	0.0000	0.1533	
14	700	0.0000 0.0000	0.0015 0.0000	0.2100 0.1314	
15	750 750	0.0000	0.0000	0.1514	
16	800	0.0000	0.0000	0.1150	
17	850	0.0000	0.0015	0.1324	
18	900	0.0000	0.0000	0.1022	
19	950	0.0000	0.0015	0.1184	
20	1000	0.0000	0.0000	0.0920	
21	1050	0.0000	0.0015	0.1071	
22	1100	0.0000	0.0000	0.0836	
23	1150	0.0000	0.0015	0.0978	
24	1200	0.0000	0.0000	0.0767	
25	1250	0.0000	0.0015	0.0900	
26 27	1300 1350	0.0000 0.0000	0.0000 0.0015	0.0708 0.0833	
28	1400	0.0000	0.0013	0.0657	
29	1450	0.0000	0.0000	0.0037	
30	1500	0.0000	0.0000	0.0613	
31	1550	0.0000	0.0015	0.0726	
32	1600	0.0000	0.0000	0.0575	
33	1650	0.0000	0.0000	0.0682	
34	1700	0.0000	0.0015	0.0541	
35	1750	0.0000	0.0000	0.0643	
36	1800	0.0000	0.0000	0.0511	
37	1850	0.0000	0.0000	0.0608	
38	1900	0.0000	0.0000	0.0484	
39	1950	0.0000	0.0000	0.0577	
40	2000	0.0000	0.0000	0.0460	



Test setup: Harmonic Current Emissions



TEST SUMMARY F

The EUT fulfils the requirements of the EN 61000-3-2 for Class A.



4.1.5 Voltage Fluctuation And Flicker Sensation

Standard	EN 61000-3-3

Test plan/Test Description

The EUT will be exercised as intended for. The total testing time is 10 min. Relative steady-state voltage change d_c , maximum relative change d_{max} and the value of d(t) shall be measured with a flicker meter

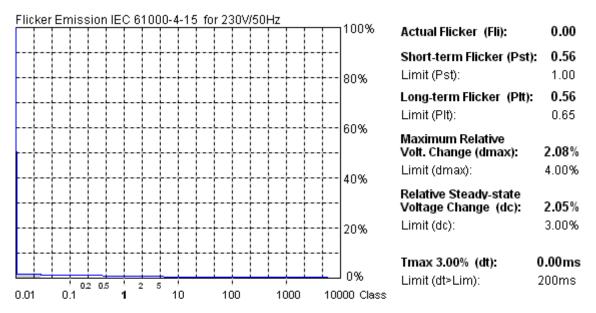
Limits

P _{ST}	≤ 1
P _{LT}	≤ 0,65
d _C	≤ 3,3 %
d _{MAX}	≤ 4 %

Operating mode

Measurements were performed at max. position.

Test results



Flicker Emission - IEC 61000-3-3, EN 61000-3-3

Urms = 231.1 V P = 1.227 W Irms = 0.012 A pf = 0.435 /C 1923 Test completed, Result: PASSED

Range: 25 A V-nom: 231 V TestTime: 10 min (100%)

17.01.2017 17:08:39

HAR-1000 EMC-Partier



Test setup : Voltage Fluctuations



TEST SUMMARY

The EUT fulfils the requirements of the EN 61000-3-3.



4.2 Immunity Test Results

4.2.1 Electrostatic Discharge Immunity (ESD)

Standard	EN 55014-2
Basic standard	EN 61000-4-2

Test plan/Test Description

Tests will be done using the air discharge on non-conductive parts of the EUT. The contact discharge will be given to all conductive parts of the EUT. Also the indirect contact discharges will be given to vertical coupling planes in order to simulate the objects placed near the EUT. All four sides and the top of the EUT will be tested with both polarities.

At least ten discharges will be given with both polarities to the selected points.

The air discharge will be given with \pm 8 kV test levels.

The contact and the indirect contact discharge will be given with ± 4 kV test levels.

Operating mode

Test results

Test setup	: Electrostatic Discharge Immunity (Esd)

TEST SUMMARY N/A.



4.2.2 Electrical Fast Transient Immunity (EFT)

Standard	EN 55014-2
Basic standard	EN 61000-4-4

Test plan/Test Description

Tests will be done to the AC-power supply port with the voltage level of \pm 1 kV and 5 kHz. First the level will be tested with both polarities. After both polarities have been tested, the coupling path will be changed. Phase line, neutral will be tested separately. Both polarities will be tested with 120 seconds duration time and with 5 seconds recovery time between the tests.

Operating inoue	0	perating	mode
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Test results

Test setup	: Electrical Fast Transient Immunity (EFT)		

TEST SUMMARY	N/A		



4.2.3 Surge Immunity Test

Standard	EN 55014-2
Basic standard	EN 61000-4-5

Test plan/Test Description

Test will be done to the AC power supply port with step by step voltage levels starting at:

- ± 1 kV between phase and phase, Output impedance: 2 ohm
- ± 1 kV between phase and neutral, Output impedance: 2 ohm
- ± 2 kV between phase and protective earth, Output impedance: 12 ohm
- \pm 2 kV between neutral and protective earth, Output impedance:12 ohm

Positive and negative pulses will be given with 0°, 90°,180° and 270° phase angles. Each pulse will be given five times with 60 seconds repetition rate. First the positive and the negative pulse will be given to the selected coupling path, then the phase angle will be changed and after that the voltage level will be increased to the next test level.

Operating mode

Test results

Test setup	: Surge Immunity

TEST SUMMARY N/A



4.2.4 RF-Electromagnetic Conducted Immunity

Standard	EN 55014-2
Basic standard	EN 61000-4-6

Test plan/Test Description

Test will be done from 150 kHz to 230 MHz. The calibration is done with 1 % logarithmic step size with an unmodulated signal. In the calibration setup the signal is fed to coupling network. The required power levels are recorded over the whole frequency range.

The EUT is placed 10 cm above the reference ground plane.

Test will be carried out with a voltage level of 3 V_{rms} (80 % AM- modulated, 1 kHz sine signal). Test will be performed to AC-power supply port.

Operating mode

Test results

Test setup	: RF-Electromagnetic Conducted Immunity

TEST SUMMARY	N/A	



Basic standard

4.2.5 Voltage Dips And Short Interruptions Immunity

EN 61000-4-11

Test plan/Test Description
Test will be done to the AC-power supply port with the following voltage percentage dips of the rated voltage: 30% and 60%. Test will be also done with 100% voltage interruptions of the rated voltage.
Operating mode
Test results

Test setup	: Voltage Dips And Short Interruptions Immunity		

TEST SUMMARY N/A



4.2.6 Radiated, Radio Frequency, Electromagnetic Field Immunity

Basic standard	EN 61000-4-3
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Test plan/Test Description

The EUT has been supplied with 230 V in Anechoic Chamber on a wooden table that was above 10 cm height from floor. The test has been made by turning EUT four dimensions on vertical and horizontal polarizations of the antenna.

Test Level : 3V/m (80MHz to 1GHz)

Modulation : 80% amplitude at 1kHz

Dwell Times : 2 seconds for each step

Operating mode

Test setup	: Radiated, Radio Frequency, Electromagnetic Field Immunity		

TEST SUMMARY N/A



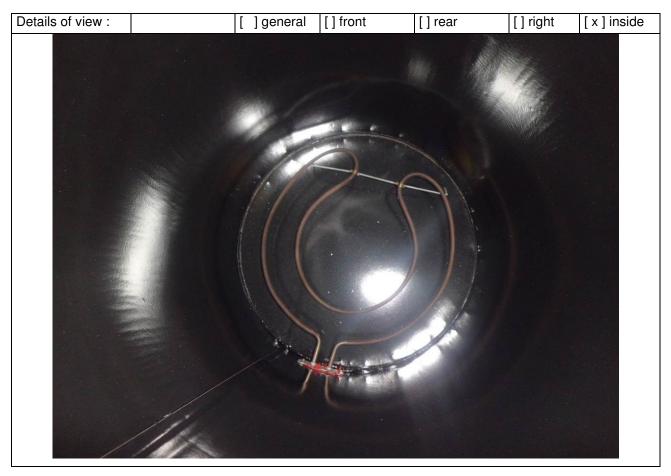
5 EQUIPMENT UNDER TEST OF PHOTOS











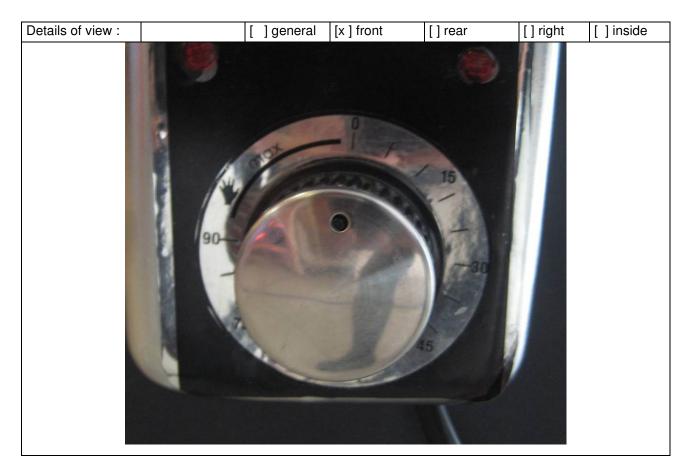
S-CRS-EE-F-32 REV:04/00 10.05.2016













6 LIST OF TEST EQUIPMENT USED

Equipment Name	Brand	Model	Serial No	Calibration Due Date
Emi Test Reciever	Rohde&Schwarz	ESCI	100173	09.2017
Solid State Power Amplifier 15 W	Bonn Elektronik	BSA012515	035357A	04.2017
Ultra Compact Simulator	EM Test	UCS 500 M4	V0630101686	07.2017
Signal Generator	Rohde&Schwarz	SML03	102312	05.2017
Coupling Decoupling	EMC Elektronik	M3	231240019	06.2017
RF Power Amplifier	AR	100W1000B1	305583	04.2017
ESD Simulator	EM Test	Dito	V0630101687	
Video Monitors	Philips	LTC 2009	M2030409	
Camera	Samsung	SBC-301AP		
VUSLP 9111 Antenna	Schwarzbeck	VULSP 9111	9111-232	07/2017
Balun Antenna	Schwarzbeck	VHBC 9133	9133-082	07/2017
IEC STANDART IMPEDANCE NETWORK	VOLTECH	EUR	26.12.1906	

Validation is done on all devices, per six month

7 MEASUREMENT UNCERTAINTIES

Equipment	Uncertainty		
Harmonic current emission	± 2.90 %		
Voltage Fluctations	± 4.3 %		
Mains conducted disturbance voltage	± 3.93 dB		
Discontinuous disturbance(clicks)	3,43 dB		
Dsturbance power	± 5.51 dB		
Electrostatic Discharges (ESD)	Interference generator fulfils basic requirements		
Elertrical fast transient(EFT)	Interference generator fulfils basic requirements		
Surge transients	Interference generator fulfils basic requirements		
Power supply voltage interruptions&dips	Interference generator fulfils basic requirements		
Equipment	Uncertainty		



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End of the Report