

TEST REPORT

Product Name : Espresso Machine with Grinder
Model Number : ES7xx***** aaa
(Where “x”, “*” and “a” can be any alpha-numeric character from A to Z or 0-9 or may be blank to denote different countries, colors, customers or customer code or configurations and package. Where “aaa” represent factory code, the factory code is not part of the official model number.)

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TABLE OF CONTENT

Test Report Description	Page
1. SUMMARY OF TEST RESULTS	6
2. GENERAL INFORMATION	7
2.1. Description of Device (EUT)	7
2.2. Independent Operation Modes	8
2.3. Test Manner	8
2.4. Description of Test Facility	8
2.5. Description of Support Device	9
2.6. Measurement Uncertainty	9
3. MEASURING DEVICE AND TEST EQUIPMENT	10
3.1. For Main ports disturbance voltage Emission Measurement	10
3.2. For Click Measurement	10
3.3. For Disturbance Power Measurement	10
3.4. For Harmonic Current / Flicker Measurement	10
3.5. For Electrostatic Discharge Immunity Test	10
3.6. For Electrical Fast Transient / Burst Immunity Test	10
3.7. For Surge Immunity Test	11
3.8. For Injected Current Susceptibility Test	11
3.9. For Voltage Dips and Interruptions Test	11
4. MAINS PORTS DISTURBANCE VOLTAGE EMISSION MEASUREMENT	12
4.1. Block Diagram of Test Setup	12
4.2. Measurement Standard and Limits	12
4.3. Test Procedure	13
4.4. Measuring Results	13
5. CLICKS MEASUREMENT	16
5.1. Block Diagram of Test Setup	16
5.2. Clicks Measurement Standard and limit	16
5.3. EUT Configuration	16
5.4. Test Procedure	16
5.5. Test Results	16
6. DISTURBANCE POWER MEASUREMENT	19
6.1. Block Diagram of Test Setup	19
6.2. Measurement Standard and Limits	19
6.3. Test Procedure	19
6.4. Test Results	20
7. HARMONIC CURRENT EMISSION MEASUREMENT	22
7.1. Block Diagram of Test Setup	22
7.2. Standard Limits	22
7.3. Test Procedure	23
7.4. Measuring Results	23
8. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT	27
8.1. Block Diagram of Test Setup	27
8.2. Standard Limits	27
8.3. Test Procedure	27
8.4. Measuring Results	27
9. IMMUNITY PERFORMANCE CRITERIA DESCRIPTION	29
10. IMMUNITY MAINS OPERATION DESCRIPTION	30

10.1. Voltage at the AC mains port	30
10.2. Frequency at the AC mains port	30
11. ELECTROSTATIC DISCHARGE IMMUNITY TEST	31
11.1. Test Specification.....	31
11.2. Block Diagram of Test Setup	31
11.3. Test Procedure	31
11.4. Test Results	32
12. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST	33
12.1. Test Specification.....	33
12.2. Block Diagram of Test Setup	33
12.3. Test Procedure	34
12.4. Test Results	34
13. SURGE IMMUNITY TEST	35
13.1. Test Specification.....	35
13.2. Block Diagram of Test Setup	35
13.3. Test Procedure	35
13.4. Test Results	36
14. INJECTED CURRENTS SUSCEPTIBILITY TEST	37
14.1. Test Specification.....	37
14.2. Block Diagram of Test Setup	37
14.3. Test Procedure	37
14.4. Test Results	38
15. VOLTAGE DIPS AND INTERRUPTIONS TEST	39
15.1. Test Specification.....	39
15.2. Block Diagram of Test Setup	39
15.3. Test Procedure	39
15.4. Test Results	40
16. PHOTOGRAPHS	41
16.1. Photos of Conducted Emission Measurement	41
16.2. Photo of Click Measurement	42
16.3. Photo of Disturbance Power Measurement.....	42
16.4. Photo of Harmonic / Flicker Measurement	43
16.5. Photo of Electrostatic Discharge Test	43
16.6. Photo of Electrical Fast Transient / Burst Test	44
16.7. Photo of Surge Test	44
16.8. Photo of Injected Currents Susceptibility Test	45
16.9. Photo of Voltage Dips and Interruption Test	45

APPENDIX (Photos of the EUT)

TEST REPORT DESCRIPTION

Applicant : SharkNinja Operating LLC
Manufacturer 1 : SharkNinja Europe Ltd
Manufacturer 2 : SharkNinja Operating LLC
Manufacturer 3 : SharkNinja Germany GmbH
Trade Mark : Shark
EUT : Espresso Machine with Grinder
Model No. : ES7xx***** aaa
(Where "x", "*" and "a" can be any alpha-numeric character from A to Z or 0-9 or may be blank to denote different countries, colors, customers or customer code or configurations and package. Where "aaa" represent factory code, the factory code is not part of the official model number.)
Power Supply : 240V~, 60Hz, 1650W

Measurement Procedure Used:

EN IEC 55014-1:2021, CISPR 14-1:2020
EN IEC 61000-3-2: 2019+A1:2021, IEC 61000-3-2:2018+A1:2020
EN 61000-3-3:2013+A2:2021, IEC 61000-3-3:2013+A1:2017+A2:2021
EN IEC 55014-2:2021, CISPR 14-2:2020
(IEC 61000-4-2:2008, IEC 61000-4-4:2012, IEC 61000-4-5: 2014+A1:2017, IEC 61000-4-6:2013, IEC 61000-4-11:2020)

The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN IEC 55014-1, EN IEC 61000-3-2, EN61000-3-3 and EN IEC 55014-2 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (SHENZHEN) CO., LTD.

Date of Test : June 16, 2024 to June 28, 2024

Prepared by : Jessie Hu
Jessie Hu/Editor

Reviewer : Kaimin Guo
Kaimin Guo/Supervisor

Approved & Authorized Signer : Lisa Wang
Lisa Wang/Manager

Modified Information

Version	Report No.	Revision date	Summary
/	ENS2406110213E00201R	/	Original Version



1. SUMMARY OF TEST RESULTS

EMISSION						
Description of Test Item			Standard	Limits	Results	
General conducted	Main ports disturbance voltage		EN IEC 55014-1:2021	Table 5	Pass	
	Auxiliary ports disturbance voltage				N/A	
	Auxiliary ports disturbance current				N/A	
Disturbance Power	General		EN IEC 55014-1:2021	Table 7	Pass	
Click			EN IEC 55014-1:2021	Section 4	Pass	
Harmonic Current Emission			EN IEC 61000-3-2: 2019+A1:2021	Class A	Pass	
Voltage Fluctuation and Flicker			EN 61000-3-3: 2013+A2:2021	Section 5	Pass	
IMMUNITY (EN IEC 55014-2:2021)						
The category of EUT	Description of Test Item		Basic Standard	Performance Criteria	Results	
☐ Category I ☒ Category II ☐ Category III ☐ Category IV ☐ Category V	Electrostatic Discharge (ESD)		IEC 61000-4-2:2008	B	Pass	
	EFT/B Immunity	AC mains power ports	IEC 61000-4-4:2012	B	Pass	
		Signal ports, control ports and wired network ports			N/A	
		DC network power ports			N/A	
	☐ Category I ☒ Category II	Surge Immunity	AC mains power ports	IEC 61000-4-5: 2014+A1:2017	B	Pass
			Wired network ports			N/A
	☐ Category III ☐ Category IV ☐ Category V	Conducte d RF Immunity	AC mains power ports	IEC 61000-4-6:2013	A	Pass
	Signal ports, control ports and wired network ports		N/A			
	DC network power ports		N/A			
	Voltage Dips, 60% Reduction			IEC 61000-4-11:2020	C	Pass
	Voltage Dips, 30% Reduction				C	Pass
	Voltage Interruptions				C	Pass
Note: 1. N/A is an abbreviation for Not Applicable. 2. Please see clause 5.4.3(Exceptions from the click definition) for EN 55014-1 Rules and Regulation, The purpose of mains connection or disconnection only(the switch)						

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	:	Espresso Machine with Grinder
Model Number	:	ES7xx***** aaa (Where "x", "*" and "a" can be any alpha-numeric character from A to Z or 0-9 or may be blank to denote different countries, colors, customers or customer code or configurations and package. Where "aaa" represent factory code, the factory code is not part of the official model number.) (Note: These models are identical in circuitry and electrical, mechanical and physical construction; the only differences are the model number. for trading purpose. We prepare ES701UK for test.)
Clock Frequency	:	4kHz
Test condition	:	The EUT needs to be preheated for 5 to 15 minutes to reach stable operation state.
Applicant	:	SharkNinja Operating LLC
Address	:	89 A Street, Suite 100 Needham, MA 02494 USA
Manufacturer 1	:	SharkNinja Europe Ltd
Address	:	1st/2nd Floor Building 3150, Thorpe Park, Century Way, Leeds, England, LS15 8ZB, United Kingdom
Manufacturer 2	:	SharkNinja Operating LLC
Address	:	89 A Street, Suite 100 Needham, MA 02494 USA
Manufacturer 3	:	SharkNinja Germany GmbH
Address	:	Rotfeder-Ring 9, 60327 Frankfurt am Main, Germany
Factory	:	Uni-Splendor Technology (Hui Zhou) Corp
Address	:	Lidong Village, Baihua Town, Huidong County, Huizhou, Guangdong, 516369 CN
Date of Received	:	June 16, 2024
Date of Test	:	June 16, 2024 to June 28, 2024

2.2. Independent Operation Modes

- A. On
 - 1. Coffee Making
 - 2. Grind Mode
- B. Stand-By
- C. Off

2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Main ports disturbance voltage	AC 230V/50Hz	Mode A	Mode A.2
Disturbance Power	AC 230V/50Hz	Mode A	Mode A.1
Click	AC 230V/50Hz	Mode A.1	\
Harmonic Current Emission	AC 230V/50Hz	Mode A.1	\
Voltage Fluctuation and Flicker	AC 230V/50Hz	Mode A.1	\
Electrostatic Discharge (ESD)	AC 230V/50Hz	Mode A	\
EFT/B Immunity	AC 230V/50Hz	Mode A	\
Surge Immunity	AC 230V/50Hz	Mode A	\
Conducted RF Immunity	AC 230V/50Hz	Mode A	\
Voltage dips and interruptions	AC 230V/50Hz	Mode A	\

2.4. Description of Test Facility

Site Description
EMC Lab.

: Accredited by CNAS

The Certificate Registration Number is L2291.

The Laboratory has been assessed and proved to be in compliance with
CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC

Designation Number: CN1204

Test Firm Registration Number: 882943

Accredited by A2LA

The Certificate Number is 4321.01.

Accredited by Industry Canada

The Conformity Assessment Body Identifier is CN0008

Name of Firm

: EMTEK (SHENZHEN) CO., LTD.

Site Location

: Building 69, Majialong Industry Zone, Nanshan District, Shenzhen,
Guangdong, China

2.5. Description of Support Device

N/A

2.6. Measurement Uncertainty

Test Item	Uncertainty
Conducted Emission Uncertainty	: 2.20dB(9k~150kHz Conduction 1#) 2.24dB(150k-30MHz Conduction 1#)
Power clamp	: 3.08dB
Uncertainty for Flicker test	: 0.514%
Uncertainty for Harmonic test	: 3.68%
Uncertainty for C/S Test	: 0.94dB(Using CDN Test) 2.37dB(Using EM Clamp Test)
Uncertainty for test site temperature and humidity	: 0.6℃ 4%

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Main ports disturbance voltage Emission Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	EMI Test Receiver	Rohde & Schwarz	ESCI	101384	May 11, 2024	1 Year
☒	AMN	Rohde & Schwarz	ENV216	101161	May 10, 2024	1 Year
☒	AMN	Kyoritsu	KNW-407	8-1492-9	May 11, 2024	1 Year

3.2. For Click Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	Click Switching Operation Box	AFJ	SW04	SW041412079	N/A	N/A
☒	Click Meter	AFJ	CL55C	55041412214	May 11, 2024	1 Year
☒	AMN	Rohde & Schwarz	ENV216	101161	May 10, 2024	1 Year

3.3. For Disturbance Power Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	EMI Test Receiver	Rohde & Schwarz	ESCI	101384	May 11, 2024	1 Year
☒	Absorbing Clamp	Rohde & Schwarz	MDS-21	833711/025	May 11, 2024	1 Year
☒	6db ATT	Rohde & Schwarz	50Ω/2W	272. 4110. 50	May 11, 2024	1Year

3.4. For Harmonic Current / Flicker Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 11, 2024	1 Year
☒	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 11, 2024	1 Year
☒	Impedance network	Teseq	INA2197/37A	1305A02873	May 11, 2024	1 Year
☒	Impedance network	Teseq	INA 2196/75A	1305A02874	May 11, 2024	1 Year
☐	Proflin 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 11, 2024	1 Year

3.5. For Electrostatic Discharge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	ESD Tester	EMTEST	Dito	P2220263883	Oct. 20, 2023	1 Year

3.6. For Electrical Fast Transient / Burst Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	Burst Tester	Partner	IMU-MGS	109938-1635	Oct. 23, 2023	1 Year

3.7. For Surge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	Controller	HAEFELY	Psurge 8000	174031	May 11, 2024	1 Year
☒	Impulse Module	HAEFELY	PIM 100	174124	May 11, 2024	1 Year
☒	Coupling Decoupling	HAEFELY	PCD 130	172181	May 11, 2024	1 Year
☐	Coupling Module	HAEFELY	PCD122	174354	May 11, 2024	1 Year
☐	Impulse Module	HAEFELY	PIM 120	174435	May 11, 2024	1 Year
☐	Coupling Module	HAEFELY	PCD 126A	174387	May 11, 2024	1 Year
☐	Impulse Module	HAEFELY	PIM 110	174391	May 11, 2024	1 Year
☐	Impulse Module	HAEFELY	PIM 150	178707	May 12, 2024	1 Year
☐	Impulse Module	PMI	PCDN8	190422	May 12, 2024	1 Year

3.8. For Injected Current Susceptibility Test

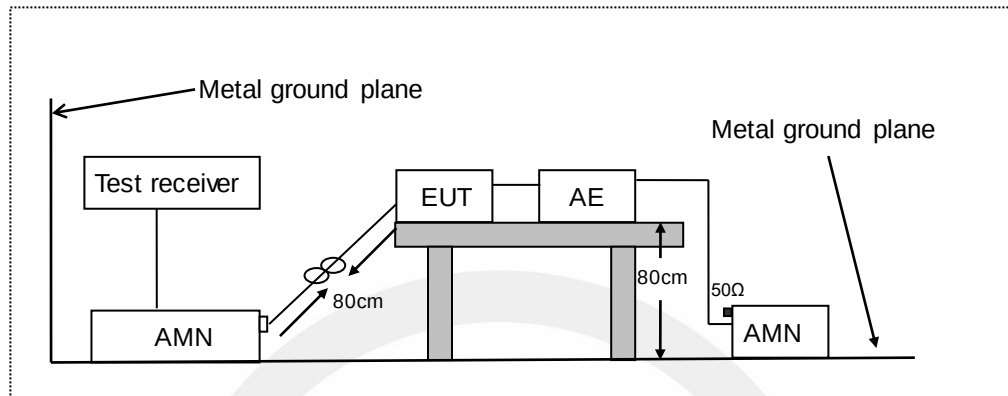
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	Continuous Wave Simulator	EMTEST	CWS500C	0900-12	May 10, 2024	1 Year
☐	CDN	EMTEST	CDN-M2	510010010010	May 11, 2024	1 Year
☒	CDN	EMTEST	CDN-M3	0900-11	May 11, 2024	1 Year
☐	EM Injection Clamp	EMTEST	F-2031-23MM	368	May 12, 2024	1 Year
☒	Attenuator	EMTEST	100W 6dB DC-3G	/	May 10, 2024	1 Year
☒	Signal Generator	ifn	2023B	1702128	May 10, 2024	1 Year
☒	CDN	LUTHI	CDN L-801 M2/M3	2606	May 11, 2024	1 Year

3.9. For Voltage Dips and Interruptions Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 11, 2024	1 Year
☐	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 11, 2024	1 Year
☐	Impedance network	Teseq	INA2197/37A	1305A02873	May 11, 2024	1 Year
☐	Impedance network	Teseq	INA 2196/75A	1305A02874	May 11, 2024	1 Year
☒	Proflin 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 11, 2024	1 Year

4. MAINS PORTS DISTURBANCE VOLTAGE EMISSION MEASUREMENT

4.1. Block Diagram of Test Setup



AMN: Artificial Mains Network
AE: Associated equipment
EUT: Equipment under test

4.2. Measurement Standard and Limits

4.2.1. Standard:

EN IEC 55014-1:2021

4.2.2. Limits

☐ Table 2- Disturbance voltage limits for the AC mains ports of equipment with active IPT functions:

Frequency Range	☐ Appliances which are 100V rated and without an earth connection		☐ All other appliances	
	Quasi-peak Level(dBμV)	Average Level(dBμV)	Quasi-peak Level(dBμV)	Average Level(dBμV)
0.009 ~ 0.050	122	-	110	-
0.050 ~ 0.150	102 ~ 92 *	-	90 ~ 80 *	-
0.150 ~ 0.5	72 ~ 62 *	62 ~ 52 *	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46	56	46
5 ~ 30	60	50	60	50

Remark: * means decreasing linearly with logarithm of frequency.

☒ Table 5- General limits:

Frequency Range	☒ Mains Ports		☐ Auxiliary Ports			
	Disturbance Voltage		☐ Disturbance Voltage		☐ Disturbance Current	
1	2	3	4	5	6	7
MHz	Quasi-peak Level(dBμV)	Average Level(dBμV)	Quasi-peak Level(dBμV)	Average Level(dBμV)	Quasi-peak Level(dBμA)	Average Level(dBμA)
0.15 ~ 0.50	66.0 ~ 56.0 *	59.0 ~ 46.0 *	80.0	70.0	40.0 ~ 30.0 *	30.0 ~ 20.0 *
0.50 ~ 5.00	56.0	46.0	74.0	64.0	30.0	20.0
5.00 ~ 30.00	60.0	50.0	74.0	64.0		

Remark: * means decreasing linearly with logarithm of frequency.

□ Table 6- Limits for the mains ports of motor operated tools:

Frequency Range	□ $P \leq 700W$		□ $700W \leq P \leq 1000W$		□ $P > 1000W$	
1	2	3	4	5	6	7
MHz	Quasi-peak Level(dB μ V)	Average Level(dB μ V)	Quasi-peak Level(dB μ V)	Average Level(dB μ V)	Quasi-peak Level(dB μ V)	Average Level(dB μ V)
0.15 ~ 0.35	66.0 ~ 59.0 *	59.0 ~ 49.0 *	70.0 ~ 63.0 *	63.0 ~ 53.0 *	76.0 ~ 69.0 *	69.0 ~ 59.0 *
0.35 ~ 5.00	59.0	49.0	63.0	53.0	69.0	59.0
5.00 ~ 30.00	64.0	54.0	68.0	58.0	74.0	64.0

Remark: * means decreasing linearly with logarithm of frequency.
P= Rated power of the motor only.

4.3. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 55014-1 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN 55014-1 standard.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz.

For single-phase equipment with a rated voltage range in the range between:

- 100 V to 127 V, test at one nominal voltage within this range;
- 200 V to 240 V, test at one nominal voltage within this range;
- 100 V to 240 V, test at two voltages within this range, one test in the range 100 V to 127 V and another test in the range 200 V to 240 V.

The recommended test voltages are 120 V for the range 100 V to 127 V; and 230 V for the range 200 V to 240 V.

During the tests the EUT shall be operated at the rated frequency specified for the equipment. If the equipment has more than one rated frequency (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one of these frequencies only.

If the equipment has a rated frequency range (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one frequency within this range

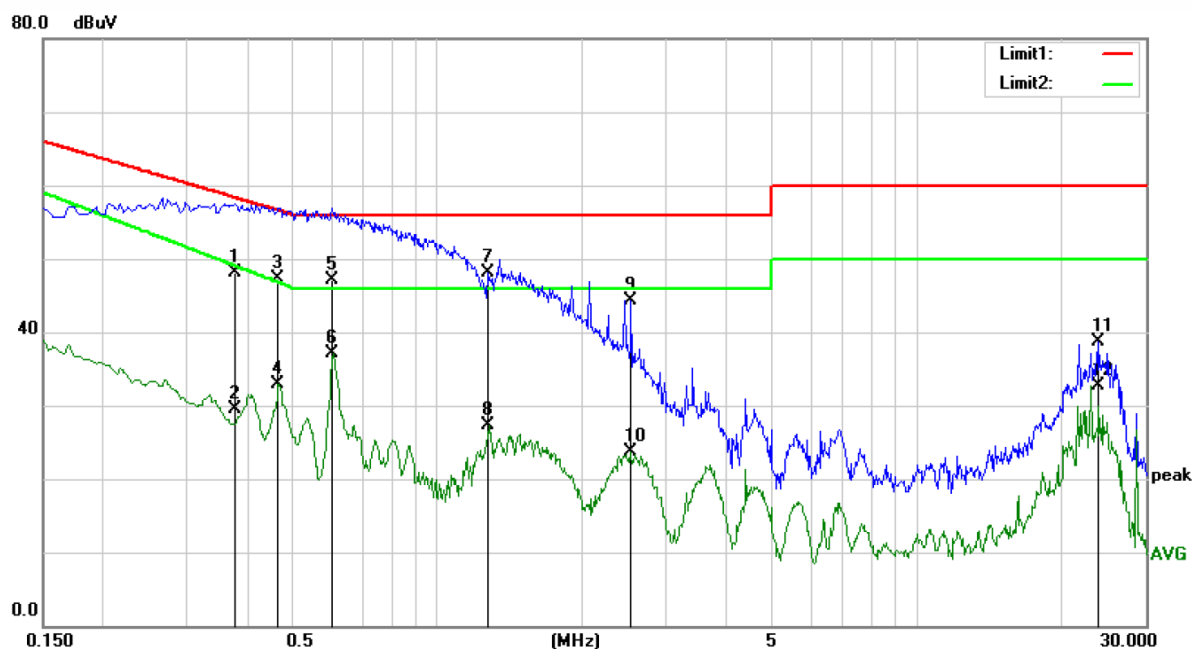
The frequency range from 150kHz to 30MHz is investigated.

4.4. Measuring Results

PASS.

All the modes were tested and the data of the worst modes are attached the following pages.

Temperature : 20.8 °C
Humidity : 61%
Atmospheric Pressure : 101kpa
Test Engineer : Sunyong Hu
Test Date : 2024-06-19



Site Conduction #1

Phase: **L1**

Temperature: 20.8

Limit: (CE)EN55014_QP

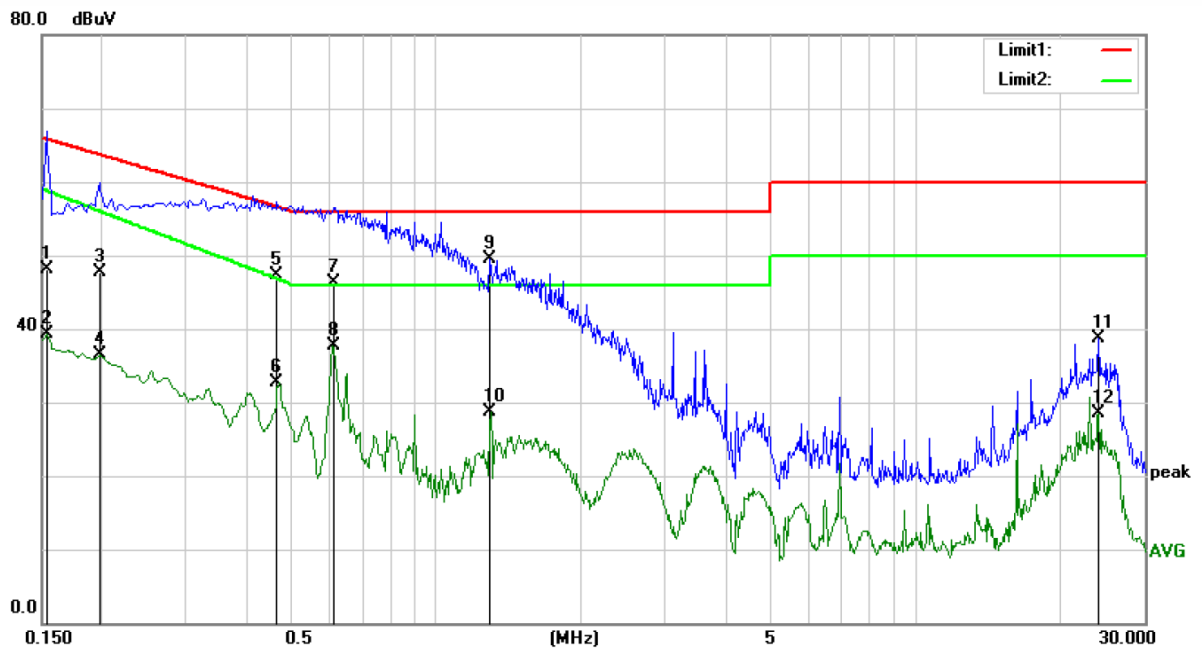
Power: AC 230V/50Hz

Humidity: 61 %

Mode: GRIND MODE

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.3780	38.24	9.96	48.20	58.32	-10.12	QP	
2		0.3780	19.62	9.96	29.58	49.02	-19.44	AVG	
3		0.4660	37.35	9.95	47.30	56.58	-9.28	QP	
4		0.4660	22.90	9.95	32.85	46.76	-13.91	AVG	
5		0.6020	37.13	9.97	47.10	56.00	-8.90	QP	
6		0.6020	27.19	9.97	37.16	46.00	-8.84	AVG	
7	*	1.2740	38.20	9.98	48.18	56.00	-7.82	QP	
8		1.2740	17.38	9.98	27.36	46.00	-18.64	AVG	
9		2.5300	34.37	9.97	44.34	56.00	-11.66	QP	
10		2.5300	13.73	9.97	23.70	46.00	-22.30	AVG	
11		23.9740	28.20	10.53	38.73	60.00	-21.27	QP	
12		23.9740	22.13	10.53	32.66	50.00	-17.34	AVG	



Site Conduction #1

Phase: **N**

Temperature: 20.8

Limit: (CE)EN55014_QP

Power: AC 230V/50Hz

Humidity: 61 %

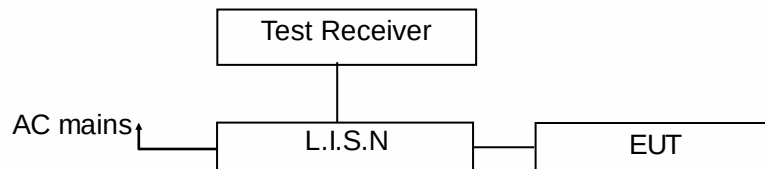
Mode: GRIND MODE

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.1540	38.08	10.02	48.10	65.78	-17.68	QP	
2		0.1540	29.23	10.02	39.25	58.72	-19.47	AVG	
3		0.1980	37.77	10.03	47.80	63.69	-15.89	QP	
4		0.1980	26.42	10.03	36.45	56.00	-19.55	AVG	
5		0.4660	37.35	9.95	47.30	56.58	-9.28	QP	
6		0.4660	22.78	9.95	32.73	46.76	-14.03	AVG	
7		0.6100	36.43	9.97	46.40	56.00	-9.60	QP	
8		0.6100	27.79	9.97	37.76	46.00	-8.24	AVG	
9	*	1.2940	39.47	9.98	49.45	56.00	-6.55	QP	
10		1.2940	18.75	9.98	28.73	46.00	-17.27	AVG	
11		24.1300	28.17	10.54	38.71	60.00	-21.29	QP	
12		24.1300	17.89	10.54	28.43	50.00	-21.57	AVG	

5. CLICKS MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Clicks Measurement Standard and limit

5.2.1. Test Standard

EN IEC 55014-1:2021

5.2.2. Test Limit

According to Clause 4.2 of standard EN IEC 55014-1.

5.3. EUT Configuration

The configuration of EUT is same as Section 4.3.

5.4. Test Procedure

This test is done when switch operations in thermostatically controlled appliances, automatic program controlled machines and other electrically controlled or operated appliances may generate discontinuous disturbance (Click). The measurement of disturbance shall be performed at the following restricted number of frequencies: 150kHz, 500kHz, 1.4MHz and 30MHz. At each frequency, for appliances, which stop automatically, duration of the minimum number of complete programs necessary to produce 40 counted clicks or, where relevant, 40 counted clicks have not been produced, the test is stopped at the end of the program in course. The relevant click rate N. The appliance under test shall be deemed to comply with the limit if not more than a quarter of the number of the counted click registered during the observation time.

5.5. Test Results

PASS.

Please refer to the following pages.



CL55 TEST REPORT

TEST PASS

19/6/2024 11:30:24

02:01:09.04

Required

Executed by Sun Yong Hu

Description

Model **ES701UK**

SN

Report

Mode **COFFEE MAKING**

Type of Eut **Espresso Machine with Grinder**

Rx 150 KHz Att. **15**
[dB]

Rx 500 kHz Att. **5**
[dB]

Rx 1.4 MHz Att. **5**
[dB]

Rx 30 MHz Att. [dB] **10**

Rx 150 kHz Input **0**
Offset [dB]

Rx 500 kHz Input **0**
Offset [dB]

Rx 1.4 MHz Input **0**
Offset [dB]

Rx 30 MHz Input **0**
Offset [dB]

External Att. [dB] **10**

Remote **LISN LT32 - LINE 1**

150 kHz

500 kHz

1.4 MHz

30 MHz

First Run

Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Events	0	0	0	0

Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBuV	66	56	56	60
N	0.00	0.00	0.00	0.00
	PASS	PASS	PASS	PASS

150 kHz	No Clicks	500 kHz	Instantaneous switchings: Exempt from amplitude limits
1.4 MHz	Instantaneous switchings: Exempt from amplitude limits	30 MHz	No Clicks

New Limit
[dBuV]

Allowed Clicks

Short

Long

Total Clicks

Events

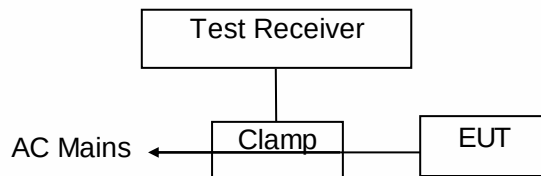
Time(s)

4.2.3.4 events

SECOND PASS NOT ALLOWED

6. DISTURBANCE POWER MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Measurement Standard and Limits

6.2.1. Test Standard

EN IEC 55014-1:2021

6.2.2. Test Limits

All emanations from devices or system including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Frequency range	☒ General		☐ Tools					
			☐ $P \leq 700W$		☐ $700W \leq P \leq 1000W$		☐ $P \geq 1000W$	
1	2	3	4	5	6	7	8	9
MHz	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)	Quasi-pe ak(dbpW)
30 ~ 300*	45 ~ 55*	35 ~ 45*	45 ~ 55*	35 ~ 45*	49 ~ 59*	39 ~ 49*	55 ~ 65*	45 ~ 55*

Remark: * means increasing linearly with the frequency.

P= Rated power of the motor only.

6.3. Test Procedure

The EUT is placed on the insulating table 0.8m high above the ground by insulating support and away from other metallic surface at least 0.8m. It is connected to the power mains through an extension cord of 6m min. The absorber clamp clamps the cord and moves from the far end to the EUT to measure the disturbing energy emitted from the cord.

The bandwidth of the field strength meter (R&S TEST RECEIVER) is set at 120kHz.

For single-phase equipment with a rated voltage range in the range between:

- 100 V to 127 V, test at one nominal voltage within this range;
- 200 V to 240 V, test at one nominal voltage within this range;
- 100 V to 240 V, test at two voltages within this range, one test in the range 100 V to 127 V and another test in the range 200 V to 240 V.

The recommended test voltages are 120 V for the range 100 V to 127 V; and 230 V for the range 200 V to 240 V.

During the tests the EUT shall be operated at the rated frequency specified for the equipment. If the equipment has more than one rated frequency (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one of these frequencies only.

If the equipment has a rated frequency range (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one frequency within this range.

6.4. Test Results

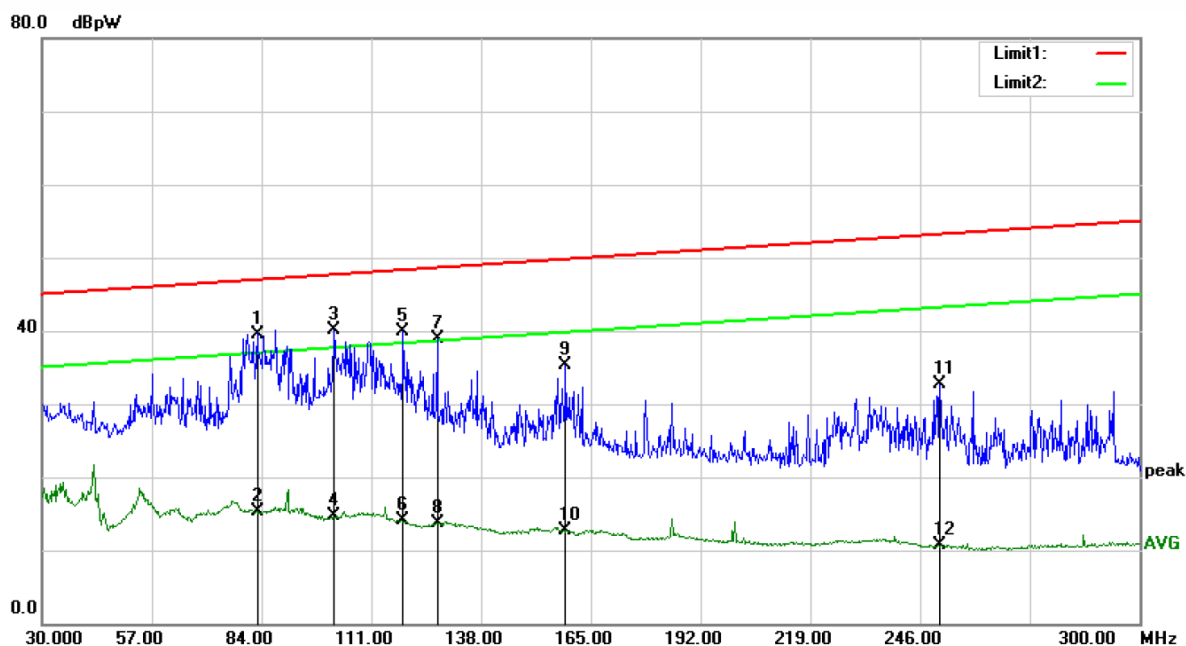
PASS.

The frequency spectrum from 30 MHz to 300 MHz is investigated.

All the modes were tested and the data of the worst modes are attached the following pages.

Temperature : 20.8 °C
Humidity : 61%
Atmospheric Pressure : 101kpa
Test Engineer : Sunyong Hu
Test Date : 2024-06-19





Site Conduction #1

Temperature: 20.8

Limit: (Clamp)EN55014_QP

Power: AC 230V/50Hz

Humidity: 61 %

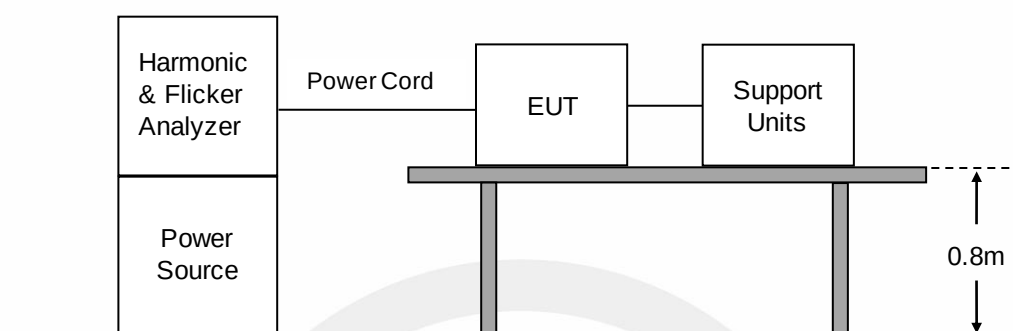
Mode: GRIND MODE

Note:

No.	Mk.	Freq.	Reading Level	Final Correct	Measure-ment	Limit	Over	Position	
		MHz	dBpW	dB	dBpW	dBpW	dB	Detector	cm
1	*	83.1000	16.77	22.83	39.60	46.97	-7.37	QP	0
2		83.1000	-7.44	22.83	15.39	36.97	-21.58	AVG	0
3		102.0500	17.65	22.49	40.14	47.67	-7.53	QP	0
4		102.0500	-7.88	22.49	14.61	37.67	-23.06	AVG	0
5		118.9500	17.72	22.21	39.93	48.29	-8.36	QP	0
6		118.9500	-8.11	22.21	14.10	38.29	-24.19	AVG	0
7		127.3000	16.23	22.77	39.00	48.60	-9.60	QP	0
8		127.3000	-9.06	22.77	13.71	38.60	-24.89	AVG	0
9		158.8000	14.36	21.01	35.37	49.77	-14.40	QP	0
10		158.8000	-8.24	21.01	12.77	39.77	-27.00	AVG	0
11		250.9000	12.92	19.71	32.63	53.18	-20.55	QP	0
12		250.9000	-9.04	19.71	10.67	43.18	-32.51	AVG	0

7. HARMONIC CURRENT EMISSION MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Standard Limits

EN 61000-3-2, CLASS A

Harmonic current emissions evaluate the potential for the EUT to cause distortion on the AC power lines. It is applicable to electrical and electronic equipment having an input current ≤ 16 A per phase, and intended to be connected to public low-voltage distribution systems

Table 1 – Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \frac{0.15}{n}$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \frac{8}{n}$

7.3. Test Procedure

The measurement of harmonic currents shall be performed as follows: i. For each harmonic order, measure the 1.5 s smoothed r.m.s. harmonic current in each DFT time window as defined in EN / IEC 61000-4-7:2009. ii. Calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period Short cyclic (T cycle $\leq$ 2.5 min). Because of synchronisation to meet the requirements for repeatability in 5%.

7.4. Measuring Results

Pass.

Please see the attached pages.



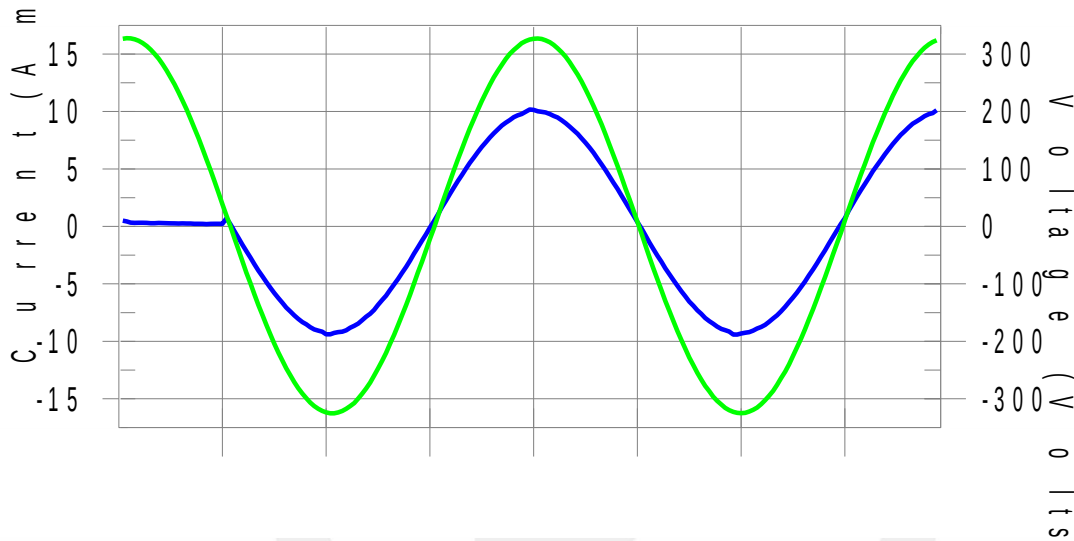
Harmonics – Class-A per IEC 61000-3-2 (Run time) incl. inter-harmonics

EUT: Espresso Machine with Grinder
Test category: Class-A (European limits)
Test date: 2024/6/18 Start time: 0:26:32
Test duration (min): 2.5 Data file name: CTSMXL_H-000378.cts_data
Comment: Coffee Making
Customer: SharkNinja Operating LLC

Tested by: XLB
Test Margin: 100
End time: 0:29:14

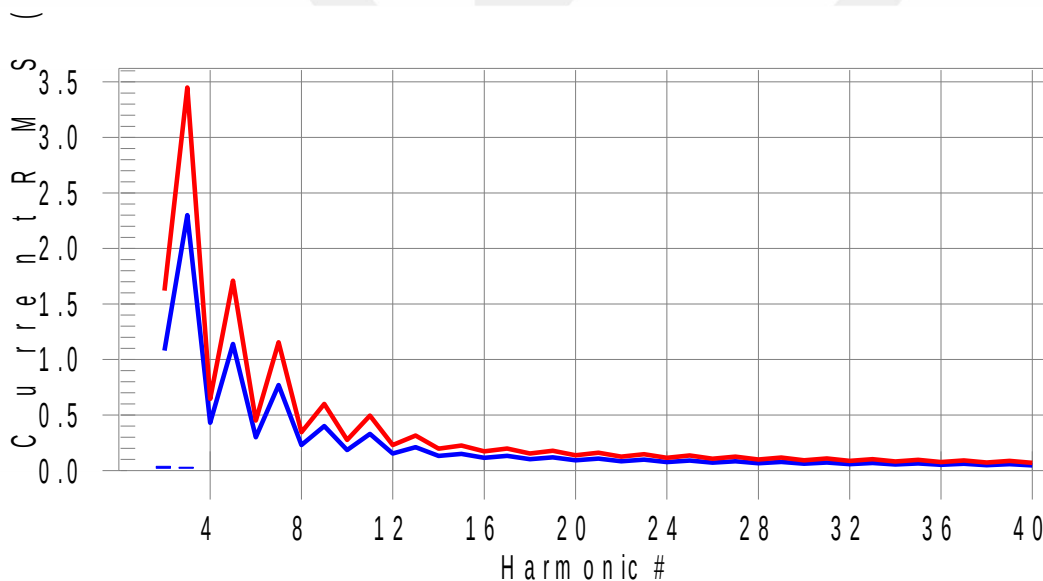
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H2-18.8% of 150% limit, H19-7.8% of 100% limit.

Current Test Result Summary (Run time)

EUT: Espresso Machine with Grinder
Test category: Class-A (European limits)
Test date: 2024/6/18 Start time: 0:26:32 End time: 0:29:14
Test duration (min): 2.5 Data file name: CTSMXL_H-000378.cts_data
Comment: Coffee Making
Customer: SharkNinja Operating LLC

Tested by: XLB
Test Margin: 100

Test Result: Pass Source qualification: Normal
THC(A): 0.066 I-THD(%): 0.9 POHC(A): 0.017 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.865
I_Peak (Amps): 10.180
I_Fund (Amps): 7.029
Power (Watts): 1621.0
Frequency(Hz): 50.00
I_RMS (Amps): 7.076
Crest Factor: 6.404
Power Factor: 1.000

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.038	1.080	3.5	0.305	1.620	18.8	Pass
3	0.030	2.300	1.3	0.140	3.450	4.1	Pass
4	0.014	0.430	3.4	0.121	0.645	18.7	Pass
5	0.018	1.140	1.6	0.075	1.710	4.4	Pass
6	0.008	0.300	2.7	0.065	0.450	14.4	Pass
7	0.016	0.770	2.1	0.049	1.155	4.3	Pass
8	0.006	0.230	2.5	0.044	0.345	12.8	Pass
9	0.013	0.400	3.3	0.040	0.600	6.6	Pass
10	0.005	0.184	N/A	0.034	0.276	N/A	Pass
11	0.013	0.330	4.0	0.035	0.495	7.1	Pass
12	0.004	0.153	N/A	0.027	0.230	N/A	Pass
13	0.011	0.210	5.1	0.028	0.315	8.8	Pass
14	0.003	0.131	N/A	0.023	0.197	N/A	Pass
15	0.011	0.150	7.4	0.026	0.225	11.7	Pass
16	0.003	0.115	N/A	0.020	0.173	N/A	Pass
17	0.009	0.132	6.9	0.022	0.198	11.4	Pass
18	0.003	0.102	N/A	0.018	0.153	N/A	Pass
19	0.009	0.118	7.8	0.021	0.178	11.7	Pass
20	0.003	0.092	N/A	0.016	0.138	N/A	Pass
21	0.008	0.107	7.1	0.018	0.161	11.4	Pass
22	0.003	0.084	N/A	0.015	0.125	N/A	Pass
23	0.007	0.098	7.5	0.017	0.147	11.7	Pass
24	0.003	0.077	N/A	0.014	0.115	N/A	Pass
25	0.006	0.090	6.9	0.015	0.135	11.3	Pass
26	0.003	0.071	N/A	0.013	0.107	N/A	Pass
27	0.006	0.083	7.5	0.015	0.125	11.8	Pass
28	0.004	0.066	N/A	0.013	0.099	N/A	Pass
29	0.006	0.078	7.1	0.014	0.116	11.6	Pass
30	0.003	0.061	N/A	0.012	0.092	N/A	Pass
31	0.004	0.073	N/A	0.012	0.109	N/A	Pass
32	0.002	0.058	N/A	0.010	0.086	N/A	Pass
33	0.004	0.068	N/A	0.011	0.102	N/A	Pass
34	0.002	0.054	N/A	0.010	0.081	N/A	Pass
35	0.003	0.064	N/A	0.010	0.096	N/A	Pass
36	0.002	0.051	N/A	0.009	0.077	N/A	Pass
37	0.003	0.061	N/A	0.010	0.091	N/A	Pass
38	0.002	0.048	N/A	0.009	0.073	N/A	Pass
39	0.003	0.058	N/A	0.009	0.087	N/A	Pass
40	0.001	0.046	N/A	0.007	0.069	N/A	Pass

Voltage Source Verification Data (Run time)

EUT: Espresso Machine with Grinder
Test category: Class-A (European limits)
Test date: 2024/6/18
Test duration (min): 2.5
Comment: Coffee Making
Customer: SharkNinja Operating LLC

Tested by: XLB
Test Margin: 100
Start time: 0:26:32
End time: 0:29:14
Data file name: CTSMXL_H-000378.cts_data

Test Result: Pass Source qualification: Normal

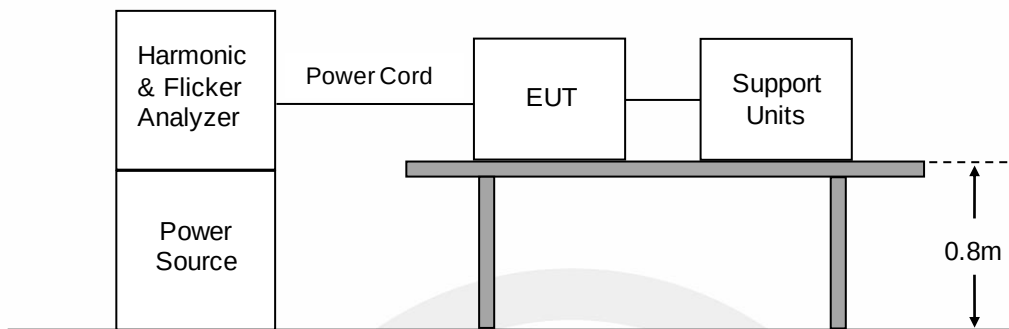
Highest parameter values during test:

Voltage (Vrms):	230.865	Frequency(Hz):	50.00
I_Peak (Amps):	10.180	I_RMS (Amps):	7.076
I_Fund (Amps):	7.029	Crest Factor:	6.404
Power (Watts):	1621.0	Power Factor:	1.000

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.088	0.462	19.09	OK
3	0.162	2.075	7.83	OK
4	0.028	0.462	6.09	OK
5	0.090	0.922	9.70	OK
6	0.020	0.461	4.43	OK
7	0.114	0.692	16.41	OK
8	0.026	0.462	5.62	OK
9	0.115	0.461	24.98	OK
10	0.027	0.461	5.75	OK
11	0.094	0.231	40.72	OK
12	0.030	0.231	13.15	OK
13	0.084	0.231	36.57	OK
14	0.027	0.231	11.91	OK
15	0.071	0.231	30.99	OK
16	0.031	0.231	13.35	OK
17	0.066	0.231	28.57	OK
18	0.029	0.231	12.47	OK
19	0.058	0.231	25.36	OK
20	0.028	0.231	12.31	OK
21	0.049	0.231	21.17	OK
22	0.026	0.231	11.15	OK
23	0.045	0.231	19.65	OK
24	0.026	0.231	11.14	OK
25	0.036	0.231	15.71	OK
26	0.023	0.231	9.78	OK
27	0.043	0.231	18.65	OK
28	0.020	0.231	8.59	OK
29	0.032	0.231	13.89	OK
30	0.018	0.231	7.93	OK
31	0.033	0.231	14.21	OK
32	0.018	0.231	7.67	OK
33	0.025	0.231	10.67	OK
34	0.017	0.231	7.26	OK
35	0.030	0.231	13.00	OK
36	0.013	0.231	5.44	OK
37	0.024	0.231	10.28	OK
38	0.011	0.231	4.76	OK
39	0.024	0.231	10.37	OK
40	0.013	0.231	5.59	OK

8. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Standard Limits

EN 61000-3-3 Limits

The objective of voltage changes, voltage fluctuations and flicker in public low voltage supply systems during equipment with rated current ≤ 16 A per phase, ensures that home appliances and certain other electrical equipment do not adversely affect lighting equipment when connected to the same power system.

Voltage Fluctuation and Flicker Limits:

- the value of Pst shall not be greater than 1.0;
- the value of Plt shall not be greater than 0.65;
- the value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3.3 %;
- the maximum relative voltage change, dmax, shall not exceed 4.0 %;

8.3. Test Procedure

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of 8% is achieved during the whole assessment procedure.

8.4. Measuring Results

PASS.

Please see the attached page.

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Espresso Machine with Grinder
 Test category: All parameters (European limits)
 Test date: 2024/6/17 Start time: 21:51:34 End time: 22:02:01
 Test duration (min): 10 Data file name: CTSMXL_F-000370.cts_data
 Comment: Coffee Making
 Customer: SharkNinja Operating LLC

Tested by: XLB
 Test Margin: 100
 End time: 22:02:01

Test Result: Pass

Status: Test Completed

Pst_i and limit line

European Limits



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.87			
T-max (mS):	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.11	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.294	Test limit:	1.000	Pass

9. IMMUNITY PERFORMANCE CRITERIA DESCRIPTION

Performance Level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Criterion B:

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however no change of actual operating state or stored data is allowed to persist after the test. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Criterion C:

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

10. IMMUNITY MAINS OPERATION DESCRIPTION

10.1. Voltage at the AC mains port

During the tests, the EUT shall be operated at the rated voltage specified for the equipment.

For single-phase equipment with a rated voltage range in the range between:

- 100 V to 127 V, testing shall be done at one nominal voltage within this range; the recommended test voltage is 120 V;
- 200 V to 240 V, testing shall be done at one nominal voltage within this range; the recommended test voltage is 230 V;
- 100 V to 240 V, testing shall be done at one nominal voltage within the range 100 V to 127 V, or at one nominal voltage within the range 200 V to 240 V. However, the user of this document may specify that the equipment is tested twice; once at one nominal voltage within the range 100 V to 127 V and once within the range 200 V to 240 V. This decision shall be recorded in the test report.

Where applicable, the same applies to the AC mains port of EPS.

Multi-phase equipment shall be tested applying the same principles set-out above.

For three-phase equipment with a rated voltage range in the range between:

- 200 V to 240 V, testing shall be done at one nominal voltage within this range; the recommended test voltage is 220 V;
- 380 V to 450 V, testing shall be done at one nominal voltage within this range; the recommended test voltage is 400 V.

10.2. Frequency at the AC mains port

During the tests, the EUT shall be operated at the rated frequency specified for the equipment.

If the equipment has more than one rated frequency (e.g. 50 Hz and/or 60 Hz), then the EUT shall be tested at one of these frequencies only.

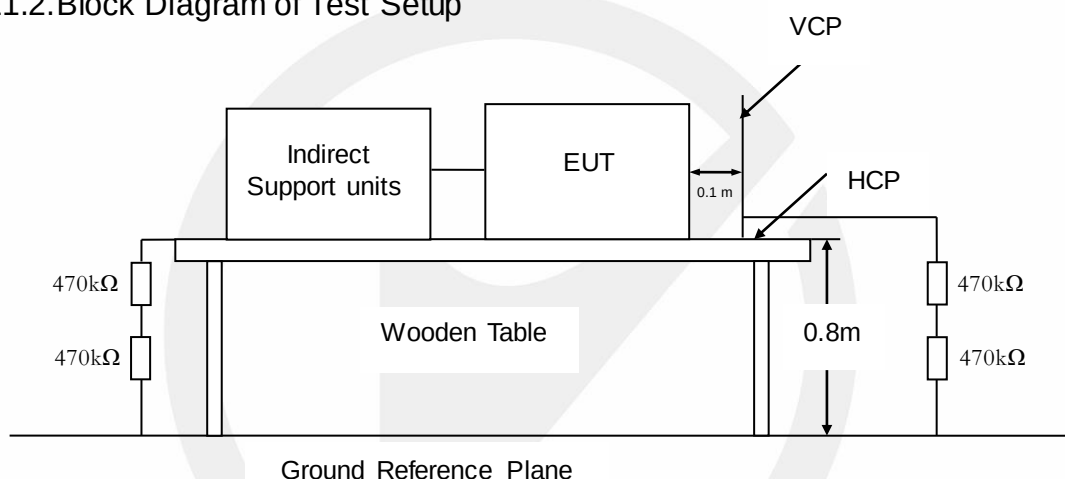
If the equipment has a rated frequency range (e.g. 50 Hz to 60 Hz), then the EUT shall be tested at one frequency within that range.

11. ELECTROSTATIC DISCHARGE IMMUNITY TEST

11.1. Test Specification

Test standard	: EN IEC 55014-2
Basic standard	: IEC 61000-4-2
Performance criterion	: B/C
Test level	: $\pm 8.0\text{kV}$ (Air discharge)
	: $\pm 4.0\text{kV}$ (Contact discharge)

11.2. Block Diagram of Test Setup



11.3. Test Procedure

- In the case of air discharge testing, the climatic conditions shall be within the following ranges:
 - ambient temperature: 15°C to 35°C;
 - relative humidity : 30% to 60%;
 - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar)
- Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
 - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
 - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
 - The contact discharge test shall not be applied to such surfaces.
- In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

- f. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in order to avoid damage to the equipment.
- g. The test shall be performed with both air discharge and contact discharge. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied. For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- h. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

11.4. Test Results

PASS.

Temperature : 24.5°C
Humidity : 49%
Atmospheric Pressure : 101kpa
Test Engineer : XLB
Test Date : 2024-06-17

Air Discharge:

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±8 kV	LED/SLOT/BUTTON	A	B	Pass

Contact Discharge

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±4kV	METAL/SCREW	A	B	Pass

Indirect Discharge

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±4kV	HCP	A	B	Pass
±4kV	VCP	A	B	Pass

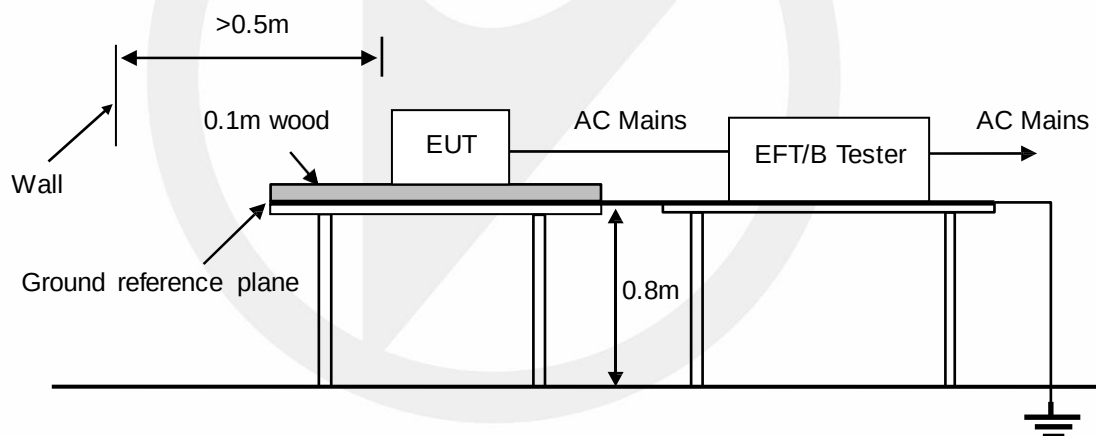
12. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

12.1. Test Specification

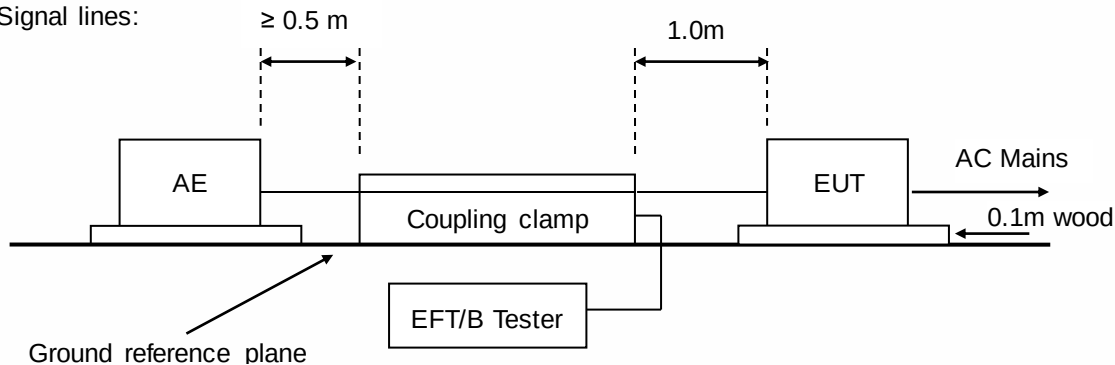
Test standard : EN IEC 55014-2
 Basic standard : IEC 61000-4-4
 Performance criterion : B
 Test level : ☒ 1kV, AC mains power ports
 ☐ 0.5kV, DC network power ports
 ☐ 0.5kV, Analogue/digital data ports
 Repetition frequency : ☒ 5kHz, ☐ 100kHz
 Tr/Th: : 5/50ns
 Burst period : 300ms
 Test time : : 120s

12.2. Block Diagram of Test Setup

AC Lines:



Signal lines:



12.3. Test Procedure

The EUT is put on the table that is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

12.4. Test Results

PASS.

Temperature : 25.3°C
Humidity : 51%
Atmospheric Pressure : 101kpa
Test Engineer : XLB
Test Date : 2024-06-17

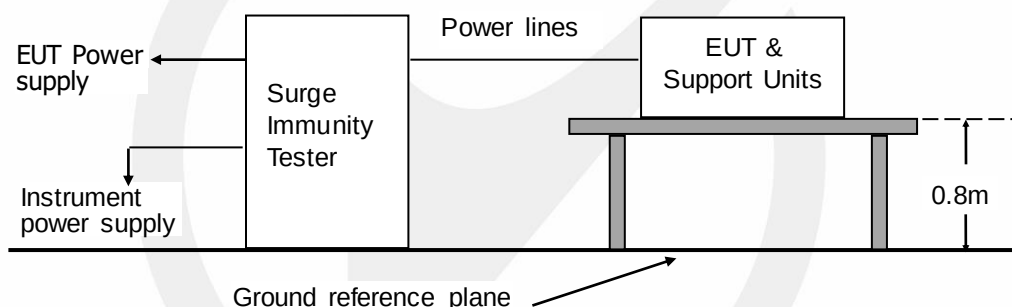
Injection Line	Voltage (kV)	Injected Method	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC mains power ports	± 1	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☐ DC network power ports	± 0.5	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☐ Signal ports, control ports and wired network ports	± 0.5	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A

13. SURGE IMMUNITY TEST

13.1. Test Specification

Test standard	: EN IEC 55014-2
Basic standard	: IEC 61000-4-5
Test level	: ☒ 1kV, Line to Line, AC mains power ports, Criterion B ☒ 2kV, Line to Earth, AC mains power ports, Criterion B ☐ 1.0kV, Lines to Ground, Unshielded symmetrical, Criterion B
Number of surges	: 5 (for each combination of parameters)
Repetition rate	: 1 minute / time
Polarity:	: Positive / Negative
Phase angle:	: 90°, 270° (Only AC mains power ports)

13.2. Block Diagram of Test Setup



13.3. Test Procedure

This test simulates a lightning event by inducing transients onto the AC/DC power supply lines in common mode (Line to Ground) and differential mode (Line to Line). Each device was tested in a total of two surge configurations: Line to Ground (L-G): Combination Wave, Line to Protective Earth with 9uF and 10Ohm and Neutral to Protective Earth with 9uF and 10Ohm, common mode, generator earthed.

Line to Line (L-L): Combination Wave,

Line to Neutral with 18uF, differential mode, generator floated.

2 ohm : the source impedance of the low-voltage power supply network.

12 ohm : the source impedance of the low-voltage power supply network and ground.

- If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).
- The surges have to be applied line to line and line to earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
- The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan. All lower levels including the selected test level shall be satisfied.
- For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level (let-through level) of the primary protection.
- Testing shall be performed according to a Test Plan, which shall be included in the test report.
- To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied.

13.4. Test Results

PASS.

Temperature : 25.3°C
Humidity : 51%
Atmospheric Pressure : 101kpa
Test Engineer : XLB
Test Date : 2024-06-17

☒ AC mains power ports:

Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ Line to line	0.5, 1	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☒ Line to earth	0.5, 1, 2	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass

☐ Wired network ports:

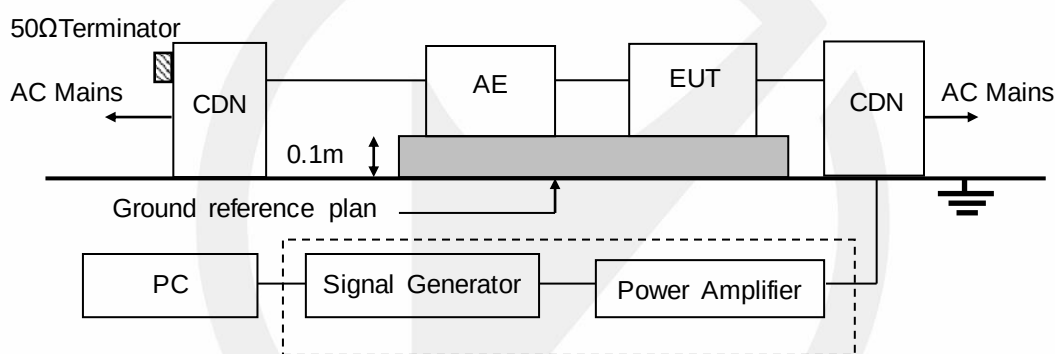
Port type	Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☐ Unshielded symmetrical (Wired network port)	Lines to ground	0.5, 1	10/700 (5/320)	Pos./ Neg.	N/A	B	N/A

14. INJECTED CURRENTS SUSCEPTIBILITY TEST

14.1. Test Specification

Test standard	: EN IEC 55014-2
Basic standard	: IEC 61000-4-6
Performance criterion	: A
Frequency range & Test level	: 0.15M to 230MHz, 3V
Modulation	: AM 80%, 1kHz sine-wave
Frequency Step	: 1% of fundamental

14.2. Block Diagram of Test Setup



14.3. Test Procedure

- The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- The EUT is placed on a 0.1m high test table, and a well grounded cable is connected to metallic plane above the test table.
- All cables/wires must be laid out on test plate (3cm in thickness), and the EUT is set up on test plate (10 cm in thickness) as shown in test setup photo, and the cables/wires must not be in mid-air, they should be touching the surface of test plate. Ensure that the EUT is properly connected to the accessory equipment.
- The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise

modes selected for susceptibility

h. Testing shall be performed according to a Test Plan, which shall be included in the test report

14.4. Test Results

PASS.

Temperature : 25.3°C
Humidity : 51%
Atmospheric Pressure : 101kpa
Test Engineer : XLB
Test Date : 2024-06-17

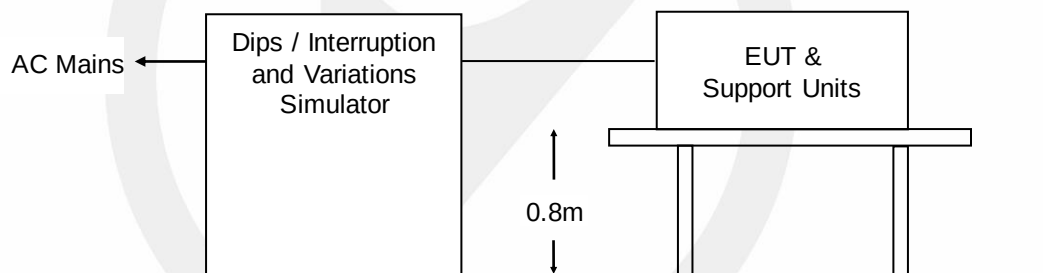
Range (MHz)	Levers (V)	Injection port	Coupling type	Actual criterion	Required performance criterion	Result (Pass/Fail)
0.15-230	3	☒ AC mains power ports	☒ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	A	A	Pass
0.15-230	3	☐ DC network power ports	☐ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	N/A	N/A	N/A
0.15-230	3	☐ Signal ports, control ports and Wired network ports	☐ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	N/A	N/A	N/A

15. VOLTAGE DIPS AND INTERRUPTIONS TEST

15.1. Test Specification

Test standard	: EN IEC 55014-2
Basic standard	: IEC 61000-4-11
Test level	: 0%, 40%, 70% Criterion C
	☒ 0%, 0.5 periods for 50Hz, Criterion C
	☐ 0%, 0.5 periods for 60Hz, Criterion C
	☒ 40%, 10 periods for 50Hz, Criterion C
	☐ 40%, 12 periods for 60Hz, Criterion C
	☒ 70%, 25 periods for 50Hz, Criterion C
	☐ 70%, 30 periods for 60Hz, Criterion C

15.2. Block Diagram of Test Setup



15.3. Test Procedure

a. Where the equipment has a rated voltage the following shall apply - If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification.

- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.

b. Test Conditions

- Select operated voltage and frequency of EUT - Test of interval : 10 sec.

- Level and duration : Sequence of 3 dips/interrupts.

1) - Voltage rise (and fall) time : 1.5 μ s.

15.4. Test Results

PASS.

Temperature : 25.3°C
Humidity : 51%
Atmospheric Pressure : 101kpa
Test Engineer : XLB
Test Date : 2024-06-17

	Test Level (% UT)	Phase angle (°)	Input Voltage (V)	Freq (Hz)	Duration (periods)	Actual criterion	Required performance criterion	Result (Pass /Fail)
☒ Voltage dips	0%	0°, 180°	AC 230V	50	0.5	A	C	Pass
☒ Voltage dips	40%	0°, 180°	AC 230V	50	10	A	C	Pass
☒ Voltage dips	70%	0°, 180°	AC 230V	50	25	A	C	Pass
☐ Voltage dips	0%	0°, 180°	AC 120V	60	0.5	N/A	C	N/A
☐ Voltage dips	40%	0°, 180°	AC 120V	60	12	N/A	C	N/A
☐ Voltage dips	70%	0°, 180°	AC 120V	60	30	N/A	C	N/A

16. PHOTOGRAPHS

16.1. Photos of Conducted Emission Measurement



16.2.Photo of Click Measurement



16.3.Photo of Disturbance Power Measurement



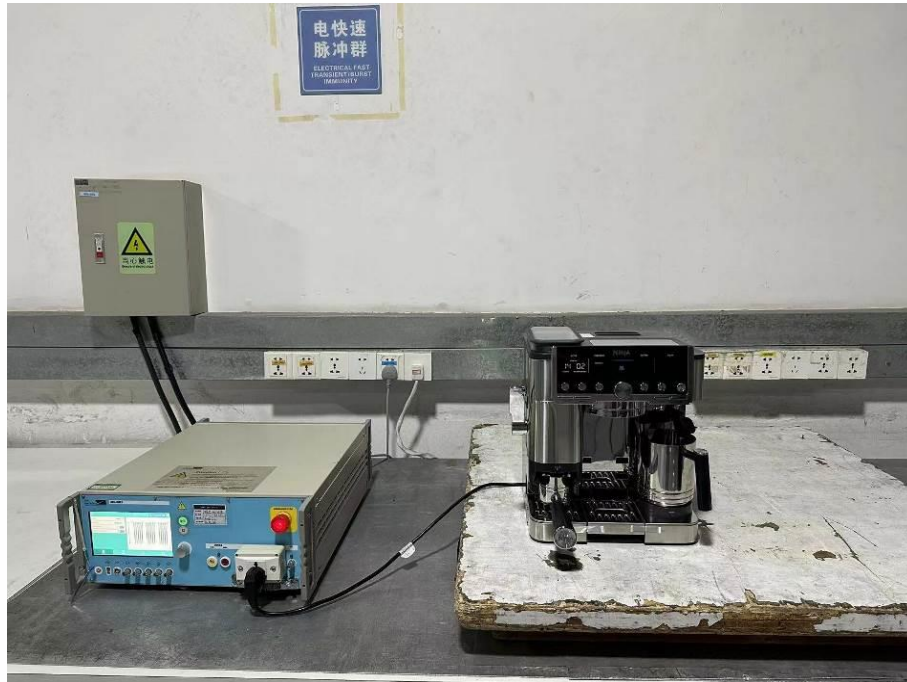
16.4. Photo of Harmonic / Flicker Measurement



16.5. Photo of Electrostatic Discharge Test



16.6.Photo of Electrical Fast Transient / Burst Test



16.7.Photo of Surge Test



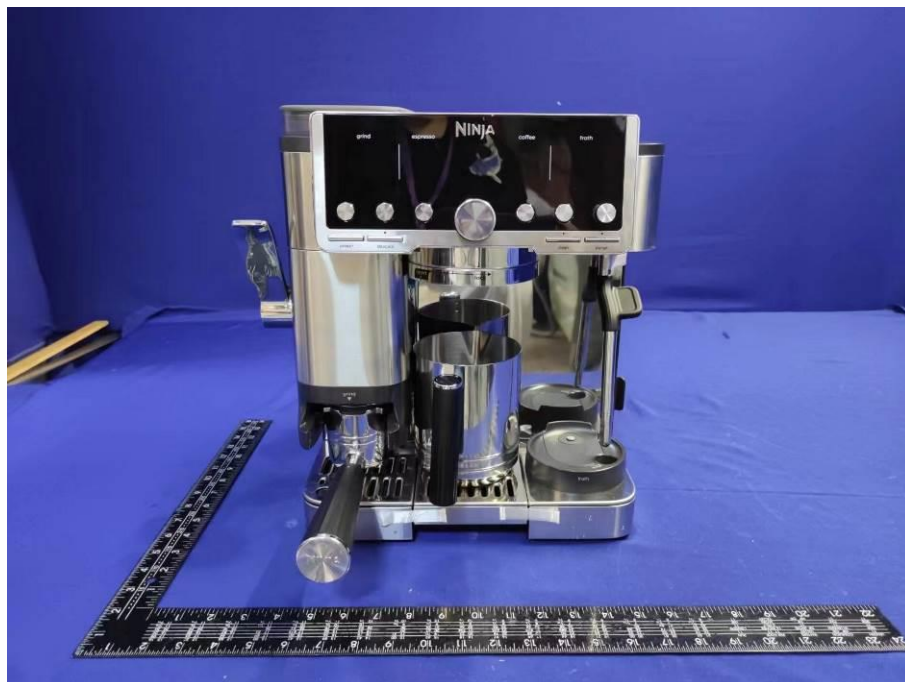
16.8.Photo of Injected Currents Susceptibility Test

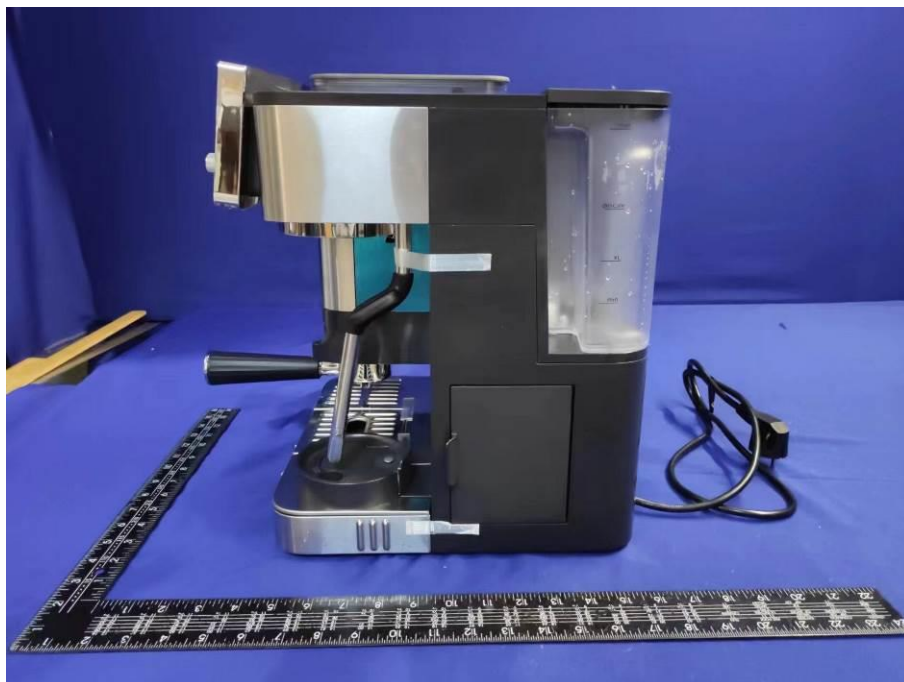


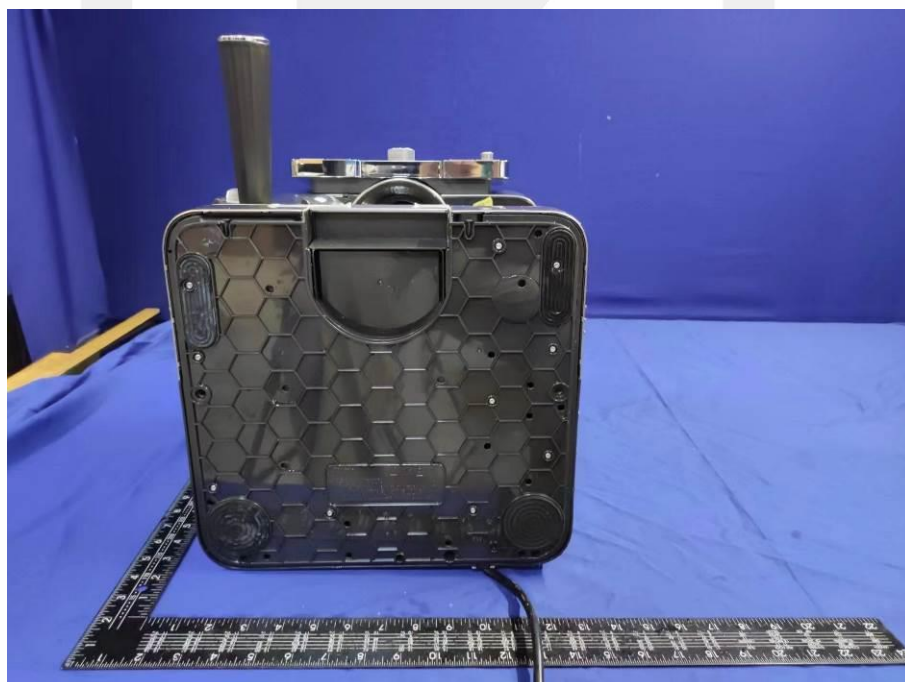
16.9.Photo of Voltage Dips and Interruption Test



APPENDIX: Photos of EUT







End of Report

Statement

- 1 . This report is invalid without the signature of the authorized approver and "special seal for testing".
- 2 . This report shall not be copied partly without authorization.
- 3 . The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.
- 4 . The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
- 5 . The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.
- 6 . Objections shall be raised within 20 days from the date receiving the report.