

Test report No: 4379276.50-EMC

# **TEST REPORT**

# **Electromagnetic Compatibility (EMC)**

Identification of item tested	Centrifugal Juicer				
Trademark	GASTROBACK				
Model and /or type reference	40117, SJ-450, SJ-450SS, SJ-450R				
Features	230 VAC 50Hz, Class II, 700W				
Derived model(s)	N/A				
Applicant's name / address	DOSIMI CO., LIMITED				
	RM.1902, EASEY COMM. BLDG., 253-261 HENNESSY ROAD, WANCHAI, HONGKONG				
Test method requested, standard	EN 55014-1:2017+A11:2020,				
	EN 55014-2:2015,				
	EN IEC 61000-3-2:2019,				
	EN 61000-3-3:2013+A1:2019				
Verdict Summary	COMPLIANCE				
Tested by (name / position & signature)	Kenny Liang				
	Project Manager Keny biany				
Approved by (name / position & signature)	Tim Yan				
	Project Manager				
Date of issue	2021-09-07				
Report template No	TRF_EMC 2017-01				



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# **COMPETENCES AND GUARANTEES**

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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# **GENERAL CONDITIONS**

- 1. This report is only referred to the item that has undergone the test.
- 2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
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- 5. This report will not be used for social proof function in China market.

## UNCERTAINTY

For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in EN 55016-4-2 (CISPR 16-4-2), EN/IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards.

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. Refer to the Annex 1 for furter information.

# **ENVIRONMENTAL CONDITIONS**

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%
Atmospheric pressure	86 kPa – 106 kPa



If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

# **POSSIBLE TEST CASE VERDICTS**

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

# **DEFINITION OF SYMBOLS USED IN THIS TEST REPORT**

Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.						
Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.						
Decimal separator used in this report 🛛 Comma (,) 🗌 Point (.)						

# ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

- EUT : Equipment Under Test
- QP : Quasi-Peak
- CAV : CISPR Average
- AV : Average
- CDN : Coupling Decoupling Network
- SAC : Semi-Anechoic Chamber
- OATS : Open Area Test Site
- BW : Bandwidth
- AM : Amplitude Modulation
- PM : Pulse Modulation
- HCP : Horizontal Coupling Plane
- VCP : Vertical Coupling Plane
- $U_{\rm N}$  : Nominal voltage

# **DOCUMENT HISTORY**

Report nr.	Date	Description
4379276.50-EMC	2021-09-07	First release.



# **REMARKS AND COMMENTS**

The equipment under test (EUT) does meet the requirements of the stated standard(s)/test(s).



# 1 **GENERAL INFORMATION**

# 1.1 General Description of the Item(s)

Description of the item:	Centrifugal Juicer
Model / Type number:	40117, SJ-450, SJ-450SS, SJ-450R
Trademark:	GASTROBACK
Ratings	230 VAC 50Hz, Class II, 700W
Manufacturer	SHENZHEN GY ELETRONIC CO., LIMITED
	#46 XIN ER HONGXIANG RD, SHAJING ST.BAOAN, SHENZHEN, CHINA
Factory	Same as manufacturer

Rated power supply:	Voltage and Frequency		Reference poles					
			L1	L2	L3	N	PE	
	$\square$	AC: 230 V, 50Hz	$\square$			$\square$		
	DC:							
	Battery:							
Clock frequencies:	Less t	han 15MHz						
Mounting position:	Table top equipment							
		Wall/Ceiling mounted equipment						
	Floor standing equipment							
	Hand-held equipment							
	Other:							

### Intended use of the Equipment Under Test (EUT)

The apparatus as supplied for the test is Centrifugal Juicer intended for residential use. The product contains no electronic control circuitry and earth connection.

		Differences
Customer model	40117	Model No. and
Factory model	SJ-450	appearance
	SJ-450SS, SJ-450R	

Hence, model SJ-450 was chosen for full tests and the corresponding data are also representative for other models as well.

No	Module/parts of test item	Туре	Manufacturer	

No	Documents as provided by the applicant - Description	File name	Issue date



Modifications to the test item during testing:	$\boxtimes$	N/A		
Copy of marking plate:				
The artwork below may be only a draf	t. The ι	use of certification m	arks on	a product must be authorized by the
respective NCBs that own these mark	S.			
GAS Gewerbest Vital Juic ArtNr. 4 230V ~ 50 Nicht in Fl Nur für de	r 20 er P 0117 Hz üssig	OBACI 21279 Holle 700 Watt gkeiten eintau ausgebrauc	Constect PC ucher	<b>F m b H</b> It • Germany /05/21

## 1.2 Environment

The requirements and standards apply to equipment intended for use in:

$\boxtimes$	Residential (domestic) environment.
$\boxtimes$	Commercial and light-industrial environment.
	Industrial environment.

## 1.3 **Test data**

Test Leastion	DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch
Test Location	No.3, Qiyun Road, Huangpu District, Guangzhou, Guangdong, China
Date of receipt of test item	2021-08-20
Date (s) of performance of tests	2021-08-20 to 2021-08-24

## 1.4 Classification according to EN 55014-2

The standard EN 55014-2 is subdivided in four categories. For each category, specific immunity requirements are formulated.

 Category I:
 Apparatus containing no electronic control circuitry.

 Examples:
 Motor operated appliances, lighting toys, track sets without electronic control units, tools, heating appliances, UV and IR radiators and apparatus containing components such as electromechanical switches and thermostats.



	Electric circuits consisting of passive components (such as radio interference suppression capacitors or inductors, mains transformers and mains frequency rectifiers) are not considered to be electronic control circuitry.
	<b>Category II:</b> Transformer toys, dual supply toys, mains powered motor operated appliances, tools, heating appliances and similar electric apparatus (for example – UV radiators, IR radiators and microwave ovens) containing electronic control circuitry with no internal clock frequency or oscillator frequency higher than 15 MHz.
	<b><u>Category III</u></b> : Battery powered apparatus (with built-in batteries or external batteries), which in normal use is not connected to the mains, containing an electronic control circuitry with no internal clock frequency or oscillator frequency higher than 15 MHz.
	Category IV: All other apparatus covered by the scope of the EN 55014-2 standard.
Clock fro	equency: Fundamental frequency of any signal used in the device, excluding those which are solely de integrated circuits (IC).



# 2 DESCRIPTION OF TEST SETUP

# 2.1 **Operating mode(s) used for tests**

During the tests the following operating mode(s) has(have) been used.

Operating	Operating mode description	Used for testing			
mode		Emission	Immunity		
1	Motor running	$\square$			
2					
Supplemental information:					

# 2.2 **Port(s) of the EUT**

Port name and description	Connected to / Termination	Cable			
		Length used	Attached	Shielded	
		during test [m]	during test	Silleided	
AC mains power input	AC mains	1,2	$\boxtimes$		
Supplemental information:					

# 2.3 Support / Auxiliary equipment / unit / software for the EUT

The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment / unit / software	Type / Version	Manufacturer	Supplied by
Supplemental information:			

# 2.4 Test Configuration / Block diagram used for tests

The following test setup / configuration / block diagram has been used during the tests:

Refer to annex 3 test photos.



# 3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

## 3.1 Standards

Standard	Year	Description
EN 55014-1	2017	Requirements for household appliances, electric tools and similar apparatus -
+A11	2020	Part 1: Emission.
EN 55016-2-1	2014	Methods of measurement of disturbances and immunity - Conducted
		disturbance measurements.
EN 55016-2-2	2011	Methods of measurement of disturbances and immunity - Measurement of
		disturbance power.
EN 55016-2-3	2010	Methods of measurement of disturbances and immunity - Radiated disturbance
+A1	2010	measurements.
+A2	2014	
EN IEC 61000-3-2	2019	Limits for harmonic current emissions (equipment input current $\leq$ 16 A per
		phase).
EN 61000-3-3	2013	Limitation of voltage changes, voltage fluctuations and flicker in public low-
+A1	2019	voltage supply systems, for equipment with rated current $\leq$ 16 A per phase and
		not subject to conditional connection.
EN 55014-2	2015	Requirements for household appliances, electric tools and similar apparatus -
		Part 2: Immunity – Product family standard.
EN 61000-4-2	2009	Electrostatic discharge immunity test.
EN 61000-4-3	2006	Radiated, radio-frequency, electromagnetic field immunity test.
+A1	2008	
+A2	2010	
EN 61000-4-4	2012	Electrical fast transient/burst immunity test.
EN 61000-4-5	2014	Surge immunity test.
EN 61000-4-6	2014	Immunity to conducted disturbances, induced by radio-frequency fields.
EN 61000-4-11	2004	Voltage dips, short interruptions and voltage variations immunity tests.

# 3.2 **Deviation(s) from the Standard(s) / Test Specification(s)**

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.



# 3.3 **Overview of results**

EMISSION TESTS – EN 55014-1				
Requirement – Test case	Basic standard(s)	Verdict	Remark	
Continuous disturbances voltage at mains terminals (Induction cooking)	EN 55016-2-1	N/A		
(9 kHz to 30 MHz)				
Magnetic field induced current (Induction cooking)	EN 55016 2 2			
(9 kHz – 30 MHz)	EIN 55010-2-5	N/A		
Continuous disturbance voltage at mains terminals	EN 55016 2 1	DASS		
(150 KHz – 30 MHz)	EN 55010-2-1	FASS		
Continuous disturbance at associated ports		NI/A		
(150 KHz – 30 MHz)	EN 55010-2-1	IN/A		
Disturbance power (30 MHz to 300 MHz)	EN 55016-2-2	PASS		
Radiated electromagnetic disturbances (300 - 1000 MHz)	EN 55016-2-3	PASS	See 1)	
Discontinuous disturbance (clicks) on AC power leads	EN 55014-1	N/A	See 2)	
Supplementary information:	-		-	

1) The EUT met the both conditions 1) and 2) of clause 4.3.4.2 procedure (a) of the standard, therefore the EUT is deemed to comply in the frequency range from 300 MHz to 1000 MHz without further measurements.

2) Exemptions from click measurements applicable.

EMISSION TESTS – EN IEC 61000-3-2, EN 61000-3-3						
Requirement – Test case	Basic standard(s)	Verdict	Remark			
Control principle shall be allowed for the application according to the clause 6.1	EN 61000-3-2	PASS				
Harmonic current emissions	EN 61000-3-2	N/A				
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	PASS				
Supplementary information:	Supplementary information:					

IMMUNITY TESTS – EN 55014-2						
Requirement – Test case	Basic standard(s)	Verdict	Remark			
Electrostatic discharge	EN 61000-4-2	N/A	See 1)			
Radio-frequency electromagnetic fields	EN 61000-4-3	N/A	See 1)			
Fast transients	EN 61000-4-4	N/A	See 1)			
Surge transient	EN 61000-4-5	N/A	See 1)			
Injected currents (radio-frequency common mode)	EN 61000-4-6	N/A	See 1)			
Voltage dips and short interruptions	EN 61000-4-11	N/A	See 1)			
Supplementary information:						
1) The equipment is classified as ested any 1 equipment according to EN 55014.2: no immunity tests are applicable						

1) The equipment is classified as category 1 equipment according to EN 55014-2; no immunity tests are applicable.

The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to calculate the uncertainty associated with the measurement result.



# 4 EMISSION TEST RESULTS

# 4.1 Conducted disturbance voltage - Mains VERDICT: PASS Standard EN 55014-1 Basic standard EN 55016-2-1

### □ Limits for induction cooking appliance

Frequency range [MHz]	Limit: QP [dB(µV) <sup>1)</sup> ]	Limit: AV [dB(μV) <sup>1)</sup> ]	IF BW	Detector(s)	
0,009 - 0,050	110		200 Hz	QP	
0,050 - 0,15	90 – 80 <sup>2)</sup>		200 Hz	QP	
0,15 - 0,50	66 – 56 <sup>2)</sup>	56 - 46 <sup>2)</sup>	9 KHz	QP, AV	
0,50 - 5,0	56	46	9 KHz	QP, AV	
5,0 - 30	60	50	9 KHz	QP, AV	
<ul> <li><sup>1)</sup> At the transition frequency, the lower limit applies.</li> <li><sup>2)</sup> The limit decreases linearly with the logarithm of the frequency.</li> </ul>					

### ⊠ Limits for appliance other than induction cooking.

Frequency range [MHz]	Limit: QP [dB( $\mu$ V) <sup>1)</sup> ]	Limit: AV [dB( $\mu$ V) <sup>1)</sup> ]	IF BW	Detector(s)			
0,15 - 0,50	66 – 56 <sup>2)</sup>	59 - 46 <sup>2)</sup>	9 KHz	QP, AV			
0,50 - 5,0	56	46	9 KHz	QP, AV			
5,0 - 30	60	50	9 KHz	QP, AV			
<sup>1)</sup> At the transition frequency, the lower limit applies.							

<sup>2)</sup> The limit decreases linearly with the logarithm of the frequency.

### **Performed measurements**

Tested terminal(s) / port	$\square$	AC mains input power	⊠ N ⊠ L1		L1		L2		L3	
		DC mains input power DC mains input power Nega						Nega	tive (-)	
	1									
Voltage – Mains [V]	230 \	/ac								
Frequency – Mains [Hz]	50 Hz	Ζ								
	1									
Test method applied	$\square$	Artificial mains network								
		Voltage probe								
Test setup	$\square$	Table top		Artific	ial hai	nd app	lied			
		Floor standing		Other	:					
	Refe	tefer to the Annex 3 for test setup photo(s).								
Operating mode(s) used	Mode	Mode 1								
Remark										

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### **Test Configuration**







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# 4.2 Magnetic field induced current (9 KHz – 30 MHz) VERDICT: N/A

Standard	EN 55014-1
Basic standard	EN 55016-2-3
Test method	Large Loop Antenna (LLA)

### Limits

	Limit: QP	[dB(µA) <sup>1)</sup> ]		Detector			
	Horizontal component	Vertical component					
0,009 - 0,07	88	106	200 Hz	QP			
0,07 - 0,15	88 - 58	106 - 76	200 Hz	QP			
0,15 - 30	58 - 22	76 - 40	9 KHz	QP			
<sup>1)</sup> At the transition frequency, the lower limit applies.							

<sup>2)</sup> The limit decreases linearly with the logarithm of the frequency.

### Performed measurements

Port under test	Enclosure				
Test method applied	Large Loop Antenna (LLA) with 2 meters diameter.				
<del>Test setup</del>	Equipment placed in the centre of the LLA.				
	Refer to the Annex 3 for test setup photo(s).				
Operating mode(s) used	-				
Remark					



# 4.3 Continuous disturbance – associated ports VERDICT: N/A

Standard	EN 55014-1
Basic standard	EN 55016-2-1

### Disturbance voltage limits

Frequency range [MHz]	Limit: QP [dB( $\mu$ V) <sup>1)</sup> ]	IF BW	Detector(s)				
0,15 - 0,50	80	70	9 KHz	QP, AV			
0,50 5,0	74	64	9 KHz	QP, AV			
5,0 - 30	74	64	9 KHz	QP, AV			
<sup>1)</sup> At the transition frequency, the lower limit applies.							

### Disturbance current limits

Frequency range [MHz]	Limit: QP [dB(µA)]	Limit: AV [dB(µA)]	IF BW	Detector(s)				
0,15 - 0,50	40 to 30 <sup>1)</sup>	30 to 20 <sup>1)</sup>	9 KHz	QP, AV				
0,50 30	30	20	9 KHz	QP, AV				
<sup>1)</sup> Decreasing linearly with the logarithm.								

### Performed measurements

Port(s) / Terminal(s) under test									
$\bowtie$	Additional ports				Other:				
₽	<del>Other:</del>				Other:				
Volta	<del>ge – Mains [V]</del>	<del>240 \</del>	/ac						
Freq	uency – Mains [Hz]	<del>50 H</del> z	2						
Test	method applied		CDN according to E	N/IE(	<del>- 61000-4-6</del>				
			ISN – Impedance Stabilisation Network						
		$\boxtimes$	Voltage probe						
			Current probe						
			Artificial mains network						
			Other:						
Test	setup		Table top		Artificial hand applied				
		$\square$	Floor standing		Other:				
Refer to the Annex 3 for				<del>st setu</del>	<del>ip photo(s).</del>				
Oper	ating mode(s) used								
Rem	ark								



# 4.4 Disturbance power (30 MHz – 300 MHz) VERDICT: PASS

Standard	EN 55014-1
Basic standard	EN 55016-2-2

### Limits

Frequency range [MHz]	Limit: QP [dB(pW)]	Limit: AV [dB(pW)]	IF BW	Detector(s)			
30 - 300	45 – 55 <sup>1)</sup>	35 - 45 1)	120 KHz	QP, AV			
Margin							
200 - 300	0 - 10 <sup>1)</sup>		120 KHz	QP, AV			
<sup>1)</sup> The limit increases linearly with the frequency.							

### Performed measurements

Port(s) under test									
$\square$	AC mains input power			Load			Control		
	Other:			Other:			Other:		
_			-			[			
Test	setup	$\square$	Table	e top		Floor	standing		
			] Other:						
	Refe			Refer to the Annex 3 for test setup photo(s).					
Cond	litions for exemption	$\square$	"Limits" reduced by "Margin" applied and passed						
300 MHz			Maximum clock frequency < 30 MHz						
Oper	ating mode(s) used	Mode	ode 1						
Rema	ark		-						

### **Test Configuration**









# 4.5 Radiated electromagnetic disturbances (30 – 1000 MHz) VERDICT: PASS

Standard	EN 55014-1
Basic standard	EN 55016-2-3
Test method	Antenna method according to EN 55016-2-3 standard.

Limits

Frequency	l		Detector			
[MHz]	@3 m.	@10 m.		Delector		
30 - 230	40	36	30	120 KHz	QP	
230 - 1000	47	120 KHz	QP			
<sup>1)</sup> At the transition frequency, the lower limit applies.						

### Performed measurements

Port under test	Enclosure						
Voltage – Mains [V]							
Frequency – Mains [Hz]							
Test method applied		OATS or SAC with measurement distance [m]: 3 m.					
		OATS or SAC with measurement distance [m]: 5 m.					
		OATS or SAC with measurement distance [m]: 10 m.					
Test setup		Equipment on a table of 80 cm height					
	Equipment on the floor (insulated from ground plane)						
	Other:						
	Refer to the Annex 3 for test setup photo(s).						
Operating mode(s) used							
Remark	The EUT met the both conditions 1) and 2) of clause 4.3.4.2 procedure (a) of the						
	standard, therefore the FLIT is deemed to comply in the frequency range from 300						
	standard, therefore the Lori is deemed to comply in the frequency range from 500						
	MHz	to 1000 MHz without further measurements.					



# 4.6 Discontinuous disturbance (clicks) on AC power leads VERDICT: N/A

Standard	EN 55014-1		
Frequency [MHz]	Limit: QP [dB(µV)]	IF BW	Detector
0,15	66	9 KHz	Quasi-Peak (QP)
0,50	56	9 KHz	Quasi-Peak (QP)
1,40	56	9 KHz	Quasi-Peak (QP)
30,0	60	9 KHz	Quasi-Peak (QP)

### Performed measurements

Voltage – Mains [V]					
Frequency – Mains [Hz]					
Test method applied	Artificial mains network				
	U Voltage probe				
Test setup	Table top				
	Other:				
	Refer to the Annex 3 for test setup photo(s).				
Operating mode(s) used	Mode 1				
Remark					



## 4.7 Harmonic current emissions

VERDICT: N/A

Standard	EN IEC 61000-3-2			
Exlusions	Arc welding equipment intended for professional use.			
(For these categories of equipment, limits are not specified in the EN 61000- 3-2 standard)		System(s) with nominal voltage(s) less than 220 $V_{\text{AC}}$ (line-to-neutral).		
		Equipment with rated power of $\leq$ 75 W (other than lighting equipment).		
		Professional equipment with total rated power > 1 kW.		
		Symmetrically controlled heating elements with a rated power $\ge$ 200 W.		
		Independent dimmers for incandescent lamps with rated power $\leq$ 1 kW.		

Classific	Classification					
$\square$	Class A	All app	All apparatus not classified as Class B, C or D			
	Class B	Portab	Portable tools			
	Class C		Lighting equipment with active input power > 25 W			
			Lighting equipment with active input power ≤ 25 W (First requirement, Table 3 column 2)			
			Lighting equipment with active input power ≤ 25 W (Second requirement)			
	Class D	Personal computers, television receivers				

Note: The EUT belongs to Kitchen machines as listed in the scope of EN 60335-2-14.

According to EN IEC 61000-3-2 Clause B.13 "Kitchen machines as listed in the scope of EN 60335-2-14 are deemed to conform to the harmonic current limits of this standard without further testing.".



# 4.8 Voltage changes, voltage fluctuations and flicker VERDICT: PASS

Standard	EN 61000-3-3

### Limits

PST (Short term flicker)	$\boxtimes$	≤ 1		Not Applicable
P <sub>LT</sub> (Long term flicker)		≤ 0,65	$\square$	Not Applicable
dc (Relative Voltage change)	$\boxtimes$	≤ <b>3</b> , <b>3</b> %		Not Applicable
d <sub>MAX</sub> (Max. voltage change)		<b>≤ 4%</b>	$\boxtimes$	6%
		7%		Not Applicable
Tmax	$\boxtimes$	≤ 500 ms		
Supplemental information:				

### **Performed measurements**

Reason for not performing the measurement(s)		Tests are not necessary because the EUT is unlikely to produce significant voltage fluctuations or flicker (clause 6.1).				
Port under test	AC Ma	AC Mains power input				
Voltage – Mains [V]	230 Va	IC				
Frequency – Mains [Hz]	50 Hz	50 Hz				
Test method		Flickermeter	Flickermeter according EN / IEC 61000-4-15:2011			
		Simulation (Clause 4.2.3 of EN / IEC 61000-3-3)				
		Analytical method (Clause 4.2.4 of EN / IEC 61000-3-3)				
		Use of $P_{\rm st}$ =	1 curve	(Clause 4.2.5 of El	N / IEC	61000-3-3)
Observation peroid	$\square$	10 min.		120 min.		Other:
		24 times switching according to Annex B				
Operating mode(c) used	Mode	1				
Remark						

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# **Test Configuration**









# 5 **IMMUNITY TEST RESULTS**

### 5.1 **Performance (Compliance) criteria**

[According to EN 55014-2 (CISPR 14-2)]

<u>Performance criteria A</u>: 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.

<u>Performance criteria B</u>: 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. 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 reasonable expect from the apparatus if used as intended.

<u>Performance criteria C :</u> 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 instruction for use.

### 5.1.1 **Performance criteria related to immunity tests**

Immunity test	Performance criteria
Electrostatic discharge	В
Radio-frequency electromagnetic fields	А
Fast transients	В
Surge transient	В
Injected currents (radio-frequency common mode)	A
Voltage dips and short interruptions	С

### 5.1.2 Manufacturer defined performance criteria

Not provided.



# 5.2 **Monitored – Checked Functions / Parameters**

During the immunity tests the following functions of the EUT has/have been monitored/checked.

	Motor speed	Display data
	Switching	Data storage
	Standby mode	Sensor functions
	Temperature	Audible signals
	Power consumption	Others : LED's
	AC mains input current	Others :
	Timing	Others :
	Illumination	Others :
<u>Supp</u>	lementary information : N/A	

Immunity test	Monitored - Checked function(s)/parameter(s) during / after the test	Method
Electrostatic discharge		
Radio-frequency electromagnetic fields		
Fast transients		
Surge transient		
Injected currents (radio-frequency common mode)		
Voltage dips and short interruptions		
Supplementary information : N/A		



# 5.3 Electrostatic discharge immunity VERDICT: N/A

Electrostatic discharges (ESD) are the result of persons or objects that accumulate static electricity due to for instance walking on synthetic carpets. The ESD can influence the operation of equipment or damage its electronics, either by a direct discharge or indirectly by coupling or radiation. Both effects are simulated during the tests.

### Requirements

Standard	EN 55014-2				
Basic standard	EN 61000-4-2				
Port under test	Enclosure				
Air discharges 1)	□ ±2 kV □ ±4 kV □ kV				
Contact discharges 1)	□ ±2 kV □ ±4 kV □ kV				
Number of discharges	$\geq$ 10 per polarity with $\geq$ 1 sec interval.				
<sup>1)</sup> Tests with lower voltages are not required.					

<del>Set-up</del>	Table-top	Floor standing
Ambient temperature [°C]		Relative Humidity air [%]
Voltage – Mains [V]		
Frequency – Mains [Hz]		
Operating mode(s) used		

Test Point (Location of discharge, see also photo)		Test Voltage [kV] -& Polarity	Coupling type	# of applied discharges / polarity	<del>Discharge</del> interval [s]			
	Points on cor	ductive surface as	±4	Contact	<del>10</del>	4		
	Points on non as indicated in	-conductive_surface the picture below.	<del>±8</del>	Air	<del>10</del>	4		
	HCP top side.		±4	Contact	<del>10</del>	4		
₽	HCP bottom side.		±4	Contact	<del>10</del>	1		
₽	UCP right side.		±4	Contact	<del>10</del>	1		
₽	VCP left side.		±4	Contact	<del>10</del>	1		
₽	VCP front side	-	<del>±</del> 4	±4 Contact 10		4		
	UCP rear side.		±4	Contact	<del>10</del>	4		
Obse <u>Supp</u>	Observation(s)       During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.         Supplementary information:       N/A							



# 5.4 Radio-frequency electromagnetic fields immunity VERDICT: N/A

During the test it is verified if the equipment under test (EUT) has sufficient immunity against radiated electromagnetic fields. Industrial electromagnetic sources, walkie-talkies, radio transmitters, television transmitters and telecommunication equipment including cellular telephones and other emitting devices can generate these fields.

### Requirements

Standard	EN 55014-2			
Basic standard	EN 61000-4-3			
Port under test	Enclosure			
Frequency range	Test level	Modulation	Dwell time	Step size
80 – 1000 MHz	3 V/m	80% AM (1kHz)	≥ 0,5 s	≤ 1%
Supplementary information:	<u>.</u>			

Test method		EN 6100	<del>EN 61000-4-3</del>			EN 61000-4-2	<u>20</u>		
Test set-up		Equipment on the table (0,8 m height)							
(see annex 3 for photo)		Equipme	<del>nt standir</del>	<del>ìg on f</del>	<del>loor (0</del>	, <del>05 – 0,15 m h</del>	<del>eight)</del>		
Voltage – Mains [V]		se write th		/voltac		ad for testing)			
Frequency - Mains [Hz]							ting)		
Operating mode(s) used						for testing)	ting)		
Frequency range (applied)	Ar Poli	Antenna         Test level         Modulation         Dwell time         Remark           Polarization         (applied)         (applied)         (applied)         Remark					Remark		
80 – 1000 MHz		Ħ	<del>3 V/</del>	m	80%	6 AM (1kHz)	<del>2 s</del>		
<del>(step size 1%)</del>		¥	<del>3 V/</del> /	m	80%	6 AM (1kHz)	<del>2 s</del>		
Exposed side of the EUT		Front (0 <sup>e</sup>	» <del>)</del>		Right	<del>(90°)</del>		Төр	
		Rear (18	₩ <del>9</del>		Left (	<del>270°)</del>		Bottom	
Observation(s)         During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.									
Supplementary information:	Supplementary information:								



# 5.5 Electrical Fast Transients immunity VERDICT: N/A

The EFT immunity test simulates disturbances by bursts of very short transients caused for example by switching off loads such as an AC motor or bouncing relay contacts. The transients are likely to disturb electronics but less likely to cause damage.

### Requirements

Standa	ard	EN 55014-2				
Basic	standard	EN 61000-4-4				
Pulse	characteristics	5/50 ns				
Port			Test level	Repetition frequency	Duration	
	AC input-output power 1)	± 1000 V	5 KHz	2 min. / polarity		
DC input-output power <sup>2)</sup>			± 500 V	5 KHz	2 min. / polarity	
Signal and Control lines 3)			± 500 V	5 KHz	2 min. / polarity	

<sup>1)</sup> For extra low voltage a.c ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

<sup>2)</sup> Not applicable to battery operated appliances that cannot be connected to the mains while in use.

<sup>3)</sup> Applicable only to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

Voltage – Mains [V]				
Frequency – Mains [Hz]				
Operating mode(s) used				
<del>Test Set-up</del>	Equipment standing on floor at (C	),1 ± 0	,01) m above ground plane	
(see annex 3 for photo)	Equipment on the table $(0,1 \pm 0,0)$	)1) m (	above ground plane	
	Artificial hand applied. Location refer to annex 3.			
Coupling	Common mode		Other:	

Port(s) under test	Test Voltage &Polarity	Repetition Frequency	Test duration / polarity	Injection method			əd
				□	CDN		<del>Clamp</del>
				Ф	CDN		<del>Clamp</del>
				□	CDN	₽	Clamp
During the test no loss of performance was observed. After the test the EUT           bservation(s)         functioned as intended. No unacceptable loss of performance or data was observed.							



# 5.6 Surge transient immunity VERDICT: N/A

The surge transient immunity test simulates the surges that are caused by over-voltages due to indirect (induced) lightning transients. The pulse is a slow transient with high-energy contents and due to its long duration may cause damage to an unprotected EUT.

### Requirements

Standard	EN 55014-2					
Basic standard	EN 61000-4-5	EN 61000-4-5				
Pulse characteristics	1,2/50µs Voltage; 8/20µs Current					
Repetition rate	≥ 60 secs. (for each test level and phase angle)					
Number of pulses	5 pulses (at each	polarity and phase a	angle)			
Port	•	Test level & Polarity & Coupling Phase angl				
Folt		Line to Line	Line to Earth	[°]		
AC input power <sup>1)</sup>	+ 1 kV	+ 2 kV	90			
AC input power <sup>1)</sup> - 1 kV - 2 kV				270		
<sup>1)</sup> Tests with lower voltages are not required.						

Voltage – Mains [V]	
Frequency – Mains [Hz]	
Operating mode(s) used	
Repetition rate	60 secs. (for each test level and phase angle)
Number of pulses	5 pulses (at each polarity and phase angle)

	Port(s) under test	Coupling	Test level & Polarity	Phase angle [ <sup>e</sup> ]	Remark	
	AC mains input power	Line to Neutral	+1 k∀	<del>90</del>		
	AC mains input power	Line to Neutral	<del>-1 k</del> ∀	<del>270</del>		
	AC mains input power	Line to Earth	+2 k∀	<del>90</del>		
	AC mains input power	Line to Earth	<del>-2 k</del> ∀	<del>270</del>		
	AC mains input power	Neutral to Earth	+2 k∀	<del>90</del>		
	AC mains input power	Neutral to Earth	<del>-2 kV</del>	<del>270</del>		
		During the test no lo	ess of performance	was observed. /	Atter the test the EUI	
Observation(s) functioned as intended. No unaccept				ble loss of perfo	rmance or data was	
observed.						
Supplementary information: N/A						



# 5.7 Injected currents (RF common mode) immunity VERDICT: N/A

During this test the immunity of the equipment for induced or conducted electromagnetic fields is checked. Fields generated by radio and other transmitters cause RF voltages in long cables like the mains network. This test reproduces these induced disturbing voltages by injecting them to the EUT via the cabling.

### Requirements

Standard		EN 55014-2				
Basic standard		EN 61000-4-6				
Frequency range		Modulation Step size		Dwell time		
	0,15 – 80 MHz	80% AM (1kHz)	≤ 1%	≥ 0,5 s		
	0,15 – 230 MHz	80% AM (1kHz)	≤ 1%	≥ 0,5 s		
	Port		Test level, <i>U</i> o			
	AC input-output power 1)		3 V			
	DC input-output power 2)	3)	1 V			
	Signal and Control lines	4)	1 V			

<sup>1)</sup> For extra low voltage a.c ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

<sup>2)</sup> Not applicable to battery operated appliances that cannot be connected to the mains while in use.

<sup>3)</sup> Applicable to battery operated appliances that can be connected to the mains while in use, or to appliances for which the length of d.c. cables may exceed 3 m according to the manufacturer's functional specification.

<sup>4)</sup> Applicable only to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.

Frequency rar	<del>nge (a</del>	Modulation (applied)	<del>Step size</del> <del>(applied)</del>					
			<del>80% AM (1kHz)</del>	<del>1%</del>				
	-							
Voltage – Mains [V]			Frequency – Mains [Hz]					
Operating mode(s) used								
<del>Test set-up</del>	$\bowtie$	Equipment standing on floor at $(0,1 \pm 0,01)$ m above ground plane.						
(see annex 3 for photo)		Equipment on the table $(0,1 \pm 0,01)$ m above ground plane.						
Artificial hand applied. Le			ocation refer to annex 3.					

Port(s) under test		<del>Test Level</del> <del>(applied)</del>	Injection method	<del>Dwell time</del> <del>(applied)</del>	Remark		
AC mains power input			CDN-M3				
			RF-Injection Clamp				
Observation(s)	During the test no loss of performance was observed. After the test the EUT functioned						
	as intended. No	ed. No unacceptable loss of performance or data was observed.					
Supplementary information:							



# 5.8 **Power supply interruptions and dips immunity VERDICT: N/A**

The purpose of the test is to verify the immunity of the equipment against voltage dips and voltage interruptions. It helps to ensure that the equipment functions properly (as expected and safely) with power supply fluctuations. Voltage dips and interruptions are caused by faults in the LV, MV, HV networks (short-circuit or ground faults).

### Requirements

Standard	EN 55014-2					
Basic standard	EN 61000-4-11					
# of dips & interruptions	3 dips / interruptions for each test level and phase angle					
Interval between events	≥ 10 seconds					
Dort	Test level 1)	Period (Cycles)		Performence Criterion		
Poli		50 Hz	60 Hz	Performance Chienon		
AC input power port	U <sub>NOM</sub> – 100%	0,5	0,5	C; Refer to the chapter 5.1 for details.		
AC input power port U <sub>NOM</sub> – 60% 10 12		C; Refer to the chapter 5.1 for details.				
AC input power port	U <sub>NOM</sub> – 30%	25 30		C; Refer to the chapter 5.1 for details.		

<sup>1)</sup> Changes to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform.

<u>NOTE:</u> Where the equipment has a rated voltage range 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 selected for testing.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.

 	Terminal	Voltage dip	Duration [cycles]		Repetion rate	Number of	Phase angle	
UNOM-[VAC]		<del>[% U<sub>NOM</sub>]</del>	<del>50 Hz</del>	60 Hz	<del>[8]</del>	dips per test	<del>[°]</del>	
		θ	<del>0,5</del>	<del>0,5</del>	<del>10</del>	3	<del>0, 180</del>	
		4 <del>0</del>	<del>10</del>	<del>12</del>	<del>10</del>	3	<del>0, 180</del>	
		70	25	30	<del>10</del>	3	<del>0, 180</del>	
		Т						
Operating mode(s) used								
Observation(s)		During the test no loss of performance was observed. After the test the EUT						
		functioned as intended. No unacceptable loss of performance or data was observed.						
Supplementary information:								



# 6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

The photographs show the tested device.



Overall view of SJ-450



Internal view of SJ-450

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Internal view of SJ-450



# 7 ANNEX 1 - MEASUREMENT UNCERTAINTIES

The table(s) below show(s) measurment uncertainties of the EMC test set-ups. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Measurement		Uncertainty
Mains disturbance voltage	(150 kHz-30MHz)	2,82 dB
Disturbance Power	(30 MHz-300 MHz)	3,76dB



# 8 ANNEX 2 – USED EQUIPMENT

Instrumentation	Manufacturer	Model No.	Serial No.	DEKRA No.	Cal. Due date
Shielding Room	Changzhou Feite	/	/	G/L861	2022/06/01
EMI Receiver	R&S	ESCI	101206	G/L858	2022/07/19
LISN	R&S	ENV216	101336	G/L859	2022/07/19
Multi-Channel	TESEQ	DIA1512D	28300	G/L871	2022/07/19
Discontinuous					
Interference					
Analyzer					
LISN	R&S	ENV216	101336	G/L860	2022/07/19
Clamp	TESEQ	MDS21	4085	G/L863	2022/08/11
POWER SOURCE	California	500LiX-CTS-	1132A00193	G/L862	2022/07/19
	Instruments	400			
Analyzer	California	PACS-A	1132A00193	G/L862	2022/07/19
	Instruments				

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# 9 ANNEX 3 - TEST PHOTOS

### Conducted disturbance voltage at mains terminals





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### Flicker



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