

## RESOLUCION 737 - SUBTEL

Fecha de publicación: 12/3/2026

### Información Comercial

#### Nombre comercial del equipo

Código	Descripción
929003772312	Wi-Fi BLE Color/4.7W GU10 GLASS 6/1PF

**Fabricante:** Signify (China) Investment Co., Ltd.

**Importador o representante en Chile:** SIGNIFY CHILENA S.A.

**Domicilio:** El Bosque Norte 0211, Las Condes - Santiago

**Correo electrónico de contacto:** tomas.aragona@signify.com

**Sitio Web:** wizconnected.com/es-cl

### Características técnicas

Tipo de equipo	Lámpara LED
Marca	WIZ
Modelo	Wi-Fi BLE Color/4.7W GU10 GLASS 6/1PF
Módulo	ESP32-C3-WIZ2012
Tecnología o modulación	IEEE 802.11b: DSSS-DBPSK, QPSK, CCK IEEE 802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM (Wi-Fi); GFSK (BT)
Frecuencias	BT: 2.400-2.483,5 ; WLAN 2,4G: 2.412-2.462 MHz.
Ganancia de antena (dBi)	3.96 dBi
P.I.R.E. (EIRP)	BT: 8,26 mW (9,17 dBm) ; WLAN 2,4G: 304,79 mW (24,84 dBm).

### Declaración de conformidad

*“El equipo previamente individualizado cumple con las disposiciones establecidas en la Norma Técnica de Equipos de alcance reducido, aprobada por la resolución exenta N° 1.985, de 2017, de la Subsecretaría de Telecomunicaciones.”*

Firma del Importador/Responsable:

Nombre de quien firma: Tomás Aragona

Cargo: Representante Legal



- ANT.: 1) Nota ingreso Subtel N° 76.425 de 14.06.2024.  
2) Resolución Exenta N° 1.985 de 2017 y sus modificaciones, de la Subsecretaría de Telecomunicaciones.  
3) Resolución Exenta N° 3.103 de 2012, de la Subsecretaría de Telecomunicaciones.  
4) Ley N° 18.168, General de Telecomunicaciones.  
5) Resolución Exenta N° 470 de 13.02.2013, que Faculta a los Jefes de División y de Departamento para firmar “Por orden del Subsecretario de Telecomunicaciones” y delega las facultades que indica.

MAT.: Certifica equipo de alcance reducido.

DE : SUBSECRETARÍA DE TELECOMUNICACIONES

A : MBSERVICES

1. De acuerdo a la información proporcionada por documento de ANT. 1), esta Subsecretaría de Estado extiende el presente certificado para operar dentro del país, condicionado al estricto cumplimiento de lo señalado en letra j.1) del artículo 1° de la norma de ANT. 2).

- Tipo de equipo : Lámpara LED.
- Marca : WIZ.
- Modelo(s) : 929003772312.
- Fabricante : Signify (China) Investment Co., Ltd.
- Frecuencias de operación : BT: 2.400-2.483,5 ; WLAN 2,4G: 2.412-2.462 MHz.
- Potencia máxima radiada : BT: 8,26 mW (9,17 dBm) ; WLAN 2,4G: 304,79 mW (24,84 dBm).
- Restricciones : Estos equipos deben operar al interior de recintos cerrados y emplear técnicas de compartición de frecuencias.

2. El incumplimiento de lo dispuesto en el presente certificado, será sancionado de acuerdo a las disposiciones legales vigentes. Estos equipos no deberán provocar interferencias a servicios de concesionarias de telecomunicaciones y no estarán protegidos respecto de interferencias que eventualmente puedan recibir.

Saluda atentamente a Ud.,  
Por orden del Subsecretario de Telecomunicaciones,

DISTRIBUCIÓN:

- MBservices: [Laboratorio@mbservices.cl](mailto:Laboratorio@mbservices.cl)
- Oficina de Partes.

Francisco Javier Pizarro Sepulveda  
Jefe División Fiscalización  
08/07/2024 17:40



Test report No:  
6179951.50-EMC

## TEST REPORT

### Electromagnetic Compatibility (EMC)

Identification of item tested	LED Lamp
Trademark	PHILIPS; WiZ
Model and /or type reference	9290024488B, 9290037722; 9290037723
Ratings	220-240 V~; 50/60 Hz; 9290037722; 9290037723: GU10 cap; 4.7 W 9290024488B: E14 cap; 4.9 W
Test Laboratory	DEKRA Testing and Certification (Shanghai) Ltd. No.250, Jiangchangsang Road, Jing'an District, Shanghai, China
Applicant's name / address	Signify (China) Investment Co., Ltd. Building No.9, Lane 888, Tianlin Road, Minhang District, Shanghai 200233, China
Test method requested, standard	ETSI EN 301 489-17 V3.2.4 ETSI EN 301 489-1 V2.2.3
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Kaiyuan Dai Test Engineer 
Approved by (name / position & signature)	Zuyao Fan Project Manager 
Date of issue	2024-03-15
Report template No	TRF_EN301 489-17_EN 301 489-1 EMC V1.0

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## COMPETENCES AND GUARANTEES

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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.

**IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

## GENERAL CONDITIONS

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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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. The information provided by the customer in this report may affect the validity of the results, the test lab is not responsible for it.
6. The test results presented in this report relate only to the object tested.

## UNCERTAINTY

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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. For all other measurements where no guidance is available, the measurement instrumentation uncertainty has been calculated and applied in accordance with ISO/IEC Guide 98-3 document.

Uncertainties have been calculated according to the DEKRA internal document PROD-P-EMC-M22. 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 further information.

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, unless the specification, standard or customer have special requirements

## ENVIRONMENTAL CONDITIONS

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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

<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.			
<input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.			
Decimal separator used in this report	<input type="checkbox"/>	Comma (,)	<input checked="" type="checkbox"/> 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
$U_N$	:	Nominal voltage
$T_x$	:	Transmitter
$R_x$	:	Receiver
N/A	:	Not Applicable
N/M	:	Not Measured

## DOCUMENT HISTORY

Report nr.	Date	Description
6179551.50-EMC	2024-03-15	First release.

## REMARKS AND COMMENTS

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

The ETSI EN 301 489-17 standard has been used in conjunction with ETSI EN 301 489-1 standard.

According to the declaration from manufacturer, The products are self-ballast LED lamps with E14 cap or GU10 cap. The drivers used in the products have same circuit diagram but different PCB layout.

Model 9290024488B uses RF module ESP32-C3-MINI-1. Model 9290037722 and 9290037723 use another RF module ESP32-C3-WIZ2012.

Model name	Rated Current (mA)	Declared Wattage (W)	Lamp cap	CCT (K)	Type of LEDs
9290024488B	40	4,9	E14	2200-6500	White and colour
9290037722	40	4.7	GU10	2700-6500	White
9290037723	40	4.7	GU10	2200-6500	White and colour

After review, all tests were carried out on the following models 9290024488B and 9290037723. The test results stated in this report are also representative for models which can be derived using model list given in Annex 4.

# 1 GENERAL INFORMATION

## 1.1 General Description of the Item(s)

Description of the item .....	LED Lamp
Test model / Type number.....	9290024488B, 9290037723
Serial number .....	N/A
Trademark.....	PHILIPS; WiZ
Manufacturer.....	Signify (China) Investment Co., Ltd. Building No.9, Lane 888, Tianlin Road, Minhang District, Shanghai 200233, China

For model **9290024488B**

### Wi-Fi

Operating frequency range(s) – Tx.:	IEEE 802.11b/g/n20: 2412 – 2472 MHz IEEE 802.11n40: 2422 – 2462 MHz
Operating frequency range(s) – Rx :	IEEE 802.11b/g/n20: 2412 – 2472 MHz IEEE 802.11n40: 2422 – 2462 MHz
Type of Modulation .....	IEEE 802.11b: DSSS-DBPSK, QPSK, CCK IEEE 802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM
Number of channel .....	IEEE 802.11b/g/n20: 13 IEEE 802.11n40: 9
Antenna type.....	PCB
Antenna gain.....	3.96 dBi

### Bluetooth

Operating frequency range(s) – Tx.:	2400 – 2483.5 MHz
Operating frequency range(s) – Rx :	2400 – 2483.5 MHz
Type of Modulation .....	GFSK
Number of channel .....	40
Antenna type.....	PCB
Antenna gain.....	3.96 dBi

**For model 9290037723**

**Wi-Fi**

Operating frequency range(s) – Tx.:	IEEE 802.11b/g/n20: 2412 – 2472 MHz IEEE 802.11n40: 2422 – 2462 MHz
Operating frequency range(s) – Rx :	IEEE 802.11b/g/n20: 2412 – 2472 MHz IEEE 802.11n40: 2422 – 2462 MHz
Type of Modulation .....	IEEE 802.11b: DSSS-DBPSK, QPSK, CCK IEEE 802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM
Number of channel .....	IEEE 802.11b/g/n20: 13 IEEE 802.11n40: 9
Antenna type.....	PCB
Antenna gain.....	5.19 dBi

**Bluetooth**

Operating frequency range(s) – Tx.:	2400 – 2483.5 MHz
Operating frequency range(s) – Rx :	2400 – 2483.5 MHz
Type of Modulation .....	GFSK
Number of channel .....	40
Antenna type.....	PCB
Antenna gain.....	5.19 dBi

Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input checked="" type="checkbox"/>	AC: 220 – 240 V, 50/60 Hz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC: 100 – 240 V, 50/60 Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	DC: 12 V, 24 V, 12 / 24 V					
	<input type="checkbox"/>	Battery:					
Rated Power .....	9290024488B: 4.9 W 9290037723: 4.7W						
Clock frequencies .....	>30MHz						
Other parameters.....	N/A						
Software version .....	Not provided						
Hardware version.....	Not provided						
Dimensions in cm (W x H x D)....	< 300 x 100 x 100						
Mounting position.....	<input checked="" type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input type="checkbox"/>	Other: LED luminaire					

Intended use of the Equipment Under Test (EUT)
The product is LED Lamp and it use Bluetooth 5.0 and Wi-Fi technology.

No	Module/parts of test item	Type	Manufacturer
1	RF module	ESP32-C3-MINI-1	Espressif Systems (Shanghai) Co., Ltd.
2	RF module	ESP32-C3-WIZ2012	Espressif Systems (Shanghai) Co., Ltd.

No.	Test model	Type
1	9290024488B	4.9 W
2	9290037723	4.7W

## 1.2 The environment(s) in which the EUT is intended to be used

The equipment under test (EUT) is intended to be used in the following environment(s):

<input checked="" type="checkbox"/>	Residential (domestic) environment.
<input checked="" type="checkbox"/>	Commercial and light-industrial environment.
<input type="checkbox"/>	Industrial environment.
<input type="checkbox"/>	Vehicular environment
<input type="checkbox"/>	Telecommunication centre environment

## 1.3 Test data

Location	DEKRA Testing and Certification (Shanghai) Ltd.
Address	No.250, Jiangchangsan Road, Jing'an District, Shanghai, China
Date of receipt of test item	2024-01-08 (sample(s) provided by applicant)
Date(s) of performance of tests	2024-01-09 to 2024-03-01

#### 1.4 Classification according to ETSI EN 301 489-1 / ETSI EN 301 489-17

For the purpose of the EMC performance assessment in the listed standards, the radio equipment and/or associated ancillary equipment under test is classified as:

<input checked="" type="checkbox"/>	Equipment for fixed use (e.g. base station equipment). See note 1.
<input type="checkbox"/>	Equipment for vehicular use (e.g. mobile equipment). See note 2.
<input type="checkbox"/>	Equipment for portable use (e.g. portable equipment). See note 1 and note 2.
<p><b>NOTE 1</b> : Hand portable or mobile equipment, or combinations of equipment, declared as capable of being powered for intended use by ac mains shall additionally be considered as fixed station equipment.</p> <p><b>NOTE 2</b> : Hand portable equipment, or combinations of equipment, declared as capable of being powered for intended use by the main battery of a vehicle shall additionally be considered as vehicular mobile equipment.</p>	

#### 1.5 Classification according to EN 55032

The radio equipment and/or associated ancillary equipment under test is classified as:

<input checked="" type="checkbox"/>	Class B	An ancillary equipment intended to be used exclusively in an residential (domestic) or commercial and light-industrial environment.
<input type="checkbox"/>	Class A	An ancillary equipment intended to be used exclusively in an industrial environment or telecommunication centres.

## 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 mode	Operating mode description	Used for testing	
		Emission	Immunity
1	Continuous communication with Wi-Fi and Bluetooth	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Continuous communication with Wi-Fi	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Continuous communication with Bluetooth	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Standby (idle)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>
<u>Supplemental information:</u>			
---			

### 2.2 Port(s) of the EUT

Port name and description	Connected to / Termination	Cable		
		Length used during test [m]	Attached during test	Shielded
AC mains input port	AC mains	0.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
<u>Supplemental information:</u>				
---				

### 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
APP software WiZ CN	1.16.11(1)CN	Klite	Klite
Remote control	WiZMOTE	Klite	Klite
<u>Supplemental information:</u>			
---			

### 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
ETSI EN 301 489-17 V3.2.4	2020-09	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems.
ETSI EN 301 489-1 V2.2.3	2019-11	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

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

N/A

### 3.3 Overview of results

EMISSION TESTS – ETSI EN 301 489-17, ETSI EN 301 489-1			
Requirement – Test case	Basic standard(s)	Verdict	Remark
Conducted disturbance voltage at AC mains power input / output port(s)	EN 55032, EN 55016-2-1	PASS	---
Conducted disturbance voltage at DC power input / output port(s)	EN 55032 and/or CISPR 25 (equipment for vehicular use)	N/A	See 1)
Conducted disturbance voltage at wired network port(s)	EN 55032, EN 55016-2-1	N/A	See 4)
Radiated electromagnetic disturbances (30 MHz to 1000 MHz)	EN 55032, EN 55016-2-3	PASS	---
Radiated electromagnetic disturbances (above 1 GHz)	EN 55032, EN 55016-2-1	N/A	See 8)
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	PASS	---
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	PASS	---
<u>Supplementary information:</u>			
1) The EUT does not have a DC mains power input / output port. 2) The test is not applicable to DC power input / output ports connected to cable(s) $\leq$ 3 m. 3) The EUT does not have an AC mains power input / output port. 4) The EUT does not have a wired network port. 5) Since the rated power of the EUT is less than 75 Watts harmonics test is not applicable. 6) The EUT is regarded as a professional equipment with a total rated power greater than 1 KW. The test is not applicable. 7) The highest internal frequency of the EUT is less than 108 MHz. 8) This test is only applicable to ancillary equipment not incorporated in the radio equipment and assessed separately from its associated radio equipment.			

IMMUNITY TESTS – ETSI EN 301 489-17, ETSI EN 301 489-1			
Requirement – Test case	Basic standard(s)	Verdict	Remark
Electrostatic discharge	EN 61000-4-2	PASS	
Radio-frequency electromagnetic fields	EN 61000-4-3	PASS	
Fast transients	EN 61000-4-4	PASS	
Surge transient	EN 61000-4-5	PASS	
Injected currents (radio-frequency common mode)	EN 61000-4-6	PASS	
Voltage dips and short interruptions	EN 61000-4-11	PASS	
Transients and surges in the vehicular environment	ISO 7637-2	N/A	See 2)
<u>Supplementary information:</u>			
1) Not applicable because no test requirements have been specified for DC/battery powered apparatus. 2) These tests are applicable to radio and ancillary equipment intended for vehicular use.			

### 3.4 Exclusion bands

The frequencies on which the transmitter part of the EUT is intended to operate is excluded from radiated emission measurements when performed in transmit mode of operation.

There is no frequency exclusion band applied to emission measurements of the receiver part of transceivers or the stand alone receiver under test, and/or associated ancillary equipment.

The exclusion band for immunity testing of equipment operating in the 2.4 GHz band is:

- lower limit of exclusion band = lowest allocated band edge frequency -120 MHz, i.e. 2 280 MHz;
- upper limit of exclusion band = highest allocated band edge frequency +120 MHz, i.e. 2 603.5 MHz.

The exclusion band for immunity testing of equipment operating in the 5 GHz Wi-Fi band is:

- lower limit of exclusion band = lowest allocated band edge frequency -270 MHz, i.e. 4 880 MHz;
- upper limit of exclusion band = highest allocated band edge frequency +270 MHz, i.e. 5 995 MHz.

The exclusion band for immunity testing of equipment operating in the 5.8 GHz band is:

- lower limit of exclusion band = lowest allocated band edge frequency -270 MHz, i.e. 5 455 MHz;
- as the immunity requirements have an upper frequency range of 6 GHz and any upper edge exclusion band would be greater than this for the 5.8 GHz band. The above frequency is also regarded as the upper end of the test range.

NOTE: These receiver exclusion band ranges align with the relevant blocking test ranges.

## 4 EMISSION TEST RESULTS

<b>4.1</b>	<b>Conducted disturbance voltage – AC power port(s)</b>	<b>VERDICT: PASS</b>
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Standard	ETSI EN 301 489-17, ETSI EN 301 489-1
Basic standard(s)	EN 55032, EN 55016-2-1

### Limits – Class B

Frequency range [MHz]	Limit: QP [dB(μV) <sup>1)</sup>	Limit: AV [dB(μV) <sup>1)</sup>	IF BW	Detector(s)
0.15 - 0.50	66 – 56 <sup>2)</sup>	56 - 46 <sup>2)</sup>	9 KHz	QP, CAV
0.50 - 5.0	56	46	9 KHz	QP, CAV
5.0 - 30	60	50	9 KHz	QP, CAV

<sup>1)</sup> At the transition frequency, the lower limit applies.

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

**NOTE 1:** The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

**NOTE 2:** Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

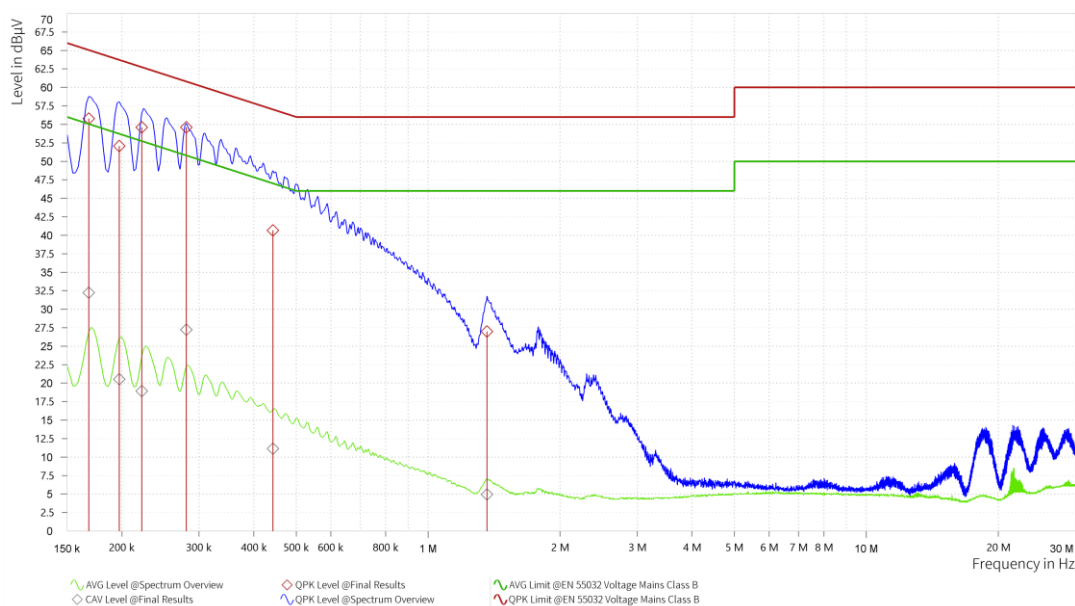
### Performed measurements

Port under test		Terminal							
<input checked="" type="checkbox"/>	AC mains input power	<input checked="" type="checkbox"/>	N	<input checked="" type="checkbox"/>	L1	<input type="checkbox"/>	L2	<input type="checkbox"/>	L3
<input type="checkbox"/>	AC output power	<input type="checkbox"/>	N	<input type="checkbox"/>	L1	<input type="checkbox"/>	L2	<input type="checkbox"/>	L3
Voltage – Mains [V]		230 Vac							
Frequency – Mains [Hz]		50 Hz							
Test method applied	<input checked="" type="checkbox"/>	Artificial mains network							
	<input type="checkbox"/>	Voltage probe							
Test setup	<input checked="" type="checkbox"/>	Table top	<input type="checkbox"/>	Artificial hand applied					
	<input type="checkbox"/>	Floor standing	<input type="checkbox"/>	Other:					
	Refer to the Annex 3 for test setup photo(s).								
Operating mode(s) used		Mode 1, 2							
Remark		---							

See next page.

Measurement data		<input checked="" type="checkbox"/>	Line	<input type="checkbox"/>	Neutral																																																								
Operating mode / voltage / frequency used during the test			Mode 1 / 230 Vac / 50 Hz																																																										
Port under test			AC mains input port																																																										
Model: 1																																																													
<table border="1"> <thead> <tr> <th>Frequency [MHz]</th> <th>QPK Level [dBµV]</th> <th>QPK Limit [dBµV]</th> <th>QPK Margin [dB]</th> <th>CAV Level [dBµV]</th> <th>CAV: AVG Limit [dBµV]</th> <th>CAV Margin [dB]</th> <th>Correction [dB]</th> </tr> </thead> <tbody> <tr> <td>0.173</td> <td>53.66</td> <td>64.84</td> <td>11.18</td> <td>29.69</td> <td>54.84</td> <td>25.15</td> <td>9.80</td> </tr> <tr> <td>0.204</td> <td>60.04</td> <td>63.45</td> <td>3.40</td> <td>35.67</td> <td>53.45</td> <td>17.77</td> <td>9.86</td> </tr> <tr> <td>0.231</td> <td>55.93</td> <td>62.41</td> <td>6.48</td> <td>25.03</td> <td>52.41</td> <td>27.38</td> <td>9.86</td> </tr> <tr> <td>0.269</td> <td>56.65</td> <td>61.14</td> <td>4.49</td> <td>27.45</td> <td>51.14</td> <td>23.69</td> <td>9.86</td> </tr> <tr> <td>0.346</td> <td>55.76</td> <td>59.06</td> <td>3.30</td> <td>30.63</td> <td>49.06</td> <td>18.43</td> <td>9.85</td> </tr> <tr> <td>18.587</td> <td>16.15</td> <td>60.00</td> <td>43.85</td> <td>5.36</td> <td>50.00</td> <td>44.64</td> <td>9.94</td> </tr> </tbody> </table>						Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	0.173	53.66	64.84	11.18	29.69	54.84	25.15	9.80	0.204	60.04	63.45	3.40	35.67	53.45	17.77	9.86	0.231	55.93	62.41	6.48	25.03	52.41	27.38	9.86	0.269	56.65	61.14	4.49	27.45	51.14	23.69	9.86	0.346	55.76	59.06	3.30	30.63	49.06	18.43	9.85	18.587	16.15	60.00	43.85	5.36	50.00	44.64	9.94
Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]																																																						
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Remark	The given graph is the combination of max-hold function																																																												

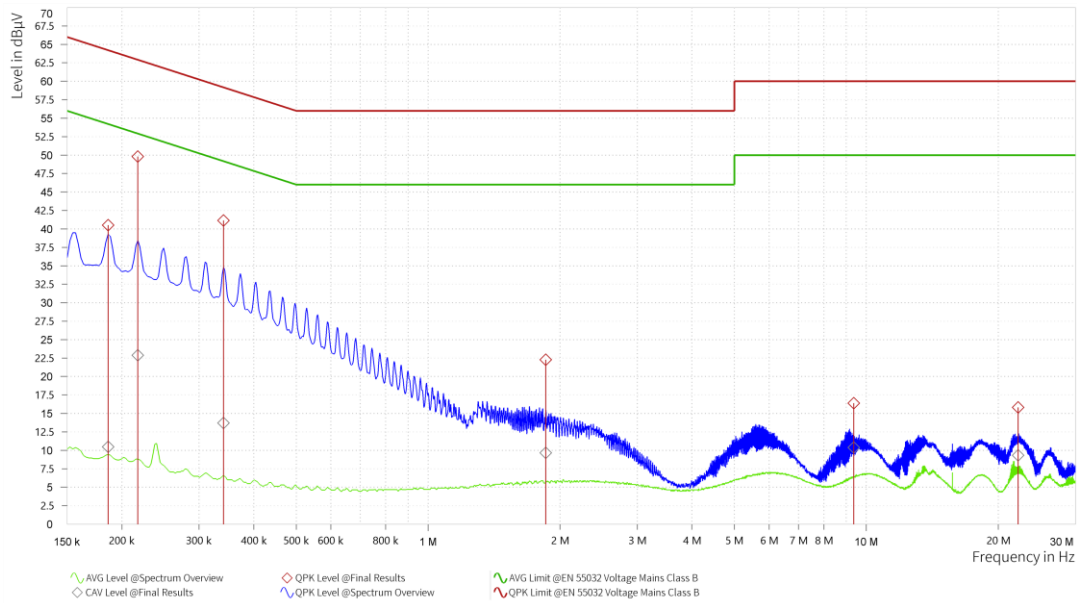
Measurement data	<input type="checkbox"/>	Line	<input checked="" type="checkbox"/>	Neutral
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz		
Port under test		AC mains input port		
Model: 1				



Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]
0.168	55.79	65.06	9.27	32.23	55.06	22.82	9.82
0.197	52.06	63.73	11.66	20.54	53.73	33.19	9.88
0.222	54.60	62.74	8.14	18.91	52.74	33.83	9.89
0.281	54.60	60.80	6.20	27.24	50.80	23.56	9.89
0.443	40.65	57.01	16.36	11.14	47.01	35.87	9.81
1.363	26.99	56.00	29.01	4.96	46.00	41.04	9.92

Remark The given graph is the combination of max-hold function

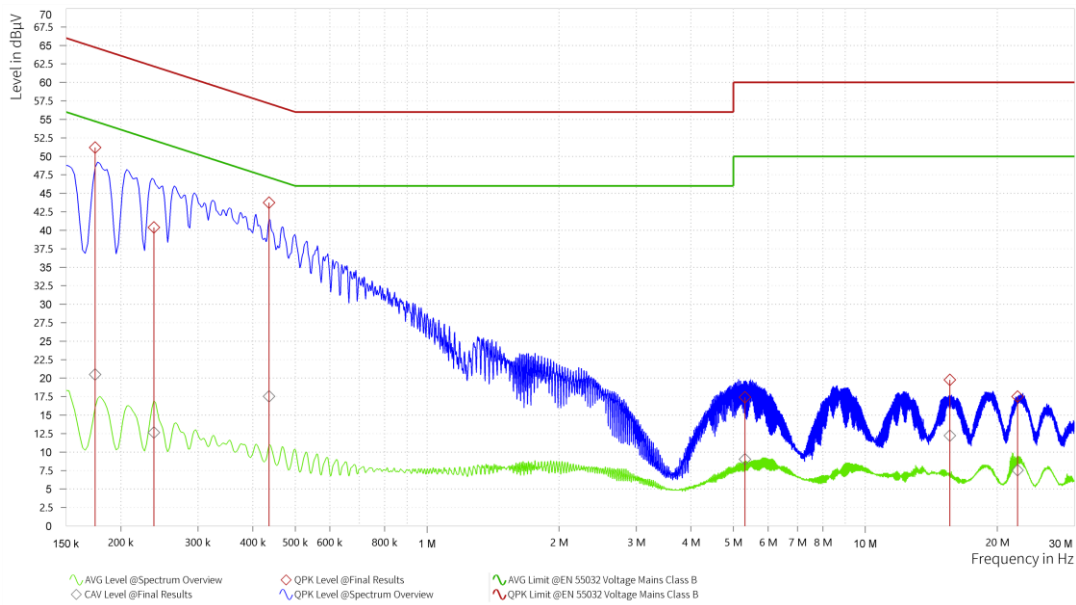
Measurement data	<input checked="" type="checkbox"/>	Line	<input type="checkbox"/>	Neutral
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz		
Port under test		AC mains input port		
Model: 2				



Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]
0.186	40.52	64.21	23.70	10.46	54.21	43.75	9.83
0.218	49.81	62.91	13.10	22.87	52.91	30.04	9.86
0.341	41.14	59.17	18.04	13.71	49.17	35.46	9.85
1.856	22.28	56.00	33.72	9.66	46.00	36.34	9.90
9.364	16.38	60.00	43.62	10.37	50.00	39.63	9.84
22.209	15.80	60.00	44.20	9.33	50.00	40.67	9.93

Remark | The given graph is the combination of max-hold function

Measurement data	<input type="checkbox"/>	Line	<input checked="" type="checkbox"/>	Neutral
Operating mode / voltage / frequency used during the test		Mode 1 / 230 Vac / 50 Hz		
Port under test		AC mains input port		
Model: 2				



Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]
0.175	51.19	64.73	13.54	20.49	54.73	34.24	9.83
0.238	40.40	62.17	21.78	12.64	52.17	39.54	9.89
0.436	43.75	57.14	13.39	17.54	47.14	29.60	9.82
5.312	17.42	60.00	42.58	9.04	50.00	40.96	9.88
15.596	19.77	60.00	40.23	12.24	50.00	37.76	9.90
22.256	17.50	60.00	42.50	7.54	50.00	42.46	9.90

Remark The given graph is the combination of max-hold function

<b>4.2</b>	<b>Radiated electromagnetic disturbances (30 – 1000 MHz)</b>	<b>VERDICT: PASS</b>
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Standard	ETSI EN 301 489-17, ETSI EN 301 489-1
Basic standard(s)	EN 55032, EN 55016-2-3
Test method	Antenna method according to EN 55032 standard.
<b>NOTE:</b> This test is only applicable to ancillary equipment not incorporated in the radio equipment and intended to be measured on a stand-alone basis, as declared by the manufacturer.	

**Limits – Class B**

Frequency [MHz]	Limit: QP [dB(μV/m) <sup>1)</sup>			IF BW	Detector
	@3 m.	@5 m.	@10 m.		
30 - 230	40	36	30	120 KHz	QP
230 - 1000	47	43	37	120 KHz	QP

<sup>1)</sup> At the transition frequency, the lower limit applies.

**Performed measurements**

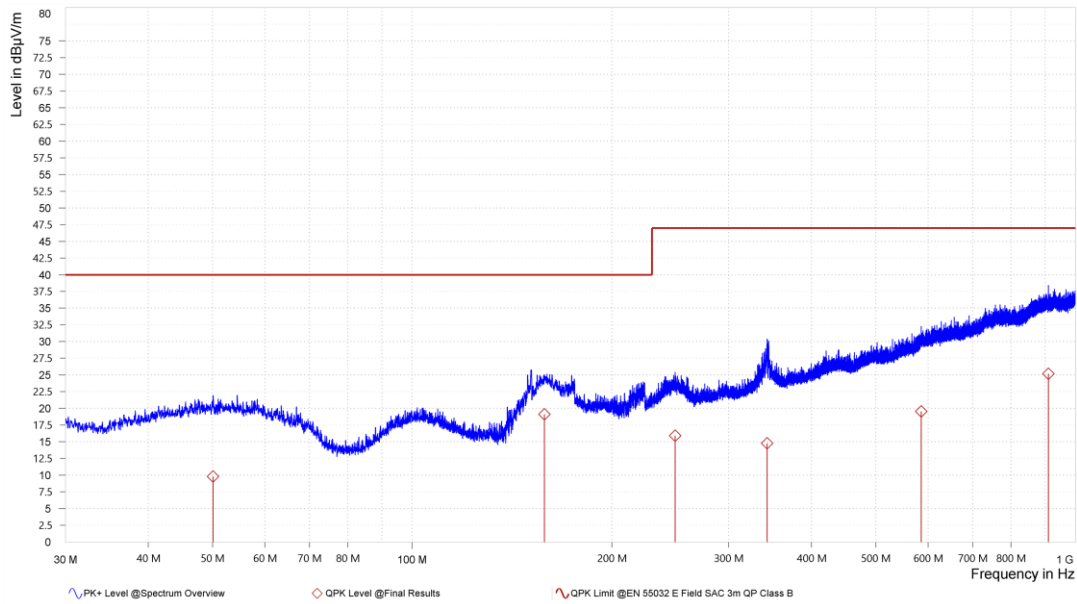
Port under test	Enclosure				
Voltage – Mains [V]	230 Vac				
Frequency – Mains [Hz]	50 Hz				
Test method applied	<input checked="" type="checkbox"/>	OATS or SAC with measurement distance [m]: 3 m.			
	<input type="checkbox"/>	OATS or SAC with measurement distance [m]: 5 m.			
	<input type="checkbox"/>	OATS or SAC with measurement distance [m]: 10 m.			
Test setup	<input checked="" type="checkbox"/>	Equipment on a table of 80 cm height			
	<input type="checkbox"/>	Equipment on the floor (insulated from ground plane)			
	<input type="checkbox"/>	Other:			
	Refer to the Annex 3 for test setup photo(s).				
Operating mode(s) used	Mode 4				
Remark	---				

See next page.

Measurement data	<input checked="" type="checkbox"/>	Horizontal	<input type="checkbox"/>	Vertical
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Operating mode / voltage / frequency used during the test Mode 4 / 230 Vac / 50 Hz

Model: 2



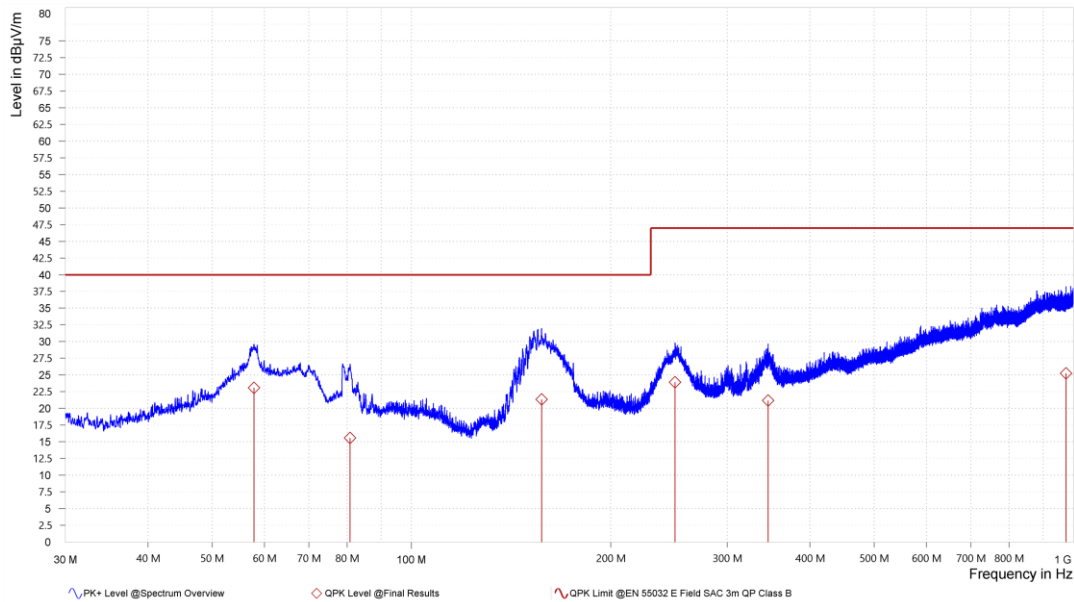
Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]
50.100	9.82	40.00	30.18	21.06
158.280	19.10	40.00	20.90	17.08
249.150	15.91	47.00	31.09	22.19
343.080	14.76	47.00	32.24	24.75
585.600	19.54	47.00	27.46	29.65
910.740	25.18	47.00	21.82	35.08

Remark The given graph is the combination of max-hold function

Measurement data	<input type="checkbox"/>	Horizontal	<input checked="" type="checkbox"/>	Vertical
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Operating mode / voltage / frequency used during the test    Mode 4 / 230 Vac / 50 Hz

Model: 2



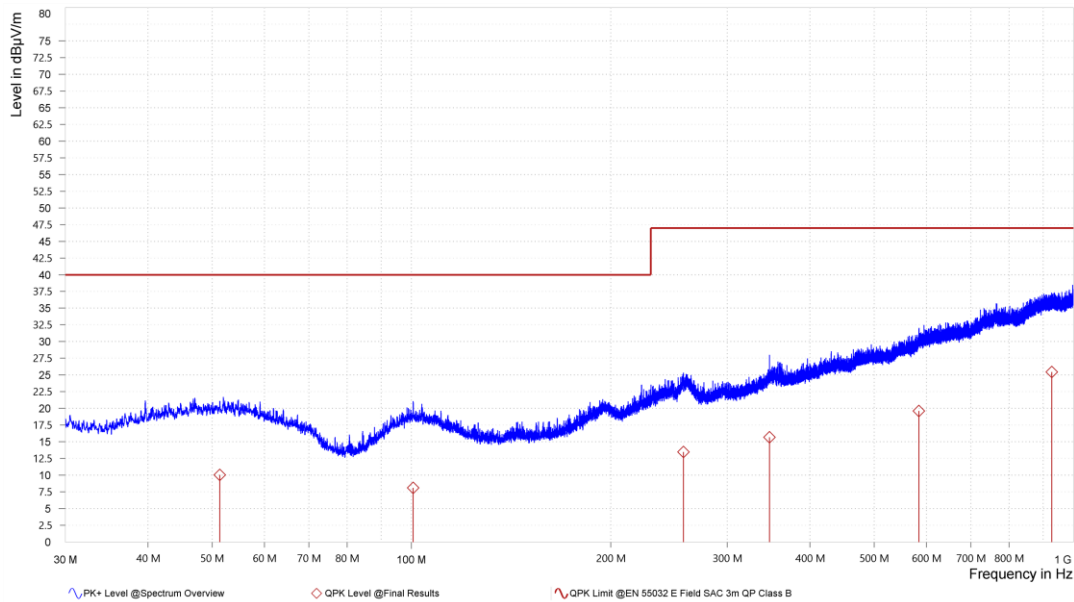
Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]
57.840	23.09	40.00	16.91	20.50
80.760	15.57	40.00	24.43	14.57
157.260	21.34	40.00	18.66	17.01
250.230	23.91	47.00	23.09	22.21
345.930	21.18	47.00	25.82	24.88
974.610	25.24	47.00	21.76	34.95

Remark    The given graph is the combination of max-hold function

Measurement data	<input checked="" type="checkbox"/>	Horizontal	<input type="checkbox"/>	Vertical
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Operating mode / voltage / frequency used during the test Mode 4 / 230 Vac / 50 Hz

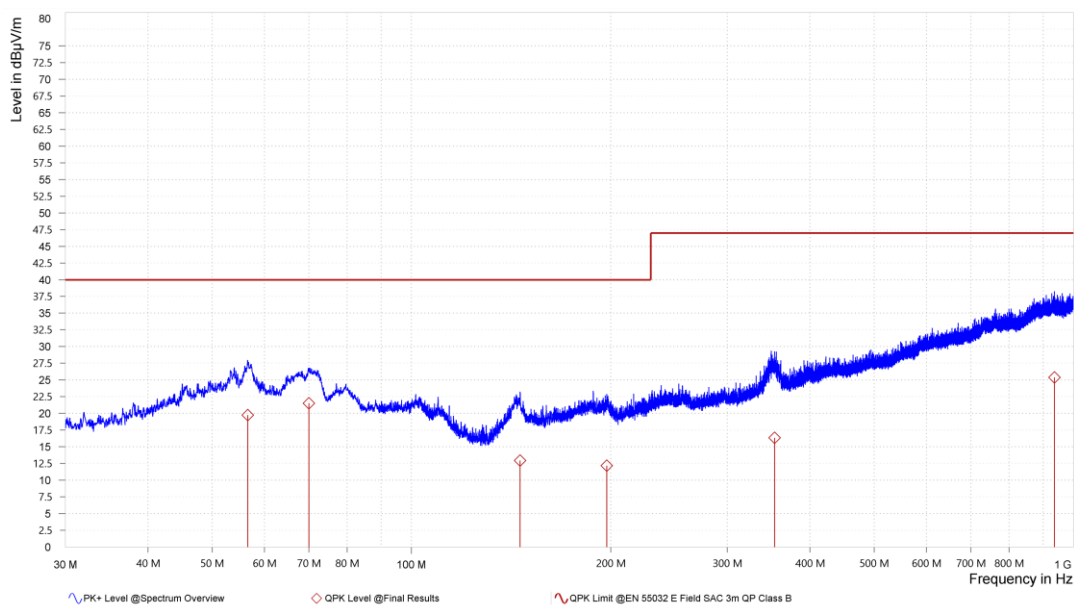
Model: 1



Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]
51.360	10.04	40.00	29.96	21.07
100.650	8.12	40.00	31.88	19.82
257.640	13.46	47.00	33.54	22.26
347.460	15.67	47.00	31.33	24.96
584.490	19.61	47.00	27.39	29.57
927.690	25.44	47.00	21.56	35.31

Remark The given graph is the combination of max-hold function

Measurement data	<input type="checkbox"/>	Horizontal	<input checked="" type="checkbox"/>	Vertical
Operating mode / voltage / frequency used during the test		Mode 4 / 230 Vac / 50 Hz		
Model: 1				



Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]
56.580	19.75	40.00	20.25	20.70
70.020	21.50	40.00	18.50	17.02
145.980	12.93	40.00	27.07	16.59
197.340	12.16	40.00	27.84	20.51
353.670	16.35	47.00	30.65	24.89
936.540	25.37	47.00	21.63	35.31

Remark	The given graph is the combination of max-hold function
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<b>4.3 Harmonic current emissions</b>	<b>VERDICT: PASS</b>
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Standard	EN 61000-3-2		
Exclusions (For these categories of equipment, limits are not specified in the EN 61000-3-2 standard)	<input type="checkbox"/>		Arc welding equipment intended for professional use.
	<input type="checkbox"/>		System(s) with nominal voltage(s) less than 220 V <sub>AC</sub> (line-to-neutral).
	<input type="checkbox"/>		Equipment with rated power of ≤ 75 W (other than lighting equipment).
	<input type="checkbox"/>		Professional equipment with total rated power > 1 kW.
	<input type="checkbox"/>		Symmetrically controlled heating elements with a rated power ≥ 200 W.
	<input type="checkbox"/>		Independent dimmers for incandescent lamps with rated power ≤ 1 kW.

Classification			
<input type="checkbox"/>	Class A	All apparatus not classified as Class B, C or D	
<input type="checkbox"/>	Class B	Portable tools	
<input checked="" type="checkbox"/>	Class C	<input type="checkbox"/>	Lighting equipment with active input power > 25 W
		<input type="checkbox"/>	Lighting equipment with active input power ≤ 25 W (First requirement, Table 3 column 2)
		<input type="checkbox"/>	Lighting equipment with active input power ≤ 25 W (Second requirement)
<input type="checkbox"/>	Class D	Personal computers, television receivers	

**Performed measurements**

Reason for not performing the measurement(s)	<input checked="" type="checkbox"/>	For lighting equipment other than discharge lighting equipment with a rated power less than 25 Watt, no limits apply. Testing is not required.				
Port under test	N/A					
Voltage – Mains [V]	N/A					
Frequency – Mains [Hz]	N/A					
Observation period	<input type="checkbox"/>	6.5 min.	<input type="checkbox"/>	2.5 min.	<input type="checkbox"/>	Other:
Version of measurement instrument standard used EN / IEC61000-4-7 (Cl. 7)	<input type="checkbox"/>	EN 61000-4-7:2002 + AM1:2009 (IEC 61000-4-7:2002+AM1:2008)				
	<input type="checkbox"/>	EN 61000-4-7:1991				
Control principle used in the EUT	<input checked="" type="checkbox"/>	Comply with the requirements of the Clause 6.1 (EN / IEC 61000-3-2).				
	<input type="checkbox"/>	Not comply with the requirements of the Clause 6.1 (EN / IEC 61000-3-2).				
Operating mode(s) used	---					
Remark	---					

See next page.

<b>4.4 Voltage changes, voltage fluctuations and flicker</b>	<b>VERDICT: PASS</b>
--------------------------------------------------------------	----------------------

Standard	ETSI EN 301 489-17, ETSI EN 301 489-1
Basic standard	EN 61000-3-3

**Limits**

$P_{ST}$ (Short term flicker) <sup>1)</sup>	<input type="checkbox"/>	$\leq 1$	<input checked="" type="checkbox"/>	Not Applicable
$P_{LT}$ (Long term flicker) <sup>1)</sup>	<input type="checkbox"/>	$\leq 0.65$	<input checked="" type="checkbox"/>	Not Applicable
$T_{max}$ ( $d_t > 3.3\%$ )	<input checked="" type="checkbox"/>	$\leq 500$ ms	<input type="checkbox"/>	Not Applicable
$d_c$ (Relative Voltage change)	<input checked="" type="checkbox"/>	$\leq 3.3\%$	<input type="checkbox"/>	Not Applicable
$d_{MAX}$ (Max. voltage change)	<input checked="" type="checkbox"/>	$\leq 4\%$	<input type="checkbox"/>	6%
	<input type="checkbox"/>	7%	<input type="checkbox"/>	Not Applicable

Supplemental information:

1)  $P_{ST}$  and  $P_{LT}$  evaluations are required only for lighting equipment which is likely to produce multiple voltage fluctuations which in turn can cause flicker of other lighting equipment, for example due to fast varying or switching of significant loads inside the lighting equipment.

**Performed measurements**

Reason for not performing the measurement(s)	<input checked="" type="checkbox"/>	Incandescent lamp luminaires with ratings less than or equal to 1 000 W and discharge and LED lamp luminaires with ratings less than or equal to 600 W, are deemed to comply with the $d_c$ , $d_{MAX}$ and $T_{max}$ limits				
Port under test						
Voltage – Mains [V]						
Frequency – Mains [Hz]						
Test method	<input type="checkbox"/>	Flickermeter according EN / IEC 61000-4-15:2011				
	<input type="checkbox"/>	Simulation (Clause 4.2.3 of EN / IEC 61000-3-3)				
	<input type="checkbox"/>	Analytical method (Clause 4.2.4 of EN / IEC 61000-3-3)				
	<input type="checkbox"/>	Use of $P_{st} = 1$ curve (Clause 4.2.5 of EN / IEC 61000-3-3)				
Observation period	<input type="checkbox"/>	10 min.	<input type="checkbox"/>	120 min.	<input type="checkbox"/>	Other:
	<input type="checkbox"/>	24 times switching according to Annex B				
Operating mode(s) used						
Remark						

See next page.

## 5 IMMUNITY TEST RESULTS

### 5.1 Performance (Compliance) criteria

The performance criteria are:

- Performance criteria A for immunity tests with phenomena of a continuous nature;
- Performance criteria B for immunity tests with phenomena of a transient nature;
- Performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified for each test.

Criteria	During test	After test
<b>A</b>	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
<b>B</b>	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
<b>C</b>	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3)

**NOTE 1:** Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

**NOTE 2:** Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

**NOTE 3:** No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

#### 5.1.1 Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### 5.1.2 Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### 5.1.3 Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### 5.1.4 Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

#### 5.1.5 Performance criteria related to immunity tests

Immunity test	Performance criteria
Electrostatic discharge	B
Radio-frequency electromagnetic fields	A
Fast transients	B
Surge transient	B
Injected currents (radio-frequency common mode)	A
Power frequency magnetic field immunity	A
Voltage dips and short interruptions	B, C

#### 5.1.6 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.

<input type="checkbox"/>	Motor speed	<input checked="" type="checkbox"/>	Display data
<input type="checkbox"/>	Switching	<input type="checkbox"/>	Data storage
<input checked="" type="checkbox"/>	Standby mode	<input type="checkbox"/>	Sensor functions
<input type="checkbox"/>	Temperature	<input type="checkbox"/>	Audible signals
<input type="checkbox"/>	Power consumption	<input type="checkbox"/>	Others :
<input type="checkbox"/>	AC mains input current	<input type="checkbox"/>	Others :
<input type="checkbox"/>	Timing	<input type="checkbox"/>	Others :
<input checked="" type="checkbox"/>	Illumination	<input type="checkbox"/>	Others :
<u>Supplementary information :</u>			

Immunity test	Monitored - Checked function(s)/parameter(s) during / after the test	Method
Electrostatic discharge	Standby mode, Illumination, Display data	Visual observation
Radio-frequency electromagnetic fields	Standby mode, Illumination, Display data	Visual observation / Camera
Fast transients	Standby mode, Illumination, Display data	Visual observation
Surge transient	Standby mode, Illumination, Display data	Visual observation
Injected currents (radio-frequency common mode)	Standby mode, Illumination, Display data	Visual observation
Power frequency magnetic field immunity	Standby mode, Illumination, Display data	Visual observation
Voltage dips and short interruptions	Standby mode, Illumination, Display data	Visual observation
<u>Supplementary information :</u>		
In case of doubt, the luminous intensity shall be deemed to be unchanged if the measured intensities do not deviate by more than 15 %.		

<b>5.3 Electrostatic discharge immunity</b>	<b>VERDICT: PASS</b>
---------------------------------------------	----------------------

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	ETSI EN 301 489-17, ETSI EN 301 489-1							
Basic standard	EN 61000-4-2							
Port under test	Enclosure							
Air discharges	<input checked="" type="checkbox"/>	±2 kV	<input checked="" type="checkbox"/>	±4 kV	<input checked="" type="checkbox"/>	±8 kV	<input type="checkbox"/>	kV
Contact discharges	<input type="checkbox"/>	±2 kV	<input checked="" type="checkbox"/>	±4 kV	<input type="checkbox"/>	±8 kV	<input type="checkbox"/>	kV
Number of discharges	≥ 10 per polarity with ≥ 1 sec interval.							

**Performed tests**

Set-up	<input checked="" type="checkbox"/>	Table-top	<input type="checkbox"/>	Floor standing
Ambient temperature [°C]	22.0		Relative Humidity air [%]	45.9
Voltage – Mains [V]	230 Vac			
Frequency – Mains [Hz]	50 Hz			
Operating mode(s) used	Mode 2, 3, 4			

	Test Point (Location of discharge)	Test Voltage [kV] & Polarity	Coupling type	# of applied discharges / polarity	Discharge interval [s]
<input checked="" type="checkbox"/>	Points on conductive surface touchable by hand	±2 / ±4	Contact	10	1
<input checked="" type="checkbox"/>	Points on non-conductive surface touchable by hand	±2 / ±4 / ±8	Air	10	1
<input checked="" type="checkbox"/>	HCP top side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	HCP bottom side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP right side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP left side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP front side.	±4	Contact	10	1
<input checked="" type="checkbox"/>	VCP rear side.	±4	Contact	10	1

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.
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Supplementary information:

<b>5.4</b>	<b>Radio-frequency electromagnetic fields immunity</b>	<b>VERDICT: PASS</b>
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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	ETSI EN 301 489-17, ETSI EN 301 489-1			
Basic standard	EN 61000-4-3			
Port under test	Enclosure			
Frequency range	Test level	Modulation <sup>1)</sup>	Dwell time	Step size
80 - 1000 MHz	3 V/m	80% AM (1kHz)	≥ 0.5 s	≤ 1%
1000 - 6000 MHz	3 V/m	80% AM (1kHz)	≥ 0.5 s	≤ 1%
<u>Supplementary information:</u>				
<sup>1)</sup> The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz. If the wanted signal is modulated at 1000 Hz, then an audio signal of 400 Hz shall be used.				

**Performed tests**

Test method	<input checked="" type="checkbox"/>	EN 61000-4-3	<input type="checkbox"/>	EN 61000-4-20		
Test set-up	<input checked="" type="checkbox"/>	Equipment on the table (0.8 m height)				
(see annex 3 for photo)	<input type="checkbox"/>	Equipment standing on floor (0.05 – 0.15 m height)				
Voltage – Mains [V]	230 Vac		Frequency – Mains [Hz]	50 Hz		
Operating mode(s) used	Mode 2, 3, 4					
Frequency range (applied)	Antenna Polarization	Test level (applied)	Modulation (applied)	Dwell time (applied)	Remark	
80 – 1000 MHz (step size 1%)	H	3 V/m	80% AM (1kHz)	2 s	1%	
	V	3 V/m	80% AM (1kHz)	2 s	1%	
1000 – 6000 MHz (step size 1%)	H	3 V/m	80% AM (1kHz)	2 s	1%	
	V	3 V/m	80% AM (1kHz)	2 s	1%	
Exposed side of the EUT	<input checked="" type="checkbox"/>	Front (0°)	<input checked="" type="checkbox"/>	Right (90°)	<input checked="" type="checkbox"/>	Top
	<input checked="" type="checkbox"/>	Rear (180°)	<input checked="" type="checkbox"/>	Left (270°)	<input checked="" type="checkbox"/>	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.					
<u>Supplementary information:</u>						
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<b>5.5</b>	<b>Electrical Fast Transients immunity</b>	<b>VERDICT: PASS</b>
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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**

Standard	ETSI EN 301 489-17, ETSI EN 301 489-1			
Basic standard	EN 61000-4-4			
Pulse characteristics	5/50 ns			
Port under test	Test level	Repetition frequency	Duration	
<input checked="" type="checkbox"/> AC input-output power	± 1000 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> DC input-output power <sup>1) 2)</sup>	± 500 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> Signal/Control/Wired network <sup>1)</sup>	± 500 V	5 KHz	2 min. / polarity	
<input type="checkbox"/> xDSL network	± 500 V	100 KHz	2 min. / polarity	
<sup>1)</sup> Only applicable to ports interfacing with cables whose total length may exceed 3 m.				
<sup>2)</sup> Only applicable to equipment that is connected to the mains while in use.				

**Performed tests**

Voltage – Mains [V]	230 Vac		
Frequency – Mains [Hz]	50 Hz		
Operating mode(s) used	Mode 2, 3, 4		
Test Set-up (see annex 3 for photo)	<input type="checkbox"/>	Equipment standing on floor at (0.1 ± 0.01) m above ground plane	
	<input checked="" type="checkbox"/>	Equipment on the table (0.1 ± 0.01) m above ground plane	
	<input type="checkbox"/>	Artificial hand applied. Location refer to chapter 9.	
Coupling	<input checked="" type="checkbox"/>	Common mode	<input type="checkbox"/> Other:

Port under test	Test Voltage & Polarity	Repetition Frequency	Test duration / polarity	Injection method		
				<input checked="" type="checkbox"/> CDN	<input type="checkbox"/> Clamp	<input type="checkbox"/> Clamp
AC mains power input	± 1000 V	5 KHz	2 min	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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:	---					

<b>5.6</b>	<b>Surge transient immunity</b>	<b>VERDICT: PASS</b>
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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		ETSI EN 301 489-17, ETSI EN 301 489-1		
Basic standard		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 angle)		
Port		Test level & Polarity & Coupling		Phase angle [°]
		Line to Line	Line to Earth	
<input checked="" type="checkbox"/>	AC mains power input	±1 kV	±2 kV	0, 90, 180, 270
<input type="checkbox"/>	Wired network, indoor cables >30m. <sup>3)</sup>	N/A	±0.5 kV	---
<input type="checkbox"/>	Symmetrically operated wired network, outdoor cables <sup>2) 3)</sup>	N/A	±1 kV	---
<input type="checkbox"/>	Non-symmetrically operated wired network, outdoor cables <sup>1) 3)</sup>	± 0.5 kV	±1 kV	---
<sup>1)</sup> In addition to the specified test level, all lower test levels as detailed in EN 61000-4-5 should also be satisfied. <sup>2)</sup> The test generator shall provide the 10/700 µs pulse as defined in EN 61000-4-5, clause 6.2. <sup>3)</sup> No test shall be required where normal functioning cannot be achieved, because of the impact of the CDN on the EUT.				

**Performed tests**

Voltage – Mains [V]	230 Vac
Frequency – Mains [Hz]	50 Hz
Operating mode(s) used	Mode 2, 3, 4
Repetition rate	60 secs. (for each test level and phase angle)
Number of pulses	5 pulses (at each polarity and phase angle)

Port under test	Coupling	Test level & Polarity	Phase angle [°]	Remark
<input checked="" type="checkbox"/> AC mains input power	Line to Neutral	±0.5 / ±1 kV	0, 90, 180, 270	1
<input type="checkbox"/> AC mains input power	Line to Earth	±0.5 / ±1 / ±2 kV	0, 90, 180, 270	
<input type="checkbox"/> AC mains input power	Neutral to Earth	±0.5 / ±1 / ±2 kV	0, 90, 180, 270	
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:				
1. The EUT does not include an earth port.				

<b>5.7</b>	<b>Injected currents (RF common mode) immunity</b>	<b>VERDICT: PASS</b>
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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	ETSI EN 301 489-17, ETSI EN 301 489-1				
Basic standard	EN 61000-4-6				
Frequency range	0.15 – 80 MHz				
Port under test	Test level, $U_0$	Modulation <sup>3)</sup>	Step size	Dwell time	
<input checked="" type="checkbox"/> AC input-output power	3 V	80% AM (1kHz)	1%	≥ 0.5 s	
<input type="checkbox"/> DC input-output power <sup>1)</sup>	3 V	80% AM (1kHz)	1%	≥ 0.5 s	
<input type="checkbox"/> Signal/Control/Wired network <sup>1) 2)</sup>	3 V	80% AM (1kHz)	1%	≥ 0.5 s	
<sup>1)</sup> Only applicable to ports interfacing with cables whose total length may exceed 3 m. <sup>2)</sup> Change of state commands are not applied during the test. <sup>3)</sup> The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz. If the wanted signal is modulated at 1000 Hz, then an audio signal of 400 Hz shall be used.					

#### Performed tests

Test method (applied)	Frequency range (applied)	Modulation (applied)	Step size (applied)		
EN 61000-4-6	0.15 – 80 MHz	80% AM (1kHz)	1%		
Voltage – Mains [V]	230 Vac	Frequency – Mains [Hz]	50 Hz		
Operating mode(s) used	Mode 2, 3, 4				
Test set-up (see annex 3 for photo)	<input type="checkbox"/>	Equipment standing on floor at (0.1 ± 0.01) m above ground plane.			
	<input checked="" type="checkbox"/>	Equipment on the table (0.1 ± 0.01) m above ground plane.			
	<input type="checkbox"/>	Artificial hand applied. Location refer to Annex 3.			
Port under test	Test Level (applied)	Injection method	Dwell time (applied)	Remark	
AC input power	3 V	CDN-M2	3 s	1	
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:					
1. During the test the metal enclosure of the EUT was connected to the reference ground plane through CDN-M1, the RF port was terminated with 50 Ohm.					

<b>5.8</b>	<b>Power supply interruptions and dips immunity</b>	<b>VERDICT: PASS</b>
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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	ETSI EN 301 489-17, ETSI EN 301 489-1
Basic standard	EN 61000-4-11
# of dips & interruptions	3 dips / interruptions for each test level and phase angle
Interval between events	≥ 10 seconds

Port under test	Test level <sup>1)</sup>	Period (Cycles)		Performance Criteria
		50 Hz	60 Hz	
AC input power port	$U_{NOM} - \geq 95\%$	0.5	---	Refer to the chapter 5.1 for details.
AC input power port	$U_{NOM} - \geq 95\%$	1	---	Refer to the chapter 5.1 for details.
AC input power port	$U_{NOM} - 30\%$	25	---	Refer to the chapter 5.1 for details.
AC input power port	$U_{NOM} - \geq 95\%$	250	---	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.

**NOTE:** 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.

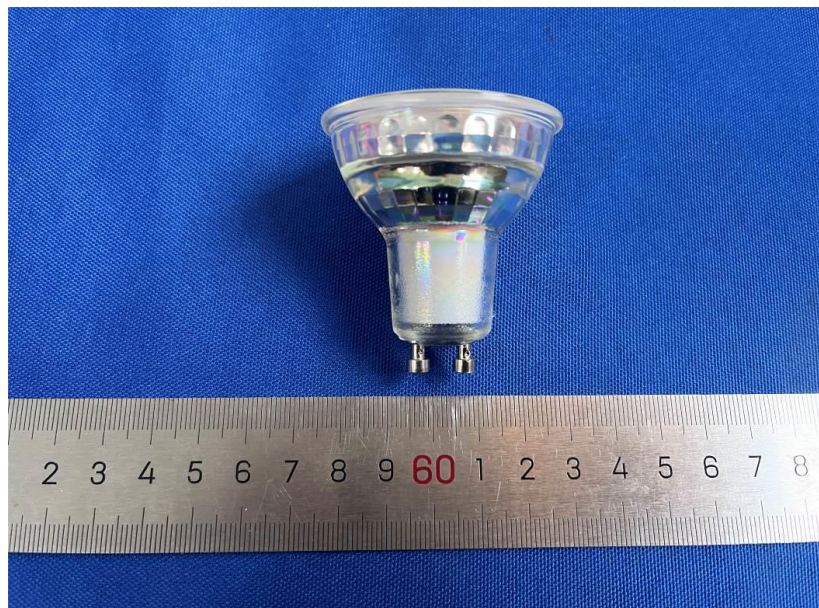
**Performed tests**

$U_{NOM}$ [V <sub>AC</sub> ]	Terminal	Test level [% $U_{NOM}$ ]	Duration [cycles]		Repetition rate [s]	Number of dips per test	Phase angle [°]
			50 Hz	60 Hz			
230	L-N	0	0.5	---	10	3	0, 45, 90, 135, 180, 225, 270, 315
230	L-N	0	1	---	10	3	
230	L-N	70	25	---	10	3	
230	L-N	0	250	---	10	3	

Operating mode(s) used	Mode 2, 3, 4
Observation(s)	During the voltage dips test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or data was observed.  During the voltage interruption test, loss of function was observed. After the test the EUT functioned as intended.
<u>Supplementary information:</u>	
---	

## 6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

The photographs show the tested device.



## 7 ANNEX 1 - MEASUREMENT UNCERTAINTIES

The table(s) below show(s) measurement 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%.

Emission tests		Uncertainty	UCISPR
RF Conducted disturbance (mains port) 9 kHz – 150 kHz	AMN: R&S ENV216	3.3 dB	3.8 dB
RF Conducted disturbance (mains port) 150 kHz – 30 MHz		2.9 dB	3.4 dB
RF Conducted disturbance (mains port) 9 kHz – 150 kHz	AMN: R&S ENV432	3.5 dB	3.8 dB
RF Conducted disturbance (mains port) 150 kHz – 30 MHz		3.1 dB	3.4 dB
Conducted disturbance using a CP (150 kHz – 30 MHz)		2.6 dB	2.9 dB
Radiated disturbance using CDNE 30 MHz – 300 MHz	CDNE M2	3.3 dB	3.8 dB
Radiated disturbance using CDNE 30 MHz – 300 MHz	CDNE M3	3.4 dB	3.8 dB
Radiated disturbance (9 kHz – 30 MHz)	LLAS	3.6 dB	3.3 dB
Radiated disturbance (30 MHz – 1000 MHz)	Horizontal	4.9 dB	6.3 dB
Radiated disturbance (30 MHz – 1000 MHz)	Vertical	6.1 dB	
Radiated disturbance (1000 MHz – 6000 MHz)		4.8 dB	5.2 dB
LF harmonic current emissions		0.6 %	N/A
LF voltage fluctuations		2.6 %	N/A

Immunity tests		Uncertainty
Electrostatic discharge		U <sub>peak</sub> =5.6%, U <sub>30ns</sub> =5.7% U <sub>60ns</sub> =5.7%, U <sub>rt</sub> =14.3%
Radio-frequency electromagnetic fields 80 MHz – 1000 MHz		2.0 dB
Radio-frequency electromagnetic fields, 1000 MHz – 6000 MHz		1.9 dB
Fast transients		U <sub>tr</sub> =7.2%, U <sub>vp</sub> =6.8%, U <sub>tw</sub> =5.4%
Surges		U <sub>vp</sub> =4.3%, U <sub>TV</sub> =6.7%, U <sub>td</sub> =1.3%
Injected currents (radio-frequency common mode)	CDN	1.5 dB
Injected currents (radio-frequency common mode)	EM Clamp	2.6 dB
Voltage dips, Short interruptions and voltage variations		U <sub>out</sub> =0.4%, U <sub>f</sub> =3%, U <sub>r-d</sub> =3%

## 8 ANNEX 2 – USED EQUIPMENT

Conducted disturbance -Shielded Room No.1				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	102958	2024/06/05
Artificial Mains Network	R&S	ENV216	102772	2024/06/05
Asymmetric artificial network	SCHWARZBECK	NTFM8131	8131-151	2024/06/13
Attenuator 26dB	SHANGHAI ESE	20dB+6dB	01	2024/06/05
High power voltage probe	SCHWARZBECK	TK9421	#308	2024/06/05
Current probe	ETS.LINDGREN	91550-1L	218473	2024/06/05
Software	R&S	ELEKTRA	4.32.0	N/A
Conducted disturbance -Shielded Room No.2				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	102305	2024/06/29
Four-line V-network	R&S	ENV432	101634	2024/11/28
Artificial Mains Network	R&S	ENV216	102747	2024/11/28
8-Wire ISN	R&S	ENV81	100448	2024/11/28
8-Wire ISN for CAT6	R&S	ENV81-CA6	101929	2024/11/28
Asymmetric artificial network	SCHWARZBECK	NTFM8131	8131-151	2024/06/13
High impedance Capacitive voltage probe	SCHWARZBECK	CVP 9222 C	00083	2024/11/28
High power voltage probe	SCHWARZBECK	TK9421	#308	2024/06/05
Current probe	ETS.LINDGREN	91550-1L	218473	2024/06/05
Software	R&S	ELEKTRA	4.32.0	N/A
Radiated disturbance-CDN/CDNE-Shielded Room No.1				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	102958	2024/06/05
Coupling/Decoupling Network	SCHWARZBECK	CDNE M3	00088	2024/10/31
Coupling/Decoupling Network	SCHWARZBECK	CDNE M2	00110	2025/01/29
Coupling/Decoupling Network	TESEQ	CDN M016S	34640	2024/06/05
Software	R&S	ELEKTRA	4.32.0	N/A
Radiated disturbance-CDN/CDNE-Shielded Room No.2				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR3	102305	2024/06/29
Coupling/Decoupling Network	SCHWARZBECK	CDNE M3	00204	2024/11/28
Coupling/Decoupling Network	SCHWARZBECK	CDNE M2	00194	2024/06/05

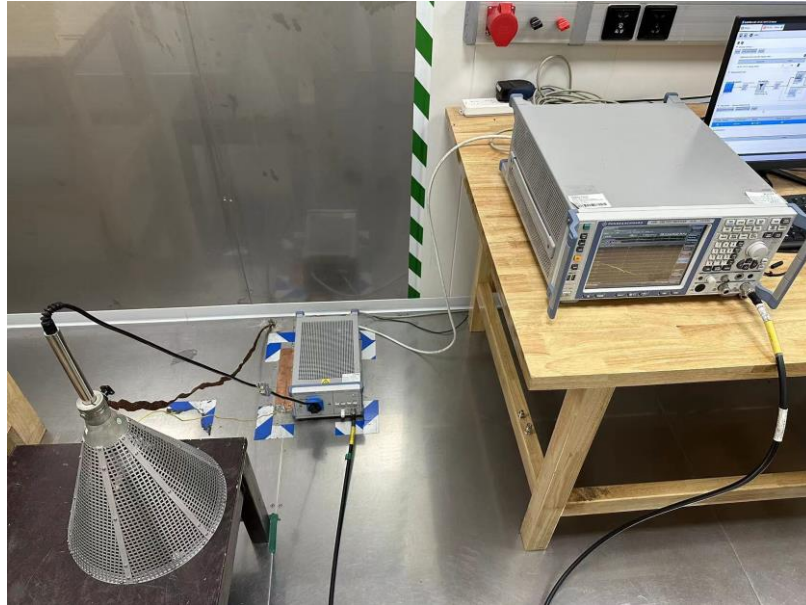
Coupling/Decoupling Network	TESEQ	CDN M016S	34640	2024/06/05
Software	R&S	ELEKTRA	4.32.0	N/A
Radiated disturbance (9 kHz to 30 MHz)				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESCI	101351	2024/06/05
3-dimensional large loop antenna	SCHWARZBECK	HXYZ 9170	HXYZ9170-245	2024/06/05
Software	AUDIX	e3	V8.130528a	N/A
Radiated disturbance (9 kHz to 30 MHz) -Anechoic Chamber No.1				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR7	102433	2024/12/29
Open Switch and control unit	R&S	OSP220	102232	NCR
Active loop antenna	SCHWARZBECK	HFH2-Z2E	101077	2024/04/24
Software	R&S	ELEKTRA	4.20.2	N/A
Radiated disturbance (30 MHz to 1000 MHz) -Anechoic Chamber No.1				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR7	102433	2024/12/29
Trilog broadband antenna	SCHWARZBECK	VULB9163/ 6dB	01514	2024/03/12
Open Switch and control unit	R&S	OSP220	102232	NCR
Coupling/Decoupling Network	SCHWARZBECK	CDNE M2	00194	2024/06/05
Coupling/Decoupling Network	SCHWARZBECK	CDNE M3	00204	2024/12/29
CMAD	SCHWARZBECK	CMAD1614	00538	2024/12/29
Software	R&S	ELEKTRA	4.20.2	N/A
Radiated disturbance (1000 MHz to 6000 MHz) -Anechoic Chamber No.1				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
EMI test receiver	R&S	ESR7	102433	2024/11/28
Pre-amplifier	R&S	SCU18F	100850	2024/11/28
Open Switch and control unit	R&S	OSP220	102232	N/A
Horn antenna	ETS	3117	00240298	2024/04/12
Software	R&S	ELEKTRA	4.20.2	N/A
Harmonic current emissions & Voltage changes, voltage fluctuations and flicker				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Harmonic currents and flicker tester	California Instruments	CTS	1306A00135	2024/06/05
AC power source	California Instruments	5001iX-CTS-400	1306A00135	2024/06/05
Harmonic currents and flicker tester	EMTEST	DPA 500N	P2114250803	2025/01/12

AC power source	EMTEST	Netwave7-400	P2136256253	2025/01/12
Software	California Instruments	CTS4	4.29.0	N/A
Software	AMETEK	NET.CONTROL	3.1.3	N/A
Electrostatic discharge immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
ESD generator	TESEQ	NSG 435	6716	2024/09/26
ESD generator	TESEQ	NSG 437	1447	2024/10/10
ESD generator	TESEQ	NSG 438	1870	2024/12/12
Voltage dips and short interruptions immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG-3040-MF	2006/DIPS:2062	2024/06/05
Automatic step transformer with circuit breaker	TESEQ	INA 6502-CIB	217	NCR
Surge immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG-3040-MF	2006 /SURGE:1234	2024/06/05
Coupling/Decoupling Network (CDN)	TESEQ	CDN 117-M	35452	NCR
Fast transient immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG-3040-MF	2006/EFT:0535	2024/06/05
EFT/Burst capacitive coupling clamp	TESEQ	CDN 3425	1786	NCR
Injected currents immunity				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Compact immunity test system	TESEQ	NSG 4070-30	35895	2024/06/05
Coupling/Decoupling Network (CDN)	TESEQ	CDN M016S	34640	2024/06/05
Attenuator	TESEQ	ANT 6050	34847	2024/06/05
EM clamp	TESEQ	KEMZ 801A	35475	2024/06/05
Radio-frequency electromagnetic fields immunity (80 MHz~1000 MHz) -Anechoic Chamber No.2				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Signal generator	R&S	SMB100B	103114	2024/12/29
Broadband Amplifier	R&S	BBA150 BC250	104841	2024/12/29
High Gain Log-periodic antenna	R&S	HL046E	100355	NCR

Open Switch and control unit	R&S	OSP220	102233	NCR
NRP6AN average power sensor	R&S	NRP6AN	101697	2024/12/29
NRP6AN average power sensor	R&S	NRP6AN	101698	2024/12/29
Field probe	LUMILOOP	LSProbe 1.2	531	2024/08/14
Software	R&S	ELEKTRA	4.20.2	N/A
Radio-frequency electromagnetic fields immunity (1 GHz~6 GHz) -Anechoic Chamber No.2				
Equipment	Manufacturer	Model No.	Serial No.	Cal. due date
Signal generator	R&S	SMB100B	103114	2024/12/29
Broadband Amplifier	R&S	BBA150C D110	104831	2024/12/29
Stacked Log.- Per. antenna	SCHWARZBECK	STLP 9149	00518	NCR
Open Switch and control unit	R&S	OSP220	102233	NCR
NRP6AN average power sensor	R&S	NRP6AN	101697	2024/12/29
NRP6AN average power sensor	R&S	NRP6AN	101698	2024/12/29
Field probe	LUMILOOP	LSProbe 1.2	531	2024/08/14
Software	R&S	ELEKTRA	4.20.2	N/A

## 9 ANNEX 3 - TEST PHOTOS

### Conducted disturbance at AC mains terminals



### Radiated disturbances (30 MHz to 1000 MHz)



**Electrical fast transient (EFT) / Burst transients & Surge transients / Power supply voltage interruptions & dips immunity**



**Conducted RF disturbances immunity**



### Electrostatic discharge immunity



### Radiated EM Field Immunity



-----END-----