



## Compliance Laboratory - EMC Test Report

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The clauses marked with \* are not covered by the ENAC accreditation. See clauses out of laboratory scope on page 9.

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FORM0138 / Revision 8



**Customer:** Protofy.xyz

**Product type:** Automatic actuator system for manual resuscitators

**EUT Model:** OxyGEN2 #HOPE

**Serial number:** 0000002 / 0000007

**Test Report ID:** BE2020063

**Test Report version:** 1.0

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**Test standards:**

EN 60601-1-2:2015

**Test results:** Compliant

Revised by:	Approved by:
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## Revision History

Date	Edited by	Pages	Version	Description
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# 1 Technical details

## 1.1 Test standards and results for EMI

Overview about the different emission measurements

EMISSION			
Kind of Test	Applied Standard	Testing Verdict	Test Page Nº.
<ul style="list-style-type: none"><li>• <b>Radiated Emissions (30MHz – 1GHz)</b> Electromagnetic Field strength at 3m <a href="#">Enclosure</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li></ul>			
	EN 60601-1-2:2015	P	39
<ul style="list-style-type: none"><li>• <b>Conducted Emissions Continuous Disturbance Voltage (150kHz – 30MHz)</b> <a href="#">AC power port</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li></ul>			
	EN 60601-1-2:2015	P	40
<ul style="list-style-type: none"><li>• <b>Disturbances in Supply Systems</b><ul style="list-style-type: none"><li>– <b>Harmonics</b> <a href="#">AC power port</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li><li>– <b>Voltage Fluctuations</b> <a href="#">AC power port</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li></ul></li></ul>			
	EN61000-3-2:2014	P	42
	EN61000-3-3:2013	P	45

Table 1 Emissions Results

## 1.2 Test standards and results for EMS

### Overview about the different susceptibility measurements

SUSCEPTIBILITY (Part I)			
Kind of Test	Applied Standard	Testing Verdict	Test Page Nº.
<ul style="list-style-type: none"><li>Radiated, radio-frequency electromagnetic field (80MHz-1GHz) <a href="#">Enclosure</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	46
<ul style="list-style-type: none"><li>Radiated, radio-frequency electromagnetic field (1GHz-2.7GHz) <a href="#">Enclosure</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	49
<ul style="list-style-type: none"><li><i>Proximity fields from wireless devices</i> <i>15 spot frequencies (385MHz-5785MHz)*</i> <a href="#">Enclosure</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	52
<ul style="list-style-type: none"><li>Immunity to conducted disturbances, induced by radio-frequency fields (150kHz-80MHz) <a href="#">AC power port</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	53
<ul style="list-style-type: none"><li>Electrical fast transient / burst (EFT) <a href="#">AC power port</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	55
<ul style="list-style-type: none"><li>Surges <a href="#">AC power port</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	56
<ul style="list-style-type: none"><li>Voltage Dips <a href="#">AC power port</a><ul style="list-style-type: none"><li><a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	57



SUSCEPTIBILITY (Part II)			
Kind of Test	Applied Standard	Testing Verdict	Test Page Nº.
<ul style="list-style-type: none"><li>• Short Interruptions <a href="#">AC power port</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	58
<ul style="list-style-type: none"><li>• Power frequency magnetic fields <a href="#">Enclosure</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	N/T	#
<ul style="list-style-type: none"><li>• Electrostatic Discharge (ESD) <a href="#">Enclosure</a><ul style="list-style-type: none"><li>- <a href="#">Operating Mode 1</a></li></ul></li></ul>	EN 60601-1-2:2015	P	59

Table 2 Susceptibility Results

### 1.3 Clauses out of Laboratory scope

**Clauses out of Laboratory scope are written with *italic letter* and marked with \*:**  
Clause 1.2 and sub clause 4.2.3 of this test report (only for frequencies above 3GHz).

### 1.4 Testing Verdicts

Not applicable.....:	<u>N/A</u>
Pass.....:	<u>P</u>
Fail.....:	<u>F</u>
Not tested.....:	<u>N/T</u>

Table 3 Testing Verdicts

## 1.5 Complete Test Results

The measurement was carried out according to the previous mentioned standards. Deviations from the standards, if any, are listed at chapter 5 of this report.

Exceeding of the limits was observed:

☐ YES

☒ NO

**Comment :**

The test result is only valid for the equipment tested.

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

In following cases the compliance with relevant standards for the system has to be ensured again:

- I. Tested product will not be used with other components than those mentioned in this report.
- II. Tested product will not be used in other modes than those described in the manufacturer descriptions.

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**IDNEO Technologies S.A.U. - Compliance Laboratory**

Viladecavalls (Barcelona): April, 3<sup>d</sup> 2020

## 2 General Details

### 2.1 Test laboratory

Laboratory address:	<b>IDNEO Technologies S.A.U.</b> <b>Polígono Industrial, Can Mitjans s/nº, C.P. 08232 Viladecavalls (Barcelona), Spain</b>
Telephone:	<b>+34 93-700-84-71</b>
Fax:	<b>+34 93-733-27-18</b>
Contact person:	<b>Mr. David Ortiz</b>
Phone contact:	<b>+34 93-700-84-71</b>
Email contact:	<b>david.ortiz@idneo.com</b>

### 2.2 Client details

Company name:	<b>Protofy.xyz</b>
Department/group:	<b>#</b>
Company address:	<b>Carrer de Ramon Turró, 100 1º 2º</b> <b>08005 Barcelona, (Spain)</b>
Contact person:	<b>Mr. Lluís Rovira</b>
Phone contact:	<b>+34 671-98-89-30</b>
Web contact:	<b>www.protofy.xyz</b>
Email contact:	<b>lluis@protofy.xyz</b>

## 2.3 Dates of order

Incoming date of order: 01/04/2020

Incoming date of the test object: 02/04/2020

Date of test: From: 02/04/2020 Until: 03/04/2020

## 2.4 Test object

Product type: Automatic actuator system for manual resuscitators

Tested model: OxyGEN2 #HOPE

Serial number: Sample 1 = 0000007  
Sample 2 = 0000002

Software / Firmware version: N/A

Hardware version: #

Manufacturer: #

Rating Power: 230Vac - 50Hz

EUT status: Engineering Sample

## 2.5 EUT operating mode description using during the EMC tests

### Operating Mode1:

EUT working with Dimmer max = 30 breaths/min + manual resuscitator (AMBU).

The EUT was continuously monitored by visual inspection during the immunity tests.

- EUT supply test voltage: 230Vac 50Hz except for Voltage Dips and Interruptions tests (these tests were performed at 240Vac 50Hz).

## 2.6 Details about uncertainty measurement

In case of measurement results close to the limit, there is the possibility, that due to the measurement uncertainty  $U_x = k \cdot \sigma_t$  ( $\sigma_t = \sqrt{\sigma_1^2 + \sigma_2^2 + \dots + \sigma_n^2}$  standard deviation of the total accumulated error), at a confidence level of 95% ( $k=2$ ), the limits are indeed exceeded. Measurement uncertainties calculation is available at customer's request.

## 2.7 Testing facilities and environmental conditions

- In the Control chamber 1 (4,5m x 3m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω

- In the Semi anechoic chamber (9,4m x 6,4m x 5,5m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω
Normal site attenuation (NSA):	≤± 4dB at 3m distance between item under test and receiver antenna for 30MHz to 1GHz
Field Uniformity (FU):	75% of 16 points ≤ 6dB requirements at 1,5 x 1,5m test window (0,8m high) from 80MHz to 3GHz
Site Voltage Standing Wave Ratio (sVSWR):	≤ 6 dB at 3m distance between item under test and receiver antenna for 1GHz to 6GHz

- In the Shield chamber 1 (7,2m x 4,3m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω

- In the Shield chamber 2 (7,8m x 3m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω

- In the Fully anechoic chamber 1 (3,7m x 4,3m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω

- In the Fully anechoic chamber 2 (7,3m x 3,4m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω
Field Uniformity (FU):	75% of 16 points ≤ 6dB requirements at 1,5 x 1,5m test window (0,8m high) from 80MHz to 3GHz

- In the Control chamber 2 (4,9m x 4,6m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω

- In the Conducted immunity chamber (4m x 4,6m x 3m), the following limits were not exceeded during the test:

Temperature:	Min.: 18°C Max.: 25°C
Relative humidity:	Min.: 30% Max.: 70%
Shielding effectiveness	>100dB
Electric insulation:	>10kΩ
Reference resistance to earth:	<0,5Ω

## 2.8 Specific performance criteria for susceptibility test

Under the test conditions specified in EN 60601-1-2 item 6.2, the ME EQUIPMENT or ME SYSTEM shall be able to provide the BASIC SAFETY and ESSENTIAL PERFORMANCE. The following degradations are not allowed:

- component failures;
- change of operating mode;
- false alarms;
- cessation or interruption of any intended operation causing critical breathing conditions;
- initiation of any unintended operation, including unintended or uncontrolled motion.

The ME EQUIPMENT or ME SYSTEM may exhibit degradation of performance that does not affect BASIC SAFETY or ESSENTIAL PERFORMANCE.

**Table 4 Performance criteria for susceptibility test**



### 3 Measurement protocols and test set-ups

#### 3.1 Emissions

##### 3.1.1 Radiated Emissions in semianechoic chamber (30MHz – 1GHz)

###### Test set-up

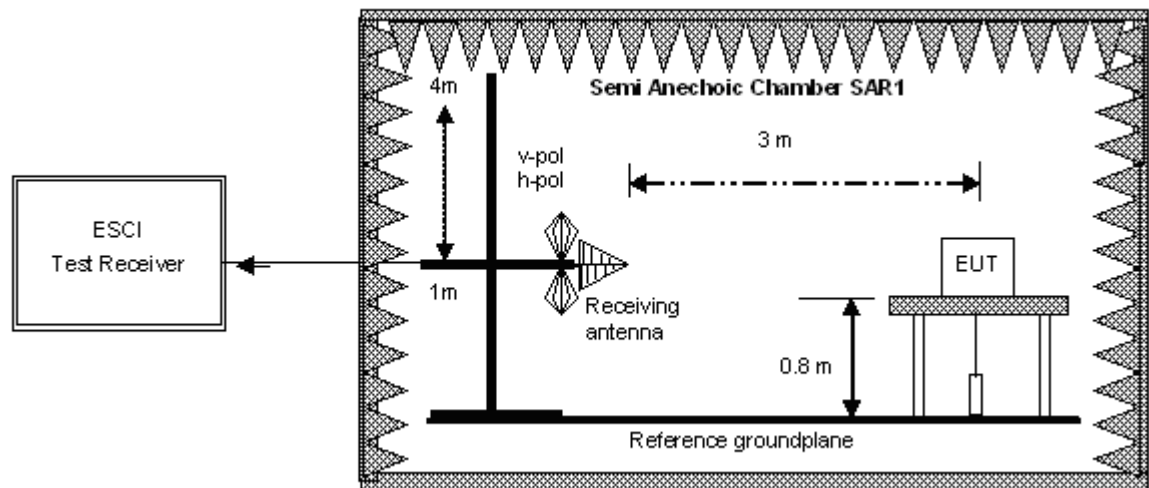


Figure 1 Schematic for radiated emissions

###### Operation Modes

Following operation modes have been applied to the EUT:	Sample 2 working as described in sub clause 2.5, Mode 1
---	---

###### Accessories, auxiliary equipment and cables used for these measurements

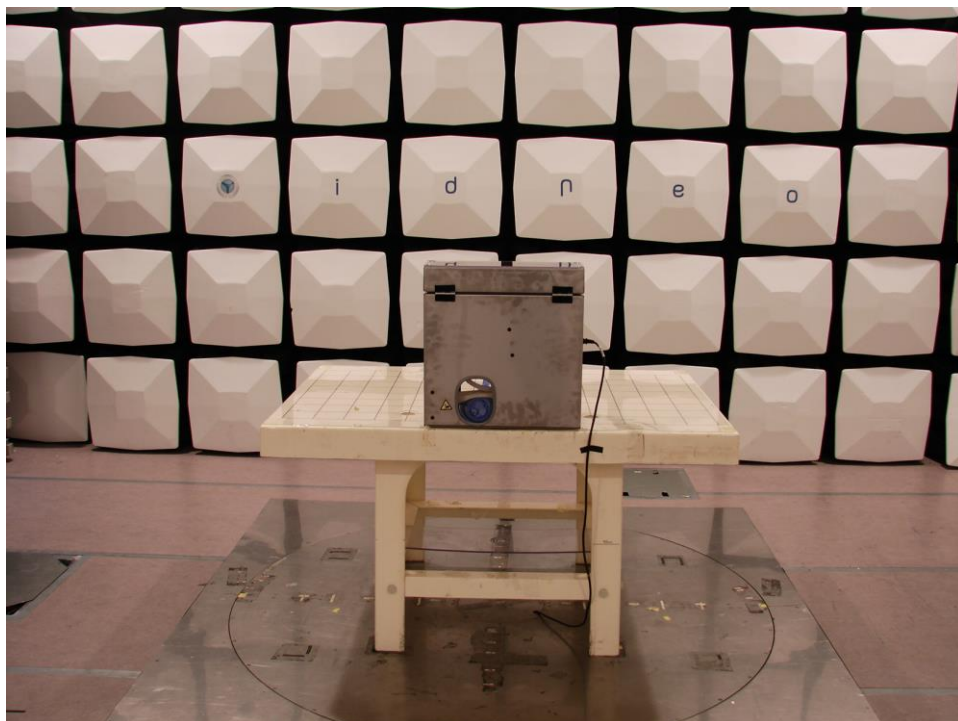
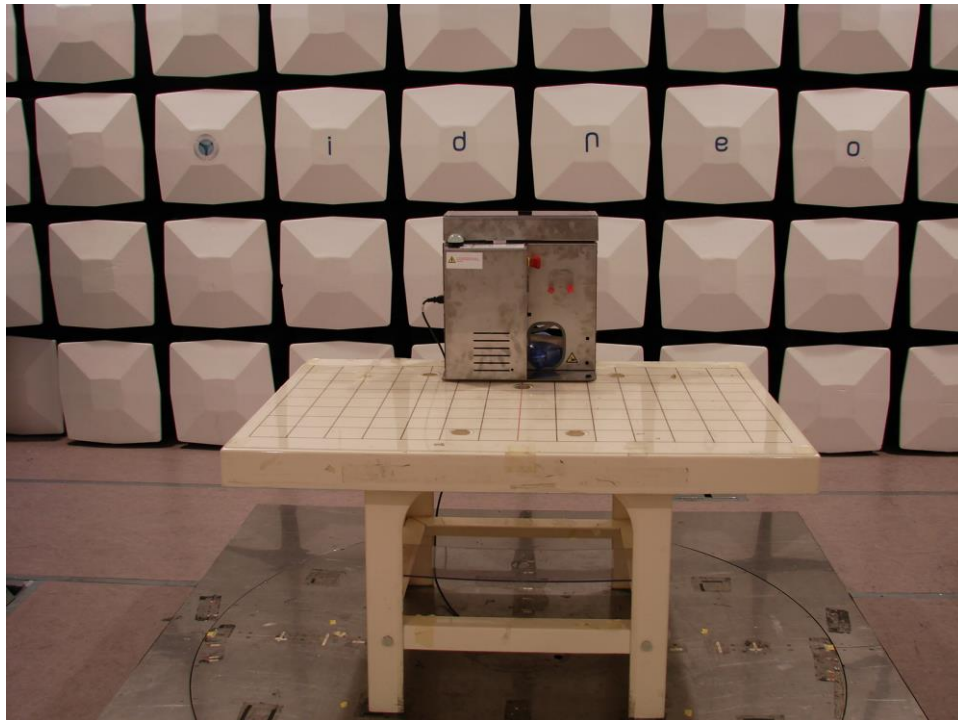
Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 5 Accessories, auxiliary equipment and cables used for radiated emission test

Test set-up – Photos

Enclosure



**Figure 2 EUT Set-up for radiated emissions**

### 3.1.2 Conducted Emissions (150kHz – 30MHz)

#### Test set-up

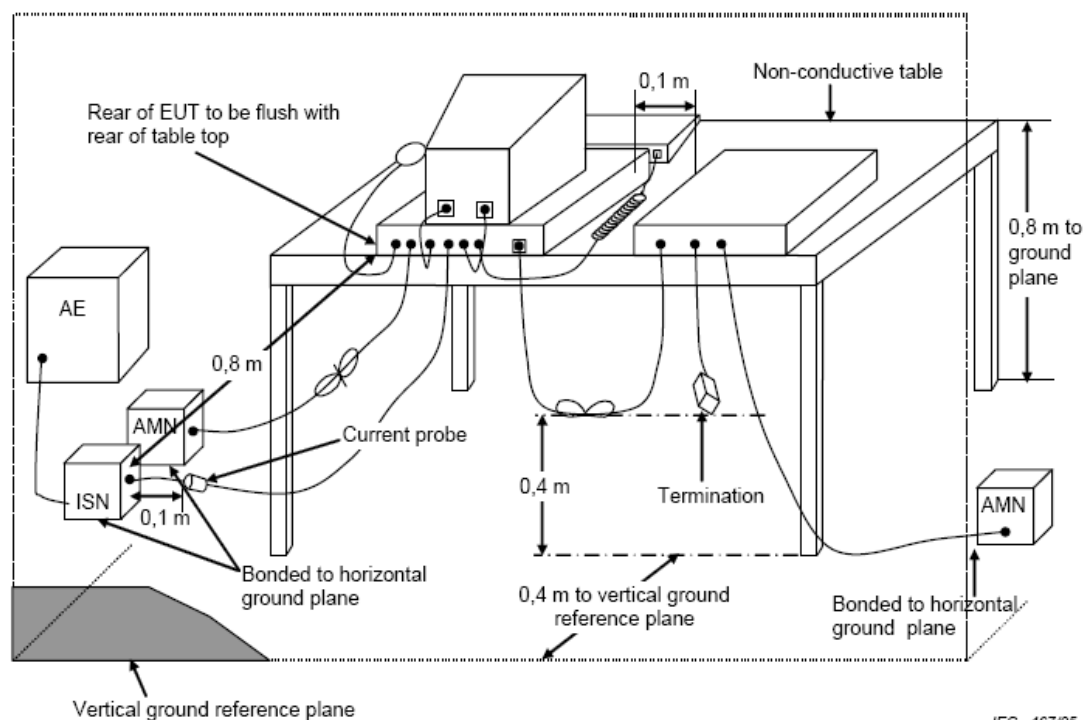


Figure 3 Schematic for conducted emissions

#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 2 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

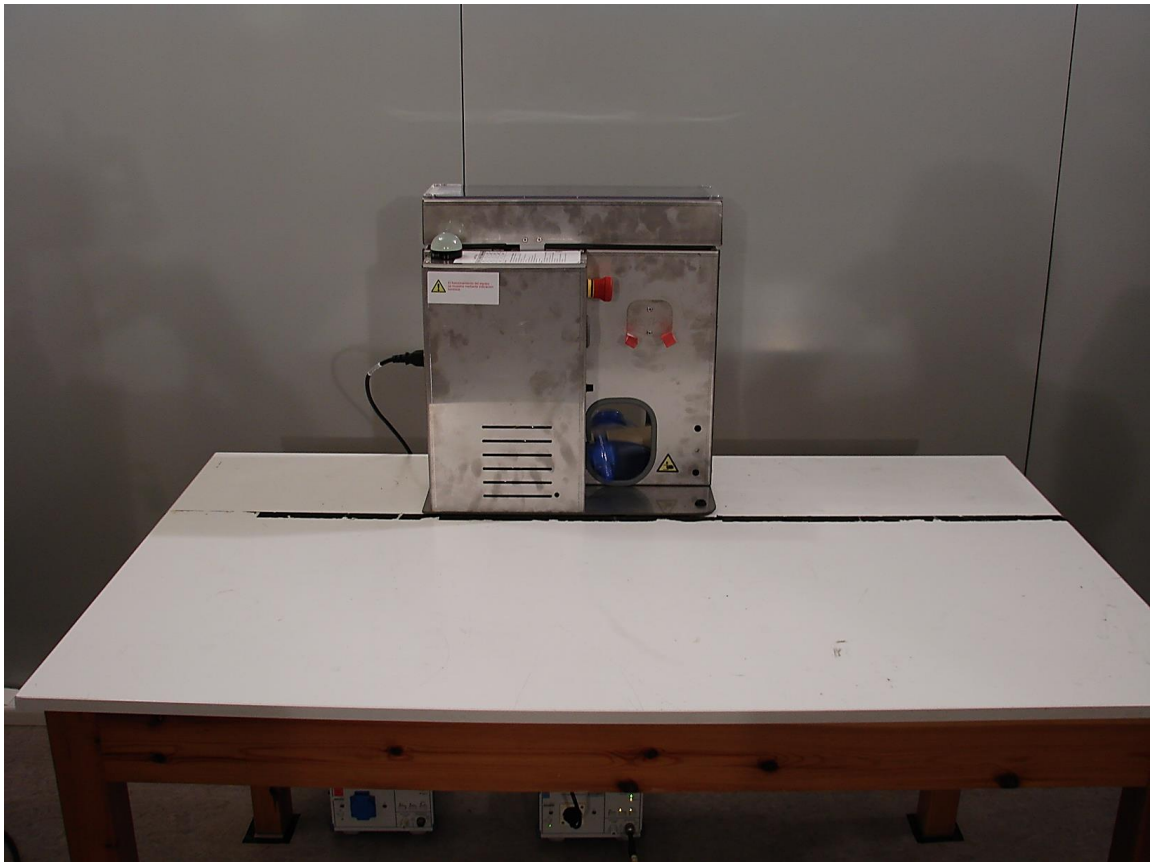
Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Voilex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 6 Accessories, auxiliary equipment and cables used for conducted emission test

Test set-up – Photos

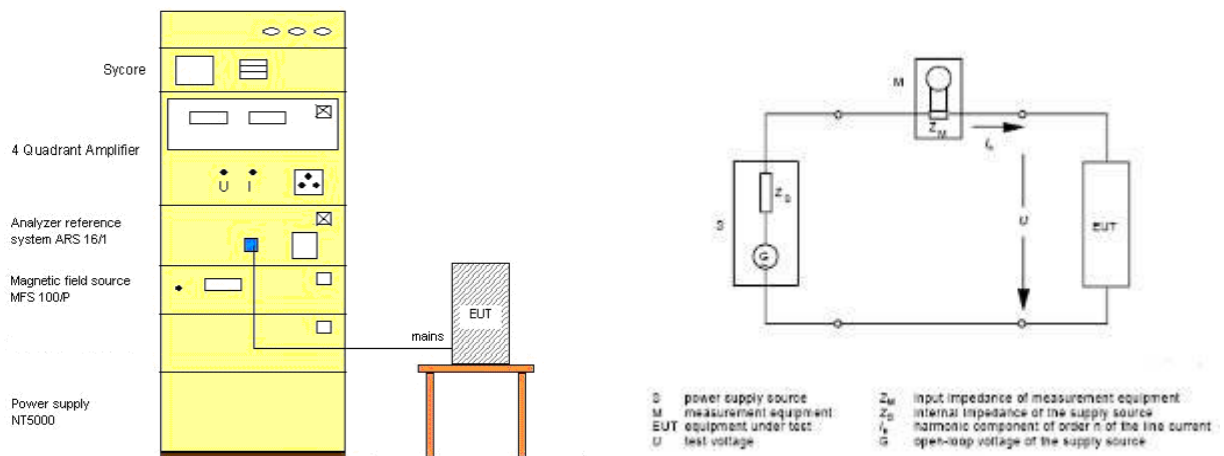
AC power port



**Figure 4 EUT Set-up for conducted emissions at AC power port**

### 3.1.3 Harmonics

#### Test set-up



#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 2 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volet	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

**Table 7 Accessories, auxiliary equipment and cables used for harmonics test**

## Test set-up – Photos

### AC power port



**Figure 6 EUT Set-up for harmonics**

### 3.1.1 Voltage fluctuation (Flicker)

#### Test set-up

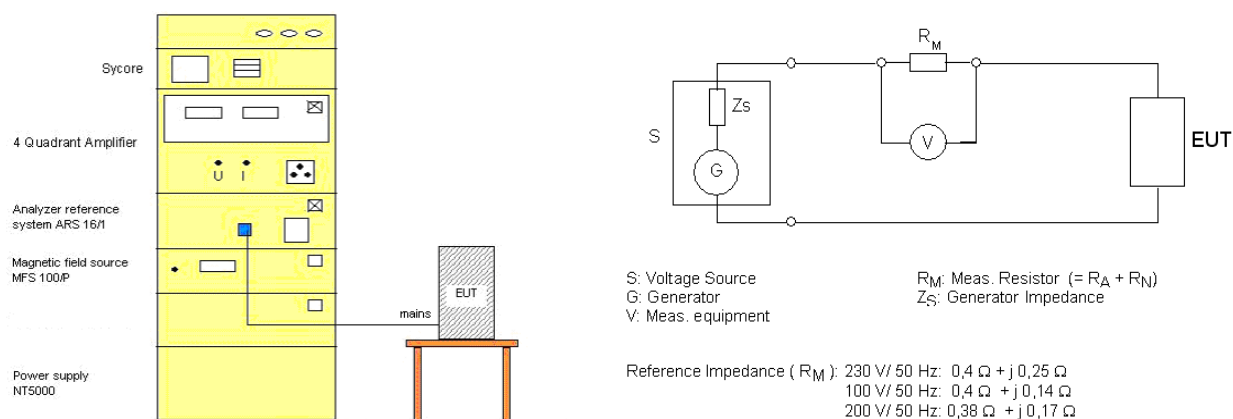


Figure 7 Schematic for flicker

#### Operation Modes

Following operation modes  
have been applied to the EUT:

Sample 2 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 8 Accessories, auxiliary equipment and cables used for flicker test



## Test set-up – Photos

### AC power port



**Figure 8 EUT Set-up for flicker**



## 3.2 Susceptibility

### 3.2.1 Radiated Immunity (set-up according to EN61000-4-3)

#### Test set-up

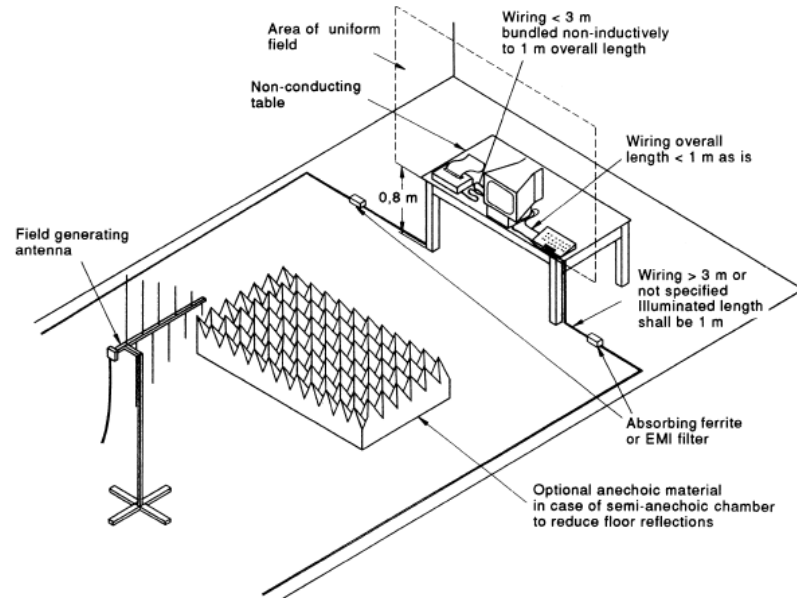


Figure 9 Schematic for radiated immunity

#### Performance criteria

The Sample must pass the test according to the acceptance criteria described in the sub clause 2.8

#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 1 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

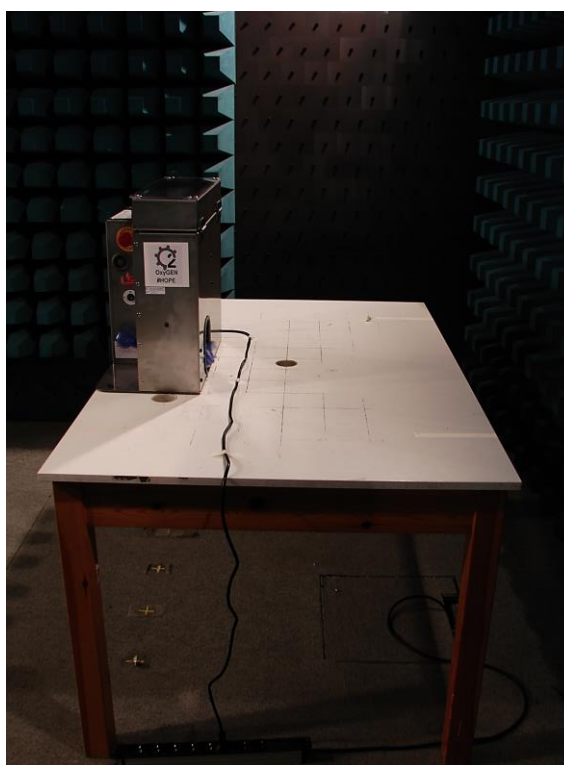
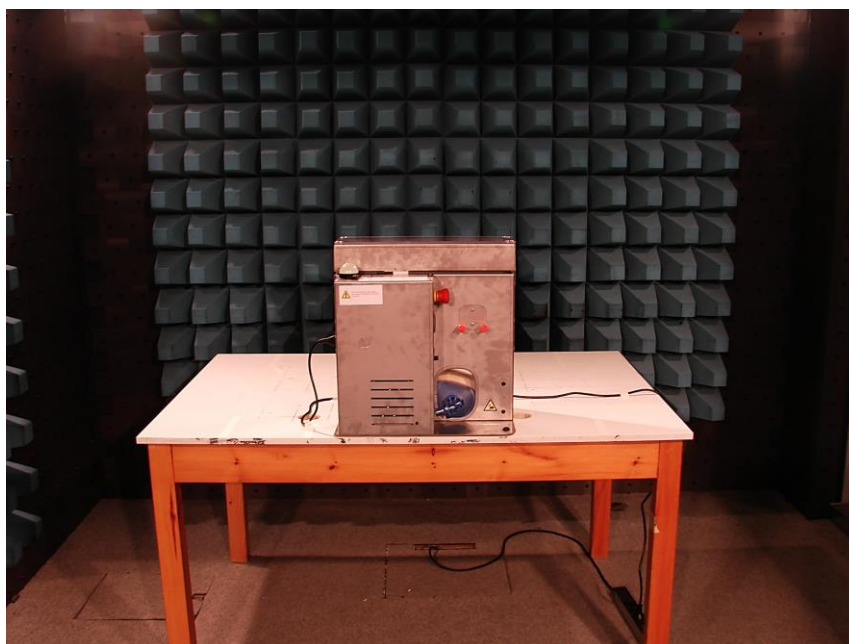
Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Voilex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 9 Accessories, auxiliary equipment and cables used for radiated immunity test

## Test set-up – Photos

### Enclosure



**Figure 10 EUT Set-up for radiated immunity**

### 3.2.2 Conducted Immunity (set-up according to EN61000-4-6)

#### Test set-up

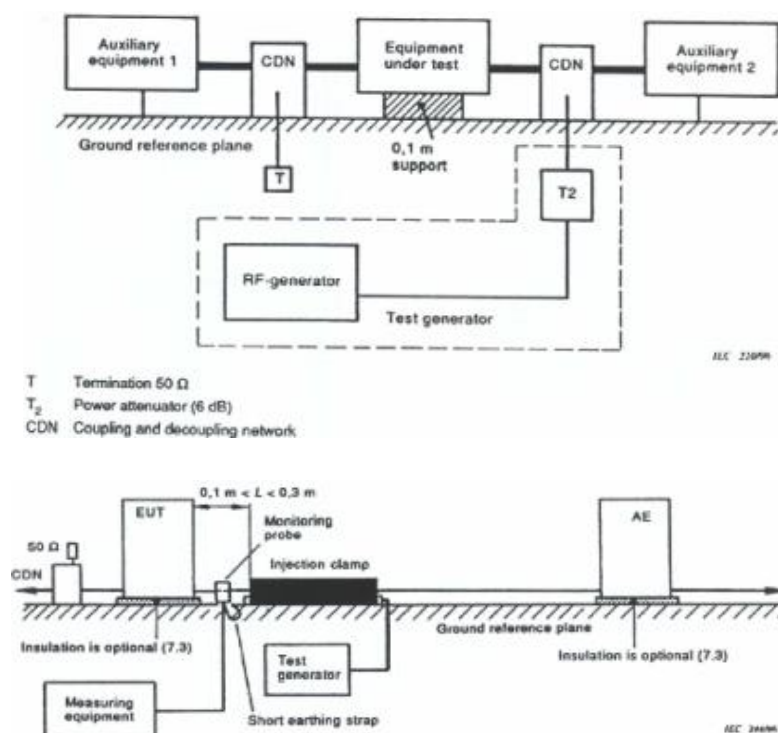


Figure 11 Schematic for conducted immunity

#### Performance criteria

The Sample must pass the test according to the acceptance criteria described in the sub clause 2.8

#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 1 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

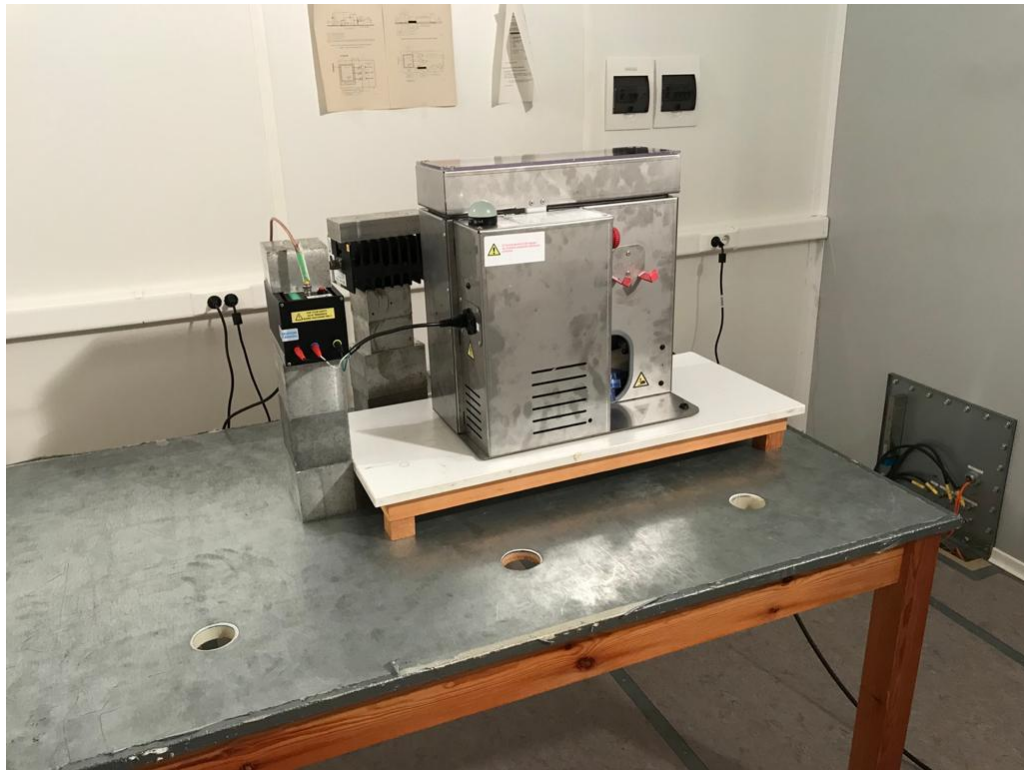
Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Voilex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 10 Accessories, auxiliary equipment and cables used for conducted immunity test

Test set-up – Photos

AC power port



**Figure 12 EUT Set-up for conducted immunity at AC power port**

### 3.2.3 Electrical Fast Transient/Burst (set-up according to EN61000-4-4)

#### Test set-up

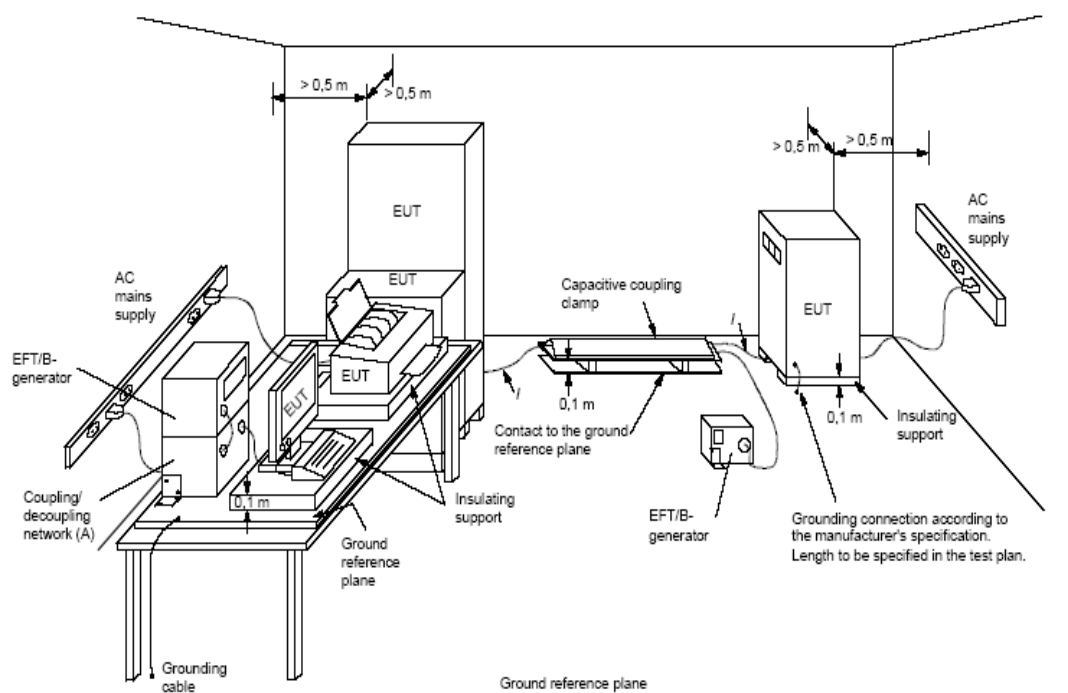


Figure 13 Schematic for electrical fast transients

#### Performance criteria

The Sample must pass the test according to the acceptance criteria described in the sub clause 2.8

#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 1 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 11 Accessories, auxiliary equipment and cables used for electrical fast transients immunity test

Test set-up – Photos

AC power port



**Figure 14 EUT Set-up for EFT at AC power port**

### 3.2.4 Surges (set-up according to EN61000-4-5)

#### Test set-up

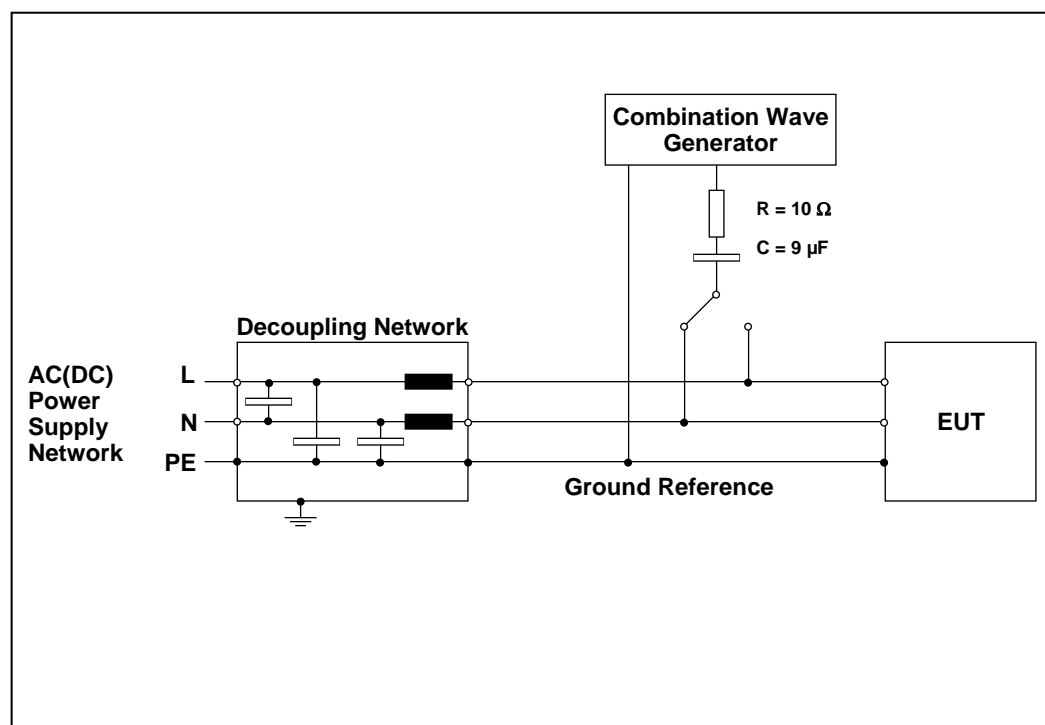
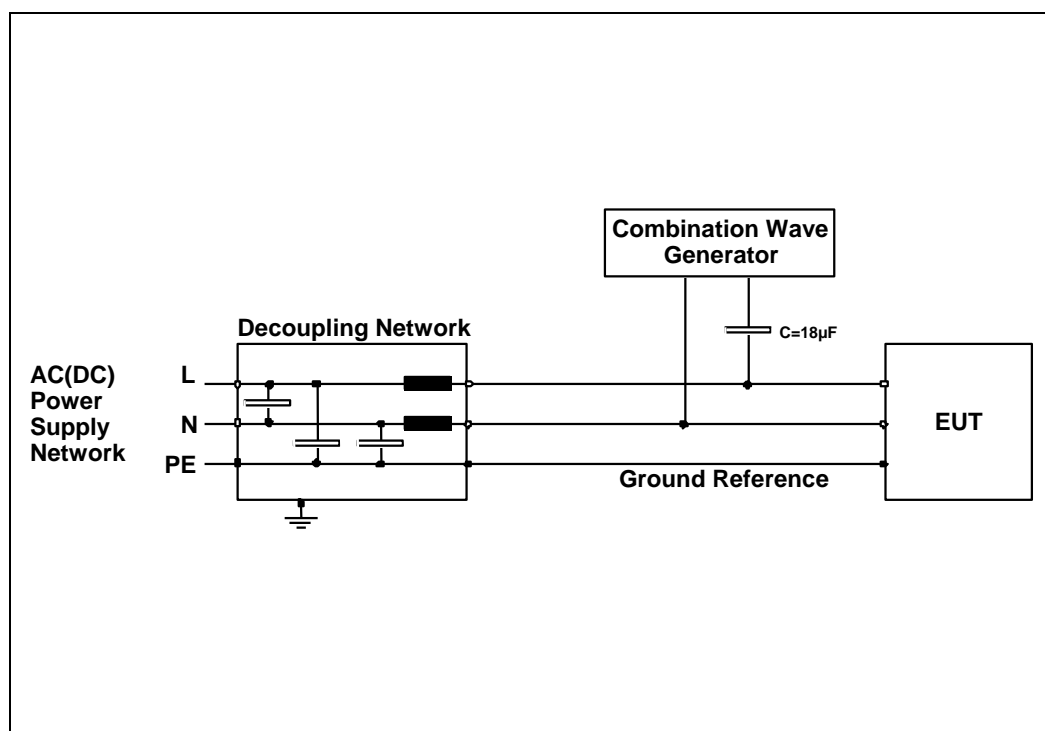


Figure 15 Schematic for surges

### Performance criteria

The Sample must pass the test according to the acceptance criteria described in the sub clause 2.8
--

### Operation Modes

Following operation modes have been applied to the EUT:	Sample 1 working as described in sub clause 2.5, Mode 1
---	---

### Accessories, auxiliary equipment and cables used for these measurements

Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

**Table 12 Accessories, auxiliary equipment and cables used for surges immunity test**



Test set-up – Photos

AC power port



**Figure 16 EUT Set-up for surges at AC power port**

### 3.2.5 Voltage dips / Short interruptions, voltage deviations, frequency variations and frequency rate of change (set-up according to EN61000-4-11)

#### Test set-up

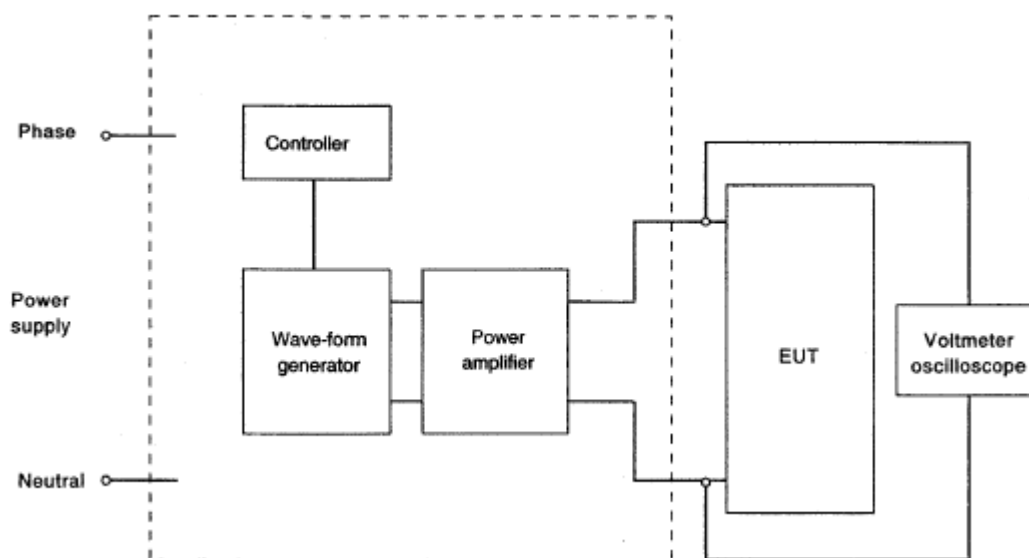


Figure 17 Schematic for voltage dips / short interruptions

#### Performance criteria

The Sample must pass the test according to the acceptance criteria described in the sub clause 2.8

#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 2 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

**Table 13 Accessories, auxiliary equipment and cables used for voltage dips & short interruptions immunity test**

## Test set-up – Photos

### AC power port



**Figure 18 EUT Set-up for voltage dips / short interruptions at AC power port**

### 3.2.6 Electrostatic Discharge (ESD) (set-up according to EN61000-4-2)

#### Test set-up

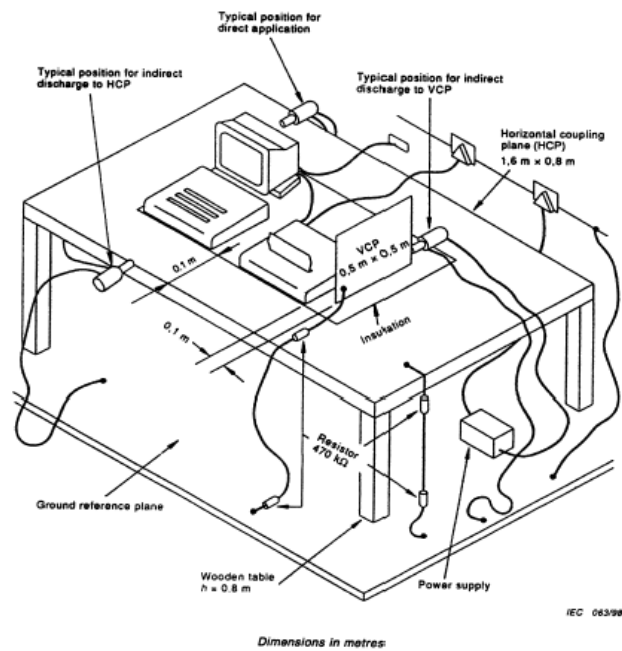


Figure 5 — Example of test set-up for tabletop equipment — Laboratory tests  
Figure 19 Schematic for electrostatic discharge

#### Performance criteria

The Sample must pass the test according to the acceptance criteria described in the sub clause 2.8

#### Operation Modes

Following operation modes have been applied to the EUT:

Sample 1 working as described in sub clause 2.5, Mode 1

#### Accessories, auxiliary equipment and cables used for these measurements

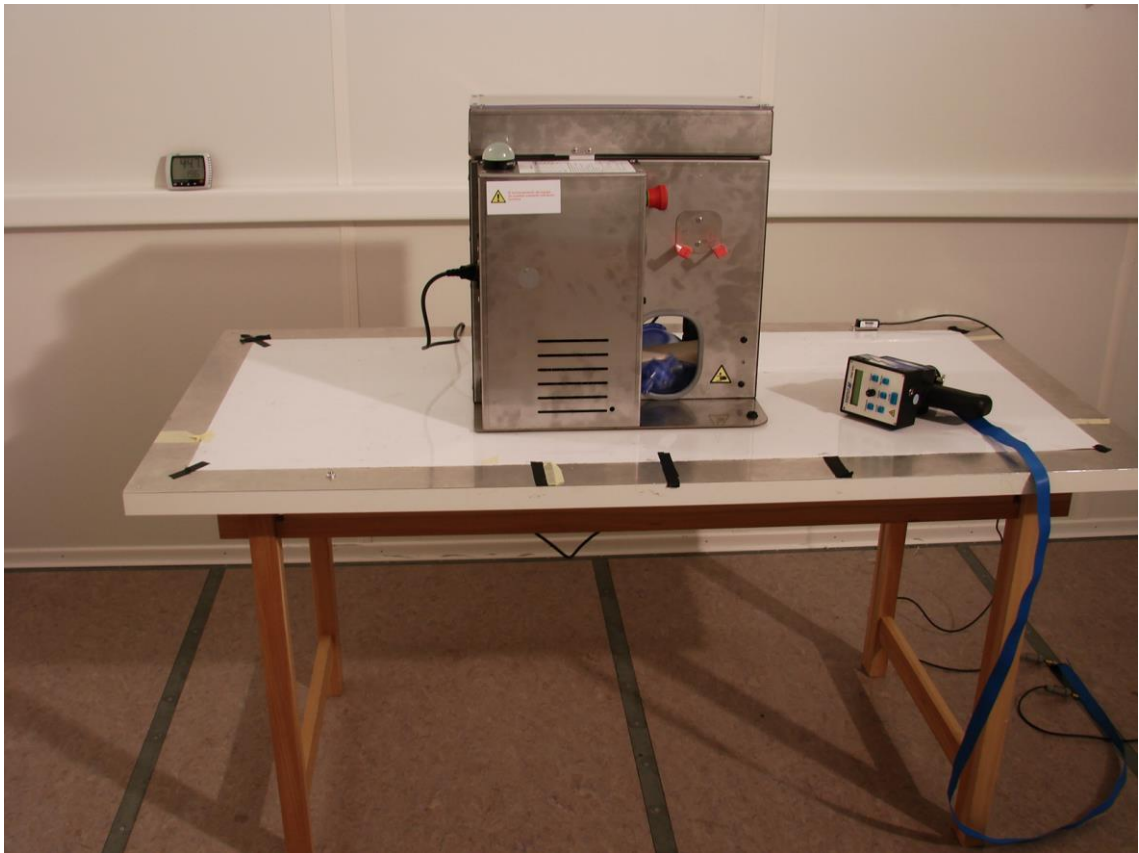
Type	Model	S/N	Manufacturer	Length	Shielded	Ferrites
16A / 250V (Mains plug)	M2511	N/A	Volex	N/A	N/A	N/A
16 A 250 VAC (Power cord)	NF-USE-Q050104-H05VV-F	N/A	HSING Industries LTD.	2.5m	N/A	N/A
Manual resuscitator	#	#	#	#	#	#

Connected cables: ☐ none cables connected

Table 14 Accessories, auxiliary equipment and cables used for electrostatic discharges immunity test

Test set-up – Photos

Enclosure



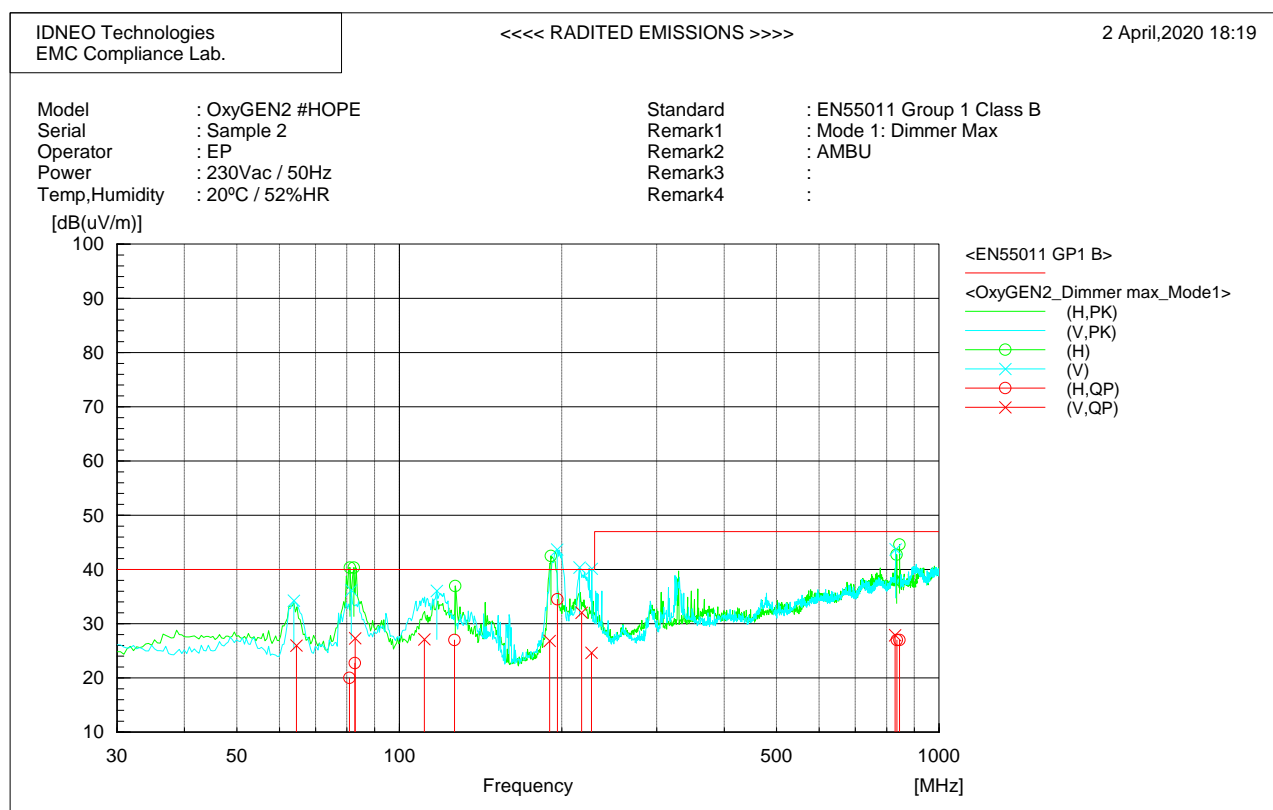
**Figure 20 EUT Set-up for electrostatic discharge**

## 4 Measurements

## 4.1 Emissions measurements

### 4.1.1 Radiated Emissions from 30MHz to 1GHz

Test Site: SAR1  
EUT Name: OxyGEN2 #HOPE  
Serial Number: Sample 2  
Test Description: Radiated Emissions – According to EN55011 GP1 Class B  
Environmental Conditions: 20°C / 52% HR  
Operator Name: EP  
Operating Mode: Mode 1  
Test Report ID: BE2020063  
Date: 02/04/2020



#### Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB (uV) ]	c.f [dB (1/m) ]	Result QP [dB (uV/m) ]	Limit [dB (uV/m) ]	Margin QP [dB]	Height [cm]	Angle [deg]
1	80.880	H	6.7	13.3	20.0	40.0	20.0	400.0	151.0
2	82.752	H	9.3	13.4	22.7	40.0	17.3	400.0	164.3
3	126.504	H	8.9	18.1	27.0	40.0	13.0	270.0	153.8
4	196.244	H	15.5	19.0	34.5	40.0	5.5	100.0	145.5
5	835.619	H	-3.7	30.7	27.0	47.0	20.0	170.0	45.6
6	844.736	H	-3.5	30.5	27.0	47.0	20.0	290.0	287.6
7	64.499	V	5.9	20.1	26.0	40.0	14.0	390.0	223.6
8	82.822	V	11.9	15.4	27.3	40.0	12.7	230.0	2.4
9	111.285	V	6.5	20.6	27.1	40.0	12.9	380.0	166.7
10	189.824	V	7.1	19.7	26.8	40.0	13.2	180.0	148.2
11	217.714	V	12.1	20.0	32.1	40.0	7.9	180.0	170.2
12	227.101	V	4.7	20.0	24.7	40.0	15.3	190.0	317.5
13	829.318	V	-3.8	31.7	27.9	47.0	19.1	280.0	232.5

Figure 21 Radiated Emissions results from 30MHz to 1GHz

## 4.1.2 Continuous Conducted Emissions from 150kHz to 30MHz

### 4.1.2.1 AC power port

Test Site:	SR2
EUT Name:	OxyGEN2 #HOPE
Serial Number:	Sample 2
Test Description:	Conducted Emissions - According to EN55011 GP1 Class B
Environmental Conditions:	19.8°C / 45.3% Humidity
Operator Name:	EP
Operating Mode:	Mode 1
Test Report ID:	BE2020063
Date:	02/04/2020

EN 55011\_AC power port\_Group 1\_Class B

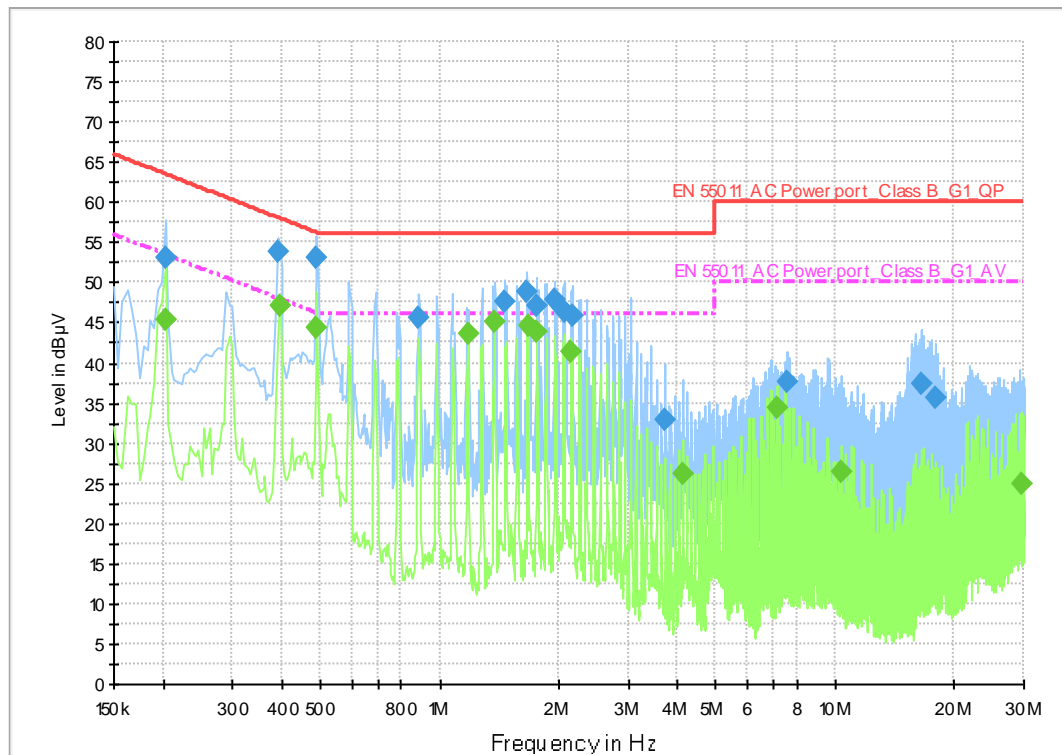


Figure 22 Conducted Emissions results from 150kHz to 30MHz at AC power port



## Final Result for QPK

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.202000	53.0	5000.0	9.000	On	L1	10.0	10.5	63.5	
0.390000	53.7	5000.0	9.000	On	L1	10.0	4.3	58.1	
0.490000	53.1	5000.0	9.000	On	N	10.1	3.0	56.2	
0.886000	45.6	5000.0	9.000	On	L1	10.0	10.4	56.0	
1.466000	47.5	5000.0	9.000	On	N	9.9	8.5	56.0	
1.666000	48.8	5000.0	9.000	On	L1	10.0	7.2	56.0	
1.762000	47.1	5000.0	9.000	On	N	9.9	8.9	56.0	
1.962000	47.9	5000.0	9.000	On	N	10.0	8.1	56.0	
2.062000	46.4	5000.0	9.000	On	N	10.0	9.6	56.0	
2.174000	45.8	5000.0	9.000	On	N	10.0	10.2	56.0	
3.726000	32.9	5000.0	9.000	On	N	10.0	23.1	56.0	
7.558000	37.5	5000.0	9.000	On	L1	10.2	22.5	60.0	
16.590000	37.4	5000.0	9.000	On	L1	10.4	22.6	60.0	
17.962000	35.5	5000.0	9.000	On	L1	10.5	24.5	60.0	

## Final Result Average

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.202000	45.4	5000.0	9.000	On	L1	10.0	8.2	53.5	
0.394000	47.1	5000.0	9.000	On	L1	10.0	0.8	48.0	
0.490000	44.3	5000.0	9.000	On	N	10.1	1.8	46.2	
1.178000	43.6	5000.0	9.000	On	L1	10.0	2.4	46.0	
1.374000	45.1	5000.0	9.000	On	L1	10.0	0.9	46.0	
1.670000	44.5	5000.0	9.000	On	L1	10.0	1.5	46.0	
1.766000	43.7	5000.0	9.000	On	N	9.9	2.3	46.0	
2.158000	41.4	5000.0	9.000	On	L1	10.0	4.6	46.0	
4.122000	26.3	5000.0	9.000	On	L1	10.1	19.7	46.0	
7.162000	34.4	5000.0	9.000	On	L1	10.2	15.6	50.0	
10.398000	26.3	5000.0	9.000	On	L1	10.2	23.7	50.0	
29.822000	24.9	5000.0	9.000	On	N	10.8	25.1	50.0	

### 4.1.3 Harmonics

Name: EP  
Department: Compliance  
Company: IDNEO Technologies S.A.U.  
Test report no: BE2020063  
T<sub>a</sub>(°C) / HR(%): 19.5°C - 48.4% HR  
Specimen: Automatic actuator system  
Manufacturer: #  
Model: OxyGEN2 #HOPE

Serial no: Sample 2  
Operating modes: Mode 1: Dimmer Max  
Comment1: AMBU  
Comment2:  
Comment3:  
Comment4:  
Test date: 02.04.2020

Maximum RMS current and corresponding values in timewindow 1:

Voltage: 231.41 Vrms THD=0.01 % THV=0.020 V POHV=0.011 V PWHD=0.03 %  
Current: 0.277 Arms -0.592 Apk THD=129.13 % THC=0.190 A POHC=0.011 A PWHD=66.18 %  
Power: 31.1 W P1=31.1 W 64.1 VA  
Power factor: 0.485 CosPhi1: 0.915

Test conditions: EN 61000-3-2:2014, f=50 Hz, Phase=L1, Range=0.80 A  
Time window=10/12 (200ms), Grouping (>2nd harm.)=on  
No Ztest selected

harmonic currents < 0.6 % of I or < 5 mA are disregard for calc. of THD, THC, POHC, PWHD

HARMONIC ANALYSIS: Test PASS

Tobs = entire measurement; POHC: avg=0.00 A, limits=0.25 A  
Iavg=0.223 Arms

Ha	Entire measurement (2.5 min = 750 time windows)							Worst 2.5 min		Average		P A S S	F A I L
	Maximum	Window	EN61000-3-2 Class A	Margin in MaxWin	100 to 150%	150 to 200%	Ex- ceeded	100 to 150%	Ex- ceeded	Value	Ex- ceeded		
DC	-0.0293 A	293	-	-	0	0	0	n.e.	n.e.	-0.0011 A	0	X	
1	0.1470 A	1	-	-	0	0	0	n.e.	n.e.	0.1012 A	0	X	
2	0.0466 A	246	1.0800 A	-95.7 %	0	0	0	n.e.	n.e.	0.0362 A	0	X	
3	0.1759 A	1	2.3000 A	-92.4 %	0	0	0	n.e.	n.e.	0.1340 A	0	X	
4	0.0417 A	270	0.4300 A	-90.3 %	0	0	0	n.e.	n.e.	0.0345 A	0	X	
5	0.0400 A	1	1.1400 A	-96.5 %	0	0	0	n.e.	n.e.	0.0314 A	0	X	
6	0.0139 A	372	0.3000 A	-95.4 %	0	0	0	n.e.	n.e.	0.0114 A	0	X	
7	0.0107 A	599	0.7700 A	-98.6 %	0	0	0	n.e.	n.e.	0.0093 A	0	X	
8	0.0084 A	1	0.2300 A	-96.3 %	0	0	0	n.e.	n.e.	0.0072 A	0	X	
9	0.0140 A	1	0.4000 A	-96.5 %	0	0	0	n.e.	n.e.	0.0108 A	0	X	
10	0.0083 A	354	0.1840 A	-95.5 %	0	0	0	n.e.	n.e.	0.0067 A	0	X	
11	0.0149 A	1	0.3300 A	-95.5 %	0	0	0	n.e.	n.e.	0.0114 A	0	X	
12	0.0076 A	3	0.1533 A	-95.1 %	0	0	0	n.e.	n.e.	0.0062 A	0	X	
13	0.0116 A	2	0.2100 A	-94.5 %	0	0	0	n.e.	n.e.	0.0089 A	0	X	
14	0.0086 A	1	0.1314 A	-93.5 %	0	0	0	n.e.	n.e.	0.0062 A	0	X	
15	0.0080 A	2	0.1500 A	-94.7 %	0	0	0	n.e.	n.e.	0.0066 A	0	X	
16	0.0059 A	201	0.1150 A	-94.9 %	0	0	0	n.e.	n.e.	0.0053 A	0	X	
17	0.0066 A	1	0.1324 A	-95.1 %	0	0	0	n.e.	n.e.	0.0053 A	0	X	
18	0.0044 A	68	0.1022 A	-95.7 %	0	0	0	n.e.	n.e.	0.0038 A	0	X	
19	0.0064 A	1	0.1184 A	-94.6 %	0	0	0	n.e.	n.e.	0.0043 A	0	X	
20	0.0041 A	3	0.0920 A	-95.5 %	0	0	0	n.e.	n.e.	0.0035 A	0	X	
21	0.0053 A	1	0.1071 A	-95.1 %	0	0	0	n.e.	n.e.	0.0038 A	0	X	
22	0.0040 A	201	0.0836 A	-95.3 %	0	0	0	n.e.	n.e.	0.0034 A	0	X	
23	0.0044 A	3	0.0978 A	-95.5 %	0	0	0	n.e.	n.e.	0.0037 A	0	X	
24	0.0039 A	3	0.0767 A	-95.0 %	0	0	0	n.e.	n.e.	0.0028 A	0	X	
25	0.0046 A	1	0.0900 A	-94.9 %	0	0	0	n.e.	n.e.	0.0034 A	0	X	
26	0.0035 A	3	0.0708 A	-95.0 %	0	0	0	n.e.	n.e.	0.0027 A	0	X	
27	0.0036 A	1	0.0833 A	-95.7 %	0	0	0	n.e.	n.e.	0.0030 A	0	X	
28	0.0028 A	618	0.0657 A	-95.7 %	0	0	0	n.e.	n.e.	0.0025 A	0	X	
29	0.0030 A	248	0.0776 A	-96.1 %	0	0	0	n.e.	n.e.	0.0027 A	0	X	
30	0.0026 A	69	0.0613 A	-95.8 %	0	0	0	n.e.	n.e.	0.0022 A	0	X	
31	0.0028 A	6	0.0726 A	-96.1 %	0	0	0	n.e.	n.e.	0.0023 A	0	X	
32	0.0023 A	3	0.0575 A	-96.0 %	0	0	0	n.e.	n.e.	0.0019 A	0	X	
33	0.0023 A	659	0.0682 A	-96.6 %	0	0	0	n.e.	n.e.	0.0020 A	0	X	
34	0.0021 A	3	0.0541 A	-96.2 %	0	0	0	n.e.	n.e.	0.0018 A	0	X	
35	0.0023 A	3	0.0643 A	-96.5 %	0	0	0	n.e.	n.e.	0.0018 A	0	X	
36	0.0020 A	3	0.0511 A	-96.0 %	0	0	0	n.e.	n.e.	0.0017 A	0	X	
37	0.0023 A	3	0.0608 A	-96.2 %	0	0	0	n.e.	n.e.	0.0017 A	0	X	
38	0.0020 A	3	0.0484 A	-95.8 %	0	0	0	n.e.	n.e.	0.0015 A	0	X	
39	0.0020 A	1	0.0577 A	-96.5 %	0	0	0	n.e.	n.e.	0.0015 A	0	X	
40	0.0017 A	721	0.0460 A	-96.3 %	0	0	0	n.e.	n.e.	0.0014 A	0	X	

average value < 0.6 % of Iavg or < 5 mA n.e. = not evaluated

Test ed with SPS EMC 4.1.3 / PAS5000 by Spitzenberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Viechtach, Germany, 02.04.2020

Name: EP  
 Department: Compliance  
 Company: IDNEO Technologies S.A.U.  
 Test report no: BE2020063  
 T<sub>a</sub>(°C) / HR(%): 19.5°C - 48.4% HR  
 Specimen: Automatic actuator system  
 Manufacturer: #  
 Model: OxyGEN2 #HOPE

Serial no: Sample 2  
 Operating modes: Mode 1: Dimmer Max  
 Comment1: AMBU  
 Comment2:  
 Comment3:  
 Comment4:  
 Test date: 02.04.2020

Voltage: 231.41 Vrms THD=0.01 % THV=0.020 V POHV=0.011 V PWHD=0.03 %  
 Current: 0.277 Arms -0.592 Apk THD=129.13 % THC=0.190 A POHC=0.011 A PWHD=66.18  
 Power: 31.1 W P1=31.1 W 64.1 VA  
 Power factor: 0.485 CosPhi1: 0.915

Test conditions: EN 61000-3-2:2014, f=50 Hz, Phase=L1, Range=0.80 A

Time window=10/12 (200ms), Grouping (>2nd harm.)=on

No Ztest selected

harmonic currents < 0.6 % of I or < 5 mA are disregarded for calc. of THD, THC, POHC, PW

HARMONIC ANALYSIS: Test PASS in Timewindow 1 of 750

Ha	Value	Percent	Angle	EN61000-3-2 Class A	Margin	PASS	FAIL
DC	-0.0046 A	-3.10 %	---. - Deg	- . - - -	- - - . -	X	
1	0.1470 A	100.00 %	23.8 Deg	- . - - -	- - - . -	X	
2	0.0340 A	23.09 %	-173.9 Deg	1.0800 A	-96.9 %	X	
3	0.1759 A	119.64 %	-2.2 Deg	2.3000 A	-92.4 %	X	
4	0.0300 A	20.40 %	-178.9 Deg	0.4300 A	-93.0 %	X	
5	0.0400 A	27.18 %	-22.9 Deg	1.1400 A	-96.5 %	X	
6	0.0126 A	8.57 %	30.2 Deg	0.3000 A	-95.8 %	X	
7	0.0103 A	7.04 %	-85.3 Deg	0.7700 A	-98.7 %	X	
8	0.0084 A	5.71 %	5.0 Deg	0.2300 A	-96.3 %	X	
9	0.0140 A	9.55 %	-168.4 Deg	0.4000 A	-96.5 %	X	
10	0.0070 A	4.75 %	48.0 Deg	0.1840 A	-96.2 %	X	
11	0.0149 A	10.15 %	-179.9 Deg	0.3300 A	-95.5 %	X	
12	0.0075 A	5.10 %	65.8 Deg	0.1533 A	-95.1 %	X	
13	0.0112 A	7.64 %	-168.0 Deg	0.2100 A	-94.7 %	X	
14	0.0086 A	5.82 %	73.0 Deg	0.1314 A	-93.5 %	X	
15	0.0080 A	5.41 %	-156.5 Deg	0.1500 A	-94.7 %	X	
16	0.0059 A	4.02 %	119.0 Deg	0.1150 A	-94.9 %	X	
17	0.0066 A	4.46 %	-144.1 Deg	0.1324 A	-95.1 %	X	
18	0.0043 A	2.96 %	-135.8 Deg	0.1022 A	-95.7 %	X	
19	0.0064 A	4.34 %	-156.8 Deg	0.1184 A	-94.6 %	X	
20	0.0040 A	2.70 %	-75.7 Deg	0.0920 A	-95.7 %	X	
21	0.0053 A	3.58 %	-142.3 Deg	0.1071 A	-95.1 %	X	
22	0.0030 A	2.07 %	35.1 Deg	0.0836 A	-96.4 %	X	
23	0.0044 A	2.98 %	-129.3 Deg	0.0978 A	-95.5 %	X	
24	0.0037 A	2.54 %	-39.8 Deg	0.0767 A	-95.1 %	X	
25	0.0046 A	3.13 %	-151.4 Deg	0.0900 A	-94.9 %	X	
26	0.0034 A	2.31 %	-44.5 Deg	0.0708 A	-95.2 %	X	
27	0.0036 A	2.42 %	177.5 Deg	0.0833 A	-95.7 %	X	
28	0.0027 A	1.81 %	68.2 Deg	0.0657 A	-96.0 %	X	
29	0.0025 A	1.68 %	-167.9 Deg	0.0776 A	-96.8 %	X	
30	0.0021 A	1.41 %	102.7 Deg	0.0613 A	-96.6 %	X	
31	0.0027 A	1.84 %	-147.9 Deg	0.0726 A	-96.3 %	X	
32	0.0023 A	1.53 %	74.5 Deg	0.0575 A	-96.1 %	X	
33	0.0021 A	1.42 %	177.1 Deg	0.0682 A	-96.9 %	X	
34	0.0019 A	1.28 %	-129.5 Deg	0.0541 A	-96.5 %	X	
35	0.0022 A	1.49 %	-49.6 Deg	0.0643 A	-96.6 %	X	
36	0.0020 A	1.36 %	-144.2 Deg	0.0511 A	-96.1 %	X	
37	0.0022 A	1.53 %	-116.3 Deg	0.0608 A	-96.3 %	X	
38	0.0020 A	1.33 %	-142.0 Deg	0.0484 A	-96.0 %	X	
39	0.0020 A	1.39 %	-149.9 Deg	0.0577 A	-96.5 %	X	
40	0.0015 A	0.99 %	-42.2 Deg	0.0460 A	-96.8 %	X	

value < 0.6 % of I or < 5 mA

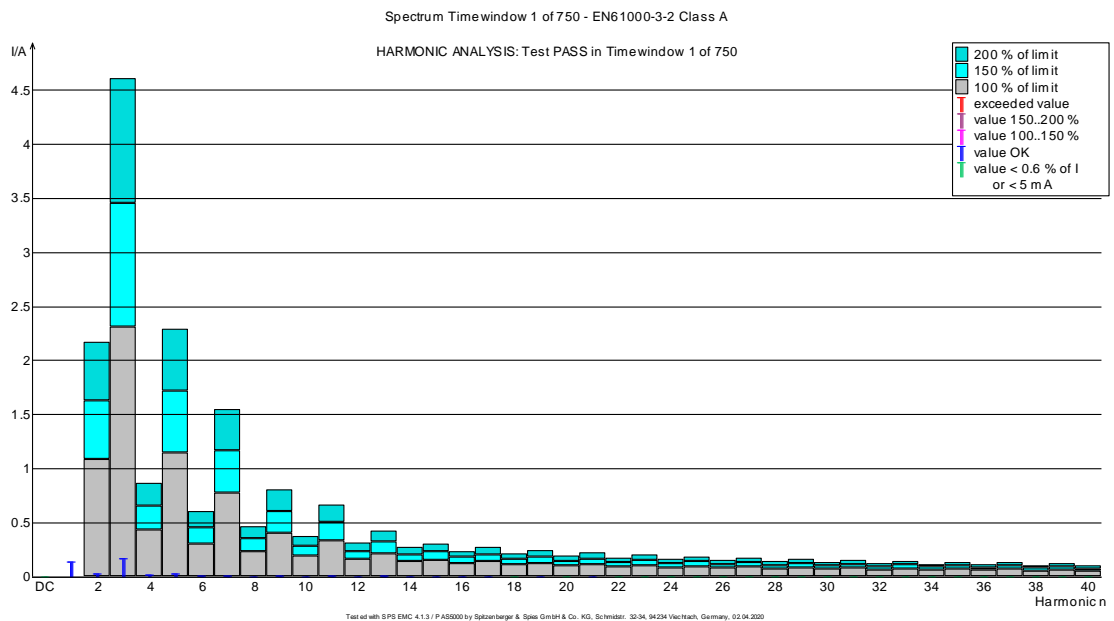


Figure 23 Harmonics results

#### 4.1.4 Voltage Fluctuations (Flicker)

Name: EP Serial no: Sample 2  
Department: Compliance Operating modes: Mode 1: Dimmer Max  
Company: IDNEO Technologies S.A.U. Comment1: AMBU  
Test report no: BE2020063 Comment2:  
T<sub>a</sub>(°C) / HR(%): 19.5°C - 48.4% HR Comment3:  
Specimen: Automatic actuator system Comment4:  
Manufacturer: # Test date: 02.04.2020  
Model: OxyGEN2 #HOPE

Test conditions EN 61000-3-3:2013 / 230 V / 50 Hz / Phase L1  
EN 61000-4-15:2011 / Obs 1 x 10 min / Z<sub>test</sub> (0.400+j0.250) Ohm  
R<sub>a</sub>+jX<sub>a</sub> (0.2400+j0.1500) Ohm / R<sub>n</sub>+jX<sub>n</sub> (0.1600+j0.1000) Ohm

FLICKER: Test PASS!

Time	P <sub>max</sub>	P <sub>st</sub>	Sliding Plt	T <sub>max</sub> [s]	d <sub>max</sub> [%]	dc [%]	PASS	FAIL
23:19:26	0.050	0.1570	- . - - -	0.000	+0.000	- . - - -	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.068576 (calculated over 12 periods)							X	
Evaluated: PST, PLT, Sliding PLT, dc, d <sub>max</sub> , T <sub>max</sub>								

FLICKER: Source test PASS!

Time	P <sub>max</sub>	P <sub>st</sub>	Sliding Plt	T <sub>max</sub> [s]	d <sub>max</sub> [%]	dc [%]	PASS	FAIL
23:19:26	0.000	0.0100	- . - - -	0.000	+0.000	- . - - -	X	
Plt: 0.004368 (calculated over 12 periods)								
Evaluated: PST <= 0.4 d <sub>max</sub> < 20 % d <sub>max1</sub>								

Tested with SP S EMC 4.1.3 / PAS5000 by Spitzenberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Viechtach, Germany, 02.04.2020

Figure 24 Voltage Fluctuations results

## 4.2 Susceptibility measurements

### 4.2.1 Immunity from radiated fields from 80MHz to 1GHz

#### *TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-3*

##### Test condition

Frequency range:	<b>80MHz to 1GHz</b>
Test level:	<b>According to EN 60601-1-2</b>
Dwell time:	<b>3s</b>
Modulation:	<b>AM: 80,0%; 1,0kHz</b>
Step Width:	<b>1%</b>
Performance criteria:	<b>Acceptance criteria is described in sub clause 2.8</b>
Field orientation:	<b>Vertical / Horizontal</b>
Antenna height:	<b>1.55m</b>
EUT position:	<b>Top table for 0°, 90°, 180° and 270°</b>
EUT operating mode:	<b>The EUT operating as described in sub clause 2.5</b>
EUT monitoring:	<b>The EUT monitoring as described in sub clause 2.5</b>

##### Test results

Frequency	Polarization	Exposed side	Result
80MHz – 1GHz	H	0°/90°/180°/270°	P
80MHz – 1GHz	V	0°/90°/180°/270°	P

**Table 15 Radiated Immunity measurements from 80MHz to 1GHz – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site:	FAR2
EUT Name:	OxyGEN2 #Hope
Serial Number:	Sample 1
Test Description:	Radiated Immunity according to EN61000-4-3
Environmental Conditions:	21°C / 45% RH
Operator Name:	EP
Operating mode:	MODE 1
Comment:	Antenna polarization: H EUT side: 0° / 90° / 180° / 270°
Test Report ID:	BE2020063
Date:	02/04/2020

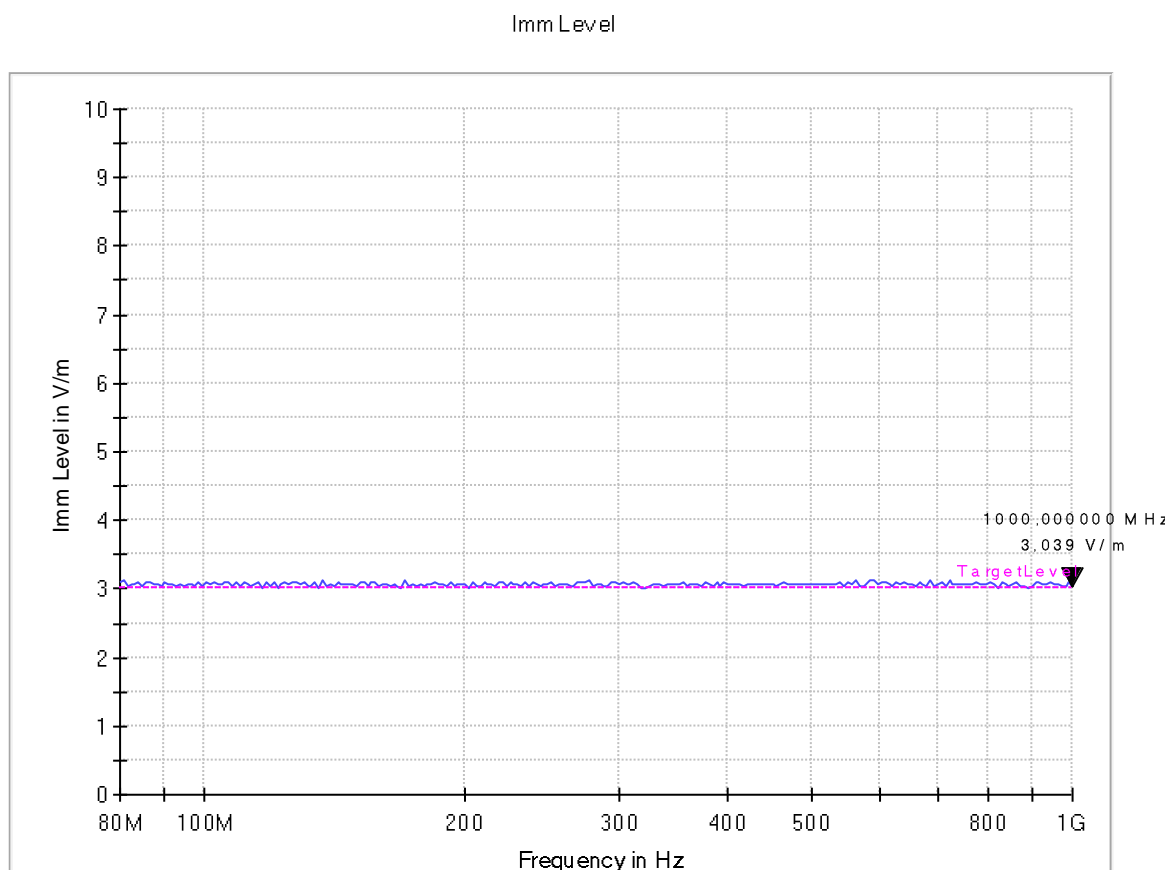


Figure 25 Radiated Immunity results for H polarity from 80MHz to 1GHz

Test Site: FAR2  
EUT Name: OxyGEN2 #Hope  
Serial Number: Sample 1  
Test Description: Radiated Immunity according to EN61000-4-3  
Environmental Conditions: 21°C / 45% RH  
Operator Name: EP  
Operating mode: MODE 1  
Comment: Antenna polarization: V EUT side: 0° / 90° / 180° / 270°  
Test Report ID: BE2020063  
Date: 02/04/2020

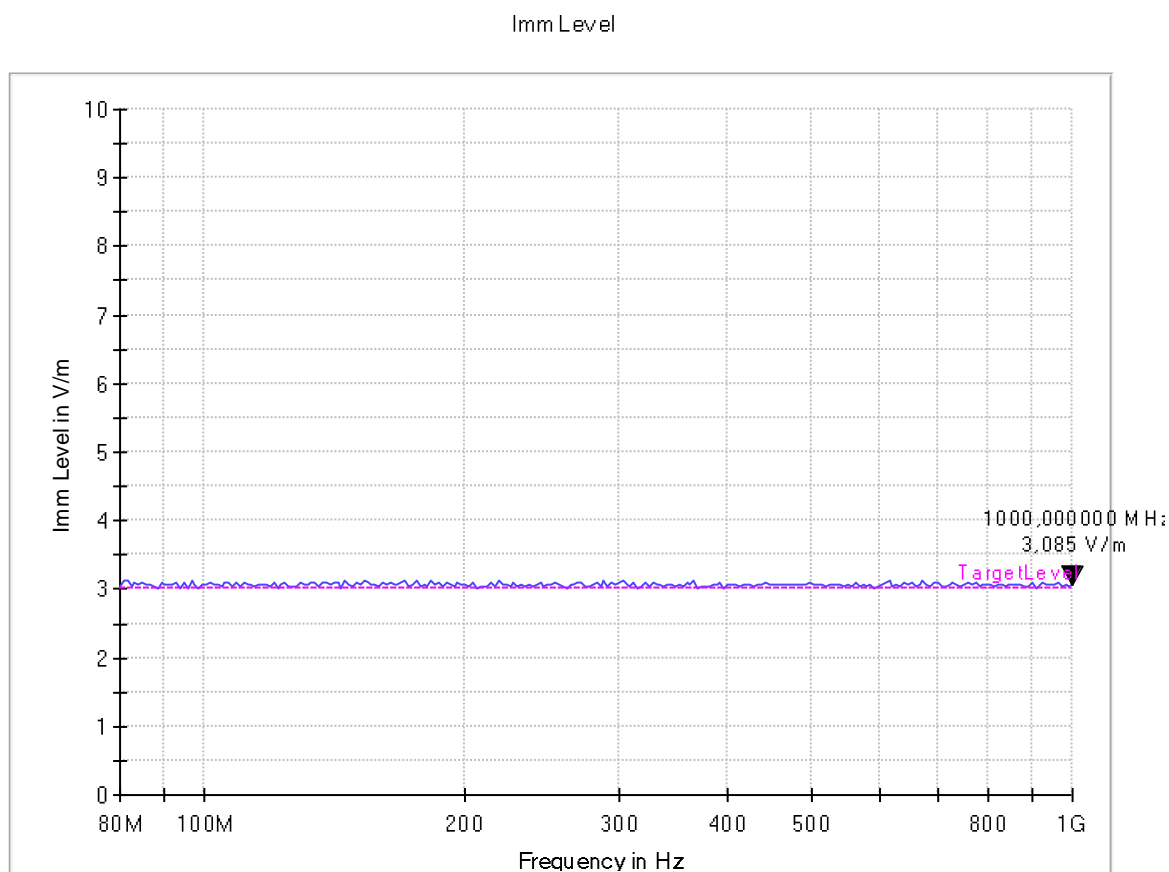


Figure 26 Radiated Immunity results for V polarity from 80MHz to 1GHz



## 4.2.2 Immunity from radiated fields from 1GHz to 2.7GHz

### TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-3

#### Test condition

Frequency range:	1GHz to 2.7GHz
Test level:	According to EN 60601-1-2
Dwell time:	3s
Modulation:	AM: 80,0%; 1,0kHz
Step Width:	1%
Performance criteria:	Acceptance criteria is described in sub clause 2.8
Field orientation:	Vertical / Horizontal
Antenna height:	1.55m
EUT position:	Top table for 0°, 90°, 180° and 270°
EUT operating mode:	The EUT operating as described in sub clause 2.5
EUT monitoring:	The EUT monitoring as described in sub clause 2.5

#### Test results

Frequency	Polarization	Exposed side	Result
1GHz – 2.7 GHz	H	0°/90°/180°/270°	P
1GHz – 2.7 GHz	V	0°/90°/180°/270°	P

**Table 16 Radiated Immunity measurements from 1GHz to 2.7GHz – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site:	FAR2
EUT Name:	OxyGEN2 #Hope
Serial Number:	Sample 1
Test Description:	Radiated Immunity according to EN61000-4-3
Environmental Conditions:	21°C / 45% RH
Operator Name:	EP
Operating mode:	MODE 1
Comment:	Antenna polarization: H EUT side: 0° / 90° / 180° / 270°
Test Report ID:	BE2020063
Date:	02/04/2020

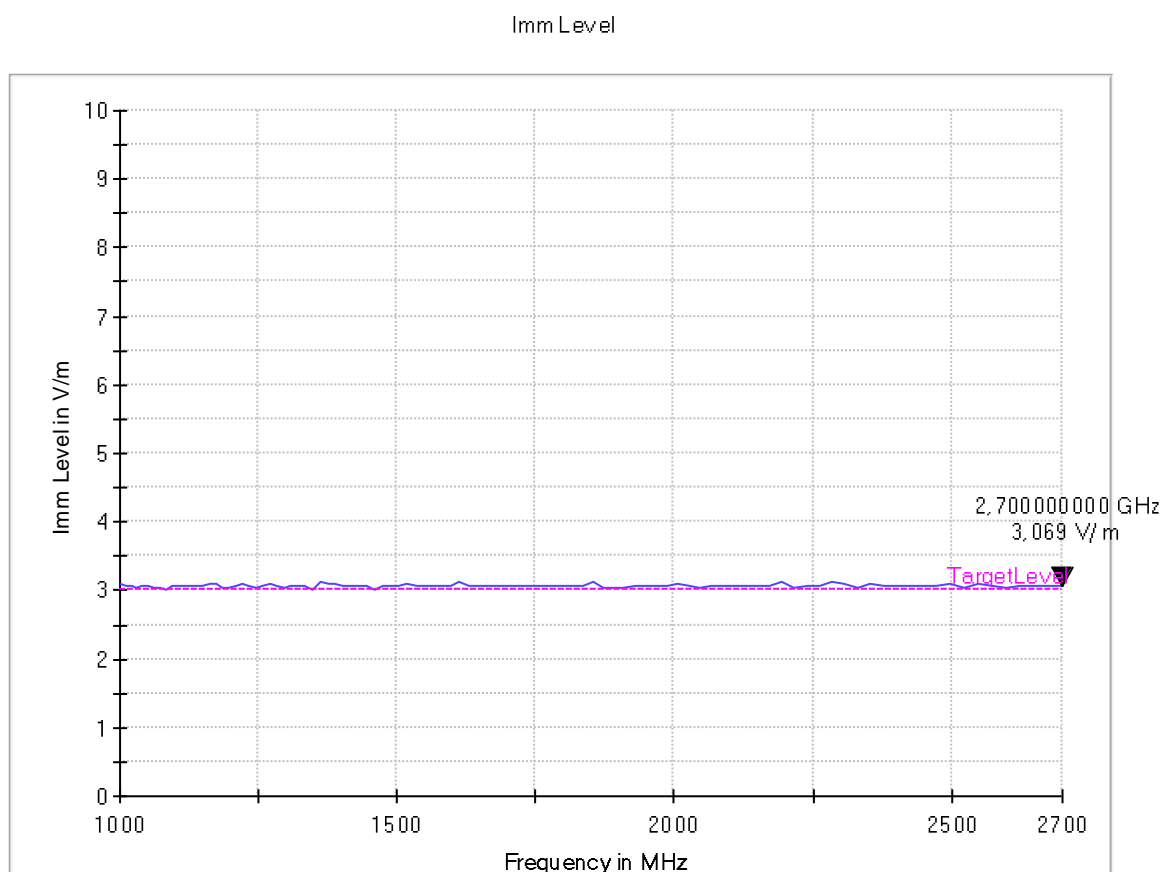
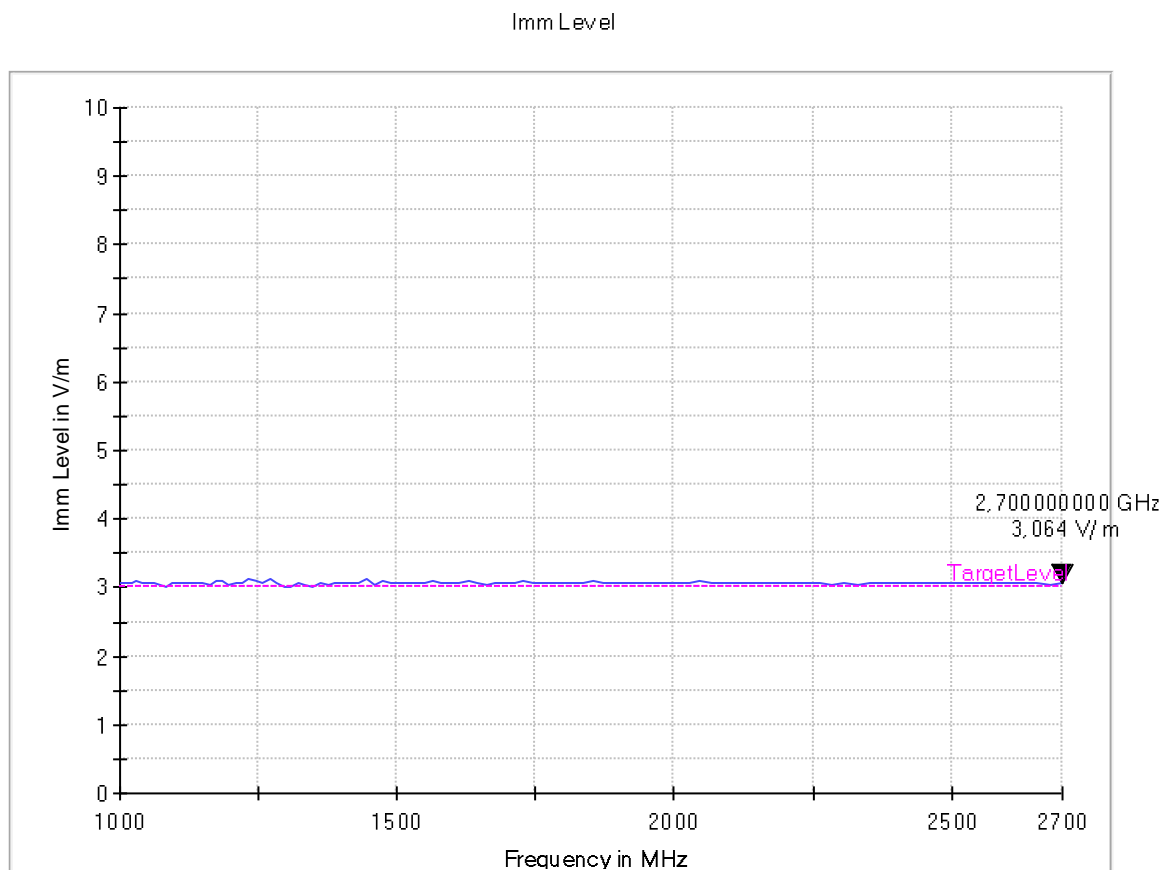


Figure 27 Radiated Immunity results for H polarity from 1GHz to 2.7GHz

Test Site:	FAR2
EUT Name:	OxyGEN2 #Hope
Serial Number:	Sample 1
Test Description:	Radiated Immunity according to EN61000-4-3
Environmental Conditions:	21°C / 45% RH
Operator Name:	EP
Operating mode:	MODE 1
Comment:	Antenna polarization: V EUT side: 0° / 90° / 180° / 270°
Test Report ID:	BE2020063
Date:	02/04/2020



**Figure 28 Radiated Immunity results for V polarity from 1GHz to 2.7GHz**

### 4.2.3 Immunity to proximity fields from RF wireless communications\*

#### Test condition

Frequency range: **From 385MHz to 5785 MHz**  
Test level: **From 9V/m to 28V/m according to EN 60601-1-2**  
Dwell time: **3s**  
Modulation: **PM 18Hz or 217Hz (50% duty cycle)**  
Step Width: **1%**  
Performance criteria: **Acceptance criteria is described in sub clause 2.8**  
Field orientation: **Vertical / Horizontal**  
Antenna height: **1.55m**  
EUT position: **Top table for 0°, 90°, 180° and 270°**  
EUT operating mode: **The EUT operating as described in sub clause 2.5**  
EUT monitoring: **The EUT monitoring as described in sub clause 2.5**

#### Test results

Test Frequency (MHz)	Modulation	Immunity test level	Exposed side	Polarization	Result	Comments
385	Pulse modulation 18Hz	27 V/m	0°/90°/180°/270°	H/V	P	
450	FM ±5kHz deviation 1kHz sine	28 V/m	0°/90°/180°/270°	H/V	P	
710	Pulse modulation 217Hz	9 V/m	0°/90°/180°/270°	H/V	P	
745			0°/90°/180°/270°	H/V	P	
780			0°/90°/180°/270°	H/V	P	
810	Pulse modulation 18Hz	28 V/m	0°/90°/180°/270°	H/V	P	
870			0°/90°/180°/270°	H/V	P	
930			0°/90°/180°/270°	H/V	P	
1720	Pulse modulation 217Hz	28 V/m	0°/90°/180°/270°	H/V	P	
1845			0°/90°/180°/270°	H/V	P	
1970			0°/90°/180°/270°	H/V	P	
2450	Pulse modulation 217Hz	28 V/m	0°/90°/180°/270°	H/V	P	
5240*	Pulse modulation 217Hz	9 V/m	0°/90°/180°/270°	H/V	P	
5500*			0°/90°/180°/270°	H/V	P	
5785*			0°/90°/180°/270°	H/V	P	

**Table 17 Immunity to proximity fields from RF wireless communications – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site: FAR2  
EUT Name: OxyGEN2 #Hope  
Serial Number: Sample 1  
Test Description: Immunity to proximity fields from RF wireless communications – According to EN61000-4-3  
Environmental Conditions: 21°C / 45% RH  
Operator Name: EP  
Operating mode: MODE 1  
Comment: Antenna polarization: H/V EUT side: 0° / 90° / 180° / 270°  
Test Report ID: BE2020063  
Date: 02/04/2020 and 03/04/2020

## 4.2.4 Immunity to conducted disturbances from 150kHz to 80MHz

### TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-6

#### 4.2.4.1 AC power port

##### Test condition

Frequency range:	150kHz to 80MHz
Test level:	According to EN 60601-1-2
Dwell time:	3s
Modulation:	AM: 80,0%; 1,0kHz
Step Width:	1%
Performance criteria:	Acceptance criteria is described in sub clause 2.8
Application method:	CDN for direct injection at AC power port
EUT position:	Top table
EUT operating mode:	The EUT operating as described in sub clause 2.5
EUT monitoring:	The EUT monitoring as described in sub clause 2.5

##### Test results

Frequency	Coupling Path	Result
150kHz - 80MHz	AC power port	P

**Table 18 Conducted Immunity measurements at AC power port – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site:	CIR
EUT Name:	OxyGEN2 #HOPE
Serial Number:	Sample 1
Test Description:	Conducted Immunity according to EN61000-4-6
Environmental Conditions:	19.9°C / 47.5% RH
Operator Name:	EP
Operating mode:	MODE 1
Comments:	Coupling Path: AC power port
Test Report ID:	BE2020063
Date:	02/04/2020

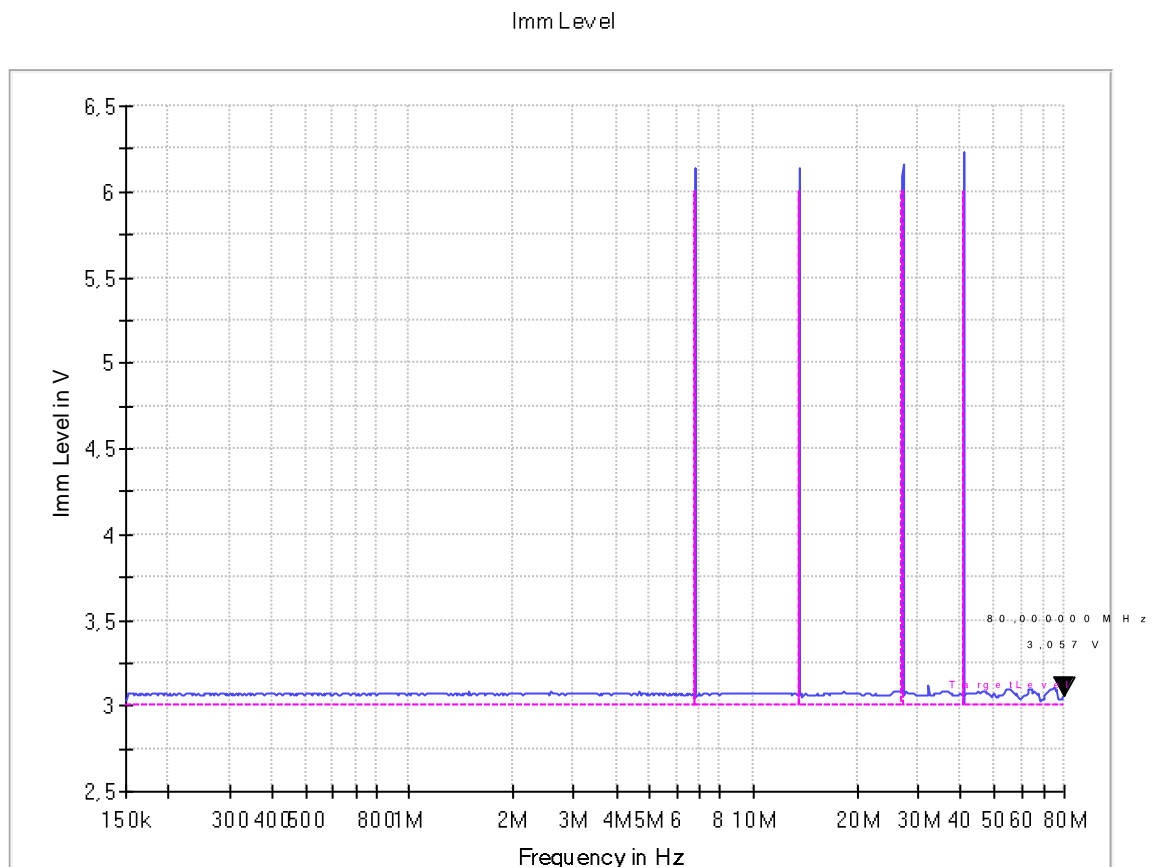


Figure 29 Conducted Immunity results for AC power port

## 4.2.5 Electrical Fast Transient / Burst Pulse (EFT)

### TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-4

#### 4.2.5.1 AC power port

##### Test condition

Test level: According to EN 60601-1-2  
Repetition Frequency: 100kHz  
Burst Duration: 0,75ms  
Burst Period: 300ms  
Application method: CDN for direct injection at AC power port  
Performance criteria: Acceptance criteria is described in sub clause 2.8  
Duration of each test: 1 minute  
EUT position: Top table  
EUT operating mode: The EUT operating as described in sub clause 2.5  
EUT monitoring: The EUT monitoring as described in sub clause 2.5

##### Test results

Type	Lines	Test level (kV)	Result
AC power port	L-GND	+2	P
		-2	P
	N-GND	+2	P
		-2	P
	LN-GND	+2	P
		-2	P
	PE-GND	+2	P
		-2	P
	LPE-GND	+2	P
		-2	P
	NPE-GND	+2	P
		-2	P
	LNPE-GND	+2	P
		-2	P

Table 19 EFT measurements at AC power port – Test Results

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site: SR2  
EUT Name: OxyGEN2 #HOPE  
Serial Number: Sample 1  
Test Description: EFT at AC power port – According to EN61000-4-4  
Environmental Conditions: 19.9°C / 46.7% HR  
Operator Name: EP  
Operating mode: Mode 1  
Comment: Application method: CDN for direct injection at AC power port  
Test Report ID: BE2020063  
Date: 02/04/2020

## 4.2.6 Surges

### TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-5

#### 4.2.6.1 AC power port

##### Test condition

Test level:	According to EN 60601-1-2
Polarity:	Positive/ Negative
Number of pulses:	5 at each polarity
Phase shifting:	0°, 90°, 180° and 270°
Performance criteria:	Acceptance criteria is described in sub clause 2.8
Repetition rate:	1 minute
EUT position:	Top table
EUT operating mode:	The EUT operating as described in sub clause 2.5
EUT monitoring:	The EUT monitoring as described in sub clause 2.5

##### Test results

Type	Lines	Test level (kV)	Phase (°)	Result
Line to Line (Differential)	L-N	+0.5	0°, 90°, 180°, 270°	P
		-0.5		P
		+1		P
		-1		P
Line to Earth (Common)	L-PE	+0.5	0°, 90°, 180°, 270°	P
	L-PE	-0.5		P
	L-PE	+1		P
	L-PE	-1		P
	L-PE	+2		P
	L-PE	-2		P
	N-PE	+0.5		P
	N-PE	-0.5		P
	N-PE	+1		P
	N-PE	-1		P
	N-PE	+2		P
	N-PE	-2		P

**Table 20 Surges measurements at AC power port – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site:	SR2
EUT Name:	OxyGEN2 #HOPE
Serial Number:	Sample 1
Test Description:	Surges at AC power port – According to EN61000-4-5
Environmental Conditions:	20°C / 46.7% HR
Operator Name:	EP
Operating mode:	Mode 1
Test Report ID:	BE2020063
Date:	02/04/2020



## 4.2.7 Voltage Dips / Short Interruptions

### TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-11

#### 4.2.7.1 Voltage Dips

##### Test condition

Test Voltage:	240Vac
Test Frequency:	50Hz for 240Vac
ΔVoltage / Duration:	100% reduction / 0.5 periods 50Hz 100% reduction / 1 period 50Hz 30% reduction / 25 periods 50Hz
Phase angle of insertion:	0° / 180° except for 100% reduction / 0.5p (0°→315° Δ45°)
Number of events:	3 at each level
Recovery time between pulses:	10s
Performance criteria:	Acceptance criteria is described in sub clause 2.8
EUT position:	Top table
EUT operating mode:	The EUT operating as described in sub clause 2.5
EUT monitoring:	The EUT monitoring as described in sub clause 2.5

##### Test results

Type	Test level (% reduction)	Phase angle of insertion (°)	Duration (periods)	Result
Voltage dips at AC power port	100%	0° → 315° with Δ45°	0.5	P
	100%	0° / 180°	1	P
	30%	0° / 180°	25	P

**Table 21 Voltage Dips measurements at AC power port – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site:	Generic standard
EUT Name:	OxyGEN2 #HOPE
Serial Number:	Sample 2
Test Description:	Voltage Dips at AC power port – According to EN61000-4-11
Environmental Conditions:	19.5°C / 48.4% HR
Operator Name:	EP
Operating mode:	Mode 1
Test Report ID:	BE2020063
Date:	02/04/2020

#### 4.2.7.2 Short Interruptions

##### Test condition

Test Voltage: **240Vac**  
Test Frequency: **50Hz for 240Vac**  
 $\Delta$ Voltage / Duration: **100% reduction / 250 periods\_50Hz**  
Phase angle of insertion: **0° / 180°**  
Number of events: **3 at each level**  
Recovery time between pulses: **10s**  
Performance criteria: **Acceptance criteria is described in sub clause 2.8**  
EUT position: **Top table**  
EUT operating mode: **The EUT operating as described in sub clause 2.5**  
EUT monitoring: **The EUT monitoring as described in sub clause 2.5**

##### Test results

Type	Test level (% reduction)	Phase angle of insertion (°)	Duration (periods)	Result
Short Interruptions at AC power port	100% red.	0° / 180°	250	P

**Table 22 Short Interruptions measurements at AC power port – Test Results**

The EUT lost power and function during the test. Once the EUT recovers power, EUT recovers its normal operation mode. The EUT passed the test under the acceptance described in sub clause 2.8.

Test Site: Generic standard  
EUT Name: OxyGEN2 #HOPE  
Serial Number: Sample 2  
Test Description: Short Interruptions at AC power port – According to EN61000-4-11  
Environmental Conditions: 19.5°C / 48.4% HR  
Operator Name: EP  
Operating mode: Mode 1  
Test Report ID: BE2020063  
Date: 02/04/2020

## 4.2.8 Electrostatic Discharges (ESD)

### TEST SET-UP UNDER THE REQUIREMENTS OF THE EN61000-4-2

#### Test condition

Test level:	<b>Contact discharge: <math>\pm 8\text{KV}</math> Air discharge: <math>\pm 2\text{KV}</math>, <math>\pm 4\text{KV}</math>, <math>\pm 8\text{KV}</math> and <math>\pm 15\text{KV}</math></b>
Discharge impedance:	<b><math>330\ \Omega</math> / <math>150\ \text{pF}</math></b>
Number of discharges:	<b>Air <math>\geq 10</math> per test point Contact <math>\geq 10</math> per test point</b>
Discharge mode:	<b>Single Discharge</b>
Discharge period:	<b>1 second minimum</b>
Performance criteria:	<b>Acceptance criteria is described in sub clause 2.8</b>
EUT position:	<b>Top table</b>
EUT operating mode:	<b>The EUT operating as described in sub clause 2.5</b>
EUT monitoring:	<b>The EUT monitoring as described in sub clause 2.5</b>

Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to the users during normal operation.

#### Test results

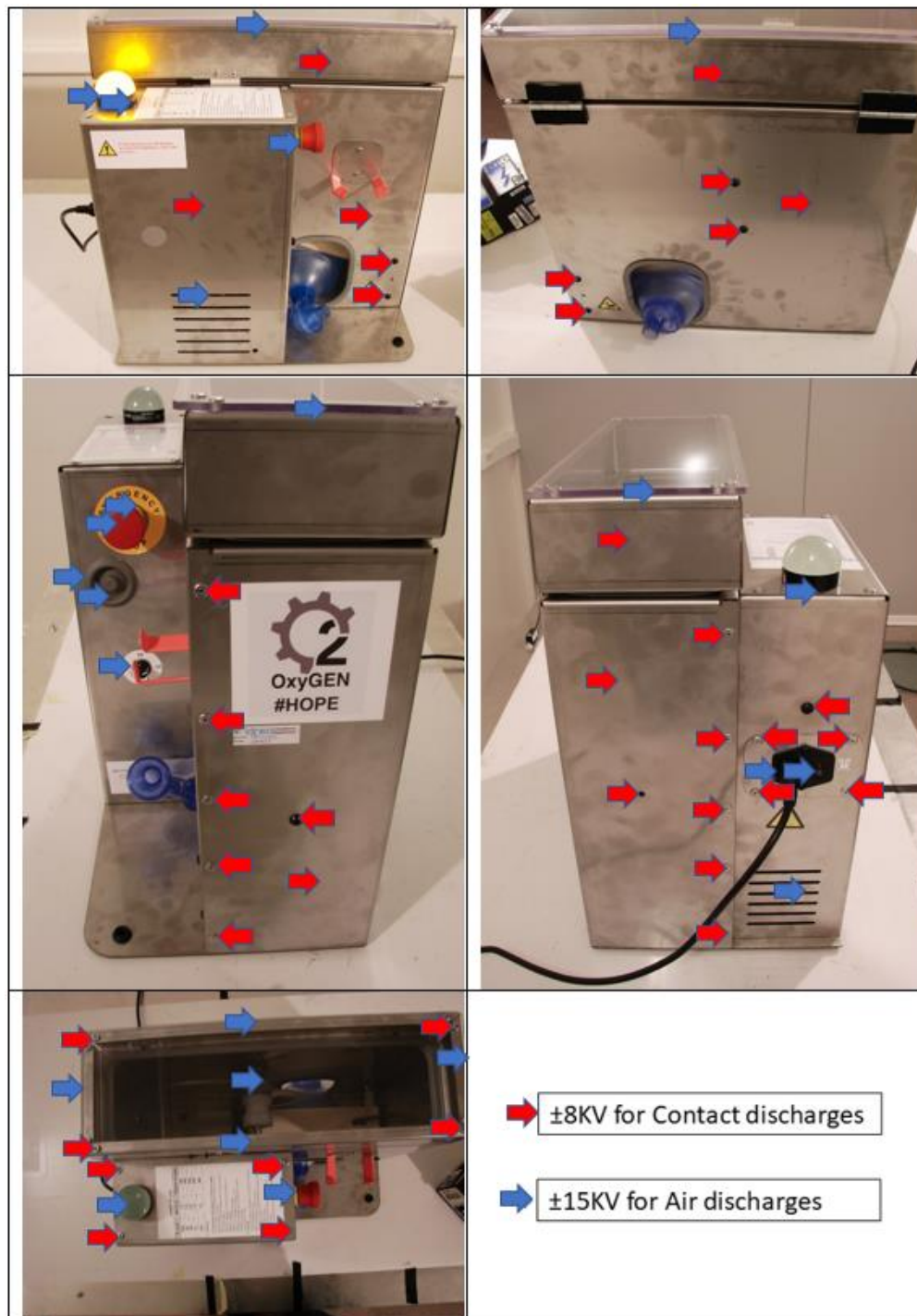
Part under test	Level (max)	Type	Application mode	Result	
				+ Polarity	- Polarity
Top cover selected points	15kV	Air	Direct	P	P
Emergency stop button	15kV	Air	Direct	P	P
AC Inlet	15kV	Air	Direct	P	P
Dimmer	15kV	Air	Direct	P	P
Main switch	15kV	Air	Direct	P	P
Metallic enclosure selected points	8kV	Contact	Direct	P	P
Enclosure screws	8kV	Contact	Direct	P	P
Enclosure	8kV	Contact	Front VCP	P	P
Enclosure	8kV	Contact	Rear VCP	P	P
Enclosure	8kV	Contact	Left VCP	P	P
Enclosure	8kV	Contact	Right VCP	P	P
Enclosure	8kV	Contact	Front HCP	P	P
Enclosure	8kV	Contact	Rear HCP	P	P
Enclosure	8kV	Contact	Left HCP	P	P
Enclosure	8kV	Contact	Right HCP	P	P

**Table 23 ESD measurements – Test Results**

There was no change compared with initial operation during and after the test. The EUT passed the test under the acceptance criteria described in sub clause 2.8.

Test Site:	CIR
EUT Name:	OxyGEN2 #HOPE
Serial Number:	Sample 1
Test Description:	Electrostatic Discharges – According to EN61000-4-2
Environmental Conditions:	19.6°C / 44.7% HR
Operator Name:	EP
Operating mode:	Mode 1
Test Report ID:	BE2020063
Date:	03/04/2020

## Test points



## 5 Measurement remarks

### Deviations from the applied test Specification

- no deviations -

### Remarks:

- no remarks -

### Other Participants:

- no other participants -

## 6 Photos of the equipment under test

### EUT: OxyGEN2 #HOPE



Figure 30 OxyGEN2 #HOPE Sample 1 and Sample 2 – Front view



Figure 31 OxyGEN2 #HOPE Sample 1 and Sample 2 – Rear view

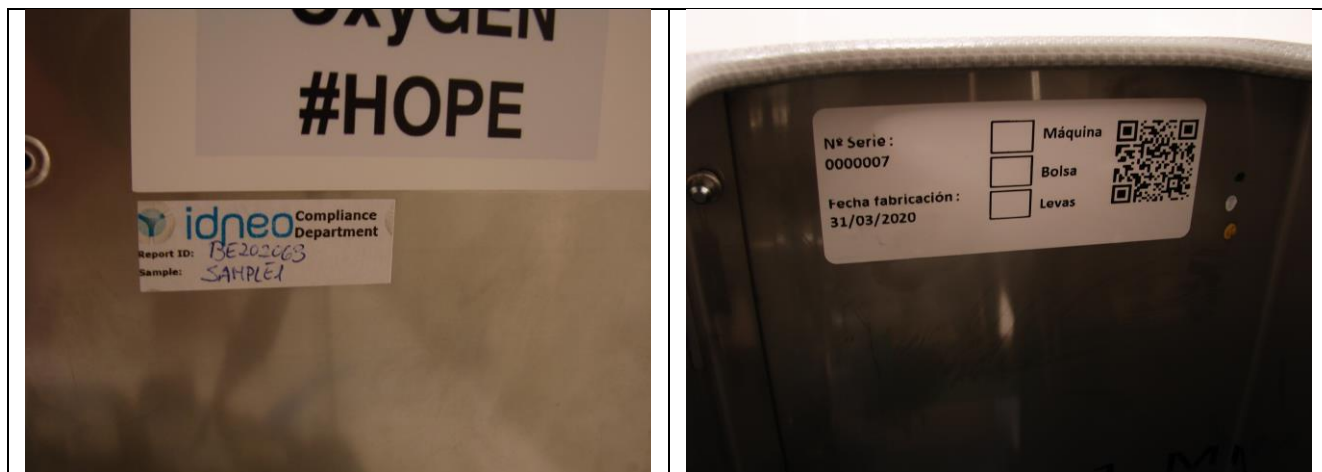


Figure 32 OxyGEN2 #HOPE – Marking Sample 1

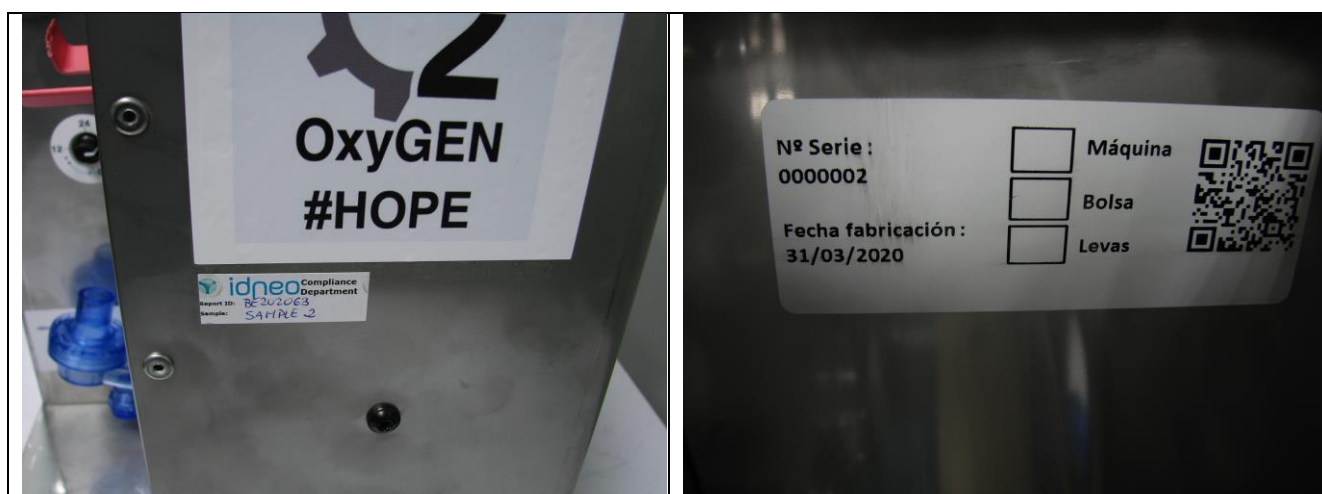


Figure 33 OxyGEN2 #HOPE – Marking Sample 2



## AUXILIARY / ACCESSORY EQUIPMENT



Figure 34 AC Power cord – General view



## 7 List of measurement equipments

### Measurement equipments which are used

Radiated Emissions					
SAR1					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
433	VULB 9163	Comb Broadband Antenna	Schwarzbeck	226	28/04/2017
435	DC-12.4GHz	6dB Attenuator	Huber Suhner	6806.17.A	20/12/2019
562	Sucoflex 100 & Enviroflex 393	RE Path	Huber Suhner	562	20/12/2019
693	413 7617	Thermohygrometer	RS	C02054	13/05/2019
715	SAR1	Semi-Anechoic Room	Albatross-projects	T162	09/01/2020
719	Type2	EMI Table	ETS-Lindgren	719	N/A

CR1					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
699	ESU26	EMI Test Receiver	Rohde&Schwarz	100203	25/06/2018
701	V-SCAN Software	EMI Software	Toyo Corporation	v4.0.10	N/A
708	CR1	Control Room	Albatross-projects	T162	N/A
1112	608-H1	Termohygrometer	Testo	45227542	09/03/2020

Conducted Emissions					
SR2					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
421	ESC13	EMI Test Receiver	Rohde&Schwarz	100129	28/11/2018
425	ENV216	LISN Two-Line V-Network	Rohde&Schwarz	100101	21/11/2019
550	W10.03	CE Path: Cable Conducted EMI	Rohde&Schwarz	550	27/01/2020
702	EMC32 Software	EMS Software	Rohde&Schwarz	v8.54.0	N/A
691	608-H1	Thermohygrometer	Testo	45053716	14/05/2019
707	SR2	Shield Room	Albatross-projects	T161	N/A

Harmonics & Flicker					
Generic Standards					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
549	ARS16/1	Analyzer Reference System	Spitzenberger&Spies	A272207/00201	28/11/2019
690	413 7617	Thermohygrometer	RS	C02057	13/05/2019
704	SPS-PHE EMC SOFTWARE	EMI Software	Spitzenberger&Spies	v.4.1.3	N/A
806	NT5000	Power Supply	Spitzenberger&Spies	A292002/00202	N/A
807	Sycore	Oscillator	Spitzenberger&Spies	A292012/00202	N/A
809	PAS5000	4 Quadrant Amplifier	Spitzenberger&Spies	A292001/00202	N/A

Radiated Immunity & Proximity fields from RF wireless					
FAR2					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
527	HL046	EMS Antenna	Rodhe&Schwarz	100028	N/A
559	W41.15	Cable Antenna	Huber Suhner	559	30/10/2018
678	STLP9149	Logperiodic Antenna	Schwarzbeck	9149-023	N/A
692	413 7617	Thermohygrometer	RS	C02056	13/05/2019
713	FAR2	Fully Anechoic Room	Albatross-projects	T161	30/10/2018
717	PT91	Video Camara	PONTIS	6210524022	N/A
1019	AK 9515 G	Cable Antenna	Schwarzbeck	187	16/10/2018

CR2					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
446	URV5-Z4	100V Insertion Unit	Rodhe&Schwarz	100107	24/10/2018
520	NRVS	Power Meter	Rohde&Schwarz	101197	22/11/2018
538	SML03	Signal Generator	Rodhe&Schwarz	102320	22/11/2018
687	608-H1	Thermohygrometer	Testo	45053727	15/05/2019
703	EMC32 Software	EMS and EMI Software	Rohde & Schwarz	v.10.30.00	N/A
711	CR2	Control Room	Albatross-projects	T162	N/A
716	CVM3551D	Monitor	BARCO	5633906	N/A

AR					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
529	BLWA 0810-160/100D	RF Amplifier	Bonn	055968B	02/07/2018
530	TS-RSP	RF System Pannel	Rohde&Schwarz	100201	22/11/2018
578	URV5-Z2	10V Insertion Unit	Rohde&Schwarz	100254	22/11/2018
680	SMF100A	Signal Generator	Rodhe&Schwarz	100565	25/11/2019
685	BLMA 1040-60/110D	RF Amplifier	Bonn	87100	02/07/2018
714	AR	Amplifier Room	Albatross-projects	T161	N/A
1024	BBA150	Power Amplifier	Rohde&Schwarz	102822	17/09/2019
1025	NRP6AN	Average Power Sensor	Rohde&Schwarz	101068	22/11/2019
1026	NRP6AN	Average Power Sensor	Rohde&Schwarz	101069	22/11/2019

Conducted Immunity					
CR2					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
446	URV5-Z4	100V Insertion Unit	Rodhe&Schwarz	100107	24/10/2018
520	NRVS	Power Meter	Rohde&Schwarz	101197	22/11/2018
538	SML03	Signal Generator	Rodhe&Schwarz	102320	22/11/2018
687	608-H1	Thermohygrometer	Testo	45053727	15/05/2019
703	EMC32 Software	EMS and EMI Software	Rohde & Schwarz	v.10.30.00	N/A
711	CR2	Control Room	Albatross-projects	T162	N/A
716	CVM3551D	Monitor	BARCO	5633906	N/A

CIR					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
513	CDN L-801 M2/M3	Coupling/Decoupling Network	Lüthi	2139	21/11/2019
515	150-SA-MFN-06	6dB Attenuator/150W	Bird Electronics	527	29/10/2018
517	EM-101	Injection Clamp	Luthi	35735	29/10/2018
552	W21.07	Cable 6dB att. CDN-Clamp	Rohde&Schwarz	1506.5328	29/10/2018
688	608-H1	Thermohygrometer	Testo	410 0116	14/05/2019
712	CIR	Conducted Immunity Room	Albatross-projects	T162	N/A

AR					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
528	BSA0125-25	RF Amplifier	Bonn	055968A	02/07/2018
530	TS-RSP	RF System Pannel	Rohde&Schwarz	100201	22/11/2018
578	URV5-Z2	10V Insertion Unit	Rohde&Schwarz	100254	22/11/2018
714	AR	Amplifier Room	Albatross-projects	T161	N/A

EFT/BURST					
SR2					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
534	PEFT4010	Burst Simulator	Haefely	146289	11/12/2018
565	Absorbing clamp Test AG	Absorbing Clamp IP 4A	HAEFELY	153115	15/05/2019
686	608-H1	Thermohygrometer	Testo	45053716	14/05/2019
707	SR2	Shield Room	Albatross-projects	T161	N/A

SURGES					
SR2					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
533	PSURGE4010	Surge Simulator	Haefely	152811	22/11/2018
686	608-H1	Thermohygrometer	Testo	45053716	14/05/2019
707	SR2	Shield Room	Albatross-projects	T161	N/A

Voltage DIPS & Interruptions					
Generic Standards					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
549	ARS16/1	Analyzer Reference System	Spitzenberger&Spies	A272207/00201	28/11/2019
690	413 7617	Thermohygrometer	RS	C02057	13/05/2019
704	SPS-PHE EMC SOFTWARE	EMI Software	Spitzenberger&Spies	v4.1.3	N/A
806	NT5000	Power Supply	Spitzenberger&Spies	A292002/00202	N/A
807	Sycore	Oscillator	Spitzenberger&Spies	A292012/00202	N/A
809	PAS5000	4 Quadrant Amplifier	Spitzenberger&Spies	A292001/00202	N/A

ESD					
CIR					
ID Equip.	Model	Type	Manufacturer	Serial Number	Cal. Date
688	608-H1	Thermohygrometer	Testo	410 0116	14/05/2019
712	CIR	Conducted Immunity Room	Albatross-projects	T162	N/A
971	PESD 1610	ESD Simulator	HAEFELY	H505591	22/11/2019