

IEC60601-1 Product Certification

Reports Summary:

- 1. IEC60601-1
- 2. ISO80601-2-12
- 3. IEC60601-1-8
- 4. IEC60601-1-2









contact@volvinnovations.com www.volvinnovations.com

ISO9001:2015, ISO13485:2016





TC-5662

IEC 60601-1 Medical electrical equipment

Part 1: General requirements for basic safety and essential performance

Report Reference No. ULR-TC566221000000018F

Date of issue...... 2021-November-30

Total number of pages 126

Testing Laboratory Intertek India Pvt Ltd

Address 17/F, 2nd Stage, Industrial suburb

Yeshwanthpur Industrial Area, Bangalore – 560 022, India

Applicant's name SFO Technologies Pvt Ltd

Address Plot#36/37,CSEZ,Cochin – 682037 India

Discipline / Product Group...... Electronics / Medical Electrical Equipment

Test specification:

Standard IEC 60601-1:2005, COR1:2006, COR2:2007, AMD1:2012

(or IEC 60601-1:2012 reprint)

Test procedure Test report

Non-standard test method...... N/A

Test Report Form No...... IEC60601_1P_modified

Test Report Form Originator UL(US)

Master TRF...... 2019-10-11

An independent organization testing for safety, performance, and certification.

General disclaimer:

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General Remarks:

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"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Test item description:	Pediatric & Adult Ventilator		
Trade-Mark:	aperta		
Original Product/Equipment Manufacturer:	Envolv Innovations Pvt Ltd		
Branding Manufacturer(s):	Same	as manufacturer	
Model/Type reference:	Aperta	P1	
Ratings:	100 – 2	240~, 50 / 60 Hz, 1.5 A	
Testing procedure and testing location:			
☐ Testing Laboratory:		Intertek India Private Limited	
Testing location/ address	:	17/F, 2nd Stage, Industrial suburb Yeshwanthpur Industrial Area, Bangalore – 560 022, India	
Tested by (name, function, signature)	:	Neha Karnwal	<u> </u>
		Project Engineer	Mula
Approved by (name, function, signature)	:	Gnanaprakasam C,	Some of
		Senior Manager- Business & Operations	Bul. 1



List of Attachments (including a total number of pages in each attachment):

1. Attachment-1: Photo Document - Pages - 123 to 126

Summary of testing

Tests performed (name of test and test clause):

- 1. Power input, clause 4.11
- 2. Humidity preconditioning treatment, clause 5.7
- 3. Determination of ACCESSIBLE PARTS, CLAUSE 5.9.2
- 4. Legibility of markings, clause 7.1.2
- 5. Durability of markings, clause 7.1.3
- Residual voltage and stored charge in attachment plug, clause 8.4.3
- 7. Protective earthing—impedance and current-carrying capability, clause 8.6.4
- 8. Leakage currents and patient auxiliary current clause 8.7
- 9. Dielectric strength, clause 8.8.3
- 10. Mechanical strength and resistance to heat, clause 8.8.4.1
- 11. Measurement of creepage distances and air clearances, clause 8.9.4
- 12. Cord anchorage clause 8.11.3.5
- 13. Instability in transport position clause 9.4.2.1
- 14. Instability excluding transport position clause 9.4.2.2
- 15. Instability from horizontal and vertical forces clause 9.4.2.3
- 16. Castors and wheels clause 9.4.2.4
- 17. Movement over a threshold clause 9.4.2.4.3
- 18. Instability from unwanted lateral movement clause 9.4.3
- 19. Excessive temperatures in ME EQUIPMENT clause 11.1
- 21.mechanical strength clause 15.3

Summary of compliance with National Differences

List of countries addressed: N/A

☐ The product fulfils the requirements

IEC 60601-1:2005, COR1:2006, COR2:2007, AMD1:2012

Testing location:

Intertek India Private Limited

17/F, Industrial Suburb, II stage, Industrial Area, Yeshwanthpur, Bangalore – 560022, India



17/F, II Stage, Industrial Suburb, Yeshwanthpura Industrial Area, Bangalore - 560022, INDIA Telephone: +91-80-4021 3911 Facsimile: +91-80-4021 3915 www.intertek.com

TEST REPORT ISO 80601–2–12

Medical electrical equipment

Part 2-12: Particular requirements for basic safety and essential performance of critical care ventilators

Report Number. CE-JOB-BAN-20-000902-002

Date of issue...... 2021-November-29

Total number of pages 55

Applicant's name SFO Technologies Pvt Ltd

Address Plot#36/37,CSEZ,Cochin – 682037 India

Discipline / Product Group Electronics / Medical Electrical Equipment

Test specification:

Standard ISO 80601-2-12: 2020 (Edition 2.0)

Test procedure Test Report

Non-standard test method...... N/A

Test Report Form No...... ISO80601 2 12B Modified

Test Report Form(s) Originator: Intertek Semko AB

Master TRF...... Dated 2020-05

Test item description Paediatric & Adult Ventilator

Trademarkaperta

Manufacturer Envolv Innovations Pvt Ltd

Model/Type reference Aperta P1

Ratings 100-240 ~, 50/60 Hz, 1.5 A

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Report No. CE-JOB-BAN-20-000902-002

General Remarks:

The test results presented in this report relate only to the object tested.

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"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

Test item description: Paediatric & Adult Ventilator		
Trademark:	aperta •	
Manufacturer	: Envolv Innovations Pvt Ltd	
Model/Type reference	Aperta P1	
Ratings	100 − 240 [~] , 50/60 Hz, 1.5A	
	Gas Supply: 3 – 6 bar (O2 and Air)	

☐ Testing Laboratory:		
Testing location/ address	Intertek India private limite 17/F, 2 nd Stage, Industrial Yeshwanthpur Industrial A	
Tested by (name, function, signature):	Neha Karnwal Project Engineer	ment of
Approved by (name, function, signature):	Gnanaprakasam C, Senior Manager- Business & Operations	John J.

List of Attachments (including a total number of pages in each attachment): N/A

Summary of testing:		
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Tests performed (name of test and test clause):

1. Overpressure requirement 201.4.11.101.1

- 2. Compatibility requirement 201.4.11.101.2
- 3. Additional requirements for audible acoustic energy 201.9.6.2.1.101.

Page 3 of 55

- 4. Additional requirements for interruption of the power supply/supply mains to ME equipment 201.11.8.101
- 5. Volume-control inflation-type 201.12.1.101
- 6. Pressure-control inflation-type 201.12.1.102

Report No. CE-JOB-BAN-20-000902-002

Testing location:

Intertek India private limited 17/F, 2nd Stage, Industrial suburb Yeshwanthpur Industrial Area, Bangalore – 560 022, India

Summary of compliance with National Differences

List of countries addressed: N/A

☐ The product fulfils the requirements of ISO 80601-2-12:2020

Copy of marking plate

See IEC 60601-1 Test Report



Page 4 of 55

Report No. CE-JOB-BAN-20-000902-002

Test item particulars			
Classification of installation and use	Refer to IEC 60601-1 test report		
Ventilatory modes	PCV, PSV, P SIMV, V SIMV, VCV, BiPAP		
Tested VBS	Category – BCC		
	Tube material- smooth bore silicon, Inspiratory limb length – 1.2-meter, Expiratory limb length – 1.2 meters, Humidifier limb length – 30 cm, Conical connectors – 22M/F		
Gas supply options	O ₂ , Air		
Pneumatic power (if applicable)	N/A		
Integrated monitoring	O ₂ , Tidal Volume, PEEP, Pressure, RR		
Possible test case verdicts:			
- test case does not apply to the test object:	N/A		
- test object does meet the requirement:	P (Pass)		
- test object does not meet the requirement:	F (Fail)		
Testing:			
Date of receipt of test item:	01 April 2021		
Date (s) of performance of tests:	21 June 2021 to 30 July 2021		
Condition of Sample on receipt	Good		
General remarks:			
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.			
Throughout this report a ☐ comma / ☒ point is used	as the decimal separator.		
Manufacturer's Declaration per sub-clause 4.2.5 of IEC	CEE 02:		
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	Not applicable ■ Not applicable Not applicable		
When differences exist: they shall be identified in the G	Seneral product information section		



Test Report issued under the responsibility of:

17/F, Il Stage, Industrial Suburb, Yeshwanthpura Industrial Area, Bangalore - 560022, INDIA Telephone: +91-80-4021 3911 Facsimile: +91-80-4021 3915 www.intertek.com

TEST REPORT IEC 60601-1-8

Medical electrical equipment

General requirements for basic safety and essential performance – Collateral standard: General requirements, tests, and guidance for alarm systems in medical electrical equipment and medical electrical systems

Report Number...... CE-JOB-BAN-20-000902-002

Date of issue 2021-November-29

Total number of pages: 21

Name of Testing Laboratory preparing Intertek India Pvt Ltd

the Report...... 17/F, Industrial Suburb, II stage, Industrial Area,

Yeshwanthpur, Bangalore - 560022, India

Applicant's name SFO Technologies Pvt Ltd

Address Plot#36/37, CSEZ, Cochin – 682037 India

Discipline / Product Group...... Electronics / Medical Electrical Equipment

Test specification:

Standard IEC 60601-1- 8:2006, AMD1:2012 for use in conjunction with IEC

60601-1:2005, AMD1:2012

Test procedure Test report

Non-standard test method.....: N/A

Test Report Form No. IEC60601 1 8F modified

Test Report Form(s) Originator: UL (US)

Master TRF Dated 2020-07-10

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Test item description:	Paediatric & Adult Ventilator		
Trade Mark(s):	aperta		
Manufacturer:	Envolv	Innovations Pvt Ltd	
Model/Type reference:	Aperta	P1	
Ratings:	100 – 2	240∼, 50/60 Hz, 1.5A	
	Gas S	upply: 3 – 6 bar (O2 and Air)	
Responsible Testing Laboratory (as app	licable)	, testing procedure and testing location	(s):
☐ Testing Laboratory:		Intertek India Private Limited	
Testing location/ address	:	17/F, 2nd Stage, Industrial suburb Yeshwanthpur Industrial Area, Bangalore – 560 022, India	
Tested by (name, function, signature)	:	Neha Karnwal Project Engineer	huse I
Approved by (name, function, signature)	:	Gnanaprakasam C, Senior Manager- Business & Operations	John J.

List of Attachments (including a total number of pages in each attachment):		
Summary of testing:		
Tests performed (name of test and test clause):	Testing location: Intertek India Private Limited	
Characteristics of auditory alarm signals clause 6.3.3.1 Characteristic of auditory alarm signal clause 6.3.3.2 Volume of auditory alarm signals and information signals clause 6.3.3.2 Alarm system delay clause 6.4.1	17/F, Industrial Suburb, II stage, Industrial Area, Yeshwanthpur, Bangalore – 560022, India	
Delays to or from a DISTRIBUTED ALARM SYSTEM clause 6.4.2 Alarm Pre-set clause 6.5		

Summary of compliance with National Differences (List of countries addressed):

IEC 60601-1- 8:2006, AMD1:2012 for use in conjunction with IEC 60601-1:2005, AMD1:2012

1 ugo 0 01 2	1 10poit 140. OE 00B B/114 20 000002 002
Statement concerning the uncertainty of the measure	ement systems used for the tests
(May be required by the product standard or client)	
☐ Internal procedure used for type testing through w been established:	hich traceability of the measuring uncertainty has
Procedure number, issue date and title: LMS-APAC-l	N-QC-12, issued on 01-April-2014 revised on
02-Feb-2021: Estimation of Measurement Uncertainty	
Calculations leading to the reported values are on file the testing.	with the NCB and testing laboratory that conducted
☐ Statement not required by the standard used for ty	ype testing
(Note: When IEC or ISO standard requires a statement concerning should be reported above. The informative text in parenthesis should be reported above.	
Copy of marking plate:	
Refer IEC 60601-1 test report.	
Test item particulars:	Refer IEC 60601-1 test report
Classification of installation and use	Mobile
Supply Connection	Internally powered /Appliance coupler
Equipment Type	ME Equipment
Accessory and detachable parts included	Breathing circuit accessories (Inhalation Tube, Exhalation Tube, Air Filter, Moisture Trap, Patient Mask, Y-arm) Air and Oxygen hoses, carrying cart with accessory holders, Air Compressor Kit, Test Lung, Disinfecting filter cartridge, Arm holder, AC Power cord.
Possible test case verdicts:	3 ,
- test case does not apply to the test object:	N/A
- test object does meet the requirement:	P (Pass)
- test object does not meet the requirement:	F (Fail)
Testing:	
Date of receipt of test item:	20 July 2021
Date (s) of performance of tests:	20 July 2021 to 30 July 2021
General remarks:	
"(See Enclosure #)" refers to additional information ap	
This Test Report Form is intended for the evaluation of medical electrical systems in accordance with IEC 606 This Test Report Form can be used to complement the The collateral standard does not specify: whether any pelectrical system is required to be provided with ALARM an ALARM CONDITION; the allocation of priorities to a part ALARM SIGNALS. Throughout this report a comma / \(\subseteq \) point is used	01-1-8. EIEC 60601-1 Test Report. Disparticular medical electrical equipment or medical SYSTEMS; the particular circumstances which initiate ticular ALARM CONDITION; or the means of generating
Manufacturer's Declaration per sub-clause 4.2.5 of IEC	·



Tel +91-80 4021 3911 Fax intertek.com



Date: 01 December 2021

To

SFO TECHNOLOGIES PVT LTD R&D Division - Cochin #36/37, Cochin Special Economic Zone, Kakkanad P.O. , Cochin - 682037 Kerala, INDIA

Subject: EMC test reports in conformity with IEC 60601-1-2:2014 Ed.4.0

Dear Sir,

Please find EMC test reports of product ICU Ventilator enclosed for your reference. This reports is issued under Project No: CE-JOB-BAN-20-000902 executed by Intertek 'India Private Limited, Bangalore laboratory.

1. Report No: TASL/17025/EMC/TRP/COM/2122/167, Total pages: 21

2. Report No: JOU 2132MED156, Total pages: 73

Should you require any further details, please do let us know.

Thanking you and assuring you of our best services.

Yours Faithfully,

For Intertek India Private Limited.

Gnanaprakasam. C

Senior Manager - Business & Operations (South)



CIN No.: U74220DL1997PTC202243







TEST REPORT		
ULR NUMBER	ULR-TC599221000000055F	
ELECTRONICS TESTING		
EM	C TEST FACILITY	
TEST REPORT NUMBER	JOU 2132MED156	
TEST REPORT ISSUE DATE	30 November 2021	
TEST REPORT VERSION	1.0	
MANUFACTURER	Envolv Innovations Pvt. Ltd,	
	#V1/809, Kakkanad, Cochin. INDIA - 682021	
EUT NAME	ICU Ventilator	
EUT MODEL	APERTA P1	
CONDITION OF EUT WHEN	Cood	
RECEIVED	Good	
ISSUED TO: NAME AND		
CONTACT INFORMATION	7/F, II Stage, Industrial Suburb, Yeshwanthpur	
OF CUSTOMER	Indl. Area, Bangalore. Karnataka. India - 560022	
ISSUED BY: NAME AND	Tarang Labs, Wipro Limited	
ADDRESS OF TEST	Sy. No.69P,71/4P,78/8AP,134P,76P,77P,80P,70P,	
LABORATORY	79/1P, Unit 1, Sarjapur Road, Doddakannelli	
	Village, Varthur Hobli, Bengaluru (Bangalore)	
	Rural, Karnataka, 560035	
	Tel: +91-80-30292929 Fax: +91-80-30298200	
	Email: tarang-planet@wipro.com	
	Web: <u>www.wipro.com</u>	







1 TEST REPORT SUMMARY

Applicant	Intertek India Pvt. Ltd,
Manufacturer	Envolv Innovations Pvt. Ltd,
EUT Name	ICU Ventilator
EUT Model	APERTA P1
EUT Serial Number	AP-21-0026
Date of receipt of test item	4 August 2021
EUT Category / Type of Equipment	Medical/Floor standing
EUT Operating Voltage range	100 to 240V AC
EUT Operating Frequency range	50/60 Hz
EUT Power Rating	345 Watts
EUT Operating Current(max)	1.5Ampere (Maximum)
Date of Test	4 August 2021 to 14 August 2021
Venue of Test	Tarang Labs-EMC

Applicable Standard	Applicable Test	Frequency range/ Class/ Test level	Applicable port	Results- Criterion
IEC 60601-1-2 (Edition 4.0):2014/ CISPR 11 (Edition 6.1) 2015+AMD1 CSV:2016*	Radiated Emission	Frequency Range: 30MHz to 1GHz	Enclosure	PASS
IEC 60601-1-2 (Edition 4.0):2014/ CISPR 11 (Edition 6.1) 2015+AMD1 CSV:2016*	Conducted Emission on Power line	Frequency Range: 150kHz to 30MHz	Power port	PASS
IEC 60601-1-2 (Edition 4.0):2014/ IEC 61000-3-2 (Edition 5.0):2018*	Harmonic Emission	Class A	Power port	PASS
IEC 60601-1-2 (Edition 4.0):2014/ IEC 61000-3-3 (Edition 3.1): 2013+AMD1:2017*	Flicker Emission	As per clause 5 of IEC 61000-3-3 (Edition 3.1) 2013+AMD1:2017	Power port	PASS
IEC 60601-1-2 (Edition 4.0):2014/ IEC 61000-4-2 (Edition 2.0):2008	Electrostatic discharge (Before Modification)	Direct Method: CD:2: ± 4kV AD:3: ± 8kV Indirect Method: CD:2: ± 4kV	Enclosure	Refer Section 5.3.5.10
IEC 60601-1-2 (Edition 4.0):2014/ IEC 61000-4-2 (Edition 2.0):2008	Electrostatic discharge (After Modification)	Direct Method: CD:4: ±8kV AD:4: ±15kV Indirect Method: CD:4: ±8kV	Enclosure	Refer Section Annexure II
IEC 60601-1-2 (Edition 4.0):2014/ IEC 61000-4-4 (Edition 3.0):2012	Electric Fast Transient (Power line)	Power Port:2: ±1kV	Power port	Refer Section 5.3.6.10

Report Number: JOU 2132MED156	EMC TEST REPORT	Dags 6 of 72
ULR NO: TC599221000000055F	ENIC LESI KEFOKI	Page 6 of 73



EMC Test Report for **ICU Ventilator**

ULR - TC522821000000238F

Test Report No.: TASL/17025/EMC/TRP/COM/2122/167





TC-5228

This report shall not be reproduced without the written approval of EMC Centre Tata Advanced Systems. The test results stated in this report are valid only for the specific item tested under specific conditions and applied to the sample as received limited to the parameters monitored during the conduction of the test.

For any Complaints / Suggestions please email to:

qmlabs@tataadvancedsystems.com

Submitted by

Tata Advanced Systems Limited 42 - 43 Electronics City Hosur Road, Bengaluru - 560 100. Tel: 080 - 6785 9900 Fax: 080 - 6785 9903

1. General Information

Name of the Applicant	M/s.Intertek India Pvt Ltd.				
Contact Name	Mr.Rachan.S				
Contact No	+918749008850				
Email id	Rachan.s@intertek.com				
EUT Manufacturer Name and Address	M/s.Envolv Innovations Pvt. Ltd., VI/809, Kakkanad, Cochin - 682021, India				
EUT Name	ICU Ventilator				
Model Number	Aperta P1				
Serial Number	AP-21-0026				
Supply Voltage & power	AC Mode: 100 - 240V AC,1.5A; Battery Mode				
Test Location	M/s. Tata Advanced Systems Limited,42 - 43 Electronics City Hosur Road, Bengaluru - 560 100.				
Test Standard	IEC 60601-1-2(edition.4.0) IEC 61000-4-3, IEC 61000-4-8, IEC 61000-4-11				
Status of EUT on receipt	EUT was received in Good Condition				
EUT Received on	23/08/2021				
Dates of Test	26/08/2021 to 28/08/2021				
Test Report Issued on	30/11/2021				
Test Witnessed by	Mr.Rachan S (M/s.Intertek India Pvt Ltd.)				
Test Result	Pass				
Statement of conformity	Declaration of conformity of the results is based as per the standard limits/ based on decision rule considering MU				
Test Report Prepared By	Mr. Akhilesh Sidapara				
Test Engineer and Reviewer Details					
Tested by	Reviewed by	Authorized by			
Digitally signed by: aki2021 DN: CN = aki2021 C = IN O	Optally agreed by: R Marularary ON CN = R Munusamy OF CN = R Affair OPER SED OU = EMC	Dollally signed by J Gogination Oby ON = J Gogination Oby			
(Akhilesh Sidapara)	(R. Munusamy)	(J. Gopinathan)			
Test Engineer	Lab in Charge	Technical Manager			

Note: This report is digitally signed by the approving authority through a secured workflow

Issue : A Issue Date : 01/03/2021 Rev No : 03 Rev Date : 24/11/2021

2. Test Summary

I. ELECTRONICS TESTING

1. EMC TESTING

SI. No	Name of the Test	Test Standard	Test Result
1.	Radiated Immunity	IEC 61000-4-3_Edition 4.0_2020	Pass Refer <u>Annex 1</u>
2.	Power Frequency Magnetic field	IEC 61000-4-8_Edition 2.0_2009	Pass Refer <u>Annex 2</u>
3.	Voltage Dips & short interruptions	IEC 61000-4-11_Edition 2.1_2017	Pass Refer <u>Annex 3</u>

2.1 OPINIONS& INTERPRETATIONS

Not Applicable

2.2 DEVIATION FROM STANDARD

No deviation from standard.

Issue : A Issue Date : 01/03/2021 Rev No : 03 Rev Date : 24/11/2021