



SAFETY TEST REPORT

SANS / IEC 60950-1

Safety of information technology equipment

Part 1: General requirements

Report Number : TRS01706/22

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Name of testing laboratory : iSERT (Pty) Ltd.

Address : 129 Khai-Apple Street, Montana, Pretoria, South Africa,
0182

Applicant's name : Kovco (Pty) Ltd.

Address : 6 Milner Road, Metro Industria, Parden Eiland, 7405

Test specification

Standard(s) : IEC 60950-1: 2005 + A1:2009 + A2:2013
SANS 60950-1:2014

Test Result : The Data-V8 Data logger complies with the requirements of SANS / IEC 60950-1 in the configuration tested.

General disclaimer:

iSERT (Pty) Ltd. test reports apply only to the specific sample(s) tested under stated conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to ensure that additional production units of this model are manufactured with identical electrical and mechanical components. iSERT (Pty) Ltd. Shall have no liability for any deductions, inference or generalizations drawn by the client or others from our Issued test reports. This report shall not be used to claim, constitute or imply a product endorsement from iSERT (Pty) Ltd.



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DOCUMENT CONTROL

Revision	Date	Author	Pages affected	Change proposal
1.0	03/03/2021	ES van Niekerk	All	N/A

TEST LABORATORY INFORMATION

Established in 2017, iSERT (Pty) Ltd. Provides EMC, RF, Safety and Performance testing services by our skilled Engineers to the public. Our services employ a wide variety of advanced cutting-edge test equipment with one of the widest ranges of accredited standards in the country.

The site and apparatus are constructed in conformance with the requirements of CISPR 16-1-4, EN 50147-1 and other equivalent standards. The laboratory is compliant with the requirements of ISO/IEC 17025




It is our definite objective to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with the best EMC, RF & Safety services by knowledgeable and accommodating staff.

Our test site is located at 129 Khai-Apple Street, Montana, Pretoria, South Africa 0186.

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Tested by	ES van Niekerk (Junior Safety Engineer)	
Approved by	CJ Deysel (Technical Director)	 

Test item description :	Data Logger for Industrial Refrigeration
Trademark..... :	Kovcolabs
Manufacturer	Kovco (Pty) Ltd.
Model / Ref number(s)	Data-v8
Serial number..... :	860665059573419
Ratings	Input: 12Vdc
Country of origin	South Africa

Test conditions :	Maximum	Minimum	Limits
Ambient temperature	27.2°C	26.7°C	25°C ±10°C
Relative humidity	41.1%	39.7%	< 75%

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCs that own these marks.



Figure 1: Data-v8 marking label

Test item particulars:		
Equipment mobility:	<input type="checkbox"/> movable <input checked="" type="checkbox"/> stationary	<input type="checkbox"/> hand-held <input type="checkbox"/> for building-in <input type="checkbox"/> transportable <input type="checkbox"/> direct plug-in
Connection to mains:	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input checked="" type="checkbox"/> not directly connected to mains <input type="checkbox"/> type A <input type="checkbox"/> type B	
Operating condition.....:	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:	
Access location.....:	<input checked="" type="checkbox"/> operator accessible <input checked="" type="checkbox"/> restricted access location <input checked="" type="checkbox"/> service accessible	
Over voltage category:	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> DC mains supply	
Mains supply tolerance (%):	N/A	
Tested for IT power systems:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
IT testing, phase-phase voltage (V):	N/A	
Class of equipment.....:	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input checked="" type="checkbox"/> Class III <input type="checkbox"/> Not classified	
Considered current rating of protective device as		
Part of the building installation (A).....:	N/A	
Pollution degree (PD).....:	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3	
Max. Specified ambient temperature (°C):	45°C	
Mass of equipment (kg):	approx. 465g	
Possible test case verdicts:		
- test case does not apply to the test object : N (Not applicable)		
- test object does meet the requirement..... : P (Pass)		
- test object does not meet the requirement..... : F (Fail)		
Testing		
Date (s) of performance of tests.....:	24/02/2022 – 03/03/2022	
The results obtained in this test report are only valid for the item(s) tested. iSERT (Pty) Ltd. does not make any claims of compliance for samples or variants which were not tested.		

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1	GENERAL		P
1.5	Components		P
1.5.1	General		P
	Comply with IEC 60950-1 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Components that were found to affect safety aspects comply with the requirements of this standard or within the safety aspects of the relevant IEC component standards.	P
1.5.3	Thermal controls		N
1.5.4	Transformers		N
1.5.5	Interconnecting cables	Interconnecting cables connect to other SELV circuits	N
1.5.6	Capacitors bridging insulation	No such component	N
1.5.7	Resistors bridging insulation	No such component	N
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		N
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable	No resistors bridging insulation	N
1.5.8	Components in equipment for IT power systems	Not intend for IT power distribution systems.	N
1.5.9	Surge suppressors		N
1.5.9.1	General		N
1.5.9.2	Protection of VDRs		N
1.5.9.3	Bridging of functional insulation by a VDR		N
1.5.9.4	Bridging of basic insulation by a VDR		N
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6	Power interface		N
1.6.1	AC power distribution systems	Class III device	N
1.6.2	Input current		N
1.6.3	Voltage limit of hand-held equipment		N
1.6.4	Neutral conductor	Class III device	N
1.7	Marking and Instructions		P
1.7.1	Power rating and identification markings		-
1.7.1.1	Power rating marking		N
	Multiple mains supply connections.....:	Not connected to mains	N
	Rated voltage(s) or voltage range(s) (V)	Input: 12Vdc	N
	Symbol for nature of supply, for d.c. only.....:		N
	Rated frequency or rated frequency range (Hz) ..:	DC only	N
	Rated current (mA or A)		N
1.7.1.2	Identification markings		P
	Manufacturer's name or trademark or identification mark	Kovcolabs	P
	Model identification or type reference.....:	Data-v8	P
	Symbol for Class II equipment only	Class III device	N
	Other markings and symbols	Additional symbols or markings do not give rise to misunderstanding	P
1.7.1.3	Use of graphical symbols		P
1.7.2	Safety instructions and marking	See below	N
1.7.2.1	General	The user's manual contains information for operation, installation, servicing, transport, storage and technical data.	N
1.7.2.2	Disconnect devices		N
	-for permanently connected equipment, a readily accessible disconnect device shall be incorporated in the building installation wiring		N
	-for pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7.2.3	Overcurrent protective device	Not pluggable equipment	N
1.7.2.4	IT power distribution systems		N
1.7.2.5	Operator access with a tool		N
1.7.2.6	Ozone	No ozone produced	N
1.7.3	Short duty cycles	Continuous operation	N
1.7.4	Supply voltage adjustment.....:	Fixed	N
1.7.5	Power outlets on the equipment.....:	No power outlets	N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference).....:		N
1.7.7	Wiring terminals		N
1.7.7.1	Protective earthing and bonding terminals.....:	Class III device	N
1.7.7.2	Terminals for a.c. mains supply conductors		N
1.7.7.3	Terminals for d.c. mains supply conductors		N
1.7.8	Controls and indicators		-
1.7.8.1	Identification, location and marking.....:	No such components	N
1.7.8.2	Colours		N
1.7.8.3	Symbols according to IEC 60417		N
1.7.8.4	Markings using figures		N
1.7.9	Isolation of multiple power sources	No hazardous power sources	N
1.7.10	Thermostats and other regulating devices		N
1.7.11	Durability	Rubbed with a cloth soaked with water for 15s then again for 15s with cloth soaked with petroleum spirits, after this test, the marking on the label did not fade there are no curling nor lifting of the label edge.	P
1.7.12	Removable parts		N
1.7.13	Replaceable batteries.....:	No replaceable batteries	N
	Language(s)		-
1.7.14	Equipment for restricted access locations.....:	Equipment not for RAL	N
2	Protection from hazards		P
2.1	Protection from electric shock and energy hazards		P

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.1.1	Protection in operator access areas		N
2.1.1.1	Access to energized parts	Class III product supplied by SELV.	P
	Test by inspection.....:	No hazardous voltage present	N
	Test with test finger (Figure 2A).....:		N
	Test with test pin (Figure 2B).....:		N
	Test with test probe (Figure 2C).....:		N
2.1.1.2	Battery compartments	No such compartment	N
2.1.1.3	Access to ELV wiring	No ELV wiring	N
	Working voltage (V_{peak} or V_{rms}); minimum distance through insulation (mm)		-
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage present	N
2.1.1.5	Energy hazards.....:	No hazard	N
2.1.1.6	Manual controls	No hazard	N
2.1.1.7	Discharge of capacitors in equipment		N
	Measured voltage (V); time-constant (s).....:		-
2.1.1.8	Energy hazards – d.c. mains supply	SELV limit not exceeded	N
	a) Capacitor connected to the d.c. mains supply ∴		N
	b) Internal battery connected to the d.c. mains supply :		N
2.1.1.9	Audio amplifiers		N
2.1.2	Protection in service access areas	No service area	N
2.1.3	Protection in restricted access locations		N
2.2	SELV circuits		P
2.2.1	General requirements		P
2.2.2	Voltages under normal conditions (V)	SELV limit not exceeded	P
2.2.3	Voltages under fault conditions (V)	SELV limit not exceeded	P
2.2.4	Connection of SELV circuits to other circuits.....:	Connected to other SELV circuits.	P
2.3	TNV circuits		N
2.3.1	Limits	No TNV circuit.	N
	Type of TNV circuits		-

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.3.2	Separation from other circuits and from accessible parts		N
2.3.2.1	General requirements		N
2.3.2.2	Protection by basic insulation		N
2.3.2.3	Protection by earthing		N
2.3.2.4	Protection by other constructions.....:		N
2.3.3	Separation from hazardous voltages		N
	Insulation employed.....:		-
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed.....:		-
2.3.5	Test for operating voltages generated externally		N
2.4	Limited current circuits		N
2.4.1	General requirements	No limited current circuits	N
2.4.2	Limit values		N
	Frequency (Hz)		-
	Measured current (mA)		-
	Measured voltage (V).....:		-
	Measured circuit capacitance (nF or µF).....:		-
2.4.3	Connection of limited current circuits to other circuits		N
2.5	Limited power sources		P
	a) Inherently limited output	See table 1.5.1	P
	b) Impedance limited output		N
	c) Regulating network limited output under normal operating and single fault condition		N
	d) Overcurrent protective device limited output		N
	Max. output voltage (V), max. output current (A), max. apparent power (VA)		N
	Current rating of overcurrent protective device (A)		N
	Use of integrated circuit (IC) current limiters		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6	Provisions for earthing and bonding		N
2.6.1	Protective earthing	Class III device, no provisions for earthing	N
2.6.2	Functional earthing		N
2.6.3	Protective earthing and protective bonding conductors		N
2.6.3.1	General		N
2.6.3.2	Size of protective earthing conductors		N
	Rated current (A), cross-sectional area (mm ²), AWG.....:		N
2.6.3.3	Size of protective bonding conductors		N
	Rated current (A), cross-sectional area (mm ²), AWG.....:		-
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min)		N
2.6.3.5	Colour of insulation.....:		N
2.6.4	Terminals		N
2.6.4.1	General		N
2.6.4.2	Protective earthing and bonding terminals		N
	Rated current (A), type, nominal thread diameter (mm)		-
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N
2.6.5	Integrity of protective earthing		N
2.6.5.1	Interconnection of equipment		N
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N
2.6.5.3	Disconnection of protective earth		N
2.6.5.4	Parts that can be removed by an operator		N
2.6.5.5	Parts removed during servicing		N
2.6.5.6	Corrosion resistance		N
2.6.5.7	Screws for protective bonding		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6.5.8	Reliance on telecommunication network or cable distribution system		N
2.7	Overcurrent and earth fault protection in primary circuits		N
2.7.1	Basic requirements	No primary circuits	N
	Instructions when protection relies on building installation		N
2.7.2	Faults not simulated in 5.3.7		N
2.7.3	Short-circuit backup protection		N
2.7.4	Number and location of protective devices		N
2.7.5	Protection by several devices		N
2.7.6	Warning to service personnel.....:		N
2.8	Safety interlocks		N
2.8.1	General principles	No safety interlocks	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
	Protection against extreme hazard		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches, relays and their related circuits		N
2.8.7.1	Separation distances for contact gaps and their related circuits (mm)		N
2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test	(See appended table 5.2)	N
2.8.8	Mechanical actuators		N
2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	Natural rubber, asbestos or hygroscopic materials are not used.	N
2.9.2	Humidity conditioning	Not required	N
	Relative humidity (%), temperature (°C)	(93 ± 3 %), (20 – 30 ± 2) °C	-

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.9.3	Grade of insulation	Functional insulation only	P
2.9.4	Separation from hazardous voltages	No hazardous voltage present	N
	Method(s) used		N
2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General	Class III equipment	-
2.10.1.1	Frequency	DC only	N
2.10.1.2	Pollution degrees	Pollution Degree II	P
2.10.1.3	Reduced values for functional insulation		N
2.10.1.4	Intervening unconnected conductive parts		N
2.10.1.5	Insulation with varying dimensions		N
2.10.1.6	Special separation requirements		N
2.10.1.7	Insulation in circuits generating starting pulses		N
2.10.2	Determination of working voltage		-
2.10.2.1	General		N
2.10.2.2	RMS working voltage		N
2.10.2.3	Peak working voltage		N
2.10.3	Clearances	Class III product – secondary circuits comply with sub-clause 5.3.4	N
2.10.3.1	General		N
2.10.3.2	Mains transient voltages	Refer to table 2.10.3 & 2.10.4	N
	a) AC mains supply		N
	b) Earthed d.c. mains supplies		N
	c) Unearthed d.c. mains supplies		P
	d) Battery operation		N
2.10.3.3	Clearances in primary circuits		N
2.10.3.4	Clearances in secondary circuits	Refer to table 2.10.3 & 2.10.4	P
2.10.3.5	Clearances in circuits having starting pulses		N
2.10.3.6	Transients from a.c. mains supply		N
2.10.3.7	Transients from d.c. mains supply		N
2.10.3.8	Transients from telecommunication networks and cable distribution systems		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10.3.9	Measurement of transient voltage levels		N
	a) Transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network...:		N
2.10.4	Creepage distances	Refer to table 2.10.3 and 2.10.4	N
2.10.4.1	General		N
2.10.4.2	Material group and comparative track index	Material group IIIb assumed	N
	CTI tests		-
2.10.4.3	Minimum creepage distances	Refer to table 2.10.3 and 2.10.4	N
2.10.5	Solid insulation		N
2.10.5.1	General		N
2.10.5.2	Distances through insulation		N
2.10.5.3	Insulating compound as solid insulation		N
2.10.5.4	Semiconductor devices		N
2.10.5.5.	Cemented joints		N
2.10.5.6	Thin sheet material General		N
2.10.5.7	Separable thin sheet material		N
	Number of layers (pcs).....:		-
2.10.5.8	Non-separable thin sheet material		N
2.10.5.9	Thin sheet material – standard test procedure		N
	Electric strength test		-
2.10.5.10	Thin sheet material – alternative test procedure		N
	Electric strength test		-
2.10.5.11	Insulation in wound components		N
2.10.5.12	Wire in wound components		N
	Working voltage		N
	a) Basic insulation not under stress		N
	b) Basic, supplementary, reinforced insulation ..		N
	c) Compliance with Annex U		N
	Two wires in contact inside wound component; angle between 45°and 90°.....:		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10.5.13	Wire with solvent-based enamel in wound components		N
	Electric strength test		-
	Routine test		-
2.10.5.14	Additional insulation in wound components		N
	Working voltage		N
	- Basic insulation not under stress		N
	- Supplementary, reinforced insulation		N
2.10.6	Construction of printed boards		N
2.10.6.1	Uncoated printed boards		N
2.10.6.2	Coated printed boards		N
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		N
2.10.6.4	Insulation between conductors on different layers of a printed board		N
	Distance through insulation	No requirement	-
	Number of insulation layers (pcs		N
2.10.7	Component external terminations		N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Sample preparation and preliminary inspection		N
2.10.8.2	Thermal conditioning		N
2.10.8.3	Electric strength test		
2.10.8.4	Abrasion resistance test		N
2.10.9	Thermal cycling		N
2.10.10	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11	Tests for semiconductor devices and cemented joints		N
2.10.12	Enclosed and sealed parts		N

3	Wiring, connections and supply		P
3.1	General		-
3.1.1	Current rating and overcurrent protection		N
3.1.2	Protection against mechanical damage	Wireways are smooth and free from sharp edges	P

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.1.3	Securing of internal wiring	All components mounted securely on PCB	P
3.1.4	Insulation of conductors		N
3.1.5	Beads and ceramic insulators	No such components	N
3.1.6	Screws for electrical contact pressure	No such screws	N
3.1.7	Insulating materials in electrical connections		N
3.1.8	Self-tapping and spaced thread screws		N
3.1.9	Termination of conductors	All conductors are reliably secured.	P
	10 N pull test		N
3.1.10	Sleeving on wiring	No such components	N
3.2	Connection to a mains supply		P
3.2.1	Means of connection		N
3.2.1.1	Connection to an a.c. mains supply	Not connected to a.c. mains	N
3.2.1.2	Connection to a d.c. mains supply	Not connected to d.c. mains	N
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter of cable and conduits (mm)		-
3.2.4	Appliance inlets		N
3.2.5	Power supply cords		P
3.2.5.1	AC power supply cords		N
	Type		-
	Rated current (A), cross-sectional area (mm ²), AWG		-
3.2.5.2	DC power supply cords		N
3.2.6	Cord anchorages and strain relief	No hazard	N
	Mass of equipment (kg), pull (N)		-
	Longitudinal displacement (mm)		-
3.2.7	Protection against mechanical damage	No sharp points or cutting edges.	N
3.2.8	Cord guards		N
	Diameter or minor dimension D (mm); test mass (g)		-
	Radius of curvature of cord (mm).....		-

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.2.9	Supply wiring space		N
3.3	Wiring terminals for connection of external conductors		N
3.3.1	Wiring terminals	No wiring terminals	N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm ²)		-
3.3.5	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter (mm)		-
3.3.6	Wiring terminal design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N
3.4	Disconnection from the mains supply		N
3.4.1	General requirement	Not connected to mains	N
3.4.2	Disconnect devices		N
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords		N
3.4.6	Number of poles - single-phase and d.c. equipment		N
3.4.7	Number of poles - three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N
3.5	Interconnection of equipment		P
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits	Interconnection circuits are SELV circuits only.	P
3.5.3	ELV circuits as interconnection circuits	No ELV circuits	N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.5.4	Data ports for additional equipment		N
4	Physical Requirements		P
4.1	Stability		N
	Angle of 10°	Class III equipment	N
	Test force (N)	Not floor standing unit	N
4.2	Mechanical strength		P
4.2.1	General	Adequate mechanical strength; no energy hazard	P
	Rack-mounted equipment.		N
4.2.2	Steady force test, 10 N	No hazardous components	N
4.2.3	Steady force test, 30 N	No hazardous components	N
4.2.4	Steady force test, 250 N	No hazardous components	N
4.2.5	Impact test		N
	Fall test		N
	Swing test		N
4.2.6	Drop test; height (mm)	3 impacts at 1000mm ±10mm	N
4.2.7	Stress relief test	7 hours at 70°C	N
4.2.8	Cathode ray tubes	No such tubes	N
	Picture tube separately certified		N
4.2.9	High pressure lamps	No such lamps	N
4.2.10	Wall or ceiling mounted equipment; force (N) ...:		N
4.3	Design and construction		P
4.3.1	Edges and corners	Edges and corners of the enclosure are rounded and smooth.	P
4.3.2	Handles and manual controls; force (N).....:	No safety related handles or controls to indicate the position of switch.	N
4.3.3	Adjustable controls	No hazardous controls	N
4.3.4	Securing of parts	All parts secured properly	P
4.3.5	Connection by plugs and sockets		N
4.3.6	Direct plug-in equipment	No such equipment	N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Torque		N
	Compliance with the relevant mains plug standard		N
4.3.7	Heating elements in earthed equipment	No heating elements	N
4.3.8	Batteries	No batteries	N
	- Overcharging of a rechargeable battery		N
	- Unintentional charging of a non-rechargeable battery		N
	- Reverse charging of a rechargeable battery		N
	- Excessive discharging rate for any battery		N
4.3.9	Oil and grease	No such substances	N
4.3.10	Dust, powders, liquids and gases		N
4.3.11	Containers for liquids or gases		N
4.3.12	Flammable liquids	Flammable liquids not used	N
	Quantity of liquid (l)		N
	Flash point (°C)		N
4.3.13	Radiation		N
4.3.13.1	General		N
4.3.13.2	Ionizing radiation		N
	Measured radiation (pA/kg)		-
	Measured high voltage (kV)		-
	Measured focus voltage (kV)		-
	CRT markings		-
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation...		N
4.3.13.5	Lasers (including laser diodes) and LEDs	LED's used in this product are for indication only.	P
4.3.13.5.1	Lasers (including laser diodes)		N
	Laser class		-
4.3.13.5.2	Light emitting diodes (LEDs)	LED's used in this product are for indication only.	P
4.3.13.6	Other types		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.4	Protection against hazardous moving parts		N
4.4.1	General	No moving parts	N
4.4.2	Protection in operator access areas		N
	Household and home/office document/media shredders		N
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		N
4.4.5	Protection against moving fan blades		N
4.4.5.1	General		N
	Not considered to cause pain or injury. a)		N
	Is considered to cause pain, not injury. b)		N
	Considered to cause injury. c)		N
4.4.5.2	Protection for users		N
	Use of symbol or warning		N
4.4.5.3	Protection for service persons		N
	Use of symbol or warning		N
4.5	Thermal requirements		P
4.5.1	General	Components/materials/parts not exposed to excessive temperatures	P
4.5.2	Temperature tests		N
	Normal load condition per Annex L	(see appended table 4.5)	-
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat		P

4.6	Openings in enclosures		N
4.6.1	Top and side openings	Equipment is supplied by SELV. A fire enclosure is not required.	N
	Dimensions (mm)		N
4.6.2	Bottoms of fire enclosures		N
	Construction of the bottom, dimensions (mm) ..		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.6.3	Doors or covers in fire enclosures		N
4.6.4	Openings in transportable equipment		N
4.6.4.1	Constructional design measures		N
	Dimensions (mm)		-
4.6.4.2	Evaluation measures for larger openings		N
4.6.4.3	Use of metallized parts		N
4.6.5	Adhesives for constructional purposes		N
	Conditioning temperature (°C), time (weeks) ...:		
4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	No excessive temperatures, no easily burning materials employed. Safety relevant components used within their specified temperature limits.	P
	Method 1, selection and application of components wiring and materials	(see appended table 4.7)	P
	Method 2, application of all simulated fault condition tests		N
4.7.2	Conditions for a fire enclosure	See below	P
4.7.2.1	Parts requiring a fire enclosure		N
4.7.2.2	Parts not requiring a fire enclosure	PCB output was evaluated and comply with limited power source requirements. No fire enclosure required	P
4.7.3	Materials	PCB rated V-0 min	P
4.7.3.1	General	Adequate selection of materials. Refer to appended table 1.5.1	P
4.7.3.2	Materials for fire enclosures		N
4.7.3.3	Materials for components and other parts outside fire enclosures		N
4.7.3.4	Materials for components and other parts inside fire enclosures	No air filter assemblies	N
4.7.3.5	Materials for air filter assemblies	No high voltage components	N
4.7.3.6	Materials used in high-voltage components		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
5	Electrical requirements and simulated abnormal conditions		P
5.1	Touch current and protective conductor current		N
5.1.1	General	Class III device	N
5.1.2	Configuration of equipment under test (EUT)		N
5.1.2.1	Single connection to an a.c. mains supply	No connected to a.c. mains	N
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		N
5.1.3	Test circuit		N
5.1.4	Application of measuring instrument		N
5.1.5	Test procedure		N
5.1.6	Test measurements		N
	Supply voltage (V)		N
	Measured touch current (mA)		N
	Max. allowed touch current (mA)		N
	Measured protective conductor current (mA)		N
	Max. allowed protective conductor current (mA)		N
5.1.7	Equipment with touch current exceeding 3,5 mA		N
5.1.7.1	General		N
5.1.7.2	Simultaneous multiple connections to the supply		N
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks	No TNV circuits	N
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		-
	Supply voltage (V)		-
	Measured touch current (mA)		-
	Max. allowed touch current (mA)		-
5.1.8.2	Summation of touch currents from telecommunication networks		N
	a) EUT with earthed telecommunication ports ...		-
	b) EUT whose telecommunication ports have no reference to protective earth		-

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	Electric strength		N
5.2.1	General	Class III device	N
5.2.2	Test procedure		N
5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	No such component	N
5.3.3	Transformers		N
5.3.4	Functional insulation.....:	Functional insulation complies with the requirements (c)	P
5.3.5	Electromechanical components	No such component	N
5.3.6	Audio amplifiers in ITE:	No such component	N
5.3.7	Simulation of faults	(see appended table 5.3)	P
5.3.8	Unattended equipment	No such component	N
5.3.9	Compliance criteria for abnormal operating and fault conditions	(see appended table 5.3)	P
5.3.9.1	During the tests		P
5.3.9.2	After the tests		N
6	Connection to telecommunication networks		N
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment	Wireless connected device	N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Supply voltage (V):		-
	Current in the test circuit (mA):		-
6.1.2.2	Exclusions:		N
6.2	Protection of equipment users from over voltages on telecommunication networks		N
6.2.1	Separation requirements	No TNV circuits	N
6.2.2	Electric strength test procedure		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.2.2.1	Impulse test		N
6.2.2.2	Steady-state test		N
6.2.2.3	Compliance criteria		N
6.3 Protection of the telecommunication wiring system from overheating			
	Max. output current (A)	No TNV circuits	-
	Current limiting method		-
7 Connection to cable distribution systems			
7.1	General		N
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N
7.3	Protection of equipment users from overvoltage on the cable distribution system		N
7.4	Insulation between primary circuits and cable distribution systems		N
7.4.1	General		N
7.4.2	Voltage surge test		N
7.4.3	Impulse test		N
Annex A Tests for resistance to heat and fire			
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N
A.1.1	Samples.....		-
	Wall thickness (mm)		-
A.1.2	Conditioning of samples; temperature (°C)		N
A.1.3	Mounting of samples		N
A.1.4	Test flame (see IEC 60695-11-3)		N
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s)		-
	Sample 2 burning time (s)		-
	Sample 3 burning time (s)		-

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N
A.2.1	Samples, material.....:		-
	Wall thickness (mm)		-
A.2.2	Conditioning of samples; temperature (°C)		N
A.2.3	Mounting of samples		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C		N
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s)		-
	Sample 2 burning time (s)		-
	Sample 3 burning time (s)		-
A.2.7	Alternative test acc. to IEC 60695-11-5, cl. 5 and 9		N
	Sample 1 burning time (s)		-
	Sample 2 burning time (s)		-
	Sample 3 burning time (s)		-
A.3	Hot flaming oil test (see 4.6.2)		N
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N
Annex B	Motor tests under abnormal conditions (see 4.7.2.2 and 5.3.2)		N
B.1	General requirements		N
	Position		-
	Manufacturer		-
	Type		-
	Rated values		-
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Test duration (days)		-
	Electric strength test: test voltage (V)		-
B.6	Running overload test for d.c. motors in secondary circuits		N
B.6.1	General		N
B.6.2	Test procedure		N
B.6.3	Alternative test procedure		N
B.6.4	Electric strength test; test voltage (V)		N
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1	General		N
B.7.2	Test procedure		N
B.7.3	Alternative test procedure		N
B.7.4	Electric strength test; test voltage (V)		N
B.8	Test for motors with capacitors		N
B.9	Test for three-phase motors		N
B.10	Test for series motors		N
	Operating voltage (V)		-

Annex C	Transformers (see 1.5.4 and 5.3.3)	N
	Position	-
	Manufacturer	-
	Type	-
	Rated values	-
	Method of protection.....	-
C.1	Overload test	N
C.2	Insulation	N
	Protection from displacement of windings.....	N

Annex D	Measuring instruments for touch-current tests (see 5.1.4)	N
D.1	Measuring instrument	N
D.2	Alternative measuring instrument	N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
Annex E	Temperature rise of a winding (see 1.4.13)		N
Annex F	Measurement of clearances and creepage distances (see 2.10 and Annex G)		N
Annex G	Alternative method for determining minimum clearances		N
G.1	Clearances		N
G.1.1	General		N
G.1.2	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply		N
G.2.2	Earthed d.c. mains supplies		N
G.2.3	Unearthed d.c. mains supplies		N
G.2.4	Battery operation		N
G.3	Determination of telecommunication network transient voltage (V)		N
G.4	Determination of required withstand voltage (V)		N
G.4.1	Mains transients and internal repetitive peaks ..		N
G.4.2	Transients from telecommunication networks ...		N
G.4.3	Combination of transients		N
G.4.4	Transients from cable distribution stems		N
G.5	Measurement of transient voltages (V)		N
	a) Transients from a main supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network		N
G.6	Determination of minimum clearances		N
Annex H	Ionizing radiation (see 4.3.13)		N
Annex J	Table of electrochemical potentials (see 2.6.5.6)		N
	Metal(s) used		

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict

Annex K	Thermal controls (see 1.5.3 and 5.3.8)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V)		N
K.3	Thermostat endurance test; operating voltage (V)		N
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation		N

Annex L	Normal load conditions for same types of electrical business equipment (see 1.2.2.1 and 4.5.2)		N
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N

Annex M	Criteria for telephone ringing signals (see 2.3.1)		N
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
M.3.1.1	Frequency (Hz)		-
M.3.1.2	Voltage (V)		-
M.3.1.3	Cadence; time (s), voltage (V)		-
M.3.1.4	Single fault current (mA)		-
M.3.2	Tripping device and monitoring voltage		N
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
Annex N	Impulse test generators (see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3 and Clause G.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N
Annex P	Normative references		N
Annex Q	Voltage dependent resistors (VDRs) (see 1.5.9.1)		N
	a) Preferred climatic categories		N
	b) Maximum continuous voltage		N
	c) Pulse current		N
Annex R	Examples of requirements for quality control programs		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)		N
R.2	Reduced clearances (see 2.10.3)		N
Annex S	Procedure for impulse testing (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
Annex T	Guidance on protection against ingress of water (see 1.1.2)		N
Annex U	Insulated winding wires for use without interleaved insulation (see 2.10.5.4)		N
Annex V	AC power distribution systems (see 1.6.1)		N
V.1	Introduction		N
V.2	TN power distribution systems		N
Annex W	Summation of touch currents		N
W.1	Touch current from electronic circuits		N
W.1.1	Floating circuits		N
W.1.2	Earthed circuits		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
W.2	Interconnection of several equipment's		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N
W.2.3	Common return, connected to protective earth		N
Annex X Maximum heating effect in transformer tests (see clause C.1)			
X.1	Determination of maximum input current		N
X.2	Overload test procedure		N
Annex Y Ultraviolet light conditioning test (see 4.3.13.3)			
Y.1	Test apparatus		N
Y.2	Mounting of test samples		N
Y.3	Carbon-arc light-exposure apparatus		N
Y.4	Xenon-arc light exposure apparatus		N
Annex Z Overvoltage categories (see 2.10.3.2 and Clause G.2)			
Annex AA Mandrel test (see 2.10.5.8)			
Annex BB Changes in the second edition			
Annex CC Evaluation of integrated circuit (IC) current limiters			
CC.1	General		N
CC.2	Test program 1		N
CC.3	Test program 2		N
Annex DD Requirements for the mounting means of rack-mounted equipment			
DD.1	General		N
DD.2	Mechanical strength test, variable N		N
DD.3	Mechanical strength test, 250N, including end stops.....		N
DD.4	Compliance.....		N
Annex EE Household and home/office document/media shredders			
EE.1	General		N

SANS / IEC 60950-1			
Clause	Requirement + Test	Result - Remark	Verdict
EE.2	Markings and instructions		N
	Use of markings or symbols		N
	Information of user instructions, maintenance and/or servicing instructions.....		N
EE.3	Inadvertent reactivation test		N
EE.4	Disconnection of power to hazardous moving parts		N
	Use of markings or symbols		N
EE.5	Protection against hazardous moving parts		N
	Test with test finger (Figure 2A)		N
	Test with wedge probe (Figure EE1 and EE2)		N

1.5.1	TABLE: List of critical components					P
Object/part No.	Manufacturer/trademark	Type/model	Technical data	Standard	Mark(s) of conformity	
Plastic Enclosure	Various	ABS	Flammability Rating: HB or better	UL 94	None	
PCB	Various	Various	Flammability Rating: V-0	UL 94	None	
PSU	CUI Inc	SWI15-12-E-P5	Input: 100-240Vac, 0.5A, 50-60Hz	IEC 62368-1	TÜV	
IC2 – LDO Voltage Regulator	Diodes Incorporated	AP2127	Max. Voltage: 6.5V Max. Current: 450mA Temp. Range: -65°C to 150°C	IEC 60950-1 (Tested in sample)	None	
IC5 – LDO Voltage Regulator	STMicroelectronics	LD1085	Max. Voltage: 30V Max. Current: 4.5A Temp. Range: -40°C to 125°C	IEC 60950-1 (Tested in sample)	None	
D2 – Diode	Nexperia	PMEG4010	Reverse Voltage: 40V Max. Current: 1A	IEC 60950-1 (Tested in sample)	None	
Supplementary information:						
* Technical data may vary depending on the battery manufacturer						

1.6.2	TABLE: Electrical Data (in normal conditions)					P
I rated (mA)	U (V)	P (W)	I (mA)	I fuse (mA)	condition/status	
--	12Vdc	1.08W	90mA	--	Normal operation	
Supplementary information:						

2.1.1.5 c)1)	TABLE: max. V, A, VA test					N
Voltage (rated) (V)	Current (rated)	Voltage (max.)	Current (max.)	VA (max.)		
--	--	--	--	--		
Supplementary information:						
2.1.1.5 c)2)	TABLE: stored energy				N	
Capacitance C (µF)	Voltage U (V)		Energy E (J)			
--	--		--			
Supplementary information:						

2.2	TABLE: evaluation of voltage limiting components in SELV circuits			N
Component (measured between)		Max. voltage (V) (normal operation)		Voltage Limiting Components
		V peak	V d.c.	
--		--	--	
--		--	--	--
Fault test performed on voltage limiting components		Voltage measured (V) in SELV circuits (V peak or V d.c.)		
--		--		
Supplementary information:				

2.4.2	TABLE: limited current circuit measurement				N
Location	Voltage (V)	Current (mA)	Freq. (KHz)	Limit (mA)	
--	--	--	--	--	
--	--	--	--	--	
Supplementary information:					

2.5	TABLE: limited power sources				N
Circuit output tested:					
Measured Uoc (V) with all load circuits disconnected					
Components		I _{sc} (A)		VA	
		Meas.	Limit	Meas.	Limit
--		--	--	--	--
Supplementary information:					

2.10.2	Table: working voltage measurement			N
Location	Peak voltage (V)	RMS voltage (V)	Comments	
--	--	--	--	
--	--	--	--	
Supplementary information:				
Customer datasheet indicates the working voltage (12Vdc).				

2.10.3 and 2.10.4	TABLE: Clearance and creepage distance measurements						N
Clearance (cl) and creepage distance (cr)	U peak	U r.m.	Required cl	cl (mm)	Required cr	cr (mm)	
--	--	--	--	--	--	--	
--	--	--	--	--	--	--	
2.10.5	TABLE: Distance through insulation measurements					N	
Distance through insulation (DTI) at/of:	U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)		
--	--	--	--	--	--		
Supplementary information:							

4.3.8	TABLE: Batteries								N
The tests of 4.3.8 are applicable only when appropriate battery data is not available							--	--	
Is it possible to install the battery in a reverse polarity position?							--	--	
	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging	
	Meas. current (mA)	Manuf. Specs(mA).		Meas. Current(mA)	Manuf. Specs(mA).	Meas. current(mA)	Manuf. Specs(mA).	Meas. current(mA)	Manuf. Specs(mA).
Max. current during normal condition	--	--	--	--	--	--	--	--	--
Max. current during fault condition	--	--	--	--	--	--	--	--	--
Test results:									
- Chemical leaks							--	N	
- Explosion of the battery							--	N	
- Emission of flame or expulsion of molten metal							--	N	
- Electric strength tests of equipment after completion of tests							--	N	

Device Battery Data	
Battery category	--
Manufacturer	--
Type / model	--
Voltage	--
Capacity	--
Tested and Certified	--
Supplementary information:	
* Cell characteristics may vary based on the manufacturer	

4.5	TABLE: Thermal requirements		N
Supply voltage (V)	--	--	
Ambient T _{min} (°C)	--	--	
Ambient T _{max} (°C)	--	--	
Maximum measured temperature T of part/at:	T (°C)	Allowed T _{max} (°C)	
--	--	--	
--	--	--	
Supplementary information:			

4.5.5	TABLE: Ball pressure test of thermoplastic parts		N
Allowed impression diameter (mm)	≤ 2 mm		--
Part	Test temperature (°C)	Impression diameter (mm)	
--	--	--	
Supplementary information:			

4.7	TABLE: Resistance to fire				P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	
Enclosure	Various	ABS	2.33	HB	
PCB	Interchangeable	Interchangeable	1.58	V-0	
Supplementary information:					
See table 1.5.1: List of critical components					

5.1	TABLE: touch current measurement			N
Measured between:	Measure d (mA)	Limit (mA)	Comments/conditions	
--	--	--	--	
--	--	--	--	
Supplementary information:				

5.2	TABLE: Electric strength tests, impulse tests and voltage surge tests			N
Test voltage applied between:	Voltage shape (AC, DC,	Test voltage (V)	Breakdown Yes / No	
--	--	500	--	
--	--	--	--	
Supplementary information:				

5.3	TABLE: Fault condition tests					P
	Ambient temperature (°C)				--	--
	Power source for EUT: Manufacturer, model/type, output rating :				--	--
Component No.	Fault	Supply voltage (V)	Test time (min)	Fuse #	Fuse current (A)	Observation
DC Input	Reverse Polarity	12Vdc	--	--	--	*Diode D2 prevents current flow during reverse polarity conditions. No hazard.
IC4	SC input pin to output pin	12Vdc	--	--	--	*Affected components rated higher than resulting conditions. No hazard.
IC5	SC input pin to output pin	12Vdc	--	--	--	*Affected components rated higher than resulting conditions. No hazard.
IC2	SC input pin to ground pin	12V	--	--	--	* Affected components rated higher than resulting conditions. No hazard.
Supplementary information:						
Supplementary information: SC=Short Circuit, OC=Short Circuit * Fault condition evaluated by simulation.						

APPENDIX 1: Device images

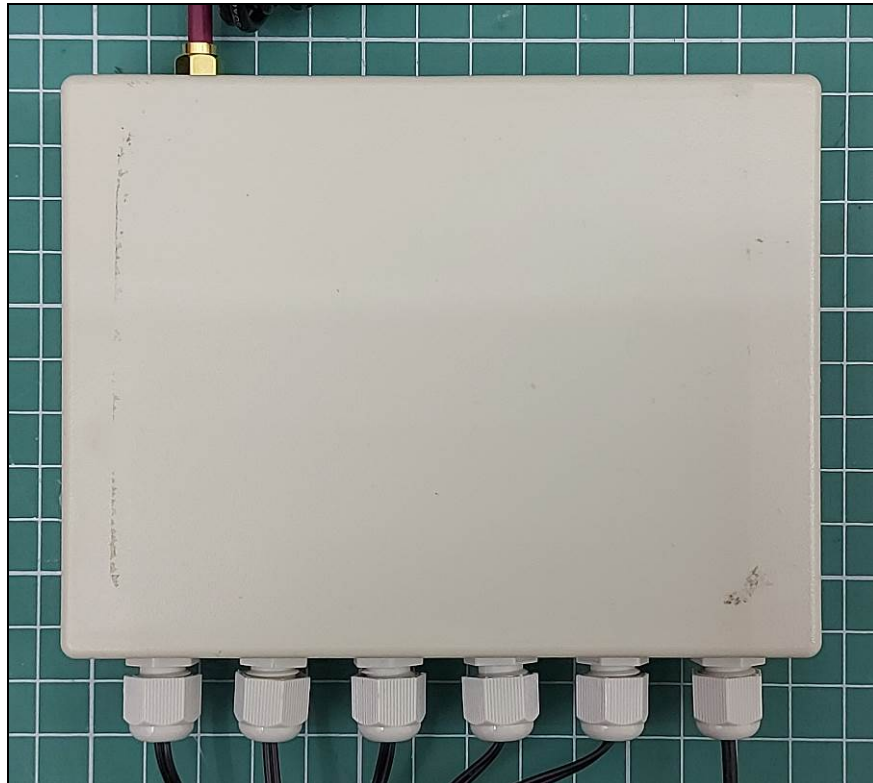


Figure 2: Enclosure top view



Figure 3: Enclosure bottom view

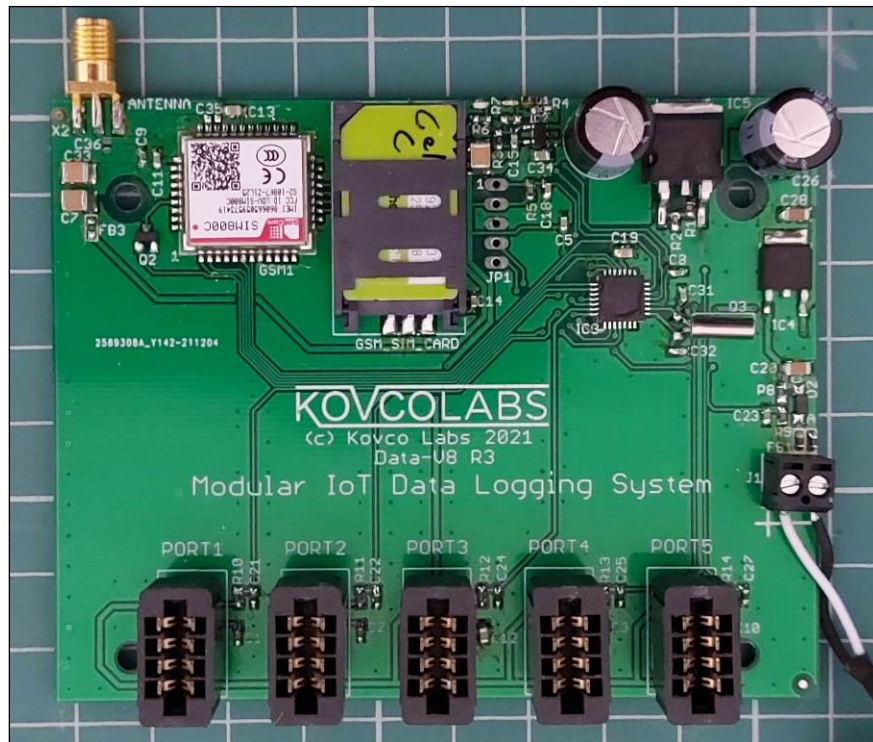


Figure 4: PCB top view

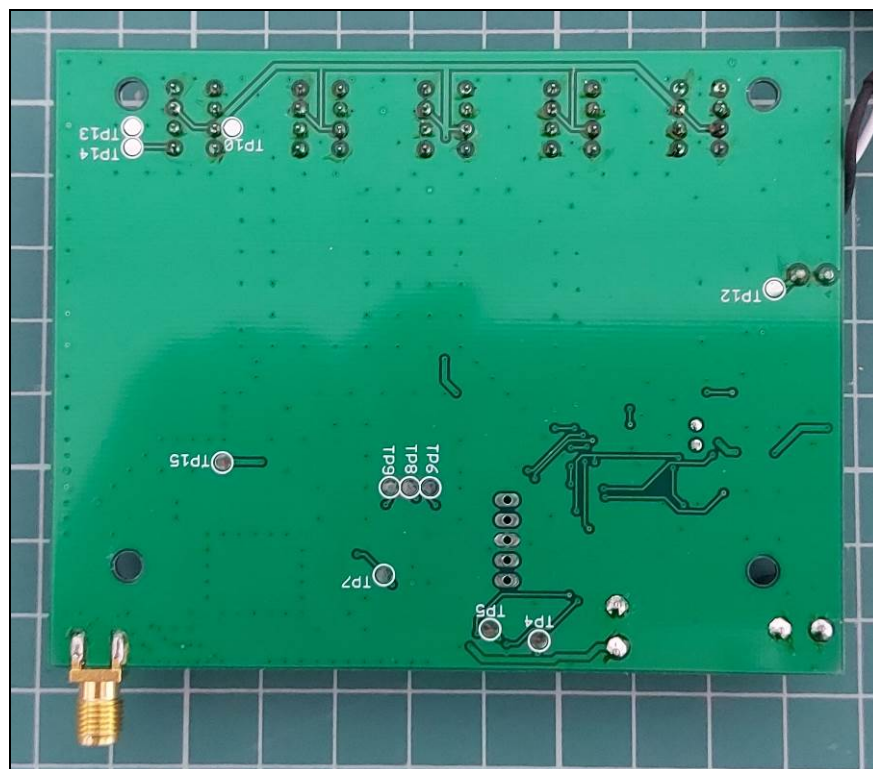


Figure 5: PCB bottom view



Figure 6: Device PSU

*** END OF REPORT ***