Template for submitting comments/inputs on Draft Test Guide titled "Outdoor Weather Proof Rack for Telecom Applications (Draft Test Guide No. TEC 66171:2026)"

Name of Manufacturer/Stakeholder:

Organization:

Contact details:

Clause No.	Clause Description	Comments, if any	Remarks, if any

Note: The comments/inputs on the draft Test Guide (Draft Test Guide No. TEC 66171:2026 may be furnished in the above format through email to adgfa-tec-dot@gov.in with copy to dirfa.tec@gov.in and ddgfla.tec@gov.in at the earliest and within prescribed time period.

अनंतिम टेस्ट गाइड
टीईसी ६६१७१: २०२६

PROVISIONAL TEST GUIDE
TEC 66171:2026

for

आउटडोर वेदर प्रूफ रैक फॉर टेलीकॉम इक्विपमेंट्स

(मानक संख्या.: टीईसी ६६१७०:२०२५)

Outdoor Weather Proof Rack For Telecom Equipments

(STANDARD No.: TEC 66170:2025)

ISO 9001:2015

दूरसंचार अभियांत्रिकी केंद्र

खुर्शीदलाल भवन , जनपथ, नई दिल्ली–110001, भारत

TELECOMMUNICATION ENGINEERING CENTRE

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Release 1: XXXX, 2026

FOREWORD

Telecommunication Engineering Centre (TEC) is the technical arm of Department of Telecommunications (DOT), Government of India. Its activities include:

- Framing of TEC Standards for Generic Requirements for a Product/Equipment, Standards for Interface Requirements for a Product/Equipment, Standards for Service Requirements & Standard document of TEC for Telecom Products and Services
- Formulation of Essential Requirements (ERs) under Mandatory Testing and Certification of Telecom Equipment (MTCTE)
- Field evaluation of Telecom Products and Systems
- Designation of Conformity Assessment Bodies (CABs)/Testing facilities
- Testing & Certification of Telecom products
- Adoption of Standards
- Support to DoT on technical/technology issues

For the purpose of testing, four Regional Telecom Engineering Centers (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

ABSTRACT

This document enumerates detailed test schedule and procedure for evaluating conformance / functionality / requirements / performance of Outdoor Weather Proof Rack For Telecom Equipments as per GR No. TEC 66170:2025

CONTENTS

A. HISTORY SHEET

Sl. No.	*Standard/Document No.*	*Title*	*Remarks*
1	TEC 66171:2026	Outdoor Weather Proof Rack For Telecom Equipments	Release 1

B. INTRODUCTION

This document enumerates detailed test schedule and procedure for evaluating conformance / functionality / requirements / performance of Outdoor Weather Proof Rack For Telecom Equipments as per GR No. TEC 66170:2025.

C. General information:

Sl. No.	General Information	Details (to be filled by the testing team)	
1	Name and Address of the Applicant		
2	Date of Registration		
3	Name and No. of GR/IR/Applicant's Spec. against which the approval sought	Outdoor Weather Proof Rack For Telecom Equipments	TEC 66170 :2025
4	Details of Equipment		
	Type of Equipment	Model No.	Serial No.
(i)			
(ii)			
5	Any other relevant Information:-		

D. Testing team: *(to be filled by the testing team)*

Sl. No.	Name	Designation	Organization	Signature
1.				
2.				

E. List of the Test Instruments:

S. No.	Name of the test instrument	Quantity	Make /Model (to be filled by the testing team)	Validity of calibration (to be filled by the testing team) dd/mm/yyyy	Remark
1.					
2.					

F. Equipment Configuration Offered: *(to be filled by the testing team)*

(a) **<Equipment/product name> Configuration:**

Sl. No.	Item	Details	Remarks

Relevant information like No. of cards, ports, slots, interfaces, size etc. may be filled as applicable for the product

(b) **<Other equipment name> Configuration:**

S.No.	Item	Details	Remarks

Relevant information like No. of cards, ports, slots, interfaces, size etc. may be filled as applicable for the product

G. Equipment System Manuals: *(to be filled by the testing team)*

Availability of Maintenance manuals, Installation manual, Repair manual & User Manual etc. **(Y/N)**

H. Clause-wise Test Type and Test No.:

Clause No.	Clause	Type of Test / Test No. etc.
1.0	INTRODUCTION	
1.1	This document contains the generic requirements of Outdoor weatherproof rack, which shall be suitable for operation from 48V power source like SMPS, Batteries, Solar Charge controller etc. It shall be at least IP55 protected and suitable for outdoor environment.	Information
2.0	FUNCTIONAL REQUIREMENTS The Outdoor rack shall be equipped with a) Air-conditioner and/ or Heat Exchanger b) 19" or 21" channels / Purchaser specific mounting arrangement c) Purchaser specific DCDB d) Smoke sensor e) Door open sensor f) LED light for rack illumination Note:- The purchaser shall specify the requirement of Heat Exchanger.	Physical Check
3.0	OPERATIONAL REQUIREMENTS The operational requirements of an outdoor rack for telecom equipment are critical for ensuring the efficient and reliable functioning of the telecom infrastructure in outdoor environments. These requirements address the performance, maintenance, and management aspects of the outdoor rack. Here are some key operational requirements: The requirements of the setup are as specified below:	Information
3.1	Operational requirements of Outdoor rack:-	

3.1.1	**Weatherproof Rack:** The outdoor rack shall be designed to provide protection against environmental elements such as rain, dust, and temperature fluctuations. It shall be typically constructed with materials that offer durability and weather resistance. The ingress protection for Outdoor rack shall be of minimum IP-55 as per IEC60529 and the purchaser shall specify higher requirement i.e. above IP55 if required.	Physical Check & Certificates from accredited test labs are to be submitted for IP in accordance with IEC60529.
3.1.2	**Usable space requirement for Telecom Equipment in Rack:** A 19-inch or 21-inch rack suitable for telecom equipment with usable space of maximum 42U. The depth of the Rack shall be of minimum 600mm. However, purchaser shall specify requirements depending upon telecommunication equipment. Mounting channels as per IEC60297 (or equivalent Indian/ETSI standard) are to be provided to install and secure telecommunications Equipment in rack cabinets. Usable space does not include the space occupied by DCDB. Usable U space can also be defined by purchaser at the time of purchase. For certification purpose (TSEC/ TAC etc.) approval purpose 42U space shall be considered.	Physical Check & Test Case 1
3.1.3	**Smoke Detectors:** The OEM/Manufacturer shall ensure to choose the smoke detectors, which operates at 48V DC and explicitly designed to be used inside the cabinet for outdoor use. The detectors are of good quality & built to withstand harsh environmental conditions, including temperature fluctuations, moisture and dust. Smoke detectors shall	Information & Required documents to be provided by the OEM

	be operating for the temperature range -20°C to 80°C, Humidity: 0 to 95% RH with no condensation or icing.	
3.1.4	**Cabinet lifting arrangement:** Four number of Cabinet lifting hooks are to be provided for installing and removing equipment racks safely and efficiently.	Physical Check
3.1.5	**Lock:** The outdoor rack shall be equipped with a metallic 4-point locking system.	Physical Check
3.1.6	**Rack material:** The outdoor rack shall be made of GI (Galvanized Iron) sheet duly powder coated (minimum 120 gsm).	Physical Check and Declaration from Manufacturer
3.1.7	**Door & Cable entry:** There should be only one door of the rack and that should be on the front side. Rack should be closed and sealed from all other sides to avoid cooling loss. Cable entry shall be provided at bottom of the cabinet with MCT or similar sealing's. Size and number of cable glands shall be specified by the Purchaser / Procurer. For TAC/ any certification purpose, one minimum MCT size (12/12) or similar sealing shall be demonstrated, if not specifically mentioned by the purchaser / procurer. For certification purpose (TSEC/ TAC etc.), total 6 nos. of cable glands should be provided in the rack as per following size and number: - PG29 – 1 no. PG16 – 1 no. PG21 – 4nos.	Physical Check
3.1.8	**Thermal insulation:** Foam type & thickness are to be decided by the OEM/ Manufacturer for minimum solar gain and deration performance. Minimum of 19 mm for Air conditioning & 6 mm for Heat Exchanger Thermal insulation foam with Fire rated to be provided.	Information & Declaration from Manufacturer

3.1.9	**DCDB:** It should be 19" in width. Following MCBs shall be provided:- (a) **MCB for cooling unit** – OEM to ensure appropriate rating of MCB shall be provided for cooling unit DC input according to the power rating of cooling unit. (b) **DC Load MCBs** – Rating and no. of MCBs shall be decided by purchaser. For TSEC approval purpose, following MCBs shall be provided:- MCB 16A – 2nos. MCB 10A – 6 nos.	Information & Physical Check
3.1.10	**Door open detection:** The rack shall have provision to detect door open status and if door is open, rack light should automatically switch ON. An Industrial grade LED panel light shall be used for this requirement.	Test Case 2
3.1.11	**Earthing:** The outdoor rack system must be diagonal earthing. Additionally, proper Earthing provisions shall be extended to the doors.	Physical Check
3.1.12	**Potential free contacts:** Following potential free contacts must be available in outdoor cabinet: (a) Common cooling unit Alarm (Fan fail, Compressor fail, Internal temperature sensor fail, Ambient temperature sensor fail, Humidity, low temperature, Over Voltage, Under Voltage, etc.) (b) High temperature inside the cabinet (c) Cabinet door open (d) Smoke alarm All alarm shall be available on Remote monitoring protocol – RS485 Modbus as per Annexure 1	Test Case 8
3.2	**Operational requirement of Air conditioner cooling unit:**	

3.2.1	**Air Conditioning Unit:** An air conditioner suitable for outdoor deployment is to be supplied based on the cooling requirements of the Telecom equipment. The air-conditioner shall operate with 48V DC power source. Factors such as capacity, energy efficiency, and environmental suitability are considered during the design Process.	Test Case 9
3.2.2	**Air Compressor:** Compressors of air conditioning system shall be hermetically sealed type of high quality, very reliable, trouble free and with long operating life. Valves shall be provided for charging / topping up of refrigerant. The Purchaser / Procurer shall furnish the details of their compressors indicating the MTBF, life of the compressor and continuous run time of the compressors without failure. Compressor shall have minimum of 1 years Warranty from the date of commissioning. Purchaser shall specify the extended warranty if needed.	Information and Declaration from the Manufacturer
3.2.3	**Microprocessor-based Controller:** The operational requirements of a microprocessor-based controller are essential for ensuring efficient and effective control of the cooling system. Some of the key operational requirements are Temperature Control and Regulation, Energy Efficiency, display of Mode of operation, temperature setting and status of operation and various system alarms. The air conditioning system shall have a microprocessor-based controller. The Controller shall be capable of displaying the real-time parameters:	Test Case 11

3.2.4	**Derating performance feature in air conditioner:** In the context of cooling systems and air conditioning system, during occasional ambient temperature spikes, higher altitude levels, voltage fluctuations or environmental and installation conditions, a safety margin shall be incorporated into the system's design. For example, this means that the compressor shall continue to be in running condition at derating/ reduced cooling capacity even if the ambient temperature slightly exceeds the upper limit of 45°C, for a short time without compromising the safety of the compressor.	Information/ Undertaking to be taken from the OEM
3.2.5	**Monitoring and Control:** RS485 port shall be available in cooling unit. Modbus communication is given in Annexure:-	Test Case 9
3.2.6	**Input Voltage working range:** Cooling unit shall work satisfactorily from 42Vdc to 58Vdc.	Test Case 9
3.2.7	**Capacity:** Suitable capacity of Air Conditioning unit to be provided to maintain the desired temperature as per mutual agreement of purchaser and OEM. Air conditioner maintains lower temperature inside the cabinet w.r.t to ambient/outside cabinet temperature.	Information
3.2.8	**Unit operating temperature range:** Unit shall operate satisfactorily from -5°C to 55°C	Test Case 3
3.2.9	**Refrigerant:** Air Conditioning unit shall have R134a or R410 refrigerant.	Information and Declaration from Manufacturer
3.2.10	**Alarms & Parameters:** Following alarms should be displayed on Air Conditioning unit display: 1. High Temperature	Test Case 10

	2. Low Temperature 3. Humidity 4. Over voltage 5. Under voltage 6. Compressor Fail 7. Fan Fail 8. Internal Temperature sensor fail. 9. Ambient temperature sensor fail 10. Cabinet door open 11. Smoke alarm	
3.3	**Operational requirement of Heat Exchanger/ Refrigerant based heat exchanger unit:**	
3.3.1	**Heat Exchanger Unit:** A heat exchanger suitable for outdoor deployment is to be supplied based on the cooling requirements of the Telecom equipment. The heat exchanger shall operate with 48V DC power source. Factors such as capacity, energy efficiency, and environmental suitability are considered during the design Process.	Information
3.3.2	**Microprocessor-based Controller:** The operational requirements of a microprocessor-based controller are essential for ensuring efficient and effective control of the cooling system. Some of the key operational requirements are Temperature Control and Regulation, Energy Efficiency, display of Mode of operation, temperature setting and status of operation and various system alarms. The heat exchanger system shall have a microprocessor-based controller. The Controller shall be capable of displaying the real-time parameters.	Test Case 11

3.3.3	**Derating performance feature in Heat exchanger:** In the context of cooling systems, during occasional ambient temperature spikes, higher altitude levels, voltage fluctuations or environmental and installation conditions, a safety margin shall be incorporated into the system's design.	Information
3.3.4	**Monitoring and Control:** RS485 port shall be available in cooling unit. Modbus communication is given in Annexure:-	Information ; Refer Annexure
3.3.5	**Input Voltage working range:** Cooling unit shall work satisfactorily from 42Vdc to 58Vdc.	Information
3.3.6	**Capacity:** Suitable capacity of heat exchanger to be provided to maintain temperature the desired temperature as per mutual agreement of purchaser and OEM. Heat exchanger maintains higher temperature inside the cabinet w.r.t to ambient/outside cabinet temperature.	Information
3.3.7	**Unit operating temperature range:** Unit shall operate satisfactorily from -5°C to 55°C	Information
3.3.8	**Refrigerant:** Air Conditioning unit shall have R134a refrigerant (only applicable for refrigerant based heat exchanger)	Information and Declaration from Manufacturer
3.3.9	**Alarms & Parameters:** Following alarms & Parameters shall be displayed on hex display: 1. High Temperature 2. Low Temperature 3. Humidity 4. Over voltage 5. Under voltage 6. Fan Fail 7. Internal Temperature sensor fail	Declaration from OEM & Test Case 10

	8. Ambient temperature sensor fail 9. Cabinet door open 10. Smoke alarm	
3.4	**Operational life:** The outdoor rack unit shall have operational life of 10 years normally subjected to mutual AMC agreement between the Purchaser / procurer and the OEM / Manufacturer. These rack units shall be capable to be installed on the transmission tower on pan India basis in climatic conditions prevailing in India.	Information and Declaration from Manufacturer
4.0	**CONSTRUCTION** The outdoor rack system shall be completely self-contained, consisting of a single AC unit of rated capacity, which can be mounted on front door of the cabinet. Good quality hinges shall be used for the doors to sustain the weight of the door and AC unit. Door stoppers shall be provided to secure and control the movement of the doors of the rack enclosure. The placement of air conditioning / Hex system should be such that the maintenance and repairing works of cooling unit shall be carried out without affecting the running of the telecom equipment. The colour of the cabinet shall be Pure Polyester RAL 9016 glossy. The system shall be assembled, wired, piped, charged with refrigerant, and fully factory tested to ensure trouble-free installation.	Physical Check
4.1	**Layout:** The layout of outdoor rack equipped with air-conditioner/Hex system shall be designed in such a	Information

	way that it provides better circulation of the air inside the cabinet to avoid any hot air pockets.	
4.2	**Cable & Wiring:** All the wires and cables including Uninyvin cables used shall be fire retardant as per IS 1554 with amendment 1 (June 94). All the cables & wires used shall also be Rodent & reptiles repellent. Uninyvin cables are also allowed to use in system.	Physical Check & Documents/Undertaking to be taken from OEM
4.3	**Accessibility & Terminations** All the termination points shall be easily accessible from front with proper labelling and safety compliance.	Physical Check
4.4	**Name Plate:** A name plate anodised, screen printed or any other better arrangement ensuring better life expectancy shall be suitably fixed inside / on shelf and contain following information: 1. TEC Standard Number: 2. Manufacturer's name: 3. Model No.: 4. Unit Serial No.: 5. TAC No. 6. Input Voltage: 7. Type of cooling and capacity: 8. Year & Month of manufacturing: *Type of cooling shall be either “Air conditioner” or “Heat Exchanger”	Physical Check
4.5	**Documentation:** Technical literature in English with complete layout, detailed block schematic and circuit diagrams of its assemblies shall be provided in hard copy. All aspects of installation, operation, maintenance, trouble	Required documents to be provided by OEM

	shooting and replacement shall be covered in this manual. Additionally, a soft copy /QR code on the system in respect of technical literature shall also be provided both in Hindi and English .This manual can be provided as a soft copy or QR code and/ or hard copy as specified by the purchaser / procurer. Label or suitable arrangement for address and telephone numbers of Maintenance centre shall also be provided.	
4.6	**REMOTE MONITORING COMMUNICATION PROTOCOL** Follow Annexure 1	Information
5.0	**QUALITY REQUIREMENTS**	
5.1	**Components:** The component parts of the equipment shall be of professional grade of reputed manufacturer to ensure prompt and continuous service and delivery of spare parts.	undertaking to be taken from OEM
5.2	**Power transformers and Chokes**: Power transformers & chokes (if used) shall be class B or higher grade of insulation. The transformers and chokes shall be wound with copper wire and provided with adequate insulation.	undertaking to be taken from OEM
5.3	Fuses or circuit breakers shall be provided wherever appropriate for the protection against failure of control/sensing circuit.	Physical check and undertaking to be taken from OEM
5.4	**Quality and Workmanship:** The equipment shall manufacture in accordance with international quality management systems ISO-9001-2015, for which the manufacturer shall be duly accredited. A quality plan describing the quality assurance system followed by the manufacturer would be required to be submitted.	Documents/Undertaking to be taken from OEM

5.4.1	The equipment shall be manufactured as per the latest Guidelines indicated in Quality Manuals QM-118 (Quality reliability in product design), Manuals QM-202 (Pictorial guidelines for Visual assessment of quality of printed board assemblies (PBA) and discrete terminal assemblies), QM-204 (Guidelines for workmanship standards for repair & modification of printed wiring board assemblies), QM-205 (Guidelines for standard of workmanship for printed boards), QM-206 (Guidelines for standard of workmanship for printed boards assemblies), QM-207 (Guidelines for soft solder and fluxes for Telecom Equipments) and QM 210 (Guidelines for standard of workmanship for surface Mounting Devices).	undertaking to be taken from OEM
5.4.2	All wiring shall be neatly secured in position and adequately supported. Metal panel or cover holes through which the wires or cables pass shall be suitably bushed.	Physical check
5.5	**BURN IN TEST:** The fully equipped rack shall be capable of withstanding a burn-in test for 72 hours at an ambient temperature of 50°C when the equipment is working at full rated load. This test may be performed in a temperature controlled room with free air flow. The ambient temperature shall be measured at a distance of 1 foot from the equipment under test. The necessary set-up for the purpose shall be provided by the manufacturer.	Test Case 3
5.5.1	The temperature rise of the heat dissipating components above the ambient, measured directly or at heat sink in the first eight hours of the test, shall not be more than:	Test Case 4

5.5.2	**Transformers and Chokes:** 70°C for Grade B insulation. For higher grade of insulation, higher temperature rise may be permissible, subject to the following conditions: i. It is at least 20°C below the permissible limit for the grade of insulation used. ii. The temperature rise shall be at least 30°C below Curie temperature of the magnetic material. iii. This temperature shall neither affect other components nor shall lead to fire hazard.	Test Case 4
5.5.3	**Semiconductor devices:** 60°C or as per component spec.	Test Case 4
5.6	**Insulation Resistance Test:** The insulation resistance of the complete System when tested with a 500V DC megger shall not be less than 5 mega ohms for the following conditions: - Interconnected Input terminals and Earth - Interconnected Output terminals and Earth - Interconnected Input terminals and Interconnected output terminals.	Test Case 5
5.7	**Voltage Proof Test:** No breakdown or abnormal temperature rise shall occur, when-after EMI/RFI capacitors and MOVs/Tranzorbs etc. removed from the circuit - a test voltage of 2000V/50Hz is applied for one minute between : - earth and interconnected output terminals. - earth and interconnected input terminals. - input and output terminals. Alternatively, without removing EMI/RFI capacitors, the lightning protection circuitry and Tranzorbs etc., but with EMI/RFI discharge resistors removed:	Test Case 6

<table>
<tr><td></td><td>a) A 2150V DC can be applied for one minute between shorted AC output & DC input terminals.
b) 650V DC can be applied for one minute between shorted AC Input terminals, shorted input DC terminals, shorted DC output terminals & earth.

This DC voltage test is in accordance with UL950 & IEC 950 Standards.

Note: This Test is to be conducted on each of the basic units of the system.</td><td></td></tr>
<tr><td>5.8</td><td>Noise & Vibration:
The fully equipped power shelf at full load shall not contribute more than 15 dB (weighted) to the ambient noise level taken as 45dBA. It shall be measured at a distance of 1 metre from the unit & 1.25m above the floor level in the Acoustic Range. The correction factor for Total Noise when the ambient noise level is more than 45dBA, shall be as given below:
<table>
<tr><th>Ambient Noise</th><th>Correction Factor</th><th>Ambient Noise</th><th>Correction Factor</th><th>Ambient Noise</th><th>Correction Factor</th></tr>
<tr><td>45dBA</td><td>0dB</td><td>51dBA</td><td>1.41dB</td><td>57dB</td><td>3.69dB</td></tr>
<tr><td>46dBA</td><td>0.18dB</td><td>52dBA</td><td>1.73dB</td><td>58dB</td><td>4.17dB</td></tr>
<tr><td>47dBA</td><td>0.39dB</td><td>53dBA</td><td>2.07dB</td><td>59dB</td><td>4.68dB</td></tr>
<tr><td>48dBA</td><td>0.61dB</td><td>54dBA</td><td>2.43dB</td><td>60dB</td><td>5.21dB</td></tr>
<tr><td>49dBA</td><td>0.86dB</td><td>55dBA</td><td>2.82dB</td><td></td><td></td></tr>
<tr><td>50dBA</td><td>1.12dB</td><td>56dBA</td><td>3.25dB</td><td></td><td></td></tr>
</table>
Note: The correction Factor shall be added to the limit of 60 dBA to arrive at the limit when the ambient is greater than 45 dBA</td><td>Test Case 7</td></tr>
</table>

5.9	**Field Observations:** For new products field observation may be carried out by purchaser for the period of one month.	Information
5.10	**MTBF & MTTRPL:** I. **MTBF** of the system shall not be less than 100,000 hours. The MTBF for fans shall be better than 70,000 hours at 40°C. The concurrence of CACT in this regard is mandatory. II. **Module Replacement Time:** The mean time to replace (MTTRPL) a faulty module (FR/FC, Inverter, CCU, Converter) shall be less than 2 minutes.	Undertaking to be taken from OEM
5.11	**Environmental:** Each system shall be capable of operating in conditions conforming to TEC 14016:2010 (old no.QM-333:2010, category B2 or D whichever applicable). It shall also comply with vibration requirements of clause 12.0 of QM-333. The system shall also be capable of working in saline atmosphere of coastal areas and up to an altitude of 3000 Meters in compliance of QM-333.	Certificates from accredited test labs are to be submitted
6.0	**EMI/ EMC**	

6.1	**Radio Frequency Interference (RFI) Suppression** The system (FR/FC, CCU, INVERTER & DSCA modules) shall be designed to minimize the level of electromagnetic interference (EMI), both conducted and radiated, detected in its vicinity and generated by the module and shall comply the following clauses: **I. Conducted and Radiated Emission from the Power equipment.** Name of EMC Standard: CISPR 32 (2015) with A1 (2019) "Electromagnetic compatibility of multimedia equipment – Emission requirements; Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment". **Limits: -** a) To comply with Class A of CISPR 32 (2015) with A1 (2019). b) The values of limits shall be as per relevant tables under CISPR 32 (2015) with A1 (2019). **II. Conducted Susceptibility Limits:** Power equipment used in Telecom Network shall not malfunction when high voltage surge as specified below is superimposed at the input power mains to the power equipment, for more than two seconds as per IEC 61000- 4-18. The equipment shall also not fail or degrade in performance after the surge is withdrawn. **Test levels:** Voltage Rise time (First peak): 75 nano sec +/- 20%. Oscillation Frequencies:100 KHz & 1 MHz +/-10% Repetition rate: at least 40/s for 100KHz and 400/s for 1MHz	Certificates from accredited test labs are to be submitted

Decaying: 50% of the peak value between the 3rd & 6th periods

Burst duration : not less than 2 s

Surge amplitude : 250V (-10%) to 2.5 KV (+10%)

Wave shape : Damped

III. Electrostatic discharge (ESD) immunity limits: The limits shall be as per IEC 61000- 4-2, 9(1) (both Contact discharge method and Air discharge method) as given below:

Contact discharge		Air discharge	
Level	**Test voltage (KV)**	**Level**	**Test voltage (KV)**
4	8	4	15

IV. Electrical fast transient/Burst immunity limits: The limits shall be as specified in IEC 61000-4-4.

Test level:

Open–circuit output test voltage (+/-10%) &repetition rate of impulses (+/ 20%)		
Level	On Power supply port, Protection Earth	
	Voltage peak KV	Repetition rate KHz
4	4	2.5
Rise time of one Pulse - 5 ns +/- 30% Impulse duration - 50 ns +/- 30%		

V. Radiated radio-frequency Electromagnetic field immunity limits: The limits as per IEC 61000-4-3.

Test level:

Frequency range : 80 MHz to 1000 MHz.	
Level	Test field strength V/m
3	10

VI. Surge immunity limits: The limits as per IEC 61000-4-5.

Test level:

Level	Open circuit test voltage(+/- 10%) KV
1	0.5
2	1.0
3	2.0
4	4.0

Voltage surge - 1.2/50 μs

Amplitude - 2 KV(DM)

- 4 KV(CM)

After testing for 4KV, the amplitude shall also be increased to 6 KV (1.2/50 μs) Combined wave form as per IEEE C62.41- 1991 to cover Lightening/ Surge protection test also.

- Test results shall be in compliance of clause 9(b) of IEC 61000-4-5.

Note: The rated voltage of the MOVs shall not be less than 320V.

VII. Radio-Frequency Conducted Susceptibility immunity limits: The limits as per IEC 61000-4-6.

Test level:

Frequency range : 150 KHz- 80 MHz	
Level	Voltage level (e.m.f.)
3	10

7.0

SAFETY REQUIREMENTS

"The equipment shall conform to relevant safety requirements as per IS/ IEC 62368-1:2018 or Latest, as prescribed under Table no. 1 of the TEC document 'SAFETY REQUIREMENTS OF TELECOMMUNICATION EQUIPMENT': TEC10009: 2024." The Manufacturer/supplier shall submit a certificate in respect of compliance to these requirements.

Certificates from accredited test labs are to be submitted

I. TEST SETUP & PROCEDURES:

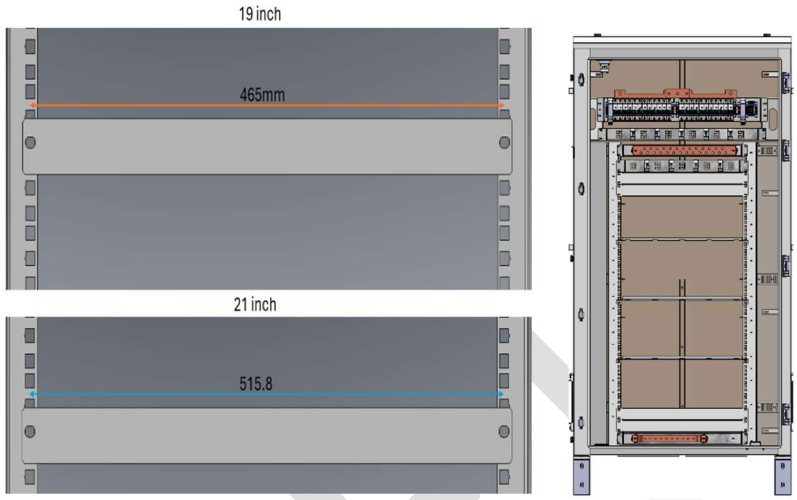
Note:

(a) The test set-up given in this document are tentative and may be changed by testing officer, considering, network/testers/ analyzer/simulator availability. In case of any discrepancy between this TSTP and GR, GR clause shall prevail.

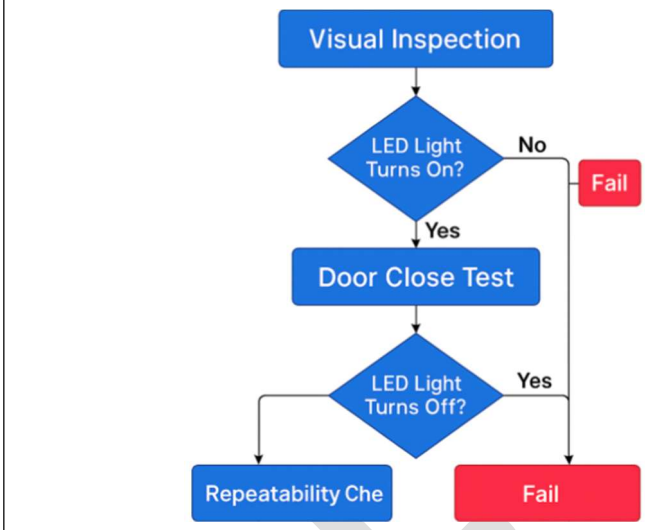
(b) Since this is provisional TSTP. Based on inputs received setup was prepared. Whenever the first testing was offered this provisional TSTP would be revised.

(c) Actual setup and tester/simulator may vary at the time of testing.

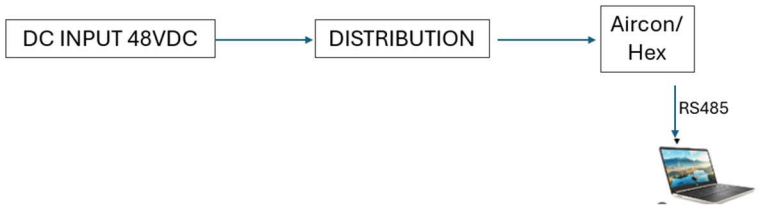
(d) Testing of Outdoor Weather Proof Rack For Telecom Equipments will be done on the basis on testing facility available for testing Outdoor Weather Proof Rack For Telecom Equipments. If no testing facility is available for testing Outdoor Weather Proof Rack For Telecom Equipments, then undertaking from OEM may be taken.

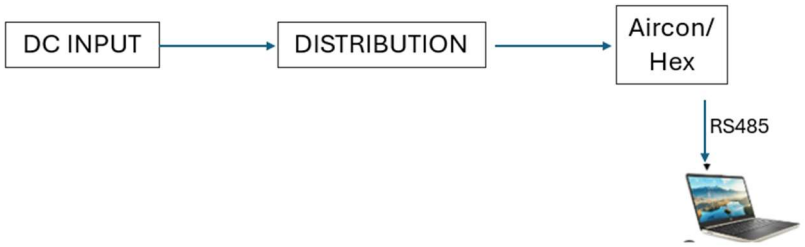
Test No.	**Test Case-1**
Test Details	Clause no. 3.1.2
Test Setup	
Test Procedure	**19”/21”** • **Using test Jig** 1. Mount 19”/21” plate on one of the cutouts in the pillar. 2. Ensure the plate is parallel with respect to ground. 3. Screw mounting holes on both sides of plate. • **Using measuring tape** 1. Place the zero mark of measuring tape at center of 19”/21” cutout. 2. Extend the tape till center of cutout on another end. 3. Ensure the tape is aligned straight along the length you want to measure (avoid bends or slack). **Cabinet Depth** 1. Place the zero mark of measuring tape at the front edge of the Cabinet (in door closed condition).

	2. Pull the tape straight toward the back panel of the cabinet, ensuring it stays level and does not bend 3. Note the reading on measuring Tape.
Test limits	A 19-inch or 21-inch rack suitable for telecom equipment with usable space of maximum 42U.
Expected Results	○ 19” plate should mount easily, and holes should match the pillar cutouts on 19” pillar. ○ 21” plate should mount and holes should match the pillar cutouts on 21” pillar. ○ The depth recorded on measuring tape should be minimum 600mm.

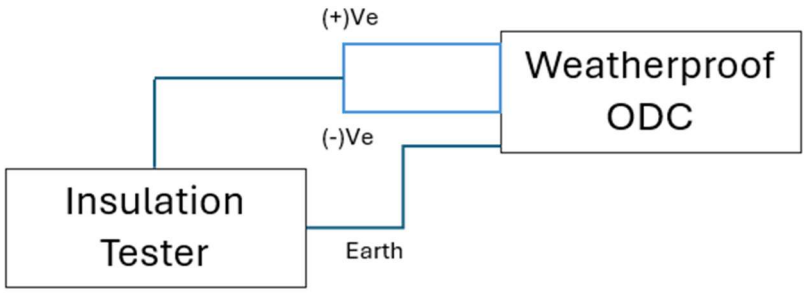
Test No.	**Test Case-2**
Test Details	Clause no. 3.1.10
Test Setup	 
Test Procedure	➢ **Visual Inspection** • Ensure the limit switch is properly mounted on the cabinet and wired to the LED light circuit. • Check that the LED panel light is securely installed and powered. ➢ **Door Open Test** Open the cabinet door slowly until the limit switch is released (open position). ➢ **Door Close Test** Close the cabinet door so the limit switch is pressed (closed position).

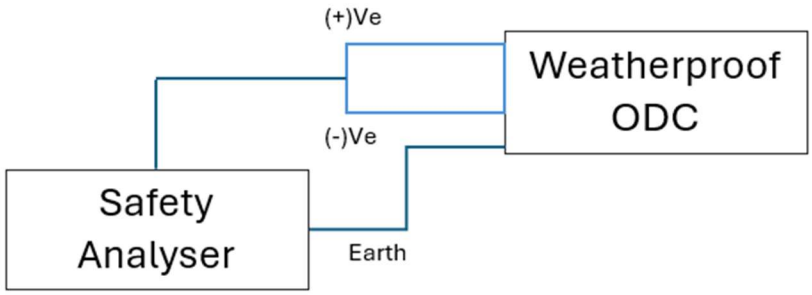
Test limits	○ If the limit switch is slightly misaligned, the test may fail even though the system is functional under normal conditions. ○ Inconsistent door opening/closing speed or incomplete closure can lead to incorrect test results.
Expected Results	○ The LED light should turn ON immediately when the door is open. ○ The LED light should turn OFF immediately when the door is closed.

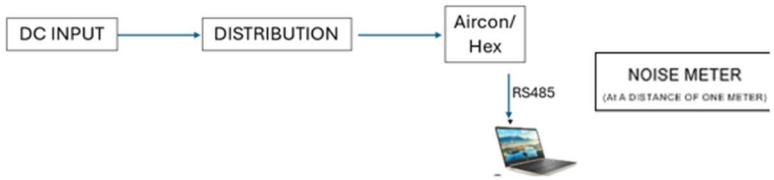
Test No.	**Test Case-3**
Test Details	Clause no. 5.5
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and connect laptop to RS485 port. 2. Data should be logged as per detail mention in the GR. 3. Fully equipped rack should be run for 72hrs with loading as per ultimate capacity.
Test limits	1. The Burn-In Test shall be conducted in Power "On" condition at full Load (Ultimate System Capacity of the Power Plant), by placing the Power Plant in Burn-In Chamber at 50 Deg +/- 2 Deg. C. 2. The AC Mains input Voltage shall be 230V in case of Single Phase and 400V in case of three Phase System. 3. All the Input & Output Parameters shall be recorded throughout the Burn-in test. 4. No of FR/FC Module will be as per system capacity.
Expected Results	Check system performance and limit as specified in GR

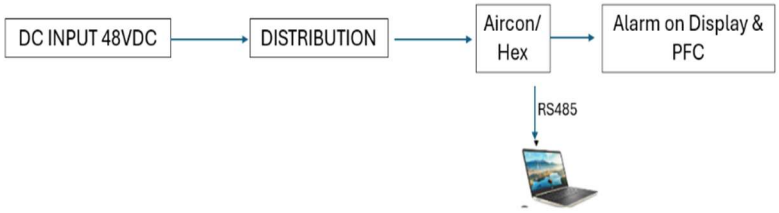
Test No.	**Test Case-4**
Test Details	Clause no. 5.5.1 , Clause no. 5.5.2,Clause no. 5.5.3
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and connect laptop to RS485 port. 2. Connect thermocouple as per detail mention in GR. 3. Data should be logged as per detail mention in GR.
Test Limits	The Temperature rise of the heat dissipating components above the ambient measured directly or at Heat Sink in the first eight hours of the test shall not be more than: 1. Transformers & Choke: 70 Deg. C for Grade B insulation. For Higher grade of insulation, higher temperature rise may be permissible subject to the following conditions: i. It is at least 20 Deg. C below the permissible limit for the grade of Insulation used. ii. The temperature rise shall be at least 30 Deg. C below Curie temperature of the Magnetic material. iii. This temperature shall neither affect other components nor shall lead to fire hazard. 2. Semiconductor devices: 60 Deg. C above the outside ambient temperature or as per Component Specification.

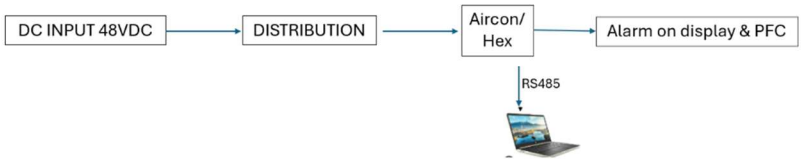
Expected Results	The Unit under test shall be subjected to Heat run for first 8 Hours of Elevated Burn-in at full load. All temperature readings shall be recorded in Deg. C. Readings are to be recorded for every 15 minutes for first 2 Hours and every hour interval for remaining 6 hours as specified in GR.

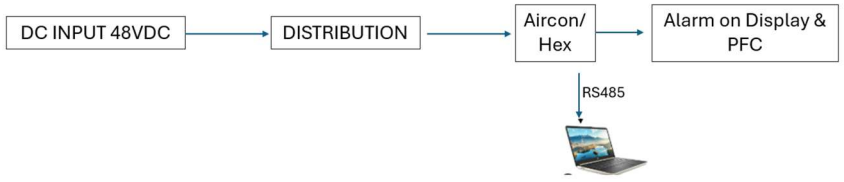
Test No.	**Test Case-5**
Test Details	Clause no. 5.6
Test Setup	
Test Procedure	Connect insulation tester between shorting terminal of DC output & earth. Now check insulation as per clause.
Test limits	DC Output & Earth - Greater than 5 mega Ohm
Expected Results	System should pass without any fault.

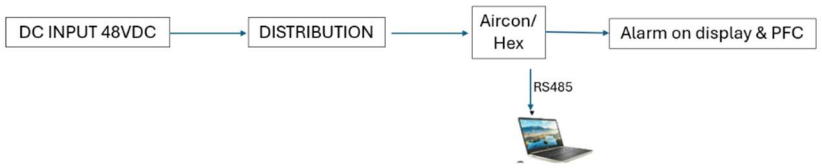
Test No.	**Test Case-6**
Test Details	Clause no. 5.7
Test Setup	
Test Procedure	Connect Safety Analyser between shorting terminal of DC output & earth. Now check voltage proof test as per clause.
Test Limits	1. For HV test using AC power source, it shall be performed by removing EMI/RFI Capacitors and MOVs/Tran zorbs from the circuit. The test is conducted by applying 2000V / 50Hz. All communication cable of DSCA shall be removed and connections to Fan Control Board and AC Auxiliary Supply card shall also be removed. 2. For HV test using DC power source, there is no need of removing EMI/RFI Capacitors, the Lightning Protection Circuitry and Tran zorbs etc., but EMI/RFI discharge resistors shall be removed. 2(i) 2150V DC can be applied for one minute between interconnected input & output terminals. 2(ii) 650V DC can be applied for one minute between interconnected output terminals & earth. 3. This DC voltage test is in accordance with UL 950 & IEC 950 Standards. No breakdown or abnormal temperature rise shall occur.
Expected Results	System shall pass with no breakdown or abnormal temperature rise shall occur as per GR.

Test No.	**Test Case-7**
Test Details	Clause no. 5.8
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and RS485 to Laptop. 2. Set noise meter at distance as specified in GR. 3. Turn on Load. 4. Connect Laptop to monitor system performance. 5. Measure Noise at various conditions.
Test Limits	Noise shall be measured at a distance of 1 meter from the unit & 1.25m above the floor level in the Acoustic Range. The fully equipped rack at full load shall not contribute more than 15 dB (weighted) to the ambient noise level taken as 45dBA.
Expected Results	For result and limit, please refer GR.

Test No.	**Test Case-8**
Test Details	Clause no. 3.1.12
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and connect laptop to RS485 port. 2. Apply Input Voltage ranging from 42VDC to 58VDC. 3. Check for Alarm on Aircon/Hex Display.
Test Limits	Respective Alarm should be available in RS485 as per Clause 3.1.12.
Expected Results	Alarm should be available in RS485.

Test No.	**Test Case-9**
Test Details	Clause no. 3.2.6
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and connect laptop to RS485 port. 2. Apply Input Voltage ranging from 42VDC to 58VDC. 3. Check for Alarm on Aircon/Hex Display.
Test Limits	Cooling unit shall work satisfactorily from 42VDC to 58VDC
Expected Results	Aircon/Hex should function between specified voltage range.

Test No.	**Test Case-10**
Test Details	Clause no. 3.2.10
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and connect laptop to RS485 port. 2. Simulate the conditions of High temperature, low temperature, Humidity, overvoltage, undervoltage, Fan Fail in Aircon/Hex. 3. Simulate the door-open condition by unlocking the cabinet door and fully opening it. 4. Simulate the smoke condition in the Cabinet.
Test Limits	Alarm as per Clause 3.2.10 should be displayed.
Expected Results	Aircon/Hex should display respective alarms as per Clause 3.2.10 for all the conditions.

Test No.	**Test Case-11**
Test Details	Clause no. 3.2.3
Test Setup	
Test Procedure	1. Connect DC input supply to Distribution and connect laptop to RS485 port 2. Apply Input Voltage ranging from 42VDC to 58VDC. 3. Set parameters withing defined range like temperature Control and Regulation, Energy Efficiency, display of Mode of operation, temperature setting and status of operation and various system alarms.
Test Limits	Operational requirements are Temperature Control and Regulation, Energy Efficiency, display of Mode of operation, temperature setting and status of operation and various system alarms.
Expected Results	Microprocessor shall cutoff compressor, etc. as per set defined parameters.

J. SUMMARY OF TEST RESULTS

TEC Standard No._____

TEC Guide No._____

Equipment name & Model No._____

Clause No.	*Compliance* *(Complied /Not Complied / Submitted/Not Submitted / Not Applicable)*	*Remarks / Test Report Annexure No.*

[Add as per requirement]

Date:

Place:

Signature & Name of TEC testing Officer /

* Signature of Applicant / Authorized Signatory

* *Section J as given above is also to be submitted by the Applicant/ Authorised signatory as part of in-house test results along with Form-A. The Authorised signatory shall be the same as the one for Form 'A'.*