सत्यमेव जयते

ISO 9001:2015

GOVERNMENT OF INDIA
MINISTRY OF COMMUNICATIONS
DEPARTMENT OF TELECOMMUNICATIONS
TELECOMMUNICATION ENGINEERING CENTRE
Gate No. 5, Khurshid Lal Bhawan, Janpath, New Delhi-110001

CERTIFICATE OF DESIGNATION

M/s Sunren Telecom Laboratory, Mumbai
(A Division of M/s Sunren Technical Solutions Pvt. Ltd., Mumbai)
has been assessed and designated as Conformity Assessment Body (CAB)

for its facilities at

C-475 TTC Industrial Area Pawane, MIDC Navi Mumbai, Maharashtra-400705

In the field of Testing

Certificate No. TEC/MRA/CAB/IND-D/68

Issue Date: 16/06/2022 **Valid Until: 11/01/2024**

This Certificate remains valid for the Scope of Designation as specified in the Annexure subject to the continued validity of NABL Accreditation and satisfied compliance to the Standards/Specifications against which lab has been designated and strict compliance to the relevant terms and conditions of TEC CAB Designation Scheme.

(To see the scope of designation of this laboratory, you may also visit TEC website www.tec.gov.in)

Signed for and on behalf of TEC

Prasanth

Prasanth Kumar
Deputy Director General (MTCTE)
For Designating Authority
TEC

Certificate No: TEC/MRA/CAB/IND-D/68 dated 16/06/2022, issued to
M/s Sunren Telecom Laboratory, Mumbai
(A Division of M/s Sunren Technical Solutions Pvt. Ltd.)
C-475 TTC Industrial Area Pawane, MIDC Navi Mumbai, Maharashtra-400705

ISO 9001:2015

Validity: 12/01/2021 to 11/01/2024

Terms & Conditions

This certificate is issued as per the terms and conditions stipulated in the TEC Scheme for Designating Domestic Conformity Assessment Bodies and Certification Bodies for Conformity Assessment and Certification of Telecommunication Equipment Issue 2 No. TEC/DES-01/02.DEC.2017.

Some of the conditions are reiterated as under:

A. Obligations of the Designated CAB.

1. It shall ensure that it maintains its accreditation status from any recognised Indian accreditation body like NABL during validity period of certificate.

2. It shall follow the stipulated procedures, rules and policies laid down by Designating Authority (DA) or Mutual Recognition Agreement (MRA)* partner for testing and evaluation.

3. In respect of tests for which it is seeking designation, it shall have no interest whatsoever in any business to carry out testing in an unfair or biased manner.

4. It shall fully indemnify DA from and against all liabilities, damages, claims, costs, and expenses incurred or sustained by DA as a result of any action taken or omitted by DA relating to the process of designation.

5. It shall comply with DA's or MRA partner's terms and conditions for designation and recognition as modified from time to time.

6. It shall be under obligation to participate in the online process prescribed by TEC for test and certification against TEC's GR/IR/ER and Standards.

7. It shall have a record system which shall have a retention period of at least 5 years for documents related to the equipment testing. It shall maintain all the relevant documents including list of products submitted for testing, product-wise testing and evaluation reports. These documents shall be produced before the DA within seven days, as and when required.

8. It shall ensure the Intellectual Property Rights of the customers in the course of testing by maintaining professional ethics, secrecy and keeping all the product related information confidential.

*Applicable only if recognized by MRA (Mutual Recognition Agreement) partner

9. It shall notify the DA in writing of occurrence of any of the following incident(s) within two weeks of its occurrence.

   a) Cessation of its business of conformity assessment for which it is designated or accredited
   b) Changes in its legal, commercial, or Organisational status
   c) Changes, which may affect continuing compliance with any of the criteria or requirement specified by DA or MRA partner.
   d) Change of premises

B. REFERENCE TO DESIGNATION STATUS

1. Designated CABs may advertise their designation status with regard to Standards or parts thereof which are included in the scope of designation.

2. The advertisement should not imply, or otherwise suggest that DA or MRA Partner has endorsed the product or imply that the designated CAB is an agent or representative of DA or MRA Partner.

3. CABs whose designations have been suspended or withdrawn for any reason, shall discontinue advertisement of their designated status and not make any misleading statements regarding their designation status.

C. POST-DESIGNATION SURVEILLANCE

As and when required, DA shall conduct surveillance assessments and other non-routine assessments of the Designated CABs to ensure that Standards of practices are maintained as well as to investigate complaints made against them.

D. SUSPENSION OR WITHDRAWAL OF DESIGNATION

1. DA shall suspend or withdraw the designation of a CAB if
   a. Its accreditation is withdrawn.
   b. It is found that the CAB is not complying with the stipulated criteria or requirements.
   c. It is guilty of any offence involving fraud or dishonesty.
   d. DA concludes that there is a just cause for withdrawing the designation.

2. A CAB whose designation, and recognition in case of MRA, has been suspended or withdrawn shall be removed from the list of designated CABs, in case it fails to take corrective measures.

3. DA shall keep the designation of a Designated CAB under suspension, until the completion of formal review process.

E. AMENDMENT TO THE SCHEME

DA reserves the rights to amend the scheme, as and when required, for the purpose of streamlining designation process.

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SCOPE OF DESIGNATION
(Annexure)

Laboratory Name: **M/s Sunren Telecom Laboratory, Mumbai**
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C-475 TTC Industrial Area Pawane, MIDC Navi Mumbai,
Maharashtra-400705

Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing	Standard/ Specification
1.	Information Technology Equipment- Safety Requirement	Power Interface Clause- 1.6	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Markings and Instructions Clause- 1.7	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Protection from Electric Shock and Energy Hazards Clause- 2.1	IEC 60950-1: 2005 + A1:2009 + A2:2013
		SELV Circuits Clause- 2.2	IEC 60950-1: 2005 + A1:2009 + A2:2013
		TNV Circuit Clause- 2.3	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Limited Current Circuit Clause- 2.4	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Limited Power Source Clause- 2.5	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Provisions for Earthing and Bonding Clause- 2.6	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Over current and Earth Fault Protection in Primary Circuits and Safety Interlocks Clause- 2.7, 2.8 except 2.8.5, 2.8.7	IEC 60950-1: 2005 + A1:2009 + A2:2013

Director (CA), TEC **AD (CA), TEC**

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing	Standard/ Specification
	Information Technology Equipment- Safety Requirement	Electrical Insulation Clause- 2.9	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Clearances and Creepage distances and distance through insulation Clause- 2.10.1 to 2.10.4, 2.10.5.1 to 2.10.5.5, 2.10.5.7, 2.10.5.9, 2.10.5.10 & 2.10.6	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Wiring, Connections and Supply General Clause- 3.1	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Connection to a Main Supply Clause- 3.2 except 3.2.5	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Wiring terminals for connection of External Conductors Clause- 3.3	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Disconnection from the Main Supply Clause- 3.4	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Interconnection of Equipment Clause- 3.5	IEC 60950-1: 2005 + A1:2009 + A2:2013

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing	Standard/ Specification
	Information Technology Equipment- Safety Requirement	Physical requirements Stability Clause- 4.1	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Mechanical Strength Clause- 4.2 except 4.2.8, 4.2.9	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Design and Construction Clause- 4.3 except 4.3.10, 4.3.11, 4.3.12	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Protection against Hazardous Moving Parts Clause- 4.4	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Thermal Requirements Clause- 4.5	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Opening in Enclosure Clause- 4.6 except 4.6.2	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Electrical requirements and Simulated abnormal conditions Touch current and Protective Conductor Current Clause- 5.1	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Electric Strength Clause- 5.2	IEC 60950-1: 2005 + A1:2009 + A2:2013

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing	Standard/ Specification
	Information Technology Equipment- Safety Requirement	Abnormal Operating and Fault Conditions Clause- 5.3	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Connection to Telecommunication Network Clause- 6.1, 6.2, 6.3	IEC 60950-1: 2005 + A1:2009 + A2:2013
		Connection to Cable Distribution System Clause- 7.1, 7.2, 7.3, 7.4 except 7.4.2	IEC 60950-1: 2005 + A1:2009 + A2:2013
2.	**EMI/EMC Testing of Telecommunication Equipment**	Electrostatic Discharge Immunity (ESD) Test IEC 61000-4-2	TEC/SD/DD/EMC-221/05/OCT-16
		Electrical Fast Transient (EFT)/ Burst Immunity Test IEC 61000-4-4	TEC/SD/DD/EMC-221/05/OCT-16
		Surge Immunity Test IEC 61000-4-5	TEC/SD/DD/EMC-221/05/OCT-16

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
3.	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	Parameters Linked with Product Variants	Channel spacing for 10G/40G/100G DWDM ITU-T G.694.1	TEC ER No. TEC78832203
		Interface: GPON	Operating Wavelength Recv. for GPON Int. ITU-T G.984.2 Cl. 8.2.5.2	TEC ER No. TEC78832203
			Operating Wavelength Trans for GPON Int. ITU-T G.984.2 Cl. 8.2.5.1	TEC ER No. TEC78832203
			Opt Output Power for GPON Int. at OLT ITU-T G.984.2	TEC ER No. TEC78832203
			Opt Output Power for GPON Int. at ONT ITU-T G.984.2	TEC ER No. TEC78832203
			Receiver Sensitivity for GPON Int. at OLT ITU-T G.984.2	TEC ER No. TEC78832203
			Receiver Sensitivity for GPON Int. at ONT ITU-T G.984.2	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	**Interface: 2 Wire**	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC78832203
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC78832203
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2.	TEC ER No. TEC78832203
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC78832203
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC78832203
		Interface: 1G Optical Ethernet	Average Launch Power IEEE 802.3z Cl. 38	TEC ER No. TEC78832203
			Receiver Sensitivity IEEE 802.3z Cl. 38	TEC ER No. TEC78832203
			Wavelength IEEE 802.3z Cl. 38	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	Interface: 10/100/1000 BASE-T Ethernet	Link Speed and Auto negotiation Test GE IEEE 802.3	TEC ER No. TEC78832203
		Interface: 10/100 BASE-T Ethernet	Link Speed and Auto negotiation Test FE IEEE 802.3	TEC ER No. TEC78832203
		Interface: 10G Optical Ethernet	Average Launch Power IEEE 802.3ae Cl. 52	TEC ER No. TEC78832203
			Receiver Sensitivity IEEE 802.3ae Cl. 52	TEC ER No. TEC78832203
			Wavelength IEEE 802.3ae Cl. 52	TEC ER No. TEC78832203
		Interface: 100 G Optical Ethernet	Average Launch Power IEEE 802.3ba Cl. 86 88	TEC ER No. TEC78832203
			Receiver Sensitivity IEEE 802.3ba Cl. 86 88	TEC ER No. TEC78832203
			Wavelength IEEE 802.3ba Cl. 86 88	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	**Interface: 40 G Optical Ethernet**	Average Launch Power IEEE 802.3ba Cl. 86 87	TEC ER No. TEC78832203
			Receiver Sensitivity IEEE 802.3ba Cl. 86 87	TEC ER No. TEC78832203
			Wavelength IEEE 802.3ba Cl. 86 87	TEC ER No. TEC78832203
		Interface: ISDN PRI	Bit Rate Tolerance for PRI ITU-T G.703 Clause no. 11.1	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703 Clause no. 11.2	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703 Clause no. 11.3	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823 Clause no. 5.1	TEC ER No. TEC78832203
			Input Jitter Tolerance ITU-T G.823 Clause no. 7.1.2	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	Interface: ISDN PRI	Layer-III PRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC78832203
			Layer-III PRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC78832203
		Interface: 2 Mbps - E1	Input Jitter Tolerance ITU-T G.823 ETSI TBR-4	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	**Interface: 2 Mbps - E1**	Input Return Loss ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203
		Interface: 8 Mbps– E2	Input Jitter Tolerance ITU-T G.823 ETSI TBR-4	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	**Interface: 34 Mbps-E3**	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203
		Interface: 140 Mbps – E4	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	**Interface: 45 Mbps**	DC Power ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203
		Interface: 64kbps	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203
		Interface: Nx64 kbps	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703	TEC ER No. TEC78832203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	Interface: Nx64 kbps	Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.823	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203
		Interface: STM-1 Electrical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC78832203
			Input Return Loss ITU-T G.703	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC78832203
			Output Jitter ITU-T G.825	TEC ER No. TEC78832203
			Pulse Mask ITU-T G.703	TEC ER No. TEC78832203
		Interface: STM-1 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC78832203
			Mean Launched Power ITU-T G.957	TEC ER No. TEC78832203

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Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	**Interface: STM-1 Optical**	Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC78832203
			Operating Wavelength Range ITU-T G.957	TEC ER No. TEC78832203
			Output Jitter ITU-T G.783	TEC ER No. TEC78832203
			Receiver Overload ITU-T G.957	TEC ER No. TEC78832203
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC78832203
		Interface: STM-4 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC78832203
			Mean Launched Power ITU-T G.957	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC78832203
			Operating Wavelength Range ITU-T G.957	TEC ER No. TEC78832203
			Output Jitter ITU-T G.783	TEC ER No. TEC78832203

Director (CA), TEC **AD (CA), TEC**

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SCOPE OF DESIGNATION
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Laboratory Name: **M/s Sunren Telecom Laboratory, Mumbai**
(A Division of M/s Sunren Technical Solutions Pvt. Ltd.)
C-475 TTC Industrial Area Pawane, MIDC Navi Mumbai, Maharashtra-400705

Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Transmission Terminal Equipment (SDH, DWDM, Multiplexing Equipment, DXC)	Interface: STM-4 Optical	Receiver Overload ITU-T G.957	TEC ER No. TEC78832203
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC78832203
		Interface: STM-16 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC78832203
			Mean Launched Power ITU-T G.957	TEC ER No. TEC78832203
			Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC78832203
			Operating Wavelength Range ITU-T G.957	TEC ER No. TEC78832203
			Output Jitter ITU-T G.783	TEC ER No. TEC78832203
			Receiver Overload ITU-T G.957	TEC ER No. TEC78832203
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC78832203

Director (CA), TEC
AD (CA), TEC

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Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
4.	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Parameters Linked with Product Variants	Dynamic Routing RFC 4728, Annex-P11 (Functional Testing)	TEC ER No. TEC37682204
			Radius RFC 2865 (Functional testing)	TEC ER No. TEC37682204
			PPPoE RFC 2516 (Functional testing)	TEC ER No. TEC37682204
			Manageability SNMP v2 or v3 RFC 3410, RFC 3416 (Functional testing)	TEC ER No. TEC37682204
		Interface: 10/100/1000 BASE-T Ethernet	Link Speed and Auto negotiation Test GE IEEE 802.3	TEC ER No. TEC37682204
		Interface: 10/100 BASE-T Ethernet	Link Speed and Auto negotiation Test FE IEEE 802.3	TEC ER No. TEC37682204

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Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: 1G Optical Ethernet	Average Launch Power IEEE 802.3z Cl. 38	TEC ER No. TEC37682204
			Receiver Sensitivity IEEE 802.3z Cl. 38	TEC ER No. TEC37682204
			Wavelength IEEE 802.3z Cl. 38	TEC ER No. TEC37682204
		Interface: 10G Optical Ethernet	Average Launch Power IEEE 802.3ae Cl. 52	TEC ER No. TEC37682204
			Receiver Sensitivity IEEE 802.3ae Cl. 52	TEC ER No. TEC37682204
			Wavelength IEEE 802.3ae Cl. 52	TEC ER No. TEC37682204
		Interface:100 G Optical Ethernet	Average Launch Power IEEE 802.3ba Cl. 86 88	TEC ER No. TEC37682204
			Receiver Sensitivity IEEE 802.3ba Cl. 86 88	TEC ER No. TEC37682204
			Wavelength IEEE 802.3ba Cl. 86 88	TEC ER No. TEC37682204
		Interface: 40 G Optical Ethernet	Average Launch Power IEEE 802.3ba Cl. 86 87	TEC ER No. TEC37682204
			Receiver Sensitivity IEEE 802.3ba Cl. 86 87	TEC ER No. TEC37682204
			Wavelength IEEE 802.3ba Cl. 86 87	TEC ER No. TEC37682204

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Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: ISDN BRI	Layer-III BRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC37682204
			Layer-III BRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC37682204
		Interface: ISDN PRI	Bit Rate Tolerance for PRI ITU-T G.703 Clause no. 11.1	TEC ER No. TEC37682204

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: ISDN PRI	Pulse Mask ITU-T G.703 Clause no. 11.2	TEC ER No. TEC37682204
			Input Return Loss ITU-T G.703 Clause no. 11.3	TEC ER No. TEC37682204
			Output Jitter ITU-T G.823 Clause no. 5.1	TEC ER No. TEC37682204
			Input Jitter Tolerance ITU-T G.823 Clause no. 7.1.2	TEC ER No. TEC37682204
			Layer-III PRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC37682204

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	**Interface: ISDN PRI**	Layer-III PRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC37682204
		Interface: 2 Mbps - E1	Input Jitter Tolerance ITU-T G.823 ETSI TBR-4	TEC ER No. TEC37682204
			Input Return Loss ITU-T G.703	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37682204
			Output Jitter ITU-T G.823	TEC ER No. TEC37682204
			Pulse Mask ITU-T G.703	TEC ER No. TEC37682204

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: 34 Mbps-E3	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC37682204
			Input Return Loss ITU-T G.703	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37682204
			Output Jitter ITU-T G.823	TEC ER No. TEC37682204
			Pulse Mask ITU-T G.703	TEC ER No. TEC37682204
		Interface: 45 Mbps	DC Power ITU-T G.703	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37682204
			Pulse Mask ITU-T G.703	TEC ER No. TEC37682204
		Interface: 64kbps	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC37682204
			Input Return Loss ITU-T G.703	TEC ER No. TEC37682204

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	**Interface:64 kbps**	Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37682204
			Output Jitter ITU-T G.823	TEC ER No. TEC37682204
			Pulse Mask ITU-T G.703	TEC ER No. TEC37682204
		Interface: Nx64 kbps	Input Jitter Tolerance ITU-T G.823	TEC ER No. TEC37682204
			Input Return Loss ITU-T G.703	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37682204
			Output Jitter ITU-T G.823	TEC ER No. TEC37682204
			Pulse Mask ITU-T G.703	TEC ER No. TEC37682204
		Interface: STM-1 Electrical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC37682204
			Input Return Loss ITU-T G.703	TEC ER No. TEC37682204

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GOVERNMENT OF INDIA
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TELECOMMUNICATION ENGINEERING CENTRE
Gate No. 5, Khurshid Lal Bhawan, Janpath, New Delhi - 110 001

ISO 9001:2015

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: STM-1 Electrical	Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37682204
			Output Jitter ITU-T G.825	TEC ER No. TEC37682204
			Pulse Mask ITU-T G.703	TEC ER No. TEC37682204
		Interface: STM-1 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC37682204
			Mean Launched Power ITU-T G.957	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC37682204
			Operating Wavelength Range ITU-T G.957	TEC ER No. TEC37682204
			Output Jitter ITU-T G.783	TEC ER No. TEC37682204
			Receiver Overload ITU-T G.957	TEC ER No. TEC37682204
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC37682204

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: STM-4 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC37682204
			Mean Launched Power ITU-T G.957	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC37682204
			Operating Wavelength Range ITU-T G.957	TEC ER No. TEC37682204
			Output Jitter ITU-T G.783	TEC ER No. TEC37682204
			Receiver Overload ITU-T G.957	TEC ER No. TEC37682204
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC37682204
		Interface: STM-16 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC37682204
			Mean Launched Power ITU-T G.957	TEC ER No. TEC37682204
			Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC37682204

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Interface: STM-16 Optical	Operating Wavelength Range ITU-T G.957	TEC ER No. TEC37682204
			Output Jitter ITU-T G.783	TEC ER No. TEC37682204
			Receiver Overload ITU-T G.957	TEC ER No. TEC37682204
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC37682204
5.	IP Security Equipment (UTM, IPS, IDS, Firewall Equipment)	Parameters Linked with Product Variants	Manageability SNMP v2 or v3 RFC 3410, RFC 3416 (Functional testing)	TEC ER No. TEC34731911
		Interface: 10/100/1000 BASE-T Ethernet	Link Speed and Auto negotiation Test GE IEEE 802.3	TEC ER No. TEC34731911
		Interface: 10/100 BASE-T Ethernet	Link Speed and Auto negotiation Test FE IEEE 802.3	TEC ER No. TEC34731911

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	IP Security Equipment (UTM, IPS, IDS, Firewall Equipment)	Interface: 1G Optical Ethernet	Average Launch Power IEEE 802.3z Cl. 38	TEC ER No. TEC34731911
			Receiver Sensitivity IEEE 802.3z Cl. 38	TEC ER No. TEC34731911
			Wavelength IEEE 802.3z Cl. 38	TEC ER No. TEC34731911
		Interface: 10G Optical Ethernet	Average Launch Power IEEE 802.3ae Cl. 52	TEC ER No. TEC34731911
			Receiver Sensitivity IEEE 802.3ae Cl. 52	TEC ER No. TEC34731911
			Wavelength IEEE 802.3ae Cl. 52	TEC ER No. TEC34731911
		Interface: 100 G Optical Ethernet	Average Launch Power IEEE 802.3ba Cl. 86 88	TEC ER No. TEC34731911
			Receiver Sensitivity IEEE 802.3ba Cl. 86 88	TEC ER No. TEC34731911
			Wavelength IEEE 802.3ba Cl. 86 88	TEC ER No. TEC34731911
		Interface: 40 G Optical Ethernet	Average Launch Power IEEE 802.3ba Cl. 86 87	TEC ER No. TEC34731911
			Receiver Sensitivity IEEE 802.3ba Cl. 86 87	TEC ER No. TEC34731911
			Wavelength IEEE 802.3ba Cl. 86 87	TEC ER No. TEC34731911

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	IP Security Equipment (UTM, IPS, IDS, Firewall Equipment)	Interface: Fast Ethernet Optical	Average Launch Power IEEE 802.3u	TEC ER No. TEC34731911
			Receiver Sensitivity IEEE 802.3u	TEC ER No. TEC34731911
			Wavelength IEEE 802.3u	TEC ER No. TEC34731911
6.	Precision Timing Protocol (PTP) Grand Master (GM) Equipment	Parameters Linked with Product Variants	Manageability SNMP v2 or v3 RFC 3410, RFC 3416 (Functional testing)	TEC ER No. TEC37871911
		Interface: 1G Optical Ethernet	Average Launch Power IEEE 802.3z Cl.	TEC ER No. TEC37871911
			Receiver Sensitivity IEEE 802.3z Cl. 38	TEC ER No. TEC37871911
			Wavelength IEEE 802.3z Cl. 38	TEC ER No. TEC37871911
		Interface: 10/100/1000 BASE-T Ethernet	Link Speed and Auto negotiation Test GE IEEE 802.3	TEC ER No. TEC37871911

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Precision Timing Protocol (PTP) Grand Master (GM) Equipment	**Interface: 2 Mbps - E1**	Input Jitter Tolerance ITU-T G.823 ETSI TBR-4	TEC ER No. TEC37871911
			Input Return Loss ITU-T G.703	TEC ER No. TEC37871911
			Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC37871911
			Output Jitter ITU-T G.823	TEC ER No. TEC37871911
			Pulse Mask ITU-T G.703	TEC ER No. TEC37871911
7.	**PABX**	**Interface: Fast Ethernet Electrical**	Link Speed and Auto Negotiation Test FE IEEE 802.3	TEC ER No. TEC67292002
		Interface: Gigabit Ethernet Electrical	Link Speed and Auto Negotiation Test GE IEEE 802.3	TEC ER No. TEC67292002
		Interface: 2-Wire Trunk	Current on Junction/ Trunk Line in PABX ETSI EN 300 001	TEC ER No. TEC67292002

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PABX	Interface: 2-Wire Trunk	DC Resistance ETSI TBR-21 Clause 4.4.1	TEC ER No. TEC67292002
			Longitudinal Conversion Loss for 2W Trunk Int. Clause No. 2.2.2 & Figure-2 of ITU-T Q.552	TEC ER No. TEC67292002
			Resistance to Earth Clause No. 4.4.4 of ETSI TBR-21	TEC ER No. TEC67292002
			Return Loss for 2 W Trunk Int. Clause No. 2.2.1.2 & Figure-1 of ITU-T Q.552	TEC ER No. TEC67292002
			Transmission of DTMF Signalling Clause 6 & 7 of ITU-T Q.23	TEC ER No. TEC67292002

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PABX	Interface: ISDN PRI	Bit Rate Tolerance for PRI ITU-T G.703 Clause no. 11.1	TEC ER No. TEC67292002
			Pulse Mask ITU-T G.703 Clause no. 11.2	TEC ER No. TEC67292002
			Input Return Loss ITU-T G.703 Clause no. 11.3	TEC ER No. TEC67292002
			Output Jitter ITU-T G.823 Clause no. 5.1	TEC ER No. TEC67292002
			Input Jitter Tolerance ITU-T G.823 Clause no. 7.1.2	TEC ER No. TEC67292002
			Layer-III PRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC67292002

Director (CA), TEC AD (CA), TEC

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Laboratory Name: **M/s Sunren Telecom Laboratory, Mumbai (A Division of M/s Sunren Technical Solutions Pvt. Ltd.) C-475 TTC Industrial Area Pawane, MIDC Navi Mumbai, Maharashtra-400705**

Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PABX	**Interface: ISDN PRI**	Layer-III PRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC67292002
8.	**ISDN Customer Premises Equipment**	**Interface: Fast Ethernet Electrical**	Link Speed and Auto negotiation Test FE IEEE 802.3	TEC ER No. TEC64731911
		Interface: Gigabit Ethernet Electrical	Link Speed and Auto negotiation Test GE IEEE 802.3	TEC ER No. TEC64731911
		Interface: 2-Wire Trunk	Current on Junction/ Trunk Line in PABX ETSI EN 300 001	TEC ER No. TEC64731911

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	ISDN Customer Premises Equipment	Interface:2-Wire Trunk	DC Resistance ETSI TBR-21 Clause 4.4.1	TEC ER No. TEC64731911
			Longitudinal Conversion Loss for 2W Trunk Int. Clause No. 2.2.2 & Figure-2 of ITU-T Q.552	TEC ER No. TEC64731911
			Resistance to Earth Clause No. 4.4.4 of ETSI TBR-21	TEC ER No. TEC64731911
			Return Loss for 2 W Trunk Int. Clause No. 2.2.1.2 & Figure-1 of ITU-T Q.552	TEC ER No. TEC64731911
			Transmission of DTMF Signalling Clause 6 & 7 of ITU-T Q.23	TEC ER No. TEC64731911

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	ISDN Customer Premises Equipment	**Interface: ISDN BRI**	Layer-III BRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC64731911
			Layer-III BRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC64731911
		Interface: ISDN PRI	Bit Rate Tolerance for PRI ITU-T G.703 Clause no. 11.1	TEC ER No. TEC64731911

Director (CA), TEC

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	ISDN Customer Premises Equipment	Interface: ISDN PRI	Pulse Mask ITU-T G.703 Clause no. 11.2	TEC ER No. TEC64731911
			Input Return Loss ITU-T G.703 Clause no. 11.3	TEC ER No. TEC64731911
			Output Jitter ITU-T G.823 Clause no. 5.1	TEC ER No. TEC64731911
			Input Jitter Tolerance ITU-T G.823 Clause no. 7.1.2	TEC ER No. TEC64731911
			Layer-III PRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC64731911

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Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	ISDN Customer Premises Equipment	**Interface: ISDN PRI**	Layer-III PRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC64731911
9.	**2- Wire Telephone Equipment**	**Parameters Linked with Product Variant**	Acoustic Shock Absorption P.360 Clause 4.1	TEC ER No. TEC18352108
			Over voltage current Protection ITU-T K.21	TEC ER No. TEC18352108
		Interface: 2 Wire	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC18352108
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC18352108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	2- Wire Telephone Equipment	Interface: 2 Wire	Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2.	TEC ER No. TEC18352108
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC18352108
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC18352108
		Interface: ISDN BRI	Layer-III BRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC18352108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	2- Wire Telephone Equipment	Interface: ISDN BRI	Layer-III BRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC18352108
10.	Point of Sales (PoS) Devices	Interface: 2 Wire	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC17672201
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC17672201
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2.	TEC ER No. TEC17672201
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC17672201

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Point of Sales (PoS) Devices	**Interface: 2 Wire**	Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC17672201
		Interface: Bluetooth Low Energy (BLE)	EIRP for BLE interface (Conducted Only) ≤ 4W (36 dBm) As per WPC GSR 45(E) ETSI EN 300 328 v2.2.2 (2019-07) clause 4.3.1.2 or 4.3.2.2	TEC ER No. TEC17672201
			Frequency of Operation of BLE int. (Conducted Only) Latest NFAP Annexure-1 2.4 GHz to 2.4835 GHz (As per WPC GSR 45(E))	TEC ER No. TEC17672201
			Spurious Emission for BLE Interface (Conducted Only) As per ETSI EN 300 328 v2.2.2 (2019-07) Clause 4.3.1.10 or 4.3.2.9	TEC ER No. TEC17672201

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Point of Sales (PoS) Devices	Interface: RFID	Permitted range of operating frequencies Latest NFAP Annexure-150 KHz to 200 KHz And / OR 13.553 MHz to 13.567MHz	TEC ER No. TEC17672201
		Interface: Wi-Fi	RF Output Power ETSI EN 300 328 v 2.2.2(2019-07) Clause 5.4.2.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
			Power Spectral Density ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.3.2.1 (For Conducting testing only)	TEC ER No. TEC17672201

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Point of Sales (PoS) Devices	**Interface: Wi-Fi**	Hopping Frequency Separation ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.5.2.1 (For Conducting testing only	TEC ER No. TEC17672201
			Adaptivity ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.6.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
			Occupied Channel Bandwidth/20 dB Bandwidth ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.7.2.1 (For Conducting testing only)	TEC ER No. TEC17672201

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Point of Sales (PoS) Devices	**Interface: Wi-Fi**	Transmitter unwanted emissions in the Out-of-band domain ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.8.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
			Transmitter unwanted emissions in the spurious domain ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.9.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
			Frequency Range ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.2 (For Conducting testing only)	TEC ER No. TEC17672201

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Point of Sales (PoS) Devices	**Interface: Wi-Fi**	Occupied Channel Bandwidth/20 dB Bandwidth ETSI EN 300 893 v 2.1.1(2017-05) Clause 5.4.3.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
			RF Output Power ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.4.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
			Peak Power Spectral Density ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.4.2.1.3 (For Conducting testing only)	TEC ER No. TEC17672201

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Point of Sales (PoS) Devices	Interface: Wi-Fi	Transmitter unwanted emissions outside the 5 GHz RLAN bands ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.5.2.1 (For Conducting testing only	TEC ER No. TEC17672201
			Receiver Spurious emissions ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.7.1, 5.4.7.2.1 (For Conducting testing only)	TEC ER No. TEC17672201
11.	Modem (V.90/ V92/ V21 to V34 Modem)	Parameters linked to product variants	Over Voltage Current Protection ITU-T K.21	TEC ER No. TEC16632108
			Modem Receiver Signal V.34 (para 6.6)	TEC ER No. TEC16632108
			Modem Transmit Power T.4 (-3dBm to -15 dBm)	TEC ER No. TEC16632108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Modem (V.90/ V92/ V21 to V34 Modem)	**Interface: 2 Wire**	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC16632108
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC16632108
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2.	TEC ER No. TEC16632108
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC16632108
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC16632108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Modem (V.90/ V92/ V21 to V34 Modem)	Interface: ISDN BRI	Layer-III BRI Specification - Call Clearing ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC16632108
			Layer-III BRI Specification - Call Setup ITU-T Q.931 Clause no.3.1.1, 3.1.2, 3.1.3, 3.1.14, 3.1.15, 3.1.5, 3.1.9, 3.1.10, 4.5.5, 4.5.8, 4.5.10, 4.5.13, Table 6-5 for all call clearing message	TEC ER No. TEC16632108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
12.	G3 Fax Machine	Parameters Linked with Product Variant	Acoustic Shock Absorption P.360	TEC ER No. TEC13292108
			Over voltage current Protection on 2W ITU-T K.21	TEC ER No. TEC13292108
			Receiver Sensitivity for FAX T.4 Clause 7	TEC ER No. TEC13292108
			Transmit Power Fax Machine T.4 Clause 6	TEC ER No. TEC13292108
		Interface: 2 Wire	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC13292108
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC13292108
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2.	TEC ER No. TEC13292108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	G3 Fax Machine	Interface: 2 Wire	Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC13292108
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC13292108
13.	Cordless Telephone	Parameters linked to product variants	Acoustic Shock Absorption P.360	TEC ER No. TEC12672108
			Over voltage current Protection ITU-T K.21	TEC ER No. TEC12672108
			EIRP for Cordless Telephone WPC GSR	TEC ER No. TEC12672108
			Frequency band for Cordless Telephone WPC GSR	TEC ER No. TEC12672108
			Spurious Emissions for Cordless Telephone Annexure- D2	TEC ER No. TEC12672108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	Cordless Telephone	**Parameters linked to product variants**	Transmit Power for Cordless Telephone Annexure- D2	TEC ER No. TEC12672108
		Interface: 2 Wire	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC12672108
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC12672108
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2	TEC ER No. TEC12672108
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC12672108
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC12672108

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Certificate Number: TEC/MRA/CAB/IND-D/68

Validity: 12/01/2021 to 11/01/2024* **Last Amended on: 16/06/2022**

Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
14.	Conferencing Equipment	Parameters Linked with Product Variant	Voice Conference Verification (Functional Test)	TEC ER No. TEC12662108
		Interface: 2 Wire	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC12662108
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC12662108
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2	TEC ER No. TEC12662108
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC12662108
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC12662108

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
15.	PON Family of Broadband Equipment (ONT, ONU, OLT)	Parameters Linked with Product Variants	MAC Address Limitation in PON IEEE 802.3 (For GPON interface based PON OLT only)	TEC ER No. TEC14762203
			Password based authentication in PON ITU-T G.984.3 Section 9.2.2 12	TEC ER No. TEC14762203
			Frame loss of PON RFC 2544 (For GPON interface based PON OLT only)	TEC ER No. TEC114762203
			Latency of PON RFC 2544 (For GPON interface based PON OLT only)	TEC ER No. TEC14762203
			MAC address learning and Aging control G.984.1	TEC ER No. TEC14762203
			Over Voltage and Over Current Protection on 2W ITU-T K.21	TEC ER No. TEC14762203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PON Family of Broadband Equipment (ONT, ONU, OLT)	Interface: 2 Wire	Idle State Current for 2 wire Int. ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1	TEC ER No. TEC14762203
			Insulation Test for 2 wire Int. ETSI EN 300 001	TEC ER No. TEC14762203
			Longitudinal Conversion Loss for 2W Int. Q.552 Cl. 2.2.2	TEC ER No. TEC14762203
			Maximum Loop Current for 2W Int. ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3	TEC ER No. TEC14762203
			Return Loss for 2W Int. Q.552 Cl. 2.2.1.2	TEC ER No. TEC14762203
		Interface: 1G Optical Ethernet	Average Launch Power IEEE 802.3z Cl. 38	TEC ER No. TEC14762203
			Receiver Sensitivity IEEE 802.3z Cl. 38	TEC ER No. TEC14762203
			Wavelength IEEE 802.3z Cl. 38	TEC ER No. TEC14762203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PON Family of Broadband Equipment (ONT, ONU, OLT)	**Interface: 10/100/1000 BASE-T Ethernet**	Link Speed and Auto negotiation Test GE IEEE 802.3	TEC ER No. TEC14762203
		Interface: 10/100 BASE-T Ethernet	Link Speed and Auto negotiation Test FE IEEE 802.3	TEC ER No. TEC14762203
		Interface: 10 BASE-T Ethernet	Link Speed IEEE 802.3	TEC ER No. TEC14762203
		Interface: 10G Optical Ethernet	Average Launch Power IEEE 802.3ae Cl. 52	TEC ER No. TEC14762203
			Receiver Sensitivity IEEE 802.3ae Cl. 52	TEC ER No. TEC14762203
			Wavelength IEEE 802.3ae Cl. 52	TEC ER No. TEC14762203
		Interface: 2 Mbps - E1	Input Jitter Tolerance ITU-T G.823 ETSI TBR-4	TEC ER No. TEC14762203
			Input Return Loss ITU-T G.703	TEC ER No. TEC14762203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PON Family of Broadband Equipment (ONT, ONU, OLT)	Interface: 2 Mbps - E1	Nominal Bit Rate with Tolerance ITU-T G.703	TEC ER No. TEC14762203
			Output Jitter ITU-T G.823	TEC ER No. TEC14762203
			Pulse Mask ITU-T G.703	TEC ER No. TEC14762203
		Interface: STM-1 Optical	Input Jitter Tolerance ITU-T G.825	TEC ER No. TEC14762203
			Mean Launched Power ITU-T G.957	TEC ER No. TEC14762203
			Nominal Bit Rate with Tolerance ITU-T G.957	TEC ER No. TEC14762203
			Operating Wavelength Range ITU-T G.957	TEC ER No. TEC14762203
			Output Jitter ITU-T G.783	TEC ER No. TEC14762203
			Receiver Overload ITU-T G.957	TEC ER No. TEC14762203
			Receiver Sensitivity ITU-T G.957	TEC ER No. TEC14762203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PON Family of Broadband Equipment (ONT, ONU, OLT)	**Interface: Wi-Fi**	RF Output Power ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.2.2.1 (For Conducting testing only)	TEC ER No. TEC14762203
			Power Spectral Density ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.3.2.1 (For Conducting testing only)	TEC ER No. TEC14762203
			Hopping Frequency Separation ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.5.2.1 (For Conducting testing only	TEC ER No. TEC14762203
			Adaptivity ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.6.2.1 (For Conducting testing only)	TEC ER No. TEC14762203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PON Family of Broadband Equipment (ONT, ONU, OLT)	Interface: Wi-Fi	Occupied Channel Bandwidth/20 dB Bandwidth ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.7.2.1 (For Conducting testing only)	TEC ER No. TEC14762203
			Transmitter unwanted emissions in the Out-of-band domain ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.8.2.1 (For Conducting testing only)	TEC ER No. TEC14762203
			Transmitter unwanted emissions in the spurious domain ETSI EN 300 328 v 2.2.2 (2019-07) Clause 5.4.9.2.1 (For Conducting testing only)	TEC ER No. TEC14762203

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Sl. No.	Telecom Equipment/Product	Test Parameter or Type of Testing		Standard/ Specification
	PON Family of Broadband Equipment (ONT, ONU, OLT)	**Interface: Wi-Fi**	Frequency Range ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.2 (For Conducting testing only)	TEC ER No. TEC14762203
			Occupied Channel Bandwidth/20 dB Bandwidth ETSI EN 300 893 v 2.1.1(2017-05) Clause 5.4.3.2.1 (For Conducting testing only)	TEC ER No. TEC14762203
			RF Output Power ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.4.2.1 (For Conducting testing only)	TEC ER No. TEC14762203

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GOVERNMENT OF INDIA
MINISTRY OF COMMUNICATIONS
DEPARTMENT OF TELECOMMUNICATIONS
TELECOMMUNICATION ENGINEERING CENTRE
Gate No. 5, Khurshid Lal Bhawan, Janpath, New Delhi - 110 001

ISO 9001:2015

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	PON Family of Broadband Equipment (ONT, ONU, OLT)	**Interface: Wi-Fi**	Peak Power Spectral Density ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.4.2.1.3 (For Conducting testing only)	TEC ER No. TEC14762203
			Transmitter unwanted emissions outside the 5 GHz RLAN bands ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.5.2.1 (For Conducting testing only	TEC ER No. TEC14762203
			Receiver Spurious emissions ETSI EN 300 893 v 2.1.1 (2017-05) Clause 5.4.7.1, 5.4.7.2.1 (For Conducting testing only)	TEC ER No. TEC14762203

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