File No.ENE51-TRM0MISC/47/2021-EEPR3

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

VIDYUT SOUDHA:: VIJAYAWADA

Sub: Vendor Registration Cell – Delegation of Powers for Vendor Registration – Service Level Agreements (SLAs) – Orders issued.

T.O.O(CE-Trans) Ms. No. 2161 Dt: 27-04-2021.

Ref: 1) T.O.O. CE(DFID&APL)/Ms.No.49, Dt:16-05-2003.
2) T.O.O. (CE-Trans) Ms.No.1942, Dt: 29-09-2020.

* * * * *

ORDER

1. As per clause 3.4 of purchase manual procedures which were implemented vide T.O.O. cited (1) above, "the authority for vendor registration will be the next higher official to the officer who invites for vendor registration".
2. After careful examination, in partial modifications of orders issued in Ref (1) T.O.O. and in supersession of orders issued in Ref(2) T.O.O., APTRANSCO accords approval for procedure of Vendor Registration for Centralised Items in Annexure-III .

Action	Action by/ Authorised Signatory	Form	SLA
Submission of Application	Vendor	Application Form-F1 Annexure-I (Documents to be uploaded) Annexure-II (Signed physical copies to be submitted)	T (Time of submission of online application and physical documents without any shortfall)
Verification of all documents & preparation of Check list at desk	Deputy Executive Engineer/Vendor Registration	Form-F2	T+10 days
Verification of documents & Inspection of Factory and submission of remarks and recommendations with Check list by Quality Assurance wing	Executive Engineer/ Quality Assurance	Form-F3	T+50 days
Vendor Registration Approval	Chief Engineer/ Transmission	Registration Form -F4	T+60 days

3. Vendors Registering with APTRANSCO shall apply in Vendor Registration Form-1 with Annexure-I in online. Vendor shall submit the downloaded application along with list of documents as per Annexure-II to Superintending Engineer/Procurement and Material Management. The Chief Engineer/Transmission shall approve vendor registrations as per SLA indicated and communicate registration form-F4 to the vendor.

4. These orders are available on APTRANSCO website and can be accessed at the address aptransco.co.in at Home→Services→Vendor Management

(BY ORDER AND IN THE NAME OF CHAIRMAN AND MANAGING DIRECTOR APTRANSCO)

Srikant Nagulapalli
CHAIRMAN AND MANAGING DIRECTOR,
APTRANSCO

To
All Functional Heads/ APTransco/Vidyut Soudha/Vijayawada.
The Chief Engineer/Zones/Kadapa/Vijayawada/Visakhapatnam.

Copy to
PS to Chairman & Managing Director/APTransco/VS/Vijayawada.
PS to Chairman & Managing Director/APSPDCL/Tirupati.
PS to Chairman & Managing Director/APEPDCL/Visakhapatnam
PS to Chairman & Managing Director/APCPDCL/Vijayawada.
PS to Joint Managing Director (Vigilance & Security)/APTransco/ VS/ VijayawadaPS to Joint Managing Director /APTransco/VS/Vijayawada
PS to Director (Finance))/APTransco/VS/Vijayawada
PS to Director (Grid Management & Transmission Management)/ APTransco/VS/ Vijayawada

//FORWARDED BY ORDER//

DEPUTY EXECUTIVE ENGINEER
VENDOR REGISTRATION

ANNEXURE-I

Documents to be uploaded in On-line

1	Certificate of Registration with Industries
2	GST Certificate
3	Pan Card
4	Approved Vendor Certificates of Other Power Utilities
5	Applicable Standards and ISO/ISI Certificate, Quality Plan
6	Manufacturing Capacity as certified by Industries Department
7	Manufacturing Experience LOAs, POs, CIPs, Supply Completion Certificate
8	Performance certificates issued towards past supply from APTRANSCO/PGCIL/Other Power Utilities
9	Type Test Certificate of product/item/material during last 5 years
10	List of Manufacturing Facilities, List of Machinery and their latest calibration
11	List of Testing and R&D Facilities and their latest calibration
12	List of Technical Personnel and their Qualification and Experience
13	Annual Turn Over during last 5 financial years for relevant Products
14	Funding and Non-funding facilities from Banks like BG, LC and Cash Limits
15	List Orders on hand, Present Status and commitments etc
16	Details of Quality accreditations/ Awards received
17	History of any Litigation, Termination, Black Listing, Debar, Others
18	Source of Raw Material for production or fabrication or

SRIKANT NAGULAPALLI,
CMD(SN), CHAIRMAN AND MANAGING DIRECTOR-ENE51

ANNEXURE-II

Documents to be submitted to Superintending Engineer/Procurement & Material Management along with signed downloaded application & original Demand Draft.

1	Power of attorney and copies thereof.
2	Income Tax, Sales Tax, Turnover, Tax Clearance certificate of applicant firm (for 3 years).
3	A certified copy of the Partnership Deed.
4	Balance Sheet for last 3 years.
5	Profit & Loss statement for the last 3 years.
6	Memorandum and Articles of Association.
7	Performance reports.
8	Type test certificates.
9	Product catalogue:
10	Valid Industrial Registration Certificate.
11	Drawings & GTPs of product
12	Previous vendor registration certificate for renewal

SRIKANT NAGULAPALLI,
CMD(SN), CHAIRMAN AND MANAGING DIRECTOR-ENE51

ANNEXURE-III

A. LIST OF ITEMS (ELECTRICAL)

I INSULATORS AND HARDWARE: (11KV and above rating).

Category-I

1 Insulators
2 400kV Insulators Hardware

Category-II

1 Insulators Hardware up to 220kV

II CONDUCTORS AND CABLES

Category-I

1 Conductors (Used for EHV Transmission-Moose, Zebra & Panther).
2 Ground Wire Including OPGW
3 Power Cables; Under Ground Cables (11 KV and above rating).

Category-II

1 Stay Wire
2 Conductors and Ground Wire Hardware (For Moose, Zebra, Panther & Earth Wire).
3 Control Cables

III SWITCH GEAR CONTROL AND PROTECTIVE GEAR: (11KV TO 1100 KV).

Category-I

1 400kV Isolators.
2 Circuit Breakers (220kV to 400kV).
3 400kV Control & Relay Panels.
4 Relays.

Category-II

1 Isolators (33kV to 220kV.
2 Circuit Breakers (33kV & 132kV).
3 Lighting Arrestors.
4 Control & Relay Panels (33kV to 220kV).

IV. TRANSFORMERS:

Category-I

1 Power Transformers (HV side 132 KV and above rating).
2 Auto Transformers (220KV to 400KV).

Category-II

1 Station Transformers (33KV/400 V).
2 Voltage Regulators including Boosters.

V. INSTRUMENT TRANSFORMERS:

Category-I

1 400 kV Potential Transformers
2 400 kV Current Transformers (11KV to 400 KV).
3 400 kV Capacitor Voltage Transformers (132 KV to 400 KV).
4 Shunt Reactors (400KV).
5 400 kV Capacitors

Category-II

1 Potential Transformers (11KV to 220 KV).
2 Current Transformers (11KV to 220 KV).
3 Capacitor Voltage Transformers (132 KV to 220 KV).
4 Capacitors (33 KV to 220 KV).

VI. MISCELLANEOUS:

Category-I

1 Transformer Oil.
2 M.S. Angle, Beams, Joist.
3 C.R. Sheets.
4 Ribbed Tor Steel.
5 M.S. Plate.
6 Cement.
7 Batteries with Trickle Chargers (220 V DC).
8 Instruments Mounted or Portable Instruments for testing (Indicating or Reading).
9 400kV Towers.
10. Fire Extinguishers and fire fighting System.

Category-II

1 M.S. Channels.
2 M.S. Flat.
3 M.S. Rods.
4 Transformer Oil filters.
5 Oil Testing Kits.
6 Meggers and Earth Resistance Meters.
7 Instruments Mounted or Portable Instruments for testing (Indicating or Reading).
8 Towers (132 KV to 220 KV).
9 Line Survey (conducting reconnoitre and detailed survey)
10. Fire Extinguishers.
11. LT panels (AC, DC, DCDB, Marsheling Box, etc).

VII. OTHERS: Bolts, Nuts, Fasteners and Earthing material- all type

B. LIST OF ITEMS (COMMUNICATION EQUIPMENT)

Category-II

1 Power Line Carrier Communication terminals.
2 Wave Traps.
3 Coupling Units.
4 Protections Couplers.
5 Voice Frequency Telegraph equipment.
6 Electronic Private Automatic Exchanges.
7 48V Battery Chargers.
8 48V Battery Sets.
9 Coaxial Cable.
Telephone Cable (armoured (U/G), Screened Jelly filled and Un-armoured (PVC) – Quantities more than 1 KM.
10 Battery Cable - Quantities more than 1 KM.
11 Optical Line Terminal equipment.
12 1.5 ton A.C. Units.
13 VSAT equipment along with accessories.
14 VHF sets (Fixed, Mobile & Handheld) & VHF antennas.
15 FAX machines.
16 Digital Protection Couplers.
17 UHF radio equipment, UHF antennas.

18 Trilon Masts.
19 Tubular Masts.
20 Electronic Testing Instruments.
Selective Level Meter.
Selective Level Oscillator.
Digital Frequency Counter.
Audio Frequency Oscillator.
Digital Multi Meter.
Oscilloscopes.
21 Media Converters (LAN to Optical fibre Port).
22 Routers (Wireline & Wireless).
23 Switch
24 Synchronous & Asynchronous high speed data terminal connectors & convertors.
25 High Speed data modems - Synchronous & Asynchronous.
Optical Ground Wire (OPGW) & All Dielectric Self Supporting (ADSS) cable& OFAC and its accessories.
26 Spare modules for communication equipment.
27 Microwave Radio equipment.
28 Towers.
29 Microwave Antennas.
30 RF Cable.
31 Digital Multiplexing equipment.
32 Digital cross connect equipment.
33 Optical Time Domain Reflectometer (OTDR).
34 Splicing machines.
35 Optical Power Meter.
36 Optical Source.
37 Spectrum Analyser, Digital Transmission Analyser.
38 Tool Kits.
39 BER Meters.
40 Computers.
41 RF Power Meters.
42 Vacuum Cleaners.
43 Furniture.
44 Binoculars.
45 Splice Boxes.

SRIKANT NAGULAPALLI,
CMD(SN), CHAIRMAN AND MANAGING DIRECTOR-ENE51

INSTRUCTIONS TO THE VENDOR FOR REGISTRATION

1	Hard copy of the downloaded application duly signed by authorized signatory, along with original DD should be submitted to the Superintending Engineer/Procurement & Material Management/ AP Transco, Vidyuth Soudha, Vijayawada-04.
2	Hard copies of the documents (Annexure-II) are also to be submitted.
3	Hard copy of the downloaded application for vendor registration should be signed by Proprietor / Managing Partner / Director (Sitting) / Commercial Manager only as the case may be who should have the authority to offer quotations and accept amendments etc, delegated by the organization management.
4	The name referred in the application shall have authority to carry on business transactions with the APTransco and the APTransco will not entertain correspondence relating to offers from any other person.
5	Furnish the detailed information against each item and upload the relevant documents (Annexure-I) attested by competent authority in the space provided.
6	Please go through the standardized GTPs and Drawings available in aptransco.gov.in website relevant to the material for which vendor registration required.
7	The fresh applicant shall submit **DD as specified towards registration fee drawn in favour of Pay Officer, APTransco payable at Vijayawada**, along with the completed signed application. The fee is non-refundable and it is not binding on the part of APTransco to register the firm in case the applicant does not fulfil the required criteria. Vendor registration processing Fee particulars are as follows. Category within state Outside state Cat-I Rs 20,000+GST/Unit Rs 50,000+GST/Unit Cat-II Rs 10,000+GST/Unit Rs 30,000+GST/Unit (Travelling charges for factory inspection to be borne by the company)
8	For renewal of already registered vendors. The vendor has to pay 50% of the Vendor registration charges for renewal of the registration. A Vendor who was not awarded any contract during the validity period of his registration will be treated as a new vendor and the procedure for the registration of new vendors shall be followed.
9	Incomplete or false information would render the Vendor's application liable for rejection without assigning the reason. False information may result in black listing the applicant.
10	While applying for vendor approval, plant should be in operation
11	Once approved the registration is valid up to 3 years

SRIKANT NAGULAPALLI,
CMD(SN), CHAIRMAN AND MANAGING DIRECTOR-ENE51

Signed by SRIKANT NAGULAPALLI
Date: 27-04-2021 11:41:54
Reason: Approved

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

Vendor Registration Application form -F1

Application No.:

I. VENDOR DETAILS:

1. Basic details

a. Company Address

Address: Phone:

City: Mobile:

State: Fax:

Country: E-Mail:

b. Manufacturing Unit 1 (Works/factory) Address

Address: Phone:

City: Mobile:

State: Fax:

Country: E-Mail:

c. Manufacturing Unit 2 (Works/factory) Address

Address: Phone:

City: Mobile:

State: Fax:

Country: E-Mail:

d. Incorporation details of company as per Companies act, 1956

ROC Certificate No: ROC Date:

GST No. :

PAN card:

e. For renewal of Present Vendor Registration

Present Vendor registration Number:

Expiry date:

f. Authorized Person

Name: Aadhar no.:

Designation: Mobile:

Address: Phone:

Fax: E-Mail:

g. If Vendor has registration with other utilities, specify

☐ APSPDCL ☐ APEPDCL ☐ APCPDCL
☐ APGENCO ☐ PGCIL ☐ OTHERS

2. History of Company

a. Quality accreditations

☐ National Assessment and Accreditation Council (NACC)

☐ British Accreditation Certificate (BAC)

☐ National Board of Accreditation (NBA)

☐ Others

☐ None

b. Pending Litigations

S.No.	Court name	Case no.	Date	Opposite Party	Value of the litigation	Present status

c. Terminations (Contracts/Agreements)

S. No	Terminated by the Utility (name)	Product/ Equipment	PO/ LOA no.	Value of the Contract/ agreement	Reason	In the Year	Remarks

d. Black List/Debar

S. No.	Black List/ Debar by the Utility (name)	Period of Black List		Product/ Equipment	PO/ LOA no.	Value of the Contract/ agreement	Reason	Remarks
		From	To					

3. Strength

a. Man power

Technical Qualification	Total No. of employees	No. of Employees with Experience				
		>1 Yr	>8 Yrs	>15 Yrs	>25 Yrs	>30Yrs
Graduate						
Diploma						

b. Technical

Product / Material	Past supply		Supplied to power utility	Supplied against PO/LOA	Successful supply completion certificates	Performance Certificates issued towards past supply from APTRANSCO/ PGCIL/ other power utilities
	Year	Qty., supplied (in nos./ Tonnes)				
					☐ Attach	☐ Attach
					☐ Attach	☐ Attach
					☐ Attach	☐ Attach

c. Financial

i. Annual Turnover during last Five financial years

Year	Amount (in Crores)

ii. Funding and Non-Funding facilities

Name of the Bank	Bank guarantee / LC/ Cash limit	Amount (in Crores)	Validity

☐ Certificate from bank not less than one month old.

iii. List of orders on hand, Present status and commitments etc

PO/LOA no.	Period of Supply as per order		Description of Product/ equipment	Quantity (No/ Tonnes)	Name of Utility
	From	To			

4. Fee Particulars

Name of the Bank:	
Name of the Branch:	
Address of the Branch:	
IFSC Code:	
DD. No.:	
Date:	
Amount (in Rs):	

II. DEVICES

1. Power Transformers

Capacity of Transformer	Manufacturing Capacity (Units/Year)	Testing facilities
500 MVA		☐
315 MVA		☐
160 MVA		☐
100 MVA		☐
80 MVA		☐
50 MVA		☐
31.5 MVA		☐
10/16 MVA		☐
15 MVA		☐
250 kVA		☐
100 kVA		☐

Testing facilities available for the following

i. Main Tank & Conservator tank

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Vacuum test
- ☐ Air cell Dimensional verification
- ☐ Air cell Leakage test
- ☐ Pressure withstand test

ii. Bushings(400kV/220kV/132kV/33kV)

- ☐ Dimensional verification
- ☐ Impulse tests (LI & SI)
- ☐ Capacitance & Tan delta test (Before and after HV tests)
- ☐ Power frequency withstand voltage test
- ☐ Pressure test
- ☐ Any other tests as per latest IS

iii. Core (CRGO)

- ☐ Dimensional verification
- ☐ Aging test
- ☐ Specific loss test (before and after aging tests)

iv. Paper Insulated copper Windings (PICC)

- ☐ Dimensional Verification
- ☐ Mechanical Elongation test
- ☐ Resistance Test
- ☐ Any other tests as per latest IS

v. Radiators

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Leakage test (Before painting at Manufacture's place)
- ☐ After painting, Paint thickness test

vi. Insulating oil

- ☐ Oil break down voltage test
- ☐ Kinematic Viscosity test
- ☐ Density test
- ☐ Pore point test
- ☐ Water content (ppm)
- ☐ Dielectric dissipation factor (Tan δ)
- ☐ Carbon composition test
- ☐ Acidity test
- ☐ Sludge test
- ☐ Interfacial tension test
- ☐ Sulphur content test
- ☐ Flash point test
- ☐ PCB content test
- ☐ Any other test as per IS/IEC

vii. Low Voltage tests

- ☐ Measurement of Ratio & Polarity check
- ☐ Magnetic Balance and Magnetizing Current at low voltage
- ☐ Vector group Verification
- ☐ Measurement of insulation Resistance & Determination of Polarization Index
- ☐ Check of core & Frame insulation for liquid immersed Transformer
- ☐ Measurement Winding Resistance
- ☐ Measurement of Short Circuit Impedance at Low voltage

viii. High Voltage Tests

- ☐ Separate Source Voltage withstand test
- ☐ Line Terminal AC Voltage withstand Test
- ☐ Induced over Voltage with Partial Discharge measurement
- ☐ Measurement of Capacitance and Tan-Delta

ix. No load losses

- ☐ Measurement of No-load Loss & Current
- ☐ Measurement of No-load Current at low voltage
- ☐ Measurement of Harmonics of No Load Current

x. Type Tests

- ☐ Temperature Rise Test
- ☐ Hot Winding Resistance
- ☐ Determination of noise/sound level
- ☐ Measurement of Zero Sequence Impedance
- ☐ Test on On-Load Tap changer
- ☐ Determination of Transient Voltage transfer Characteristics
- ☐ Measurement of Power taken by fans & liquid pump motors
- ☐ Measurement of Load Loss & Impedance Voltage

xi. Special Tests

- ☐ Switching Impulse Test
- ☐ Lighting Impulse Test
- ☐ Measurement of frequency Response Analysis

2. Reactors

Capacity of Reactor	Manufacturing Capacity (Units/Year)	Testing facilities
125 MVAR		☐
80 MVAR		☐
63 MVAR		☐
50 MVAR		☐

Testing facilities available for the following

i. Main Tank & Conservator tank

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Vacuum test
- ☐ Air cell Dimensional verification

- ☐ Air cell Leakage test
- ☐ Pressure withstand test

ii. Bushings(400kV/220kV/132kV/33kV)

- ☐ Dimensional verification
- ☐ Impulse tests (LI & SI)
- ☐ Capacitance & Tan delta test (Before and after HV tests)
- ☐ Power frequency withstand voltage test
- ☐ Pressure test
- ☐ Any other tests as per latest IS

iii. Core (CRGO)

- ☐ Dimensional verification
- ☐ Ageing test
- ☐ Specific loss test (before and after aging tests)

iv. Paper Insulated copper Windings (PICC)

- ☐ Dimensional Verification
- ☐ Mechanical Elongation test
- ☐ Resistance Test
- ☐ Any other tests as per latest IS

v. Radiators

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Leakage test (Before painting at Manufacture’s place)
- ☐ After painting, Paint thickness test

vi. Insulating oil

- ☐ Oil break down voltage test
- ☐ Kinematic Viscosity test
- ☐ Density test
- ☐ Pore point test
- ☐ Water content (ppm)
- ☐ Dielectric dissipation factor (Tan δ)
- ☐ Carbon composition test
- ☐ Acidity test
- ☐ Sludge test
- ☐ Interfacial tension test

- ☐ Sulphur content test
- ☐ Flash point test
- ☐ PCB content test
- ☐ Any other test as per IS/IEC

vii. Low Voltage tests

- ☐ Measurement of Ratio & Polarity check
- ☐ Magnetic Balance and Magnetizing Current at low voltage
- ☐ Vector group Verification
- ☐ Measurement of insulation Resistance & Determination of Polarization Index
- ☐ Check of core & Frame insulation for liquid immersed Transformer
- ☐ Measurement Winding Resistance
- ☐ Measurement of Short Circuit Impedance at Low voltage

viii. High Voltage Tests

- ☐ Separate Source Voltage withstand test
- ☐ Line Terminal AC Voltage withstand Test
- ☐ Induced over Voltage with Partial Discharge measurement
- ☐ Measurement of Capacitance and Tan-Delta

ix. No load losses

- ☐ Measurement of No-load Loss & Current
- ☐ Measurement of No-load Current at low voltage
- ☐ Measurement of Harmonics of No Load Current

x. Type Tests

- ☐ Temperature Rise Test
- ☐ Hot Winding Resistance
- ☐ Determination of noise/sound level
- ☐ Measurement of Zero Sequence Impedance
- ☐ Test on On-Load Tap changer
- ☐ Determination of Transient Voltage transfer Characteristics
- ☐ Measurement of Power taken by fans & liquid pump motors
- ☐ Measurement of Load Loss & Impedance Voltage

xi. Special Tests

- ☐ Switching Impulse Test
- ☐ Lighting Impulse Test
- ☐ Measurement of frequency Response Analysis

3. Circuit Breakers

Rating of Circuit Breaker	Manufacturing Capacity (Units/Year)	Testing facilities
420 kV		☐
245 kV		☐
145 kV		☐
36 kV		☐

Testing facilities available for the following

Routine/Acceptance tests

☐ Visual & Dimensional verification

☐ HV test (70 kV on Power circuit) for 1 minute

☐ HV test of 1 kV on auxiliary circuit

☐ Electrical & Mechanical operation

☐ Mechanical Endurance Test

☐ Power frequency voltage withstand tests (wet & dry)

☐ Lightning Impulse withstand test

☐ Basic short circuit tests, short line fault test duties and out of phase switching tests

☐ Short time withstand current and peak withstand current tests

☐ Line and cable charging current tests

☐ Capacitive current switching tests

Type Tests

☐ Partial discharge

☐ Temperature rise test

☐ Seismic withstand test

☐ RIV (Radio Interference) Voltage Test. (for 220 kV & 132 kV SF6 Circuit Breakers only)

4. Isolators

Rating of Isolator	Manufacturing Capacity (Units/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Testing facilities available for the following

☐ Visual and Dimensional Check

☐ Voltage Test on Control and Auxiliary Circuits

☐ Measurement of Resistance of Main Circuit

☐ Mechanical Operation Test

☐ Sequence of Operation of Isolator

☐ Sequence of Operation of Earth Switch

☐ Test on Galvanising Components

☐ Temperature rise test

5. Instrument Transformers (CTs/PTs/CVTs)

Rating of Instrument Transformer	Manufacturing Capacity (Units/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Testing facilities available for the following

Routine/Acceptance tests

☐ Short- time current test

☐ High voltage power frequency wet withstand voltage test

☐ Tests for accuracy

☐ Temperature Coefficient Test

☐ Partial Discharge measurement

☐ Thermal stability test

☐ Tan Delta and capacitance Test

☐ Power frequency voltage with stand tests on primary terminals

☐ Power frequency voltage with stand tests between sections, if applicable

☐ Power frequency voltage with stand tests on secondary terminals

☐ Tests on accuracy

☐ Inter-turn over voltage test

☐ Test for winding resistance, rated knee point E.M.F and exciting current at rated knee point E.M.F for all ratios

☐ Verification of terminal marking and polarity

☐ Determination of the instrument security factor (FS) of measuring current transformer at all ratios

Type Tests

☐ Temperature –rise test

☐ Impulse voltage withstand test on primary terminals

6. Surge Arresters (Lightning Arrestors)

Rating of Surge Arrester	Manufacturing Capacity (Units/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Testing facilities available for the following

Insulation withstand Test

☐ Lightning Impulse

☐ Power frequency

☐ Switching Impulse (For 400KV)

Routine/Acceptance tests

☐ Residual Voltage Test

☐ Steep Current Impulse

☐ Test to verify long term stability under COV

☐ Repetitive charge transfer withstand

☐ Heat dissipation behaviour verification of test sample

☐ Switching surge operating duty test

☐ Power Frequency voltage Vs Time Curve

☐ Short circuit test

☐ High Current

☐ Low Current

☐ Bending Test(Cantilever Strength)

☐ Seal Leakage Test

☐ Test to verify the dielectric withstand test

☐ Test of internal grading components

☐ IP-67 test on surge Monitor

☐ test on silicon rubber as per standard IEC-61462

☐ Uniformity of Zinc coating for metal parts

☐ Lightning Impulse Residual voltage test

☐ Partial discharge test

☐ Tests on discharge counter

☐ Leakage check rate test for a duration of 24 hrs.

Type Tests

☐ Radio interference voltage test & Corona inception & extinction voltage

☐ Weather ageing test

☐ Salt fog test 1000 h

☐ UV light test 1000 h

☐ TERT (Tracking & Erosion resistance test

☐ Degree of Protection test on counter/surge monitor

7. Battery Sets

Rating of Battery Sets	Manufacturing Capacity (Units/Year)	Testing facilities
220V, 200 AH		☐
220V, 100 AH		☐
48V, 400 AH		☐
48V, 300 AH		☐
48V, 250 AH		☐
48V, 200 AH		☐

Testing facilities available for the following

☐ Test for capacity and test for voltage during discharge.

☐ Ampere hour and Watt hour efficiency tests.

☐ Test for loss of capacity on storage.

☐ Endurance test.

8. AC DC Distribution Boards and Battery Chargers

Rating of Battery Chargers	Manufacturing Capacity (Units/Year)	Testing facilities
220V, 200 AH		☐
200V, 100 AH		☐
48V, 200 AH		☐
48V, 150 AH		☐
48V, 100 AH		☐
48V, 50 AH		☐
48V, 35 AH		☐

Testing facilities available for the following

- ☐ Insulation Resistance Test
- ☐ High Voltage Test
- ☐ Annunciation Verification
- ☐ DC output voltage regulation
- ☐ Efficiency at full load
- ☐ Power factor
- ☐ DC output voltage ripple
- ☐ Battery path current limit
- ☐ Battery Low Trip Setting
- ☐ Protection against short circuit
- ☐ Ripple Test
- ☐ IP 54/IP 55 test

9. Insulators

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Disc Insulators		☐
Solid core Insulators		☐
SRC Insulators		☐

Testing facilities available for the following

- ☐ Verification of Dimensions
- ☐ Verification of the tightness of the interface between end fittings and insulator housing
- ☐ Verification of the locking System
- ☐ Verification of the SML
- ☐ Galvanization Test
- ☐ Brittle Fracture Resistance Test
- ☐ Temperature cycle Test
- ☐ Hydrophobicity test
- ☐ Dye Penetration test
- ☐ N.D.T
- ☐ Glass Content test

10. Hardware (Both Conductor & Insulators)

Item	Manufacturing Capacity (No. of sets/Year)	Testing facilities
Panther		☐
Zebra		☐
Moose		☐
Ground Wire		☐
Clamps & Connectors		☐
Others, Specify:		☐

Testing facilities available for the following

Tests for both suspension and tension hardware

☐ Visual examination

☐ Verification of dimensions

☐ Galvanising test / Electroplating

☐ Mechanical strength test on each component

☐ Mechanical strength test of welded joint

☐ Test on locking device for ball and socket coupling

☐ Chemical Analysis, hardness tests grain size

☐ Magnetic particle inspection of forgings and casting

Tests for Suspension Hardware

☐ Clamp slip strength Vs torque test for suspension clamp

☐ Shore hardness test of elastomer cushion for AG suspension clamp

☐ Bend test for armour rod set

☐ Resilience test for armour rods set

☐ Conductivity test for armour rods set

Tests for tension Hardware

☐ Slip strength test for dead-end assembly

☐ On Mid Span Compression Joint for Conductor and Earth Wire

☐ Visual examination

☐ Dimensional verification

☐ Galvanizing test

☐ Hardness Test

Tests on Flexible Steel Bond

☐ Visual examination

☐ Dimensional verification

☐ Slip strength test

Tests on Flexible Copper Bond

☐ Visual examination

☐ Dimensional verification

☐ Slip strength test

Tests on Vibration Damper for Power Conductor

☐ Visual examination

☐ Dimensional verification

☐ Galvanising test

☐ Verification of Resonance frequencies

☐ Clamp slip test

☐ Clamp bolt torque test

☐ Strength of the messenger cable

☐ Mass pull off test

☐ Fatigue Test

Tests on Earth Wire suspension & tension clamp Assembly

☐ Visual Examination and Dimension Verification

☐ Galvanizing Test

☐ Clamp Slip Strength Test

☐ Mechanical Strength test on each component

☐ Hardness Test for Tension clamp

11. Capacitor Banks

Rating	Manufacturing Capacity (Units/Year)	Testing facilities
132kV Capacitor Banks		☐
33kV Capacitor Banks		☐

Testing facilities available for the following

☐ Measurement of capacitance

☐ Voltage test between terminals

☐ Test between line terminals and container

☐ AC voltage test between terminals & containers

☐ Test of discharge device

☐ Capacitor loss tangent measurement

☐ Sealing test

12. Telecom Equipment

a. Optical Line Terminal Equipment (Plesiochronous Digital Hierarchy (PDH)/ Synchronous Digital Hierarchy(SDH))

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Components of Plesiochronous Digital Hierarchy (PDH)		
Power Supply Card		☐
E1 Interface Card		☐
Ethernet interface		☐
Card (10/100Mbps)		☐
Multiplexer Card		☐
Synchronization Card		☐
Distribution frame		☐
Clock Module		☐
Components of Synchronous Digital Hierarchy(SDH)		
Power supply card		☐
S type optical card		☐
L Type Optical card		☐
Optical line interface Optical card		☐
Tributary Card		☐
n x n ports switching matrix		☐
E1 interface Card		☐
Ethernet interface Card (10/100Mbps)		☐
Drop & Insert Multiplexer		☐
2 wire voice Chanel Card		☐
4 wire E & M Voice Chanel Card		☐
Asynchronous sub channels data Card (V.24/V.48)		☐
Synchronous Data Cards		☐
Digital Access cross connect switch		☐
Network manage & Elementary management system		☐
Main Distribution frame (200pairs)		☐
GPS Clock		☐

Testing facilities available for the following

- ☐ Power Supply Test
- ☐ BER test at E1 interface
- ☐ BER test at STM-4 Interface
- ☐ Out Inter for E1 Interface
- ☐ Output jitter at STM level Interface
- ☐ Input jitter Tolerance for E1 Interface
- ☐ Input jitter Tolerance for STM level
- ☐ Pulse mask Measurement at E1 Interface
- ☐ Optical Power Measurement
- ☐ Optical Receiver sensitivity Measurement
- ☐ Network management Interface performance through Remote login
- ☐ Simulation of failure condition and fail over or each redundant unit
- ☐ Ethernet Performance Test

b. Multiplexer/Digital Distribution Frame(DDF)

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Multiplexer		☐
Digital Distribution Frame (DDF)		☐

Testing facilities available for the following

- ☐ Electrical Interface – 2M loop back test
- ☐ Cross Connection function Measurement
- ☐ E1 Pulse space shape
- ☐ Framing signalling, operational and maintenance test
- ☐ Data Channel BER Measurement on N*64k bit/sec
- ☐ E & M Gain level Measurement
- ☐ E & M/Idle Channel Noise Measurement
- ☐ Exch/Sub Frequency level Measurement
- ☐ Exch/Sub – Idle Channel Noise Measurement
- ☐ Power Supply unit Redundancy check
- ☐ 1+1 Control Card Redundancy

c. EPAX Exchange/EPABX Exchange

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Components of EPAX Exchange		
Power supply Card		☐
Ringer Module		☐
Central Processing Unit with stored program control and backup memory		☐
Switching Matrix		☐
Line Interface Card		☐
Trunk Interface Card		☐
Components of EPABX Exchange		
Power supply Card		☐
Ringer Module		☐
Central Processing Unit with stored program control and backup memory		☐
Switching Matrix		☐
Line Interface Card		☐
Junction Interface Card		☐

Testing facilities available for the following

☐ Power supply test

☐ Protection test

☐ Engage pulse timing test

☐ Priority timing test

☐ Digital pulse timing test

☐ Inter digit pulse timing test

☐ Releasing pulse timing test

Test calls for EPAX Exchange

☐ Subscriber to Subscriber

☐ Subscriber to Trunk

☐ Trunk to Trunk

Test calls for EPABX Exchange

☐ Subscriber to Subscriber

☐ Subscriber to Junction

☐ DID facility

13. Automation Hardware

a. SAS Control & Relay Panels

Rating	Manufacturing Capacity (Units/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Testing facilities available for the following

- ☐ Physical Verification Panel
- ☐ BOM Verification
- ☐ AC and DC Circuit
- ☐ IR Value before HV Test (500V DC)
- ☐ HV Test (2KV AC, 1mm)
- ☐ IR Value after HV Test (500V DC)
- ☐ Leakage Current
- ☐ CT/PT Check
- ☐ Backup Relay
- ☐ Bay control Unit (BCU)
- ☐ Bay control & protection Unit (BCPU)
- ☐ Trip Circuit Supervision
- ☐ Annunciator Circuit
- ☐ Closing/Tripping Circuit
- ☐ Interlock Circuit/AUX Relay circuit
- ☐ Paint Shade and Thickness
- ☐ Others, Specify:

b. SAS C&R Panel Components

Rating	Manufacturing Capacity (Units/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Bay control Unit (BCU)		☐
Bay control & protection Unit (BCPU)		☐
Bay protection Unit (BPU)		☐
Data Concentrator		☐
Gateway for remote control		☐
Gateway interface		☐
GPS Clock, Antenna with time display unit		☐
Intelligent Electronic Devices(IEDs)		☐
3kVA Inverter (RS485 Compatible)		☐
Ethernet switches		☐
Display Unit		☐

Testing facilities available for Control IEDs and Communication Equipment

Power Input

☐ Auxiliary Voltage

☐ Current Circuits

☐ Voltage Circuits

☐ Indications

Accuracy Tests

☐ Operational Measured Values

☐ Currents

☐ Voltages

☐ Time resolution

Insulation Tests

☐ Dielectric Tests

☐ Impulse Voltage withstand Test

Influencing Quantities

☐ Limits of operation

☐ Permissible ripples

☐ Interruption of input voltage

Electromagnetic Compatibility Test

☐ 1 MHZ burst disturbance test

☐ Electrostatic Discharge Test

☐ Radiated Electromagnetic Field Disturbance Test

☐ Electrical Fast transient Disturbance Test

☐ Conducted Disturbances Tests induced by Radio Frequency Field

☐ Magnetic Field Test

☐ Emission (Radio interference level) Test.

☐ Conducted Interference Test

Function Tests

☐ Indication

☐ Commands

☐ Measured value Acquisition

☐ Display Indications

Environmental tests

☐ Cold Temperature

☐ Dry Heat

☐ Wet heat

☐ Humidity (Damp heat Cycle)

☐ Vibration

☐ Bump

☐ Shock

Other tests

☐ Hardware Integration test

☐ Integrated System test

☐ Factory Acceptance test

c. Relays

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Distance relay		☐
Differential relay		☐
Over flux relay		☐
Over current relay		☐
Earth Fault relay		☐
DC supply Supervision relay		☐
Restricted Earth fault relay		☐
Auxiliary relay		☐

Testing facilities available for the following

Insulation test

- ☐ Dielectric test
- ☐ Insulation Resistance Measurement Test
- ☐ Impulse Voltage withstand test
- ☐ Tests for thermal and mechanical requirements
- ☐ Tests for rated burden
- ☐ Contact performance test
- ☐ High frequency disturbance test
- ☐ Fast transient test
- ☐ Relay characteristics, performance and accuracy test
- ☐ Steady state Characteristics and operating time
- ☐ Dynamic Characteristics and operating time for distance protection relays and current differential protection relay
- ☐ Disturbance recorder and Event logger only performance tests are intended under this item
- ☐ 5kV Impulse Peak voltage Test
- ☐ Vibration test
- ☐ Overshoot time test

d. Remote Terminal Unit (RTU)

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Digital input Card		☐
Digital output card		☐
Analog card		☐
CPU		☐
Power supply unit		☐
RTU (Total unit)		☐

Type Tests

- ☐ Surge Immunity test
- ☐ Electrical fast transient burst test
- ☐ Damped Oscillatory wave test
- ☐ Electrostatic discharge test
- ☐ Radiated Electromagnetic field test
- ☐ Damped Oscillatory Magnetic field test
- ☐ Power frequency magnetic field test
- ☐ Power frequency Voltage withstand test
- ☐ 1.2/50µsec impulse Voltage withstand test
- ☐ Insulation resistance test
- ☐ Dry heat test
- ☐ Damp heat test

Acceptance Tests

- ☐ Functional test
- ☐ RTU & Panel power up
- ☐ RTU start up and shutdown
- ☐ Verification of CPU IP address
- ☐ Verification of dual LAN
- ☐ Verification of CPU dual ports
- ☐ Verification of Configuration download
- ☐ Verification of Configuration Upload
- ☐ Verification of IEC60870-5-104 Slave protocol
- ☐ IEC60870-5-104 Redundancy check
- ☐ RTU Time synchronization check
- ☐ Verification of System diagnostics

- ☐ RTU power consumption test
- ☐ Event logging buffer & Memory test
- ☐ Power Supply unit Redundancy check
- ☐ CPU Redundancy check for control Central & Slave device (Energy Meter)
- ☐ Reporting to multiple masters

e. IT Equipment

i. Desktop PC

Item	Manufacturing Capacity (Units/Year)	Testing facilities
a. Monitor		
22 inches		☐
24 inches		☐
26 inches		☐
28 inches		☐
Others, Specify		☐
b. Processor Model		
i3		☐
i5		☐
AMD		☐
Others, Specify:		☐
c. Mouse		
Wireless		☐
Wired		☐
Others, Specify		☐
d. Keyboard		
Wired		☐
Wireless		☐
Others, Specify		☐
e. RAM		
4GB		☐
8GB		☐
16GB		☐
Others, Specify		☐
f. System Type		
32 bit		☐

64 bit		☐
Others, Specify		☐
g. CPU Speed		
3 GHz		☐
4 GHz		☐
5 GHz		☐
Others, Specify:		☐
h. Operating System		
MS Windows		☐
Linux		☐
Others, Specify:		☐
i. Hard Disk Drive		
500GB		☐
1TB		☐
2 TB		☐
Others, Specify:		☐

ii. Laptop

Item	Manufacturing Capacity (Units/Year)	Testing facilities
a. Size		
22 inches		☐
24 inches		☐
26 inches		☐
28 inches		☐
Others, Specify		☐
b. Processor Model		
i3		☐
i5		☐
i7		☐
i8		☐
AMD		☐
Others, Specify:		☐
c. RAM		
4GB		☐
8GB		☐
16GB		☐

Others, Specify		☐
d. System Type		
32 bit		☐
64 bit		☐
Others, Specify		☐
e. CPU Speed		
3 GHz		☐
4 GHz		
5 GHz		☐
Others, Specify:		☐
f. Operating System		
MS Windows		☐
Linux		☐
Others, Specify:		☐
g. Hard Disk Drive		
500GB		☐
1TB		☐
2 TB		☐
Others, Specify:		☐

iii. Printers

Item	Manufacturing Capacity (Units/Year)	Testing facilities
Dot matrix		☐
Laser jet		☐
Ink jet		☐
Others, Specify:		☐

iv. Un-interrupted Power Supply(UPS)

Item	Manufacturing Capacity (Units/Year)	Testing facilities
a. Time back up		
Half an hour		☐
One Hour		☐
Two Hours		☐
Others, Specify:		☐
b. Input Voltage Range		

+/- 10%		☐
+/- 15%		☐
Others, Specify:		☐

f. Hard ware Components of Computer

i. CPU

Description	Manufacturing Capacity (Units/Year)	Testing facilities
a. Processor		
i3		☐
i5		☐
i7		☐
AMD		☐
Others, Specify:		☐
b. Speed		
3GHz		☐
3.5GHz		☐
4 GHz		☐
Others Specify:		☐

ii. Monitor

Description	Manufacturing Capacity (Units/Year)	Testing facilities
a. Size		
20		☐
22		☐
24		☐
Others Specify:		☐
b. Type		
LCD		☐
LED		☐
Others Specify:		☐

iii. Keyboard

Description	Manufacturing Capacity (Units/Year)	Testing facilities
Wired		☐
Wireless		☐
Others Specify:		☐

iv. Mouse

Description	Manufacturing Capacity (Units/Year)	Testing facilities
Wired		☐
Wireless		☐
Others Specify:		☐

v. RAM

Description	Manufacturing Capacity (Units/Year)	Testing facilities
4GB		☐
8GB		☐
16GB		☐
Others Specify:		☐

vi. Hard Disk Drive

Description	Manufacturing Capacity (Units/Year)	Testing facilities
500GB		☐
1 TB		☐
2 TB		☐
Others Specify:		☐

g. Communication Network

i. Local Area Network (LAN)

a. Ethernet Switches

☐ 8 port ☐ 16 port ☐ 32 port

☐ 10port ☐ 24 port ☐ 64 port

b. Cables

☐ Cat5 ☐ Cat6

ii. Wide Area Network (WAN)

a. Routers

☐ 1841 ☐ 3861

☐ 2811 ☐ Others, specify:

b. Modems

☐ 64Kbps ☐ nX64Kbps, specify:

☐ 2Mbps

c. Communication Channel

☐ Leased line

☐ Multi Port Label Switch(MPLS) leased line

☐ Virtual Private Network (VPN)

d. Internet service provider

☐ Bandwidth capacity, specify:

☐ Upload speed(in Mbps), specify:

☐ Download speed(in Mbps), specify:

e. Cyber security system

Firewall (Hardware)

☐ 5520 ☐ 60E ☐ 1C

☐ 520 ☐ 60F ☐ 2C

☐ 30E ☐ 80E ☐ 4C

☐ 40F ☐ 80F ☐ 12C

☐ 50E ☐ 100E

h. Servers

Description	Manufacturing Capacity (Units/Year)	Testing facilities
a. RAM		
8GB		☐
16GB		☐
32GB		☐
Others, Specify		☐
b. Cores		
18 Core		☐

28 Core		☐
32 Core		☐
Others, Specify		☐
c. Speed		
2.5GHz		☐
2.6GHz		☐
2.7GHz		☐
Others, Specify:		☐
d. Hard Disk Drive		
500GB		☐
1TB		☐
1.5TB		☐
Others, Specify:		☐
e. Type		
Rack		☐
Tower		☐
Blade		☐

i. Operating System

☐ Linux ☐ Windows ☐ Unix

ii. Database

☐ Oracle ☐ Sybase ☐ MSSQL

☐ MAXDB ☐ HANA

iii. Interfaces

☐ 1GB Ethernet port ☐ V.24 ☐ V.28

☐ Other standards, Specify:

iv. Redundant Array of Independent Discs (RAID) support

☐ 0 ☐ 1 ☐ 5

☐ 6 ☐ Others, Specify:

v. Network ports

☐ 2 ☐ 4 ☐ Others, specify:

vi. Power supply

☐ Single A.C ☐ Dual A.C

14. Automation Software

Software	Development team size (in no.)	
	India	Out of India
Supervisory Control and Data Acquisition (SCADA) Software		
Substation Automation System(SAS) Software		
Energy Management Software		
Enterprise Resource planning (ERP)		
Asset Management (GIS)		
Others, Specify:		

a. Supervisory Control and Data Acquisition (SCADA) Software

RTU/Gateway Data Acquisition

- ☐ RTU/Gateways database & Remote diagnostics
- ☐ RTU/Gateway in Test mode
- ☐ RTU/Gateway time synchronization
- ☐ RTU/Gateway communication monitoring, recording & Statistics
- ☐ Backup communication channel processing

Data exchange with the Control centres

- ☐ Inter control Centre communication Protocol Data Exchange
- ☐ Data exchange with Information Storage Retrieval system
- ☐ Data exchange with other system/Application
- ☐ Data exchange priorities

Data processing

- ☐ Analog Data processing
- ☐ Digital status Input Data processing
- ☐ Continuous Real time data storage and playback
- ☐ Open Database Connectivity (ODBC) Interface
- ☐ Network Status processor
- ☐ Sequence of Events Recording
- ☐ Pulse Accumulator processing

Calculated data processing

- ☐ MVA Calculation
- ☐ MW and MVAR Integration
- ☐ Rate of change
- ☐ Line loss Calculations

- ☐ Average Value calculations
- ☐ Max/Min value calculations
- ☐ System Load and Interchange data
- ☐ Frequency Variation Index

Supervisory control

- ☐ Select before execute
- ☐ Control Inhibit
- ☐ Control Action Monitor
- ☐ Power Flow Check Before Control
- ☐ Interlocks and security checks for supervisory control
- ☐ Sequential Switching Operation

Information Storage and Retrieval

- ☐ Realtime data snapshot storage
- ☐ Storage of SCADA System Statistics
- ☐ Storage of files and save cases
- ☐ System message logs storage & Retrieval

System parameters

- ☐ State Estimation (SE)
- ☐ Bus load Forecast
- ☐ Contingency Analysis
- ☐ Optimal Power Flow
- ☐ Transmission/Corridor Capacity Monitor
- ☐ Short Circuit Analysis
- ☐ Transient Stability Studies

Other features

- ☐ Operator Training Simulator
- ☐ Control centre SCADA system communicating with RTU/SAS on IEC 60870-5-101 or IEC 60870-5-104 protocol
- ☐ Feasibility for Bays augmentation in long run
- ☐ Defined user levels with proper authentication
- ☐ Graphical user interface
- ☐ Integration of new Gate way
- ☐ Integration of new control centre on Inter control centre Protocol

☐ Critical & Non-critical functions
SCADA functions including control functions

☐ Periodic Scans & Exception scans

☐ GIS technology

b. Substation Automation System (SAS) Software

Gateway Data Acquisition

☐ Gateways database & Remote diagnostics

☐ Gateway in Test mode

☐ Gateway time synchronization

☐ Gateway communication monitoring, recording & Statistics

☐ Backup communication channel processing

Data processing

☐ Analog Data processing

☐ Digital status Input Data processing

☐ Continuous Real time data storage and playback

☐ Open Database Connectivity (ODBC) Interface

☐ Network Status processor

☐ Sequence of Events Recording

☐ Pulse Accumulator processing

Calculated data processing

☐ MVA Calculation

☐ MW and MVAR Integration

☐ Rate of change

☐ Average Value calculations

☐ Max/Min value calculations

☐ System Load and Interchange data

☐ Frequency Variation Index

Supervisory control

☐ Interlocks and security checks for supervisory control

☐ Sequential Switching operations

☐ Capacitor/Reactor Banks

☐ Tap Changing of Transformer

☐ Control Action Monitor

☐ Power Flow check before control

☐ Select before execute

Storage of SCADA system statistics

- ☐ Storage of files and save cases
- ☐ System message logs storage & Retrieval

Other features

- ☐ Critical & Non-critical functions
- ☐ Data dissemination
- ☐ Adjustable parameters
- ☐ Output requirements
- ☐ Periodic Scans & Exception scans
- ☐ Data exchange with Information Storage Retrieval system
- ☐ Feasibility for Bays augmentation in long run
- ☐ Defined user levels with proper authentication
- ☐ Data exchange with other system/Application
- ☐ Data exchange priorities
- ☐ Substation Event logger logs & Automatic disturbance recorder files extraction
- ☐ IED access for configuration
- ☐ Graphical user interface
- ☐ Manual data entry
- ☐ Condition monitoring applications
- ☐ Transmission/Corridor Capacity Monitor
- ☐ Integration of Gate way
- ☐ GIS technology
- ☐ Shall support IEC 61850, IEC 60870-5-101/104 Protocols

c. Energy Management Software

i. Scheduling Software

- ☐ Prepare Schedules for Day ahead, Weekly ahead and Monthly ahead
- ☐ Certification of availability of Generators
- ☐ Forecast Load Generation Balance Report for Day Ahead, Weekly ahead and Monthly ahead
- ☐ Develop Intra-state Availability Based Tariff module
- ☐ Mobile application
- ☐ Generate Report for Visualization

ii. Open access Software

- ☐ Issue Energy exchange No objection certificate
- ☐ Issue Bilateral Concurrence
- ☐ Issue Intra state Approvals
- ☐ Check Regional Load Dispatch Centres approvals
- ☐ Generate Report for Visualization
- ☐ Communicate Schedules to Generators
- ☐ Communicate Schedules to consumers
- ☐ Communicate Schedules to DISCOMs

iii. Energy accounting

- ☐ Certify Energy for Distribution Companies (manual readings)
- ☐ Certify energy for Private Developers
- ☐ Calculate Deviation Energy
- ☐ Certify energy for Generating stations
- ☐ Calculate Transmission losses with MRI data
- ☐ Issue ABT compatibility for energy meters of ISOA Generators
- ☐ Settle Intrastate open access energy for consumers
- ☐ Certify Distribution companies energy
- ☐ Calculate DSM for wind and solar generators
- ☐ Generate Report for Visualization.
- ☐ Prepare AMC Bills.

iv. Billing and Load Dispatch Centre report

- ☐ Outage planning and management system
- ☐ Market Operations Management
- ☐ Master Data Management, Data Archival and Retrieval
- ☐ Data Migration & Maintenance Mechanism from different Data sources
- ☐ Data Integration
- ☐ Dashboard
- ☐ MIS Reports
- ☐ Mobile Application

v. Renewable Energy Forecasting and scheduling

- ☐ Issue Renewable Energy Accreditation
- ☐ Certify Energy Injection Reports
- ☐ Verify Renewable Power Purchase obligation compliance

- ☐ Issuing of Technical clearance for Synchronization of RE generators
- ☐ Generate Report for Visualization

vi. Financial accounting & Statutory compliance

- ☐ Payments Accounting System for Load Dispatch Centre
- ☐ User Administration
- ☐ Security Management

d. Enterprise Resource planning (ERP) Software

- ☐ Human Capital Management
- ☐ Finance & Costing
- ☐ Plant Maintenance
- ☐ Project Systems
- ☐ Material Management
- ☐ Sales & Distribution
- ☐ Quality Management

e. Asset management (GIS) Software

Geo-tagging features

- ☐ Geocoding Capability
- ☐ Map Creation Capability
- ☐ Spatial Analysis Capability
- ☐ GPS Tracking Capability
- ☐ Routing and Navigation Capability
- ☐ Edit, Visualize, Manage and analyse geospatial data
- ☐ Reverse Geo-coding Capability
- ☐ Geo-reference imagery Capability

User Management features

- ☐ Users Access Control feature
- ☐ Single Sign on feature
- ☐ Role-Based Permissions feature

Data base management

- ☐ Data import/Export and Synchronization feature
- ☐ Data Visualization feature
- ☐ Data Management feature
- ☐ Secure Data Storage feature
- ☐ Maximum user handling capability
- ☐ Concurrent user handling capability

Other Features

- ☐ Image Exporting Capability
- ☐ Image Management Capability
- ☐ Interoperability Capability(OGC)
- ☐ Labelling Capability
- ☐ 3D Analysis Capability
- ☐ Census data Integration
- ☐ Visual Analytics feature
- ☐ Web integration feature
- ☐ Up-gradation to Higher version
- ☐ Drag & Drop Interface feature
- ☐ Forecasting feature
- ☐ Mobile Integration feature
- ☐ Multi-Language feature
- ☐ Performance Management feature

f. ☐ Others, Specify:

15. Other Devices as per relevant standards

Sl. No.	Equipment/Product/ Material	Type test during last 5 years	Relevant standard	Year of test

III. STRUCTURES

Tower Parts including Stubs and Structures

Rating	Manufacturing Capacity (MT/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Testing facilities available for the following

☐ Galvanising Test

Mechanical Tests

☐ Yield Load (N)

☐ Yield Stress Test (N/Sq.mm)

☐ Ultimate Load (N)

☐ Ultimate tensile strength (N/Sq.mm)

☐ Percentage Elongation

☐ Bend test

Chemical Test

☐ Carbon %

☐ Silicon %

☐ Manganese %

☐ Phosphorous %

☐ Sulphur %

IV. CIRCUIT SEGMENTS

1. Conductor

Item	Manufacturing Capacity (Km/Year)	Testing facilities
Panther		☐
Zebra		☐
Moose		☐
Others, Specify:		☐

Testing facilities available for the following

☐ Break load(KN)

☐ Resistance(at 20◦c ohms/km)

☐ Wrapping

☐ Lay-Ratio

☐ Over all Diameter (mm)

☐ Elongation (%)

☐ Wt. of Zinc Coating(g/Sq.m)

☐ Uniformity of Zinc Coating

☐ Chemical test on Aluminium strands

2. Underground XLPE cable

Description	Manufacturing Capacity (Km/Year)	Testing facilities
400 kV		☐
220 kV		☐
132 kV		☐
33 kV		☐

Testing facilities available for the following

Type Tests on Cable

☐ Bending Test

☐ Partial discharge test after bending test

☐ Tan δ measurement

☐ Heating cycle voltage test

☐ Partial discharge test during and after heating cycle test

☐ Impulse withstand test

☐ Power frequency voltage test

Tests on Conductor

☐ Dimensional verification

☐ D.C. Resistance at 20^0C

☐ Measurement of thickness of metallic sheets

☐ Test on concentric metallic service

☐ Test on combined electrical resistance of copper wire screen and metallic test

☐ Annealing test after copper

Tests for insulation & sheath

☐ Thickness and dimensions of insulation and outer sheath

☐ Tensile strength and elongation at break of insulation & outer sheath

☐ Thermal ageing in air oven

☐ Tensile strength and elongation and break of insulation and outer sheath after ageing

☐ Hot set test for XLPE insulation

☐ Shrinkage test on XLPE insulation as per IEC

☐ Resistivity of semi-conducting conductor & insulation screen and at room temperature and at 90^0C conductor temperature

☐ Hot deformation test for PE sheath

☐ Carbon black content of black PE sheaths

☐ Pressure test at high temperature on sheath

☐ Test on concentric metallic screen

☐ Tests for concentric copper wire

☐ Tests for concentric copper tape

☐ Test for combined electrical resistance of copper wire screen and metallic sheath

☐ Measurement of thickness of metallic sheath as per relevant IEC

☐ Type tests on accessories as per relevant IEC

☐ Type Tests on Cable system as per relevant IEC

3. Earth Wire

Description	Manufacturing Capacity (Km/Year)	Testing facilities
HTGS		☐

Testing facilities available for the following

☐ Breaking Load

☐ Elongation

☐ Torsion

☐ Zinc Coating

☐ Uniformity of Zinc Coating

☐ Wrapping Test

☐ Adhesion

☐ Over all Strands Breaking Load

☐ Strand O.D

☐ Lay ratio

☐ DC Resistance of overall Strands at 20◦c

4. Power & Control Cables

Description	Manufacturing Capacity (Km/Year)	Testing Facilities
Power cables		☐
Control Cables		☐
Optical Fibre Cable		☐

Testing facilities available for the following

Routine/Acceptance tests

☐ Annealing test

☐ Conductor resistance

☐ Thickness of insulation and sheath

☐ Tensile strength and elongation at break of insulation and sheath

☐ Insulation Resistance Test

☐ High Voltage Test at room temperature

☐ Conductor resistance test

☐ High voltage test at room temperature

Optional tests

☐ Cold bend

☐ Cold impact

5. OPGW

Description	Manufacturing Capacity (Km/Year)	Testing facilities
24 Fibre		☐
48 Fibre		☐

Testing facilities available for the following

☐ Attenuation Co-efficient (1310 nm, 1550 nm)

☐ Visual material verification and dimensional checks as per approved drawings

☐ Rated/ultimate Tensile Strength

☐ Lay length measurements

V. METERS

Energy Meters

Description	Manufacturing Capacity (Units/Year)	Testing facilities
0.2 Class		☐
0.2s Class		☐
Others, specify:		☐

Testing facilities available for the following

Test on raw materials

☐ Component testing as per the relevant component specification

☐ Circuit card Assembly testing before burn-in

☐ Circuit Assembly burn-in

☐ Circuit card Assembly. Testing after burn-in

Routine/Acceptance tests

☐ AC High voltage tests

- ☐ Insulation resistance test
- ☐ Burden test
- ☐ No-load test
- ☐ Test of Accuracy requirement
- ☐ Starting current test
- ☐ Vibration test
- ☐ Test of meter Constant
- ☐ Reliability test
- ☐ Shock test
- ☐ Magnetic Induction of external origin (AC and DC)
- ☐ Tamper & Fraud Protection

CHECK LIST FOR VENDOR REGISTRATION AT DESK
Form-F2

Application No. :

I. ABOUT VENDOR:

- ☐ Registration Fee paid
- ☐ Certificate of Registration with Industries valid
- ☐ GST Certificate valid
- ☐ Pan Card valid
- ☐ Quality accreditations submitted
- ☐ Pending Litigations undertaking submitted
- ☐ Terminations (Contracts/Agreements) undertaking submitted
- ☐ Black List undertaking submitted
- ☐ Approved Vendor Certificates of other power utilities submitted
- ☐ Power of attorney submitted

II. FINANCIAL POSITION OF COMPANY

- ☐ Company Annual turnover during last 5 years submitted
- ☐ IT Clearance certificate of applicant firm (for 3 years) submitted
- ☐ Balance Sheet for last 3 years submitted
- ☐ Profit & Loss statement for the last 3 years submitted
- ☐ Certificate from bank not less than 1 month old submitted
- ☐ List of orders on hand submitted
- ☐ Certified copy of the Partnership Deed submitted

III. PERFORMANCE

- ☐ Manufacturing Experience submitted
- ☐ Successful supply completion certificates submitted
- ☐ Performance certificates submitted

PTO

IV. PRODUCT DETAILS

- ☐ Proof of document regarding source of Raw Material for production or fabrication or assembling submitted
- ☐ Product catalogue submitted
- ☐ Drawings of product submitted
- ☐ Guarantee Technical Particulars of product submitted

V. DECLARATION BY THE QUALITY CONTROL WING

- ☐ Vendor plant inspection Passed

Signed by SRIKANT NAGULAPALLI
Date: 27-04-2021 11:40:48
Reason: Approved

CHECK LIST FOR VENDOR REGISTRATION BY QUALITY CONTROL WING
Form-F3

Application Form No. :

I. PRODUCTION CAPACITY

A. DEVICES

i. Power Transformer

Production capacity declared are available for following

☐ 500 MVA ☐ 315 MVA ☐ 160 MVA
☐ 100 MVA ☐ 80 MVA ☐ 50 MVA
☐ 31.5 MVA ☐ 10/16 MVA ☐ 15 MVA
☐ 250KVA ☐ 100kVA

ii. Reactor

Production capacity declared are available for following

☐ 50 MVAR ☐ 63 MVAR
☐ 80 MVAR ☐ 125 MVAR & above

iii. Circuit Breaker

Production capacity declared are available for following

☐ 420kV ☐ 245kV ☐ 145kV
☐ 36kV

iv. Isolator

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV
☐ 33kV

v. Current Transformer

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV
☐ 33kV ☐ 33kV NCT

vi. Potential Transformer

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV
☐ 33kV

vii. Capacitor Voltage Transformer

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV

viii. Surge Arrester

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

ix. Battery Sets

Production capacity declared are available for following

☐ 220V, 415AH ☐ 200V, 200AH ☐ 200V,100AH

☐ 48V, 400AH ☐ 48V, 250 AH ☐ 48V, 200AH

☐ 48V, 300AH

x. AC DC Distribution Board and Battery Chargers

Production capacity declared are available for following

☐ 220V, 200AH ☐ 220V, 100AH ☐ 48V,200A

☐ 48V, 150A ☐ 48V, 100A ☐ 48V, 50A

☐ 48V, 35A

xi. Insulators

Production capacity declared are available for following

☐ Disc Insulators ☐ Solid core Insulators ☐ SRC

xii. Hardware

Production capacity declared are available for following

☐ Panther ☐ Zebra ☐ Moose

☐ Ground wire ☐ OPGW ☐ Clamps

☐ Others, Specify:

xiii. Capacitor Bank

Production capacity declared are available for following

☐ 132kV ☐ 33kV

xiv. Telecom Equipment

Production capacity declared are available for following

☐ Plesiochronous Digital Hierarchy (PDH) Equipment	☐ Synchronous Digital Hierarchy Equipment	☐ EPAX Exchange
☐ EPABX Exchange	☐ Multiplexer	☐ Digital Distribution Frame

xv. Automation Hardware

a. Production capacity declared are available for following SAS C&R Panels

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

b. Production capacity declared are available for following SAS C&R Panels components

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

☐ Bay control Unit (BCU)

☐ Bay control & protection Unit (BCPU)

☐ Bay protection Unit (BPU)

☐ Data Concentrator

☐ Gateway for remote control

☐ Gateway interface

☐ GPS Clock, Antenna with time display unit

☐ Intelligent Electronic Devices(IEDs)

☐ 3kVA Inverter (RS485 Compatible)

☐ Ethernet switches

☐ Human machine Interface (HMI)

c. Relays

Production capacity declared are available for following Relays

☐ Distance relay

☐ Differential relay

☐ Over flux relay

- ☐ Over current relay
- ☐ Earth Fault relay
- ☐ DC supply Supervision relay
- ☐ Restricted Earth fault relay
- ☐ Auxiliary relay

d. Production capacity declared are available for the following Remote Terminal Unit (RTU) components

- ☐ RTU
- ☐ Digital input card
- ☐ IP relays
- ☐ Digital output card
- ☐ Power supply unit
- ☐ Analog card
- ☐ CPU

e. IT Equipment

Production capacity declared are available for following

- ☐ Desktop PC
- ☐ Laptop
- ☐ Printers
- ☐ UPS
- ☐ Server

f. Hard ware Components of Computer

Production capacity declared are available for following

- ☐ CPU
- ☐ Monitor
- ☐ Keyboard
- ☐ Mouse
- ☐ RAM
- ☐ Hard Disk Drive

g. Servers

Production capacity declared are available for following

i. RAM

- ☐ 8GB
- ☐ 16GB
- ☐ 32GB
- ☐ Others, Specify:

ii. Cores

- ☐ 18
- ☐ 28
- ☐ 32
- ☐ Others, Specify:

iii. Speed

- ☐ 2.5GHz
- ☐ 2.6GHz
- ☐ 2.7GHz
- ☐ Others, Specify:

iv. Hard Disk Drive

☐ 500GB ☐ 1TB ☐ 1.5TB

☐ Others, Specify:

v. Space

☐ Rack ☐ Tower ☐ Blade

vi. Power supply

☐ Single A.C ☐ Dual A.C

xvi. Software development capacity declared is available

☐ Supervisory Control and Data Acquisition (SCADA)

☐ Substation Automation System (SAS)

☐ Energy Management System

☐ Enterprise Resource planning (ERP)

☐ Asset management

☐ Others, Specify:

B. <u>STRUCTURES</u>

Tower parts & Structures

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

C. <u>CIRCUIT SEGMENTS</u>

i. Conductor

Production capacity declared are available for following

☐ Panther ☐ Zebra ☐ Moose

☐ Others, Specify:

ii. Underground XLPE cable

Production capacity declared are available for following

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

iii. Earth wire

Production capacity declared are available for following

☐ HTGS

iv. Power & Control Cables

Production capacity declared are available for following

☐ Power Cable ☐ Control Cables ☐ Optical Fibre Cable

v. OPGW

Production capacity declared are available for following

☐ 24 Fibre ☐ 48 Fibre

D. METERS

Energy meters

Production capacity declared are available for following

☐ 0.2 Class ☐ 0.2s class ☐ Any other, Specify:

E. ☐ Others, Specify:

II. TESTING FACILITIES

A. DEVICES

1. Power Transformers

Testing facilities available for the following

i. Main Tank & Conservator tank

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Vacuum test
- ☐ Aircel Dimensional verification
- ☐ Aircel Leakage test
- ☐ Pressure withstand test

ii. Bushings(400kV/220kV/132kV/33kV)

- ☐ Dimensional verification
- ☐ Impulse tests (LI & SI)
- ☐ Capacitance & Tan delta test (Before and after HV tests)
- ☐ Power frequency withstand voltage test

- ☐ Pressure test
- ☐ Any other tests as per latest IS

iii. Core (CRGO)

- ☐ Dimensional verification
- ☐ Ageing test
- ☐ Specific loss test (before and after aging tests)

iv. Paper Insulated copper Windings (PICC)

- ☐ Dimensional Verification
- ☐ Mechanical Elongation test
- ☐ Resistance Test
- ☐ Any other tests as per latest IS

v. Radiators

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Leakage test (Before painting at Manufacture's place)
- ☐ After painting, Paint thickness test

vi. Insulating oil

- ☐ Oil break down voltage test
- ☐ Kinematic Viscosity test
- ☐ Density test
- ☐ Pore point test
- ☐ Water content (ppm)
- ☐ Dielectric dissipation factor (Tan δ)
- ☐ Carbon composition test
- ☐ Acidity test
- ☐ Sludge test
- ☐ Interfacial tension test
- ☐ Sulphur content test
- ☐ Flash point test
- ☐ PCB content test
- ☐ Any other test as per IS/IEC

vii. Low Voltage tests

- ☐ Measurement of Ratio & Polarity check

- ☐ Magnetic Balance and Magnetizing Current at low voltage
- ☐ Vector group Verification
- ☐ Measurement of insulation Resistance & Determination of Polarization Index
- ☐ Check of core & Frame insulation for liquid immersed Transformer
- ☐ Measurement Winding Resistance
- ☐ Measurement of Short Circuit Impedance at Low voltage

viii. High Voltage Tests

- ☐ Separate Source Voltage withstand test
- ☐ Line Terminal AC Voltage withstand Test
- ☐ Induced over Voltage with Partial Discharge measurement
- ☐ Measurement of Capacitance and Tan-Delta

ix. No load losses

- ☐ Measurement of No-load Loss & Current
- ☐ Measurement of No-load Current at low voltage
- ☐ Measurement of Harmonics of No Load Current

x. Type Tests

- ☐ Temperature Rise Test
- ☐ Hot Winding Resistance
- ☐ Determination of noise/sound level
- ☐ Measurement of Zero Sequence Impedance
- ☐ Test on On-Load Tap changer
- ☐ Determination of Transient Voltage transfer Characteristics
- ☐ Measurement of Power taken by fans & liquid pump motors
- ☐ Measurement of Load Loss & Impedance Voltage

xi. Special Tests

- ☐ Switching Impulse Test
- ☐ Lighting Impulse Test
- ☐ Measurement of frequency Response Analysis

2. Reactors

Testing facilities available for the following

i. Main Tank & Conservator tank

- ☐ Dimensional verification
- ☐ Pressure test

- ☐ Vacuum test
- ☐ Air cell Dimensional verification
- ☐ Air cell Leakage test
- ☐ Pressure withstand test

ii. Bushings(400kV/220kV/132kV/33kV)

- ☐ Dimensional verification
- ☐ Impulse tests (LI & SI)
- ☐ Capacitance & Tan delta test (Before and after HV tests)
- ☐ Power frequency withstand voltage test
- ☐ Pressure test
- ☐ Any other tests as per latest IS

iii. Core (CRGO)

- ☐ Dimensional verification
- ☐ Aging test
- ☐ Specific loss test (before and after aging tests)

iv. Paper Insulated copper Windings (PICC)

- ☐ Dimensional Verification
- ☐ Mechanical Elongation test
- ☐ Resistance Test
- ☐ Any other tests as per latest IS

v. Radiators

- ☐ Dimensional verification
- ☐ Pressure test
- ☐ Leakage test (Before painting at Manufacture’s place)
- ☐ After painting, Paint thickness test

vi. Insulating oil

- ☐ Oil break down voltage test
- ☐ Kinematic Viscosity test
- ☐ Density test
- ☐ Pore point test
- ☐ Water content (ppm)
- ☐ Dielectric dissipation factor (Tan δ)
- ☐ Carbon composition test

- ☐ Acidity test
- ☐ Sludge test
- ☐ Interfacial tension test
- ☐ Sulphur content test
- ☐ Flash point test
- ☐ PCB content test
- ☐ Any other test as per IS/IEC

vii. Low Voltage tests

- ☐ Measurement of Ratio & Polarity check
- ☐ Magnetic Balance and Magnetizing Current at low voltage
- ☐ Vector group Verification
- ☐ Measurement of insulation Resistance & Determination of Polarization Index
- ☐ Check of core & Frame insulation for liquid immersed Transformer
- ☐ Measurement Winding Resistance
- ☐ Measurement of Short Circuit Impedance at Low voltage

viii. High Voltage Tests

- ☐ Separate Source Voltage withstand test
- ☐ Line Terminal AC Voltage withstand Test
- ☐ Induced over Voltage with Partial Discharge measurement
- ☐ Measurement of Capacitance and Tan-Delta

ix. No-load losses

- ☐ Measurement of No-load Loss & Current
- ☐ Measurement of No-load Current at low voltage
- ☐ Measurement of Harmonics of No Load Current

x. Type Tests

- ☐ Temperature Rise Test
- ☐ Hot Winding Resistance
- ☐ Determination of noise/sound level
- ☐ Measurement of Zero Sequence Impedance
- ☐ Test on On-Load Tap changer
- ☐ Determination of Transient Voltage transfer Characteristics
- ☐ Measurement of Power taken by fans & liquid pump motors

☐ Measurement of Load Loss & Impedance Voltage

xi. Special Tests

☐ Switching Impulse Test

☐ Lighting Impulse Test

☐ Measurement of frequency Response Analysis

3. Circuit Breakers

Testing facilities available for the following

Routine/Acceptance tests

☐ Visual & Dimensional verification

☐ HV test (70 kV on Power circuit) for 1 minute

☐ HV test of 1 kV on auxiliary circuit

☐ Electrical & Mechanical operation

☐ Mechanical Endurance Test

☐ Power frequency voltage withstand tests (wet & dry)

☐ Lightning Impulse withstand test

☐ Basic short circuit tests, short line fault test duties and out of phase switching tests

☐ Short time withstand current and peak withstand current tests

☐ Line and cable charging current tests

☐ Capacitive current switching tests

Type Tests

☐ Partial discharge

☐ Temperature rise test

☐ Seismic withstand test

☐ RIV (Radio Interference) Voltage Test. (for 220 kV & 132 kV SF6 Circuit Breakers only)

4. Isolators

Testing facilities available for the following

☐ Visual and Dimensional Check

☐ Voltage Test on Control and Auxiliary Circuits

☐ Measurement of Resistance of Main Circuit

- ☐ Mechanical Operation Test
- ☐ Sequence of Operation of Isolator
- ☐ Sequence of Operation of Earth Switch
- ☐ Test on Galvanizing Components
- ☐ Temperature rise test

5. Instrument Transformers (CTs/PTs/CVTs)

Testing facilities available for the following

Routine/Acceptance tests

- ☐ Short time current test
- ☐ High voltage power frequency wet withstand voltage test
- ☐ Tests for accuracy
- ☐ Temperature Coefficient Test
- ☐ Partial Discharge measurement
- ☐ Thermal stability test
- ☐ Tan Delta and capacitance Test
- ☐ Power frequency voltage with stand tests on primary terminals
- ☐ Power frequency voltage with stand tests between sections, if applicable
- ☐ Power frequency voltage with stand tests on secondary terminals
- ☐ Tests on accuracy
- ☐ Inter-turn over voltage test
- ☐ Test for winding resistance, rated knee point E.M.F and exciting current at rated knee point E.M.F for all ratios
- ☐ Verification of terminal marking and polarity
- ☐ Determination of the instrument security factor (FS) of measuring current transformer at all ratios

Type Tests

- ☐ Temperature –rise test
- ☐ Impulse voltage withstand test on primary terminals

6. Surge Arresters (LAs)

Testing facilities available for the following

Insulation withstand Test

- ☐ Lightning Impulse

- ☐ Power frequency
- ☐ Switching Impulse (For 400 KV)

Routine/Acceptance tests

- ☐ Residual Voltage Test
- ☐ Steep Current Impulse
- ☐ Test to verify long term stability under COV
- ☐ Repetitive charge transfer withstand
- ☐ Heat dissipation behavior verification of test sample
- ☐ Switching surge operating duty test
- ☐ Power Frequency voltage Vs Time Curve
- ☐ Short circuit test
- ☐ High Current
- ☐ Low Current
- ☐ Bending Test(Cantilever Strength)
- ☐ Seal Leakage Test
- ☐ Test to verify the dielectric withstand test
- ☐ Test of internal grading components
- ☐ IP-67 test on surge Monitor
- ☐ test on silicon rubber as per standard IEC-61462
- ☐ Uniformity of Zinc coating for metal parts
- ☐ Lightning Impulse Residual voltage test
- ☐ Partial discharge test
- ☐ Tests on discharge counter
- ☐ Leakage check rate test for a duration of 24 hrs.

Type Tests

- ☐ Radio interference voltage test & Corona inception & extinction voltage
- ☐ Weather ageing test
- ☐ Salt fog test 1000 h
- ☐ UV light test 1000 h
- ☐ TERT (Tracking & Erosion resistance test)
- ☐ Degree of Protection test on counter/surge monitor

7. Battery Sets

Testing facilities available for the following

- ☐ Test for capacity and test for voltage during discharge.

- ☐ Ampere hour and Watt hour efficiency tests.
- ☐ Test for loss of capacity on storage.
- ☐ Endurance test.

8. AC DC Distribution Boards and Battery Chargers

Testing facilities available for the following

- ☐ Insulation Resistance Test
- ☐ High Voltage Test
- ☐ Annunciation Verification
- ☐ DC output voltage regulation
- ☐ Efficiency at full load
- ☐ Power factor
- ☐ DC output voltage ripple
- ☐ Battery path current limit
- ☐ Battery Low Trip Setting
- ☐ Protection against short circuit
- ☐ Ripple Test
- ☐ IP 54/IP 55 test

9. Insulators

Testing facilities available for the following

- ☐ Verification of Dimensions
- ☐ Verification of the tightness of the interface between end fittings and insulator housing
- ☐ Verification of the locking System
- ☐ Verification of the SML
- ☐ Galvanization Test
- ☐ Brittle Fracture Resistance Test
- ☐ Temperature cycle Test
- ☐ Hydrophobicity test
- ☐ Dye Penetration test
- ☐ N.D.T
- ☐ Glass Content test

10. Hardware (Both Conductor & Insulators)

Testing facilities available for the following

Tests for both suspension and tension hardware

- ☐ Visual examination
- ☐ Verification of dimensions
- ☐ Galvanizing test / Electroplating
- ☐ Mechanical strength test on each component
- ☐ Mechanical strength test of welded joint
- ☐ Test on locking device for ball and socket coupling
- ☐ Chemical Analysis, hardness tests grain size
- ☐ Magnetic particle inspection of forgings and casting

Tests for Suspension Hardware

- ☐ Clamp slip strength Vs torque test for suspension clamp
- ☐ Shore hardness test of elastomer cushion for AG suspension clamp
- ☐ Bend test for armour rod set
- ☐ Resilience test for armour rods set
- ☐ Conductivity test for armour rods set

Tests for tension Hardware

- ☐ Slip strength test for dead-end assembly
- ☐ On Mid-Span Compression Joint for Conductor and Earth Wire
- ☐ Visual examination
- ☐ Dimensional verification
- ☐ Galvanizing test
- ☐ Hardness Test

Tests on Flexible Steel Bond

- ☐ Visual examination
- ☐ Dimensional verification
- ☐ Slip strength test

Tests on Flexible Copper Bond

- ☐ Visual examination
- ☐ Dimensional verification
- ☐ Slip strength test

Tests on Vibration Damper for Power Conductor

- ☐ Visual examination
- ☐ Dimensional verification
- ☐ Galvanizing test
- ☐ Verification of Resonance frequencies
- ☐ Clamp slip test
- ☐ Clamp bolt torque test
- ☐ Strength of the messenger cable
- ☐ Mass pull off test
- ☐ Fatigue Test

Tests on Earth Wire suspension & tension clamp Assembly

- ☐ Visual Examination and Dimension Verification
- ☐ Galvanizing Test
- ☐ Clamp Slip Strength Test
- ☐ Mechanical Strength test on each component
- ☐ Hardness Test for Tension clamp

11. Capacitor Banks

Testing facilities available for the following

- ☐ Measurement of capacitance
- ☐ Voltage test between terminals
- ☐ Test between line terminals and container
- ☐ AC voltage test between terminals & containers
- ☐ Test of discharge device
- ☐ Capacitor loss tangent measurement
- ☐ Sealing test

12. Telecom Equipment

Testing facilities available for the following

a. Optical Line Terminal Equipment (Plesiochronous Digital Hierarchy (PDH)/ Synchronous Digital Hierarchy(SDH))

- ☐ Power Supply Test
- ☐ BER test at E1 interface
- ☐ BER test at STM-4 Interface
- ☐ Out Inter for E1 Interface

- ☐ Output jitter at STM level Interface
- ☐ Input jitter Tolerance for E1 Interface
- ☐ Input jitter Tolerance for STM level
- ☐ Pulse mask Measurement at E1 Interface
- ☐ Optical Power Measurement
- ☐ Optical Receiver sensitivity Measurement
- ☐ Network management Interface performance through Remote login
- ☐ Simulation of failure condition and fail over or each redundant unit
- ☐ Ethernet Performance Test

b. Multiplexer/Digital Distribution Frame

- ☐ Electrical Interface – 2M loop back test
- ☐ Cross Connection function Measurement
- ☐ E1 Pulse space shape
- ☐ Framing signaling, operational and maintenance test
- ☐ Data Channel BER Measurement on N*64k bit/sec
- ☐ E & M Gain level Measurement
- ☐ E & M/Idle Channel Noise Measurement
- ☐ Exch/Sub Frequency level Measurement
- ☐ Exch/Sub – Idle Channel Noise Measurement
- ☐ Power Supply unit Redundancy check
- ☐ 1+1 Control Card Redundancy

c. EPAX

- ☐ Power supply test
- ☐ Protection test
- ☐ Engage pulse timing test
- ☐ Priority timing test
- ☐ Digital pulse timing test
- ☐ Interdigit pulse timing test
- ☐ Releasing pulse timing test

Test calls

- ☐ Subscriber to Subscriber
- ☐ Subscriber to Trunk

☐ Trunk to Trunk

d. EPABX

☐ Power supply test

☐ Protection test

☐ Digital pulse timing test

☐ Interdigit pulse timing test

☐ Releasing pulse timing test

Test calls

☐ Subscriber to Subscriber

☐ Subscriber to Junction

☐ DID facility

13. Automation Hardware

Testing facilities available for the following

a. SAS Control & Relay Panels

☐ Physical Verification Panel

☐ BOM Verification

☐ AC and DC Circuit

☐ IR Value before HV Test (500V DC)

☐ HV Test (2KV AC, 1mm)

☐ IR Value after HV Test (500V DC)

☐ Leakage Current

☐ CT/PT Check

☐ Protection Only

☐ Backup Relay

☐ BCU

☐ BCPU

☐ Trip Circuit Supervision

☐ Annunciator Circuit

☐ Closing/Tripping Circuit

☐ Interlock Circuit/AUX Relay circuit

☐ MIMIC/SLD

☐ Paint Shade and Thickness

b. Testing facilities available for Control IEDs and Communication Equipment of SAS C&R Panels

Power Input

☐ Auxiliary Voltage

☐ Current Circuits

☐ Voltage Circuits

☐ Indications

Accuracy Tests

☐ Operational Measured Values

☐ Currents

☐ Voltages

☐ Time resolution

Insulation Tests

☐ Dielectric Tests

☐ Impulse Voltage withstand Test

Influencing Quantities

☐ Limits of operation

☐ Permissible ripples

☐ Interruption of input voltage

Electromagnetic Compatibility Test

☐ 1 MHZ. burst disturbance test

☐ Electrostatic Discharge Test

☐ Radiated Electromagnetic Field Disturbance Test

☐ Electrical Fast transient Disturbance Test

☐ Conducted Disturbances Tests induced by Radio Frequency Field

☐ Magnetic Field Test

☐ Emission (Radio interference level) Test.

☐ Conducted Interference Test

Function Tests

☐ Indication

☐ Commands

☐ Measured value Acquisition

☐ Display Indications

Environmental tests

☐ Cold Temperature

☐ Dry Heat

☐ Wet heat

☐ Humidity (Damp heat Cycle)

☐ Vibration

☐ Bump

☐ Shock

Other tests

☐ Hardware Integration test

☐ Integrated System test

☐ Factory Acceptance test

c. Relays

Testing facilities available for the following

Insulation test

☐ Dielectric test

☐ Insulation Resistance Measurement Test

☐ Impulse Voltage withstand test

☐ Tests for thermal and mechanical requirements

☐ Tests for rated burden

☐ Contact performance test

☐ High frequency disturbance test

☐ Fast transient test

☐ Relay characteristics, performance and accuracy test

☐ Steady state Characteristics and operating time

☐ Dynamic Characteristics and operating time for distance protection relays and current differential protection relay

☐ Disturbance recorder and Event logger only performance tests are intended under this item

☐ 5kV Impulse Peak voltage Test

☐ Vibration test

☐ Overshoot time test

d. Remote Terminal Unit

☐ Surge Immunity test

☐ Electrical fast transient burst test

☐ Damped Oscillatory wave test

- ☐ Electrostatic discharge test
- ☐ Radiated Electromagnetic field test
- ☐ Damped Oscillatory Magnetic field test
- ☐ Power frequency magnetic field test
- ☐ Power frequency Voltage withstand test
- ☐ 1.2/50μsec impulse Voltage withstand test
- ☐ Insulation resistance test
- ☐ Dry heat test
- ☐ Damp heat test
- ☐ Functional test
- ☐ RTU & Panel power up
- ☐ RTU start up and shutdown
- ☐ Verification of CPU IP address
- ☐ Verification of dual LAN
- ☐ Verification of CPU dual ports
- ☐ Verification of Configuration download
- ☐ Verification of Configuration Upload
- ☐ Verification of IEC60870-5-104 Slave protocol
- ☐ IEC60870-5-104 Redundancy check
- ☐ RTU Time synchronization check
- ☐ Verification of System diagnostics
- ☐ RTU power consumption test
- ☐ Event logging buffer & Memory test
- ☐ Power Supply unit Redundancy check
- ☐ CPU Redundancy check for control Central & Slave device (Energy Meter)
- ☐ Reporting to multiple masters

e. Testing facilities available for following IT Equipment

☐ Desktop PC ☐ Laptop ☐ Printers

☐ UPS

f. Testing facilities available for following Hard ware Components of Computer

☐ CPU ☐ Monitor ☐ Keyboard

☐ Mouse ☐ RAM ☐ Hard Disk Drive

g. Testing facilities available for Servers

☐ Testing facilities available as per the declaration

14. Other Devices as per relevant standards

Sl.No.	Equipment/Product/ Material	Type test during last 5 years	Relevant standard	Year of test

B. <u>STRUCTURES</u>

Tower Parts including stubs

Testing facilities available for the following

☐ Galvanizing Test

Mechanical Tests

☐ Yield Load (N)

☐ Yield Stress Test (N/mm2)

☐ Ultimate Load (N)

☐ Ultimate tensile strength (N/mm2)

☐ Percentage Elongation

☐ Bend test

Chemical Test

☐ Carbon %

☐ Silicon %

☐ Manganese %

☐ Phosphorous %

☐ Sulphur %

C. CIRCUIT SEGMENTS

1. Conductor

Testing facilities available for the following

- ☐ Break load(KN)
- ☐ Resistance(at 20◦c ohms/km)
- ☐ Wrapping
- ☐ Lay-Ratio
- ☐ Over all Diameter (mm)
- ☐ Elongation (%)
- ☐ Wt. of Zinc Coating(g/Sq.m)
- ☐ Uniformity of Zinc Coating
- ☐ Chemical test on Aluminum strands

2. Underground XLPE cable

Testing facilities available for the following

Type Tests on Cable

- ☐ Bending Test
- ☐ Partial discharge test after bending test
- ☐ Tan δ measurement
- ☐ Heating cycle voltage test
- ☐ Partial discharge test during and after heating cycle test
- ☐ Impulse withstand test
- ☐ Power frequency voltage test

Tests on Conductor

- ☐ Dimensional verification
- ☐ D.C. Resistance at 20^0C
- ☐ Measurement of thickness of metallic sheets
- ☐ Test on concentric metallic service
- ☐ Test on combined electrical resistance of copper wire screen and metallic test
- ☐ Annealing test after copper

Tests for insulation & sheath

- ☐ Thickness and dimensions of insulation and outer sheath
- ☐ Tensile strength and elongation at break of insulation & outer sheath
- ☐ Thermal ageing in air oven
- ☐ Tensile strength and elongation and break of insulation and outer sheath after ageing
- ☐ Hot set test for XLPE insulation
- ☐ Shrinkage test on XLPE insulation as per IEC
- ☐ Resistivity of semi-conducting conductor & insulation screen and at room temperature and at 90^0C conductor temperature
- ☐ Hot deformation test for PE sheath
- ☐ Carbon black content of black PE sheaths
- ☐ Pressure test at high temperature on sheath
- ☐ Test on concentric metallic screen
- ☐ Tests for concentric copper wire
- ☐ Tests for concentric copper tape
- ☐ Test for combined electrical resistance of copper wire screen and metallic sheath
- ☐ Measurement of thickness of metallic sheath as per relevant IEC
- ☐ Type tests on accessories as per relevant IEC
- ☐ Type Tests on Cable system as per relevant IEC

3. Earth Wire

Testing facilities available for the following

- ☐ Breaking Load
- ☐ Elongation
- ☐ Torsion
- ☐ Zinc Coating
- ☐ Uniformity of Zinc Coating
- ☐ Wrapping Test
- ☐ Adhesion
- ☐ Over all Strands Breaking Load
- ☐ Strand O.D
- ☐ Lay ratio
- ☐ D.C Resistance of overall Strands at 20◦c

4. Power & Control Cables

Testing facilities available for the following

Routine/Acceptance tests

- ☐ Annealing test
- ☐ Conductor resistance
- ☐ Thickness of insulation and sheath
- ☐ Tensile strength and elongation at break of insulation and sheath
- ☐ Insulation Resistance Test
- ☐ High Voltage Test at room temperature
- ☐ Conductor resistance test
- ☐ High voltage test at room temperature

Optional tests

- ☐ Cold bend
- ☐ Cold impact

5. OPGW

Testing facilities available for the following

- ☐ Attenuation Co-efficient (1310nm, 1550nm)
- ☐ Visual material verification and dimensional checks as per approved drawings
- ☐ Rated/ultimate Tensile Strength
- ☐ Lay length measurements

D. <u>METERS</u>

Energy Meters

Testing facilities available for the following

Test on raw materials

- ☐ Component testing as per the relevant component specification
- ☐ Circuit card Assembly testing before burn-in
- ☐ Circuit Assembly burn-in
- ☐ Circuit card Assembly. Testing after burn-in

Routine/Acceptance tests

- ☐ AC High voltage tests
- ☐ Insulation resistance test

- ☐ Burden test
- ☐ No-load test
- ☐ Test of Accuracy requirement
- ☐ Starting current test
- ☐ Vibration test
- ☐ Test of meter Constant
- ☐ Reliability test
- ☐ Shock test
- ☐ Magnetic Induction of external origin (AC and DC)
- ☐ Tamper & Fraud Protection

E. ☐ Others,

Specify:

III. FACITILIES AVAILABILITY

- ☐ Technical man power is available
- ☐ Machinery is available
- ☐ R&D facilities are available

III. QUALITY CONTROL DECLARATION

- ☐ Pass

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

www.aptransco.gov.in

VENDOR REGISTRATION FORM

I. Name of the Vendor:

Address of the Vendor:

Factory location:

E-mail address:

Website address of Vendor:

II. Registration No._____dt._____

Valid From: To:

III. DEVICES

i. Power Transformer

☐ 500 MVA ☐ 315 MVA ☐ 160 MVA

☐ 100 MVA ☐ 80 MVA ☐ 50 MVA

☐ 31.5 MVA ☐ 10/16 MVA ☐ 15 MVA

☐ 250KVA ☐ 100kVA

ii. Reactor

☐ 50 MVAR ☐ 63 MVAR

☐ 80 MVAR ☐ 125 MVAR & above

iii. Circuit Breaker

☐ 420kV ☐ 245kV ☐ 145kV

☐ 36kV

iv. Isolator

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

v. Current Transformer

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV ☐ 33kV NCT

vi. Potential Transformer

☐ 400kV ☐ 220kV ☐ 132kV
☐ 33kV

vii. Capacitor Voltage Transformer

☐ 400kV ☐ 220kV ☐ 132kV

viii. Surge Arrester

☐ 400kV ☐ 220kV ☐ 132kV
☐ 33kV

ix. Battery Sets

☐ 200V, 415 AH ☐ 200V, 200 AH ☐ 200V, 100 AH
☐ 48V, 400AH ☐ 48V, 300AH ☐ 48V, 250 AH
☐ 200V, 100AH

x. AC DC Distribution Board and Battery Charger

☐ 220V, 200AH ☐ 220V, 100AH ☐ 48V,200A
☐ 48V, 150A ☐ 48V, 100A ☐ 48V, 50A
☐ 48V, 35A

xi. Insulators

☐ Disc Insulators ☐ Solid core Insulators ☐ SRC

xii. Hardware

☐ Panther ☐ Zebra ☐ Moose
☐ Ground wire ☐ OPGW ☐ Clamps
☐ Others

xiii. Capacitor Bank

☐ 132kV ☐ 33kV

xiv. Telecom Equipment

☐ PDH Equipment ☐ SDH Equipment ☐ EPAX Exchange
☐ EPABX Exchange ☐ Multiplexer ☐ DDF

xv. Automation Hardware

a. SAS Control & Relay panel

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

b. SAS C&R Panel Components

☐ Bay control Unit (BCU)

☐ Bay control & protection Unit (BCPU)

☐ Bay protection Unit (BPU)

☐ Data Concentrator

☐ Gateway for remote control

☐ Gateway for SLDC

☐ GPS Clock, Antenna with time display unit

☐ Intelligence Electronic Devices(IEDs)

☐ 3kVA Inverter (RS485 Compatible)

☐ Industrial grade Ethernet switches

☐ Human machine Interface (HMI)

c. Relays

☐ Distance relay

☐ Differential relay

☐ Over flux relay

☐ Over current relay

☐ Earth Fault relay

☐ Restricted Earth Fault relay

☐ DC supply Supervision relay

☐ Auxiliary relay

d. Remote Terminal Unit (RTU)

☐ RTU ☐ Digital output card ☐ Analog card

☐ Digital input card ☐ Power supply unit ☐ CPU

e. IT Equipment

☐ Desktop PC ☐ Laptop ☐ Printers

☐ UPS

f. Hard ware Components of Computer

☐ CPU	☐ Monitor	☐ Keyboard
☐ Mouse	☐ RAM	☐ Hard Disk Drive

g. Servers

1. RAM

☐ 8GB	☐ 16GB	☐ 32GB
☐ Others, Specify:		

2. Cores

☐ 18	☐ 28	☐ 32
☐ Others, Specify:		

3. Speed

☐ 2.5GHz	☐ 2.6GHz	☐ 2.7GHz
☐ Others, Specify:		

4. Hard Disk Drive

☐ 500GB	☐ 1TB	☐ 1.5TB
☐ Others, Specify:		

5. Operating System

☐ Linux	☐ Windows	☐ Unix

6. Database

☐ Oracle	☐ Sybase	☐ MSSQL
☐ MAXDB	☐ HANA	

7. Space

☐ Rack	☐ Tower	☐ Blade

8. Interfaces

☐ 1GB Ethernet port	☐ V.24	☐ V.28
☐ Other standards, Specify:		

9. Redundant Array of Independent Discs (RAID) support

☐ 0	☐ 1	☐ 5
☐ 6	☐ Others, Specify:	

10. Network ports

☐ 2	☐ 4	☐ Others, specify

11. Power supply

☐ Single A.C ☐ Dual A.C

xvi. Automation Software

☐ Supervisory Control and Data Acquisition (SCADA)

☐ Substation Automation System (SAS)

☐ Energy Management System

☐ Enterprise Resource planning (ERP)

☐ Asset management

☐ Others, Specify:

IV. STRUCTURES

Tower parts & Structures

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

V. CIRCUIT SEGMENTS

i. Conductor

☐ Panther ☐ Zebra ☐ Moose

☐ Others, Specify:

ii. Underground XLPE cable

☐ 400kV ☐ 220kV ☐ 132kV

☐ 33kV

iii. Earth wire

☐ HTGS

iv. Power & Control Cables

☐ Power Cable ☐ Control Cables ☐ Optical Fibre Cable

v. OPGW

☐ 24 Fibre ☐ 48 Fibre

VI. METERS

Energy meters

☐ 0.2 Class ☐ 0.2s class ☐ Any other, Specify:

VII. ☐ Others, Specify:

The registration is subject to the following conditions

1. The registration is valid for three years .
2. Enlisted vendor shall maintain high standard of integrity and performance in respect of their dealing and supplies and generally endeavour to give no cause for complaints.
3. Vendor shall mail proper response/offer in time and accept forms and conditions of APTRANSCO.
4. Copies of Sales Tax clearance (both central & state) Balance sheet and Profit & loss Account statement shall be submitted every year. Valid dealership certificate shall also be submitted as and when renewed, failing which registration will be treated as cancelled.
5. If there is any change of address and name, the same shall be immediately bring to the notice of this office to update the same.
6. For consideration of renewal of registration, Vendor shall submit a fresh application form two months prior to expiry of the validity of registration duly filled in along with necessary documents like Sales Tax clearance, Balance sheet, Profit & loss Account certificate and relevant documents.
7. This registration neither guarantees the award of contract/order nor confer any right to demand of enquiries.
8. APTRANSCO reserves the right to cancel your registration at any time without assigning any reason.
9. If the vendor is non-responsive due to blacklisting, termination, litigation or on account of its performance of disabilities, the registration is liable for premature termination.
10. Registration information is also available in APTRANSCO website, www.aptransco.gov.in.
11. All communication/notices shall be through the e-mail address submitted in the application form.

Chief Engineer/Transmission,
APTRANSCO, Vidyutsoudha,
Vijayawada.

Signed by SRIKANT NAGULAPALLI
Date: 27-04-2021 11:39:41
Reason: Approved