

# Central Electricity Authority

## Draft Regulation on Communication Standards for Power System Operation, 2019

Sl. No.	Description	Summary
1.	<b>Control Period</b>	N.A.
2.	<b>Objective</b>	These regulations shall provide for planned development of communications infrastructure to ensure seamless integration, reliable, redundant and secure communication for power system operations.
3.	<b>Application</b>	All Users, SLDCs, Discom LDCs, RLDCs, NLDC, CTU, STUs, RPCs, REMC, FSP (Forecasting Service Provider) and Power Exchanges.
4.	<b>Functional Requirement</b>	<ul style="list-style-type: none"> <li>• To provide reliable data communication and tele-protection for power system at National, Regional, Inter-State and Intra-State level. The Communication System shall provide integration with SCADA, WAMS, Video Conferencing System (VCS), Automatic Meter Reading (AMR), EPABX and tele-protection. The required communication interfaces shall be provided both at sending (User) and receiving (Control Centre) ends.</li> <li>• The Communication System shall form a wideband Network to support the requirement of Power System Operation.</li> </ul>
5.	<b>Standards and Codes of Practice</b>	<ol style="list-style-type: none"> <li>1. Follow the industry best practices and applicable industry standards in respect of the equipment installation and O&amp;M (Operation and Maintenance).</li> <li>2. The communication equipment shall comply with the relevant standards of Bureau of Indian Standards (BIS). If BIS Standards are not available for a particular equipment or material, the relevant British Standard (BS), International Electro-Technical Commission (IEC) Standard, Institute of Electrical and Electronics Engineers (IEEE), EIA (Electronic Industries Association) Standards, American National Standards Institute (ANSI) Standards, ITU-T (International Telecommunications Union – Telecommunication) / CCITT (Consultative Committee for International Telephony and Telegraphy) Standards, CISPR (International Special Committee on Radio Interference) Standards, Fiber Optic Association (FOA) or any other equivalent International Standard shall be followed.</li> </ol>
6.	<b>Lightning &amp; Surge Protection</b>	<ul style="list-style-type: none"> <li>• Earth connection of communication equipment (indoor &amp; outdoor) shall be proper and preferably separate to avoid failure due to earthing. Sufficient protection shall be provided for lightning and electric surge as per relevant standards of IEC (model by IEC 61000-4-5 and compliant to relevant parts of IEC 62305).</li> <li>• Earth connection shall be done in accordance with the norms of IEEE-80 or BIS:3043. The resistibility of communication equipment installed against over voltage and over current shall be as per ITU-T (K 20) recommendations.</li> </ul>
7.	<b>Access to Data</b>	Communication System access shall be designed, developed, built, configured and maintained in such a way that only authorized users have access.
8.	<b>Design &amp; Planning</b>	<ol style="list-style-type: none"> <li>1. Cellular and RF based communication technology shall not be considered for control and protection functions.</li> <li>2. Central/State Transmission Utility while planning shall consider design of the intervening communication system for seamless integration to have Wideband network.</li> <li>3. User, whose system is proposed to be interfaced with the communication system, shall furnish the requisite interface information to the appropriate Control Centre as prescribed by them.</li> <li>4. Communication equipment installed shall be interoperable, so as to allow seamless integration between different vendors.</li> <li>5. Network equipment shall be synchronized through provision of GPS clock to achieve the desired functionality.</li> </ol>

		<p>6. At least 10 hours battery backup shall be provided for the communication equipment for all the nodes. Extended backup shall be provided depending upon requirement.</p> <p>7. Supply voltage shall be 48V DC +15%, -10% (positive pole earthed).</p> <p>8. The minimum guaranteed life for all the wideband communication equipment shall be 10 years.</p>																																																					
9.	<b>Site Responsibility Schedule</b>	<p>1. A Site Responsibility Schedule (SRS) for every interface point shall be prepared by the owner of the communication interface equipment at the interfacing location.</p> <p>2. SRS shall include:</p> <ul style="list-style-type: none"> <li>• Schedule of telecommunication interface equipment, their responsibility for access, maintenance and operation;</li> <li>• Schedule of Auxiliary Power Supply catering communication equipment;</li> <li>• Schedule of patching details (like STM level, E-1 level, TCP/IP level) for channel routing, and numbers of fiber connectivity;</li> <li>• Type of connectors required for making the connection through;</li> <li>• Specific information provided by the OEM (Original Equipment Manufacturer);</li> <li>• Site / Node Common Drawings for each interface point and</li> <li>• Responsible person (s) for the site.</li> </ul> <p>3. If Packet technology is used in backhaul network, following additional information shall be included:</p> <ul style="list-style-type: none"> <li>• Mode of Connectivity</li> <li>• Protocol used (Level 2/Level 3)</li> <li>• Bandwidth Provisioning</li> </ul>																																																					
10.	<b>Access to Connection Site / Node</b>	Owner of the interface site/node shall provide reasonable access and space to the User or its authorized representative, whose equipment is installed or proposed to be installed at the interface site for installation, configuration, testing and O&M of the equipment.																																																					
11.	<b>Performance</b>	<p>Communication System shall be planned with required bandwidth to conform the data interval time, as specified below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Category</th> <th rowspan="2">Data Type</th> <th colspan="3">Time Interval ( Sec )</th> <th colspan="3">Time Interval (Sec) via Data Concentrator</th> </tr> <tr> <th>765 or 400 kV</th> <th>220 or 132* kV</th> <th>Below 132* kV</th> <th>765 or 400 kV</th> <th>220 or 132* kV</th> <th>Below 132* kV</th> </tr> </thead> <tbody> <tr> <td>AGC</td> <td>Analog Value</td> <td colspan="2">2</td> <td>3</td> <td colspan="2">2</td> <td>3</td> </tr> <tr> <td rowspan="2">Dispatch</td> <td>Status</td> <td>2</td> <td>3</td> <td>4</td> <td>2</td> <td>3</td> <td>5</td> </tr> <tr> <td>Analog Value</td> <td>4</td> <td>5</td> <td>6</td> <td>4</td> <td>5</td> <td>7</td> </tr> <tr> <td>Phasor</td> <td>Analog/Status</td> <td colspan="3">0.04 to 0.01</td> <td colspan="3">0.04 to 0.01</td> </tr> <tr> <td>Forecast/Weather</td> <td>Value</td> <td colspan="3">60</td> <td colspan="3">60</td> </tr> </tbody> </table> <p>* 132kV may be replaced with 110kV wherever 110kV is used in transmission system</p>	Category	Data Type	Time Interval ( Sec )			Time Interval (Sec) via Data Concentrator			765 or 400 kV	220 or 132* kV	Below 132* kV	765 or 400 kV	220 or 132* kV	Below 132* kV	AGC	Analog Value	2		3	2		3	Dispatch	Status	2	3	4	2	3	5	Analog Value	4	5	6	4	5	7	Phasor	Analog/Status	0.04 to 0.01			0.04 to 0.01			Forecast/Weather	Value	60			60		
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12.	<b>Control Command Delay</b>	Communication System shall relay the Control Command from the Control Centre to relevant equipment within 2 seconds for SCADA and within 1 second for WAMS, whether the command is transmitted directly or via Data Concentrator.																																																					
13.	<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Total outage period shall be less than 16 hours on monthly basis respectively for interface node, wideband node and communication media. The total outages in a rolling 12-months assessment period shall be less than 48 hours.</li> </ul>																																																					

		<ul style="list-style-type: none"> <li>• While designing the communication system, adequate redundancy shall be kept.</li> </ul>
14.	<b>Cyber Security</b>	All Users and Control Centre Owner connected to the communication system shall have robust programs in place to adequately and continuously manage cyber security risks that could have adversely impact power system communications and supporting system and infrastructure.
15.	<b>Safety &amp; Testing</b>	Owner of communication equipment shall be responsible for the safety of its equipment installed.
16.	<b>Maintenance</b>	Monthly Outage shall be planned and got approved by the owner of communication equipment in the concerned RPC (Regional Power Committee), as per detailed procedure finalized by the respective RPC.
17.	<b>System Upgradability &amp; Expandability</b>	All Communication interfaces shall be sized (though not necessarily equipped) to support system / subsystem expansion / upgradation to full capacity as provided by specified aggregate transmission rates. Equipment units provisioned for equipped subunits shall be terminated with appropriate termination interfaces.
18.	<b>Training</b>	Specialized training shall be provided to the persons manning the centralized monitoring center and the field support staff to ensure quick fault detection and restoration of the communication system. Training shall be provided to the maintenance persons on all communication equipment for its operation and maintenance.