

Scope: Etc = Electrical, 1 = Physical, 2 - 7 = OSI Stack, Sv = Abstract services, Sm = Semantic Model, Bu = Business policy/procedures, In = Introductory, Cs = Cybersecurity, Gu = Guidelines, Tst = Testing  
 Type: Std = Standard, IS = International Standard, TS = Technical Specification, Rd2 = Second Edition, Rec = Recommended Practice, TR = Technical Report, DTR = Draft Technical Report, Und = Under development, Pl = Planned, Ob = Obsolete

| Standard                                                                                                                 | Status      | Etc | OSI Stack |   |   |   |     |                   |                             | Sv | Sm | Bu | In | Cs | Gu | Tst                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Brief Description                                                            | Domain                                             | Security References                         | Security technologies generally applicable only to OSI Layers |                                                                                                                                                    | Comments & Issues |
|--------------------------------------------------------------------------------------------------------------------------|-------------|-----|-----------|---|---|---|-----|-------------------|-----------------------------|----|----|----|----|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|                                                                                                                          |             |     | 1         | 2 | 3 | 4 | 5-7 | NISTIR Interfaces | SGCC (CSWG) Recommendations |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                              |                                                    |                                             |                                                               |                                                                                                                                                    |                   |
| ANSI/ASHRAE 135-2008/ISO 16484-5 BACnet - A Data Communication Protocol for Building Automation and Control Networks     | Std         |     |           | X | X | X | X   |                   |                             | X  |    |    |    |    |    | BACnet defines an information model and messages for building system communications at a customer's site. BACnet incorporates a range of networking technologies, using IP protocols, to provide scalability from very small systems to multi-building operations that span wide geographic areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Customer: Building appliances                                                | None                                               | U44, U43                                    |                                                               |                                                                                                                                                    |                   |
| ANSI C12.1                                                                                                               | Std         |     | X         |   |   |   |     |                   |                             |    |    |    |    |    | X  | Performance- and safety-type tests for revenue meters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Customer: metering                                                           |                                                    | U64, U74                                    |                                                               |                                                                                                                                                    |                   |
| ANSI C12.18/IEEE P1701/MC1218                                                                                            | Std         |     | X         |   |   |   |     |                   |                             |    |    |    |    |    |    | Transport of measurement device data over telephone networks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Customer: metering                                                           |                                                    | U64, U74                                    |                                                               |                                                                                                                                                    |                   |
| ANSI C12.19/MC1219                                                                                                       | Std         |     |           |   |   |   |     |                   |                             | X  |    |    |    |    |    | Revenue metering End Device Tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Customer: metering                                                           |                                                    | U64, U74                                    |                                                               |                                                                                                                                                    |                   |
| ANSI C12.20                                                                                                              | Std         |     | X         |   |   |   |     |                   |                             |    |    |    |    |    | X  | Revenue metering accuracy specification and type tests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Customer: metering                                                           |                                                    | U64, U74                                    |                                                               |                                                                                                                                                    |                   |
| ANSI C12.21/IEEE P1702/MC1221                                                                                            | Std         |     | X         |   |   |   |     |                   |                             |    |    |    |    |    |    | Protocol and optical interface for measurement devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Customer: metering                                                           |                                                    | U64, U74                                    |                                                               |                                                                                                                                                    |                   |
| ANSI C12.22                                                                                                              | Std         |     |           | X | X | X |     |                   |                             |    |    |    | X  |    |    | Metering protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Customer: metering                                                           | Listed in ANSI C12.22                              | U64, U74                                    |                                                               |                                                                                                                                                    |                   |
| ANSI/CEA 709 and CEA 852.1 LON Protocol Suite:                                                                           |             |     |           | X | X | X |     |                   |                             |    |    |    |    |    |    | This is a general purpose local area networking protocol in use for various applications including electric meters, street lighting, home automation, and building automation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Customer: metering, appliances                                               | ??                                                 | U44, U120                                   |                                                               |                                                                                                                                                    |                   |
| ANSI/CEA 709.1-B-2002 Control Network Protocol Specification                                                             |             |     |           | X | X | X |     |                   |                             |    |    |    |    |    |    | Overall network specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Customer                                                                     | ??                                                 | U44                                         |                                                               |                                                                                                                                                    |                   |
| ANSI/CEA 709.2-A-R-2006 Control Network Power Line (PL) Channel Specification                                            |             |     | X         |   |   |   |     |                   |                             |    |    |    |    |    |    | This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Customer                                                                     | ??                                                 | U44                                         |                                                               |                                                                                                                                                    |                   |
| ANSI/CEA 709.3-R-2004 Free-Topology Twisted-Pair Channel Specification                                                   |             |     | X         |   |   |   |     |                   |                             |    |    |    |    |    |    | This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Customer                                                                     | ??                                                 | U44                                         |                                                               |                                                                                                                                                    |                   |
| ANSI/CEA-709.4:1999 Fiber-Optic Channel Specification                                                                    |             |     | X         |   |   |   |     |                   |                             |    |    |    |    |    |    | This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Customer                                                                     | ??                                                 | U44                                         |                                                               |                                                                                                                                                    |                   |
| CEA-852.1:2009 Enhanced Tunneling Device Area Network Protocols Over Internet Protocol Channels                          |             |     |           | X | X | X |     |                   |                             |    |    |    |    |    |    | This protocol provides a way to tunnel local operating network messages through an IP network using the User Datagram Protocol (UDP). This is a specific physical layer protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Customer                                                                     | ??                                                 | U44                                         |                                                               |                                                                                                                                                    |                   |
| IEEE 1815 (DNP3) Serial                                                                                                  | Std         |     |           | X | X | X | X   |                   |                             | X  |    |    |    |    |    | This document specifies the DNP3 protocol structure, functions, and application alternatives. In addition to defining the structure and operation of DNP3, the standard defines three application levels that are interoperable. The simplest application is for low-cost distribution feeder devices, and the most complex is for full-featured master stations. The intermediate application level is for substation and other intermediate devices. The protocol is suitable for operation on a variety of communication media consistent with the makeup of most electric power communication systems. The simpler version addresses serial links for substation and feeder device automation, as well as                                                                                                                                                                                                                                                                                                    | Distribution, Transmission                                                   | IEC 62351-5, ISO/IEC 9798-4                        | U65, U117, U108, U137, U112, U82, U81, U111 |                                                               |                                                                                                                                                    |                   |
| IEEE 1815:2012 (DNP3) Network                                                                                            | Std         |     |           |   |   |   | X   |                   |                             | X  |    |    |    |    |    | This standard is used for networks for substation and feeder device automation, as well as for communications between control centers and substations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Distribution, Transmission                                                   | IEC 62351-5, IEC 62351-3, ISO/IEC 9798-4           | U65, U117, U108, U137, U112, U82, U81, U111 |                                                               |                                                                                                                                                    |                   |
| IEEE 1815.1 Draft Standard for Exchanging Information between networks Implementing IEC 61850 and IEEE 5 Std 1815 (DNP3) | Und         |     |           |   |   |   |     |                   |                             | X  |    |    |    |    |    | This document specifies the mapping rules for building and configuring a system using both IEC 61850 and IEEE 1815 (DNP3) protocols by utilizing gateways in-between IEC 61850 and DNP3 devices / subsystems. The objective is to enable operational run-time data exchange among these devices / subsystems, and to automate the configuration of a gateway as much as possible. Within the capability of each protocol, some configuration attributes (IEC 61850 attributes with functional constraint CF) are also mapped in addition to the operational real-time data. The rules specified in this document are based on the published standards, and will not make any proposed changes to either standard. It does not specify any rules for a 61850 device to directly communicate with an IEEE 1815 device and vice versa, except                                                                                                                                                                       | Distribution, Transmission, Generation (DER)                                 | ??                                                 | U65, U117, U108, U137, U112, U82, U81, U111 |                                                               |                                                                                                                                                    |                   |
| IEC 60870-6 / TASE.2 / IEC Part 503 TASE.2 Services and protocol                                                         | IS Ed2 2002 |     |           |   |   |   | X   | X                 |                             |    |    |    |    |    |    | This part of IEC 60870 specifies a method of exchanging time-critical control centre data through wide-area and local-area networks using a full ISO compliant protocol stack. It contains provisions for supporting both centralized and distributed architectures. This standard includes the exchange of real-time data indications, control operations, time-series data, scheduling and accounting information, remote program control and event notification. Though the primary objective of TASE.2 is to provide control centre (telecontrol) data exchange, its use is not restricted to control centre data exchange. It may be applied in any other domain having comparable requirements. Examples of such domains are power plants, factory automation, process control automation, and others.                                                                                                                                                                                                     | Transmission, Distribution                                                   | IEC 62351-3, IEC 62351-4                           | U115, U83, U89, U116, U56, U80              |                                                               |                                                                                                                                                    |                   |
| IEC 60870-6-702 Functional profile for providing the TASE.2 application service in end systems                           | IS 1998     |     |           |   |   |   | X   |                   |                             |    |    |    |    |    |    | This profile for telecontrol application service element (TASE.2, also known as inter-control centre communications protocol, ICCP) is an application-class profile (A-profile) providing communications capabilities to control centre applications. The TASE.2 in the application layer is specified in IEC 60870-6-503. The present standard refines the application layer protocol to meet interoperability requirements and specifies requirements on the presentation and session layers support for TASE.2. TASE.2 operates in a connection mode, so this A-profile                                                                                                                                                                                                                                                                                                                                                                                                                                       | Transmission, Distribution                                                   |                                                    |                                             |                                                               |                                                                                                                                                    |                   |
| IEC 60870-6 / TASE.2 / IEC Part 802 TASE.2 Object models                                                                 | IS Ed2 2005 |     |           |   |   |   |     |                   |                             | X  |    |    |    |    |    | This standard defines the object models for TASE.2/ICCP data. These object models are simple, being based on typical SCADA data types with analog, digital, and state points. Therefore there are 3 basic SCADA object models: indication point, control point, and protection equipment event point. Additional object models are defined for some specific types of data, such as wheeling, accounting information, <del>outage information, etc. but these are not yet formally used</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Transmission, Distribution                                                   | IEC 62351-3, IEC 62351-4                           | U115, U83, U89, U116, U56, U80              |                                                               |                                                                                                                                                    |                   |
| IEC 61850-1 Introduction and Overview                                                                                    | TR 2003     |     |           |   |   |   |     |                   |                             |    |    | X  |    |    |    | The IEC 61850 series of standards define object models, abstract services, and mappings to communications protocols for field devices and systems. The scope of IEC 61850 includes information exchanges within substations, for protective relaying, between substations, between substations and control centers, within hydro power plants, for distribution automation, for managing distributed energy resources (generation and storage), and for managing charging of electric vehicles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Transmission & Distribution Substations, Generation (DER), Electric Vehicles | IEC 62351-3, IEC 62351-4, IEC 62351-6, IEC 61850-8 |                                             |                                                               | See IEC 62351 for details on these security standards                                                                                              |                   |
| IEC 61850-2 Glossary                                                                                                     | TS 2003     |     |           |   |   |   |     |                   |                             |    |    | X  |    |    |    | This part contains the glossary of specific terminology and definitions used in the context of Substation Automation Systems within the various parts of the standard.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | T&D Substations                                                              |                                                    |                                             |                                                               |                                                                                                                                                    |                   |
| IEC 61850-3 General requirements                                                                                         | IS 2002     |     |           |   |   |   |     |                   |                             | X  |    |    | X  |    |    | The specifications of this part pertain to the general requirements of the communication network, with emphasis on the quality requirements, such as reliability, availability, maintainability, security, data integrity and others that apply to the communication systems that are used for monitoring, configuration and control of processes within the substation. It also deals with guidelines for environmental conditions and auxiliary services, with recommendations on the relevance of specific requirements from other standards and specifications.                                                                                                                                                                                                                                                                                                                                                                                                                                              | T&D Substations                                                              |                                                    |                                             |                                                               | This document identifies denial of service and illegitimate use (e.g. unauthorized use) as the two main security issues for substation automation. |                   |
| IEC 61850-4 System and project management                                                                                | IS 2002     |     |           |   |   |   |     |                   |                             | X  |    |    |    |    |    | The specifications of this part pertain to the system and project management with respect to the engineering process and its supporting tools; the life cycle of the overall system and its IEDs; and <del>the quality assurance beginning with the development stage and ending with discontinuation and decommissioning of the SAS and its IEDs.</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | T&D Substations                                                              |                                                    |                                             |                                                               |                                                                                                                                                    |                   |
| IEC 61850-5 Communication requirements for functions and device models                                                   | IS 2003     |     |           |   |   |   |     |                   |                             | X  |    |    |    |    |    | This part defines the communication requirements for functions and device models for substations. The functions of a substation automation system (SAS) refer to tasks, which have to be performed in the substation. These are functions to control, monitor and protect the equipment of the substation and its feeders. In addition, there exist functions, which are needed to maintain the SAS, i.e. for system configuration, communication management or software management. However, since substation configurations can vary significantly while interoperability is still desired, the communication requirements need to be flexibly but clearly defined. Specifically, the goal for interoperability for devices from different suppliers implies the following aspects: a) the devices shall be connectable to a common bus with a common protocol (syntax); b) the devices shall understand the information provided by other devices (semantics); c) the devices                                 | T&D Substations                                                              |                                                    |                                             |                                                               |                                                                                                                                                    |                   |
| IEC 61850-6 Ed2 System Configuration Language (SCL)                                                                      | IS Ed2 2009 |     |           |   |   |   |     |                   |                             | X  |    |    |    |    |    | This part specifies a file format for describing communication-related IED (Intelligent Electronic Device) configurations and IED parameters, communication system configurations, switch yard (function) structures, and the relations between them. The main purpose of this format is to exchange IED capability descriptions, and SA system descriptions between IED engineering tools and the system engineering tool(s) of different manufacturers in a compatible way. The defined language is called System Configuration description Language (SCL). The IED and communication system model in SCL is XML-based and is according to IEC 61850-5 and IEC 61850-7-x. Some aspects may need to be updated for the 7-4xx parts. Implementations of SCL tools by vendors are the primary method for implementing IEC 61850, providing interoperability across vendors and standardized methods for coordinating the information structures and services across multiple devices and systems. Some aspects of | T&D Substations                                                              |                                                    | U81, U135                                   |                                                               |                                                                                                                                                    |                   |

|    |                                                                                                                                                                                               |             |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                  |                                                    |                                                  |  |  |  |  |  |  |  |
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| 26 | IEC 61850-7-1 Basic communication structure - Principles and models                                                                                                                           | IS Ed2 2011 |  |  |  |  |  |  |  |  |  |  |  | X |   |  |  |  |  | This part of the IEC 61850 series is intended for all stakeholders of standardized communication and standardized systems in the utility industry. It provides an overview of and an introduction to the abstract models and services in IEC 61850-7-4, IEC 61850-7-3, IEC 61850-7-2, IEC 61850-6, and IEC 61850-8-1. This part of the IEC 61850 series uses simple examples of functions to describe the concepts and methods applied in the IEC 61850 series and describes the relationships between other parts of the IEC 61850 series. Finally this part defines how interoperability is reached.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Substations and other field equipment: Hydro plants, DER, DA, EV |                                                    |                                                  |  |  |  |  |  |  |  |
| 27 | IEC 61850-7-2 Ed2 Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI) | IS Ed2 2010 |  |  |  |  |  |  |  |  |  |  |  | X |   |  |  |  |  | This part defines the abstract communication service interface (ACSI) for use in the utility application domain that requires real-time cooperation of intelligent electronic devices. The ACSI has been defined so as to be independent of the underlying communication systems. Specific communication service mappings1) (SCSM) are specified in IEC 61850-8-x and IEC 61850-9-x. It covers the following abstract messaging services:<br><ul style="list-style-type: none"> <li>• Real-time data access and retrieval</li> <li>• Device control</li> <li>• Reporting by exception</li> <li>• Event logging</li> <li>• Publish/subscribe</li> <li>• Self-description of devices (device data dictionary)</li> <li>• Data typing and discovery of data types</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Substations and other field equipment: Hydro plants, DER, DA, EV | IEC 62351-3, IEC 62351-4, IEC 62351-6, IEC 62351-8 | Between multiple Actor 46s: Transmission IED     |  |  |  |  |  |  |  |
| 28 | IEC 61850-7-3 Common Data Classes (CDCs)                                                                                                                                                      | IS Ed2 2010 |  |  |  |  |  |  |  |  |  |  |  | X |   |  |  |  |  | This part specifies the hierarchy of abstract classes, starting with standard data types, "constructed attribute", and common data classes (CDCs) which can be used to build data objects within Logical Nodes contained in Logical Devices (see Figure 1). In particular, this part specifies the names and structures for:<br><ul style="list-style-type: none"> <li>• Standard data types (e.g. integers, floating points, binary, etc.)</li> <li>• Attribute types (e.g. quality codes)</li> <li>• CDCs for status information (e.g. value, quality code, and timestamp)</li> <li>• CDCs for measured information</li> <li>• CDCs for control</li> <li>• CDCs for status settings</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Substations and other field equipment: Hydro plants, DER, DA, EV |                                                    | Between multiple Actor 46s: Transmission IED     |  |  |  |  |  |  |  |
| 29 | Communication networks and systems for power utility automation – Part 7-4: Basic communication structure – Compatible logical node classes and data object classes                           | IS Ed2 2010 |  |  |  |  |  |  |  |  |  |  |  | X |   |  |  |  |  | This part specifies the abstract information model of devices and functions, consisting of data objects contained in Logical Nodes (LNs). This part was initially just for substation automation, but has been expanded to include the common Logical Nodes used in many different domains, including:<br><ul style="list-style-type: none"> <li>• Intra-substation information exchanges</li> <li>• Substation-to-substation information exchanges</li> <li>• Substation-to-control centre information exchanges</li> <li>• Power plant-to-control centre information exchanges</li> <li>• Information exchange for distributed generations</li> <li>• Information exchange for distributed automations</li> <li>• Information exchange for metering.</li> </ul> This part also specifies normative naming rules for multiple instances and private, compatible extensions of logical node (LN) classes and                                                                                                                                                                                                                                                                                                                      | Substations and other field equipment: Hydro plants, DER, DA, EV |                                                    | Between multiple Actor 46s: Transmission IED     |  |  |  |  |  |  |  |
| 30 | IEC 61850-7-410 Hydroelectric power plants                                                                                                                                                    | IS 2007     |  |  |  |  |  |  |  |  |  |  |  | X |   |  |  |  |  | This part specifies the additional common data classes, logical nodes and data objects required for the use of IEC 61850 in a hydropower plant. The Logical Nodes and Data Objects address the following functions:<br><ul style="list-style-type: none"> <li>• Electrical functions. This group includes LN and DO used for various control functions, essentially related to the excitation of the generator. New LN and DO defined within this group are not specific to hydropower plants; they are more or less general for all types of larger power plants.</li> <li>• Mechanical functions. This group includes functions related to the turbine and associated equipment. The specifications of this document are intended for hydropower plants, modifications might be required for application to other types of generating plants. Some more generic functions are though defined under Logical Node group K.</li> <li>• Hydrological functions. This group of functions includes objects related to water flow, control and management of reservoirs and dams. Although specific for hydropower plants, the LN and DO defined here can also be used for other types of utility water management systems.</li> </ul> | Hydro plants                                                     |                                                    | Between Actor 1 components: Plant Control System |  |  |  |  |  |  |  |
| 31 | IEC 61850-7-420 Communication networks and systems for power utility automation – Part 7-420: Basic communication structure – Distributed energy resources logical nodes                      | IS 2009     |  |  |  |  |  |  |  |  |  |  |  | X |   |  |  |  |  | This part defines the IEC 61850 information models (Logical Nodes, Data Objects, and Common Data Classes) to be used in the exchange of information with distributed energy resources (DER), which comprise dispersed generation devices and dispersed storage devices, including<br><ul style="list-style-type: none"> <li>• Reciprocating engines</li> <li>• Fuel cells</li> <li>• Photovoltaic systems</li> <li>• Combined heat and power</li> <li>• Batteries</li> </ul> The DER information model standard utilizes existing IEC 61850-7-4 logical nodes where possible, but also defines DER-specific logical nodes where needed.<br>This standard will be updated to Edition 2 after Technical Reports of different new DER types and capabilities are issued – see IEC 61850-90-                                                                                                                                                                                                                                                                                                                                                                                                                                          | Distributed Energy Resources (DER)                               |                                                    | U130, U45, U32, U88, U92, U95, U137, U65         |  |  |  |  |  |  |  |
| 32 | IEC 61850-7-5 IEC 61850 modeling concepts                                                                                                                                                     | Und         |  |  |  |  |  |  |  |  |  |  |  |   | X |  |  |  |  | This part will contain the general concepts and guidelines for modeling with IEC 61850, while the 7-5xx parts will provide the guidelines for modeling specific applications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                  |                                                    |                                                  |  |  |  |  |  |  |  |
| 33 | IEC 61850-7-500 Guidelines for using LNs to model substations functions                                                                                                                       | Und         |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  | Guidelines for using IEC 61850 LNs in Substations. Still being drafted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | T&D Substations                                                  |                                                    |                                                  |  |  |  |  |  |  |  |
| 34 | IEC 61850-7-510 Guidelines for using LNs to model hydroelectric power plant functions                                                                                                         | Und         |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  | Guidelines for using IEC 61850 LNs in Hydro plants -Still being drafted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Hydro plants                                                     |                                                    |                                                  |  |  |  |  |  |  |  |
| 35 | IEC 61850-7-520 Guidelines for using LNs to model Distributed Energy Resources (DER) functions                                                                                                | Und         |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  | Guidelines for using IEC 61850 LNs in DER - Currently a rough white paper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DER                                                              |                                                    |                                                  |  |  |  |  |  |  |  |
| 36 | IEC 61850-8-1 Mapping ACSI to MMS (ISO/IEC 9506) and Ethernet (ISO/IEC 8802-3)                                                                                                                | IS 2004     |  |  |  |  |  |  |  |  |  |  |  |   | X |  |  |  |  | This part is intended to provide inter-device operation of a variety of substation and other field devices to create and exchange concrete ("bits-and-bytes") communication messages by mapping the abstract services (ACSI, specified in IEC 61850-7-2) and the abstract logical nodes and common data models (specified in IEC 61850-7-4 and IEC 61850-7-3) to the Manufacturing Messaging Specification (MMS) over Ethernet.<br>This standard also defines additional protocols for the mapping of time-critical information exchanges (GOOSE messages, specified in IEC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All 61850 domains                                                | IEC 62351-4                                        | All interfaces with field devices                |  |  |  |  |  |  |  |
| 37 | IEC 61850-9-1 Sampled values over serial unidirectional multidrop point-to-point link                                                                                                         | IS 2003     |  |  |  |  |  |  |  |  |  |  |  |   | X |  |  |  |  | This part specifies a mapping of the abstract service for the transmission of sampled values (as defined in IEC 61850-7-2) on a serial unidirectional multidrop point to point link. Sampled values are rapidly sampled measurements typically from current and voltage transformers (CTs and VTs) that are used by substation equipment such as protection relays.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | T&D Substations                                                  | IEC 62351-6                                        |                                                  |  |  |  |  |  |  |  |
| 38 | IEC 61850-9-2 Mapping sampled values over Ethernet (ISO/IEC 8802-3)                                                                                                                           | IS 2004     |  |  |  |  |  |  |  |  |  |  |  |   | X |  |  |  |  | This part specifies a mapping of the abstract service for the transmission of sampled values (as defined in IEC 61850-7-2) on Ethernet. Sampled values are rapidly sampled measurements typically from current and voltage transformer (CTs and PTs) that are used by substation equipment such as protection relays.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | T&D Substations                                                  |                                                    |                                                  |  |  |  |  |  |  |  |
| 39 | IEC 61850-10 Conformance testing                                                                                                                                                              | IS 2005     |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  | This part of IEC 61850 specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters.<br>In general, conformance testing of the communication behavior of an IED should address the functional requirements and performance requirements of typical applications supported by these devices in substation automation. IEC 61850-4 defines a general classification of quality tests, which are used within this part.<br>This part of IEC 61850 defines:<br><ul style="list-style-type: none"> <li>• The methods and abstract test cases for conformance testing of devices used in substation automation systems</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | T&D Substations                                                  |                                                    |                                                  |  |  |  |  |  |  |  |
| 40 | IEC 61850-80-1 Guideline to exchange information from CDC-based model using IEC 60870-5 101/104                                                                                               | TS 2008     |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  | This technical specification gives a guideline on how to exchange information from a CDC-based data model (for example IEC 61850) while using IEC 60870-5-101 or IEC 60870-5-104 between substation(s) and control center(s). Mostly guidelines for functions needed in a substation gateway device are given.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | European, since this is a mapping to IEC 610870-5                | IEC 62351-5                                        |                                                  |  |  |  |  |  |  |  |









