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SE-330 IEC 61850 COMMUNICATION CONFORMANCE STATEMENT

REVISION 0-A-072314

TABLE OF CONTENTS

SECTION **PAGE**

1. INTRODUCTION

1.1 SCOPE

The purpose of this document is to declare the conformance of the SE-330 IEC 61850 server to the IEC 61850 standard.

1.2 TERMS AND ABBREIVATIONS

ACSI	Abstract Communication Service Interfaces
BDA	Basic Data Attribute (Not Structured)
DA	Data Attributes
DO	DATA in IEC 61850-7-2, Data Object Type or Instance
FCD	Functionally Constrained Data
FCDA	Functionally Constrained Data Attribute
ID	Identifier
IED	Intelligent Electronic Device
LD	Logical Device
LN	Logical Node
MSV	Multicast Sampled Value
RCB	Report Control Block
GCB	GOOSE Control Block or GSSE Control Block
SCL	Substation Configuration Language
SCSM	Specific Communication Service Mapping
XML	Extensible Markup Language
GSSE	Generic Substation State Events
GOOSE	Generic Object Oriented Substation Events
SCD	Substation Configuration Description File
ICD	IED Configuration Description
CID	Configured IED Description
PICS	Protocol Implementation Conformance Statement
MICS	Model Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
TICS	Tissue Implementation Conformance Statement

2. PICS DETAILS

Conformance of the IEC 61850 server in SE-330 relays:

Supported Models and Services	Yes
Unsupported	No
Not applicable to Server/publisher	--

2.1 ASCI BASIC CONFORMANCE STATEMENT

Basic ASCI Conformance		Client/ Subscriber	Server/ Publisher	Comment
Client – Server Roles				
B11	Server Side (of Two-Party Application Association)		Yes	
B12	Client Side (of Two-Party Application Association)		N/A	
SCSMs Supported				
B21	SCSM: IEC 61850-8-1 Used		Yes	
B22	SCSM: IEC 61850-9-1 Used		No	
B23	SCSM: IEC 61850-9-2 Used		No	
B24	SCSM: Other		N/A	
Generic Substation Event Model (GSE)				
B31	Publisher Side		Yes	
B32	Subscriber Side		Yes	
Transmission of Sampled Value Model (SVC)				
B41	Publisher Side		No	
B42	Subscriber Side		No	

2.2 ASCI MODELS CONFORMANCE STATEMENT

ASCI Model Conformance		Client/ Subscriber	Server/ Publisher	Comment
M1	Logical Device		Yes	One LD Instance
M2	Logical Node		Yes	Only standard LN types defined in Part 7-4.
M3	Data		Yes	Only standard object types defined in Part 7-3, 7-4. Mandatory objects and attributes and selected optional objects and attributes.
M4	Data Set		Yes	Three pre-defined persistent data sets, not configurable via SCL. Supports dynamically created persistent and non-persistent data sets. Data set member selection restricted to ST and MX FCs.
M5	Substitution		No	
M6	Setting Group Control		No	
Reporting				
M7	Buffered Report Control		Yes	
M7-1	Sequence-Number		Yes	
M7-2	Report-Time-Stamp		Yes	

ASCI Models Conformance Statement (continued)

ASCI Model Conformance		Client/ Subscriber	Server/ Publisher	Comment
M7-3	Reason-for-Inclusion		Yes	
M7-4	Data-Set-Name		Yes	
M7-5	Data-Reference		Yes	
M7-6	Buffer-Overflow		Yes	
M7-7	entryID		Yes	
M7-8	BufTm		Yes	
M7-9	IntgPd		Yes	
M7-10	GI		Yes	
M7-11	Conf-Revision		Yes	
M8	Unbuffered Report Control		Yes	
M8-1	Sequence-Number		Yes	
M8-2	Report-Time-Stamp		Yes	
M8-3	Reason-for-Inclusion		Yes	
M8-4	Data-Set-Name		Yes	
M8-5	Data-Reference		Yes	
M8-6	BufTm		Yes	
M8-7	IntgPd		Yes	
M8-8	GI		Yes	
M8-9	Conf-Revision		Yes	
Logging				
M9	Log control		No	
M10	Log		No	
Other				
M11	Control		Yes	
M12	GOOSE		Yes	Type 1B, Class P2/2, < 20ms
M13	GSSE		No	
M14	Multicast SVC		No	
M15	Unicast SVC		No	
M16	Time		Yes	
M17	File Transfer		No	

2.3 ASCI SERVICE CONFORMANCE STATEMENT

ASCI Service Conformance		Client/ Subscriber	Server/ Publisher	Comment
Server				
S1	ServerDirectory		Yes	
Application Association				
S2	Associate		Yes	
S3	Abort		Yes	
S4	Release		Yes	
Logical Device				
S5	LogicalDeviceDirectory		Yes	
Logical Node				
S6	LogicalNodeDirectory		Yes	
S7	GetAllDataValues		Yes	Alternate access is also supported. All values of a particular logical node can be obtained through the use of a single MMS read request with the logical node name as the MMS variable name.
Data				
S8	GetDataValues		Yes	
S9	SetDataValues		Yes	
S10	GetDataDirectory		Yes	
S11	GetDataDefinition		Yes	
Data set				
S12	GetDataSetValues		Yes	
S13	SetDataSetValues		Yes	Supported, but all dataset values are read only attributes from ST and MX functional constraints so values cannot be set.
S14	CreateDataSet		Yes	
S15	DeleteDataSet		Yes	
S16	GetDataSetDirectory		Yes	
Substitution				
S17	SetDataValues		No	
Setting Group Control				
S18	SelectActiveSG		No	
S19	SelectEditSG		No	
S20	SetSGValues		No	
S21	ConfirmEditSGValues		No	

ASCI Service Conformance Statement (continued)

ASCI Service Conformance		Client/ Subscriber	Server/ Publisher	Comment
S22	GetSGValues		Yes	
S23	GetSGCBValues		No	
Reporting				
Buffered Report Control Block (BRCB)				
S24	Report		Yes	
S24-1	Data-Change (dchg)		Yes	
S24-2	Qchg-Change (qchg)		Yes	
S24-3	Data-Update (dupd)		Yes	
S25	GetBRCBValues		Yes	
S26	SetBRCBValues		Yes	
Unbuffered Report Control Block (URCB)				
S27	Report		Yes	
S27-1	Data-Change (dchg)		Yes	
S27-2	Qchg-Change (qchg)		Yes	
S27-3	Data-Update (dupd)		Yes	
S28	GetURCBValues		Yes	
S29	SetURCBValues		Yes	
Logging				
Log Control				
S30	GetLCBValues		No	
S31	SetLCBValues		No	
Log				
S32	QueryLogByTime		No	
S33	QueryLogAfter		No	
S34	GetLogStatusValues		No	
Generic Substation Event Model (GSE)				
GOOSE Control Block				
S35	SendGOOSEMessage		Yes	
S36	GetGoReference		No	
S37	GetGOOSEElementNumber		No	
S38	GetGoCBValues		Yes	
S39	SetGoCBValues		Yes	

ASCI Service Conformance Statement (continued)

ASCI Service Conformance		Client/ Subscriber	Server/ Publisher	Comment
GSSE Control Block				
S40	SendGSSEMessage		No	
S41	GetGsReference		No	
S42	GetGSSEElementNumber		No	
S43	GetGsCBValues		No	
S44	SetGsCBValues		No	
Transmission of Sampled Value Model (SVC)				
Multicast SVC				
S45	SendMSVMessage		No	
S46	GetMSVCBValues		No	
S47	SetMSVCBValues		No	
Unicast SVC				
S48	SendUSVMessage		No	
S49	GetUSVCBValues		No	
S50	SetUSVCBValues		No	
Control				
S51	Select		No	
S52	SelectWithValue		No	
S53	Cancel		No	
S54	Operate		Yes	Direct-operate model supported.
S55	Command-Termination		No	
S56	TimeActivated-Operate		No	
File Transfer				
S57	GetFile		No	
S58	SetFile		No	
S59	DeleteFile		No	
S60	GetFileAttributeValues		No	
Time				
T1	Time Resolution of Internal Clock		10 bits	
T2	Time Accuracy of Internal Clock		T1: 1ms	
T3	Supported TimeStamp Resolution		1 ms	
T4	TimeSynchronization		Yes	

2.4 PROTOCOL PROFILE SUPPORT

A-Profile		Client/ Subscriber	Server/ Publisher	Comment
A1	Client/Server A-Profile		Yes	
A2	GOOSE/GSE Management A-Profile		Yes	
A3	GSSE A-Profile		No	
A4	TimeSync A-Profile		Yes	SNTP

T-Profile		Client/ Subscriber	Server/ Publisher	Comment
T1	TCP/IP T-Profile		Yes	
T2	OSI T-Profile		No	
T3	GOOSE/GSE T-Profile		Yes	
T4	GSSE T-Profile		No	
T5	TimeSync T-Profile		Yes	Performance Class T1 (1 ms Accuracy)

3. SCL CONFORMANCE DEGREE

SCL Conformance Degree		Client/ Subscriber	Server/ Publisher	Comment
SCL.1	SCL File for Implementation Available Offline		Yes	
SCL.2	SCL File Available From Implementation Online		No	
SCL.3	SCL Implementation Reconfiguration Supported Online		No	

Supported ASCI Services for SCL.2 and SCL.3		Client/ Subscriber	Server/ Publisher	Comment
	GetFileAttributeValues		No	
	GetFile		No	
	SetFile		No	
	DeleteFile		No	
	GetDataValues		No	
	SetDataValues		No	
	SCL Control Block		No	
	SCL File Structure		No	
	Remote Creation of SCL File		No	

Additional MMS Services for SCL.2 and SCL.3		Client/ Subscriber	Server/ Publisher	Comment
	GetCapabilityList		Yes	
	GetDomainAttributes		Yes	
	LoadDomainContent		No	
	StoreDomainContent		No	

Definition of SCL Control Block (IEC61850-8-1 Component Name)		Client/ subscriber	Server/ publisher	Comment
	Validate		No	
	ValState		No	
	Activate		No	

4. MICS DETAILS

4.1 CLASSES OF LOGICAL NODES SUPPORTED IN THE SERVER

The following table shows the Common Data Class Logical Nodes that are supported by the SE-330.

LN Name	LN Description	Server	Comment:
	L - System Logical Nodes		
LLN0	Common Logical Node Zero	Yes	
LPHD	Physical Device	Yes	
	P – Protection Functions		
PDIF	Differential		
PDIR	Directional		
PDIS	Distance		
PDOP	Directional Over Power		
PDUP	Directional Under Power		
PFRC	Rate of Frequency Change		
PHAR	Harmonic Restraint		
PHIZ	Ground Detector		
PIOC	Instantaneous Over Current		
PMRI	Motor Restart Inhibition		
PMSS	Motor Starting Time Supervision		
POPF	Over Power Factor		
PPAM	Phase Angle Measuring		
PSCH	Protection Scheme		

Classes of Logical Nodes Supported in the Server (continued)

LN Name	LN Description	Server	Comment:
PSDE	Sensitive Directional Earth Fault		
PTEF	Transient Earth Fault		
PTOC	Time Over Current	Yes	Ground Fault Trip (50/51)
PTOF	Over Frequency		
PTOV	Over Voltage	Yes	Resistor Fault Trip (59N)
PTRC	Protection Trip Conditioning		
PTTR	Thermal Overload		
PTUC	Under Current		
PTUV	Under Voltage		
PUPF	Under Power Factor		
PTUF	Under Frequency		
PVOC	Voltage Controlled Time Over Current		
PVPH	Volts per Hz		
PZSU	Zero Speed or Under Speed		
	R – Protection Related Functions		
RDRE	Disturbance Recorder Function		
RADR	Disturbance Recorder Channel Analogue		
RBDR	Disturbance Recorder Channel Binary		
RDRS	Disturbance Record Handling		
RBRF	Breaker Failure		
RDIR	Directional Element		
RFLO	Fault Locator		
RPSB	Power Swing Detection/Blocking		
RREC	Auto Reclosing		
RSYN	Synchronism Check or Synchronizing		
	C – Control Functions		
CALH	Alarm Handling		
CCGR	Cooling Group Control		
CILO	Interlocking		
CPOW	Point on Wave Switching		
CSWI	Switch Controller		
	G – Generic Functions		
GAPC	Generic Automatic Process Control		

Classes of Logical Nodes Supported in the Server (continued)

LN Name	LN Description	Server	Comment:
GGIO	Generic Process I/O	Yes	SE-330 Event Records
GSAL	Generic Security Application		
	I – Interfacing and Archiving Functions		
IARC	Archiving		
IHMI	Human Machine Interface		
ITCI	Telecontrol Interface		
ITMI	Telemonitoring Interface		
	A – Automatic Control Functions		
ANCR	Neutral Current Regulator		
ARCO	Reactive Power Control		
ATCC	Automatic Tap Changer Controller		
AVCO	Voltage Control		
	M – Metering and Measurement Functions		
MDIF	Differential Measurements		
MHAI	Harmonics or Interharmonics		
MHAN	Non-Phase Related Harmonics or Interharmonics		
MMTR	Metering		
MMXN	Non-Phase Related Measurement		
MMXU	Measurement	Yes	NGR Resistance NGR Neutral voltage NGR Neutral current
MSQI	Sequence and Imbalance		
MSTA	Metering Statistics		
	S – Sensors and Monitoring Functions		
SARC	Monitoring and Diagnostics for Arcs		
SIMG	Insulation Medium Supervision (gas)		
SIML	Insulation Medium Supervision (liquid)		
SPDC	Monitoring and Diagnostics for Partial Discharges		
	X – Switchgear Functions		
XCBR	Circuit Breaker		
XSWI	Circuit Switch		
	T – Instrument Transformers		
TCTR	Current Transformer		

Classes of Logical Nodes Supported in the Server (continued)

LN Name	LN Description	Server	Comment:
TVTR	Voltage Transformer		
	Y – Power Transformers		
YEFN	Earth Fault Neutralizer		
YLTC	Tap Changer		
YPSH	Power Shunt		
YPTR	Power Transformer		
	Z – Further Power Systems Equipment		
ZAXN	Auxilliary Network		
ZBAT	Battery		
ZBSN	Bushing		
ZCAB	Power Cable		
ZCAP	Capacitor Bank		
ZCON	Converter		
ZGEN	Generator		
ZGIL	Gas Insulated Line		
ZLIN	Power Overhead Line		
ZMOT	Motor		
ZREA	Reactor		
	LN Classes From Edition 2		

4.2 Logical Node Extensions

4.2.1 New Logical Nodes

No new LN classes are implemented.

4.2.2 Extended Logical Nodes

None.

4.3 Common Data Class Extensions

4.3.1 New Common Data Classes

No new common data classes are implemented.

4.3.2 Extended Common Data Classes

No extensions to common data class definitions given in IEC 61850-7-3 are implemented.

4.4 Enum Types Extensions

4.4.1 New Enum Types

None.

4.4.2 Extended Enum Types

None.

5. PIXIT DETAILS

The following sections define additional information for the performance of the SE-330 IEC 61850 server implementation.

5.1 PIXIT FOR ASSOCATION MODEL

ID	Description	Value / Clarification	
As1	Maximum number of clients that can set-up an association simultaneously.	4	
As2	TCP_KEEPALIVE Value	Configurable: from 1 to 1000 s	
As3	Lost Connection Detection Time	Default 10 s (default cycle of TCP Keep-alive message 1 s, 10 retransmissions)	
As4	Is Authentication Supported	No	
As5	What association parameters are necessary for successful association?	Association Param. Transport Selector Session Selector Presentation Selector AP Title AE Qualifier	Required? Yes (Checking can be Disabled) Yes (Checking can be Disabled) Yes (Checking can be Disabled) Yes (Checking can be Disabled) Yes (Checking can be Disabled) Checking for ALL or for NONE
As6	Association Parameters are Configurable	Configurable Param. Transport selector Session selector Presentation selector AP Title AE Qualifierr	Default Value 1 1 1 1.1.1.999.1 12
As7	What is the Maximum and Minimum MMS PDU Size?	Max: 12 kB Min: There is no limit (message syntax must be correct).	
As8	Time Taken for Startup	10 s	

5.2 PIXIT FOR SERVER MODEL

ID	Description	Value / Clarification
Sr1	Which analogue value (MX) quality bits are supported (can be set by server)?	Validity: Y Good Y Invalid N Reserved N Questionable N Overflow N OutofRange N BadReference N Oscillatory N Failure N OldData N Inconsistent N Inaccurate Source: Y Process N Substituted N Test N OperatorBlocked
Sr2	Which status value (ST) quality bits are supported (can be set by server)?	Validity: Y Good Y Invalid N Reserved N Questionable N BadReference N Oscillatory N Failure N OldData N Inconsistent N Inaccurate Source: Y Process N Substituted N Test N OperatorBlocked
Sr3	What is the maximum number of data values in one GetDataValues request?	Limited by PDU size. 12kB

PIXIT for Server Model (continued)

ID	Description	Value / Clarification
Sr4	What is the maximum number of data values in one SetDataValues request.	Limited by PDU size. 12kB
Sr5	Which Mode / Behaviour values are supported.	On Y Blocked N Test N Test/Blocked N Off N

5.3 PIXIT FOR DATA SET MODEL

ID	Description	Value / Clarification
	Maximum Number of Data Sets Handled by Device.	30 data sets, where 3 are fixed, and 27 are pre-defined or dynamically created.
Ds1	Maximum Number of Data Elements in One Data Set .	30 data attributes in pre-defined data sets to be referenced by RCB, 30 data attributes in dynamically created data sets to be referenced by RCB.
Ds2	How many persistent data sets can be created by one or more clients?	27 Persistent Datasets
Ds3	How many non-persistent data sets can be created by one or more clients?	27 Non-Persistent Datasets
Ds4	Maximum Number of Data Elements in GOOSE Publisher Data Set	LLN0$DS3_GOOSE is Referenced by GCB
Ds5	Data Set Members in RCB Data Set	Only functionally constrained data with FC = ST or FC = MX. Value, quality and time stamp only. Process data only.
Ds6	Data Set Members in GOOSE Publisher Data Set	Only functionally constrained data with FC = ST or FC = MX. Pre-selected list of signals. Only value attribute from process data included.
Ds7	Persistent Data Sets – Pre-Defined	3 for RCB and 1 for GCB (all Pre-Defined Data Sets are Fixed)
Ds8	GOOSE Publisher Data Set	Pre-defined and Fixed
Ds9	SetDataSetValues Service	Supported but with negative response for all data sets (data sets are composed of read-only attributes).

5.4 PIXIT FOR REPORTING MODEL

ID	Description	Value / Clarification	
Rp1	The Supported Trigger Conditions	Integrity	Yes
		Data Change	Yes
		Quality Change	Yes
		Data Update	No
		General Interrogation	Yes

PIXIT for Reporting Model (continued)

ID	Description	Value / Clarification	
Rp2	The Supported Optional Fields	Sequence-Number	Yes
		Report-Time-Stamp	Yes
		Reason-for-Inclusion	Yes
		Data-Set-Name	Yes
		Data-Reference	Yes
		EntryID	Yes
		Conf-Rev	Yes
Rp3	Support for Sending Segmented Reports	No	
Rp4	Mechanism on second internal data change notification of the same analogue data value within buffer period.	Send Report Immediately	
Rp5	Multi client URCB approach (compare IEC 61850-7-2 $14.2.1)	All RCB instances are visible to clients; client can reserve selected instances and subscribe for reports. 4 BRCB Instances 4 URCB Instances	
Rp6	Format of EntryID	Octet string 8, four LSB bytes are used as counter.	
Rp7	Buffer size for each BRCB or how many reports can be buffered.	64 kbytes per Report Control Block	
Rp8	Pre-configured RCB attributes that cannot be changed online when: RptEna = FALSE (see also the ICD report settings)	None	
Rp9	May the Reported Data Set Contain: - Structured Data Objects? - Data Attributes? - Timestamp Data Attributes?	 Y Y Y	
Rp 10	What is the scan cycle for binary events? Is this fixed, Configurable	10 ms Fixed	
Rp 11	Does the device support pre-assigning an RCB to a specific client in the SCL?	N	
Rp 12	Can unbuffered or buffered reporting be disabled by changing Mod or Beh to Off or Blocked?	N	

5.5 PIXIT FOR GENERIC SUBSTATION EVENTS MODEL (GOOSE)

ID	Description	Value / Clarification
Go1	What elements of a subscribed GOOSE header are checked to decide the message is valid and the allData values are accepted? If yes, describe the conditions. Note: The VLAN tag may be removed by an Ethernet switch and should not be checked.	N Source MAC address Y Destination MAC Address (Equal to Configured) Y Ethertype = 0x88B8 Y APPID (Equal to Configured) N gocbRef N timeAllowedtoLive (See Remarks) N datSet Y goID (Equal to configured, checking can be set off. N t Y stNum (see Remarks) N sqNum (see Remarks) Y test (If True, Values not Passed to Application) Y confRev (Equal to Configured) Y ndsCom (if True, Values not Passed to Applic) Y numDatSetEntries (see Remarks)
Go2	Can the test flag in the published GOOSE be turned on / off?	Y
Go3	Does the device accept a configuration with a GOOSE control block with empty data set or too large data set?	Data set for GOOSE publisher control blocks is fixed.
Go4	What is the behavior when the GOOSE publish configuration is incorrect?	If in device the GOOSE publisher configuration is incorrect the publisher keeps GoEna=F and ndsCom=T
Go5	When is a subscribed GOOSE marked as lost? (TAL = time allowed to live value from the last received GOOSE message)	Delayed messages are processed as normal. No need of status indication to the relay application about GOOSE problem (data marked as OLD if the message does not arrive prior to TAL).
Go6	What is the behavior when one or more subscribed GOOSE messages isn't received or syntactically incorrect (missing GOOSE)	The subsequently received GOOSE message is accepted even if the new state number is not equal to the incremented value of the previously received state number. It is enough that it is not equal to the last received state number or the last received state number minus 1 (see notes).
Go7	What is the behavior when a subscribed GOOSE message is out-of-order?	Message is treated as normal (it is assumed that previous messages have been lost).
Go8	What is the behavior when a subscribed GOOSE message is duplicated?	Duplicated message is ignored.

PIXIT for Generic Substation Events Model (continued)

ID	Description	Value / Clarification
Go9	Does the device subscribe to GOOSE messages with/without the VLAN tag?	Y With the VLAN tag Y Without the VLAN tag
Go10	May the GOOSE data set contain: - structured data objects? - data attributes? - timestamp data attributes?	Subscribed Published N N Y Y N N
Go11	Published FCD Supported Common Data Classes / Data Types Are	BOOL Only DS3_GOOSE – common for both of GOOSE publishers, with 5 binary data elements: GF start, GF trip, RF start, RF trip, Remote trip.
Go12	Subscribed FCD Supported Common Data Classes / Data Types Are	BOOL
Go13	What is the slow retransmission time? Is it fixed or configurable?	Default 2,000 ms with TAL = 2*2000 Configurable by Configuration Tool
Go14	What is the fast retransmission scheme? Is it fixed or configurable?	First message upon data change. Then the retransmission interval is calculated from the geometric growth formula by doubling the interval. Fixed
Go15	Can the Goose publish be turned on / off by using SetGoCBValues(GoEna)?	Y
Go16	Maximum Number of Different GOOSE Data Items that can be Received and Processed by GOOSE Subscriber	16 boolean data items (it is possible to receive GOOSE data of boolean type and also of integer and bit string type with selection of valid bit)
Go17	Maximum Number of GOOSE Publishers From Which the Data Can be Received and Processed Subscriber	16 (with Maximum Number of Publishers Only One Data Item per Publisher)
Go18		

TAL = Time Allowed to Live

NOTES:

A GOOSE message will be accepted and processed by the subscriber:

- Even if it is received after expiration of the time allowed to live sent in the previous message
- Even if the new state number is not equal to the incremented value of the previously received state number - it is enough that it is not equal to the last received state number or the last received state number minus 1 which allows for retransmission on crossed redundant networks
- If the state number differs from the previously received state number, the sequence number is accepted with any value (if the state number is equal to the previously received state number or equal to the previously received state number minus 1, the message is treated as retransmission)

- Even if the received message contains a dataset of the size different than the size of the previously received dataset.

The value of numDatSetEntries from the header determines how many data entries from the message are processed. With numDatSetEntries = 0 no data entries are processed from the received message.

5.6 PIXIT FOR GOOSE PERFORMANCE

ID	Description	Value / Clarification
Gp1	Performance Class	Type 1B, Class P2/3
Gp2	GOOSE Ping-Pong Processing Method	Scan Cycle Based
Gp3	Application Logic Scan Cycle (ms)	Time Slice Based OS Approx. 5 ms
Gp4	Maximum number of data attributes in GOOSE dataset (value and quality has to be counted as separate attributes).	5 (Fixed Data Set)
Gp5	Maximum number of GOOSE to be published .	5 (Two GoCB but with Identical Data Set)
Gp6	Maximum number of GOOSE to be subscribed.	16
Gp7	Data types in GOOSE dataset for published according to 7-2 Table 2.	BOOL
Gp8	Data types in GOOSE dataset for subscribed according to 7-2 Table 2.	BOOL, INT, and BITSTRING

5.7 PIXIT FOR CONTROL MODEL

ID	Description	Value / Clarification
Ct1	Control Modes Supported	Y Status-Only
		Y Direct-with-Normal-Security
		N sbo-with-Normal-Security
		N Direct-with-Enhanced-Security
		N sbo-with-Enhanced-Security
Ct2	Is the control model fixed, configurable and/or online changeable?	FIXED FOR GGIO All controllable objects under GGIO class the control model is fixed: direct-with-normal-security.
Ct3	Time Activated Operate (operTm) Supported	N
Ct4	Is “operate-many” Supported?	N
Ct5	What is the behavior of the device when the test attribute is set in the SelectWithValue and/or Operate request?	Device will accept the command but will not perform it on the hardware.

PIXIT for Control Model (continued)

ID	Description	Value / Clarification
Ct6	What are the conditions for the time (T) attribute in the SelectWithValue and/or Operate request?	No Functionality
ID	Description	Value / Clarification
Ct7	Is pulse configuration supported?	N
Ct8	What is the behavior of the device when the check conditions are set? Is this behavior fixed, configurable, online changeable?	N Synchrocheck N Interlock-Check Device ignores the check value and the command is executed as usual. Fixed
Ct9	What additional cause diagnosis are supported?	N/A (the Only Model Supported is Direct with Normal Security)
Ct10	How to force a “test-not-ok” respond with SelectWithValue request?	N/A
Ct11	How to force a “test-not-ok” respond with Select request?	N/A
Ct12	How to force a “test-not-ok” respond with Operate request?	DOns: Operate with orCat out of range SBOns: N/A DOes: N/A SBOes: N/A
Ct13	Which origin categories are supported?	All
Ct14	What happens if the orCat is not supported? Out of range or within the range but not supported?	DOns: Negative response SBOns: N/A DOes: N/A SBOes: N/A
Ct15	Does the IED accept an selectwithvalue/operate with the same ctlVal as the current status value?	DOns: N/A SBOns: N/A DOes: N/A SBOes: N/A
Ct16	Does the IED accept a select/operate on the same control object from 2 different clients at the same time?	DOns: Y (see Remarks) SBOns: N/A DOes: N/A SBOes: N/A
Ct17	Does the IED accept a select/selectwithvalue from the same client when the control object is already selected (tissue 334)?	SBOns: N/A SBOes: N/A

PIXIT for Control Model (continued)

ID	Description	Value / Clarification
Ct18	Is for SBOes the internal validation performed during the SelectWithValue and/or Operate step?	N/A
Ct19	Can a control operation be blocked by Mod=Off or Blocked?	N (if Mod Not Configurable)
Ct20	Does the IED support local / remote operation?	Y
Ct21	Does the IED send an InformationReport with LastApplError as part of the Operate response- for control with normal security?	DOns: N SBOns: N/A

NOTES:

In DOns model: When two client sends Operate request with very short interval (e.g. 10 ms) then for processing the second command the object position is still unchanged due to the first command, thus both clients receive positive Operate response.

5.8 PIXIT FOR TIME SYNCHRONIZATION

ID	Description	Value / Clarification
Tm1	What quality bits are supported?	N LeapSecondsKnown N ClockFailure Y ClockNotSynchronized
Tm2	Describe the behavior when the time synchronization signal/messages are lost?	Time is taken from internal RTC.
Tm3	When is the time quality bit “Clock failure” set?	Not Set
Tm4	When is the time quality bit “Clock not synchronized” set?	It is done when the device detects that the configured NTP server does not respond; the latency depends on measured drift of the internal clock. Typically takes 1 minute.
Tm5	Is the timestamp of a binary event adjusted to the configured scan cycle?	Y
Tm6	Does the device support time zone and daylight saving?	Y
Tm7	Which attributes of the SNTP response packet are validated?	N Leap indicator Not Equal to 3. N Mode is Equal to SERVER. N OriginateTimestamp is Equal to Value. Sent by the SNTP Client as Transmit. Timestamp Y RX/TX Timestamp Fields are Checked for Reasonable Values Y SNTP Version 3 or 4 N Other

5.9 PIXIT FOR FILE TRANSFER MODEL

ID	Description	Value / Clarification
Ft1	What is structure of files and directories?	N/A
	Is the IETF FTP protocol also implemented?	N/A
Ft2	Directory names are separated from the file name by ?	N/A
Ft3	The maximum file name size including path (recommended 64 chars)?	N/A
Ft4	Are directory/file name case sensitive?	N/A
Ft5	Maximum File Size	N/A
Ft6	Is the requested file path included in the file name of the MMS fileDirectory respond?	N/A
Ft7	Is the wild char supported MMS fileDirectory request?	N/A
Ft8	Is it allowed that 2 clients get a file at the same time?	N/A

6. TICS DETAILS

6.1 INTRODUCTION

This part of the document is based on a template for the tissues conformance statement. According to the UCA IUG QAP the tissue conformance statement is required to perform a conformance test and is referenced on the certificate.

6.2 MANDATORY INTOP TISSUES

During the October 2006 meeting IEC TC57 working group 10 decided that:

- Green Tissues with the category "IntOp" are mandatory for IEC 61850 edition 1
- Tissues with the category "Ed.2" Tissues should not be implemented.

The table below gives an overview of the implemented IntOp Tissues.

Part	Tissue No.	Description	Implemented Y, N/A
8-1	116	GetNameList with Empty Response?	Y
	165	Improper Error Response for GetDataSetValues	Y
	183	GetNameList Error Handling	Y
7-4	None		
7-3	28	Definition of APC	N/A
	54	Point def xVal, Not cVal	N/A
	55	Ineut = Ires ?	Y
	60	Services Missing in Tables	N/A
	63	Mag in CDC CMV	Y
	219	operTm in ACT	N/A
	270	WYE and DEL RMS Values	note 3

Implemented IntOp Tissues (continued)

Part	Tissue No.	Description	Implemented Y, N/A
7-2	30	Control Parameter T	Y
	31	Typo	N/A
	32	Typo in Syntax	N/A
	35	Typo Syntax Control Time	N/A
	36	Syntax Parameter DSet-Ref Missing	N/A
	37	Syntax GOOSE “T” Type	Y
	39	Add DstAddr to GoCB	Y
	40	GOOSE Message “AppID” to “GoID”	Y
	41	GsCB “AppID” to “GsID”	N/A
	42	SV Timestamp: “EntryTime” to “TimeStamp”	N/A
	43	Control “T” Semantic	N/A
	44	AddCause - Object Not Sel	Y
	45	Missing AddCauses (Neg Range)	N/A, note 2
	46	Synchro check Cancel	N/A
	47	“.” in LD Name?	Y
	50	LNName Start with Number?	Y
	51	ARRAY [0..num] Missing	Y
	52	Ambiguity GOOSE SqNum	Y
	53	Add DstAddr to GsCB, SV	N/A
	151	Name Constraint for Control Blocks etc.	Y
	166	DataRef Attribute in Log	N/A
	185	Logging - Integrity Periode	N/A
	189	SV Format	N/A
	234	New Type CtxInt (Enums are Mapped to 8 Bit Integer)	N/A
	278	EntryId Not Valid for a Server (Part of #453)	Y
	453	Reporting & Logging Model Revision	Y

Part	Tissue No.	Description	Implemented Y, N/A
6	1	Syntax	N/A
	5	tExtensionAttributeNameEnum is Restricted	Y
	8	SIUnit Enumeration for W	Y
	10	Base Type for Bitstring Usage	Y
	17	DAI/SDI Elements Syntax	Y
	169	Ordering of Enum Differs From 7-3	N/A

NOTES:

1) Editorial tissues are marked as “N/A”.

2) Final proposal on tissue 45 is not defined yet.

3) Tissue 270: In SE330 data model the LNs with WYE and DEL data are described (in the LN prefix and in the description attributes) whether they provide amplitude or rms values.

6.3 Optional IntOp Tissues

After the approval of the server conformance test procedures version 2.2 the following IntOp tissues were added or changed. Implementation of all tissues in this section is specified as optional.

Part	Tissue No.	Description	Implemented Y, N/A
8-1	246	Control Negative Response (SBOns) with LastApplError	N
8-1	545	Skip File Directories with No Files	Y
7-4	79	AutoRecSt value 4 = “unsuccessful”	N/A
7-2	333	Enabling of an Incomplete GoCB	Y
7-2	453	Combination of all Reporting and Logging Tissues	Y
6	245	Attribute RptId in SCL	Y
6	529	Replace sev - Unknown by Unknown	N/A

6.4 Other Implemented Tissues

Other implemented tissues that should have no impact on interoperability.

Part	Tissue No.	Description	Implemented Y, N/A

APPENDIX A DOCUMENT REVISION HISTORY

DOCUMENT RELEASE DATE	DOCUMENT REVISION
July 23, 2014	0-A-072314

DOCUMENT REVISION 0-A-072314

Initial Release.

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