TISSUEs Implementation Conformance Statement (TICS) for the IEC 61850 Edition 2 server interface in AQ-300 series

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1 Introduction

This tissues conformance statement is applicable for **AQ-300 series** with firmware version **2.10.**

This document provides a template for the Tissues conformance statement. According to the UCAlug QAP the Tissue conformance statement is required to perform a conformance test and is referenced on the certificate.

1.1 Mandatory Edition 2 Tissues

Below tables give an overview of the applicable mandatory Tissues.

Items in italic are brief interpretations provided by the UCA International Users Group to aid in interpretation and is not normative.

The original TISSUE should consulted for details of changes.

"Implemented by server":
"Y": means that the server has implemented the respective tissue.
"ni": No impact on testing
"na": not applicable if the server does not support the corresponding ACSI service(s)

"Supported by client":
"Y": means that the client supports servers that have implemented the respective tissue.
"ni": No impact on testing
"na": not applicable if the client does not support the corresponding ACSI service(s)

Table 1 Part 6 Tissues

Part 6 Tissue	Description	Implemented by server	Supported by client
658	Tracking related features *EntryID and CST missing, these are checked by schema*	Y	
663	FCDA element cannot be a "functionally constrained logical node" *doName now mandatory in FCDA element,* *SCT: refuse to make empty doName? ICT: Refuse SCD*	Y	
668	Autotransformer modeling *Autotransformer model in substation section has changed*	na	
687	SGCB ResvTms *SettingControl has added attribute resvTms* *see also TISSUE 845*	Y	
719	ConfDataSet - maxAttributes definition is confusing *maxAttributes now means max count of FCDA allowed in dataset*	Y	
721	Log element name *LN0/Log now has optional attribute "name"*	na	
768	bType VisString65 is missing *VisString65 added as SCL BasicType*	Y	
779	object references *"@" as first character in object references now allowed*	Y	
788	SICS S56 from optional to mandatory *SICS S56="Interpret IED capabilities and prohibit unsupported usage"*	na	
789	ConfLdName as services applies to both server and client *Many changes made to Services section*	na	
804	valKind and IED versus System configuration *valImport missing/false DAI means ICT shall ignore value in SCD and SCT shall not change from ICD/IID value.* *Instance section inherits from DA/BDA element.*	na	
806	Max length of log name inconsistent between -6 and -7-2 *LogControl.logName and Log.name restricted to 32 chars*	na	

807	Need a way to indicate if "Owner" present in RCB *Services/ReportSettings@owner added*	na	
823	ValKind for structured data attributes *valKind is prohibited on structured attributes*	na	
824	Short addresses on structured data attributes *sAddr is now allowed for structured attributes*	na	
825	Floating point value *Server shall support <Val> with exponential notation*	Y	
845	SGCB ResvTms *Services/SettingGroups/SGEdit added attribute resvTms* *Services/SettingGroups/ConfSG added attribute resvTms* *See also TISSUE 687*	na	
853	SBO and ProtNs *DA[@name=SBO] element shall have ProtNS element*	Y	
855	Recursive SubFunction *Substation section extension must be tolerated*	na	
856	VoltageLevel frequency and phases *Substation section extension must be tolerated*	ni	
857	Function/SubFunction for ConductingEquipment *Substation section extension must be tolerated*	na	
886	Missing 8-1 P-types *"tP_IP_UDP_PORT" and "tP_IP_TCP_PORT" added*	Y	
901	tServices as AP or as IED element *Rules for contents of AP/Server/Services are now defined*	Y	
936	SupSubscription parameter usage is difficult *SupSubscription "max" replaced by "maxGo" and "maxSv"*	na	
1147	tServices - FileHandling not consistent with -7-2 *Services/FileHandling now means only support for GetFile and GetFileAttributeValues and NOT SetFile/DeleteFile*	Y	
1185	Valkind value Conf for EX FC data *valKind=Conf is allowed for dataNs*	na	
1284	SCSM mapping may require a communication section in an ICD file *Server IEDs supporting client/server associations to 61850-8-1 shall include a <Communication> section*	Y	
1328	Limitation on the size of data type templates identifiers *Identifer now limited to 255 characters*	Y	
1395	Client LN attributes *ReportControl/RptEnabled/ClientLN@ldInst shall be "LD0" for pure clients (without any Logical Devices)*	ni	
1402	ExtRef during engineering *an ExtRef.intAddr attribute value unequal to empty string (prescribed or filled by the IED tool) is the flag indicating that the ExtRef shall not be deleted by the system tool. The system tool can however remove the link to the source IED* *<<applicable for SCL tool test>>*	ni	
1415	SICS-S110 IID import mandatory for Edition2 *only the import of data model modifications and CF value changes is mandatory for system tool* *<<applicable for SCL tool test>>*	ni	
1419	Support of IdName on other IEDs *SICS I212 is now mandatory for client and subscriber*	na	
1444	Need to support fixed and SCT controlled Datasets *Services/xxxSetttings@datSet=fix now means "data set pointed by Control Block cannot be altered from ICD/IID value <<applicable for SCL tool test>>*	na	
1445	ConfReportControl and a fixed ReportSettings *Control block capabilities must be consistent* *<<applicable for SCL tool test>>*	na	
1450	originalSclXxx computation rules *Ed2 ICD/IID files specifying SCL@version=2007 SHALL include*	Y	

	originalSCLVersion=2007 and originalSCLRevision as attributes of the <IED>element		
1485	Need to supercede Tissue 1398 to clarify SCT behavior *Same as TISSUE 1450 <<applicable for SCL tool test>>*	Y	

Table 2 Part 7-1 Tissues

Part 7-1 Tissue	Description	Implemented by Server	Implemented by Client
828	Data model namespace revision IEC 61850-7-4:2007[A] *Both 2007 and 2007A are allowed for namespace name*	Y	
948	Enumeration (string) values format *Enums are limited to 127 characters from Basic-Latin and Latin-1 character sets*	Y	
1151	simulated GOOSE disappears after 1st appearance when LPHD.Sim = TRUE *New LGOS state machine defined, but TISSUE is not IntOp2, therefore TISSUE is optional if LGOS is used*	na	
1396	The use and configuration flow of LGOS and LSVS is unclear *If Services/SupSubscription@maxGo > 1 then at least 1 LGOS must exist. Same for maxSv/LSVS.* *If maxGo > count(LGOS) then SCT can create additional LGOS. Same for maxSv/LSVS*	na	
1447	Restriction on ENUMtypes in SCL *If a ENUM DA limits write or configuration to a subset, then that subset must be declared*	na	
1457	Multiple DOI nodes with the same name *LN can have no more than one DOI with same name*	Y	
1468	Re-use DO from other LN *allow standard or private dataNs*	na	
1491	CmdBlk blocks itself? *The data CmdBlk shall have no effect on the controllable data Mod or CmdBlk*	na	

Table 3 Part 7-2 Tissues

Part 7-2 Tissue	Description	Implemented by Server	Implemented by Client
728	BRCB: could PurgeBuf be set when RptEna=TRUE? *PurgeBuf while RptEna=true is prohibited*	Y	
778	AddCause values – add value not-supported *Align 7-2 with 8-1 (nothing new to 8-1)*	Y/	
780	What are unsupported trigger option at a control block? *All control blocks must support all trigger options*	Y	
783	TimOper Resp- ; add Authorization check *Clarifies Time-Operated Controls*	Y/	
786	AddCause values 26 and 27 are switched *Annex B.2 has wrong AddCause values*	Y	
820	Mandatory ACSI services (use for PICS template) *Model entries M18 (Application Association), M19 (GCB), M20 (SVCB) are new. Services S17 (Substitution) and S61 (GetServerDirectory) are new. Services S1, S3, S4, S5, S6, S8, S16, S18, S23, S36, S37, S41, S42 are changed. Final resolution in file tissue820Resolution_final_20120308.doc*	Y	
858	typo in enumeration ServiceType *Tracking serviceType now has GetLogicalNodeDirectory*	na	
861	dchg of ConfRev attribute *Clarifies (tracking) BTS.confRev is AFTER BRCB change*	Y	
1050	GTS Phycomaddr definition in SCL *(Tracking) GTS needs a special structure for SCL*	Y/	

Part 7-2 Tissue	Description	Implemented by Server	Implemented by Client
1071	Length of DO name *Private DO name length shall be <=12 including instance*	Y	
1127	Missing owner attribute in BTS and UTS *NSD files for 61850-7-3 show owner in (tracking) BTS/UTS*	Y	
1202	GI not optional *GI support is mandatory for both URCB and BRCB*	Y	
1232	EntryID needs clarification *Segments of a report shall have same identifiers*	Y	
1242	NTS definition *NTS.resv have been added*	na	
1307	Segmented report with Buffer overflow *Segments of a report shall have identical buf-overflow value*	Y	
1428	MTS and NTS should use svOptFlds *MTS.optFlds and NTS.optFlds now have bType=SvOptFlds*	na	
1630	Attributes in CDC=LTS do not match 8-1 definition *Order of attributes in LTS changed to:* *logEna, logRef, datSet, oldEntrTm, newEntrTm, oldEnt, newEnt,* *trgOps, intgPd*	na	

Table 4 Part 7-3 Tissues

Part 7-3 Tissue	Description	Implemented by Server	Implemented by Client
697	persistent command / PulseConfig *PulseConfig adds enum "persistent-feedback"* *DPC.cmdQual=="persistent" is conditionally allowed*	Y	
698	Wrong case is BAC.dB attribute *attribute renamed from "dB" to "db"*	na	
711	blkEna freeze data update while setting its quality to operaterBlocked *Mode=Blocked shall not cause q.operatorBlocked*	na	
722	Units for 'h' and 'min' not in UnitKind enumeration. *New unit enums 84=hours, 85=minutes*	na	
919	Presence Condition for sVC *svC may be valKind=Conf in ICD file*	na	
925	Presence of i or f attribute - Problem with writing *New constructed attribute class "AnalogueValueCtl"*	na	
926	Presence Conditions within RangeConfig *All or none of hhLim+hLim+lLim+llLim shall be present*	na	
954	Data attributes with FC=CF should have trgOp=dchg *Some INS and HST and CSG attributes missing dchg*	Y	
1078	CMV.t update if rangeAng changed *Add rangeAng to "reasons-to-update-timestamp-of-CMV"*	na	
1565	db = 0 behaviour *db=0 not longer suppresses reporting*	na	
1578	dataAttribute NameSpace content *Attributes with FC=EX must be initialized in ICD/IID file*	Y	

Table 5 Part 7-4 Tissues

Part 7-4 Tissue	Description	Implemented by Server	Implemented by Client
671	mistake in definition of Mod & Beh *Beh=on, q=test should be "Processed as valid"*	Y	
674	CDC of ZRRC.LocSta is wrong *ZRRC LocSta should be CDC=SPC*	na	
676	Same data object name used with different CDC *LCCH.Fer renamed to FerCh, LCCH.RedFer to RedFerCh*	na	

677	MotStr is used with different CDC in PMMS and SOPM LN classes *Rename SOPM.MotStr to MotStrNum*	na	
679	Remove CycTrMod Enum *Enum is no longer used, use TrMod instead*	na	
680	SI unit for MHYD.Cndct *Change unit from S/cm^2 to S/m*	na	
681	Enum PIDAlg *Typographical error, invalid XML syntax*	na	
682	ANCR.ParColMod *ParColMod enum values text have changed*	na	
683	Enum QVVR.IntrDetMth *IntrDetMth enum values text have changed*	na	
685	Enum ParTraMod *ParTraMod enum values text have changed*	na	
686	New annex H - enums types in XML *Many changes have been made to enumeration names*	Y	
694	Data object CmdBlk *CmdBlk semantics have changed*	na	
696	LSVS.St (Status of subscription) *LSVS.St is now mandatory*	na	
712	interpretation of quality operatorBlocked *Mode and Behavior semantics have changed*	na	
713	DO Naming of time constants in FFIL *Many DO names in FFIL have changed*	na	
714	Enums for ShOpCap and SwOpCap *Type for YPSH.ShOpCap and XSWI.SwOpCap have changed*	Y	
715	RBDR.ChNum1 *RBDR.ChNum1 changes from optional to conditional*	na	
716	TAXD text for condition *TAXD.SmRte condition for inclusion has changed*	na	
724	ANCR.Auto *ANCR.Auto changes from mandatory to optional*	na	
725	Loc in LN A-group *Loc changes to optional, LocKey/LocSta conditions change*	Y	
734	LLN0.OpTmh vs. LPHD.OpTmh *LLN0.OpTmh deleted, LPHD.OpTmH added as conditional*	na	
736	PFSign *PFSign description in Clause 6 is clarified*	ni	
742	GAPC.Str, GAPC.Op and GAPC.StrVal *Objects have instance indicator removed (ex, Str1 to Str)*	na	
743	CCGR.PmpCtl and CCGR.FanCtl *Object have instance indicator added (ex:PmpCtl to PmpCtl1)*	na	
744	LN STMP, EEHealth and EEName *Removed STMP.EEHealth and STMP.EEName*	na	
772	LPHD.PwrUp/PwrDn should be transient *These objects are now transient*	na	
773	Loc, LocKey and LocSta YPSH and YLTC *Add Loc, LocKey and LocSta in YLTC and YPSH (optional)*	na	
774	ITCI.LocKey *Add ITCI.LocKey as optional*	na	
776	LPHD.OutOv/InOv and LCCH.OutOv/InOv *Clarified: stays true until buffer space again available*	na	
800	Misspelling in CSYN *CSYN.VInvTmms renamed to CSYN.VIntvTmms*	na	
802	CCGR and Harmonized control authority *Add Loc, LocKSta to every controllable LN (e.g. FSPT)*	na	
808	Presence condition of ZMoT.DExt and new DOs *Change ZMOT.DExt to optional; add TotThmSt and MotSt*	na	

831	Setting of ConfRevNum in LGOS *Add RxConfRevNum to LGOS and LSVS*	na	
838	Testing in Beh=Blocked *Change sematic of Beh=Blocked to allow controls to be* *acknowledged even when LN is blocked.*	na	
844	MFLK.PhPiMax, MFLK.PhPiLoFil, MFLK.PhPiRoot DEL->WYE *Change these NFLK objects from cdc=DEL to cdc=WYE*	na	
877	QVUB -settings should be optional *Change QVUB.UnbDetMth and QVUB.StrVal to optional*	ni	
908	ARIS.StrSeq – transient *Change ARIS.StrSeq to transient* *Transient is not tested*	ni	
909	Remove ANCR.ColOpR and ColOpL *Replace ANCR.ColOpR and ANCR.ColOpL with* *ANCR.ColChg. Add YEFN.ColChg*	na	
912	Clarification of PwrRtg/VARtg *Change many DOs in YPTR, and ZGEN, see name space* *2007A2.nsd for final result*	na	
920	Resetable Counter is NOT resetable *Change GGIO.CntRs to CntVal; Same for FCNT*	na	
932	Rename AVCO.SptVol to AVCO.VolSpt	na	
933	Presence of LCCH.RedFerCh and RedRxCnt *Change the presence condition of LCCH.RedChLiv*	na	
939	Change CDC for ANCR.FixCol *Change ANCR.FixCol from APC to ASG*	na	
991	LGOS: GoCBRef (as well as LSVS.SvCBRanre ef) should be mandatory *LGOS.GoCBRef and LSVS.SvCBRef are now both mandatory*	na	
1007	PTRC as fault indicator - Update of description required *PTRC.Tr and Op and Str conditional (at least 1 of group)*	Y	
1044	TapChg in AVCO *AVCO.TapChg is now optional*	na	
1077	Rename DOnames within LTIM *LTIM.TmChgDayTm, changed to TmChgDay;* *LTIM.TmChgStdTm changed to TmChgStd*	na	
1256	New DO for LTIM to set time "manually" *Add LTIM.TmSet*	na	
1331	Mod, Beh and Health with q=TEST, client can't receive their states *Mod while in Blocked will always be processed*	Y	
1426	Add two DO for leap seconds in LTIM *LTIM.Leap added*	na	
1456	Annex A and Mod/Beh/Health *Mod.stVal writes always ignore test bits in controls*	Y	
1568	ISAF.AlmReset ->transient *Change ISAF.AmlReset to transient* *Transient is not tested*	ni	

Note: TISSUE 675, 735, 772, 775, 776, 878 are not relevant for conformance testing

Table 6 Part 8-1 Tissues

Part 8-1 Tissue	Description	Implemented by Server	Implemented by Client
770	GoID type mitmatch 18.1.1 and 18.1.2.5.2 *GoID string length is now 129*	Y	
784	Tracking of control (CTS) *Tracking CTS has been added*	Y	
817	Fixed-length GOOSE float encoding *GOOSE float is encoded Tag-0x87, length=5, first octet=8*	Y	

Part 8-1 Tissue	Description	Implemented by Server	Implemented by Client
827	Mandatory ACSI services (Part of 7-2 TISSUE resolution) *Change Table 111 (ServicesSupported): Add initiate, abort, and release. Change conditions for defineNamedVariables.Final resolution in file tissue820Resolution_final_20120308.doc*	ni	
834	File dir name length 64 *Filename length changed from 32 to 64*	Y	
951	Encoding of Owner attribute *xRCB.owner is encoded as 4 octets(IPv4) or 16 octets(IPv6)*	Y	
1040	More associate error codes *3 additional associate error codes added*	na	
1178	Select Response+ is non-null value *Response to SBO read should be <CO_CtrlObjectRef>*	Y	
1324	The response- for DeleteNamedVariableList is not defined *numDeleted=0; error=service/object-constraint-conflict*	Y	
1345	Fixed-length GOOSE ASN.1 length encoding *GOOSE publisher shall always encode minimum size legth field*	na	
1441	Optonal fields in buffered reports *Writing BRCB.optFld shall not cause a purgeBuf operation*	Y	
1442	Journal variableTag for ReasonCode *Example in the standard is incorrect*	na	
1453	Purge buffer on write to BRCB *PurgeBuf only occurs if different value is written*	Y	
1454	Reports can be transmitted before write(RptEna=true) is confirmed	Y	
1495	GetVariableAccessAttributes error code *Return MMS error access/object-non-existent if the object does not exist*	Y	
1500	the response for DeleteNamedVariableList with a non-existent LN is not specified *CreateDataSet/DefineNamedVariableList specifying a non-existing LD/LN shall fail with access/object-non-existent*	Y	
1626	PICS for Information Report is incorrect *MMS ServicesSupported "informationReport" should be optional for servers because they never receive InformationReport requests. It is only required for clients which process reports or control command-termination*	Y	

Compare the TISSUE database for more details: http://iec61850.tissue-db.com