STS Association

STS 531-0

Edition 1.9.6

April 2023

Standard Transfer Specification- Compliance Test Specification – Quality Plan

CONTENTS

Revision History

Revision	Clause	Date	Change details from previous Edition
1.1	General	22 Feb 2015	Only Edition number changed from 1 to 1.1 to match the document suite
1.2	General	May 2015	Only Edition number changed from 1.1 to 1.2 to match the document suite
1.3	General	July 2015	Added Revision column to this table. Updated conformance block diagram (CB10 and CB12 had incorrect spec numbers).
1.4	General	Oct 2015	Only Edition number changed from 1.3 to 1.4 to match the document suite
1.5	Logo	April 2016	Changed logo to latest STS logo
1.6	General	June 2016	Only Edition number changed from 1.5 to 1.6 to match the document suite
1.7	General	Nov 2016	Only Edition number changed from 1.6 to 1.7 to match the document suite
1.8	Technical	Feb 2017	Added Entity Type H1
1.8.1	General	Nov 2017	Only Edition number changed from 1.8 to 1.8.1 to match the document suite
1.8.2	General	Jan 2018	Only Edition number changed from 1.8.1 to 1.8.2 to match the document suite
1.9	Technical	July 2018	Updated suite to cover IEC62055-41 Ed3 Added reference to STS531-1-1-04
1.9.1	1.1	March 2019	Removed table in 1.1. Added STS531-8-3 (API) test document reference as normative
	various		Added reference to STS600-10-1 and PCI document
	Annexure A, 4.3.8		Updated conformance block references
	general		Added foreword
1.9.2	4.3.3	July 2019	Added TCT=02
	4.3.15		Corrected description
	Annexure A		Corrected CB14 to include all two way port types, corrected CB3 to include TCT=02
	General		Corrected titles for STS531-9-1-07 and STS531-9-1-11 references
1.9.3	technical	Oct 2019	Updated document suite – STS531-1-0-02 and STS531-10-02 are now deprecated.
1.9.4	2.1, 4.1	Jan 2021	Removed references to IEC62055-52 in 2.1 and 4.1
	Foreword		Added note on voting
	4.3		Added Entity Type J
	4.3.13, 4.3.13.1		Updated clause to include Entities I and J
	4.3.16 4.3.16.1		Added clauses
	Annexure A		Updated annexure to include entity types I,J
1.9.5	2.1, 4.1.1	Apr 2022	Added reference to STS2100-3 and certification criteria clause 4.1.1
1.9.6	General	April 2023	Updated revision to match document set

STANDARD TRANSFER SPECIFICATION ASSOCIATION

STANDARD TRANSFER SPECIFICATION –

Compliance Test Specification – Quality Plan

FOREWORD

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Standard Transfer Specification STS 531-0 has been prepared by working group 8.

The text of this standard is based on the following documents:

FDS	Report on voting
STS531-0/CD	see note1

Note1: due to the large number of documents in the test set, member voting is not performed prior to publication. However, corrections will be made to the document set if errors are reported.

This publication has been drafted in accordance with STSA Directive STS 2100-1 with the exception of Note1

1 Scope

1.1 General

This document provides the compliance criteria and test descriptions for prepayment meters designed to accept tokens that comply with the STS and POS systems designed to produce STS-compliant tokens.

2 Normative references

2.1 General

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62055-41 Ed3 – *ELECTRICITY METERING – PAYMENT SYSTEMS – Part 41 (ED3): Standard Transfer Specification – Application layer protocol for one-way token carrier systems*

IEC 62055-51 – *ELECTRICITY METERING – PAYMENT SYSTEMS – Part 51: Standard Transfer Specification – Physical layer protocol for one-way numeric and magnetic card token carriers*

STS2100-3 - *MANAGEMENT DIRECTIVE - Procedure for STS Product Certification*

STS531-1-0-04 - *COMPLIANCE TEST SPECIFICATION – Entity Type A – POSToTokenCarrierInterface application layer protocol for POS devices supporting DKGA=04 and EA=11, and optionally: DKGA=04 and EA=07.*

STS531-1-1-04 - *COMPLIANCE TEST SPECIFICATION – Entity Type A – POSToTokenCarrierInterface application layer protocol for POS devices supporting DKGA=04 and EA=07, and optionally: DKGA02 and EA07.*

STS531-2-1 – *Compliance Test Specification – Entity type B POS to token carrier interface physical layer protocol for TCT=01 and TCT=02*

STS531-3 – COMPLIANCE TEST SPECIFICATION – Entity Type C – Token Carrier: Token Carrier for TCT = 01 and TCT=02

STS531-4 *COMPLIANCE TEST SPECIFICATION – Entity type D token carrier to meter interface physical layer protocol for TCT=01 and TCT=02*

STS531-5-0 – *COMPLIANCE TEST SPECIFICATION – Entity Type E – TokenCarriertoMeterInterface Application Layer Protocol for TCT = 01 and TCT=02*

STS531-6-1-07 – *COMPLIANCE TEST SPECIFICATION – Entity Type F – MeterApplicationProcess for TCT = 01 and TCT = 02, Using EA=07*

STS531-6-1-11 – *COMPLIANCE TEST SPECIFICATION – Entity Type F – MeterApplicationProcess for TCT = 01 and TCT = 02, Using EA=11*

STS531-7 – *COMPLIANCE TEST SPECIFICATION – Entity type G Key Management System*

STS531-8-2- *COMPLIANCE TEST SPECIFICATION – Entity type H POStoSecurityModuleInterface application layer protocol*

STS531-8-3- *COMPLIANCE TEST SPECIFICATION – Entity type H POStoSecurityModuleInterface application layer protocol – API*

STS531-9-1-07 - *COMPLIANCE TEST SPECIFICATION –Entity Type I – Physical layer protocol for a two-way virtual token carrier for direct local connection for Port types A and B for EA=07*

STS531-9-1-11 – *COMPLIANCE TEST SPECIFICATION – Entity Type I – Physical layer protocol for a two-way virtual token carrier for direct local connection for Port types A and B for EA=11*

STS531-10-04 - *COMPLIANCE TEST SPECIFICATION – Entity Type H1 – POStoSecurityModuleInterface application layer protocol*

STS531-10-1-04 - *COMPLIANCE TEST SPECIFICATION – Entity Type H1 – SecurityModuleToPOSInterface adaptation layer protocol for POS devices supporting DKGA=04 and EA=07, and optionally: DKGA02 and EA07.*

STS600-10-1 – *Standard Transfer Specification: HSM REQUIREMENTS SPECIFICATION*

3 Terms and definitions

3.1 Definitions

For the purposes of this test specification, the definitions given in the normative references identified in paragraph 2 apply.

3.2 Terms

For the purposes of this test specification, the terms given in the normative references identified in paragraph 2 apply.

4 Quality Plan

4.1 Testing Philosophy

This compliance test specification adopts a “black-box” testing philosophy approach with the test data being applied at the unit under test interfaces. Expected results are measured at the interfaces, which in turn interpret the behaviour of the “black-box” internal functions; these being the requirements specified in IEC 62055-41 and IEC 62055-51.

Note:
Notwithstanding the results obtained from these tests, the entities tested must comply to IEC62055-41 and IEC62055-51 as applicable. This suite of test documents does not cover all possible combinations of tests but does give an indication of conformance.

As an example:
Test CTSF15 : DDTK coded accepting clear credit PM all credit registers – this test indicates that a PM coded under a Default key is able to accept a management token as required by IEC62055-41. Not all management tokens are tested for acceptance in this test. It is the manufacturer’s responsibility to ensure that in fact all management tokens are accepted when a PM is coded under DDTK.

4.1.1 Certification criteria

Please refer to document STS2100-3 for the certification criteria applicable to all product certifications.

4.2 Objectives

The compliance test specifications have been compiled with the following objectives in mind:

- Manufacturers may be able to self certify products as per STS2100-3;
- The number of test equipment/tools required is kept to a minimum;
- A tester need only require minimal domain knowledge or experience to perform the tests and interpret the results; and
- Test cases have been optimised for efficiency with the shortest testing time while covering maximum ground without compromising on quality.

4.3 Multi-Part Architecture

This compliance test specification approaches the unit under test from the perspective given in clause 5 of IEC 62055-41 which identifies the following distinct entity types that may exist independently or in combination in a unit under test.

Entity type	Description	Reference
A	POS to Token Carrier Interface – Application layer protocol	Clause 6 of IEC 62055-41
B	POS to Token Carrier Interface – Physical layer protocol	Clause 5 of IEC 62055-51
C	Physical characteristics of magnetic token carrier	Clause 5 0f IEC 62055-51
D	Token Carrier to Meter Interface – Physical layer protocol	Clause 6 of IEC 62055-51
E	Token Carrier to Meter Interface – Application layer protocol	Clause 7 of IEC 62055-41
F	Meter Application Process	Clause 8 of IEC 62055-41
G	Key Management System	Clause 10 of IEC 62055-41
H	Security Module to POS interface – Application layer protocol	IEC62055-41
H1	Security Module to POS interface – adaptation layer protocol	IEC62055-41
I	POSToTokenCarrierInterface – Physical layer protocol for a two-way virtual token carrier for direct local connection for Port types A and B	IEC62055-52
J	POSToTokenCarrierInterface – Physical layer protocol for a two-way virtual token carrier using DLMS/COSEM	STS101-2, STS201-2

Note: The physical characteristics of magnetic token carrier have been placed in an independent section due to the particular requirements of this token carrier type.

Note: The POS Application Process is not within the scope of this compliance test specification, but under certain conditions it may be the only interface for the tester to gain access to entity A or B or a combination thereof.

This compliance test specification takes cognisance of the fact that STS products are developed as multi-part installations. This section therefore defines 13 parts that encompass the range of possible STS products that are made up of a single distinct entity or combination of distinct entities. Each part defines the applicable entities and associated tests that must be applied to ensure compliance. Annexure A describes these parts in more detail, giving an outline of the conformance blocks possible.

Note: Although Entity Types D, E, and F have associated conformance blocks, it is currently not possible to test these individually since no standard protocols exist for communications between these entities. These conformance blocks are therefore informative only. Entities D, E, and F can therefore only be tested together.

4.3.1 Part 1 (CB1)

This part applies to an entity type A STS product. Examples of this product type would include but are not limited to:

- A point of sale component responsible for the generation of the encoded token data given the necessary APDU data elements and/or IDRecord (e.g.: secure module).
- A central online resource that generates the encoded tokens for delivery to remote terminals/point of sales (e.g.: online transaction server).

4.3.1.1 Part 1 - Applicable tests/requirements

All the tests detailed in document STS531-1-0-04 and STS531-1-1-04 apply with respect to compliance.

4.3.2 Part 2 (CB2)

This part applies to an entity type B STS product. Examples of this product type would include but are not limited to:

- A magnetic card encoder responsible for the encoding of TCT 01 tokens.
- A printer used to print TCT 02 tokens.

4.3.2.1 Part 2 - Applicable tests/requirements

All the tests detailed in document STS531-2-1 apply with respect to compliance.

4.3.3 Part 3 (CB3)

This part applies to an entity type C STS product. Examples of this product type would include but are not limited to:

- A magnetic token carrier (TCT 01) – see IEC62055-41.
- A numeric keypad (TCT 02) – see IEC62055-41.

4.3.3.1 Part 3 - Applicable tests/requirements

All the tests detailed in documents STS531-3 apply with respect to compliance.

4.3.4 Part 4 (CB4)

This part applies to an entity type D STS product. Examples of this product type would include but are not limited to:

- The meter component responsible for the reading or input of an encoded token (e.g.: card reader or numeric keypad).
- A token capture device responsible for the reading or input of an encoded token (e.g.: card reader or numeric keypad) that is connected to the meter by a communication link such as a radio link or power line carrier.

This entity would typically be submitted in combination with parts 4, 5 and 6.

4.3.4.1 Part 4 - Applicable tests/requirements

All the tests detailed in documents STS531-4 apply with respect to compliance.

4.3.5 Part 5 (CB5)

This part applies to an entity type E STS product. An example of this product type would include but is not limited to:

- The meter component responsible for the decoding of an encoded token.

This entity would typically be submitted in combination with parts 4 and 6.

4.3.5.1 Part 5 - Applicable tests/requirements

All the tests detailed in documents STS531-5-0 apply with respect to compliance.

4.3.6 Part 6 (CB6)

This part applies to an entity type F STS product. An example of this product type would include but is not limited to:

- The meter component responsible for the reading, interpretation and execution of all the categories of token (e.g.: integrated payment meter).

This entity would typically be submitted in combination with parts 4, and 5.

4.3.6.1 Part 6 - Applicable tests/requirements

All the tests detailed in document STS531-6-1-07 and/or STS531-6-1-11 apply with respect to compliance.

4.3.7 Part 7 (CB7)

This part applies to an entity type G STS product. An example of this product type would include but is not limited to:

- A key management system responsible for the secure generation, storage and distribution of vending keys.

4.3.7.1 Part 7 - Applicable tests/requirements

All the tests detailed in document STS531- 7 apply with respect to compliance.

4.3.8 Part 8 (CB8)

This part applies to an entity type H STS product. An example of this product type would include but is not limited to:

- A security module responsible for the secure generation of STS tokens.

4.3.8.1 Part 8 - Applicable tests/requirements

All the tests detailed in document STS531-8-2, and STS531-8-3 apply with respect to compliance.

All HSM devices must conform to the requirements of the STS600-10-1 HSM requirements Specification. Supporting documents shall be submitted to the certification body to verify such compliance.

4.3.9 Part 9 (CB9)

This part applies to a combined entity type A and entity type B STS product. Examples of this product type would include but are not limited to:

- An integrated point of sale system capable of generating encoded tokens for multiple token carrier types in a stand-alone environment.
- A vending system comprising client point-of-sale terminal together with the remote online transaction server.

4.3.9.1 Part 9 - Applicable tests/requirements

All the tests detailed in documents STS531-1-0-04, STS531-1-1-04, STS531-2-1 apply with respect to compliance.

4.3.10 Part 10 (CB10)

This part applies to a combined entity type A, entity type B and entity type C STS product. An example of this product type would include but is not limited to:

- An active token carrier that generates tokens and carries them to the meter.

4.3.10.1 Part 10 - Applicable tests/requirements

All the tests detailed in documents STS531-1-0-04, STS531-1-1-04, STS531-2-1 and STS531-3 apply with respect to compliance.

4.3.11 Part 11 (CB11)

This part applies to a combined entity type D and entity type E STS product. An example of this product type would include but is not limited to:

- A token reader with integrated token decoder.

4.3.11.1 Part 11 - Applicable tests/requirements

All the tests detailed in documents STS531-4 and STS531-5-0 apply with respect to compliance.

4.3.12 Part 12 (CB12)

This part applies to a combined entity type E and entity type F STS product. An example of this product type would include but is not limited to:

- The metering part of a two-part prepayment meter.

4.3.12.1 Part 12 - Applicable tests/requirements

All the tests detailed in documents STS531-5, and STS531-6-1-07 or STS531-6-1-11 apply with respect to compliance.

4.3.13 Part 13 (CB13)

This part applies to a combined entity type D, entity type E and entity type F STS product. An example of this product type would include but is not limited to:

- An integrated prepayment meter.

4.3.13.1 Part 13 Applicable tests/requirements

All the tests detailed in documents STS531-4, STS531-5, and STS531-6-1-07 or STS531-6-1-11 apply with respect to compliance.

4.3.14 Part 14 (CB14)

This part applies to a combined entity type I STS product. An example of this product type would include but is not limited to:

- An integrated prepayment meter with direct connection.

4.3.14.1 Part 14 Applicable tests/requirements

All the tests detailed in documents STS531-9-1-07 and STS531-9-1-11 apply with respect to compliance.

4.3.15 Part 15 (CB15)

This part applies to an entity type H1 product with a wrapper (possibly a service) to handle all the communications protocols to a security module. An example of this product type would include but is not limited to:

- A token server with integrated security module used by a POS to generate tokens but not having its own database.

4.3.15.1 Part 15 Applicable tests/requirements

All the tests detailed in document STS531-10-04, 4, STS531-10-1-04 apply with respect to compliance.

4.3.16 Part 16 (CB16)

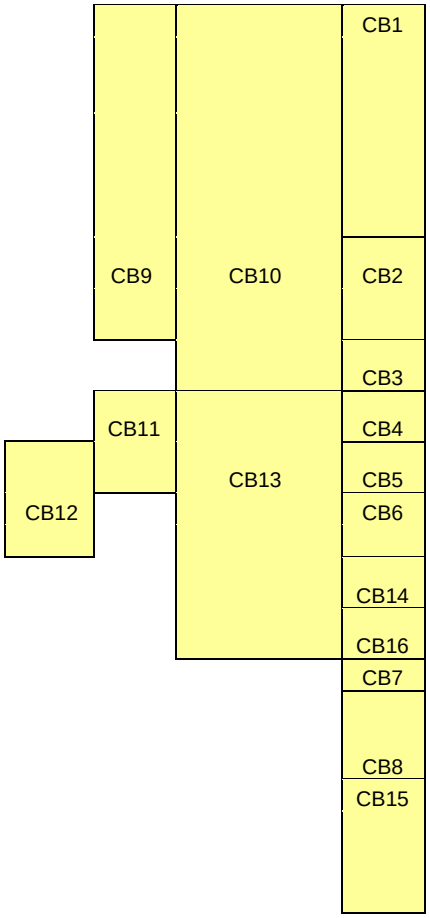
This part applies to a combined entity type J STS product. An example of this product type would include but is not limited to:

- An integrated prepayment meter with direct connection using DLMS.

4.3.16.1 Part 16 Applicable tests/requirements

All the tests detailed in documents STS531-9-3-07 and STS531-9-3-11 apply with respect to compliance.

5 Annexure A – Conformance Blocks



document number	content class	content type
STS531-0	Quality plan	for compliance testing of payment meters and point of sale equipment
STS531-1-0-02	EntityType A	deprecated on publication of this document
STS531-1-0-04	EntityType A	Entity Type A - POSToTokenCarrierInterface application layer protocol for POS devices supporting DKGA=04/EA=11, and DKGA=04/EA=07.
STS531-1-1-04	EntityType A	Standard Transfer Specification- Compliance Test Specification - Entity Type A - POSToTokenCarrierInterface application layer protocol for POS devices supporting DKGA=04/EA=07
STS531-2-1	EntityType B	POSToTokenCarrierInterface physical layer protocol for TCT = 01 and TCT=02
STS531-2-2	EntityType B	POSToTokenCarrierInterface physical layer protocol (TCT = 08)
STS531-3	EntityType C	Token carrier: Magnetic card token carrier for TCT = 01, Keypad for TCT=02
STS531-4	EntityType D	TokenCarriertoMeterInterface physical layer protocol for TCT=01 and TCT=02
STS531-5-0	EntityType E	TokenCarriertoMeterInterface application layer protocol for TCT=01 and TCT=02
STS531-6-1-07	EntityType F	MeterApplicationProcess for EA=07
STS531-6-1-11	EntityType F	MeterApplicationProcess for EA=11
STS531-9-1-07, STS531-9-1-11	EntityType I	Physical layer protocol for a two-way virtual token carrier
STS531-9-3-07, STS531-9-3-11	EntityType J	Physical layer protocol for a two-way virtual token carrier using DLMS
STS531-7	EntityType G	KeyManagementSystem
STS531-8-6 STS531-8-2 STS531-8-3 STS600-10-1	EntityType H	Security Module
STS531-10-02	EntityType H1	deprecated on publication of this document
STS531-10-04	EntityType H1	Security Module to POS interface for DKGA=04 - adaptation layer protocol
STS531-10-1-04	EntityType H1	Security Module to POS interface for DKGA=04 and EA07 - adaptation layer protocol

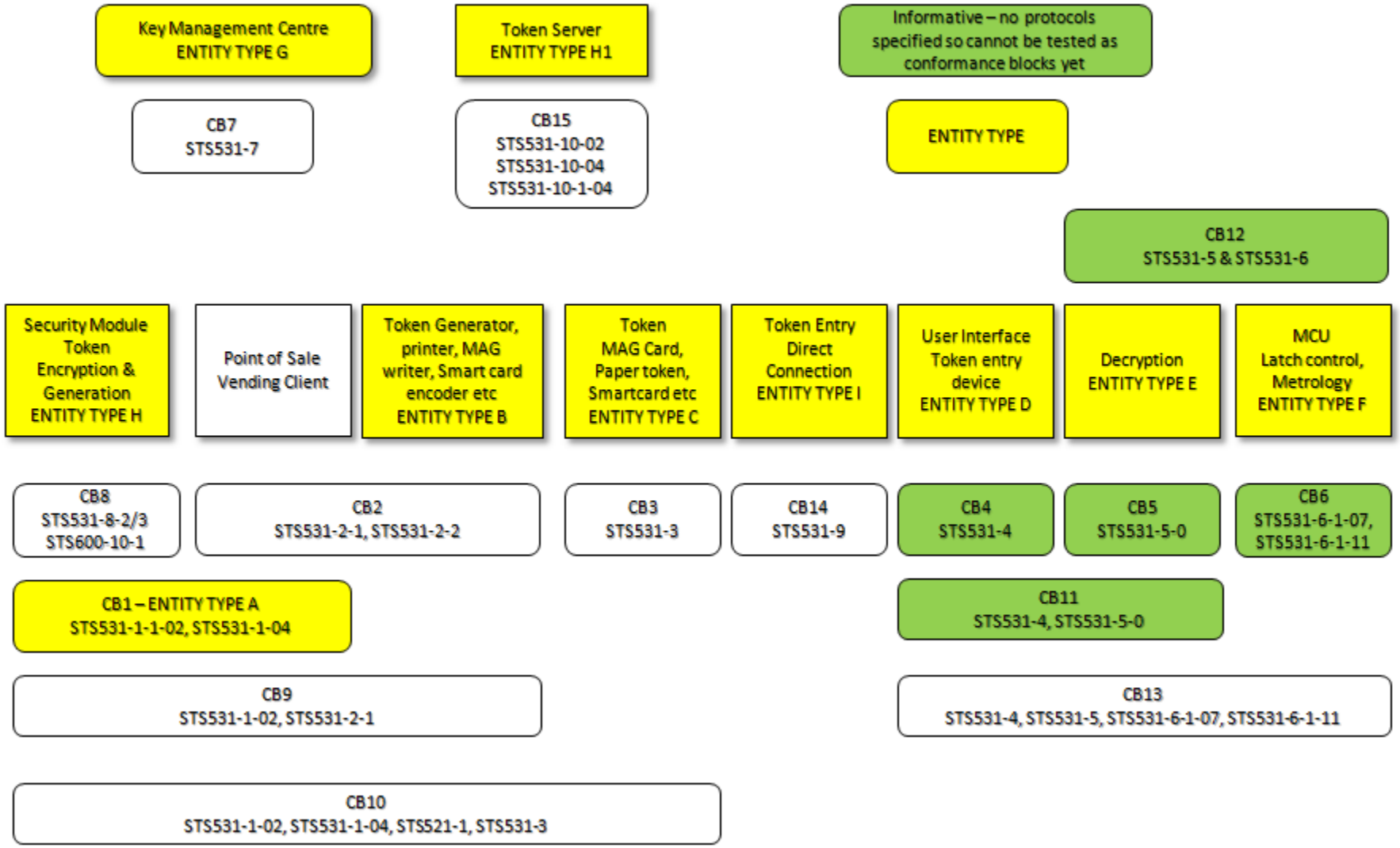
Entity types

EntityType A	Part of POS that generates the token
EntityType B	Part of POS that encodes the token onto the token carrier
EntityType C	Physical token carrier
EntityType D	Part of payment meter that reads the token from the token carrier
EntityType E	Part of payment meter that decrypts and decodes the token from the read token data
EntityType F	Part of payment meter that executes the token instruction
EntityType G	Part of the payment system infrastructure that generates, stores and distibutes cryptographic keys
EntityType H	Part of the payment system infrastructure that encrypts tokens
EntityType H1	Part of the payment system infrastructure that generates tokens
Entity Type I	Part of the payment system that allows direct connection from the POS to the payment meter via an interface using Type A or Type B connections
Entity Type J	Part of the payment system that allows direct connection from the POS to the payment meter via an interface using DLMS

Conformance blocks	examples
CB1	a token generator without token carrier encoding
CB2	a POS online client with token carrier encoding
CB3	a magnetic card

CB4	a split meter installation with a passive CIU, with a token reader, without keys, without algorithms
CB5	a split meter installation with an active CIU, with a token reader, with keys, with algorithms
CB6	a split meter installation with an active MCU where the token instruction is executed
CB7	KMC with 12distributed secure modules installed at multiple POS terminals
CB8	Secure module
CB9	a POS with integrated token generation, with token carrier encoding
CB10	an active token carrier (such as a Dallas button) that generates tokens and carries the token to the meter
CB11	a split meter installation with CIU having integrated token reader and decryption and keys
CB12	a split meter installation without CIU, with decryption
CB13	a single part payment meter with integrated token reader, with decryption, with keys, with token instruction execution
CB14	Direct connection to a single or multipart payment meter with decryption, with keys, with token instruction execution using Port Type A or Port Type B
CB15	A secure module service (server) that accepts token requests from a POS device and generates tokens
CB16	Direct connection to a single or multipart payment meter with decryption, with keys, with token instruction execution using DLMS

CTS Conformance Blocks



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IEC 62051 - *ELECTRICITY METERING – Glossary of terms*

IEC 62055-31 - *ELECTRICITY METERING – PAYMENT SYSTEMS – Part 31: Particular requirements – Static payment meters for active energy (classes 1 and 2)*

STS 101-1 - *INTERFACE SPECIFICATION – Physical Layer Mechanical and Electrical Interface for Virtual Token Carriers*

STS201-1 - *COMPANION SPECIFICATION - Generic classes for meter function objects*

STS 201-15-1-1 *COMPANION SPECIFICATION – Meter function object: RegisterTable for payment meters*