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Technical Specification

Smart Cards;
Test specification for the
Single Wire Protocol (SWP) interface;
Part 2: UICC features
(Release 10)

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The present document is part 2 of a multi-part deliverable covering the Test specification for the Single Wire Protocol (SWP) interface, as identified below:

Part 1: "Terminal features";

Part 2: "UICC features".

Introduction

The present document defines test cases for the UICC relating to Single Wire Protocol (SWP). SWP is the communication interface between the UICC and a contactless frontend (CLF) as specified in TS 102 613 [1].

The aim of the present document is to ensure interoperability between the terminal and the UICC independently of the respective manufacturer, card issuer or operator.

1 Scope

The present document covers the minimum characteristics which are considered necessary for the UICC in order to provide compliance to TS 102 613 [1].

The present document specifies the test cases for:

- the physical layer of the interface CLF - UICC;
- the electrical interface of the UICC;
- the initial communication establishment CLF - UICC;
- the data link layer.

Test cases for the terminal relating to TS 102 613 [1] and test cases for the host controller interface (HCI) covering both terminal and UICC are out of scope of the present document.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 102 613: "Smart Cards; UICC - Contactless Front-end (CLF) Interface; Part 1: Physical and data link layer characteristics.

[2] ETSI TS 102 221: "Smart Cards; UICC-Terminal interface; Physical and logical characteristics".

[3] ETSI TS 102 600: "Smart Cards; UICC-Terminal interface; Characteristics of the USB interface".

[4] ETSI TS 102 622: " Smart Cards; UICC - Contactless Front-end (CLF) Interface; Host Controller Interface (HCI)".

[5] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[6] ISO/IEC 14443-3: "Identification cards - Contactless integrated circuit cards - Proximity cards - Part 3: Initialization and anticollision".

[7] Void.

[8] ISO/IEC 18092: "Information technology - Telecommunications and information exchange between systems - Near Field Communication - Interface and Protocol (NFCIP-1)".

[9] ISO/IEC 13239: "Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 102 613 [1] and the following apply:

corrupted frame: SWP frame which is well-formed with respect to the MAC layer, with the exception that the CRC16 in the frame does not match with the CRC16 result calculated over the payload

NOTE: This frame has at least 1 byte payload. Used by the TE to represent the situation where the DUT receives a corrupted frame (unless otherwise specified).

Non-occurrence RQ: RQ which has been extracted from TS 102 613 [1], but which indicates a situation which should never occur

NOTE: The consequence is that such RQs cannot be explicitly tested.

Nomenclature used for tests involving SHDLC LLC:

For SHDLC link establishment, following definitions apply:

- Terminal simulator transmits RSET:
  - RSET(): RSET frame without payload.
  - RSET(Ws=w): RSET frame with one byte payload.
  - RSET(Ws=w, SREJ=S): RSET frame with two bytes payload. For the endpoint capabilities byte, SREJ=0 represents the value 0x00, SREJ=1 represents the value 0x01.
- UICC transmits RSET:
  - RSET: RSET frame with any valid payload.
  - RSET(): RSET frame without payload.
  - RSET(Ws=w): RSET frame with one byte payload.
  - RSET(Ws=w, SREJ=S): RSET frame with two bytes payload. For the endpoint capabilities byte, SREJ=0 represents the value 0x00, SREJ=1 represents the value 0x01.

For every calculation on NS0_T, NS0_S or NR in the test procedures use modulo 8.

Representative SWP frame exchange procedure: sequence of SWP frames exchanged between TE and DUT

NOTE: Used by the TE to cause SWP communication traffic where needed in test procedures. This sequence shall provide the following characteristics, unless otherwise specified or more precisely stated in test procedures:

- Amount of data exchanged between TE and DUT at least 500 byte (with respect to the MAC layer), valid for both directions.
- Some half-duplex SWP communication.
- Some full-duplex SWP communication.
- Frame transmission started by the TE while the DUT yet sends a frame.
- Exchanged data shall enforce occurrence of some bit stuffing in both directions.
- Some variation of frame length sent from the TE.

The DUT provider shall provide sufficient information to allow this procedure to be defined.

Representative USB frame exchange procedure: sequence of USB frames exchanged between TE and DUT

NOTE: Used by the TE to cause USB communication traffic where needed in test procedures.

User: logical or physical entity which controls the test equipment in a way that it is able to trigger activities of the DUT

3.2 Symbols

For the purposes of the present document, the symbols given in TS 102 613 [1] and the following apply:

The characters x, y, z represent any values for the current test, unless otherwise specified.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TS 102 613 [1] and the following apply:

AC	Alternating Current
CLK	ClocK
CLT	ContactLess Tunnelling
CRC	Cyclic Redundancy Code
DUT	Device Under Test
ES	SHDLC endpoint of test equipment (i.e. the terminal simulator)
EUT	SHDLC Endpoint Under Test (i.e. the DUT)
FFS	For Further Study
GND	GrouND
ISO	International Organization for Standardization
NR	Number of next information frame to Receive
RF	Radio Frequency
RNR	Receive Not Ready
RQ	Conformance requirement
RR	Receive Ready
RSET	ReSET
RST	ReSeT
SDL	Specification and Description Language
SHDLC	Simplified High Level Data Link Control
SREJ	Selective Reject
SWIO	Single Wire protocol Input/Output
SWP	Single Wire Protocol
T	Terminal, i.e. the terminal simulator (shortcut used only in test procedure tables)
TE	Test Equipment
UA	Unnumbered Acknowledgment
WS	Window Size