



**Smart Cards;
Test specification for the
Single Wire Protocol (SWP) interface;
Part 1: Terminal features
(Release 10)**

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Contents

Intellectual Property Rights	9
Foreword.....	9
Modal verbs terminology.....	9
Introduction	10
1 Scope	11
2 References	11
2.1 Normative references	11
2.2 Informative references.....	12
3 Definitions, symbols and abbreviations	12
3.1 Definitions	12
3.2 Symbols.....	13
3.3 Abbreviations	13
3.4 Formats.....	14
3.4.1 Format of the table of optional features.....	14
3.4.2 Format of the applicability table	14
3.4.3 Status and Notations	15
4 Test environment.....	16
4.1 Table of optional features.....	16
4.2 Applicability table	17
4.3 Information provided by the device supplier.....	21
4.4 Test equipment	21
4.4.1 Measurement/setting uncertainties.....	22
4.4.2 Default conditions for DUT operation.....	22
4.4.2.1 Temperature	23
4.4.2.2 ETSI TS 102 221 interface contacts (CLK, RST, I/O) and contact Vcc	23
4.4.2.3 ETSI TS 102 600 interface contacts (IC_DP, IC_DM).....	23
4.4.2.4 ETSI TS 102 613 interface contact (SWIO).....	23
4.4.2.5 Status of UICC interfaces.....	23
4.4.2.6 Characteristics of LLC's	23
4.4.2.6.1 ACT LLC	23
4.4.2.6.2 SHDLC LLC	24
4.4.2.6.3 CLT LLC.....	24
4.4.3 Minimum/maximum conditions for DUT operation.....	24
4.4.4 Execution requirements	24
4.4.4.1 Definition of TR1	24
4.4.4.2 Definition of TR2.....	24
4.5 Test execution	25
4.5.1 Parameter variations	25
4.5.2 Execution requirements	25
4.6 Pass criterion	26
5 Test cases.....	26
5.1 Principle of the Single Wire Protocol.....	26
5.2 System architecture	26
5.2.1 General overview	26
5.2.2 ETSI TS 102 221 support	26
5.2.2.1 Conformance requirements	26
5.2.3 Configurations	27
5.2.3.1 Conformance requirements	27
5.2.4 Interaction with other interfaces	27
5.2.4.1 Conformance requirements	27
5.3 Physical characteristics.....	27
5.3.1 Temperature range for card operations	27

5.3.1.1	Conformance requirements	27
5.3.2	Contacts	27
5.3.2.1	Provision of contacts	27
5.3.2.1.1	Conformance requirements.....	27
5.3.2.2	Contact activation and deactivation	28
5.3.2.2.1	Conformance requirements.....	28
5.3.2.2.2	Test case 1: activation of SWP additionally to other interfaces	28
5.3.2.2.3	Test case 2: activation of SWP in low power mode	29
5.3.2.3	Interface activation.....	29
5.3.2.3.1	Conformance requirements.....	29
5.3.2.3.2	Test case 1: SWP initial activation in full power mode - normal procedure	32
5.3.2.3.3	Test case 2: SWP Initial activation - no resume	32
5.3.2.3.4	Test case 3: SWP initial activation in full power mode - corrupted ACT_SYNC frame (repeat the last frame).....	32
5.3.2.3.5	Test case 4: SWP initial activation in full power mode - no ACT_SYNC frame (repeat the last frame).....	33
5.3.2.3.6	Test case 5: SWP initial activation failed in full power mode - corrupted ACT_SYNC frame (multiple).....	33
5.3.2.3.7	Test case 6: SWP initial activation failed in full power mode - no ACT_SYNC frame (multiple).....	34
5.3.2.3.8	Test case 7: SWP Initial activation in full power mode - corrupted ACT_READY frame (repeat last frame).....	35
5.3.2.3.9	Void.....	35
5.3.2.3.9a	Test case 8a: SWP Initial activation in full power mode - no ACT_READY frame (repeat last frame)	35
5.3.2.3.10	Test case 9: SWP initial activation failed in full power mode - corrupted ACT_READY frame (multiple).....	36
5.3.2.3.11	Test case 10: SWP initial activation failed in full power mode - no ACT_READY frame (multiple).....	37
5.3.2.3.12	Test case 11: SWP initial activation in low power mode	37
5.3.2.3.13	Test case 12:SWP initial activation in low power mode - corrupted ACT_SYNC frame (repeat the last frame).....	38
5.3.2.3.14	Test case 13: SWP initial activation in low power mode - no ACT_SYNC frame (repeat the last frame).....	38
5.3.2.3.15	Test case 14: SWP initial activation failed in low power mode - corrupted ACT_SYNC frame (multiple).....	39
5.3.2.3.16	Test case 15: SWP initial activation failed in low power mode - no ACT_SYNC frame (multiple).....	40
5.3.2.3.17	Test case 16: SWP subsequent activation in full power mode	40
5.3.2.3.18	Void.....	41
5.3.2.3.19	Test case 18: SWP initial activation in full power mode - send ACT frames in wrong order, ACT_READY frame after activation (repeat the last frame)	41
5.3.2.4	Behavior of a UICC in a terminal not supporting SWP	41
5.3.2.4.1	Conformance requirements.....	41
5.3.2.5	Behavior of terminal connected to a UICC not supporting SWP.....	42
5.3.2.5.1	Conformance requirements.....	42
5.3.2.5.2	Void.....	42
5.3.2.6	Inactive contacts.....	42
5.3.2.6.1	Conformance requirements.....	42
5.4	Electrical characteristics	42
5.4.1	Operating conditions and sub-clauses.....	42
5.4.1.1	Operating conditions	42
5.4.1.2	Supply voltage classes.....	42
5.4.1.3	V _{CC} (C1) low power mode definition.....	42
5.4.1.3.1	Conformance requirements.....	42
5.4.1.3.2	Test case 1: current provided in low power mode, no spikes	43
5.4.1.3.3	Test case 2: current provided in low power mode, with spikes	43
5.4.1.4	Signal S1	45
5.4.1.4.1	Conformance requirements.....	45
5.4.1.4.2	Test case 1: communication with S2 variation in full power mode.....	45
5.4.1.4.3	Test case 2: communication with S2 variation in low power mode	46
5.4.1.5	Signal S2 and subclauses	46

5.4.1.5.1	Signal S2.....	46
5.4.1.5.2	Operating current for S2.....	46
5.5	Physical transmission layer	48
5.5.1	S1 Bit coding and sampling time	48
5.5.1.1	Conformance requirements	48
5.5.1.2	Test case 1: S1 waveforms, default bit duration.....	48
5.5.1.2.1	Test execution.....	48
5.5.1.2.2	Initial conditions	49
5.5.1.2.3	Test procedure	49
5.5.1.3	Test case 2: S1 waveforms, extended bit durations.....	49
5.5.1.3.1	Test execution.....	49
5.5.1.3.2	Initial conditions	49
5.5.1.3.3	Test procedure	50
5.5.2	S2 switching management	50
5.5.2.1	Conformance requirements	50
5.5.3	SWP interface states management	51
5.5.3.1	Conformance requirements	51
5.5.3.2	Test case 1: SWP states and transitions, communication.....	51
5.5.3.2.1	Test execution.....	51
5.5.3.2.2	Initial conditions	52
5.5.3.2.3	Test procedure	52
5.5.3.3	Test Case 2: SWP resume after upper layer indication that the UICC requires no more activity on this interface	52
5.5.3.3.1	Test execution.....	52
5.5.3.3.2	Initial Conditions	52
5.5.3.3.3	Test procedure	53
5.5.4	Power mode states/transitions and Power saving mode.....	53
5.5.4.1	Conformance requirements	53
5.5.4.2	Test case 1: power provided in full power mode.....	53
5.5.4.2.1	Test execution.....	53
5.5.4.2.2	Initial conditions	53
5.5.4.2.3	Test procedure	54
5.5.4.3	Test case 2: switching from full to low power mode	54
5.5.4.3.1	Test execution.....	54
5.5.4.3.2	Initial conditions	54
5.5.4.3.3	Test procedure	54
5.5.4.4	Test case 3: switching from low to full power mode	54
5.5.4.4.1	Test execution.....	54
5.5.4.4.2	Initial conditions	54
5.5.4.4.3	Test procedure	55
5.6	Data link layer	55
5.6.1	Overview	55
5.6.2	Medium Access Control (MAC) layer.....	55
5.6.2.1	Bit order	55
5.6.2.1.1	Conformance requirements.....	55
5.6.2.2	Structure	55
5.6.2.2.1	Conformance requirements.....	55
5.6.2.2.2	Test case 1: interpretation of incorrectly formed frames - SHDLC RSET frames	56
5.6.2.2.3	Test case 2: interpretation of incorrectly formed frames - SHDLC I-frames	56
5.6.2.3	Bit stuffing	57
5.6.2.3.1	Conformance requirements.....	57
5.6.2.3.2	Test case 1: behavior of CLF with bit stuffing in frame.....	57
5.6.2.4	Error detection.....	57
5.6.2.4.1	Conformance requirements.....	57
5.6.3	Supported LLC layers and sub clauses	58
5.6.3.1	Supported LLC layers	58
5.6.3.1.1	Conformance requirements.....	58
5.6.3.2	Interworking of the LLC layers.....	58
5.6.3.2.1	Conformance requirements.....	58
5.6.3.2.2	Test case 1: ignore ACT LLC frame reception after the SHDLC link establishment	58
5.6.3.2.3	Test case 2: ignore ACT LLC frame reception in CLT session.....	59
5.6.3.2.4	Test case 3: CLT session during SHDLC communication	59

5.6.3.2.5	Test case 4: closing condition of CLT session whereas SHDLC link has been established before CLT session.....	59
5.6.4	ACT LLC definition and sub clauses.....	60
5.6.4.1	ACT LLC definition.....	60
5.6.4.1.1	Conformance requirements.....	60
5.6.4.2	SYNC_ID verification process.....	60
5.6.4.2.1	Conformance requirements.....	60
5.6.4.2.2	Test case 1: not matching SYNC_ID verification in low power mode.....	60
5.7	SHDLC LLC definition.....	61
5.7.1	SHDLC overview	61
5.7.1.1	Conformance requirements	61
5.7.1.2	Test Case 1: data passed up to the next layer	61
5.7.1.2.1	Test execution.....	61
5.7.1.2.2	Initial conditions	61
5.7.1.2.3	Test procedure	61
5.7.1.3	Test Case 2: error management - corrupted I-frame	61
5.7.1.3.1	Test execution.....	61
5.7.1.3.2	Initial Conditions	62
5.7.1.3.3	Test procedure	62
5.7.1.4	Test Case 3: error management - corrupted RR frame	62
5.7.1.4.1	Test execution.....	62
5.7.1.4.2	Initial Conditions	62
5.7.1.4.3	Test procedure	62
5.7.2	Endpoints	62
5.7.2.1	Conformance requirements	62
5.7.3	SHDLC frames types.....	62
5.7.3.1	Conformance requirements	62
5.7.4	Control Field.....	62
5.7.4.1	Conformance requirements	62
5.7.4.2	I-Frames coding	63
5.7.4.2.1	Conformance requirements	63
5.7.4.3	S-Frames coding	63
5.7.4.3.1	Conformance requirements.....	63
5.7.4.4	U-Frames coding.....	63
5.7.4.4.1	Conformance requirements.....	63
5.7.5	Changing sliding window size and endpoint capabilities	63
5.7.5.1	Conformance requirements	63
5.7.5.2	RSET frame payload	63
5.7.5.2.1	Conformance requirements.....	63
5.7.5.3	UA frame payload	63
5.7.5.3.1	Conformance requirements.....	63
5.7.6	SHDLC context	64
5.7.6.1	Conformance requirements	64
5.7.6.2	Constants	64
5.7.6.2.1	Conformance requirements.....	64
5.7.6.3	Variables	64
5.7.6.3.1	Conformance requirements.....	64
5.7.6.4	Initial Reset state	64
5.7.6.4.1	Conformance requirements.....	64
5.7.6.4.2	Test case 1: initial state at link reset - reset by the UICC	64
5.7.7	SHDLC sequence of frames.....	65
5.7.7.1	Conformance requirements	65
5.7.7.2	Nomenclature	65
5.7.7.2.1	Conformance requirements.....	65
5.7.7.3	Link establishment with default sliding window size	66
5.7.7.3.1	Conformance requirements.....	66
5.7.7.3.2	Test Case 1: link establishment by the UICC	66
5.7.7.3.3	Test case 2: Link establishment and connection time out.....	67
5.7.7.3.4	Test Case 3: requesting unsupported window size and/or SREJ support - link establishment by UICC	68
5.7.7.3.5	Test Case 4: forcing lower window size and SREJ not used - link establishment by the T	68
5.7.7.3.6	Test case 5: discard buffered frames on link re-establishment	69

5.7.7.4	Link establishment with custom sliding window size	69
5.7.7.4.1	Conformance requirements	69
5.7.7.5	Data flow	70
5.7.7.5.1	Conformance requirements	70
5.7.7.5.2	Test case 1: I-frame transmission	70
5.7.7.5.3	Test case 2: I-frame reception - single I-Frame reception	70
5.7.7.5.4	Test case 3: I-frame reception - multiple I-Frame reception	71
5.7.7.6	Reject (go N back)	71
5.7.7.6.1	Conformance requirements	71
5.7.7.6.2	Test case 1: REJ transmission - multiple I-frames received	72
5.7.7.6.3	Test case 2: REJ reception	72
5.7.7.7	Last Frame Loss	73
5.7.7.7.1	Conformance requirements	73
5.7.7.7.2	Test Case 1: retransmission of multiple frames	73
5.7.7.8	Receive and not ready	73
5.7.7.8.1	Conformance requirements	73
5.7.7.8.2	Test case 1: RNR reception	74
5.7.7.8.3	Test case 2: Empty I-frame transmission	74
5.7.7.9	Selective reject	75
5.7.7.9.1	Conformance requirements	75
5.7.7.9.2	Test case 1: SREJ transmission	75
5.7.7.9.3	Test case 2: SREJ transmission - multiple I-frames received	75
5.7.7.9.4	Test case 3: SREJ reception	75
5.7.7.9.5	Void	76
5.7.8	Implementation	76
5.7.8.1	Conformance requirements	76
5.7.8.2	Information Frame emission	76
5.7.8.2.1	Conformance requirements	76
5.7.8.3	Information Frame reception	76
5.7.8.3.1	Conformance requirements	76
5.7.8.4	Reception Ready Frame reception	76
5.7.8.4.1	Conformance requirements	76
5.7.8.5	Reject Frame reception	77
5.7.8.5.1	Conformance requirements	77
5.7.8.6	Selective Reject Frame reception	77
5.7.8.6.1	Conformance requirements	77
5.7.8.7	Acknowledge timeout	77
5.7.8.7.1	Conformance requirements	77
5.7.8.8	Guarding/transmit timeout	77
5.7.8.8.1	Conformance requirements	77
5.8	CLT LLC definition	77
5.8.1	System Assumptions	77
5.8.2	Overview	77
5.8.2.1	Conformance requirements	77
5.8.3	Supported RF protocols	78
5.8.3.1	Conformance requirements	78
5.8.4	CLT Frame Format	78
5.8.4.1	Conformance requirements	78
5.8.5	CLT Command Set	78
5.8.5.1	Conformance requirements	78
5.8.5.2	Test case 1: ISO/IEC 14443-3 Type A, no administrative command	78
5.8.5.2.1	Test execution	79
5.8.5.2.2	Initial conditions	79
5.8.5.2.3	Test procedure	79
5.8.6	CLT Frame Interpretation	79
5.8.6.1	CLT frames with Type A aligned DATA_FIELD	79
5.8.6.1.1	Conformance requirements	79
5.8.6.2	Handling of DATA_FIELD by the CLF	79
5.8.6.2.1	Conformance requirements	79
5.8.6.3	Handling of ADMIN_FIELD	80
5.8.6.3.1	CL_PROTO_INF(A)	80
5.8.6.3.2	CL_PROTO_INF(F)	81

5.8.6.3.3	CL_GOTO_INIT and CL_GOTO_HALT.....	86
5.8.7	CLT Protocol Rules	86
5.8.7.1	Rules for the CLF.....	86
5.8.7.1.1	Conformance requirements.....	86
5.8.7.2	Rules for the UICC.....	86
5.9	Timing and performance	86
5.9.1	SHDLC Data transmission mode.....	86
5.9.1.1	CLF processing delay when receiving data over an RF-link.....	86
5.9.1.1.1	Conformance requirements.....	86
5.9.1.2	CLF processing delay when sending data over an RF-link	87
5.9.1.2.1	Conformance requirements.....	87
5.9.1.2.2	Test case 1: Transceiving non-chained data over RF in Card Emulation	87
5.9.2	CLT data transmission mode for ISO/IEC 14443-3 Type A	88
5.9.2.1	CLF processing delay (three subclauses)	88
5.9.2.1.1	Conformance requirements.....	88
5.9.2.1.2	Test case 1: CLF processing time - Type A aligned communication, with RF response	89
5.9.2.1.3	Test case 2: CLF processing time, no RF response	90
5.9.2.2	Timing value for the CLF processing delay (Request Guard Time)	91
5.9.2.2.1	Conformance requirements.....	91
5.9.2.2.2	Test case 1: CLF processing time, Request Guard Time from IDLE state - Type A state transition	92
5.9.2.2.3	Test case y: CLF processing time, Request Guard Time from HALT state- Type A state transition	93
5.9.3	CLT data transmission mode for ISO/IEC 18092 212 kbps/424 kbps passive mode	94
Annex A:	Void	95
Annex B (informative):	Core specification version information.....	96
Annex C (informative):	Change history	97
History		99

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The present document is part 1 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".

Modal verbs terminology

In the present document **"shall"**, **"shall not"**, **"should"**, **"should not"**, **"may"**, **"may not"**, **"need"**, **"need not"**, **"will"**, **"will not"**, **"can"** and **"cannot"** are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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Introduction

The present document defines test cases for the terminal relating to Single Wire Protocol (SWP). SWP is the communication interface between the UICC and a contactless frontend (CLF) as specified in ETSI 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.

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1 Scope

The present document covers the minimum characteristics which are considered necessary for the terminal in order to provide compliance to ETSI 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 CLF;
- the initial communication establishment CLF - UICC;
- the data link layer.

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

2 References

2.1 Normative 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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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 14443-3: "Identification cards -- Contactless integrated circuit cards -- Proximity cards -- Part 3: Initialization and anticollision".
- [6] ISO/IEC 14443-4: "Identification cards -- Contactless integrated circuit cards -- Proximity cards -- Part 4: Transmission protocol".
- [7] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".
- [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".
- [10] ISO/IEC 14443-2: "Identification cards -- Contactless integrated circuit cards -- Proximity cards -- Part 2: Radio frequency power and signal interface".

2.2 Informative references

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Not applicable.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions apply given in ETSI 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).

nomenclature used for tests involving SHDLC LLC:

For SHDLC link establishment, following definitions apply:

- ES transmits RSET:
 - RSET(): RSET frame without payload.
 - RSET($W_s=w$): RSET frame with one byte payload.
 - RSET($W_s=w$, 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.
- ES receives RSET:
 - RSET: RSET frame with any valid payload.
 - RSET(): RSET frame without payload.
 - RSET($W_s=w$): RSET frame with one byte payload.
 - RSET($W_s=w$, 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.

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

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

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: describes any 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 ETSI 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 ETSI TS 102 613 [1] and the following apply:

(U)SIM	Universal Subscriber Identity Module
ACT	ACTivation protocol
CLF	ContactLess Frontend
CLT	ContactLess Tunnelling
CRC	Cyclic Redundancy Code
DUT	Device under test
ES	SHDLC endpoint of test equipment (i.e. the UICC simulator)
FFS	For further study
FSC	Frame Size for proximity Card
HCI	Host Controller Interface
HCP	Host Controller Protocol
LLC	Logical Link Control
NAA	Network Access Application
NR	Number of next information frame to Receive
NS	Number of next information frame to Send
PCD	Proximity Coupling Device
RQ	Conformance requirement
SHDLC	Simplified High Level Data Link Control
SWIO	Single Wire protocol Input/Output
SWP	Single Wire Protocol