



**Smart Cards;  
Test specification for the  
Single Wire Protocol (SWP) interface;  
Part 2: UICC features  
(Release 9)**

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Smart Card Platform (SCP).

The contents of the present document are subject to continuing work within TC SCP and may change following formal TC SCP approval. If TC SCP modifies the contents of the present document, it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

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- Y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- Z the third digit is incremented when editorial only changes have been incorporated in the document.

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.

- In the case of a reference to a TC SCP document, a non specific reference implicitly refers to the latest version of that document in the same Release as the present document.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

## 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(s) 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:

- ES transmits RSET:
  - RSET(): RSET frame without payload.
  - RSET(W<sub>s</sub>=w): RSET frame with one byte payload.
  - RSET(W<sub>s</sub>=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.
- EUT transmits RSET:
  - RSET: RSET frame with any valid payload.
  - RSET(): RSET frame without payload.
  - RSET(W<sub>s</sub>=w): RSET frame with one byte payload.
  - RSET(W<sub>s</sub>=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  |
| 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 TS  |
| WS    | Window Size   |

## 3.4 Formats

### 3.4.1 Format of the table of optional features

The columns in table 4.1 have the following meaning.

| Column    | Meaning  |
|-----------|--|
| Option:   | The optional feature supported or not by the implementation.   |
| Status:   | See clause 3.4.3, 'Status and Notations'.  |
| Support:  | The support columns shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [5], are used for the support column in table 4.1. <ul style="list-style-type: none"> <li>• Y or y supported by the implementation;</li> <li>• N or n not supported by the implementation;</li> <li>• N/A, n/a or - no answer required (allowed only if the status is N/A, directly or after evaluation of a conditional status).</li> </ul> |
| Mnemonic: | The mnemonic column contains mnemonic identifiers for each item.   |

### 3.4.2 Format of the applicability table

The applicability of every test in table 4.2 a) is formally expressed by the use of Boolean expression defined in the following clause.

The columns in table 4.2 a) have the following meaning.

| Column       | Meaning  |
|--------------|--|
| Test case:   | The "Test case" column gives a reference to the test case number(s) detailed in the present document and required to validate the implementation of the corresponding item in the "Description" column.  |
| Description: | In the "Description" column a short non-exhaustive description of the requirement is found.  |
| Release:     | The "Release" column gives the Release applicable and onwards, for the item in the "Description" column.   |
| Rel-x UICC:  | For the given Release, the corresponding "Rel-x UICC" column lists the tests required for a UICC to be declared compliant to this Release.   |
| Support:     | The "Support" column is blank in the proforma, and shall be completed by the manufacturer in respect of each particular requirement to indicate the choices, which have been made in the implementation. |

### 3.4.3 Status and Notations

The "Rel-x UICC" columns show the status of the entries as follows:

The following notations, defined in ISO/IEC 9646-7 [5], are used for the status column:

|     |  |
|-----|--|
| M   | mandatory - the capability is required to be supported.  |
| O   | optional - the capability may be supported or not.   |
| N/A | not applicable - in the given context, it is impossible to use the capability.   |
| X   | prohibited (excluded) - there is a requirement not to use this capability in the given context.  |
| O.i | qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies a unique group of related optional items and the logic of their selection which is defined immediately following the table.   |
| Ci  | conditional - the requirement on the capability ("M", "O", "X" or "N/A") depends on the support of other optional or conditional items. "i" is an integer identifying a unique conditional status expression which is defined immediately following the table. For nested conditional expressions, the syntax "IF ... THEN (IF ... THEN ... ELSE...) ELSE ..." shall be used to avoid ambiguities. |

References to items:

For each possible item answer (answer in the support column) there exists a unique reference, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns shall be discriminated by letters (a, b, etc.), respectively.

EXAMPLE: A.1/4 is the reference to the answer of item 4 in table A.1.

## 4 Test environment

### 4.1 Table of optional features

The supplier of the implementation shall state the support of possible options in table 4.1.

**Table 4.1: Options**

| Item | Option                              | Status | Support | Mnemonic     |
|------|-------------------------------------|--------|---------|--------------|
| 1    | Class A on TS 102 221 [2] interface | O      |         | O_CLASS_A    |
| 2    | CLT, ISO/IEC 14443 [6] Type A       | O      |         | O_CLT_A      |
| 3    | CLT, ISO/IEC 18092 [8]              | O      |         | O_CLT_F      |
| 4    | Extended bit durations              | O      |         | O_EXTENDED_T |
| 5    | SREJ                                | O      |         | O_SREJ       |
| 6    | Sliding window size of 3            | O      |         | O_WS_3       |
| 7    | Sliding window size of 4 (see note) | O      |         | O_WS_4       |
| 8    | HCI as per TS 102 622 [4]           | O      |         | O_102_622    |
| 9    | USB as per TS 102 600 [3]           | O      |         | O_102_600    |
| 10   | Void                                |        |         |              |
| 11   | Support of TERMINAL CAPABILITY      | O      |         | O_TERM_CAP   |

NOTE: If the UICC supports O\_WS\_4, then it also shall support O\_WS\_3.

## 4.2 Applicability table

Table 4.2 a) specifies the applicability of each test case to the device under test. See clause 3.4 for the format of table 4.2 a).

**Table 4.2 a): Applicability of tests**

| Test case   | Description   | Release | Rel-7 UICC | Rel-8 UICC | Rel-9 UICC | Support |
|-------------|---|---------|------------|------------|------------|---------|
|             | <b>System architecture tests</b>  |         |            |            |            |         |
| 5.2.3.2     | Global Interface bytes of the ATR   | Rel-7   | M          | M          | M          |         |
| 5.2.3.3     | interaction with TS 102 221 [2] interface - SWP activation while the UICC receives data   | Rel-7   | M          | M          | M          |         |
| 5.2.3.4     | interaction with TS 102 221 [2] interface - SWP activation while the UICC sends data      | Rel-7   | M          | M          | M          |         |
| 5.2.4.2     | interaction with TS 102 221 [2] interface - TS 102 221 [2] clock stop                     | Rel-7   | M          | M          | M          |         |
| 5.2.4.3     | interaction with TS 102 221 [2] interface - TS 102 221 [2] reset                          | Rel-7   | M          | M          | M          |         |
| 5.2.4.4     | interaction with TS 102 221 [2] interface - SWP deactivation while the UICC receives data | Rel-7   | M          | M          | M          |         |
| 5.2.4.5     | interaction with TS 102 221 [2] interface - SWP deactivation while the UICC sends data    | Rel-7   | M          | M          | M          |         |
| 5.2.4.6     | interaction with TS 102 221 [2] interface - reset SWP while the UICC receives data        | Rel-7   | M          | M          | M          |         |
| 5.2.4.7     | interaction with TS 102 221 [2] interface - reset SWP while the UICC sends data           | Rel-7   | M          | M          | M          |         |
|             | <b>Physical characteristics tests</b>   |         |            |            |            |         |
| 5.3.2.3.2   | initial activation in low power mode  | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.3   | initial activation in low power mode with corrupted frames                                | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.4   | no activation   | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.6   | full power mode activation  | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.7   | low power mode activation with re-transmission of ACT_SYNC                                | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.8   | full power mode activation with re-transmission of ACT_SYNC                               | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.10  | low power mode activation with multiple re-transmission of ACT_SYNC                       | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.11  | full power mode activation with re-transmission of ACT_READY                              | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.12  | full power mode activation with multiple re-transmission of ACT_SYNC                      | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.13  | subsequent activation in low power mode   | Rel-7   | M          | M          | M          |         |
| 5.3.2.3.14  | subsequent activation in full power mode  | Rel-7   | M          | M          | M          |         |
| 5.3.2.4.2   | detect terminal not supporting SWP by TERMINAL CAPABILITIES, classes B and C              | Rel-7   | C007       | C007       | C007       |         |
| 5.3.2.4.3   | detect terminal not supporting SWP by TERMINAL CAPABILITIES, class A                      | Rel-7   | C008       | C008       | C008       |         |
|             | <b>Electrical characteristics tests</b>   |         |            |            |            |         |
| 5.4.1.2.2   | TS 102 221 [2] voltage classes B and C support  | Rel-7   | M          | M          | M          |         |
| 5.4.1.3.2   | operation in low power mode   | Rel-7   | M          | M          | M          |         |
| 5.4.1.4.2   | S1 communication in voltage class B   | Rel-7   | M          | M          | M          |         |
| 5.4.1.4.3   | S1 communication in voltage class C, full power mode                                      | Rel-7   | M          | M          | M          |         |
| 5.4.1.4.4   | S1 communication in low power mode  | Rel-7   | M          | M          | M          |         |
| 5.4.1.5.2.2 | S2 communication in voltage class B   | Rel-7   | M          | M          | M          |         |
| 5.4.1.5.2.3 | S2 communication in voltage class C, full power mode                                      | Rel-7   | M          | M          | M          |         |
| 5.4.1.5.2.4 | S2 communication in low power mode  | Rel-7   | M          | M          | M          |         |
|             | <b>Physical transmission layer tests</b>  |         |            |            |            |         |
| 5.5.1.2     | communication with timing variation, default bit duration                                 | Rel-7   | M          | M          | M          |         |
| 5.5.1.3     | communication with timing variation, extended bit duration                                | Rel-7   | C004       | C004       | C004       |         |



| Test case  | Description   | Release | Rel-7 UICC | Rel-8 UICC | Rel-9 UICC | Support |
|------------|---|---------|------------|------------|------------|---------|
| 5.5.1.4    | S1 rise and fall time   | Rel-7   | M          | M          | M          |         |
| 5.5.1.5    | measurement of C6 input capacitance   | Rel-7   | M          | M          | M          |         |
| 5.5.1.6    | communication with variation in bit duration  | Rel-7   | M          | M          | M          |         |
| 5.5.2.2    | S2 switching management   | Rel-7   | M          | M          | M          |         |
| 5.5.3.2    | SWP interface states management by the UICC   | Rel-7   | M          | M          | M          |         |
| 5.5.4.2    | power states in low power mode (ACT_POWER_MODE)   | Rel-7   | M          | M          | M          |         |
| 5.5.4.3    | power states in low power mode (non-ACT)  | Rel-7   | M          | M          | M          |         |
| 5.5.4.4    | power states in full power mode, without TS 102 221 [2]   | Rel-7   | M          | M          | M          |         |
| 5.5.4.5    | power saving mode with TS 102 221 [2] interface - restart TS 102 221 [2] interface first        | Rel-7   | M          | M          | M          |         |
| 5.4.6      | power saving mode with TS 102 221 [2] interface - restart TS 102 613 [1] interface first        | Rel-7   | M          | M          | M          |         |
| 5.5.4.7    | power saving mode with TS 102 600 [3] interface - restart TS 102 600 [3] interface first        | Rel-7   | C005       | C005       | C005       |         |
| 5.5.4.8    | power saving mode with TS 102 600 [3] interface - restart TS 102 613 [1] interface first        | Rel-7   | C005       | C005       | C005       |         |
| 5.5.4.9    | power states in full power mode, with TS 102 221 [2]  | Rel-7   | M          | M          | M          |         |
|            | <b>Data link layer tests</b>  |         |            |            |            |         |
| 5.6.2.2.2  | interpretation of incorrectly formed frames - ACT LLC   | Rel-7   | M          | M          | M          |         |
| 5.6.2.2.3  | interpretation of incorrectly formed frames - SHDLC RSET frames                                 | Rel-7   | M          | M          | M          |         |
| 5.6.2.2.4  | interpretation of incorrectly formed frames - SHDLC I-frames                                    | Rel-7   | M          | M          | M          |         |
| 5.6.2.2.5  | communication with frames - idle bits and wakeup sequence                                       | Rel-7   | M          | M          | M          |         |
| 5.6.2.3.2  | behaviour of UICC with bit stuffing in frame  | Rel-7   | M          | M          | M          |         |
| 5.6.2.4.2  | RSET with CRC error   | Rel-7   | M          | M          | M          |         |
| 5.6.3.1.2  | support of ACT LLC and ACT LPDU structure   | Rel-7   | M          | M          | M          |         |
| 5.6.3.1.3  | support of SHDLC LLC and SHDLC LPDU structure   | Rel-7   | M          | M          | M          |         |
| 5.6.3.2.2  | error handling of ACT LLC on reception of corrupted frame, after SWIO activation                | Rel-7   | M          | M          | M          |         |
| 5.6.3.2.3  | ignore ACT LLC frame reception after the SHDLC link establishment                               | Rel-7   | M          | M          | M          |         |
| 5.6.3.2.4  | ignore ACT LLC frame reception in CLT session   | Rel-7   | C003       | C003       | C003       |         |
| 5.6.3.2.5  | CLT session during SHDLC communication  | Rel-7   | C003       | C003       | C003       |         |
| 5.6.3.2.6  | closing condition of CLT session whereas SHDLC link has been established before CLT session     | Rel-7   | C003       | C003       | C003       |         |
| 5.6.3.2.7  | closing condition of CLT session whereas SHDLC link has not been established before CLT session | Rel-7   | C003       | C003       | C003       |         |
| 5.6.3.2.8  | interpretation of corrupted frames - single SHDLC frame   | Rel-7   | M          | M          | M          |         |
| 5.6.3.2.9  | interpretation of corrupted frames - SHDLC I-frames   | Rel-7   | M          | M          | M          |         |
| 5.6.3.2.10 | interpretation of corrupted frames - CLT frames   | Rel-7   | C003       | C003       | C003       |         |
| 5.6.4.1.2  | structure of ACT LPDU - full power mode   | Rel-7   | M          | M          | M          |         |
| 5.6.4.1.3  | structure of ACT LPDU - low power mode  | Rel-7   | M          | M          | M          |         |
| 5.6.4.1.4  | behaviour of UICC on reception of ACT frames - values of INF bit                                | Rel-7   | M          | M          | M          |         |
| 5.6.4.1.5  | RFU values in ACT_INFORMATION field   | Rel-7   | M          | M          | N/A        |         |
| 5.6.4.1.6  | extended bit durations as per ACT_INFORMATION field   | Rel-7   | C004       | C004       | C004       |         |
| 5.6.4.1.7  | RFU values in ACT_INFORMATION field   | Rel-9   | N/A        | N/A        | M          |         |
|            | <b>SHDLC LLC definition tests</b>   |         |            |            |            |         |
| 5.7.1.2    | data passed up to the next layer  | Rel-7   | C001       | C001       | C001       |         |
| 5.7.1.3    | error management, EUT sending I-frame   | Rel-7   | M          | M          | M          |         |
| 5.7.1.4    | error management  | Rel-7   | M          | M          | M          |         |
| 5.7.6.4.2  | initial state at link reset - reset by the EUT  | Rel-7   | M          | M          | M          |         |
| 5.7.6.4.3  | initial state at link reset - reset by the ES   | Rel-7   | M          | M          | M          |         |

| Test case   | Description  | Release | Rel-7 UICC | Rel-8 UICC | Rel-9 UICC | Support |
|-------------|--|---------|------------|------------|------------|---------|
| 5.7.7.3.2   | link establishment by the EUT  | Rel-7   | M          | M          | M          |         |
| 5.7.7.3.3   | link establishment by the ES   | Rel-7   | M          | M          | M          |         |
| 5.7.7.3.4   | discard frames before initialization   | Rel-7   | M          | M          | M          |         |
| 5.7.7.3.5   | connection time - reset by EUT   | Rel-7   | M          | M          | M          |         |
| 5.7.7.3.6   | connection time - reset by ES  | Rel-7   | C107       | C107       | C107       |         |
| 5.7.7.3.7   | EUT discards I-frames and S-frames during link establishment                   | Rel-7   | M          | M          | M          |         |
| 5.7.7.3.8   | requesting unsupported window size - link establishment by ES                  | Rel-7   | C103       | C103       | C103       |         |
| 5.7.7.3.9   | requesting unsupported SREJ support - link establishment by ES                 | Rel-7   | C104       | C104       | C104       |         |
| 5.7.7.3.10  | requesting unsupported window size and SREJ support - link establishment by ES | Rel-7   | C105       | C105       | C105       |         |
| 5.7.7.3.11  | forcing lower window size - link establishment by the EUT                      | Rel-7   | C101       | C101       | C101       |         |
| 5.7.7.3.12  | forcing SREJ not used - link establishment by the EUT                          | Rel-7   | C102       | C102       | C102       |         |
| 5.7.7.3.13  | forcing lower window size and SREJ not used - link establishment by the EUT    | Rel-7   | C106       | C106       | C106       |         |
| 5.7.7.3.14  | discard buffered frames on link re-establishment                               | Rel-7   | C102       | C102       | C102       |         |
| 5.7.7.5.2   | I-frame transmission   | Rel-7   | M          | M          | M          |         |
| 5.7.7.5.3   | I-frame reception - single I-Frame reception                                   | Rel-7   | M          | M          | M          |         |
| 5.7.7.5.4   | I-frame reception - multiple I-Frame reception                                 | Rel-7   | M          | M          | M          |         |
| 5.7.7.5.5   | piggybacking   | Rel-7   | M          | M          | M          |         |
| 5.7.7.6.2   | REJ transmission   | Rel-7   | M          | M          | M          |         |
| 5.7.7.6.3   | REJ transmission - multiple I-frames received                                  | Rel-7   | C101       | C101       | C101       |         |
| 5.7.7.6.4   | REJ reception  | Rel-7   | M          | M          | M          |         |
| 5.7.7.7.2   | retransmission of a single frame   | Rel-7   | M          | M          | M          |         |
| 5.7.7.7.3   | retransmission of multiple frames  | Rel-7   | M          | M          | M          |         |
| 5.7.7.8.2   | RNR reception  | Rel-7   | M          | M          | M          |         |
| 5.7.7.8.3   | Empty I-frame transmission   | Rel-7   | M          | M          | M          |         |
| 5.7.7.9.2   | SREJ transmission  | Rel-7   | C102       | C102       | C102       |         |
| 5.7.7.9.4   | SREJ reception   | Rel-7   | C102       | C102       | C102       |         |
|             | <b>CLT LLC definition tests</b>  |         |            |            |            |         |
| 5.8.4.2     | Padding of CLT PAYLOAD in Type A aligned structure                             | Rel-7   | C110       | C110       | C110       |         |
| 5.8.5.2     | CLT commands, ISO/IEC 14443 [6] Type A   | Rel-7   | C110       | C110       | C110       |         |
| 5.8.5.3     | CLT commands, ISO/IEC 18092 [8]  | Rel-7   | C111       | C111       | C111       |         |
| 5.8.6.3.1.2 | Interpretation of CL_PROTO_INF(A)  | Rel-7   | C110       | C110       | C110       |         |
|             | <b>Timing and performance tests</b>  |         |            |            |            |         |
|             | (No test cases present for this clause)  |         |            |            |            |         |

Table 4.2 b): Conditional items referenced by table 4.2 a)

| Conditional item | Condition                                    |
|------------------|--|
| C001             | IF O_102_622 THEN M ELSE N/A                 |
| C002             | IF O_CLASS_A THEN M ELSE N/A                 |
| C003             | IF (O_CLT_A OR O_CLT_F) THEN M ELSE N/A      |
| C004             | IF O_EXTENDED_T THEN M ELSE N/A              |
| C005             | IF O_102_600 THEN M ELSE N/A                 |
| C006             | Void   |
| C007             | IF O_TERM_CAP THEN M ELSE N/A                |
| C008             | IF O_CLASS_A AND O_TERM_CAP THEN M ELSE N/A  |
| C101             | IF O_WS_3 THEN M ELSE N/A                    |
| C102             | IF O_SREJ THEN M ELSE N/A                    |
| C103             | IF NOT O_WS_4 THEN M ELSE N/A                |
| C104             | IF NOT O_SREJ THEN M ELSE N/A                |
| C105             | IF NOT O_SREJ AND NOT O_WS_4 THEN M ELSE N/A |
| C106             | IF O_SREJ AND O_WS_3 THEN M ELSE N/A         |
| C107             | IF NOT (O_SREJ AND O_WS_4) THEN M ELSE N/A   |
| C108             | IF O_WS_3 OR O_SREJ THEN M ELSE N/A          |
| C109             | Void   |
| C110             | IF O_CLT_A THEN M ELSE N/A                   |
| C111             | IF O_CLT_F THEN M ELSE N/A                   |

### 4.3 Information to be provided by the DUT supplier

If the DUT supplier claims that the DUT supports TS 102 622 [4], the representative SWP frame exchange procedure shall be executed using HCI layer. In particular, the DUT shall act as a valid host according to TS 102 622 [4] and correctly perform the HCI session initialization and support commands/events needed to execute this procedure.

### 4.4 Test equipment

The test equipment shall provide a terminal simulator which is connected to the DUT during test procedure execution, unless otherwise specified.

With respect to the UICC, the terminal simulator shall act as a valid terminal according to TS 102 613 [1], TS 102 221 [2], and TS 102 600 [3] (if this interface is present at the UICC), unless otherwise specified. In particular, during test procedure execution, the terminal simulator shall respect the electrical and signalling conditions for all UICC contacts within the limits given by TS 102 613 [1], TS 102 221 [2] and TS 102 600 [3]). The accuracy of the terminal simulator's settings shall be taken into account when ensuring this.

Some test cases might require the presence of an upper layer, such as HCI (as specified in TS 102 622 [4]). The test equipment shall provide this layer if required. If message fragmentation is used, all HCP packets, with the possible exception of the last packet, shall contain the maximum amount of data possible for HCP packets.

#### 4.4.1 Measurement/setting uncertainties

The following accuracy applies for measurement and setting of electrical parameter for the test equipment.

**Table 4.3 a): Measurement accuracy**

| Parameter   | Tolerance         | Remark |
|---|-------------------|--------|
| $I_{CC}$  | $\pm 0,1$ mA      |        |
| $I_H$   | $\pm 25$ $\mu$ A  |        |
| $I_L$   | $\pm 5$ $\mu$ A   |        |
| $T_{S2\_INHIBIT}$ ,<br>$T_{S2\_ACT\_RES\_V}$ ,<br>$T_{S2\_ACT\_RES\_D}$ ,<br>$T_{S2\_ACT\_FRP}$ | $\pm 20$ $\mu$ s  |        |
| P3  | $\pm 100$ ns      |        |
| $C_{LOAD}$  | FFS               |        |
| T2, T3  | $\pm 100$ $\mu$ s |        |
| Enter power saving mode time<br>(clause 5.5.4.1, RQ5)   | $\pm 100$ $\mu$ s |        |
| Connect low impedance time<br>(clause 5.3.2.4.1, RQ1)   | $\pm 100$ ms      |        |

**Table 4.3 b): Setting uncertainty**

| Parameter              | Tolerance   | Remark |
|------------------------|-------------|--------|
| $V_{IL}$ ,<br>$V_{IH}$ | $\pm 15$ mV |        |
| T                      | $\pm 25$ ns |        |
| $t_r$ ,<br>$t_f$       | FFS         |        |

The test equipment shall take care to avoid misinterpretation of parasitic S2 currents caused by SWIO line and UICC load capacitance.

All voltages shall be measured with respect to GND (contact C5), directly at the UICC's contacts.

In steps where it is specified that no response SWP frame is expected, the test equipment shall wait for 20 ms to check that no response frame is sent, unless otherwise specified.

## 4.4.2 Default conditions for DUT operation

Unless otherwise specified, the test equipment shall apply the default conditions described in the following clauses during test procedure execution.

### 4.4.2.1 Temperature

The ambient temperature shall be kept in a range of  $25\text{ °C} \pm 3\text{ °C}$ .

### 4.4.2.2 TS 102 221 interface contacts (CLK, RST, I/O) and contact Vcc

When the TS 102 221 [2] interface is activated, the terminal simulator shall maintain the characteristics on contacts CLK, RST, I/O in following ranges.

**Table 4.4: Default condition for TS 102 221 [2] contacts operation**

| Contact              | Voltage class | Low level           | High level       |
|----------------------|---------------|---------------------|------------------|
| C2 (RST)             | A             | 0,0 V to 0,2 V      | 0,9 x Vcc to Vcc |
| C3 (CLK)             |               | 0,0 V to 0,2 V      | 0,9 x Vcc to Vcc |
| C7 (I/O), UICC input |               | 0,0 V to 0,2 V      | 0,9 x Vcc to Vcc |
| C2 (RST)             | B             | 0,0 V to 0,07 x Vcc | 0,9 x Vcc to Vcc |
| C3 (CLK)             |               | 0,0 V to 0,07 x Vcc | 0,9 x Vcc to Vcc |
| C7 (I/O), UICC input |               | 0,0 V to 0,07 x Vcc | 0,9 x Vcc to Vcc |
| C2 (RST)             | C             | 0,0 V to 0,1 x Vcc  | 0,9 x Vcc to Vcc |
| C3 (CLK)             |               | 0,0 V to 0,1 x Vcc  | 0,9 x Vcc to Vcc |
| C7 (I/O), UICC input |               | 0,0 V to 0,1 x Vcc  | 0,9 x Vcc to Vcc |

In case these interface contacts are not active (i.e. Vcc is powered, but the TS 102 221 [2] interface is not activated), the terminal simulator shall maintain contacts CLK, RST, I/O between 0,0 V and 0,1 V.

The terminal simulator shall maintain the voltage on Vcc for each voltage class in the following ranges:

- When activated in voltage class A:
  - A range of 4,90 V to 5, 10 V.
- When activated in voltage class B
  - A range of: 2,90 V to 3,10 V.
- When activated in voltage class C:
  - A range of 1,75 V to 1,85 V.

### 4.4.2.3 TS 102 600 interface contacts (IC\_DP, IC\_DM)

When the TS 102 600 [3] interface is activated, the terminal simulator shall maintain the characteristics on these contacts in following ranges.

**Table 4.5: Default condition for TS 102 600 [3] contacts operation**

| Contact                            | Voltage class | Low level    | High level     |
|------------------------------------|---------------|--------------|----------------|
| C4/ C8 (IC_DP / IC_DM), UICC input | 1,8 V         | 0 V to 0,6 V | 1,2 V to 2,1 V |
| C4/ C8 (IC_DP / IC_DM), UICC input | 3,0 V         | 0 V to 0,5 V | 2,0 V to 3,3 V |

All tests shall be performed in the J-state, i.e. contact C4 shall be maintained in high level range and C8 in low level range.

In case these interface contacts are not active (i.e. Vcc is powered, but the TS 102 600 [3] interface is not activated), the terminal simulator shall handle contacts IC\_DP and IC\_DM as follows:

- For UICCs supporting the TS 102 600 [3] interface, these contacts shall be maintained between 0,0 V and 0,1 V.
- For UICCs not supporting the TS 102 600 [3] interface, these contacts shall be maintained between 0,0 V and 0,1 V.

#### 4.4.2.4 TS 102 613 interface contact (SWIO)

When the SWIO contact is activated, the terminal simulator shall maintain the characteristics on this contact in following range:

- SWP bit duration T between 1,1  $\mu$ s and 4,9  $\mu$ s:
  - The variation of T between two consecutive bits shall not exceed 5 % of T of the first bit.
- S1 signal waveshape applied:
  - For a logical 1:  $T_{H1} = 75$  % of T.
  - For a logical 0:  $T_{H0} = 25$  % of T.
  - For a transition sequence:  $T - T_{H0}$ , with  $T_{H0} = 25$  % of T.
  - Rise and fall time between 5 ns and 0,02 % of T.
- S1 signal levels applied for voltage class B:
  - State L between 0,0 V and 0,3 V.
  - State H between 1,40 V and 1,98 V.
- S1 signal levels applied for voltage class C:
  - State L between 0,0 V and 0,15 x Vcc.
  - State H between 0,85 x Vcc and Vcc.

The P4 time shall be 100  $\mu$ s minimum.

#### 4.4.2.5 Status of UICC interfaces

The terminal simulator may activate the contacts CLK, RST, I/O of the TS 102 221 [2] interface and exchange data over this interface at any time after activation of contact V<sub>CC</sub>.

NOTE: In low power mode, the contacts CLK, RST, I/O of the TS 102 221 [2] interface will never be activated.

The terminal simulator shall not activate the TS 102 600 [3] interface.

#### 4.4.2.6 Characteristics of LLC's

##### 4.4.2.6.1 ACT LLC

In ACT\_POWER\_MODE frames, the FR bit shall be set to 0.

##### 4.4.2.6.2 SHDLC LLC

For SHDLC link establishment, the terminal simulator shall send RSET().

I-frames sent by the terminal simulator shall contain at least 1 byte and shall contain valid values according to the upper layer, if applicable.

#### 4.4.2.6.3 CLT LLC

Void.

### 4.4.3 Minimum/maximum conditions for DUT operation

Unless otherwise specified, the test equipment shall apply the minimum/maximum conditions as described in the following clauses during test procedure execution.

#### 4.4.3.1 Temperature

- Minimum ambient temperature: A range of -25 °C to -23 °C.
- Maximum ambient temperature: A range of +83 °C to +85 °C.

#### 4.4.3.2 Contact Vcc

When activated in voltage class B:

- Minimum: A range of 2,70 V to 2,80 V.
- Maximum: A range of 3,20 V to 3,30 V.

When activated in voltage class C:

- Minimum: A range of 1,62 V to 1,67 V.
- Maximum: A range of 1,93 V to 1,98 V.

## 4.5 Test execution

### 4.5.1 Parameter variations

Unless otherwise specified, all tests shall be carried out once for each of following parameter variations in addition to the parameter variations specified individually for each test case.

**Table 4.5.1: Global parameter variations**

| Voltage class and power mode | Vcc     |
|------------------------------|---------|
| B                            | Default |
|                              | Minimum |
|                              | Maximum |
| C, full power                | Default |
|                              | Minimum |
|                              | Maximum |
| C, low power                 | Default |
|                              | Minimum |
|                              | Maximum |

## 4.6 Pass criterion

A test shall only be considered only as successful, if the test procedure was carried out successfully under all parameter variations with the DUT respecting all conformance requirements referenced in the test procedure.

**NOTE:** Within the test procedures, the RQs are referenced in the step where they are observable. In some cases, this is different from the step where they occur with respect to the DUT.

## 5 Test cases

### 5.1 Principle of the Single Wire Protocol

Reference: TS 102 613 [1], clause 4.

There are no conformance requirements for the UICC for the referenced clause.

### 5.2 System architecture

#### 5.2.1 General overview

Reference: TS 102 613 [1], clause 5.1.

There are no conformance requirements for the UICC for the referenced clause.

#### 5.2.2 TS 102 221 support

##### 5.2.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 5.2.

|       |   |
|-------|---|
| RQ1   | A UICC supporting the SWP interface shall remain compliant with TS 102 221 [2].   |
| NOTE: | Test cases for RQ1 are out of scope of the present document. The compliancy to TS 102 221 [2] might be validated by executing tests given in test specifications related to TS 102 221 [2]. |

#### 5.2.3 Configurations

##### 5.2.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 5.3.

|  |  |
|--|--|
| RQ1  | The UICC shall indicate support of SWP interface in the Global Interface bytes of the ATR as defined in TS 102 221 [2].  |
| RQ2  | If the SWP interface is activated while a session on the TS 102 600 [3] interface is in progress, actions on the SWP interface shall not disturb the terminal-UICC exchange on the TS 102 600 [3] interface. |
| RQ3  | If the SWP interface is activated while a session on the TS 102 600 [3] interface is in progress, actions on the TS 102 600 [3] interface shall not disturb the terminal-UICC exchange on the SWP interface. |
| RQ4  | If the SWP interface is activated while a session on the TS 102 221 [2] interface is in progress, actions on the SWP interface shall not disturb the terminal-UICC exchange on the TS 102 221 [2] interface. |
| RQ5  | If the SWP interface is activated while a session on the TS 102 221 [2] interface is in progress, actions on the TS 102 221 [2] interface shall not disturb the terminal-UICC exchange on the SWP interface. |
| NOTE 1: Development of test cases involving the TS 102 600 [3] interface are FFS.                  |  |
| NOTE 2: In RQ4 and RQ5, the term "session" is interpreted as "card session" as per TS 102 221 [2]. |  |



### 5.2.3.2 Test case 1: Global Interface bytes of the ATR

#### 5.2.3.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.2.3.2.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.2.3.2.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Activate contacts Vcc, CLK, RST, I/O as per TS 102 221 [2] and apply a cold reset. |     |
| 2    | UICC → T  | Send ATR.  | RQ1 |

### 5.2.3.3 Test case 2: interaction with TS 102 221 interface - SWP activation while the UICC receives data

#### 5.2.3.3.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.2.3.3.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.2.3.3.3 Test procedure

Procedure (a), executed on TS 102 221 [2] interface.

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | T → UICC   | Activate TS 102 221 [2] interface.                              |     |
| 2    | UICC → T   | UICC sends the ATR.   |     |
| 3    | T → UICC   | Execute PPS procedure as per TS 102 221 [2].                    |     |
| 4    | T → UICC   | After sending 1 <sup>st</sup> byte of PPS, start procedure (b). | RQ4 |
| 5    | T ← → UICC | Continue PPS procedure as per TS 102 221 [2].                   | RQ4 |

Procedure (b), executed on SWP interface.

| Step | Direction  | Description               | RQ  |
|------|------------|---------------------------|-----|
| 1    | T ← → UICC | SWP interface activation. | RQ5 |

### 5.2.3.4 Test case 3: interaction with TS 102 221 interface - SWP activation while the UICC sends data

#### 5.2.3.4.1 Test execution

This test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.2.3.4.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.2.3.4.3 Test procedure

Procedure (a), executed on TS 102 221 [2] interface.

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | T → UICC   | Activate TS 102 221 [2] interface.                                |     |
| 2    | UICC → T   | UICC starts to send the ATR.                                      |     |
| 3    | T → UICC   | After receiving 1 <sup>st</sup> byte of ATR, start procedure (b). | RQ4 |
| 4    | UICC → T   | UICC continues to send the ATR.                                   | RQ4 |
| 5    | T ← → UICC | Execute PPS procedure as per TS 102 221 [2].                      |     |

Procedure (b), executed on SWP interface.

| Step | Direction  | Description               | RQ  |
|------|------------|---------------------------|-----|
| 1    | T ← → UICC | SWP interface activation. | RQ5 |

## 5.2.4 Interaction with other interfaces

### 5.2.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 5.4 and clause 5.3.

|       |  |
|-------|--|
| RQ1   | Signalling on a contact assigned to one interface shall not affect the state of other contacts assigned to another interface. This also applies to the activation sequence of the UICC.  |
| RQ2   | Operation of the SWP interface after activation shall be independent from operation of other interfaces (e.g. the TS 102 221 [2] or TS 102 600 [3] interface) that may be implemented on the UICC.   |
| RQ3   | Any reset signalling (RST signal on contact C2 as specific to the TS 102 221 [2] interface or logical reset on TS 102 600 [3] interface) shall only affect the UICC protocol stack related to these interfaces. SWP-related processes shall not be affected by another interface reset signal. |
| RQ4   | A logical reset signalling on the data link layer (SHDLC RSET) over the SWP interface shall not affect any of the other interfaces.  |
| RQ5   | Activation and deactivation of SWP interface shall not affect any of the other interfaces.   |
| NOTE: | Development of test cases involving the TS 102 600 [3] interface is FFS.   |

### 5.2.4.2 Test case 1: interaction with TS 102 221 interface - TS 102 221 clock stop

#### 5.2.4.2.1 Test execution

This test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.2.4.2.2 Initial conditions

- The TS 102 221 [2] interface is activated, ATR is sent and PPS is successfully completed.
- The SHDLIC link is established.

#### 5.2.4.2.3 Test procedure

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | T ← → UICC | Run the representative SWP frame exchange procedure during all steps.   |     |
| 2    | T ← → UICC | At reception of the first I-frame, suspend the clock signal on the TS 102 221 [2] interface.  | RQ1 |
| 3    | T ← → UICC | Continue the representative SWP frame exchange procedure.   | RQ1 |
| 4    | T ← → UICC | At reception of the fifth I-frame of the representative SWP frame exchange procedure, restart the clock signal on the TS 102 221 [2] interface. | RQ1 |
| 5    | T ← → UICC | Finish the representative SWP frame exchange procedure.   | RQ1 |

#### 5.2.4.3 Test case 2: interaction with TS 102 221 interface - TS 102 221 reset

##### 5.2.4.3.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

##### 5.2.4.3.2 Initial conditions

- The TS 102 221 [2] interface is activated, ATR is sent and PPS is successfully completed.
- The SHDLIC link is established.

##### 5.2.4.3.3 Test procedure

Procedure (a), executed on SWP interface.

| Step | Direction  | Description   | RQ          |
|------|------------|---|-------------|
| 1    | T ← → UICC | Run the representative SWP frame exchange procedure during all steps. |             |
| 2    | T ← → UICC | At reception of the first I-frame, start procedure (b).               | RQ2         |
| 3    | T ← → UICC | Finish the representative SWP frame exchange procedure.               | RQ1,<br>RQ3 |

Procedure (b), executed on TS 102 221 [2] interface.

| Step | Direction   | Description   | RQ  |
|------|-------------|---|-----|
| 1    | User → UICC | Issue a warm reset on the TS 102 221 [2] interface. |     |
| 2    | UICC → T    | Sends ATR.  | RQ3 |
| 3    | T ← → UICC  | Execute PPS procedure.                              | RQ1 |

#### 5.2.4.4 Test case 3: interaction with TS 102 221 interface - SWP deactivation while the UICC receives data

##### 5.2.4.4.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

##### 5.2.4.4.2 Initial conditions

- None of the UICC contacts is activated.

##### 5.2.4.4.3 Test procedure

Procedure (a), executed on TS 102 221 [2] interface.

| Step | Direction | Description   | RQ  |
|------|-----------|---|-----|
| 1    | T → UICC  | Activate TS 102 221 [2] interface and SWP interface.            |     |
| 2    | UICC → T  | Send the ATR.   |     |
| 3    | T → UICC  | Execute PPS procedure as per TS 102 221 [2].                    |     |
| 4    | T → UICC  | After sending 1 <sup>st</sup> byte of PPS, start procedure (b). | RQ5 |
| 5    | T ↔ UICC  | Continue PPS procedure as per TS 102 221 [2].                   | RQ5 |
| 6    | T → UICC  | Select EF <sub>DIR</sub> on TS 102 221 [2] interface.           |     |
| 7    | UICC → T  | Send response.  | RQ5 |

Procedure (b), executed on SWP interface.

| Step | Direction | Description                            | RQ |
|------|-----------|--|----|
| 1    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state. |    |

#### 5.2.4.5 Test case 4: interaction with TS 102 221 interface - SWP deactivation while the UICC sends data

##### 5.2.4.5.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

##### 5.2.4.5.2 Initial conditions

- None of the UICC contacts is activated.

## 5.2.4.5.3 Test procedure

Procedure (a), executed on TS 102 221 [2] interface.

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | T → UICC   | Activate TS 102 221 [2] interface and SWP interface.              |     |
| 2    | UICC → T   | Send the ATR.   |     |
| 3    | T → UICC   | Start executing PPS procedure as per TS 102 221 [2].              |     |
| 4    | T → UICC   | After receiving 1 <sup>st</sup> byte of PPS, start procedure (b). | RQ5 |
| 5    | T ← → UICC | Continue PPS procedure as per TS 102 221 [2].                     | RQ5 |
| 6    | T → UICC   | Select EF <sub>DIR</sub> on TS 102 221 [2] interface.             |     |
| 7    | UICC → T   | Send response.  | RQ5 |

Procedure (b), executed on SWP interface.

| Step | Direction | Description                            | RQ |
|------|-----------|--|----|
| 1    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state. |    |

## 5.2.4.6 Test case 5: interaction with TS 102 221 interface - reset SWP while the UICC receives data

## 5.2.4.6.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.2.4.6.2 Initial conditions

- None of the UICC contacts is activated.

## 5.2.4.6.3 Test procedure

Procedure (a), executed on TS 102 221 [2] interface.

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | T → UICC   | Activate TS 102 221 [2] interface and SWP interface.            |     |
| 2    | UICC → T   | Send the ATR.   |     |
| 3    | T → UICC   | Execute PPS procedure as per TS 102 221 [2].                    |     |
| 4    | T → UICC   | After sending 1 <sup>st</sup> byte of PPS, start procedure (b). | RQ4 |
| 5    | T ← → UICC | Continue PPS procedure as per TS 102 221 [2].                   | RQ4 |

Procedure (b), executed on SWP interface.

| Step | Direction | Description | RQ  |
|------|-----------|-------------|-----|
| 1    | T → UICC  | Send RSET.  | RQ4 |

### 5.2.4.7 Test case 6: interaction with TS 102 221 interface - reset SWP while the UICC sends data

#### 5.2.4.7.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.2.4.7.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.2.4.7.3 Test procedure

Procedure (a), executed on TS 102 221 [2] interface.

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | T → UICC   | Activate TS 102 221 [2] interface and SWP interface.              |     |
| 2    | UICC → T   | Send the ATR.   |     |
| 3    | T → UICC   | Start executing PPS procedure as per TS 102 221 [2].              |     |
| 4    | T → UICC   | After receiving 1 <sup>st</sup> byte of PPS, start procedure (b). | RQ4 |
| 5    | T ← → UICC | Continue PPS procedure as per TS 102 221 [2].                     | RQ4 |

Procedure (b), executed on SWP interface.

| Step | Direction | Description | RQ  |
|------|-----------|-------------|-----|
| 1    | T → UICC  | Send RSET.  | RQ4 |

## 5.3 Physical characteristics

### 5.3.1 Temperature range for card operations

#### 5.3.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 6.1.

|         |   |
|---------|---|
| RQ1     | All parameter values for the SWP interface shall apply for the standard temperature range for storage and full operation as defined in TS 102 221 [2].  |
| NOTE 1: | Tests for RQ1, SWP operation, with the parameter temperature are carried out by a selected number of test procedures in other clauses, where the variation of the temperature parameter is explicitly stated in the test execution. |
| NOTE 2: | Tests for RQ1, storage temperature, are out of scope of the present document.   |

## 5.3.2 Contacts

### 5.3.2.1 Provision of contacts

#### 5.3.2.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 6.2.1.

|       |  |
|-------|--|
| RQ1   | The UICC shall use SWIO (contact C6) for data exchange (i.e. SWP) between UICC and the CLF.  |
| NOTE: | Tests for SWP interface operation with SWIO (contact C6) are carried out within all test procedures which perform communication over SWIO. |

### 5.3.2.2 Contact activation and deactivation

#### 5.3.2.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 6.2.2.

There are no conformance requirements for the UICC for the referenced clause.

### 5.3.2.3 Interface activation

#### 5.3.2.3.1 Conformance requirements

Reference: TS 102 613 [1], clauses 6.2.3 and 9.3.1.

The following conformance requirements apply to initial SWP interface activation:

|     |       |   |
|-----|-------|---|
| RQ1 | 6.2.3 | The UICC shall indicate that it is ready to exchange data via SWP by resuming SWP.  |
| RQ2 | 6.2.3 | In case the UICC does not detect the SWP <b>ACTIVATED</b> state, the UICC shall set S2 to state L not later than T <sub>S2_INHIBIT</sub> after the UICC has put S2 in state H.  |
| RQ3 | 6.2.3 | If the action in RQ2 is taken, the UICC shall not respond to further attempts from the CLF to communicate via SWP and shall wait for UICC deactivation or shall retrieve information about SWP capability of the terminal via any other UICC interface.       |
| RQ4 | 6.2.3 | The UICC shall send the first ACT_SYNC frame and wait for the first frame from the CLF.   |
| RQ5 | 6.2.3 | When the UICC has received an ACT_POWER_MODE frame from the CLF, the UICC shall take the following action:<br>If the UICC has received a correct ACT_POWER_MODE and the FR bit of this frame is 1, then the UICC shall repeat the last ACT frame it had sent. |
| RQ6 | 6.2.3 | When the UICC has received an ACT_POWER_MODE frame from the CLF, the UICC shall take the following action:<br>If the UICC has received a correct ACT_POWER_MODE and the FR bit of this frame is 0 then the UICC shall respond with an ACT_READY frame.        |
| RQ7 | 6.2.3 | If the UICC has received a corrupted frame, the UICC shall not respond.   |

The following conformance requirements apply to subsequent SWP interface activation:

|     |       |  |
|-----|-------|--|
| RQ8 | 6.2.3 | The initial interface activation sequence as specified in RQ1 to RQ7 shall also be applied after the transition of S1 to state H from the state DEACTIVATED. |
| RQ9 | 6.2.3 | The UICC shall not send an ACT_INFORMATION field in any of the ACT frames.   |

The following conformance requirements apply to initial and/or subsequent SWP interface activation as specified:

|      |       |   |
|------|-------|---|
| RQ10 | 6.2.3 | For initial interface activation, the UICC shall resume SWP for sending 1 <sup>st</sup> ACT_SYNC frame within a maximum of 700 $\mu$ s ( $T_{S2\_ACT\_RES\_V}$ ). |
| RQ11 | 6.2.3 | The UICC responds to ACT_POWER_MODE frames (calculated from last bit of EOF to SWP resume) within a maximum of 2 000 $\mu$ s ( $T_{S2\_ACT\_FRP}$ ).              |
| RQ12 | 6.2.3 | The UICC re-enters <b>SUSPENDED</b> in case the CLF did not respond to resume within a maximum of 100 $\mu$ s ( $T_{S2\_INHIBIT}$ ).                              |
| RQ13 | 6.2.3 | For subsequent interface activation, the UICC shall resume SWP for sending 1 <sup>st</sup> ACT_SYNC frame within 500 $\mu$ s ( $T_{S2\_ACT\_RES\_D}$ ).           |

The following conformance requirements apply to initial and/or subsequent SWP interface activation as specified:

|      |       |   |
|------|-------|---|
| RQ14 | 6.2.3 | If the UICC was activated according to TS 102 221 [2], an additional activation of the SWP interface shall be considered as selected application on the UICC. |
| RQ15 | 9.3.1 | After successful activation of the SWP interface, the UICC shall support the establishment of the SHDLC link by the CLF.                                      |

### 5.3.2.3.2 Test case 1: initial activation in low power mode

#### 5.3.2.3.2.1 Test execution

The test procedure shall only be executed in low power mode.

The test procedure shall be executed once for each of following parameters:

- $T_{S1\_HIGH\_V}$ : (1) Between 1 000  $\mu$ s and 1 020  $\mu$ s; and (2) between 5 000  $\mu$ s and 5 050  $\mu$ s.

#### 5.3.2.3.2.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.3.2.3.2.3 Test procedure

| Step | Direction            | Description                              | RQ           |
|------|----------------------|--|--------------|
| 1    | T $\rightarrow$ UICC | Activate Vcc (contact C1).               |              |
| 2    | T $\rightarrow$ UICC | Activate SWIO (contact C6) (see note).   |              |
| 3    | UICC $\rightarrow$ T | Resume SWP.                              | RQ1,<br>RQ10 |
| 4    | T $\rightarrow$ UICC | Put the SWP into <b>ACTIVATED</b> state. |              |
| 5    | UICC $\rightarrow$ T | Send ACT_SYNC frame.                     | RQ4          |
| 6    | T $\leftarrow$ UICC  | Perform SHDLC link establishment.        | RQ15         |

NOTE: SWP in **SUSPENDED** state.

### 5.3.2.3.3 Test case 2: initial activation in low power mode with corrupted frames

#### 5.3.2.3.3.1 Test execution

The test procedure shall only be executed in low power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.3.2.3.3.2 Initial conditions

- None of the UICC contacts is activated.



## 5.3.2.3.3.3 Test procedure

| Step   | Direction  | Description  | RQ           |
|--|------------|--|--------------|
| 1  | T → UICC   | Activate Vcc (contact C1).                         |              |
| 2  | T → UICC   | Activate SWIO (contact C6) (see note).             |              |
| 3  | UICC → T   | Resume SWP.  | RQ1,<br>RQ10 |
| 4  | T → UICC   | Put the SWP Interface into <b>ACTIVATED</b> state. |              |
| 5  | UICC → T   | Send ACT_SYNC frame.                               | RQ4          |
| 6  | T → UICC   | Send corrupted frame.                              |              |
| 7  | UICC       | No response.                                       | RQ7          |
| 8  | T ← → UICC | Perform SHDLC link establishment.                  | RQ15         |
| NOTE: SWP interface in <b>SUSPENDED</b> state. |            |  |              |

## 5.3.2.3.4 Test case 3: no activation

## 5.3.2.3.4.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.4.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.4.3 Test procedure

| Step                                 | Direction | Description                             | RQ           |
|--------------------------------------|-----------|---|--------------|
| 1                                    | T → UICC  | Activate Vcc (contact C1).              |              |
| 2                                    | T → UICC  | Activate SWIO (contact C6) (see note).  |              |
| 3                                    | UICC → T  | Resume SWP.                             | RQ1,<br>RQ10 |
| 4                                    | T → UICC  | Keep the SWP in <b>SUSPENDED</b> state. |              |
| 5                                    | UICC → T  | Set S2 to state L.                      | RQ2,<br>RQ12 |
| NOTE: SWP in <b>SUSPENDED</b> state. |           |   |              |

## 5.3.2.3.5 Void

## 5.3.2.3.6 Test case 5: full power mode activation

## 5.3.2.3.6.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for the parameters in each row of the following table:

| Activate TS 102 221 [2] interface in step 2 |
|---|
| No  |
| Yes   |

## 5.3.2.3.6.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.6.3 Test procedure

| Step                                 | Direction            | Description   | RQ        |
|--------------------------------------|----------------------|---|-----------|
| 1                                    | T → UICC             | Activate Vcc (contact C1).  |           |
| 2                                    | T ↔ UICC conditional | If Test execution clause indicates to do so, activate TS 102 221 [2] interface. |           |
| 3                                    | T → UICC             | Activate SWIO (contact C6) (see note).  |           |
| 4                                    | UICC → T             | Resume SWP.   | RQ1, RQ10 |
| 5                                    | T → UICC             | Put the SWP into <b>ACTIVATED</b> state.  |           |
| 65                                   | UICC → T             | Send ACT_SYNC frame.  | RQ4       |
| 7                                    | T → UICC             | Send ACT_POWER_MODE frame.  |           |
| 8                                    | UICC → T             | Send ACT_READY frame.   | RQ6, RQ11 |
| 9                                    | T ↔ UICC             | Perform SHDLC link establishment.   | RQxx      |
| NOTE: SWP in <b>SUSPENDED</b> state. |                      |   |           |

## 5.3.2.3.7 Test case 6: low power mode activation with re-transmission of ACT\_SYNC

## 5.3.2.3.7.1 Test execution

The test procedure shall only be executed in low power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.7.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.7.3 Test procedure

| Step                                 | Direction | Description  | RQ        |
|--------------------------------------|-----------|--|-----------|
| 1                                    | T → UICC  | Activate Vcc (contact C1).   |           |
| 2                                    | T → UICC  | Activate SWIO (contact C6) (see note).                             |           |
| 3                                    | UICC → T  | Resume SWP.  | RQ1, RQ10 |
| 4                                    | T → UICC  | Put the SWP into <b>ACTIVATED</b> state.                           |           |
| 5                                    | UICC → T  | Send ACT_SYNC frame.   | RQ4       |
| 6                                    | T → UICC  | Send ACT_POWER_MODE frame with FR=1 and low power mode indication. |           |
| 7                                    | UICC → T  | Send ACT_SYNC frame.   | RQ5, RQ11 |
| 8                                    | T ↔ UICC  | Perform SHDLC link establishment.                                  | RQ15      |
| NOTE: SWP in <b>SUSPENDED</b> state. |           |  |           |

## 5.3.2.3.8 Test case 7: full power mode activation with re-transmission of ACT\_SYNC

## 5.3.2.3.8.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.8.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.8.3 Test procedure

| Step | Direction  | Description  | RQ           |
|------|------------|--|--------------|
| 1    | T → UICC   | Activate Vcc (contact C1).   |              |
| 2    | T → UICC   | Activate SWIO (contact C6) (see note).                               |              |
| 3    | UICC → T   | Resume SWP.  | RQ1,<br>RQ10 |
| 4    | T → UICC   | Put the SWP into <b>ACTIVATED</b> state.                             |              |
| 5    | UICC → T   | Send ACT_SYNC frame.   | RQ4          |
| 6    | T → UICC   | Sends ACT_POWER_MODE frame with FR=1 and full power mode indication. |              |
| 7    | UICC → T   | Send ACT_SYNC frame.   | RQ5,<br>RQ11 |
| 8    | T ← → UICC | Perform SHDLC link establishment.                                    | RQ15         |

NOTE: SWP in **SUSPENDED** state.

## 5.3.2.3.9 Void

## 5.3.2.3.10 Test case 9: low power mode activation with multiple re-transmission of ACT\_SYNC

## 5.3.2.3.10.1 Test execution

The test procedure shall only be executed in low power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.10.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.10.3 Test procedure

| Step | Direction  | Description   | RQ           |
|------|------------|---|--------------|
| 1    | T → UICC   | Activate Vcc (contact C1).  |              |
| 2    | T → UICC   | Activate SWIO (contact C6) (see note).                              |              |
| 3    | UICC → T   | Resume SWP.   | RQ1,<br>RQ10 |
| 4    | T → UICC   | Put the SWP into <b>ACTIVATED</b> state.                            |              |
| 5    | UICC → T   | Send ACT_SYNC frame.  | RQ4          |
| 6    | T → UICC   | Sends ACT_POWER_MODE frame with FR=1 and low power mode indication. |              |
| 7    | UICC → T   | Send ACT_SYNC frame.  | RQ5,<br>RQ11 |
| 8    | T → UICC   | Sends ACT_POWER_MODE frame with FR=1 and low power mode indication. |              |
| 9    | UICC → T   | Send an ACT_SYNC frame.   | RQ5,<br>RQ11 |
| 10   | T ← → UICC | Perform SHDLC link establishment.                                   | RQ15         |

NOTE: SWP in **SUSPENDED** state.

## 5.3.2.3.11 Test case 10: full power mode activation with re-transmission of ACT\_READY

## 5.3.2.3.11.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.11.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.11.3 Test procedure

| Step | Direction  | Description  | RQ           |
|------|------------|--|--------------|
| 1    | T → UICC   | Activate Vcc (contact C1).   |              |
| 2    | T → UICC   | Activate SWIO (contact C6) (see note).                               |              |
| 3    | UICC → T   | Resume SWP.  | RQ1,<br>RQ10 |
| 4    | T → UICC   | Put the SWP into <b>ACTIVATED</b> state.                             |              |
| 5    | UICC → T   | Send ACT_SYNC frame.   | RQ4          |
| 6    | T → UICC   | Sends ACT_POWER_MODE frame with FR=0 and full power mode indication. |              |
| 7    | UICC → T   | Send ACT_READY frame.  | RQ6,<br>RQ11 |
| 8    | T → UICC   | Send ACT_POWER_MODE frame with FR=1 and full power mode indication.  |              |
| 9    | UICC → T   | Send ACT_READY frame.  | RQ5,<br>RQ11 |
| 10   | T ← → UICC | Perform SHDLIC link establishment.                                   | RQ15         |

NOTE: SWP in **SUSPENDED** state.

## 5.3.2.3.12 Test case 11: full power mode activation with multiple re-transmission of ACT\_SYNC

## 5.3.2.3.12.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.12.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.3.12.3 Test procedure

| Step | Direction  | Description   | RQ           |
|------|------------|---|--------------|
| 1    | T → UICC   | Activate Vcc (contact C1).  |              |
| 2    | T → UICC   | Activate SWIO (contact C6) (see note).                              |              |
| 3    | UICC → T   | Resume SWP.   | RQ1,<br>RQ10 |
| 4    | T → UICC   | Put the SWP into <b>ACTIVATED</b> state.                            |              |
| 5    | UICC → T   | Send ACT_SYNC frame.  | RQ4          |
| 6    | T → UICC   | Send ACT_POWER_MODE frame with FR=1 and full power mode indication. |              |
| 7    | UICC → T   | Send ACT_SYNC frame.  | RQ5,<br>RQ11 |
| 8    | T → UICC   | Send ACT_POWER_MODE frame with FR=1 and full power mode indication. |              |
| 9    | UICC → T   | Send ACT_SYNC frame.  | RQ5,<br>RQ11 |
| 10   | T ← → UICC | Perform SHDLIC link establishment.                                  | RQ15         |

NOTE: SWP in **SUSPENDED** state.

## 5.3.2.3.13 Test case 12: subsequent activation in low power mode

## 5.3.2.3.13.1 Test execution

The test procedure shall only be executed in low power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.13.2 Initial conditions

- SWP resides in **DEACTIVATED** state, and previously an initial SWP interface activation in low power mode has been successful.

## 5.3.2.3.13.3 Test procedure

| Step                                 | Direction  | Description  | RQ         |
|--------------------------------------|------------|--|------------|
| 1                                    | T → UICC   | Initiate subsequent SWP interface activation (see note). |            |
| 2                                    | UICC → T   | Resume SWP.  | RQ13       |
| 3                                    | T → UICC   | Put the SWP into <b>ACTIVATED</b> state.                 |            |
| 4                                    | UICC → T   | Send ACT_SYNC frame.                                     | RQ4<br>RQ9 |
| 5                                    | T ← → UICC | Perform SHDLC link establishment.                        | RQ15       |
| NOTE: SWP in <b>SUSPENDED</b> state. |            |  |            |

## 5.3.2.3.14 Test case 13: subsequent activation in full power mode

## 5.3.2.3.14.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.3.2.3.14.2 Initial conditions

- SWP resides in **DEACTIVATED** state, and previously an initial SWP interface activation in full power mode has been successful.

## 5.3.2.3.14.3 Test procedure

| Step                                 | Direction  | Description  | RQ         |
|--------------------------------------|------------|--|------------|
| 1                                    | T → UICC   | Initiate subsequent SWP interface activation (see note). |            |
| 2                                    | UICC → T   | Resume SWP.  | RQ13       |
| 3                                    | T → UICC   | Put the SWP into <b>ACTIVATED</b> state.                 |            |
| 4                                    | UICC → T   | Send ACT_SYNC frame.                                     | RQ4<br>RQ9 |
| 5                                    | T ← → UICC | Perform SHDLC link establishment.                        | RQ15       |
| NOTE: SWP in <b>SUSPENDED</b> state. |            |  |            |

## 5.3.2.3.15 Void

## 5.3.2.4 Behaviour of a UICC in a terminal not supporting SWP

## 5.3.2.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 6.2.4.

|     |  |
|-----|--|
| RQ1 | When the UICC detects that the contact C6 is not connected to Vcc it shall connect the C6 contact with a low impedance to Gnd within 2 s after detecting that the terminal does not indicate the support of SWP interface. |
|-----|--|

## 5.3.2.4.2 Test case 1: detect terminal not supporting SWP by TERMINAL CAPABILITIES, classes B and C

## 5.3.2.4.2.1 Test execution

The test procedure shall be executed only in voltage class B, and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

The test equipment shall provide an "electrically isolated" condition on SWIO (contact C6). This shall be achieved by connecting a high impedance to Gnd, providing  $V_{IL}$  conditions.

## 5.3.2.4.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.4.2.3 Test procedure

| Step | Direction | Description   | RQ  |
|------|-----------|---|-----|
| 1    | T → UICC  | Activate the TS 102 221 [2] interface.  |     |
| 2    | UICC → T  | Send ATR.   |     |
| 3    | T → UICC  | Send TERMINAL CAPABILITY command as per TS 102 221 [2], not indicating the support of the UICC-CLF interface according to TS 102 613 [1]. |     |
| 4    | UICC      | Connect SWIO (contact C6) with a low impedance to Gnd.  | RQ1 |

NOTE: The value of "low impedance" is not specified in TS 102 613 [1].

## 5.3.2.4.3 Test case 2: detect terminal not supporting SWP by TERMINAL CAPABILITIES, class A

## 5.3.2.4.3.1 Test execution

The test procedure shall be executed only in voltage class A.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

The test equipment shall provide an "electrically isolated" condition on SWIO (contact C6). This shall be achieved by connecting a high impedance to Gnd, providing voltage class B  $V_{IL}$  conditions.

NOTE: For voltage class A,  $V_{IL}$  is not specified.

## 5.3.2.4.3.2 Initial conditions

- None of the UICC contacts is activated.

## 5.3.2.4.3.3 Test procedure

| Step   | Direction | Description   | RQ  |
|--|-----------|---|-----|
| 1  | T → UICC  | Activate the TS 102 221 [2] interface.  |     |
| 2  | UICC → T  | Send ATR.   |     |
| 3  | T → UICC  | Send TERMINAL CAPABILITY command as per TS 102 221 [2], not indicating the support of the UICC-CLF interface according to TS 102 613 [1]. |     |
| 4  | UICC      | Connect SWIO (contact C6) with a low impedance to Gnd.  | RQ1 |
| NOTE: The value of "low impedance" is not specified in TS 102 613 [1]. |           |   |     |

## 5.3.2.5 Behaviour of a terminal connected to a UICC not supporting SWP

Reference: TS 102 613 [1], clause 6.2.5.

There are no conformance requirements for the UICC for the referenced clause.

## 5.3.2.6 Inactive contacts

Reference: TS 102 613 [1], clause 6.2.6.

There are no conformance requirements for the UICC for the referenced clause.

## 5.4 Electrical characteristics

## 5.4.1 Operating conditions

## 5.4.1.1 Operating conditions

Reference: TS 102 613 [1], clause 7.1.

There are no conformance requirements for the UICC for the referenced clause.

## 5.4.1.2 Supply voltage classes

## 5.4.1.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 7.1.1.

|     |   |
|-----|---|
| RQ1 | The UICC shall support the voltage classes B and C, as defined in TS 102 221 [2]. |
|-----|---|

## 5.4.1.2.2 Test case 1: TS 102 221 voltage classes B and C support

## 5.4.1.2.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.4.1.2.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.4.1.2.2.3 Test procedure

| Step | Direction | Description   | RQ  |
|------|-----------|---|-----|
| 1    | T → UICC  | Activate TS 102 221 [2] interface.  |     |
| 2    | UICC → T  | Send ATR.<br>If the first TA for T=15 is present in the ATR, it shall indicate support of at least voltage classes B and C. | RQ1 |
| 3    | T → UICC  | Activate contact SWIO.  |     |
| 4    | UICC → T  | Send ACT_SYNC frame.  | RQ1 |

## 5.4.1.3 Vcc (C1) low power mode definition

## 5.4.1.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 7.1.2.

|     |  |
|-----|--|
| RQ1 | When operating in low power mode, the UICC shall not draw more than 5 mA from Vcc, averaged over 1 ms. |
| RQ2 | In low power mode, the UICC shall operate with Vcc in the range of 1,62 V to 1,98 V.                   |

## 5.4.1.3.2 Test case 1: operation in low power mode

## 5.4.1.3.2.1 Test execution

The test procedure shall only be executed in voltage class C, low power mode.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.4.1.3.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.4.1.3.3.3 Test procedure

| Step | Direction  | Description   | RQ          |
|------|------------|---|-------------|
| 1    | T → UICC   | Activate Vcc (contact C1).  |             |
| 2    | T → UICC   | Activate SWIO (contact C6).   |             |
| 3    | UICC → T   | Send ACT_SYNC frame.  | RQ1         |
| 4    | T ← → UICC | Perform SHDLC link establishment and run the representative SWP frame exchange procedure. | RQ1,<br>RQ2 |
| 5    | T → UICC   | Put SWP into <b>DEACTIVATED</b> state.  | RQ1         |
| 6    | T → UICC   | Maintain <b>DEACTIVATED</b> state for at least 10 ms.                                     | RQ1         |
| 7    | T ← → UICC | Perform subsequent SWP interface activation.  | RQ1,<br>RQ2 |



## 5.4.1.4 Signal S1

### 5.4.1.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 7.1.3.

|     |  |
|-----|--|
| RQ1 | In voltage class B the UICC shall consider S1 to be in state H when S1 is in the range between 1,13 V and 2,28 V.                        |
| RQ2 | In voltage class B the UICC shall consider S1 to be in state L when S1 is in the range between -0,3 V and 0,48 V.                        |
| RQ3 | In voltage class C the UICC shall consider S1 to be in state H when S1 is in the range between $0,7 \times V_{cc}$ and $V_{cc} + 0,3$ V. |
| RQ4 | In voltage class C the UICC shall consider S1 to be in state L when S1 is in the range between -0,3 and $0,25 \times V_{cc}$ .           |

### 5.4.1.4.2 Test case 1: S1 communication in voltage class B

#### 5.4.1.4.2.1 Test execution

The test procedure shall only be executed in voltage class B.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- $V_{cc}$  at default, and S1 signal applied with:
  - $V_{IL} = 0,15$  V and  $V_{IH} = 1,70$  V;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 1,70$  V;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 1,70$  V;
  - $V_{IL} = 0,15$  V and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,15$  V and  $V_{IH} = V_{IHmax}$ .
- $V_{cc}$  at minimum, and S1 signal applied with:
  - $V_{IL} = 0,15$  V and  $V_{IH} = 1,70$  V;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 1,70$  V;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 1,70$  V;
  - $V_{IL} = 0,15$  V and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,15$  V and  $V_{IH} = V_{IHmax}$ .
- $V_{cc}$  at maximum, and S1 signal applied with:
  - $V_{IL} = 0,15$  V and  $V_{IH} = 1,70$  V;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 1,70$  V;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 1,70$  V;
  - $V_{IL} = 0,15$  V and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,15$  V and  $V_{IH} = V_{IHmax}$ .

## 5.4.1.4.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.4.1.4.2.3 Test procedure

| Step | Direction | Description                       | RQ          |
|------|-----------|-----------------------------------|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).        |             |
| 2    | T → UICC  | Activate SWIO (contact C6).       |             |
| 3    | UICC → T  | Send ACT_SYNC frame.              | RQ1,<br>RQ2 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.        | RQ1,<br>RQ2 |
| 5    | UICC → T  | Respond ACT_READY frame.          | RQ1,<br>RQ2 |
| 6    | T ↔ UICC  | Perform SHDLC link establishment. | RQ1,<br>RQ2 |

## 5.4.1.4.3 Test case 2: S1 communication in voltage class C, full power mode

## 5.4.1.4.3.1 Test execution

The test procedure shall only be executed in voltage class C, full power mode.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- Vcc at default, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmax}$ ;
- Vcc at minimum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmax}$ ;
- Vcc at maximum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmin}$ ;

- $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .

#### 5.4.1.4.3.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.4.1.4.3.3 Test procedure

| Step | Direction | Description   | RQ          |
|------|-----------|---|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).                            |             |
| 2    | T → UICC  | Activate SWIO (contact C6).                           |             |
| 3    | UICC → T  | Send ACT_SYNC frame.                                  | RQ3,<br>RQ4 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame indicating full power mode. | RQ3,<br>RQ4 |
| 5    | UICC → T  | Respond ACT_READY frame.                              | RQ3,<br>RQ4 |
| 6    | T ↔ UICC  | Perform SHDLIC link establishment.                    | RQ3,<br>RQ4 |

#### 5.4.1.4.4 Test case 3: S1 communication in low power mode

##### 5.4.1.4.4.1 Test execution

The test procedure shall only be executed in voltage class C, low power mode.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- Vcc at default, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ ;
- Vcc at minimum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ ;

- Vcc at maximum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmin}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = V_{ILmax}$  and  $V_{IH} = 0,85 \times V_{cc}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{cc}$  and  $V_{IH} = V_{IHmax}$ .

#### 5.4.1.4.4.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.4.1.4.4.3 Test procedure

| Step | Direction | Description                       | RQ          |
|------|-----------|-----------------------------------|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).        |             |
| 2    | T → UICC  | Activate SWIO (contact C6).       |             |
| 3    | UICC → T  | Send ACT_SYNC frame.              | RQ3,<br>RQ4 |
| 4    | T ↔ UICC  | Perform SHDLC link establishment. | RQ3,<br>RQ4 |

#### 5.4.1.5 Signal S2

##### 5.4.1.5.1 Signal S2

Reference: TS 102 613 [1], clause 7.1.4.

There are no conformance requirements for the UICC for the referenced clause.

##### 5.4.1.5.2 Operating current for S2

###### 5.4.1.5.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 7.1.4.1.

|     |   |
|-----|---|
| RQ1 | For supply voltage class B, when transmitting state L on S2, the UICC shall not draw less current than 0 $\mu$ A and not draw more current than 20 $\mu$ A from SWIO, with S1 measured on the UICC contacts between 1,13 V and 2,28 V.              |
| RQ2 | For supply voltage class B, when transmitting state H on S2, the UICC shall not draw less current than 600 $\mu$ A and not draw more current than 1 000 $\mu$ A from SWIO, with S1 measured on the UICC contacts between 1,13 V and 2,28 V.         |
| RQ3 | For supply voltage class C, when transmitting state L on S2, the UICC shall not draw less current than 0 $\mu$ A and not draw more current than 20 $\mu$ A from SWIO, with S1 measured on the UICC contacts between 0,7 x Vcc and Vcc + 0,3 V.      |
| RQ4 | For supply voltage class C, when transmitting state H on S2, the UICC shall not draw less current than 600 $\mu$ A and not draw more current than 1 000 $\mu$ A from SWIO, with S1 measured on the UICC contacts between 0,7 x Vcc and Vcc + 0,3 V. |

## 5.4.1.5.2.2 Test case 1: S2 communication in voltage class B

## 5.4.1.5.2.2.1 Test execution

The test procedure shall only be executed in voltage class B.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- Vcc at default, and S1 signal applied with:
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = 1,70 \text{ V}$ ;
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = V_{IHmax}$ ;
- Vcc at minimum, and S1 signal applied with:
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = 1,70 \text{ V}$ ;
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = V_{IHmax}$ ;
- Vcc at maximum, and S1 signal applied with:
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = 1,70 \text{ V}$ ;
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,15 \text{ V}$  and  $V_{IH} = V_{IHmax}$ .

## 5.4.1.5.2.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.4.1.5.2.2.3 Test procedure

| Step | Direction | Description  | RQ          |
|------|-----------|--|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).                         |             |
| 2    | T → UICC  | Activate SWIO (contact C6).                        |             |
| 3    | UICC → T  | Send ACT_SYNC frame.                               | RQ1,<br>RQ2 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.                         | RQ1         |
| 5    | UICC → T  | Respond ACT_READY frame.                           | RQ1,<br>RQ2 |
| 6    | T → UICC  | Put SWP in <b>SUSPENDED</b> state.                 | RQ1         |
| 7    | T → UICC  | Maintain <b>SUSPENDED</b> state for at least 2 ms. | RQ1         |
| 8    | T ↔ UICC  | Perform SHDLC link establishment.                  | RQ1,<br>RQ2 |

## 5.4.1.5.2.3 Test case 2: S2 communication in voltage class C, full power mode

## 5.4.1.5.2.3.1 Test execution

The test procedure shall only be executed in voltage class C, full power mode.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- Vcc at default, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .
- Vcc at minimum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .
- Vcc at maximum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .

## 5.4.1.5.2.3.2 Initial conditions

- None of the UICC contacts is activated.

## 5.4.1.5.2.3.3 Test procedure

| Step | Direction | Description   | RQ          |
|------|-----------|---|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).                            |             |
| 2    | T → UICC  | Activate SWIO (contact C6).                           |             |
| 3    | UICC → T  | Send ACT_SYNC frame.                                  | RQ3,<br>RQ4 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame indicating full power mode. | RQ3         |
| 5    | UICC → T  | Respond ACT_READY frame.                              | RQ3,<br>RQ4 |
| 6    | T → UICC  | Put SWP in <b>SUSPENDED</b> state.                    | RQ3         |
| 7    | T → UICC  | Maintain <b>SUSPENDED</b> state for at least 2 ms.    | RQ3         |
| 8    | T ↔ UICC  | Perform SHDLC link establishment.                     | RQ3,<br>RQ4 |

## 5.4.1.5.2.4 Test case 3: S2 communication in low power mode

## 5.4.1.5.2.4.1 Test execution

The test procedure shall only be executed in voltage class C, low power mode.

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameters:

- Vcc at default, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .
- Vcc at minimum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .
- Vcc at maximum, and S1 signal applied with:
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = 0,85 \times V_{CC}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmin}$ ;
  - $V_{IL} = 0,10 \times V_{CC}$  and  $V_{IH} = V_{IHmax}$ .

## 5.4.1.5.2.4.2 Initial conditions

- None of the UICC contacts is activated.

## 5.4.1.5.2.4.3 Test procedure

| Step | Direction | Description  | RQ          |
|------|-----------|--|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).                         |             |
| 2    | T → UICC  | Activate SWIO (contact C6).                        |             |
| 3    | UICC → T  | Send ACT_SYNC frame.                               | RQ3,<br>RQ4 |
| 4    | T → UICC  | Put SWP in <b>SUSPENDED</b> state.                 | RQ3         |
| 5    | T → UICC  | Maintain <b>SUSPENDED</b> state for at least 2 ms. | RQ3         |
| 6    | T ↔ UICC  | Perform SHDLC link establishment.                  | RQ3,<br>RQ4 |

## 5.5 Physical transmission layer

### 5.5.1 S1 Bit coding and sampling time

#### 5.5.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 8.1.

|      |  |
|------|--|
| RQ1  | The UICC shall interpret a signal waveform received on S1 having a duration T constituted by two sequential rising edges with the state H for a time $T_{H1}$ between $0,70 \times T$ and $0,80 \times T$ as bit with the logical value 1. The timing reference point for T and $T_{H1}$ shall be 50 % of the S1 signal amplitude. |
| RQ2  | The UICC shall interpret a signal waveform received on S1 having a duration T constituted by two sequential rising edges with the state H for a time $T_{H0}$ from $0,20 \times T$ to $0,30 \times T$ as bit with the logical value 0. The timing reference point for T and $T_{H0}$ shall be 50 % of the S1 signal amplitude.     |
| RQ3  | For the signal waveforms as per RQ1 and RQ2, the UICC shall accept signal edges with a fall time (tf) between 5 ns and $0,05 \times T$ with $T \leq 5\,000$ ns and between 5 ns and 250 ns with $T > 5\,000$ ns, where the timing reference points for the fall time are 10 % and 90 % of the S1 signal amplitude.                 |
| RQ4  | For the signal waveforms as per RQ1 and RQ2, the UICC shall accept signal edges with a rise time (tr) between 5 ns and $0,05 \times T$ with $T \leq 5\,000$ ns and between 5 ns and 250 ns with $T > 5\,000$ ns, where the timing reference points for the rise time are 10 % and 90 % of the S1 signal amplitude.                 |
| RQ5  | The UICC shall be capable to communicate with bit rates varying with each bit transmitted on S1 between the minimum and maximum bit duration supported (see also RQ7 and RQ8).   |
| RQ6  | The input capacitance of the UICC ( $C_{LOAD}$ ) on the contact C6 shall not exceed 10 pF.   |
| RQ7  | The UICC shall interpret bits with a duration T between 1 $\mu$ s and 5 $\mu$ s.   |
| RQ8  | The UICC shall interpret bits with extended bit durations in the indicated range (see clause 9.4).   |
| RQ9  | For a transition from <b>DEACTIVATED</b> state or for SWIO contact activation (preceding the SWP interface activation procedure), the UICC shall accept a rise time tr of the signal S1 in the range of 5 ns to 250 ns.  |
| RQ10 | For a transition to <b>DEACTIVATED</b> state, the UICC shall accept a fall time tf of the signal S1 in the range of 5 ns to 250 ns.  |
| RQ11 | The UICC shall accept a transition sequence, consisting of the falling edge, the state L period and the rising edge of an idle bit (see RQ2). The value of T shall result from the length of the state L period, where the timing reference point shall be 50 % of the S1 signal amplitude.  |
| RQ12 | The UICC shall accept a transition sequence as described in RQ11 with the definitions as described in RQ3 and RQ4 for the fall time tf for the leading edge and the rise time tr for the trailing edge.  |

#### 5.5.1.2 Test case 1: communication with timing variation, default bit duration

##### 5.5.1.2.1 Test execution

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

The test procedure shall be executed once for each of following parameter sets:

| T         | $T_{H1}$ | $T_{H0}$ |
|-----------|----------|----------|
| 3 $\mu$ s | 75 %     | 25 %     |
| 1 $\mu$ s | 70 %     | 30 %     |
|           | 80 %     | 20 %     |
|           | 75 %     | 25 %     |
| 5 $\mu$ s | 70 %     | 30 %     |
|           | 80 %     | 20 %     |
|           | 75 %     | 25 %     |

##### 5.5.1.2.2 Initial conditions

- None of the UICC contacts is activated.



## 5.5.1.2.3 Test procedure

| Step | Direction            | Description  | RQ                  |
|------|----------------------|--|---------------------|
| 1    | T → UICC             | Activate Vcc (contact C1).   |                     |
| 2    | T → UICC             | Activate SWIO (contact C6).  |                     |
| 3    | UICC → T             | Resume SWP.  |                     |
| 4    | T → UICC             | Send a transition sequence.  |                     |
| 5    | UICC → T             | Send ACT_SYNC frame.   | RQ11                |
| 6    | T → UICC<br>UICC → T | If the terminal performs initial SWP interface activation in full power mode, complete initial SWP interface activation.                                     | RQ1,<br>RQ2,<br>RQ7 |
| 7    | T → UICC<br>UICC → T | Establish SHDLC link.  | RQ1,<br>RQ2,<br>RQ7 |
| 8    | T → UICC<br>UICC → T | Run the representative SWP frame exchange procedure.<br>The frame exchange shall be performed in such a way, that the referenced RQs can be fully validated. | RQ1,<br>RQ2,<br>RQ7 |

## 5.5.1.3 Test case 2: communication with timing variation, extended bit duration

## 5.5.1.3.1 Test execution

The test procedure shall be executed at default, minimum, and maximum ambient temperature.

If the DUT supports bit durations down to 0,590  $\mu$ s and up to 5  $\mu$ s, the test procedure shall be executed once for each of the following parameter sets:

| T             | T <sub>H1</sub> | T <sub>H0</sub> |
|---------------|-----------------|-----------------|
| 0,590 $\mu$ s | 70 %            | 30 %            |
|               | 80 %            | 20 %            |
|               | 75 %            | 25 %            |

If the DUT supports bit durations down to 1  $\mu$ s and up to 10  $\mu$ s, the test procedure shall be executed once for each of the following parameter sets:

| T          | T <sub>H1</sub> | T <sub>H0</sub> |
|------------|-----------------|-----------------|
| 10 $\mu$ s | 70 %            | 30 %            |
|            | 80 %            | 20 %            |
|            | 75 %            | 25 %            |

If the DUT supports bit durations down to 0.590  $\mu$ s and up to 10  $\mu$ s, the test procedure shall be executed once for each of the following parameter sets:

| T             | T <sub>H1</sub> | T <sub>H0</sub> |
|---------------|-----------------|-----------------|
| 0,590 $\mu$ s | 70 %            | 30 %            |
|               | 80 %            | 20 %            |
|               | 75 %            | 25 %            |
| 10 $\mu$ s    | 70 %            | 30 %            |
|               | 80 %            | 20 %            |
|               | 75 %            | 25 %            |

## 5.5.1.3.2 Initial conditions

- None of the UICC contacts is activated.

## 5.5.1.3.3 Test procedure

| Step | Direction            | Description  | RQ                          |
|------|----------------------|--|-----------------------------|
| 1    | T → UICC             | Activate Vcc (contact C1).   |                             |
| 2    | T → UICC             | Activate SWIO (contact C6).  |                             |
| 3    | UICC → T             | Resume SWP.  |                             |
| 4    | T → UICC             | Send a transition sequence.  |                             |
| 5    | UICC → T             | Send ACT_SYNC frame.   | RQ11                        |
| 6    | T → UICC<br>UICC → T | If the terminal performs initial SWP interface activation in full power mode, complete initial SWP interface activation.                                     | RQ1,<br>RQ2,<br>RQ7,<br>RQ8 |
| 7    | T → UICC<br>UICC → T | Establish SHDLC link   | RQ1,<br>RQ2,<br>RQ7,<br>RQ8 |
| 8    | T → UICC<br>UICC → T | Run the representative SWP frame exchange procedure.<br>The frame exchange shall be performed in such a way, that the referenced RQs can be fully validated. | RQ1,<br>RQ2,<br>RQ7,<br>RQ8 |

## 5.5.1.4 Test case 3: S1 rise and fall time

## 5.5.1.4.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameter sets:

| T    | tr     | tf     |
|------|--------|--------|
| 3 μs | 78 ns  | 78 ns  |
| 1 μs | 28 ns  | 28 ns  |
|      | 5 ns   | 28 ns  |
|      | 28 ns  | 5 ns   |
|      | 50 ns  | 28 ns  |
|      | 28 ns  | 50 ns  |
| 5 μs | 128 ns | 128 ns |
|      | 5 ns   | 128 ns |
|      | 128 ns | 5 ns   |
|      | 250 ns | 128 ns |
|      | 128 ns | 250 ns |

## 5.5.1.4.2 Initial conditions

- None of the UICC contacts is activated.

## 5.5.1.4.3 Test procedure

| Step | Direction            | Description                                | RQ           |
|------|----------------------|--|--------------|
| 1    | T → UICC             | Activate Vcc (contact C1).                 |              |
| 2    | T → UICC             | Activate SWIO (contact C6).                |              |
| 3    | UICC → T             | Resume SWP.                                | RQ9          |
| 4    | T → UICC             | Send a transition sequence.                |              |
| 5    | UICC → T             | Send ACT_SYNC frame.                       | RQ12         |
| 6    | T → UICC<br>UICC ← T | Complete initial SWP interface activation. | RQ3,<br>RQ4  |
| 7    | T → UICC<br>UICC → T | Perform SHDLC link establishment.          | RQ3,<br>RQ4  |
| 8    | T → UICC             | Put SWP into <b>DEACTIVATED</b> state.     |              |
| 9    | T → UICC             | Initiate subsequent interface activation.  |              |
| 10   | UICC → T             | Resume SWP.                                | RQ9,<br>RQ10 |

## 5.5.1.5 Test case 4: measurement of C6 input capacitance

## 5.5.1.5.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.5.1.5.2 Initial conditions

- None of the UICC contacts is activated.

## 5.5.1.5.3 Test procedure

| Step | Direction | Description                | RQ  |
|------|-----------|----------------------------|-----|
| 1    | T → UICC  | Activate Vcc (contact C1). |     |
| 2    |           | Measure $C_{LOAD}$ .       | RQ6 |

NOTE: Clause 5.5.1.5.4 gives an example for the implementation of this test.

## 5.5.1.5.4 Example for C6 input capacitance test implementation (informative)

In this example, the test equipment provides means for capacitance measurement, e.g. by connecting temporarily an LCR-meter instead of the terminal simulator. But regardless, the test equipment has to act as valid terminal.

The capacitance measurement is done at several settings for the frequency of the AC signal (sine wave), e.g. 4 MHz, 16 MHz, 28 MHz.

With the initial condition: "None of the UICC contacts is activated", the test procedure is as follows:

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).   |     |
| 2    | T → UICC  | Activate SWIO (contact C6).  |     |
| 3    | UICC → T  | Send ACT_SYNC frame.   |     |
| 4    |           | Wait for at least 1 ms.  |     |
| 5    |           | Measure the capacitance $C_{LOAD}$ on SWIO (contact C6), with an AC signal (sine wave) applied having a signal range between $V_{IHmin}$ and $V_{IHmax}$ . | RQ6 |
| 6    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state.   |     |
| 7    |           | Wait for at least 1 ms.  |     |
| 8    |           | Measure the capacitance $C_{LOAD}$ on SWIO (contact C6), with an AC signal (sine wave) applied having a signal range between 0 V and $V_{ILmax}$ .         | RQ6 |

### 5.5.1.6 Test case y: communication with variation in bit duration

#### 5.5.1.6.1 Test execution

The bit duration between bits transmitted on S1 shall be varied such that RQ5 can be fully validated, including extended bit duration if supported by the UICC.

#### 5.5.1.6.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.5.1.6.3 Test procedure

| Step | Direction            | Description  | RQ  |
|------|----------------------|--|-----|
| 1    | T → UICC             | Activate Vcc (contact C1).   |     |
| 2    | T → UICC             | Activate SWIO (contact C6).  |     |
| 3    | UICC → T             | Resume SWP.  |     |
| 4    | T → UICC             | Send a transition sequence.  |     |
| 5    | UICC → T             | Send ACT_SYNC frame.   | RQ5 |
| 6    | T → UICC<br>UICC → T | If the terminal performs initial SWP interface activation in full power mode, complete initial SWP interface activation. | RQ5 |
| 7    | T → UICC<br>UICC → T | Establish SHDLC link   | RQ5 |
| 8    | T → UICC             | Send I-frame   |     |
| 9    | UICC → T             | Acknowledge the received I-frame   | RQ5 |

## 5.5.2 S2 switching management

### 5.5.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 8.2.

|     |  |
|-----|--|
| RQ1 | The UICC shall only perform switching of S2 when S1 is in state L, or when resuming SWP. |
|-----|--|

### 5.5.2.2 Test case 1: S2 switching management

#### 5.5.2.2.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.5.2.2.2 Initial conditions

- The SHDLC link is established.

## 5.5.2.2.3 Test procedure

| Step | Direction            | Description   | RQ  |
|------|----------------------|---|-----|
| 1    | T → UICC<br>UICC → T | Run the representative SWP frame exchange procedure.<br><br>The frame exchange shall be performed in such a way, that the referenced RQ can be fully validated. | RQ1 |

## 5.5.3 SWP interface states management

## 5.5.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 8.3.

|     |   |
|-----|---|
| RQ1 | For a transition from SWP <b>SUSPENDED</b> state to SWP <b>ACTIVATED</b> state initiated by the UICC, the UICC shall draw a current (S2 in state H). (The slave resumes by drawing a current).  |
| RQ2 | In case the state transition from SWP <b>SUSPENDED</b> state to SWP <b>ACTIVATED</b> state was initiated by the UICC, the delay after the transition sequence until the 1 <sup>st</sup> bit of the SOF is sent by the UICC shall not exceed 4 bits. |
| RQ3 | The UICC shall be capable of receiving frames in the <b>ACTIVATED</b> state.  |

## 5.5.3.2 Test case 1: SWP interface states management by the UICC

## 5.5.3.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.5.3.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.5.3.2.3 Test procedure

| Step | Direction | Description                 | RQ  |
|------|-----------|-----------------------------|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).  |     |
| 2    | T → UICC  | Activate SWIO (contact C6). |     |
| 3    | UICC → T  | Resume SWP.                 | RQ1 |
| 4    | T → UICC  | Send a transition sequence. |     |
| 5    | UICC → T  | Send ACT_SYNC frame.        | RQ2 |
| 6    | T → UICC  | Send ACT_POWER_MODE frame.  |     |
| 7    | UICC → T  | Send ACT_READY frame.       | RQ3 |

## 5.5.4 Power mode states/transitions and Power saving mode

### 5.5.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 8.4.

|     |   |
|-----|---|
| RQ1 | When the terminal activates Vcc (contact C1) the UICC shall enter the initial power state with the current consumption of the UICC complying with the value in TS 102 221 [2] for "power consumption of the UICC during ATR at 4 MHz external clock frequency".   |
| RQ2 | The UICC shall enter low power mode when this mode is indicated in a power mode frame during initial SWP interface activation or when the UICC receives the first non-ACT frame without having received a power mode frame during initial SWP interface activation.   |
| RQ3 | The UICC shall enter full power mode when this mode is indicated in a power mode frame during initial SWP interface activation, or if the conditions for full power mode on another interface are fulfilled.  |
| RQ4 | During the initial power state, the UICC may already increase its current consumption to the value defined for low power mode as soon as it detects the SWP ACTIVATED state.  |
| RQ5 | The UICC shall enter the power saving mode when all of the following conditions for activated interfaces are given: <ul style="list-style-type: none"> <li>• clock stop mode according to TS 102 221 [2] if this interface is activated (if UICC is in full power mode);</li> <li>• suspend mode according to TS 102 600 [3] if this interface is activated (if UICC is in full power mode);</li> <li>• SWP contact deactivated (if UICC is in full power mode or in low power mode). The UICC shall enter the power saving mode no later than 10 ms after the SWP is in state <b>DEACTIVATED</b>.</li> </ul> |
| RQ6 | When the UICC is in power saving mode it shall not exceed the current defined for clock stop mode in TS 102 221 [2] or the limit given for suspend mode in TS 102 600 [3] whatever the interface is activated.  |
| RQ7 | The UICC shall exit the power saving mode when at least one of the UICC interfaces is resumed from these conditions.  |

### 5.5.4.2 Test case 1: power states in low power mode (ACT\_POWER\_MODE)

#### 5.5.4.2.1 Test execution

The test procedure shall only be executed voltage class C, low power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.5.4.2.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.5.4.2.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).   | RQ1 |
| 2    | T → UICC  | Activate SWIO (contact C6).  | RQ4 |
| 3    | UICC → T  | Send ACT_SYNC frame.   | RQ4 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame indicating low power mode with FR bit set to 1 | RQ2 |
| 5    | UICC → T  | Send ACT_SYNC frame.   | RQ2 |

### 5.5.4.3 Test case 2: power states in low power mode (non-ACT)

#### 5.5.4.3.1 Test execution

The test procedure shall only be executed in voltage class C, low power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

#### 5.5.4.3.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.5.4.3.3 Test procedure

| Step | Direction | Description                | RQ  |
|------|-----------|----------------------------|-----|
| 1    | T → UICC  | Activate Vcc (contact C1)  | RQ1 |
| 2    | T → UICC  | Activate SWIO (contact C6) | RQ4 |
| 3    | UICC → T  | Send ACT_SYNC frame        | RQ4 |
| 4    | T → UICC  | Send RSET() frame          | RQ2 |
| 5    | UICC → T  | Send UA or RSET frame      | RQ2 |

#### 5.5.4.4 Test case 3: power states in full power mode, without TS 102 221

##### 5.5.4.4.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

The contacts CLK, RST, I/O of the TS 102 221 [2] interface shall not be activated.

##### 5.5.4.4.2 Initial conditions

- None of the UICC contacts is activated

##### 5.5.4.4.3 Test procedure

| Step | Direction | Description                 | RQ  |
|------|-----------|-----------------------------|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).  | RQ1 |
| 2    | T → UICC  | Activate SWIO (contact C6). | RQ4 |
| 3    | UICC → T  | Send ACT_SYNC frame.        | RQ4 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.  | RQ3 |
| 5    | UICC → T  | Send ACT_READY frame.       | RQ3 |

#### 5.5.4.5 Test case 4: power saving mode with TS 102 221 interface - restart TS 102 221 interface first

##### 5.5.4.5.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

##### 5.5.4.5.2 Initial conditions

- The SHDLIC link is established.
- The TS 102 221 [2] interface is activated.

## 5.5.4.5.3 Test procedure

| Step | Direction | Description   | RQ          |
|------|-----------|---|-------------|
| 1    | T → UICC  | On the TS 102 221 [2] interface, stop the clock when TS 102 221 [2] interface is in idle state. |             |
| 2    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state.  |             |
| 3    | UICC      | Power saving mode.  | RQ5,<br>RQ6 |
| 4    | T → UICC  | On the TS 102 221 [2] interface, restart the clock.   |             |
| 5    | T → UICC  | Send a C-APDU on the TS 102 221 [2] interface.  |             |
| 6    | UICC → T  | Send an R-APDU on the TS 102 221 [2] interface.   | RQ7         |
| 7    | T → UICC  | Initiate subsequent SWP interface activation.   |             |
| 8    | UICC → T  | Send ACT_SYNC frame.  | RQ7         |

## 5.5.4.6 Test case 5: power saving mode with TS 102 221 interface - restart TS 102 613 interface first

## 5.5.4.6.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

## 5.5.4.6.2 Initial conditions

- The SHDLC link is established.
- The TS 102 221 [2] interface is activated.

## 5.5.4.6.3 Test procedure

| Step | Direction | Description   | RQ          |
|------|-----------|---|-------------|
| 1    | T → UICC  | On the TS 102 221 [2] interface, stop the clock when TS 102 221 [2] interface is in idle state. |             |
| 2    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state.  |             |
| 3    | UICC      | Power saving mode.  | RQ5,<br>RQ6 |
| 4    | T → UICC  | Initiate subsequent SWP interface activation.   |             |
| 5    | UICC → T  | Send ACT_SYNC frame.  | RQ7         |
| 6    | T → UICC  | On the TS 102 221 [2] interface, restart the clock.   |             |
| 7    | T → UICC  | Send a C-APDU on the TS 102 221 [2] interface.  |             |
| 8    | UICC → T  | Send an R-APDU on the TS 102 221 [2] interface.   | RQ7         |

## 5.5.4.7 Test case 6: power saving mode with TS 102 600 interface - restart TS 102 600 interface first

## 5.5.4.7.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.



#### 5.5.4.7.2 Initial conditions

- The SHDLC link is established.
- The TS 102 600 [3] interface is activated.

#### 5.5.4.7.3 Test procedure

| Step | Direction | Description                                      | RQ          |
|------|-----------|--|-------------|
| 1    | T → UICC  | Enter Suspend state on TS 102 600 [3] interface. |             |
| 2    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state.           |             |
| 3    | UICC      | Power saving mode.                               | RQ5,<br>RQ6 |
| 4    | T → UICC  | Resume the TS 102 600 [3] interface.             |             |
| 5    | T → UICC  | Send a C-APDU on the TS 102 600 [3] interface.   |             |
| 6    | UICC → T  | Send an R-APDU on the TS 102 600 [3] interface.  | RQ7         |
| 7    | T → UICC  | Initiate subsequent SWP interface activation.    |             |
| 8    | UICC → T  | Send ACT_SYNC frame.                             | RQ7         |

#### 5.5.4.8 Test case 7: power saving mode with TS 102 600 interface - restart TS 102 613 interface first

##### 5.5.4.8.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

##### 5.5.4.8.2 Initial conditions

- The SHDLC link is established.
- The TS 102 600 [3] interface is activated.

##### 5.5.4.8.3 Test procedure

| Step | Direction | Description                                      | RQ          |
|------|-----------|--|-------------|
| 1    | T → UICC  | Enter Suspend state on TS 102 600 [3] interface. |             |
| 2    | T → UICC  | Put SWP into <b>DEACTIVATED</b> state.           |             |
| 3    | UICC      | Power saving mode.                               | RQ5,<br>RQ6 |
| 4    | T → UICC  | Initiate subsequent SWP interface activation.    |             |
| 5    | UICC → T  | Send ACT_SYNC frame.                             | RQ7         |
| 6    | T → UICC  | Resume the TS 102 600 [3] interface.             |             |
| 7    | T → UICC  | Send a C-APDU on the TS 102 600 [3] interface.   |             |
| 8    | UICC → T  | Send an R-APDU on the TS 102 600 [3] interface.  | RQ7         |

#### 5.5.4.9 Test case 8: power states in full power mode, with TS 102 221

##### 5.5.4.9.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test case-specific parameters for this test case.

### 5.5.4.9.2 Initial conditions

- None of the UICC contacts is activated.

### 5.5.4.9.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).                                       | RQ1 |
| 2    | T → UICC  | Activate SWIO (contact C6).                                      | RQ4 |
| 3    | UICC → T  | Send ACT_SYNC frame.   | RQ4 |
| 4    | T → UICC  | Activate contacts CLK, RST, I/O of the TS 102 221 [2] interface. | RQ3 |

## 5.6 Data link layer

### 5.6.1 Overview

Reference: TS 102 613 [1], clause 9.1.

There are no conformance requirements for the UICC for the referenced clause.

### 5.6.2 Medium Access Control (MAC) layer

#### 5.6.2.1 Bit order

##### 5.6.2.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.2.1.

|       |   |
|-------|---|
| RQ1   | The UICC shall send payload data with MSB first.                                      |
| RQ2   | The UICC shall interpret payload data received from the CLF with MSB first.           |
| NOTE: | RQ1 and RQ2 are validated implicitly in other test cases within the present document. |

##### 5.6.2.1.2 Void

#### 5.6.2.2 Structure

##### 5.6.2.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.2.2.

|     |   |
|-----|---|
| RQ1 | The UICC shall correctly interpret error free frames sent by CLF with at least one idle bit between the frames.                     |
| RQ2 | Between frames, idle bits (logical value 0) are sent. There is at least one idle bit between frames.                                |
| RQ3 | A wakeup sequence, consisting of a bit with logical value 1, shall be inserted before each frame sent from the slave to the master. |
| RQ4 | The UICC shall reject incorrectly formed frames sent by CLF (this includes incorrect frame structures).                             |
| RQ5 | The UICC shall send correctly formed frames to the CLF.   |

### 5.6.2.2.2 Test case 1: interpretation of incorrectly formed frames - ACT LLC

#### 5.6.2.2.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters:

- Incorrectly formed ACT LLC frame:
  - ACT\_POWER\_MODE frame with wrong CRC16.
  - ACT\_POWER\_MODE frame, no SOF.
  - ACT LLC frame with ACT\_POWER\_MODE in the LLC control field, no CRC16.
  - ACT LLC frame with ACT\_POWER\_MODE in the LLC control field, followed by 7 bits with value 0, CRC16 calculated for a ACT\_POWER\_MODE frame indicating full power mode.
  - Frame with no Payload and no CRC16.

#### 5.6.2.2.2.2 Initial conditions

- None of the UICC contacts is activated.

#### 5.6.2.2.2.3 Test procedure

| Step | Direction | Description                            | RQ           |
|------|-----------|--|--------------|
| 1    | T → UICC  | Activate Vcc (contact C1).             |              |
| 2    | T → UICC  | Activate SWIO (contact C6).            |              |
| 3    | UICC → T  | Send ACT_SYNC frame.                   | RQ5.         |
| 4    | T → UICC  | Send incorrectly formed ACT LLC frame. |              |
| 5    | UICC → T  | No response.                           | RQ4          |
| 6    | T → UICC  | Send ACT_POWER_MODE frame.             |              |
| 7    | UICC → T  | Respond with ACT_READY frame.          | RQ1,<br>RQ5. |

### 5.6.2.2.3 Test case 2: interpretation of incorrectly formed frames - SHDLC RSET frames

#### 5.6.2.2.3.1 Test execution

The test procedure shall be executed once for each of the following parameters.

- Incorrectly formed SHDLC LLC RSET frame:
  - RSET() frame with wrong CRC16.
  - RSET() frame, no SOF.
  - Frame with no Payload and no CRC16.

#### 5.6.2.2.3.2 Initial conditions

- The SHDLC link is established and no further communication is expected.

## 5.6.2.2.3.3 Test procedure

| Step | Direction  | Description                                     | RQ          |
|------|------------|---|-------------|
| 1    | T → UICC   | Send incorrectly formed SHDLC LLC RSET() frame. |             |
| 2    | UICC → T   | No response.                                    | RQ4         |
| 3    | T → UICC   | Send RSET().                                    |             |
| 4    | T ← → UICC | Complete SHDLC link re-establishment.           | RQ1,<br>RQ5 |

## 5.6.2.2.4 Test case 3: interpretation of incorrectly formed frames - SHDLC I-frames

## 5.6.2.2.4.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- Incorrectly formed SHDLC LLC I-frame:
  - I-Frame with wrong CRC16.
  - I-Frame, no SOF.
  - Frame with no Payload and no CRC16.

## 5.6.2.2.4.2 Initial conditions

- The SHDLC link is established without SREJ support, and no further communication is expected.

## 5.6.2.2.4.3 Test procedure

| Step | Direction | Description  | RQ         |
|------|-----------|--|------------|
| 1    | T → UICC  | Send corrupted frame followed immediately by I-frame (NS0_S+2,x), where NS0_S is the sequence number of the last I-frame sent by the terminal simulator which was successfully acknowledged by the UICC. |            |
| 2    | UICC → T  | Send REJ(NS0_S+1).   | RQ4<br>RQ5 |

## 5.6.2.2.5 Test case 4: communication with frames - idle bits and wakeup sequence

## 5.6.2.2.5.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

## 5.6.2.2.5.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.2.2.5.3 Test procedure

| Step | Direction            | Description   | RQ          |
|------|----------------------|---|-------------|
| 1    | T → UICC             | Activate Vcc (contact C1).  |             |
| 2    | T → UICC             | Activate SWIO (contact C6).   |             |
| 3    | UICC → T<br>T → UICC | Perform SWP interface activation and SHDLC link establishment.  | RQ2,<br>RQ3 |
| 4    | User → UICC          | Trigger the UICC to send 9 I-frames.<br>Where possible, the UICC should be triggered in such a way that the I-frames will be sent in as close succession as possible. |             |
| 5    | UICC → T<br>T → UICC | UICC send I-Frames as indicated in step 4.<br>Terminal simulator acknowledges these I-frames.   | RQ2,<br>RQ3 |
| 6    | T → UICC             | Send 4 consecutive I-frames, with at least two occurrences of consecutive I-frames transmitted with a single idle bit between the frames.                             |             |
| 7    | UICC → T             | UICC acknowledges these frames  | RQ1         |

## 5.6.2.3 Bit stuffing

## 5.6.2.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.2.3.

|     |   |
|-----|---|
| RQ1 | Zero bit stuffing shall be employed by the transmitting entity when sending the payload and the CRC on SWP. After five consecutive bits with the logical value 1, a bit with the logical value 0 is inserted. |
| RQ2 | If the last five bits of the CRC contain the logical value 1, then no bit with the logical value 0 shall be added.  |
| RQ3 | In a received frame, the UICC shall recognize stuffed bits and discard them.  |

## 5.6.2.3.2 Test case 1: behaviour of UICC with bit stuffing in frame

## 5.6.2.3.2.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

## 5.6.2.3.2.2 Initial conditions

- The SHDLC link is established and no further communication is expected.

## 5.6.2.3.2.3 Test procedure

| Step | Direction  | Description  | RQ                 |
|------|------------|--|--------------------|
| 1    | T ← → UICC | Run the representative SWP frame exchange procedure.<br>Exchanged data shall be chosen in such a way that all referenced RQs can be fully validated. | RQ1<br>RQ2,<br>RQ3 |

## 5.6.2.4 Error detection

## 5.6.2.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.2.4.

|     |  |
|-----|--|
| RQ1 | Frames transmitted by UICC shall use the 16 bit frame checking sequence as given in ISO/IEC 13239 [9] on bits between SOF and EOF, which are both excluded, to compute the CRCs. |
| RQ2 | The UICC shall detect errors on received frames using the 16 bit frame checking sequence as given in ISO/IEC 13239 [9] on bits between SOF and EOF, which are both excluded.     |

#### 5.6.2.4.2 Test case 1: RSET with CRC error

##### 5.6.2.4.2.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

##### 5.6.2.4.2.2 Initial conditions

- SWP interface is activated.

##### 5.6.2.4.2.3 Test procedure

| Step | Direction | Description                 | RQ  |
|------|-----------|-----------------------------|-----|
| 1    | T → UICC  | Send RSET() with CRC error. |     |
| 2    | UICC      | No response.                | RQ2 |
| 3    | T → UICC  | Send RSET().                |     |
| 4    | UICC → T  | Respond UA or RSET.         | RQ1 |

### 5.6.3 Supported LLC layers

#### 5.6.3.1 Supported LLC layers

##### 5.6.3.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.3.

|     |  |
|-----|--|
| RQ1 | The UICC shall support the SHDLC LLC layer.            |
| RQ2 | The UICC shall support the ACT LLC layer.              |
| RQ3 | LPDUs shall be structured according to TS 102 613 [1]. |

##### 5.6.3.1.2 Test case 1: support of ACT LLC and ACT LPDU structure

###### 5.6.3.1.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

###### 5.6.3.1.2.2 Initial conditions

- None of the UICC contacts is activated.

###### 5.6.3.1.2.3 Test procedure

| Step | Direction | Description                 | RQ          |
|------|-----------|-----------------------------|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).  |             |
| 2    | T → UICC  | Activate SWIO (contact C6). |             |
| 3    | UICC → T  | Send ACT_SYNC frame.        | RQ2,<br>RQ3 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.  |             |
| 5    | UICC → T  | Send ACT_READY frame.       | RQ2,<br>RQ3 |

### 5.6.3.1.3 Test case 2: support of SHDLC LLC and SHDLC LPDU structure

#### 5.6.3.1.3.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

#### 5.6.3.1.3.2 Initial conditions

- The SWP interface is activated.

#### 5.6.3.1.3.3 Test procedure

| Step | Direction  | Description   | RQ          |
|------|------------|---|-------------|
| 1    | T ← → UICC | Perform SHDLC link establishment.   |             |
| 2    | T ← → UICC | Run the representative SWP frame exchange procedure.<br>Exchange of I-frames and S-frames in both directions shall be included. | RQ1,<br>RQ3 |

### 5.6.3.2 Interworking of the LLC layers

#### 5.6.3.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.3.1.

|  |   |
|--|---|
| RQ1  | After the SWIO activation or after the transition of S1 to state H from <b>DEACTIVATED</b> state, the ACT LLC shall be used by the UICC.                                |
| RQ2  | After the UICC and the CLF have established the SHDLC link, the UICC shall not send ACT LLC frames.   |
| RQ3  | After the UICC and the CLF have opened a CLT session, the UICC shall not send ACT LLC frames.   |
| RQ4  | After the UICC and the CLF have established the SHDLC link, the UICC shall ignore received ACT LLC frames.  |
| RQ5  | After the UICC and the CLF have opened a CLT session, the UICC shall ignore received ACT LLC frames.  |
| RQ6  | To enter the SHDLC LLC for the first time after SWP interface activation, the link establishment procedure (as described in TS 102 613 [1]) shall apply.                |
| RQ7  | Once the SHDLC link is established, a CLT session shall not invalidate the SHDLC context and the endpoint capabilities negotiated during the SHDLC link establishments. |
| RQ8  | During a CLT session, if an SHDLC LLC frame is received by the UICC, then the UICC shall consider the CLT session as closed.  |
| RQ9  | On receiving a corrupted SWP frame, the UICC shall use the error recovery procedure defined for LLC of the last correctly received SWP frame.                           |
| RQ10   | Immediately after SWIO activation or after the transition of S1 to state H from <b>DEACTIVATED</b> state, the error handling of the ACT LLC shall apply.                |
| NOTE 1: RQ2 and RQ3 are non-occurrence RQs.                                      |   |
| NOTE 2: Development of test cases for RQ2 and RQ3 is FFS.                        |   |
| NOTE 3: Test cases for RQ6 are given also in clause 5.7 of the present document. |   |
| NOTE 4: RQ9 is tested in clause 5.6.2.2.4 in the context of the SHDLC LLC.       |   |

#### 5.6.3.2.2 Test case 1: error handling of ACT LLC on reception of corrupted frame, after SWIO activation

##### 5.6.3.2.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

## 5.6.3.2.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.3.2.2.3 Test procedure

| Step | Direction  | Description                               | RQ    |
|------|------------|---|-------|
| 1    | T → UICC   | Activate Vcc (contact C1).                |       |
| 2    | T → UICC   | Activate SWIO (contact C6).               |       |
| 3    | UICC → T   | Send ACT_SYNC frame.                      | RQ1   |
| 4    | T → UICC   | Send corrupted frame.                     |       |
| 5    | UICC → T   | No response.                              | RQ10, |
| 6    | T → UICC   | Send ACT_POWER_MODE frame with FR = 0.    |       |
| 7    | UICC → T   | Send ACT_READY frame.                     |       |
| 8    | T → UICC   | Send corrupted frame.                     |       |
| 9    | UICC → T   | No response.                              | RQ9   |
| 10   | T → UICC   | Put SWP in <b>DEACTIVATED</b> state.      |       |
| 11   | T → UICC   | Initiate subsequent interface activation. |       |
| 12   | UICC → T   | Send ACT_SYNC frame.                      | RQ1   |
| 13   | T → UICC   | Send corrupted frame.                     |       |
| 14   | UICC → T   | No response.                              | RQ10  |
| 15   | T ← → UICC | Perform SHDLIC link establishment.        | RQ10  |

## 5.6.3.2.3 Test case 2: ignore ACT LLC frame reception after the SHDLIC link establishment

## 5.6.3.2.3.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

## 5.6.3.2.3.2 Initial conditions

- The SHDLIC link is established and no further communication is expected.

## 5.6.3.2.3.3 Test procedure

| Step | Direction | Description                                   | RQ  |
|------|-----------|---|-----|
| 1    | T → UICC  | Send ACT_POWER_MODE frame.                    |     |
| 2    | UICC      | No response or response not based on ACT LLC. | RQ4 |
| 3    | T → UICC  | Send I-frame.                                 |     |
| 4    | UICC → T  | Acknowledge I-frame.                          | RQ4 |

## 5.6.3.2.4 Test case 3: ignore ACT LLC frame reception in CLT session

## 5.6.3.2.4.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- CLT LLC transporting ISO/IEC 14443-3 [6] type A data, if available, and CLT LLC transporting ISO/IEC 18092 [8] data, if available.

## 5.6.3.2.4.2 Initial conditions

- The CLT session is established and last frame exchange was a UICC response based on CLT LLC.



## 5.6.3.2.4.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Send ACT_POWER_MODE frame.   |     |
| 2    | UICC      | No response or response not based on ACT LLC.                      | RQ5 |
| 3    | T → UICC  | Send valid CLT frame with ADMIN_FIELD = No administrative command. |     |
| 4    | UICC → T  | Send valid CLT response frame.                                     | RQ5 |

## 5.6.3.2.5 Test case 4: CLT session during SHDLC communication

## 5.6.3.2.5.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- CLT LLC transporting ISO/IEC 14443-3 [6] type A data, if available, and CLT LLC transporting ISO/IEC 18092 [8] data, if available.

## 5.6.3.2.5.2 Initial conditions

- The SWP interface is activated.

## 5.6.3.2.5.3 Test procedure

| Step | Direction  | Description  | RQ  |
|------|------------|--|-----|
| 1    | T ← → UICC | Perform SHDLC link establishment.  |     |
| 2    | T ← → UICC | Exchange the SHDLC frames according to upper layer, at least as needed to enter a CLT session.   |     |
| 3    | T          | Wait until no further communication is expected over the SHDLC link.   |     |
| 4    | T → UICC   | Send CLT frame to open a CLT session.  |     |
| 5    | UICC → T   | Respond CLT frame.   |     |
| 6    | T ← → UICC | Perform further SHDLC communication using the previous SHDLC context and the endpoint capabilities negotiated during the SHDLC link establishment. | RQ7 |

## 5.6.3.2.6 Test case 5: closing condition of CLT session whereas SHDLC link has been established before CLT session

## 5.6.3.2.6.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- CLT LLC transporting ISO/IEC 14443-3 [6] type A data, if available, and CLT LLC transporting ISO/IEC 18092 [8] data, if available.

## 5.6.3.2.6.2 Initial conditions

- The SHDLC link was established before opening of CLT session.
- The CLT session is established and last frame exchange was a UICC response based on CLT LLC.

## 5.6.3.2.6.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Send I-frame.  |     |
| 2    | UICC → T  | Acknowledge I-frame.                                     |     |
| 3    | T → UICC  | Send CLT frame which is not valid to open a CLT session. |     |
| 4    | UICC → T  | No response or response not based on CLT session.        | RQ8 |

### 5.6.3.2.7 Test case 6: closing condition of CLT session whereas SHDLC link has not been established before CLT session

#### 5.6.3.2.7.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- CLT LLC transporting ISO/IEC 14443-3 [6] type A data, if available, and CLT LLC transporting ISO/IEC 18092 [8] data, if available.

#### 5.6.3.2.7.2 Initial conditions

- The SHDLC link was not established before opening of CLT session.
- The CLT session is established and last frame exchange was a UICC response based on CLT LLC.

#### 5.6.3.2.7.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T ← →UICC | Perform SHDLC link establishment.                        |     |
| 2    | T → UICC  | Send CLT frame which is not valid to open a CLT session. |     |
| 3    | UICC → T  | No response or response not based on CLT session.        | RQ8 |

### 5.6.3.2.8 Test case 7: interpretation of corrupted frames - single SHDLC frame

#### 5.6.3.2.8.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

#### 5.6.3.2.8.2 Initial conditions

- The SHDLC link is established and no further communication is expected.

#### 5.6.3.2.8.3 Test procedure

| Step | Direction | Description           | RQ  |
|------|-----------|-----------------------|-----|
| 1    | T → UICC  | Send corrupted frame. |     |
| 2    | UICC → T  | No response.          | RQ9 |
| 3    | T → UICC  | Send I-frame.         |     |
| 4    | UICC → T  | Acknowledge I-frame.  | RQ9 |

#### 5.6.3.2.9 Void

### 5.6.3.2.10 Test case 9: interpretation of corrupted frames - CLT frames

#### 5.6.3.2.10.1 Test execution

The test procedure shall be executed once for each of the following parameters:

- CLT LLC transporting ISO/IEC 14443-3 [6] type A data, if available, and CLT LLC transporting ISO/IEC 18092 [8] data, if available.

#### 5.6.3.2.10.2 Initial conditions

- The CLT session is established and last frame exchange was a UICC response based on CLT LLC.

## 5.6.3.2.10.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | T → UICC  | Send corrupted frame.  |     |
| 2    | UICC → T  | No response.   | RQ9 |
| 3    | T → UICC  | Send valid CLT frame with ADMIN_FIELD = No administrative command. |     |
| 4    | UICC → T  | Send valid CLT response frame.                                     | RQ9 |

## 5.6.4 ACT LLC definition

## 5.6.4.1 ACT LLC definition

## 5.6.4.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.4.

NOTE: Test cases for conformance requirements for clause 9.4 are also given in clause 5.3.2.3.

|                            |                |  |
|----------------------------|----------------|--|
| RQ1                        |                | The ACT LPDU shall be structured according to TS 102 613 [1].                                      |
| RQ2                        |                | When a UICC receives an ACT frame, it shall ignore the INF bit.                                    |
| RQ3                        |                | A frame sent from the UICC to the CLF shall have the FR bit set to 0.                              |
| RQ4                        |                | ACT_READY frames shall have an ACT_DATA field length of zero bytes.                                |
| RQ5                        |                | ACT_SYNC frames shall have an ACT_DATA field length of two bytes.                                  |
| RQ6                        |                | The UICC shall not use RFU values in the ACT_CTRL field when transmitting frames.                  |
| RQ7                        | Rel 7<br>Rel 8 | Bits b8 to b3 of ACT_INFORMATION field shall all have the value 0.                                 |
| RQ8                        |                | Extended SWP bit duration down to 0,590 µs shall be supported if b2 of ACT_INFORMATION field is 1. |
| RQ9                        |                | Extended SWP bit durations up to 10 µs shall be supported if b1 of ACT_INFORMATION field is 1.     |
| RQ10                       | REL9           | Bits b8 to b4 of ACT_INFORMATION field shall all have the value 0.                                 |
| RQ11                       | REL9           | Extended resume shall be supported if b3 of ACT_INFORMATION field is 1.                            |
| NOTE: RQ11 testing is FFS. |                |  |

## 5.6.4.1.2 Test case 1: structure of ACT LPDU - full power mode

## 5.6.4.1.2.1 Test execution

The test procedure shall only be executed in voltage class B and voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

## 5.6.4.1.2.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.4.1.2.3 Test procedure

| Step | Direction | Description                 | RQ                           |
|------|-----------|-----------------------------|------------------------------|
| 1    | T → UICC  | Activate Vcc (contact C1).  |                              |
| 2    | T → UICC  | Activate SWIO (contact C6). |                              |
| 3    | UICC → T  | Send ACT_SYNC frame.        | RQ1,<br>RQ3,<br>RQ5,<br>RQ6. |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.  |                              |
| 5    | UICC → T  | Send ACT_READY frame.       | RQ1,<br>RQ3,<br>RQ4,<br>RQ6  |

## 5.6.4.1.3 Test case 2: structure of ACT LPDU - low power mode

## 5.6.4.1.3.1 Test execution

The test procedure shall only be executed in voltage class C, low power mode.

The test procedure shall be executed once for each of the following parameters:

- There are no test case-specific parameters for this test case.

## 5.6.4.1.3.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.4.1.3.3 Test procedure

| Step | Direction | Description                           | RQ                          |
|------|-----------|---------------------------------------|-----------------------------|
| 1    | T → UICC  | Activate Vcc (contact C1).            |                             |
| 2    | T → UICC  | Activate SWIO (contact C6).           |                             |
| 3    | UICC → T  | Send ACT_SYNC frame.                  | RQ1,<br>RQ3,<br>RQ5,<br>RQ6 |
| 4    | T → UICC  | Send ACT_POWER_MODE frame with FR =1. |                             |
| 5    | UICC → T  | Send ACT_SYNC frame.                  | RQ1,<br>RQ3,<br>RQ5,<br>RQ6 |

## 5.6.4.1.4 Test case 3: behaviour of UICC on reception of ACT frames - values of INF bit

## 5.6.4.1.4.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters.

- ACT\_POWER\_MODE frame:
  - INF =0;
  - INF =1.

## 5.6.4.1.4.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.4.1.4.3 Test procedure

| Step | Direction | Description                 | RQ  |
|------|-----------|-----------------------------|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).  |     |
| 2    | T → UICC  | Activate SWIO (contact C6). |     |
| 3    | UICC → T  | Send ACT_SYNC frame.        |     |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.  |     |
| 5    | UICC → T  | Send ACT_READY frame.       | RQ2 |

## 5.6.4.1.5 Test case 4: RFU values in ACT\_INFORMATION field

## 5.6.4.1.5.1 Test execution

The test procedure shall only be executed for releases 7 and 8.

The test procedure shall be executed once for each of the following parameters.

- There are no test case-specific parameters for this test case.

## 5.6.4.1.5.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.4.1.5.3 Test procedure

| Step | Direction | Description                                       | RQ  |
|------|-----------|---|-----|
| 1    | T → UICC  | Activate Vcc (contact C1).                        |     |
| 2    | T → UICC  | Activate SWIO (contact C6).                       |     |
| 3    | UICC → T  | Send ACT_SYNC frame (with ACT_INFORMATION field). | RQ7 |

## 5.6.4.1.6 Test case 5: extended bit durations as per ACT\_INFORMATION field

## 5.6.4.1.6.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of the following parameters:

- For ACT\_POWER\_MODE and ACT\_READY, apply the following bit duration:
  - If ACT\_INFORMATION field bit 2 set to 0 and bit 1 is set to 1:
    - 10 μs.
  - If ACT\_INFORMATION field bit 2 set to 1 and bit 1 is set to 0:
    - 0,590 μs.
  - If ACT\_INFORMATION field bit 2 set to 1 and bit 1 is set to 1:
    - 10 μs and 0,590 μs.

## 5.6.4.1.6.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.4.1.6.3 Test procedure

| Step | Direction | Description                                       | RQ          |
|------|-----------|---|-------------|
| 1    | T → UICC  | Activate Vcc (contact C1).                        |             |
| 2    | T → UICC  | Activate SWIO (contact C6).                       |             |
| 3    | UICC → T  | Send ACT_SYNC frame (with ACT_INFORMATION field). |             |
| 4    | T → UICC  | Send ACT_POWER_MODE frame.                        |             |
| 5    | UICC → T  | Send ACT_READY frame.                             | RQ8,<br>RQ9 |

## 5.6.4.1.7 Test case 6-1: RFU values in ACT\_INFORMATION field

## 5.6.4.1.7.1 Test execution

The test procedure shall be executed from release 9 only.

The test procedure shall be executed once for each of the following parameters.

- There are no test case-specific parameters for this test case.

## 5.6.4.1.7.2 Initial conditions

- None of the UICC contacts is activated.

## 5.6.4.1.7.3 Test procedure

| Step | Direction | Description                                       | RQ   |
|------|-----------|---|------|
| 1    | T → UICC  | Activate Vcc (contact C1).                        |      |
| 2    | T → UICC  | Activate SWIO (contact C6).                       |      |
| 3    | UICC → T  | Send ACT_SYNC frame (with ACT_INFORMATION field). | RQ10 |

## 5.6.4.2 SYNC\_ID verification process

## 5.6.4.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 9.4.1.

|       |  |
|-------|--|
| RQ1   | The UICC shall send an ACT_SYNC frame containing 'verification data' when the SWP interface is activated.  |
| NOTE: | For RQ1, the presence of the SYNC_ID is covered by RQ5 in clause 5.6.4.1. Further use of verification data is up to upper layer and is out of scope of the present document. |

## 5.7 SHDLC LLC definition

## 5.7.1 SHDLC overview

## 5.7.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.1.

|     |  |
|-----|--|
| RQ1 | The SHDLC layer in an endpoint shall ensure that data passed up to the next layer has been received exactly as transmitted (i.e. error free, without loss and in the correct order). |
| RQ2 | If an endpoint receives a corrupted frame, it shall discard the frame.   |

### 5.7.1.2 Test Case 1: data passed up to the next layer

#### 5.7.1.2.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

The data sent by the ES shall have the following characteristics:

- The message in the EVT\_POST\_DATA shall be fragmented into 9 I-frames

#### 5.7.1.2.2 Initial conditions

- SHDLC link is established.
- A pipe (PIPE\_LOOP\_BACK) has been created to the HCI host's loopback gate, and is currently open.

#### 5.7.1.2.3 Test procedure

| Step | Direction  | Description   | RQ  |
|------|------------|---|-----|
| 1    | ES ← → EUT | Send from the ES an EVT_POST_DATA message containing referenced sent data on PIPE_LOOP_BACK<br><br>Send back from the EUT a corresponding EVT_POST_DATA message containing the referenced data on PIPE_LOOP_BACK in the expected order. | RQ1 |

### 5.7.1.3 Test Case 2: error management, EUT sending I-Frame

#### 5.7.1.3.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.1.3.2 Initial Conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

#### 5.7.1.3.3 Test procedure

| Step | Direction  | Description  | RQ  |
|------|------------|--|-----|
| 1    | ES → EUT   | Send a corrupted RNR frame.  |     |
| 2    | User → EUT | Trigger the EUT to send an I-frame.                                |     |
| 3    | EUT → ES   | Send I(NS0_T,x).   | RQ2 |
| 4    | ES → EUT   | Send a corrupted RR(NS0_T+1) frame.                                |     |
| 5    | ES         | Wait at least T2 time and does not acknowledge the received frame. |     |
| 6    | EUT → ES   | Send I(NS0,x).   | RQ2 |

### 5.7.1.4 Test Case 3: error management

#### 5.7.1.4.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.1.4.2 Initial Conditions

- SHDLC link is established and idle, i.e. no further communication is expected

#### 5.7.1.4.3 Test procedure

| Step | Direction  | Description  | RQ  |
|------|------------|--|-----|
| 1    | ES → EUT   | Send a corrupted I-frame.  |     |
| 2    | ES ← → EUT | ES waits at least 20 ms and don't retransmit it.<br>The EUT does not send any frame. | RQ2 |
| 3    | ES → EUT   | Send a corrupted RSET frame.   |     |
| 4    | ES ← → EUT | ES waits at least T3 time and don't retransmit it.<br>EUT does not send any frame.   | RQ2 |

### 5.7.2 Endpoints

#### 5.7.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.2.

There are no conformance requirements for the EUT for the referenced clause.

### 5.7.3 SHDLC frames types

#### 5.7.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.3.

There are no conformance requirements for the EUT for the referenced clause.

### 5.7.4 Control Field

#### 5.7.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.4.

All conformance requirements for the referenced clause are included in clause 5.7.7.3.1 of the present document.

#### 5.7.4.2 I-Frames coding

##### 5.7.4.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.4.1.

There are no conformance requirements for the EUT for the referenced clause.



### 5.7.4.3 S-Frames coding

#### 5.7.4.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.4.2.

|         |  |
|---------|--|
| RQ1     | Optional type of frame shall not be used before capability negotiation is defined during initialization. |
| RQ2     | Only one SREJ shall remain outstanding on each link direction at any one time.                           |
| RQ3     | An endpoint shall not send a S-frame with an information field.  |
| RQ4     | An SREJ shall be transmitted for each erroneous frame; each frame is treated as a separate error.        |
| NOTE 1: | RQ1, RQ2 and RQ4 for the referenced clause are included in clause 5.7.7.9.1 of the present document.     |
| NOTE 2: | RQ3 is a non-occurrence RQ.  |

### 5.7.4.4 U-Frames coding

#### 5.7.4.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.4.3.

|       |   |
|-------|---|
| RQ1   | An endpoint shall only send U-Frames using modifiers specified in TS 102 613 [1]. |
| NOTE: | RQ1 is not tested, as it is a non-occurrence RQ.                                  |

## 5.7.5 Changing sliding window size and endpoint capabilities

### 5.7.5.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.5.

All conformance requirements for the referenced clause are included in clause 5.7.7.3.1 of the present document.

### 5.7.5.2 RSET frame payload

#### 5.7.5.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.5.1.

All conformance requirements for the referenced clause are included in clause 5.7.7.3.1 of the present document.

### 5.7.5.3 UA frame payload

#### 5.7.5.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.5.2.

All conformance requirements for the referenced clause are included in clause 5.7.7.3.1 of the present document.

#### 5.7.5.3.2 Void

## 5.7.6 SHDLC context

### 5.7.6.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.6.

There are no conformance requirements for the EUT for the referenced clause.

### 5.7.6.2 Constants

#### 5.7.6.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.6.1.

|  |   |
|--|---|
| RQ1  | I-frames shall be acknowledged within T1.   |
| RQ2  | If the I-frames are not acknowledged, an endpoint shall retransmit these frames not sooner than T2.                                       |
| RQ3  | An endpoint shall retry to setup link if the targeted endpoint did not answer with a UA or a RSET frame to a RSET frame within T3 (5 ms). |
| NOTE 1: RQ1 for the referenced clause is included in clause 5.7.7.5.1 of the present document. |   |
| NOTE 2: RQ2 for the referenced clause is included in clause 5.7.7.7.1 of the present document. |   |
| NOTE 3: RQ3 for the referenced clause is included in clause 5.7.7.3.1 of the present document. |   |

### 5.7.6.3 Variables

#### 5.7.6.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.6.2.

All conformance requirements for the referenced clause are included in clause 5.7.7.5.1 of the present document.

### 5.7.6.4 Initial Reset state

#### 5.7.6.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.6.3.

|     |  |
|-----|--|
| RQ1 | The following initial states shall apply in every endpoint after successful link establishment:<br>$N(S) = N(R) = DN(R) = 0$ . |
|-----|--|

#### 5.7.6.4.2 Test case 1: initial state at link reset - reset by the EUT

##### 5.7.6.4.2.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

##### 5.7.6.4.2.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

## 5.7.6.4.2.3 Test procedure

| Step | Direction   | Description   | RQ  |
|------|-------------|---|-----|
| 1    | User → EUT  | Trigger the EUT to reset the SHDLC link.  |     |
| 2    | EUT → ES    | Send RSET.  |     |
| 3    | ES → EUT    | Send UA.  |     |
| 4    | Conditional | If the EUT does not immediately send I-frames after SHDLC link establishment, trigger the EUT to send an I-frame. |     |
| 5    | EUT → ES    | Send I-frame(0,0).  | RQ1 |
| 6    | ES → EUT    | Send RR(1).   |     |
| 7    | Conditional | If the EUT continue to send I-frames, acknowledge them.   |     |
| 8    | ES → EUT    | Send I-frame(0,NR).   |     |
| 9    | EUT → ES    | acknowledge the previously sent I-frame.  | RQ1 |

## 5.7.6.4.3 Test case 2: initial state at link reset - reset by the ES

## 5.7.6.4.3.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

Run this test procedure with each of the following initial conditions:

- The SWP interface is activated and SHDLC link is not established.
- SHDLC link is established and idle, i.e. no further communication is expected.

## 5.7.6.4.3.2 Initial conditions

The initial conditions shall be established as specified in the test execution clause.

## 5.7.6.4.3.3 Test procedure

| Step | Direction                 | Description   | RQ  |
|------|---------------------------|---|-----|
| 1    | ES → EUT                  | Send RSET( $Ws=2$ , $SREJ=0$ ).   |     |
| 2    | EUT → ES                  | Send UA.  |     |
| 3    | Conditional<br>User → EUT | If the EUT does not immediately send I-frames after SHDLC link establishment, trigger the EUT to send an I-frame. |     |
| 4    | EUT → ES                  | Send I-frame(0,0).  | RQ1 |
| 5    | ES → EUT                  | Send RR(1).   |     |
| 6    | Conditional               | If the EUT continue to send I-frames, acknowledge them.   |     |
| 7    | ES → EUT                  | Send I-frame(0,NR).   |     |
| 8    | EUT → ES                  | Acknowledge the previously sent I-frame.  | RQ1 |

## 5.7.7 SHDLC sequence of frames

## 5.7.7.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.7.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.7.2 Nomenclature

## 5.7.7.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.7.1.

There are no conformance requirements for the EUT for the referenced clause.

### 5.7.7.3 Link establishment with default sliding window size

#### 5.7.7.3.1 Conformance requirements

Reference: TS 102 613 [1], clauses 10.7.2, 10.7.4, 10.4, 10.5, 10.1 and 10.5.2.

|  |        |   |
|--|--------|---|
| RQ1  | 10.7.2 | An endpoint establishing an SHDLC link shall initiate link establishment by sending a RSET frame.   |
| RQ2  | 10.7.2 | If an endpoint supports the sliding window size and SREJ value in the RSET frame, it shall acknowledge that frame with a UA frame.  |
| RQ3  | 10.7.2 | An endpoint receiving a RSET frame without window size and/or endpoint capabilities field shall interpret the RSET frame as if it contained the default values.   |
| RQ4  | 10.7.2 | Before link establishment, all SHDLC frames except RSET from other endpoint shall be discarded.   |
| RQ5  | 10.7.2 | If the link is re-established, all buffered frames (received out of order or stored in the retransmission queue) shall be discarded.  |
| RQ6  | 10.7.2 | If the link is re-established, an endpoint shall inform the upper layer of a link reset.  |
| RQ7  | 10.7.2 | An endpoint shall support a link re-establishment which is initiated by the peer endpoint.  |
| RQ8  | 10.4   | An endpoint's default size of sliding window shall be four frames.  |
| RQ9  | 10.5   | If the initial sliding window size is too large or SREJ support is requested and the receiving endpoint cannot handle (at least one) of those features, it shall not acknowledge the RSET frame. Instead, the receiver shall send a RSET frame with an appropriate sliding window size and/or SREJ frame support bit. |
| RQ10   | 10.5   | An endpoint shall obey to window size reconfiguration and/or SREJ support if the requested window size is lower than its default configuration or the peer endpoint does not support SREJ frames.   |
| RQ11   | 10.5.1 | The number provided for the endpoint sliding window size shall be between 2 to 4 inclusive.   |
| RQ12   | 10.5.1 | In case this RSET frame is sent in response to a received RSET frame, the endpoint size value shall not be higher than the previously provided value.   |
| RQ13   | 10.5.1 | If an RSET frame is received without the second optional byte the default value of SREJ not supported should be used.   |
| RQ14   | 10.6.1 | An endpoint shall retry to setup link if the targeted endpoint did not answer with a UA or a RSET frame to a RSET frame within T3(5 ms).  |
| RQ15   | 10.7.4 | Once the link is established, an endpoint shall be able to receive data.  |
| RQ16   | 10.5.2 | The endpoint shall not include a payload in UA frames.  |
| NOTE 1: Tests for RQ6 are out of scope of the present document.  |        |   |
| NOTE 2: Part of RQ5 related to discarding frame in the retransmission buffer when the link is re-establish will not be tested. |        |   |

#### 5.7.7.3.2 Test Case 1: link establishment by the EUT

##### 5.7.7.3.2.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

##### 5.7.7.3.2.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

##### 5.7.7.3.2.3 Test procedure

| Step | Direction  | Description                                  | RQ   |
|------|------------|--|------|
| 1    | User → EUT | Trigger the EUT to establish the SHDLC link. |      |
| 2    | EUT → ES   | Send RSET.                                   | RQ1  |
| 3    | ES → EUT   | Send UA.                                     |      |
| 4    | ES → EUT   | Send an I-frame.                             |      |
| 5    | EUT → ES   | Acknowledge the previously sent I-frame.     | RQ15 |

### 5.7.7.3.3 Test Case 2: link establishment by the ES

#### 5.7.7.3.3.1 Test execution

For every RSET frame in the table below which contains a window size and endpoint capabilities which are supported by the endpoint under test:

|                 |
|-----------------|
| RSET()          |
| RSET(2)         |
| RSET(3)         |
| RSET(4)         |
| RSET(2, SREJ=0) |
| RSET(2, SREJ=1) |
| RSET(3, SREJ=0) |
| RSET(3, SREJ=1) |
| RSET(4, SREJ=0) |
| RSET(4, SREJ=1) |

run the test procedure with the following initial conditions:

- The SWP interface is activated and SHDLC link is not established.
- The SHDLC link is established and idle, i.e. no further communication is expected.

#### 5.7.7.3.3.2 Initial conditions

The initial conditions shall be established as specified in the test execution clause.

#### 5.7.7.3.3.3 Test procedure

| Step   | Direction | Description   | RQ                                    |
|--|-----------|---|---------------------------------------|
| 1  | ES → EUT  | Send the RSET frame indicated in the test execution clause. |                                       |
| 2  | EUT → ES  | Send UA.  | RQ2,<br>RQ3,<br>RQ7,<br>RQ13,<br>RQ16 |
| 3  | ES → EUT  | Send an I-frame.  |                                       |
| 4  | EUT → ES  | Acknowledges the previously sent I-frame.                   | RQ15                                  |
| NOTE: RQ3 is only validated when RSET() is sent in step 1. |           |   |                                       |

### 5.7.7.3.4 Test case 3: discard frames before initialization

#### 5.7.7.3.4.1 Test execution

Run the test procedure for the each of the following frames in step 1:

- UA;
- I-frame(0,0);
- RNR(0);
- SREJ(0).

#### 5.7.7.3.4.2 Initial conditions

- The SWP interface is activated and SHDLC link is not established.

## 5.7.7.3.4.3 Test procedure

| Step | Direction            | Description  | RQ  |
|------|----------------------|--|-----|
| 1    | ES → EUT             | Do not send a RSET frame and send the defined frame.   |     |
| 2    | ES                   | Wait for 20 ms.  |     |
| 3    | Conditional          | If the EUT sends a RSET frame, perform step 4 and stop.<br>If the EUT sends a different frame, the EUT fails the test.<br>If the EUT does not send any frame, perform steps 5 and 6. | RQ4 |
| 4    | ES → EUT             | Send UA frame.   |     |
| 5    | ES → EUT             | Send RSET(Ws=4, SREJ=1).   |     |
| 6    | EUT → ES<br>ES → EUT | Complete SHDLC link establishment.   | RQ4 |

## 5.7.7.3.5 Test case 4: connection time - reset by EUT

## 5.7.7.3.5.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.3.5.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

## 5.7.7.3.5.3 Test procedure

| Step | Direction  | Description   | RQ   |
|------|------------|---|------|
| 1    | User → EUT | Trigger the EUT to reset the SHDLC link.                    |      |
| 2    | EUT → ES   | Send RSET.  |      |
| 3    | ES         | Do not send a UA frame.                                     |      |
| 4    | EUT → ES   | Send RSET after at least T3 time after execution of step 2. | RQ14 |

## 5.7.7.3.6 Test case 5: connection time - reset by ES

## 5.7.7.3.6.1 Test execution

Run the test procedure with each of the following initial conditions:

- The SWP interface is activated and SHDLC link is not established.
- SHDLC link is established and idle, i.e. no further communication is expected.

## 5.7.7.3.6.2 Initial conditions

The initial conditions shall established as specified in the test execution clause.

## 5.7.7.3.6.3 Test procedure

| Step | Direction | Description   | RQ   |
|------|-----------|---|------|
| 1    | ES → EUT  | Send RSET frame with unsupported features.                  |      |
| 2    | EUT → ES  | Send RSET.  |      |
| 3    | ES        | Do not send a UA frame.                                     |      |
| 4    | EUT → ES  | Send RSET after at least T3 time after execution of step 2. | RQ14 |

### 5.7.7.3.7 Test case 6: EUT discards I-frames and S-frames during link establishment

#### 5.7.7.3.7.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- Run the test procedure for the following frames in step 3:
  - I-frame(0,0);
  - RNR(0);
  - SREJ(0).

#### 5.7.7.3.7.2 Initial conditions

- SHDLC link is established and is idle, i.e. no further communication is expected.

#### 5.7.7.3.7.3 Test procedure

| Step | Direction  | Description   | RQ   |
|------|------------|---|------|
| 1    | User → EUT | Trigger the EUT to reset the SHDLC link.                    |      |
| 2    | EUT → ES   | Send RSET.  |      |
| 3    | ES         | Do not send a UA frame and send the defined frame.          |      |
| 4    | EUT → ES   | Send RSET after at least T3 time after execution of step 2. | RQ14 |

### 5.7.7.3.8 Test case 7: requesting unsupported window size - link establishment by ES

#### 5.7.7.3.8.1 Test execution

The test procedure shall be executed once for each of following parameters:

- Run the test procedure for the following values of RSET frame in step 1:
  - RSET();
  - RSET(WS=4, SREJ=0);

#### 5.7.7.3.8.2 Initial conditions

- SHDLC link is established.

#### 5.7.7.3.8.3 Test procedure

| Step | Direction | Description   | RQ                                    |
|------|-----------|---|---------------------------------------|
| 1    | ES → EUT  | Send the defined RSET frame.  |                                       |
| 2    | EUT → ES  | Send RSET(W <sub>sy</sub> ) or RSET(W <sub>sy</sub> ,SREJ=0)<br>Where y = host provider announced size. | RQ3,<br>RQ8,<br>RQ9,<br>RQ11,<br>RQ12 |
| 3    | ES → EUT  | Send UA.  |                                       |

### 5.7.7.3.9 Test Case 8: requesting unsupported SREJ support - link establishment by ES

#### 5.7.7.3.9.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.7.3.9.2 Initial conditions

- SHDLC link is established.

#### 5.7.7.3.9.3 Test procedure

| Step | Direction | Description                                  | RQ                    |
|------|-----------|--|-----------------------|
| 1    | ES → EUT  | Send RSET(WS=2, SREJ=1) frame.               |                       |
| 2    | EUT → ES  | Send RSET(WS=2, SREJ=0) frame or RSET(WS=2). | RQ9,<br>RQ11,<br>RQ12 |
| 3    | ES → EUT  | Respond UA.                                  |                       |

### 5.7.7.3.10 Test Case 9: requesting unsupported window size and SREJ support - link establishment by ES

#### 5.7.7.3.10.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.7.3.10.2 Initial conditions

- SHDLC link is established.

#### 5.7.7.3.10.3 Test procedure

| Step | Direction | Description  | RQ                    |
|------|-----------|--|-----------------------|
| 1    | ES → EUT  | Send RSET(WS=4, SREJ=1) frame.   |                       |
| 2    | EUT → ES  | Send RSET(W <sub>sy</sub> , SREJ=0) frame<br>Where y = host provider announced size. | RQ9,<br>RQ11,<br>RQ12 |
| 3    | ES → EUT  | Respond UA.  |                       |

### 5.7.7.3.11 Test Case 10: forcing lower window size - link establishment by the EUT

#### 5.7.7.3.11.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.7.3.11.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.



## 5.7.7.3.11.3 Test procedure

| Step | Direction  | Description                              | RQ           |
|------|------------|--|--------------|
| 1    | User → EUT | Trigger the EUT to reset the SHDLC link. |              |
| 2    | EUT → ES   | Send RSET frame.                         |              |
| 3    | ES → EUT   | Send RSET(WS=2).                         |              |
| 4    | EUT → ES   | Send UA.                                 | RQ2,<br>RQ10 |

## 5.7.7.3.12 Test Case 11: forcing SREJ not used - link establishment by the EUT

## 5.7.7.3.12.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.3.12.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

## 5.7.7.3.12.3 Test procedure

| Step | Direction  | Description   | RQ           |
|------|------------|---|--------------|
| 1    | User → EUT | Trigger the EUT to reset the SHDLC link.  |              |
| 2    | EUT → ES   | Send RSET(W <sub>sy</sub> , SREJ = 1) frame.<br>Where y = host provider announced size. |              |
| 3    | ES → EUT   | Send RSET(WS=y, SREJ=0) frame.  |              |
| 4    | EUT → ES   | Send UA.  | RQ2,<br>RQ10 |

## 5.7.7.3.13 Test Case 12: forcing lower window size and SREJ not used - link establishment by the EUT

## 5.7.7.3.13.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.3.13.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

## 5.7.7.3.13.3 Test procedure

| Step | Direction  | Description   | RQ           |
|------|------------|---|--------------|
| 1    | User → EUT | Trigger the EUT to reset the SHDLC link.  |              |
| 2    | EUT → ES   | Send RSET(W <sub>sy</sub> , SREJ=1) frame.<br>Where y = host provider announced size. |              |
| 3    | ES → EUT   | Send RSET(WS=2, SREJ=0) frame.  |              |
| 4    | EUT → ES   | Send UA.  | RQ2,<br>RQ10 |

### 5.7.7.3.14 Test case 13: discard buffered frames on link re-establishment

#### 5.7.7.3.14.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.7.3.14.2 Initial conditions

- The SHDLC link is established with SREJ support.
- SHDLC link is idle, i.e. no further communication expected.

#### 5.7.7.3.14.3 Test procedure

| Step | Direction  | Description  | RQ  |
|------|------------|--|-----|
| 1    | ES → EUT   | Send I-frame(NS0_S,x).   |     |
| 2    | EUT → ES   | Acknowledges I-frame(NS0_S,x).   |     |
| 3    | ES → EUT   | Send I-frame(NS0_S+2,x).   |     |
| 4    | EUT → ES   | Send SREJ(NS0_S+1).  |     |
| 5    | ES → EUT   | Re-establish SHDLC link.   |     |
| 6    | ES ← → EUT | ES sends I-frames (0,NR) to I-frame(NS0_S+1,NR).<br>EUT acknowledges these I-frames. | RQ5 |

### 5.7.7.4 Link establishment with custom sliding window size

#### 5.7.7.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.7.3.

There are no conformance requirements for the EUT for the referenced clause.

#### 5.7.7.5 Data flow

##### 5.7.7.5.1 Conformance requirements

Reference: TS 102 613 [1], clauses 10.7.4, 10.6.1 and 10.6.2, 10.8.2

|  |                   |  |
|--|-------------------|--|
| RQ1  | 10.7.4            | An endpoint shall acknowledge frame reception regularly.   |
| RQ2  | 10.7.4            | The acknowledgement timeout shall not be too long .  |
| RQ3  | 10.7.4            | If the number of unacknowledged I-frames on the link equals the negotiated window size, then the endpoint shall not transmit any further I-frames until reception of an acknowledgement. |
| RQ4  | 10.6.1            | I-frames shall be acknowledged within T1.  |
| RQ5  | 10.6.2            | An endpoint shall increment its value of the N(S) field after emission of an I-Frame.  |
| RQ6  | 10.6.2,<br>10.8.2 | N(R) shall be set as described in TS 102 613 [1].  |
| RQ7  | 10.6.2            | During full duplex data transmission or by emission of a S type frame, all received frames with a sequence number lower than N(R) are acknowledged.                                      |
| NOTE 1: RQ2 is covered by RQ1 and therefore will not be mentioned explicitly in test procedures. |                   |  |
| NOTE 2: RQ4 (i.e. conformance to T1) is not tested.  |                   |  |

### 5.7.7.5.2 Test case 1: I-frame transmission

#### 5.7.7.5.2.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

Run this test procedure for:

- Every supported window size.
- I-frame acknowledgement method by the ES:
  - Every I-frame acknowledged individually.
  - Acknowledge just before T1 expires and using the maximum allowed value for NR.

#### 5.7.7.5.2.2 Initial conditions

- SHDLCLink is established with the window size indicated in the test execution clause.
- SHDLCLink is idle, i.e. no further communication is expected.

#### 5.7.7.5.2.3 Test procedure

| Step | Direction            | Description   | RQ                          |
|------|----------------------|---|-----------------------------|
| 1    | User → EUT           | Trigger the EUT to send 9 I-frames.   |                             |
| 2    | EUT → ES<br>ES → EUT | EUT send I-Frames as indicated in step 1.<br>ES acknowledges these frames using the acknowledgement mechanism indicated in the test execution clause, using RR frames unless the upper layer requires the transmission of I-frames. | RQ3,<br>RQ5,<br>RQ6,<br>RQ7 |

### 5.7.7.5.3 Test case 2: I-frame reception - single I-Frame reception

#### 5.7.7.5.3.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.7.5.3.2 Initial conditions

- SHDLCLink is established and idle, i.e. no further communication is expected.

#### 5.7.7.5.3.3 Test procedure

| Step | Direction            | Description   | RQ          |
|------|----------------------|---|-------------|
| 1    | User → EUT           | Prepare the ES to send 10 I-frames, without retransmission, waiting the acknowledgement of the previously sent I-frame before sending the next I-frame. |             |
| 2    | ES → EUT<br>EUT → ES | ES sends I-frames as indicated in step 1.<br>EUT acknowledges these I-frames.   | RQ1,<br>RQ6 |

### 5.7.7.5.4 Test case 3: I-frame reception - multiple I-Frame reception

#### 5.7.7.5.4.1 Test execution

Run this test procedure for every supported window size.

## 5.7.7.5.4.2 Initial conditions

- SHDLC link is established with the window size indicated in the test execution clause.
- SHDLC link is idle, i.e. no further communication is expected.

## 5.7.7.5.4.3 Test procedure

| Step | Direction            | Description  | RQ          |
|------|----------------------|--|-------------|
| 1    | User → EUT           | Prepare the ES to send 10 I-frames.<br>The ES shall send each I-frame as soon as possible, without waiting for the acknowledgement of the previously sent I-frame, while still complying to the current window boundaries. |             |
| 2    | EUT → ES<br>ES → EUT | ES sends I-Frames as indicated in step 1.<br>EUT acknowledges these frames.  | RQ1,<br>RQ6 |

## 5.7.7.5.5 Test case 4: piggybacking

## 5.7.7.5.5.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

Run this test procedure twenty times for every supported window size.

## 5.7.7.5.5.2 Initial conditions

- SHDLC link is established with the window size indicated in the test execution clause.
- SHDLC link is idle, i.e. no further communication is expected.

## 5.7.7.5.5.3 Test procedure

| Step | Direction            | Description   | RQ                                  |
|------|----------------------|---|-------------------------------------|
| 1    | User → ES            | Prepare the ES to send 50 I-frames, sending the first I-frame when the first I-frame from the EUT is received.<br>The ES shall send each I-frame as soon as possible, without waiting for the acknowledgement of the previously sent I-frame, while still complying to the current window boundaries. |                                     |
| 2    | User → EUT           | Trigger the EUT to send 50 I-frames   |                                     |
| 3    | EUT → ES<br>ES → EUT | EUT sends I-frames according to RQ3, RQ5, RQ6, RQ7<br>ES sends I-Frames as indicated in step 1 and acknowledges the I-frames sent by the EUT.<br>EUT acknowledges the I-frames sent by the ES according to RQ1 and RQ6.   | RQ1,<br>RQ3,<br>RQ5,<br>RQ6,<br>RQ7 |

## 5.7.7.6 Reject (go N back)

## 5.7.7.6.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.7.5.

|     |        |  |
|-----|--------|--|
| RQ1 | 10.7.5 | If an endpoint detects missing I-frame sequence numbers and if SREJ is not supported or if several frames got lost, the endpoint shall send a REJ frame as soon as possible.                                   |
| RQ2 | 10.7.5 | When an endpoint receives a REJ frame with a sequence number which identifies an unacknowledged I-frame previously sent within the sliding window size it shall restart the stream at the first missing frame. |
| RQ3 | 10.7.5 | After sending REJ, an endpoint shall accept the peer endpoint restarting the stream at the first missing frame.  |

## 5.7.7.6.2 Test case 1: REJ transmission

## 5.7.7.6.2.1 Test execution

Run the test procedure for every combination of supported window size and SREJ support which the EUT supports in the following table.

| EUT support           |                 | Procedure parameters |                           |
|-----------------------|-----------------|----------------------|---------------------------|
| Supported window size | SREJ supported? | SREJ negotiated      | I-frame to send in step 3 |
| 2                     | No              | No                   | I-frame(NS0_S+2,x)        |
| 3                     | No              | No                   | I-frame(NS0_S +2,x)       |
| 3                     | No              | No                   | I-frame(NS0_S +3,x)       |
| 4                     | No              | No                   | I-frame(NS0_S +2,x)       |
| 4                     | No              | No                   | I-frame(NS0_S +3,x)       |
| 4                     | No              | No                   | I-frame(NS0_S +4,x)       |
| 3                     | Yes             | Yes                  | I-frame(NS0_S +WS,x)      |
| 4                     | Yes             | Yes                  | I-frame(NS0_S +WS,x)      |
| 2                     | Yes             | No                   | I-frame(NS0_S +2,x)       |
| 3                     | Yes             | No                   | I-frame(NS0_S +2,x)       |
| 4                     | Yes             | No                   | I-frame(NS0_S +2,x)       |

## 5.7.7.6.2.2 Initial conditions

- SHDLCLink is established with SREJ support as indicated in the test execution clause.
- SHDLCLink is idle, i.e. no further communication is expected.

## 5.7.7.6.2.3 Test procedure

| Step | Direction | Description  | RQ  |
|------|-----------|--|-----|
| 1    | ES → EUT  | Sends I-frame(NS0_S,x).  |     |
| 2    | EUT → ES  | Acknowledges I-frame(NS0_S,x).   |     |
| 3    | ES → EUT  | Sends the I-frame indicated in the test execution clause.                          |     |
| 4    | EUT → ES  | Sends REJ(NS0_S+1).  | RQ1 |
| 5    | ES ↔ EUT  | ES sends 10 I-frames starting at I-frame(NS0_S+1,x).<br>EUT acknowledges I-frames. | RQ3 |

## 5.7.7.6.3 Test case 2: REJ transmission - multiple I-frames received

## 5.7.7.6.3.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.6.3.2 Initial conditions

- SHDLCLink is established without SREJ support.
- SHDLCLink is idle, i.e. no further communication is expected.

## 5.7.7.6.3.3 Test procedure

| Step | Direction | Description   | RQ  |
|------|-----------|---|-----|
| 1    | ES → EUT  | Send I-frame(NS0_S,x).  |     |
| 2    | EUT → ES  | Acknowledge I-frame(NS0_S,x).   |     |
| 3    | ES → EUT  | Send I-frame(NS0_S+WS-1,x) followed immediately by I-frame(NS0_S+WS,x).   |     |
| 4    | EUT → ES  | EUT send REJ(NS0_S+1).<br>The EUT is allowed to send additional REJ(NS0_S+1), in response to any additional I-frame(NS0_S+x,x). | RQ1 |
| 5    | ES ↔ EUT  | ES send 10 I-frames starting at I-frame(NS0_S+1,x)<br>EUT acknowledge I-frames.   | RQ3 |

## 5.7.7.6.4 Test case 3: REJ reception

## 5.7.7.6.4.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.6.4.2 Initial conditions

- SHDLC link is established without SREJ support.
- SHDLC link is idle, i.e. no further communication is expected.

## 5.7.7.6.4.3 Test procedure

| Step | Direction  | Description  | RQ  |
|------|------------|--|-----|
| 1    | User → EUT | Trigger the EUT to send I-frames.  |     |
| 2    | EUT → ES   | Send I-frame(NS0_T, y).  |     |
| 3    | ES         | Do not acknowledge I-frame(NS0_T,y).   |     |
| 4    | EUT → ES   | If the EUT retransmits I-frame(NS0_T,y), then stop the test procedure, as it is not possible for the ES to send a valid REJ. This is not a failure of the EUT.<br>If the EUT transmits I-frame(NS0+1,y), then continue the test procedure. |     |
| 5    | ES → EUT   | Send REJ(NS0_T).<br>The ES is required to send additional REJ(NS0_T), in response to any additional I-frame(NS0_T+x,y).  |     |
| 6    | EUT → ES   | Send I-frame(NS0_T,y).   | RQ2 |
| 7    | ES → EUT   | acknowledge I-frame(NS0_T,y).  |     |
| 8    | EUT → ES   | Send I-frame(NS0_T+1,y).   | RQ2 |
| 9    | ES → EUT   | acknowledge I-frame(NS0-T+1,y).  |     |

## 5.7.7.7 Last Frame Loss

## 5.7.7.7.1 Conformance requirements

Reference: TS 102 613 [1], clauses 10.7.6 and 10.6.1.

|     |        |  |
|-----|--------|--|
| RQ1 | 10.7.6 | Each frame shall have a guarding/transmit timeout in order to retransmit frames if the destination does not notice a loss. |
| RQ2 | 10.6.1 | If the I-frames are not acknowledged, an endpoint shall retransmit these frames not sooner than T2.                        |

### 5.7.7.7.2 Test Case 1: retransmission of a single frame

#### 5.7.7.7.2.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

#### 5.7.7.7.2.2 Initial conditions

- SHDLCLink is established and idle, i.e. no further communication is expected.

#### 5.7.7.7.2.3 Test procedure

| Step | Direction  | Description                          | RQ          |
|------|------------|--------------------------------------|-------------|
| 1    | User → EUT | Trigger the EUT to send an I-frame.  |             |
| 2    | EUT → ES   | Sends I-frame(NS0_T,x).              |             |
| 3    | ES         | Do not acknowledge I-frame(NS0_T,x). |             |
| 4    | EUT → ES   | Sends I-frame(NS0_T,x).              | RQ1,<br>RQ2 |

### 5.7.7.7.3 Test Case 2: retransmission of multiple frames

#### 5.7.7.7.3.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

Run this test procedure for every supported window size.

#### 5.7.7.7.3.2 Initial conditions

- SHDLCLink is established without SREJ support.
- SHDLCLink is idle, i.e. no further communication is expected.

#### 5.7.7.7.3.3 Test procedure

| Step | Direction      | Description  | RQ          |
|------|----------------|--|-------------|
| 1    | User → EUT     | Trigger the EUT to send 9 I-frames.  |             |
| 2    | EUT → ES<br>ES | EUT sends I-frames as indicated in step 1.<br>For the first transmission of each I-frame, ES does not acknowledge the I-frame. |             |
| 3    | EUT → ES<br>ES | EUT retransmits each I-frame according to RQ1, RQ2.<br>For each retransmitted I-frame, ES acknowledges only this I-frame.      | RQ1,<br>RQ2 |

### 5.7.7.8 Receive and not ready

#### 5.7.7.8.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.7.7.

|  |        |   |
|--|--------|---|
| RQ1  | 10.7.7 | When an endpoint transmits a RNR and is now ready to receive an I-Frame, it shall send a RR frame every 5 ms to 20 ms until it receives a new I-frame.                                    |
| RQ2  | 10.7.7 | If an endpoint receives a RR in a context described in RQ1 and has no data to send, it shall send an I-Frame with empty information field to signal the proper reception of the RR frame. |
| RQ3  | 10.7.7 | If an endpoint receives RNR frame then it shall suspend transmission of I-frames until reception of a RR frame.   |
| NOTE: RQ1 will not be tested as it is not possible to trigger the EUT to transmit a RNR. |        |   |

#### 5.7.7.8.2 Test case 1: RNR reception

##### 5.7.7.8.2.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

##### 5.7.7.8.2.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.

##### 5.7.7.8.2.3 Test procedure

| Step | Direction            | Description  | RQ  |
|------|----------------------|--|-----|
| 1    | User → EUT           | Trigger the EUT to send 9 I-frames.  |     |
| 2    | EUT → ES             | Starts sending I-frames.   |     |
| 3    | ES → EUT             | Acknowledge I-frame(NS0_T,x) with RNR(NS0_T+1).  |     |
| 4    | ES                   | Wait 20 ms   | RQ3 |
| 5    | ES → EUT             | Send RR, where N(R) = N(S) of last received I-frame + 1.   |     |
| 6    | EUT → ES<br>ES → EUT | EUT sends remaining I-frames, where N(S) of the first I-frame = N(S) of previously transmitted I-frame + 1.<br>ES acknowledges remaining I-frames. |     |

#### 5.7.7.8.3 Test case 2: Empty I-frame transmission

##### 5.7.7.8.3.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for all combinations of the following parameters:

- Each supported window size.
- RR retransmission time of the ES in step 4 between 5 ms and 7 ms; and between 18 ms and 20 ms.

##### 5.7.7.8.3.2 Initial conditions

- SHDLC link is established and idle, i.e. no further communication is expected.



## 5.7.7.8.3.3 Test procedure

| Step | Direction            | Description  | RQ  |
|------|----------------------|--|-----|
| 1    | User → EUT           | Trigger the EUT to send 1 I-frame.   |     |
| 2    | EUT → ES             | Send I-frame(NS0_T,x).   |     |
| 3    | ES → EUT             | Acknowledge I-frames(NS0_T,x) with RNR(NS0_T+1).   |     |
| 4    | ES → EUT<br>EUT → ES | <p>Send RR(NS0_T+1) in order to indicate to the EUT that I-frame transmission can be resumed.</p> <p>In the subsequent frame exchanges:</p> <ul style="list-style-type: none"> <li>The ES shall apply the RR retransmission time specified in the Test execution clause.</li> <li>The ES shall ignore the first I-frame sent by the EUT, in order to instigate a retransmission of the RR frame (by the ES) or the I-frame (by the EUT).</li> </ul> <p>In order to pass the test, the EUT:</p> <ul style="list-style-type: none"> <li>Shall send a first empty I-frame(NS0_T+1,x) within 20 ms of the original RR frame; this may occur before or after a retransmission by the ES of the original RR frame.</li> <li>Shall retransmit the empty I-frame; this may occur before or after a retransmission by the ES of the original RR frame.</li> </ul> <p>The ES shall continue with this frame exchange until it successfully acknowledges an empty I-frame with RR(NS0_T+2).</p> | RQ2 |
| 5    | User → EUT           | Trigger the EUT to send further I-frames.  |     |
| 6    | EUT → ES<br>ES → EUT | EUT sends remaining I-frames; the first I-frame shall be I-frame(NS0_T+2,x).<br>ES acknowledges remaining I-frames.  | RQ3 |

## 5.7.7.9 Selective reject

## 5.7.7.9.1 Conformance requirements

Reference: TS 102 613 [1], clauses 10.7.8, 10.8.2 and 10.4.2.

|  |        |   |
|--|--------|---|
| RQ1  | 10.8.2 | If an I-frame (I <sub>x,y</sub> ) is received by an endpoint and support for Selective Reject S frames was negotiated for the link and X is exactly one higher than N(R), a SREJ <sub>n(r)</sub> shall be sent instead of the REJ <sub>n(r)</sub> . The received I-frame shall be buffered. |
| RQ2  | 10.8.2 | Once the retransmitted I-frame with X = N(R) is received in the content of RQ3, the buffered I-frame shall also be processed.   |
| RQ3  | 10.7.8 | If an endpoint receives a SREJ frame and supports for SREJ was agreed at link establishment, it shall retransmit the corresponding I-Frame.   |
| RQ4  | 10.4.2 | Only one SREJ shall remain outstanding on each link direction at any one time.  |
| RQ5  | 10.4.2 | An SREJ shall be transmitted for each erroneous frame; each frame is treated as a separate error.   |
| RQ6  | 10.4.2 | Optional type of frame shall not be used before capability negotiation is defined during initialization.  |
| NOTE: RQ6 is not tested, as it is a non-occurrence RQ. |        |   |

## 5.7.7.9.2 Test case 1: SREJ transmission

## 5.7.7.9.2.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.9.2.2 Initial conditions

- The SHDLC link is established with SREJ support.
- SHDLC link is idle, i.e. no further communication is expected.

## 5.7.7.9.2.3 Test procedure

| Step | Direction | Description   | RQ  |
|------|-----------|---|-----|
| 1    | ES → EUT  | Send I-frame(NS0_S,x).                                  |     |
| 2    | EUT → ES  | Acknowledge I-frame(NS0_S,x).                           |     |
| 3    | ES → EUT  | Send I-frame(NS0_S+2,x).                                |     |
| 4    | EUT → ES  | Send SREJ(NS0_S+1).                                     | RQ1 |
| 5    | ES → EUT  | Sends I-frame(NS0_S+1,x).                               |     |
| 6    | EUT → ES  | Acknowledges I-frame(NS0_S+1,x) and I-frame(NS0_S+2,x). |     |
| 7    | ES → EUT  | Send I-frame(NS0_S+3, x).                               |     |
| 8    | EUT → ES  | Acknowledges I-frame(NS0_S+3,x).                        | RQ2 |

## 5.7.7.9.3 Test case 2: SREJ transmission - multiple I-frames received

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## 5.7.7.9.4 Test case 3: SREJ reception

## 5.7.7.9.4.1 Test execution

The test procedure shall only be executed in voltage class B and in voltage class C, full power mode.

The test procedure shall be executed once for each of following parameters:

- There are no test-case specific parameters for this test.

## 5.7.7.9.4.2 Initial conditions

- SHDLC link is established with SREJ support.
- SHDLC link is idle, i.e. no further communication is expected.

## 5.7.7.9.4.3 Test procedure

| Step | Direction  | Description  | RQ  |
|------|------------|--|-----|
| 1    | User → EUT | Trigger the EUT to send 9 I-frames.  |     |
| 2    | EUT → ES   | Send I-frame(NS0_T,x).   |     |
| 3    | ES → EUT   | Do not acknowledge the received I-frame.   |     |
| 4    | EUT → ES   | If the EUT retransmits I-frame(NS0_T,x), then stop the test procedure, as it is not possible for the ES to send a valid REJ. This is not a failure of the EUT.<br>If the EUT transmits I-frame(NS0_T+1,x), then continue the test procedure. |     |
| 5    | ES → EUT   | Send SREJ(NS0_T).  |     |
| 6    | EUT → ES   | Retransmit only the rejected I-Frame and continue sending remaining I-frames.<br>ES acknowledges remaining I-frames.   | RQ3 |

## 5.7.7.9.5 Void

## 5.7.8 Implementation

## 5.7.8.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.8.2 Information Frame emission

### 5.7.8.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.1.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.8.3 Information Frame reception

### 5.7.8.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.2.

All conformance requirements for the referenced clause are included in clause 5.7.7.9.1 of the present document.

## 5.7.8.4 Reception Ready Frame reception

### 5.7.8.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.3.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.8.5 Reject Frame reception

### 5.7.8.5.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.4.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.8.6 Selective Reject Frame reception

### 5.7.8.6.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.5.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.8.7 Acknowledge timeout

### 5.7.8.7.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.6.

There are no conformance requirements for the EUT for the referenced clause.

## 5.7.8.8 Guarding/transmit timeout

### 5.7.8.8.1 Conformance requirements

Reference: TS 102 613 [1], clause 10.8.7.

There are no conformance requirements for the EUT for the referenced clause.

## 5.8 CLT LLC definition

### 5.8.1 System Assumptions

Reference: TS 102 613 [1], clause 11.1.

There are no conformance requirements for the UICC for the referenced clause.

### 5.8.2 Overview

Reference: TS 102 613 [1], clause 11.2.

There are no conformance requirements for the UICC for the referenced clause.

### 5.8.3 Supported RF protocols

#### 5.8.3.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.2a.

|       |   |
|-------|---|
| RQ1   | The UICC shall provide the initialization data to the CLF, which performs RF protocol initialization commands of ISO/IEC 18092 [8] 212 kbps/424 kbps passive mode based card emulation protocols. |
| NOTE: | Test cases for RQ1 are out of scope of the present document.  |

### 5.8.4 CLT Frame Format

#### 5.8.4.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.3.

|     |   |
|-----|---|
| RQ1 | When sending a CLT frame with the CLT PAYLOAD in Type A aligned structure, meaningless bits in the last byte of the CLT PAYLOAD shall be padded with 0. |
|-----|---|

#### 5.8.4.2 Test case 1: Padding of CLT PAYLOAD in Type A aligned structure

This test case is carried out only if DUT manufacturer provides sufficient information about opening a CLT session and exchanging CLT frames in Type A aligned manner, and all parameters needed are present in the terminal.

##### 5.8.4.2.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case specific parameters for this test case.

##### 5.8.4.2.2 Initial conditions

- The SWP interface is activated and no more communication is expected.

### 5.8.4.2.3 Test procedure

| Step  | Direction | Description  | RQ  |
|---|-----------|--|-----|
| 1   | T → UICC  | Send CLT frame with CL_PROTO_INF(A) in the ADMIN_FIELD and a valid command (see Note) for one of the RF protocols supported by the UICC in the DATA_FIELD. |     |
| 2   | UICC → T  | Respond CLT frame with CLT_CMD field set to 00000 and at least 1 byte of data in the CLT PAYLOAD field.  | RQ1 |
| 3   | T → UICC  | Send CLT frame with CLT_CMD field set to 00000 and a valid command (see note) for one of the RF protocols supported by the UICC in the DATA_FIELD.         |     |
| 4   | UICC → T  | Respond CLT frame with CLT_CMD field set to 00000 and at least 1 byte of data in the CLT PAYLOAD field.  | RQ1 |
| NOTE: This command shall be chosen in a way, that the UICC responds data with respect to RF (but not 8, 16 or 24 RF bytes), and without requesting a transition to "HALT" or "IDLE" state as per ISO/IEC 14443-3 [6]. |           |  |     |

## 5.8.5 CLT Command Set

### 5.8.5.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.4.

|                                   |   |
|-----------------------------------|---|
| RQ1                               | The UICC shall interpret received data in DATA_FIELD as Type A aligned, if bit 5 in CLT CMD field is 0.                                 |
| RQ2                               | The UICC shall interpret received data in DATA_FIELD as byte aligned, if bit 5 in CLT CMD field is 1.                                   |
| RQ3                               | The UICC shall interpret a CLT frame containing an ADMIN_FIELD with the value 0000 as containing no administrative command.             |
| RQ4                               | The UICC shall interpret a CLT frame containing an ADMIN_FIELD with the value 1000 as containing a CL_PROTO_INF(A) command.             |
| RQ5                               | The UICC shall interpret a CLT frame containing an ADMIN_FIELD with the value 1001 as containing a CL_PROTO_INF(F) command.             |
| RQ6                               | The UICC indicates that no administrative command is being sent by setting the ADMIN_FIELD in a CLT frame to 0000.                      |
| RQ7                               | For ISO/IEC 14443-3 [6], the UICC instructs the CLF to enter the initial state by sending a CLT frame with the ADMIN_FIELD set to 0001. |
| RQ8                               | For ISO/IEC 14443-3 [6], the UICC instructs the CLF to enter the "HALT" state by sending a CLT frame with the ADMIN_FIELD set to 0010.  |
| RQ9                               | RFU values for ADMIN_FIELD shall not be sent by the UICC.   |
| RQ10                              | When sending Type A aligned data in DATA_FIELD, the UICC shall set bit 5 in CLT CMD field to 0.   |
| RQ11                              | When sending byte aligned data in DATA_FIELD, the UICC shall set bit 5 in CLT CMD field to 1.   |
| NOTE: RQ9 is a non-occurrence RQ. |   |

### 5.8.5.2 Test case 1: CLT commands, ISO/IEC 14443 Type A

This test case is carried out only if DUT manufacturer provides sufficient information about opening a CLT session and exchanging CLT frames in Type A aligned manner, and all parameters needed are present in the terminal.

#### 5.8.5.2.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case specific parameters for this test case.

#### 5.8.5.2.2 Initial conditions

- The SWP interface is activated and no more communication is expected.

## 5.8.5.2.3 Test procedure

| Step   | Direction | Description  | RQ                                   |
|--|-----------|--|--------------------------------------|
| 1  | T → UICC  | Send CLT frame with CL_PROTO_INF(A) in the ADMIN_FIELD and a valid command (see note 1) for one of the RF protocols supported by the UICC in the DATA_FIELD. |                                      |
| 2  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00000 and at least 1 byte of data in the CLT PAYLOAD field.  | RQ2,<br>RQ4,<br>RQ6,<br>RQ9,<br>RQ10 |
| 3  | T → UICC  | Send CLT frame with CLT_CMD field set to 00000 and a valid command (see note 1) for one of the RF protocols supported by the UICC in the DATA_FIELD.         |                                      |
| 4  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00000.   | RQ1,<br>RQ3,<br>RQ6,<br>RQ9<br>RQ10  |
| 5  | T → UICC  | Send CLT frame with CLT_CMD field set to 00000 and a command which causes the UICC to request a transition to "HALT" state as per ISO/IEC 14443-3 [6].       |                                      |
| 6  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00010 (i.e. ADMIN_FIELD set to CL_GOTO_HALT) (see note 2).   | RQ1,<br>RQ3,<br>RQ8,<br>RQ9<br>RQ10  |
| 7  | T → UICC  | Send CLT frame with CL_PROTO_INF(A) in the ADMIN_FIELD and a valid command (see note 1) for one of the RF protocols supported by the UICC in the DATA_FIELD. |                                      |
| 8  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00000 and at least 1 byte of data in the CLT PAYLOAD field.  | RQ2,<br>RQ4,<br>RQ6,<br>RQ9<br>RQ10  |
| 9  | T → UICC  | Send CLT frame with CLT_CMD field set to 00000 and a command which causes the UICC to request a transition to "IDLE" state as per ISO/IEC 14443-3 [6].       |                                      |
| 10   | UICC → T  | Respond CLT frame with CLT_CMD field set to 00001 (i.e. ADMIN_FIELD set to CL_GOTO_INIT) (see note 2).   | RQ1,<br>RQ3,<br>RQ7,<br>RQ9<br>RQ10  |
| NOTE 1: This command shall be chosen in a way, that the UICC responds data with respect to RF, and without requesting a transition to "HALT" or "IDLE" state as per ISO/IEC 14443-3 [6]. |           |  |                                      |
| NOTE 2: DATA_FIELD may be present or not.  |           |  |                                      |

## 5.8.5.3 Test case 2: CLT commands, ISO/IEC 18092

This test case is carried out only if DUT manufacturer provides sufficient information about opening a CLT session and exchanging CLT frames in Type F RF technology, and all parameters needed are present in the terminal.

## 5.8.5.3.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case specific parameters for this test case.

## 5.8.5.3.2 Initial conditions

- The SWP interface is activated and no more communication is expected.

## 5.8.5.3.3 Test procedure

| Step | Direction | Description  | RQ                                  |
|------|-----------|--|-------------------------------------|
| 1    | T → UICC  | Send CLT frame with CL_PROTO_INF(F) in the ADMIN_FIELD and the RF data representing the initialization command 'POLLING REQUEST' which matches the application available on the UICC in the DATA_FIELD.        |                                     |
| 2    | UICC → T  | Respond CLT frame with CLT_CMD field set to 10000 and RF data representing the initialization response 'POLLING RESPONSE' in the DATA_FIELD field.   | RQ2,<br>RQ5,<br>RQ6,<br>RQ9<br>RQ11 |
| 3    | T → UICC  | Send CLT frame with CL_PROTO_INF(F) in the ADMIN_FIELD and the RF data representing the initialization command 'POLLING REQUEST' which does not match the application available on the UICC in the DATA_FIELD. |                                     |
| 4    | UICC → T  | Respond CLT frame with CLT_CMD field set to 10000, without a DATA_FIELD.   | RQ2,<br>RQ5,<br>RQ6,<br>RQ9<br>RQ11 |

## 5.8.6 CLT Frame Interpretation

## 5.8.6.1 CLT frames with Type A aligned DATA\_FIELD

## 5.8.6.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.5.1.

|       |   |
|-------|---|
| RQ1   | When the UICC receives a CLT frame with Type A aligned DATA_FIELD, the bit count shall be retrieved implicitly from the length of the CLT PAYLOAD, where the interpretation rule is defined as table 11.2 in TS 102 613 [1].                          |
| RQ2   | When the UICC sends a CLT frame with Type A aligned DATA_FIELD, the size of the CLT PAYLOAD shall be determined according to table 11.3 in TS 102 613 [1] and the number of RF bits to be sent.   |
| RQ3   | The UICC instructs the CLF to send N full bytes plus N parity bits over the RF by sending a CLT frame with a CLT PAYLOAD of a size determined according to table 11.3 based on DATA_FIELD of (N × 9) bits in a Type A aligned manner, for 1 ≤ N ≤ 25. |
| RQ4   | The UICC instructs the CLF to send 4 bits over the RF by sending a CLT frame with a CLT PAYLOAD of a size of 1 byte, based on DATA_FIELD of 4 bits in a Type A aligned manner.  |
| NOTE: | Test cases for RQ1, RQ2, RQ3, RQ4 are out of scope of the present document, as the UICC can hardly be triggered to fulfill the needs of a test case.  |

## 5.8.6.2 Handling of DATA\_FIELD by the CLF

## 5.8.6.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.5.2.

|       |  |
|-------|--|
| RQ1   | If the condition not to respond is evaluated by the UICC, it shall send a CLF frame without a DATA_FIELD.  |
| RQ2   | If the condition to respond is evaluated by the UICC, it shall send a CLT frame with a DATA_FIELD of a size greater than zero bytes to the CLF.      |
| NOTE: | Test cases for RQ1, RQ2, RQ3, RQ4 are out of scope of the present document, as the UICC can hardly be triggered to fulfill the needs of a test case. |

### 5.8.6.3 Handling of ADMIN\_FIELD

#### 5.8.6.3.1 CL\_PROTO\_INF(A)

##### 5.8.6.3.1.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.5.3.2.

|     |   |
|-----|---|
| RQ1 | On receiving a CLT frame with ADMIN_FIELD CL_PROTO_INF(A), if the contents of the DATA_FIELD are a valid command for one of the RF protocols supported by the UICC, the UICC shall compute the response and send it to the CLF within a CLT frame.  |
| RQ2 | On receiving a CLT frame with ADMIN_FIELD CL_PROTO_INF(A), if the contents the DATA_FIELD are equal to ISO/IEC 14443-3 [6] command "HALT", the UICC shall reply with a CLT frame with the ADMIN_FIELD CL_GOTO_HALT.   |
| RQ3 | On receiving a CLT frame with ADMIN_FIELD CL_PROTO_INF(A), if the contents of DATA_FIELD are not a valid command for one of the RF protocols supported by the UICC or its not equal to ISO/IEC 14443-3 [6] command "HALT", the UICC shall send a CLT frame with the ADMIN_FIELD CL_GOTO_INIT. |

##### 5.8.6.3.1.2 Test case 1: Interpretation of CL\_PROTO\_INF(A)

This test case is carried out only if DUT manufacturer provides sufficient information about opening a CLT session and exchanging CLT frames in Type A aligned manner, and all parameters needed are present in the terminal.

##### 5.8.6.3.1.2.1 Test execution

The test procedure shall be executed once for each of following parameters:

- There are no test case specific parameters for this test case.

##### 5.8.6.3.1.2.2 Initial conditions

- The SWP interface is activated and no more communication is expected.

##### 5.8.6.3.1.2.3 Test procedure

| Step   | Direction | Description   | RQ  |
|--|-----------|---|-----|
| 1  | T → UICC  | Send CLT frame with CL_PROTO_INF(A) in the ADMIN_FIELD and a valid command (see note 1) for one of the RF protocols supported by the UICC in the DATA_FIELD.  |     |
| 2  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00000 and at least 1 byte of data in the CLT PAYLOAD field.   | RQ1 |
| 3  | T → UICC  | Send CLT frame with CL_PROTO_INF(A) in the ADMIN_FIELD and the "HALT" command as per ISO/IEC 14443-3 [6] in the DATA_FIELD.   |     |
| 4  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00010 (i.e. ADMIN_FIELD set to CL_GOTO_HALT) (see note 2).  | RQ2 |
| 5  | T → UICC  | Send CLT frame with CL_PROTO_INF(A) in the ADMIN_FIELD and a command not representing either "HALT" as per ISO/IEC 14443-3 [6] or a valid command (see note 1) for one of the RF protocols supported by the UICC in the DATA_FIELD. |     |
| 6  | UICC → T  | Respond CLT frame with CLT_CMD field set to 00001 (i.e. ADMIN_FIELD set to CL_GOTO_INIT) (see note 2).  | RQ3 |
| NOTE 1: This command shall be chosen in a way, that the UICC responds data with respect to RF, and without requesting a transition to "HALT" or "IDLE" state as per ISO/IEC 14443-3 [6]. |           |   |     |
| NOTE 2: DATA_FIELD may be present or not.  |           |   |     |



### 5.8.6.3.2 CL\_PROTO\_INF(F)

#### 5.8.6.3.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.5.3.2.

|  |   |
|--|---|
| RQ1  | On receiving a CLT frame with ADMIN_FIELD CL_PROTO_INF(F), and in case the error detection code (RF CRC) and the LEN byte are correct and the received DATA_FIELD does not match with the applications available on the UICC, the UICC shall send a CLT frame without a DATA_FIELD to the CLF within 1 150 $\mu$ s.   |
| RQ2  | On receiving a CLT frame with ADMIN_FIELD CL_PROTO_INF(F), and in case the error detection code and the LEN byte are correct and the received DATA_FIELD matches with the applications available on the UICC, the UICC shall respond with an CLT frame containing the ISO/IEC 18092 [8] 212 kbps/424 kbps passive mode initialization response frame ("POLLING RESPONSE", including the LEN and RF CRC field) encapsulated in the DATA_FIELD, within 1 150 $\mu$ s. |
| RQ3  | On receiving a CLT frame with ADMIN_FIELD CL_PROTO_INF(F), and in case an error with respect to ISO/IEC 18092 [8] 212 kbps/424 kbps passive mode is detected, the UICC shall send a CLT frame without a DATA_FIELD to the CLF within 1 150 $\mu$ s.   |
| NOTE: Development of test cases for RQ1 to RQ3 is FFS. |   |

### 5.8.6.3.3 CL\_GOTO\_INIT and CL\_GOTO\_HALT

Reference: TS 102 613 [1], clause 11.5.3.2.

There are no conformance requirements for the UICC for the referenced clause.

## 5.8.7 CLT Protocol Rules

### 5.8.7.1 Rules for the CLF

Reference: TS 102 613 [1], clause 11.6.1.

There are no conformance requirements for the UICC for the referenced clause.

### 5.8.7.2 Rules for the UICC

#### 5.8.7.2.1 Conformance requirements

Reference: TS 102 613 [1], clause 11.6.2.

|   |  |
|---|--|
| RQ1   | The UICC shall not send a CLT frame before having received a CLT frame with the ADMIN_FIELD set to CL_PROTO_INF(A) or CL_PROTO_INF(F).   |
| RQ2   | The UICC shall interpret a received CLT frame with the ADMIN_FIELD set to CL_PROTO_INF(A) or CL_PROTO_INF(F) as condition to open a new CLT session and to close any former CLT session. |
| RQ3   | After having received a CLT frame with the ADMIN_FIELD set to CL_PROTO_INF(A), subsequently sent CLT frames within the CLT session shall be coded in Type A aligned manner.              |
| RQ4   | During a CLT session, the UICC shall ignore a corrupted SWP frame.   |
| RQ5   | During a CLT session, the UICC shall ignore received CLT frames if the ADMIN_FIELD contains a value which is reserved for future use.  |
| RQ6   | During a CLT session, the UICC shall ignore received CLT frames if the length of the DATA_FIELD indicated for a Type A aligned CLT frame is invalid.                                     |
| NOTE 1: RQ1 is a non-occurrence RQ.   |  |
| NOTE 2: Test cases for RQ2 are given also in clause 5.6.3.2 and subclauses of the present document. |  |
| NOTE 3: Development of test cases for RQ1 to RQ6 is FFS.  |  |

## 5.9 Timing and performance

Reference: TS 102 613 [1], clause 12.

There are no conformance requirements for the UICC for the referenced clause.

# Annex A (informative): State diagrams

## A.1 SDL symbols definition

All symbols (except „State“) used are available in Microsoft Visio 2003, SDL Diagram Shapes (Metric)

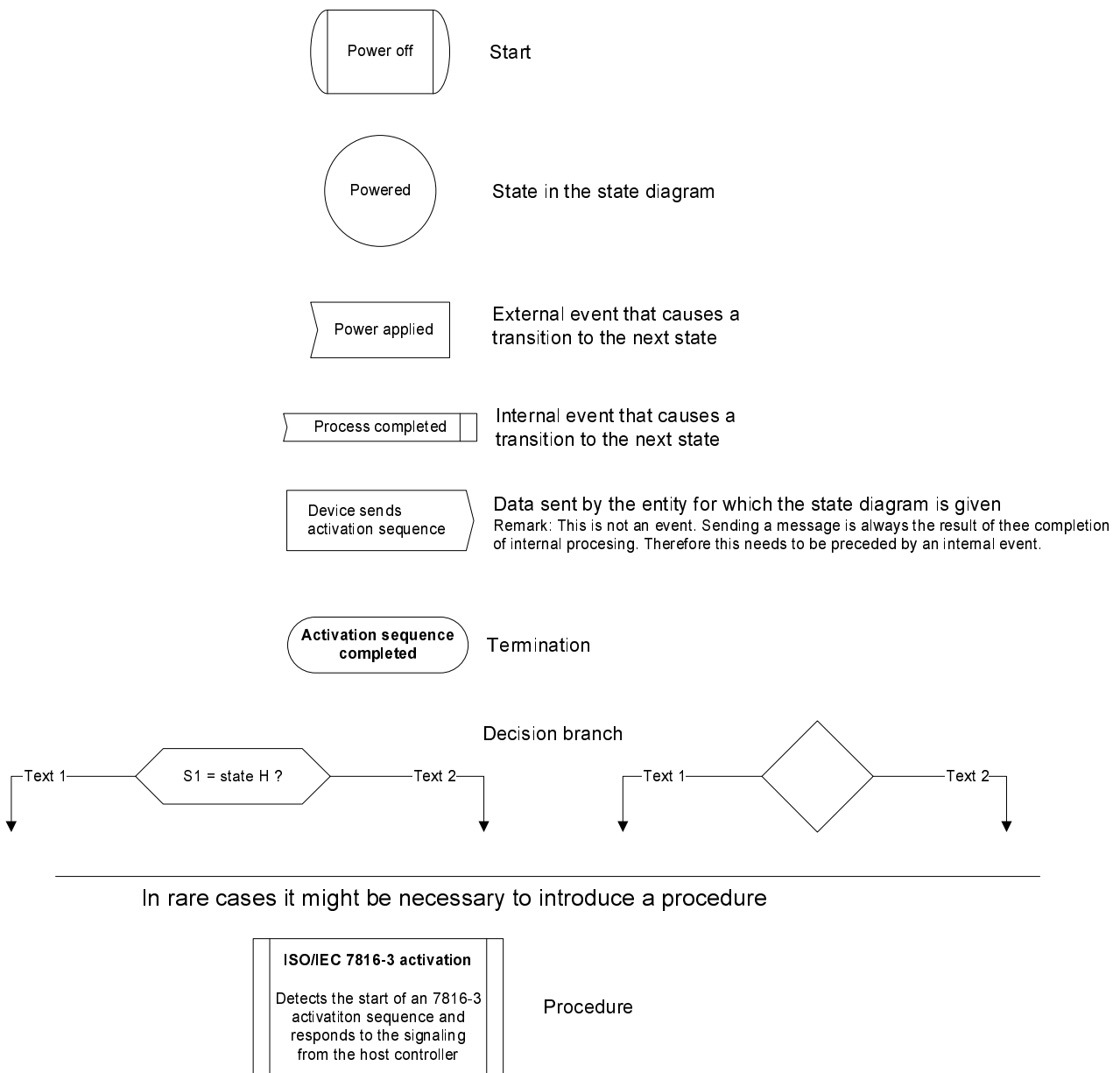


Figure A.1.1: SDL symbols definition

## A.2 Initial SWP interface activation

This clause describes part of TS 102 613 [1], clause 6.2.3.1 in SDL notation.

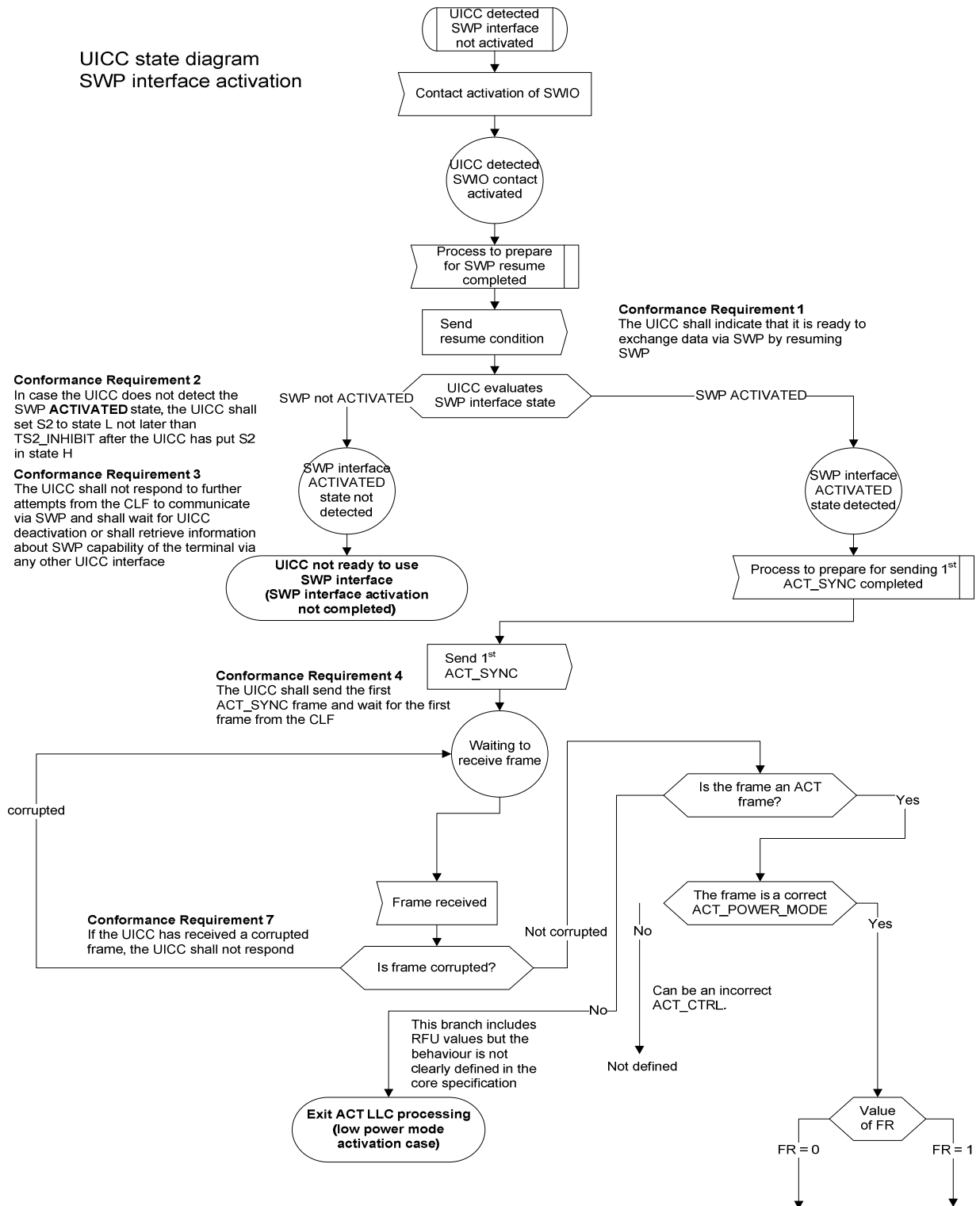


Figure A.2.1: Initial SWP interface activation, part 1

**Conformance Requirement 6**  
 If the UICC has received a correct ACT\_POWER\_MODE and the FR bit of this frame is 0 then the UICC shall respond with an ACT\_READY frame

**Conformance Requirement 5**  
 If the UICC has received a correct ACT\_POWER\_MODE and the FR bit of this frame is 1, then the UICC shall repeat the last ACT frame it had sent

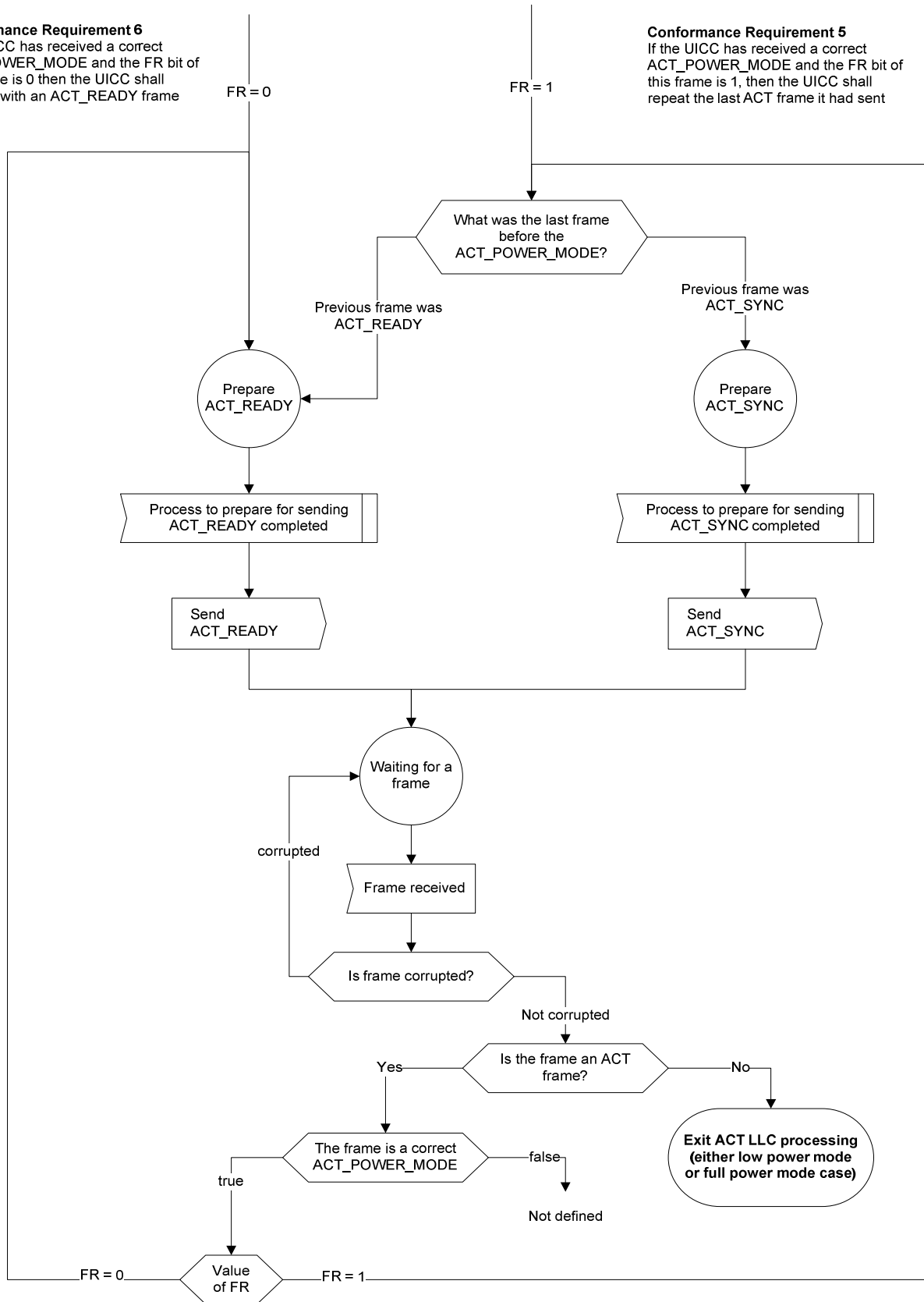


Figure A.2.2: Initial SWP interface activation, part 2

## A.3 SHDLC operation

This clause describes part of TS 102 613 [1], clause 10 in SDL notation.

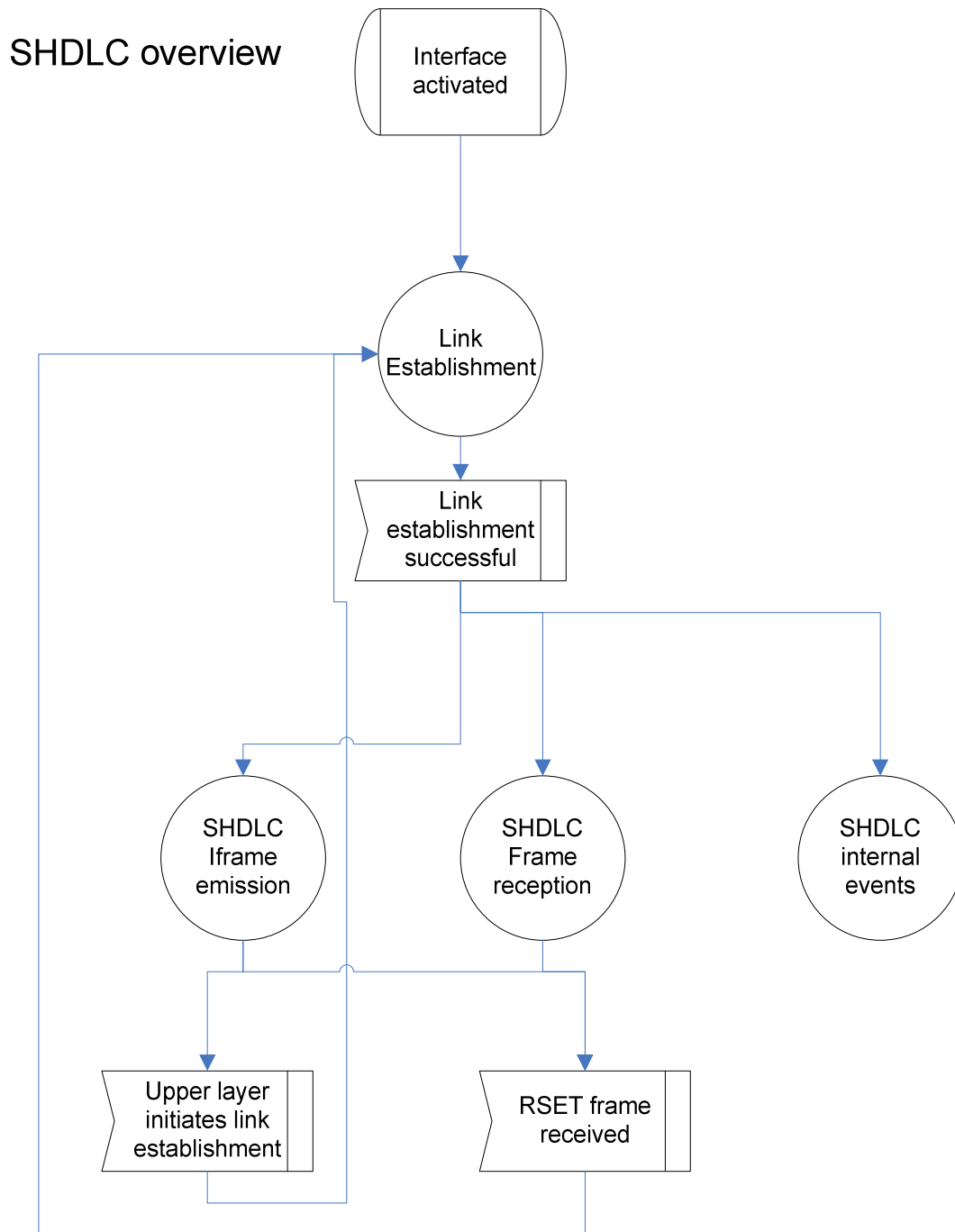


Figure A.3.1: SHDLC overview

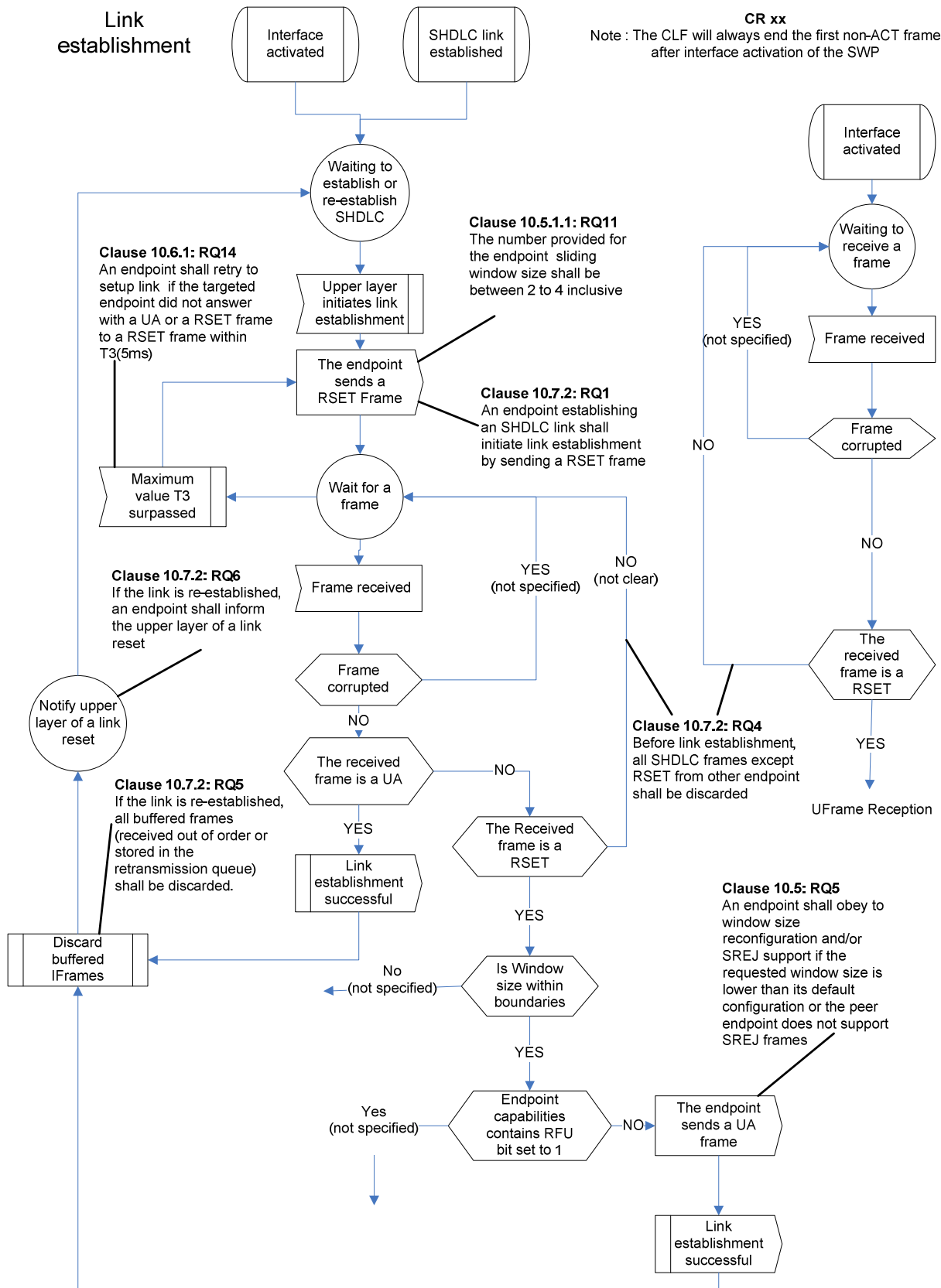


Figure A.3.2: Link establishment

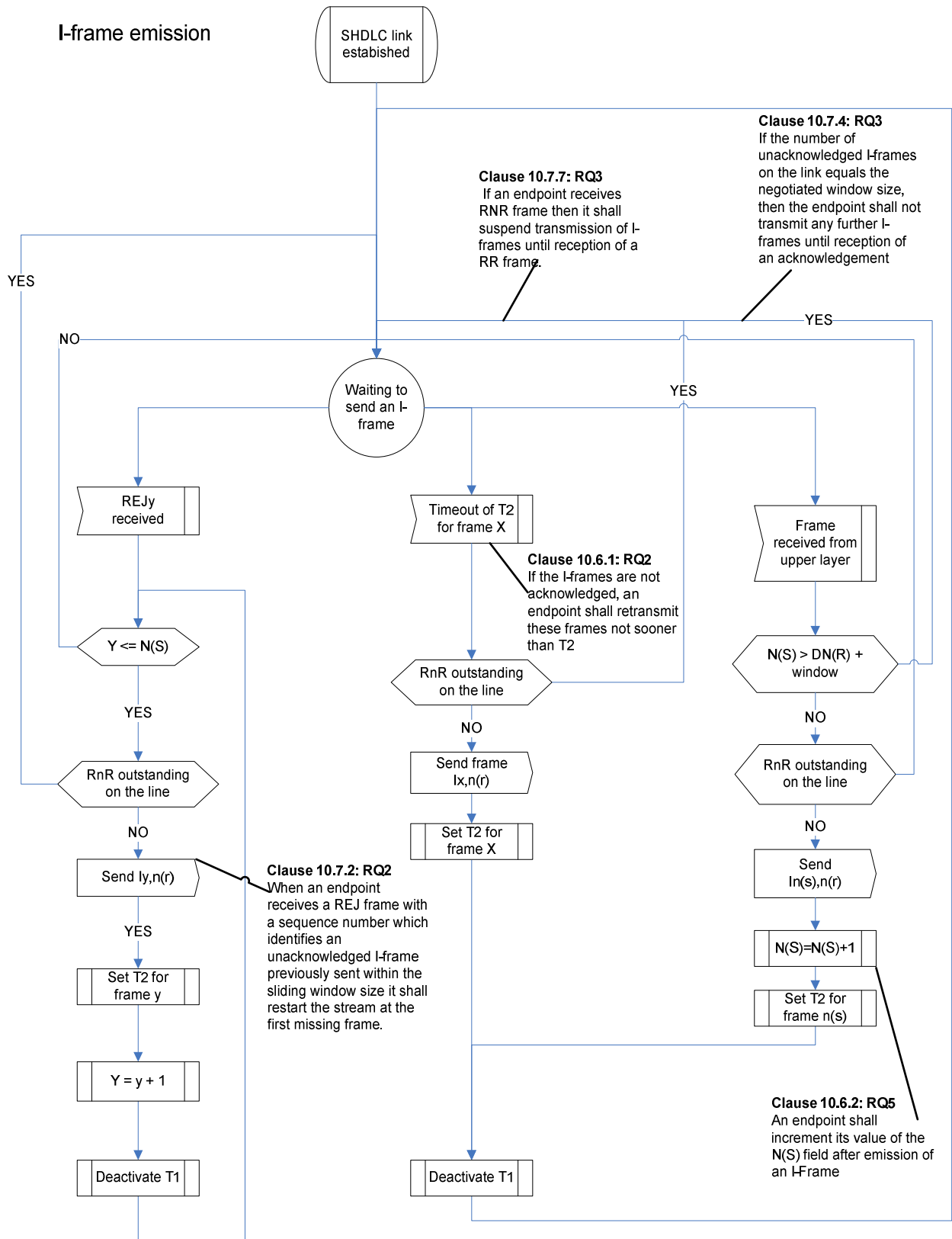


Figure A.3.3: I-frame emission

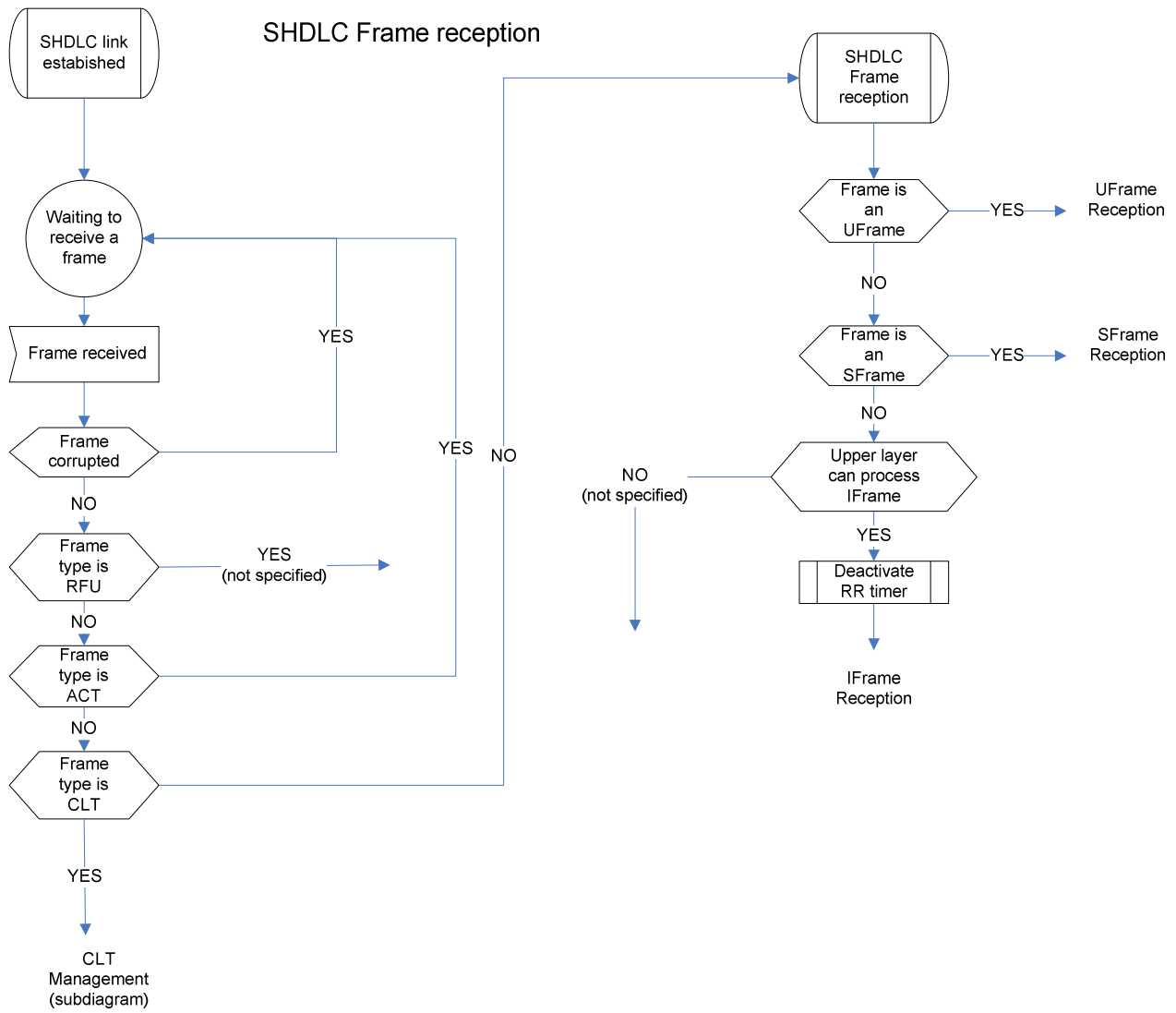


Figure A.3.4: SHDLC frame reception



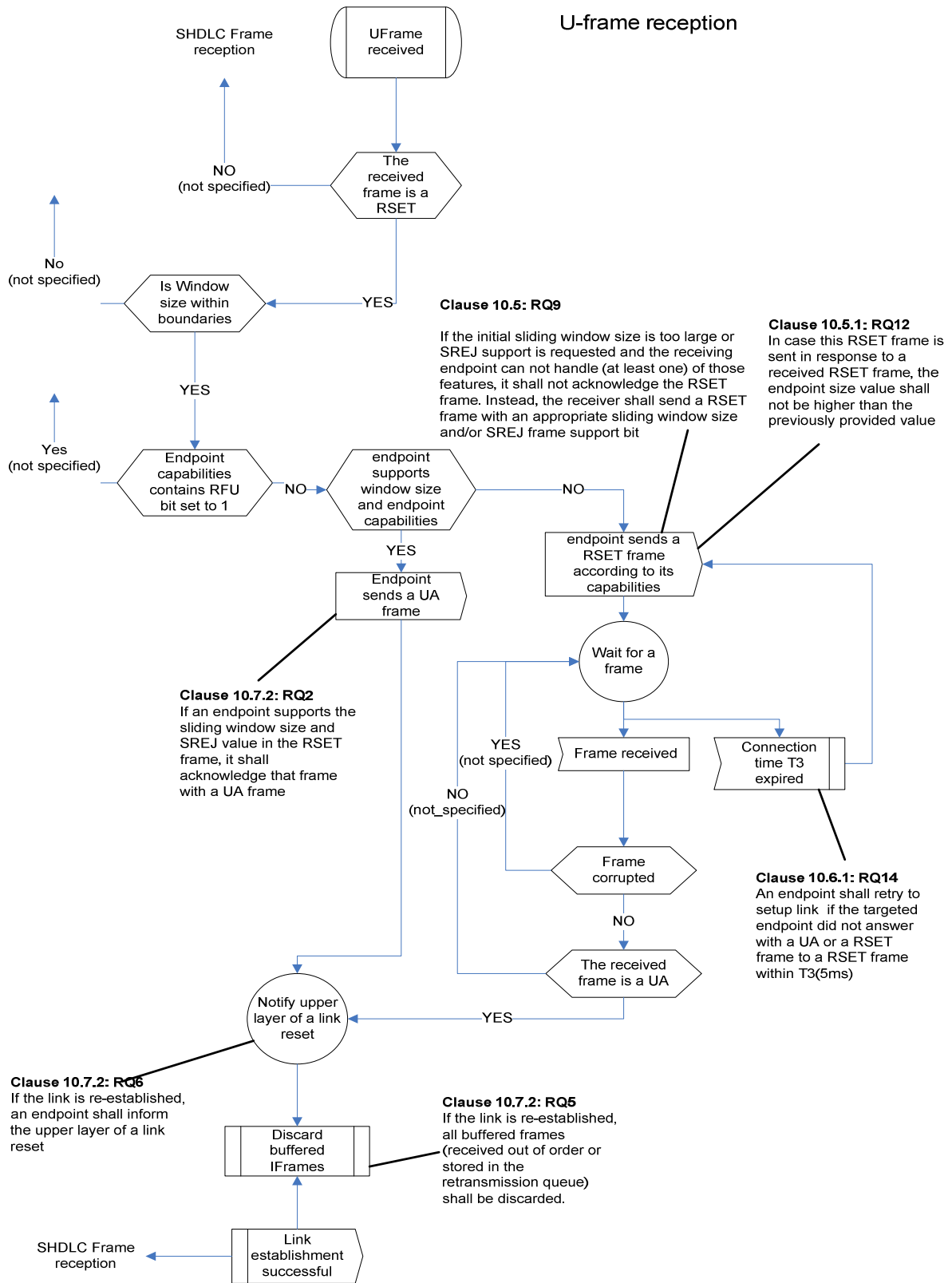


Figure A.3.5: U-frame reception

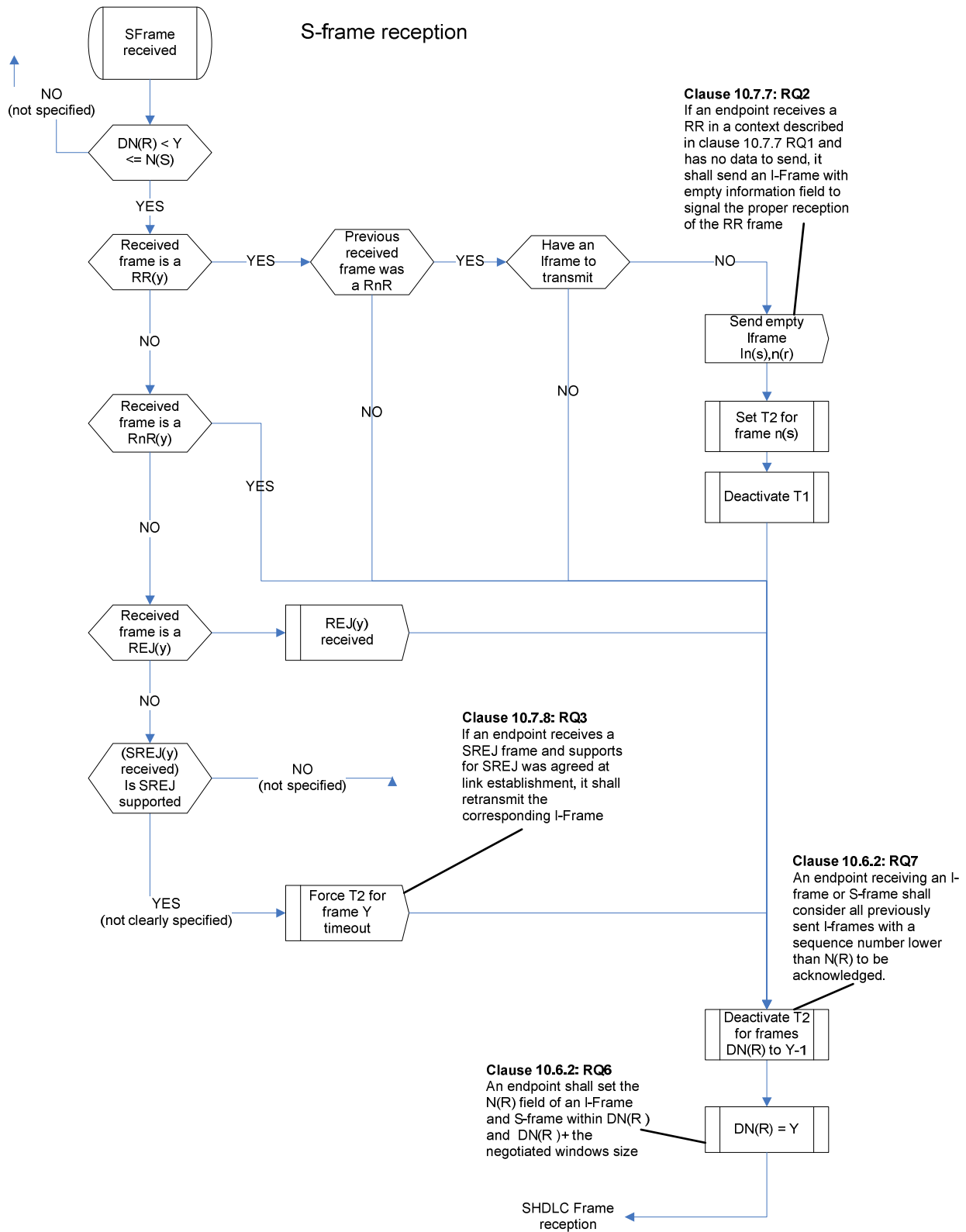


Figure A.3.6: S-frame reception



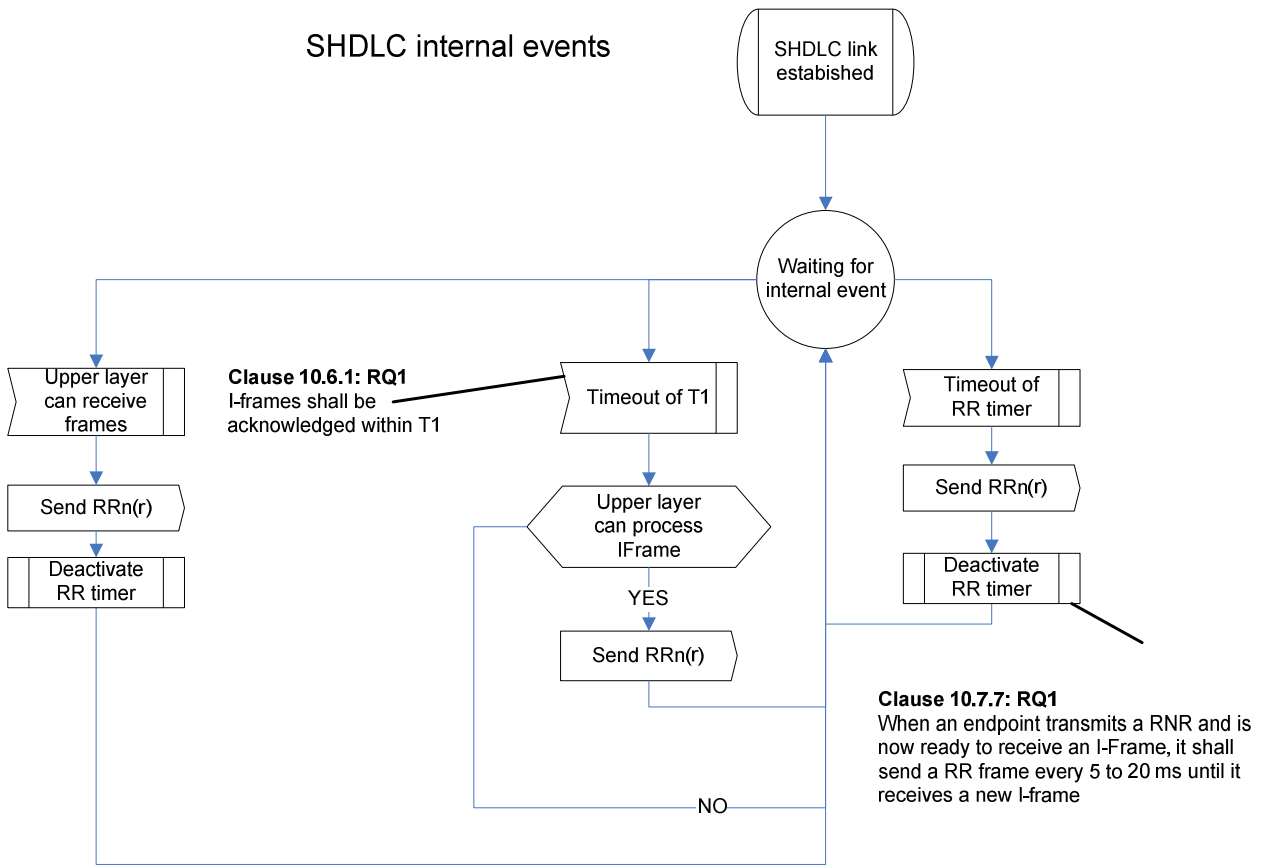


Figure A.3.8: SHDLC internal events

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## Annex B (informative): Bibliography

- ISO/IEC 14443-4: "Identification cards - Contactless integrated circuit cards - Proximity cards - Part 4: Transmission protocol".

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## Annex C (informative): Core specification version information

Unless otherwise specified, the versions of TS 102 613 [4] from which conformance requirements have been extracted are as follows:

| <b>Release</b> | <b>Latest version from which conformance requirements have been extracted</b> |
|----------------|---|
| Rel-7          | V7.9.0  |
| Rel-8          | V8.2.0  |
| Rel-9          | V9.2.0  |

## Annex D (informative): Change history

The table below indicates all changes that have been incorporated into the present document since it was placed under change control.

| Change history |         |             |     |   |       |  |       |       |
|----------------|---------|-------------|-----|---|-------|--|-------|-------|
| Date           | Meeting | Plenary Doc | CR  | Rev   | Cat   | Subject/Comment  | Old   | New   |
| 2009-07        | SCP #42 | SCP-090254  |     |   |       | Creation of the specification  | 2.4.0 | 7.0.0 |
| 2009-10        | SCP #43 | SCP-090315  | 001 | -   | F     | Test Case 5.3.2.3.3: initial activation in low power mode with corrupted frames  | 7.0.0 | 7.1.0 |
|                |         | SCP-090315  | 002 | -   | F     | Correction of the RQ verification of TC 4: 'Communication with frames - idle bits and wakeup sequence'                 | 7.0.0 | 7.1.0 |
|                |         | SCP-090315  | 003 | 2   | F     | Addition of test cases fro CLT LLC definition  | 7.0.0 | 7.1.0 |
|                |         | SCP-090315  | 004 |   | F     | Changes with respect to TS 102 221 interface   | 7.0.0 | 7.1.0 |
| 2010-03        | SCP #44 | SCP(10)0066 | 005 | 1   | D     | Editorial corrections  | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0067 | 006 | 1   | F     | Modify test case 5.2.4.5 and adding new test cases 5.2.4.x and 5.2.4.y   | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0068 | 007 | 1   | F     | Reword RQ6 in clause 5.7.7.5   | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0069 | 008 | 1   | F     | Correct test case 5.7.7.6.3  | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0070 | 009 | 1   | F     | Modified 5.2.4.2 to start clock in middle of frame exchange  | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0071 | 010 | 1   | F     | Modification of 5.2.4.4/5 to send ISO command after SWP deactivation   | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0072 | 011 | 1   | F     | Updated 5.3.2.3.6 to test both with and without activation of TS 102 221 interface                                     | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0073 | 012 | 1   | F     | Loosened test equipment timing constraints in 5.7.1.X  | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0074 | 013 | 1   | D     | Various editorial corrections  | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0075 | 014 | 1   | F     | Updated test cases for activation / corrupted frames to send subsequent frames in order to check for response          | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0076 | 015 | 1   | F     | Correction of tests wrongly implying an ACT_POWER_MODE after a correct ACT_SYNC in low power mode                      | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0077 | 016 | 1   | F     | 5.5.1.3 - removal of redundant test execution parameters   | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0078 | 017 | 1   | F     | 5.6.2.3.9: removal of redundant and unclearly specified test case  | 7.0.0 | 7.1.0 |
|                |         | SCP(10)0079 | 018 | 1   | F     | Correction of test case 5.6.2.2.4  | 7.0.0 | 7.1.0 |
| 2010-07        | SCP #45 | SCP(10)0119 | 019 | -   | F     | Removal of test case in 5.3.2.3.15   | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 020 | -   | F     | Addition of specific max. Time for 'no response'   | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 022 | -   | F     | Delete test case 5.6.2.1.2   | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 023 | -   | F     | Addition of new test case to test RQ5 from TS 102 694-2, clause 5.5.1.1 and remove this RQ from the related test cases | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 024 | -   | F     | Removal of duplication/invalid execution parameters in activation tests  | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 025 | -   | F     | Correction of test case 5.7.7.8.   | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 026 | -   | F     | Improved testing of idle bits  | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 027 | -   | F     | Change of usage of 10 I-frames throughout specification to 9 I-frames  | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 029 | -   | F     | Test case 5.6.4.1.6: removal of redundant parameter  | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 030 | -   | F     | ACT_INFORMATION in ACT_SYNC during initial interface activation made mandatory   | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 031 | -   | F     | Correction of Terminal Capability support to be optional   | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 032 | -   | F     | Test case 5.7.1.2: correction of ambiguous text  | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 033 | -   | F     | Test case 5.4.1.2.2: correction of ATR test  | 7.1.0 | 7.2.0 |
|                |         | SCP(10)0119 | 035 | -   | F     | Test case 5.7.7.3.4: consistency of window size support  | 7.1.0 | 7.2.0 |
| SCP(10)0119    | 021     | -           | F   | Update of SHDLC test cases to align with TS 102 694-1 | 7.1.0 | 7.2.0  |       |       |
| SCP(10)0119    | 028     | 1           | F   | HCP message fragmentation                             | 7.1.0 | 7.2.0  |       |       |
| SCP(10)0119    | 034     | 1           | F   | Clarification of O_WS_3                               | 7.1.0 | 7.2.0  |       |       |
| 2010-10        | SCP #46 | SCP(10)0222 | 016 | -   | F     | Removal of execution parameter in test cases 'interpretation of incorrect formatted frames'                            | 7.2.0 | 7.3.0 |
| 2011-01        | SCP #47 | SCP(11)0027 | 037 |   | F     | Correction to "only one SREJ at any one time" test case  | 7.3.0 | 7.4.0 |

| Change history |         |               |     |     |     |  |       |       |
|----------------|---------|---------------|-----|-----|-----|--|-------|-------|
| Date           | Meeting | Plenary Doc   | CR  | Rev | Cat | Subject/Comment  | Old   | New   |
| 2011-03        | SCP #48 | SCP(11)0108   | 040 |     | F   | Addition of testing for reception of closely spaced frames                         | 7.3.0 | 7.4.0 |
| 2011-03        | SCP #48 | SCP(11)0106   | 038 |     | F   | Creation of TS 102 694-2 Rel-8   | 7.4.0 | 8.0.0 |
| 2011-12        | SCP #53 | SCP(11)0342   | 046 |     | F   | Deletion of test case 5.7.7.9.3  | 8.0.0 | 8.1.0 |
| 2011-12        | SCP #53 | SCP(11)0345r1 | 044 | 1   | F   | Clarification of the representative SWP frame exchange procedure when HCI is used. | 8.0.0 | 8.1.0 |
| 2011-12        | SCP #53 | SCP(11)0343   | 042 |     | B   | Creation of TS 102 694-2 REL-9   | 8.1.0 | 9.0.0 |



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# History

| <b>Document history</b> |            |             |
|-------------------------|------------|-------------|
| V9.0.0                  | March 2012 | Publication |
|                         |            |             |
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