EMVCo Type Approval
Terminal Level 1
Test Cases

Version 2.1

January 15th, 2009

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Version History

Version	Date	Revision Description
1.0	April 30th, 2000	Initial Publication.
2.0	December 20th, 2002	Test conformance with EMV2000 ICC Specification for Payment Systems Version 4.0 dated December, 2000.
2.1	January 15th, 2009	TA Bulletin 33, 41 and 55 incorporated.

Table of Content

1. SCOPE

EMVCo, LLC ("EMVCo) is the owner of the EMV 2000 ***Integrated Circuit Card Specification for Payment Systems (version 4.0),*** hereinafter called **EMV Specification**.
This specification is now divided in 4 books:

- Book 1: Application Independent ICC to Terminal Interface Requirements
- Book 2: Security and Key Management
- Book 3: Application Specification
- Book 4: Cardholder, Attendant, and Acquirer Interface Requirements

The Book 1 (Part II) and Book 2 define the complete flow of a transaction between an Integrated Circuit Card (ICC) and a terminal, from the selection of an application in the ICC to the completion of the transaction.

Book 3 defines the format of ICC commands used during the transaction flow between the ICC and terminal. Also defined is the transaction flow and associated data for an application compliant with the EMV specifications.

Finally *Book 4* defines the characteristics of a Terminal that supports an ICC conforming to the two previous specifications mentioned.

The 4 Books are divided in testable requirements listed in the **'EMVCo Terminal Level 2 Type Approval – Requirements'**.

EMVCo's objective is that terminals, used for any transaction within the payment systems of EMVCo's members (i.e. Europay International, MasterCard International and VISA International), conform to the EMV Specification.

Within Book I, Part 1 of the *Integrated Circuit Card Specification for Payment Systems* defines electromechanical characteristics, logical interface, and transmission protocols as they apply to the exchange of information between an Integrated Circuit Card (ICC) and a terminal. The purpose of the specification mentioned above is to maximize confidence that ICCs and terminals do not damage each other, and that ICCs and terminals function together correctly up to the point of exchanging information.

The present document, '**'EMVCo Type Approval – Terminal Level 1 – Test Cases'**, describes a set of test cases which when applied to the IFM part of terminals, are designed to determine whether the IFM meets the requirements listed in the **EMV Specification**.

The test cases described cover only the IFM interface as defined in the **'EMVCo Type Approval – Terminal Level 1 – Administrative Process'**, and test mechanical, electrical, answer to reset, character transmission, T=0 protocol, and T=1 protocol requirements. They do not cover the terminal/host interface (if present), general terminal functionality, or other regulatory requirements such as electrical safety or electromagnetic compatibility.

The environment and conditions to be maintained during testing are defined in **'Terminal Level 1 Type Approval – Implementation Requirements'**. If any special conditions are required for a specific test case, these conditions are described in the test case itself.

The intended audience for this document is testers (EMVCo accredited test laboratories), terminal equipment vendors and qualified auditors.

A test laboratory which wants to implement and run test cases described in the present document shall follow the rules defined in:
- **'Terminal Level 1 Type Approval – Implementation Requirements'**.
- **'Terminal Level 1 Type Approval – Administrative Process'**

2. REFERENCED DOCUMENTS

[N1]	EMV 2000 Integrated Circuit Card Specification for Payment Systems – Book 1 – Application Independent ICC to Terminal Interface Requirements	Version 4.0 – December 2000
[N2]	EMVCo Type Approval – Terminal Level 1 – Requirements	Version 1.0
[N3]	ISO/IEC – Information Technology – Open systems interconnection – conformance testing methodology and framework – Part 1 : General concept	ISO/IEC 9646-1
[N4]	IEEE Standard for Software Verification and Validation Plans	IEEE std 1012-1998
[N5]	Book Bulletins - Section TA 33 - Bulletin n°33, EMVCo Type Approval Terminal Level 1 Test Cases	First edition April 2005
[N6]	Book Bulletins - Section TA 41 - Bulletin n°41, Update to EMVCo Type Approval Terminal Level 1 Test Cases	First edition April 2006
[N7]	Book Bulletins - Section TA 55 - Bulletin n°55, Update to EMVCo Type Approval Terminal Level 1 Test Cases	First edition January 2007

3. ABBREVIATIONS AND NOTATIONS

APDU	Application Protocol Data Unit
ATR	Answer to Reset
BGT	Block Guard Time
BWI	Block Waiting Time Integer
BWT	Block Waiting Time
C-APDU	Command APDU
C_{IN}	Input Capacitance
CLA	Class Byte of the Command Message
CLK	Clock
C-TPDU	Command TPDU
CWI	Character Waiting Time Integer
CWT	Character Waiting Time
DAD	Destination Node Address
DC	Direct Current
EDC	Error Detection Code
EMV	Europay, MasterCard, Visa
etu	Elementary Time Unit
f	Frequency
GND	Ground
I-block	Information Block
ICC	Integrated Circuit Card
IFD	Interface Device
IFS	Information Field Size

IFSC	Information Field Size for the ICC
IFSD	Information Field Size for the Terminal
IFSI	Information Field Size Integer
I_{IH}	High Level Input Current
I_{IL}	Low Level Input Current
INF	Information Field
INS	Instruction Byte of Command Message
IUT	Implementation Under Test
I/O	Input/Output
I_{OH}	High Level Output Current
I_{OL}	Low Level Output Current
ISO	International Organization for Standardization
K_M	Master Key
K_S	Session Key
kΩ	Kilohm
Lc	Exact Length of Data Sent by the TAL in a Case 3 or 4 Command
lcm	Least Common Multiple
L_{DD}	Length of the ICC Dynamic Data
Le	Maximum Length of Data Expected by the TAL in Response to a Case 2 or 4 Command
Licc	Exact Length of Data Available in the ICC to be Returned in Response to the Case 2 or 4 Command Received by the ICC
LEN	Length
Lr	Length of Response Data Field
LRC	Longitudinal Redundancy Check
μm	Micrometer

mA	Milliampere
max.	Maximum
MHz	Megahertz
min.	Minimum
mm	Millimeter
mΩ	Milliohm
m/s	Meters per Second
μA	Microampere
μs	Microsecond
LT	Lower Tester
N	Newton
NAD	Node Address
NAK	Negative Acknowledgment
nAs	Nanoampere-second
N_{CA}	Length of the Certification Authority Public Key Modulus
N_I	Length of the Issuer Public Key Modulus
N_{IC}	Length of the ICC Public Key Modulus
ns	Nanosecond
P1	Parameter 1
P2	Parameter 2
P3	Parameter 3
PCB	Protocol Control Byte
PCO	Point of Control & Observation
pF	Picofarad
P_I	Issuer Public Key
P_{IC}	ICC Public Key

PTS	Protocol Type Selection
R-APDU	Response APDU
R-block	Receive Ready Block
RST	Reset
R-TPDU	Response TPDU
SAD	Source Node Address
S-block	Supervisory Block
S_{CA}	Certification Authority Private Key
S_I	Issuer Private Key
S_{IC}	ICC Private Key
SUT	System Under Test
SW1	Status Word One
SW2	Status Word Two
TCK	Check Character
t_F	Fall Time Between 90% and 10% of Signal Amplitude
t_{Px}	Time period x over which a voltage is monitored
TPDU	Transport Protocol Data Unit
t_R	Rise Time Between 10% and 90% of Signal Amplitude
TTL	Terminal Transport Layer
UT	Upper Tester
V	Volt
V_{CC}	Voltage Measured on VCC Contact
VCC	Supply Voltage
V_{IH}	High Level Input Voltage
V_{IL}	Low Level Input Voltage

V_{OH}	High Level Output Voltage
V_{OL}	Low Level Output Voltage
VPP	Programming Voltage
WI	Waiting Time Integer
WTX	Waiting Time Extension
εV	Voltage measurement accuracy of the Test Tool equipment
εs	Time measurement accuracy of the Test Tool equipment
εΩ	Resistance measurement accuracy of the Test Tool equipment
εN	Force measurement accuracy of the Test Tool equipment
εA	Current measurement accuracy of the Test Tool equipment
ε%	Duty Cycle measurement accuracy of the Test Tool equipment
εHz	Frequency measurement accuracy of the Test Tool equipment

4. GENERAL REQUIREMENTS

4.1. Testing Strategy.

4.1.1. Compliance Demonstration Objective.

Within EMVCo Level 1 type approval process, EMVCo **compliance demonstration objectives** are:

1. to ensure implementation of EMV 2000 Book I - part I terminal requirements ref. [N1],
2. to ensure that ICC and Terminal do not damage one another,
3. to ensure ICC / Terminal interoperability whatever the terminal customization performed by the vendor.

4.1.2. Implementation Under Test for Level 1 Approval.

The IUT is the Interface Module as defined in the **'Terminal Level 1 Type Approval - Administrative Process'**.

4.1.3. Testing Strategy for Terminal Mechanical Characteristics

For the purpose of the EMVCo Level 1 type approval process**, for terminal mechanical characteristics**, following Implementation Under Test (IUT) and Test Types have been defined according to the definition established in section 4 of this document:

IUT : IFM_Connector
Test Type : Type 1: Dimensioning / Physical Compatibility
Type 2 : Environmental (Thermal, EMI, Vibration ...)

4.1.4. Testing Strategy for Terminal Electrical characteristics.

For the purpose of the EMVCo Level 1 type approval process, **for terminal electrical characteristics**, following Implementation Under Tests (IUT) and Test Types have been defined according to definition established in section 4 of this document:

IUT : IFM_Coupler
Test Type :

- Type 1 : functional – nominal (Valid IUT behavior,)
- Type 2 : functional – robustness (IUT reaction to invalid events)

4.1.5. Testing Strategy for Terminal Protocol characteristics.

EMVCo Testing strategy for terminal protocol characteristics encompasses ISO/IEC 9646-1 ref. [1] proposed conformance testing methodology and framework.

For the purpose of this EMVCo Level 1 type approval process, **for terminal protocol characteristics**, following IUT and Tests Classes have been defined according to the definition established in section 4 of this documents:

IUT : IFM_Level1_Protocol
Test types :

- Type 1 : functional – nominal (Valid IUT behavior,)
- Type 2 : functional – robustness (IUT reaction to invalid events)
- Type 3 : data- flow (PDUs sent to IUT, PDU received from IUT)
- Type 4 : control-flow (dynamic interaction between PDUs sent and received)

For testing against the terminal protocol characteristics, the test tool will be composed of :

- a **Lower Tester** (ISO 9646-1 ref. [N3]), the representation of the means of providing, during test execution, indirect control and observation of the lower service interface of the IFM_Level1_Protocol,
- and an **Upper Tester** (ISO 9646-1 ref. [N3]), which is the representation of the means of providing control and observation of the upper service interface of the IFM_Level1_Protocol.

Communication between terminal and ICC
The communication between the terminal and the card following the ATR is implemented via a 2-layer hierarchical approach - defining an IUT and an "application" layer with a mapping between the 2 layers.

Note: The reader shall refer to Appendix 3 to obtain information on tests methods.

4.2. Test Tool Implementation Requirements

The Test Tool Implementation requirements are defined in the **'Terminal Level 1 Type Approval - Implementation Requirements'**. This document specifies all requirements that the implementation of the test cases shall follow, and for example the level of accuracy 'ε' that the Test Tool shall have.

4.3. Test Conditions

4.3.1. Default environmental conditions

For the description of the default environmental conditions (temperature, humidity,...), refer to the **'Terminal Level 1 Type Approval - Implementation Requirements'**.

4.3.2. ATR

In the Functional Test Cases described in the present document, recommended ATRs are proposed. Others ATRs may be used, if they strictly follow the test conditions listed in the test cases.

5. TEST CASES DESCRIPTION

5.1. Introduction

5.1.1. Coding of the references

<u>Test Cases References are coded as following</u>

1C*t***.***xyz***.***uv*

Two digits for Sub-test Cases numbering (00 to 99)

Three digits for Test Cases numbering (000 to 999)

One letter for categories of Test Cases (A to Z)

1C means Test ***C***ases Level ***1*** references

<u>Requirement References are coded as following:</u>

1R*t***.***xyz***.***uv*

Two digits for Sub-test Requirements numbering (00 to 99)

Three digits for Test Requirements numbering (000 to 999)

One letter for categories of Test Requirements (A to Z)

1R means Test ***R***equirements Level ***1*** references

5.2. Mechanical Tests

5.2.1. 1CA.001.0x - Physical compatibility and contact location

Test No. **1CA.001.0x**

Objective: To ensure that the physical characteristics of the IFM allow the acceptance of ICCs having a size between the minimum and the maximum standard dimensions, and that galvanic contact is established between the IFM and reference probes having minimal area contacts.

References: 1RA.001.00 - Physical characteristics of Interface Device

1RA.001.01 - Physical characteristics of Interface Device

1RA.002.00 - Position of contacts

1RA.003.00 - Embossing

1RA.004.00 - Correct connection of contacts

1RA.004.02 - ICC accessible

Conditions: Temperature = 20°C (±3°C)

Ambient relative humidity between 20% and 80%

The IUT is supplied with nominal power

Reference probes inserted:

- x=1 : Minimum dimensioned probe (see Test Implementation Guideline)
- x=2 : Maximum dimensioned probe (see Test Implementation Guideline)

Procedure: <u>Procedure for each of the 2 test conditions</u>: Mechanical insertion of reference probes having minimum and maximum physical dimensions and minimum contact area. Confirmation of galvanic connection to the contacts by monitoring of signal activation. Withdrawal of the reference probe from the IUT.

Pass Criteria:

1. The reference probes may be inserted without mechanical interference into the IFM.
2. The contact activation sequence is correctly performed.
3. The reference probe may be withdrawn from the IFM without mechanical interference.

5.2.2. 1CA.002.00 - IFM Contact Force

Test No. **1CA.002.00**

Objective: To ensure that the force exerted by any one IUT contact over its corresponding LT contact is within specifications.

Reference: 1RA.005.00 - Contact forces

Conditions: The test N°1CA.001.0x "Physical compatibility and contacts location" has to be performed before this test.

Temperature = 20°C (±3°C)

Ambient relative humidity between 20% and 80%

IUT is not supplied with any power.

Procedure: Insertion of contact force measuring probe into the IFM; Measurement of the contact force on each contact present (see ICS) at least three times with at least one second between measurements.

Pass Criteria: $0.2\ N - \varepsilon N \leq$ contact force $\leq 0.6\ N + \varepsilon N$

For each contact and measurement.

5.3. Electrical Tests.

5.3.1. 1CB.001.0x - Short circuit resilience

Test No. **1CB.001.0x**

Objective: To ensure that the IUT is not damaged by inter IFD contact short circuits or by short circuits between any IFD contact and GND

References: 1RB.026.00 - Short circuit resilience

Conditions: Default environmental conditions.

Procedure: Initiate contact activation with a shorting paddle having ≤ 2Ω between; I/O and GND, CLK and GND, and RST and GND.

Keep shorting paddle during 10 seconds.

Perform test case 1CB.017.0x.

Repeat previous sequence with a shorting paddle having ≤ 2Ω between; I/O and VCC, CLK and VCC, and RST and VCC.

Repeat previous sequence with a shorting paddle having ≤ 2Ω between VCC and GND.

Repeat 10 times for all combinations of temperature.

Pass Criteria: Any other test case performed correctly after this one

5.3.2. 1CB.002.00 - VPP Isolation

Test No. **1CB.002.00**

Objective: To ensure that the contact is isolated for new model terminals

References: 1RA.006.00 - Isolation of C6

Book Bulletins - Section TA 55 - Bulletin n°55, Update to EMVCo Type Approval Terminal Level 1 Test Cases

Conditions: Default environmental conditions.

Note: This test case shall only be performed if the C6 contact is isolated from the terminal (see ICS: Chapter V — item 2).

Procedure: Measure the DC resistance between C6 and GND, by applying no greater than a 5 V DC voltage between these contacts and measuring the resulting current.

Pass Criteria: Resistance $\geq 10M\Omega$ $-\varepsilon\Omega$)

5.3.3. 1CB.003.0x - Vpp Voltage

Test No. **1CB.003.0x**

Objective: To ensure that the voltage does not exceed the specified limit throughout a card session for existing model IUTs

References: 1RA.007.00 - Potential of C6 in case of connection for existing class A terminals

Book Bulletins - Section TA 55 - Bulletin n°55, Update to EMVCo Type Approval Terminal Level 1 Test Cases

Conditions: Default environmental conditions.

Load current, I_{CC} = 2mA and 54mA (±1mA)

Note: This test case shall only be performed if the C6 contact is connected to the terminal (see ICS: Chapter V — item 2).

Procedure: Initiate a cold reset, return the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{PP} throughout activation sequence, ATR and processing of the commands sequence.

Repeat for all combinations of temperature and load current.

Pass Criteria: $0 - \varepsilon V \leq V_{PP} \leq (1.05 \times V_{CC}) + \varepsilon V$

5.3.4. 1CB.004.0x - I/O Current

Test No. **1CB.004.0x**

Objective: To ensure that the IUT limits the current flowing into or out of the I/O contact to specified limits

References: 1RB.002.00 - I/O current

Conditions: Default environmental conditions.

Load current, I_{CC} = 2mA and 54mA (±1mA).

Procedure: Initiate cold reset.

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

During the processing of the commands sequence, apply a low value load of 33Ω between VCC and I/O, and compute $I_{I/O}$ current until the short collapse I/O and cause contact deactivation.

Repeat the above test applying the load between I/O and GND.

Repeat for all combinations of temperature and load current.

Pass Criteria: $-15mA - \varepsilon A \le I_{I/O} \le 15mA + \varepsilon A$ and any other test case performed correctly after this one.

5.3.5. 1CB.005.0x - I/O Transmission voltage

Test No. **1CB.005.0x**

Objective: To ensure that the signal high and low voltages are within specified limits

References: 1RB.003.00 - Characteristics of I/O V_{OH} in transmit mode

1RB.004.00 - Characteristics of I/O V_{OL} in transmit mode

Conditions: Default environmental conditions.

Load current: I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{OH} and V_{OL}.

Repeat for all combinations of temperature and load currents.

Pass Criteria: $(0.8 \times V_{CC}) - \varepsilon V \leq V_{OH} \leq V_{CC} + \varepsilon V$ and $0V - \varepsilon V \leq V_{OL} \leq 0.4V + \varepsilon V$

5.3.6. 1CB.006.0x - I/O Transmission rise and fall time

Test No. **1CB.006.0x**

Objective: To ensure that the signal rise and fall times are within specified limits

References: 1RB.005.00 - Characteristics of I/O t_R and t_F in transmit mode

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA).

Procedure: Initiate cold reset.

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

During the processing of the commands sequence:

- Measure t_R between 10% & 90% points of signal rising edges.
- Measure t_F between 90% & 10% points of signal falling edges.

Repeat for all combinations of temperature and load current.

Pass Criteria: $t_R \le 0.8\mu s + \varepsilon s$

$t_F \le 0.8\mu s + \varepsilon s$

5.3.7. 1CB.007.0x - I/O transmission signal perturbations

Test No. **1CB.007.0x**

Objective: To ensure that the signal perturbations are within specified limits

References: 1RB.006.00 - Characteristics of I/O Signal perturbations in transmit mode

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{OHinst} and V_{OLinst} during the processing of the commands sequence.

Repeat for all combinations of temperature and load current.

Pass Criteria: $(0.8 \times V_{CC}) - \varepsilon V \leq V_{OHinst} \leq (V_{CC} + 0.25V) + \varepsilon V$

$-0.25V - \varepsilon V \leq V_{OLinst} \leq 0.4V + \varepsilon V$

5.3.8. 1CB.008.0x - I/O reception voltage

Test No. **1CB.008.0x**

Objective: To ensure that the IUT correctly interprets the I/O signals from the LT

References: 1RB.007.00 - Characteristics of I/O V_{IH} in reception mode
1RB.008.00 - Characteristics of I/O V_{IL} in reception mode

Conditions: Default environmental conditions.
Load current I_{CC} = 2mA and 54mA (±1mA)
I/O voltage from LT:

- V_{IH} = (0.9 x V_{CC}) and V_{IL} = 0.1V (t_R & t_F <0.1µs)
- V_{IH} = V_{CC} and V_{IL} = 0V (t_R & t_F <0.1µs)
- V_{IH} = (0.6 x V_{CC}) and V_{IL} = 0.5V (t_R & t_F <0.1µs)

Procedure: Initiate cold reset
Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.
Repeat for all combinations of temperature, load current and I/O voltage.

Pass Criteria: The sequence of commands shall be performed correctly each time.

5.3.9. 1CB.009.0x - I/O reception rise and fall times

Test No. **1CB.009.0x**

Objective: To ensure that the IUT correctly interprets (as logic high or low as appropriate) signals from the LT having rise and fall times as defined in [N1].

References: 1RB.009.00 - Characteristics of I/O t_R and t_F in reception mode

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA)

t_R & t_F values:

- t_R & $t_F \leq 0.1\mu s$ (±0.01µs), $V_{IH} = (0.9 \times V_{CC})$ and $V_{IL} = 0.1V$
- t_R & $t_F = 1.2\mu s$ (±0.01µs), $V_{IH} = (0.9 \times V_{CC})$ and $V_{IL} = 0.1V$

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Repeat for all combinations of temperature, load current and t_R & t_F values.

Pass Criteria: The sequence of commands shall be performed correctly each time.

5.3.10. 1CB.010.0x - CLK voltage

Test No. **1CB.010.0x**

Objective: To ensure that the signal high and low voltages generated by the IUT are within specified limits.

References: 1RB.010.00 - Characteristics of CLK V_{OH}

1RB.011.00 - Characteristics of CLK V_{OL}

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA).

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{OH} (t_{P1})

Monitor V_{OL} (t_{P2})

Repeat for all combinations of temperature and load current.

Pass Criteria: $(V_{CC} - 0.5V) - \varepsilon V \leq V_{OH} \leq V_{CC} + \varepsilon V$ for t_{P1}

$0V - \varepsilon V \leq V_{OL} \leq 0.4V + \varepsilon V$ for t_{P2}

5.3.11. 1CB.011.0x - CLK rise and fall times

Test No. **1CB.011.0x**

Objective: To ensure that the signal rise and fall times are within specified limits

References: 1RB.012.00 - Characteristics of CLK t_R and t_F

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Measure t_R between 10% & 90% points of rising edge

Measure t_F between 90% & 10% points of falling edge

Repeat for all combinations of temperature and load current.

Pass Criteria: $t_R \leq$ 8% + εs of clock period

$t_F \leq$ 8% + εs of clock period

5.3.12. 1CB.012.0x - CLK signal perturbations

Test No. **1CB.012.0x**

Objective: To ensure that the signal perturbations are within specified limits

References: 1RB.013.00 - Characteristics of CLK Signal perturbations

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{OHinst} and V_{OLinst} during the processing of the commands sequence.

Repeat for all combinations of temperature and load current.

Pass Criteria: $(V_{CC} - 0.5V) - \varepsilon V \leq V_{OHinst} \leq (V_{CC} + 0.25V) + \varepsilon V$

$-0.25V - \varepsilon V \leq V_{OLinst} \leq 0.4V + \varepsilon V$

5.3.13. 1CB.013.0x - CLK Frequency and duty cycles

Test No. **1CB.013.0x**

Objective: To ensure that the clock frequency, stability, and duty cycle are within specified limits.

References: 1RB.014.00 - CLK Duty cycle

1RB.015.00 - CLK Frequency range

1RB.016.00 - CLK Frequency stability

Conditions: Default environmental conditions.

Load current, I_{CC} = 2mA and 54mA (±1mA)

Procedure: Power on the SUT and wait at least 1 minute.

Initiate cold reset.

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

During the processing of the commands sequence, measure frequency and duty cycle 10 times at 50ms intervals from CLK start.

Repeat for all combinations of temperature and load current.

Pass Criteria: 1MHz - εHz $\leq$ average frequency $\leq$ 5MHz+ εHz

Frequency variation $\leq$ 1% of average frequency

45% - ε% $\leq$ duty cycle $\leq$ 55% + ε% of signal period

5.3.14. 1CB.014.0x - RST voltage

Test No. **1CB.014.0x**

Objective: To ensure that the steady state signal low and high voltages generated by the IUT are within specified limits.

References: 1RB.017.00 - Characteristics of RST V_{OH}

1RB.018.00 - Characteristics of RST V_{OL}

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

During the processing of the commands sequence, monitor V_{OL} (t_{P1}) before RST low to high transition and V_{OH} (t_{P2}) afterwards.

Repeat for all combinations of temperature and load currents.

Pass Criteria: $0V - \varepsilon V \le V_{OL} \le 0.4V + \varepsilon V$ for t_{P1}

$(V_{CC} - 0.5V) - \varepsilon V \le V_{OH} \le V_{CC} + \varepsilon V$ for t_{P2}

5.3.15. 1CB.015.0x - RST rise and fall times

Test No. **1CB.015.0x**

Objective: To ensure that the signal rise and fall times are within specified limits

References: 1RB.019.00 - Characteristics of RST t_R and t_F

Conditions: Default environmental conditions.
Load current I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate a sequence for RST low to high transition
Measure t_R between 10% & 90% points of rising edge
Initiate a sequence for RST high to low transition
Measure t_F between 90% & 10% points of falling edge
Repeat 10 times for all combinations of temperature and load current.

Pass Criteria: $t_R \leq 0.8\mu s + \varepsilon s$

$t_F \leq 0.8\mu s + \varepsilon s$

5.3.16. 1CB.016.0x - RST signal perturbations

Test No. **1CB.016.0x**

Objective: To ensure that the signal perturbations are within specified limits

References: 1RB.020.00 - Characteristics of RST Signal perturbations

Conditions: Default environmental conditions.

Load current I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate a sequence for RST low to high transition

Monitor V_{OHinst} for 5µs (+5%) from the 90% point of the rising edge (t_{P1})

Initiate a sequence for RST high to low transition

Monitor V_{OLinst} for 5µs (+5%) from the 10% point of the falling edge (t_{P2})

Send the default T=0 ATR and complete processing of a command sequence between LT and IUT.

Monitor V_{OHinst} during reception of the first two bytes of the ATR (t_{P3})

Monitor V_{OHinst} during transmission of the first two bytes of the command header(t_{P4})

Repeat 10 times for all combinations of temperature and load current.

Pass Criteria: $(V_{CC} - 0.5V) - \varepsilon V \leq V_{OHinst} \leq (V_{CC} + 0.25V) + \varepsilon V$ for t_{P1}

$-0.25V - \varepsilon V \leq V_{OLinst} \leq 0.4V + \varepsilon V$ for t_{P2}

$(V_{CC} - 0.5V) - \varepsilon V \leq V_{OHinst} \leq (V_{CC} + 0.25V) + \varepsilon V$ for t_{P3}

$(V_{CC} - 0.5V) - \varepsilon V \leq V_{OHinst} \leq (V_{CC} + 0.25V) + \varepsilon V$ for t_{P4}

5.3.17. 1CB.017.0x - VCC Contact voltage

Test No. **1CB.017.0x**

Objective: To ensure that the supply voltage generated by the IUT remains within specified limits over a range of applied load conditions.

References: 1RB.021.00 - Characteristics of Supply Voltage VCC

1RB.022.00 - Characteristics of Supply current on VCC contact

1RB.024.00 - Supply Voltage VCC not negative

Conditions: Default environmental conditions.

Load current, I_{CC} = 1mA (±0,1mA), 25mA and 54mA (±1mA)

IUT input power supply voltage at nominal, max. and min. values.

Procedure: Initiate a cold reset for VCC activation.

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{CC} throughout the processing of the commands sequence.

Repeat for all combinations of temperature, load current and power supply voltage.

Pass Criteria: Vcc shall be in the following range when appropriate:

- $0V - \varepsilon V \leq V_{CC} \leq 0.4V + \varepsilon V$
- $4.6V - \varepsilon V \leq V_{CC} \leq 5.4V + \varepsilon V$

5.3.18. 1CB.018.0x - Transients neutralization on VCC

Test No. **1CB.018.0x**

Objective: To ensure that the supply voltage generated by the IUT remains within specified limits under dynamic load conditions.

References: 1RB.025.00 - Transients neutralization on VCC

Conditions: Default environmental conditions.

Load current, I_{CC} = 1mA (±0,1mA), 25mA and 54mA (±1mA)

Transient load:

- square wave current drain pulses of 20 mA ± 0.5 mA without constant current, at a frequency of 5 MHz ± 100 kHz with a duty cycle of 50 % ± 10%)

Note: other wave forms and amplitude values can be used as an implementation choice as long the transient remains within the boundaries specified: <100nA, <400ns, <400nA.s, < total current limited to 55mA.

- peak of 95 mA ± 5 mA of fixed 400 ns ± 10 ns duration, activated at a frequency which vary with an asynchronous sequence at 2 kHz);

IUT input power supply voltage at nominal, max. and min. values.

Procedure: Initiate a cold reset for VCC activation.

Send the default T=0 ATR and complete processing of a commands sequence between LT and IUT with a minimum duration of 5 seconds.

Monitor V_{CC} throughout the processing of the commands sequence.

Repeat for all combinations of temperature, load current, transient load and power supply voltage.

Pass Criteria: Vcc shall be in the following range $4.6V - \varepsilon V \leq V_{CC} \leq 5.4V + \varepsilon V$ (perturbation resolution 2.5ns).

5.4. Card Session Tests

5.4.1. 1CC.001.0x - Contact Activation Sequence

Test No. **1CC.001.0x**

Objective: To ensure that the IFD contacts are activated according to the defined sequence when the LT is inserted into the IUT

References: 1RB.026.00 - Short circuit resilience

1RC.001.00 - Contact in state L on insertion of the ICC

1RC.002.00 - RST activation sequence

1RC.003.00 - VCC activation sequence

1RC.004.00 - I/O and CLK activation sequence

1RC.005.00 - Maximum delay before I/O is in reception mode

Conditions: The LT card is out of the IUT at the beginning of the test.

Default environmental conditions.

Load current, I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset for contact activation sequence.

Monitor V_{RST}, V_{CLK} and $V_{I/O}$ for ≥1ms prior to $V_{CC} \geq 0.4V$ (t_{P1})

Monitor V_{RST}, V_{CLK} and $V_{I/O}$ from $V_{CC} \geq 0.4V$ until $V_{CC} \geq 4.6V$ (t_{P2})

Monitor V_{CC} , V_{RST} and $V_{I/O}$ from $V_{CC} \geq 4.6V$ until $V_{CLK} \geq 0.4V$ (t_{P3}) (for the first transition)

Monitor V_{CC} , V_{RST} and $V_{I/O}$ for a time period equivalent to 200 CLK cycles (+1%) (ending at t_{S1}) from $V_{CLK} \geq 4.6V$ (t_{P4}) (for the first transition)

Monitor V_{CC} and $V_{I/O}$ from t_{S1} until $V_{RST} \geq 0.4V$ (t_{P5})

Repeat 10 times for all combinations of temperature and load current.

Pass Criteria:

- $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$, $0V - \varepsilon V \leq V_{CLK} \leq 0.4V + \varepsilon V$,

$0V - \varepsilon V \leq V_{I/O} \leq 0.4V + \varepsilon V$ for t_{P1}

- $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$, $0V - \varepsilon V \leq V_{CLK} \leq 0.4V + \varepsilon V$,

$0V - \varepsilon V \leq V_{I/O} \leq V_{CC} + \varepsilon V$ for t_{P2}

- $4.6V - \varepsilon V \leq V_{CC} \leq 5.4V + \varepsilon V$, $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$,

$0V - \varepsilon V \leq V_{I/O} \leq V_{CC} + \varepsilon V$ for t_{P3}

- $4.6V - \varepsilon V \leq V_{CC} \leq 5.4V + \varepsilon V$, $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$,

$0V - \varepsilon V \leq V_{I/O} \leq V_{CC} + \varepsilon V$, $4.6V + \varepsilon V \leq V_{CLK} \leq 0.4V - \varepsilon V$ for t_{P4}

- $4.6V - \varepsilon V \leq V_{CC} \leq 5.4V + \varepsilon V$ and $(0.8 \times V_{CC}) - \varepsilon V \leq V_{I/O} \leq V_{CC} + \varepsilon V$,
  $4.6V + \varepsilon V \leq V_{CLK} \leq 0.4V - \varepsilon V$ for t_{P5}

5.4.2. 1CC.002.0x - Contact Deactivation Sequence

Test No. **1CC.002.0x**

Objective: To ensure that the IFD contacts are deactivated according to the defined sequence

References: 1RC.016.00 - RST contact timing during a deactivation sequence

1RC.017.00 - CLK and I/O contact timing during a deactivation sequence

1RC.018.00 - VCC contact timing during a deactivation sequence

1RC.019.00 - Maximum duration for Deactivation sequence

Conditions: Default environmental conditions.

Load current, I_{CC} = 2mA and 54mA (±1mA)

Procedure: Initiate cold reset and do not return ATR to initiate deactivation sequence

Measure the time from $V_{RST} \leq 0.4V$ until $V_{CC} \leq 0.4V$ (t_{P1})

Monitor V_{RST} from $V_{RST} \leq 0.4V$ until $V_{CC} \leq 4.6V$ (t_{P2})

Monitor $V_{CLK,}$ V_{RST} and $V_{I/O}$ from $V_{CC} \leq 4.6V$ until $V_{CC} \leq 0.4V$ (t_{P3})

Monitor V_{CC}, V_{CLK}, V_{RST} and $V_{I/O}$ from $V_{CC} \leq 0.4V$ for 100mS (t_{P4})

Repeat for all combinations of temperature and load current

Pass Criteria:

- $t_{P1} \leq 100ms + \varepsilon s$
- $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$ for t_{P2}
- $0V - \varepsilon V \leq V_{CLK} \leq 0.4V + \varepsilon V$, $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$ and

$0V - \varepsilon V \leq V_{I/O} \leq (V_{CC} + 0.25V) + \varepsilon V$ for t_{P3}

- $0V - \varepsilon V \leq V_{CC} \leq 0.4V + \varepsilon V$, $0V - \varepsilon V \leq V_{CLK} \leq 0.4V + \varepsilon V$,
  $0V - \varepsilon V \leq V_{RST} \leq 0.4V + \varepsilon V$ and $0V - \varepsilon V \leq V_{I/O} \leq 0.4V + \varepsilon V$ for t_{P4}

5.4.3. 1CC.003.0x - Cold Reset

Test No. **1CC.003.0x**

Objective: To ensure that the IUT drives the RST line correctly and within the specified timing limits during a cold reset of the LT. To ensure that the IUT responds correctly if an ATR is received.

References: 1RC.006.00 - Cold Reset

1RC.007.00 - RST contact timing during a cold reset

1RC.008.00 - Answer to reset timing during a cold reset

Conditions: Default environmental conditions.

Procedure: Initiate cold reset for contact activation sequence.

Measure the time period (t_{P1}) between the rising edge of CLK and the rising edge of RST.

Return the default T=0 ATR after a time period equivalent to 400 CLK cycles ($\pm 10\mu s$) after rising edge of RST and complete processing of a commands sequence between LT and IUT.

Repeat but return the default T=0 ATR after a time period equivalent to 40,000 CLK cycles ($\pm 10\mu s$) after rising edge of RST.

Repeat 10 times.

Pass Criteria: $40{,}000 \le t_{P1} \le 45{,}000$ CLK cycles

IUT correctly processes the sequence of commands after the default ATRs

5.4.4. 1CC.004.0x - Warm Reset

Test No. **1CC.004.0x**

Objective: To ensure that the IUT drives the RST line correctly and within the specified timing limits during a warm reset of the LT. To ensure that the IUT responds correctly if an ATR is received.

References: 1RC.010.00 - Warm Reset

1RC.011.00 - CLK and VCC stability during a warm reset

1RC.012.00 - I/O line driver timing during a warm reset

1RC.013.00 - RST contact timing during a warm reset

1RC.014.00 - Answer to reset timing during a warm reset

Conditions: Default environmental conditions.

Procedure: Initiate a warm reset

Measure the time period (t_{P1}) between the falling edge of RST and the subsequent rising edge of RST

Monitor VCC and CLK throughout t_{P1}

Monitor I/O throughout t_{P1} less a time period (t_{P2}) at the start equivalent to 200 CLK cycles ($\pm 10\mu s$)

Return the default T=0 ATR after a time period equivalent to 400 CLK cycles ($+10\mu s$) after rising edge of RST and complete processing of a commands sequence between LT and IUT.

Repeat but return the default T=0 ATR after a time period equivalent to 40,000 CLK cycles ($\pm 10\mu s$) after rising edge of RST

Repeat 10 times.

Pass Criteria: $40{,}000 \le t_{P1} \le 45{,}000$ CLK cycles

$4.6V - \varepsilon V \le V_{CC} \le 5.4V + \varepsilon V$ and CLK = active ($\pm \varepsilon V$) for t_{P1}

$(0.8 \times V_{CC}) - \varepsilon V \le V_{I/O} \le V_{CC} + \varepsilon V$ for t_{P2}

IUT processes the sequence of commands after receiving the default ATRs.

5.5. Answer to reset

5.5.1. 1CE.001.00: Valid Minimum Character-to-Character Interval during ATR

Test No. **1CE.001.00**

Objective: To ensure that the IUT correctly receives and interprets an ATR with a character-to-character time of 11.8 initial etus.

References: 1RE.001.00 - Minimum interval between characters in ATR

1RE.002.00 - Maximum interval between characters in ATR

EMV2000 4.4 - 4th bullet

Conditions: Default environmental conditions.

The LT sends the ATR with a character-to-character time of at or just greater than 11.8 initial etus.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'FE'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.2. 1CE.002.00: Valid Maximum Interval between Characters during ATR

Test No. **1CE.002.00**

Objective: To ensure that the IUT correctly receives and interprets an ATR with a character-to-character time of up to 10,080 initial etus.

References: 1RE.001.00 - Minimum interval between characters in ATR

1RE.002.00 - Maximum interval between characters in ATR

EMV2000 4.4 – 5^{th} bullet

Conditions: Default environmental conditions.

The LT sends ATR with a character-to-character time :

- between T0 and TB1 of at or just less than 10,080 initial etus
- between TB1 and TC1 of at or just less than 9,108 initial etus
- and between all other characters of 12 initial etus.

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'FE'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.3. 1CE.003.00: ATR Global Time Respected — Cold Reset

Test No. **1CE.003.00**

Objective: To ensure that the IUT correctly receives and interprets an answer to a cold reset complete within 20,160 initial etus.

References: 1RE.003.00 - Maximum duration of Answer to Reset

EMV2000 4.4 - 6th bullet

Conditions: Default environmental conditions.

The LT sends all the characters of the cold ATR at or just less than 20,160 initial etus following the transmission of the TS character.

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘80’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.4. 1CE.004.00: ATR Global Time Respected — Warm Reset

Test No. **1CE.004.00**

Objective: To ensure that the IUT correctly receives and interprets an answer to a warm reset complete within 20,160 initial etus.

References: 1RE.003.00 - Maximum duration of Answer to Reset

EMV2000 4.4 - 6th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the terminal to perform a warm reset then the LT sends all the characters of the warm ATR at or just less than 20,160 initial etus following the transmission of the TS character.

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘80’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.5. 1CE.005.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Specific Mode — Cold Reset

Test No. **1CE.005.xy**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR with TA1='11', TA1='12' and TA1='13' in specific mode.

References: 1RE.014.00 - Acceptance of TA2 with b5 = 0 and TA1 = '11' (cold reset)

1RE.015.00 - Acceptance of TA2 with b5 = 0 and TA1 = '11' (cold reset)

1RE.027.00 - Supported values of TA2 (cold reset)

EMV2000 4.3.3.1 – Terminal behavior 1st bullet

Conditions: Default environmental conditions.

T0 is returned with b5 set to 1 and TA1 is returned with a specific value.

Test made for both protocols and both modes with cold ATRs:

- y=0: T=0; direct convention
- y=1: T=0; inverse convention
- y=2: T=1; direct convention
- y=3: T=1; inverse convention

And test made for three TA1 values:

- x=0: TA1='11' (D=1) → current etu = 372/f seconds
- x=1: TA1='12' (D=2) → current etu = 186/f seconds
- x=2: TA1='13' (D=4) → current etu = 93/f seconds

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	'3B'	'F0'	'11'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 01	'3F'	'F0'	'11'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 02	'3B'	'F0'	'11'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'91'
xy = 03	'3F'	'F0'	'11'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'91'
xy = 10	'3B'	'F0'	'12'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 11	'3F'	'F0'	'12'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 12	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'92'
xy = 13	'3F'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'92'
xy = 20	'3B'	'F0'	'13'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 21	'3F'	'F0'	'13'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 22	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'93'
xy = 23	'3F'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'93'

Pass Criteria: The IUT accepts the cold ATR and continues the card session using the correct value of the current etu (F/Df).

5.5.6. 1CE.006.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Specific Mode — Warm Reset

Test No. **1CE.006.xy**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR with TA1='11', TA1='12' and TA1='13' in specific mode.

References:

1RE.016.00 - Acceptance of TA2 with b5 = 0 and TA1 <> '11' (cold reset)

1RE.017.00 Acceptance of TA1 = '11' and no TA2 (cold reset)

1RE.027.01 - Supported values of TA2 (warm reset)

1RE.012.01 - Supported T0 values (warm reset)

EMV2000 – Terminal behavior 1st bullet

Conditions: Default environmental conditions.

A suitable ATR has led the terminal to perform a warm reset then the LT sends a warm ATR in which T0 is returned with b5 set to 1 and TA1 is returned with a specific value.

Test made for both protocols with warm ATRs:

- y=0: T=0; direct convention
- y=1: T=0; inverse convention
- y=2: T=1; direct convention
- y=3: T=1; inverse convention

And test made for three TA1 values:

- x=0: TA1='11' (D=1) ➔ current etu = 372/f seconds
- x=1: TA1='12' (D=2) ➔ current etu = 186/f seconds
- x=2: TA1='13' (D=4) ➔ current etu = 93/f seconds

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	'3B'	'F0'	'11'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 01	'3F'	'F0'	'11'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 02	'3B'	'F0'	'11'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'91'
xy = 03	'3F'	'F0'	'11'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'91'
xy = 10	'3B'	'F0'	'12'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 11	'3F'	'F0'	'12'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 12	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'92'
xy = 13	'3F'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'92'
xy = 20	'3B'	'F0'	'13'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
xy = 21	'3F'	'F0'	'13'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

xy = 22	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'93'
xy = 23	'3F'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'61'	-	'01'	'00'	-	-	-	-	'93'

Pass Criteria: The IUT accepts the warm ATR and continues the card session using the correct value of the current etu (F/Df).

5.5.7. 1CE.007.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Negotiable Mode — Cold Reset

Test No. **1CE.007.xy**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR with TA1='11', TA1='12' and TA1='13' in negotiable mode.

References: 1RE.017.00 - Acceptance of TA1 = '11' and no TA2 (cold reset)

EMV2000 – Terminal behavior (negotiable mode)

Conditions: Default environmental conditions.

Test made for both protocols with cold ATRs:

- y=0: T=0
- y=1: T=1

And test made for three TA1 values:

- x=0: TA1='11' (D=1) ➔ current etu = initial etu
- x=1: TA1='12' (D=2) ➔ current etu = initial etu
- x=2: TA1='13' (D=4) ➔ current etu = initial etu

For each ATR, TA2 is not returned.

Note: the subcases x=1 and x=2 shall only be run for terminals that do not support a proprietary technique for negotiating parameters to be used (see ICS; Chapter VII — item 7)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	'3B'	'70'	'11'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
xy = 01	'3B'	'F0'	'11'	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'70'
xy = 10	'3B'	'70'	'12'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
xy = 11	'3B'	'F0'	'12'	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'73'
xy = 20	'3B'	'70'	'13'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
xy = 21	'3B'	'F0'	'13'	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'72'

Pass Criteria: The IUT accepts the cold ATR and continues the card session using a current etu having the same value as the initial etu i.e. 372/f seconds.

5.5.8. 1CE.008.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Negotiable Mode — Warm Reset

Test No. **1CE.008.xy**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR with TA1='11', TA1='12' and TA1='13' in negotiable mode.

References: 1RE.017.01 - Acceptance of TA1 = '11' and no TA2 (warm reset)

EMV2000 – Terminal behavior (negotiable mode)

Conditions: Default environmental conditions. A suitable ATR has led the terminal to perform a warm reset.

Test made for both protocols with warm ATRs:

- y=0: T=0
- y=1: T=1

And test made for three TA1 values:

- x=0: TA1='11' (D=1) ➔ current etu = initial etu
- x=1: TA1='12' (D=2) ➔ current etu = initial etu
- x=2: TA1='13' (D=4) ➔ current etu = initial etu

For each ATR, TA2 is not returned.

Note: the subcases x=1 and x=2 shall only be run for terminals that do not support a proprietary technique for negotiating parameters to be used (see ICS; Chapter VII — item 7)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	'3B'	'70'	'11'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
xy = 01	'3B'	'F0'	'11'	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'70'
xy = 10	'3B'	'70'	'12'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
xy = 11	'3B'	'F0'	'12'	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'73'
xy = 20	'3B'	'70'	'13'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
xy = 21	'3B'	'F0'	'13'	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'72'

Pass Criteria: The IUT accepts the warm ATR and continues the card session using a current etu having the same value as the initial etu i.e. 372/f seconds.

5.5.9. 1CE.009.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Cold Reset — T=0

Test No. **1CE.009.0y**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=0, with TC1 having any value in the range ‘00’ to ‘FF’.

References: 1RE.023.00 - Supported values of TC1 (cold reset)

1RF.002.00 - Minimum interval between two characters (TC1 present)

1RF.008.00 - Minimum interval between characters

Conditions: Default environmental conditions.

Five cold ATR test cases:

- y=0: TC1 = '00': minimum timing = 12 etus
- y=1: TC1 = '80': minimum timing = 140 etus
- y=2: TC1 = 'F0': minimum timing = 252 etus
- y=3: TC1 = 'FF': minimum timing = 12 etus
- y=4: TC1 = 'FE': minimum timing = 266 etus

note: for y=1 and y=2, the TC1 values specified above are supplied as an indication - other values in the range '00' < TC1 < 'FF' are possible.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘60’	-	‘00’	‘80’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 2	‘3B’	‘60’	-	‘00’	‘F0’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 3	‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 4	‘3B’	‘60’	-	‘00’	‘FE’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 to 266 etus, as indicated by TC1.

5.5.10. 1CE.010.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Cold Reset — T=1

Test No. **1CE.010.0y**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=1, with TC1 having any value in the range ‘00’ to '1E' and ‘FF’.

References: 1RE.012.00 - Supported T0 values (cold reset)

1RE.023.00 - Supported values of TC1 (cold reset)

1RF.031.00 - Minimum interval between characters

1RF.036.00 - Minimum interval between characters

Conditions: Default environmental conditions

Three T=1 cold ATR test cases:

- y=0: TC1 = '00': minimum timing = 12 etus
- y=1: TC1 = '1E': minimum timing = 42 etus
- y=2: TC1 = 'FF': minimum timing = 11 etus

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’
y = 1	‘3B’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘6B’
y = 2	‘3B’	‘E0’	-	‘00’	‘FF’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘8E’

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 11 to 42 etus for T=1 protocol, as indicated by TC1.

5.5.11. 1CE.011.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Warm Reset — T=0

Test No. **1CE.011.0y**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=0, with TC1 having any value in the range ‘00’ to ‘FF’.

References: 1RE.023.01 - Supported values of TC1 (warm reset)

1RF.002.02 - Minimum interval between two characters (TC1 = 'FF')

1RF.008.00 - Minimum interval between characters

Conditions: Default environmental conditions. A suitable ATR has led the terminal to perform a warm reset.

Five warm ATR test cases:

- y=0: TC1 = '00': minimum timing = 12 etus
- y=1: TC1 = '80': minimum timing = 140 etus
- y=2: TC1 = 'F0': minimum timing = 252 etus
- y=3: TC1 = 'FF': minimum timing = 12 etus
- y=4: TC1 = 'FE': minimum timing = 266 etus

note: for y=1 and y=2, the TC1 values specified above are supplied as an indication - other values in the range '00' < TC1 < 'FF' are possible.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘60’	-	‘00’	‘80’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 2	‘3B’	‘60’	-	‘00’	‘F0’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 3	‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 4	‘3B’	‘60’	-	‘00’	‘FE’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 to 266 etus, as indicated by TC1.

5.5.12. 1CE.012.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Warm Reset — T=1

Test No. **1CE.012.0y**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=1, with TC1 having any value in the range ‘00’ to ‘FF’.

References: 1RE.012.01 - Supported T0 values (warm reset)

1RE.023.01 – Supported values of TC1 (warm reset)

1RF.031.00 – Minimum interval between characters

1RF.036.00 – Minimum interval between characters

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Conditions: Default environmental conditions. A suitable ATR has led the terminal to perform a warm reset.

Three warm ATR test cases:

- y=0: TC1 = '00': minimum timing = 12 etus
- y=1: TC1 = '1E': minimum timing = 42 etus
- y=2: TC1 = 'FF': minimum timing = 11 etus

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’
y = 1	‘3B’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘6B’
y = 2	‘3B’	‘E0’	-	‘00’	‘FF’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘8E’

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 11 to 42 etus in T=1, as indicated by TC1.

5.5.13. 1CE.013.00: Inter-Character Timings Measurement — Default Value of TC1 — Cold Reset — T=0

Test No. **1CE.013.00**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=0 not containing TC1.

References: 1RE.024.00 – Default value of TC1 (cold reset)

1RF.002.01 – Minimum interval between two characters (TC1 absent)

Conditions: Default environmental conditions.

The LT sends a cold ATR with TC1 absent but with T0 consistent with the absence of TC1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘20’	-	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

5.5.14. 1CE.014.00: Inter-Character Timings Measurement — Default Value of TC1 — Cold Reset — T=1

Test No. **1CE.014.00**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=1 not containing TC1.

References: 1RE.024.00 – Default value of TC1 (cold reset)

Conditions: Default environmental conditions.

The LT sends a cold ATR with TC1 absent but with T0 consistent with the absence of TC1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘21’

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

5.5.15. 1CE.015.00: Inter-Character Timings Measurement — Default Value of TC1 — Warm Reset — T=0

Test No. **1CE.015.00**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=0 not containing TC1.

References: 1RE.024.01 - Default value of TC1 (warm reset)
1RE.012.01 - Supported T0 values (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the terminal to perform a warm reset; the LT sends a warm ATR with TC1 absent but with T0 consistent with the absence of TC1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘20’	-	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria : The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

5.5.16. 1CE.016.00: Inter-Character Timings Measurement — Default Value of TC1 — Warm Reset — T=1

Test No. **1CE.016.00**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=1 not containing TC1**.**

References: 1RE.024.01 – Default value of TC1 (warm reset)

1RE.052.01 – Waiting time before transmission T=1 (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the terminal to perform a warm reset; the LT sends a warm ATR with TC1 absent but with T0 consistent with the absence of TC1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘21’

Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

5.5.17. 1CE.017.0y: Conformance after Cold Reset — Basic ATRs

Test No. **1CE.017.0y**

Objective: To ensure that the IUT correctly accepts and interprets basic cold ATRs, as specified in Tables I-11 and I-12 in [N1], in direct and inverse conventions and in both protocols.

Reference: 1RE.005.00 - Cold basic ATR for T=0

1RE.006.00 - Cold basic ATR for T=1

1RE.061.00 - Card session after a valid cold reset

Conditions: Default environmental conditions.

The LT sends a cold ATR as indicated.

Five cold ATR test cases :

y	protocol	convention
0	T=0	Direct convention
1	T=0	Inverse convention
2	T=0	Inverse convention
3	T=1	Inverse convention
4	T=1	Inverse convention

<u>note</u>: ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.010.00 (direct convention – T=1)

ATR	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3F’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 2	‘3F’	‘60’	-	‘00’	‘FE’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 3	‘3F’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘10’	‘05’	-	-	-	-	-	‘5B’
y = 4	‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT accepts the ATR and continues the card session using the correct protocol and convention.

5.5.18. 1CE.018.0y: Conformance after Warm Reset — Basic ATRs

Test No. **1CE.018.0y**

Objective: To ensure that the IUT correctly accepts and interprets basic warm ATRs, as specified in Tables I-11 and I-12 in [N1], in direct and inverse conventions and in both protocols.

Reference: 1RE.062.00 - Card session after a valid warm reset

1RE.005.01 - Warm basic ATR for T=0

1RE.006.01 - Warm basic ATR for T=1

1RE.009.00 - Deduction of TS value

1RE.009.02 - TS value for direct convention (warm reset)

1RE.010.01 - TS value for inverse convention (warm reset)

1RE.012.01 - Supported T0 values (warm reset)

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Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset. Then the LT sends a warm ATR as indicated.

Seven warm ATR test cases :

y	protocol	CONVENTION
0	T=0	Direct convention
1	T=0	Inverse convention
2	T=0	Direct convention
3	T=0	Inverse convention
4	T=0	Inverse convention
5	T=1	Inverse convention
6	T=1	Inverse convention

note: ATR '3B E0 00 81 31 20 01 71' is tested in 1CE.012.00 (direct convention – T=1)

ATR	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3F’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 2	‘3B’	‘60’	-	‘01’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 3	‘3F’	‘60’	-	‘01’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 4	‘3F’	‘60’	-	‘00’	‘FE’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 5	‘3F’	E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘10’	‘05’	-	-	-	-	-	‘5B’
y = 6	‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT accepts the ATR and continues the card session using the correct protocol and convention.

5.5.19. 1CE.019.0y: ATR longer than basic ATR — Cold Reset

Test No. **1CE.019.0y**

Objective: To ensure that the IUT accepts a cold ATR whose length is greater than the length of basic ATR.

References: 1RE.007.00 - Maximum number of characters returned in cold ATR

Conditions: Default environmental conditions.

This test shall be performed in both protocols with cold ATR:

- y = 0: T=0
- y = 1: T=1

The ATR contains all the possible characters in accordance with Book1 Specification (see below).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0:	3B	FF	11	00	00	D0	80	-	0A	F1	20	01	00	71	00	00	00	7A
y=1:	3B	FF	11	00	00	D1	81	-	0A	F1	20	01	00	71	00	00	00	7A

Historical bytes: FF, 5A, A5, 5A, A5, 5A,A5, 5A, A5, 5A, A5, 5A, A5, 90, 00

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.20. 1CE.020.0y: ATR longer than basic ATR — Warm Reset

Test No. **1CE.020.0y**

Objective: To ensure that the IUT accepts a warm ATR whose length is greater than the length of basic ATR.

References: 1RE.007.00 - Maximum number of characters returned in cold ATR

Conditions: Default environmental conditions. A suitable ATR has led the IUT to perform a warm reset.

This test shall be performed in both protocols with warm ATR:

- y = 0: T=0
- y = 1: T=1

The ATR contains all the possible characters in accordance with Book1 Specification (see below).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0:	3B	FF	11	00	00	D0	80	-	0A	F1	20	01	00	71	00	00	00	7A
y=1:	3B	FF	11	00	00	D1	81	-	0A	F1	20	01	00	71	00	00	00	7A

Historical bytes: FF, 5A, A5, 5A, A5, 5A,A5, 5A, A5, 5A, A5, 5A, A5, 90, 00

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.21. 1CE.021.0y: Supported Values for T0 — Cold Reset

Test No. **1CE.021.0y**

Objective: To ensure that the IUT accepts a cold ATR with supported values for T0, (provided that the value returned correctly indicates, and is consistent with, the interface characters and the historical bytes).

References: 1RE.012.00 - Supported T0 values (cold reset)

1RE.046.00 - Absence of TC3 (cold reset)

1RE.035.00 - Supported values of TD2, l.s. nibble (cold reset)

Conditions: Default environmental conditions.

The LT sends the following cold ATR for T=0:

- y = 0: b8 is set to 1, TD1 is sent

The LT sends the following cold ATRs for T=1:

- y = 1: b5 and b7 are set to 1,TA1 and TC1 are sent
- y = 2: b7 is set to 0 and TC1 is not sent

<u>note</u> : ATR '3B 60 00 00' is tested in 1CE.009.00 (T0='60')
ATR '3B 20 00' is tested in 1CE.013.00 (T0='20')
ATR '3B 70 11 00 00' is tested in 1CE.007.00 (T0='70')
ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.010.00 (T0='E0')

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘80’	-	-	-	'71'	'20'	'01'	'00'	-	-	-	-	'30'
y = 1	‘3F’	‘F0’	‘11’	‘00’	‘00’	‘81’	-	-	-	‘61’	-	‘01’	'00'	-	-	-	-	‘00’
y = 2	‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘71’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.22. 1CE.022.0y: Supported Values for T0 — Warm Reset

Test No. **1CE.022.0y**

Objective: To ensure that the IUT accepts a warm ATR with supported values for T0, (provided that the value returned correctly indicates, and is consistent with, the interface characters and the historical bytes).

References: 1RE.012.01 - Supported T0 values (warm reset)

1RE.046.01 - Absence of TC3 (warm reset)

1RE.034.01 - Supported values of TD2, m.s. nibble (warm reset)

1RE.035.01 - Supported values of TD2, l.s. nibble (warm reset)

1RE.036.01 - Supported values of TD2, l.s. nibble (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends the following warm ATR for T=0:

- y = 0: b8 is set to 1, TD1 is sent

The LT sends the following warm ATRs for T=1:

- y = 1: b5 and b7 are set to 1, TA1 and TC1 are sent
- y = 2: b7 is set to 0 and TC1 is not sent

<u>note</u> : ATR '3B 60 00 00' is tested in 1CE.011.00 (T0='60')
ATR '3B 20 00' is tested in 1CE.015.00 (T0='20')
ATR '3B F0 11 00 00 10 80' is tested in 1CE.006.00 (T0='F0')
ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.012.00 (T0='E0')

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘80’	-	-	-	'71'	'20'	'01'	'00'	-	-	-	-	'30'
y = 1	‘3F’	‘F0’	‘11’	‘00’	‘00’	‘81’	-	-	-	‘61’	-	‘01’	'00'	-	-	-	-	‘00’
y = 2	‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘71’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.23. 1CE.023.00: Supported Values of TB1 and Vpp Measurement — Cold Reset

Test No. **1CE.023.00**

Objective: To ensure that the IUT accepts a cold ATR with supported values of TB1 and does not generate Vpp.

References: 1RE.019.00 - Supported values of TB1 in a cold reset

Conditions: Default environmental conditions.

The LT sends a cold T=1 ATR with TB1=’00’.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT accepts the ATR and continues the card session without Vpp generation.

5.5.24. 1CE.024.0y: Supported Values of TB1 and Vpp Measurement — Warm Reset

Test No. **1CE.024.0y**

Objective: To ensure that the IUT accepts a warm ATR with supported values of TB1 and does not generate Vpp.

References: 1RE.020.00 - Supported values of TB1 in a warm reset

1RE.021.00 - Default value of TB1 in a warm reset

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset.

Four warm ATR test cases:

- y=0: T=0: TB1 any value
- y=1: T=0: TB1 unsent
- y=2: T=1: TB1 any value
- y=3: T=1: TB1 unsent

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘A5’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘40’	-	-	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 2	‘3B’	‘E0’	-	‘A5’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘D4’
y = 3	‘3B’	‘C0’	-	-	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘51’

Pass Criteria: The IUT accepts the ATR and continues the card session without Vpp generation.

5.5.25. 1CE.025.0y: Supported Values of TD1 — Cold Reset

Test No. **1CE.025.0y**

Objective: To ensure that the IUT accepts a cold ATR containing supported values of TD1.

References: 1RE.025.00 - Supported values of TD1 (cold reset)

Conditions: Default environmental conditions.

Two cold ATR tests cases:

- y = 0: T=1, TD1=‘81’ and TD2 is sent
- y = 1: T=1, TD1=‘91’ and TA2 and TD2 are sent

<u>note</u> : ATR '3B E0 00 00 40 0A' is tested in 1CE.027.00 (TD1='40')
ATR '3B F0 11 00 00 10 80' is tested in 1CE.005.00 (TD1='10')

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘3E’

Pass Criteria: The IUT accepts the cold ATR and continues the card session.

5.5.26. 1CE.026.0y: Supported Values of TD1 — Warm Reset

Test No. **1CE.026.0y**

Objective: To ensure that the IUT accepts a warm ATR containing supported values of TD1.

References: 1RE.025.01 - Supported values of TD1 (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset.

Three warm ATR tests cases:

- y = 0: T=0, TD1=‘10’ and TA2 is sent
- y = 1: T=1, TD1=‘81’ and TD2 is sent
- y = 2: T=1, TD1=‘91’ and TA2 and TD2 are sent

note : ATR '3B E0 00 00 40 0A' is tested in 1CE.028.00 (TD1='40')

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘10’	‘80’	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘3E’

Pass Criteria: The IUT accepts the warm ATR and continues the card session.

5.5.27. 1CE.027.00: Supported Value for TC2 — Cold Reset

Test No. **1CE.027.00**

Objective: To ensure that the IUT accepts a cold ATR with supported value of TC2.

References: 1RE.012.00 - Supported T0 values (cold reset)
1RE.030.00 - Supported values of TC2 (cold reset)

Conditions: Default environmental conditions.
The LT sends a cold T=0 ATR with TC2='0A'.

note : ATR '3B 60 00 00' is tested in 1CE.009.00 (TC2 absent)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘0A’	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.28. 1CE.028.00: Supported Value for TC2 — Warm Reset

Test No. **1CE.028.00**

Objective: To ensure that the IUT accepts a warm ATR with supported value of TC2.

References: 1RE.012.01 - Supported T0 values (warm reset)

1RE.030.01 - Supported values of TC2 (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends a warm T=0 ATR with TC2='0A'.

note : ATR '3B 60 00 00' is tested in 1CE.011.00 (TC2 absent)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘0A’	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.29. 1CE.029.00: Supported Values of TD2 — Cold Reset

Test No. **1CE.029.00**

Objective: To ensure that the IUT accepts a cold ATR containing supported values of TD2 (l.s. nibble).

References: 1RE.036.00 - Supported values of TD2, l.s. nibble (cold reset)

Conditions: Default environmental conditions.

The LT sends the cold ATR with the l.s. nibble of TD2 set to ‘E’ (it implies TD1’s l.s. nibble = ‘0’)

note :

ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.010.00 (TD2 = '31')

ATR '3F F0 11 00 00 81 61 01 00 00' is tested in 1CE.021.01 (TD2 = '61')

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘80’	-	-	-	‘0E’	-	-	-	-	-	-	-	‘6E’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.30. 1CE.030.00: Supported Values of TD2 — Warm Reset

Test No. **1CE.030.00**

Objective: To ensure that the IUT accepts a warm ATR containing supported values of TD2 (l.s. nibble).

References: 1RE.036.01 - Supported values of TD2, l.s. nibble (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends a warm ATR with the l.s. nibble of TD2 set to ‘E’ (it implies TD1’s l.s. nibble=‘0’)

note : ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.012.00 (TD2='31')
ATR '3F F0 11 00 00 81 61 01 00 00' is tested in 1CE.022.01 (TD2='61')

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘80’	-	-	-	‘0E’	-	-	-	-	-	-	-	‘6E’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.31. 1CE.031.00: Default Value of TA3 — Cold Reset

Test No. **1CE.031.00**

Objective: To ensure that the IUT correctly accepts and interprets a cold ATR not containing TA3.

References: 1RE.038.00 - Default value of TA3 (cold reset)

Conditions: Default environmental conditions.

The LT sends a T=1 cold ATR without TA3 but with TD2 consistent with the absence of TA3.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘21’	-	‘01’	-	-	-	-	-	‘41’

Pass Criteria: The IUT continues the card session respecting IFSI=‘20’ (i.e. using TA3 default value) both in non-chained and chained I-blocks it subsequently sends.

5.5.32. 1CE.032.00: Default Value of TA3 — Warm Reset

Test No. **1CE.032.00**

Objective: To ensure that the IUT correctly accepts and interprets a warm ATR not containing TA3.

References: 1RE.038.01 - Default value of TA3 (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends a T=1 warm ATR not containing TA3 but with TD2 consistent with the absence of TA3.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘21’	-	‘01’	-	-	-	-	-	‘41’

Pass Criteria: The IUT continues the card session respecting IFSI=‘20’ (i.e. using TA3 default value) both in non-chained and chained I-blocks it subsequently sends.

5.5.33. 1CE.033.0y: Supported Values of TB3 — Cold Reset

Test No. **1CE.033.0y**

Objective : To ensure that the IUT accepts a cold ATR containing supported values of TB3.

References: 1RE.044.00 - Supported values of TB3 (cold reset)

Conditions: Default environmental conditions.

The LT sends a cold T=1 ATR. Three cold ATR test cases:

- y = 0: 2^{CWI} = 32 ; N+1 = 1; BWI = 4
- y = 1: 2^{CWI} = 2 ; N+1 = 1; BWI = 4
- y = 2: 2^{CWI} = 32 ; N+1 = 31; BWI = 4

note: the values specified above are supplied as an indication – any other correct combination of TB3/TC1 is possible.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘45’	-	-	-	-	-	‘35’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘31’
y = 2	‘3B’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘20’	‘45’	-	-	-	-	-	‘2B’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.34. 1CE.034.0y: Supported Values of TB3 — Warm Reset

Test No. **1CE.034.0y**

Objective: To ensure that the IUT accepts a warm ATR containing supported values of TB3.

References: 1RE.044.01 - Supported values of TB3 (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; then the LT sends a T=1 warm ATR. Three warm ATR test cases:

- y = 0: $2^{CWI} = 32$; N+1 = 1 ; BWI = 4
- y = 1: $2^{CWI} = 2$; N+1 = 1 ; BWI = 4
- y = 2: $2^{CWI} = 32$; N+1 = 31 ; BWI = 4

<u>note</u>: the values specified above are supplied as an indication – any other correct combination of TB3/TC1 is possible.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘45’	-	-	-	-	-	‘35’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘31’
y = 2	‘3B’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘20’	‘45’	-	-	-	-	-	‘2B’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.35. 1CE.035.00: Supported Value of TC3 — Cold Reset

Test No. **1CE.035.00**

Objective: To ensure that the IUT accepts a cold ATR containing a supported value of TC3.

References: 1RE.045.00 - Supported values of TC3 (cold reset)

Conditions: Default environmental conditions.

The LT sends a cold T=1 ATR with TC3 = ‘00’.

note: ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.010.00 (TC3 not returned)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘31’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.36. 1CE.036.00: Supported Value of TC3 — Warm Reset

Test No. **1CE.036.00**

Objective: To ensure that the IUT accepts a warm ATR containing a supported value of TC3.

References: 1RE.045.01 - Supported values of TC3 (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset ; then the LT sends a warm T=1 ATR with TC3 = ‘00’.

note: ATR '3B E0 00 00 81 31 20 01 71' is tested in 1CE.012.00 (TC3 not returned)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘31’

Pass Criteria: The IUT accepts the ATR and continues the card session.

5.5.37. 1CE.037.0y: Different conventions between cold and warm ATRs

Test No. **1CE.037.0y**

Objective: To ensure that the IUT accepts a warm ATR with a convention different from that of the cold ATR.

References: EMV2000 § 4.3.1

Conditions: Default environmental conditions.

y	**Incorrect cold ATR convention**	**Correct Warm ATR convention**	**Protocol used for both ATRs**
0	direct	inverse	T=0
1	inverse	direct	T=0
2	direct	inverse	T=1
3	inverse	direct	T=1

cold ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	'3B'	'60'	-	'05'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y=1	'3F'	'60'	-	'05'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘E0’	-	‘05’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘34’
y=3	‘3F’	‘E0’	-	‘05’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘34’
warm ATR	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	'3F'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y=1	'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘31’
y=3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘31’

Pass Criteria: The IUT accepts the warm ATR and continues the card session using the convention indicated in the warm ATR.

5.5.38. 1CE.050.00-1: ATR Global Time Exceeded — Cold Reset (1)

Test No. **1CE.050.00-1**

note: The laboratory may implement test case 1CE.050 according to the option 1 or option 2 (1CE.050-1 or 1CE.050-2).

Objective: To ensure that the IUT rejects the ICC if all the characters to be returned in a cold ATR are not received within 20,160 initial etus after transmission of the TS character.

Reference: 1RE.057.00 - Maximum duration of ATR of a cold reset

EMV2000 4.4 – 6th bullet

Conditions: Default environmental conditions.

The LT sends the first three characters (TS, T0 & TB1) of the cold ATR with character-to-character times close to 9,600 initial etus maximum and does not send TC1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

5.5.39. 1CE.050.00-2: ATR Global Time Exceeded — Cold Reset (2)

Test No. **1CE.050.00-2**

note: The laboratory may implement test case 1CE.050 according to the option 1 or option 2 (1CE.050-1 or 1CE.050-2).

Objective: To ensure that the IUT rejects the ICC if all the characters to be returned in a cold ATR are not received within 20,160 initial etus after transmission of the TS character.

Reference: 1RE.057.00 - Maximum duration of ATR of a cold reset

EMV2000 4.4 – 6th bullet

Conditions: Default environmental conditions.

The LT sends all the characters of the cold ATR within at least 20,160 + 1 initial etus = 20,161 initial etus after the transmission of the TS character (the LT, by sending the ATR characters, shall systematically respect the maximum inter-character timing of 9,600 etus).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

5.5.40. 1CE.051.00-1: ATR Global Time Exceeded — Warm Reset (1)

Test No. **1CE.051.00-1**

note: The laboratory may implement test case 1CE.051 according to the option 1 or option 2 (1CE.051-1 or 1CE.051-2).

Objective: To ensure that the IUT initiates the deactivation sequence if all the characters to be returned in a warm ATR are not received within 20,160 initial etus after transmission of the TS character.

Reference: 1RE.058.00 - Maximum duration of ATR of a warm reset

EMV2000 4.4 – 6th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends the first three characters (TS, T0 & TB1) of the warm ATR with character-to-character times close to 9,600 initial etus maximum and does not send TC1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

5.5.41. 1CE.051.00-2: ATR Global Time Exceeded — Warm Reset (2)

Test No. **1CE.051.00-2**

note: The laboratory may implement test case 1CE.051 according to the option 1 or option 2 (1CE.051-1 or 1CE.051-2).

Objective:

To ensure that the IUT initiates the deactivation sequence if all the characters to be returned in a warm ATR are not received within 20,160 initial etus after transmission of the TS character.

Reference: 1RE.058.00 - Maximum duration of ATR of a warm reset

EMV2000 4.4 – 6th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends all the characters of the warm ATR within at least 20,160 + 1 initial etus = 20,161 initial etus after the transmission of the TS character (the LT, by sending the ATR characters, shall systematically respect the maximum inter-character timing of 9,600 etus).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

5.5.42. 1CE.052.00-1: Maximum Interval between Characters during ATR Exceeded — Cold Reset (1)

Test No. **1CE.052.00-1**

note: The laboratory may implement test case 1CE.052 according to the option 1 or option 2 (1CE.052-1 or 1CE.052-2).

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the cold ATR.

References: 1RE.056.00 - Maximum interval between characters

EMV2000 4.4 – 5th bullet

Conditions: Default environmental conditions.

The LT sends one or more characters of a cold ATR then does not send any further character.

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 14,400 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the cold ATR.

5.5.43. 1CE.052.00-2: Maximum Interval between Characters during ATR Exceeded — Cold Reset (2)

Test No. **1CE.052.00-2**

note: The laboratory may implement test case 1CE.052 according to the option 1 or option 2 (1CE.052-1 or 1CE.052-2).

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the ATR.

References: 1RE.056.00 - Maximum interval between characters

EMV2000 4.4 – 5th bullet

Conditions: Default environmental conditions.

The LT sends a cold ATR with an interval between T0 and TB1, or TB1 and TC1, of 10,080 + 1 initial etus = 10,081 initial etus (however, the LT respects the total ATR timing of 19,200 etus).

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 14,400 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the cold ATR.

5.5.44. 1CE.053.00-1: Maximum Interval between Characters during ATR Exceeded — Warm Reset (1)

Test No. **1CE.053.00-1**

note: The laboratory may implement test case 1CE.053 according to the option 1 or option 2 (1CE.053-1 or 1CE.053-2).

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the ATR.

References: 1RE.056.00 - Maximum interval between characters

EMV2000 4.4 – 5th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends one or more characters of a warm ATR then does not send any further character.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 14,400 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the warm ATR.

5.5.45. 1CE.053.00-2: Maximum Interval between Characters during ATR Exceeded — Warm Reset (2)

Test No. **1CE.053.00-2**

note: The laboratory may implement test case 1CE.053 according to the option 1 or option 2 (1CE.053-1 or 1CE.053-2).

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the warm ATR.

References: 1RE.056.00 - Maximum interval between characters

EMV2000 4.4 – 5th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends a warm ATR with an interval between T0 and TB1, or TB1 and TC1, of 10,080 + 1 = 10,081 initial etus (however, the LT respects the total ATR timing of 19,200 etus) .

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 14,400 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the warm ATR.

5.5.46. 1CE.054.00-1: Incorrect Cold ATR Initiation Delay (1)

Test No. **1CE.054.00-1**

note: The laboratory may implement test case 1CE.054 according to the option 1 or option 2 (1CE.054-1 or 1CE.054-2).

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the cold ATR initiation delay (by more than 2,000 clock cycles).

References: EMV'96 Part I § 2.1.3.1 (4th and 5th bullets)

EMV2000 2.1.3.1 - 5th bullet

Conditions: Default environmental conditions.

The LT does not send any character of the cold ATR.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

5.5.47. 1CE.054.00-2: Incorrect Cold ATR Initiation Delay (2)

Test No. **1CE.054.00-2**

note: The laboratory may implement test case 1CE.054 according to the option 1 or option 2 (1CE.054-1 or 1CE.054-2).

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the cold ATR initiation delay (by more than 2,000 clock cycles).

References: EMV'96 Part I § 2.1.3.1 (4th and 5th bullets)

EMV2000 2.1.3.1 - 5th bullet

Conditions: Default environmental conditions.

The LT waits at least 42,001 clock cycles following time that RST is set to high before sending the first character of the cold ATR.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

5.5.48. 1CE.055.00-1: Incorrect Warm ATR Initiation Delay (1)

Test No. **1CE.055.00-1**

note: The laboratory may implement test case 1CE.055 according to the option 1 or option 2 (1CE.055-1 or 1CE.055-2).

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the warm ATR initiation delay (by more than 2,000 clock cycles).

References: EMV'96 Part I § 2.1.3.2 (5th and 6th bullets)

EMV2000 2.1.3.1 - 5th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset. Then the LT does not send any character of the warm ATR.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

5.5.49. 1CE.055.00-2: Incorrect Warm ATR Initiation Delay (2)

Test No. **1CE.055.00-2**

note: The laboratory may implement test case 1CE.055 according to the option 1 or option 2 (1CE.055-1 or 1CE.055-2).

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the warm ATR initiation delay (by more than 2,000 clock cycles).

References: EMV'96 Part I § 2.1.3.2 (5th and 6th bullets)

EMV2000 2.1.3.1 - 5th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset. Then the LT waits at least 42,001 clock cycles following time that RST is set to high before sending the first character of the warm ATR.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

5.5.50. 1CE.056.0y: Invalid ATR — Parity Error — Cold reset

Test No. **1CE.056.0y**

Objective: To ensure that the IUT rejects an ICC when presented with an ATR containing a parity error in response to a cold reset.

References: 1RE.008.00 - Parity checking (cold reset)

1RE.059.00 - Parity error in ATR

EMV2000 4.4 - 7th bullet

Conditions: Default environmental conditions.

The LT sends the following ATRs with a parity error on one of the characters:

- y = 0: T=0
- y = 1: T=1

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.51. 1CE.057.0y: Invalid ATR — Parity Error — Warm reset

Test No. **1CE.057.0y**

Objective: To ensure that the IUT rejects an ICC when presented with an ATR containing a parity error in response to a warm reset.

References: 1RE.008.01 - Parity checking (warm reset)

1RE.060.00 - Parity error in ATR

EMV2000 4.4 - 7th bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends the following ATRs with a parity error on one of the characters:

- y = 0: T=0
- y = 1: T=1

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	'3B'	'E0'	-	'00'	'00'	'81'	-	-	-	'31'	'FE'	'01'	-	-	-	-	-	'AF'

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.52. 1CE.058.0y: Incorrect TS — Cold Reset

Test No. **1CE.058.0y**

Objective: To ensure that the IUT rejects an ICC returning an answer to a cold reset with TS values other than ‘3B’ or ‘3F’.

References: 1RE.009.00 - Deduction of TS value

1RE.011.00 - Unsupported TS values (cold reset)

EMV2000 4.4 – 1st bullet

Conditions: Default environmental conditions.

Four cold ATR test cases according to TS value:

- y=0: (H)LHLHHHHLLH
- y=1: (H)LHLHHHHLLL
- y=2: (H)LHHLLLLHLL
- y=3: (H)LHHLLLLHLH

note:

y=0 and y=1 correspond to '3D' in direct convention without/with parity error.
y=2 and y=3 correspond to '3D' in inverse convention without/with parity error.
Moreover, if y=0 is interpreted in inverse convention it will lead to parity error and also for y=2 in direct convention. That's why each convention is tested with two values of the parity bit to be sure that the ATR is not rejected because of parity error.

ATR	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0 to 3	‘3D’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.53. 1CE.059.0y: Incorrect TS — Warm Reset

Test No. **1CE.059.0y**

Objective: To ensure that the IUT rejects an ICC returning an answer to a warm reset with TS values other than ‘3B’ or ‘3F’.

References: 1RE.009.00 - Deduction of TS value

1RE.011.01 - Unsupported TS values (warm reset)

EMV2000 4.4 – 1st bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; four warm ATR test cases according to TS value:

- y=0: (H)LHLHHHHLLH
- y=1: (H)LHLHHHHLLL
- y=2: (H)LHHLLLLHLL
- y=3: (H)LHHLLLLHLH

<u>note</u>:

y=0 and y=1 correspond to '3D' in direct convention without/with parity error.
y=2 and y=3 correspond to '3D' in inverse convention without/with parity error.
Moreover, if y=0 is interpreted in inverse convention it will lead to parity error and also for y= 2 in direct convention. That's why each convention is tested with two values of the parity bit to be sure that the ATR is not rejected because of parity error:

ATR	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0 to 3	‘3D’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.54. 1CE.060.0y: Character Overrun in the ATR — Cold Reset

Test No. **1CE.060.0y**

Objective: To ensure that the IUT rejects a cold ATR when the value returned does not correctly indicate, or is not consistent with, the interface characters.

References: 1RE.013.00 - Unsupported T0 values (cold reset)

EMV2000 4.4 – 2nd bullet

Book Bulletins - Section TA 33 - Bulletin n°33, EMVCo Type Approval Terminal Level 1 Test Cases version 2.0 update

Book Bulletins - Section TA 41 - Bulletin n°41, Update to EMVCo Type Approval Terminal Level 1 Test Cases

Conditions: Default environmental conditions.

The LT sends the following cold ATRs for T=0:

- y = 0: T=0 with b6=0, b7=1: TB1 sent and TC1 sent
- y = 1: T=0 with b6=1, b7=0: TB1 sent and TC1 sent

There is a conflict between the value of T0 and the double presence of TB1 and TC1.

Note: Test cases y=0 and y=1 shall only be performed if the terminal does not continue the card session as soon as all characters indicated in T0/or TDi have been received (see ICS: Chapter VII — item 5).

ATR:	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘40’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘20’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates a warm reset after the T0 character has been received and within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.55. 1CE.061.0y: Character Overrun in the ATR — Warm Reset

Test No. **1CE.061.0y**

Objective: To ensure that the IUT rejects a warm ATR when the value returned does not correctly indicate, or is not consistent with, the interface characters.

References: 1RE.013.01 - Unsupported T0 values (warm reset)

EMV2000 4.4 – 2nd bullet

Book Bulletins - Section TA 33 - Bulletin n°33, EMVCo Type Approval Terminal Level 1 Test Cases version 2.0 update

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends the following warm ATRs for T=0:

- y = 0: b6=0, b7=1: TB1 sent and TC1 sent
- y = 1: b6=1, b7=0: TB1 sent and TC1 sent

There is a conflict between the value of T0 and the double presence of TB1 and TC1.

<u>Note</u>: Test cases y=0 and y=1 shall only be performed if the terminal does not continue the card session as soon as all characters indicated in T0/or TDi have been received (see ICS: Chapter VII — item 5).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘40’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘20’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.56. 1CE.062.0y: Unsupported TA1 in Specific Mode — Cold Reset

Test No. **1CE.062.0y**

Objective: To ensure that the IUT rejects a cold ATR with any value of TA1 outside the range ‘11’ to '13' (unless it is able to support the conditions indicated; see ICS) in specific mode.

References: 1RE.016.00 - Acceptance of TA2 with b5 = 0 and TA1 <> ‘11’ (cold reset)
EMV2000 4.3.3.1 – Terminal behavior (2nd bullet)
EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

This test shall only be performed for terminals that do not support values of TA1 outside the range '11' to '13' (see ICS — Chapter IX-1 — item 3) and that support TA2 (see ICS — Chapter IX-1 — item 12)

Test made for both protocols with cold ATR:

- y=0: T=0 (the b5 value of T0 is set to 1, TA1 any value outside the range '11' to '13' and TA2 returned)
- y=1: T=1 (the b5 value of T0 is set to 1, TA1 any value outside the range '11' to '13' and TA2 returned)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘F0’	‘D6’	‘00’	‘00’	‘10’	‘00’	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘F0’	‘D6’	‘00’	‘00’	‘91’	‘01’	-	-	‘31’	‘40’	‘01’	-	-	-	-	-	‘C6’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.57. 1CE.063.0y: Unsupported TA1 in Specific Mode — Warm Reset

Test No. **1CE.063.0y**

Objective: To ensure that the IUT rejects a warm ATR with any value of TA1 outside the range ‘11’ to '13' (unless it is able to support the conditions indicated; see ICS) in specific mode.

References: 1RE.016.01 - Acceptance of TA2 with b5 = 0 and TA1 <> ‘11’ (warm reset)

EMV2000 4.3.3.1 – Terminal behavior (2nd bullet)

EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

This test shall only be performed for terminals that do not support values of TA1 outside the range '11' to '13' (see ICS — Chapter IX-1 — item 3) and that support TA2 (see ICS — Chapter IX — item 12).

A suitable ATR has led the IUT to perform a warm reset; test made for both protocols with warm ATR:

- y=0: T=0 (the b5 value of T0 is set to 1, TA1 any value outside the range '11' to '13' and TA2 returned)
- y=1: T=1 (the b5 value of T0 is set to 1, TA1 any value outside the range '11' to '13' and TA2 returned)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘F0’	‘D6’	‘00’	‘00’	‘10’	‘00’	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘F0’	‘D6’	‘00’	‘00’	‘91’	‘01’	-	-	‘31’	‘40’	‘01’	-	-	-	-	-	‘C6’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.58. 1CE.064.0y: Unsupported Values of TB1 — Cold Reset

Test No. **1CE.064.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TB1.

References: EMV2000 4.4 – 2nd bullet

Book Bulletins - Section TA 41 - Bulletin n°41, Update to EMVCo Type Approval Terminal Level 1 Test Cases

Conditions: Default environmental conditions.

Four cold ATR test cases:

- y=0: T=0: TB1≠'00'
- y=1: T=0: TB1 unsent
- y=2: T=1: TB1≠'00'
- y=3: T=1: TB1 unsent

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	'3B'	'60'	-	'05'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	'3B'	'40'	-	-	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 2	'3B'	'E0'	-	'10'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'61'
y = 3	'3B'	'C0'	-	-	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'51'

Pass Criteria: The IUT initiates a warm reset after the T0 character has been received and within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.59. 1CE.065.0y: Unsupported Values of TD1 — Cold Reset

Test No. **1CE.065.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TD1 (l.s. nibble).

References: 1RE.026.00 - Unsupported values of TD1 (cold reset)
EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

Two cold ATR test cases :

- y = 0 : l.s. nibble = ‘E’
- y = 1 : l.s. nibble different from ‘0’, ‘1’ and ‘E’

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘0E’	-	-	-	-	-	-	-	-	-	-	-	‘EE’
y = 1	‘3F’	‘E0’	-	‘00’	‘00’	‘04’	-	-	-	-	-	-	-	-	-	-	-	‘E4’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.60. 1CE.066.0y: Unsupported Values of TD1 — Warm Reset

Test No. **1CE.066.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TD1 (l.s. nibble).

References: 1RE.026.01 - Unsupported values of TD1 (warm reset)
EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; two warm ATR test cases :

- y = 0: l.s. nibble = ‘E’
- y = 1: l.s. nibble different from ‘0’, ‘1’ and ‘E’

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘0E’	-	-	-	-	-	-	-	-	-	-	-	‘EE’
y = 1	‘3F’	‘E0’	-	‘00’	‘00’	‘04’	-	-	-	-	-	-	-	-	-	-	-	‘E4’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm reset to the time that RST is set low.

5.5.61. 1CE.067.00: Unsupported Values of TA2 — Cold Reset

Test No. **1CE.067.00**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TA2.

References: 1RE.028.00 - Unsupported values of TA2 (cold reset)
EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

The presence of TA2 is indicated in TD1 in the cold ATR but bit b5 of TA2 is equal to 1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘10’	‘10’	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.62. 1CE.068.00: Unsupported Values of TA2 — Warm Reset

Test No. **1CE.068.00**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TA2.

References: 1RE.028.01 - Unsupported values of TA2 (warm reset)
EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; then the LT sends a warm ATR such that the presence of TA2 is indicated in TD1 but bit b5 of TA2 is equal to 1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘10’	‘10’	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.63. 1CE.069.00: Irrelevant presence of TB2 — Cold Reset

Test No. **1CE.069.00**

Objective: To ensure that the IUT rejects a cold ATR containing TB2.

References: EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

The presence of TB2 is indicated in TD1 (bit b6 = 1) in the cold ATR and TB2 is returned.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘A1’	-	‘00’	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘51’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.64. 1CE.070.00: Irrelevant presence of TB2 — Warm Reset

Test No. **1CE.070.00**

Objective: To ensure that the IUT rejects a warm ATR containing TB2.

References: EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; then the LT sends a warm ATR such that the presence of TB2 is indicated in TD1 (bit b6 = 1) and TB2 is returned.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘A1’	-	‘00’	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘51’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.65. 1CE.071.0y: Unsupported Values of TC2 — Cold Reset

Test No. **1CE.071.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TC2.

References: 1RE.031.00 - Unsupported values of TC2 (cold reset)

1RE.032.00 - Unsupported values of TC2 (cold reset)

1RE.033.00 - Optional support of TC2 between ‘01’ and ‘09’ (cold reset)

EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

Four cold ATR test cases:

- y=0: TC2 = ‘00’
- y=1: TC2 > '0A' (this subcase is run subject to Implementation Conformance Statement (Chapter IX-1 — item 16)).
- The cases y=2 and y=3 (value in the range '01' to '09') are run subject to the Implementation Conformance Statement (Chapter IX-1 — item 16).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘00’	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘0B’	-	-	-	-	-	-	-	-	-
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘01’	-	-	-	-	-	-	-	-	-
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘09’	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set to low.

5.5.66. 1CE.072.0y: Unsupported Values of TC2 — Warm Reset

Test No. **1CE.072.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TC2.

References: 1RE.031.01 - Unsupported values of TC2 (warm reset)

1RE.032.01 - Unsupported values of TC2 (warm reset)

1RE.033.01 - Optional support of TC2 between ‘01’ and ‘09’ (warm reset)

EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset.

Four warm ATR test cases:

- y=0: TC2 = ‘00’
- y=1: TC2 > '0A' (this subcase is run subject to Implementation Conformance Statement (Chapter IX-1 — item 16)).
- The cases y=2 and y=3 (value in the range '01' to '09') are run subject to the Implementation Conformance Statement (Chapter IX-1 — item 16).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘00’	-	-	-	-	-	-	-	-	-
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘0B’	-	-	-	-	-	-	-	-	-
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘01’	-	-	-	-	-	-	-	-	-
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘09’	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates a deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.67. 1CE.073.0y: Unsupported Values of TD2 — Cold Reset

Test No. **1CE.073.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TD2 (l.s. nibble).

References: 1RE.037.00 - Unsupported values of TD2 (cold reset)
EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

Three cold ATR test cases :

- y = 0: l.s. nibble = ‘0’
- y = 1: l.s. nibble = ‘E’ and TD1’s l.s. nibble =‘1’
- y = 2: l.s. nibble = ‘F’

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘20’	-	‘01’	-	-	-	-	-	‘40’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘2E’	-	‘01’	-	-	-	-	-	‘4E’
y = 2	‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘2F’	-	‘01’	-	-	-	-	-	‘4F’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.68. 1CE.074.0y: Unsupported Values of TD2 — Warm Reset

Test No. **1CE.074.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TD2 (l.s. nibble).

References: 1RE.037.01 - Unsupported values of TD2 (warm reset)
EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a to warm reset.

Three warm ATR test cases:

- y = 0: l.s. nibble = ‘0’
- y = 1: l.s. nibble = ‘E’ and TD1’s l.s. nibble =‘1’
- y = 2: l.s. nibble = ‘F’

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘20’	-	‘01’	-	-	-	-	-	‘40’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘2E’	-	‘01’	-	-	-	-	-	‘4E’
y = 2	‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘2F’	-	‘01’	-	-	-	-	-	‘4F’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.69. 1CE.075.0y: Unsupported Values of TA3 — Cold Reset

Test No. **1CE.075.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TA3.

References: 1RE.039.00 - Unsupported values of TA3 (cold reset)
EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

The LT sends T=1 ATR with an incorrect value for TA3.

Three cold ATR test cases:

- y=0: TA3 = ‘FF’
- y=1: TA3 = ‘00’
- y=2: TA3 = ‘0F’

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FF’	‘01’	-	-	-	-	-	‘AE’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘00’	‘01’	-	-	-	-	-	‘51’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘0F’	‘01’	-	-	-	-	-	‘5E’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.70. 1CE.076.0y: Unsupported Values of TA3 — Warm Reset

Test No. **1CE.076.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TA3.

References: 1RE.039.01 - Unsupported values of TA3 (warm reset)
EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset.

The LT sends a T=1 warm ATR with an incorrect value for TA3.

Three warm ATR test cases:

- y=0: TA3 = ‘FF’
- y=1: TA3 = ‘00’
- y=2: TA3 = ‘0F’

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FF’	‘01’	-	-	-	-	-	‘AE’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘00’	‘01’	-	-	-	-	-	‘51’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘0F’	‘01’	-	-	-	-	-	‘5E’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.71. 1CE.077.0y: Unsupported Values of TB3 — Cold Reset

Test No. **1CE.077.0y**

Objective : To ensure that the IUT rejects a cold ATR containing an unsupported value of TB3.

References: 1RE.040.00 - Mandatory presence of TB3 in case protocol is T=1 (cold reset)

1RE.041.00 - Unsupported values of TB3 (cold reset)

1RE.042.00 - Unsupported values of TB3 (cold reset)

1RE.043.00 - Unsupported values of TB3 (cold reset)

EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

The LT sends a T=1 cold ATR. Four cold ATR test cases:

- y=0: TB3 absent
- y=1: BWI > 4
- y=2: CWI > 5
- y=3: CWI so that 2^{CWI} = N+1

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘11’	‘40’	-	-	-	-	-	-	‘30’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘51’	-	-	-	-	-	‘41’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘06’	-	-	-	-	-	‘16’
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘00’	-	-	-	-	-	‘10’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.72. 1CE.078.0y: Unsupported Values of TB3 — Warm Reset

Test No. **1CE.078.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TB3.

References: 1RE.040.01 - Mandatory presence of TB3 in case protocol is T=1 (warm reset)

1RE.041.01 - Unsupported values of TB3 (warm reset)

1RE.042.01 - Unsupported values of TB3 (warm reset)

1RE.043.01 - Unsupported values of TB3 (cold reset)

EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; then the LT sends a T=1 warm ATR. Four warm ATR test cases:

- y=0: TB3 absent
- y=1: BWI > 4
- y=2: CWI > 5
- y=3: CWI so that 2^{CWI} = N+1

ATR:	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘11’	‘40’	-	-	-	-	-	-	‘30’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘51’	-	-	-	-	-	‘41’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘06’	-	-	-	-	-	‘16’
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘00’	-	-	-	-	-	‘10’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.73. 1CE.079.0y: Unsupported Values of TC3 — Cold Reset

Test No. **1CE.079.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TC3.

References: 1RE.047.00 - Unsupported values of TC3 (cold reset)

EMV2000 4.4 – 2nd bullet

Conditions: Default environmental conditions.

Two cold ATR test cases:

- y=0: TC3 = ‘FF’
- y=1: ‘00’<TC3 <‘FF’: TC3 = ‘01’

<u>note</u>: for y=1, the TC3 value is supplied as an indication; any other value in the range ‘00’<TC3 <‘FF is possible.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘40’	‘01’	‘FF’	-	-	-	-	‘AE’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘40’	‘01’	‘01’	-	-	-	-	‘50’

Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.74. 1CE.080.0y: Unsupported Values of TC3 — Warm Reset

Test No. **1CE.080.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TC3.

References: 1RE.047.01 - Unsupported values of TC3 (warm reset)

EMV2000 4.4 – 3rd bullet

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset; then the LT sends a warm ATR; two warm ATR test cases:

- y=0: TC3 = ‘FF’
- y=1: ‘00’<TC3 <‘FF’: TC3 = ‘01’

<u>note</u>: for y=1, the TC3 value is supplied as an indication; any other value in the range ‘00’<TC3 <‘FF is possible.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘40’	‘01’	‘FF’	-	-	-	-	‘AE’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘40’	‘01’	‘01’	-	-	-	-	‘50’

Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.5.75. 1CE.081.0y: Invalid TCK When Protocol <> T=0 — Cold Reset

Test No. **1CE.081.0y**

Objective: To ensure that the IUT rejects a cold ATR not containing TCK or containing an incorrect TCK if the protocol used is not T=0.

References: 1RE.049.00 - Mandatory presence of TCK when protocol <> T=0 (cold reset)

1RE.050.00 - Incorrect TCK (cold reset)

1RE.051.00 - Deactivation sequence in case of incorrect TCK (cold reset)

EMV2000 4.4 – 1st and 5th bullet

Conditions: Default environmental conditions.

Two cold ATR test cases:

- y=0: the character TCK is not returned in the cold ATR (ATR duration less than 9,600 initial etus).
- y=1: the character TCK is invalid.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘11’	-	-	-	-	-	-
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘61’

Pass Criteria:

- For TCK missing, the IUT initiates the deactivation sequence within 14,400 initial etus measured from the leading edge of the start bit of the last received character of the cold ATR to the time that RST is set low.
- For TCK incorrect, the IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

5.5.76. 1CE.082.0y: Invalid TCK When Protocol <> T=0 — Warm Reset

Test No. **1CE.082.0y**

Objective: To ensure that the IUT rejects a warm ATR not containing TCK or containing incorrect TCK if the protocol used is not T=0.

References: 1RE.049.01 - Mandatory presence of TCK when protocol <> T=0 (warm reset)

1RE.050.01 - Incorrect TCK

1RE.051.01 - Deactivation sequence in case of incorrect TCK (warm reset)

EMV2000 4.4 – 5th and 1st bullets

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform warm reset; then the LT sends a warm ATR; two warm ATR test cases:

- y=0: the character TCK is not returned in the warm ATR (ATR duration less than 9,600 initial etus).
- y=1: the character TCK is invalid.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘11’	-	-	-	-	-	-
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘61’

Pass Criteria:

- For TCK missing, the IUT initiates the deactivation sequence within 14,400 initial etus measured from the leading edge of the start bit of the last received character of the warm ATR to the time that RST is set low.
- For TCK incorrect, the IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

5.6. Protocol Tests: T=0

5.6.1. 1CF.001.00: ETU Measurement — Cold Reset

Test No. **1CF.001.00**

Objective: To ensure that the IUT, when having received a basic T=0 cold ATR, continues using the default values of D=1 and F=372 during subsequent exchanges.

References: 1RE.018.00 - Default values when TA1 is absent (cold reset)

Conditions: Default environmental conditions.

The LT sends a cold ATR without TA1 and TA2. It invokes protocol T=0.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT continues the card session using a current etu having a value of 372/f seconds, the same as the initial etu.

5.6.2. 1CF.002.00: ETU Measurement — Warm Reset

Test No. **1CF.002.00**

Objective: To ensure that the IUT, when having received a basic T=0 warm ATR, continues using the default values of D=1 and F=372 during subsequent exchanges.

References: 1RE.018.01 - Default values when TA1 is absent (warm reset)

Conditions: Default environmental conditions.

A suitable ATR has led the terminal to perform warm reset then the LT sends a warm ATR without TA1 and TA2. It invokes protocol T=0.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT continues the card session with a current etu having a value of 372/f seconds, the same as the initial etu.

5.6.3. 1CF.003.00: Minimum Interval between Characters Sent in the Same Direction Respected

Test No. **1CF.003.00**

Objective: To ensure that the IUT correctly receives characters sent with a minimum character-to-character timing of 11.8 etus.

References: 1RF.003.00 - Minimum interval between characters
1RF.009.00 - Minimum interval between characters
EMV2000 5.2.2.1 – 2nd §

Conditions:
ATR invokes protocol T=0.
The LT sends characters using an inter-character timing of 11.8 etus.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts and understands the characters and continues the card session.

5.6.4. 1CF.004.00: Minimum Interval between Characters Sent in Opposite Direction Respected

Test No. **1CF.004.00**

Objective: To ensure that the IUT correctly receives a character sent as early as 15 etus after the last character from the IUT.

References: 1RF.003.00 - Minimum interval between characters

1RF.009.00 - Minimum interval between characters

EMV2000 5.2.2.1 – 5^{th} §

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT sends a character 15 etus from the last character sent by the IUT.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts and understands the characters and continues the card session.

5.6.5. 1CF.005.0y: Maximum Interval between Characters Sent in the Same Direction Respected (Work Waiting Time)

Test No. **1CF.005.0y**

Objective : To ensure that the IUT correctly receives characters sent with a maximum character-to-character timing of the Work Waiting Time + D * 480 etus.

References: 1RF.004.00 – Maximum interval between characters
EMV2000 5.2.2.1 – 4^{th} §

Conditions: Default environmental conditions.

ATR invokes protocol T=0. The LT sends two consecutive characters with an inter-character timing at or just less than WWT + D * 480 etus with WWT = 960 x D x WI (9,599 etus if TC2 is absent).

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the characters and continues the card session.

5.6.6. 1CF.006.0y: Maximum Interval between Characters Sent in Opposite Directions Respected (Work Waiting Time)

Test No. **1CF.006.0y**

Objective: To ensure that the IUT correctly receives a character sent as late as the Work Waiting Time + D * 480 etus after the last character from the IUT.

References: 1RF.005.00 – Maximum interval between characters

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Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT sends a character at or just less than WWT + D * 480 etus with WWT = 960 x D x WI (9,599 etus if TC2 is absent) after the last character from the IUT.

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the character and continues the card session.

5.6.7. 1CF.007.00: Minimum Interval between Characters Sent in Opposite Directions Respected by the IUT after Cold Reset

Test No. **1CF.007.00**

Objective: To ensure that the IUT respects the minimum interval of 16 etus when, having received a character from the LT (including the last character of the ATR), it sends a character in the opposite direction.

References: 1RF.008.00 - Minimum interval between characters

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: After reception of the cold ATR, the IUT systematically continues the card session with an interval measured between the first character it sends and the previous character sent by the LT, greater than or equal to 16 etus.

5.6.8. 1CF.008.00: Minimum Interval between Characters Sent in Opposite Directions Respected by the IUT after Warm Reset

Test No. **1CF.008.00**

Objective: To ensure that the IUT respects the minimum interval of 16 etus when, having received a character from the LT (including the last character of the ATR), it sends a character in the opposite direction.

References: 1RF.008.00 - Minimum interval between characters

Conditions: Default environmental conditions.

A suitable ATR has led the IUT to perform a warm reset then the LT sends a warm ATR. This ATR invokes protocol T=0.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: After reception of the warm ATR, the IUT systematically continues the card session with an interval measured between the first character it sends and the previous character sent by the LT, greater than or equal to 16 etus.

5.6.9. 1CF.009.00: INS Procedure Byte — Cases 3 and 4 Commands

Test No. **1CF.009.00**

Objective: To ensure that when the procedure byte value is equal to the INS byte, the IUT transfers all remaining data bytes.

References: 1RF.010.00 - Procedure byte = INS (case 3 or 4 command)

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT returns a byte of value ‘INS’ in response to the command header in Case 3 or 4 commands.

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: After receipt of the INS procedure byte, the IUT sends the correct number of characters as indicated by Lc in the command header.

5.6.10. 1CF.010.00: INS Procedure Byte — Case 2 Commands

Test No. **1CF.010.00**

Objective: To ensure that, when the procedure byte value is equal to the INS byte, the IUT is ready to receive all remaining data bytes from the LT.

References: 1RF.010.01 - Procedure byte = INS (case 2 command)

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT returns a byte of value 'INS' in response to the command header in case 2 commands.

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT accepts the data transmitted by the LT (followed by '9000') and continues the card session.

5.6.11. 1CF.011.0y: INS Complement Byte — Case 3 and 4 Commands

Test No. **1CF.011.0y**

Objective: To ensure that when the procedure byte returned to the IUT is equal to the complement of the INS byte, the next data byte is transferred by the IUT.

References: 1RF.011.00 - Procedure byte = complement of INS (case 3 or 4 command)

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

Then two test cases:

- y = 0: after each reception of a byte from IUT, the LT sends a complement of the INS procedure byte.
- y = 1: after the reception of the first data byte from IUT, the LT sends a pair of INS complement/INS procedure bytes

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT conforms with the procedure bytes:

- y=0: the IUT transmits a single byte for each complement of the INS procedure byte received and continues the card session.
- y=1: the IUT transmits the first data bytes (byte per byte under the control of the INS complemented) on receipt of all the complements of the INS procedure byte and the rest of data on receipt of INS procedure byte and continues the card session.

5.6.12. 1CF.012.0y: INS Complement Procedure Byte — Case 2 Command

Test No. **1CF.012.0y**

Objective: To ensure that, when the procedure byte is equal to complement of the INS byte, the IUT is ready to receive the next data byte from the LT.

References: 1RF.011.01 - Procedure byte = complement of INS (case 2 command)

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

Then two test cases:

- y = 0: the LT sends a complement of INS procedure byte after each reception of a byte from IUT.

- y = 1: the LT sends a pair of INS complement/INS procedure bytes after the reception of the first data byte from IUT.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0 - 1	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria:

- y = 0: the IUT accepts the data sent by the LT byte by byte and continues the card session.
- y = 1: the first data bytes are accepted (byte per byte under control of the INS complemented) on receipt of all the INS complements byte, then the rest of the data on receipt of INS procedure byte, and continues the card session.

5.6.13. 1CF.013.0y: ‘60’ Procedure Byte

Test No. **1CF.013.0y**

Objective: To ensure that the IUT grants additional work waiting time on receipt of a ‘60’ procedure byte.

References: 1RF.012.00 - Procedure byte = ‘60’

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

Three test cases:

- y = 0: one ‘60’ procedure byte
- y = 1: 10 consecutive ‘60’ procedure bytes
- y = 2: 50 consecutive '60' procedure bytes

After the last '60' procedure byte and just before the Work Waiting Time timeout, the LT sends the next character.

note: for y=1 and y=2, the number of repetitions are supplied as an indication; the LT shall send several consecutive '60' procedure bytes.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT waits the additional work waiting time following receipt of the ‘60’ procedure byte, and continues the card session.

5.6.14. 1CF.014.0y: ‘60’ amid INS Complement Procedure Byte

Test No. **1CF.014.0y**

Objective: To ensure that when the procedure byte ‘60’ is sent amidst data transmission or reception, the IUT grants additional work waiting time and does not regard ‘60’ as a data byte.

References: 1RF.012.00 - Procedure byte = ‘60’

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

Two test cases:

- y=0: the LT sends the data under the control of complement of INS procedure bytes, includes a ‘60’ procedure byte and uses the additional work waiting time until sending of the next procedure byte
- y=1: the LT receives data from the IUT by sending complement of INS procedure bytes, includes a ‘60’ procedure byte and uses the additional work waiting time until sending of the next procedure byte

ATR:

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria:

- y=0: the IUT accepts the data sent by the LT byte by byte and continues the card session.
- y=1: the IUT sends the data byte by byte and continues the card session.

5.6.15. 1CF.015.0y: '61' Procedure Byte — Case 2 Command

Test No. **1CF.015.0y**

Objective: To ensure that on receipt of a '61' procedure byte, the IUT waits for a further procedure byte and then sends a GET RESPONSE command header to the LT with a maximum length of 'xx', where 'xx' is the value of the second procedure byte.

References: 1RF.013.00 - Procedure byte = '61'

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Conditions: Default environmental conditions.

ATR invokes protocol T=0.

A Case 2 command is passed from the UT to the TTL.
On receipt of the command header (two cases):

- o y=0: the LT sends a '61' procedure byte followed by the second procedure byte 'xx' (where 'xx' may take any value).
- o y=1: the LT sends a '61' procedure byte followed by the second procedure byte 'xx' = 'INS complemented' (where 'INS complemented' is the complement of the instruction code of the Case 2 command previously passed from the UT to the TTL).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: On receipt of the '61xx' procedure bytes, the IUT sends a GET RESPONSE command header with P3 ≤ 'xx'.

5.6.16. 1CF.016.xy: Status Byte ‘6x’ or '9x'

Test No. **1CF.016.xy**

Objective: To ensure that on receipt of a '6x’ (except ‘60’,’61’, and ‘6C’) or '9x' status byte, the IUT waits for a further status byte SW2.

References: 1RF.015.00 - Status byte

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The following table lists twenty-nine sub-cases. Sub-cases 00, 01, 02, 03, 04, 05, 15, and 16 are mandatory and will be executed by all laboratories. Sub-cases 06 through 14, and 17 through 28, may or may not be performed.

xy	00	01	02	03	04	05	06	07	08	09	10
SW1 SW2	’62 xx ’	’63 xx ’	’67 00 ’	’6A xx’	'6F xx'	’90 00’	’64 xx’	’65 xx’	'66 xx'	'68 xx'	'69 xx'

xy	11	12	13	14	15	16	17	18	19	20	21
SW1 SW2	'6B xx'	'6D 00'	'6E 00'	’91 xx ’	’92 xx ’	’93 xx’	’94 xx’	’95 xx’	’96 xx’	’97 xx’	‘98 xx’

xy	22	23	24	25	26	27	28
SW1 SW2	‘99 xx’	'9A xx'	'9B xx '	'9C xx '	'9D xx '	'9E xx'	'9F xx'

When SW2 = ‘xx’, it means a value between ‘00’ and ‘FF’.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT waits for a further status byte then correctly continues the card session.

5.6.17. 1CF.030.0y-1: Maximum Interval between Characters Sent in Same Direction Exceeded (Work Waiting Time) (1)

Test No. **1CF.030.0y-1**

Note: The laboratory may implement test case 1CF.030.0y according to option 1 described in ICF.030.0y-1 or option 2 in 1CF.030.0y-2.

Objective : To ensure that, if the Work Waiting Time is exceeded (by more than 480 etus) between two consecutive characters sent by the LT, the IUT initiates the deactivation sequence.

References: 1RF.006.00 – Work waiting time exceeded

EMV2000 5.2.2.1 – 4th §

EMV2000 4.3.3.1

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

After having sent the ATR and received the response of the IUT, the LT sends one or more characters then does not send any further character.

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	'F0'	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

5.6.18. 1CF.030.0y-2: Maximum Interval between Characters Sent in Same Direction Exceeded (Work Waiting Time) (2)

Test No. **1CF.030.0y-2**

Note: The laboratory may implement test case 1CF.030.0y according to option 1 described in ICF.030.0y-1 or option 2 in 1CF.030.0y-2.

Objective : To ensure that, if the Work Waiting Time is exceeded (by more than D * 480 etus) between two consecutive characters sent by the LT, the IUT initiates the deactivation sequence.

References: 1RF.006.00 – Work waiting time exceeded

EMV2000 5.2.2.1 – 4^{th} §

EMV2000 4.3.3.1

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0.
- After having sent the ATR and received the command header from the IUT, the LT sends characters with inter-character timing set to at least WWT + D * 480 + 1 etus.
- Test is made with three values of D:
- • y=0: D=1
- • y=1: D=2
- • y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

5.6.19. 1CF.031.0y-1: Maximum Interval between Characters Sent in Opposite Directions Exceeded (Work Waiting Time) (1)

Test No. **1CF.031.0y-1**

Note: The laboratory may implement test case 1CF.031.0y according to option 1 described in ICF.031.0y-1 or option 2 in 1CF.031.0y-2.

Objective: To ensure that the IUT initiates the deactivation sequence if the Work Waiting Time is exceeded by more than D * 480 etus after the last character from the IUT.

References: 1RF.007.00 – Work waiting time exceeded

EMV2000 5.2.2.1 – 4th bullet

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0.
- After having sent the ATR and received the command header from the IUT, the LT does not respond.

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

5.6.20. 1CF.031.0y-2: Maximum Interval between Characters Sent in Opposite Directions Exceeded (Work Waiting Time) (2)

Test No. **1CF.031.0y-2**

Note: The laboratory may implement test case 1CF.031.0y according to option 1 described in ICF.031.0y-1 or option 2 in 1CF.031.0y-2.

Objective: To ensure that the IUT initiates the deactivation sequence if the Work Waiting Time is exceeded by more than D * 480 etus after the last character from the IUT.

References: 1RF.007.00 – Work waiting time exceeded

EMV2000 5.2.2.1 – 4th bullet

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0.
- After having sent the ATR and received the response of the IUT, the LT waits for at least WWT + (D * 480) + 1 etus before sending the first character (WWT = 960 x D x WI).

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

5.6.21. 1CF.032.0y: Unsupported Procedure Byte or Status Byte

Test No. **1CF.032.0y**

Objective: To ensure that the IUT initiates the deactivation sequence on receipt of an invalid procedure byte.

References: 1RF.017.00 - Unsupported procedure byte or status byte

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

Two test cases:

- y=0: following a command from the IUT, the LT replies with '00' instead of the expected procedure byte INS
- y=1: on completion of processing of the command header from the IUT, the LT replies with 'FF xx' instead of the expected '90 00' for the R-TPDU SW1 SW2.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within 9,600 etus following the leading edge of the start bit of the invalid byte received to the time that RST is set low.

5.6.22. 1CF.033.0y: Error Detection (Parity)

Test No. **1CF.033.0y**

Objective: To ensure that the IUT signals an error if a character is sent with incorrect parity.

References: 1RD.004.00 – Error indication in T=0

1RF.017.01 – Error indication

1RF.018.00 – Parity error indication

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT sends a character with incorrect parity during the protocol exchange.

Two test cases:

- y = 0: direct convention (TS = '3B')
- y = 1: inverse convention (TS = '3F')

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-
y = 1	‘3F’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT drives I/O low at a time 10.5 ± 0.2 etus following the leading edge of the start bit of the character containing the parity error, and maintains I/O low for a minimum of 1 etu and a maximum of 2 etus. On receipt of the repeated character without the parity error, the IUT continues normal processing.

5.6.23. 1CF.034.00: Multiple Error Repetitions (Receiving)

Test No. **1CF.034.00**

Objective: To ensure that the IUT correctly signals a parity error in a byte sent by the LT up to four times in succession.

References: 1RF.018.01 - Detection of the number of times an error appears (ICC sending)

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT repeatedly sends the same character with incorrect parity four times in succession, then sends a fifth time with correct parity.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria:

- On receipt of each of the characters with the parity error, the IUT drives I/O low for a period of 1 to 2 etus starting 10.5 ± 0.2 etus from the leading edge of the character with the parity error.
- On receipt of the repeated character without the parity error, the IUT continues normal processing.

5.6.24. 1CF.035.0y : Excess Error Repetitions (Receiving)

Test No. **1CF.035.0y**

Objective: To ensure that the IUT correctly signals a parity error in a byte sent by the LT four times in succession and initiates the deactivation sequence on receipt of a further byte with a parity error.

References: 1RF.018.01 - Detection of the number of times an error appears (ICC sending)
EMV2000 5.2.3 – 5th §

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT repeatedly sends the same character with incorrect parity five times.

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria:

- On receipt of each of the first four characters with a parity error, the IUT drives I/O low for a period of 1 to 2 etus starting 10.5 ± 0.2 etus from the leading edge of the character with the parity error.
- On receipt of the fifth repeated character with the parity error, the IUT initiates the deactivation sequence within D * 960 etus from the leading edge of the character with the parity error to the time that RST is set low.

5.6.25. 1CF.036.00: Interpretation of Repeated Character

Test No. **1CF.036.00**

Objective: To ensure that, after receiving a character with a parity error from the LT followed by the correct repeated character, the IUT stores and uses the correct repeated character.

References: 1RF.022.01 - Reception of a character after an error

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT correctly interprets the repeated character and continues the card session.

5.6.26. 1CF.037.0y: Error Correction

Test No. **1CF.037.0y**

Objective : To ensure that the IUT detects an error signaling and repeats the disputed character.

References: 1RF.019.00 – I/O line testing after sending of a character
1RF.019.02 – Detection of error indication (terminal sending)
1RF.020.00 – Character repetition in case of error detection (terminal sending)

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0.
- The LT shall indicate an error by setting the I/O line to state low. State low is measured from the leading edge of the start bit for the character assumed as invalid.

This test case may be implemented conforming to either of the two options provided below. The first option utilizes separate sub-cases for multiple state low start and duration timings. The second option consolidates the multiple sub-cases into a single test case utilizing the net duration for state low.

OPTION	**TEST CASE**	**START** (etus)	**DURATION** (etus)	**END** (etus)
1	y = 0	10.5	1.5	12
	y = 1	10.3	1	11.3
	y = 2	10.3	2	12.3
	y = 3	10.7	1	11.7
	y = 4	10.7	2	12.7
2	y = 0	10.7	0.6	11.3

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT repeats the same character after the delay of at least 2 etus following detection of an error i.e. repeats the character which contained the parity error after the delay of at least 12.8 etus following the leading edge of the start bit of the erroneous character.

5.6.27. 1CF.038.00: Multiple Error Repetition (Transmitting)

Test No. **1CF.038.00**

Objective: To ensure that the IUT repeats the same disputed character a maximum of five times if the LT indicates an error after each character except the last.

References: 1RF.020.01 – Character repetition in case of error detection (terminal sending)

1RF.021.00 – Maximum number of Character repetition

1RF.023.00 – Unsuccessful character repetition

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT signals a parity error four times in succession after sending of a character from IUT.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT transmits the disputed character five times consecutively, and then continues the card session.

5.6.28. 1CF.039.0y: Excess Error Repetitions (Transmitting)

Test No. **1CF.039.0y**

Objective: To ensure that the IUT initiates the deactivation sequence if a parity error is signaled five times in succession.

References: 1RF.020.01 – Character repetition in case of error detection (terminal sending)

1RF.021.00 – Maximum number of Character repetition

1RF.023.00 – Unsuccessful character repetition

Conditions: Default environmental conditions.

ATR invokes protocol T=0.

The LT signals a parity error five times.

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT initiates the deactivation sequence within D * 960 etus from the leading edge of the signaling of the fifth parity error.

5.7. Protocol Tests : T=1

5.7.1. 1CF.051.00: Minimum Interval between Characters Respected

Test No. **1CF.051.00**

Objective: To ensure that the IUT correctly receives characters sent with minimum inter-character timing.

References: 1RF.032.00 - Minimum interval between characters

EMV2000 5.2.4.2.2 – 2nd §

Book Bulletins - Section TA 33 - Bulletin n°33, EMVCo Type Approval Terminal Level 1 Test Cases version 2.0 update

Conditions: Default environmental conditions

ATR invokes protocol T=1.

The LT sends blocks using an inter-character timing of 10.8 etus between consecutive characters (the LT sends at least one block having an information field of size 254 bytes).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’

Pass Criteria: The IUT accepts the blocks sent by the LT and continues the card session.

5.7.2. 1CF.052.0y: Character Waiting Time (CWT) Respected

Test No. **1CF.052.0y**

Objective: To ensure that the IUT correctly receives characters sent with maximum character-to-character timing of the character waiting time (CWT) + 4 etus.

References: 1RF.033.01 - Maximum interval between characters (sent by the ICC)
EMV2000 5.2.4.2.2 – 3rd §

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT sends a block using an inter-character timing of CWT + 4 etus between consecutive characters (step 3 — see Appendix 1).
- This test case shall be repeated with the different values of TB3 from the following table:

y	TB3	CWI	CWT (etus)	Response time (etus)
0	‘01’	1	13	17
1	‘02’	2	15	19
2	‘03’	3	19	23
3	‘04’	4	27	31
4	‘05’	5	43	47

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘02’	-	-	-	-	-	‘72’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘03’	-	-	-	-	-	‘73’
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘04’	-	-	-	-	-	‘74’
y = 4	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘75’

Pass Criteria: The IUT accepts the block and continues the card session.

5.7.3. 1CF.053.xy: Block Waiting Time Respected (BWT)

Test No. **1CF.053.xy**

Objective: To ensure that the IUT correctly receives a block sent as late as the block waiting time (BWT) + (D * 960) etus after the last character sent by the IUT.

References: 1RF.034.00 - Maximum interval between characters
EMV2000 5.2.4.2.2 - 5th §

Conditions: Default environmental conditions.

ATR invokes protocol T=1.

The LT sends a block at or just less than BWT + (D * 960) etus after the reception of the last character of the last received block from the terminal (step 5 — Appendix 1).

This test case shall be repeated with different values of TB3 and different values of D according to the following table:

x	**y**	**TA1**	**TB3**	**BWI**	**BWT** [(2^{BWI} x 960 x 372D/f) + 11] etu	**Response time** (= BWT + D * 960)
0	0	'11' or absent (D=1)	‘01’	0	971	1,931
	1		‘11’	1	1,931	2,891
	2		‘21’	2	3,851	4,811
	3		‘31’	3	7,691	8,651
	4		‘41’	4	15,371	16,331
1	0	'12' (D=2)	‘01’	0	1,931	3,851
	1		‘11’	1	3,851	5,771
	2		‘21’	2	7,691	9,611
	3		‘31’	3	15,371	17,291
	4		‘41’	4	30,731	32,651
2	0	'13' (D=4)	‘01’	0	3,851	7,691
	1		‘11’	1	7,691	11,531
	2		‘21’	2	15,371	19,211
	3		‘31’	3	30,731	34,571
	4		‘41’	4	61,451	65,291

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria: The IUT accepts the block and continues the card session.

5.7.4. 1CF.054.00: Block Guard Time (BGT) Respected

Test No. **1CF.054.00**

Objective: To ensure that the IUT correctly receives a block sent as early as the block guard time (BGT) – 1 etus after the last character sent by the IUT.

References: 1RF.035.00 - Minimum interval between characters
EMV2000 5.2.4.2.2 – 6th §

Conditions: Default environmental conditions.

ATR invokes protocol T=1.

The LT sends a block at least BGT –1 etus (21 etus) from the last block sent by the IUT (steps 3 and 4 — Appendix 1).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’

Pass Criteria: The IUT accepts the block and continues the card session.

5.7.5. 1CF.055.00: Block Guard Time (BGT) Respected by the IUT after Cold Reset

Test No. **1CF.055.00**

Objective: To ensure that the IUT respects the minimum interval of 22 etus (BGT) when, having received a character from the LT (including the last character of the ATR), the IUT sends a character in the opposite direction.

References: 1RF.031.00 - Minimum interval between characters

1RF.036.00 - Minimum interval between characters

Conditions: Default environmental conditions.

ATR invokes protocol T=1.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT continues the card session with an interval measured between the first character of each block it sends and the previous character sent by the LT, equal to or greater than 22 etus.

5.7.6. 1CF.056.00: Block Guard Time (BGT) Respected by the IUT after Warm Reset

Test No. **1CF.056.00**

Objective: To ensure that the IUT respects the minimum interval of 22 etus (BGT) when, having received a character from the LT (including the last character of the ATR), the IUT sends a character in the opposite direction.

References: 1RF.031.00 - Minimum interval between characters

1RF.036.00 - Minimum interval between characters

Conditions: Default environmental conditions.

ATR invokes protocol T=1.

A suitable ATR has led the terminal to perform a warm reset.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT continues the card session with an interval measured between the first character of each block it sends and the previous character sent by the LT, equal to or greater than 22 etus.

5.7.7. 1CF.057.0y: Chained Blocks — Waiting Time Extension (WTX) Respected

Test No. **1CF.057.0y**

Objective: To ensure that the IUT correctly manages a WTX request during chaining from the IUT and respects the waiting time extension.

References: 1RF.044.00 - Acknowledgement of a WTX request

1RF.045.00 – WTX establishment

1RF.047.00 – I-Block acknowledgement

Conditions: Default environmental conditions.

ATR invokes protocol T=1

The LT requests a waiting time extension (WTX = BWT x m) and then sends a block at or just less than WTX + (m * D * 960) etus after reception of the last character of the last block received from the terminal (step 8 — Appendix 1).

Test is made with three values of D:

- y=0: D=1
- y=1: D=2
- y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘A0’	-	‘00’	-	‘91’	‘81'	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘E0’
y=1	‘3B’	‘B0’	'12'	‘00’	-	‘91’	‘81'	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘E2’
y=2	‘3B’	‘B0’	'13'	‘00’	-	‘91’	‘81'	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘E3’

Pass Criteria: The IUT correctly manages chaining, grants the WTX extension, accepts the block and continues the card session.

5.7.8. 1CF.058.00: Sequence Number of the First I-block

Test No. **1CF.058.00**

Objective: To ensure that the first I-block sent by the IUT has a sequence number of 0.

References: 1RF.026.06 – Sequence number of I-Block after ATR and resynchronization
1RF.042.00 – I-Block acknowledgement

Conditions: Default environmental conditions.
ATR invokes protocol T=1.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’

Pass Criteria: The IUT sends its first I-block with a sequence number (bit b7 of the PCB) equal to 0.

5.7.9. 1CF.059.00: Valid Exchanges of I-Blocks

Test No. **1CF.059.00**

Objective: To ensure that the IUT properly sends and receives non-chained I-blocks.

References: 1RF.043.01 - I-block acknowledgement from ICC

Conditions:

- Default environmental conditions.
- Answer to Reset invokes protocol T=1
- I-blocks shall be exchanged between the IUT and LT at least 5 times (scenario repeated from step 5 — see Appendix 1)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends I-blocks with the correct sequence number, and correctly accepts incoming data from LT.

5.7.10. 1CF.060.00: Chaining — IUT Receiving

Test No. **1CF.060.00**

Objective: To ensure that the IUT correctly receives chained I-blocks.

References: 1RF.049.00 – Chaining
1RF.049.02 – R-APDU in chaining mode
1RF.050.00 – Reception of a chain of I-blocks

Conditions: Default environmental conditions.
ATR invokes protocol T=1
The LT sends chained blocks to the IUT.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT correctly receives the chained I-blocks from the LT, correctly manages the sequence number in the R-blocks and continues the card session.

5.7.11. 1CF.061.00: Chaining — Sequence Number of the R-blocks

Test No. **1CF.061.00**

Objective: To ensure that the IUT correctly manages the sequence number (modulo 2 counter coded on one bit which indicates the next I-block the IUT expects to receive) of the R-blocks it sends even if it receives erroneous block.

References: 1RF.026.11 – Sequence number of R-block

1RF.062.00 – Value of error coding bits in an R-block

Conditions: Default environmental conditions.

ATR invokes protocol T=1.

The LT correctly chains blocks then sends an erroneous block in response to an R-block that acknowledged the previous chained I-block (step 10 – Appendix 1).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’

Pass Criteria: The IUT correctly manages the sequence number.

5.7.12. 1CF.062.00: Chaining in Both Directions

Test No. **1CF.062.00**

Objective: To ensure that the IUT properly manages chained I-blocks in both directions.

References: 1RF.047.00 – I-Block acknowledgement
1RF.049.00 – Chaining
1RF.049.01 – Transmission of a C-APDU in chaining mode
1RF.049.02 – R-APDU in chaining mode
1RF.050.00 – Reception of a chain of I-blocks
1RF.051.00 – Sending of a chain of I-blocks
1RF.052.00 – Length of a chained block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT correctly responds to chained blocks then sends chained-blocks as well.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT respects the sequencing of transmitted I-block, correctly performs truncating of data that require chaining which results in chaining (most significant part first) with correct management of ‘more data’ bit; it accepts at once chained I-block.

5.7.13. 1CF.063.0y: IUT Sends Chained and non Chained Blocks — Respect of IFSI by the IUT

Test No. **1CF.063.0y**

Objective: To ensure that the IUT respects the IFSI value (this value is returned in TA3 during ATR by the LT): any information block sent by the IUT shall have an information field size less than or equal to this value.

References: 1RF.027.00 – IFSC establishment

1RF.043.01 – I-block acknowledgement from ICC

Conditions: Default environmental conditions.

Nine sub-cases are defined below. Sub-cases y=0 and 1 are mandatory and will be executed by all laboratories. Sub-cases y=2 to 8 may or may not be performed. The TA3 values specified are intended as examples to test a range of potential values. The test laboratory is permitted to substitute other values approximately equivalent to the specified values.

ATR invokes protocol T=1; the value of TA3 varies from 16 to 254:

- y = 0: TA3 = ‘10’
- y = 1: TA3 = ‘20’
- y = 2: TA3 = ‘40’
- y = 3: TA3 = ‘60’
- y = 4: TA3 = ‘80’
- y = 5: TA3 = ‘A0’
- y = 6: TA3 = ‘C0’
- y = 7: TA3 = ‘E0’
- y = 8: TA3 = ‘FE’

note: the TA3 values are just supplied as an indication – any 9 values in the range 16 to 254, other than specified above, are allowed.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘10’	‘01’	-	-	-	-	-	‘41’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘01’	-	-	-	-	-	‘11’
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘60’	‘01’	-	-	-	-	-	‘31’
y = 4	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘80’	‘01’	-	-	-	-	-	‘D1’
y = 5	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘A0’	‘01’	-	-	-	-	-	‘F1’
y = 6	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘C0’	‘01’	-	-	-	-	-	‘91’

y = 7	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘E0’	‘01’	-	-	-	-	-	‘B1’
y = 8	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’

Pass Criteria: The IUT respects IFSI both in non-chained and chained I-blocks it sends.

5.7.14. 1CF.064.0y: Chaining or Not — Repeated Requests to Change IFSC Between Two chains

Test No. **1CF.064.0y**

Objective: To ensure that the IUT responds correctly to successive requests to change the IFSC and is able to adjust (using chaining or not) the size of chained blocks in order to fit new IFSC.

References: 1RF.027.00 – IFSC establishment

1RF.038.00 – Request for a new IFSC size

1RF.039.00 – Acknowledgement of a new IFSC size

1RF.040.00 – Acknowledgement of a new IFSC size

1RF.051.00 – Sending of a chain of I-blocks

1RF.052.00 – Length of a chained block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- Initial IFSC (value 16) is contained in ATR variable TA3
- The LT sends several S(IFS request) with different INF field values (see Appendix 1).
- The UT sends C-APDU of different sizes to the TTL:

Three sub-cases are defined below. Sub-case y=0 is mandatory and will be executed by all laboratories. Sub-cases y=1 and y=2 may or may not be performed.

- y = 0: the size of the C-APDUs is 16
- y = 1: the size of the C-APDUs is 150
- y = 2: the size of the C-APDUs is 260

<u>Note</u>: The medium C-APDU size value in sub-case y=1 specified above is supplied as an example. The actual value utilized in the sub-case may be any other value representing a medium C-APDU size between the C-APDU sizes tested in sub-cases 0 and 2.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘10’	‘01’	-	-	-	-	-	‘41’

Pass Criteria: The IUT respects the IFSI value indicated in the ATR, acknowledges the S(IFS request) by sending an S(IFS response) and continues to correctly adjust block sizes to respect the new IFSC.

5.7.15. 1CF.080.xy-1: Characters Waiting Time (CWT) Exceeded (1)

Test No. **1CF.080.xy-1**

Note: The laboratory may implement test case 1CF.080-0y according to option 1 described in ICF.080.xy-1 or option 2 in 1CF.080.xy-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block or an S-request block (depends on the type of the block not responded to)

if the LT exceeds the character waiting time (CWT) (by more than 4 etus).

References: 1RF.033.01 – Maximum interval between characters (send by the ICC)

1RF.056.01 – Detection of CWT time-out Error

1RF.065.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT sends one or more characters then does not send any further byte (step 4 — Appendix 1)in response to:
  - x=0: an I-block, R-block or S-response block
  - x=1: an S-request block.

- This test case shall be repeated with the different values of TB3 from the table below:

y	TB3	CWI	CWT (etus)
0	‘01’	1	13
1	‘02’	2	15
2	‘03’	3	19
3	‘04’	4	27
4	‘05’	5	43

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘02’	-	-	-	-	-	‘72’
y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘03’	-	-	-	-	-	‘73’
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘04’	-	-	-	-	-	‘74’
y = 4	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘75’

Pass Criteria:

- For x=0 and x=1: the IUT initiates the deactivation sequence

OR

- For x=0: the IUT sends an R-block
- For x=1: the IUT sends an S-request block

between (CWT + 4) and (CWT + 4,800) etus following the leading edge of the start bit of the last character received.

5.7.16. 1CF.080.xy-2: Characters Waiting Time (CWT) Exceeded (2)

Test No. **1CF.080.xy-2**

Note: The laboratory may implement test case 1CF.080.0y according to option 1 described in ICF.080.xy-1 or option 2 in 1CF.080.xy-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence OR
- sends an R-block or an S-request block (depends on the type of the block not responded to)

if the LT exceeds the character waiting time (CWT) (by more than 4 etus).

References: 1RF.033.01 – Maximum interval between characters (send by the ICC)

1RF.056.01 – Detection of CWT time-out Error

1RF.065.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT sends a block with an inter-character interval (hereafter called response time) that is at least CWT + 5 etus (step 4 — Appendix 1) in response to:
  - x=0: an I-block, R-block or S-response block
  - x=1: an S-request block
- This test case shall be repeated with the different values of TB3 from the table below:

y	**TB3**	**CWI**	**CWT (etus)**	**Response time (etus)** (= CWT + 4 + 1 etus)
0	‘01’	1	13	18
1	‘02’	2	15	20
2	‘03’	3	19	24
3	‘04’	4	27	32
4	‘05’	5	43	48

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’
y = 1	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘02’	-	-	-	-	-	‘72’

y = 2	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘03’	-	-	-	-	-	‘73’
y = 3	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘04’	-	-	-	-	-	‘74’
y = 4	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘75’

Pass Criteria:

- For x=0 and x=1: the IUT initiates the deactivation sequence

OR

- For x=0: the IUT sends an R-block
- For x=1: the IUT sends an S-request block

between (CWT + 4) and (CWT + 4,800) etus following the leading edge of the start bit of the last character received.

5.7.17. 1CF.081.xy-1: Block Waiting Time (BWT) Exceeded in response to an S-request block (1)

Test No. **1CF.081.xy-1**

Note: The laboratory may implement test case 1CF.081.xy according to option 1 described in ICF.081.xy-1 or option 2 in 1CF.081.xy-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an S-request block

if the LT exceeds BWT by more than (D * 960) etus.

References: 1RF.055.00 – Detection of BWT time-out Error

1RF.063.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- the LT does not respond to an S-request block sent by the IUT
- this test is made with three values of D:
    - x=0: D=1
    - x=1: D=2
    - x=2: D=4
- this test case shall be repeated with the different values of TB3 from the table below:

x	y	TA1	TB3	BWI	BWT [(2^{BWI} x 960 x 372D/f) + 11] etu
0	0	'11' or absent (D=1)	‘01’	0	971
	1		‘11’	1	1,931
	2		‘21’	2	3,851
	3		‘31’	3	7,691
	4		‘41’	4	15,371
1	0	'12' (D=2)	‘01’	0	1,931
	1		‘11’	1	3,851
	2		‘21’	2	7,691
	3		‘31’	3	15,371
	4		‘41’	4	30,731
2	0	'13' (D=4)	‘01’	0	3,851
	1		‘11’	1	7,691
	2		‘21’	2	15,371
	3		‘31’	3	30,731
	4		‘41’	4	61,451

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria: The IUT initiates the deactivation sequence

Or

The IUT sends an S-request block

between {(BWT + (D * 960)} and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

5.7.18. 1CF.081.xy-2: Block Waiting Time (BWT) Exceeded in response to an S-request block (2)

Test No. **1CF.081.xy-2**

Note: The laboratory may implement test case 1CF.081.0y according to option 1 described in ICF.081.xy-1 or option 2 in 1CF.081.xy-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an S-request

if the LT exceeds BWT by more than (D * 960) etus.

References: 1RF.055.00 – Detection of BWT time-out Error

1RF.063.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- After reception of the ATR, the IUT sends an S-request block requesting a response.
- The LT waits at least "response time" before sending the response.
- This test is made with three values of D:
  - x=0: D=1
  - x=1: D=2
  - x=2: D=4
- this test case shall be repeated with the different values of TB3 from the table below:

x	y	TA1	TB3	BWI	BWT	Response time (etu) (= BWT + (D * 960) + 1)
0	0	'11' or absent (D=1)	‘01’	0	971 etus	1,932
	1		‘11’	1	1,931 etus	2,892
	2		‘21’	2	3,851 etus	4,812
	3		‘31’	3	7,691 etus	8,652
	4		‘41’	4	15,371 etus	16,332
1	0	'12' (D=2)	‘01’	0	1,931	3,852
	1		‘11’	1	3,851	5,772
	2		‘21’	2	7,691	9,612
	3		‘31’	3	15,371	17,292
	4		‘41’	4	30,731	32,652
2	0	'13' (D=4)	‘01’	0	3,851	7,692
	1		‘11’	1	7,691	11,532
	2		‘21’	2	15,371	19,212
	3		‘31’	3	30,731	34,572
	4		‘41’	4	61,451	65,292

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria:

The IUT initiates the deactivation sequence

Or

The IUT sends an S-request block

between {BWT + (D * 960)} etus and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

5.7.19. 1CF.081.xy-1 (bis): Block Waiting Time (BWT) Exceeded in response to an I-block, R-block or S-response block (1)

Test No. **1CF.081.xy-1 (bis)**

Note: The laboratory may implement test case 1CF.082.xy according to option 1 described in ICF.082.xy-1 or option 2 in 1CF.082.xy-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block

if the LT exceeds BWT by more than (D * 960) etus.

References: 1RF.055.00 – Detection of BWT time-out Error

1RF.063.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- the LT does not respond to an I-block, an R-block or an S-response block sent by the IUT.
- this test is made with three values of D:
  - x=0: D=1
  - x=1: D=2
  - x=2: D=4
- this test case shall be repeated with the different values of TB3 from the table below:

x	y	TA1	TB3	BWI	BWT [(2^{BWI} x 960 x 372D/f) + 11] etu
0	0	'11' or absent (D=1)	‘01’	0	971
	1		‘11’	1	1,931
	2		‘21’	2	3,851
	3		‘31’	3	7,691
	4		‘41’	4	15,371
1	0	'12' (D=2)	‘01’	0	1,931
	1		‘11’	1	3,851
	2		‘21’	2	7,691
	3		‘31’	3	15,371
	4		‘41’	4	30,731
2	0	'13' (D=4)	‘01’	0	3,851
	1		‘11’	1	7,691
	2		‘21’	2	15,371
	3		‘31’	3	30,731
	4		‘41’	4	61,451

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	'3B'	'E0'	-	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'01'	-	-	-	-	-	'E0'
xy = 01	'3B'	'E0'	-	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'11'	-	-	-	-	-	'F0'
xy = 02	'3B'	'E0'	-	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'21'	-	-	-	-	-	'C0'
xy = 03	'3B'	'E0'	-	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'31'	-	-	-	-	-	'D0'
xy = 04	'3B'	'E0'	-	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'41'	-	-	-	-	-	'A0'
xy = 10	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'01'	-	-	-	-	-	'E2'
xy = 11	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'11'	-	-	-	-	-	'F2'
xy = 12	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'21'	-	-	-	-	-	'C2'
xy = 13	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'31'	-	-	-	-	-	'D2'
xy = 14	'3B'	'F0'	'12'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'41'	-	-	-	-	-	'A2'
xy = 20	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'01'	-	-	-	-	-	'E3'
xy = 21	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'11'	-	-	-	-	-	'F3'
xy = 22	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'21'	-	-	-	-	-	'C3'
xy = 23	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'31'	-	-	-	-	-	'D3'
xy = 24	'3B'	'F0'	'13'	'00'	'00'	'91'	'81'	-	-	'31'	'20'	'41'	-	-	-	-	-	'A3'

Pass Criteria: The IUT initiates the deactivation sequence

Or

The IUT sends an R-block

between {(BWT + (D * 960)} and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

5.7.20. 1CF.081.xy-2 (bis): Block Waiting Time (BWT) Exceeded in response to an I-block, R-block or S-response block (2)

Test No. **1CF.081.xy-2 (bis)**

Note: The laboratory may implement test case 1CF.082.0y according to option 1 described in ICF.082.xy-1 or option 2 in 1CF.082.xy-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block

if the LT exceeds BWT by more than (D * 960) etus.

References: 1RF.055.00 – Detection of BWT time-out Error

1RF.063.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- After reception of the ATR, the IUT sends an I-block, an R-block or an S-response block requesting a response.
- The LT waits "response time" before sending the response.
- This test is made with three values of D:
  - x=0: D=1
  - x=1: D=2
  - x=2: D=4
- This test case shall be repeated with the different values of TB3 from the table below:

x	y	TA1	TB3	BWI	BWT (etu) [$(2^{BWI}$ x 960 x 372D/f) + 11]	Response time (etu) (= BWT + (D * 960) + 1)
0	0	'11' or absent (D=1)	‘01’	0	971	1,932
	1		‘11’	1	1,931	2,892
	2		‘21’	2	3,851	4,812
	3		‘31’	3	7,691	8,652
	4		‘41’	4	15,371	16,332
1	0	'12' (D=2)	‘01’	0	1,931	3,852
	1		‘11’	1	3,851	5,772
	2		‘21’	2	7,691	9,612
	3		‘31’	3	15,371	17,292
	4		‘41’	4	30,731	32,652
2	0	'13' (D=4)	‘01’	0	3,851	7,692
	1		‘11’	1	7,691	11,532
	2		‘21’	2	15,371	19,212
	3		‘31’	3	30,731	34,572
	4		‘41’	4	61,451	65,292

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria:

The IUT initiates the deactivation sequence

Or

The IUT sends an R-block

between {BWT + (D * 960)} etus and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

5.7.21. 1CF.082.0y: Non Chained Blocks — Proper then Improper Use of Waiting Time Extension (WTX)

Test No. **1CF.082.0y**

Objective: To ensure that the IUT correctly interprets an S(WTX request), grants a response, and respects the waiting time extension. Also to ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block (only one scenario possible)

if the LT again uses the extension without having sent another S(WTX request).

References: 1RF.044.00 – Acknowledgement of a WTX request

1RF.045.00 – WTX establishment

Conditions: Default environmental conditions.

- ATR invokes protocol T=1.
- The LT requests an extended waiting time (BWT x m) and then sends a block just before extended waiting time timeout (time called 'response time'); then, without requesting again extended waiting time, the LT sends a block using the same response time (see steps 8 and 13 — Appendix 1).
- This test is made with three values of D:
  - y=0: D=1
  - y=1: D=2
  - y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘A0’	-	‘00’	-	‘91’	‘81'	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘E0’
y=1	‘3B’	‘B0’	'12'	‘00’	-	‘91’	‘81'	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	'E2'
y=2	‘3B’	‘B0’	'13'	‘00’	-	‘91’	‘81'	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘E3’

Pass Criteria: The IUT correctly grants the waiting time extension and accepts the I-block from the LT, then the IUT:

initiates the deactivation sequence

Or

sends an R-block

between {BWT + (D * 960)} etus and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block in response to which the LT uses the BWT extension again without requesting to do so.

5.7.22. 1CF.083.xy-1: Waiting Time Extension (WTX) Exceeded (1)

Test No. **1CF.083.xy-1**

Note: The laboratory may implement test case 1CF.084.0y according to option 1 described in ICF.084.0y-1 or option 2 in 1CF.084.0y-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence.

OR

- sends an R-block (only one scenario possible)

if the waiting time extension is exceeded (by more than (m * D * 960 etus)

References: 1RF.056.00 – Detection of WTX time-out Error

1RF.064.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- the ATR invokes T=1 protocol
- after exchange of S(WTX) blocks, the LT is unresponsive.
- This test is made with three values of D:
    - x=0: D=1
    - x=1: D=2
    - x=2: D=4
- this test case shall be repeated with the different values of TB3 from the table below:

x	y	TA1	TB3	BWI	BWT (etu) [(2^BWI x 960 x 372D/f) + 11]	WTX (etu) (= BWT x m) example for m=3
0	0	'11' or absent (D=1)	‘01’	0	971	2,913
	1		‘11’	1	1,931	5,793
	2		‘21’	2	3,851	11,553
	3		‘31’	3	7,691	23,073
	4		‘41’	4	15,371	46,113
1	0	'12' (D=2)	‘01’	0	1,931	5,793
	1		‘11’	1	3,851	11,553
	2		‘21’	2	7,691	23,073
	3		‘31’	3	15,371	46,113
	4		‘41’	4	30,731	92,193
2	0	'13' (D=4)	‘01’	0	3,851	11,553
	1		‘11’	1	7,691	23,073
	2		‘21’	2	15,371	46,113
	3		‘31’	3	30,731	92,193
	4		‘41’	4	61,451	184,353

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria:

The IUT:

initiates the deactivation sequence

Or

sends an R-block

between {WTX + (m * D * 960)} and {WTX + (m * D * 4,800)} etus following the leading edge of the start bit of the last received character of the block to which there was no response.

5.7.23. 1CF.083.xy-2: Waiting Time Extension (WTX) Exceeded (2)

Test No. **1CF.083.xy-2**

Note: The laboratory may implement test case 1CF.084.0y according to option 1 described in ICF.084.0y-1 or option 2 in 1CF.084.0y-2.

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block (only one scenario possible).

if the waiting time extension is exceeded (by more than 960 etus)

References: 1RF.056.00 – Detection of WTX time-out Error

1RF.064.00 – Deactivation sequence when no response from ICC

Conditions:

- Default environmental conditions.
- the ATR invokes T=1 protocol
- after exchange of S(WTX) blocks, the LT waits "response time" before sending the response.
- this test case shall be repeated with the different values of TB3 from the table below:

x	y	TA1	TB3	BWI	**BWT** (= (2^{BWI} x 960 x 372D/F) + 11) **(etus)**	**WTX** (= BWT x m) example for m=3 **(etus)**	**response time** (= WTX + (m * D * 960) + 1 etus) example for m=3 **(etus)**
0	0	'11' or absent (D=1)	'01'	0	971	2,913	5,794
	1		'11'	1	1,931	5,793	8,674
	2		'21'	2	3,851	11,553	14,434
	3		'31'	3	7,691	23,073	25,954
	4		'41'	4	15,371	46,113	48,994
1	0	'12' (D=2)	'01'	0	1,931	5,793	11,554
	1		'11'	1	3,851	11,553	17,314
	2		'21'	2	7,691	23,073	28,834
	3		'31'	3	15,371	46,113	51,874
	4		'41'	4	30,731	92,193	97,954
2	0	'13' (D=4)	'01'	0	3,851	11,553	23,074
	1		'11'	1	7,691	23,073	34,594
	2		'21'	2	15,371	46,113	57,634
	3		'31'	3	30,731	92,193	103,714
	4		'41'	4	61,451	184,353	195,874

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria: The IUT:

initiates the deactivation sequence

Or

sends an R-block

between {WTX + (m * D * 960)} and {WTX + (m * D * 4,800)} etus following the leading edge of the start bit of the last received character to which there was no response.

5.7.24. 1CF.084.0y: Non Chained Block — Transmission Error followed by an Error Notification on an I-block

Test No. **1CF.084.0y**

Objective: To ensure that the IUT correctly manages a block with transmission error followed by an error notification on a non-chained I-block.

References: 1RF.043.00 – I-Block acknowledgement during chaining

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with transmission error on a non-chained I-block followed by an error notification (on first I-block) on receipt of the R-block requesting retransmission (step 6 and 8 - Appendix 1) then sends a non-chained I-block on receipt of the repeated I-block:

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block, retransmits the I-block in response to the R-block and continues the card session on receipt of the subsequent I-block.

5.7.25. 1CF.085.xy: Non Chained Block — Syntax/Semantic Error in Response to an I-block Then Error Notification Then I-Block

Test No. **1CF.085.xy**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages a block with syntax/semantic error in response to a non chained I-block followed by an error notification on the previous non-chained I-block then a non chained I-block.

References: 1RF.024.05 – Coding of PCB of an R-block (reception)

1RF.024.10 – LEN error in an R-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.02 – INF in R-block

1RF.043.00 – I-Block acknowledgement during chaining

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block, an I-block or an S(request) block is expected in response to the non-chained I-block, the LT returns a block with a syntax or semantic error (14 test cases) then an error notification (step 6 and 8 - Appendix 1) on receipt of the R-block then sends a non-chained I-block:
  - xy = 00: R-block, I-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6 = 1
  - xy = 07: R-block with wrong sequence number
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(ABORT response)
  - xy = 10: S(WTX response)
  - xy = 11: S(IFS response)
  - xy = 12: S(RESYNCH response)
  - xy = 13: Unknown S(request)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, retransmits the I-block on receipt of the error free R-block and continues the card session on receipt of the subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.26. 1CF.086.0y: Non Chained Blocks — Excess of Transmission Errors in Response to an I-Block

Test No. **1CF.086.0y**

Objective: To ensure that the IUT deactivates after receiving a third successive block with transmission error on receipt of a non-chained I-block.

References: 1RF.043.00 – I-Block acknowledgement during chaining

1RF.066.00 – Invalid I-block reception in response to I-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with transmission error three times in succession in response to a non-chained I-block (step 6, 8 and 10 - see Appendix 1):

2 options:

<u>option 1</u>:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

<u>option 2:</u>

- y = 0: parity/EDC combination

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends two R-blocks on receipt of the first two erroneous blocks then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

5.7.27. 1CF.087.xy: Non Chained Blocks — Excess of Syntax/Semantic Errors in Response to an I-block

Test No. **1CF.087.xy**

Objective: To ensure that the IUT deactivates when receiving three consecutive blocks with syntax/semantic error in response to a non-chained I-block.

References: 1RF.024.05 – Coding of PCB of an R-block (reception)

1RF.024.10 – LEN error in an R-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.02 – INF in R-block

1RF.043.00 – I-Block acknowledgement during chaining

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

1RF.066.00 – Invalid I-block reception in response to I-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block, an I-block or an S(request) block is expected in response to the non-chained I-block, the LT returns a block with syntax/semantic error three times in succession in response to a non-chained I-block (step 6, 8 and 10 - Appendix 1):
  - xy = 00: R-block, I-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6 = 1
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(ABORT response)
  - xy = 10: S(WTX response)
  - xy = 11: S(IFS response)
  - xy = 12: S(RESYNCH response)
  - xy = 13: Unknown S(request)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends two R-blocks on receipt of the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.28. 1CF.088.xy: Non Chained Blocks — One or Two Consecutive Transmission Errors in Response to an I-Block Then I-Block

Test No. **1CF.088.xy**

Objective: To ensure that the IUT responds correctly to one or two successive blocks with transmission error in response to a non-chained I-block, then to a correct non-chained I-block.

References: 1RF.066.00 – Invalid I-block reception in response to I-block

1RF.067.00 – Invalid I-block reception in response to R-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns one or two block(s) (y=0 or 1) with a transmission error in response to a non-chained I-block (step 6 - Appendix 1) followed by a correct non-chained I-block:
  - x = 0: parity error
  - x = 1: EDC error
  - x = 2: parity/EDC error combination
- This test shall be stated with error generation, a different number of times:
  - y = 0: one error (skip steps 7 to 8 in the scenario in Appendix 1)
  - y = 1: two successive errors (in accordance with the scenario in Appendix 1)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block and continues the card session on receipt of the subsequent I-block.

5.7.29. 1CF.089.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block, Then I-Block

Test No. **1CF.089.xy**

Objective: To ensure that the IUT responds correctly to a block with syntax/semantic error in response to a non chained I-block, then to an I-block.

References: 1RF.024.09 – LEN error in an I-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.09 – Sequence number error in I-block

1RF.026.10 – Sequence number error in first I-block

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

1RF.066.00 – Invalid I-block reception in response to I-block

1RF.067.00 – Invalid I-block reception in response to R-block

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block, an I-block or an S(request) block is expected in response to the non-chained I-block, the LT returns a block with a syntax/semantic error (step 6 - see Appendix 1) then a correct non-chained I-block:
    - xy = 00: R-block, I-block or S(request) with NAD error (*Unless allowed by ICS - Chapter XI-1 — item 1)*
    - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
    - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
    - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
    - xy = 04: S(IFS request) with INF < '10'
    - xy = 05: S(IFS request) with INF = 'FF'
    - xy = 06: R-block with bit b6 = 1
    - xy = 07: R-block with wrong sequence number
    - xy = 08: I-block with wrong sequence number
    - xy = 09: S(WTX response) instead of I-block
    - xy = 10: S(IFS response) instead of I-block
    - xy = 11: S(RESYNCH response) instead of I-block
    - xy = 12: S(ABORT response) instead of I-block
    - xy = 13: Unknown S(request)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.30. 1CF.090.xy: Non Chained Blocks — Two Consecutive Syntax/Semantic Errors in Response to an I-Block, Then I-Block

Test No. **1CF.090.xy**

Objective: To ensure that the IUT responds correctly to two successive blocks with syntax/semantic error in response to a non chained I-block, then to an I-block.

References: 1RF.024.09 – LEN error in an I-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.09 – Sequence number error in I-block

1RF.026.10 – Sequence number error in first I-block

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

1RF.066.00 – Invalid I-block reception in response to I-block

1RF.067.00 – Invalid I-block reception in response to R-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block, an I-block or an S(request) block is expected in response to the non-chained I-block, the LT returns two successive blocks with a syntax/semantic error (step 6 - see Appendix 1) then a correct non-chained I-block:
  - xy = 00: R-block, I-block or S(request) with NAD error (*Unless allowed by ICS – Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6 = 1
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(WTX response) instead of I-block
  - xy = 10: S(IFS response) instead of I-block
  - xy = 11: S(RESYNCH response) instead of I-block
  - xy = 12: S(ABORT response) instead of I-block
  - xy = 13: Unknown S(request)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block and continues the card session on receipt of the subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.31. 1CF.091.0y: Non Chained Blocks — Transmission Error in Response to an I-Block, then Error Notification on R-block Then I-Block

Test No. **1CF.091.0y**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages a block with transmission error in response to a non-chained I-block, then an error notification on the previous R-block then an I-block.

References: 1RF.066.00 – Invalid I-block reception in response to I-block

1RF.067.00 – Invalid I-block reception in response to R-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with a transmission error (two options — step 6 - Appendix 1) in response to a non-chained I-block, notifies of an error in response to the subsequent R-block (step 8 - Appendix 1) then sends a correct non-chained I-block:

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-Block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block and continues the card session on receipt of the subsequent I-block.

5.7.32. 1CF.092.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block, then Error Notification on R-Block Then I-Block

Test No. **1CF.092.xy**

Objective: To ensure that the IUT correctly manages an I-block with syntax/semantic error in response to a non-chained I-block, then an error notification on the previous R-block then an I-block.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.09 – Sequence number error in I-block

1RF.026.10 – Sequence number error in first I-block

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block, an I-block or an S(request) block is expected in response to the non-chained I-block, the LT returns a block with a syntax/semantic error (14 test cases) and returns an R-block indicating an error in response to the subsequent R-block (step 6 - Appendix 1):
  - xy = 00: R-block, I-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6 = 1
  - xy = 07: R-block with wrong sequence number
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(WTX response)
  - xy = 10: S(IFS response)
  - xy = 11: S(RESYNCH response)
  - xy = 12: S(ABORT response)
  - xy = 13: Unknown S(request)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block and continues the card session on receipt of the correct subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.33. 1CF.093.00: Non Chained Blocks — Two Consecutive Transmission Errors in Response to an I-block, then Error Notification

Test No. **1CF.093.00**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages two successive blocks with transmission error in response to a non-chained I-block, then an error notification.

References: 1RF.066.00 – Invalid I-block reception in response to I-block

1RF.067.00 – Invalid I-block reception in response to R-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns two successive blocks with a transmission error in response to a non chained I-block then notifies of an error (step 6, 8 and 10 - Appendix 1):

This test case may be executed using option 1 or 2 stated below.

Option 1:

All the following errors shall be generated and the two erroneous blocks shall not contain the same error; consequently, the steps 5 to 14 (see Appendix 1) shall be performed twice with generation of the following errors sequentially (parity error in first block, EDC error in second then repetition of the scenario with EDC error in first block, parity error in second).

- parity error
- EDC error
- parity/EDC combination

Option 2:

- parity/EDC combination

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, then sends an R-block on receipt of the R-block, and continues the card session on receipt on the subsequent I-block.

5.7.34. 1CF.094.00: Non Chained Blocks — Two Consecutive Syntax/Semantic Errors in Response to an I-Block, Then Error Notification

Test No. **1CF.094.00**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages two consecutive blocks with syntax/semantic error in response to a non-chained block followed by an error notification on the previous R-block then a correct non chained I-block.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.10 – Sequence number error in first I-block

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block, an I-block or an S(request) block is expected in response to the non-chained I-block, the LT returns two successive blocks with a syntax/semantic error then sends an error notification (steps 6, 8 and 10 - Appendix 1) then a non-chained I-block:

All the following errors shall be generated and the two erroneous blocks shall not contain the same error; consequently, the steps 5 to 14 (see Appendix 1) shall be performed seven times with generation of the following errors sequentially (NAD error in first block, R-block with LEN error in second then repetition of the scenario with S-block with LEN error in first block, S(IFS request) with INF error in second…):

- R-block, I-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
- R-block with LEN ≠ 0 (INF size equal to LEN)
- S(request) with LEN ≠ '01' (INF size equal to LEN)
- S(IFS request) with INF < '10'
- S(IFS request) with INF = 'FF'
- R-block with bit b6 = 1
- R-block with wrong sequence number
- I-block with wrong sequence number
- S(WTX response)
- S(IFS response)
- S(RESYNCH response)
- S(ABORT response)
- Unknown S(request)
- I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, then an R-block on receipt of the R-block, then continues the card session on receipt on the subsequent I-block.

Note: the terminal is allowed to deactivate because of CWT excess on receipt of I-block with LEN = 'FF'.

5.7.35. 1CF.095.0y: Non Chained Blocks — Transmission Error in Response to an S(IFS Response) Then I-Block

Test No. **1CF.095.0y**

Objective: To ensure that the IUT responds correctly to a block with transmission error in response to an S(response) block to change the IFSC, then to a non chained block.

References: 1RF.069.00 – Invalid I-block reception in response to S-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT sends an S(IFS request) block in response to a non-chained I-block, sends a block with a transmission error (two options) on receipt of the S(IFS response) block (step 8 - Appendix 1) then sends a non-chained I-block:

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block, and continues the card session on receipt of the valid I-block.

5.7.36. 1CF.096.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an S(IFS Response), Then I-Block

Test No. **1CF.096.xy**

This test case may or may not be performed

Objective: To ensure that the IUT responds correctly to a block with syntax/semantic error in response to an S(response) block to change the IFSC, then a non chained I-block.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.10 – Sequence number error in first I-block

1RF.069.00 – Invalid I-block reception in response to S-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT sends an S(IFS request) block in response to a non-chained I-block.
- While an I-block or an S(request) block is expected in response to the S(IFS response), the LT sends a block with a syntax or semantic error (12 test cases) (step 8 - Appendix 1), then sends a non-chained I-block:
  - xy = 00: I-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 02: I-block with wrong sequence number
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: any R-block
  - xy = 07: S(WTX response)
  - xy = 08: S(IFS response)
  - xy = 09: S(RESYNCH response)
  - xy = 10: S(ABORT response)
  - xy = 11: Unknown S(request)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	'3B'	'E0'	-	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'71'

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent I-block.

Note: For xy=01, the IUT is allowed to deactivate because of CWT excess.

5.7.37. 1CF.097.0y: Non Chained Blocks — Transmission Error in Response to an S(IFS Response) Then Error Notification, Then I-Block

Test No. **1CF.097.0y**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages a block with transmission error, then an error notification on the previous R-block then a non chained block.

References:

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT sends an S(IFS request) block in response to a non-chained I-block, sends a block with a transmission error (two options) following the S(IFS response) block (step 8 - Appendix 1) then notifies of an error, then sends a non chained block:

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block, and continues the card session on receipt of the subsequent I-block.

5.7.38. 1CF.098.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an S(IFS Response) Block then Error Notification, Then I-Block

Test No. **1CF.098.xy**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages a block with syntax/semantic error in response to an S(IFS response) then an error notification then a non chained I-block.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.10 – Sequence number error in first I-block

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT sends an S(IFS request) block in response to a non chained I-block.
- While an S(IFS request) or an I-block is expected in response to the S(IFS response) block, the LT sends a block with a syntax/semantic error (12 test cases) (step 8 - Appendix 1) then notifies of an error then sends a non chained I-block:
  - xy = 00: S(IFS request) or I-block with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 02: I-block with wrong sequence number
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: any R-block
  - xy = 07: S(WTX response)
  - xy = 08: S(IFS response)
  - xy = 09: S(RESYNCH response)
  - xy = 10: S(ABORT response)
  - xy = 11: Unknown S(request)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block and continues the card session on receipt of the subsequent I-block.

Note: For xy=01, the IUT is allowed to deactivate because of CWT excess.

5.7.39. 1CF.099.00: Non Chained Blocks — Error Notification on an I-Block Then I-Block

Test No. **1CF.099.00**

Objective: To ensure that the IUT correctly manages the notification of an error on an I-block then a non chained I-block.

References: 1RF.070.00 – S(Resynch request) sent by the terminal if 3 retransmission requests by ICC

1RF.072.00 – Deactivation sequence

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT notifies of an error in the previous non-chained I-block then sends a non chained I-block.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the I-block on receipt of the R-block and continues the card session on receipt of the subsequent I-block.

5.7.40. 1CF.100.00: Non Chained Blocks — Two Consecutive Error Notifications on an I-Block Then I-Block

Test No. **1CF.100.00**

Objective: To ensure that the IUT correctly manages two consecutive error notifications on an I-block then a non chained I-block.

References: 1RF.070.00 – S(Resynch request) sent by the terminal if 3 retransmission requests by ICC

1RF.072.00 – Deactivation sequence

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT notifies of an error twice in succession in response to a non-chained I-block (while it should remain in reception mode after the 1st error notification) then sends a non-chained I-block.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'E0'	-	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'71'

Pass Criteria: The IUT retransmits the I-block twice on receipt the R-blocks then continues the card session on receipt of the subsequent I-block

5.7.41. 1CF.101.00: Non Chained Blocks — Excess of Error Notifications on I-Blocks

Test No. **1CF.101.00**

Objective: To ensure that the IUT initiates the deactivation sequence after transmitting the same non-chained I-block three times without receiving a valid response.

References: 1RF.070.00 – S(Resynch request) sent by the terminal if 3 retransmission requests by ICC

1RF.072.00 – Deactivation sequence

Conditions:
- Default environmental conditions.
- ATR invokes T=1.
- The LT notifies of an error three times in succession in response to I-blocks (while it should remain in reception mode after the 1st error notification).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the I-block twice on receipt of the R-blocks then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following reception of the leading edge of the start bit of the last character of the last block the IUT has sent. Note: The IUT, having received 3 consecutive R-blocks, should deactivate. These error notifications, although correct blocks, are not valid responses in the sense that they do not acknowledge the previous I-block sent at steps 5, 7 and 9.

5.7.42. 1CF.102.0y: Non Chained Blocks — Transmission Error in Response to an I-block, then S(IFS request)

Test No. **1CF.102.0y**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages a block with transmission error followed by an S(IFS request) block.

References:

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT sends a block with transmission error (step 6 -Appendix 1) in response to a non chained block then an S(IFS request):

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block, then accepts correct S(IFS request) and sends the S(IFS response).

5.7.43. 1CF.103.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block then S(IFS request)

Test No. **1CF.103.xy**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages reception of a block with syntax/semantic error in response to a non chained I-block then an S(IFS request).

References: 1RF.024.07 – Coding of PCB of an S-block (reception)

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.04 – INF error in a S(IFS request)

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an S(request) or an I-block or an R-block is expected in response to a non chained I-block, the LT sends a block with syntax/semantic error (12 test cases) (step 6 - Appendix 1) then a correct S(IFS request):
  - xy = 00: S(request), I-block or R-block with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 02: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: I-block with wrong sequence number
  - xy = 07: R-block with wrong sequence number
  - xy = 08: R-block with bit b6=1
  - xy = 09: Unknown S(request)
  - xy = 10: S(WTX response)
  - xy = 11: S(IFS response)
  - xy = 12: S(ABORT response)
  - xy = 13: S(RESYNCH response)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, then accepts S(IFS request) and sends the S(IFS response).

Note: For xy=01, the IUT is allowed to deactivate because of CWT excess.

5.7.44. 1CF.104.00: Non Chained Blocks — Error Notification on S(IFS request) Then S(IFS Response)

Test No. **1CF.104.00**

Objective: To ensure that the IUT manages correctly an error notification on an S(IFS request) block then an S(IFS response).

References: 1RF.070.00 – S(Resynch request) sent by the terminal if 3 retransmission requests by ICC

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT notifies of an error in response to the S(IFS request) block then sends an S(IFS response).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘80’	‘01’	-	-	-	-	-	‘D1’

Pass Criteria: The IUT retransmits the S(IFS request) on receipt of the R-block, and continues the card session on receipt of the S(IFS response).

5.7.45. 1CF.105.0y: Non Chained Blocks — Transmission Error in Response to an S(IFS request) Then S(IFS Response)

Test No. **1CF.105.0y**

Objective: To ensure that the IUT correctly manages a block with transmission error in response to an S(IFS request) block then an S(IFS response).

References: 1RF.045.02 – Error when having sending S(… request) Invalid block received

1RF.068.00 – No reception of S-block in response to S-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with a transmission error in response to the S(IFS request) block (step 4 - Appendix 1) and then returns an S(IFS response) block:

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘80’	‘01’	-	-	-	-	-	‘D1’

Pass Criteria: The IUT retransmits the S(IFS request) block and continues the card session on receipt of the subsequent S(IFS response).

5.7.46. 1CF.106.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an S(IFS request) Then S(IFS response)

Test No. **1CF.106.xy**

Objective: To ensure that the IUT responds correctly to a block with syntax/semantic error in response to an S(IFS request) block then an S(IFS response).

References: 1RF.024.07 – Coding of PCB of an S-block (reception)

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.03 – INF error in a S(IFS response)

1RF.045.02 – Error when having sending S(… request) Invalid block received

1RF.068.00 – No reception of S-block in response to S-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an S(IFS response) or an R-block is expected in response to the S(IFS request) block, the LT returns a block with a syntax/semantic error (step 4 - Appendix 1) and then returns an S(IFS response) block:
  - xy = 00: S(IFS response) or R-block with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: S(IFS response) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 03: S(IFS response) with INF ≠ 'FE'
  - xy = 04: R-block with wrong sequence number
  - xy = 05: R-block with bit b6 = 1
  - xy = 06: any I-block
  - xy = 07: Unknown S(response)
  - xy = 08: S(WTX response)
  - xy = 09: S(IFS request)
  - xy = 10: S(ABORT response)
  - xy = 11: S(RESYNCH response)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘80’	‘01’	-	-	-	-	-	‘D1’

Pass Criteria: The IUT retransmits the S(IFS request) block on receipt of the erroneous block and continues the card session on receipt of the subsequent S(IFS response).

5.7.47. 1CF.107.00: Non Chained Blocks — Error Notification on S(IFS response) Then I-Block

Test No. **1CF.107.00**

Objective: To ensure that the IUT responds correctly to an error notification on an S(IFS response) then a non chained I-block .

References:

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=1
- The LT sends an S(IFS request) in response to a non-chained I-block, notifies of an error (by repeating the S(IFS request) block) in response to the S(IFS response) block then sends a non-chained I-block in response to the repeated S(IFS response).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the S(IFS Response) block on receipt of the repeated S(IFS request) and continues the card session on receipt of the subsequent I-block.

5.7.48. 1CF.108.xy: Non Chained Blocks — One or Two Successive Transmission Errors in Response to an I-block, then S(WTX request)

Test No. **1CF.108.xy**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages one or two successive blocks with transmission error in response to a non-chained I-block, then an S(WTX request).

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns one or two blocks (y=0 or 1) with transmission error (2 options) in response to a non-chained I-block (step 6 – Appendix 1) then sends a correct S(WTX request):

  This test case may be executed using option 1 or 2 stated below.

  Option 1:
  - x = 0: parity error
  - x = 1: EDC error
  - x = 2: parity/EDC combination

  Option 2:
  - x = 0: parity/EDC combination

- This test case shall be repeated with variable number of successive blocks with error:
  - y = 0: 1 error generation (as in scenario in Appendix 1)
  - y = 1: 2 error generations (steps 6 and 7 of the scenario in Appendix 1 shall be repeated)

After reception of the S(WTX response), the LT waits more than BWT but less than BWT extended before sending the next I-block (extended waiting time = BWT x m).

ATR : TS T0 TA1 TB1 TC1 TD1 TA2 TB2 TC2 TD2 TA3 TB3 TC3 TD3 TA4 TB4 TC4 TCK

‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘11’

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, then sends S(WTX response) to the S(WTX request) and accepts that LT uses WTX extension.

5.7.49. 1CF.109.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block Then S(WTX request)

Test No. **1CF.109.xy**

This test case may or may not be performed

Objective: To ensure that the IUT correctly manages a block with syntax/semantic error in response to a non-chained I-block then an S(WTX request).

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an S(request), an R-block or an I-block is expected in response to a non-chained I-block, the LT returns a block with syntax/semantic error (step 6 - Appendix 1) then sends a correct S(WTX request):
  - xy = 00: S(request), R-block or I-block with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6 = 1
  - xy = 07: R-block with wrong sequence number
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(WTX response)
  - xy = 10: S(IFS response)
  - xy = 11: S(ABORT response)
  - xy = 12: S(RESYNCH response)
  - xy = 13: Unknown S(request)

After reception of the S(WTX response), the LT waits more than BWT but less than BWT extended before sending the next I-block (extended waiting time = BWT x m).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘11’

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, sends S(WTX response) to the correct S(WTX request) and accepts that LT uses WTX extension.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.50. 1CF.110.xy: Non Chained Blocks — Two Successive Syntax/Semantic Errors in Response to an I-Block Then S(WTX request)

Test No. **1CF.110.xy**

Objective: To ensure that the IUT correctly manages two successive blocks with syntax/semantic error in response to a non-chained I-block then an S(WTX request).

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an S(request), an R-block or an I-block is expected in response to a non-chained I-block, the LT returns two blocks with syntax/semantic error (step 6 - Appendix 1) then sends a correct S(WTX request):
  - xy = 00: S(request), R-block or I-block with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6 = 1
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(WTX response)
  - xy = 10: S(IFS response)
  - xy = 11: S(ABORT response)
  - xy = 12: S(RESYNCH response)
  - xy = 13: Unknown S(request)
- After reception of the S(WTX response), the LT waits more than BWT but less than BWT extended before sending the next I-block (extended waiting time = BWT x m).

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK

‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘11’

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, sends S(WTX response) to the correct S(WTX request) and accepts that LT uses WTX extension.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.51. 1CF.111.00: Non Chained Blocks — Error Notification on S(WTX response)

Test No. **1CF.111.00**

Objective: To ensure that the IUT responds correctly to an error notification on an S(WTX response) and grants waiting time extension on receipt of the subsequent non chained I-block.

References: 1RF.070.00 – S(Resynch request) sent by the terminal if 3 retransmission requests by ICC

Conditions:

- Default environmental conditions.
- Answer to Reset invokes protocol T=1
- The LT sends an S(WTX request) on receipt of a non-chained I-block, repeats this S(WTX request) block notifying of an error in the S(WTX response) block.
- After reception of the 2nd S(WTX response), the LT waits more than BWT but less than BWT extended before sending the next I-block (extended waiting time = BWT x m).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘01’

Pass Criteria: The IUT retransmits the S(WTX response) block on receipt of the repeated S(WTX request) and continues the card session respecting the waiting time extension on receipt of the subsequent I-block.

5.7.52. 1CF.112.0y: IUT Chaining — Transmission Error in Response to an I-Block

Test No. **1CF.112.0y**

Objective: To ensure that the IUT responds correctly to a block with transmission error in response to a chained I-block then to an R-block.

References: 1RF.049.01 – Transmission of a C-APDU in chaining mode

1RF.051.00 – Sending of a chain of I-blocks

1RF.052.00 – Length of a chained block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with a transmission error in response to a chained I-block and then returns a R-block acknowledging previous I-block, in response to the R-block indicating an error (step 6 - Appendix 1):

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block and then continues the chaining on receipt of the subsequent R-block.

5.7.53. 1CF.113.xy: IUT Chaining — Syntax/Semantic Error in Response to an I-Block

Test No. **1CF.113.xy**

Objective: To ensure that the IUT responds correctly to an R-block with syntax/semantic error in response to a chained I-block then to an R-block acknowledging previous I-block.

References: 1RF.024.05 – Coding of PCB of an R-block (reception)

1RF.024.10 – LEN error in an R-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.02 – INF in R-block

1RF.049.01 – Transmission of a C-APDU in chaining mode

1RF.051.00 – Sending of a chain of I-blocks

1RF.052.00 – Length of a chained block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block or an S(request) is expected in response to the chained I-block, the LT returns a block with a syntax/semantic error and then returns a R-block in response to the R-block indicating an error (step 6 - Appendix 1):
    - xy = 00: R-block or S(request) with NAD error *(Unless allowed by ICS – Chapter XI-1 — item 1)*
    - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
    - xy = 02: R-block with bit b6=1
    - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
    - xy = 04: S(IFS request) with INF < '10'
    - xy = 05: S(IFS request) with INF = 'FF'
    - xy = 06: S(ABORT response)
    - xy = 07: S(WTX response)
    - xy = 08: S(IFS response)
    - xy = 09: S(RESYNCH response)
    - xy = 10: Unknown S(request)
    - xy = 11: I-block (with sequence number equal to the sequence number of the next chained I-block expected from IUT)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	'3B'	'E0'	-	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'71'

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block and then continues the chaining on receipt of the subsequent R-block.

5.7.54. 1CF.114.0y: IUT Chaining — Excess of Transmission Errors in Response to an I-block

Test No. **1CF.114.0y**

Objective: To ensure that the IUT deactivates when receiving three consecutive blocks with transmission error in response to a chained I-block.

References: 1RF.043.00 – I-Block acknowledgement during chaining

1RF.049.01 – Transmission of a C-APDU in chaining mode

1RF.051.00 – Sending of a chain of I-blocks

1RF.052.00 – Length of a chained block

1RF.066.00 – Invalid I-block reception in response to I-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with transmission error three times in succession in response to a chained I-block (step 6 - Appendix 1):

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

5.7.55. 1CF.115.xy: IUT Chaining — Excess of Syntax/Semantic Errors in Response to an I-Block

Test No. **1CF.115.xy**

Objective: To ensure that the IUT deactivates when receiving three consecutive blocks with syntax/semantic error in response to a chained I-block.

References: 1RF.024.05 – Coding of PCB of an R-block (reception)

1RF.024.10 – LEN error in an R-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.02 – INF in R-block

1RF.043.00 – I-Block acknowledgement during chaining

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

1RF.049.01 – Transmission of a C-APDU in chaining mode

1RF.051.00 – Sending of a chain of I-blocks

1RF.052.00 – Length of a chained block

1RF.066.00 – Invalid I-block reception in response to I-block

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an R-block or an S(request) is expected in response to the chained I-block, the LT returns a block with a syntax/semantic error three times in succession (step 6 - Appendix 1):
  - xy = 00: R-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: R-block with bit b6 = 1
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: S(ABORT response)
  - xy = 07: S(WTX response)
  - xy = 08: S(IFS response)
  - xy = 09: S(RESYNCH response)
  - xy = 10: Unknown S(request)
  - xy = 11: I-block (with sequence number equal to the sequence number of the next chained I-block expected from IUT)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the 2nd R-block it has sent.

5.7.56. 1CF.116.00: IUT Chaining — Excess of Error Notifications on I-block

Test No. **1CF.116.00**

Objective: To ensure that the IUT initiates the deactivation sequence if it has sent three consecutive blocks without obtaining a valid response after an error notification.

References: 1RF.072.00 – Deactivation sequence

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT returns an R-block notifying of an error in response to chained I-blocks four times in succession.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the I-block twice on receipt of the R-blocks then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following reception of the leading edge of the start bit of the last character of the last block the IUT has sent. Note: The IUT, having received 3 consecutive R-blocks, should deactivate. These error notifications, although correct blocks, are not valid responses in the sense that they do not acknowledge the previous I-block sent at steps 5, 7 and 9.

5.7.57. 1CF.117.0y: IUT Chaining — Reception of an S(ABORT request)

Test No. **1CF.117.0y**

Objective: To ensure that the IUT initiates the deactivation sequence on receipt of an S(ABORT request).

References: 1RF.076.00 - S(ABORT request) detection

Conditions: *This test is run if the ICS (Chapter XI-2 — item 11 "sending") doesn't specify that the IUT supports abortion.*

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT sends an S(ABORT request) in response to a chained block.
- Test is made with three values of D:
  - y=0: D=1
  - y=1: D=2
  - y=2: D=4

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y=0	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
y=1	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
y=2	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	'81'	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’

Pass Criteria: The IUT initiates the deactivation sequence within (D * 9,600) etus following reception of the leading edge of the start bit of the last character of the S(ABORT request) block.

5.7.58. 1CF.118.00: Chaining — Error Notification on R-Block

Test No. **1CF.118.00**

Objective: To ensure IUT responds correctly to an error notification on an R-block during chaining.

References: 1RF.049.02 – R-APDU in chaining mode

1RF.050.00 – Reception of a chain of I-blocks

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT chains data to the IUT and returns an R-block notifying of an error in response to the R-block that acknowledged the previous chained I-block then sends the next chained I-block.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the R-block on receipt of the R-block and continues the card session on receipt of the subsequent chained I-block.

5.7.59. 1CF.119.0y: Chaining — Transmission Error in response to an R-block Then I-Block

Test No. **1CF.119.0y**

Objective: To ensure that the IUT responds correctly to a block with transmission error in response to an R-block during chaining then to a chained I-block.

References: 1RF.049.02 – R-APDU in chaining mode

1RF.050.00 – Reception of a chain of I-blocks

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT returns a block with a transmission error in response to the R-block which acknowledged the previous chained I-block (step 9 - Appendix 1) then sends the next chained I-block:

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'E0'	-	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'71'

Pass Criteria: The IUT retransmits the R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent chained I-block.

5.7.60. 1CF.120.xy: Chaining — Syntax/Semantic Error in Response to an R-block Then I-Block

Test No. **1CF.120.xy**

This test case may or may not be performed

Objective: To ensure the IUT responds correctly to a block with syntax/semantic error in response to an R-block during chaining then to a chained I-block.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.049.02 – R-APDU in chaining mode

1RF.050.00 – Reception of a chain of I-blocks

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an I-block, an R-block or an S(request) block is expected in response to the R-block (which acknowledged the previous chained I-block), the LT returns a block with a syntax/semantic error (step 9 - Appendix 1) then sends a chained I-block:
  - xy = 00: I-block, R-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6=1
  - xy = 07: R-block with wrong sequence number
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(ABORT response)
  - xy = 10: S(WTX response)
  - xy = 11: S(IFS response)
  - xy = 12: S(RESYNCH response)
  - xy = 13: Unknown S(request)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent chained I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.61. 1CF.121.0y: Chaining in Both Directions — Error Notification on last block of a chain, then two transmission errors during ICC chaining

Test No. **1CF.121.0y**

This test case may or may not be performed

Objective: To ensure that IUT properly manages an error notification on the last block of a chain, then a block with transmission error, then another block with transmission error in response to an R-block during ICC chaining.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.048.00 – Acknowledgement in case of incorrect reception

1RF.049.00 – Chaining

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT notifies of an error on the last I-block of the chain and sends a block with transmission error on receipt of the repeated I-block; on receipt of the R-block requesting retransmission, it sends a correct first chained I-block followed by a block with transmission error; finally, it sends the correct last chained I-block (step 10, 12 and 17 - Appendix 1):

This test case may be executed using option 1 or 2 stated below.

Option 1:

- y = 0: parity error
- y = 1: EDC error
- y = 2: parity/EDC combination

Option 2:

- y = 0: parity/EDC combination

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT retransmits the last I-block of a chain on receipt of the error notification, sends an R-block on receipt of each erroneous block, then continues the card session on receipt of the last I-block of a chain.

5.7.62. 1CF.122.xy: Chaining in Both Directions — Error Notification on Last I-block of a Chain, then Syntax/Semantic Errors in a Chain

Test No. **1CF.122.xy**

Objective: To ensure that IUT properly manages an error notification on the last I-block of a chain, then syntax/semantic errors in a chain.

References: 1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.048.00 – Acknowledgement in case of incorrect reception

1RF.049.00 – Chaining

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- The LT notifies of an error on the last I-block of the chain.
- While an R-block, an I-block or an S(request) block is expected in response to the repeated I-block, the LT sends a block with syntax/semantic error (14 test cases); on receipt of the R-block requesting retransmission, it sends the first chained I-block followed by a block with syntax/semantic error (14 test cases); finally, it sends the correct last chained I-block (steps 10, 12 and 17 - Appendix 1):
  - xy = 00: R-block, I-block or S(request) with NAD error *(Unless allowed by ICS - Chapter XI-1 — item 1)*
  - xy = 01: R-block with LEN ≠ 0 (INF size equal to LEN)
  - xy = 02: I-block with LEN = 'FF' (the actual length of the INF part of the block shall be < 255)
  - xy = 03: S(request) with LEN ≠ '01' (INF size equal to LEN)
  - xy = 04: S(IFS request) with INF < '10'
  - xy = 05: S(IFS request) with INF = 'FF'
  - xy = 06: R-block with bit b6=1
  - xy = 07: R-block with wrong sequence number
  - xy = 08: I-block with wrong sequence number
  - xy = 09: S(WTX response)
  - xy = 10: S(IFS response)
  - xy = 11: S(RESYNCH response)
  - xy = 12: S(ABORT response)
  - xy = 13: Unknown S(request)

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	'3B'	'E0'	-	'00'	'00'	'81'	-	-	-	'31'	'20'	'01'	-	-	-	-	-	'71'

Pass Criteria: The IUT retransmits the last chained I-block on receipt of the R-block, sends an R-block on receipt of each erroneous block then continues the card session on receipt of the correct last chained I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

5.7.63. 1CF.123.00: Resynchronization Attempt After Excess of Invalid Blocks in Response to an I-Block

Test No. **1CF.123.00**

Objective: To ensure that the IUT properly tries to resynchronize on receipt of three successive invalid blocks in response to an I-block .

References: 1RF.070.01 - S(Resynch request) sent by the terminal if 3 retransmission requests by ICC

1RF.072.01 - Deactivation sequence in case of unsuccessful resynchronization

Conditions: *This test is performed if the vendor specifies in the ICS (Chapter XI-2 — item 4 "sending") that resynchronization is supported for proprietary reasons.*

- Default environmental conditions.
- ATR invokes protocol T=1.
- The LT sends three consecutive invalid blocks (invalid because of transmission, syntax or semantic error) in response to an I-block.

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then sends a valid S(Resynch request).

5.7.64. 1CF.124.xy: IUT Chaining — Excess of Errors in Response to an I-Block with variation of allowed deactivation delay

Test No. **1CF.124.xy**

Objective: To ensure that the IUT deactivates using the good timing (function of D and BWT) when receiving three consecutive blocks with error in response to an I-block.

References: 1RF.024.05 – Coding of PCB of an R-block (reception)

1RF.024.10 – LEN error in an R-block

1RF.026.00 – Reception of unsupported NAD

1RF.026.01 – Detection of unsupported NAD and correction

1RF.026.02 – INF in R-block

1RF.043.00 – I-Block acknowledgement during chaining

1RF.043.02 – Error when R-block or I-block expected, S(Abort response) received

1RF.043.03 – Error when R-block or I-block expected, S(WTX response) received

1RF.043.04 – Error when R-block or I-block expected, S(IFS response) received

1RF.043.05 – Error when R-block or I-block expected, S(Resynch response) received

1RF.049.01 – Transmission of a C-APDU in chaining mode

1RF.051.00 – Sending of a chain of I-blocks

1RF.052.00 – Length of a chained block

1RF.066.00 – Invalid I-block reception in response to I-block

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Conditions:

- Default environmental conditions.
- ATR invokes protocol T=1
- While an I-block, an R-block or an S(request) is expected in response to the chained I-block, the LT returns a block with an error three times in succession.
- Test is made with several values of D:
    - x=0: D=1
    - x=1: D=2
    - x=2: D=4
- Test is made with several values of BWT (TB3):

x	y	TA1	TB3	BWI	BWT	Deactivation delay (etu) (= BWT + (D * 14,400))
0	0	'11' or absent (D=1)	‘01’	0	971 etus	15,371
	1		‘11’	1	1,931 etus	16,331
	2		‘21’	2	3,851 etus	18,251
	3		‘31’	3	7,691 etus	22,091
	4		‘41’	4	15,371 etus	29,771
1	0	'12' (D=2)	‘01’	0	971 etus	29,771
	1		‘11’	1	1,931 etus	30,731
	2		‘21’	2	3,851 etus	32,651
	3		‘31’	3	7,691 etus	36,491
	4		‘41’	4	15,371 etus	44,171
2	0	'13' (D=4)	‘01’	0	971 etus	58,571
	1		‘11’	1	1,931 etus	59,531
	2		‘21’	2	3,851 etus	61,451
	3		‘31’	3	7,691 etus	65,291
	4		‘41’	4	15,371 etus	72,971

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
xy = 00	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E0’
xy = 01	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F0’
xy = 02	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C0’
xy = 03	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D0’
xy = 04	‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A0’
xy = 10	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E2’
xy = 11	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F2’
xy = 12	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C2’
xy = 13	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D2’
xy = 14	‘3B’	‘F0’	'12'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A2’
xy = 20	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘E3’
xy = 21	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘F3’
xy = 22	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘C3’
xy = 23	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘D3’
xy = 24	‘3B’	‘F0’	'13'	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘A3’

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

5.7.65. 1CF.125.00: IUT Chaining — R-block requesting next chained block and PCB indicating an error

Test No. **1CF.125.00 – this test is deleted**

5.8. Terminal Transport Layer

5.8.1. 1CF.151.00: Case 1 Command

Test No. **1CF.151.00**

This test case may or may not be performed

Objective: To ensure that, when a case 1 command is sent, the IUT processes the status words returned after the command.

References: 1RF.076.04 – Mapping of data and status in R-APDU
1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’
1RF.077.01 – Status bytes ‘9000’ received
1RF.077.02 – Receipt of “bad” status (Cases 1-2-3)
1RF.079.00 – Flow of exchange for case 1 commands
1RF.080.00 – Flow of exchange for case 1 commands

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0.
- A Case 1 command is passed from the UT to the TTL (Note: a case 1 shall be devised in the related executable test as none is defined in the EMV document).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT passes the correct R-APDU of {90 00} to the UT.

5.8.2. 1CF.152.0y: Case 2 Command with '6C'

Test No. **1CF.152.0y**

Objective: To ensure that the IUT correctly processes a ‘6C’ procedure byte sent in response to a case 2 command header.

References: 1RF.014.00 - Procedure byte = ‘6C

1RF.076.04 – Mapping of data and status in R-APDU

1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’

1RF.077.01 – Status bytes ‘9000’ received

1RF.077.02 – Receipt of “bad” status (Cases 1-2-3)

1RF.081.00 – Le value for case 2 commands

1RF.081.01 – Status returned in Case 2 commands

1RF.081.02 – Mapping of the different fields of C-APDU in Case 2

1RF.083.00 – Flow of exchange for case 2 commands

1RF.083.01 – Mapping of data in R-APDU (Case 2)

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Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0.
- A Case 2 command is passed from the UT to the TTL.
- On receipt of the command header (two cases):.
    - y=0: the LT sends a '6C' procedure byte followed by the second procedure byte 'Licc' (where ‘Licc’ may take any value).
    - y=1: the LT sends a '6C' procedure byte followed by the second procedure byte 'Licc' = 'INS complemented' (where ‘INS complemented’ is the complement of the instruction code of the Case 2 command previously passed from the UT to the TTL).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:

- resends the case 2 command header with P3 set to 'xx' on receipt of the '6C xx'
- passes the R-APDU to the UT
- continues the card session.

5.8.3. 1CF.153.00: Case 2 Command — Error Status Received in Response to Command Header

Test No. **1CF.153.00**

Objective: To ensure that the IUT discontinues command processing on receipt of error status sent in response to a case 2 command header.

References: 1RF.076.04 – Mapping of data and status in R-APDU

1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’

1RF.077.01 – Status bytes ‘9000’ received

1RF.081.00 – Le value for case 2 commands

1RF.081.01 – Status returned in Case 2 commands

1RF.081.02 – Mapping of the different fields of C-APDU in Case 2

1RF.083.00 – Flow of exchange for case 2 commands

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0.
- A Case 2 command is passed from the UT to the TTL.
- On receipt of the command header, the LT returns error status bytes.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT discontinues processing of the case 2 command on receipt of the error status bytes and passes the error to the UT.

5.8.4. 1CF.154.00: Case 2 Command with ‘6C’ and with ‘61’

Test No. **1CF.154.00**

Objective: To ensure that the IUT correctly processes a case 2 command under control of ‘61’ and ‘6C’ procedure bytes.

References:
1RF.076.04 – Mapping of data and status in R-APDU
1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’
1RF.077.01 – Status bytes ‘9000’ received
1RF.081.00 – Le value for case 2 commands
1RF.081.01 – Status returned in Case 2 commands
1RF.081.02 – Mapping of the different fields of C-APDU in Case 2
1RF.083.00 – Flow of exchange for case 2 commands
1RF.097.00 – Interpretation of procedure bytes in Cases 2 and 4

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 2 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends the '6C Licc' procedure bytes; then on reception of the second command header, the LT sends a '61 yy' procedure byte (where 'yy' means any value in the range '01' to 'Licc').

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:
- resends the command header with P3 set to 'xx' on receipt of the ‘6Cxx’ procedure bytes
- sends GET RESPONSE commands with P3 set to ≤'yy' in response to ‘61yy’ procedure bytes and passes the data to the UT
- passes the R-APDU to the UT
- continues the card session.

5.8.5. 1CF.155.0y: Case 3 Command — Normal Processing

Test No. **1CF.155.0y**

Objective: To ensure that the IUT correctly processes a case 3 command and accepts the status bytes ‘9000’, ‘62xx’, ‘63xx’, ‘9xxx’ (except ‘9000’) in response to the command data.

References: 1RF.076.04 – Mapping of data and status in R-APDU

1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’

1RF.077.01 – Status bytes ‘9000’ received

1RF.084.00 – Flow of exchange for case 3 commands

1RF.084.01 – Mapping of the different fields of the C-APDU in Case 3

1CF.084.02 – Receipt of the procedure byte in Case 3

1RF.084.04 – Status expected in Case 3

1RF.085.00 – Flow of exchange for case 3 commands

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Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 3 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends a procedure byte (INS or INS complemented).
- On receipt of the command data, the LT sends two status bytes:
    - y=0: SW1 SW2 = ’9000’
    - y=1: SW1 SW2 = ‘62xx’
    - y=2: SW1 SW2 = ‘63xx’
    - y=3: SW1 SW2 = ‘9xxx’ (except ‘9000’)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:

- correctly processes the case 3 command by sending data on receipt of the procedure byte
- discontinues the current command processing and continues the card session on receipt of the status bytes which it passes to the UT.

5.8.6. 1CF.156.00: Case 4 Command — Normal Processing

Test No. **1CF.156.00**

Objective: To ensure that the IUT correctly processes a case 4 command.

References:
1RF.076.04 – Mapping of data and status in R-APDU
1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’
1RF.077.01 – Status bytes ‘9000’ received
1RF.086.00 – Le value for case 4 commands
1RF.086.01 – Mapping of the status returned by ICC in Case 4
1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4
1RF.087.00 – Flow of exchange for case 4 commands
1RF.088.00 – Flow of exchange for case 4 commands
1RF.090.00 – Flow of exchange for case 4 commands
1RF.093.00 – Flow of exchange for case 4 commands
1RF.093.01 – Flow of exchange for case 4 commands (5)
1RF.095.00 – Mapping of the data returned
1RF.097.00 – Interpretation of procedure bytes in Cases 2 and 4
1RF.098.00 – Structure of the GET_RESPONSE

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 4 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends a procedure byte (INS or INS complemented).

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:

- correctly processes the case 4 command by sending data on receipt of procedure byte
- sends GET RESPONSE commands with P3 set to 'Licc' in response to ‘61 Licc' procedure bytes
- passes R-APDU to the UT
- continues the card session.

5.8.7. 1CF.157.00: Case 4 Command with ‘61’ Procedure Bytes

Test No. **1CF.157.00**

Objective: To ensure that the IUT correctly processes a case 4 command under the control of ‘61’ procedure bytes.

References: 1RF.076.04 – Mapping of data and status in R-APDU

1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’

1RF.077.01 – Status bytes ‘9000’ received

1RF.086.00 – Le value for case 4 commands

1RF.086.01 – Mapping of the status returned by ICC in Case 4

1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4

1RF.087.00 – Flow of exchange for case 4 commands

1RF.088.00 – Flow of exchange for case 4 commands

1RF.090.00 – Flow of exchange for case 4 commands

1RF.093.00 – Flow of exchange for case 4 commands

1RF.093.02 – Flow of exchange for case 4 commands (5)

1RF.095.00 – Mapping of the data returned

1RF.097.00 – Interpretation of procedure bytes in Cases 2 and 4

1RF.098.00 – Structure of the GET_RESPONSE

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 4 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends a procedure byte (INS or INS complemented) then on receipt of the data, it sends a '61 yy' procedure byte ('yy' means any value in the range '01' to 'Licc').

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
	‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:

- correctly processes the cases 4 command by sending data on receipt of procedure byte
- sends GET RESPONSE commands as required in response to ‘61xx’ procedure bytes
- passes the R-APDU to the UT
- continues the card session.

5.8.8. 1CF.158.0y: Case 4 Command with Warning following Response Data after the ‘61’ Procedure Byte

Test No. **1CF.158.0y**

Objective: To ensure that the IUT behaves correctly on receipt of warning status following response data after reception of a '61' procedure byte.

References: 1RF.076.04 – Mapping of data and status in R-APDU
1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’
1RF.077.01 – Status bytes ‘9000’ received
1RF.086.00 – Le value for case 4 commands
1RF.086.01 – Mapping of the status returned by ICC in Case 4
1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4
1RF.087.00 – Flow of exchange for case 4 commands
1RF.088.00 – Flow of exchange for case 4 commands
1RF.090.00 – Flow of exchange for case 4 commands
1RF.093.00 – Flow of exchange for case 4 commands
1RF.095.00 – Mapping of the data returned
1RF.097.00 – Interpretation of procedure bytes in Cases 2 and 4
1RF.098.00 – Structure of the GET_RESPONSE

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0.
- A Case 4 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends a procedure byte (INS or INS complemented) then on receipt of the data, it sends a '61 Licc'.
- After having received the GET RESPONSE, the LT follows the response data with warning status of:
    - y = 0 with type '62 xx'
    - y = 1 with type '63 xx'

ATR :	TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
y = 0 & 1	‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:

- correctly processes the command by sending the data on receipt of the procedure byte
- sends a GET RESPONSE commands with P3 set to 'Licc' in response to ‘61 Licc' procedure bytes
- passes the R-APDU to the UT
- continues the card session.

5.8.9. 1CF.159.0y: Case 4 Command — Status Bytes Received after Sending the Command Data

Test No. **1CF.159.0y**

Objective: To ensure that the IUT correctly processes a case 4 command when status is received following transmission of the command data.

References:
1RF.076.04 – Mapping of data and status in R-APDU
1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’
1RF.077.01 – Status bytes ‘9000’ received
1RF.078.00 – Management of procedure bytes ‘62xx’ and ‘63xx’
1RF.086.00 – Le value for case 4 commands
1RF.086.01 – Mapping of the status returned by ICC in Case 4
1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4
1RF.087.00 – Flow of exchange for case 4 commands
1RF.088.00 – Flow of exchange for case 4 commands
1RF.091.00 – Flow of exchange for case 4 commands
1RF.092.00 – Flow of exchange for case 4 commands
1RF.093.00 – Flow of exchange for case 4 commands
1RF.093.03 – Flow of exchange for case 4 commands (5)
1RF.095.00 – Mapping of the data returned
1RF.097.00 – Interpretation of procedure bytes in Cases 2 and 4
1RF.098.00 – Structure of the GET_RESPONSE

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 4 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends a procedure byte (INS or INS complemented) then on receipt of the data, it sends:
  - y = 0 (case 4b): the warning was correct ('62xx' or '63xx' or '9xxx' but not '9000')
  - y = 1 (case 4c): the warning was not correct (other status words than in y=0)

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria:

- y = 0: the IUT:
  - correctly processes the case 4 command by sending the data on receipt of the procedure byte
  - sends a GET RESPONSE command with P3 set to '0' on receipt of the status bytes
  - sends a GET RESPONSE commands with P3 set to 'Licc' in response to '61 Licc' procedure bytes
  - passes the R-APDU to the UT
  - continues the card session.

- y = 1: the IUT:
  - sends the data on receipt of the procedure byte
  - discontinues processing of the command after receipt of status bytes from the LT.

In both cases, the status bytes received (step 3 — Appendix 1) shall be mapped onto the mandatory trailer of the R-APDU without change.

5.8.10. 1CF.160.0y: Case 4 — Error Indicated following Response Data after the '61' Procedure Byte

Test No. **1CF.160.0y**

Objective: To ensure that the IUT behaves correctly on receipt of error status following response data after '61' procedure byte.

References: 1RF.076.04 – Mapping of data and status in R-APDU

1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’

1RF.077.01 – Status bytes ‘9000’ received

1RF.086.00 – Le value for case 4 commands

1RF.086.01 – Mapping of the status returned by ICC in Case 4

1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4

1RF.087.00 – Flow of exchange for case 4 commands

1RF.088.00 – Flow of exchange for case 4 commands

1RF.097.00 – Interpretation of procedure bytes in Cases 2 and 4

1RF.098.00 – Structure of the GET_RESPONSE

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 4 command is passed from the UT to the TTL.
- On receipt of the command header, the LT sends a procedure byte (INS or INS complemented) then on receipt of the data, it sends a '61' procedure byte.
  Then, on receipt of the GET RESPONSE, the LT causes the sequence to be discontinued by sending an error status (step 5 - Appendix 1): SW1 and SW2 are variable within the LT. Tests must be done with SW1- SW2 equal to:
    - y=0: ‘62 81’
    - y=1: ‘67 00’
    - y=2: ‘6F 00’
    - y=3: ‘6A 86’

The LT/UT interface is capable of comparing the input and output values.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT:

- sends the data on receipt of the procedure byte
- sends a GET RESPONSE commands with P3 set to 'Licc' in response to '61 xx' procedure bytes
- discontinues the command processing after reception of an error status.

Moreover, the status bytes SW1-SW2 (step 5 — Appendix 1) shall be passed as a mandatory trailer of the R-APDU to UT.

5.8.11. 1CF.161.0y : Case 4 — Warning after Receiving Data and Error after GET RESPONSE

Test No. **1CF.161.0y**

Objective: To ensure that the IUT correctly processes a case 4 command when warning status is received following transmission of the command data, and error status is received following transmission of the GET RESPONSE command header.

References: 1RF.076.04 – Mapping of data and status in R-APDU

1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’

1RF.077.01 – Status bytes ‘9000’ received

1RF.086.00 – Le value for case 4 commands

1RF.086.01 – Mapping of the status returned by ICC in Case 4

1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4

1RF.087.00 – Flow of exchange for case 4 commands

1RF.088.00 – Flow of exchange for case 4 commands

1RF.098.00 – Structure of the GET_RESPONSE

Conditions:

- Default environmental conditions.
- ATR invokes protocol T=0
- A Case 4 command is passed from the UT to the TTL. On receipt of the command header, the LT sends a procedure byte (INS or INS complemented) then on receipt of the data, it sends warning status of '62xx' or '63xx'.
- Then on receipt of the GET RESPONSE it sends error status (4 different error status) (step 5 — Appendix 1):
    - y=0: '62 81'
    - y=1: '67 00'
    - y=2: '6F 00'
    - y=3: '6A 86'

The LT/UT interface is capable of comparing the input and output values.

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
'3B'	'60'	-	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria:

The IUT:

- sends the data on receipt of the procedure byte
- sends a GET RESPONSE commands with P3 set to '0' in response to the warning status
- discontinues the command processing on receipt of the error status.

Moreover, it passes the status bytes SW1-SW2 (step 3b) as a mandatory trailer of the R-APDU to UT.

5.8.12. 1CF.162.0y: Case 2, 3 or 4 Command — Status Returned after Command Header

Test No. **1CF.162.0y**

Objective: To ensure that the IUT discontinues processing a case 2, 3 or 4 command, when status (error or warning) is returned in response to the command header.

References:
1RF.076.04 – Mapping of data and status in R-APDU
1RF.077.00 – Management of procedure bytes ‘61xx’ and ‘6Cxx’
1RF.077.01 – Status bytes ‘9000’ received
1RF.077.02 – Receipt of “bad” status (Cases 1-2-3)
1RF.084.03 – Unexpected status received in Case 3
1RF.084.04 – Status expected in Case 3
1RF.085.00 – Flow of exchange for case 3 commands
1RF.086.00 – Le value for case 4 commands
1RF.086.01 – Mapping of the status returned by ICC in Case 4
1RF.086.02 – Mapping of the different fields of the C-APDU in Case 4
1RF.087.00 – Flow of exchange for case 4 commands
1RF.089.00 – Flow of exchange for case 4 commands
1RF.098.00 – Structure of the GET_RESPONSE

Conditions:
- Default environmental conditions.
- ATR invokes protocol T=0.
- A Case 4 command is passed from the UT to the TTL.
- The LT returns warning or error status in response to the command header.
- Three test cases:
    - y = 0: case 2 command
    - y = 1: case 3 command
    - y = 2: case 4 command

ATR :

TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-

Pass Criteria: The IUT discontinues processing of the command following receipt of the status bytes and passes them to the UT.

6. APPENDIX 1: DESCRIPTION OF TEST PROCEDURES

6.1. INTRODUCTION

Note: the following graphic procedures are supplied as an indication.

6.1.1. Graphic representation for ATR and T=0

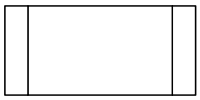
The graphic representation of the test procedure is used to represent the events occurring or the different actions taken by the Implementation Under Test, the Lower Tester, the Upper Tester as well as the PDU exchanged …in case of ATR or protocol T=0.
In this representation, the convention used is the following:

- in the left column, the actions of the Implementation Under Test appear,
- in the middle column, the actions of the Upper Tester appear,
- in the right column, the actions of the Lower Tester appear,

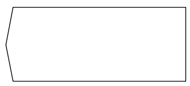
This is a conceptual representation independent of any test system implementation that is why the tester is in a sole part on the right of the IUT which is delimited with dotted lines.

The different symbols in the graphics are:

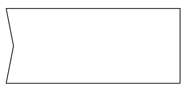
Represents a local process with no protocol



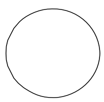
Represents a suite of homogeneous processes during a protocol



Focuses on a local process involving a PDU transmission



Focuses on a local process involving a PDU reception



Represents an action of the tester outside the specifications

The text above an arrow means an input action or variable that the LT shall introduce under control in the tests procedure

6.1.2. Graphic representation for T=1

LEGEND OF TEST CASES:

➔: block transmitted by IUT to LT
🡐 : block transmitted by LT to IUT
/* ... */: comment about step
M=x: bit 'more data' of I-block = x (0 or 1)
I (i, ...): I-block sent by the IUT with b7 (sequence number) = i (0 or 1)
I (j, ...): I-block sent by the LT with b7 (sequence number) = j (0 or 1)
R (i): R-block with b5 (sequence number) = i
R (j): R-block with b5 (sequence number) = j

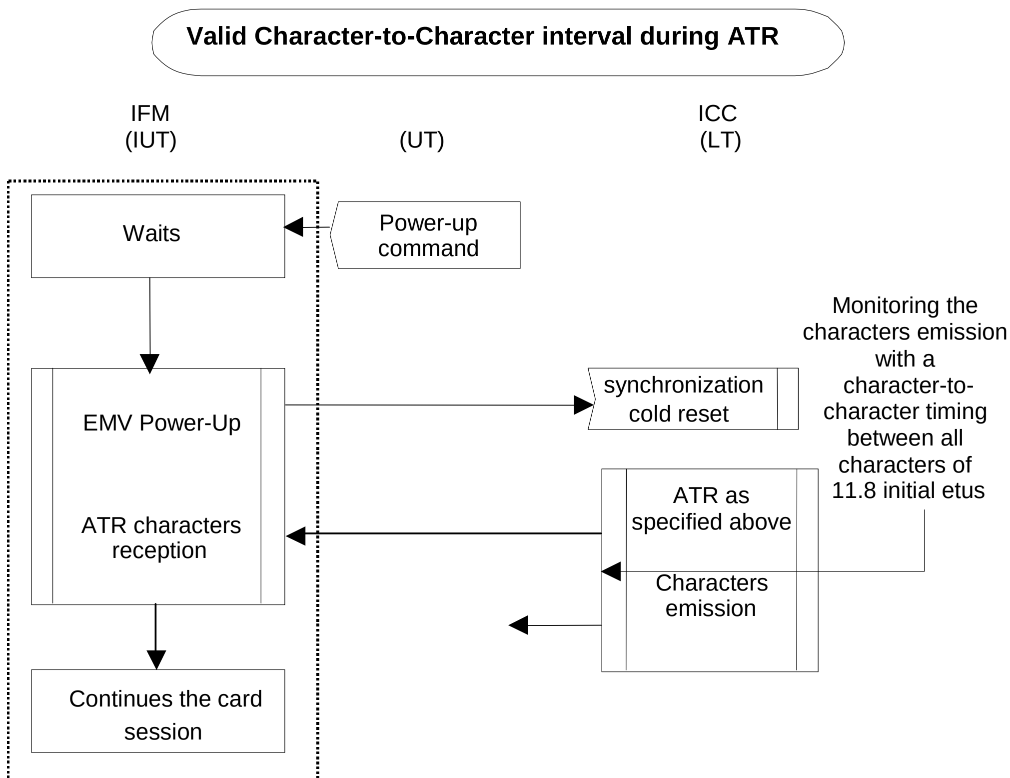
6.2. Answer To Reset

6.2.1. 1CE.001.00: Valid Character-to-Character Interval during ATR

Test No. **1CE.001.00**

Objective: To ensure that the IUT correctly receives and interprets an ATR with a character-to-character time of 11.8 initial etus.

Procedure:



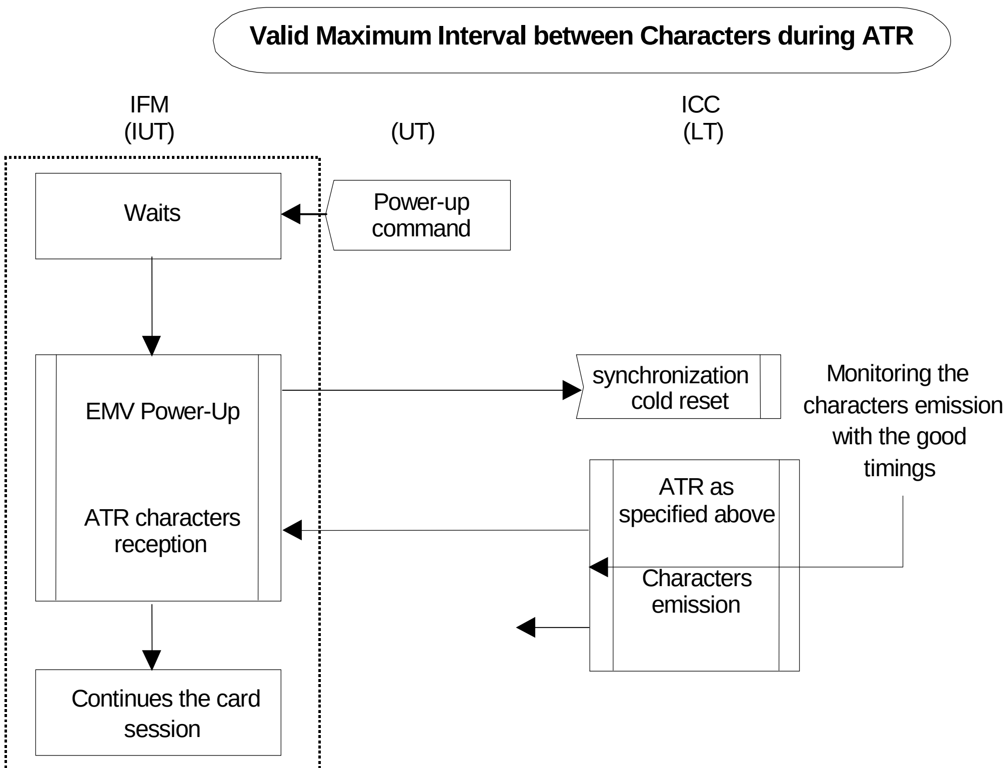
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.2. 1CE.002.00: Valid Maximum Interval between Characters during ATR

Test No. **1CE.002.00**

Objective: To ensure that the IUT correctly receives and interprets an ATR with a character-to-character time of up to 10.080 initial etus.

Procedure:



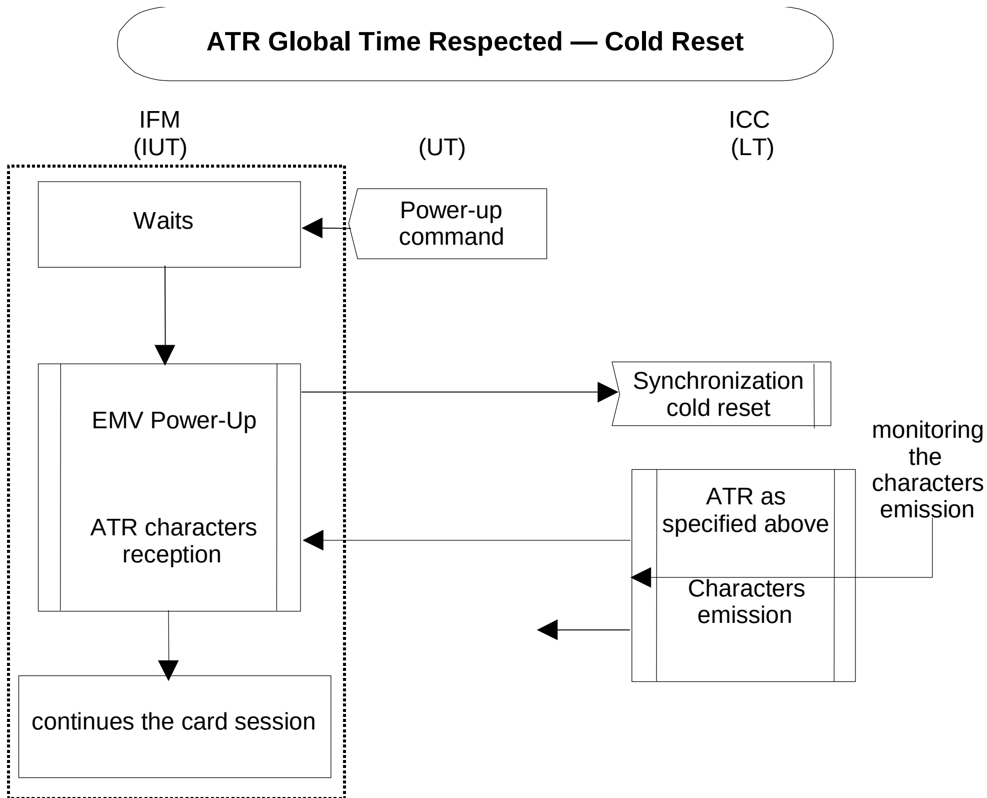
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.3. 1CE.003.00: ATR Global Time Respected — Cold Reset

Test No. **1CE.003.00**

Objective: To ensure that the IUT correctly receives and interprets an answer to a cold reset complete within 20.160 initial etus.

Procedure:



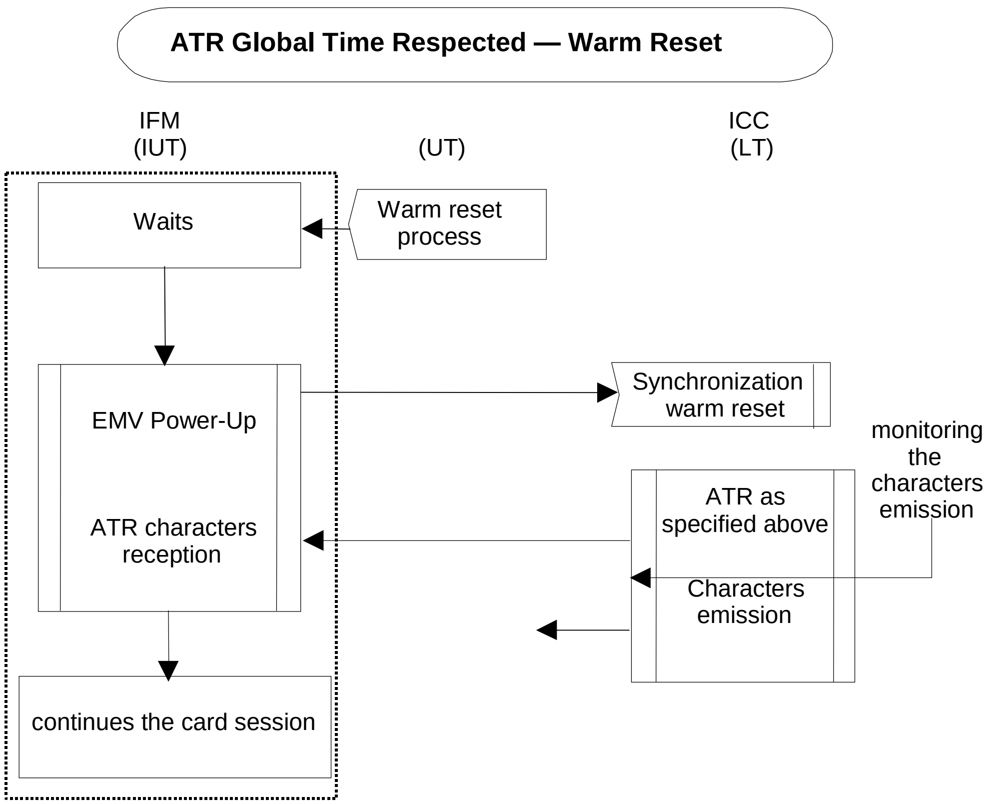
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.4. 1CE.004.00: ATR Global Time Respected — Warm Reset

Test No. **1CE.004.00**

Objective: To ensure that the IUT correctly receives and interprets an answer to a warm reset complete within 20.160 initial etus.

Procedure:



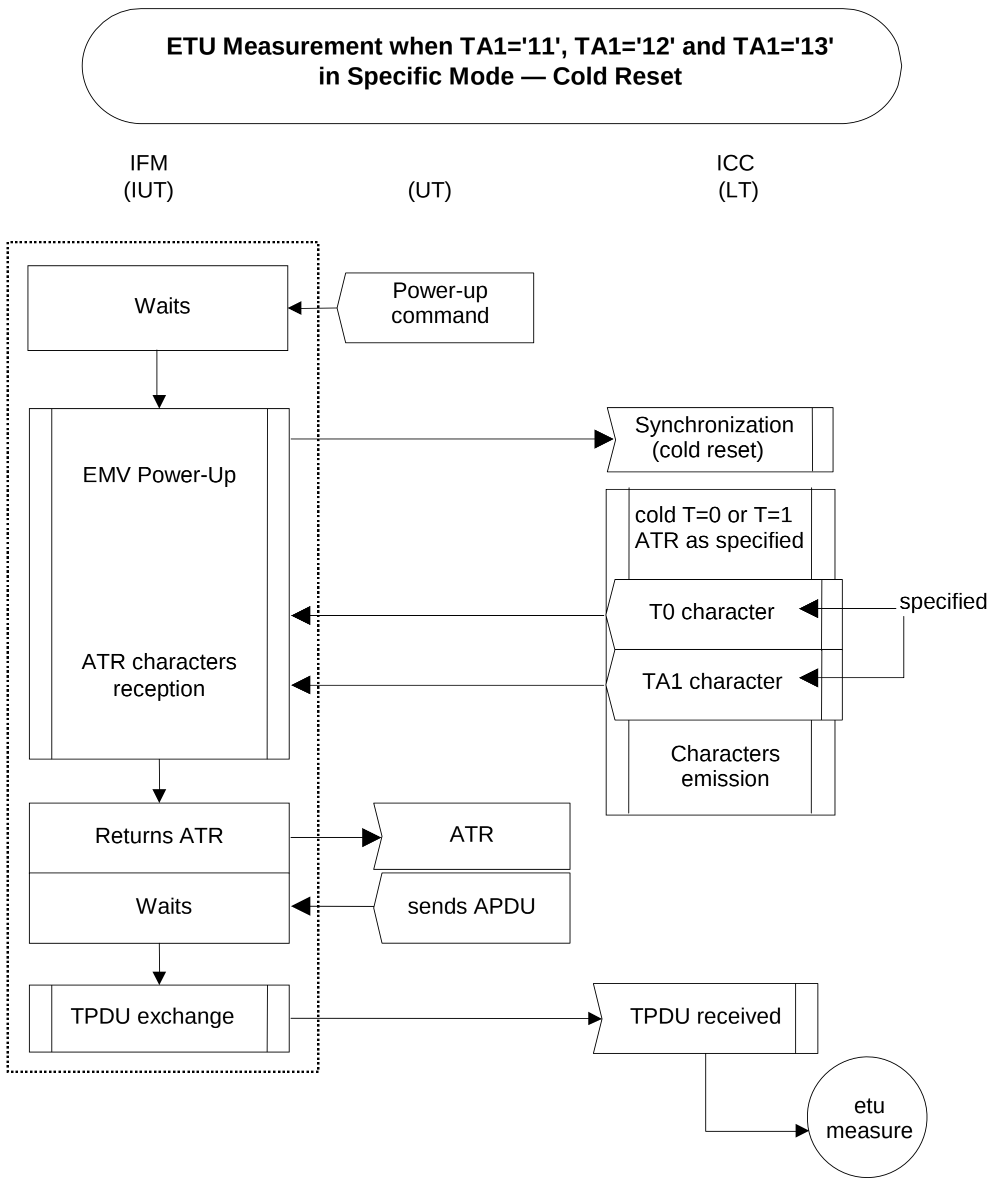
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.5. 1CE.005.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Specific Mode — Cold Reset

Test No. **1CE.005.xy**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR with TA1='11', TA1='12' and TA1='13' in specific mode.

Procedure:



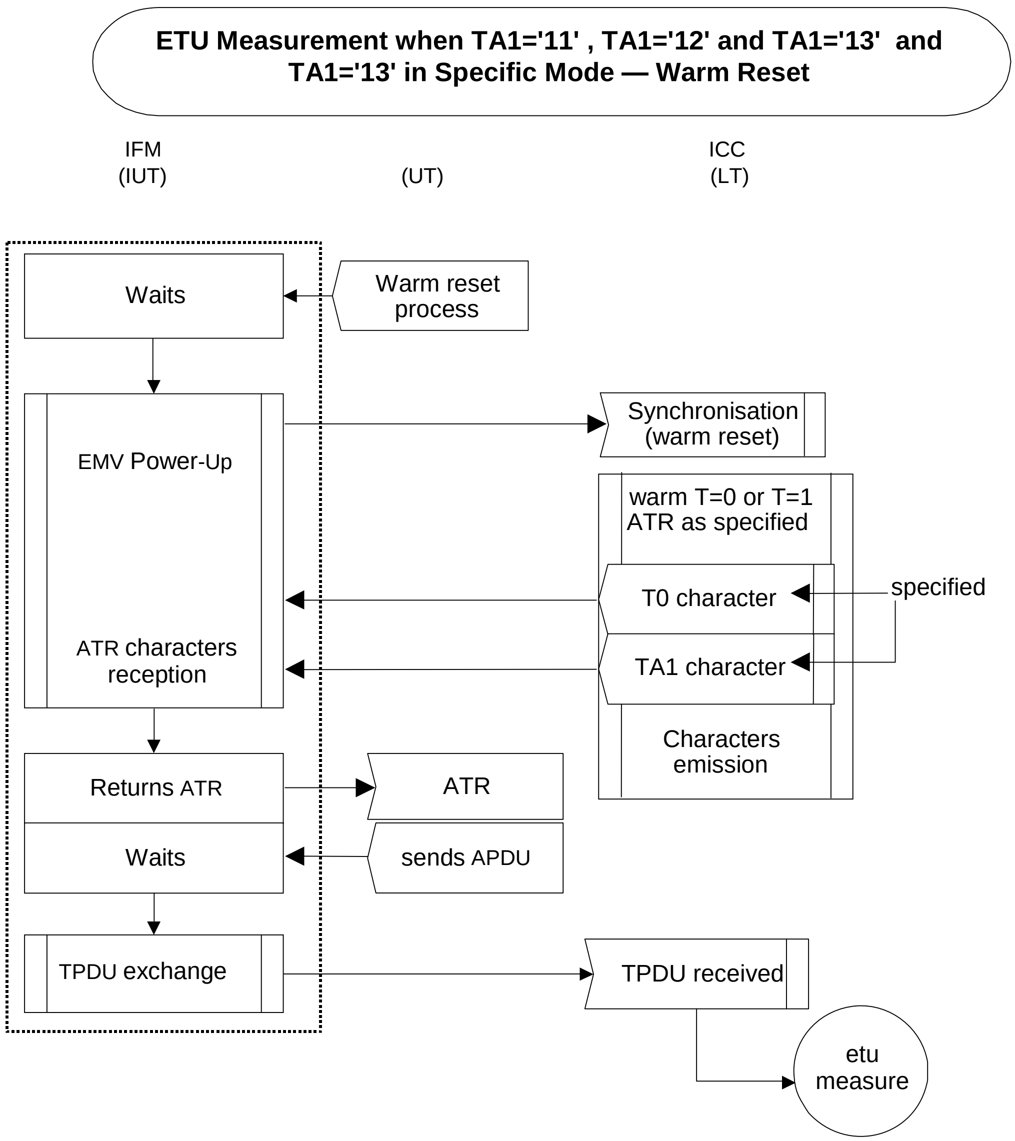
Pass Criteria: The IUT accepts the cold ATR and continues the card session using the good value of the current etu (F/Df).

6.2.6. 1CE.006.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Specific Mode — Warm Reset

Test No. **1CE.006.xy**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR with TA1 = '11', TA1='12' and TA1='13' in specific mode .

Procedure:



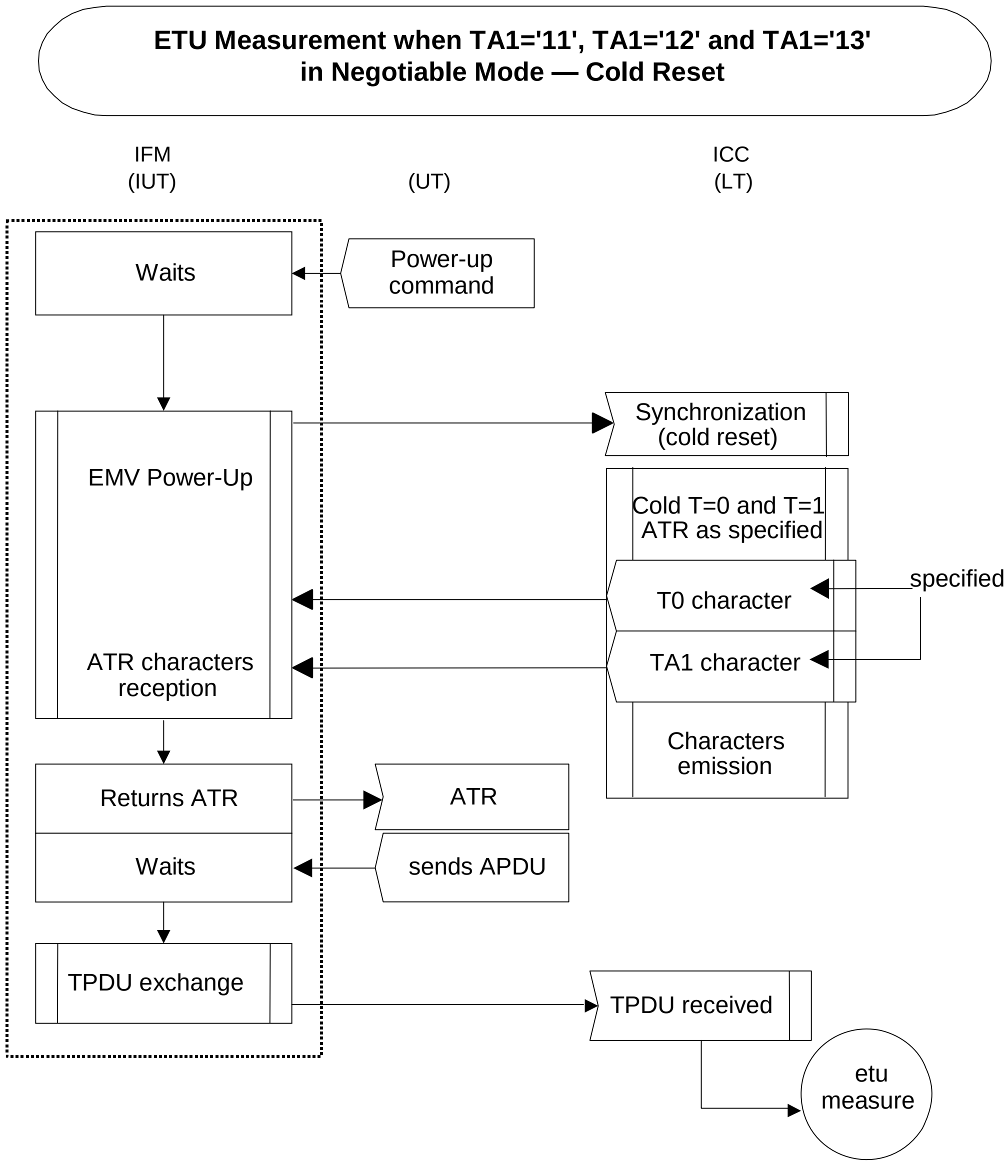
Pass Criteria: The IUT accepts the warm ATR and continues the card session using the good value of the current etu (F/Df).

6.2.7. 1CE.007.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Negotiable Mode — Cold Reset

Test No. **1CE.007.xy**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR with TA1 = '11', TA1='12' and TA1='13' in negotiable mode.

Procedure:



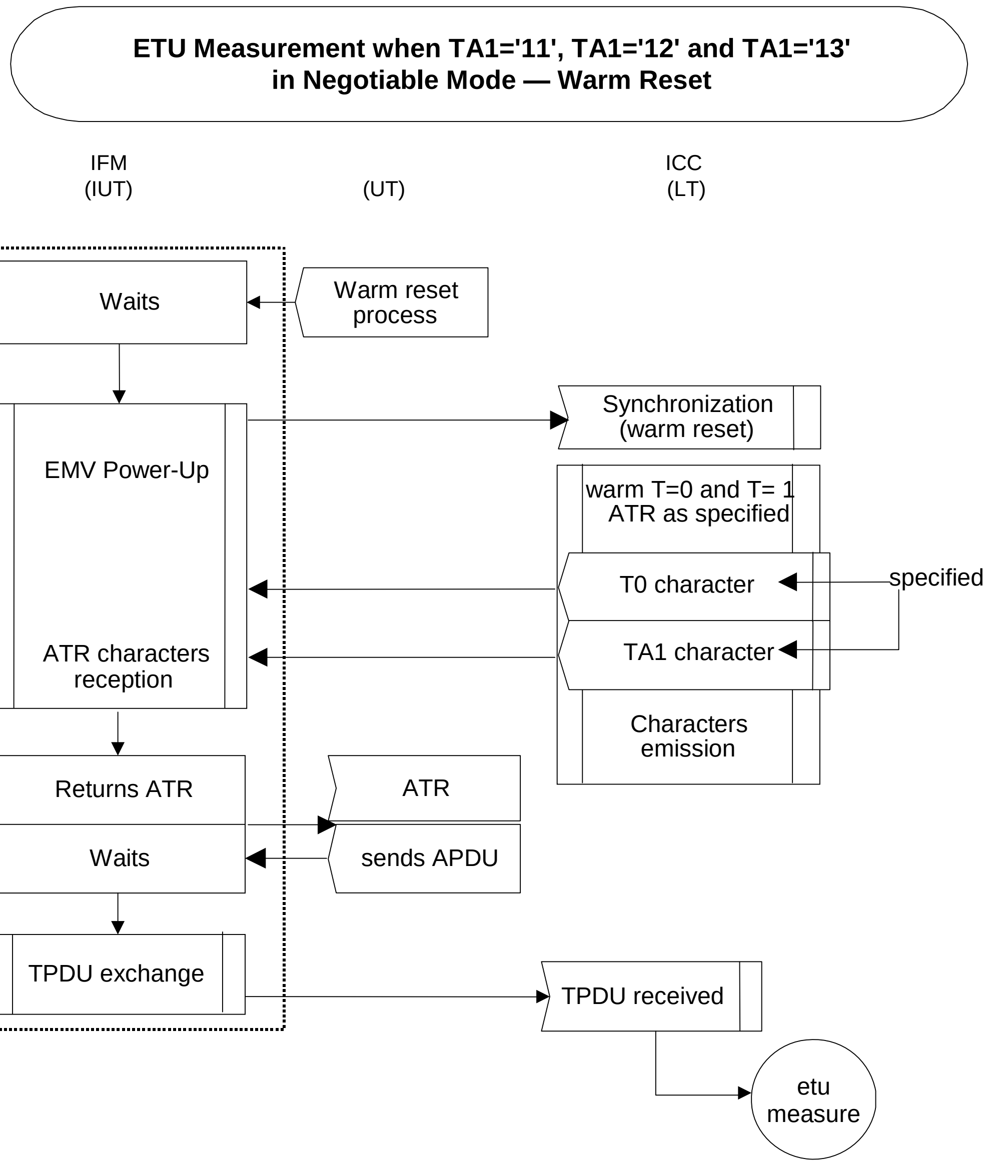
Pass Criteria: The IUT accepts the cold ATR and continues the card session using a current etu having the same value as the initial etu i.e. 372/f seconds.

6.2.8. 1CE.008.xy: ETU Measurement when TA1='11', TA1='12' and TA1='13' in Negotiable Mode — Warm Reset

Test No. **1CE.008.xy**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR with TA1='11', TA1='12' and TA1='13' in negotiable mode.

Procedure:



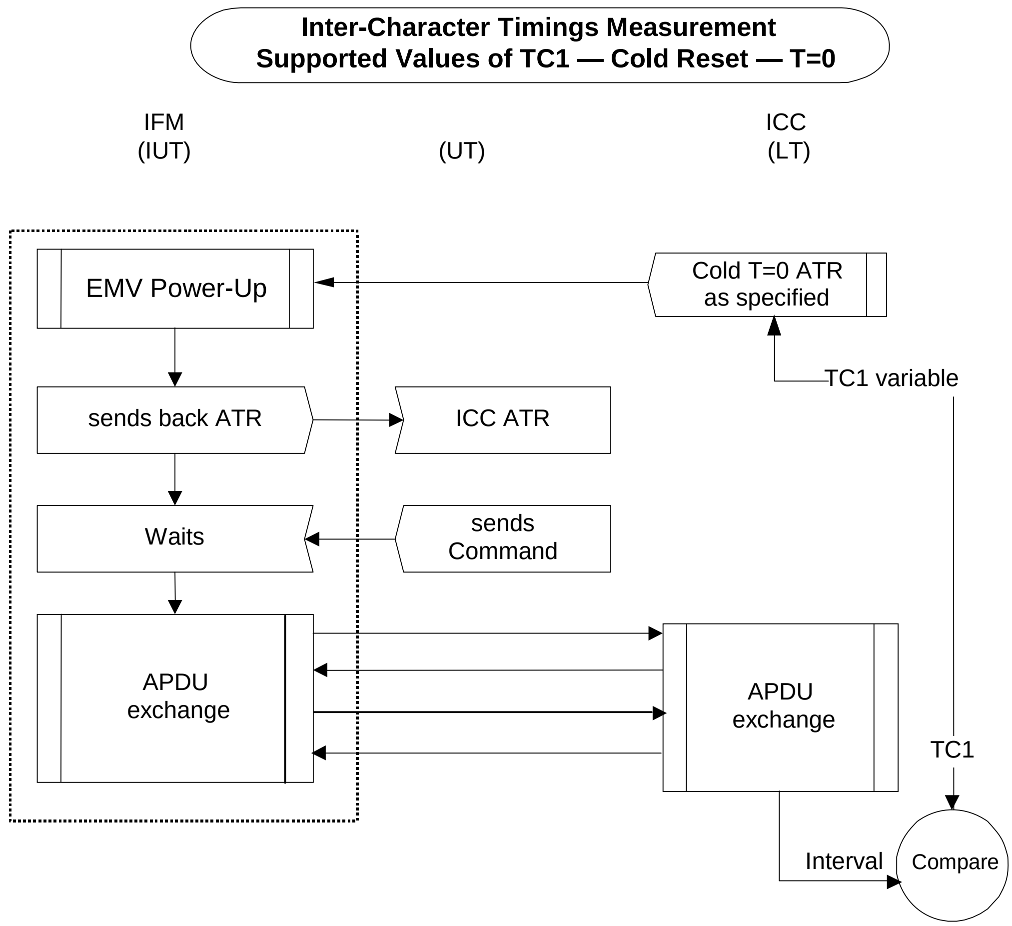
Pass Criteria: The IUT accepts the warm ATR and continues the card session using a current etu having the same value as the initial etu i.e. 372/f seconds.

6.2.9. 1CE.009.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Cold Reset — T=0

Test No. **1CE.009.0y**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=0, with TC1 having any value in the range '00' to 'FF'.

Procedure:



Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 to 266 etus, as indicated by TC1.

6.2.10. 1CE.010.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Cold Reset — T=1

Test No. **1CE.010.0y**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=1, with TC1 having any value in the range ‘00’ to '1E' and ‘FF’.

Procedure:

step 1	IUT←ATR as specified	←LT /*answer to reset */
step 2	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M=0)	←LT

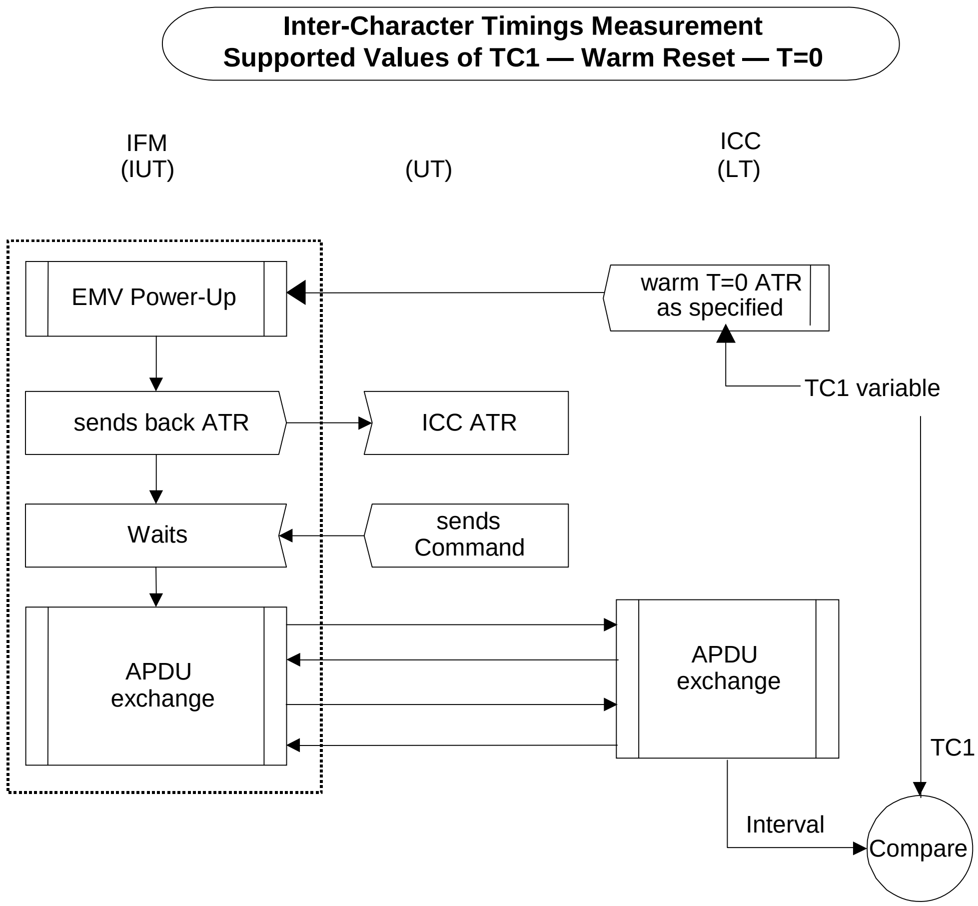
Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 11 to 42 etus for T=1 protocol.

6.2.11. 1CE.011.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Warm Reset — T=0

Test No. **1CE.011.0y**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=0, with TC1 having any value in the range ‘00’ to ‘FF’.

Procedure:



Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 to 266 etus, as indicated by TC1.

6.2.12. 1CE.012.0y: Inter-Character Timings Measurement — Supported Values of TC1 — Warm Reset — T=1

Test No. **1CE.012.0y**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=1, with TC1 having any value in the range ‘00’ to ‘FF’.

Procedure:

step 1	IUT🡐ATR as specified	🡐LT /* answer to reset */
step 2	IUT🡒S(IFS request) INF=‘FE’	🡒LT /* requests new size = 254 */
step 3	IUT🡐S(IFS response) INF=‘FE’	🡐LT /* LT agrees with new size */
step 4	IUT🡒I(i,M=0)	🡒LT
step 5	IUT🡐I(j, M=0)	🡐LT

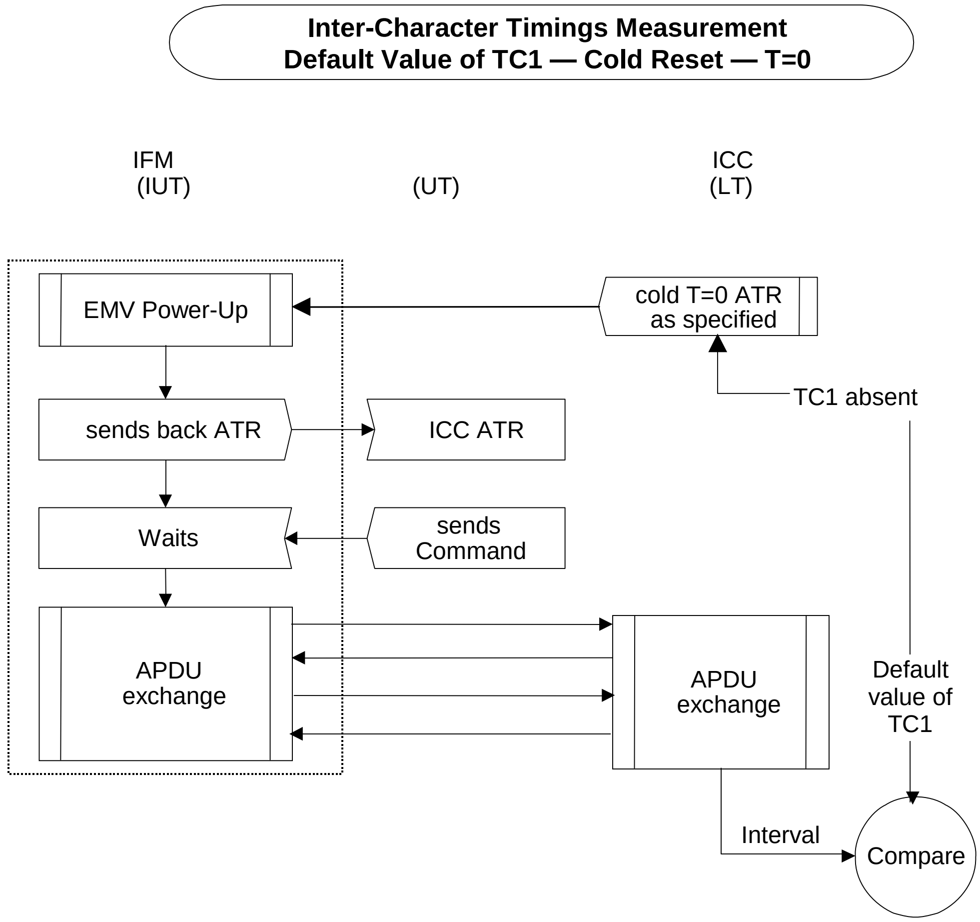
Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 11 to 42 etus in T=1, as indicated by TC1

6.2.13. 1CE.013.00: Inter-Character Timings Measurement — Default Value of TC1 — Cold Reset — T=0

Test No. **1CE.013.00**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=0 not containing TC1.

Procedure:



Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

6.2.14. 1CE.014.00: Inter-Character Timings Measurement — Default Value of TC1 — Cold Reset — T=1

Test No. **1CE.014.00**

Objective: To ensure that the IUT correctly receives and interprets a cold ATR in T=1, not containing TC1

Procedure:

step 1	IUT←ATR as specified	→LT /* answer to reset */
step 2	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M=0)	←LT

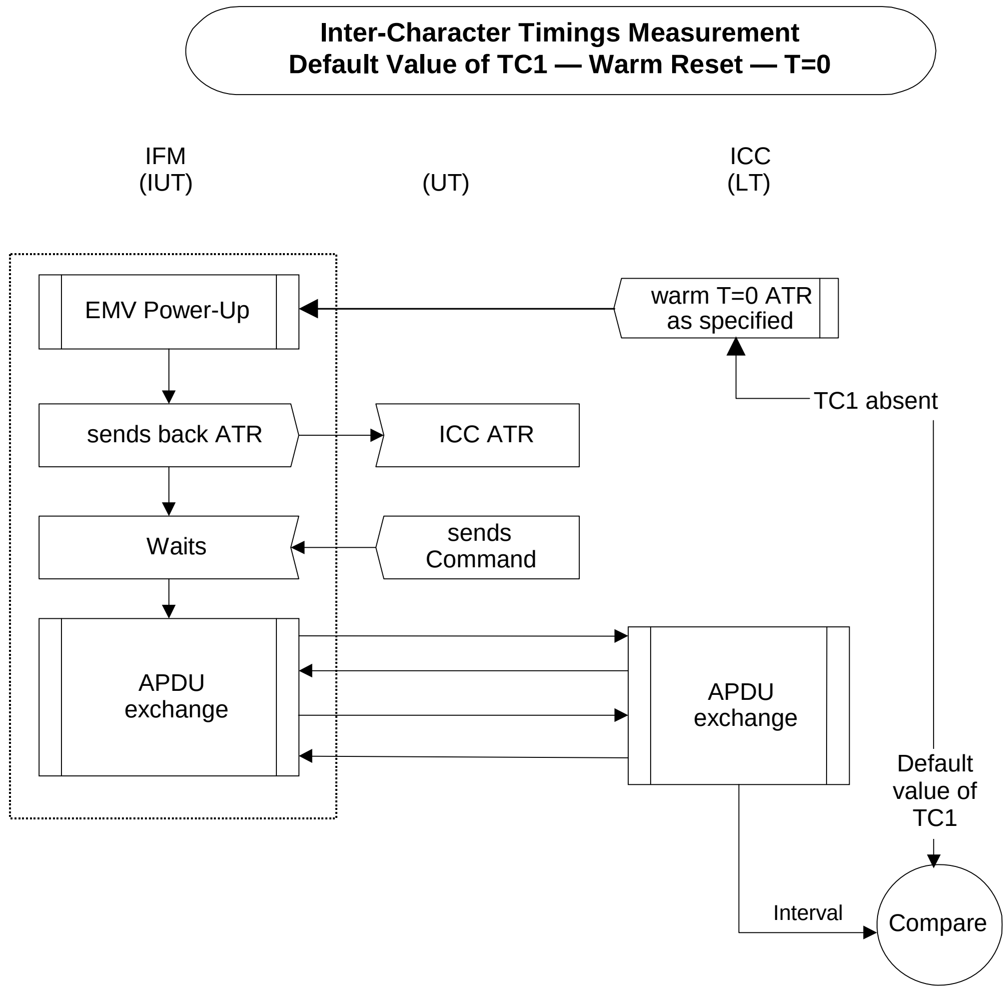
Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

6.2.15. 1CE.015.00: Inter-Character Timings Measurement — Default Value of TC1 — Warm Reset — T=0

Test No. **1CE.015.00**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=0 not containing TC1.

Procedure:



Pass Criteria : The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

6.2.16. 1CE.016.00: Inter-Character Timings Measurement — Default Value of TC1 — Warm Reset — T=1

Test No. **1CE.016.00**

Objective: To ensure that the IUT correctly receives and interprets a warm ATR in T=1 not containing TC1**.**

Procedure:

step 1	IUT←ATR as specified	←LT /* answer to reset */
step 2	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M=0)	←LT

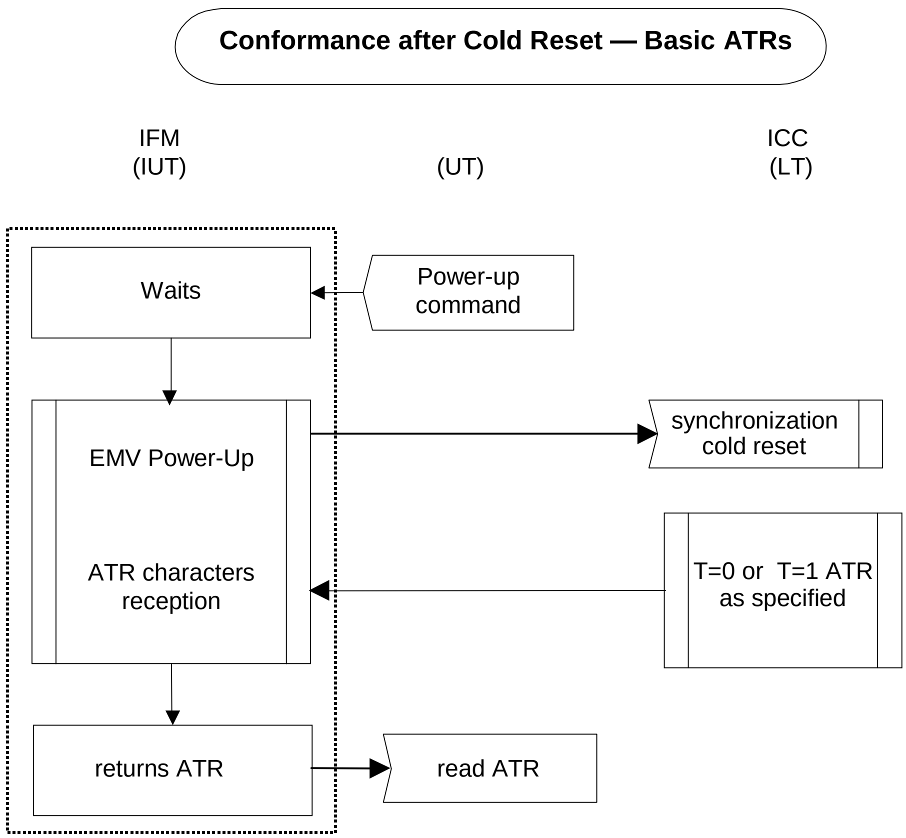
Pass Criteria: The IUT continues the card session with a character-to-character interval greater than or equal to the minimum timing of 12 etus.

6.2.17. 1CE.017.0y: Conformance after Cold Reset — Basic ATRs

Test No. **1CE.017.0y**

Objective: To ensure that the IUT correctly accepts and interprets basic cold ATR, as specified in Tables I-11 and I-12 in [N1], in direct and inverse conventions and in both protocols.

Procedure:



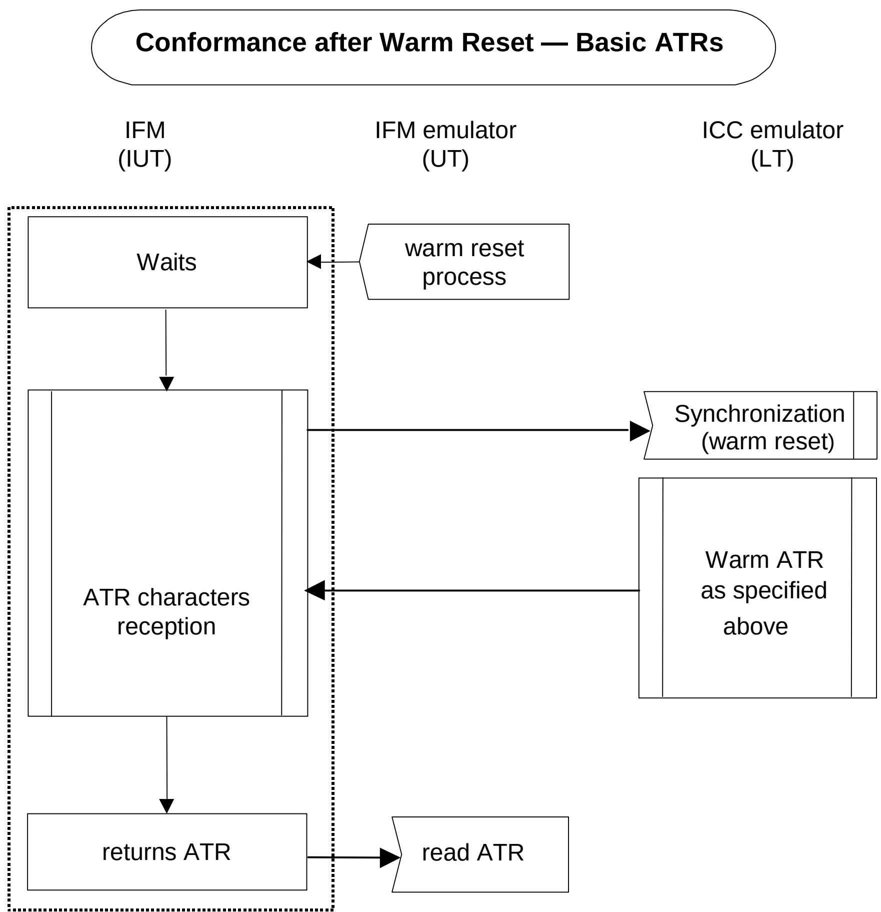
Pass Criteria: The IUT accepts the ATR and continues the card session using the correct protocol and convention.

6.2.18. 1CE.018.0y: Conformance after Warm Reset — Basic ATRs

Test No. **1CE.018.0y**

Objective: To ensure that the IUT correctly accepts and interprets basic warm ATRs, as specified in Tables I-11 and I-12 in [N1] and valid ATRs (y=2 and y=3), in direct and inverse conventions and in both protocols.

Procedure:



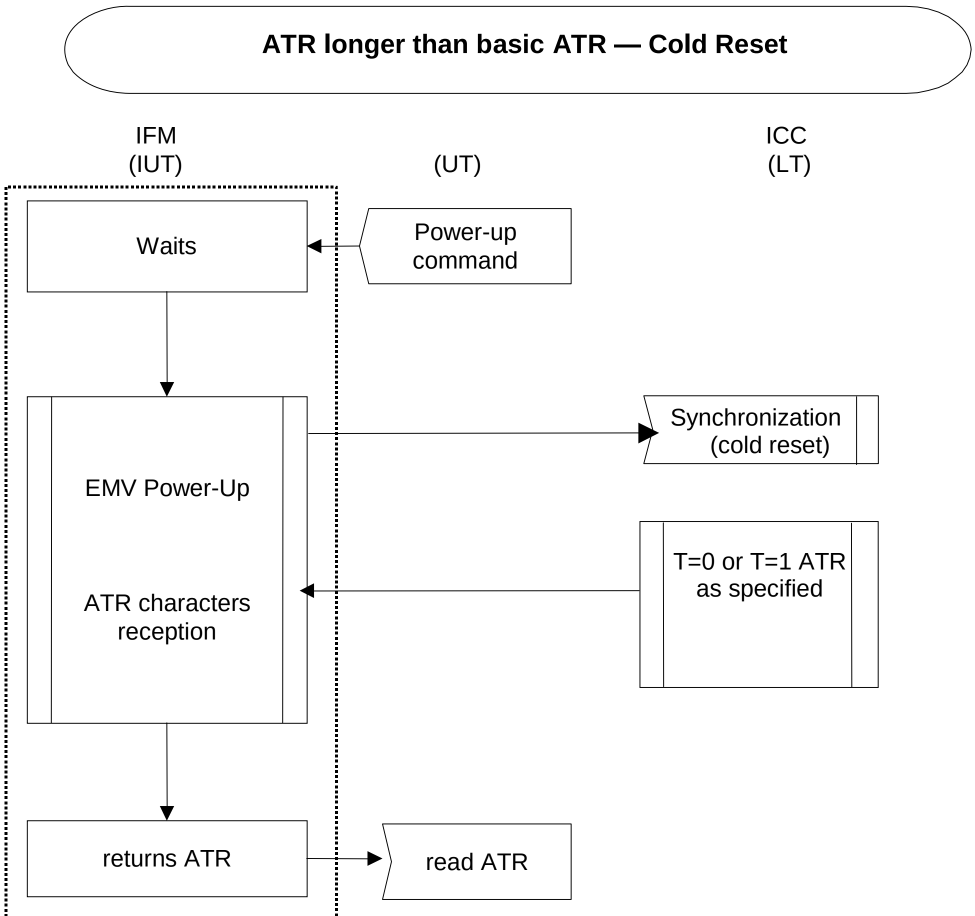
Pass Criteria: The IUT accepts the ATR and continues the card session using the correct protocol and convention.

6.2.19. 1CE.019.0y: ATR longer than basic ATR — Cold Reset

Test No. **1CE.019.0y**

Objective: To ensure that the IUT accepts a cold ATR whose length is greater than the length of basic ATR.

Procedure:



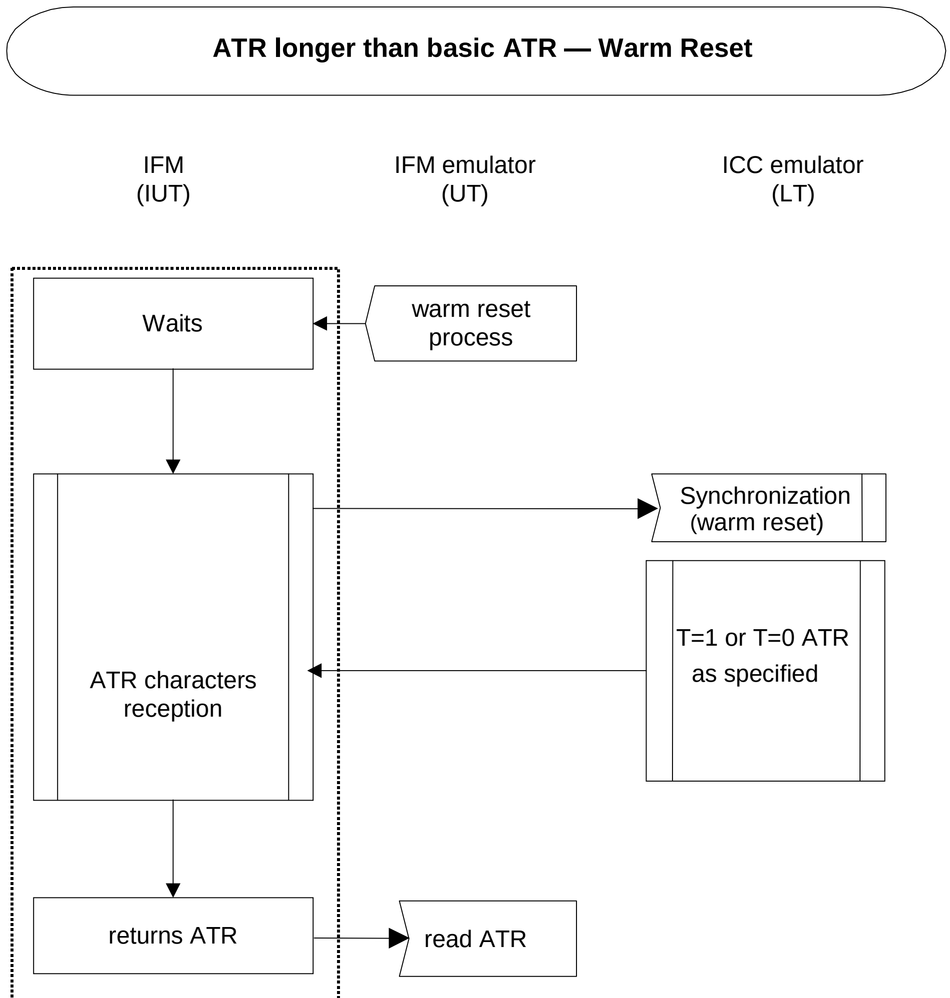
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.20. 1CE.020.0y: ATR longer than basic ATR — Warm Reset

Test No. **1CE.020.0y**

Objective: To ensure that the IUT accepts a warm ATR whose length is greater than the length of basic ATR.

Procedure:



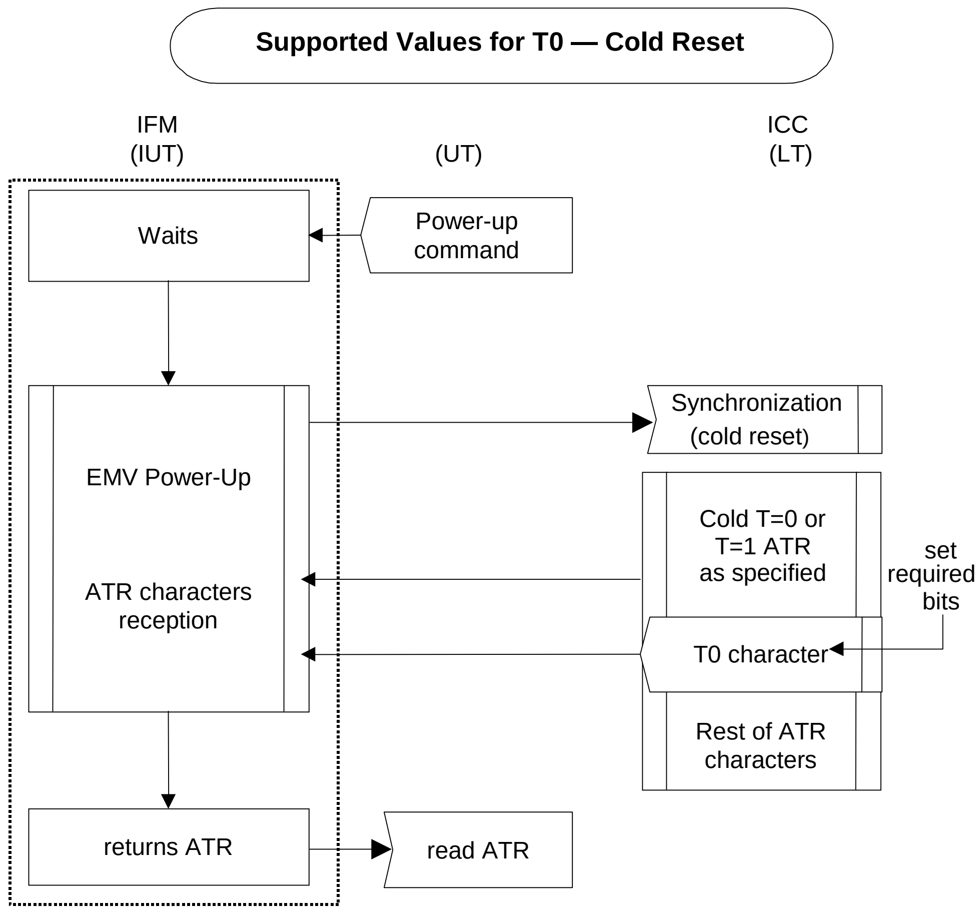
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.21. 1CE.021.0y: Supported Values for T0 — Cold Reset

Test No. **1CE.021.0y**

Objective: To ensure that the IUT accepts a cold ATR with supported values for T0, (provided that the value returned correctly indicates, and is consistent with, the interface characters and the historical bytes).

Procedure:



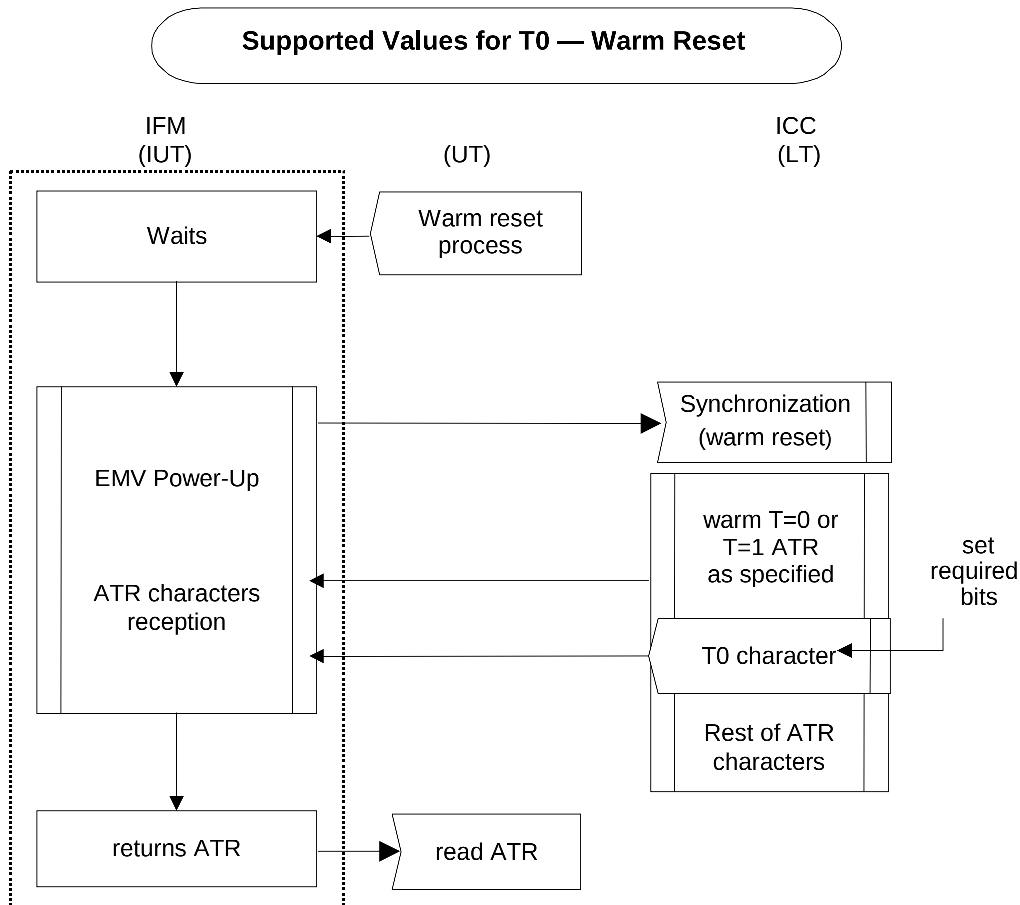
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.22. 1CE.022.0y: Supported Values for T0 — Warm Reset

Test No. **1CE.022.0y**

Objective: To ensure that the IUT accepts a warm ATR with supported values for T0, (provided that the value returned correctly indicates, and is consistent with, the interface characters and the historical bytes).

Procedure:



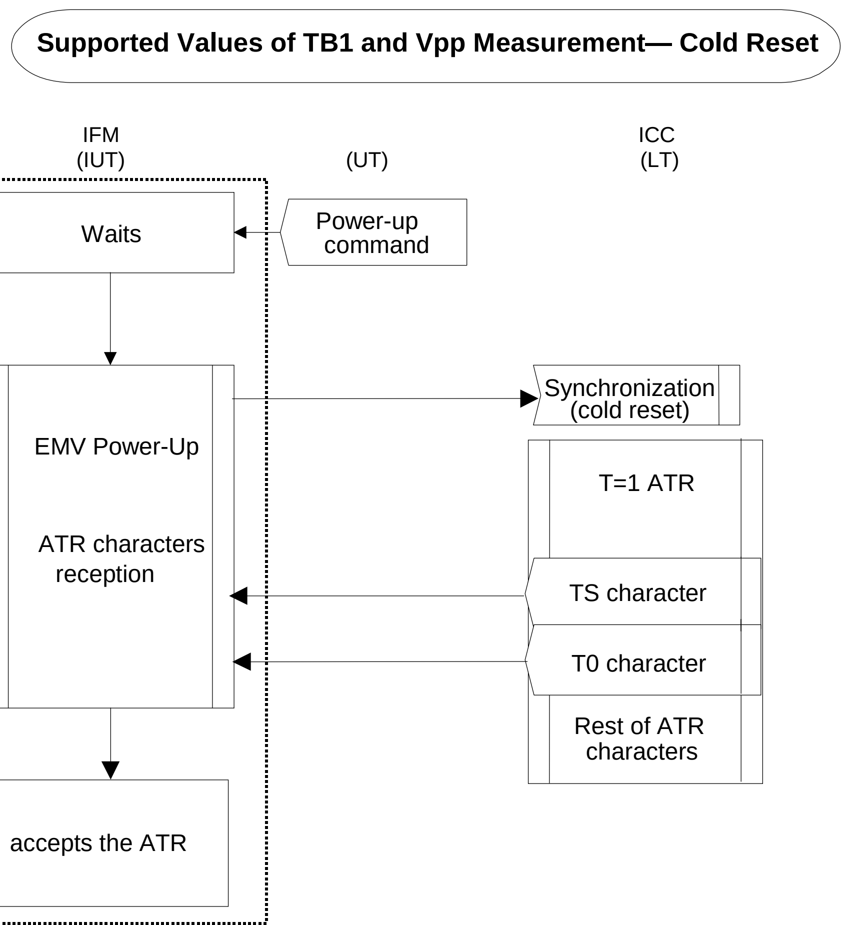
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.23. 1CE.023.00: Supported Values of TB1 and Vpp Measurement — Cold Reset

Test No. **1CE.023.00**

Objective: To ensure that the IUT accepts a cold ATR with supported values of TB1 and does not generate Vpp.

Procedure:



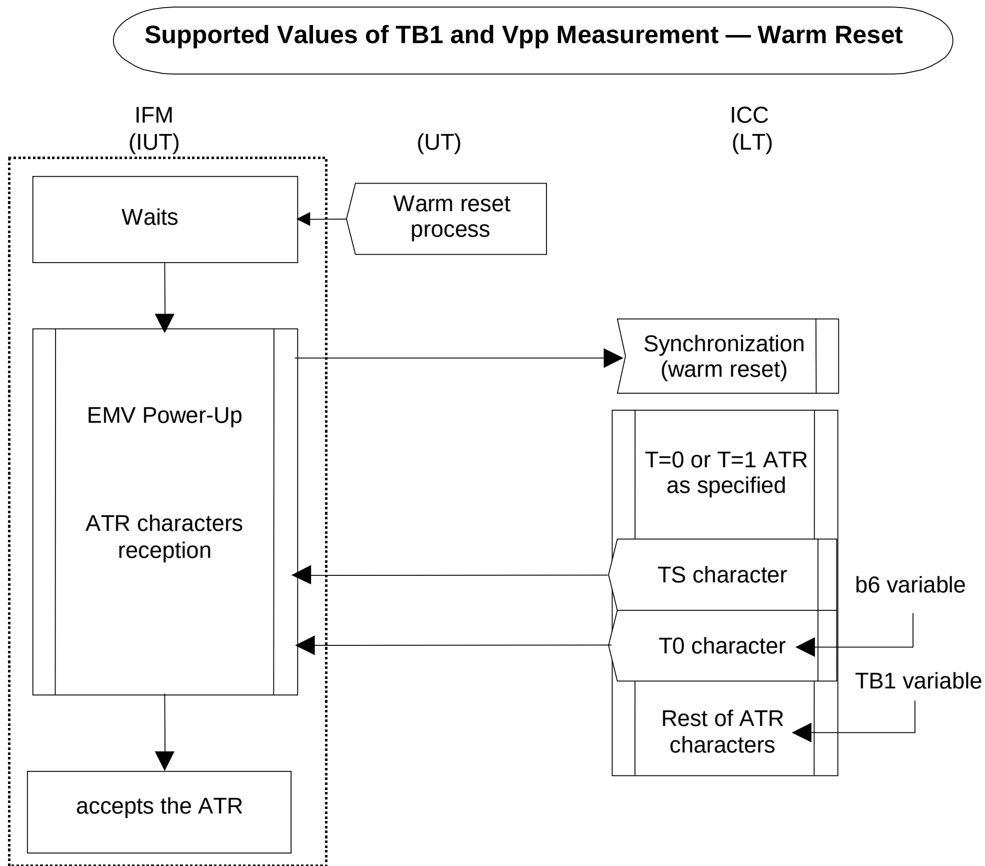
Pass Criteria: The IUT accepts the ATR and continues the card session without Vpp generation.

6.2.24. 1CE.024.0y: Supported Values of TB1 and Vpp Measurement — Warm Reset

Test No. **1CE.024.0y**

Objective: To ensure that the IUT accepts a warm ATR with supported values of TB1 and does not generate Vpp.

Procedure:



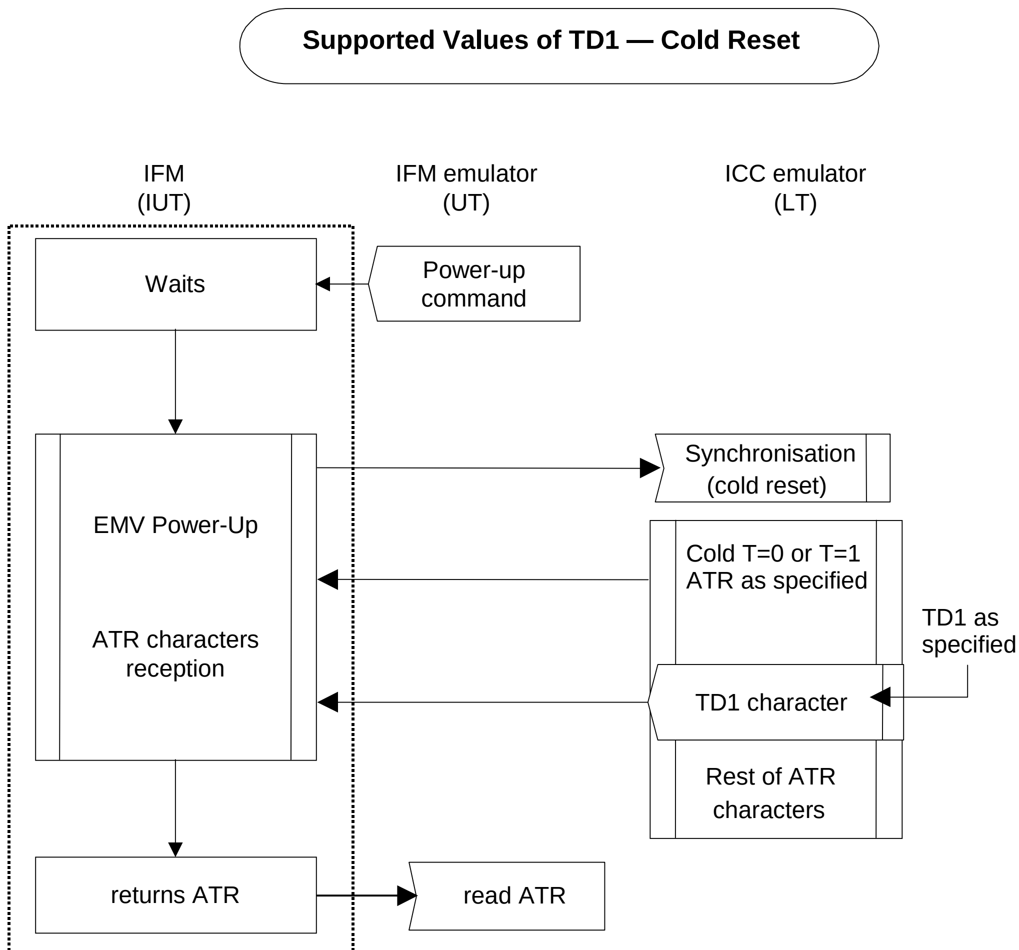
Pass Criteria: The IUT accepts the ATR and continues the card session without Vpp generation.

6.2.25. 1CE.025.0y: Supported Values of TD1 — Cold Reset

Test No. **1CE.025.0y**

Objective: To ensure that the IUT accepts a cold ATR containing supported values of TD1.

Procedure:



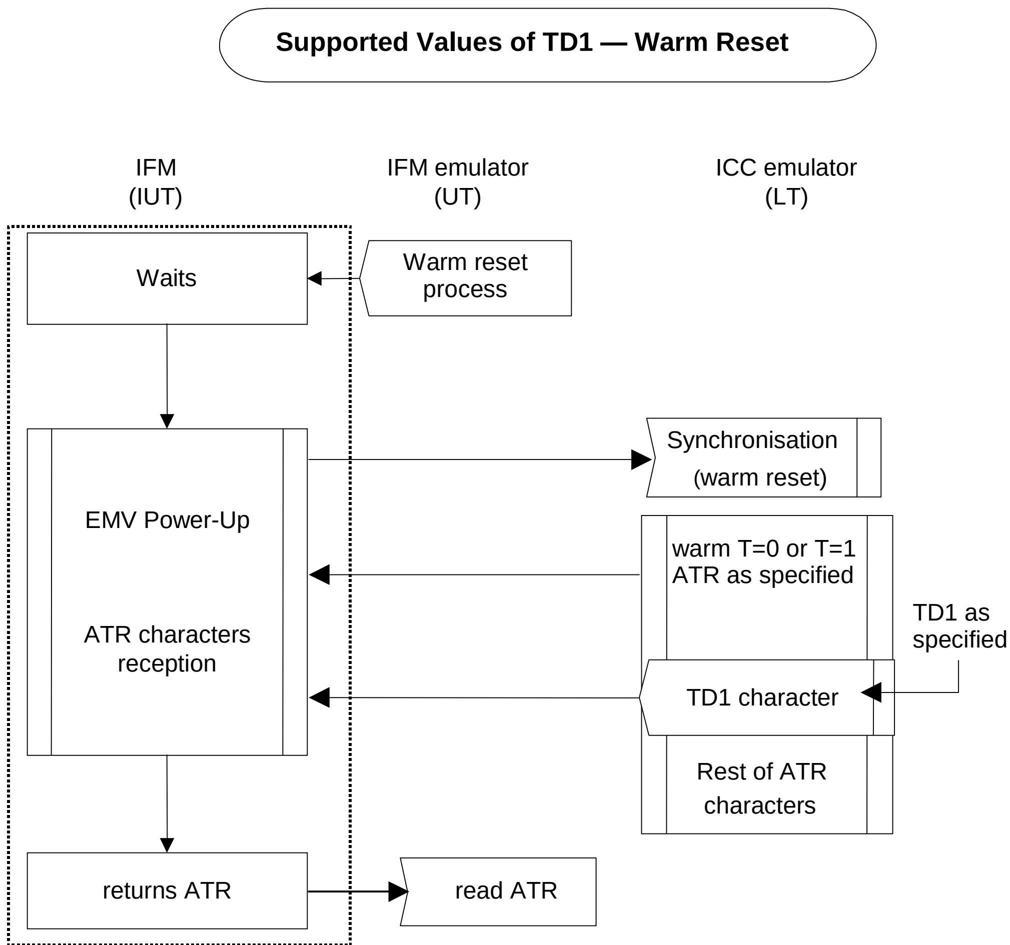
Pass Criteria: The IUT accepts the cold ATR and continues the card session.

6.2.26. 1CE.026.0y: Supported Values of TD1 — Warm Reset

Test No. **1CE.026.0y**

Objective: To ensure that the IUT accepts a warm ATR containing supported values of TD1.

Procedure:



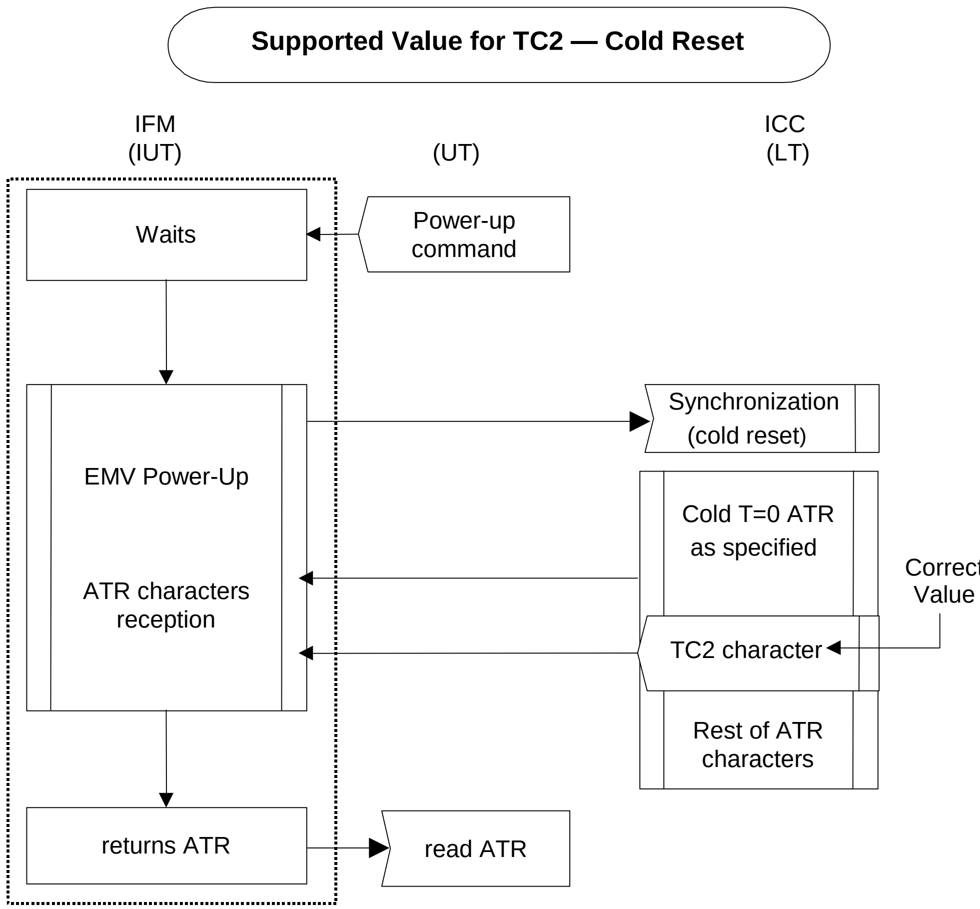
Pass Criteria: The IUT accepts the warm ATR and continues the card session.

6.2.27. 1CE.027.00: Supported Value for TC2 — Cold Reset

Test No. **1CE.027.00**

Objective: To ensure that the IUT accepts a cold ATR with supported value of TC2.

Procedure:



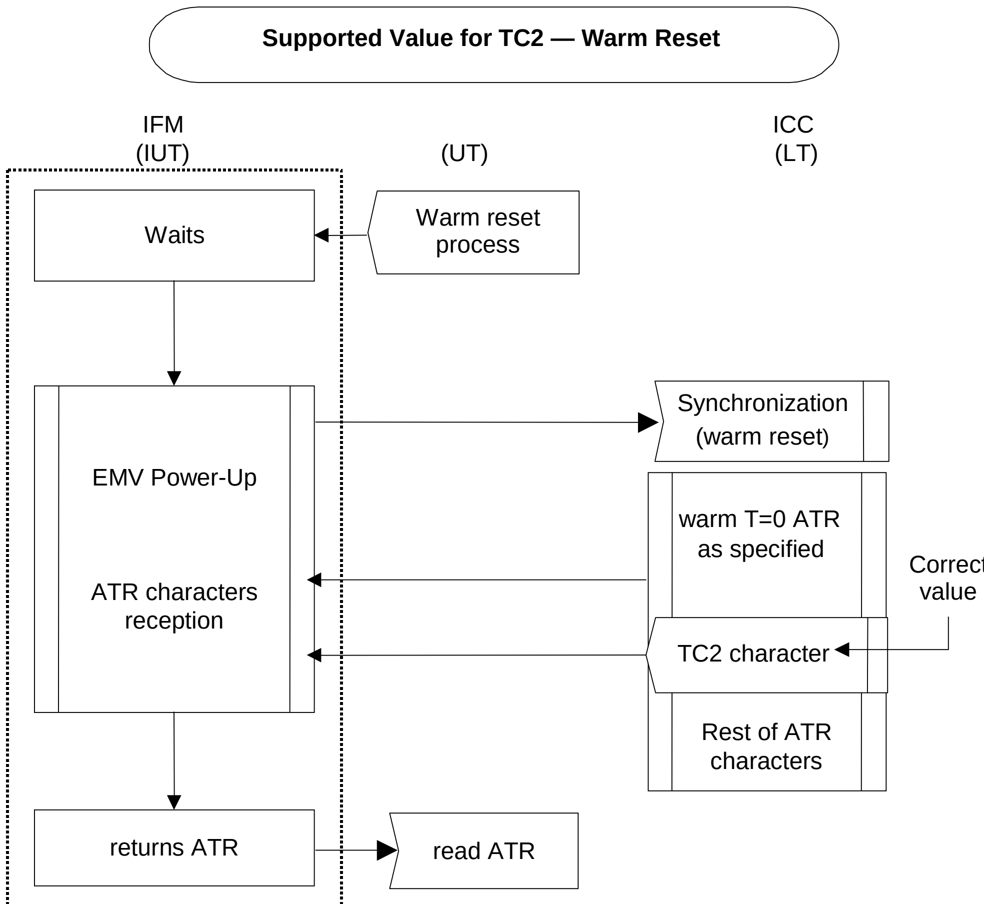
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.28. 1CE.028.00: Supported Value for TC2 — Warm Reset

Test No. **1CE.028.00**

Objective: To ensure that the IUT accepts a warm ATR with supported value of TC2.

Procedure:



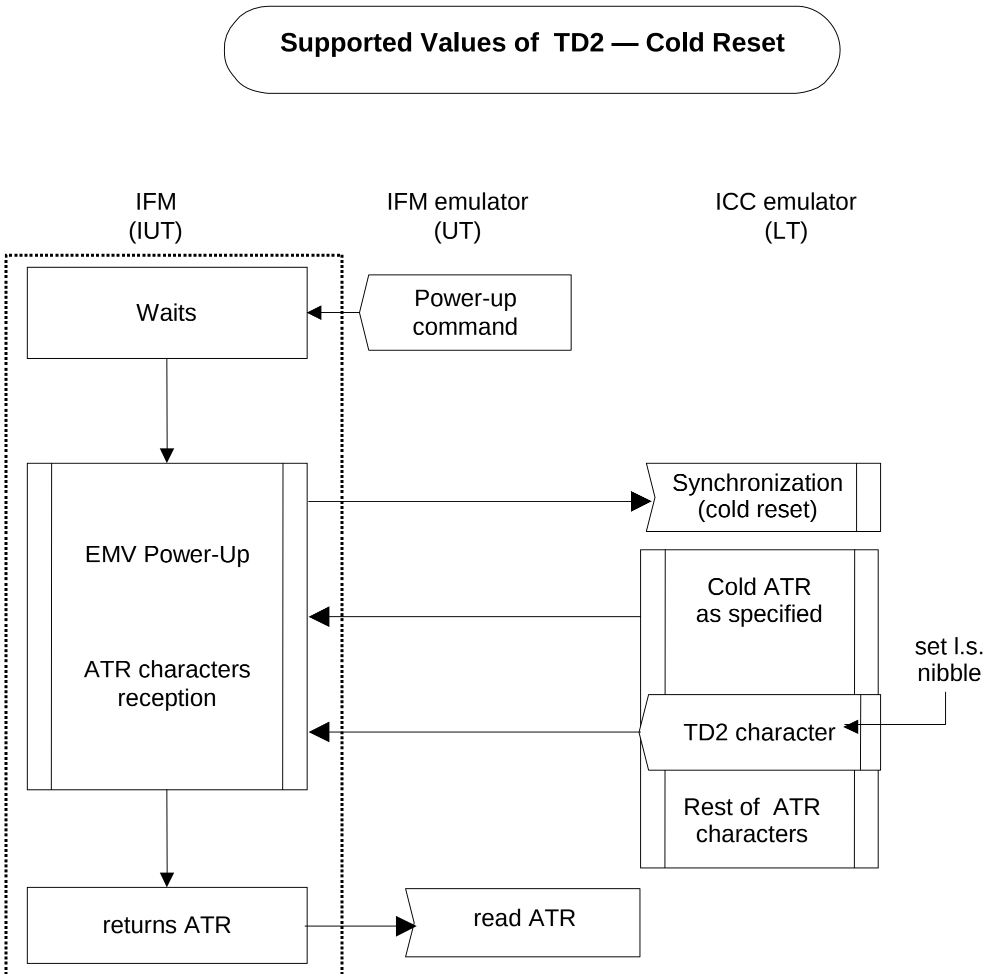
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.29. 1CE.029.00: Supported Values of TD2 — Cold Reset

Test No. **1CE.029.00**

Objective: To ensure that the IUT accepts a cold ATR containing supported values of TD2 (l.s. nibble).

Procedure:



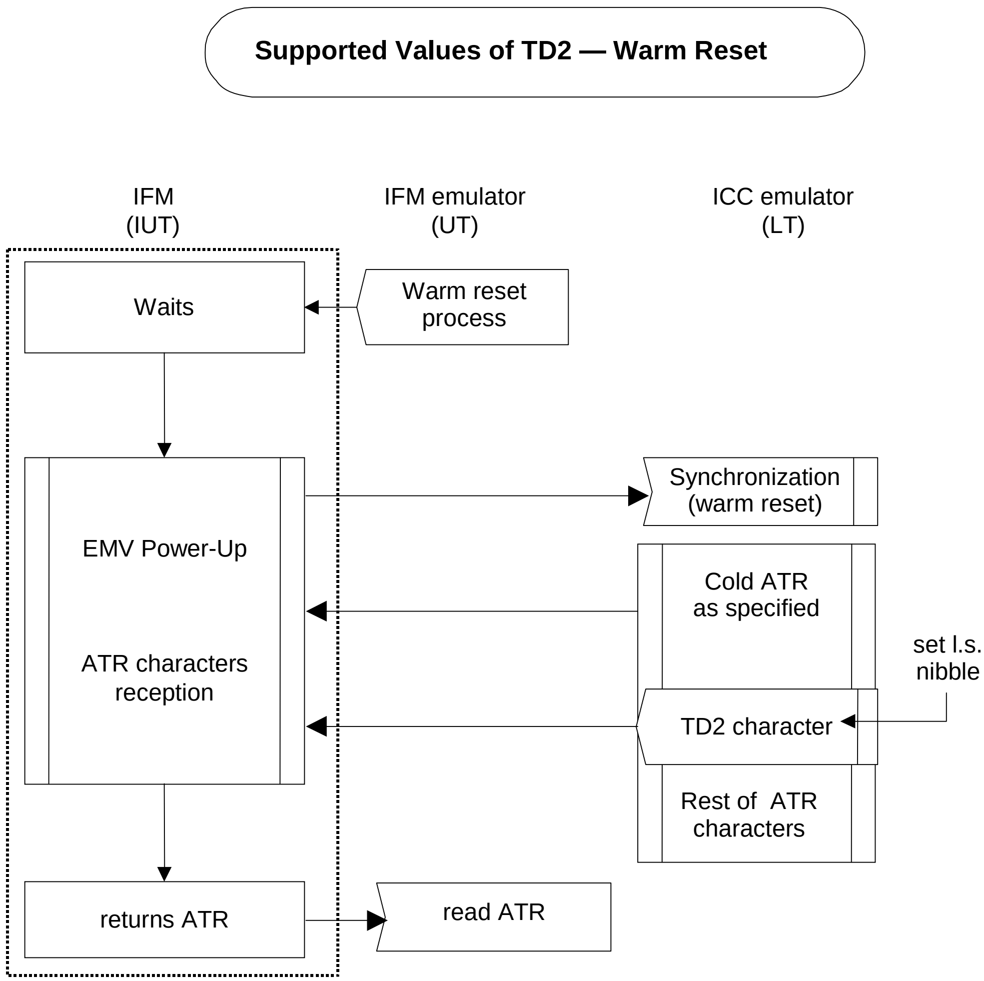
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.30. 1CE.030.00: Supported Values of TD2 — Warm Reset

Test No. **1CE.030.00**

Objective: To ensure that the IUT accepts a warm ATR containing supported values of TD2 (l.s. nibble).

Procedure:



Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.31. 1CE.031.00: Default Value of TA3 — Cold Reset

Test No. **1CE.031.00**

Objective: To ensure that the IUT correctly accepts and interprets a cold ATR not containing TA3.

Procedure:

step 1	IUT←ATR as specified	←LT /* answer to reset */
step 2	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 3	IUT← S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M)	←LT
step 6	*etc ... until complete transmission of R-APDU*	
step 7	IUT→I(i, M=1)	→LT /* 1st I-block */
step 8	IUT← R(i+1)	←LT /* acknowledges 1st I-block */
step 9	IUT→I(i+1, M=1)	→ LT /* 2nd I-block */
step 10	IUT←R(i)	←LT /* acknowledges 2nd I-block */
step 11	*etc. ... until complete transmission of application data message (check that last I-block has M=0)*	
step 12	IUT→I(i, M=0)	→LT
step 13	IUT←I(j, M)	←LT /* acks last I-block of chain */

Pass Criteria: The IUT respects IFSI = ‘20’ both in non-chained and chained I-blocks it subsequently sends.

6.2.32. 1CE.032.00: Default Value of TA3 — Warm Reset

Test No. **1CE.032.00**

Objective: To ensure that the IUT correctly accepts and interprets a warm ATR not containing TA3.

Procedure:

step 1	IUT←ATR as specified	←LT /* answer to reset */
step 2	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M)	←LT
step 6	*etc ... until complete transmission of R-APDU*	
step 7	IUT→I(i, M=1)	→LT /* 1st I-block */
step 8	IUT←R(i+1)	←LT /* acknowledges 1st I-block */
step 9	IUT→I(i+1, M=1)	→LT /* 2nd I-block */
step 10	IUT←R(i)	←LT /* acknowledges 2nd I-block */
step 11	*etc. ... until complete transmission of application data message (check that last I-block has M=0)*	
step 12	IUT→I(i, M=0)	→LT
step 13	IUT←I(j, M)	←LT /* acks last I-block of chain */

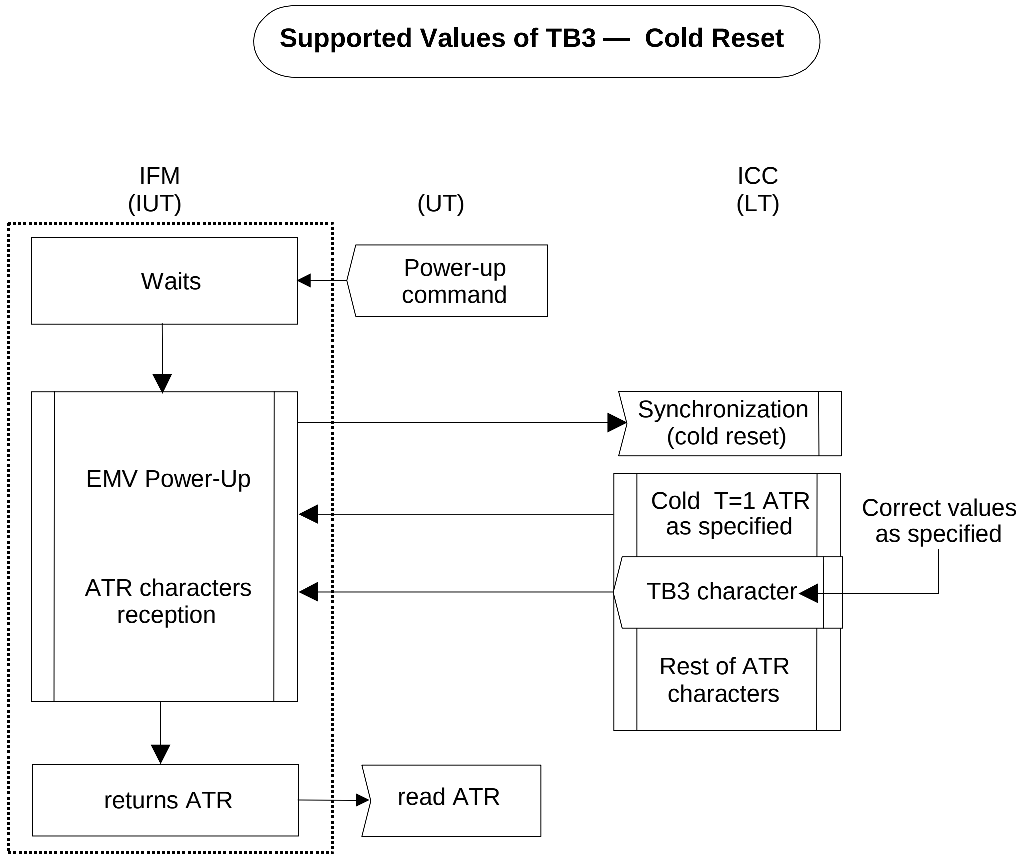
Pass Criteria: The IUT respects IFSI = ‘20’ both in non-chained and chained I-blocks it subsequently sends.

6.2.33. 1CE.033.0y: Supported Values of TB3 — Cold Reset

Test No. **1CE.033.0y**

Objective : To ensure that the IUT accepts a cold ATR containing supported values of TB3.

Procedure:



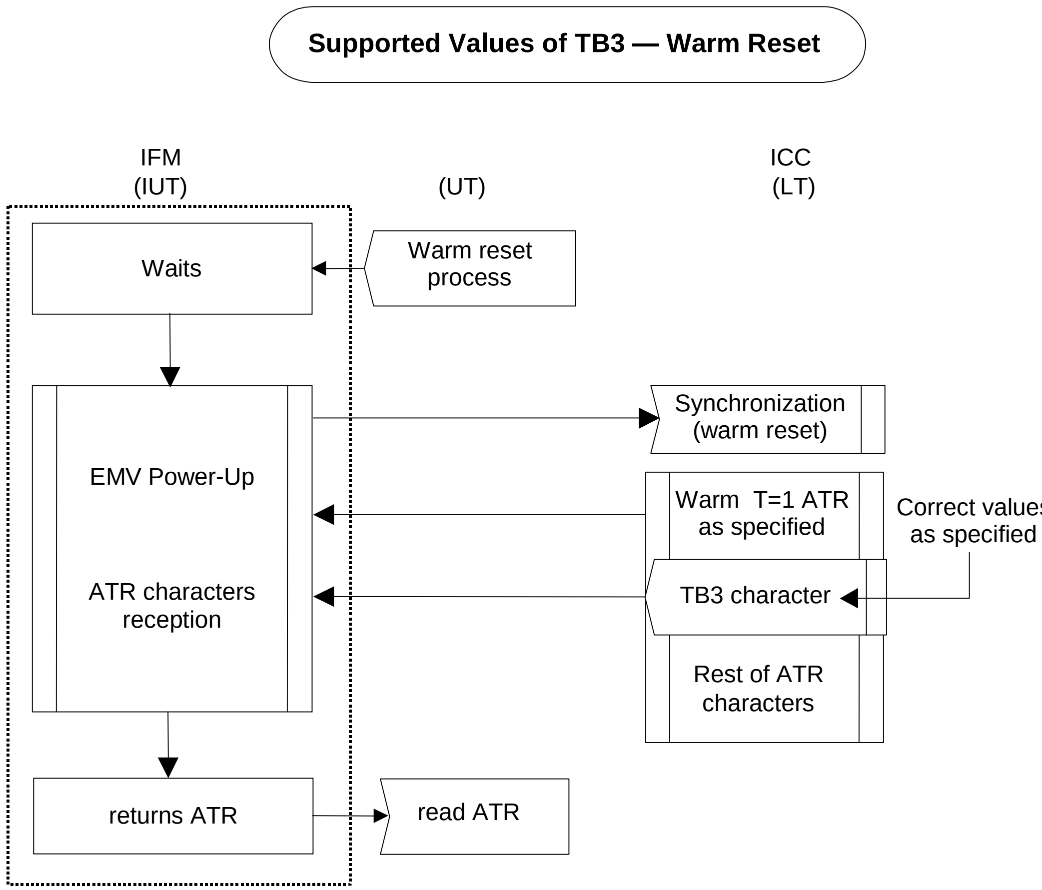
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.34. 1CE.034.0y: Supported Values of TB3 — Warm Reset

Test No. **1CE.034.0y**

Objective: To ensure that the IUT accepts a warm ATR containing supported values of TB3.

Procedure:



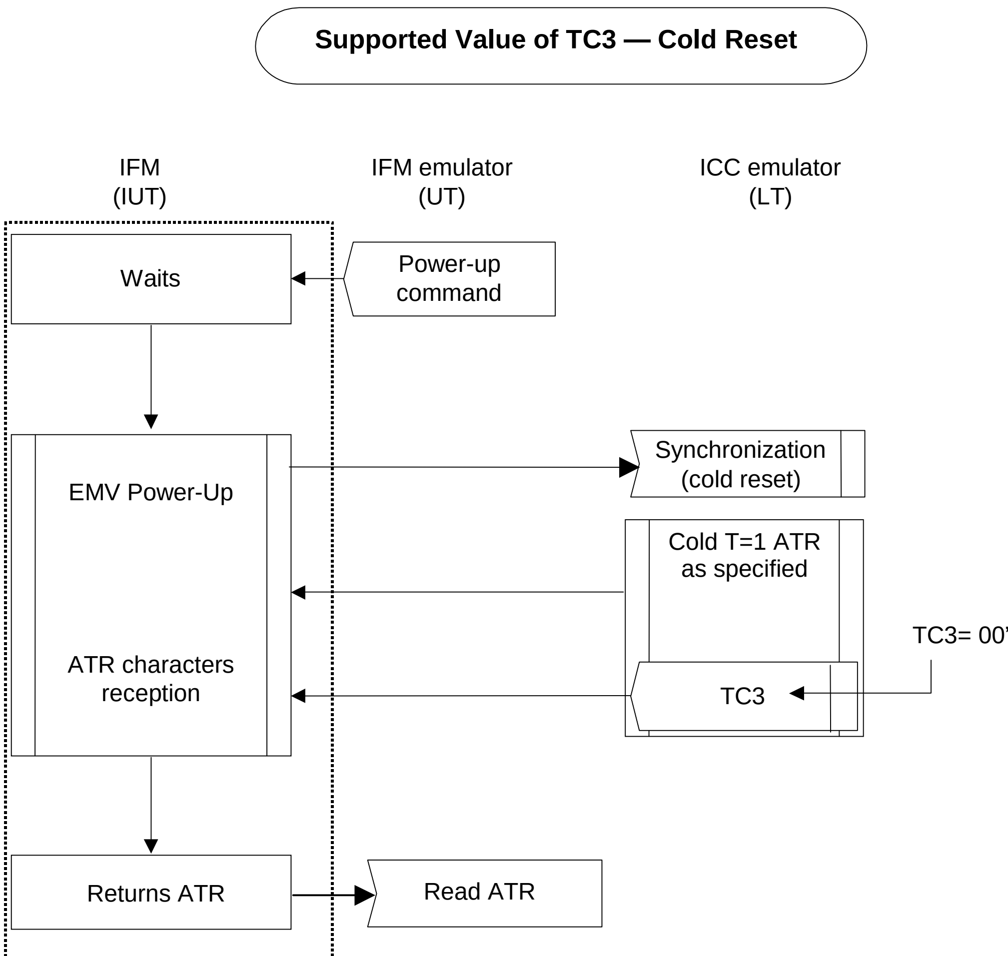
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.35. 1CE.035.00: Supported Value of TC3 — Cold Reset

Test No. **1CE.035.00**

Objective: To ensure that the IUT accepts a cold ATR containing a supported value of TC3 = ‘00’.

Procedure:



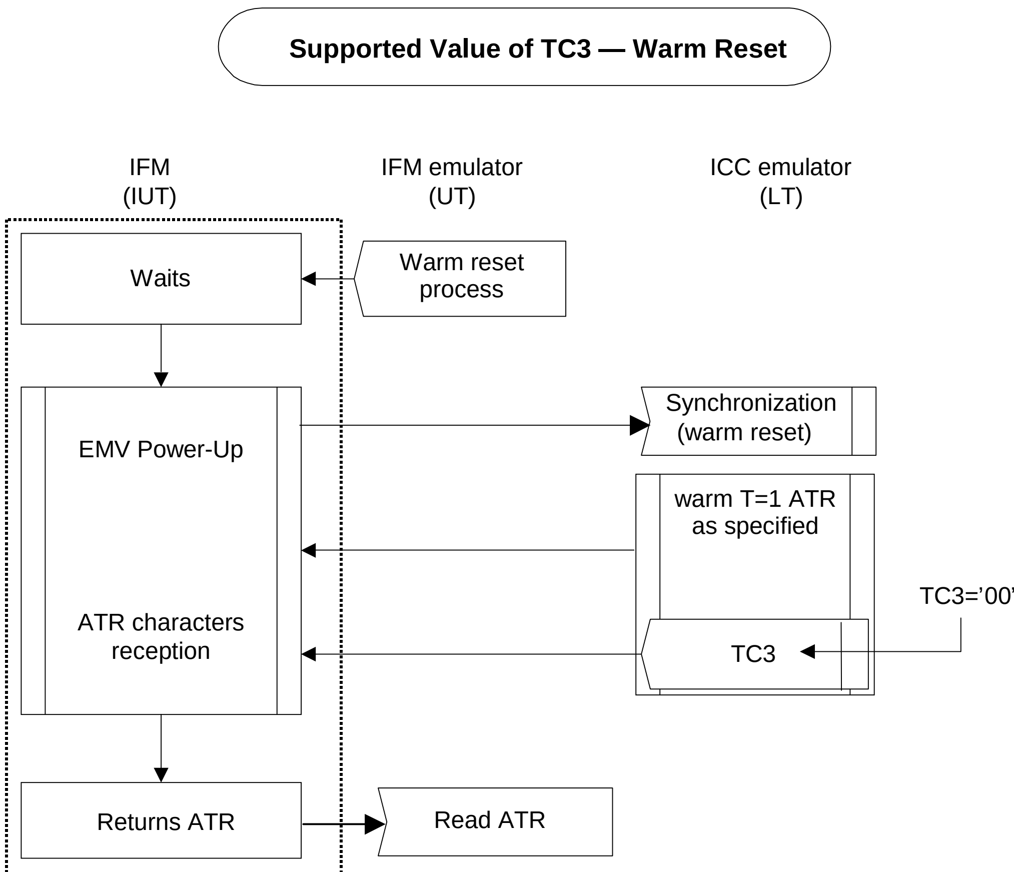
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.36. 1CE.036.00: Supported Value of TC3 — Warm Reset

Test No. **1CE.036.00**

Objective: To ensure that the IUT accepts a warm ATR containing a supported value of TC3.

Procedure:



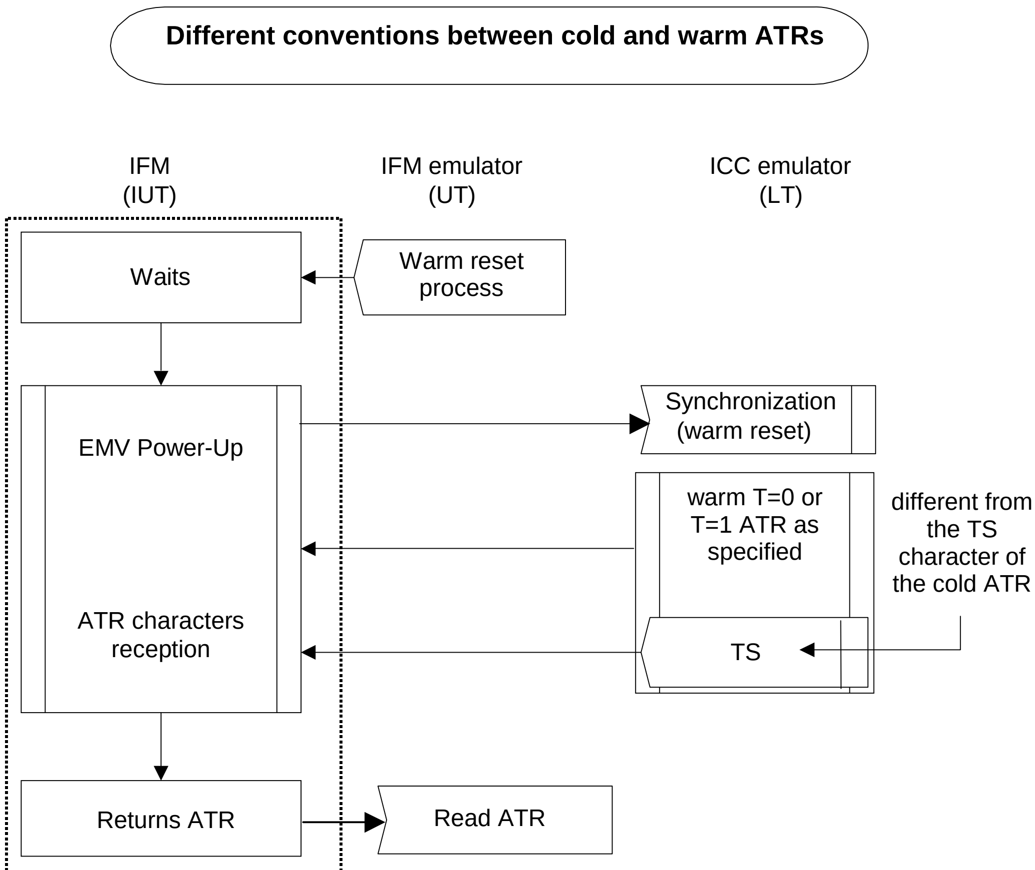
Pass Criteria: The IUT accepts the ATR and continues the card session.

6.2.37. 1CE.037.0y: Different conventions between cold and warm ATRs

Test No. **1CE.037.0y**

Objective: To ensure that the IUT accepts a warm ATR with a convention different from that of the cold ATR.

Procedure:



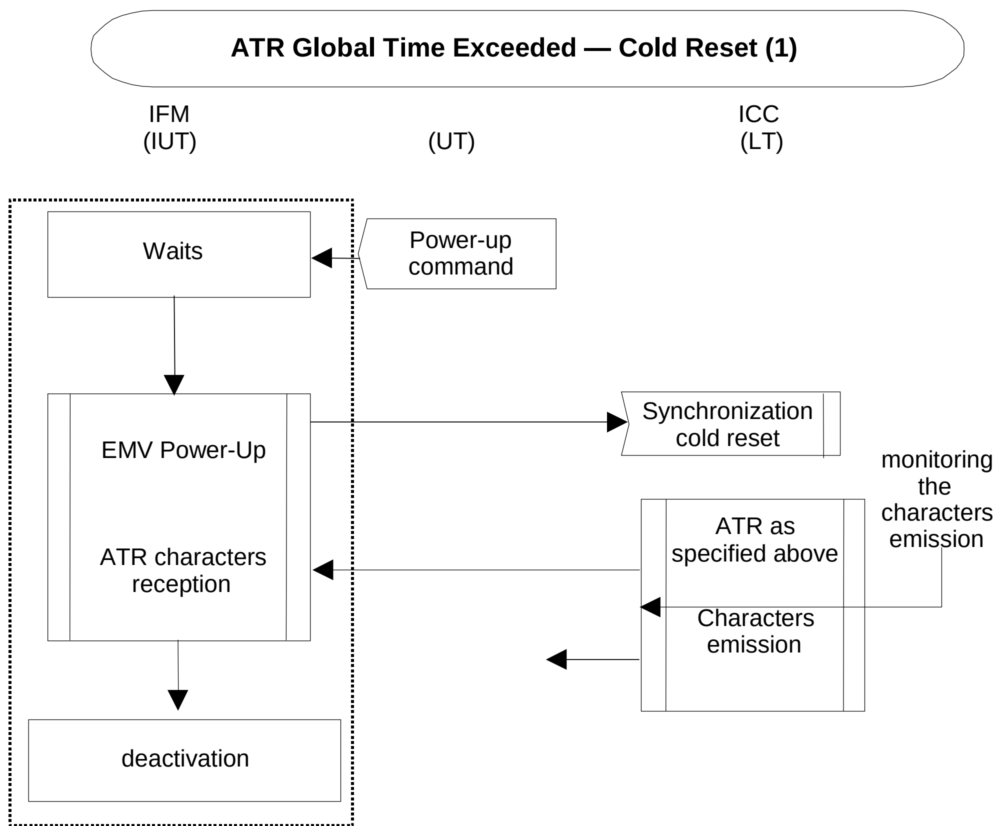
Pass Criteria: The IUT accepts the warm ATR and continues the card session using the convention indicated in the warm ATR.

6.2.38. 1CE.050.00-1: ATR Global Time Exceeded — Cold Reset (1)

Test No. **1CE.050.00-1**

Objective: To ensure that the IUT rejects the ICC if all the characters to be returned in a cold ATR are not received within 20,160 initial etus after transmission of the TS character.

Procedure:



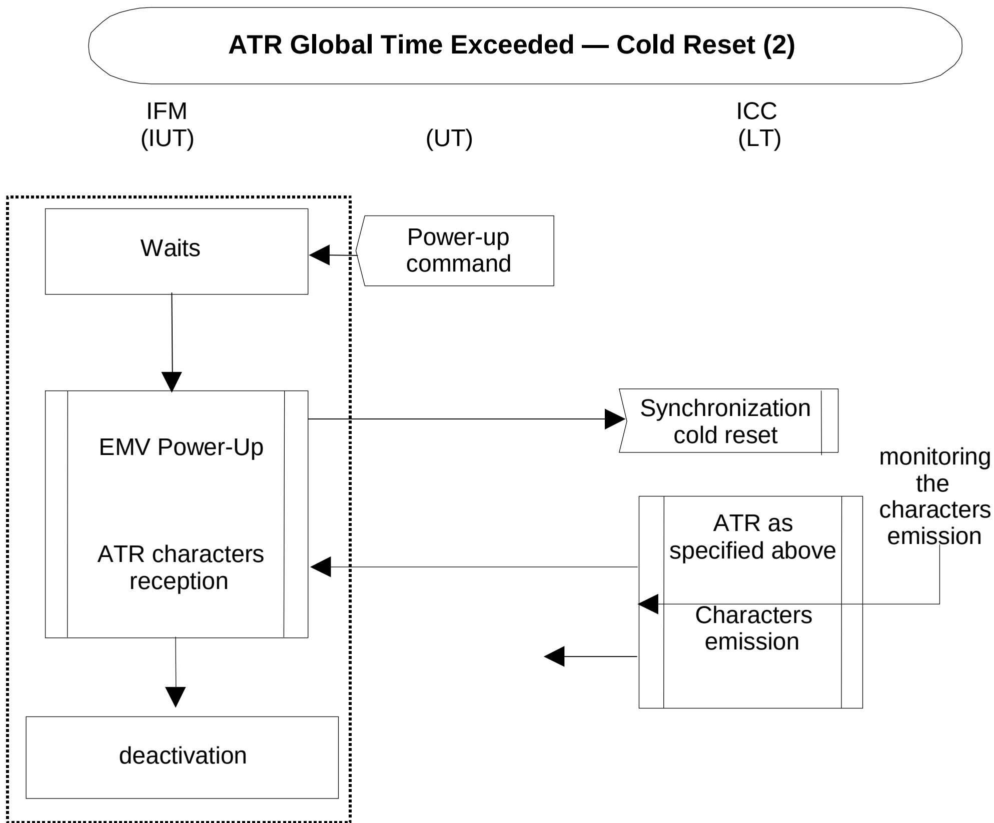
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

6.2.39. 1CE.050.00-2: ATR Global Time Exceeded — Cold Reset (2)

Test No. **1CE.050.00-2**

Objective: To ensure that the IUT rejects the ICC if all the characters to be returned during a cold ATR are not received within 20,160 initial etus after transmission of the TS character.

Procedure:



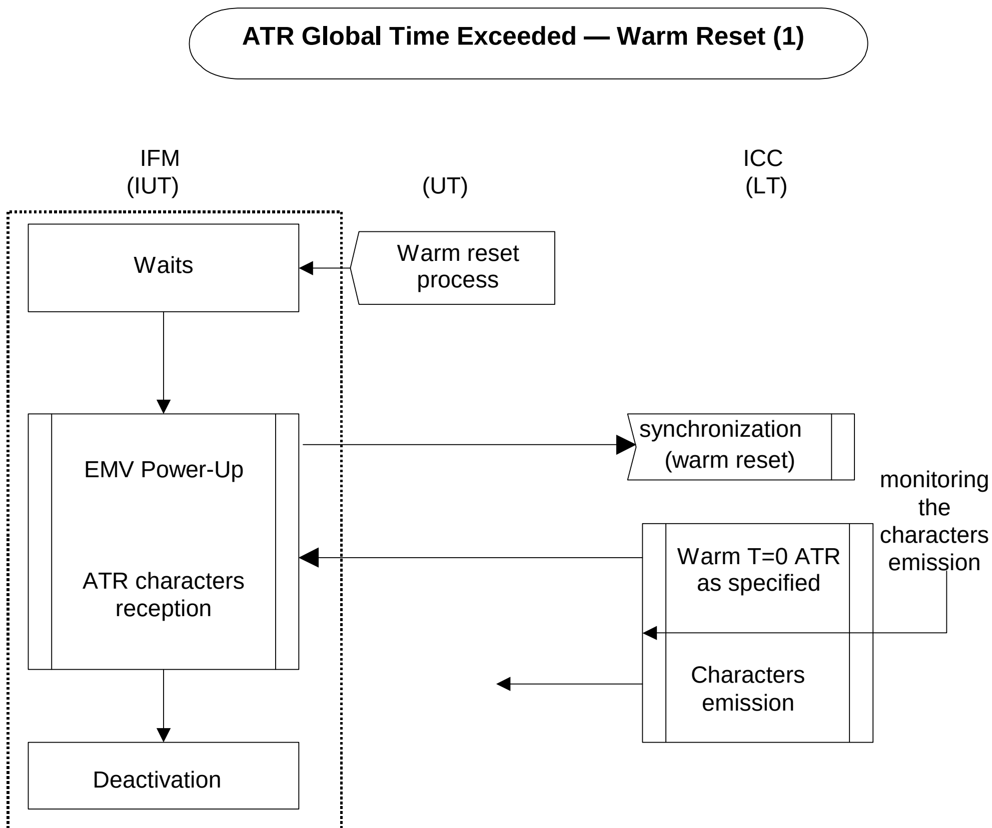
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

6.2.40. 1CE.051.00-1: ATR Global Time Exceeded — Warm Reset (1)

Test No. **1CE.051.00-1**

Objective: To ensure that the IUT initiates the deactivation sequence if all the characters to be returned in a warm ATR are not received within 20,160 initial etus after transmission of the TS character.

Procedure:



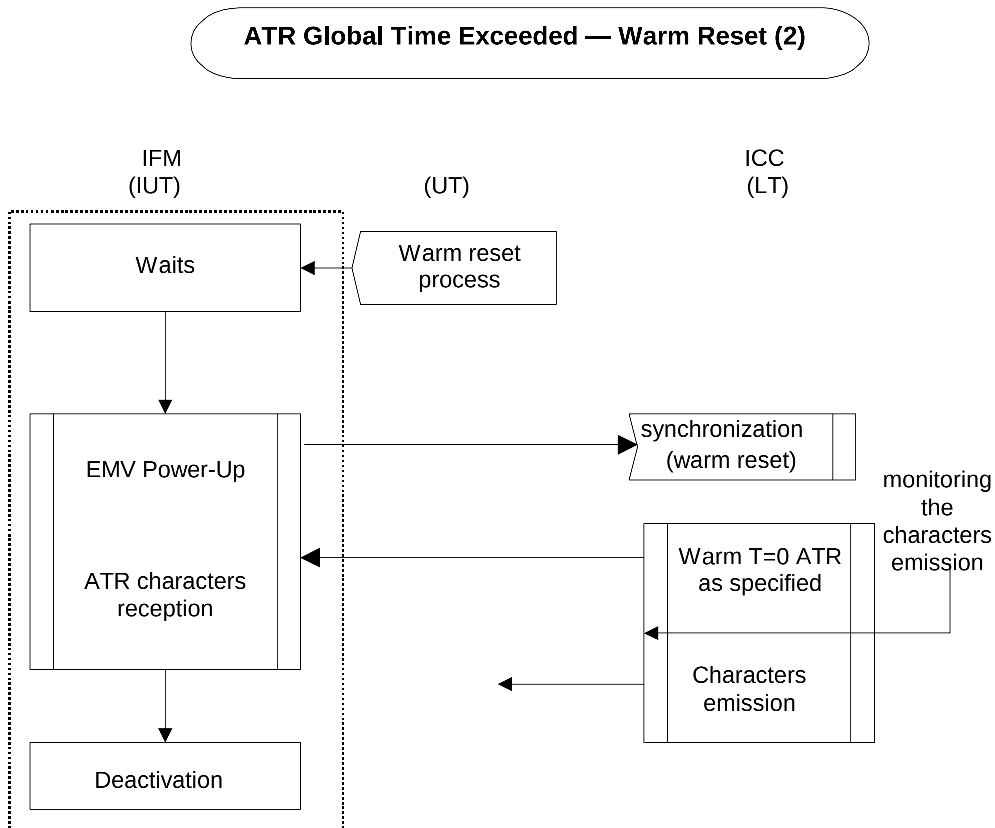
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

6.2.41. 1CE.051.00-2: ATR Global Time Exceeded — Warm Reset (2)

Test No. **1CE.051.00-2**

Objective: To ensure that the IUT initiates the deactivation sequence if all the characters to be returned in a warm ATR are not received within 20,160 initial etus after transmission of the TS character.

Procedure:



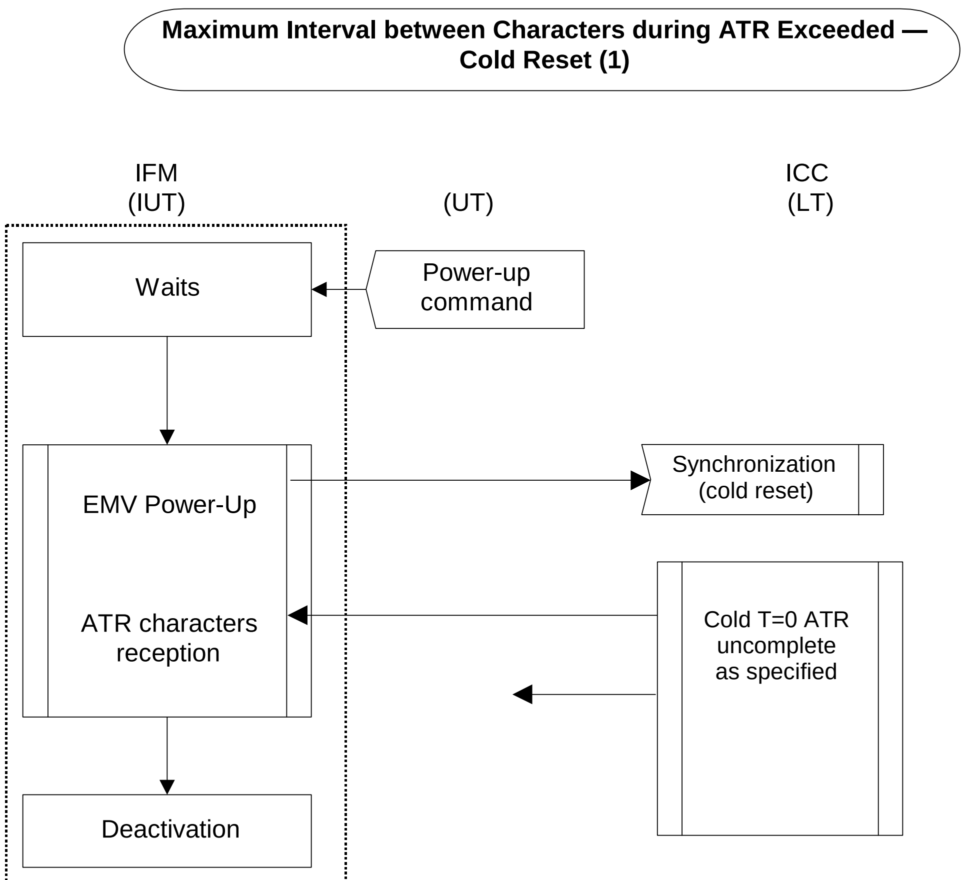
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus (4,800 + 19,200 initial etus) following the leading edge of the start bit of the TS character.

6.2.42. 1CE.052.00-1: Maximum Interval between Characters during ATR Exceeded — Cold Reset (1)

Test No. **1CE.052.00-1**

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the ATR.

Procedure:



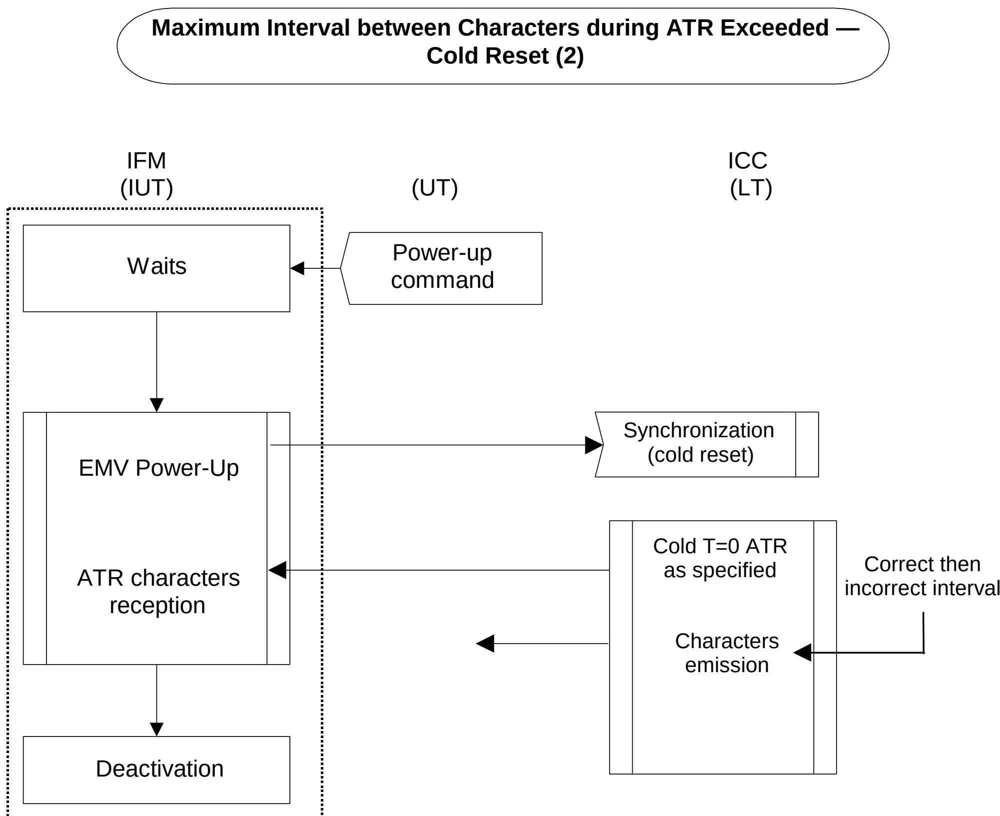
Pass Criteria: The IUT initiates the deactivation sequence within 14,000 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the cold ATR.

6.2.43. 1CE.052.00-2: Maximum Interval between Characters during ATR Exceeded — Cold Reset (2)

Test No. **1CE.052.00-2**

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the ATR.

Procedure:



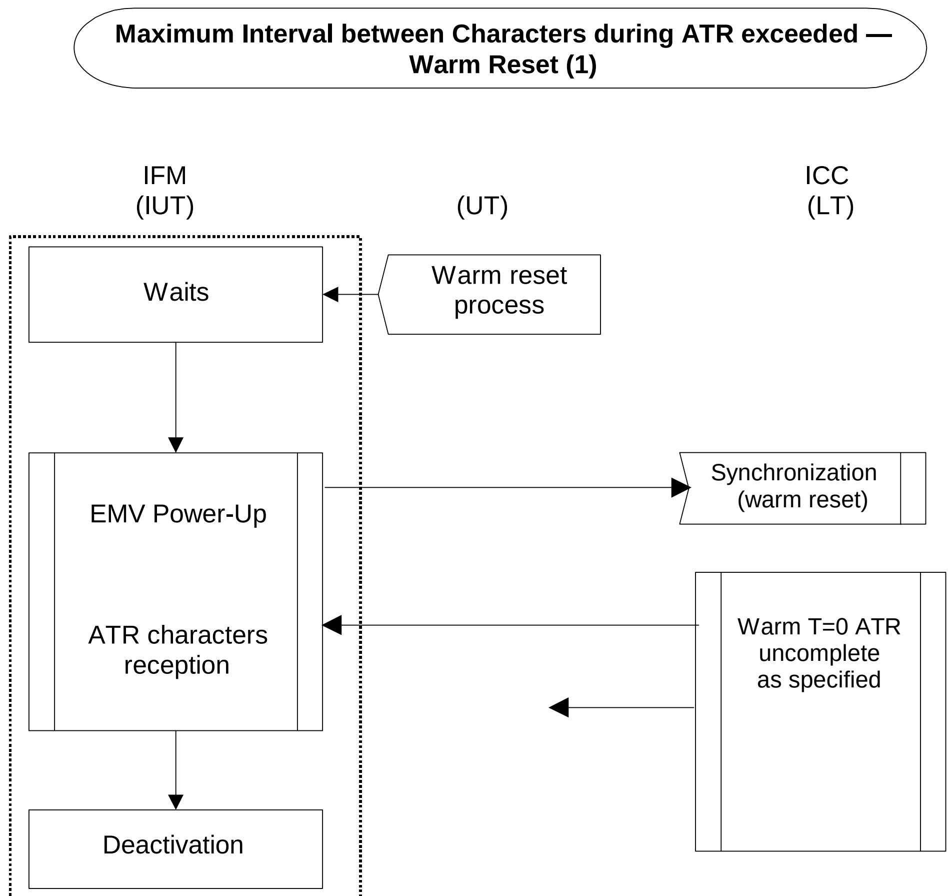
Pass Criteria: The IUT initiates the deactivation sequence within 14,000 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the cold ATR.

6.2.44. 1CE.053.00-1: Maximum Interval between Characters during ATR Exceeded — Warm Reset (1)

Test No. **1CE.053.00-1**

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the ATR.

Procedure:



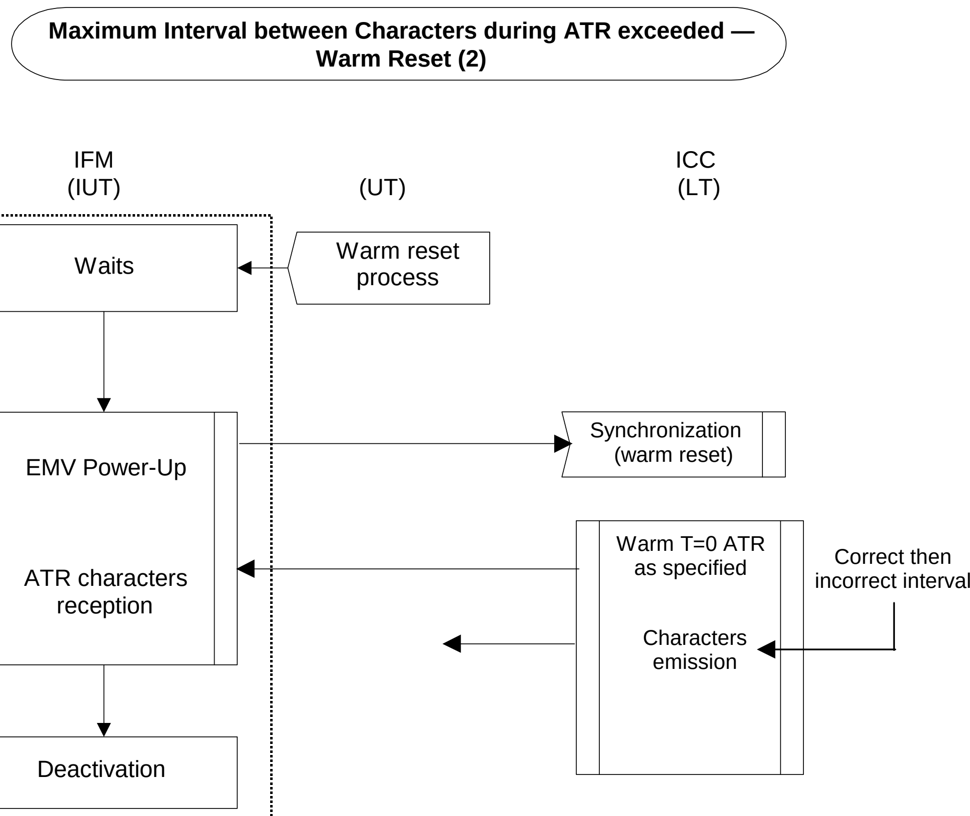
Pass Criteria: The IUT initiates the deactivation sequence within 14,000 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the warm ATR.

6.2.45. 1CE.053.00-2: Maximum Interval between Characters during ATR Exceeded — Warm Reset (2)

Test No. **1CE.053.00-2**

Objective: To ensure that the IUT initiates the deactivation sequence if the interval between the leading edges of the start bits of two consecutive characters exceeds 10,080 initial etus during the ATR.

Procedure:



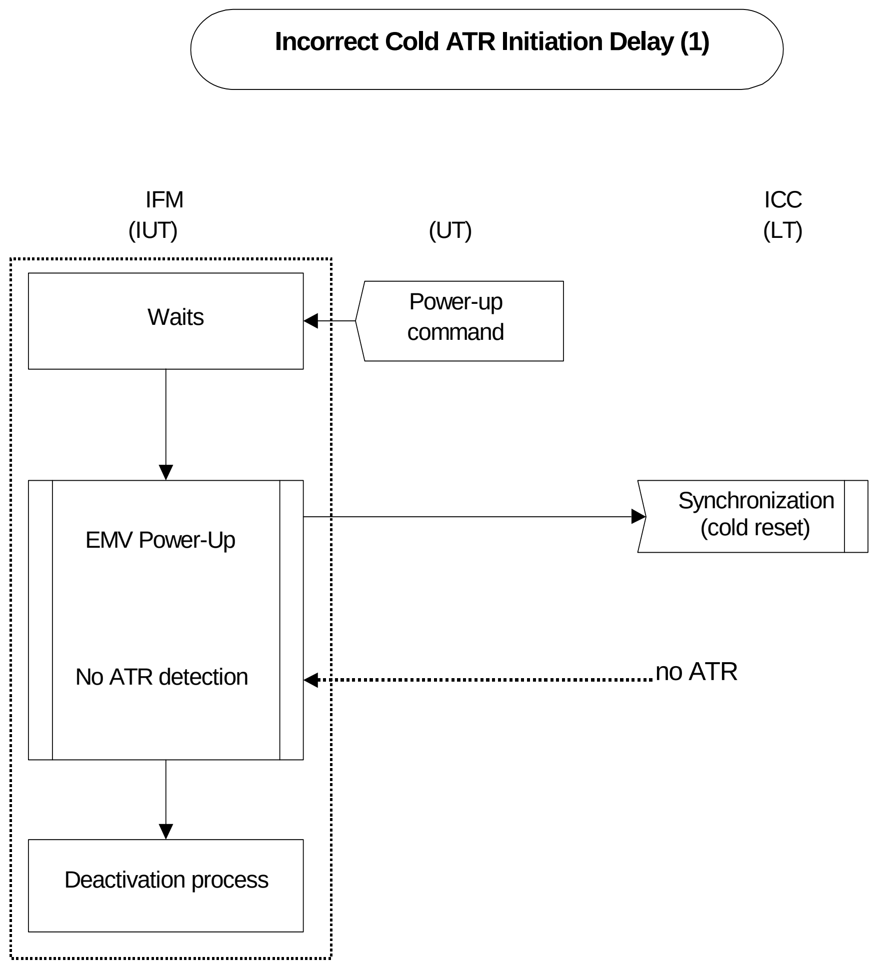
Pass Criteria: The IUT initiates the deactivation sequence within 14,000 (4,800 + 9,600) initial etus following the leading edge of the start bit of the TS character of the warm ATR.

6.2.46. 1CE.054.00-1: Incorrect Cold ATR Initiation Delay (1)

Test No. **1CE.054.00-1**

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the cold ATR initiation delay (by more than 2,000 clock cycles).

Procedure:



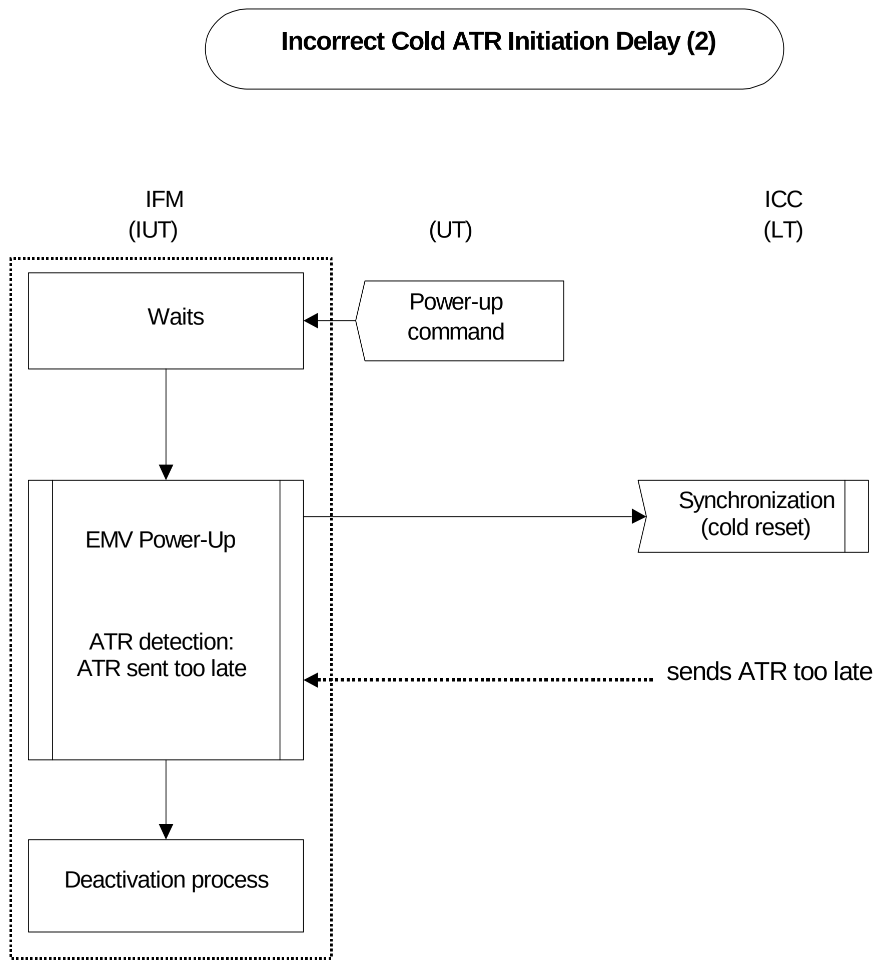
Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

6.2.47. 1CE.054.00-2: Incorrect Cold ATR Initiation Delay (2)

Test No. **1CE.054.00-2**

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the cold ATR initiation delay (by more than 2,000 clock cycles).

Procedure:



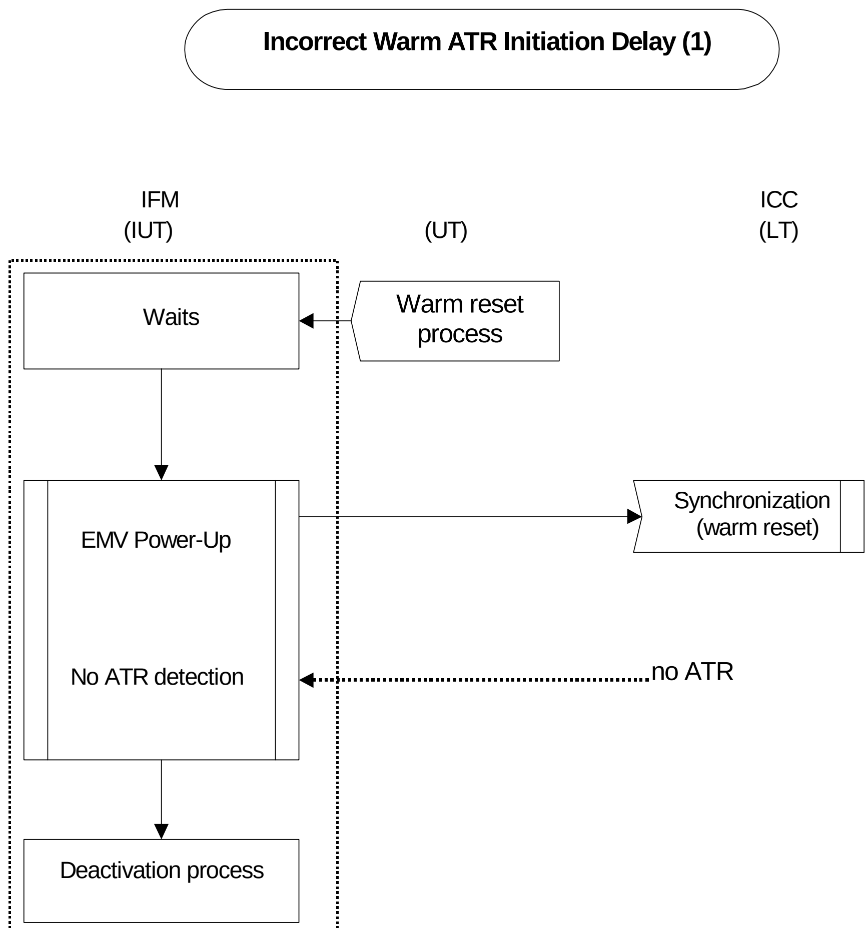
Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

6.2.48. 1CE.055.00-1: Incorrect Warm ATR Initiation Delay (1)

Test No. **1CE.055.00-1**

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the warm ATR initiation delay (by more than 2,000 clock cycles).

Procedure:



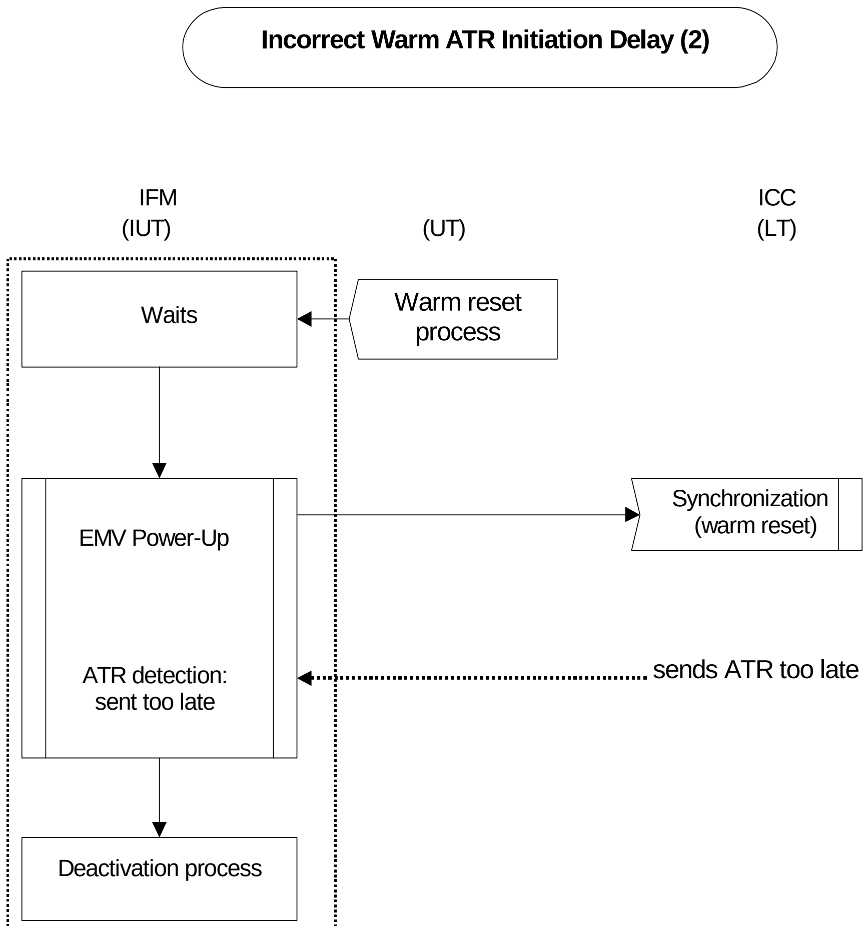
Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

6.2.49. 1CE.055.00-2: Incorrect Warm ATR Initiation Delay (2)

Test No. **1CE.055.00-2**

Objective: To ensure that the IUT rejects the ICC if the LT exceeds the upper limit of the warm ATR initiation delay (by more than 2,000 clock cycles).

Procedure:



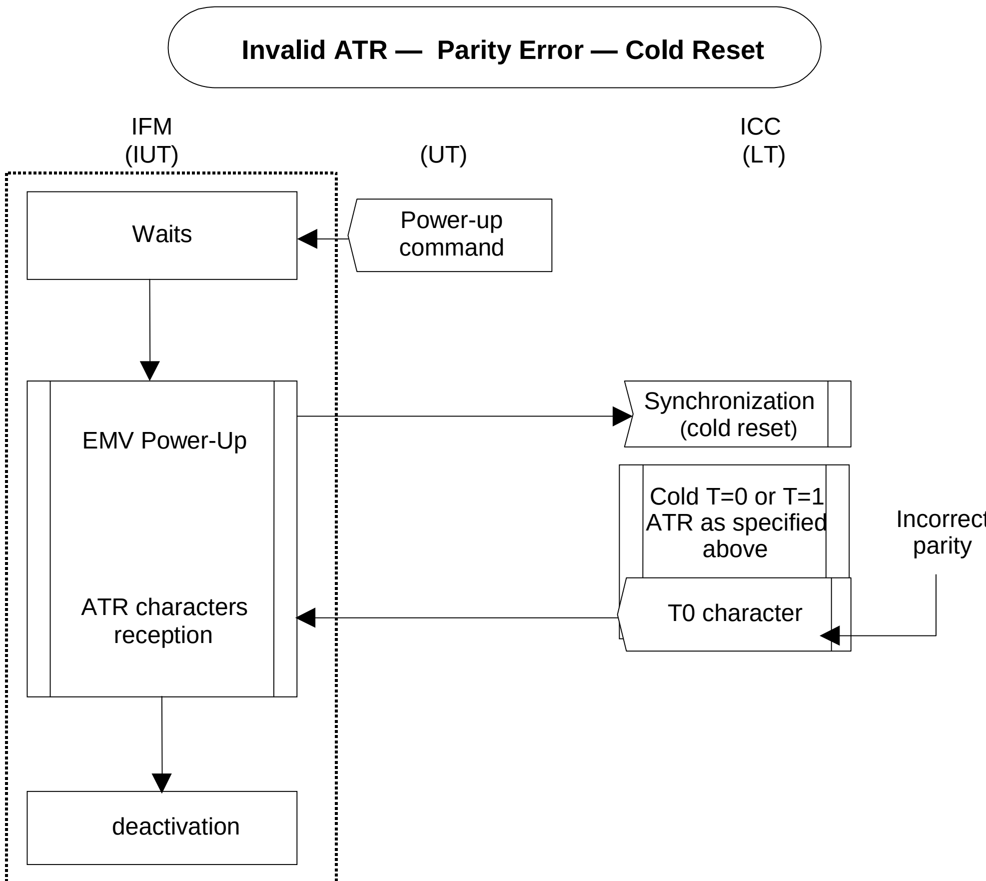
Pass Criteria: The IUT initiates the deactivation sequence within 42,000 clock cycles + 50 ms following time that RST is set high.

6.2.50. 1CE.056.0y: Invalid ATR — Parity Error — Cold reset

Test No. **1CE.056.0y**

Objective: To ensure that the IUT rejects an ICC when presented with an ATR containing a parity error in response to a cold reset.

Procedure:



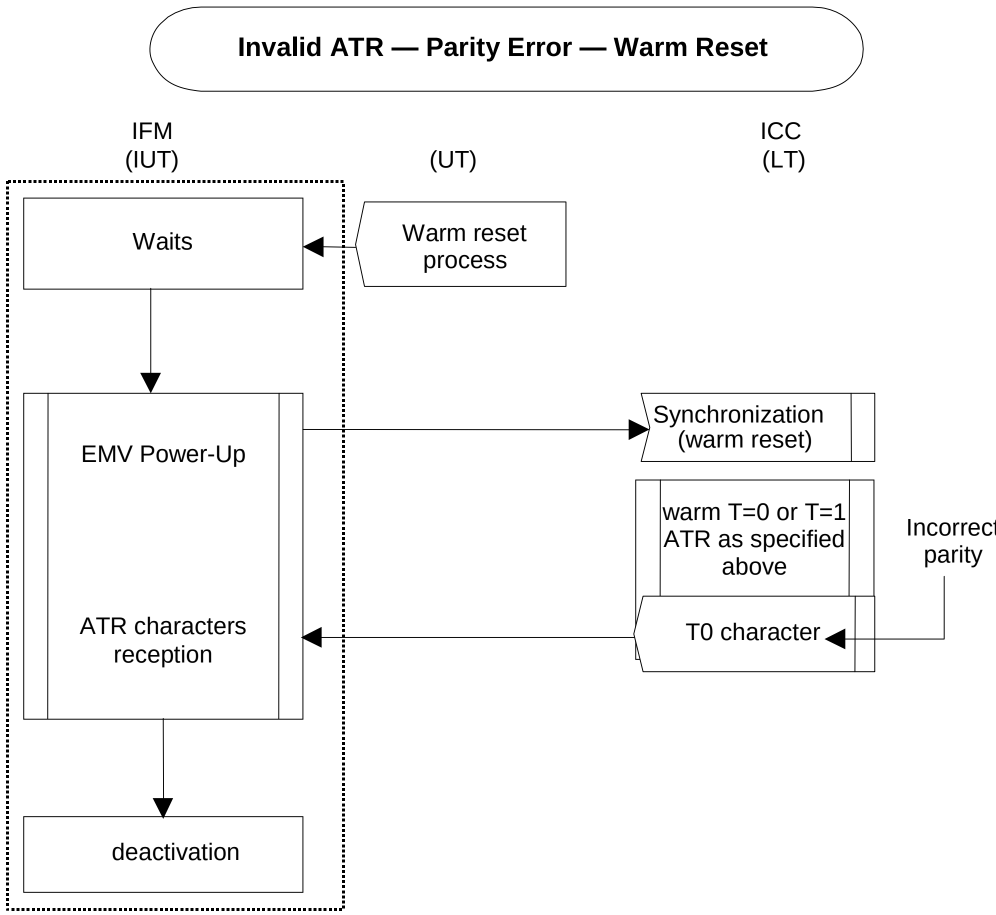
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.51. 1CE.057.0y: Invalid ATR — Parity Error — Warm reset

Test No. **1CE.057.0y**

Objective: To ensure that the IUT rejects an ICC when presented with an ATR containing a parity error in response to a warm reset.

Procedure:



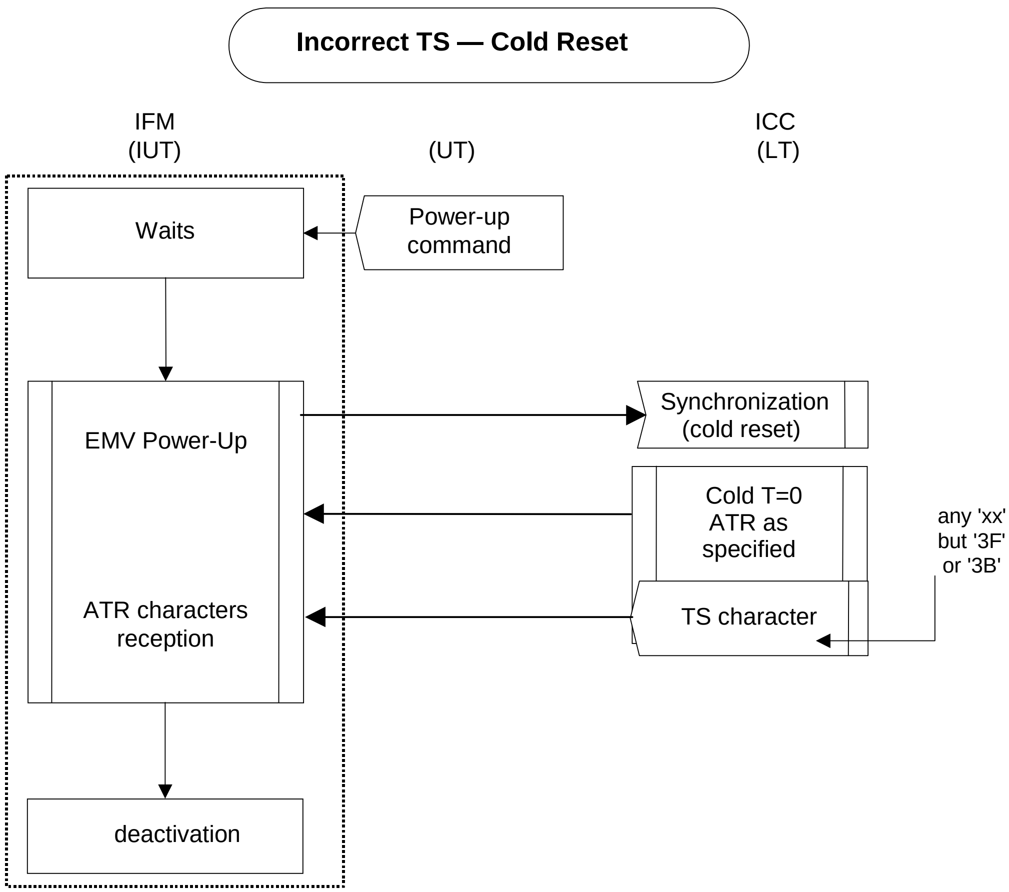
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.52. 1CE.058.0y: Incorrect TS — Cold Reset

Test No. **1CE.058.0y**

Objective: To ensure that the IUT rejects an ICC returning an answer to a cold reset with TS values other than ‘3B’ or ‘3F’.

Procedure:



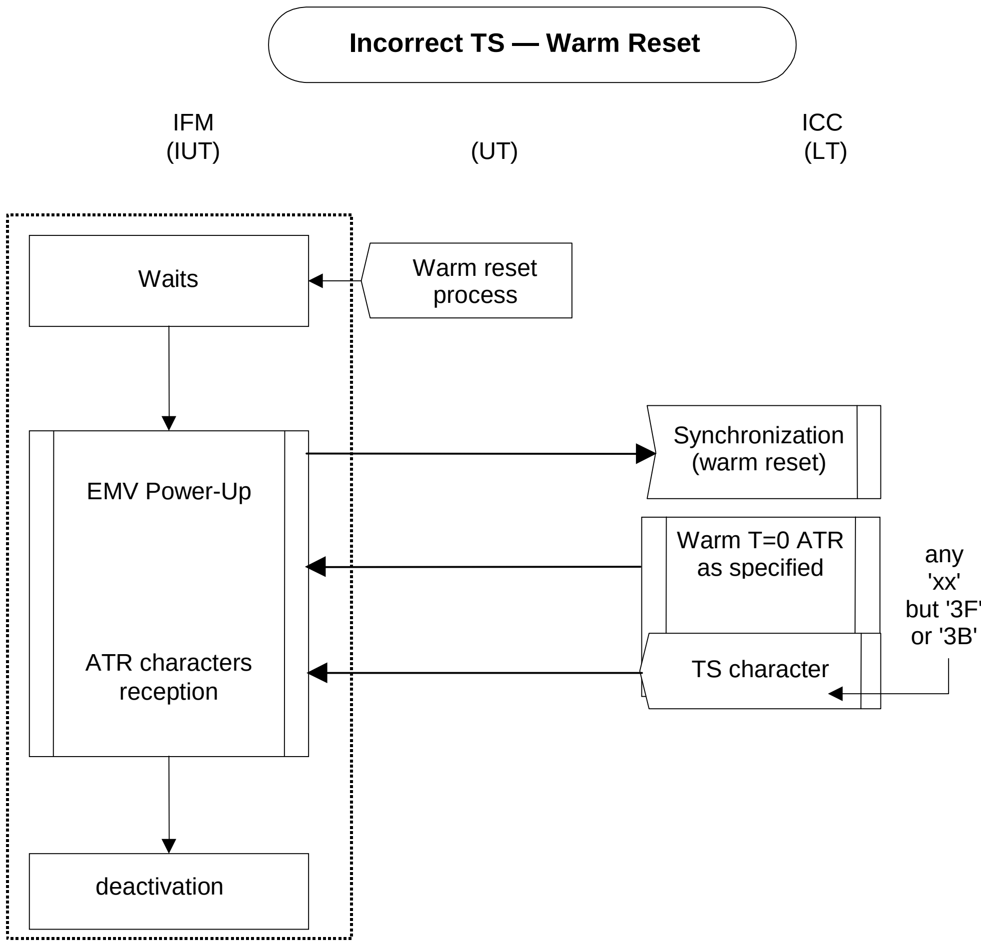
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.53. 1CE.059.0y: Incorrect TS — Warm Reset

Test No. **1CE.059.0y**

Objective: To ensure that the IUT rejects an ICC returning an answer to a warm reset with TS values other than '3B' or '3F'.

Procedure:



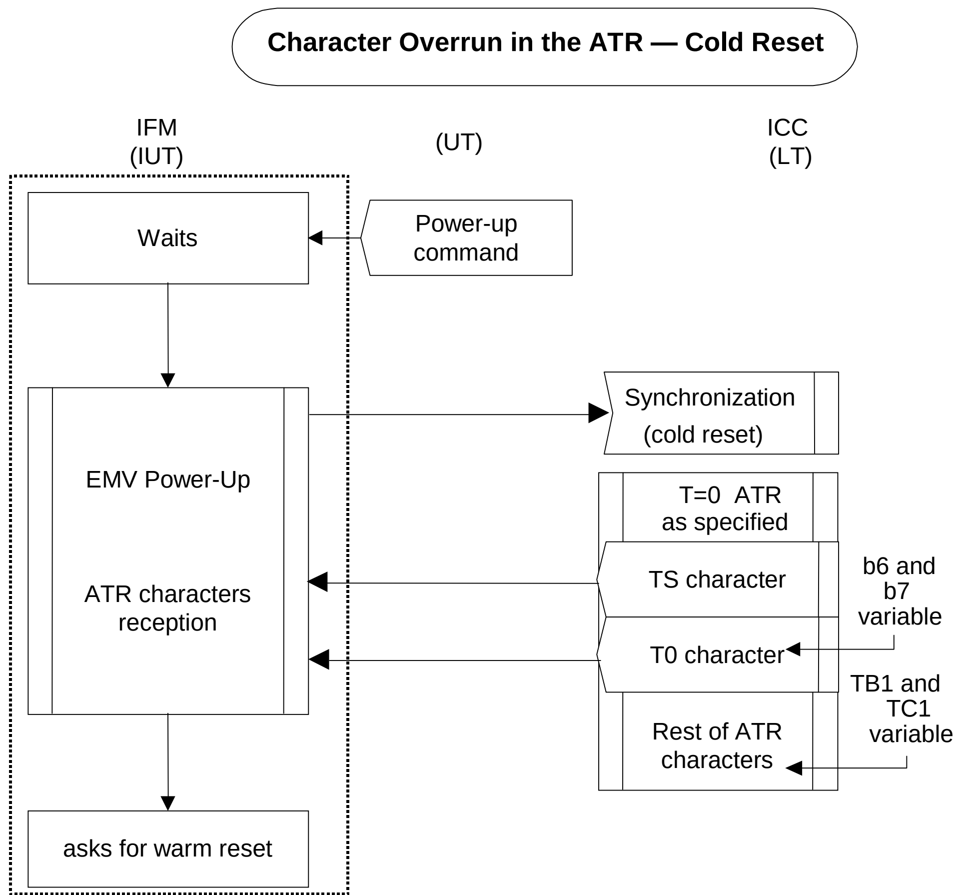
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.54. 1CE.060.0y: Character Overrun in the ATR — Cold Reset

Test No. **1CE.060.0y**

Objective: To ensure that the IUT rejects a cold ATR when the value returned does not correctly indicate, or is not consistent with, the interface characters.

Procedure:



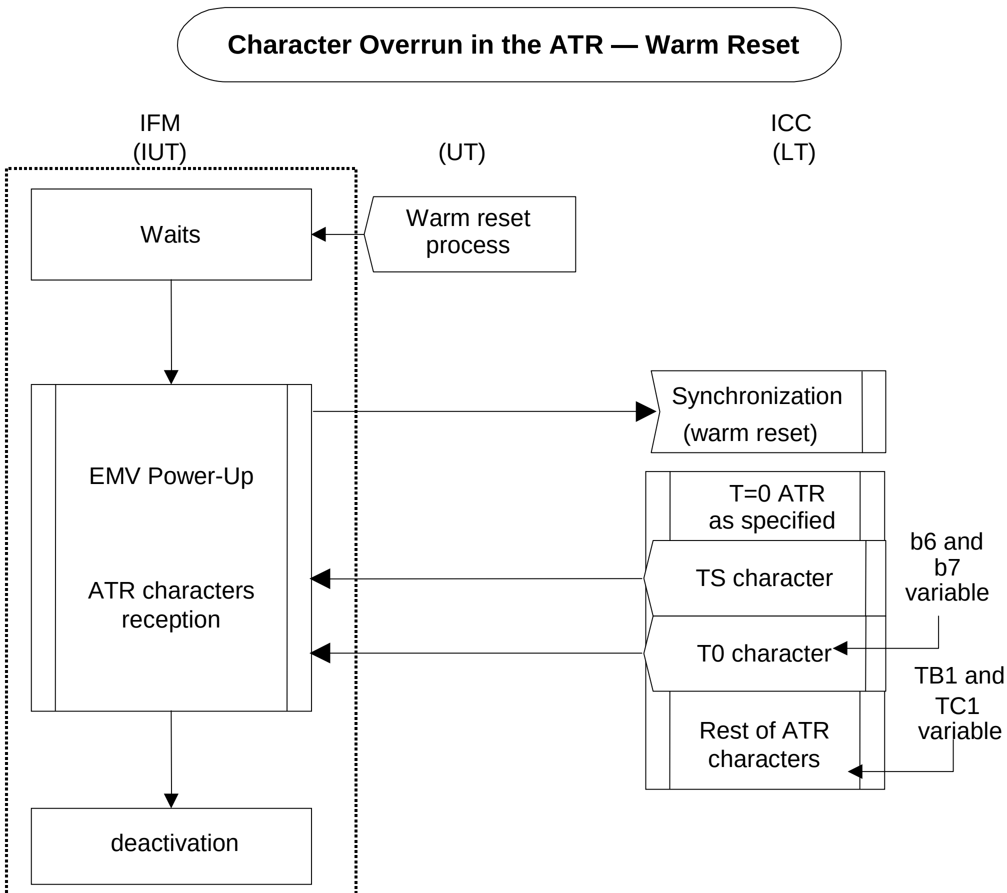
Pass Criteria: The IUT initiates a warm reset after the T0 character has been received and within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.55. 1CE.061.0y: Character Overrun in the ATR — Warm Reset

Test No. **1CE.061.0y**

Objective: To ensure that the IUT rejects a warm ATR when the value returned does not correctly indicate, or is not consistent with, the interface characters.

Procedure:



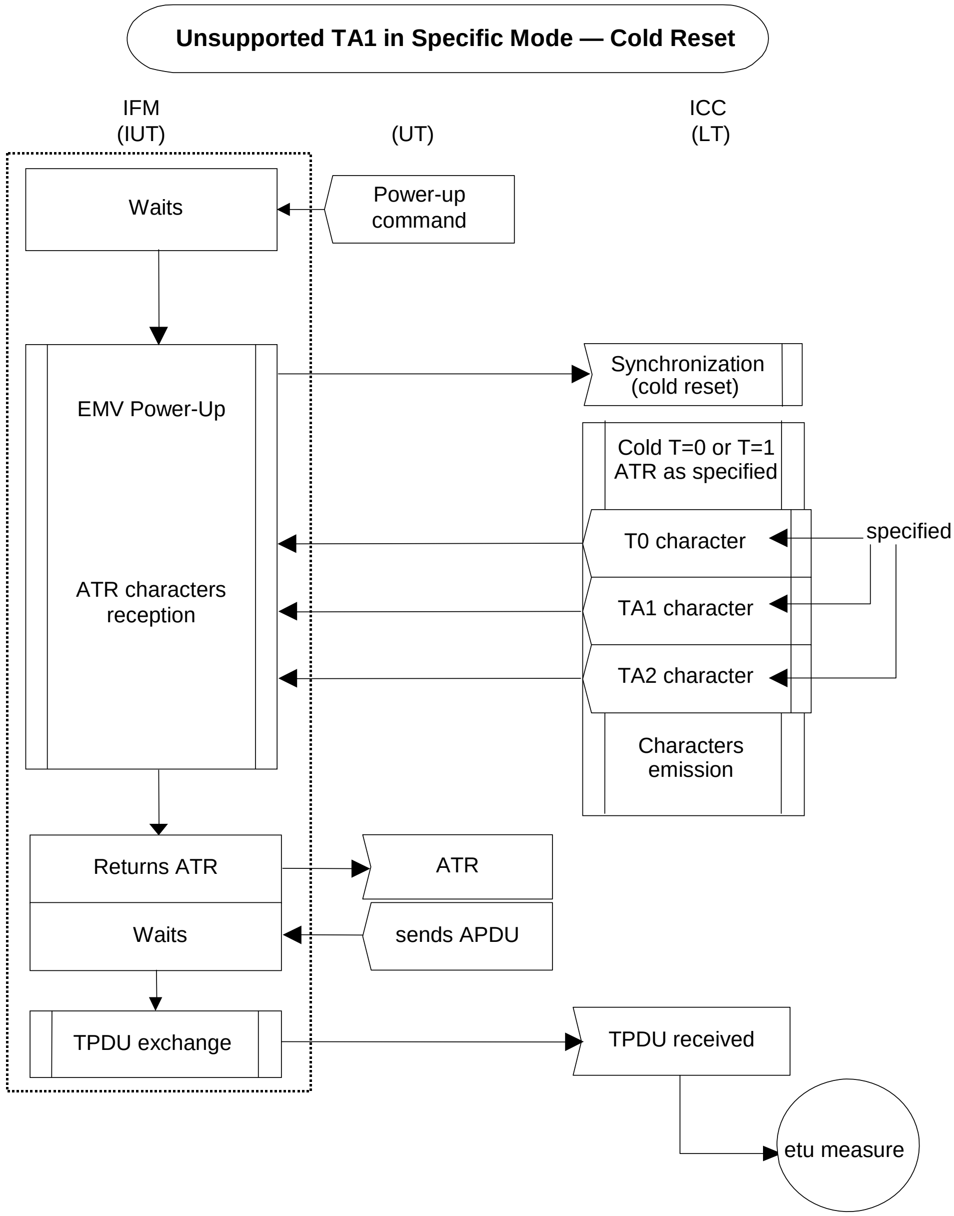
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.56. 1CE.062.0y: Unsupported TA1 in Specific Mode — Cold Reset

Test No. **1CE.062.0y**

Objective: To ensure that the IUT rejects a cold ATR with any value of TA1 outside the range ‘11’ to '13' (unless it is able to support the conditions indicated; see ICS) in specific mode.

Procedure:



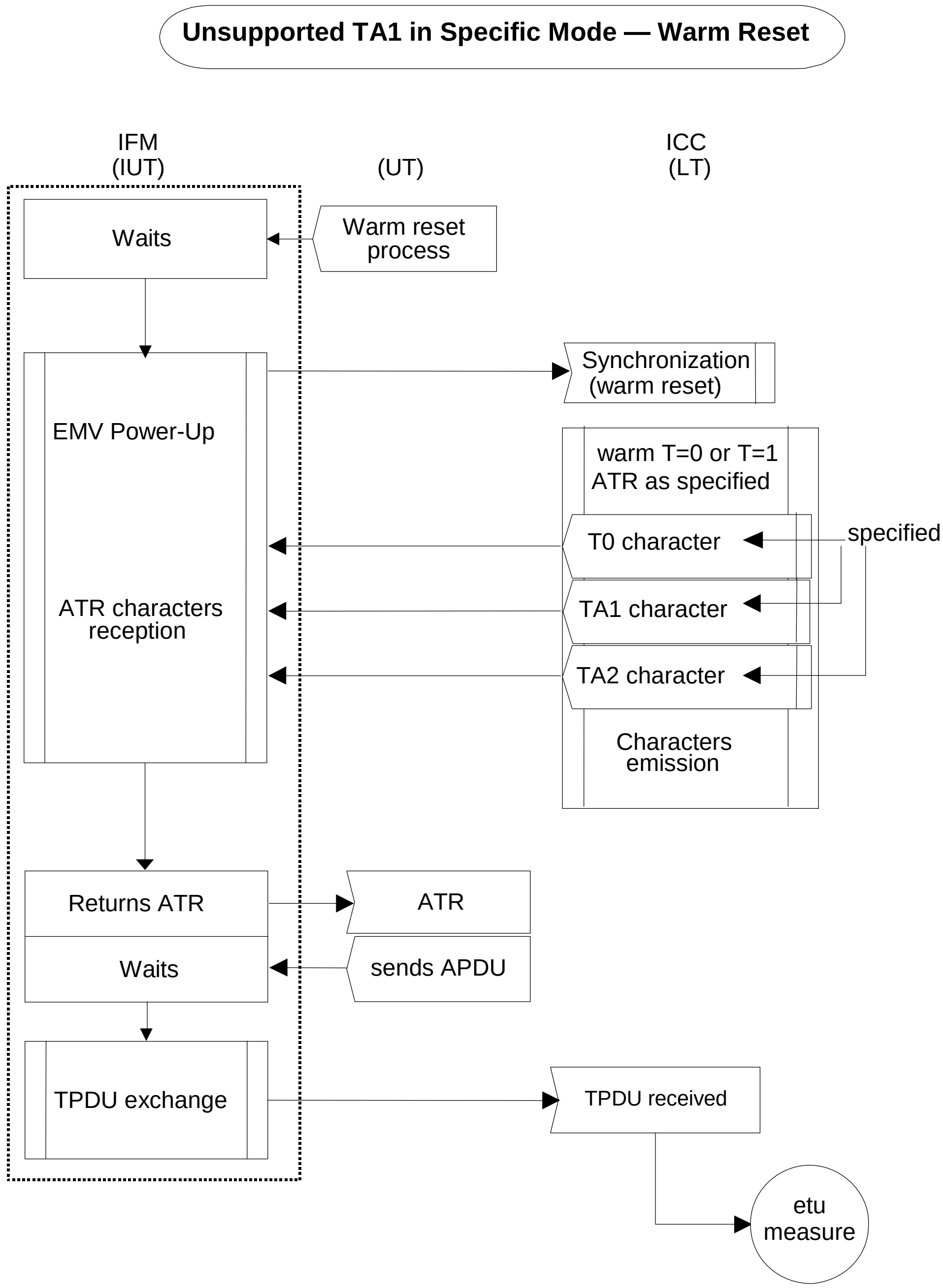
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.57. 1CE.063.0y: Unsupported TA1 in Specific Mode — Warm Reset

Test No. **1CE.063.0y**

Objective: To ensure that the IUT rejects a warm ATR with any value of TA1 outside the range ‘11’ to '13' (unless it is able to support the conditions indicated; see ICS) in specific mode.

Procedure:



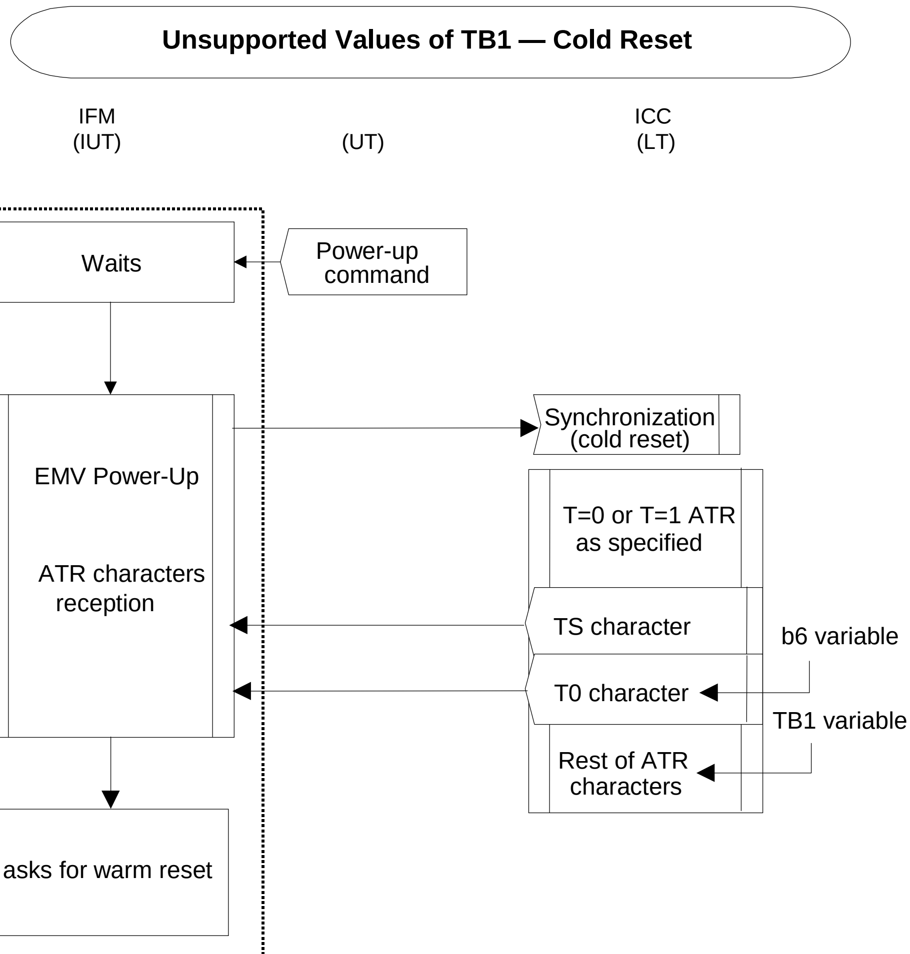
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.58. 1CE.064.0y: Unsupported Values of TB1 — Cold Reset

Test No. **1CE.064.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TB1.

Procedure:



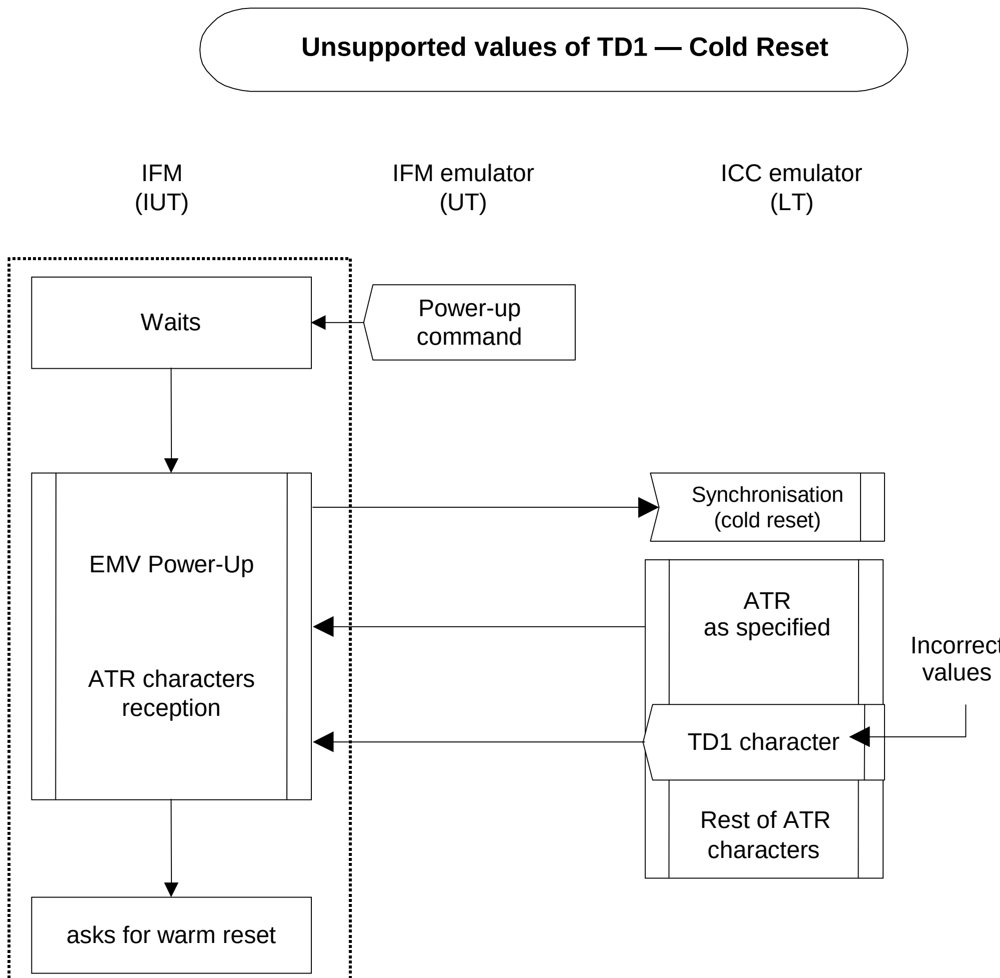
Pass Criteria: The IUT initiates a warm reset after the T0 character has been received and within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.59. 1CE.065.0y: Unsupported Values of TD1 — Cold Reset

Test No. **1CE.065.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TD1 (l.s. nibble).

Procedure:



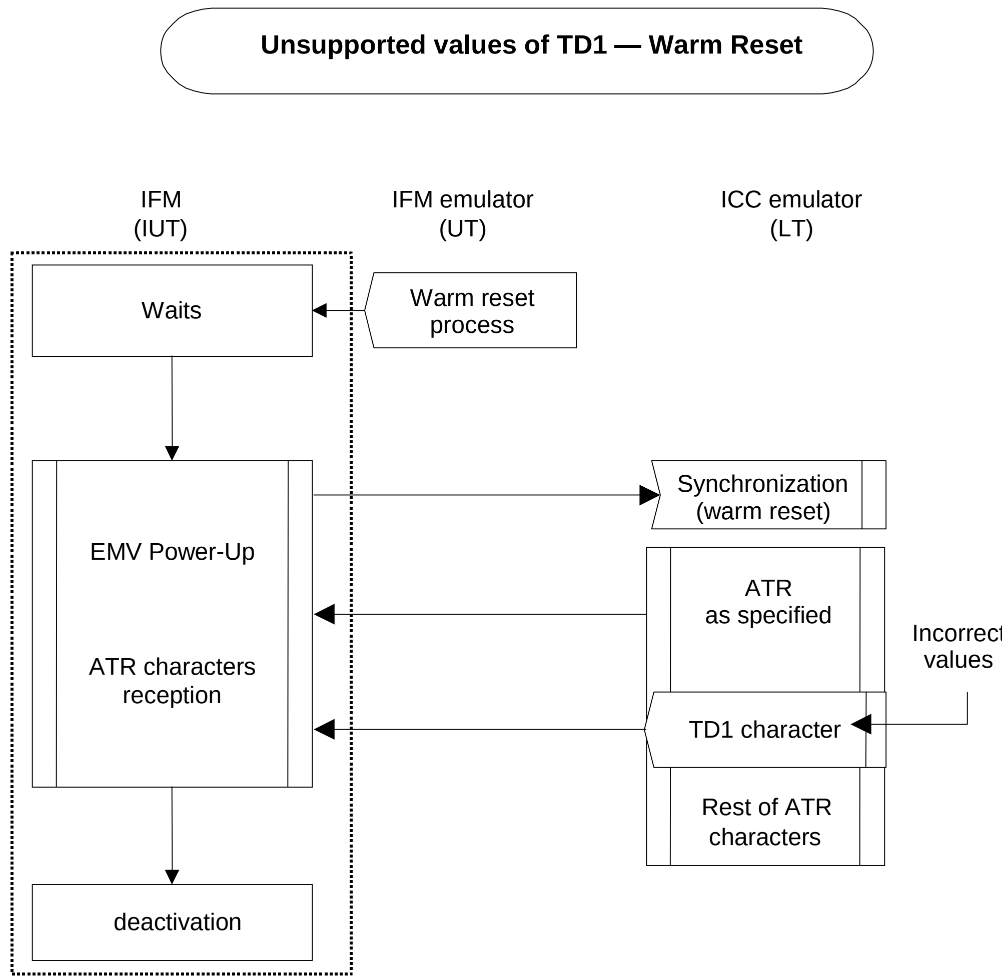
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.60. 1CE.066.0y: Unsupported Values of TD1 — Warm Reset

Test No. **1CE.066.0y**

Objective: To ensure that the IUT rejects an ATR containing an unsupported value of TD1 (l.s. nibble).

Procedure:



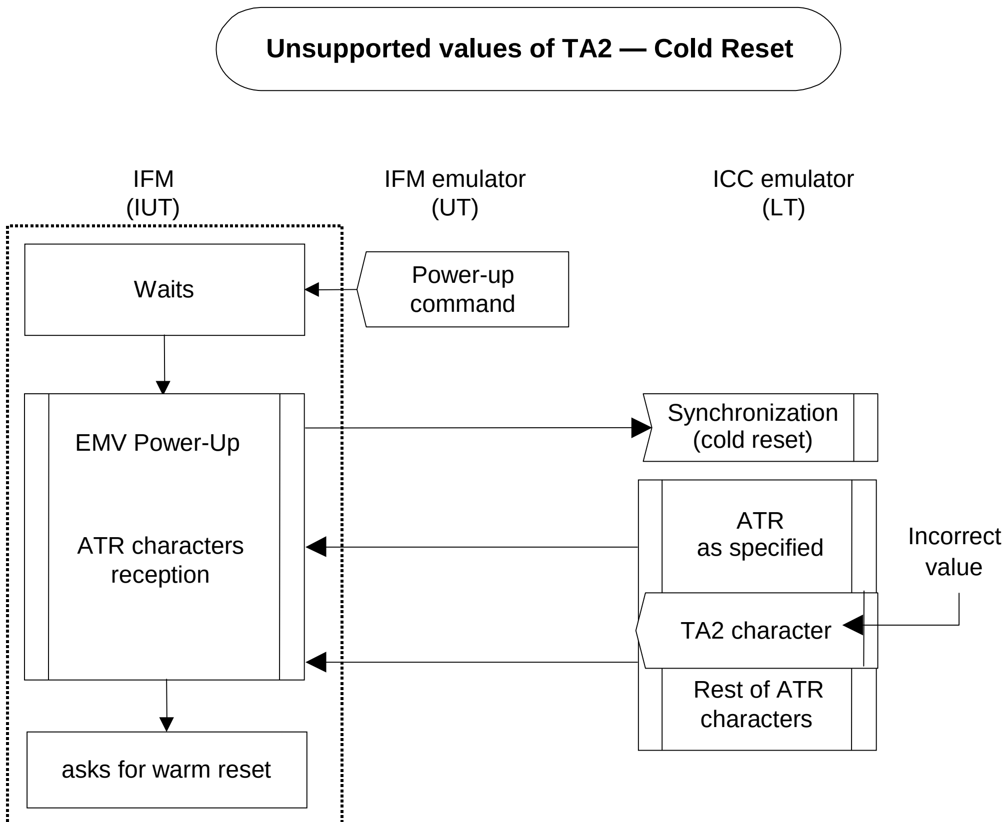
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm reset to the time that RST is set low.

6.2.61. 1CE.067.00: Unsupported Values of TA2 — Cold Reset

Test No. **1CE.067.00**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TA2.

Procedure:



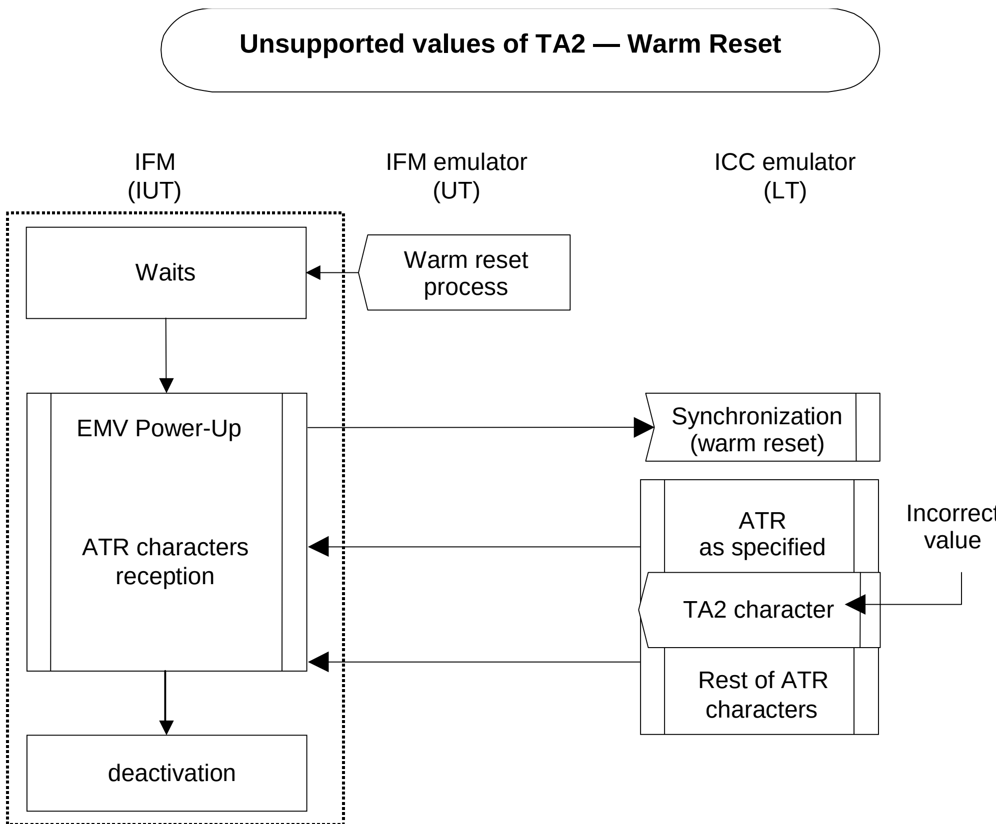
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.62. 1CE.068.00: Unsupported Values of TA2 — Warm Reset

Test No. **1CE.068.00**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TA2.

Procedure:



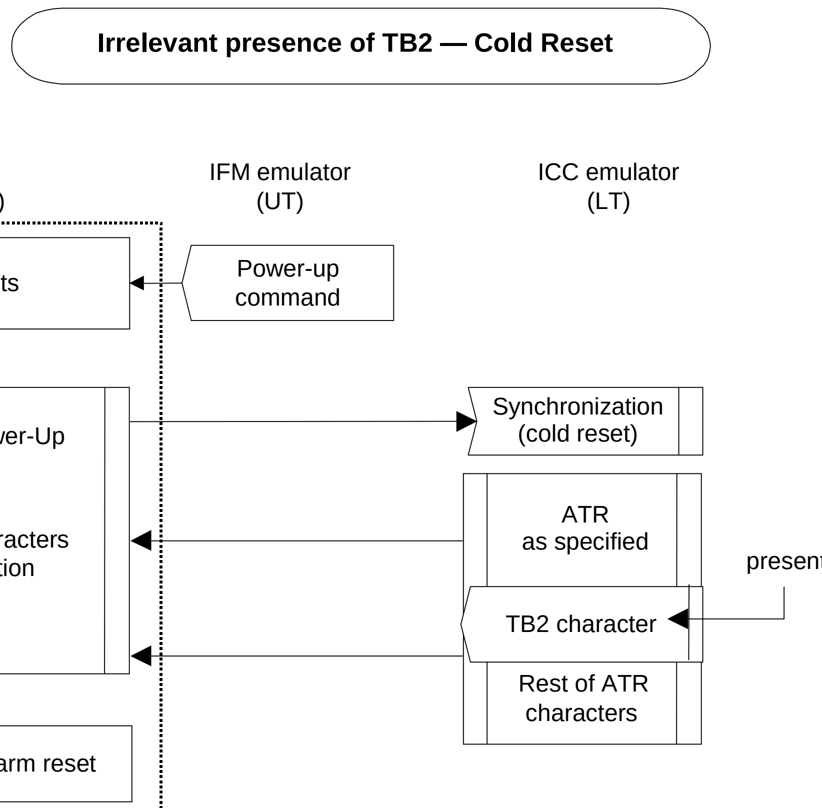
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.63. 1CE.069.00: Irrelevant presence of TB2 — Cold Reset

Test No. **1CE.069.00**

Objective: To ensure that the IUT rejects a cold ATR containing TB2.

Procedure:



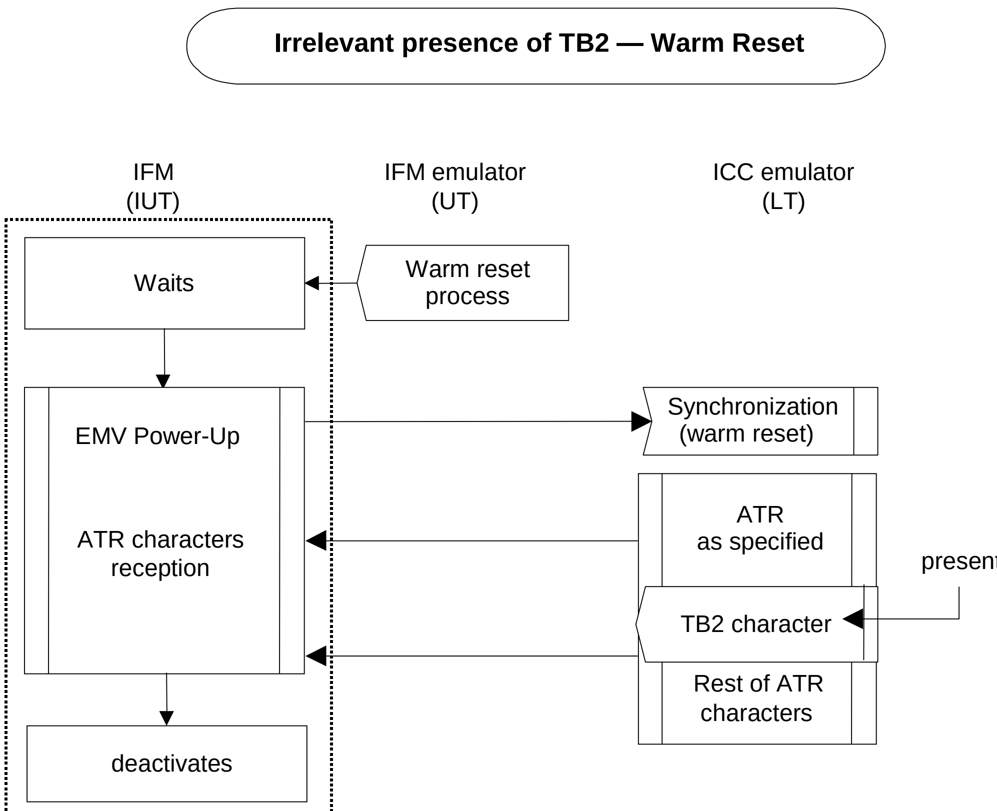
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.64. 1CE.070.00: Irrelevant presence of TB2 — Warm Reset

Test No. **1CE.070.00**

Objective: To ensure that the IUT rejects a warm ATR containing TB2.

Procedure:



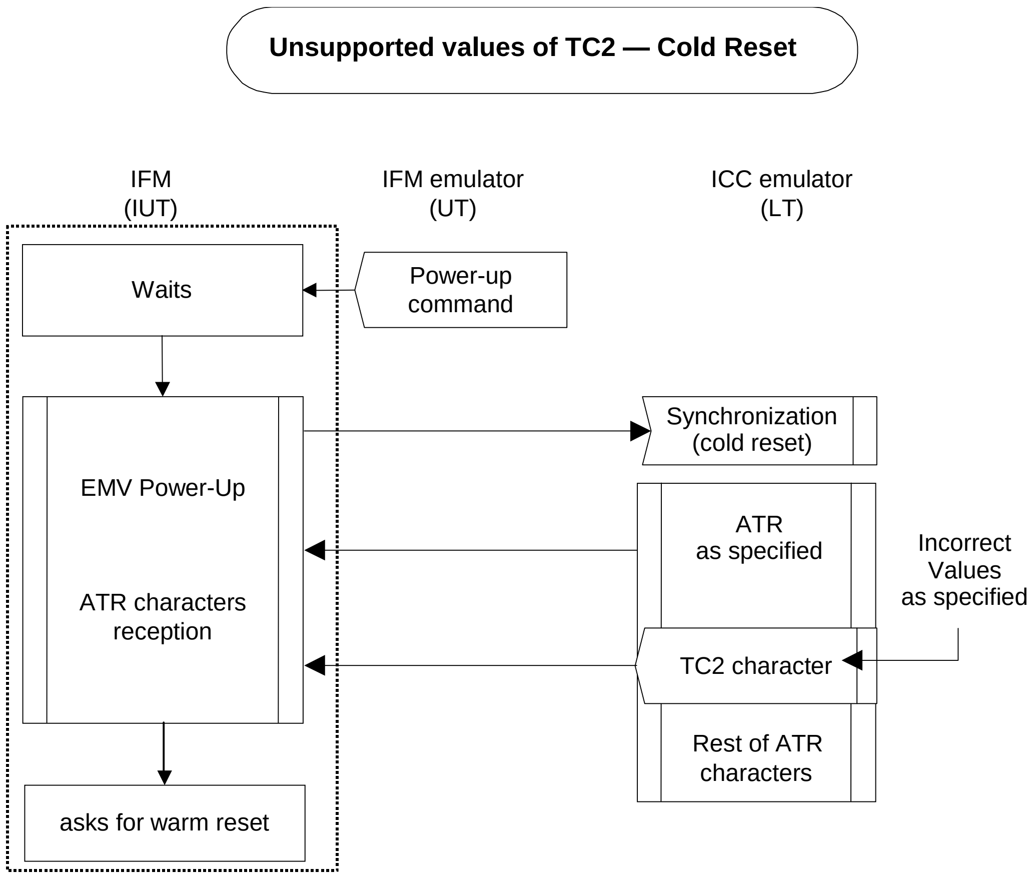
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.65. 1CE.071.0y: Unsupported Values of TC2 — Cold Reset

Test No. **1CE.071.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TC2.

Procedure:



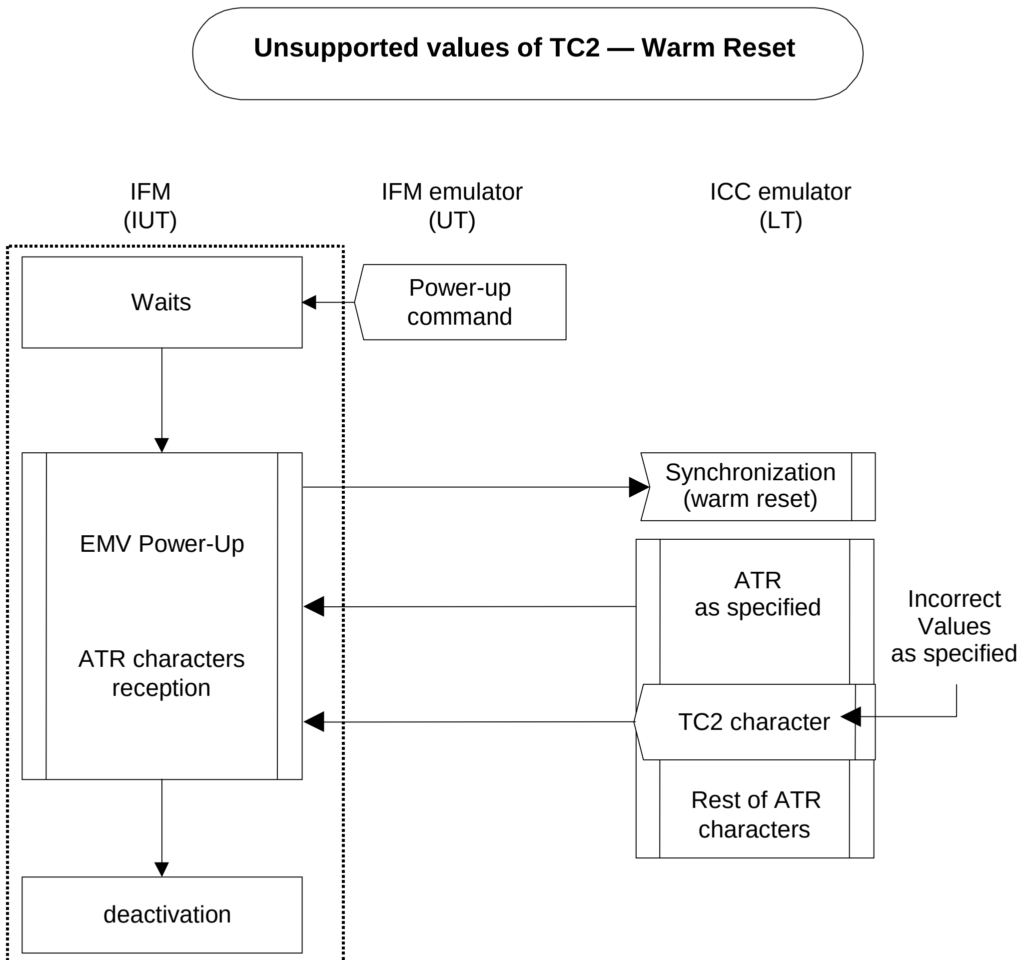
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.66. 1CE.072.0y: Unsupported Values of TC2 — Warm Reset

Test No. **1CE.072.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TC2.

Procedure:



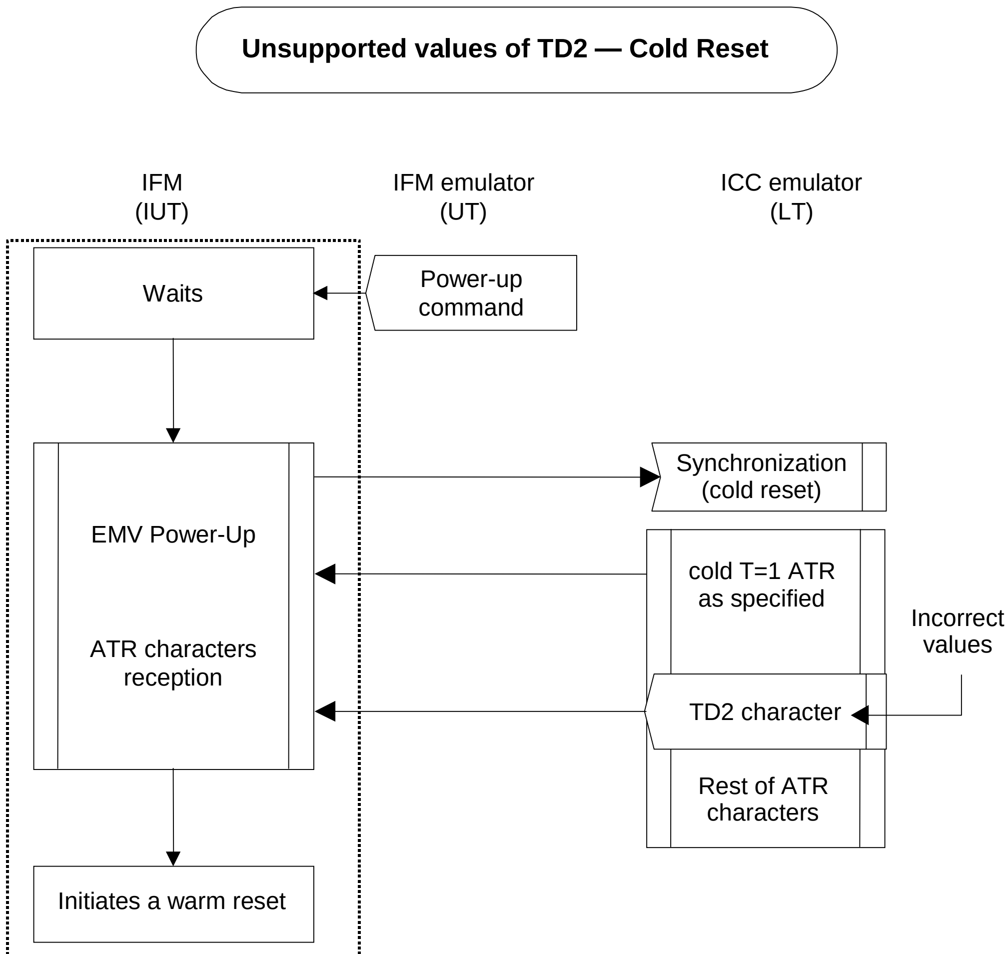
Pass Criteria: The IUT initiates a deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.67. 1CE.073.0y: Unsupported Values of TD2 — Cold Reset

Test No. **1CE.073.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TD2 (l.s. nibble).

Procedure:



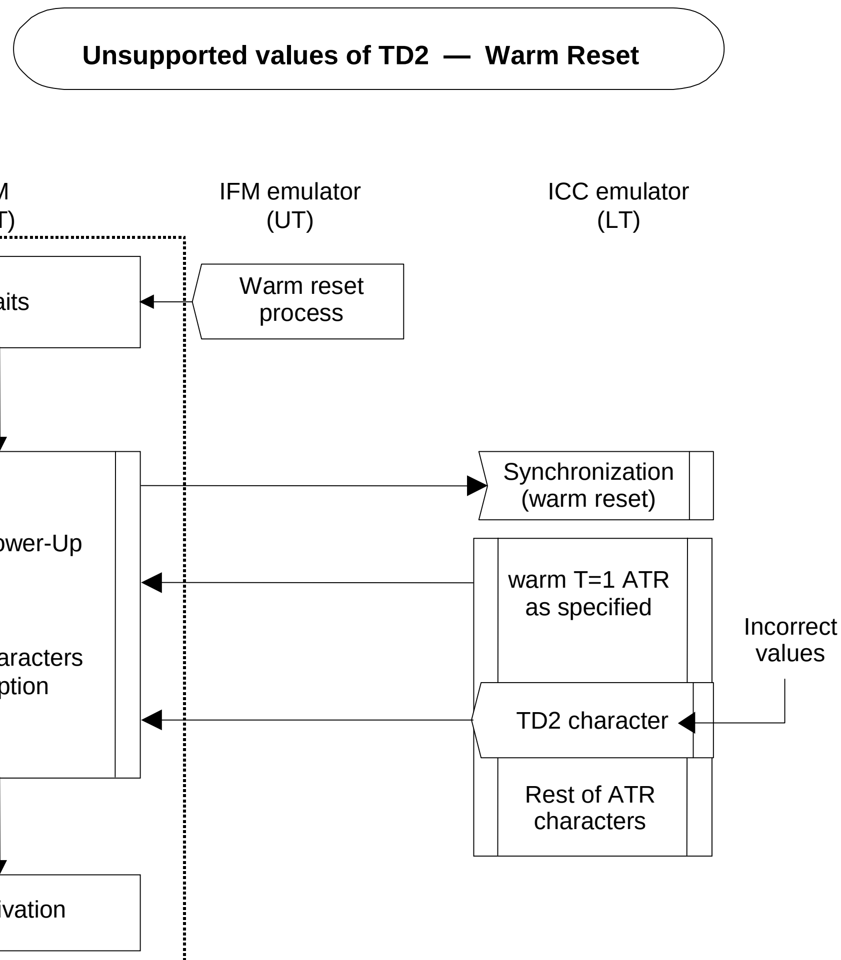
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.68. 1CE.074.0y: Unsupported Values of TD2 — Warm Reset

Test No. **1CE.074.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TD2 (l.s. nibble).

Procedure:



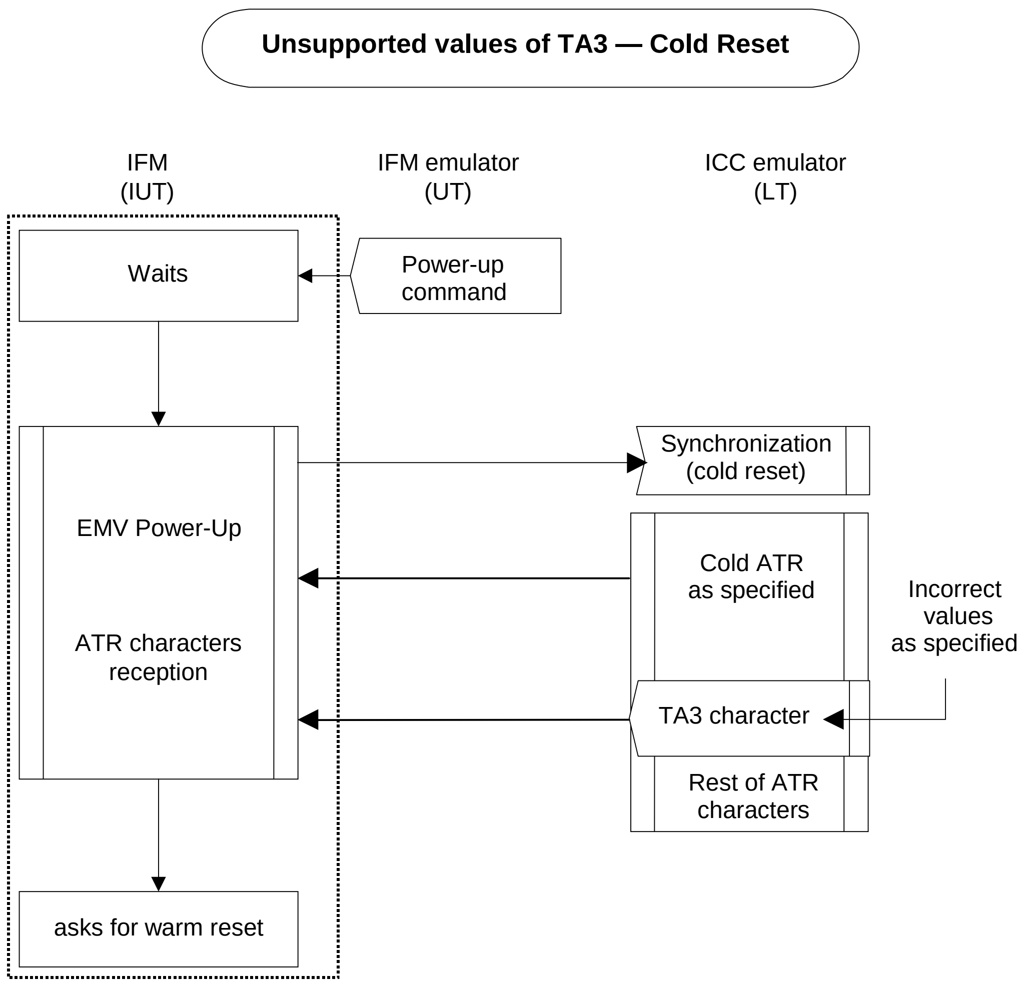
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.69. 1CE.075.0y: Unsupported Values of TA3 — Cold Reset

Test No. **1CE.075.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TA3.

Procedure:



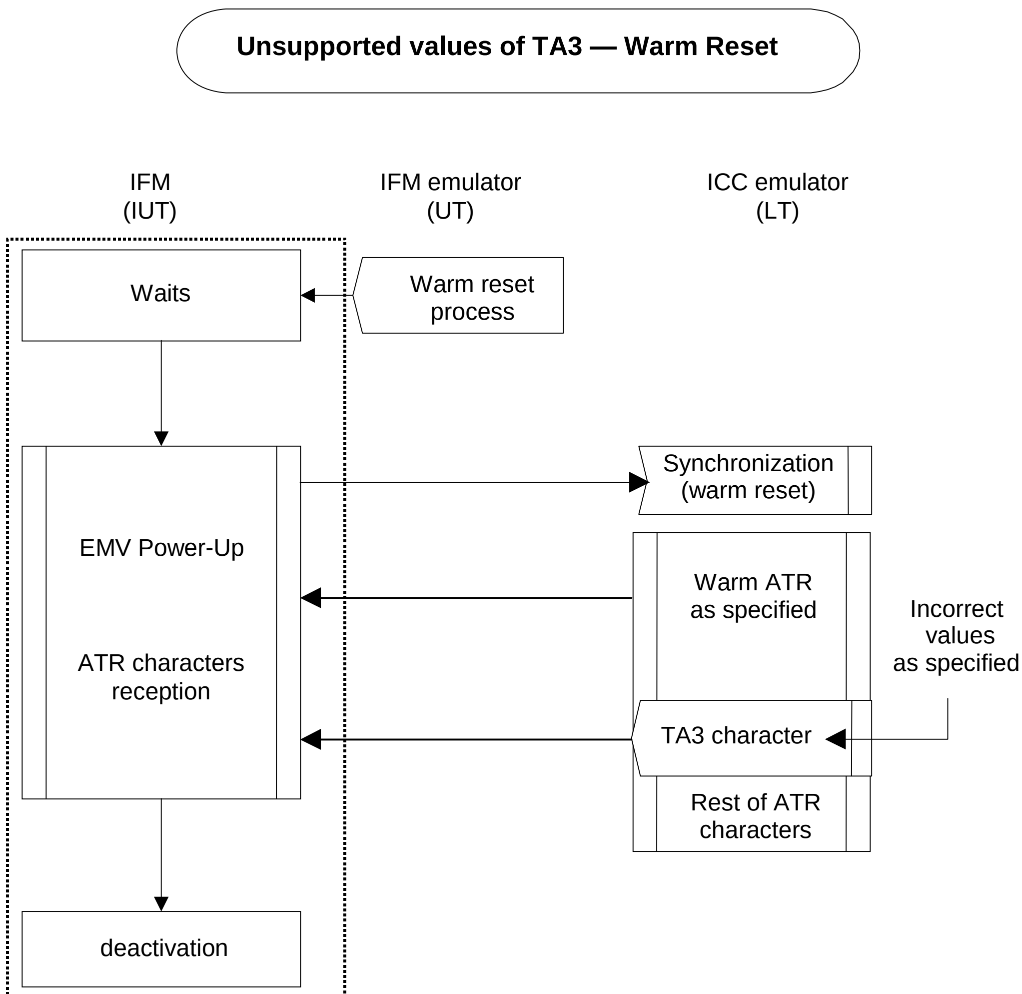
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.70. 1CE.076.0y: Unsupported Values of TA3 — Warm Reset

Test No. **1CE.076.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TA3.

Procedure:



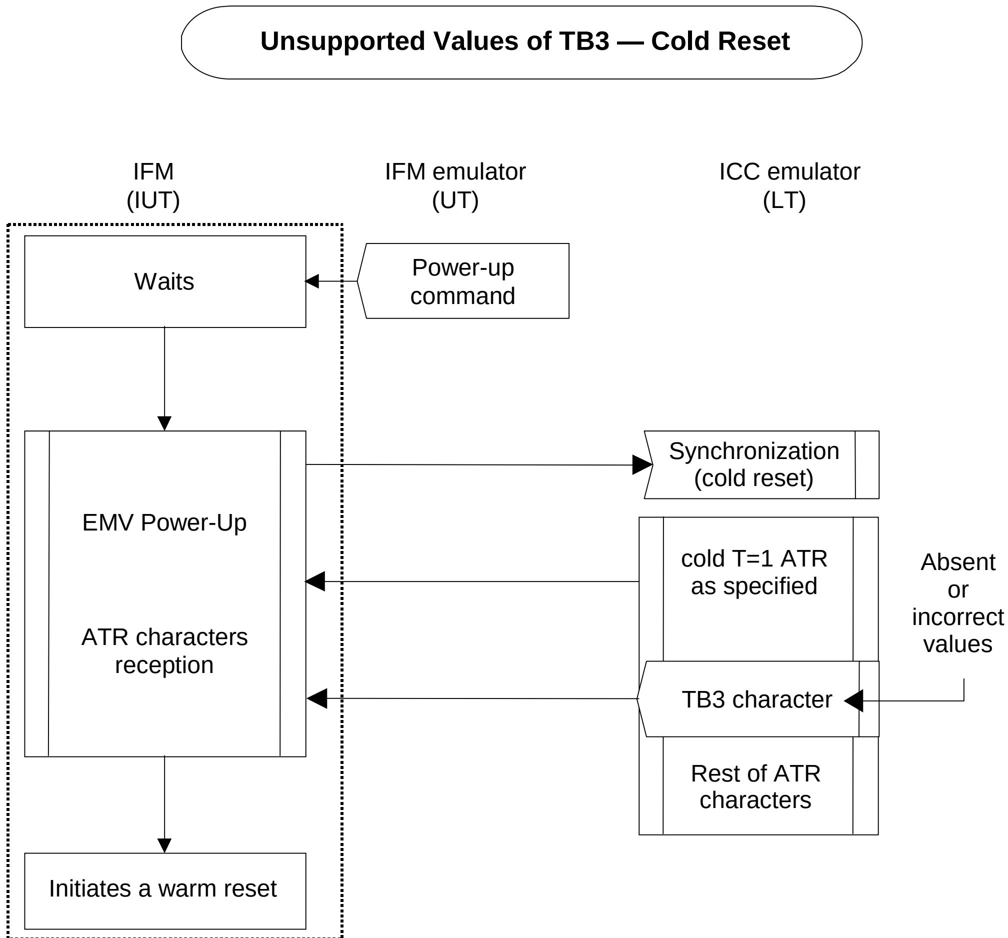
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.71. 1CE.077.0y: Unsupported Values of TB3 — Cold Reset

Test No. **1CE.077.0y**

Objective : To ensure that the IUT rejects a cold ATR containing an unsupported value of TB3.

Procedure:



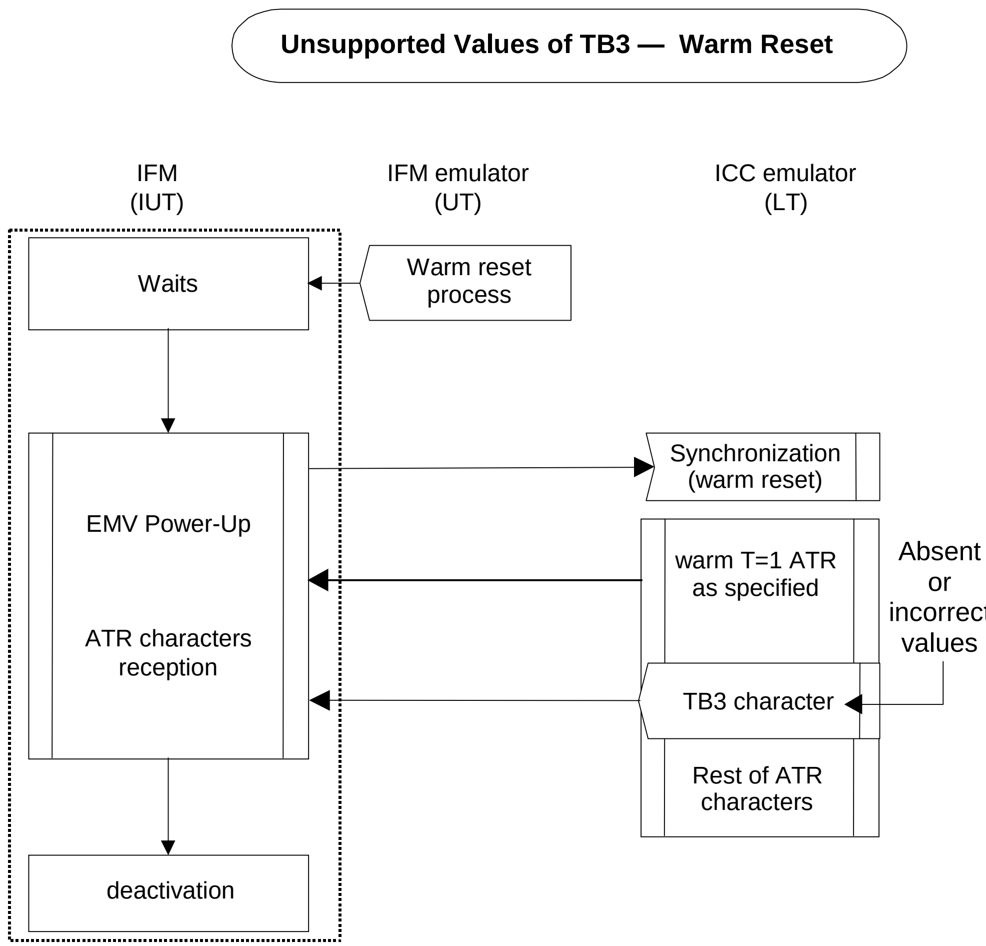
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.72. 1CE.078.0y: Unsupported Values of TB3 — Warm Reset

Test No. **1CE.078.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TB3.

Procedure:



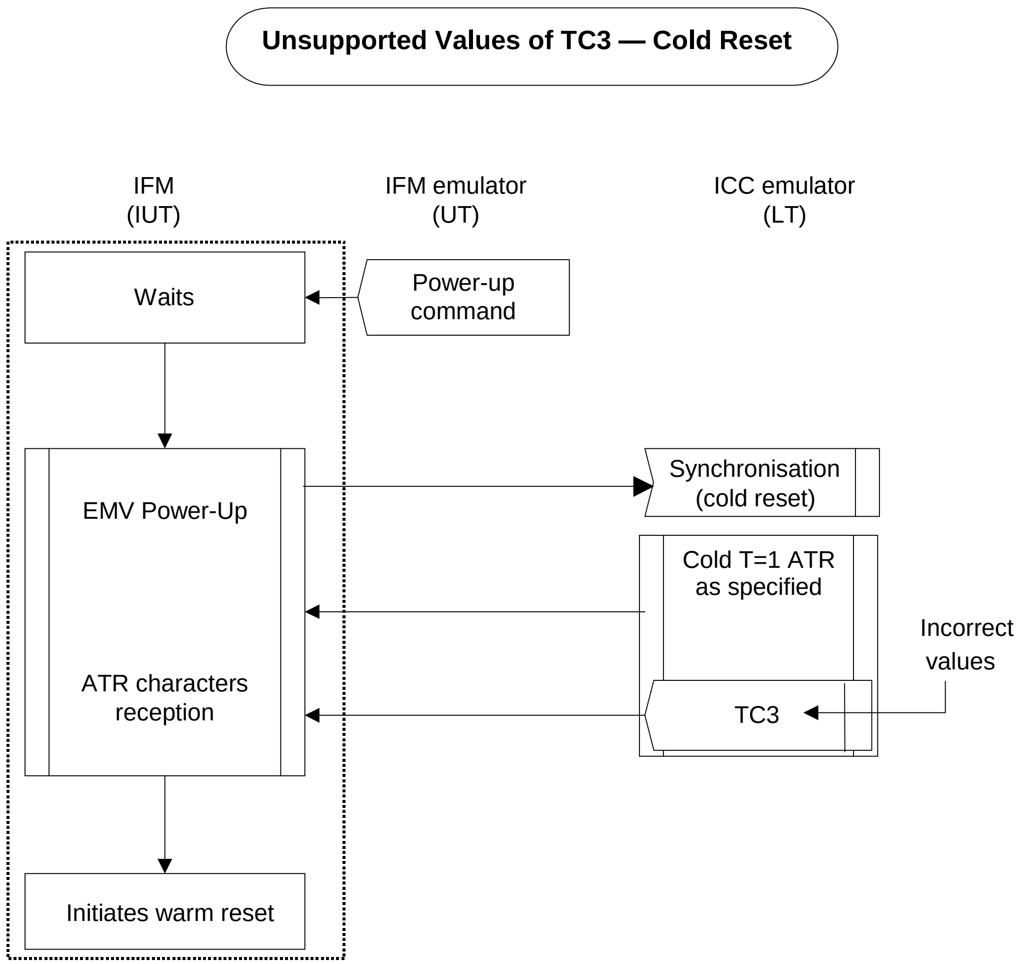
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.73. 1CE.079.0y: Unsupported Values of TC3 — Cold Reset

Test No. **1CE.079.0y**

Objective: To ensure that the IUT rejects a cold ATR containing an unsupported value of TC3.

Procedure:



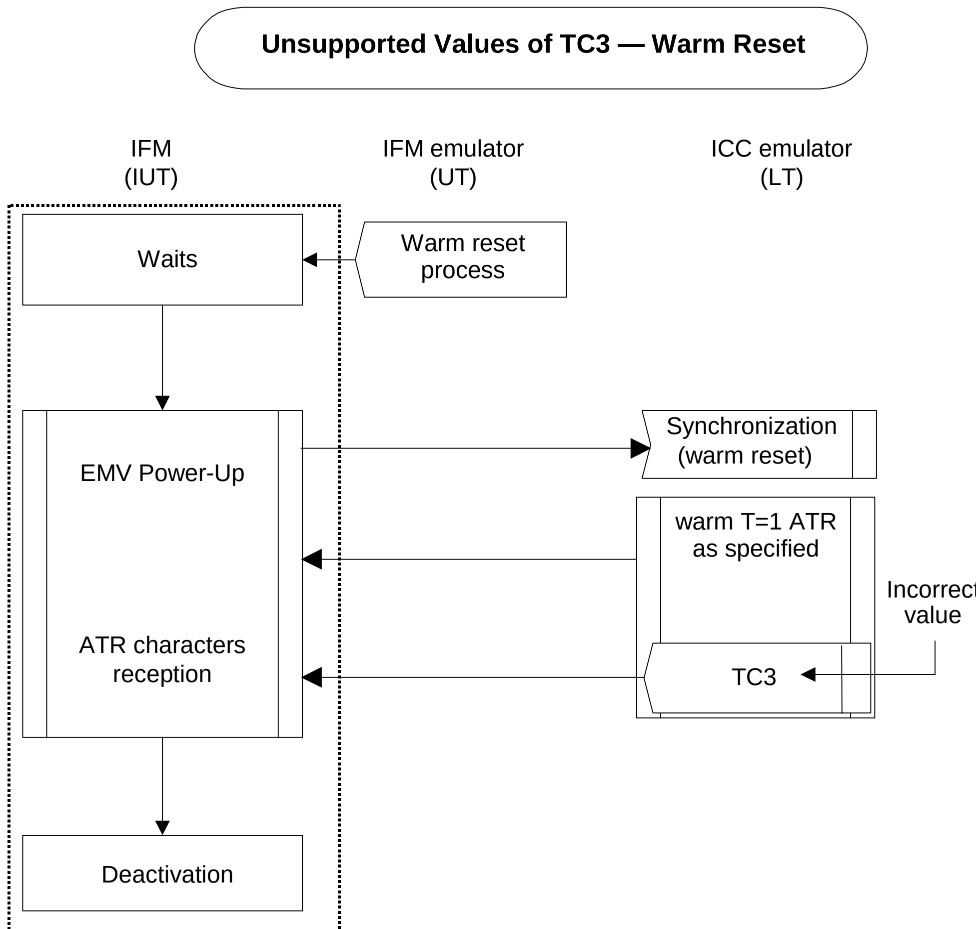
Pass Criteria: The IUT initiates a warm reset within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.74. 1CE.080.0y: Unsupported Values of TC3 — Warm Reset

Test No. **1CE.080.0y**

Objective: To ensure that the IUT rejects a warm ATR containing an unsupported value of TC3.

Procedure:



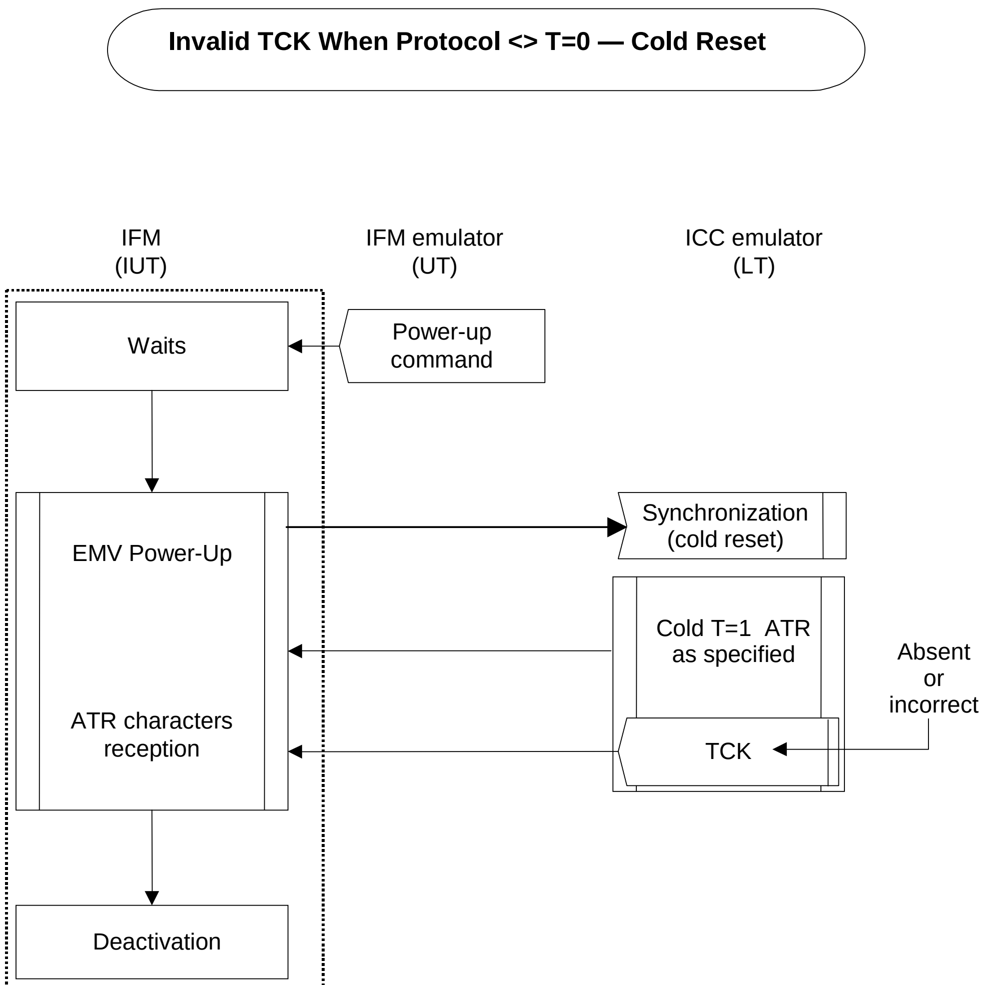
Pass Criteria: The IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the warm ATR to the time that RST is set low.

6.2.75. 1CE.081.0y: Invalid TCK When Protocol <> T=0 — Cold Reset

Test No. **1CE.081.0y**

Objective: To ensure that the IUT rejects a cold ATR not containing TCK or containing an incorrect TCK if the protocol used is not T=0.

Procedure:



Pass Criteria:

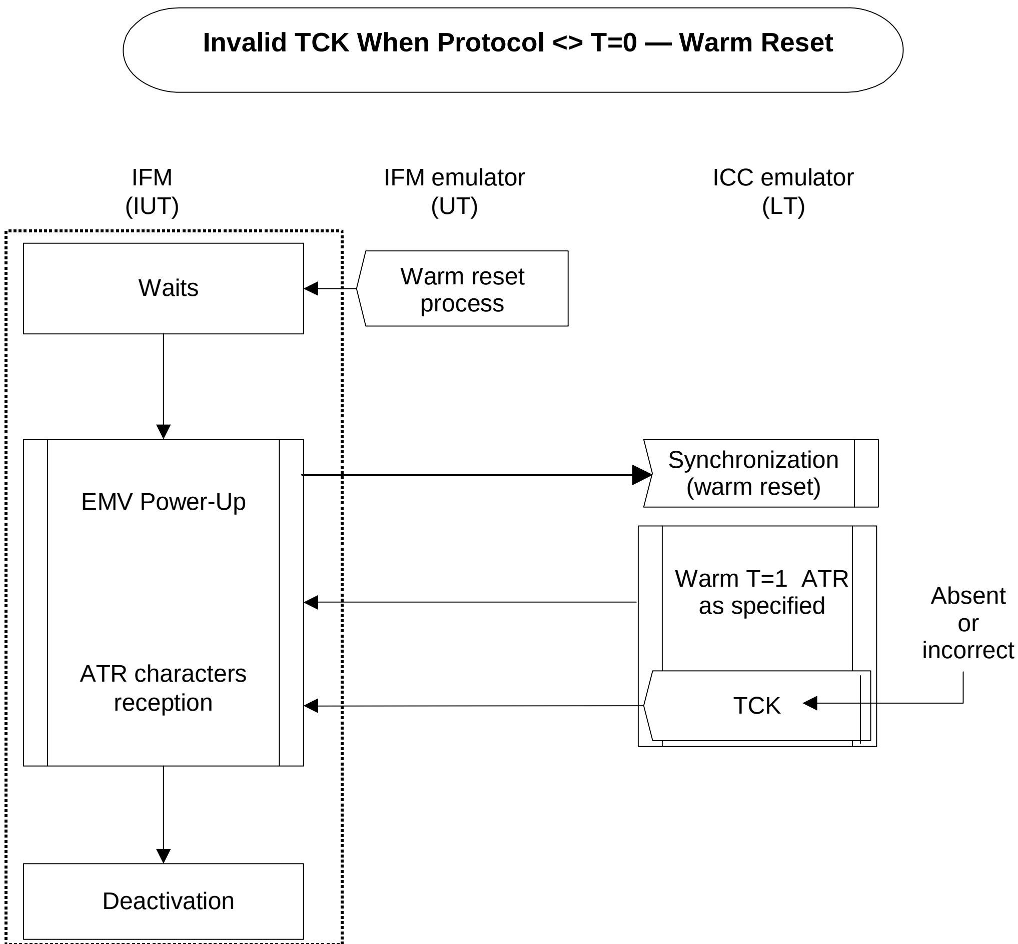
- For TCK missing, the IUT initiates the deactivation sequence within 14,400 initial etus measured from the leading edge of the start bit of the last character of the cold ATR to the time that RST is set low.
- For TCK incorrect, the IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

6.2.76. 1CE.082.0y: Invalid TCK When Protocol <> T=0 — Warm Reset

Test No. **1CE.082.0y**

Objective: To ensure that the IUT rejects a warm ATR not containing TCK or containing an incorrect TCK if the protocol used is not T=0.

Procedure:



Pass Criteria:

- For TCK missing, the IUT initiates the deactivation sequence within 14,400 initial etus measured from the leading edge of the start bit of the last character of the warm ATR to the time that RST is set low.
- For TCK incorrect, the IUT initiates the deactivation sequence within 24,000 initial etus measured from the leading edge of the start bit of the TS character of the cold ATR to the time that RST is set low.

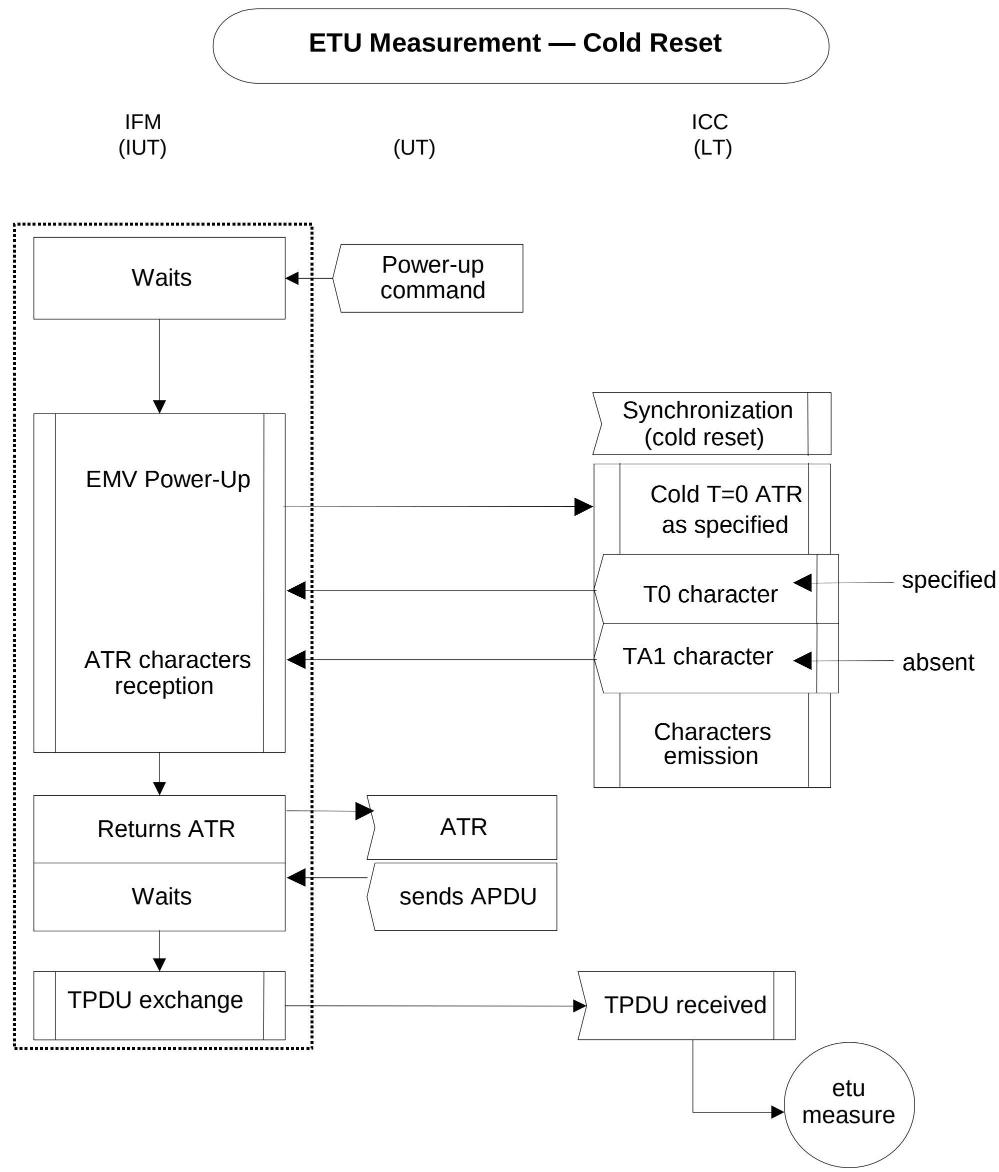
6.3. Protocol Tests T=0

6.3.1. 1CF.001.00: ETU Measurement — Cold Reset

Test No. **1CF.001.00**

Objective: To ensure that the IUT, when having received a basic T=0 cold ATR, continues using the default values of D=1 and F=372 during subsequent exchanges.

Procedure:



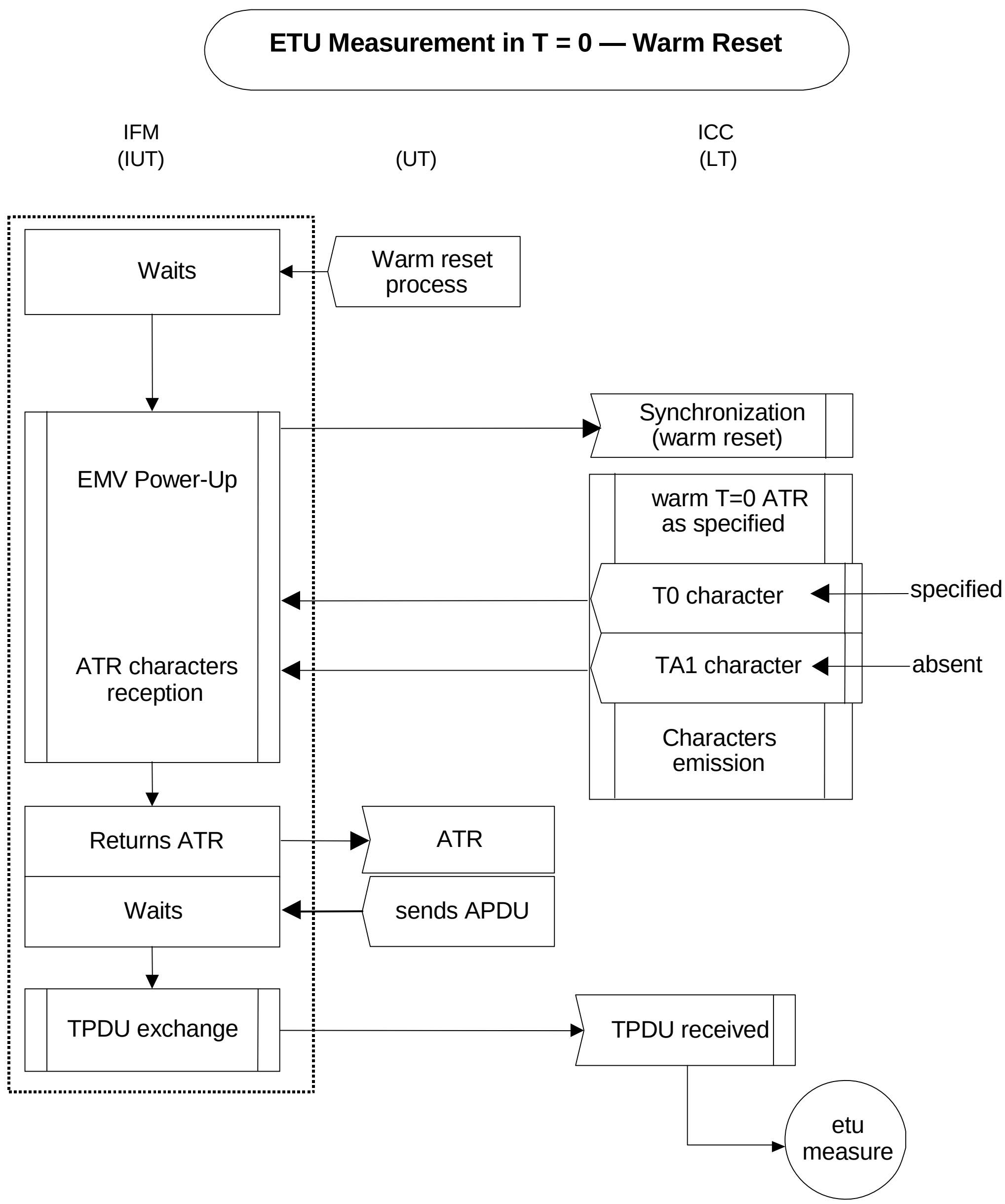
Pass Criteria: The IUT continues the card session using a current etu having a value of 372/f seconds, the same as the initial etu.

6.3.2. 1CF.002.00: ETU Measurement — Warm Reset

Test No. **1CF.002.00**

Objective: To ensure that the IUT, when having received a basic T=0 warm ATR, continues using the default values of D=1 and F=372 during subsequent exchanges.

Procedure:



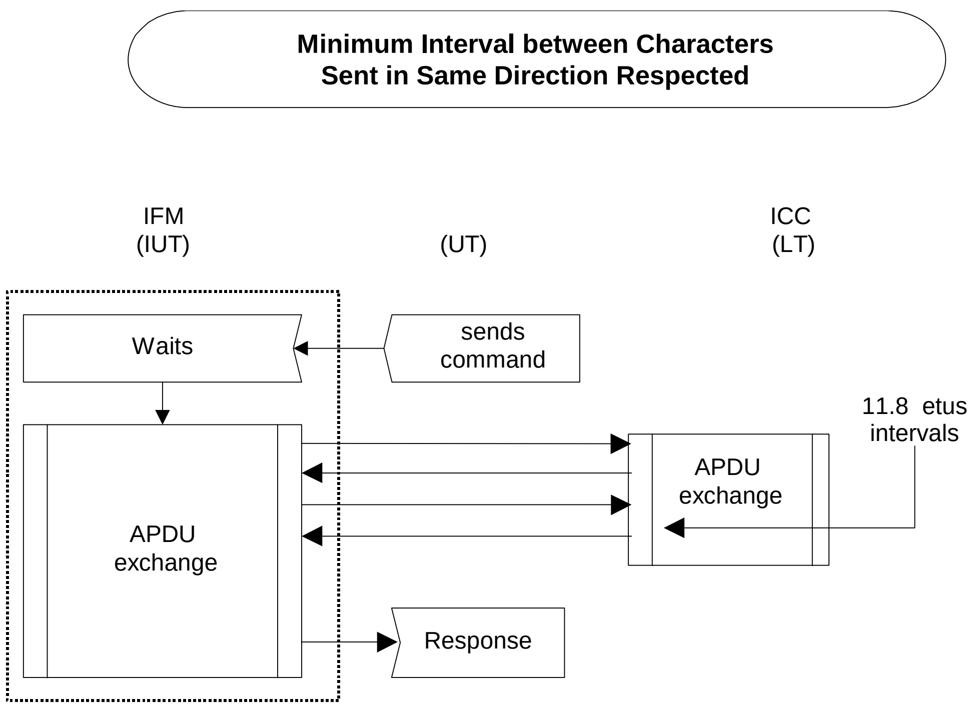
Pass Criteria: The IUT continues the card session with a current etu having a value of 372/f seconds, the same as the initial etu.

6.3.3. 1CF.003.00: Minimum Interval between Characters Sent in Same Direction Respected

Test No. **1CF.003.00**

Objective: To ensure that the IUT correctly receives characters sent with a minimum character-to-character timing of 11.8 etus.

Procedure:



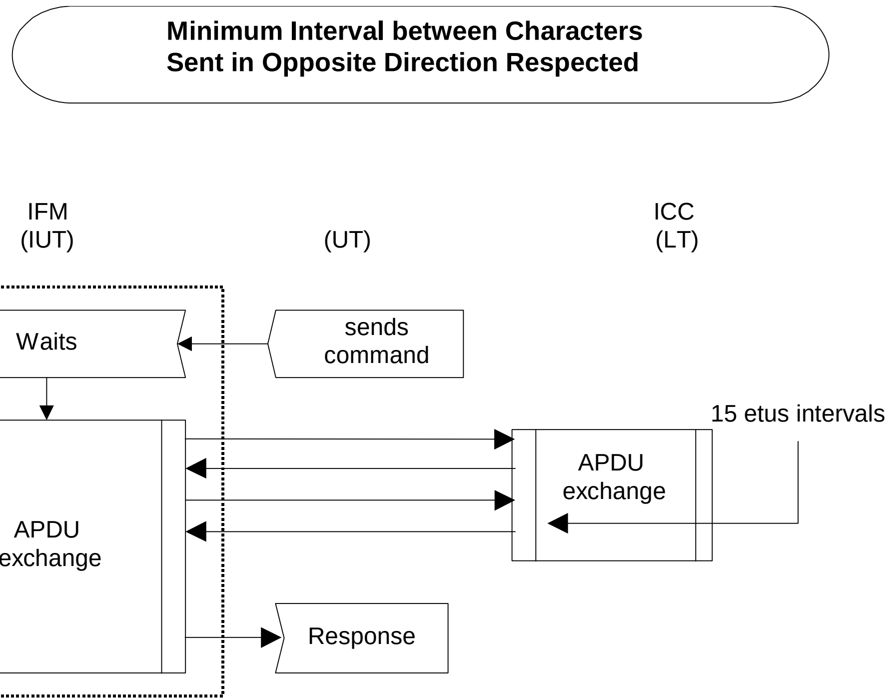
Pass Criteria: The IUT accepts and understands the characters and continues the card session.

6.3.4. 1CF.004.00: Minimum Interval between Characters Sent in Opposite Direction Respected

Test No. **1CF.004.00**

Objective: To ensure that the IUT correctly receives a character sent as early as 15 etus after the last character from the IUT.

Procedure



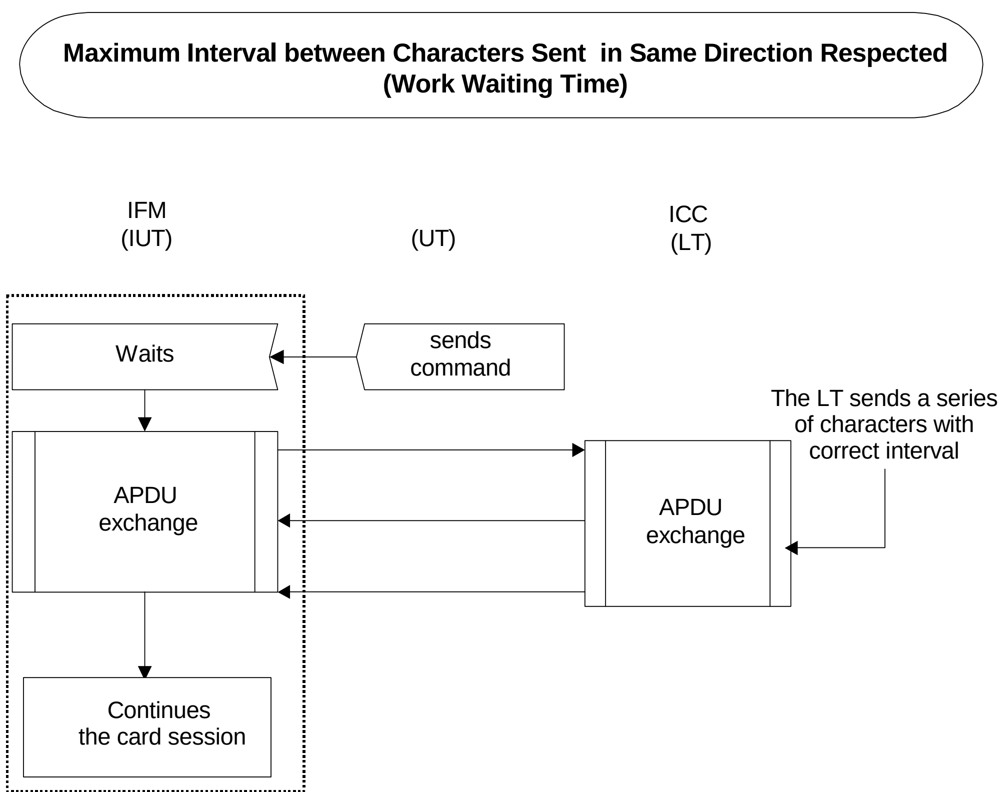
Pass Criteria: The IUT accepts and understands the characters and continues the card session.

6.3.5. 1CF.005.0y: Maximum Interval between Characters Sent in Same Direction Respected (Work Waiting Time)

Test No. **1CF.005.0y**

Objective : To ensure that the IUT correctly receives characters sent with a maximum inter-character timing of the Work Waiting Time + D * 480 etus.

Procedure:



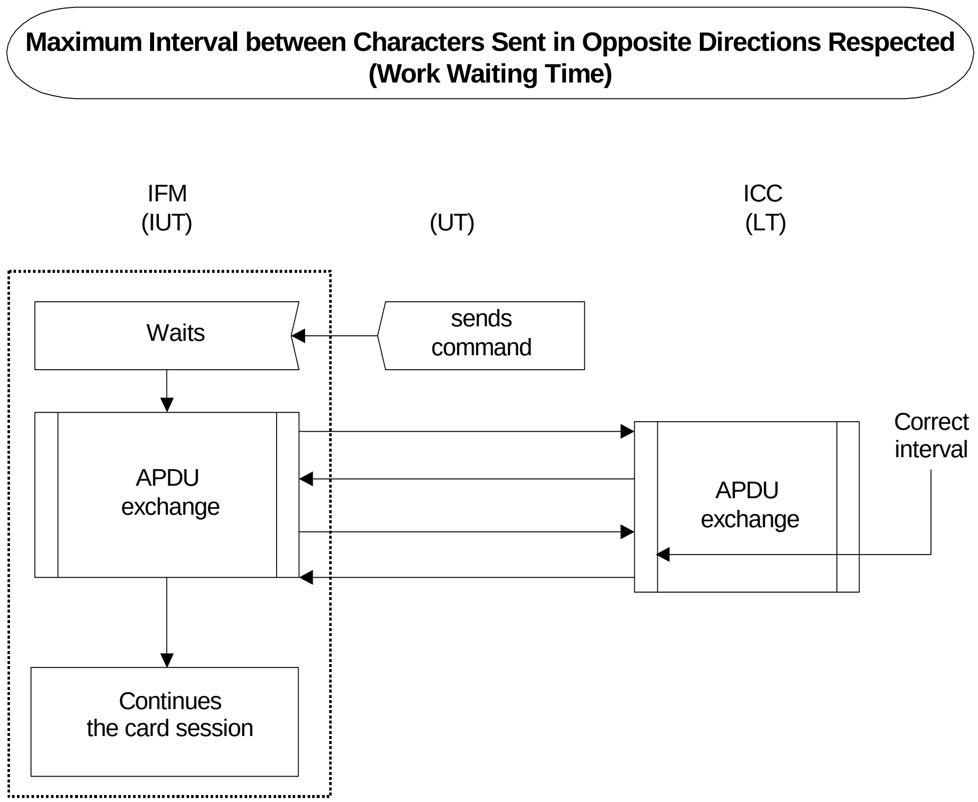
Pass Criteria: The IUT accepts the characters and continues the card session.

6.3.6. 1CF.006.0y: Maximum Interval between Characters Sent in Opposite Directions Respected (Work Waiting Time)

Test No. **1CF.006.0y**

Objective: To ensure that the IUT correctly receives a character sent as late as the Work Waiting Time + D * 480 etus after the last character from the IUT.

Procedure:



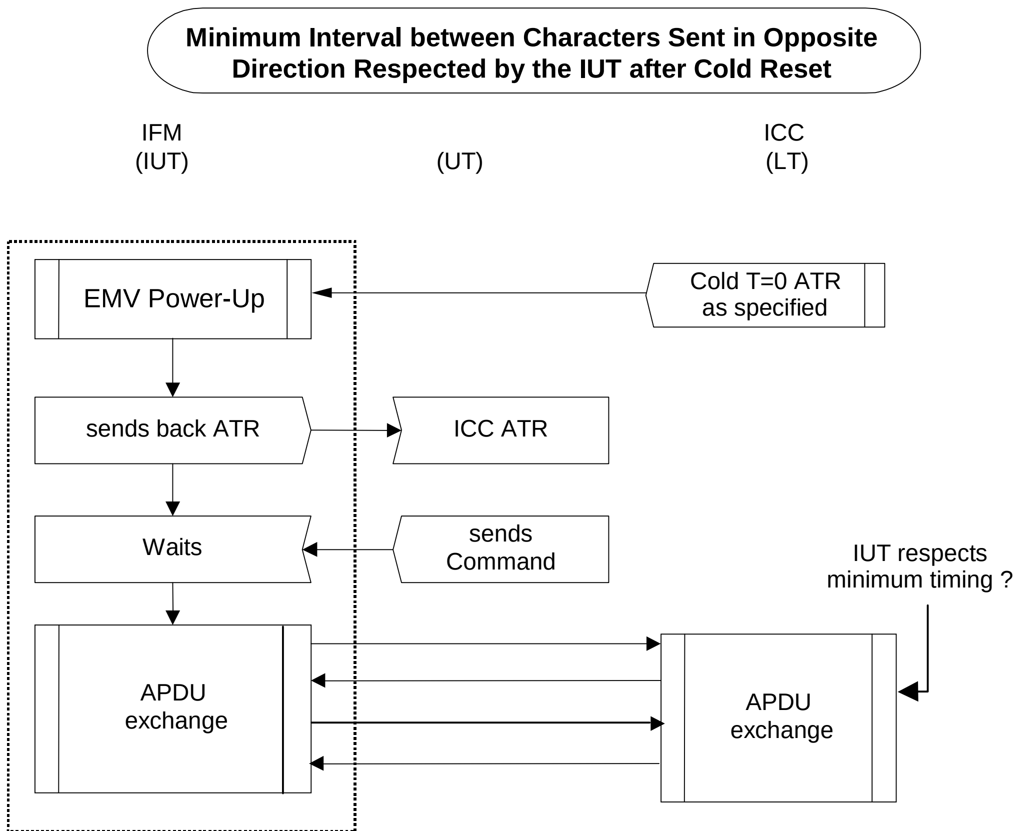
Pass Criteria: The IUT accepts the character and continues the card session.

6.3.7. 1CF.007.00: Minimum Interval between Characters Sent in Opposite Direction Respected by the IUT after Cold Reset

Test No. **1CF.007.00**

Objective: To ensure that the IUT respects the minimum interval of 16 etus when, having received a character from the LT (including the last character of the ATR, it sends a character in the opposite direction.

Procedure:



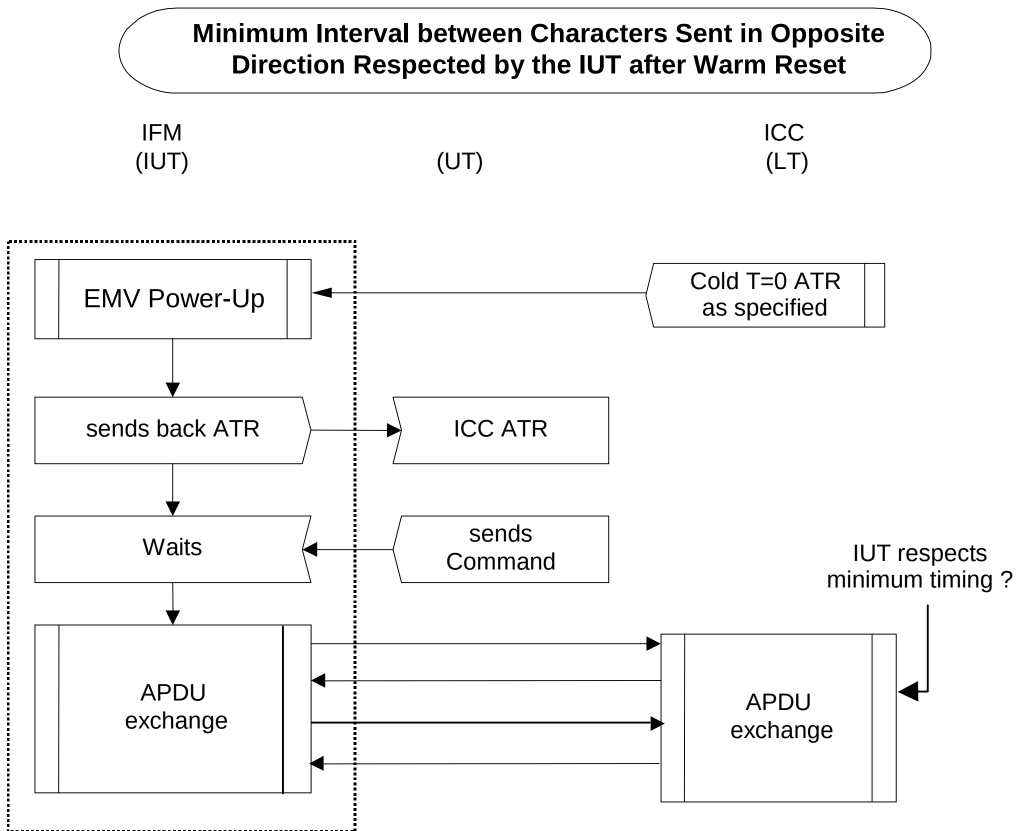
Pass Criteria: After reception of the cold ATR, the IUT systematically continues the card session with an interval measured between the first character it sends and the previous character sent by the LT, equal to or greater than 16 etus.

6.3.8. 1CF.008.00: Minimum Interval between Characters Sent in Opposite Direction Respected by the IUT after Warm Reset

Test No. **1CF.008.00**

Objective: To ensure that the IUT respects the minimum interval of 16 etus when, having received a character from the LT (including the last character of the ATR, it sends a character in the opposite direction.

Procedure:



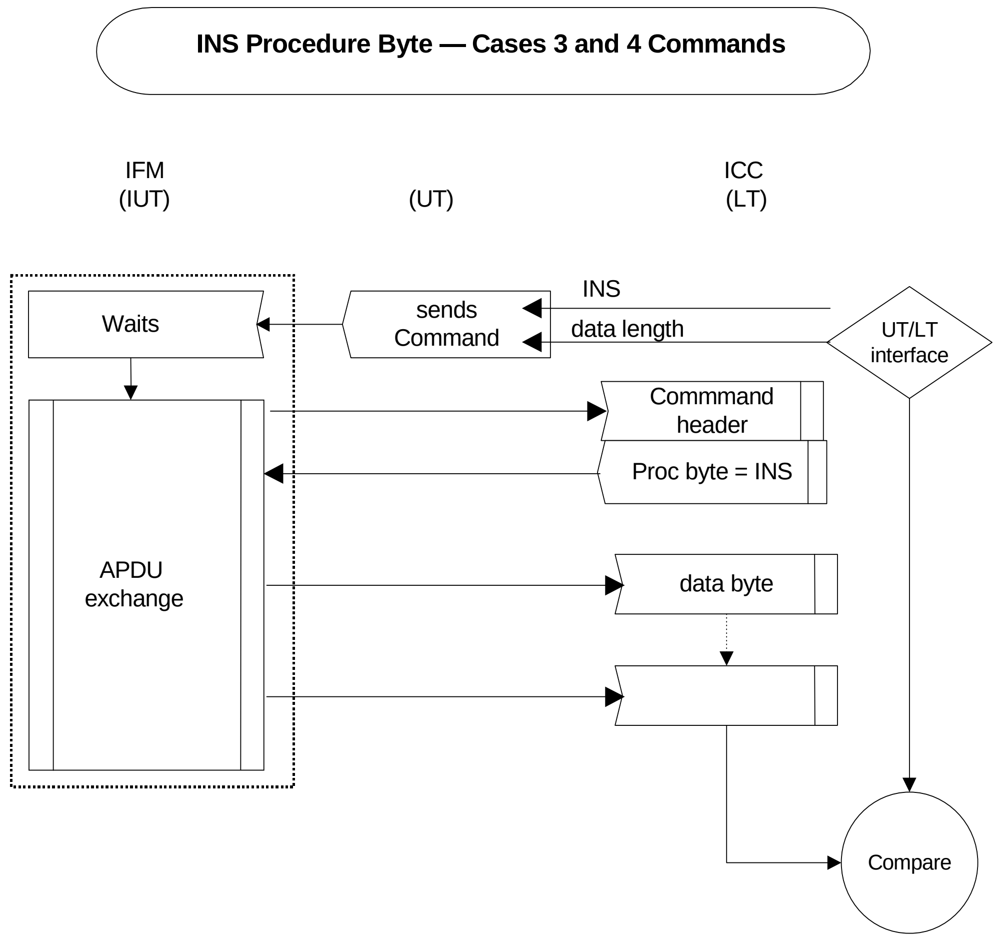
Pass Criteria: After reception of the warm ATR, the IUT systematically continues the card session with an interval measured between the first character it sends and the previous character sent by the LT, equal to or greater than 16 etus.

6.3.9. 1CF.009.00: INS Procedure Byte — Cases 3 and 4 Commands

Test No. **1CF.009.00**

Objective: To ensure that when the procedure byte value is equal to the INS byte, the IUT transfers all remaining data bytes.

Procedure:



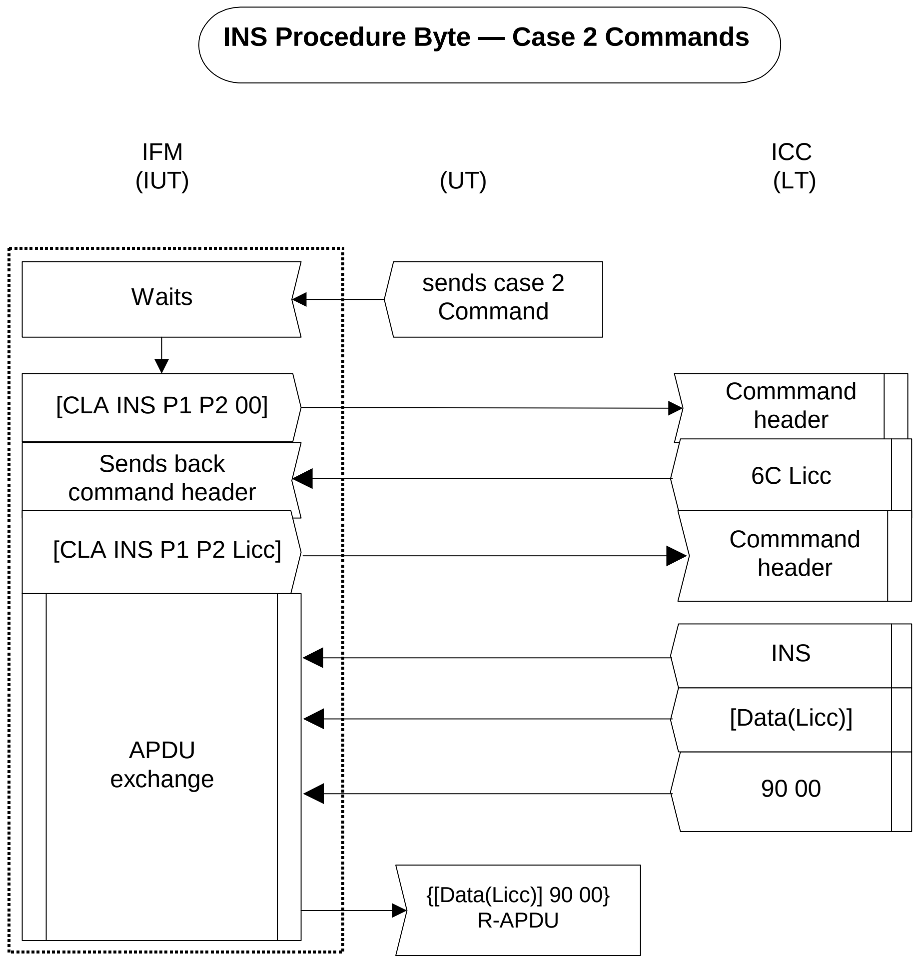
Pass Criteria: After receipt of the INS procedure byte, the IUT sends the correct number of characters as indicated by Lc in the command header.

6.3.10. 1CF.010.00: INS Procedure Byte — Case 2 Commands

Test No. **1CF.010.00**

Objective: To ensure that, when the procedure byte value is equal to the INS byte, the IUT is ready to receive all remaining data bytes from the LT.

Procedure:



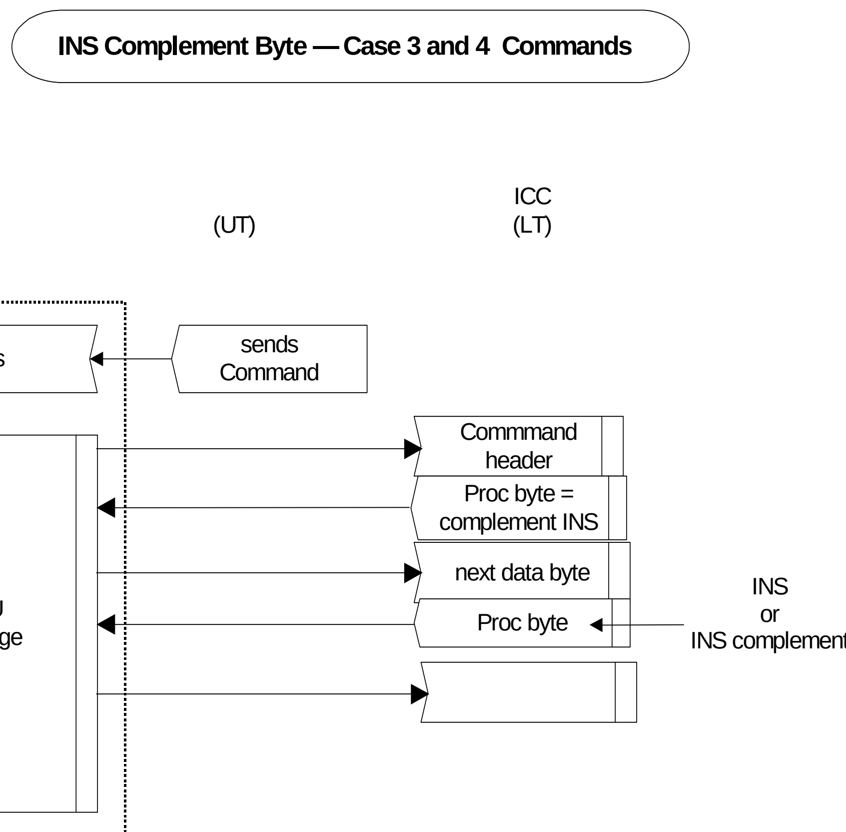
Pass Criteria: The IUT accepts the data transmitted by the LT (followed by ‘9000’) and continues the card session.

6.3.11. 1CF.011.0y: INS Complement Byte — Case 3 and 4 Commands

Test No. **1CF.011.0y**

Objective: To ensure that when the procedure byte returned to the IUT is equal to the complement of the INS byte, the next data byte is transferred by the IUT.

Procedure:



Pass Criteria: The IUT conforms with the procedure bytes:

- y=0: the IUT transmits a single data byte for each complement of the INS procedure byte received and continues the card session

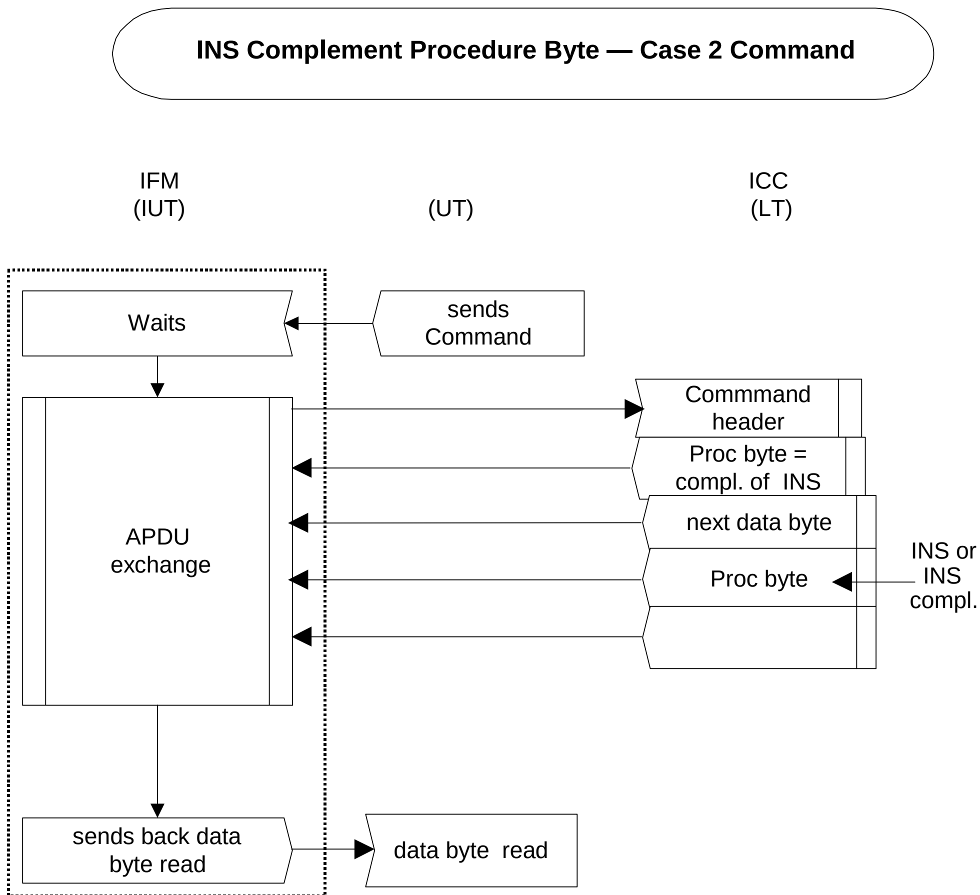
- y=1: the IUT transmits the first data bytes (byte per byte under the control of the INS complemented) on receipt of all complements of the INS procedure byte and the rest of data on receipt of INS procedure byte and continues the card session.

6.3.12. 1CF.012.0y: INS Complement Procedure Byte — Case 2 Command

Test No. **1CF.012.0y**

Objective: To ensure that, when the procedure byte is equal to complement of the INS byte, the IUT is ready to receive the next data byte from the LT.

Procedure:



Pass Criteria:

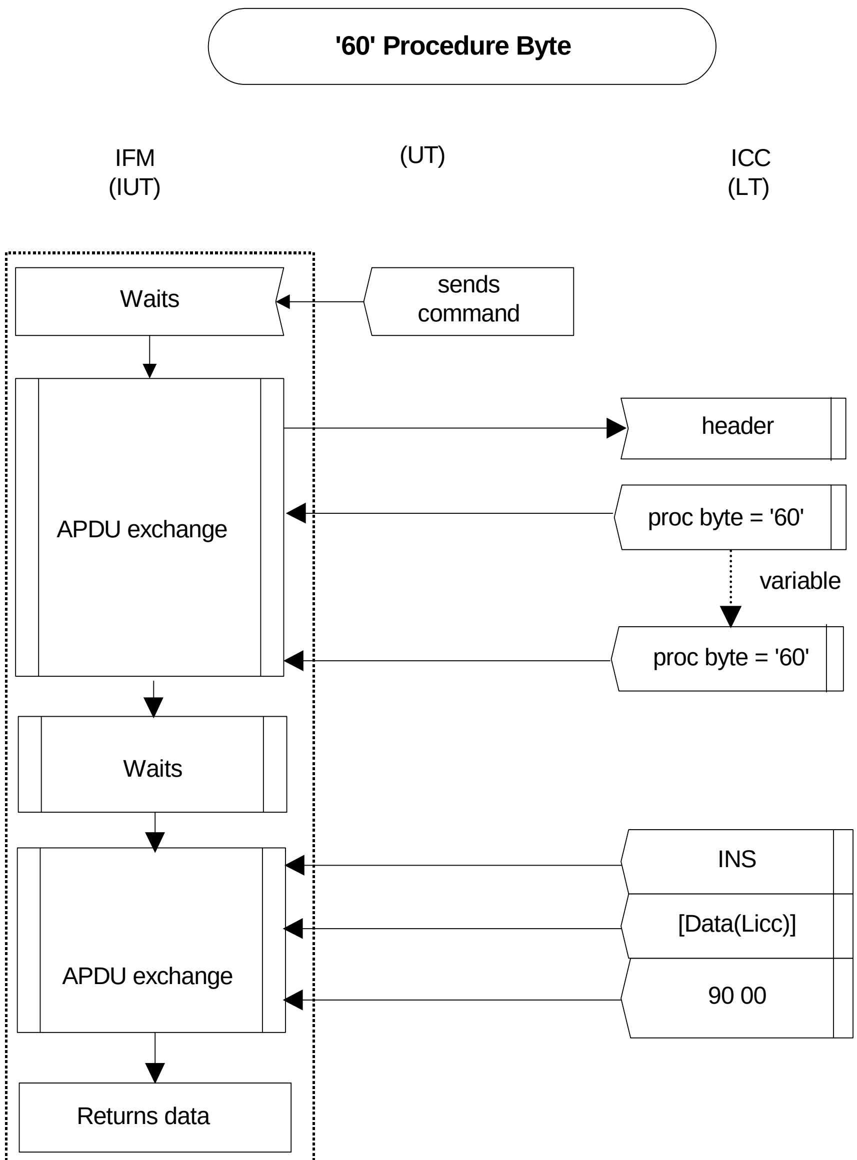
- y = 0: the IUT accepts the data sent by the LT byte by byte and continues the card session.
- y = 1: the first data bytes are accepted (byte per byte under the control of the INS complemented) on receipt of all the INS complement bytes, then the rest of the data on receipt of INS procedure byte, and continues the card session.

6.3.13. 1CF.013.0y: ‘60’ Procedure Byte

Test No. **1CF.013.0y**

Objective: To ensure that the IUT grants additional work waiting time on receipt of a ‘60’ procedure byte.

Procedure:



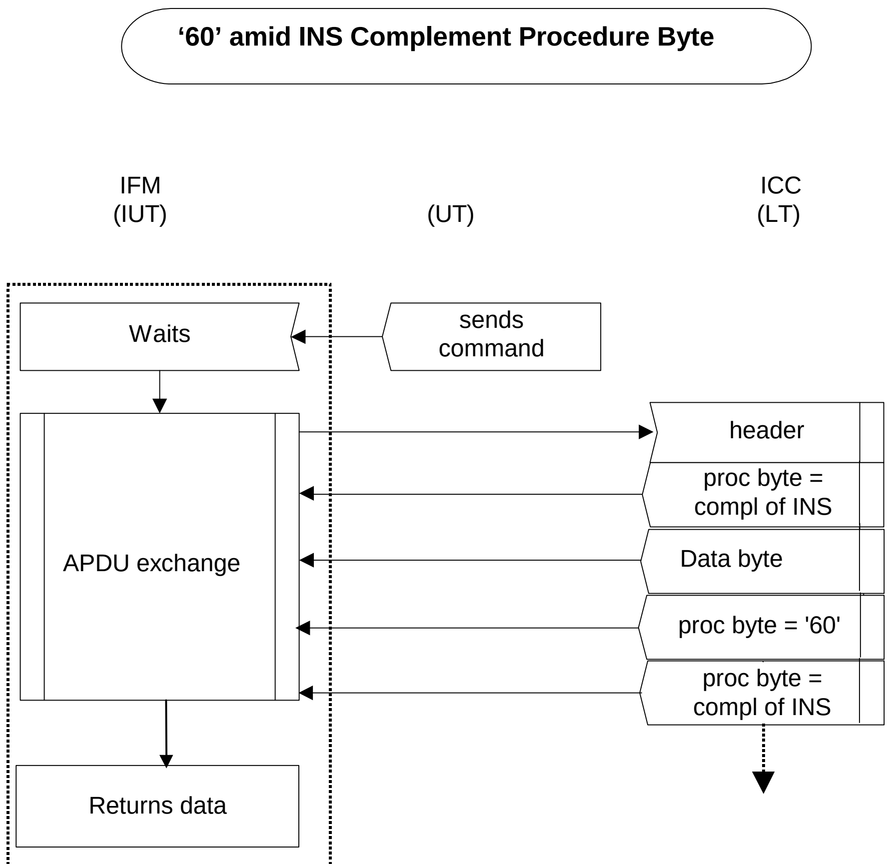
Pass Criteria: The IUT waits the additional work waiting time following receipt of the ‘60’ procedure byte, and continues the card session.

6.3.14. 1CF.014.0y: ‘60’ amid INS Complement Procedure Byte

Test No. **1CF.014.0y**

Objective: To ensure that when the procedure byte ‘60’ is sent amidst data transmission or reception, the IUT grants additional work waiting time and does not regard ‘60’ as a data byte.

Procedure:



Pass Criteria:

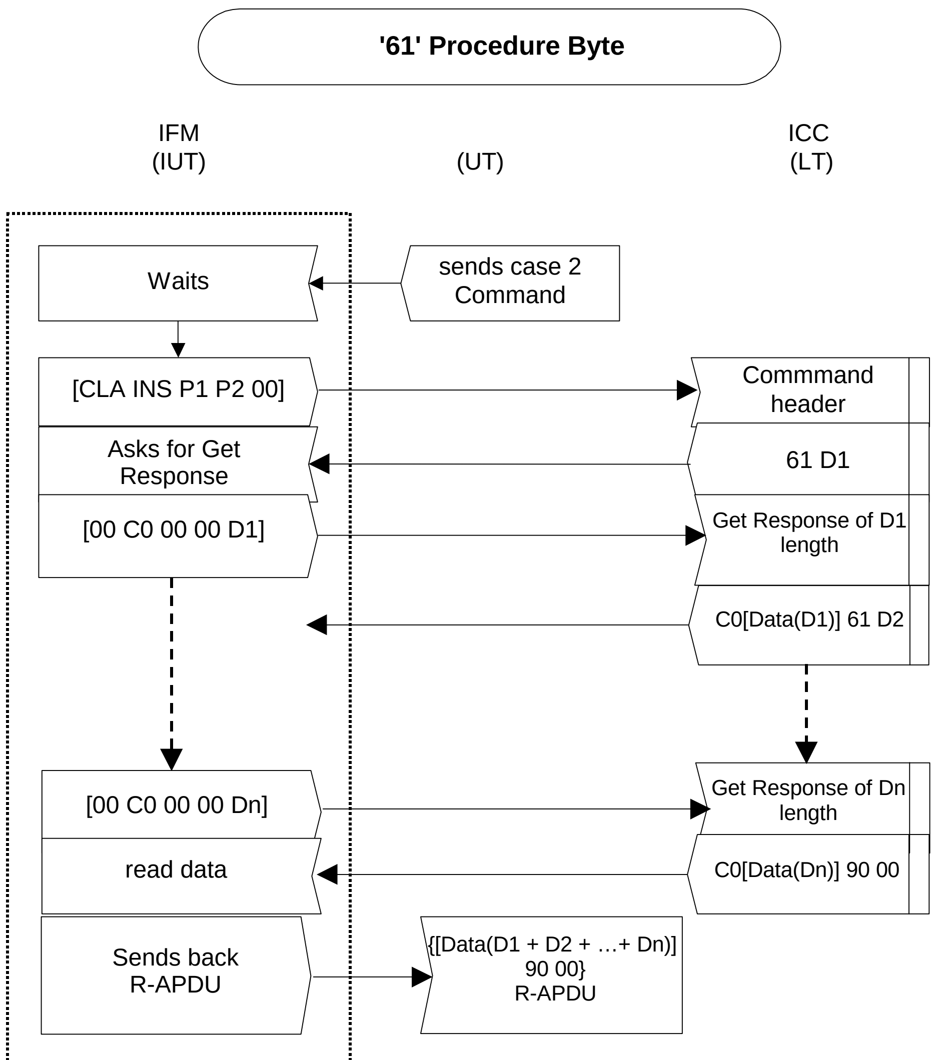
- y=0: the IUT accepts the data sent by the LT byte by byte and continues the card session.
- y=1: the IUT sends the data byte by byte and continues the card session.

6.3.15. 1CF.015.0y: '61' Procedure Byte — Case 2 Command

Test No. **1CF.015.0y**

Objective: To ensure that on receipt of a '61' procedure byte, the IUT waits for a further procedure byte and then sends a GET RESPONSE command header to the LT with a maximum length of 'xx', where 'xx' is the value of the second procedure byte.

Procedure:



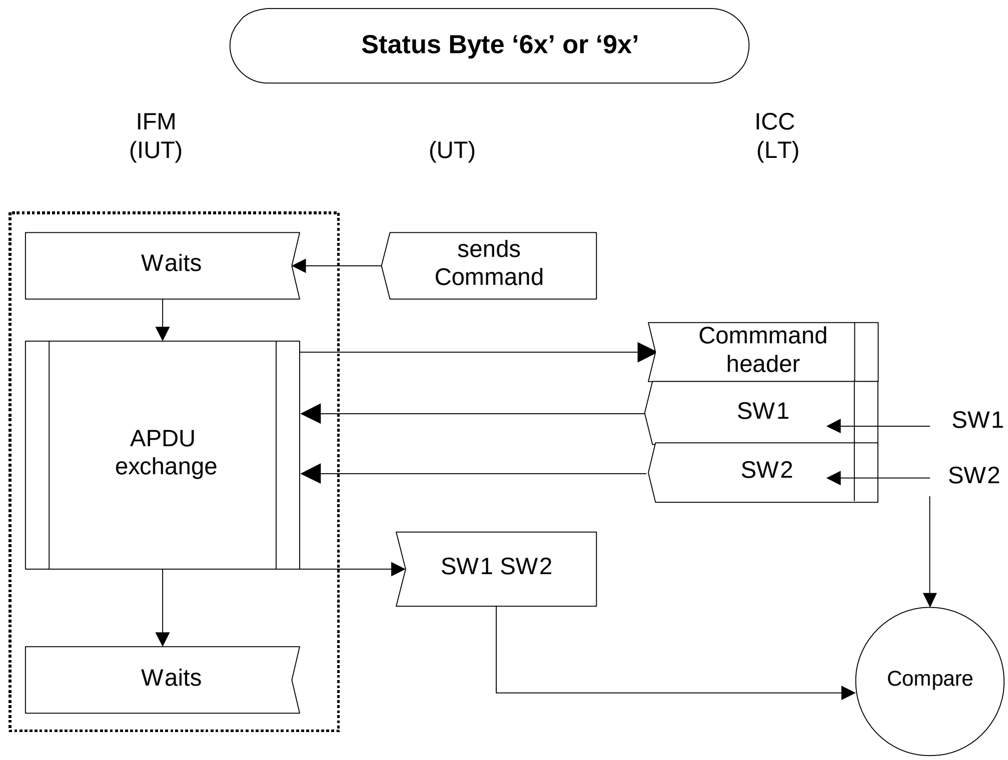
Pass Criteria: On receipt of the '61xx' procedure bytes, the IUT sends a GET RESPONSE command header with P3 ≤ 'xx'.

6.3.16. 1CF.016.xy: Status Byte ‘6x’ or '9x'

Test No. **1CF.016.xy**

Objective: To ensure that on receipt of a '6x' (except ‘60’,’61’, and ‘6C’) or '9x' status byte, the IUT waits for a further status byte SW2.

Procedure:



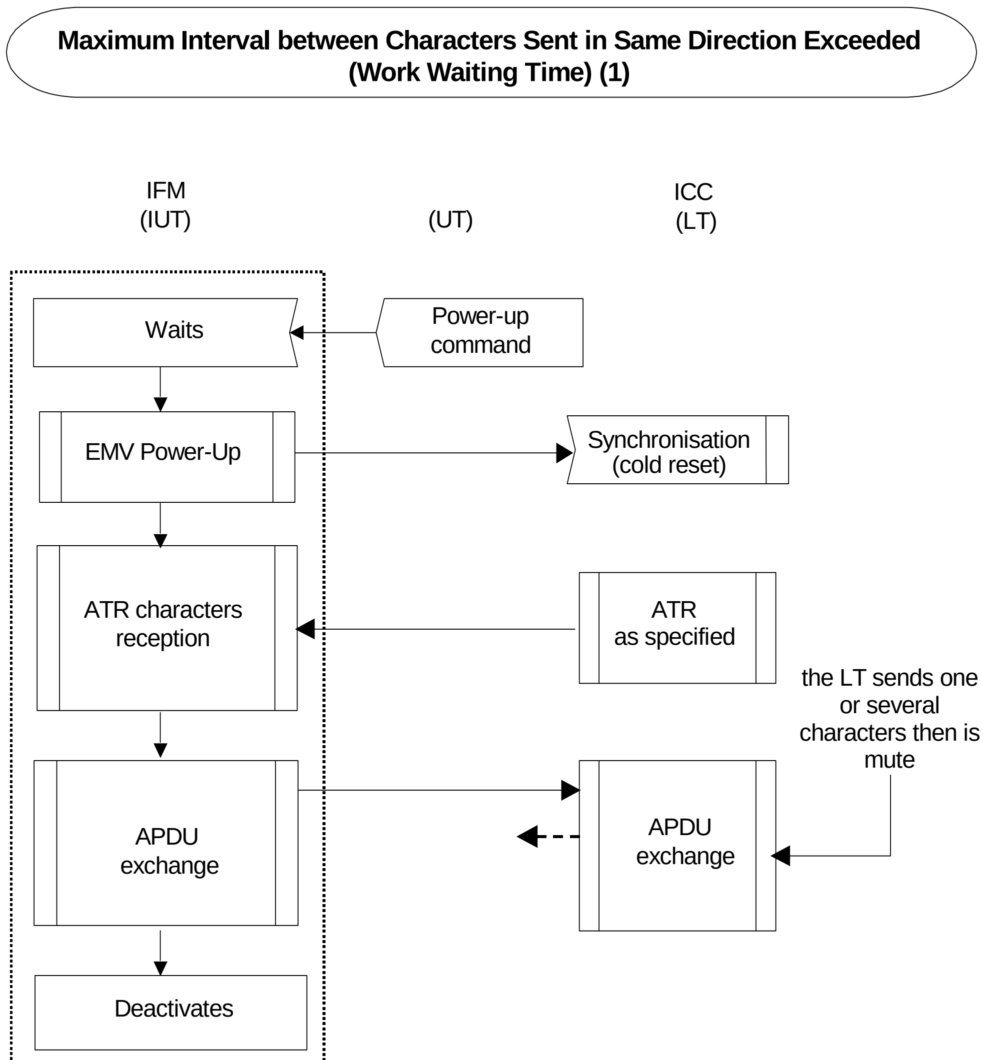
Pass Criteria: The IUT waits for a further status byte then correctly continues the card session.

6.3.17. 1CF.030.0y-1: Maximum Interval between Characters Sent in Same Direction Exceeded (Work Waiting Time) (1)

Test No. **1CF.030.0y-1**

Objective : To ensure that, if the Work Waiting Time is exceeded (by more than D * 480 etus) between two consecutive characters sent by the LT, the IUT initiates the deactivation sequence.

Procedure:



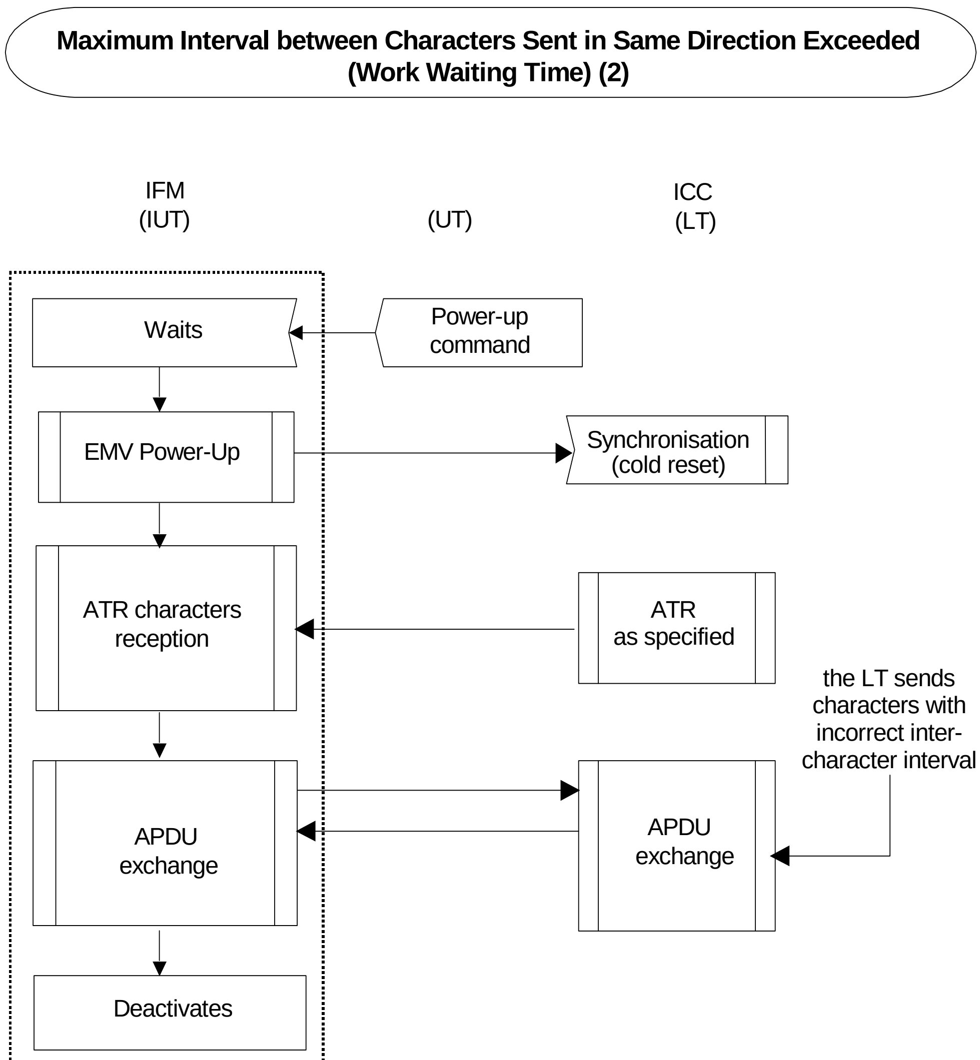
Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

6.3.18. 1CF.030.0y-2: Maximum Interval between Characters Sent in Same Direction Exceeded (Work Waiting Time) (2)

Test No. **1CF.030.0y-2**

Objective : To ensure that, if the Work Waiting Time is exceeded (by more than D * 480 etus) between two consecutive characters sent by the LT, the IUT initiates the deactivation sequence.

Procedure:



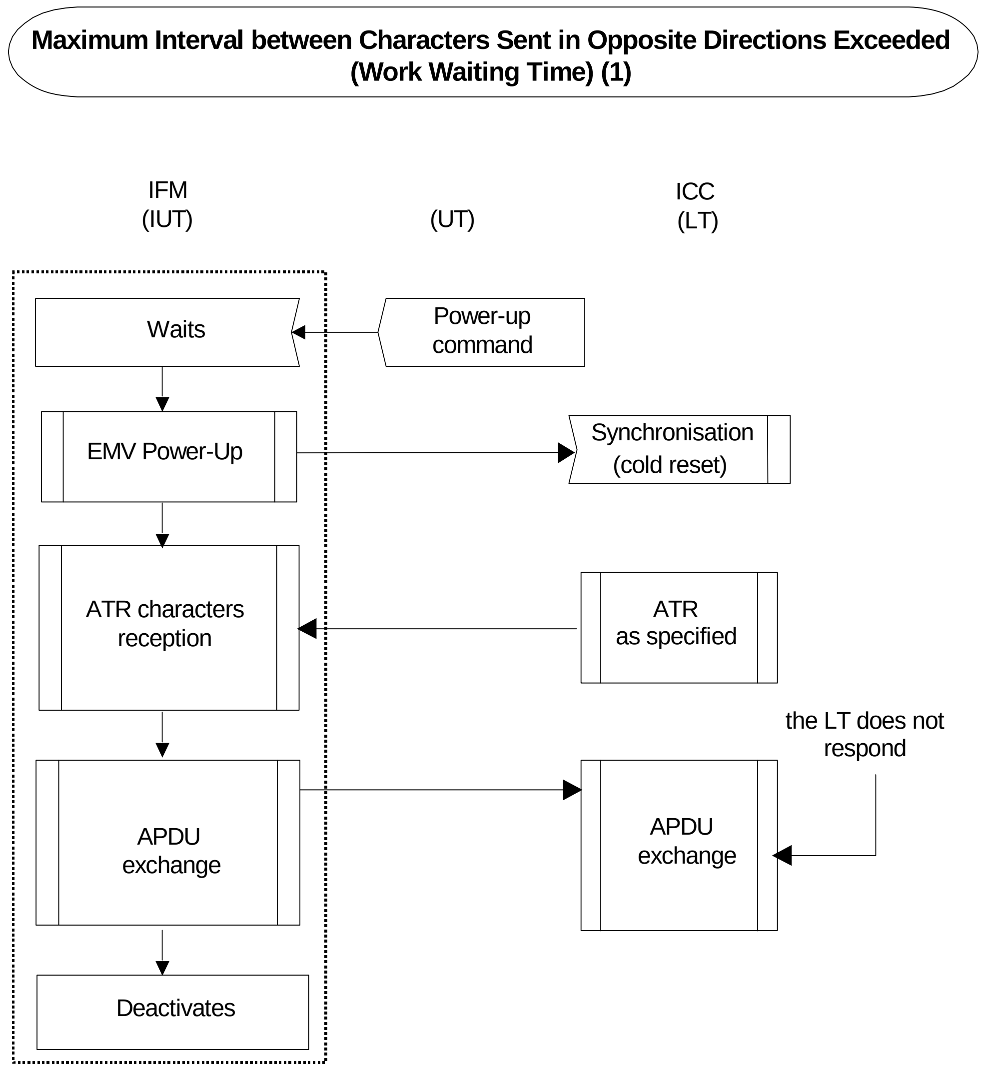
Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

6.3.19. 1CF.031.0y-1: Maximum Interval between Characters Sent in Opposite Directions Exceeded (Work Waiting Time) (1)

Test No. **1CF.031.0y-1**

Objective: To ensure that the IUT initiates the deactivation sequence if the Work Waiting Time is exceeded by more than D * 480 etus after the last character from the IUT.

Procedure:



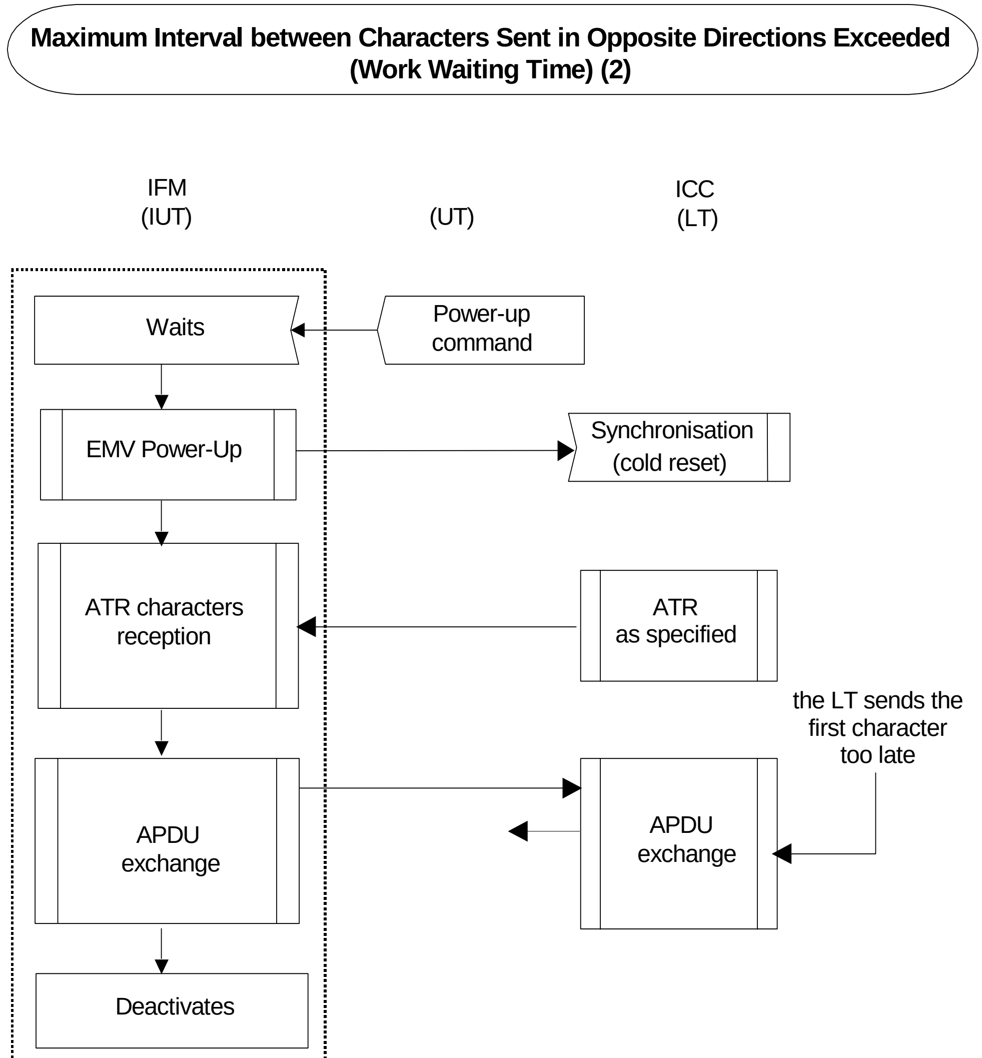
Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 9,600)} etus following the leading edge of the start bit of the character from which the timeout occurred.

6.3.20. 1CF.031.0y-2: Maximum Interval between Characters Sent in Opposite Directions Exceeded (Work Waiting Time) (2)

Test No. **1CF.031.0y-2**

Objective: To ensure that the IUT initiates the deactivation sequence if the Work Waiting Time is exceeded by more than D * 480 etus after the last character from the IUT.

Procedure:



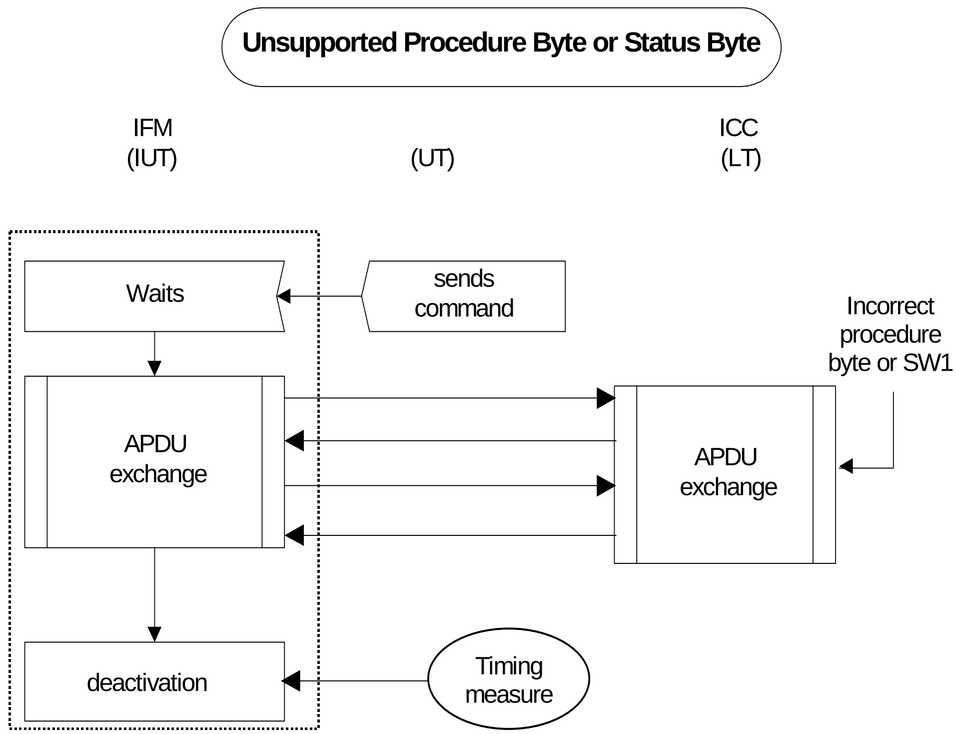
Pass Criteria: The IUT initiates the deactivation sequence within {WWT + (D x 960)} following the leading edge of the start bit of the character from which the timeout occurred.

6.3.21. 1CF.032.0y: Unsupported Procedure Byte or Status Byte

Test No. **1CF.032.0y**

Objective: To ensure that the IUT initiates the deactivation sequence on receipt of an invalid procedure byte.

Procedure:



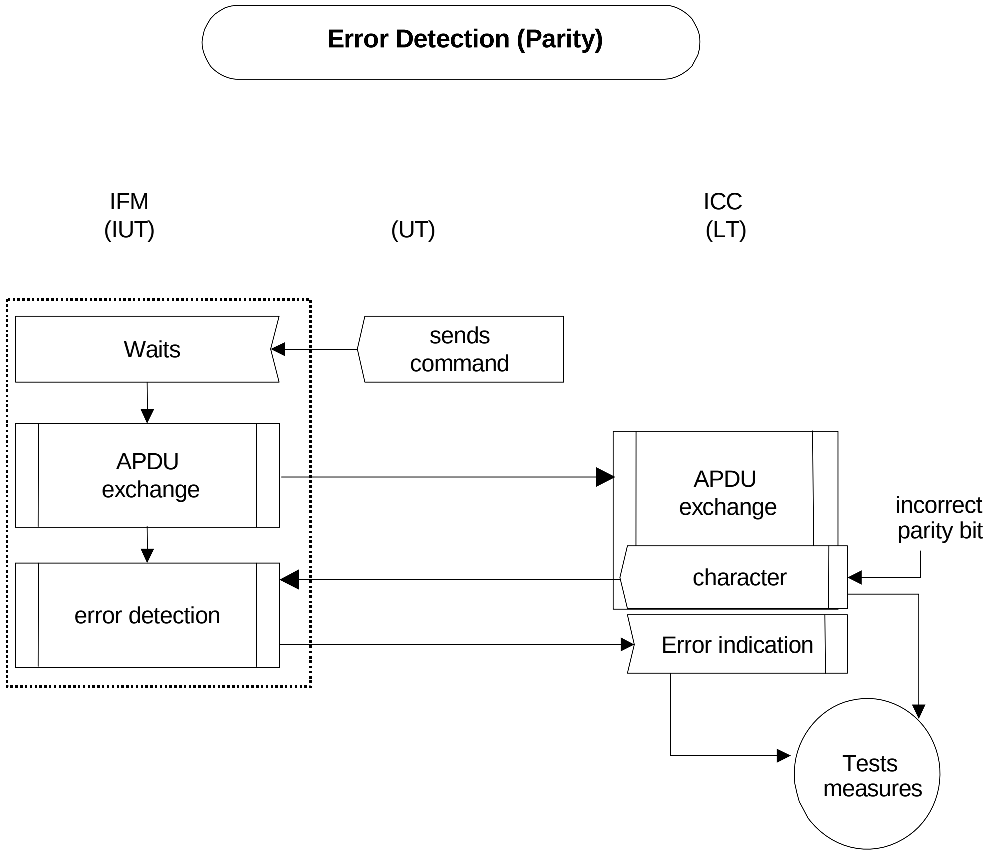
Pass Criteria: The IUT initiates the deactivation sequence within 9,600 etus following the leading edge of the start bit of the invalid byte received to the time that RST is set low.

6.3.22. 1CF.033.0y: Error Detection (Parity)

Test No. **1CF.033.0y**

Objective: To ensure that the IUT signals an error if a character is sent with incorrect parity.

Procedure:



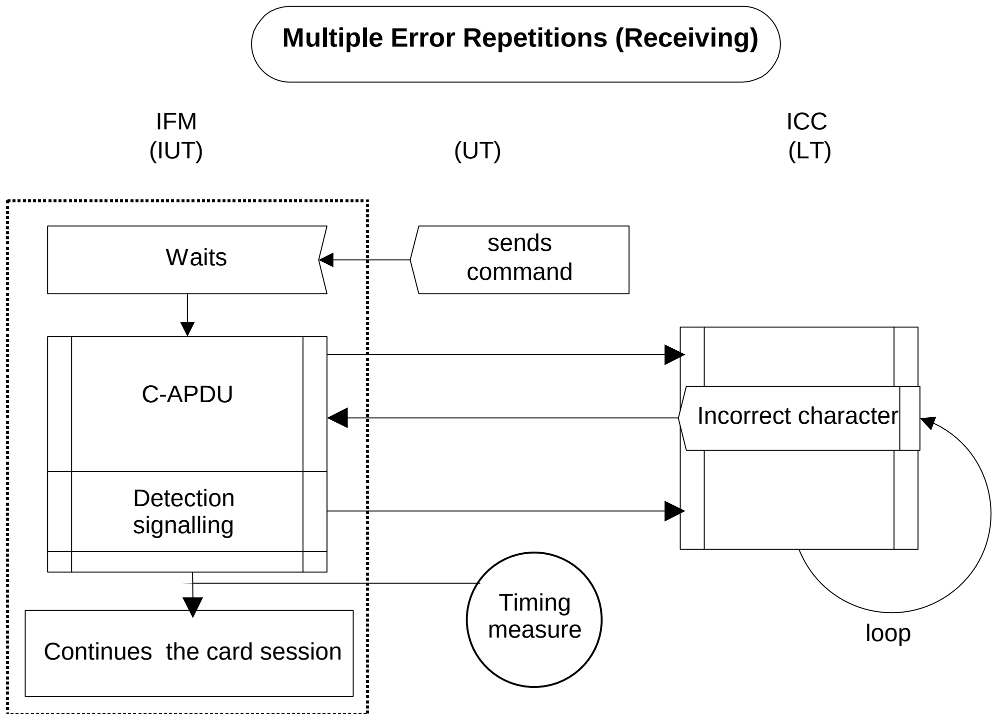
Pass Criteria: The IUT drives I/O low at a time 10.5 ± 0.2 etus following the leading edge of the start bit of the character containing the parity error, and maintains I/O low for a minimum of 1 etu and a maximum of 2 etus. On receipt of the repeated character without the parity error, the IUT continues normal processing.

6.3.23. 1CF.034.00: Multiple Error Repetitions (Receiving)

Test No. **1CF.034.00**

Objective: To ensure that the IUT correctly signals a parity error in a byte sent by the LT up to four times in succession.

Procedure:



Pass Criteria:

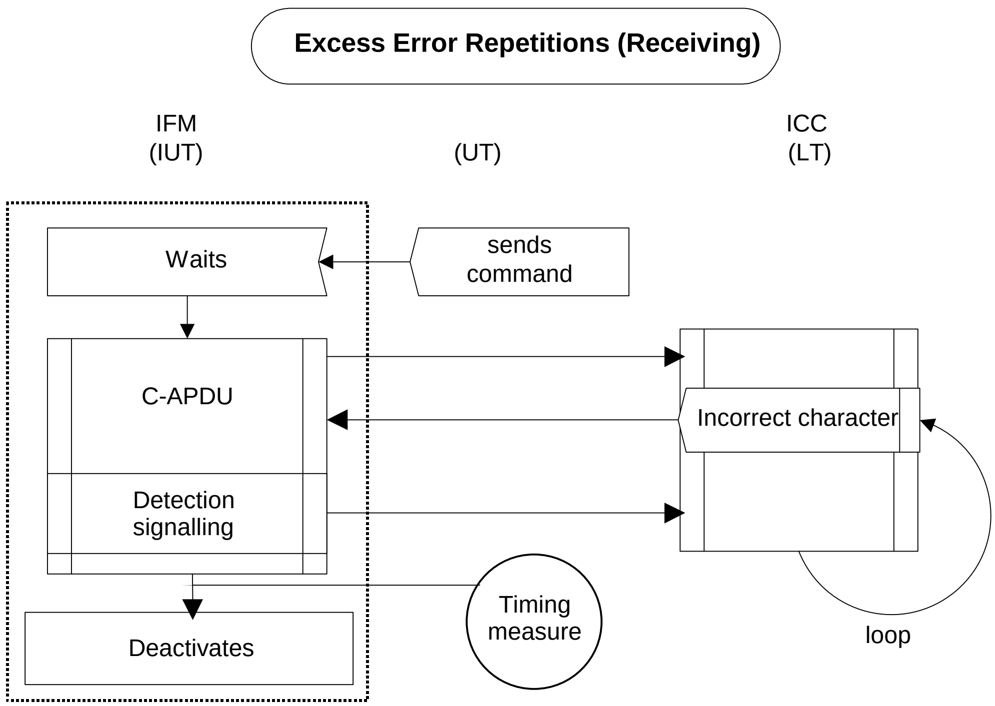
- On receipt of each of the characters with the parity error, the IUT drives I/O low for a period of 1 to 2 etus starting 10.5 ± 0.2 etus from the leading edge of the character with the parity error.
- On receipt of the repeated character without the parity error, the IUT continues normal processing

6.3.24. 1CF.035.0y : Excess Error Repetitions (Receiving)

Test No. **1CF.035.0y**

Objective: To ensure that the IUT correctly signals a parity error in a byte sent by the LT four times in succession and initiates the deactivation sequence on receipt of a further byte with a parity error.

Procedure:



Pass Criteria:

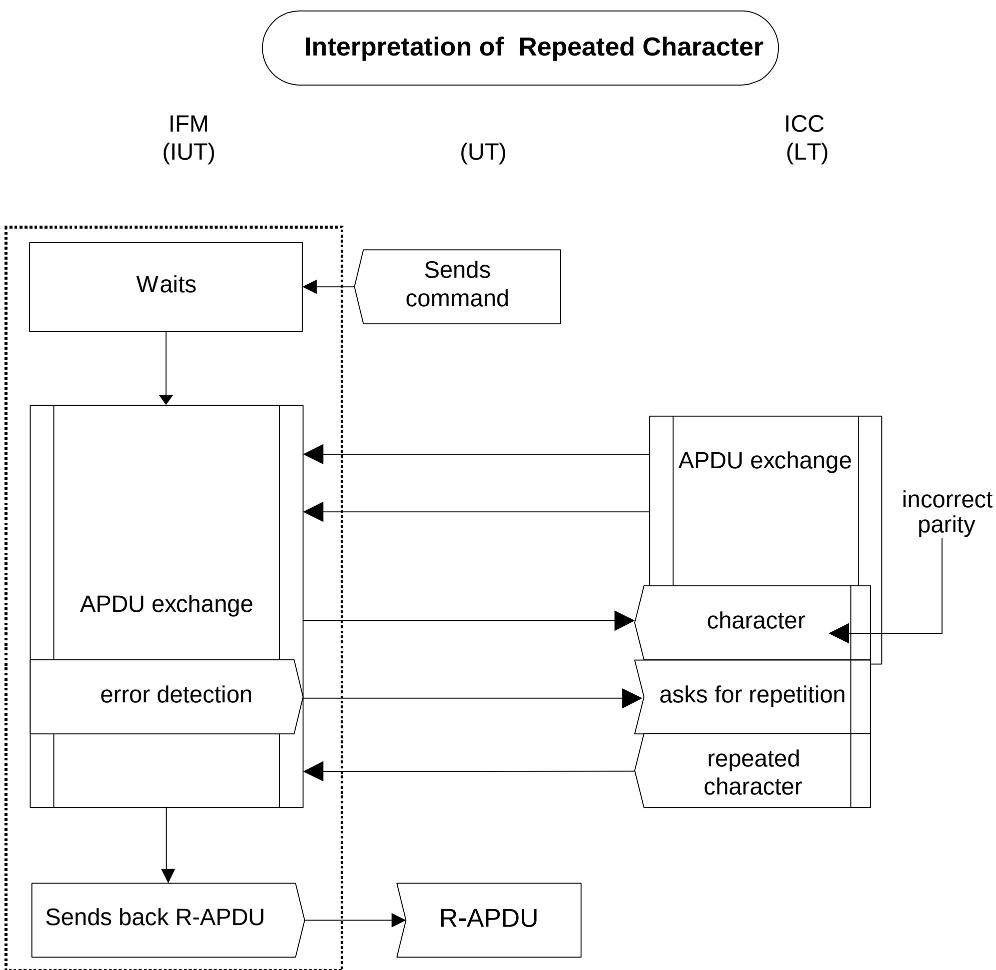
- On receipt of each of the first four characters with a parity error, the IUT drives I/O low for a period of 1 to 2 etus starting 10.5 ± 0.2 etus from the leading edge of the character with the parity error.
- On receipt of the fifth repeated character with the parity error, the IUT initiates the deactivation sequence within D * 960 etus from the leading edge of the character with the parity error to the time that RST is set low.

6.3.25. 1CF.036.00: Interpretation of Repeated Character

Test No. **1CF.036.00**

Objective: To ensure that, after receiving a character with a parity error from the LT followed by the correct repeated character, the IUT stores and uses the correct repeated character.

Procedure:



Note : the repeated character has not the same value as the originally sent incorrect character.

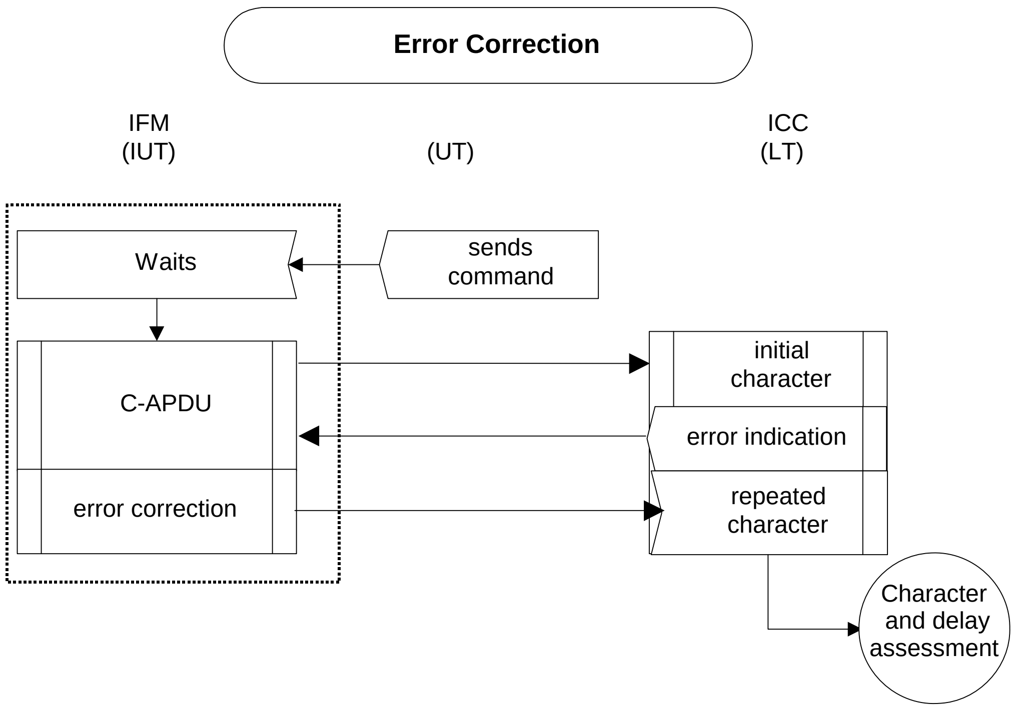
Pass Criteria: The IUT correctly interprets the repeated character and continues the card session.

6.3.26. 1CF.037.0y: Error Correction

Test No. **1CF.037.0y**

Objective : To ensure that the IUT detects an error signaling and repeats the disputed character.

Procedure:



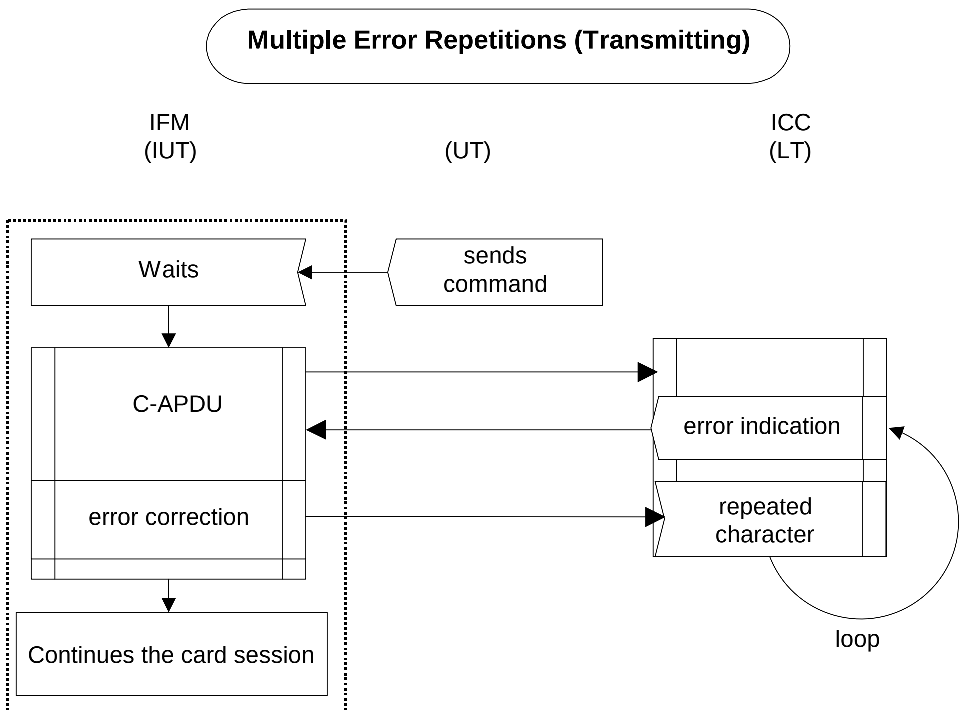
Pass Criteria: The IUT repeats the same character after the delay of at least 2 etus following detection of an error i.e. repeats the character which contained the parity error after the delay of at least 12.8 etus following the leading edge of the start bit of the erroneous character.

6.3.27. 1CF.038.00: Multiple Error Repetitions (Transmitting)

Test No. **1CF.038.00**

Objective: To ensure that the IUT repeats the same disputed character a maximum of five times if the LT indicates an error after each character except the last.

Procedure:



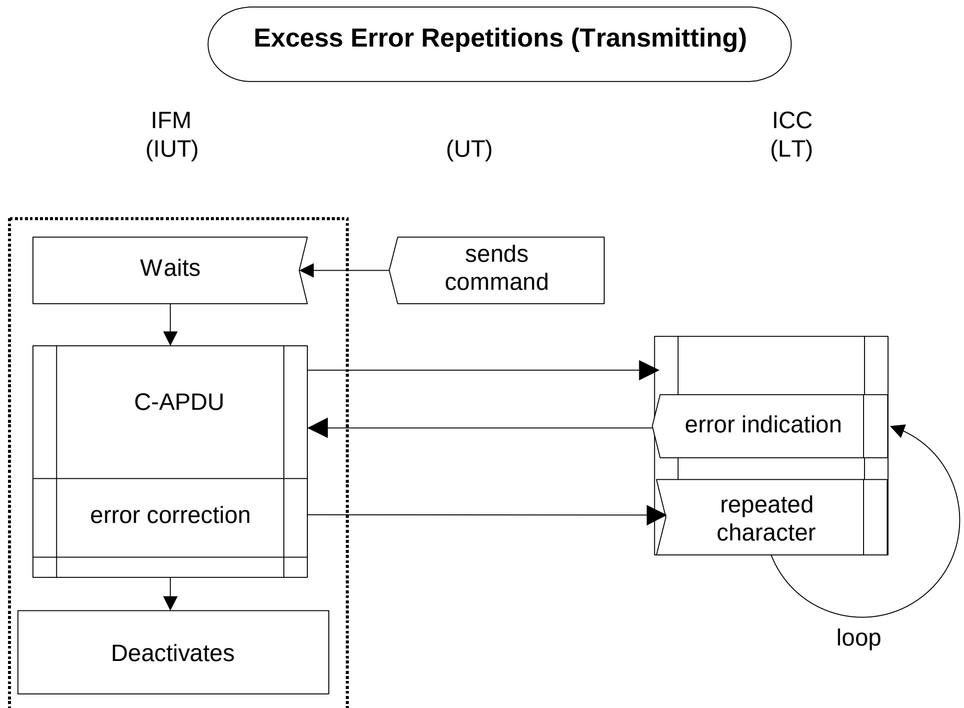
Pass Criteria: The IUT transmits the disputed character five times consecutively, and then continues the card session.

6.3.28. 1CF.039.0y: Excess Error Repetitions (Transmitting)

Test No. **1CF.039.0y**

Objective: To ensure that the IUT initiates the deactivation sequence if a parity error is signaled five times in succession.

Procedure:



Pass Criteria: The IUT initiates the deactivation sequence within D * 960 etus from the leading edge of the signaling of the fifth parity error.

6.4. Protocol Tests : T=1

6.4.1. 1CF.051.00: Minimum Interval between Characters Respected

Test No. **1CF.051.00**

Objective: To ensure that the IUT correctly receives characters sent with minimum inter-character timing.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→ S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT← S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	*IUT continues the card session*	

Pass Criteria: The IUT accepts the blocks sent by the LT and continues the card session.

6.4.2. 1CF.052.0y: Character Waiting Time (CWT) Respected

Test No. **1CF.052.0y**

Objective: To ensure that the IUT correctly receives characters sent maximum character-to-character timing of the character waiting time (CWT) + 4 etus.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	*IUT continues the card session*	

Pass Criteria: The IUT accepts the block and continues the card session.

6.4.3. 1CF.053.xy: Block Waiting Time Respected (BWT)

Test No. **1CF.053.xy**

Objective: To ensure that the IUT correctly receives a block sent as late as the block waiting time (BWT) + (D * 960) etus after the last character sent by the IUT.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=0)	→LT
step 6	IUT←I(j, M=0)	←LT
step 7	*IUT confirms to UT sending of data*	
step 8	*IUT indicates to UT incoming data*	

Pass Criteria: The IUT accepts the block and continues the card session.

6.4.4. 1CF.054.00: Block Guard Time (BGT) Respected

Test No. **1CF.054.00**

Objective: To ensure that the IUT correctly receives a block sent as early as the block guard time (BGT) – 1 etus after the last character sent by the IUT.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	*IUT continues the card session*	

Pass Criteria: The IUT accepts the block and continues the card session.

6.4.5. 1CF.055.00: Block Guard Time (BGT) Respected by the IUT after Cold Reset

Test No. **1CF.055.00**

Objective: To ensure that the IUT respects the minimum interval of 22 etus (BGT) when, having received a character from the LT (including the last character of the ATR), the IUT sends a character in the opposite direction.

Procedure:

step 1	IUT←ATR as specified	←LT /*answer to reset */
step 2	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M=0)	←LT

Pass Criteria: The IUT continues the card session with an interval measured between the first character of each block it sends and the previous character sent by the LT, equal to or greater than 22 etus.

6.4.6. 1CF.056.00: Block Guard Time (BGT) Respected by the IUT after Warm Reset

Test No. **1CF.056.00**

Objective: To ensure that the IUT respects the minimum interval of 22 etus (BGT) when, having received a character from the LT (including the last character of the ATR), the IUT sends a character in the opposite direction.

Procedure:

step 1	IUT←ATR as specified	←LT /*answer to reset */
step 2	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 4	IUT→I(i,M=0)	→LT
step 5	IUT←I(j, M=0)	←LT

Pass Criteria: The IUT continues the card session with an interval measured between the first character of each block it sends and the previous character sent by the LT, equal to or greater than 22 etus.

6.4.7. 1CF.057.0y: Chained Blocks — Waiting Time Extension (WTX) Respected

Test No. **1CF.057.0y**

Objective: To ensure that the IUT correctly manages a WTX request during chaining from the IUT and respects the waiting time extension.

Procedure:

step 1	IUT←ATR	←	LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*		
step 3	IUT→S(IFS request) INF=‘FE’	→	LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←	LT /* LT agrees with new size */
step 5	IUT→I(i, M=1)	→	LT /* 1st I-block */
step 6	IUT←S(WTX request) INF=m	←	LT /* first request */
step 7	IUT→S (WTX response) INF=m	→	LT /* grants waiting time extension */
step 8	*LT waits more than BWT but less than extended waiting time*		
step 9	IUT←R(i+1)	←	LT /* acknowledges 1st I-block */
step 10	IUT→I(i+1, M=1)	→	LT /* 2nd I-block */
step 11	IUT←R(i)	←	LT /* acknowledges 2nd I-block */
step 12	*etc. until complete transmission of application data message (check last I-block has M=0), then*		
step 13	IUT→I(i, M=0)	→	LT
step 14	IUT←I(j, M)	←	LT /* acknowledges last I-block of chain */
step 15	*IUT confirms to UT transmission of data*		

Pass Criteria: The IUT correctly manages chaining, grants the WTX extension, accepts the block and continues the card session.

6.4.8. 1CF.058.00: Sequence Number of the First I-block

Test No. **1CF.058.00**

Objective: To ensure that the first I-block sent by the IUT has a sequence number of 0.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 3	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 4	IUT→I(i,M)	→LT /* first I-block */
step 5	*checks that the first I-block sent has i=0*	

Pass Criteria: The IUT sends its first I-block with a sequence number (bit b7 of the PCB) equal to 0.

6.4.9. 1CF.059.00: Valid Exchanges of I-Blocks

Test No. **1CF.059.00**

Objective: To ensure that the IUT properly sends and receives non-chained I-blocks.

Procedure:

step 1	IUT←ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF='FE'	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT	/* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT	
step 6	IUT←I(j, M=0)	←LT	
step 7	*IUT confirms UT of the sending of data and indicates to it incoming data*		
step 8	*IUT indicates incoming data to UT*		
step 9	*UT requests IUT to send short data*		
step 10	IUT→I(i+1, M=0)	→LT	/* transmits next I-block */
step 11	IUT←I(j+1, M=0)	←LT	
step 12	*IUT confirms UT of the sending of data sent*		
step 13	*IUT indicates incoming data to UT*		

Pass Criteria: The IUT sends I-blocks with the correct sequence number, and correctly accepts incoming data from LT.

6.4.10. 1CF.060.00: Chaining — IUT Receiving

Test No. **1CF.060.00**

Objective: To ensure that the IUT correctly receives chained I-blocks.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→ S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT← S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→ I(i, M=0)	→LT
step 6	IUT← I(j, M=1)	←LT
step 7	*IUT confirms to UT the sending of data*	
step 8	UT→ R(j+1)	→LT /* acknowledges chained I-block */
step 9	IUT← I(j+1, M=1)	←LT
step 10	IUT→ R(j)	→LT /* acknowledges chained I-block */
step 11	IUT← I(j, M=0)	←LT /* last block of chain */
step 12	*IUT indicates to UT incoming data*	

Pass Criteria: The IUT correctly receives the chained I-blocks from the LT, correctly manages the sequence number in the R-blocks and continues the card session.

6.4.11. 1CF.061.00: Chaining — Sequence Number of the R-blocks

Test No. **1CF.061.00**

Objective: To ensure that the IUT correctly manages the sequence number (modulo 2 counter coded on one bit which indicates the next I-block the IUT expects to receive) of the R-blocks it sends even if it receives erroneous block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=0)	→LT
step 6	IUT←I(j,M=1)	←LT /* first chained block */
step 7	IUT→R(j+1)	→LT /* IUT acknowledges I-block */
step 8	IUT←I(j+1, M=1)	←LT /* chained I-block */
step 9	IUT→R(j)	→LT /* IUT acknowledges I-block */
step 10	IUT←I(j,M=0) with error	←LT /* chained I-block with error */
step 11	IUT→R(j)	→LT /* asks for retransmission */
step 12	IUT←I(j,M=0)	←LT /* chained I-block (retransmission) */

Pass Criteria: The IUT correctly manages the sequence number.

6.4.12. 1CF.062.00: Chaining in Both Directions

Test No. **1CF.062.00**

Objective: To ensure that the IUT properly manages chained I-blocks in both directions.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=1)	→LT /* 1st I-block */
step 6	IUT←R(i+1)	←LT /* acknowledges 1st I-block */
step 7	IUT→I(i+1, M=1)	→LT /* 2nd I-block */
step 8	IUT←R(i)	←LT /* acknowledges 2nd I-block */
step 9	IUT→I(i, M=0)	→LT /* last I-block of IUT chain */
step 10	IUT←I(j, M=1)	←LT /* 1st I-block of LT chain */
step 11	*IUT confirms transmission to UT*	
step 12	IUT→R(j+1)	→LT /* acknowledges 1st I-block */
step 13	IUT←I(j+1, M=0)	←LT /* last I-block of LT chain */
step 14	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT respects the sequencing of transmitted I-block, correctly performs truncating of data that require chaining which results in chaining (most significant part first) with correct management of 'more data' bit; it accepts at once chained I-block.

6.4.13. 1CF.063.0y: IUT Sends Chained and non Chained Blocks — Respect of IFSI by the IUT

Test No. **1CF.063.0y**

Objective: To ensure that the IUT respects the IFSI value (this value is returned in TA3 during ATR by the LT): any information block sent by the IUT shall have an information field size less than or equal to this value.

Procedure:

step 1	IUT ← ATR	←LT /* Answer To Reset */
step 2	*UT requests to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=0)	→LT
step 6	IUT←I(j, M)	←LT
step 7	*etc ... until complete transmission of R-APDU*	
step 8	*IUT confirms to UT sending of data*	
step 9	*IUT indicates to UT incoming data*	
step 10	*UT requests IUT to send data that require chaining*	
step 11	IUT→I(i, M=1)	→LT /* 1st I-block */
step 12	IUT←R(i+1)	←LT /* acknowledges 1st I-block */
step 13	IUT→I(i+1, M=1)	→LT /* 2nd I-block */
step 14	IUT←R(i)	←LT /* acknowledges 2nd I-block */
step 15	*etc. ... until complete transmission of application data message (check that last I-block has M=0), ... then*	
step 16	IUT→I(i, M=0)	→LT
step 17	IUT←I(j, M)	←LT /* acknowledges last I-block of chain */
step 18	*IUT confirms to UT sending of data*	

Pass Criteria: The IUT respects IFSI both in non-chained and chained I-blocks it sends.

6.4.14. 1CF.064.0y: Chaining or Not — Repeated Requests to Change IFSC Between two chains

Test No. **1CF.064.0y**

Objective: To ensure that the IUT responds correctly to successive requests to change the IFSC and is able to adjust (using chaining or not) the size of chained blocks in order to fit new IFSC.

Procedure:

step 1	IUT←ATR	←LT /* Answer To reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests IFSD size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* accepts new size = 254 */
step 5	IUT→I(0, M=0)	→LT /* sends non chained I-block */
step 6	IUT←S(IFS request) INF = 'FE'	←LT /* request to change IFSC */
step 7	IUT→S(IFS response) INF='FE'	→LT /* IUT acks IFS request */
step 8	IUT←I(j, M)	←LT /* I-block - chained or not */
step 9	*etc ... until complete transmission of R-APDU*	
step 10	*IUT confirms transmission to UT*	
step 11	*IUT passes incoming data to UT*	
step 12	IUT→I(i, M)	→LT /* sends I-block */
step 13	*etc ... until complete transmission of C-APDU*	
step 14	IUT←S(IFS request) INF = '10'	←LT /* request to change IFSC */
step 15	IUT→S(IFS response) INF='10'	→LT /* IUT acks IFS request */
step 16	IUT←I(j, M)	←LT /* I-block - chained or not */
step 17	*etc ... until complete transmission of R-APDU*	
step 18	*IUT confirms transmission to UT*	
step 19	*IUT passes incoming data to UT*	
step 20	IUT→I(i, M)	→LT /* sends I-block */
step 21	*etc ... until complete transmission of C-APDU*	
step 22	IUT←S(IFS request) INF = '20'	←LT /* request to change IFSC */
step 23	IUT→S(IFS response) INF='20'	→LT /* IUT acks IFS request */
step 24	IUT←I(j, M)	←LT /* I-block - chained or not */
step 25	*etc… until complete transmission of R-APDU*	
step 26	*IUT confirms transmission to UT*	
step 27	*IUT passes incoming data to UT*	
step 28	IUT→I(i, M)	→LT /* sends I-block */
step 29	*etc ... until complete transmission of C-APDU*	
step 30	IUT←S(IFS request) INF = 'F0'	←LT /* request to change IFSC */
step 31	IUT→S(IFS response) INF='F0'	→LT /* IUT acks IFS request */
step 32	IUT←I(j, M)	←LT /* I-block - chained or not */
step 33	*etc ... until complete transmission of R-APDU*	
step 34	*IUT confirms transmission to UT*	
step 35	*IUT passes incoming data to UT*	
step 36	IUT→I(i, M)	→LT /* sends I-block */
step 37	*etc ... until complete transmission of C-APDU*	

step 38	IUT←S(IFS request) INF = '80'	←LT /* request to change IFSC */
step 39	IUT→S(IFS response) INF='80'	→LT /* IUT acks IFS request */
step 40	IUT←I(j, M)	←LT /* I-block - chained or not */
step 41	*etc ... until complete transmission of R-APDU*	
step 42	*IUT confirms transmission to UT*	
step 43	*IUT passes incoming data to UT*	
step 44	IUT→I(i, M)	→LT /* sends I-block */
step 45	*etc ... until complete transmission of C-APDU*	
step 46	IUT←I(j, M=0)	←LT /* last R-APDU */
step 47	*IUT confirms transmission to UT*	
step 48	*IUT passes incoming data to UT*	

Pass Criteria: The IUT acknowledges the S(IFS request) by sending an S(IFS response) and correctly adjusts chained block sizes to respect the new IFSC.

6.4.15. 1CF.080.xy-1: Characters Waiting Time (CWT) Exceeded (1)

Test No. **1CF.080.xy-1**

Objective: To ensure that the IUT:

- initiates the deactivation sequence
- sends an R-block or an S-request block (depends on the type of the block not responded to)

if the LT exceeds the character waiting time (CWT) (by more than 4 etus).

Procedure:

x=0:

step 1	IUT🡐ATR	🡐LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT🡒S(IFS request) INF='FE'	🡒LT /* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF='FE'	🡐LT /* accepts new size = 254 */
step 5	IUT🡒I(i, M=0)	🡒LT /* sends non chained I-block */
step 6	IUT 🡐I(j, M=0)	🡐 LT /* LT stops sending during transmission of the block */
step 7	*IUT deactivates LT contacts and IUT indicates deactivation to UT*	
OR	IUT 🡒 R(j)	🡒LT

x=1:

step 1	IUT🡐ATR	🡐LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT🡒S(IFS request) INF='FE'	🡒LT /* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF='FE'	🡐LT /* LT stops sending during transmission of the block */
step 5	*IUT deactivates LT contacts and IUT indicates deactivation to UT*	
OR	IUT 🡒 S(IFS request) INF='FE'	🡒LT

Pass Criteria:

- For x=0 and x=1: the IUT initiates the deactivation sequence

OR

- For x=0: the IUT sends an R-block
- For x=1: the IUT sends an S-request block

between (CWT + 4) and (CWT + 4,800) etus following the leading edge of the start bit if the last received character

6.4.16. 1CF.080.xy-2: Characters Waiting Time (CWT) Exceeded (2)

Test No. **1CF.080.xy-2**

Objective: To ensure that the IUT:

- initiates the deactivation sequence
- sends an R-block or an S-request block (depends on the type of the block not responded to)

if the LT exceeds the character waiting time (CWT) (by more than 4 etus).

Procedure:

x=0:

step 1	IUT←ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF='FE'	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT	/* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT	/* sends non chained I-block */
step 6	IUT ← I(j, M=0)	← LT	/* sends characters with interval that exceeds CWT + 4 etus */
step 7	*IUT deactivates LT contacts and IUT indicates deactivation to UT*		
OR	IUT → R(j)	→LT	

x=1:

step 1	IUT←ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF='FE'	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	← LT	/* sends characters with interval that exceeds CWT + 4 etus */
step 5	*IUT deactivates LT contacts and IUT indicates deactivation to UT*		
OR	IUT→S(IFS request) INF='FE'		

Pass Criteria:

- For x=0 and x=1: the IUT initiates the deactivation sequence

OR

- For x=0: the IUT sends an R-block
- For x=1: the IUT sends an S-request block

between (CWT + 4) and (CWT + 4,800) etus following the leading edge of the start bit of the last received character.

6.4.17. 1CF.081.xy-1: Block Waiting Time (BWT) Exceeded in response to an S-request block (1)

Test No. **1CF.081.xy-1**

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an S-request block

if the LT exceeds BWT (by more than 960 etus).

Procedure:

step 1	IUT←ATR	←LT/* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT
step 4	*BWT is exceeded since the LT is unresponsive*	
step 5	*IUT deactivates LT contacts and indicates deactivation to the UT*	
OR	IUT→S(IFS request) INF='FE'	→LT

Pass Criteria: The IUT initiates the deactivation sequence

Or

The IUT sends an S-request block

between {BWT + (D * 960)} and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

6.4.18. 1CF.081.xy-2: Block Waiting Time (BWT) Exceeded in response to an S-request block (2)

Test No. **1CF.081.xy-2**

Objective: To ensure that the IUT:

initiates the deactivation sequence.

OR

sends an S-request block

if the LT exceeds BWT by more than 960 etus

Procedure:

step 1	IUT←ATR	←LT/* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→ S(IFS request) INF='FE'	→LT
step 4	*BWT is exceeded since the LT responds too late*	
step 5	*IUT deactivates LT contacts and indicates deactivation to the UT*	
OR	IUT→S(IFS request) INF='FE'	→LT

Pass Criteria: The IUT initiates the deactivation sequence

OR

The IUT sends an S-request block

between {BWT + (D * 960)} etus and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

6.4.19. 1CF.081.xy-1 (bis): Block Waiting Time (BWT) Exceeded in response to an I-block, an R-block or an S-response block (1)

Test No. **1CF.081.xy-1 (bis)**

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block

if the LT exceeds BWT (by more than 960 etus).

Procedure:

step 1	IUT←ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF=‘FE’	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT	/* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT	/* sends non chained I-block */
step 6	*BWT is exceeded since the LT is unresponsive*		
step 7	*IUT deactivates LT contacts and IUT indicates deactivation to UT*		
OR	IUT → R(j)	→LT	

Pass Criteria: The IUT initiates the deactivation sequence

Or

The IUT sends an R-block

between {BWT + (D * 960)} and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

6.4.20. 1CF.081.xy-2 (bis): Block Waiting Time (BWT) Exceeded in response to an I-block, an R-block or an S-response block (2)

Test No. **1CF.081.xy-2 (bis)**

Objective: To ensure that the IUT:

initiates the deactivation sequence.

OR

sends an R-block

if the LT exceeds BWT by more than 960 etus

Procedure:

step 1	IUT🡐ATR	🡐LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT🡒S(IFS request) INF=‘FE’	🡒LT	/* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF=‘FE’	🡐LT	/* accepts new size = 254 */
step 5	IUT🡒I(i, M=0)	🡒LT	/* sends non chained I-block */
step 6	*BWT is exceeded since the LT responds too late*		
step 7	*IUT deactivates LT contacts and IUT indicates deactivation to UT*		
OR	IUT 🡒 R(j)	🡒LT	

Pass Criteria: The IUT initiates the deactivation sequence

Or

The IUT sends an R-block

between {BWT + (D * 960)} etus and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

6.4.21. 1CF.082.0y: Non Chained Blocks — Proper then Improper Use of Waiting Time Extension (WTX)

Test No. **1CF.082.0y**

Objective: To ensure that the IUT correctly interprets an S(WTX request), grants a response, and respects the waiting time extension. Also to ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block (only one scenario possible)

if the LT again uses the extension without having sent another S(WTX request).

Procedure:

step 1	IUT←ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF=‘FE’	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT	/* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT	
step 6	IUT←S(WTX request) INF=m	←LT	
step 7	IUT→S (WTX response) INF=m	→LT	/* grants waiting time extension */
step 8	*LT waits more than BWT but less than extended waiting time*		
step 9	IUT←I(j, M=0)	←LT	
step 10	*IUT confirms transmission of data sent*		
step 11	*IUT indicates incoming data to UT*		
step 12	IUT→I(i+1, M=0)	→LT	
step 13	*LT waits more than BWT but less than obsolete extended waiting time*		
step 14	IUT←I(j+1, M=0)	←LT	
step 15	*IUT deactivates LT and indicates deactivation to UT*		
OR	IUT → R(j)	→LT	

Pass Criteria: The IUT correctly grants the waiting time extension and accepts the I-block from the LT, then the IUT:

initiates the deactivation sequence

Or

sends an R-block

between {BWT + (D * 960)} etus and {BWT + (D * 4,800)} etus following the leading edge of the start bit of the last character of the block in response to which the LT uses BWT extension again without requesting to do so.

6.4.22. 1CF.083.xy-1: Waiting Time Extension (WTX) Exceeded (1)

Test No. **1CF.083.xy-1**

Objective: To ensure that the IUT:

- initiates the deactivation sequence

OR

- sends an R-block (only one scenario possible)

if the waiting time extension is exceeded (by more than 960 etus)

Procedure:

step 1	IUT🡐ATR	🡐LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT➔S(IFS request) INF=‘FE’	➔LT	/* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF=‘FE’	🡐LT	/* LT agrees with new size */
step 5	IUT➔I(i, M=0)	➔LT	
step 6	IUT🡐S(WTX request) INF = m	🡐LT	
step 7	IUT➔S (WTX response) INF = m	➔LT	/* grants waiting time extension */
step 8	*WTX is exceeded since the LT is unresponsive*		
step 9	*IUT deactivates LT contacts and indicates deactivation to UT*		
OR	IUT ➔ R(j)	➔LT	

Pass Criteria: The IUT:

initiates the deactivation sequence

Or

sends an R-block

between {WTX + (m * D * 960)} etus and {WTX + (m * D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

6.4.23. 1CF.083.xy-2: Waiting Time Extension (WTX) Exceeded (2)

Test No. **1CF.083.xy-2**

Objective: To ensure the IUT:

- initiates the deactivation sequence

OR

- sends an R-block (only one scenario possible) .

that if the waiting time extension is exceeded by more than (m * D * 960) etus

Procedure:

step 1	IUT🡐ATR	🡐LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT➔S(IFS request) INF=‘FE’	➔LT /* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF=‘FE’	🡐LT /* LT agrees with new size */
step 5	IUT➔I(i, M=0) ➔LT	
step 6	IUT🡐S(WTX request) INF = m	🡐LT
step 7	IUT➔S (WTX response) INF = m	➔LT /* grants waiting time extension */
step 8	*WTX is exceeded since the LT responds too late*	
step 9	*IUT deactivates LT contacts and indicates deactivation to UT*	
OR	IUT ➔ R(j)	➔LT

Pass Criteria: The IUT:

initiates the deactivation sequence

Or

sends an R-block

between {WTX + (m * D * 960)} etus and {WTX + (m * D * 4,800)} etus following the leading edge of the start bit of the last character of the block to which there was no response.

6.4.24. 1CF.084.0y: Non Chained Block — Transmission Error followed by an Error Notification on an I-block

Test No. **1CF.084.0y**

Objective: To ensure that the IUT correctly manages a block with transmission error followed by an error notification on a non-chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with transmission error	←LT /* transmission error */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←R(i)	←LT /* notifies of an error on the I-block */
step 9	IUT→I(i, M=0)	→LT /* retransmits I-block */
step 10	IUT←I(j, M=0)	←LT /* acknowledges I-block */
step 11	*IUT confirms to UT the sending of data*	
step 12	*IUT indicates to UT incoming data*	

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block, then retransmits the I-block in response to the R-block and continues the card session on receipt of the subsequent I-block.

6.4.25. 1CF.085.xy: Non Chained Block — Syntax/Semantic Error in Response to an I-block, then Error Notification, Then I-Block

Test No. **1CF.085.xy**

Objective: To ensure that the IUT correctly manages a block with syntax/semantic error in response to a non chained I-block followed by an error notification on the previous non chained I-block then a non chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT /* erroneous block */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←R(i)	←LT /* notifies of an error on I-block */
step 9	IUT→I(i, M=0)	→LT /* retransmits I-block */
step 10	IUT←I(j, M=0)	←LT /* acknowledges I-block */
step 11	*IUT confirms to UT the sending of data*	
step 12	*IUT indicates to UT incoming data*	

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, then retransmits the I-block on receipt of the error free R-block and continues the card session on receipt of the subsequent I-block.

6.4.26. 1CF.086.0y: Non Chained Blocks — Excess of Transmission Errors on receipt of an I-Block

Test No. **1CF.086.0y**

Objective: To ensure that the IUT deactivates after receiving a third successive block with transmission error on receipt of a non-chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=0)	→LT
step 6	IUT←block with transmission error	←LT /* first transmission error */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←block with transmission error	←LT /* 2nd transmission error */
step 9	IUT→ R(j)	→LT /* asks for retransmission 2 */
step 10	IUT←block with transmission error	←LT /* 3rd transmission error */
step 11	*IUT deactivates LT.*	
step 12	*IUT indicates to UT the deactivation*	

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

6.4.27. 1CF.087.xy: Non Chained Blocks — Excess of Syntax/Semantic Errors in Response to an I-block

Test No. **1CF.087.xy**

Objective: To ensure that the IUT deactivates when receiving three consecutive blocks with syntax/semantic error in response to a non-chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT /* first erroneous block */
step 7	IUT→R(j)	→LT /* asks for retransmission 1 */
step 8	IUT←block with syntax or semantic error	←LT /* 2nd erroneous block */
step 9	IUT→R(j)	→LT /* asks for retransmission 2 */
step 10	IUT←block with syntax or semantic error	←LT /* 3rd erroneous block */
step 11	*IUT deactivates LT.*	
step 12	*IUT indicates to UT the deactivation*	

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

6.4.28. 1CF.088.xy: Non Chained Blocks — One or Two Consecutive Transmission Errors in Response to an I-Block Then I-Block

Test No. **1CF.088.xy**

Objective: To ensure that the IUT responds correctly to one or two successive blocks with transmission error in response to a non-chained I-block, then to a correct non-chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT/* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with transmission error	←LT /* 1st error generated */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←block with transmission error	←LT /* 2nd error generated */
step 9	IUT→R(j)	→LT /* asks for retransmission */
step 10	IUT←I(j, M=0)	←LT /* correct I-block */
step 11	*IUT confirms to UT the sending of data*	

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block and continues the card session on receipt of the subsequent I-block.

6.4.29. 1CF.089.xy: Non Chained Blocks — Syntax/Semantic Errors in Response to an I-Block, Then I-Block

Test No. **1CF.089.xy**

Objective: To ensure that the IUT responds correctly to a block with syntax/semantic error in response to a non-chained I-block, then to an I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT /* error generated */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←I(j, M=0)	←LT
step 9	*IUT confirms to UT the sending of data*	

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

6.4.30. 1CF.090.xy: Non Chained Blocks — Two Consecutive Syntax/Semantic Errors in Response to an I-Block, Then I-Block

Test No. **1CF.090.xy**

Objective: To ensure that the IUT responds correctly to two successive blocks with syntax/semantic error in response to a non-chained I-block, then to an I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT /* 1st error generated */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←block with syntax or semantic error	←LT /* 2nd error generated */
step 9	IUT→R(j)	→LT /* asks for retransmission */
step 10	IUT←I(j, M=0)	←LT
step 11	*IUT confirms to UT the sending of data*	

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block and continues the card session on receipt of the subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

6.4.31. 1CF.091.0y: Non Chained Blocks — Transmission Error in Response to an I-Block, then Error Notification on R-block Then I-Block

Test No. **1CF.09.0y**

Objective: To ensure that the IUT correctly manages one block with transmission error in response to a non-chained I-block, then an error notification on the previous R-block then an I-block.

Procedure:

step 1	IUT← ATR	←LT /* Answer to Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with transmission error	←LT /* error generated */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←R(i+1)	←LT /* LT acks 1st I-block and notifies of error */
step 9	IUT→R(j)	→LT /* asks for retransmission */
step 10	IUT←I(j, M=0)	←LT
step 11	*IUT confirms transmission to UT*	
step 12	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT sends an R-Block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block and continues the card session on receipt of the subsequent I-block.

6.4.32. 1CF.092.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block, then Error Notification Then I-Block

Test No. **1CF.092.xy**

Objective: To ensure that the IUT correctly manages a block with syntax/semantic error in response to a non-chained I-block, then an error notification on the previous R-block then an I-block.

Procedure:

step 1	IUT← ATR	←LT	/* Answer to Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF='FE'	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT	/* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT	
step 6	IUT←block with syntax or semantic error	←LT	/* error generated */
step 7	IUT→R(j)	→LT	
step 8	IUT←R(i+1)	←LT	/* LT acks 1st I-block and notifies of error */
step 9	IUT→R(j)	→LT	/* retransmission request */
step 10	IUT←I(j, M=0)	←LT	
step 11	*IUT confirms transmission to UT*		
step 12	*IUT indicates incoming data to UT*		

Pass Criteria: The IUT sends an R-Block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block and continues the card session on receipt of the correct subsequent I-block.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

6.4.33. 1CF.093.00: Non Chained Blocks — Two Consecutive Transmission Errors in Response to an I-block, then Error Notification

Test No. **1CF.093.00**

Objective: To ensure that the IUT correctly manages two successive blocks with transmission error in response to a non-chained I-block, then an error notification.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT /* sends data */
step 6	IUT←block with transmission error	←LT /* bad transmission of block */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←block with transmission error	←LT /* bad transmission of block */
step 9	IUT→R(j)	→LT /* asks for retransmission */
step 10	IUT←R(i+1)	←LT /* notification of an error */
step 11	IUT→R(j)	→LT /* asks for retransmission */
step 12	IUT←I(j, M=0)	←LT /* LT retransmits I-block */
step 13	*IUT confirms transmission to UT*	
step 14	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, then sends an R-block on receipt of the R-block, and continues the card session on receipt on the subsequent I-block.

6.4.34. 1CF.094.00: Non Chained Blocks — Two Consecutive Syntax/Semantic Errors in Response to an I-Block, Then Error Notification

Test No. **1CF.094.00**

Objective: To ensure that the IUT correctly manages two consecutive blocks with syntax/semantic error in response to a non-chained block followed by an error notification on the previous R-block then a correct non chained I-block.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT /* sends data */
step 6	IUT←block with syntax or semantic error	←LT /* erroneous block */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←block with syntax or semantic error	←LT /* erroneous block */
step 9	IUT→R(j)	→LT /* asks for retransmission */
step 10	IUT←R(i+1)	←LT /* notifies of an error and ack. first I-block */
step 11	IUT→R(j)	→LT /* asks for retransmission */
step 12	IUT←I(j, M=0)	←LT
step 13	*IUT confirms transmission to UT*	
step 14	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, then an R-block on receipt of the R-block, and continues the card session on receipt on the subsequent I-block.

Note: the terminal is allowed to deactivate because of CWT excess on receipt of I-block with LEN = 'FF'.

6.4.35. 1CF.095.0y: Non Chained Blocks — Transmission Error in Response to an S(IFS Response) Then I-Block

Test No. **1CF.095.0y**

Objective: To ensure that the IUT responds correctly to a block with transmission error in response to an S(response) block to change the IFSC then to a non chained block.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT /* sends non chained I-block */
step 6	IUT←S(IFS request)	←LT /* request to change IFSC */
step 7	IUT→S(IFS response)	→LT /* IUT acks IFS request */
step 8	IUT←block with transmission error	←LT /* erroneous block */
step 9	IUT→R(j)	→LT /* asks for retransmission */
step 10	IUT←I(j, M=0)	←LT /* non chained I-block */
step 11	*IUT confirms transmission*	
step 12	*IUT passes incoming data to UT*	

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block, and continues the card session on receipt of the subsequent I-block.

6.4.36. 1CF.096.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an S(IFS Response), Then I-Block

Test No. **1CF.096.xy**

Objective: To ensure that the IUT responds correctly to a block with syntax/semantic error in response to an S(response) block to change the IFSC, then a non chained I-block.

Procedure:

step 1	IUT← ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF=‘FE’	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT	/* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT	/* sends non chained I-block */
step 6	IUT←S(IFS request)	←LT	/* request to change IFSC */
step 7	IUT→S(IFS response)	→LT	/* IUT acks IFS request */
step 8	IUT←block with syntax or semantic error	←LT	/* erroneous block */
step 9	IUT→R(j)	→LT	/* asks for retransmission */
step 10	IUT←I(j, M=0)	←LT	/* non chained I-block */
step 11	*IUT confirms transmission*		
step 12	*IUT passes incoming data to UT*		

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent I-block.

Note: For xy=01, the IUT is allowed to deactivate because of CWT excess.

6.4.37. 1CF.097.0y: Non Chained Blocks — Transmission Error in Response to an S(IFS Response) Then Error Notification, Then I-Block

Test No. **1CF.097.0y**

Objective: To ensure that the IUT correctly manages a block with transmission error, then an error notification on the previous R-block, then a non chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→ S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT← S(IFS response) INF='FE'	←LT /* accepts new size = 254 */
step 5	IUT→ I(i, M=0)	→LT /* sends non chained I-block */
step 6	IUT← S(IFS request)	←LT /* request to change IFSC */
step 7	IUT→ S(IFS response)	→LT /* acknowledges IFS request */
step 8	IUT← block with transmission error	←LT /* erroneous block */
step 9	IUT→ R(j)	→LT /* asks for retransmission */
step 10	IUT← R(i+1)	←LT /* notifies of an error */
step 11	IUT→ R(j)	→LT /* repeats R-block */
step 12	IUT← I(j, M=0)	←LT /* non chained I-block */
step 13	*IUT confirms transmission to UT*	
step 14	*IUT passes incoming data to UT*	

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block on receipt of the erroneous block, then repeats this R-block on receipt of the R-block, and continues the card session on receipt of the subsequent I-block.

6.4.38. 1CF.098.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an S(IFS Response) Block then Error Notification, Then I-Block

Test No. **1CF.098.xy**

Objective: To ensure that the IUT, after the IFSC establishment, correctly manages a non-chained I-block with syntax/semantic error, then an error notification.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→ S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT← S(IFS response) INF='FE'	←LT /* accepts new size = 254 */
step 5	IUT→ I(i, M=0)	→LT /* sends non chained I-block */
step 6	IUT← S(IFS request)	←LT /* request to change IFSC */
step 7	IUT→ S(IFS response)	→LT /* acknowledges IFS request */
step 8	IUT← block with syntax or semantic error	←LT /* erroneous block */
step 9	IUT→ R(j)	→LT /* asks for retransmission */
step 10	IUT← R(i+1)	←LT /* notifies of an error */
step 11	IUT→ R(j)	→LT /* repeats R-block */
step 12	IUT← I(j, M=0)	←LT /* non chained I-block */
step 13	*IUT confirms transmission to UT*	
step 14	*IUT passes incoming data to UT*	

Pass Criteria: The IUT, after the IFSC exchange, sends an R-block indicating an error on the erroneous block, then repeats this R-block on receipt of the R-block and continues the card session on receipt of the subsequent I-block.

Note: For xy=01, the IUT is allowed to deactivate because of CWT excess.

6.4.39. 1CF.099.00: Non Chained Blocks — Error Notification on an I-Block Then I-Block

Test No. **1CF.099.00**

Objective: To ensure that the IUT correctly manages the notification of an error on an I-block then a non chained I-block.

Procedure:

step 1	IUT←ATR	←LT	/* Answer To Reset */
step 2	*UT requests IUT to send short data*		
step 3	IUT→S(IFS request) INF='FE'	→LT	/* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT	/* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT	
step 6	IUT←R(i)	←LT	/* notifies of an error */
step 7	IUT→I(i, M=0)	→LT	/* retransmits I-block */
step 8	IUT←I(j, M=0)	←LT	/* acknowledges I-block */
step 9	*IUT confirms to UT the sending of data sent*		
step 10	*IUT indicates to UT incoming data*		

Pass Criteria: The IUT retransmits the I-block on receipt of the R-block and continues the card session on receipt of the subsequent I-block.

6.4.40. 1CF.100.00: Non Chained Blocks — Two Consecutive Error Notifications on an I-Block Then I-Block

Test No. **1CF.100.00**

Objective: To ensure that the IUT correctly manages two consecutive error notifications on an I-block then a non chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*LT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←R(i)	←LT /* notifies of an error */
step 7	IUT→I(i, M=0)	→LT
step 8	IUT←R(i)	←LT /* 2nd error notification */
step 9	IUT→I(i,M = 0)	→LT /* retransmits I-block */
step 10	IUT←I(j, M=0)	←LT /* acknowledges I-block */
step 11	*IUT confirms to UT the sending of data*	
step 12	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT retransmits the I-block twice on receipt the R-blocks then continues the card session on receipt of the subsequent I-block

6.4.41. 1CF.101.00: Non Chained Blocks — Excess of Error Notifications on I-Blocks

Test No. **1CF.101.00**

Objective: To ensure that the IUT initiates the deactivation sequence after transmitting the same non chained I-block three times without receiving a valid response.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i,M = 0)	→LT
step 6	IUT←R(i)	←LT /* first error notification */
step 7	IUT→I(i,M=0)	→LT /* 1st I-block repetition */
step 8	IUT←R(i)	←LT /* 2nd error notification */
step 9	IUT→I(i,M=0)	→LT /* 2nd I-block repetition */
step 10	IUT←R(i)	←LT /* 3rd error notification */

step 11 *IUT deactivates LT since TTL has sent three consecutive blocks without obtaining valid response (although responses were correct)*

step 12 *IUT indicates deactivation to UT*

Pass Criteria: The IUT retransmits the I-block twice on receipt of the R-blocks then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following reception of the leading edge of the start bit of the last character of the last block the IUT has sent. Note: The IUT, having received 3 consecutive R-blocks, should deactivate. These error notifications, although correct blocks, are not valid responses in the sense that they do not acknowledge the previous I-block sent at steps 5, 7 and 9.

6.4.42. 1CF.102.0y: Non Chained Blocks — Transmission Error in Response to an I-block, then S(IFS request)

Test No. **1CF.102.0y**

Objective: To ensure that the IUT correctly manages a block with transmission error then an S(IFS request) block .

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with transmission error	←LT /* request to change IFSC */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←S(IFS request)	←LT /* request to change IFSC */
step 9	IUT→S(IFS response)	→LT / * acknowledges IFS request */
step 10	IUT←I(j, M=0)	←LT /* non chained I-block */
step 11	*IUT confirms transmission to UT*	
step 12	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block, then accepts correct S(IFS request) and sends the S(IFS response).

6.4.43. 1CF.103.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block then S(IFS request)

Test No. **1CF.103.xy**

Objective: To ensure that the IUT correctly manages reception of a block with syntax/semantic error in response to a non chained I-block then an S(IFS request).

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT /* erroneous block */
step 7	IUT→R(j)	→LT /* indication of the error */
step 8	IUT←S(IFS request)	←LT /* request to change IFSC */
step 9	IUT→S(IFS response)	→LT / * acknowledges IFS request */
step 10	IUT←I(j, M=0)	←LT /* non chained I-block */
step 11	*IUT confirms transmission to UT*	
step 12	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, then accepts S(IFS request) and sends the S(IFS response).

Note: For xy=01, the IUT is allowed to deactivate because of CWT excess.

6.4.44. 1CF.104.00: Non Chained Blocks — Error Notification on S(IFS request) Then S(IFS Response)

Test No. **1CF.104**

Objective: To ensure that the IUT manages correctly an error notification on an S(IFS request) block then an S(IFS response).

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send data*	
step 3	IUT→S(IFS request)	→LT
step 4	IUT←R(i)	←LT /* notifies of an error */
step 5	IUT→S(IFS request) INF=‘FE’	→LT /* repeats S-block */
step 6	IUT←S(IFS response) INF=‘FE’	←LT /* accepts new size = 254 */
step 7	IUT→I(i, M=0)	→LT
step 8	IUT←I(j, M=0)	←LT /* acknowledges I-block */
step 9	*IUT indicates to UT the sending of data*	

Pass Criteria: The IUT retransmits the S(IFS request) on receipt of the R-block, and continues the card session on receipt of the S(IFS response).

6.4.45. 1CF.105.0y: Non Chained Blocks — Transmission Error in Response to an S(IFS request) Then S(IFS Response)

Test No. **1CF.105.0y**

Objective: To ensure that the IUT correctly manages a block with transmission error in response to an S(IFS request) block then an S(IFS response).

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←block with transmission error	←LT /* erroneous block */
step 5	IUT→S(IFS request) INF='FE'	→LT /* asks for retransmission */
step 6	IUT←S(IFS response) INF='FE'	←LT /* accepts new size = 254 */
step 7	IUT→I(i, M=0)	→LT
step 8	IUT←I(j, M=0)	←LT /* acknowledges I-block */
step 9	*IUT indicates to UT that data have been sent*	

Pass Criteria: The IUT retransmits the S(IFS request) block and continues the card session on receipt of the subsequent S(IFS response).

6.4.46. 1CF.106.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an S(IFS request) Then S(IFS Response)

Test No. **1CF.106.xy**

Objective: To ensure that the IUT manages correctly a block with syntax/semantic error in response to an S(IFS request) block then an S(IFS response).

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←block with syntax or semantic error	←LT /* erroneous block */
step 5	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 6	IUT←S(IFS response) INF=‘FE’	←LT /* accepts new size = 254 */
step 7	IUT→I(i, M=0)	→LT
step 8	IUT←I(j, M=0)	←LT /* acknowledges I-block */
step 9	*IUT indicates to UT that data have been sent*	

Pass Criteria: The IUT retransmits the S(IFS request) block on receipt of the erroneous block and continues the card session on receipt of the subsequent S(IFS response).

6.4.47. 1CF.107.00: Non Chained Blocks — Error Notification on S(IFS response) Then I-Block

Test No. **1CF.107.00**

Objective: To ensure that the IUT manages correctly an error notification on an S(IFS response) then a non chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←S(IFS request)	←LT /* request to change IFSC */
step 7	IUT→S(IFS response)	→LT
step 8	IUT←S(IFS request)	←LT /* notifies of an error */
step 9	IUT→S(IFS response)	→LT /* repeats S(IFS response) */
step 10	IUT←I(j, M=0)	←LT /* non chained I-block */
step 11	*IUT confirms transmission to UT*	
step 12	*IUT passes incoming data to UT*	

Pass Criteria: The IUT retransmits the S(IFS Response) block on receipt of the repeated S(IFS request) and continues the card session on receipt of the subsequent I-block.

6.4.48. 1CF.108.xy: Non Chained Blocks — One or Two Successive Transmission Errors in Response to an I-block, then S(WTX request)

Test No. **1CF.108.xy**

Objective: To ensure that the IUT correctly manages one or two successive blocks with transmission error in response to a non-chained I-block, then an S(WTX request).

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with transmission error	←LT
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←S(WTX request) INF=m	←LT
step 9	IUT→S(WTX response) INF=m	→LT /* grants waiting time extension */
step 10	*LT waits more than BWT but less than BWT + extension*	
step 11	IUT←I(j, M=0)	←LT
step 12	*IUT confirms to UT the sending of data*	
step 13	*IUT indicates the incoming data to UT*	

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, sends S(WTX response) on receipt of the S(WTX request) and accepts that LT uses WTX extension.

6.4.49. 1CF.109.xy: Non Chained Blocks — Syntax/Semantic Error in Response to an I-Block Then S(WTX request)

Test No. **1CF.109.xy**

Objective: To ensure that the IUT correctly manages a block with syntax/semantic error in response to a non-chained I-block then an S(WTX request).

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←S(WTX request) INF=m	←LT
step 9	IUT→S (WTX response) INF=m	→LT /* grants waiting time extension */
step 10	*LT waits more than BWT but less than BWT + extension*	
step 11	IUT←I(j, M=0)	←LT
step 12	*IUT confirms to UT the sending of data*	
step 13	*IUT indicates the incoming data to UT*	

Pass Criteria: The IUT sends an R-block on receipt of the erroneous block, sends S(WTX response) to the correct S(WTX request) and accepts that LT uses WTX extension.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

6.4.50. 1CF.110.xy: Non Chained Blocks — Two Successive Syntax/Semantic Errors in Response to an I-Block Then S(WTX request)

Test No. **1CF.110.xy**

Objective: To ensure that the IUT correctly manages two successive blocks with syntax/semantic error in response to a non-chained I-block then an S(WTX request).

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←block with syntax or semantic error	←LT /* first erroneous block */
step 7	IUT→R(j)	→LT /* asks for retransmission */
step 8	IUT←block with syntax or semantic error	←LT /* second erroneous block */
step 9	IUT→R(j)	→LT /* asks for retransmission again */
step 10	IUT←S(WTX request) INF=m	←LT
step 11	IUT→S (WTX response) INF=m	→LT /* grants waiting time extension */
step 12	*LT waits more than BWT but less than BWT + extension*	
step 13	IUT←I(j, M=0)	←LT
step 14	*IUT confirms to UT the sending of data*	
step 15	*IUT indicates the incoming data to UT*	

Pass Criteria: The IUT sends an R-block on receipt of each erroneous block, sends S(WTX response) to the correct S(WTX request) and accepts that LT uses WTX extension.

Note: For xy=02, the IUT is allowed to deactivate because of CWT excess.

6.4.51. 1CF.111.00: Non Chained Blocks — Error Notification on S(WTX response)

Test No. **1CF.111.00**

Objective: To ensure that the IUT responds correctly to an error notification on an S(WTX response) and grants the waiting time extension on receipt of the subsequent non chained I-block.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT← S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→ I(i, M=0)	→LT
step 6	IUT← S(WTX request) INF=m	←LT
step 7	IUT→ S(WTX response) INF=m	→LT
step 8	IUT← S(WTX request) INF=m	←LT /* notifies of an error */
step 9	IUT→ S (WTX response) INF=m	→LT /* repeats the block */
step 10	*LT waits more than BWT but less than BWT + extension*	
step 11	IUT← I(j, M=0)	←LT
step 12	*IUT confirms transmission to UT*	
step 13	*IUT indicates incoming data to UT*	

Pass Criteria: The IUT retransmits the S(WTX response) block on receipt of the repeated S(WTX request) and continues the card session respecting the waiting time extension on receipt of the subsequent I-block.

6.4.52. 1CF.112.0y: IUT Chaining — Transmission Error in Response to an I-Block

Test No. **1CF.112.0y**

Objective: To ensure that the IUT responds correctly to a block with transmission error in response to a chained I-block then to an R-block.

Procedure:

step 1	IUT←ATR	← LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=1)	→LT /* sends start of chain */
step 6	IUT←block with transmission error	←LT /* error generated */
step 7	IUT→R(j)	→LT /* IUT asks for retransmission */
step 8	IUT← R(i+1)	←LT /* acknowledges first I-block */
step 9	IUT→ I(i+1, M=1)	→LT /* 2nd I-block */
step 10	*etc. … until complete transmission of application data message (check last I-block has M=0), then*	
step 11	IUT → I(i,M=0)	→LT /* last I-block of chain */
step 12	IUT ← I(j, M)	←LT /* acknowledges last I-block of chain */
step 13	*IUT confirms transmission to UT*	

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block and then continues the chaining on receipt of the subsequent R-block.

6.4.53. 1CF.113.xy: IUT Chaining — Syntax/Semantic Error in Response to an I-Block

Test No. **1CF.113.xy**

Objective: To ensure that the IUT responds correctly to an R-block with syntax/semantic error in response to a chained I-block then to an R-block acknowledging previous I-block.

Procedure:

step 1	IUT←ATR	← LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=1)	→LT /* sends start of chain */
step 6	IUT←block with syntax and semantic error	←LT /* error generated */
step 7	IUT→R(j)	→LT /* IUT asks for retransmission */
step 8	IUT← R(i+1)	←LT /* acknowledges first I-block */
step 9	IUT→ I(i+1,M=1)	→LT /* 2^{nd} I-block */
step 10	*etc. … until complete transmission of application data message (check last I-block has M=0), then*	
step 11	IUT → I(i,M=0)	→LT /* last I-block of chain */
step 12	IUT ← I(j,M)	←LT /* acknowledges last I-block of chain */
step 13	*IUT confirms transmission to UT*	

Pass Criteria: The IUT sends an R-block indicating an error on the erroneous block and then continues the chaining on receipt of the subsequent R-block.

6.4.54. 1CF.114.0y: IUT Chaining — Excess of Transmission Errors in Response to an I-block

Test No. **1CF.114.0y**

Objective: To ensure that the IUT deactivates when receiving three consecutive blocks with transmission error in response to a chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=1)	→LT /* first block of the chain */
step 6	IUT←block with transmission error	←LT
step 7	IUT→R(j)	→LT /* asks for retransmission 1 */
step 8	IUT←block with transmission error	←LT
step 9	IUT→R(j)	→LT /* asks for retransmission 2 */
step 10	IUT←block with transmission error	←LT
step 11	*IUT deactivates LT*	
step 12	*IUT indicates to UT the deactivation*	

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the 2nd R-block it has sent.

6.4.55. 1CF.115.xy: IUT Chaining — Excess of Syntax/Semantic Errors in Response to an I-Block

Test No. **1CF.115.xy**

Objective: To ensure that the IUT deactivates when receiving three consecutive blocks with syntax/semantic error in response to a chained I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=1)	→LT /* first block of the chain */
step 6	IUT←block with syntax or semantic error	←LT
step 7	IUT→R(j)	→LT /* asks for retransmission 1 */
step 8	IUT←block with syntax or semantic error	←LT
step 9	IUT→R(j)	→LT /* asks for retransmission 2 */
step 10	IUT←block with syntax or semantic error	←LT
step 11	*IUT deactivates LT*	
step 12	*IUT indicates to UT the deactivation*	

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the 2nd R-block it has sent.

6.4.56. 1CF.116.00: IUT Chaining — Excess of Error Notifications on I-block

Test No. **1CF.116.00**

Objective: To ensure that the IUT initiates the deactivation sequence if it has sent three consecutive blocks without obtaining a valid response after an error notification.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M = 1)	→LT
step 6	IUT←R(i)	←LT /* first error notification */
step 7	IUT→I(i,M=1)	→LT /* 1st I-block repetition */
step 8	IUT←R(i)	←LT /* 2nd error notification */
step 9	IUT→I(i,M=1)	→LT /* 2nd I-block repetition */
step 10	IUT←R(i)	←LT /* 3rd error notification */
step 11	*IUT deactivates LT*	/* 3 correct but not valid responses */
step 12	*IUT indicates deactivation to UT*	

Pass Criteria: The IUT retransmits the I-block twice on receipt of the R-blocks then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following reception of the leading edge of the start bit of the last character of the last block the IUT has sent. Note: The IUT, having received 3 consecutive R-blocks, should deactivate. These error notifications, although correct blocks, are not valid responses in the sense that they do not acknowledge the previous I-block sent at steps 5, 7 and 9.

6.4.57. 1CF.117.0y: IUT Chaining — Reception of an S(ABORT request)

Test No. **1CF.117.0y**

Objective: To ensure that the IUT initiates the deactivation sequence on receipt of an S(ABORT request).

Procedure:

step 1	IUT 🡐 ATR	🡐 LT	/* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*		
step 3	IUT🡒I(i,M=1)	🡒LT	
step 4	IUT🡐S(Abort request)	🡐LT	
step 5	*IUT deactivates the LT contacts*		
step 6	*IUT indicates deactivation to the UT*		

Pass Criteria: The IUT initiates the deactivation sequence within (D * 9,600) etus following reception of the leading edge of the start bit of the last character of the S(ABORT request) block.

6.4.58. 1CF.118.00: Chaining — Error Notification on R-Block

Test No. **1CF.118.00**

Objective: To ensure IUT responds correctly to an error notification on an R-block during chaining.

Procedure:

step 1	IUT🡐ATR	🡐LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT🡒S(IFS request) INF=‘FE’	🡒LT /* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF=‘FE’	🡐LT /* accepts new size = 254 */
step 5	IUT🡒I(i, M=0)	🡒LT
step 6	IUT🡐I(j, M=1)	🡐LT /* chained I-block */
step 7	*IUT confirms transmission to UT*	
step 8	IUT🡒R(j+1)	🡒LT /* asks for next chained I-block */
step 9	IUT🡐R(i+1)	🡐LT /* notifies of an error */
step 10	IUT🡒R(j+1)	🡒LT /* repeats R-block */
step 11	IUT🡐I(j+1, M=1)	🡐LT /* chained I-block */
step 12	IUT🡒R(j)	🡒LT /* IUT acknowledges I-block */
step 13	IUT🡐I(j, M=0)	🡐LT /* chained I-block : last block */
step 14	*IUT passes incoming data to UT*	

Pass Criteria: The IUT retransmits the R-block on receipt of the R-block and continues the card session on receipt of the subsequent chained I-block.

6.4.59. 1CF.119.0y: Chaining — Transmission Error in Response to an R-Block Then I-Block

Test No. **1CF.119.0y**

Objective: To ensure that the IUT responds correctly to a block with transmission error in response to an R-block during chaining then to a chained I-block.

Procedure:

step 1	IUT← ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* accepts new size = 254 */
step 5	IUT→I(i, M=0)	→LT
step 6	IUT←I(j, M=1)	←LT /* first chained I-block */
step 7	*IUT confirms transmission to UT*	
step 8	IUT→R(j+1)	→LT /* asks for next chained I-block */
step 9	IUT←block with transmission error	←LT /* error generated */
step 10	IUT→R(j+1)	→LT /* acknowledges first I-block and asks for retransmission */
step 11	IUT←I(j+1, M=1)	← LT /* chained I-block */
step 12	IUT→R(j)	→LT /* IUT acknowledges I-block */
step 13	IUT←I(j, M=0)	←LT /* chained I-block : last block */
step 14	*IUT passes incoming data to UT*	

Pass Criteria: The IUT retransmits the R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent chained I-block.

6.4.60. 1CF.120.xy: Chaining — Syntax/Semantic Error in Response to an R-Block Then I-Block

Test No. **1CF.120.xy**

Objective: To ensure that the IUT responds correctly to a block with syntax/semantic error in response to an R-block during chaining then to a chained I-block.

Procedure:

step 1	IUT🡐 ATR	🡐LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT➔S(IFS request) INF='FE'	➔LT /* requests new size = 254 */
step 4	IUT🡐S(IFS response) INF='FE'	🡐LT /* accepts new size = 254 */
step 5	IUT➔I(i, M=0)	➔LT
step 6	IUT🡐I(j, M=1)	🡐LT /* first chained I-block */
step 7	*IUT confirms transmission to UT*	
step 8	IUT➔R(j+1)	➔LT /* asks for next chained I-block */
step 9	IUT🡐block with syntax or semantic error	🡐LT /* erroneous block */
step 10	IUT➔R(j+1)	➔LT /* acknowledges first I-block and asks for retransmission */
step 11	IUT🡐I(j+1, M=1)	🡐 LT /* chained I-block */
step 12	IUT➔R(j)	➔LT /* IUT acknowledges I-block */
step 13	IUT🡐I(j, M=0)	🡐LT /* chained I-block : last block */
step 14	*IUT passes incoming data to UT*	

Pass Criteria: The IUT retransmits the R-block on receipt of the erroneous block and continues the card session on receipt of the subsequent chained I-block.

6.4.61. 1CF.121.0y: Chaining in Both Directions — Error Notification on last block of a chain, then two transmission errors during ICC chaining

Test No. **1CF.121.0y**

Objective: To ensure that IUT properly manages an error notification on the last block of a chain, then a block with transmission error, then another block with transmission error in response to an R-block during ICC chaining.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=1)	→LT /* 1st I-block IUT chaining */
step 6	IUT←R(i+1)	←LT /* acknowledges 1st I-block */
step 7	IUT→I(i+1, M=1)	→LT /* 2nd I-block */
step 8	IUT←R(i)	←LT /* acknowledges 2nd I-block */
step 9	IUT→I(i, M=0)	→LT /* last chained block */
step 10	IUT←R(i)	←LT /* notifies of an error */
step 11	IUT→I(i, M=0)	→LT /* repeats last I-block of IUT chain */
step 12	IUT←block with transmission error	←LT /* erroneous block */
step 13	IUT→R(j)	→LT /* asks for retransmission */
step 14	IUT←I(j, M=1)	←LT /* 1st I-block of LT chain */
step 15	*IUT confirms transmission to UT*	
step 16	IUT→ R(j+1)	→LT /* acknowledges 1st I-block */
step 17	IUT←block with transmission error	←LT /* erroneous block of LT chain */
step 18	IUT→ R(j+1)	→LT /* asks for retransmission */
step 19	IUT←I(j+1, M=0)	←LT /* sends last I-block of LT chain */
step 20	*IUT indicates to UT incoming data*	

Pass Criteria: The IUT retransmits the last I-block of the chain on receipt of the error notification, sends an R-block on receipt of each erroneous block, then continues the card session on receipt of the last I-block of the chain.

6.4.62. 1CF.122.xy: Chaining in Both Directions — Error Notification on Last I-block of a Chain, then Syntax/Semantic Errors in a Chain

Test No. **1CF.122.xy**

Objective: To ensure that IUT properly manages an error notification on the last I-block of a chain, then syntax/semantic errors in a chain.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send data that require chaining*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i, M=1)	→LT /* 1st I-block IUT chaining */
step 6	IUT←R(i+1)	←LT /* acknowledges 1st I-block */
step 7	IUT→I(i+1, M=1)	→LT /* 2nd I-block */
step 8	IUT←R(i)	←LT /* acknowledges 2nd I-block */
step 9	IUT→I(i, M=0)	→LT /* last chained I-block */
step 10	IUT←R(i)	←LT /* notifies of an error */
step 11	IUT→I(i, M=0)	→LT /* repeats last I-block of IUT chain */
step 12	IUT←block with syntax or semantic error	←LT /* erroneous block */
step 13	IUT→R(j)	→LT /* asks for retransmission */
step 14	IUT←I(j, M=1)	←LT /* 1st I-block of LT chain */
step 15	*IUT confirms transmission to UT*	
step 16	IUT→R(j+1)	→LT /* acknowledges 1st I-block */
step 17	IUT←block with syntax or semantic error	←LT /* erroneous block of LT chain */
step 18	IUT→R(j+1)	→LT /* asks for retransmission */
step 19	IUT←I(j+1, M=0)	←LT /* last I-block of LT chain */
step 20	*IUT indicates to UT incoming data*	

Pass Criteria: The IUT retransmits the last I-block of the chain on receipt of the R-block, sends an R-block on receipt of each erroneous block, then continues the card session on receipt of the correct last I-block of the chain.

6.4.63. 1CF.123.00: Resynchronization Attempt After Excess of Invalid Blocks in Response to an I-block

Test No. **1CF.123.00**

Objective: To ensure that the IUT properly tries to resynchronize on receipt of three successive invalid blocks in response to an I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF='FE'	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF='FE'	←LT /* LT agrees with new size */
step 5	IUT→I(i,M)	→LT
step 6	IUT← erroneous block	←LT /* erroneous block */
step 7	IUT→R(j)	→LT /* asks retransmission for the first time */
step 8	IUT←erroneous block	←LT /* erroneous block */
step 9	IUT→R(j)	→LT /* asks retransmission for the 2nd time */
step 10	IUT←erroneous block	←LT /* erroneous block */
step 11	IUT→S(Resynch request)	→LT /*resynchronization attempt */

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then sends a valid S(Resynch request).

6.4.64. 1CF.124.xy: IUT Chaining — Excess of Errors in Response to an I-Block with variation of allowed deactivation delay

Test No. **1CF.124.xy**

Objective: To ensure that the IUT deactivates using the good timing (function of D and BWT) when receiving three consecutive blocks with error in response to an I-block.

Procedure:

step 1	IUT←ATR	←LT /* Answer To Reset */
step 2	*UT requests IUT to send short data*	
step 3	IUT→S(IFS request) INF=‘FE’	→LT /* requests new size = 254 */
step 4	IUT←S(IFS response) INF=‘FE’	←LT /* LT agrees with new size */
step 5	IUT→I(i,M=1)	→LT /* first block of the chain */
step 6	IUT←block with error	←LT
step 7	IUT→R(j)	→LT /* asks for retransmission 1 */
step 8	IUT←block with error	←LT
step 9	IUT→R(j)	→LT /* asks for retransmission 2 */
step 10	IUT←block with error	←LT
step 11	*IUT deactivates LT*	
step 12	IUT indicates to UT the deactivation	

Pass Criteria: The IUT sends two R-blocks indicating an error on the first two erroneous blocks, then initiates the deactivation sequence within {BWT + (D * 14,400)} etus following the leading edge of the start bit of the last character of the second R-block it has sent.

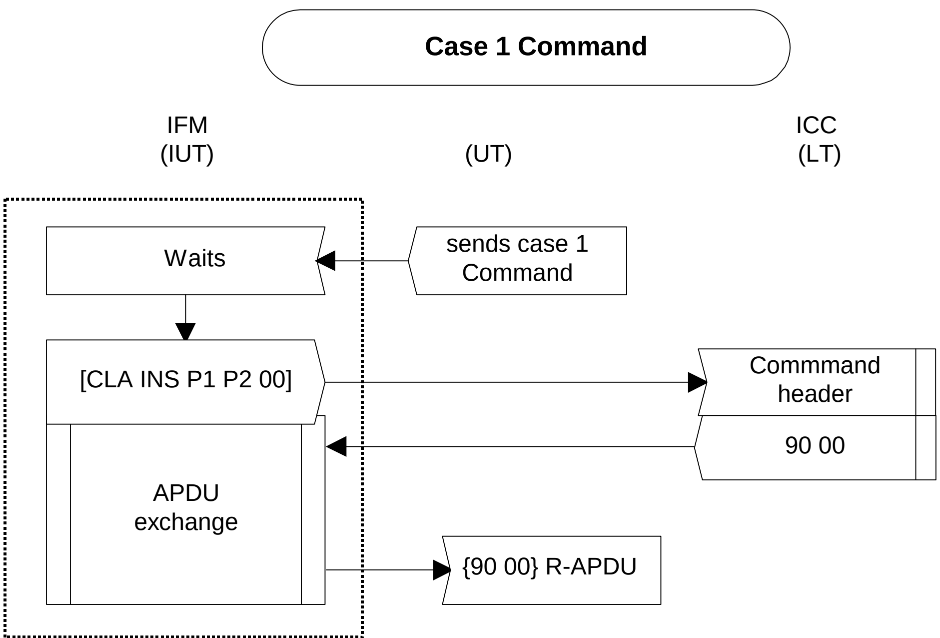
6.5. Terminal Transport Layer

6.5.1. 1CF.151.00: Case 1 Command

Test No. **1CF.151.00**

Objective: To ensure that, when a case 1 command is sent, the IUT processes the status words returned after the command.

Procedure:



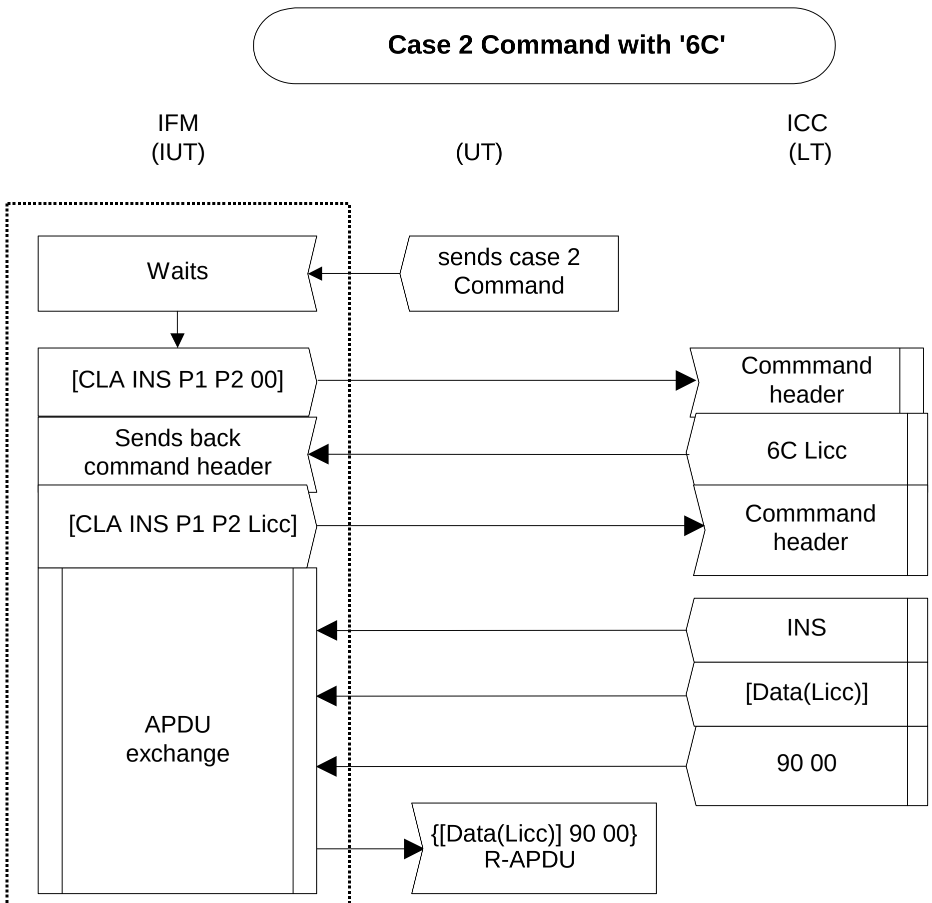
Pass Criteria: The IUT passes the correct R-APDU of {90 00} to the UT.

6.5.2. 1CF.152.0y: Case 2 Command with '6C'

Test No. **1CF.152.0y**

Objective: To ensure that the IUT correctly processes a ‘6C’ procedure byte sent in response to a case 2 command header.

Procedure:



Pass Criteria: The IUT:

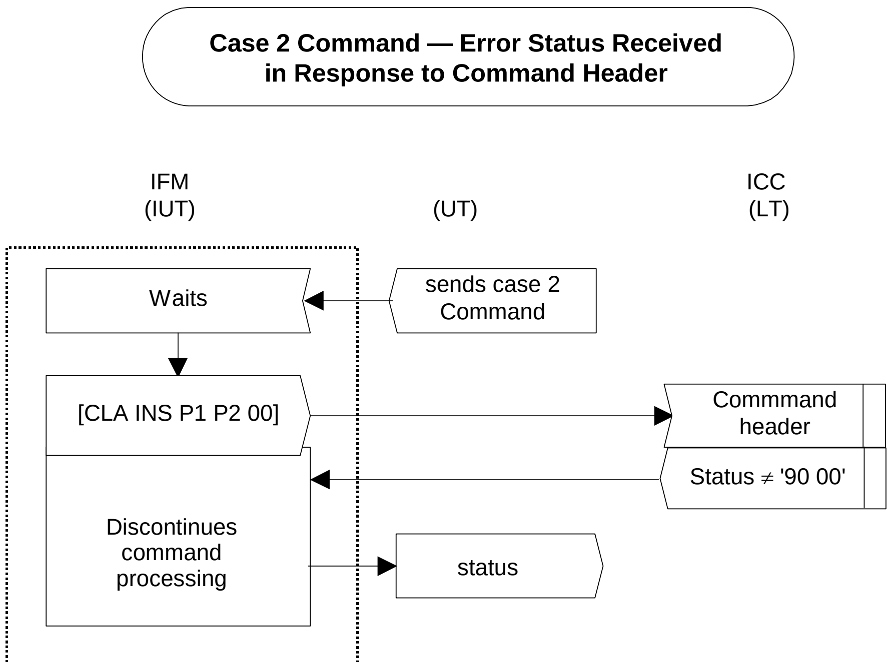
- resends the case 2 command header with P3 set to 'xx' on receipt of the command header with P3 set to 'xx'
- passes the R-APDU to the UT
- continues the card session.

6.5.3. 1CF.153.00: Case 2 Command — Error Status Received in Response to Command Header

Test No. **1CF.153.00**

Objective: To ensure that the IUT discontinues command processing on receipt of error status sent in response to a case 2 command header.

Procedure:



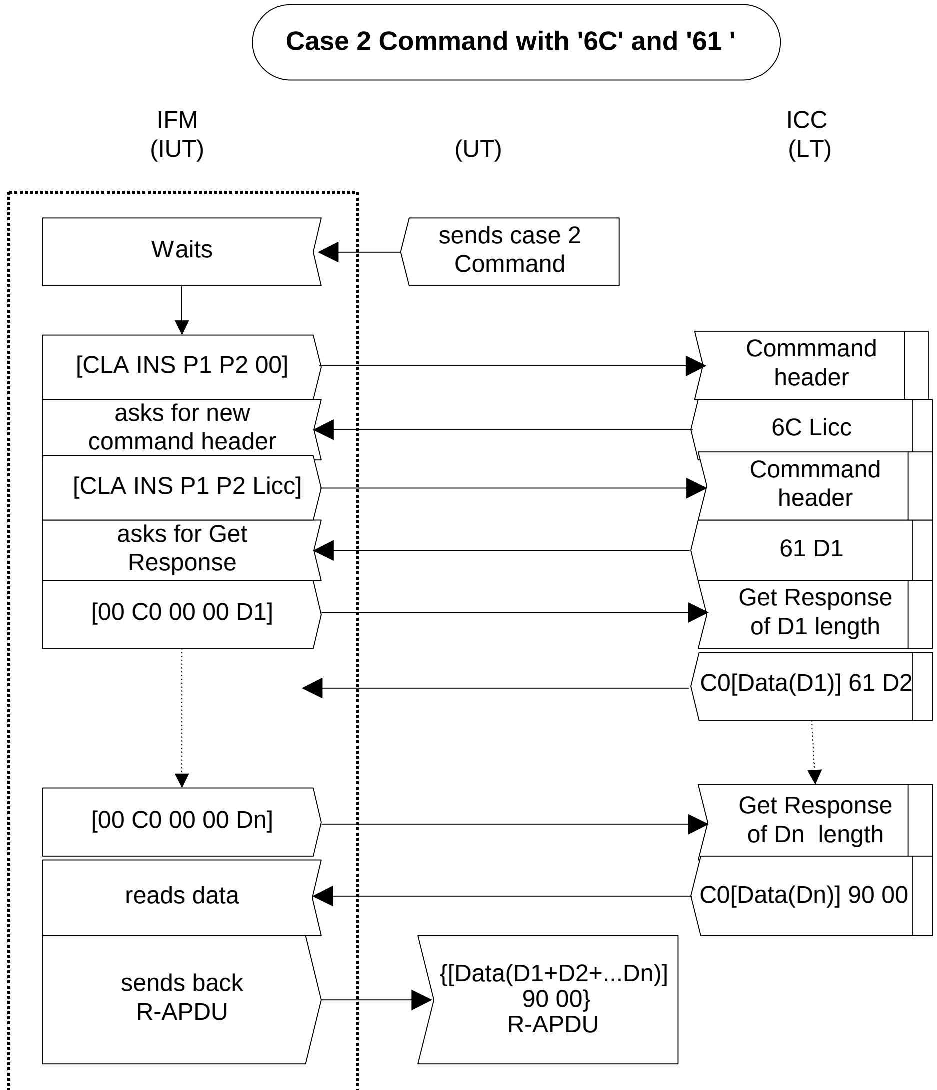
Pass Criteria: The IUT discontinues processing of the case 2 command on receipt of the error status bytes and passes the error to the UT.

6.5.4. 1CF.154.00: Case 2 Command with ‘6C’ and with ‘61’

Test No. **1CF.154.00**

Objective: To ensure that the IUT correctly processes a case 2 command under control of ‘61’ and ‘6C’ procedure bytes.

Procedure:



Pass Criteria: The IUT:

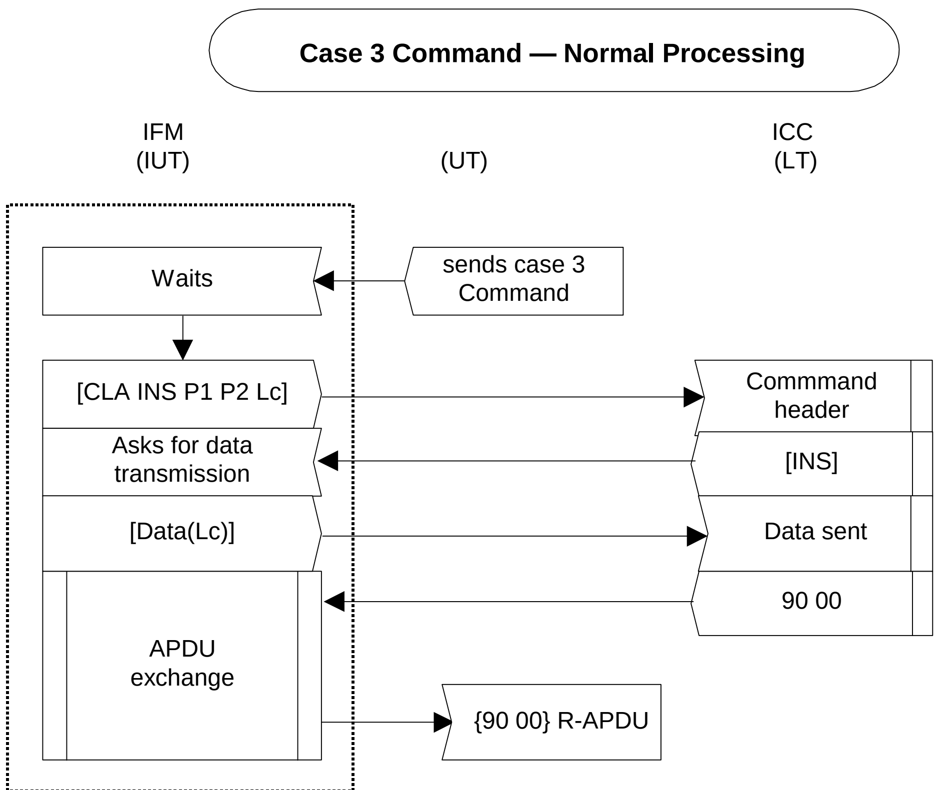
- resends the command header with P3 set to 'xx' on receipt of the ‘6Cxx’ procedure bytes
- sends GET RESPONSE commands with P3 set to ≤'yy' in response to ‘61yy’ procedure bytes
- passes the R-APDU to the UT.
- continues the card session

6.5.5. 1CF.155.0y: Case 3 Command — Normal Processing

Test No. **1CF.155.0y**

Objective: To ensure that the IUT correctly processes a case 3 command and accepts the status bytes '9000', '62xx', '63xx', '9xxx' (except '9000') in response to the command data.

Procedure:



Pass Criteria: The IUT:

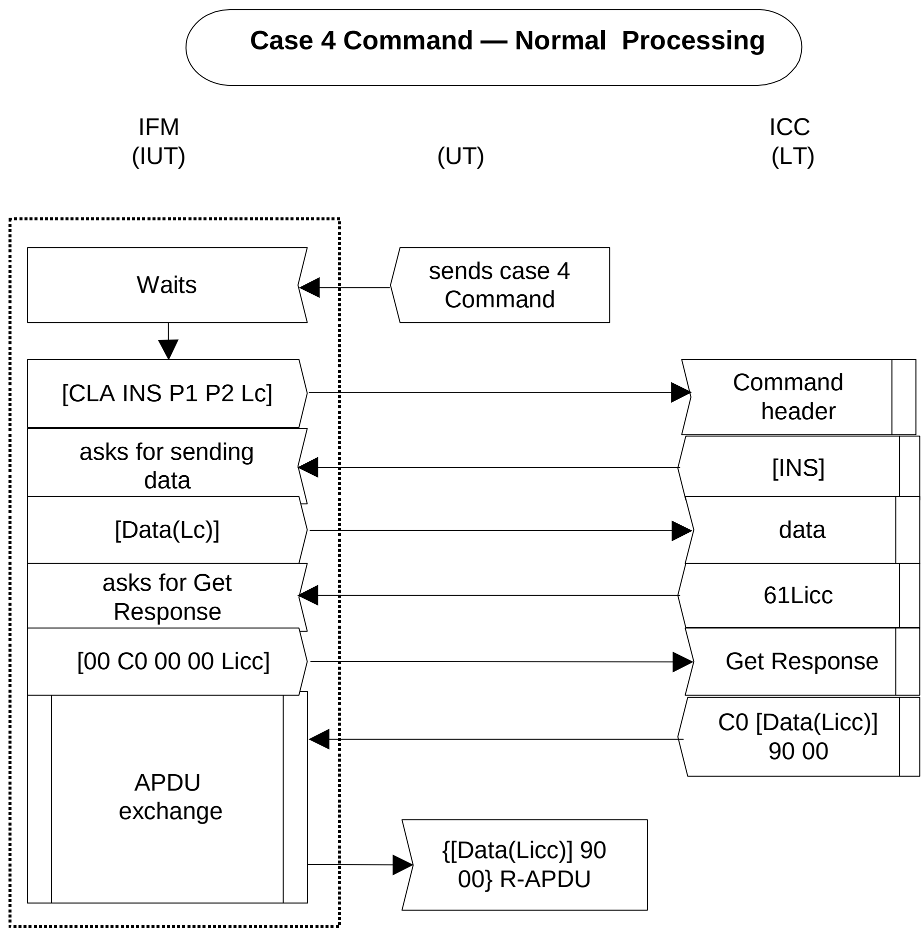
- correctly processes the case 3 command by sending data on receipt of the procedure byte
- discontinues the current command processing and continues the card session on receipt of the status bytes which it passes to the UT.

6.5.6. 1CF.156.00: Case 4 Command — Normal Processing

Test No. **1CF.156.00**

Objective: To ensure that the IUT correctly processes a case 4 command.

Procedure:



Pass Criteria: The IUT:

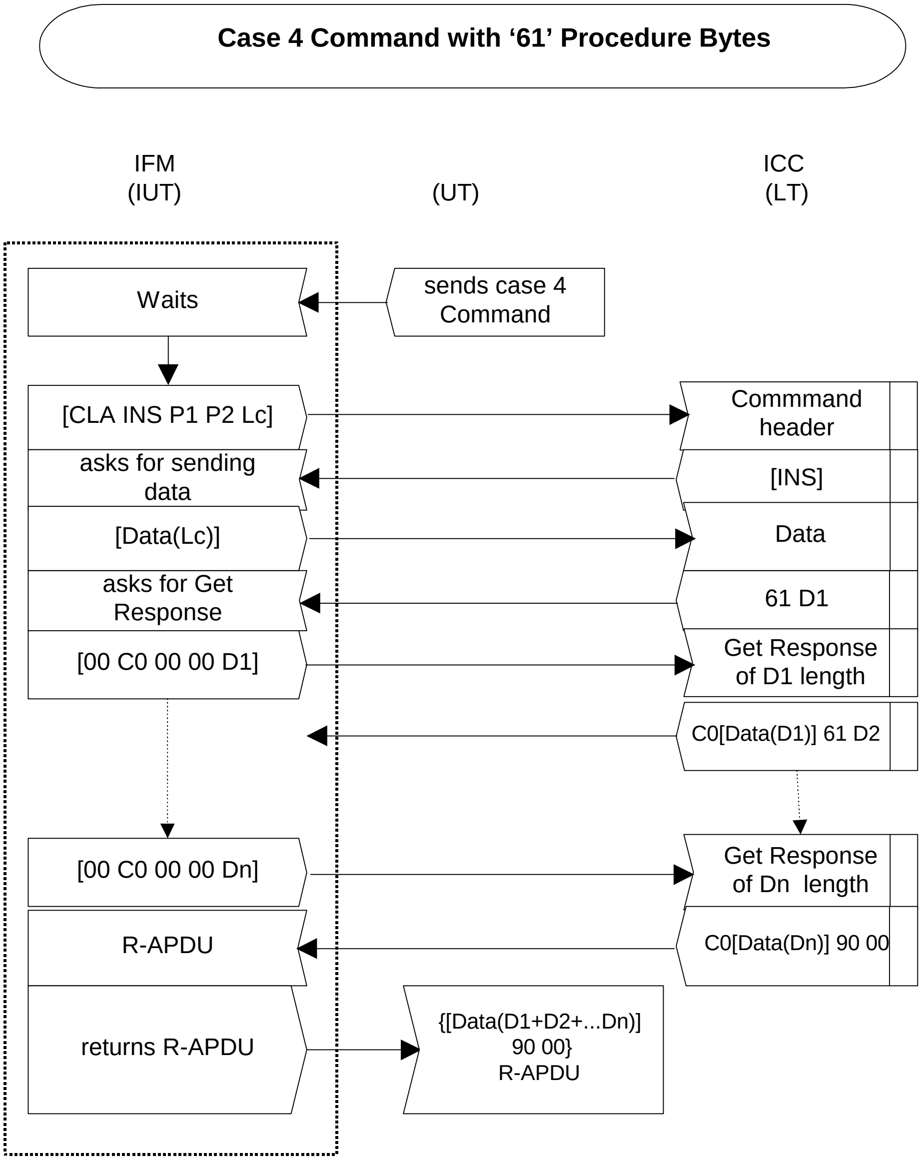
- correctly processes the case 4 command by sending data on receipt of procedure byte
- sends GET RESPONSE commands with P3 set to 'Licc' in response to ‘61 Licc' procedure bytes
- passes R-APDU to the UT.
- continues the card session

6.5.7. 1CF.157.00: Case 4 Command with '61' Procedure Bytes

Test No. **1CF.157.00**

Objective: To ensure that the IUT correctly processes a case 4 command under the control of '61' procedure bytes.

Procedure:



Pass Criteria: The IUT:

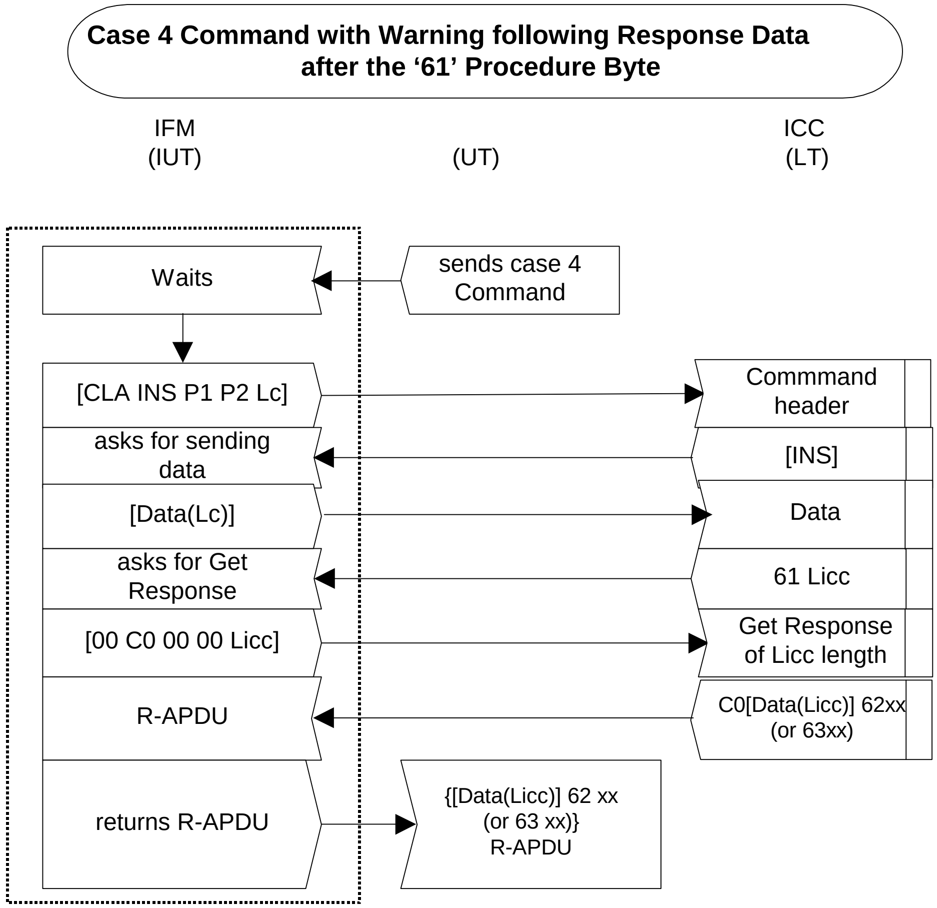
- correctly processes the case 4 command by sending data on receipt of procedure byte
- sends GET RESPONSE commands as required in response to '61xx' procedure bytes
- passes the R-APDU to the UT
- continues the card session.

6.5.8. 1CF.158.0y: Case 4 Command with Warning following Response Data after the ‘61’ Procedure Byte

Test No. **1CF.158.0y**

Objective: To ensure that the IUT behaves correctly on receipt of warning status following response data after reception of a '61' procedure byte.

Procedure:



Pass Criteria: The IUT:

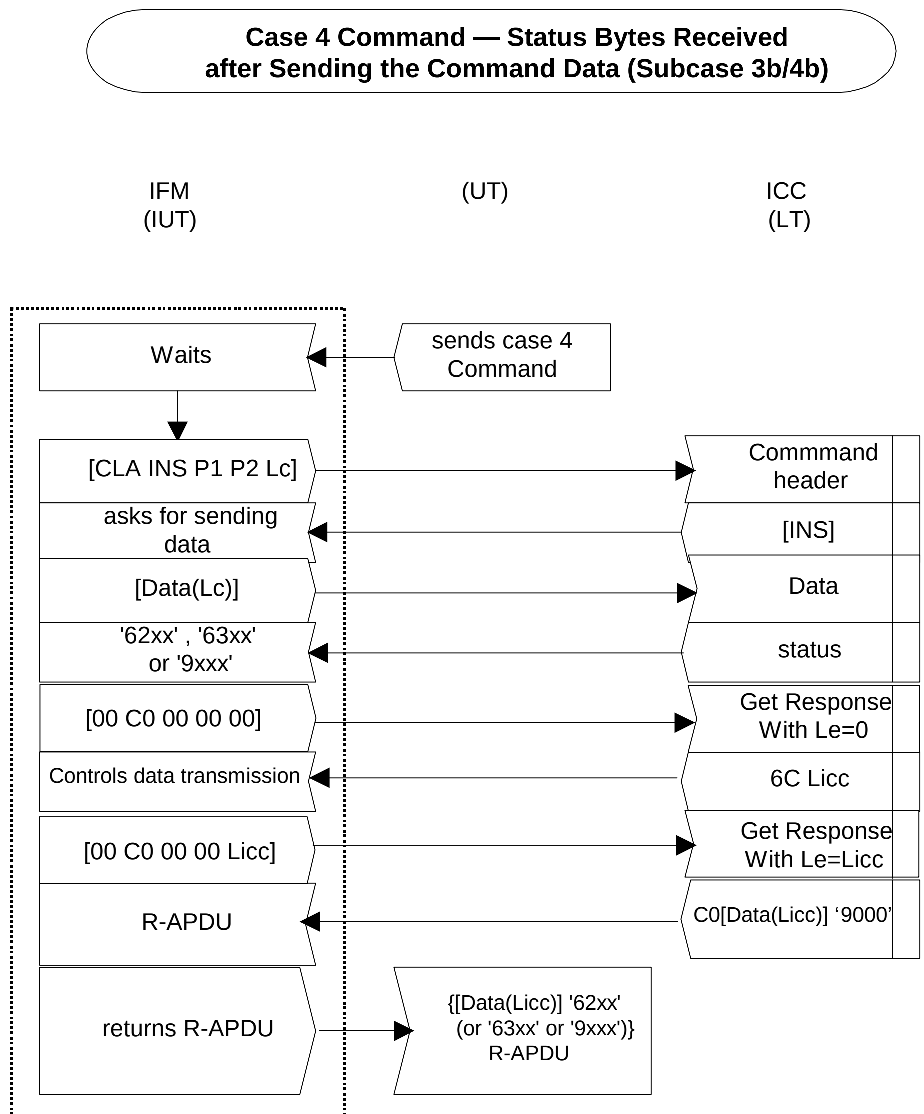
- correctly processes the case 4 command by sending the data on receipt of the procedure byte
- sends a GET RESPONSE commands with P3 set to 'Licc' in response to '61 Licc' procedure bytes
- passes the R-APDU to the UT
- continues the card session.

6.5.9. 1CF.159.0y: Case 4 Command — Status Bytes Received after Sending the Command Data

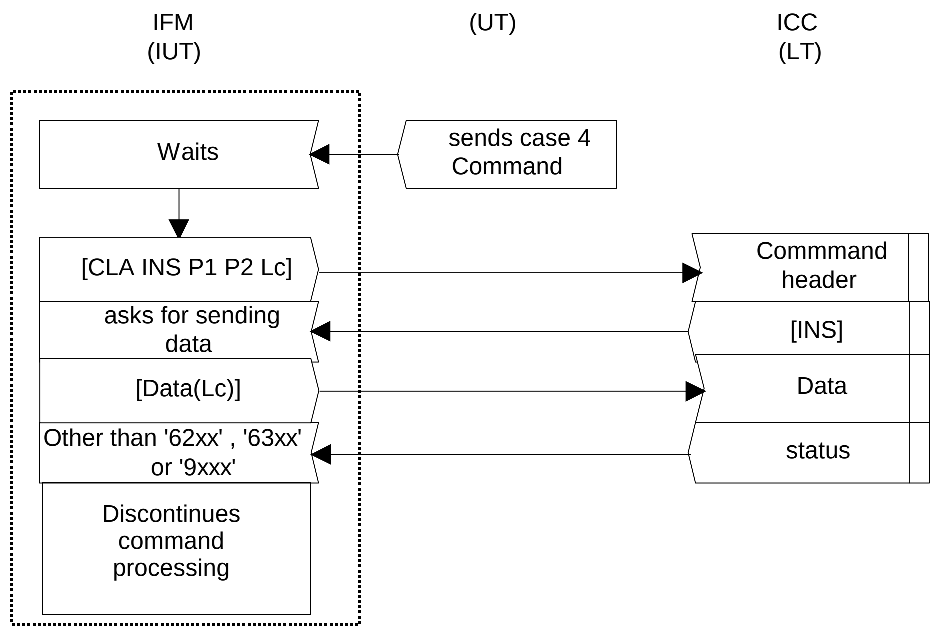
Test No. **1CF.159.0y**

Objective: To ensure that the IUT correctly processes a case 4 command when status is received following transmission of the command data.

Procedure:



Case 4 Command — Status Bytes Received after Sending the Command Data (Subcase 3b/4c)



Pass Criteria:

- y = 0: the IUT:
  - correctly processes the case 4 command by sending the data on receipt of the procedure byte
  - sends a GET RESPONSE commands with P3 set to '0' on receipt of the status bytes
  - sends a GET RESPONSE commands with P3 set to 'Licc' in response to '61 Licc' procedure bytes
  - passes the R-APDU to the UT
  - continues the card session.

- y = 1: the IUT:
  - sends the data on receipt of the procedure byte
  - discontinues processing of the command after receipt of status bytes from the LT.

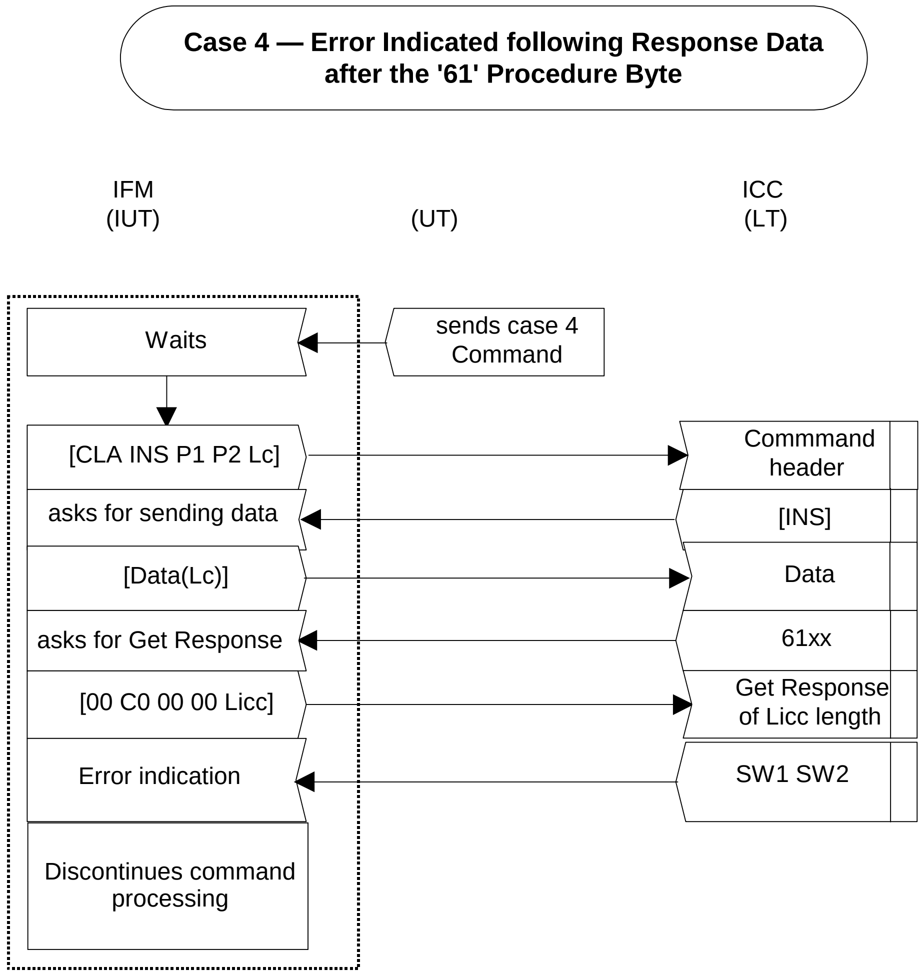
In both cases, the status bytes received (step 3) shall be mapped onto the mandatory trailer of the R-APDU without change.

6.5.10. 1CF.160.0y: Case 4 — Error Indicated following Response Data after the '61' Procedure Byte

Test No. **1CF.160.0y**

Objective: To ensure that the IUT behaves correctly on receipt of error status following response data after '61' procedure byte.

Procedure:



note that the GET RESPONSE issued with length Licc above may be perfectly valid if Licc≤xx

Pass Criteria: The IUT:

- sends the data on receipt of the procedure byte
- sends a GET RESPONSE commands with P3 set to 'Licc' in response to '61 xx' procedure bytes
- discontinues the command processing after reception of an error status.

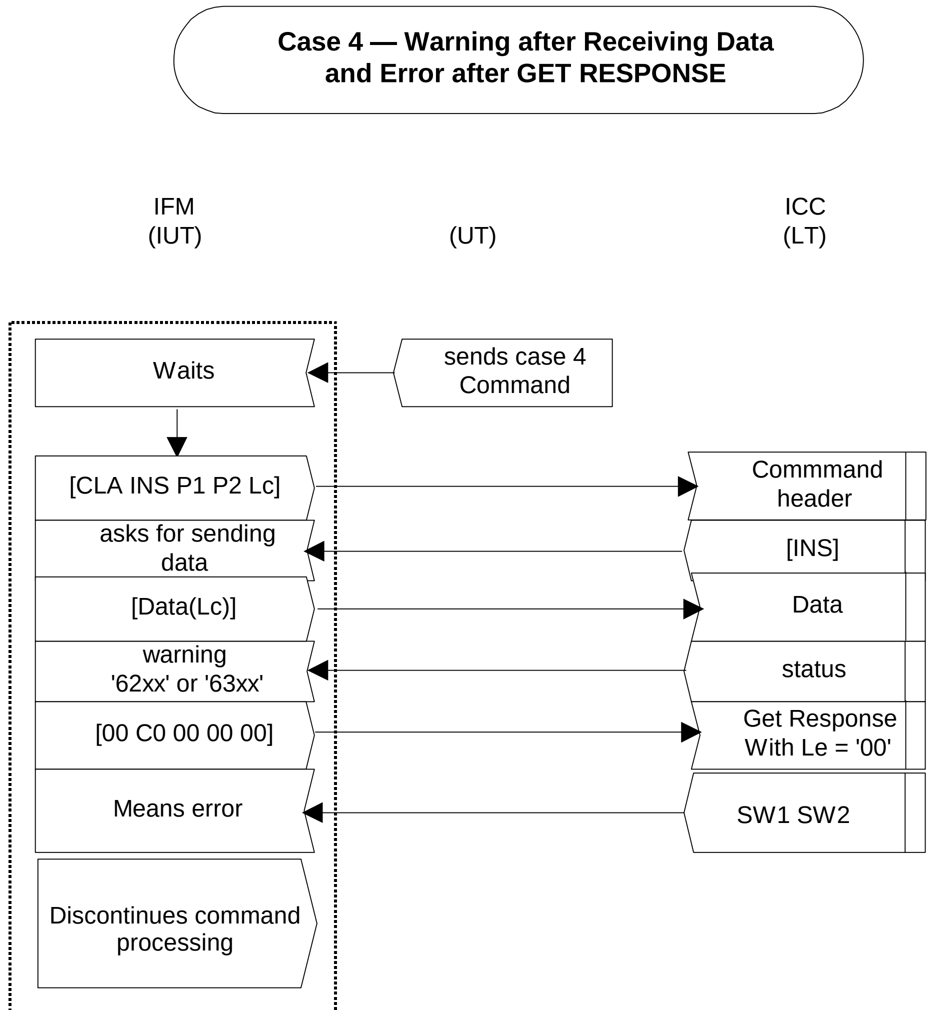
Moreover, the status bytes SW1-SW2 (step 5) shall be passed as a mandatory trailer of the R-APDU to UT.

6.5.11. 1CF.161.0y : Case 4 — Warning after Receiving Data and Error after GET RESPONSE

Test No. **1CF.161.0y**

Objective: To ensure that the IUT correctly processes a case 4 command when warning status is received following transmission of the command data, and error status is received following transmission of the GET RESPONSE command header.

Procedure:



Pass Criteria:

The IUT:

- sends the data on receipt of the procedure byte
- sends a GET RESPONSE commands with P3 set to '0' in response to the warning status
- discontinues the command processing on receipt of the error status.

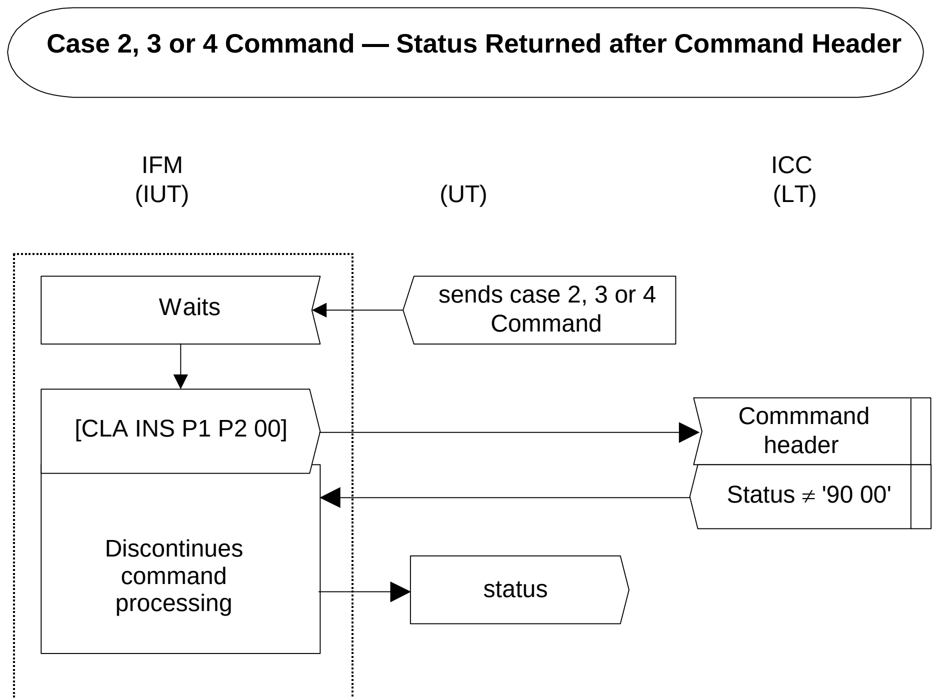
Moreover, it passes the status bytes SW1-SW2 (step 3b) as a mandatory trailer of the R-APDU to UT.

6.5.12. 1CF.162.0y: Case 2, 3 or 4 Command — Status Returned after Command Header

Test No. **1CF.162.0y**

Objective: To ensure that the IUT discontinues processing a case 2, 3 or 4 command, when status (error or warning) is returned in response to the command header.

Procedure:



Pass Criteria: The IUT discontinues processing of the command following receipt of the status bytes and passes them to the UT .

7. APPENDIX 2: REFERENCE ATR LIST

7.1. Introduction

The objective of this part is to set a cross-reference between each ATR sent by the LT in this document and all the tests where it is used. This cross-reference is divided into four tables:

- -ATRs used in error free T=0 tests
- -ATRs used in error free T=1 tests
- -ATRs used in error handling T=0 tests
- -ATRs used in error handling T=1 tests

In each table, the first 18 columns indicate the values of the ATR characters TS to TCK; the 19th column indicates whether the ATR is sent after Cold reset (C), Warm reset (W) or Both after cold and warm resets (B). In the last column, are listed the tests numbers using those ATRs. The letter W, next to a test number, indicates, as above, that, in this test, the ATR is sent after warm reset. If not mentioned, the ATR is sent after cold reset.

7.2. Cross-reference

7.2.1. T=0 ATRs — error free tests

ATR characters																		C W B	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
'3B'	'60'	-	'00'	'FE'	-	-	-	-	-	-	-	-	-	-	-	-	-	C	1CE.001 1CE.002
'3B'	'60'	-	'00'	'80'	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.003 1CE.004(W) 1CE.009 1CE.011(W) 1CF.007 1CF.008(W)
'3B'	'F0'	'11'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-	B	1CE.005 1CE.006(W)
'3F'	'F0'	'11'	'00'	'00'	'10'	'80'	-	-	-	-	-	-	-	-	-	-	-	B	1CE.005 1CE.006(W)

ATR characters																		C W B	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
‘3B'	'70'	'11'	'00'	'00'	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.007 1CE.008(W)
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.009 1CE.011(W) 1CE.017 1CE.018(W) 1CF.001 to 1CF.016 except 1CF.003 & 1CF.004 + all tests on TTL except 1CF.154, 1CF.155 & 1CF.158
‘3B’	‘60’	-	‘00’	‘F0’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.009 1CE.011(W) 1CF.007 1CF.008(W)
‘3B’	‘60’	-	‘00’	‘FF’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.009 1CE.011(W) 1CF.003 1CF.004 1CF.007 1CF.008(W) 1CF.154 1CF.157 1CF.158
‘3B’	‘20’	-	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.013 1CE.015(W)
‘3F’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.017 1CE.018 (W)
‘3B’	‘60’	-	‘01’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	W	1CE.018(W)
‘3F’	‘60’	-	‘01’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	W	1CE.018(W)
‘3F’	‘60’	-	‘00’	‘FE’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.017 1CE.018 (W)
‘3B’	‘FF’	‘11’	‘00’	‘00’	‘D0’	‘80’	-	‘0A’	‘F1’	‘20’	‘01’	‘00’	‘71’	‘00’	‘00’	‘00’	‘7A’	B	1CE.019 1CE.020(W) + Historical bytes
'3B'	'FF'	'11'	'00'	'00'	'C0'	-	-	'0A'	'F1'	‘20’	‘01’	‘00’	‘71’	‘00’	‘00’	‘00’	'EA'	B	1CE.019 1CE.020(W) + Historical bytes
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘0A’	-	-	-	-	-	-	-	-	-	B	1CE.027 1CE.028(W)
‘3B’	‘60’	-	‘A5’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	W	1CE.024(W)
‘3B’	‘40’	-	-	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	W	1CE.024(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘10’	‘80’	-	-	-	-	-	-	-	-	-	-	-	W	1CE.026(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘80’	-	-	-	‘0E’	-	-	-	-	-	-	-	‘6E’	B	1CE.029 1CE.030(w)

7.2.2. T=1 ATRs — error free tests

ATR characters																		C W B	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
‘3B’	‘F0’	‘11’	‘00’	‘00’	‘91’	‘80’	-	-	‘61’	-	‘01’	‘00’	-	-	-	-	‘90’	B	1CE.005 1CE.006(W)
‘3F’	‘F0’	‘11’	‘00’	‘00’	‘91’	‘80’	-	-	‘61’	-	‘01’	‘00’	-	-	-	-	‘90’	B	1CE.005 1CE.006(W)
‘3B’	‘F0’	‘11’	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘70’	B	1CE.007 1CE.008(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’	B	1CE.010 1CE.012(W) 1CE.023 all correct T=1 tests except those specified hereafter (*)[1]
‘3B’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘6B’	B	1CE.010 1CE.012(W)
‘3B’	‘E0’	-	‘00’	‘FF’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘8E’	B	1CE.010 1CE.012(W)
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘21’	B	1CE.014 1CE.016(W)
‘3F’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘10’	‘05’	-	-	-	-	-	‘5B’	B	1CE.017 1CE.018 (W)
‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’	B	1CE.017 1CE.018 (W)
'3B'	'FF'	'11'	'00'	'00'	'D1'	'80'	-	'0A'	'F1'	'20'	'01'	'00'	'71'	'00'	'00'	'00'	'7B'	B	1CE.019 1CE.020(W) + Historical bytes

[1] when (*) is placed against a test number, it means that none of this test's ATRs is equal to '3B E0 00 00 81 31 20 01 71'.

ATR characters																		C W B	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
‘3B’	‘FF’	‘11’	‘00’	‘00’	‘C1’	-	-	‘0A’	‘F1’	‘20’	‘01’	‘00’	‘71’	‘00’	‘00’	‘00’	‘EB’	B	1CE.019 1CE.020(W) + Historical bytes
‘3F’	‘F0’	‘11’	‘00’	‘00’	‘81’	-	-	-	‘61’	-	‘01’	'00'	-	-	-	-	‘00’	B	1CE.021 1CE.022(W)
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘71’	B	1CE.021 1CE.022(W) 1CF.057(*)
‘3B’	‘E0’	-	‘A5’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘D4’	W	1CE.024(W)
‘3B’	‘C0’	-	-	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘51’	W	1CE.024(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’	B	1CE.025 1CE.026(W) 1CF.051(*) 1CF.054(*) 1CF.058(*) 1CF.061(*) 1CF.063
‘3B’	‘E0’	-	‘00’	‘00’	‘91’	‘81’	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘3E’	B	1CE.025 1CE.026(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘21’	-	‘01’	-	-	-	-	-	‘41’	B	1CE.031 1CE.032(w)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘45’	-	-	-	-	-	‘35’	B	1CE.033 1CE.034(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘31’	B	1CE.035 1CE.036(W)
‘3B’	‘E0’	-	‘00’	‘1E’	‘81’	-	-	-	‘31’	‘20’	‘45’	-	-	-	-	-	‘2B’	B	1CE.033 1CE.034(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘31’	B	1CE.033 1CE.034(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘02’	-	-	-	-	-	‘72’	C	1CF.052
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘03’	-	-	-	-	-	‘73’	C	1CF.052
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘04’	-	-	-	-	-	‘74’	C	1CF.052
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘75’	C	1CF.052
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘61’	C	1CF.053
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘51’	C	1CF.053
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘41’	C	1CF.053
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘31’	C	1CF.053
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘10’	‘01’	-	-	-	-	-	‘41’	C	1CF.063 1CF.065(*)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘01’	-	-	-	-	-	‘11’	C	1CF.063
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘60’	‘01’	-	-	-	-	-	‘31’	C	1CF.063
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘80’	‘01’	-	-	-	-	-	‘D1’	C	1CF.063
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘A0’	‘01’	-	-	-	-	-	‘F1’	C	1CF.063
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘C0’	‘01’	-	-	-	-	-	‘91’	C	1CF.063
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘E0’	‘01’	-	-	-	-	-	‘B1’	C	1CF.063

7.2.3. T=0 ATRs — error handling tests

ATR characters																		C W B	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
‘3B’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.050 1CE.051(W) (ATR global time exceeded) 1CE.052 1CE.053(W) (max. int. between ATR characters exceeded) 1CE.054 1CE.055(W) (incorrect ATR delay) 1CE.056 1CE.057(W) (parity error) 1CF.030 to 1CF.039 (timings exceeded or errors generated and assumed)
‘3D’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.058 1CE.059(W)
‘3B’	‘40’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.060 1CE.061(W)
‘3B’	‘20’	-	‘00’	’00’	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1CE.060 1CE.061(W)
‘3B’	‘F0’	‘D6’	‘00’	‘00’	‘10’	‘00’	-	-	-	-	-	-	-	-	-	-	-	B	1CE.062 1CE.063(W)
‘3B’	‘60’	-	‘05’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	C	1CE.064
‘3B’	‘40’	-	-	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	C	1CE.064
‘3B’	‘E0’	-	‘00’	‘00’	‘10’	‘10’	-	-	-	-	-	-	-	-	-	-	-	B	1CE.067 1CE.068(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘00’	-	-	-	-	-	-	-	-	-	B	1CE.071 1CE.072(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘0B’	-	-	-	-	-	-	-	-	-	B	1CE.071 1CE.072(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘01’	-	-	-	-	-	-	-	-	-	B	1CE.071 1CE.072(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘40’	-	-	‘09’	-	-	-	-	-	-	-	-	-	B	1CE.071 1CE.072(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘11’	-	-	-	-	-	-	B	1CE.081 1CE.082(W)
‘3F’	‘60’	-	‘00’	‘00’	-	-	-	-	-	-	-	-	-	-	-	-	-	C	1CF.033

7.2.4. T=1 ATRs — error handling tests

ATR characters																		C W B	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘FE’	‘01’	-	-	-	-	-	‘AF’	B	1CE.056 1CE.057(W) (parity error)
‘3B’	‘F0’	‘D6’	‘00’	‘00’	‘91’	‘01’	-	-	‘31’	‘40’	‘01’	-	-	-	-	-	‘C6’	B	1CE.062 1CE.063(W)
‘3B’	‘E0’	-	‘10’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘61’	C	1CE.064
‘3B’	‘C0’	-	-	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘51’	C	1CE.064
‘3B’	‘E0’	-	‘00’	‘00’	‘0E’	-	-	-	-	-	-	-	-	-	-	-	‘EE’	B	1CE.065[2] 1CE.066(W)
‘3F’	‘E0’	-	‘00’	‘00’	‘04’	-	-	-	-	-	-	-	-	-	-	-	‘E4’	B	1CE.065[2] 1CE.066(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘A1’	-	‘00’	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘51’	B	1CE.069 1CE.070(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘20’	-	‘01’	-	-	-	-	-	‘40’	B	1CE.073 1CE.074(W)
‘3B’	‘E0’	-	‘00’	'00'	‘81’	-	-	-	‘2E’	-	‘01’	-	-	-	-	-	‘4E’	B	1CE.073 1CE.074(W)
‘3F’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘2F’	-	‘01’	-	-	-	-	-	‘4F’	B	1CE.073 1CE.074(W)
‘3B’	‘E0’	-	‘00’	'00'	‘81’	-	-	-	‘31’	‘FF’	‘01’	-	-	-	-	-	‘AE’	B	1CE.075 1CE.076(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘00’	‘01’	-	-	-	-	-	‘51’	B	1CE.075 1CE.076(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘0F’	‘01’	-	-	-	-	-	‘5E’	B	1CE.075 1CE.076(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘11’	‘40’	-	-	-	-	-	-	‘30’	B	1CE.077 1CE.078(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘51’	-	-	-	-	-	‘41’	B	1CE.077 1CE.078(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘06’	-	-	-	-	-	‘16’	B	1CE.077 1CE.078(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘40’	‘00’	-	-	-	-	-	‘30’	B	1CE.077 1CE.078(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘40’	‘01’	‘FF’	-	-	-	-	‘AE’	B	1CE.079 1CE.080(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘71’	‘40’	‘01’	‘01’	-	-	-	-	‘50’	B	1CE.079 1CE.080(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘61’	B	1CE.081 1CE.082(W)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘71’	B	all incorrect T=1 tests except those specified hereafter (*)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘02’	-	-	-	-	-	‘72’	C	1CF.080
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘03’	-	-	-	-	-	‘73’	C	1CF.080

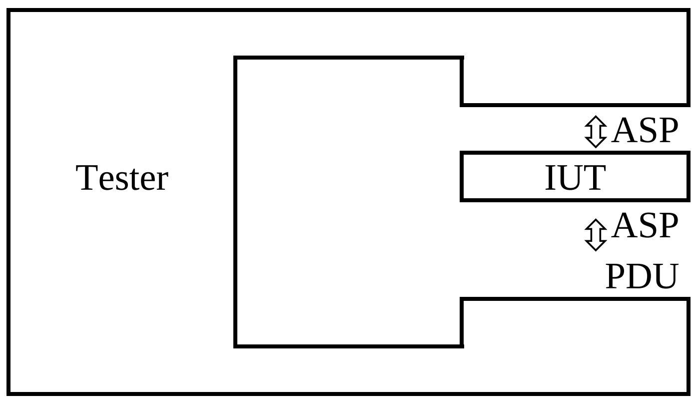
[2] These ATRs do not specify neither T=0 nor T=1.

ATR characters																		CWB	# test
TS	T0	TA1	TB1	TC1	TD1	TA2	TB2	TC2	TD2	TA3	TB3	TC3	TD3	TA4	TB4	TC4	TCK		
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘04’	-	-	-	-	-	‘74’	C	1CF.080
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘05’	-	-	-	-	-	‘75’	C	1CF.080
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘11’	-	-	-	-	-	‘61’	C	1CF.081 1CF.083
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘51’	C	1CF.081 1CF.083
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘41’	C	1CF.081 1CF.083
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘20’	‘41’	-	-	-	-	-	‘31’	C	1CF.081 1CF.083
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘71’	‘20’	‘01’	‘00’	-	-	-	-	‘71’	C	1CF.082(*)
‘3B’	‘E0’	-	‘00’	‘FF’	‘81’	-	-	-	‘31’	‘20’	‘01’	-	-	-	-	-	‘8E’	C	1CF.092(*)
‘3B’	‘E0’	-	‘00’	‘00’	‘81’	-	-	-	‘31’	‘80’	‘01’	-	-	-	-	-	‘D1’	C	1CF.104(*) 1CF. 105(*) 1CF.106(*)
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘21’	-	-	-	-	-	‘11’	C	1CF.108(*) 1CF.109(*)
‘3B’	‘A0’	-	‘00’	-	‘81’	-	-	-	‘31’	‘20’	‘31’	-	-	-	-	-	‘01’	C	1CF.110(*)

8. APPENDIX 3: TEST METHOD FOR PROTOCOL CHARACTERISTICS

The test method for the protocol characteristics shows the abstract architecture of the tests, indicating the information flows between the IUT, the UT and the LT.

8.1. Conceptual Test Architecture

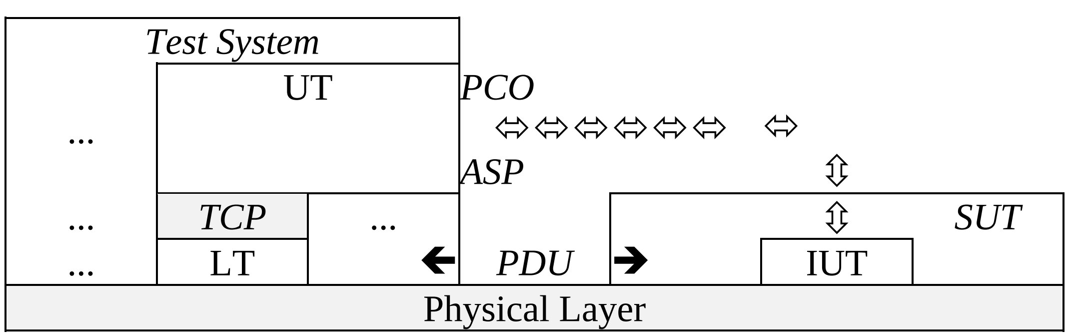


8.2. The 4 test methods

There are 4 possible test methods available for this purpose:

8.2.1. Local test method :

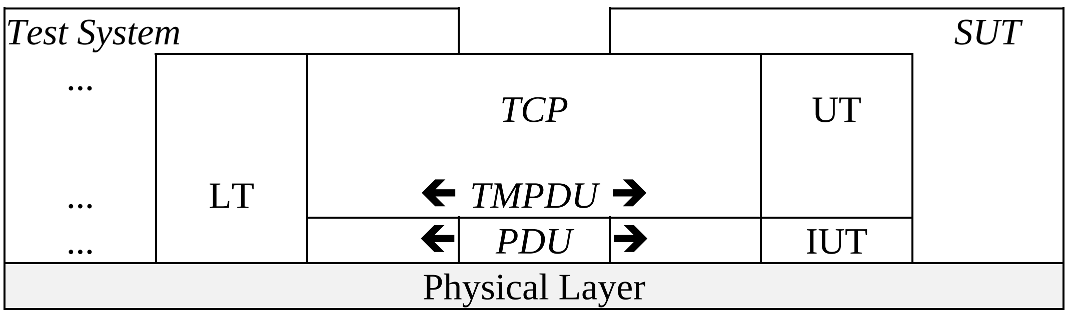
In this method, the LT and UT are located within the same system. This allows the test co-ordination procedures to be realized entirely within that system. In this method there must be a hardware interface to the upper boundary of the IUT.



8.2.2. Co-ordinated test method :

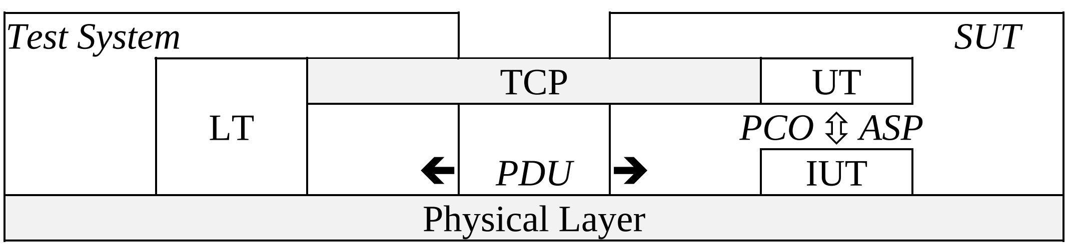
In this method, the test system is distinct and houses the lower tester, but that the upper tester is implemented in the system under test. In this configuration, the upper tester executes test events (service requests and responses) at the upper interface to the IUT but does not provide a means to externally observe test events (service indications and confirms) at that interface. Thus, there is only one PCO: beneath the lower tester.

In this configuration, as in other ones, the lower and upper testers must co-ordinate their efforts: the lower tester must be able to control activity of the upper tester and receive reports of its observation. For this purpose a Test Management Protocol is used. The disadvantage of this method is that it requires a logical connection for this protocol. This connection can be provided in-band or out-of-band.



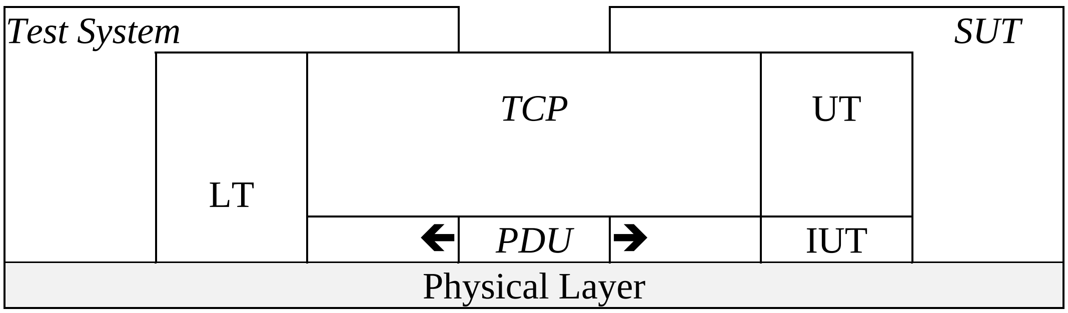
8.2.3. Distributed test method :

In this method, the upper tester is implemented in the system under test. The upper tester executes test events (service requests and responses) at the upper interface to the IUT and provides a means to externally observe test events (service indications and confirms) at that interface. Thus, there are two PCOs. It is generally used to testing application layers protocols.



8.2.4. Remote test method:

In this method, there is no upper tester as such, but some upper tester functions may be performed by the system under test. The focus of this method is on the protocol behavior of the IUT and not on the services it provides to the next higher layer. The only means of control and observation is the exchange of PDUs between the lower tester and the IUT. Because this method is limited in its control and observation, it cannot test all states of the protocol and is not as complete as the other test methods. It is best suited to protocols that do not need many user initiated events executed during testing.



EMV has decided to adopt the remote test method.

9. APPENDIX 4: ERROR MANAGEMENT

9.1. T=1 Error Management

9.1.1. Principle

The following errors shall be detected by the receiver (unless specified).
Each time a block is (or should be) received by the receiver, it shall be fully analyzed to check whether it is correct or it contains any of the error types mentioned below.
When a block contains any of these errors, it is indicated as erroneous.

9.1.1.1. Error generation by the Lower Tester

If the receiver is the IUT, it means that the error shall be generated by the Lower Tester (during the relevant test cases described in this document) which shall observe the IUT behavior to detect and correct the error.

9.1.1.2. Error notification by the Lower Tester

In several test cases, the Lower Tester, in order to check the terminal behavior, notifies that a block sent by the IUT is erroneous and consequently sends the relevant block indicating the error. The IUT is then expected to perform the error correction technique (repetition, deactivation, …) specified by the EMV 3.1.1. document.

9.1.1.3. Error detection by the Lower Tester

This analysis is internal to the test tool (Lower tester). If the receiver is the LT, it means that the LT shall detect all the possible errors described hereafter.
If any transmission, syntax or semantic error is detected, then the verdict shall be *failed*.
Moreover, for all tests, the LT shall perform a control of the IUT activity according to the relevant ICS declaration.
The value of the time out implemented in the LT shall be greater than or equal to that defined in the ICS.

9.1.2. Typology of the errors

9.1.2.1. Transmission and timing errors

As the IUT or LT receives a block, it shall analyze if this block contains a transmission or a timing error.
If such an error is detected, then the result of the analysis is *transmission error*.

These errors can break out in the following main groups :

- **Synchronization error**
- ♦ **EGT error** : 2 consecutive characters closer than the value conveyed by TC1
- ♦ **BGT error** : 1st character sent by LT before Block Guard Time (22 etus)

In the present version of the reference spec., detection by the IUT of EGT and BGT errors is not mandatory, therefore no corresponding test is specified.

- **Overrun error** : actual block length greater than requested length (LEN)

In the present version of the reference spec., detection of an overrun error is not mandatory (as such an error may go undetected by the receiver), therefore this error is not generated by the LT and no corresponding test is performed.

- **Under-run error** : 2 consecutive characters separated by more than CWT

- **Parity error**

- **EDC error** (can also be seen as a syntax error)

- **BWT excess error** :

block not sent (by ICC) until **BWT time out**

9.1.2.2.Syntax errors

As the IUT or LT receives a block, it shall analyze whether this block contains a syntax error.
If a syntax error is detected, then the result of the analysis is *syntax error*.

These errors can break out in the following main groups :

- **NAD error**

- NAD byte ≠ '00' (Part I - § 5.2.4.1.1.1.) The terminal shall respect NAD = '00'. For the blocks it receives, NAD ≠ '00' is an error if the ICS indicates it.

- **PCB error**

- Values different from those allowed by tables I-22, I-23 and I-24

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- **Length error**

- Length of block different from the spec. requirement (ref: 5.2.4.1.1.3, 5.2.4.1.2, 5.2.4.2.1, 5.2.4.3 10^{th} bullet)

9.1.2.3. Semantic errors

As the IUT or LT receives a block, it shall analyze if this block contains a semantic error.
A semantically erroneous block is a block of which syntax is correct but not expected according to the protocol specifications.
If a semantic error is detected, then the result of the analysis is *semantic error*.

These errors can break out in the following main groups :

- **Errors of block type**

These errors concern block syntactically correct but not expected by specification at that moment of the dialogue (example : S(IFS response) block received while an S(WTX response) block was expected).

Particularly, if, in any of the tests, the first block sent by the IUT following the ATR is not a S(IFS request) with IFSD = 254*, then the verdict shall be FAIL (because of an error of block type) - reference : § 5.2.4.2.1 : second paragraph.*

- **Errors of block numbering** (for I-blocks and R-blocks)

These errors concern block sequence bit of I-block or R-block (0 instead of 1 or 1 instead of 0, the 1st I-block sent by the IUT after the ATR shall be 0)

- **IFSD conformance errors** : the terminal shall accept blocks with LEN ≤ 254
- **IFSC conformance errors** : the ICC shall check that all blocks received :

- have LEN ≤ IFSC if the more data bit is set to 0
- have LEN = IFSC if the more data bit is set to 1

Length of block greater than receiver IFS (before and after new negotiation)

9.2. T=0 Error Management

An equivalent description of errors in T=0 session will be added in the future.