EMV®*
Integrated Circuit Card Specifications for Payment Systems

EMVCo Terminal Type Approval: Level 1 Loopback Upper Tester Specification

Version 4.3a
November 2015

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1 Scope

EMVCo, LLC ("EMVCo") is the owner of the EMV Integrated Circuit Card Specification for Payment Systems (version 4.3), hereinafter called EMV Specification.

EMVCo's objective in establishing the type approval process described in this document is to create a limited mechanism for testing IFMs used in integrated circuit chip card terminals for sufficient conformance with the EMV Specification for their stated purpose as of the date of such testing, subject to all of the limitations and restrictions of the type approval process set forth herein.

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This document describes the EMVCo's specific Loopback Application to be implemented in an IFM in order for this IFM to undergo the Type Approval Tests, and interoperate with the EMVCo test tool accordingly.

The target audience of this document includes:

- IFM providers
- Testing laboratories accredited to perform the type approval tests
- Auditors acting on behalf of EMVCo

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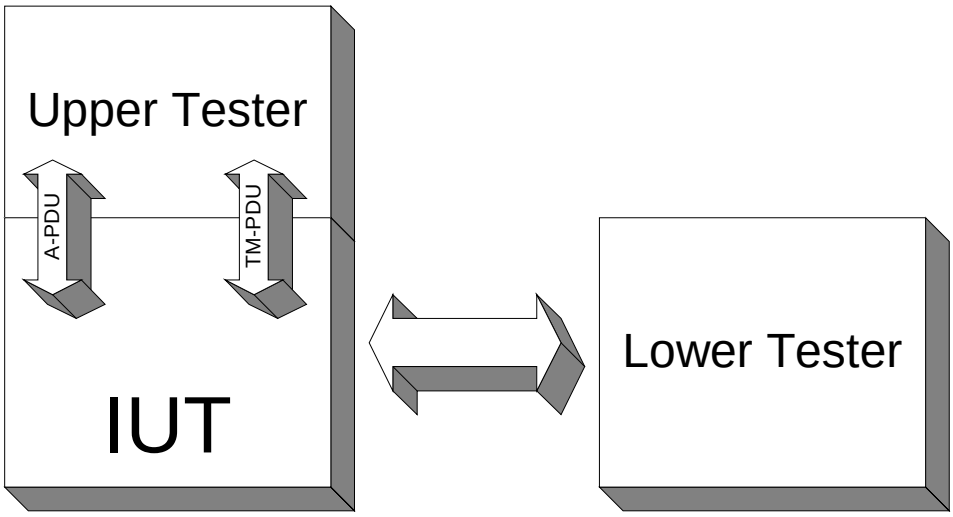
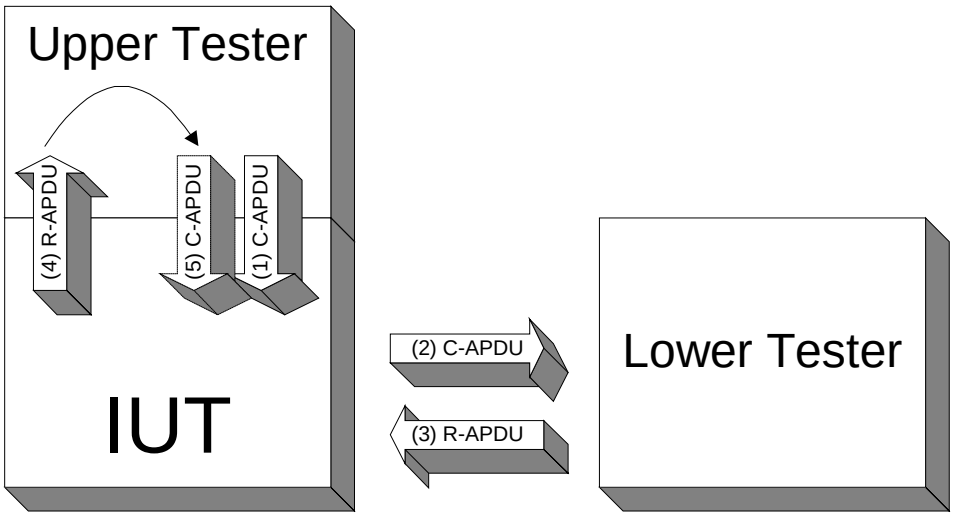
2 Loop-back Concept

The ISO 9646 abstract model chosen is the remote test method where the existing protocol between the IUT and the LT (the protocol to be tested) also conveys the TM-PDU (Test Management PDU):



The implementation of the remote test method in the context of the Terminal Level 1 Type Approval is called the « loop-back » concept, where the response APDU that the UT gets is derived into the next command APDU:



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3 System Under Test Behaviour

The System Under Test (SUT) represents the Terminal that contains the IFM to be tested.

The SUT behaviour can be summarized by the following points and flowchart :

1. The SUT waits for a card to be inserted.
2. When a card is inserted, the SUT shall wait 10 seconds before it activates the card.
3. If the activation sequence went wrong, the SUT shall deactivate it and waits for its removal and then return to the state described in the first bullet.
4. If the activation sequence went fine (ICC conforms to EMV), the first C-APDU to be sent is a SELECT Payment System Environment APDU ('00A404000E'+«1PAY.SYS.DDF01»+'00').
5. The current C-APDU is sent and the R-APDU is awaited.
6. If the command failed (according to the protocol) but no early deactivation occurred, then the IUT shall transmit the relevant status to the TAL (loopback) which immediately sends the next C-APDU: the SELECT Payment System Environment APDU.
7. Else (If it succeeded) :
    - If the R-APDU is less than 6 bytes long (it cannot be derived into the next C-APDU), the next C-APDU is the SELECT Payment System Environment APDU.
    - Else :
    - If the second byte of the R-APDU equals '70', the SUT shall deactivate the ICC and waits for its removal and then return to the state described in the first bullet.
    - Else the R-APDU is derived into the next C-APDU by stripping the status word.
    - Loop to the fifth step (exchange of APDU).
8. The SUT shall wait 200 milliseconds.
9. Then, the SUT shall loop to the fifth step (APDU Exchange).

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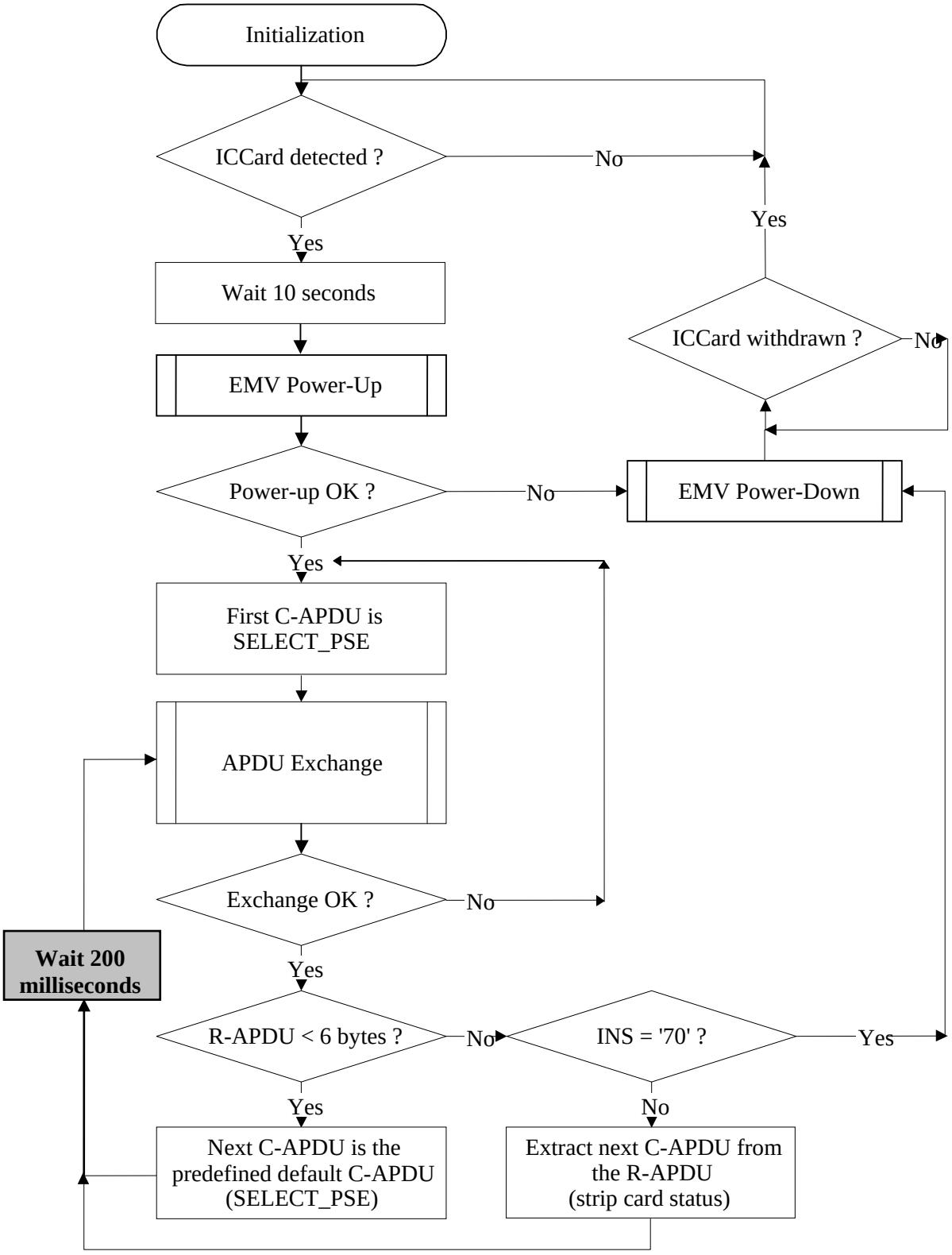

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4 Lower Tester Test Application

The test application in the LT is very simple. It basically stores a set of predefined answers (a specific set of commands is used for each executable test). After it has been activated, each time it gets a command from the SUT, it sends the current response in the set, starting from the first one, and skipping to the next each time one is sent.

Everything else is governed by the protocol rules and the test modes for the current test.

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