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ISO/IEC 18328-4

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Identification cards — ICC-managed devices —

Part 4: Test methods for logical characteristics

Cartes d'identification — Dispositifs contrôlés par carte à circuit intégré (ICC) —

Partie 4: Titre manque

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/IEC JTC 1, *Information technology*, SC 17, *Cards and personal identification*.

A list of all the parts in the ISO 18328 series can be found on the ISO website.

Introduction

The ISO/IEC 18328 series of standards establishes a normative basis for an ICC with at least one additional device, such as an ICC-managed device.

This document prescribes requirements for testing the conformance of an ICC with at least one ICC-managed device with requirements of ISO/IEC 18328-3, respectively.

Identification cards — ICC-managed devices —

Part 4:
Test methods for logical characteristics

1 Scope

This document specifies the test methods used for conformity testing, to determine whether an ICC with at least one ICC-managed device is considered to conform with the specifications of ISO/IEC 18328-3, e.g. device management and device handling.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 7816-4, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 18328-1, *Identification cards — ICC-managed devices — Part 1: General framework*

ISO/IEC 18328-2, *Identification cards — ICC-managed devices — Part 2: Physical characteristics and test methods for cards with devices*

ISO/IEC 18328-3, *Identification cards — ICC-managed devices — Part 3: Organization, security and commands for interchange*

3 Terms and definitions

For the purpose of this document, the terms and definition given in ISO/IEC 7816-4, ISO/IEC 18328-1, ISO/IEC 18328-2 and ISO/IEC 18328-3 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO/IEC 7816-4, ISO/IEC 18328-1, ISO/IEC 18328-2, ISO/IEC 18328-3 and the following apply.

DUT device under test

5 Test design

5.1 General

This clause describes the concept of the test methods for ICC-managed devices.

Clause 6 provides test methods for an ICC with a general ICC-managed device. These test methods are independent from any specific device.

An elementary test method is a test case. All test cases are categorized into several test units.

5.2 Device under test (DUT)

A device under test (DUT) is an ICC with at least one ICC-managed on-card device for this edition of this document. Figure 1 illustrates a DUT with a test apparatus. This edition of this document specifies the test methods only for on-card devices. Test cases of checking general feature management DO, such as Idle 001 to 003 may cover off-card devices.

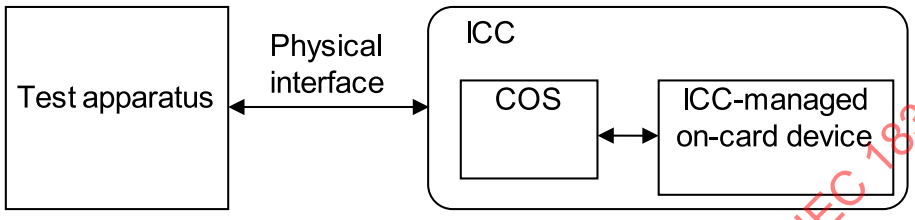

Figure 1 — DUT with test apparatus

5.3 Test unit

A test unit is a group of test cases that are related to the same type of functionality. Each test unit is defined by the following information:

Test Unit-ID	Uniquely identifies the test unit.
Purpose	Specifies the common issue addressed by the test cases contained in this test unit.
References	Optionally identifies references applicable to all test cases within the test unit.

5.4 Test case

A test case covers testing one function of an ICC with an ICC-managed device. Each test case is defined by the following information:

Test Case-ID	Uniquely identifies the test case within a test unit. Test Case-ID is a concatenation of Test unit-ID and a consecutive number.
Purpose	Specifies the requirement addresses in this test case.
Version	Version number of this test case.
References	Identifies specific reference to the requirement addressed by this test case.
Profile	Defines the features for which the test case is applicable. If the DUT does not match with each of the defined features, the test case is skipped and marked "NA" (not applicable) in the test report. A feature is described with its own number defined in Table 1.
Precondition	Defines the state in which the DUT needs to be before the test case can be executed, including test cases that shall have been successfully passed, if any. If these preconditions are not fulfilled, the test case is skipped and marked as such in the test report.

Test scenario	Defines the test steps that shall be taken. Each step covers a simple, exactly defined operation with a measureable result that can be included in the test report. The steps shall be performed in the order listed. Each test step is defined by the following: — Test Step-ID is a consecutive number, uniquely identifying each test step and the execution order in the test case. — Description defines the operation that has to be executed for this step. — Configuration Data optionally specifies input data required to perform this test step.
Expected result	Defines pass criteria for each test step in the test scenario. The analysis of the observed result in comparison with this expected result leads to a "Pass" or a "Fail".

Table 1 lists features described in the column of profile for test cases.

Table 1 — List of features

Number of the feature	Feature
01	Supplemental logical channel supporting
02	ICC with MF
03	ICC without MF having one application DF
04	ICC having one application DF
05	ICC having two application DFs
06	ICC-managed on-card and/or off-card device
07	ICC-managed on-card device
08	ICC-managed on-card device with DVCP
09	ICC-managed on-card input device
10	ICC-managed on-card input device with DVCP
11	Shareable ICC-managed on-card input device with DVCP
12	Not shareable ICC-managed on-card input device with DVCP
13	ICC-managed on-card input device with supporting time frame
14	ICC-managed on-card output device
15	ICC-managed on-card output device with DVCP
16	Shareable ICC-managed on-card output device with DVCP
17	Not shareable ICC-managed on-card output device with DVCP
18	Device identifier list DO'83' under general feature management DO'7F74' in EF.ATR/INFO under MF
19	Device identifier list DO'83' under general feature management DO'7F74' in EF.ATR/INFO under the application DF
20	Device identifier list DO'83' under general feature management DO'7F74' under the FCI of the application DF
21	Device identifier list DO'83' under general feature management DO'7F74' in EF.ATR/INFO or under the FCI of the application DF
22	ADM GENERAL DEVICE RESET command
23	ADM LOGICAL DEVICE RESET command
24	ADM OPEN DEVICE command
25	ADM DEACTIVATE DEVICE command
26	ADM REACTIVATE DEVICE command
27	ADM EXCLUSIVE DEVICE USAGE command

Table 1 *(continued)*

Number of the feature	Feature
28	ADM GENERAL DEVICE USAGE command
29	ADM GET FROM DEVICE command
30	ADM GET FROM DEVICE command with absent response data field
31	ADM PUT TO DEVICE command
32	ADM PUT TO DEVICE command with absent command data field
33	ADM GET DEVICE INFORMATION command
34	ADM ERASE DEVICE CONTENT command
35	A structure (e.g. transparent EF, record or data object) receiving input data from ICC-managed on-card input device
36	A proper command (e.g. READ BINARY, READ RECORD or GET DATA) for retrieving input data from a structure

NOTE Feature 06 is provided for test unit Idle 001 to 003 and these test units can cover on-card devices.

5.5 Test report

Detailed test results shall be recorded for reference in a test report. The test report contains the test result of each:

— test unit;

— test case;

— test step.

If the profile of a test case is not applicable, this is noted. If the profile of a test case is applicable and the preconditions are fulfilled, the test result for a test step, a test case and a test unit can be:

— Pass for matching the expected results with actually obtained results from the DUT.

— Fail for not matching one of the expected results with actually obtained results from the DUT.

6 Test methods

6.1 General test requirements

6.1.1 Preconditions for testing

The tests in this clause require a fully personalized ICC with at least one on-card ICC-managed device.

6.1.2 Test setup

For setting up these tests, any test apparatus for communicating with an ICC that meets the requirements of ISO/IEC 7816-1, ISO/IEC 7816-2, ISO/IEC 7816-3, and/or ISO/IEC 14443 (all parts) can be used.

6.2 List of test cases

Table 2 lists test cases specified in Clause 6. “Input” in the device column of Table 2 means ICC-managed input device and operation of this device is required for test cases of test unit input, e.g. key inputting, sensor touching or button pushing. “Output” in the device column of Table 2 means ICC-managed output device and visually or auditory verification of this device is required for test cases of test unit output,

e.g. lighting, displaying image or sound. "-" in the device column of Table 2 means that operation of ICC-managed input device and/or visually or auditory verification of ICC-managed output device is not required.

Table 2 — List of test cases

Test Unit	No.	Device	Outline
Idle	001	-	Getting general feature management DO from EF.ATR/INFO with MF
	002	-	Getting general feature management DO from EF.ATR/INFO without MF
	003	-	Getting general feature management DO from FCI of application DF
	004	-	Opening on-card device
Ready	001	-	Getting DVCP
	002	-	Switching usage attribute GENERAL and EXCLUSIVE DEVICE USAGE
	003	-	Switching activity status READY and DEACTIVATED
	004	-	Logical resetting from READY
	005	-	Logical resetting from DEACTIVATED
	006	-	General resetting from READY
	007	-	General resetting from DEACTIVATED
Input	001	Input	Inputting data into ICC
	002	Input	Inputting data into response data field
Output	001	Output	Outputting data from ICC
	002	Output	Outputting data from command data field
Erase	001	Output	Turning back the condition of an output device into same as just after OPEN DEVICE function applied
Deactivated	001	-	Unable to input at DEACTIVATED
	002	-	Unable to output at DEACTIVATED
Exclusive	001	-	Unable to input by other application at EXCLUSIVE DEVICE USAGE
	002	-	Unable to output by other application at EXCLUSIVE DEVICE USAGE
General	001	Input	Enable to input by different applications at GENERAL DEVICE USAGE
	002	Output	Enable to output by different applications at GENERAL DEVICE USAGE
Timeout	001	-	Detecting timeout
Shareability	001	Input	Enable to input by using different logical channels on shareable device
	002	Output	Enable to output by using different logical channels on shareable device
	003	Input	Unable to input by using other logical channel on not shareable input device
	004	Output	Unable to output by using other logical channel on not shareable output device

6.3 Test unit Idle

6.3.1 Test unit

Test Unit-ID	Idle
Purpose	Identifying ICC-managed on-card and/or off-card device at IDLE/WAIT state and possible function of ADDITIONAL DEVICE MANAGEMENT (ADM) command
References	ISO/IEC 7816-4, ISO/IEC 18328-3

6.3.2 Test case Idle 001

Test Case-ID	Idle 001
Purpose	Identifying ICC-managed on-card and/or off-card device at IDLE/WAIT state
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 1 and 2
Profile	02 ICC with MF 06 ICC-managed on-card and/or off-card device 18 Device identifier list DO‘83‘ under general feature management DO‘7F74‘ in EF.ATR/INFO under MF
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed device is powered. 3. MF is selected.
Test scenario	1. Selecting EF.ATR/INFO by file identifier ‘2F01‘ 2. Reading entire content of EF.ATR/INFO
Expected result	1. The DUT returns SW1-SW2 as ‘9000‘. 2. The DUT returns entire content of EF.ATR/INFO with SW1-SW2 as ‘9000‘. The content includes DO‘7F74‘. DO‘7F74‘ shall include on-card services DO‘81‘ and its format of value field is according to ISO/IEC 18328-3:2016, Table 2. DO‘7F74‘ includes device identifier list DO‘83‘ and its format of value field is according to Table 1 in ISO/IEC 18328-3.

6.3.3 Test case Idle 002

Test Case-ID	Idle 002
Purpose	Identifying ICC-managed on-card and/or off-card device at IDLE/WAIT state
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 1 and 2
Profile	03 ICC without MF having one application DF 06 ICC-managed on-card and/or off-card device 19 Device identifier list DO‘83‘ under general feature management DO‘7F74‘ in EF.ATR/INFO under the application DF
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed device is powered.

Test scenario	1. Selecting the application DF by its DF name. 2. Selecting EF.ATR/INFO by file identifier '2F01'. 3. Reading entire content of EF.ATR/INFO.
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns entire content of EF.ATR/INFO with SW1-SW2 as '9000'. The content includes DO'7F74'. DO'7F74' shall include on-card services DO'81' and its format of value field is according to ISO/IEC 18328-3:2016, Table 2. DO'7F74' includes device identifier list DO'83' and its format of value field is according to ISO/IEC 18328-3:2016, Table 1.

6.3.4 Test case Idle 003

Test Case-ID	Idle 003
Purpose	Identifying ICC-managed on-card and/or off-card device at IDLE/WAIT state
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 1 and 2
Profile	04 ICC having one application DF 06 ICC-managed on-card and/or off-card device 20 Device identifier list DO'83' under general feature management DO'7F74' under the FCI of the application DF
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed device is powered.
Test scenario	1. Selecting the application DF by its DF name and reading FCI with FCP or FMD template
Expected result	1. The DUT returns entire content of FCI with SW1-SW2 as '9000'. The content includes DO'7F74'. DO'7F74' shall include on-card services DO'81' and its format of value field is according to ISO/IEC 18328-3:2016, Table 2. DO'7F74' includes device identifier list DO'83' and its format of value field is according to ISO/IEC 18328-3:2016, Table 1.

6.3.5 Test case Idle 004

Test Case-ID	Idle 004
Purpose	Opening (selecting) ICC-managed on-card device at IDLE/WAIT state and getting its DHN
Version	1.0
References	ISO/IEC 18328-3:2016, Table 5 and 6.3.4
Profile	07 ICC-managed on-card device 21 Device identifier list DO'83' under general feature management DO'7F74' in EF.ATR/INFO or under the FCI of the application DF 24 ADM OPEN DEVICE command

Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered. 3. MF or an application DF is selected. 4. The device identifier of on-card device is gotten.
Test scenario	1. Opening (selecting) on-card device by using ADM OPEN DEVICE command with the device identifier.
Expected result	1. The DUT returns 1-byte DHN with SW1-SW2 as '9000'. DHN is according to ISO/IEC 18328-3:2016, Table 5.

6.4 Test unit Ready

6.4.1 Test unit

Test Unit-ID	Ready
Purpose	Possible function of ADDITIONAL DEVICE MANAGEMENT (ADM) command for ICC-managed on-card device at READY state
References	ISO/IEC 18328-3

6.4.2 Test case Ready 001

Test Case-ID	Ready 001
Purpose	Getting DVCP of ICC-managed on-card device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.11
Profile	08 ICC-managed on-card device with DVCP 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. MF or an application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. Bit b8 of first byte of value field of DO'82' shall be 1 (ICC-managed on-card device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state).

6.4.3 Test case Ready 002

Test Case-ID	Ready 002
Purpose	Switching usage attribute of ICC-managed on-card device
Version	1.0

References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.7, 6.3.8, 6.3.11
Profile	04 ICC having one application DF 08 ICC-managed on-card device with DVCP 27 ADM EXCLUSIVE DEVICE USAGE command 28 ADM GENERAL DEVICE USAGE command 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Setting usage attribute of ICC-managed on-card device as general by using ADM GENERAL DEVICE USAGE command with the DHN 2. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 3. Setting usage attribute of ICC-managed device as exclusive by using ADM EXCLUSIVE DEVICE USAGE command with the DHN 4. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 5. Setting usage attribute of ICC-managed device as general by using ADM GENERAL DEVICE USAGE command with the DHN 6. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. Bit b8 of first byte of value field of DO'82' shall be 1 (ICC-managed on-card device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. 1-byte value field of DO'8A' shall be 0xxx x010 (GENERAL DEVICE USAGE and READY state). 3. The DUT returns SW1-SW2 as ,9000'. 4. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. 1-byte value field of DO'8A' shall be 1xxx x010 (EXCLUSIVE DEVICE USAGE and READY state). 5. The DUT returns SW1-SW2 as '9000'. 6. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. 1-byte value field of DO'8A' shall be 0xxx x010 (GENERAL DEVICE USAGE and READY state).

6.4.4 Test case Ready 003

Test Case-ID	Ready 003
Purpose	Switching activity state of ICC-managed on-card device between READY and DE-ACTIVATED
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.5, 6.3.6, 6.3.11
Profile	04 ICC having one application DF 08 ICC-managed on-card device with DVCP 25 ADM DEACTIVATE DEVICE command 26 ADM REACTIVATE DEVICE command 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 2. Initiating transition of activity status of on-card device from READY to DEACTIVATED by using ADM DEACTIVATE DEVICE command with the DHN 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 4. Initiating transition of activity status of on-card device from DEACTIVATED to READY by using ADM REACTIVATE DEVICE command with the DHN 5. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as ‘9000‘. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO‘82‘, device identifier DO‘83‘ and current activity state DO‘8A‘. Bit b8 of first byte of value field of DO‘82‘ shall be 1 (ICC-managed on-card device). 2-byte value field of DO‘83‘ shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO‘8A‘ shall be 010 (READY state). 2. The DUT returns SW1-SW2 as ‘9000‘. 3. The DUT returns DVCP with SW1-SW2 as ‘9000‘. DVCP shall include current activity state DO‘8A‘. Bits b3-b1 in 1-byte value field of DO‘8A‘ shall be 100 (DEACTIVATED state). 4. The DUT returns SW1-SW2 as ‘9000‘. 5. The DUT returns DVCP with SW1-SW2 as ‘9000‘. DVCP shall include current activity state DO‘8A‘. Bits b3-b1 in 1-byte value field of DO‘8A‘ shall be 010 (READY state).

6.4.5 Test case Ready 004

Test Case-ID	Ready 004
Purpose	Logical resetting of ICC-managed on-card device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.3, 6.3.11
Profile	04 ICC having one application DF 08 ICC-managed on-card device with DVCP 23 ADM LOGICAL DEVICE RESET command 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 2. Logical resetting of on-card device by using ADM LOGICAL DEVICE RESET command with the DHN 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. Bit b8 of first byte of value field of DO'82' shall be 1 (ICC-managed on-card device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns SW1-SW2 as checking error, e.g. '6985' (Activity state not fit to command) or '6A82' (DHN not available).

6.4.6 Test case Ready 005

Test Case-ID	Ready 005
Purpose	Logical resetting of ICC-managed on-card device at DEACTIVATED
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.3, 6.3.5, 6.3.11
Profile	04 ICC having one application DF 08 ICC-managed on-card device with DVCP 23 ADM LOGICAL DEVICE RESET command 25 ADM DEACTIVATE DEVICE command 33 ADM GET DEVICE INFORMATION command

Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 2. Initiating transition of activity status of on-card device from READY to DEACTIVATED by using ADM DEACTIVATE DEVICE command with the DHN 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 4. Logical resetting of on-card device by using ADM LOGICAL DEVICE RESET command with the DHN 5. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82' device identifier DO'83' and current activity state DO'8A'. Bit b8 of first byte of value field of DO'82' shall be 1 (ICC-managed on-card device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. Bits b3-b1 in 1-byte value field of DO'8A' shall be 100 (DEACTIVATED state). 4. The DUT returns SW1-SW2 as '9000'. 5. The DUT returns SW1-SW2 as checking error, e.g. '6985' (Activity state not fit to command) or '6A82' (DHN not available).

6.4.7 Test case Ready 006

Test Case-ID	Ready 006
Purpose	General resetting of ICC-managed on-card device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.2, 6.3.11
Profile	04 ICC having one application DF 08 ICC-managed on-card device with DVCP 22 ADM GENERAL DEVICE RESET command 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.

Test scenario	1. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 2. General resetting of on-card device by using ADM GENERAL DEVICE RESET command with the DHN 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. Bit b8 of first byte of value field of DO'82' shall be 1 (ICC-managed on-card device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns SW1-SW2 as checking error, e.g. '6985' (Activity state not fit to command) or '6A82' (DHN not available).

6.4.8 Test case Ready 007

Test Case-ID	Ready 007
Purpose	General resetting of ICC-managed on-card device at DEACTIVATED
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.2, 6.3.5, 6.3.11
Profile	04 ICC having one application DF 08 ICC-managed on-card device with DVCP 22 ADM GENERAL DEVICE RESET command 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 2. Initiating transition of activity status of on-card device from READY to DEACTIVATED by using ADM DEACTIVATE DEVICE command with the DHN 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN 4. General resetting of on-card device by using ADM GENERAL DEVICE RESET command with the DHN 5. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN

Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. Bit b8 of first byte of value field of DO'82' shall be 1 (ICC-managed on-card device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. Bits b3-b1 in 1-byte value field of DO'8A' shall be 100 (DEACTIVATED state). 4. The DUT returns SW1-SW2 as '9000'. 5. The DUT returns SW1-SW2 as checking error, e.g. '6985' (Activity state not fit to command) or '6A82' (DHN not available).

6.5 Test unit Input

6.5.1 Test unit

Test Unit-ID	Input
Purpose	Input operation by using ICC-managed on-card input device at READY state
References	ISO/IEC 18328-3

6.5.2 Test case Input 001

Test Case-ID	Input 001
Purpose	Verifying input data stored in ICC from ICC-managed on-card input device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.9, 6.3.11
Profile	04 ICC having one application DF 10 ICC-managed on-card input device with DVCP 30 ADM GET FROM DEVICE command with absent response data field 33 ADM GET DEVICE INFORMATION command 35 A structure, e.g. transparent EF, record or data object receiving input data from ICC-managed on-card input device 36 A proper command, e.g. READ BINARY, READ RECORD or GET DATA for retrieving input data from a structure
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card input device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card input device are gotten.

Test scenario	1. Getting the DVCP of on-card input device by using ADM GET DEVICE INFORMATION command with the DHN 2. Requesting input through ICC-managed on-card input device by using ADM GET FROM DEVICE command with the DHN Operating input by using ICC-managed on-card input device 3. Retrieving input data stored in ICC, e.g. transparent EF, record or data object by using proper command, e.g. READ BINARY, READ RECORD or GET DATA 4. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. First byte of value field of DO'82' shall be 1xx0 01xx (ICC-managed on-card input device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns input data with SW1-SW2 as '9000'. Verifying input data according to specifications of input device with application specification, e.g. keypad extracting text data from typing, biometric sensor extracting biometric feature data from capturing biometric image. 4. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state).

6.5.3 Test case Input 002

Test Case-ID	Input 002
Purpose	Verifying input data at response data field from ICC-managed on-card input device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.9, 6.3.11
Profile	04 ICC having one application DF 10 ICC-managed on-card input device with DVCP 30 ADM GET FROM DEVICE command with absent response data field 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card input device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card input device are gotten.

Test scenario	1. Getting the DVCP of on-card input device by using ADM GET DEVICE INFORMATION command with the DHN 2. Requesting input through ICC-managed on-card input device by using ADM GET FROM DEVICE command with the DHN Operating input by using ICC-managed on-card input device 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. First byte of value field of DO'82' shall be 1xx0 01xx (ICC-managed on-card input device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns input data with SW1-SW2 as '9000'. Verifying input data according to specifications of input device with application specification, e.g. keypad extracting text data from typing, biometric sensor extracting biometric feature data from capturing biometric image. 3. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state).

6.6 Test unit Output

6.6.1 Test unit

Test Unit-ID	Output
Purpose	Output to ICC-managed on-card output device at READY state
References	ISO/IEC 18328-3

6.6.2 Test case Output 001

Test Case-ID	Output 001
Purpose	Verifying output data from ICC on ICC-managed on-card output device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.10, 6.3.11
Profile	04 ICC having one application DF 15 ICC-managed on-card output device with DVCP 32 ADM PUT TO DEVICE command with absent command data field 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card output device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card output device are gotten. 5. Output data is stored in ICC, e.g. transparent EF, record or data object.

Test scenario	1. Getting the DVCP of on-card output device by using ADM GET DEVICE INFORMATION command with the DHN 2. Requesting output data from ICC to ICC-managed on-card output device by using ADM PUT TO DEVICE command with the DHN 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN
Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. First byte of value field of DO'82' shall be 1xx0 10xx (ICC-managed on-card output device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. The DUT extracts transformed output data visually or auditory, e.g. lighting, displaying image or sound. 3. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state).

6.6.3 Test case Output 002

Test Case-ID	Output 002
Purpose	Verifying output data from test apparatus to ICC-managed on-card output device
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.10, 6.3.11
Profile	04 ICC having one application DF 15 ICC-managed on-card output device with DVCP 31 ADM PUT TO DEVICE command 33 ADM GET DEVICE INFORMATION command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card output device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card output device are gotten.
Test scenario	1. Getting the DVCP of on-card output device by using ADM GET DEVICE INFORMATION command with the DHN 2. Requesting output data from test apparatus to ICC-managed on-card output device by using ADM PUT TO DEVICE command with the DHN and output data in the command data field 3. Getting the DVCP of on-card device by using ADM GET DEVICE INFORMATION command with the DHN

Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. First byte of value field of DO'82' shall be 1xx0 10xx (ICC-managed on-card output device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. The DUT extracts transformed output data visually or auditory, e.g. lighting, displaying image or sound. 3. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP shall include current activity state DO'8A'. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state).

6.7 Test unit Erase

6.7.1 Test unit

Test Unit-ID	Erase
Purpose	Erase an ICC-managed on-card output device at READY state
References	ISO/IEC 18328-3

6.7.2 Test case Erase 001

Test Case-ID	Erase 001
Purpose	Turning back the condition of an ICC-managed on-card output device into same as after OPEN DEVICE function applied
Version	1.0
References	ISO/IEC 18328-3:2016, Tables 4, 6 to 9 and 5.5, 6.3.10, 6.3.11, 6.3.12
Profile	04 ICC having one application DF 15 ICC-managed on-card output device with DVCP 31 ADM PUT TO DEVICE command 33 ADM GET DEVICE INFORMATION command 34 ADM ERASE DEVICE CONTENT command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card output device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card output device are gotten.
Test scenario	1. Getting the DVCP of on-card output device by using ADM GET DEVICE INFORMATION command with the DHN 2. Requesting output data from test apparatus to ICC-managed on-card output device by using ADM PUT TO DEVICE command with the DHN and output data in the command data field 3. Erasing the content of on-card output device by using ADM ERASE DEVICE CONTENT command with the DHN

Expected result	1. The DUT returns DVCP with SW1-SW2 as '9000'. DVCP is according to ISO/IEC 18328-3:2016, 5.5. DVCP shall include device descriptor DO'82', device identifier DO'83' and current activity state DO'8A'. First byte of value field of DO'82' shall be 1xx0 10xx (ICC-managed on-card output device). 2-byte value field of DO'83' shall match with gotten device identifier for precondition. Bits b3-b1 in 1-byte value field of DO'8A' shall be 010 (READY state). 2. The DUT returns SW1-SW2 as '9000'. The DUT extracts transformed output data visually or auditory, e.g. lighting, displaying image or sound. 3. The DUT returns SW1-SW2 as '9000'. The DUT turns back the visually or auditory condition into same as after OPEN DEVICE function.

6.8 Test unit Deactivated

6.8.1 Test unit

Test Unit-ID	Deactivated
Purpose	No input or output operation of ICC-managed on-card device at DEACTIVATED state
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.9, 6.3.10

6.8.2 Test case Deactivated 001

Test Case-ID	Deactivated 001
Purpose	No input operation of ICC-managed on-card input device at DEACTIVATED
Version	1.0
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.9
Profile	04 ICC having one application DF 09 ICC-managed on-card input device 25 ADM DEACTIVATE DEVICE command 29 ADM GET FROM DEVICE command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Initiating transition of activity status of on-card device from READY to DEACTIVATED by using ADM DEACTIVATE DEVICE command with the DHN 2. Requesting input through ICC-managed on-card input device by using ADM GET FROM DEVICE command with the DHN
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns SW1-SW2 as '6985' means activity state not fit to command.

6.8.3 Test case Deactivated 002

Test Case-ID	Deactivated 002
Purpose	No output operation of ICC-managed on-card output device at DEACTIVATED
Version	1.0
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.10
Profile	04 ICC having one application DF 09 ICC-managed on-card input device 25 ADM DEACTIVATE DEVICE command 31 ADM PUT TO DEVICE command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. The application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Initiating transition of activity status of on-card device from READY to DEACTIVATED by using ADM DEACTIVATE DEVICE command with the DHN 2. Requesting output to ICC-managed on-card output device using ADM PUT TO DEVICE command with the DHN
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns SW1-SW2 as '6985' means activity state not fit to command.

6.9 Test unit Exclusive

6.9.1 Test unit

Test Unit-ID	Exclusive
Purpose	No input or output operation of ICC-managed on-card device at exclusive device usage by other application
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.7, 6.3.9, 6.3.10

6.9.2 Test case Exclusive 001

Test Case-ID	Exclusive 001
Purpose	No input operation of ICC-managed on-card input device at exclusive device usage by other application
Version	1.0
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.7, 6.3.9
Profile	05 ICC having two application DFs 09 ICC-managed on-card input device 27 ADM EXCLUSIVE DEVICE USAGE command 29 ADM GET FROM DEVICE command

Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. One application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Setting usage attribute of ICC-managed device as exclusive by using ADM EXCLUSIVE DEVICE USAGE command with the DHN 2. Selecting other application DF using SELECT command with its DF name 3. Requesting input through ICC-managed on-card input device using ADM GET FROM DEVICE command with the DHN
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns DVCP with SW1-SW2 as '6A81' means activity status byte in DVCP forbids general device usage.

6.9.3 Test case Exclusive 002

Test Case-ID	Exclusive 002
Purpose	No output operation of ICC-managed on-card output device at exclusive device usage by other application
Version	1.0
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.7, 6.3.10
Profile	05 ICC having two application DFs 14 ICC-managed on-card output device 27 ADM EXCLUSIVE DEVICE USAGE command 31 ADM PUT TO DEVICE command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. One application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Setting usage attribute of ICC-managed device as exclusive by using ADM EXCLUSIVE DEVICE USAGE command with the DHN 2. Selecting other application DF using SELECT command with its DF name 3. Requesting output to ICC-managed on-card output device using ADM PUT TO DEVICE command with the DHN
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns SW1-SW2 as ,9000'. 3. The DUT returns DVCP with SW1-SW2 as '6A81' means activity status byte in DVCP forbids general device usage.

6.10 Test unit General

6.10.1 Test unit

Test Unit-ID	General
Purpose	Input or output operation of ICC-managed on-card device at general device usage by different applications
References	ISO/IEC 18328-3:2016, Table 14 and 6.3.7, 6.3.9, 6.3.10

6.10.2 Test case General 001

Test Case-ID	General 001
Purpose	Input operation of ICC-managed on-card input device at general device usage by different applications
Version	1.0
References	ISO/IEC 18328-3:2016, 6.3.8, 6.3.9
Profile	05 ICC having two application DFs 09 ICC-managed on-card input device 28 ADM GNERAL DEVICE USAGE command 29 ADM GET FROM DEVICE command
Precondition	1. ICC with its communication protocol is activated. 2. ICC-managed on-card device is powered and at READY state. 3. One application DF is selected. 4. The device identifier and the DHN of on-card device are gotten.
Test scenario	1. Setting usage attribute of ICC-managed device as general device usage by using ADM GENERAL DEVICE USAGE command with the DHN 2. Requesting input through ICC-managed on-card input device using ADM GET FROM DEVICE command with the DHN Operating input by using ICC-managed on-card input device 3. Selecting other application DF using SELECT command with its DF name 4. Requesting input through ICC-managed on-card input device using ADM GET FROM DEVICE command with the DHN Operating input by using ICC-managed on-card input device
Expected result	1. The DUT returns SW1-SW2 as '9000'. 2. The DUT returns SW1-SW2 as '9000'. 3. The DUT returns SW1-SW2 as '9000'. 4. The DUT returns SW1-SW2 as '9000'.

6.10.3 Test case General 002

Test Case-ID	General 002
Purpose	Output operation of ICC-managed on-card output device at general device usage by different applications
Version	1.0