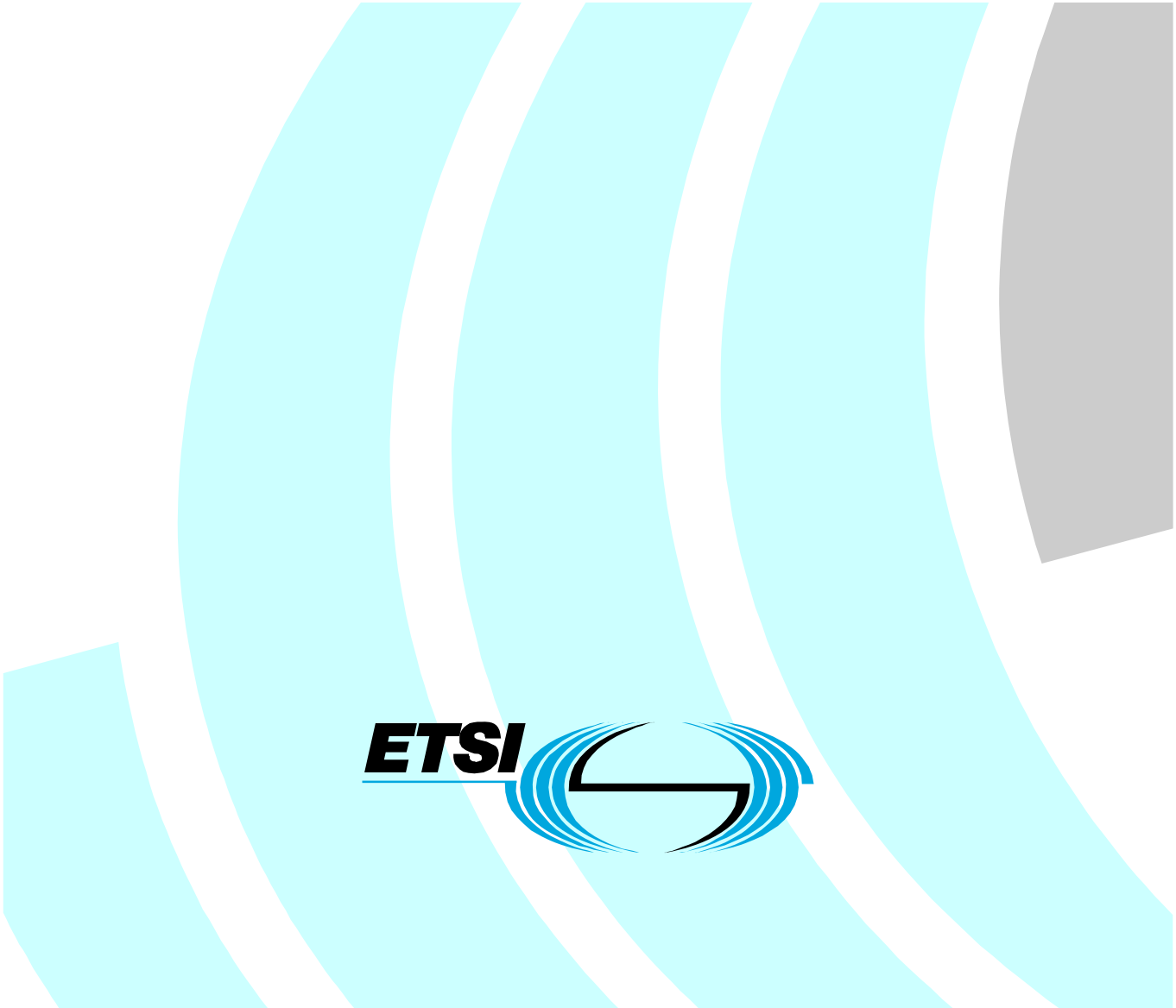
ETSI TS 102 922-2 V7.0.0 (2011-03)

Technical Specification

Smart Cards;
Test specification for the ETSI aspects of the IC_USB interface;
Part 2: UICC features
(Release 7)



Reference
DTS/SCP-00USBU

Keywords
smart card, terminal, USB

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The present document is part 2 of a multi-part deliverable covering the Test specification for the USB interface, as identified below:

Part 1: "Terminal features";

Part 2: "UICC features";

Introduction

The present document defines test cases for the UICC relating to the USB interface, as specified in TS 102 600 [1].

The aim of the present document is to ensure interoperability between the terminal and the UICC independently of the respective manufacturer, card issuer or operator.

1 Scope

The present document covers the minimum characteristics which are considered necessary for the UICC in order to provide compliance to TS 102 600 [1].

The present document specifies the test cases for:

- the characteristics of the Inter-Chip USB electrical interface between the USB UICC and the USB UICC-enabled terminal;
- the initial communication establishment and the transport protocols;
- the communication layers between the USB UICC and the USB UICC-enabled terminal.

Test cases for the USB UICC relating to TS 102 221 [2] interface are out of scope of the present document.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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

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

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 102 600: "Smart Cards; UICC-Terminal interface; Characteristics of the USB interface".

[2] ETSI TS 102 221: "Smart Cards; UICC-Terminal interface; Physical and logical characteristics".

[3] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

[4] Universal Serial Bus Specification Revision 2.0, USB Implementers Forum.

NOTE: Available at http://www.usb.org/developers/docs. This is a ZIP package containing the following:

- The original USB 2.0 specification released on April 27, 2000.
- The "USB On-The-Go supplement" Revision 1.3 as of December 5, 2006.
- The "Inter-Chip USB supplement to the USB 2.0 Specification" Revision 1.0 March 13, 2006.
- Errata and Engineering Change Notices.

In the context of the present document, this reference, abbreviated as "USB 2.0", is used specifically in relation to the original USB 2.0 specification and associated errata and Engineering Change Notices, while its supplements are referred through separate references.

[5] "Inter-Chip USB supplement to the USB 2.0 Specification", Revision 1.0 March 13, 2006 published as part of the Universal Serial Bus Revision 2.0 specification package (see TS 102 223 [i.1]).

NOTE: available at http://www.usb.org/developers/docs.

[6] Universal Serial Bus, "Mass Storage Class Specification Overview", Revision 1.2, USB Implementers Forum, Device Working Group: Mass Storage.

NOTE: Available at http://www.usb.org/developers/devclass-docs.

[7] "Universal Serial Bus Mass Storage Class Bulk-Only Transport" Revision 1.0.

NOTE: Available at http://www.usb.org/developers/devclass-docs.

[8] Universal Serial Bus "Device Class: Smart Card ICCD Specification for USB Integrated Circuit(s) Card Devices" Revision 1.0.

NOTE: Available at http://www.usb.org/developers/devclass-docs.

[9] "Universal Serial Bus Communications Class Subclass Specification for Ethernet Emulation Model Devices", Revision 1.0, USB Implementers Forum, Device Working Group: Communication.

NOTE: Available at http://www.usb.org/developers/devclass_docs.

[10] ANSI/INCITS 405-2005: "Information Technology - SCSI Block Commands - 2 (SBC-2)".

NOTE: Available at http://www.t10.org.

[11] ANSI/INCITS 408-2005: "Information Technology - SCSI Primary Commands - 3 (SPC-3)".

NOTE: Available at http://www.t10.org.

[12] ISO/IEC 7810: "Identification cards -- Physical characteristics".

[13] ISO/IEC 7816-2: "Identification cards -- Integrated circuit cards -- Part 2: Cards with contacts -- Dimensions and location of the contacts".

[14] ETSI TS 102 613: "Smart Cards; UICC - Contactless Front-end (CLF) Interface; Part 1: Physical and data link layer characteristics".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TS 102 223: "Smart Cards; Card Application Toolkit (CAT)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the termns and definitions given in TS 102 600 [1] and TS 102 221 [2]apply.

3.2 Symbols

For the purposes of the present document, the symbols given in TS 102 600 [1] and TS 102 221 [2] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TS 102 600 [1], TS 102 221 [2] and the following apply:

CBW	Command Block Wrapper
CSW	Command Status Wrapper
DUT	Device Under Test
EEM	Ethernet Emulation Model
FFS	For Further Study
GND	GrouND
IC	Inter-Chip
ICCD	Integrated Circuit Card Device
ICCID	Integrated Circuit Card IDentification
MSC	Mass Storage Class
RQ	Conformance requirement
T	Terminal, i.e. the terminal simulator (shortcut used only in test procedure tables)
TE	Test Equipment
USB	Universal Serial Bus

3.4 Formats

3.4.1 Format of the table of optional features

The columns in table 4.1 have the following meaning.

Column	Meaning
Option	The optional feature supported or not by the implementation.
Status	See chapter 3.4.3 "Status and Notations"
Support	The support columns shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [3], are used for the support column in table 4.1. Y or y: supported by the implementation N or n: not supported by the implementation N/A, n/a or -: no answer required (allowed only if the status is N/A, directly or after evaluation of a conditional status)
Mnemonic	The mnemonic column contains mnemonic identifiers for each item.

3.4.2 Format of the applicability table

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

The columns in table 4.2 have the following meaning.

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

3.4.3 Status and Notations

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

The following notations, defined in ISO/IEC 9646-7 [3], are used for the status column:

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

References to items

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

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

4 Test environment

4.1 Table of optional features

The supplier of the implementation shall state the support of possible options in table 4.1. See clause 3.4 for the format of table 4.1.

Table 4.1: Options

Item	Option	Status	Support	Mnemonic
1	EEM class	O		O_EEM
2	Mass Storage class	O		O_MSC
3	ICCD Bulk Interface	O		O_ICCD_BULK

4.2 Applicability table

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

Table 4.2 a): Applicability of tests

Test case	Description	Release	Rel-7 Terminal	Support
	Physical Tests			
6.2.1	Dimensions of the UICC card	Rel-7	M	
6.2.2	Mechanical characteristics	Rel-7	M	
	Basic Electrical Tests			
6.3.1.1	No connection for incorrect voltage class	Rel-7	M	
6.3.1.2	Reaction at Class C'	Rel-7	M	
6.3.1.3	Reaction at Class B	Rel-7	M	
	Activation Tests			
6.4.1.1	Support of voltage classes C' and B	Rel-7	M	
6.4.1.2	UICC detects non-USB Terminal	Rel-7	M	
6.4.2.1	Activation of TS 102 221 [2] interface only	Rel-7	M	
6.4.2.2	USB Interface selection - ATR procedure	Rel-7	M	
6.4.2.3	USB Interface selection - USB procedure	Rel-7	M	
6.4.2.4	USB Interface selection - Concurrent procedure	Rel-7	M	
6.4.2.5	Activation of TS 102 221 [2] interface with PPS procedure	Rel-7	M	
	Initialisation Tests			
6.5.1.1	Support of Get Interface power request current as requested	Rel-7	M	
6.5.1.2	Support of Get Interface power request wLength greater than 2	Rel-7	M	
6.5.1.3	Support of Set Interface power request minimum current	Rel-7	M	
6.5.2.1	Resume Time Negotiation	Rel-7	M	
	Descriptors			
6.6.1.1.1	Device Descriptor Test	Rel-7	M	
6.6.1.2.1	Configuration Descriptor and ICCD Interface Descriptor Test	Rel-7	M	
6.6.1.3.1	EEM Interface Descriptor Test	Rel-7	C101	
6.6.1.3.2	Mass Storage Interface Descriptor Test	Rel-7	C102	
	Protocol Stack and Higher Level			
6.7.1.1	Suspend with no effect on internal State	Rel-7	M	
6.7.2.1	ICCD Control B Interface basic functionality	Rel-7	M	
6.7.3.1	ICCD Bulk Interface basic functionality	Rel-7	C103	
6.7.4.1	EEM Echo Test	Rel-7	C101	
6.7.5.1	Device Type Test	Rel-7	C102	
6.7.5.2	Removable Media Test	Rel-7	C102	
6.7.5.3	Insufficent Power Capabilities for Mass Storage Test	Rel-7	C102	
6.7.5.4	Stop Unit Test	Rel-7	C102	
6.7.5.5	MBR Test	Rel-7	C102	

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

Conditional item	Condition
C101	IF O_EEM THEN M ELSE N/A
C102	IF O_MSC THEN M ELSE N/A
C103	IF O_ICCD_BULK THEN M ELSE N/A

4.3 Information provided by the device supplier

The device supplier shall provide the list of configurations used by the device (i.e. configuration index and configuration value 'bConfigurationValue' and its description for each configuration).

EXAMPLE: Index 0, 'bConfigurationValue'=1, EEM and Mass Storage supported.

4.4 Test equipment

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

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

For the purpose of the present document, the Terminal simulator shall not activate the UICC-CLF interface as defined in TS 102 613 [14].

4.4.1 Measurement/setting uncertainties

Void.

4.4.2 Default conditions for DUT operation

4.4.2.1 Temperature

The tests shall be run at a fully operational temperature (i.e. between -25 °C and +85 °C).

4.4.3 Minimum/maximum conditions for DUT operation

Void.

4.5 Test execution

4.5.1 Parameter variations

Unless otherwise specified, all tests shall be carried out once for each voltage class available in the UICC in addition to the parameter variations specified individually for each test case.

4.6 Pass criterion

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

5 Conformance Requirements

5.1 USB UICC system architecture

Reference: TS 102 600 [1], clause 4.

RQ number	Clause	Description
RQ01_0101	4.1	USB UICCs shall remain compliant with TS 102 221 [2].
RQ01_0201	4.2	The TS 102 221 [2] interface shall be activated when a terminal with only TS 102 221 [2] capability is connected to a USB UICC.
RQ01_0202	4.2	The TS 102 221 [2] interface shall be activated when a USB UICC-enabled terminal is connected to a UICC with only TS 102 221 [2].
RQ01_0203	4.2	Commands and functionality specified in TS 102 221 [2] shall also be supported over the IC_USB interface.
RQ01_0301	4.3	Except for contacts C1 and C5, actions by an entity (terminal or UICC) on one interface shall not affect the state of the other interface.
RQ01_0302	4.3	A USB UICC shall indicate the support of USB in its ATR, as described in TS 102 221 [2].
NOTE: RQ01_0202 is not tested in the present document, as it considers non-USB UICC.		

5.2 Physical characteristics

Reference: TS 102 600 [1], clause 5.

RQ number	Clause	Description
RQ02_0001	5	The physical characteristics of the USB UICC-Terminal interface are as defined in TS 102 221 [2] except for the specific provisions specified in the present document.
RQ02_0101	5.1.1.2	A USB UICC shall provide contacts C4 and C8.
RQ02_0201	5.1.2	Following power up, a USB UICC shall present a high impedance state on contacts C4 and C8 within 80µs following establishment of a stable power supply.
RQ02_0202	5.1.2	When the IC_USB interface is suspended, a USB UICC shall support the terminal turning off Vcc without further action on C4 and C8.
RQ02_0301	5.2	USB UICCs shall not be damaged when inserted in or removed from a slot where power is present.
NOTE 1: RQ02_0202 testing is FFS. NOTE 2: RQ02_0301 is not tested, as there is no reasonable way to completely prove that the UICC is not damaged.		

5.3 Electrical characteristics

Reference: TS 102 600 [1], clause 6.

RQ number	Clause	Description
RQ03_0101	6.1	The operating conditions defined in TS 102 221 [2] apply to USB UICCs, except when otherwise specified in the present document.
RQ03_0102	6.1	The contacts C4 and C8 operate as specified in Inter-Chip USB [5] for IC_DP and IC_DM respectively.
RQ03_0201	6.1.1	When the USB UICC is operating under class B operating conditions, the supply voltage on C1 and C5 shall be as defined in TS 102 221 [2].
RQ03_0202	6.1.1	When the USB UICC is operating under class B operating conditions, the operation of contacts C4 and C8 shall follow the requirements specified in Inter-Chip USB [5] for the Voltage Class 3.0 Volt.
RQ03_0301	6.1.2	When the USB UICC is operating at a nominal supply voltage of 1,8 V, the supply voltage on C1 and C5 shall follow the requirements specified in the Inter-Chip USB [5] for the Voltage Class 1,8 Volt.
RQ03_0302	6.1.2	When the USB UICC is operating at a nominal supply voltage of 1,8 V, the operation of contacts C4 and C8 shall follow the requirements specified in the Inter-Chip USB [5] for the Voltage Class 1,8 Volt.
NOTE: RQ03_0102 is only partially tested, as testing Inter-Chip USB [5] is not in the scope of the present document.		

5.4 Initial communication establishment procedures

Reference: TS 102 600 [1], clause 7.

RQ number	Clause	Description
RQ04_0101	7.1	USB UICCs shall support voltage class B and C/C' operating conditions.
RQ04_0102	7.1	Any voltage class defined in the present document which is supported by the USB UICC shall be supported on both the IC_USB interface and the TS 102 221 [2] interface.
RQ04_0201	7.2	Before attachment, the USB UICC shall present high impedance on C4 and C8 and shall monitor the signals on C4 and C8.
RQ04_0202	7.2	The USB UICC shall continue with the attachment procedure only if one of the following conditions is met: - C4 and C8 are maintained in state L by the terminal for at least 10ms after the supply voltage has reached a valid operation level; - the condition described in the procedure using ATR is met.
RQ04_0203	7.2	The USB UICC attaches itself as a USB Full-Speed device by pulling the C4 line to state H as specified in USB 2.0 [4].
RQ04_0204	7.2	In case the attachment causes the C8 line to go to state H simultaneously with C4, the USB UICC shall immediately terminate the USB attachment and activate its IC_USB pull-down resistors on contacts C4 and C8.
RQ04_0205	7.2	The UICC shall support the terminal performing only one of these procedures (using USB or using ATR) or performing both in parallel asynchronously.
RQ04_0206	7.2	The UICC shall support all the variations of terminal behaviour described in the following text: "For the Interface selection procedure using USB. USB UICC-enabled terminals do not need to provide a clock signal on contact C3 to operate a USB UICC. However, if only the procedure using USB is used, then immediately after applying power to the UICC, it is recommended that the USB UICC-enabled terminal provides a clock on contact C3 compliant with TS 102 221 [2] for at least 200 cycles while maintaining C2 in state L to allow UICCs supporting only the TS 102 221 [2] interface to assert the state of all their contacts. It is recommended that the terminal switches off this clock after that".
RQ04_0207	7.2	For the Interface selection procedure using USB. USB UICCs shall support switching off of the clock as long as C2 is kept in state L.
RQ04_0208	7.2	Upon receiving the special PPS command indicating T=15 with PPS2 set to 'C0', the UICC shall attach on USB if this has not already happened before replying to the PPS command. A USB UICC receiving this PPS shall remain attached on USB until the terminal drives a USB Reset.
RQ04_0209	7.2	If the USB UICC receives any other command following ATR than the special PPS command indicating T=15 with PPS2 set to 'C0', it shall terminate any actions on contacts C4 and C8 and activate its pull-down resistors. The USB UICC shall not attempt to attach itself on USB again until it has been powered down and up.
RQ04_0210	7.2	After a successful PPS exchange indicating T=15 with PPS2 set to 'C0', the terminal may stop the clock on the TS 102 221 [2] interface and the USB UICC shall no longer react to events, such as new commands, on the TS 102 221 [2] interface.
RQ04_0211	7.2	A USB UICC shall fully execute any command already initiated on the TS 102 221 [2] interface even if a USB Reset is received before completion. This shall not prevent the UICC from operating normally on the USB interface following the USB Reset.
RQ04_0301	7.3	USB UICC ADDRESS ASSIGNMENT: The terminal assigns a unique address to the USB UICC as specified in USB 2.0 [4].
RQ04_0302	7.3	POWER NEGOTIATION: The USB UICC and the terminal exchange information about voltage classes and current consumption as defined in TS 102 600 [1] clause 8.2.
RQ04_0303	7.3	USB UICC CONFIGURATION: The terminal configures the USB UICC for the applications it is running, as described in USB 2.0 [4]. Terminal applications using the IC_USB interface should specify the behaviour of a terminal when a USB function that it expects is not available on a USB UICC (the terminal may, e.g. inform the user of a mismatch and attempts to activate the TS 102 221 [2] interface).
RQ04_0401	7.4.1	During activation, the USB-UICC shall be able to operate with 10mA or less.
RQ04_0402	7.4.1	The power consumption of the USB UICC shall remain within the limit that applies during ATR at maximum external clock frequency as specified in TS 102 221 [2] until it has received a USB Reset signalling from the terminal.
RQ04_0501	7.4.2	If the IC_USB interface is selected, after a successful power negotiation procedure, the UICC shall not exceed the negotiated power limit.
RQ04_0601	7.4.3	When its IC_USB interface is not activated or is suspended, and no other UICC interfaces are active, the USB UICC current consumption at 25 °C shall not exceed the values specified in TS 102 221 [2] for a UICC in idle state.
RQ04_0701	7.5	The ATR returned by a USB UICC activated using the USB ICCD device class on the IC_USB interface in response to an ICC_POWER_ON or a PC_to_RDR_IccPowerOn request according to the Smart Card ICCD specification [8] shall be the same as the ATR that would be returned over the TS 102 221 [2] interface after the corresponding type of reset.

RQ number	Clause	Description
RQ04_0801	7.6	To minimize power consumption, USB UICCs shall support dynamic switching of their resistors on C4 and C8 during traffic signalling as described in Inter-Chip USB [5].
RQ04_0901	7.7	The USB UICC shall support Suspend and Resume states as defined in USB 2.0 [4].
RQ04_0902	7.7	The USB UICC shall enter Suspend state after the bus has not transmitted any data for 3 ms, in compliance with USB 2.0 [4].
RQ04_0903	7.7	In order to perform a remote wakeup, the USB UICC shall perform a Resume signalling as described in USB 2.0 [4].
RQ04_0904	7.7	If the UICC supports remote wake-up signalling for minimum 10 ms, see clause 8.3, then the USB UICC shall perform a Resume signalling for at least 10 ms and up to the maximum duration of 15 ms allowed in USB 2.0 [4].
RQ04_0905	7.7	after a resume time negotiation as described in clause 8.3, the minimum duration of the resume signalling and the minimum number of SOF tokens during resume recovery are the values returned by the UICC during the resume time negotiation.
RQ04_1001	7.8	When the IC_USB interface is suspended, the UICC shall support the terminal removing power from the USB UICC at any time.
NOTE 1: RQ04_0206, RQ04_0207, RQ04_0302, RQ04_0801 and RQ04_1001 testing are FFS. NOTE 2: RQ04_0903 and RQ04_0904 are not tested, as it is not possible to test the remote wake-up without a specific application on the UICC.		

5.5 USB interface operational features

Reference: TS 102 600 [1], clause 8.

RQ number	clause	description
RQ05_0101	8.1	USB Full Speed, as defined in USB 2.0 [4], shall be supported on the USB UICC.
RQ05_0201	8.2	A USB UICC shall support the Get Interface Power request as defined in TS 102 600 [1], tables 8.1 and 8.2.
RQ05_0202	8.2	A USB UICC shall support the Set Interface Power request as defined in TS 102 600 [1], tables 8.1 and 8.2.
RQ05_0203	8.2	A USB UICC according to the present document shall accept wLength values greater than 2 in the Get Interface Power request, but only respond with returning 2 bytes.
RQ05_0204	8.2	If the USB UICC supports mass storage, it shall support removable media on its mass storage endpoint.
RQ05_0205	8.2	If the USB UICC supports mass storage, it shall inform MEDIUM NOT PRESENT (see [11]) until the Get Interface Power Request followed by a Set Interface Power Request procedure has completed.
RQ05_0206	8.2	A USB UICC shall not signal MEDIUM PRESENT (see [11]) if terminal power capabilities are not sufficient.
RQ05_0207	8.2	A USB UICC shall support the STOP UNIT command as specified in the SCSI Primary Commands specification [11].
RQ05_0208	8.2	From that point on, the USB UICC shall keep its current consumption within the limit indicated by the terminal and adapt its USB configuration descriptors and interface descriptors accordingly.
RQ05_0301	8.3	A USB UICC shall be able to answer a Resume Time Request according to table 8.3 as defined in TS 102 600 [1], table 8.4.
RQ05_0302	8.3	The response data from the USB UICC shall contain three bytes with the values of the minimum resume signalling time required by the UICC, the minimum number of SOF tokens during resume recovery required by the UICC, and information about whether the UICC will maintain the resume signalling for remote wakeup for a minimum of 10 ms.
RQ05_0303	8.3	The attributes of the Response to Resume Time Request shall be according to TS 102 600 [1], table 8.4.
RQ05_0401	8.4	USB UICCs shall provide at least 2 bulk endpoints (one in and one out) in addition to the default endpoint 0.
RQ05_0402	8.4	The application(s) related to the functional interfaces shall keep their internal state (e.g. file and security context or dynamically assigned IP address) when configurations are switched.
NOTE: RQ05_0208 and RQ05_0402 testing is FFS.		

5.6 Protocol stacks for USB UICC applications

Reference: TS 102 600 [1], clause 9.

RQ number	clause	description
RQ06_0101	9.1	All USB UICCs shall present at least one USB configuration descriptor with short APDU-level exchanges over Version B Control transfer with no Interrupt pipe as defined in the Smart Card ICCD specification [8].
RQ06_0102	9.1	Applications relying on APDU communication to exchange large amount of data may specify one or several additional configurations using short APDU-level exchange over a dedicated pair of bulk pipes and no interrupt pipe for USB UICC-enabled terminals and USB UICC (see note 3).
RQ06_0103	9.1	Switching between configurations having bulk and control B interfaces shall be transparent at the application layer.
RQ06_0104	9.1	Suspend shall have no effect on the internal state of the UICC (file context, security status, etc.).
RQ06_0201	9.1.1	USB UICCs requiring a different polling frequency while using APDU communication over USB shall set it accordingly by means of a POLL INTERVAL command.
RQ06_0202	9.1.1	When a USB UICC using APDU communication over USB has no need for proactive polling, it shall indicate it to the terminal by using the POLLING OFF command.
RQ06_0301	9.2	If the Ethernet Emulation Model subclass of the USB communication device class is supported, it shall be as defined in CDC EEM [9].
RQ06_0302	9.2	Support of the SuspendHint, ResponseHint and ResponseCompleteHint commands as described in CDC EEM [9] is mandatory for the USB UICC.
RQ06_0303	9.2	The USB UICC shall send SuspendHints whenever it completes internal processing. The suspend condition for this interface is that a SuspendHint was the last EEM packet sent by the USB UICC.
RQ06_0401	9.3	The USB UICC shall support the Mass Storage Bulk Only 1.0 specification [7] as explained in the Mass Storage Specification Overview [6] with the SCSI Transparent subclass '06', corresponding to support of the SCSI Primary Command set of INCITS 408-2005 [11].
RQ06_0402	9.3	The USB UICC shall support the SCSI Peripheral Device Type '00' corresponding to a direct access SCSI block device as specified in INCITS 405-2005 [10].
RQ06_0403	9.3	The first sector of the unprotected memory area shall contain an MBR with a partition table. Number, format and content of the partition(s) are beyond the scope of the present document.
NOTE 1: RQ06_0201, RQ06_0202,RQ06_0302,RQ06_0303 are not testable, and therefore will not be considered in the present document. NOTE 2: RQ06_0103 testing is FFS (to be considered together with RQ05_0402). NOTE 3: This is an implicit requirement for ICCD using Bulk transfers if supported.		

5.7 USB Descriptors of a USB UICC

Reference: TS 102 600 [1], annex A.

RQ number	clause	description
RQ07_0101	A.1	The Standard device descriptor for a USB UICC shall be as defined in the Smart Card ICCD specification [8], with the specific values for the following entries: => bDeviceClass = 00h. => bDeviceSubClass = 00h. => bDeviceProtocol = 00h.
RQ07_0201	A.2	The Standard configuration descriptor for a USB UICC shall be as defined in the Smart Card ICCD specification [8], with the below restrictions: => Same Definition as in USB2.0 without Class specific Information. => bmAttributes = A0. => bMaxPower = 1, 2, 3 or 4.
RQ07_0301	A.3	The Standard Interface descriptor for APDU transfer shall be as defined in the Smart Card ICC specification [8], with the below restrictions: => (bNumEndpoints,bInterfaceProtocol) = (00,02) or (02,00).
RQ07_0302	A.3	The Standard Interface descriptor for Ethernet Emulation shall be as defined in CDC EEM [9].
RQ07_0303	A.3	The Standard Interface descriptor for Mass Storage shall be as defined in the Mass Storage Bulk Only 1.0 specification [7], with the below restrictions: => bNumEndpoints = 02. => binterfaceSubClass = 06.
RQ07_0401	A.4	The Standard Endpoint descriptors for Bulk-IN and Bulk-OUT shall be as defined in USB2.0 [4], with the specific value for the following entry: => bInterval = 00.
RQ07_0501	A.5	The Class specific descriptor for APDU transfer shall be as defined in the Smart Card ICCD specification [8], with the restrictions below: => dwProtocols = 0000 0002. => dwMaxIFSD = 0000 00FE. => DwFeatures = 0002 0840 or 0004 0840.

5.8 Assigned values for vendor specifIC_USB requests

Reference: TS 102 600 [1], annex B.

No requirement in this clause.

6 Test cases

6.1 Void

6.2 Physical Tests

6.2.1 Test case 1: Dimensions of the UICC card

6.2.1.1 Test execution

The TS 102 221 [2] allows three kind of cards with different form factors:

- ID1 - UICC: Defined in TS 102 221 [2], ISO/IEC 7810 [12] and ISO/IEC 7816-2 [13].
- Plug-in UICC: Defined in TS 102 221 [2].
- Mini - UICC: Defined in TS 102 221 [2].

The UICC - card shall abide by the dimensions that are defined in accordance to the specification. This applies in particular to the electrical contacts.

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

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

6.2.1.2 Initial conditions

- Identify the dimension design for the kind of UICC card TS 102 221 [2], ISO/IEC 7810 [12] or ISO/IEC 7816-2 [13].

6.2.1.3 Test procedure

Step	Direction	Description	RQ
1	User	Measure the dimensions of the card and the contacts and check if they perform the dimensions of the design.	RQ02_0001

6.2.2 Test case 2: Mechanical characteristics

6.2.2.1 Test execution

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

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

6.2.2.2 Initial conditions

- None.

6.2.2.3 Test procedure

Step	Direction	Description	RQ
1	User	The mechanical characteristics of the USB UICC are as defined in TS 102 221 [2].	RQ02_0001

6.3 Basic Electrical Tests

6.3.1 Supply Voltage Value

6.3.1.1 Test case 1: No connection for incorrect voltage class

6.3.1.1.1 Test execution

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

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

6.3.1.1.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.

6.3.1.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact Vcc(C1) at 1,25 V ± 0,05 V.	
2	UICC → T	C4(IC_DP) and C8(IC_DM) set low and shall not show attachment.	RQ03_0102

6.3.1.2 Test case 2: Reaction at Class C'

6.3.1.2.1 Test execution

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

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

6.3.1.2.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.

6.3.1.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact Vcc(C1) at 1,65 V.	
2	UICC → T	C4 (IC_DP)set high between 10 ms and 20 ms(tp1) after VOP (1,32 V) is reached.	RQ03_0301 RQ03_0302

6.3.1.3 Test case 3: Reaction at Class B

6.3.1.3.1 Test execution

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

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

6.3.1.3.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.

6.3.1.3.3 Test procedure

Step	Direction	Description	RQ
1	T ← → UICC	Activate contact Vcc(C1) at 2,7 V.	
2	UICC → T	C4 (IC_DP)set high between 10 ms and 20 ms(tp1) after VOP (2,16 V) is reached.	RQ03_0201 RQ03_0202

6.4 Activation Tests

6.4.1 Voltage class Activation

6.4.1.1 Test case 1: Support of voltage classes C' and B

6.4.1.1.1 Test execution

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

- Voltage Class C'.
- Voltage Class B.

6.4.1.1.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC contacts C2, C3and C7 are connected to the Terminal simulator contacts C2, C3and C7. Terminal simulator Contacts C2, C3and C7 are individually pulled down to C5 (GND).by a resistor of 50 kΩ.

6.4.1.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter and maintain V_{CC}. Start monitoring the power drawn by the UICC.	
2	UICC	Within 80µs following establishment of a stable power supply, the USB UICC shall present a high impedance state on contacts C4 and C8.	RQ02_0101 RQ02_0201 RQ04_0201
3	UICC → T	C4 is pulled up after 10ms and before 20 ms after the power supply is stable.	RQ04_0101 RQ04_0102 RQ04_0201 RQ04_0202 RQ04_0203 RQ05_0101
4	UICC	Stop monitoring the power drawn by the UICC.	RQ04_0401

6.4.1.2 Test case 2: UICC detects non-USB Terminal

6.4.1.2.1 Test execution

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

- Voltage Class C'.
- Voltage Class B.

6.4.1.2.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC contacts C2, C3, C6 and C7 are connected to the Terminal simulator contacts C2, C3and C7. Terminal simulator Contacts C2, C3and C7 are individually pulled down to C5 (GND).by a resistor of 50 kΩ.

6.4.1.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter and maintain V_{CC}.	
2	UICC → T	C4 is pulled up after 10 ms and before 20 ms after the power supply is stable.	RQ02_0101
3	T → UICC	C8 is driven High simultaneously with C4.	
4	UICC	Terminate the USB attachment and activate its IC_USB pull-down resistors on contacts C4 and C8.	RQ04_0204

6.4.2 Interface Selection/Activation

6.4.2.1 Test case 1: Activation of TS 102 221 interface only

6.4.2.1.1 Test execution

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

- Voltage Class C.
- Voltage Class B.

6.4.2.1.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC is connected to the Terminal simulator and none of the contacts are activated.
- The terminal simulator is simulating a fully functional TS 102 221 [2] only terminal.

6.4.2.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter and maintain Vcc	
2	T → UICC	Activate the rest of the TS 102 221 [2] interface contacts	
3	UICC → T	Send ATR: - The first TBi (i>2) after T = 15 indicates Inter-Chip USB. UICC-Terminal interface supported as defined in TS 102 600 [1]: - The first TAi (i>2) after T = 15 shall indicate at least class B and C'.	RQ01_0302
4	T → UICC	Send a command "Select MF" on the TS 102 221 [2] interface	
5	UICC → T	Activate pull-down resistors on C4 and C8. Respond with status "90 00"	RQ01_0101 RQ01_0201 RQ04_0209

6.4.2.2 Test case 2: USB Interface selection - ATR procedure

6.4.2.2.1 Test execution

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

- Voltage Class C'.
- Voltage Class B.

6.4.2.2.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC is connected to the Terminal simulator and none of the contacts are activated.

6.4.2.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter and maintain Vcc Start monitoring the power drawn by the UICC.	
2	T → UICC	Activate the rest of the TS 102 221 [2] interface contacts	
3	UICC → T	Send ATR: - The first TBi (i>2) after T = 15 indicates Inter-Chip USB. UICC-Terminal interface supported as defined in TS 102 600 [1]: - The first TAi (i>2) after T = 15 shall indicate at least class B and C'.	
4	T → UICC	Send PPS command with: - PPS0 = '2F' (i.e. indicating T=15). - PPS2 = 'C0'.	
5	UICC → T	UICC has asserted the pull-up of the C4 line to state H. Send PPS response: - PPS0 = '2F' (i.e. indicating T=15). - PPS2 = 'C0'.	RQ03_0101 RQ04_0203 RQ04_0205 RQ04_0208
6	T → UICC	Send USB Reset signal. Stop monitoring the power drawn by the UICC.	RQ04_0402
7	T → UICC	Request the first 8 bytes of the Device Descriptor on Device Address 0.	
8	UICC → T	Send the first 8 bytes of the Device Descriptor.	RQ04_0205
9	T → UICC	Send a command "Select MF" on the TS 102 221 [2] interface.	
10	UICC	No reaction on TS 102 221 [2] interface.	RQ04_0210

6.4.2.3 Test case 3: USB Interface selection - USB procedure

6.4.2.3.1 Test execution

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

- Voltage Class C'.
- Voltage Class B.

6.4.2.3.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC is connected to the Terminal simulator and none of the contacts are activated.

6.4.2.3.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter.	
2	UICC → T	C4 is pulled up after 10ms and before 20ms after the power supply is stable.	RQ04_0205
3	T → UICC	Send USB Reset signal.	RQ04_0203
4	T → UICC	Request the first 8 bytes of the Device Descriptor on Device Address 0.	
5	UICC → T	Send the first 8 bytes of the Device Descriptor.	RQ04_0205

6.4.2.4 Test case 4: USB Interface selection - Concurrent procedure

6.4.2.4.1 Test execution

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

- Voltage Class C'.
- Voltage Class B.

6.4.2.4.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC is connected to the Terminal simulator and none of the contacts are activated.

6.4.2.4.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter and maintain Vcc and wait for a C4 pull-up. Start monitoring the power drawn by the UICC.	
2	UICC → T	C4 is pulled up after 10ms and before 20ms after the power supply is stable.	RQ04_0205
3	T → UICC	Activate the rest of the TS 102 221 [2] interface contacts.	
4	UICC → T	Send ATR: - The first TBi (i>2) after T = 15 indicates Inter-Chip USB. UICC-Terminal interface supported as defined in TS 102 600 [1]: - The first TAi (i>2) after T = 15 shall indicate at least class B and C'.	RQ01_0301
5	T → UICC	Start sending USB Reset signal. Stop monitoring the power drawn by the UICC. As soon as possible after starting the USB Reset signal, send PPS command with: - PPS0 = '2F' (i.e. indicating T=15). - PPS2 = 'C0'.	RQ04_0402
6	UICC → T	Send PPS response: - PPS0 = '2F' (i.e. indicating T=15). - PPS2 = 'C0'.	RQ01_0301 RQ04_0203 RQ04_0205 RQ04_0208 RQ04_0211
7	T → UICC	Request the first 8 bytes of the Device Descriptor on Device Address 0.	
8	UICC → T	Send the first 8 bytes of the Device Descriptor.	RQ04_0205
NOTE: Step 6 can take place while the USB Reset signal is asserted.			

6.4.2.5 Test case 5: Activation of TS 102 221 interface with PPS procedure

6.4.2.5.1 Test execution

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

- Voltage Class C'.
- Voltage Class B.

6.4.2.5.2 Initial conditions

- Terminal simulator is connected to UICC, but none of the contacts are activated.
- The USB UICC is connected to the Terminal simulator and none of the contacts are activated.

6.4.2.5.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Activate contact V_{CC} (C1) with voltage class according to parameter and maintain V_{CC}	
2	T → UICC	Activate the rest of the TS 102 221 [2] interface contacts.	
3	UICC → T	Send ATR: - The first TBi (i>2) after T = 15 indicates Inter-Chip USB. UICC-Terminal interface supported as defined in TS 102 600 [1]: - The first TAi (i>2) after T = 15 shall indicate at least class B and C'.	
4	T → UICC	Send PPS command with: - PPS0 = '10' (i.e. indicating T=0).	
5	UICC → T	Activate pull-down resistors on C4 and C8, and send PPS response accordingly to TS 102 221 [2] for T=0 (in either order or at the same time).	RQ04_0209

6.5 Initialisation Tests

6.5.1 Power Negotiation

6.5.1.1 Test case 1: Support of Get Interface power request current as requested

6.5.1.1.1 Test execution

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

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

6.5.1.1.2 Initial conditions

- Device descriptor has been read.
- No Power Negotiation executed.

6.5.1.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send Get Interface Power Request.	
2	UICC → T	Return Get Interface Power Request Response.	RQ05_0201
3	T → UICC	Send Set Interface Power Request indicating the support of the activated voltage and at least current of bMaxCurent.	
4	UICC → T	Return response successful completion.	RQ05_0202
5	T → UICC	Send Get Configuration Descriptor request.	RQ04_0501
6	UICC → T	Return Configuration Descriptor.	RQ04_0501
7	T → UICC	Set Configuration.	RQ04_0501

6.5.1.2 Test case 2: Support of Get Interface power request wLength greater than 2

6.5.1.2.1 Test execution

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

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

6.5.1.2.2 Initial conditions

- Device descriptor has been read.
- No Power Negotiation executed.

6.5.1.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send Get Interface Power Request wLength = 4.	
2	UICC → T	Return Get Interface Power Request Response length = 2 bytes.	RQ05_0203

6.5.1.3 Test case 3: Support of Set Interface power request minimum current

6.5.1.3.1 Test execution

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

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

6.5.1.3.2 Initial conditions

- Device connected (no Power Negotiation executed).
- Device descriptor has been read.

6.5.1.3.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send Get Interface Power Request.	
2	UICC → T	Return Get Interface Power Request Response	
3	T → UICC	Send Set Interface Power Request indicating the support of the activated voltage and bMaxCurrent = 10 mA.	
4	UICC → T	Return response successful completion, and current consumption less or equal to 10 mA.	RQ04_0501
5	T → UICC	Send Get Configuration Descriptor request.	RQ04_0501
6	UICC → T	Return Configuration Descriptor.	RQ04_0501
7	T → UICC	Set Configuration.	RQ04_0501

6.5.2 Resume Time Negotiation

6.5.2.1 Test case 1: Resume Time Negotiation

6.5.2.1.1 Test execution

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

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

6.5.2.1.2 Initial conditions

- Device is Addressed and ICCD Control B Configuration selected.
- The UICC has not been suspended.

6.5.2.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send Resume Time Request.	
2	UICC → T	Response to Resume Time Request with the following parameters: - bMinResTime = '0A' to '1E'. - bMinSofTokens = 1 to 5. - bmRemWakeup = 0 or 1(Remote Wakeup Support Do not Care).	RQ05_0301 RQ05_0302 RQ05_0303
3	T → UICC	Suspend Device by maintaining a constant idle state for at least 3 ms.	
4	UICC	No activity (i.e. UICC in suspend state). Measure current consumption on Vcc. It shall be less or equal to 150 µA as specified in Inter-Chip USB [5].	RQ04_0901 RQ04_0902
5	T → UICC	Resume signalling with the minimum duration and with he minimum number of SOF as returned in step 2.	
6	T → UICC	Request the device status.	
7	UICC → T	Return response.	RQ05_0302 RQ04_0905

6.6 Descriptors

6.6.1 Standard-Descriptors

6.6.1.1 Device Descriptor

6.6.1.1.1 Test case 1: Device Descriptor Test

6.6.1.1.1.1 Test execution

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

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

6.6.1.1.1.2 Initial conditions

- Device in Default state

6.6.1.1.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Request the first 8 bytes of the Device Descriptor on Device Address 0	
2	UICC → T	Send the first 8 bytes of the Device Descriptor	RQ07_0101
3	T → UICC	Request the full Device Descriptor on Device Address 0	
4	UICC → T	Send the full Device Descriptor	RQ07_0101
5	T → UICC	Send Set Address using Device Address 42	
6	T → UICC	Request the full Device Descriptor on Device Address 42	
7	UICC → T	Send the full Device Descriptor	RQ04_0301 RQ07_0101
8	T → UICC	Send Set Configuration with the identified configuration value on Device Address 42	
9	T → UICC	Request the full Device Descriptor on Device Address 42	
10	UICC → T	Send the full Device Descriptor	RQ04_0303 RQ07_0101
11	T → UICC	Request the first 8 bytes of Device Descriptor on Device Address 0	
12		No UICC response in 1 second	RQ04_0301
13	T → UICC	Request the first 8 bytes of Device Descriptor on Device Address 29	
14		No UICC response in 1 second	RQ04_0301

Descriptors sent in steps 4, 7 and 10 shall be identical (i.e. have the same value). If not, then the test is failed.

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.6.1.2 Configuration Descriptor with ICCD Interface

6.6.1.2.1 Test case 1: Configuration Descriptor and ICCD Interface Descriptor Test

6.6.1.2.1.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD capability. Configurations are identified by index values.

6.6.1.2.1.2 Initial conditions

- Device in Default state

6.6.1.2.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Request the first 9 bytes of the Configuration Descriptor, using the index of the configuration under test on Device Address 0	
2	UICC → T	Send the first 9 bytes of the Configuration Descriptor as per the above index	RQ07_0201
3	T → UICC	Request wTotalLength bytes of Configuration Descriptor for the same index as previously on Device Address 0	
4	UICC → T	Send wTotalLength bytes of Configuration Descriptor as per the above index	RQ05_0401 RQ06_0101 RQ07_0201 RQ07_0301 RQ07_0401 RQ07_0501
5	T → UICC	Send Set Address using Device Address 42	
6	T → UICC	Request wTotalLength bytes of Configuration Descriptor for the same index as previously on Device Address 42	
7	UICC → T	Send wTotalLength bytes of Configuration Descriptor as per the above index	RQ04_0301 RQ05_0401 RQ06_0101 RQ07_0201 RQ07_0301 RQ07_0401 RQ07_0501
8	T → UICC	Send Set Configuration with the identified configuration value on Device Address 42	
9	T → UICC	Request wTotalLength bytes of Configuration Descriptor for the same index as previously on Device Address 42	
10	UICC → T	Send wTotalLength bytes of Configuration Descriptor as per the above index	RQ04_0303 RQ05_0401 RQ06_0101 RQ07_0201 RQ07_0301 RQ07_0401 RQ07_0501

Descriptors sent in steps 4, 7 and 10 shall be identical (i.e. have the same value). If not, then the test is failed.

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.6.1.3 Interface Descriptor

6.6.1.3.1 Test case 1: EEM Interface Descriptor Test

6.6.1.3.1.1 Test execution

The test procedure shall only be executed if EEM Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing EEM capability. Configurations are identified by index values.

6.6.1.3.1.2 Initial conditions

- Device in Default state.

6.6.1.3.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Request the first 9 bytes of the Configuration Descriptor, using the index of the configuration under test.	
2	UICC → T	Send the first 9 bytes of the Configuration Descriptor as per the above index.	
3	T → UICC	Request wTotalLength bytes of Configuration Descriptor for the same index as previously.	
4	UICC → T	Send wTotalLength bytes of Configuration Descriptor as per the above index.	RQ07_0302

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.6.1.3.2 Test case 2: Mass Storage Interface Descriptor Test

6.6.1.3.2.1 Test execution

The test procedure shall only be executed if Mass Storage Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing Mass Storage capability. Configurations are identified by index values.

6.6.1.3.2.2 Initial conditions

- Device in Default state.

6.6.1.3.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Request the first 9 bytes of the Configuration Descriptor, using the index of the configuration under test.	
2	UICC → T	Send the first 9 bytes of the Configuration Descriptor as per the above index.	
3	T → UICC	Request wTotalLength bytes of Configuration Descriptor for the same index as previously.	
4	UICC → T	Send wTotalLength bytes of Configuration Descriptor as per the above index.	RQ06_0401 RQ07_0303

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.7 Protocol Stack and Higher Level

6.7.1 ICCD - APDU based UICC Applications

6.7.1.1 Test case 1: Suspend with no effect on internal State

6.7.1.1.1 Test execution

The test procedure shall be performed for each available configuration containing ICCD Control B interface (as declared in clause 4.3). Configurations are identified by index values.

6.7.1.1.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- The Resume time negotiation has been done.
- ICC_POWER_ON sent.

6.7.1.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT MF"	
2	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ01_0203
3	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2')	
4	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	
5	T → UICC	Send XFR_BLOCK with "READ BINARY"	
6	UICC → T	Return DATA_BLOCK containing the identification number for the UICC	RQ01_0203
7	T	Suspend Device by maintaining a constant idle state for at least 3 ms	
8	UICC	No activity	RQ04_0601
9	T → UICC	Resume Device	
10	T → UICC	Send XFR_BLOCK with "READ BINARY" after *bMinSofTokens*, as negotiated during the resume time negotiation	
11	UICC → T	Return DATA_BLOCK containing the identification number for the UICC	RQ01_0203 RQ04_0905 RQ06_0104

Data sent in steps 6 and 11 shall be identical (i.e. have the same value). If not, then the test is failed.

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.7.2 USB ICCD Control B

6.7.2.1 Test case 1: ICCD Control B Interface basic functionality

6.7.2.1.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD capability. Configurations are identified by index values.

6.7.2.1.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ATR has been received on TS 102 221 [2] interface, and recorded.

6.7.2.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send ICC_POWER_OFF	
2	T → UICC	Send SLOT_STATUS request	
3	UICC → T	Return SLOT_STATUS (USB-ICC is virtually not present)	RQ06_0101
4	T → UICC	Send ICC_POWER_ON	
5	T → UICC	Send DATA_BLOCK request	
6	UICC → T	Return DATA_BLOCK containing valid ATR Verify that this ATR is identical to the one recorded from TS 102 221 [2] interface	RQ06_0101 RQ04_0701
7	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00	
8	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ01_0203 RQ06_0101
9	T → UICC	Send XFR_BLOCK with "READ BINARY" and bLevelParameter = 0x00	
10	UICC → T	Return DATA_BLOCK containing expected response (the identification number for the UICC)	RQ01_0203 RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.7.3 USB ICCD Bulk

6.7.3.1 Test case 1: ICCD Bulk Interface basic functionality

6.7.3.1.1 Test execution

The test procedure shall only be executed if ICCD Bulk Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD Bulk capability. Configurations are identified by index values.

6.7.3.1.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Bulk Configuration selected.
- ATR has been received on TS 102 221 [2] interface, and recorded.

6.7.3.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send PC_to_RDR_IccPowerOff	
2	UICC → T	Return RDR_to_PC_SlotStatus (USB-ICC is virtually not present)	RQ06_0102
3	T → UICC	Send PC_to_RDR_IccPowerOn	
4	UICC → T	Return RDR_to_PC_DataBlock containing valid ATR Verify that this ATR is identical to the one recorded from TS 102 221 [2] interface	RQ04_0701 RQ06_0102
5	T → UICC	Send PC_to_RDR_XfrBlock with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00	
6	UICC → T	Return RDR_to_PC_DataBlock containing expected response (SW = "90 00")	RQ01_0203 RQ06_0102
7	T → UICC	Send PC_to_RDR_XfrBlock with " READ BINARY" and bLevelParameter = 0x00	
8	UICC → T	Return RDR_to_PC_DataBlock containing expected response (the identification number for the UICC)	RQ01_0203 RQ06_0102
NOTE: This test verifies that the ICCD Bulk is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.7.4 EEM - Ethernet Emulation Model

6.7.4.1 Test case 1: EEM Echo Test

6.7.4.1.1 Test execution

The test procedure shall only be executed if EEM Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing EEM capability. Configurations are identified by index values.

6.7.4.1.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- EEM Configuration selected.

6.7.4.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send single EEM command packet with "Echo"	
2	UICC → T	Return valid "Echo response"	RQ06_0301

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

6.7.5 Mass-Storage

6.7.5.1 Test case 1: Device Type Test

6.7.5.1.1 Test execution

The test procedure shall only be executed if Mass Storage Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing Mass Storage capability. Configurations are identified by index values.

6.7.5.1.2 Initial conditions

- Power Negotiation executed with power requested by the UICC (i.e. sufficient power to run the Mass Storage capability).
- Device is at Device Address 42 and in Configured state.
- MSC Configuration selected.

6.7.5.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send CBW containing SCSI "INQUIRY" command, as per SCSI Primary Command set of INCITS 408-2005 [11].	
2	UICC → T	Return the CSW and SCSI "Standard INQUIRY Data", as per SCSI Primary Command set of INCITS 408-2005 [11].	RQ06_0401 RQ06_0402

6.7.5.2 Test case 2: Removable Media Test

6.7.5.2.1 Test execution

The test procedure shall only be executed if Mass Storage Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing Mass Storage capability. Configurations are identified by index values.

6.7.5.2.2 Initial conditions

- Device connected (no Power Negotiation executed).
- Device is at Device Address 42 and in Configured state.
- MSC Configuration selected.

6.7.5.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send CBW containing SCSI "INQUIRY" command, as per SCSI Primary Command set of INCITS 408-2005 [11].	
2	UICC → T	Return the CSW and SCSI "Standard INQUIRY Data", as per SCSI Primary Command set of INCITS 408-2005 [11]. Check for Removable Medium Bit is set.	RQ06_0401 RQ05_0204
3	T → UICC	Send CBW containing SCSI "Test Unit Ready" command, as per SCSI Primary Command set of INCITS 408-2005 [11].	
4	UICC → T	Return valid CSW with status 1.	RQ06_0401
5	T → UICC	Send CBW containing SCSI "Request Sense" command, as per SCSI Primary Command set of INCITS 408-2005 [11].	
6	UICC → T	Return CSW with Status 0 and Request Sense Data. Verify ASC|ASCQ value is MEDIUM_NOT_PRESENT (ASC = 0x3A, ASCQ = 0x00).	RQ06_0401 RQ05_0204 RQ05_0205
7	T → UICC	Send Get Interface Power Request.	
8	UICC → T	Return Get Interface Power Request Response.	
9	T → UICC	Send Set Interface Power Request with power requested by the UICC.	
10	T → UICC	Send CBW containing SCSI "Test Unit Ready" command, as per SCSI Primary Command set of INCITS 408-2005 [11].	
11	UICC → T	Return valid CSW with status 0.	RQ06_0401 RQ05_0204 RQ05_0205

6.7.5.3 Test case 3: Insufficent Power Capabilities for Mass Storage Test

6.7.5.3.1 Test execution

The test procedure shall only be executed if Mass Storage Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing Mass Storage capability. Configurations are identified by index values.

This test is based on the assumption that 10 mA is not enough for Mass Storage Interface.

6.7.5.3.2 Initial conditions

- Device connected (no Power Negotiation executed).
- Device is at Device Address 42 and in Configured state.
- MSC Configuration selected.

6.7.5.3.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send Get Interface Power Request	
2	UICC → T	Return Get Interface Power Request Response	
3	T → UICC	Send Set Interface Power Request with a power of 10 mA	
4	T → UICC	Send CBW containing SCSI "Test Unit Ready" command, as per SCSI Primary Command set of INCITS 408-2005 [11]	
5	UICC → T	Return valid CSW with status 1	RQ06_0401
6	T → UICC	Send CBW containing SCSI "Request Sense" command, as per SCSI Primary Command set of INCITS 408-2005 [11]	
7	UICC → T	Return CSW with Status 0 and Request Sense Data Verify ASC|ASCQ value is MEDIUM_NOT_PRESENT (ASC = 0x3A, ASCQ = 0x00)	RQ06_0401 RQ05_0204 RQ05_0206

6.7.5.4 Test case 4: Stop Unit Test

6.7.5.4.1 Test execution

The test procedure shall only be executed if Mass Storage Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing Mass Storage capability. Configurations are identified by index values.

6.7.5.4.2 Initial conditions

- Power Negotiation executed with power requested by the UICC (i.e. sufficient power to run the Mass Storage capability).
- Device is at Device Address 42 and in Configured state.
- MSC Configuration selected.

6.7.5.4.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send CBW containing SCSI "Start Stop Unit" command with the following parameter: - POWER CONDITIONS = 0 - LOEJ = 0 - START = 0	
2	UICC → T	Return valid CSW with status 0	RQ06_0401 RQ05_0207

6.7.5.5 Test case 5: MBR Test

6.7.5.5.1 Test execution

The test procedure shall only be executed if Mass Storage Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing Mass Storage capability. Configurations are identified by index values.

6.7.5.5.2 Initial conditions

- Power Negotiation executed with power requested by the UICC (i.e. sufficient power to run the Mass Storage capability).
- Device is at Device Address 42 and in Configured state.
- MSC Configuration selected.

6.7.5.5.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send CBW containing SCSI "Read Capacity" command	
2	UICC → T	Return CSW with Status 0 and Read Capacity Data	RQ06_0401
3	T → UICC	Send CBW containing SCSI "Read(10)" requesting first Sector of unprotected Memory	
4	UICC → T	Return CSW with Status 0 and requested first Sector data	RQ06_0401 RQ06_0403

Annex A (informative): List of test cases for each conformance requirement

RQ number	Test clauses
RQ01_0101	6.4.2.1
RQ01_0201	6.4.2.1
RQ01_0202	not tested in the present document, as it considers non-USB UICC
RQ01_0203	6.7.1.1, 6.7.2.1, 6.7.3.1
RQ01_0301	6.4.2.4
RQ01_0302	6.4.2.1

RQ number	Test clauses
RQ02_0001	6.2.1, 6.2.2
RQ02_0101	6.4.1.1, 6.4.1.2
RQ02_0201	6.4.1.1
RQ02_0202	FFS
RQ02_0301	not tested, as there is no reasonable way to completely prove that the UICC is not damaged

RQ number	Test clauses
RQ03_0101	6.4.2.2
RQ03_0102	6.3.1.1
RQ03_0201	6.3.1.3
RQ03_0202	6.3.1.3
RQ03_0301	6.3.1.2
RQ03_0302	6.3.1.2

RQ number	Test clauses
RQ04_0101	6.4.1.1
RQ04_0102	6.4.1.1
RQ04_0201	6.4.1.1
RQ04_0202	6.4.1.1
RQ04_0203	6.4.1.1, 6.4.2.2, 6.4.2.3, 6.4.2.4
RQ04_0204	6.4.1.2
RQ04_0205	6.4.2.2, 6.4.2.3, 6.4.2.4
RQ04_0206	FFS
RQ04_0207	FFS
RQ04_0208	6.4.2.2, 6.4.2.4
RQ04_0209	6.4.2.1, 6.4.2.5
RQ04_0210	6.4.2.2
RQ04_0211	6.4.2.4
RQ04_0301	6.6.1.1.1, 6.6.1.2.1
RQ04_0302	FFS
RQ04_0303	6.6.1.1.1, 6.6.1.2.1
RQ04_0401	6.4.1.1
RQ04_0402	6.4.2.2, 6.4.2.4
RQ04_0501	6.5.1.1, 6.5.1.3
RQ04_0601	6.7.1.1
RQ04_0701	6.7.2.1, 6.7.3.1
RQ04_0801	FFS
RQ04_0901	6.5.2.1
RQ04_0902	6.5.2.1
RQ04_0903	not tested, as it is not possible to test the remote wake-up without a specific application on the UICC
RQ04_0904	not tested, as it is not possible to test the remote wake-up without a specific application on the UICC
RQ04_0905	6.5.2.1, 6.7.1.1
RQ04_1001	FFS

RQ number	Test clauses
RQ05_0101	6.4.1.1
RQ05_0201	6.5.1.1
RQ05_0202	6.5.1.1
RQ05_0203	6.5.1.2
RQ05_0204	6.7.5.2, 6.7.5.3
RQ05_0205	6.7.5.2
RQ05_0206	6.7.5.3
RQ05_0207	6.7.5.4
RQ05_0208	FFS
RQ05_0301	6.5.2.1
RQ05_0302	6.5.2.1
RQ05_0303	6.5.2.1
RQ05_0401	6.6.1.2.1
RQ05_0402	FFS

Q number	Test clauses
RQ06_0101	6.6.1.2.1, 6.7.2.1
RQ06_0102	6.7.3.1
RQ06_0103	FFS
RQ06_0104	6.7.1.1
RQ06_0201	not testable
RQ06_0202	not testable
RQ06_0301	6.7.4.1
RQ06_0302	not testable
RQ06_0303	not testable
RQ06_0401	6.6.1.3.2, 6.7.5.1, 6.7.5.2, 6.7.5.3, 6.7.5.4, 6.7.5.5
RQ06_0402	6.7.5.1
RQ06_0403	6.7.5.5

RQ number	Test clauses
RQ07_0101	6.6.1.1.1
RQ07_0201	6.6.1.2.1
RQ07_0301	6.6.1.2.1
RQ07_0302	6.6.1.3.1
RQ07_0303	6.6.1.3.2
RQ07_0401	6.6.1.2.1
RQ07_0501	6.6.1.2.1

Annex B (informative): Additional optional test cases for USB ICCD

This annex contains additional tests extending the above mandatory tests.

RQ06_0101 is tested in a more extensive manner than needed in the mandatory section. These additional tests are therefore considered as optional and are provided for those interested.

B.1 USB ICCD Control B

B.1.1 Send XFR_BLOCK with Chaining (ICCD State=Waiting for Command APDU)

B.1.1.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.1.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with 1st 1/3 of "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x01	
2	UICC → T	Return DATA_BLOCK containing no data and bResponseType = 0x10	RQ06_0101
3	T → UICC	Send XFR_BLOCK with 2nd 1/3 of "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x03	
4	UICC → T	Return DATA_BLOCK containing no data and bResponseType = 0x10	RQ06_0101
5	T → UICC	Send XFR_BLOCK with 3rd 1/3 of "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x02	
6	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.1.2 Send DATA_BLOCK with different length (ICCD State=4)

B.1.2.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.2.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00 Requested response length wLength = 0xFFFF	
2	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ06_0101
3	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00 Requested response length wLength = 0x0004	
4	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.1.3 Send valid commands in ICCD State= Ready to receive next command APDU part

B.1.3.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.3.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.3.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x01	
3	UICC → T	Return DATA_BLOCK containing no data and bResponseType = 0x10	RQ06_0101
4	T → UICC	Send SLOT_STATUS request	
5	UICC → T	Return SLOT_STATUS (USB-ICC is present and activated)	RQ06_0101
6	T → UICC	Send ICC_POWER_OFF	
7	T → UICC	Send SLOT_STATUS request	
8	UICC → T	Return SLOT_STATUS (USB-ICC is virtually not present)	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.1.4 Send DATA_BLOCK with different length (ICCD State=3)

B.1.4.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.4.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.4.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x01	
2	UICC → T	Return DATA_BLOCK containing no data and bResponseType = 0x10	RQ06_0101
3	T → UICC	Send XFR_BLOCK with bLevelParameter = 0x03 Requested response length wLength = 0xFFFF	
4	UICC → T	Return DATA_BLOCK containing no data and bResponseType = 0x10	RQ06_0101
5	T → UICC	Send XFR_BLOCK with bLevelParameter = 0x03 Requested response length wLength = 0x0004	
6	UICC → T	Return DATA_BLOCK containing no data and bResponseType = 0x10	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.1.5 Send valid commands in ICCD State= Response APDU partially sent

B.1.5.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.5.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.5.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00	
2	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ06_0101
3	T → UICC	Send XFR_BLOCK with "READ BINARY" and bLevelParameter = 0x00 (expected data length = 10) Requested response length wLength = 0x0004	
4	UICC → T	Return DATA_BLOCK with bResponseType = 0x01	RQ06_0101
5	T → UICC	Send SLOT_STATUS request	
6	UICC → T	Return SLOT_STATUS (USB-ICC is present and activated)	RQ06_0101
7	T → UICC	Send ICC_POWER_OFF	
8	T → UICC	Send SLOT_STATUS request	
9	UICC → T	Return SLOT_STATUS (USB-ICC is virtually not present)	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.1.6 Send XFR Block (ICCD State= Response APDU partially sent)

B.1.6.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.6.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.6.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00	
2	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ06_0101
3	T → UICC	Send XFR_BLOCK with "READ BINARY" and bLevelParameter = 0x00 (expected data length = 10) Requested response length wLength = 0x0004	
4	UICC → T	Return DATA_BLOCK containing first 3 bytes of expected response and bResponseType = 0x01	RQ06_0101
4	T → UICC	Send XFR_BLOCK with bLevelParameter = 0x10 Requested response length wLength = 0x000A	
6	UICC → T	Return DATA_BLOCK containing last 9 bytes of expected response and bResponseType = 0x02	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.1.7 Send valid commands in ICCD State= 5

B.1.7.1 Test execution

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD control B capability. Configurations are identified by index values.

B.1.7.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Control B Configuration selected.
- ICC_POWER_ON sent.

B.1.8.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Send XFR_BLOCK with "SELECT EF" with parameter ICCID (ICC Identification/Identifier '2FE2') and bLevelParameter = 0x00	
2	UICC → T	Return DATA_BLOCK containing expected response (SW = "90 00")	RQ06_0101
3	T → UICC	Send XFR_BLOCK with "READ BINARY" and bLevelParameter = 0x00 (expected data length = 10) Requested response length wLength = 0x0004	
4	UICC → T	Return DATA_BLOCK with bResponseType = 0x01	RQ06_0101
4	T → UICC	Send XFR_BLOCK with bLevelParameter = 0x10	
5	T → UICC	Send SLOT_STATUS request	
6	UICC → T	Return SLOT_STATUS (USB-ICC is present and activated)	RQ06_0101
7	T → UICC	Send ICC_POWER_OFF	
8	T → UICC	Send SLOT_STATUS request	
9	UICC → T	Return SLOT_STATUS (USB-ICC is virtually not present)	RQ06_0101
NOTE: This test verifies that the ICCD Control B transfer is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

B.2 USB ICCD Bulk

B.2.1 Send Icc Power On (ICCD State=Waiting for Command APDU)

B.2.1.1 Test execution

The test procedure shall only be executed if ICCD Bulk Interface is present.

The test procedure shall be performed for each available configuration (as declared in clause 4.3) containing ICCD Bulk capability. Configurations are identified by index values.

B.2.1.2 Initial conditions

- Device is at Device Address 42 and in Configured state.
- ICCD Bulk Configuration selected.
- PC_to_RDR_IccPowerOn sent.

B.2.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	PC_to_RDR_IccPowerOn	
2	UICC → T	STALL	RQ06_0101
NOTE: This test verifies that the ICCD Bulk is present and working, as declared in the configuration descriptor.			

If any USB control transfer request returns "Request Error", this is considered as a failure of the UICC.

Annex C (informative): Additional optional requirements and test cases for Electrical characteristics

This annex contains additional material extending the above mandatory requirements and tests.

Several additional requirements are given here, derived from the Inter-Chip USB [5] and USB 2.0 [4] specifications.

These additional requirements and tests are therefore considered as optional and are provided for those interested.

C.1 Conformance Requirements from Inter-Chip USB and USB 2.0

C.1.1 Full-Speed general conditions

Reference: USB 2.0 [4] (U), clause 7.1. and Inter-Chip USB [5] (IC), clause 1.5.

RQ number	clause	description
RQad_0101	U 7.1.11	The data rate for full-speed is specified at 12,000 Mb/s. The required data-rate accuracy while transmitting shall be ±0.25% (2500 ppm) for the peripheral.
Rqad_0102	U 7.1.13.2	The duration of SE0 of the EOP send by the peripheral shall be within 160 ns and 175 ns for full-speed transmission. This interval already includes timing variations due to rise and fall time mismatches, differential delays in buffer, noise and other random effects.

C.1.2 Electrical Interface for voltage class C' (1,8 V)

Reference: Inter-Chip USB [5] (IC), clause 5.1.4.

RQ number	clause	description
Rqad_0201	IC 5.1.4	The Output High Voltage (V_{OH}) for IC_DP (C4) and IC_DM (C8) shall be greater or equal V_{CC} - 0,45 V for voltage class C' (1,8 V) while the High Level Output Current (I_{OH}) draws -2 mA.
Rqad_0202	IC 5.1.4	The Output Low Voltage (V_{OL}) for IC_DP (C4) and IC_DM (C8) shall be less or equal 0,45 V for voltage class C' (1,8 V) while the Low Level Output Current (I_{OL}) draws 2 mA.
Rqad_0203	IC 5.1.4	The Input High Voltage (V_{IH}) for IC_DP (C4) and IC_DM (C8) shall be within 0,65 * V_{CC} and V_{CC} + 0,3 V for voltage class C' (1,8 V) while the High Level Output Voltage (V_{OH}) is greater or equal V_{CC} - 0,45 V.
Rqad_0204	IC 5.1.4	The Input Low Voltage (V_{IL}) for IC_DP (C4) and IC_DM (C8) shall be within -0,3 V and 0,35 * V_{CC} for voltage class C' (1,8 V) while the Low Level Output Voltage (V_{OL}) is less or equal 0,45 V.

C.1.3 Electrical Interface for voltage class B (3,0 V)

Reference: Inter-Chip USB [5] (IC), clause 5.1.5.

RQ number	clause	description
Rqad_0301	IC 5.1.5	The Output High Voltage (V_{OH}) for IC_DP (C4) and IC_DM (C8) shall be greater or equal V_{CC} - 0,45 V for voltage class B (3,0 V) while the High Level Output Current (I_{OH}) draws -2 mA.
Rqad_0302	IC 5.1.5	The Output Low Voltage (V_{OL}) for IC_DP (C4) and IC_DM (C8) shall be less or equal 0,45 V for voltage class B (3,0 V) while the Low Level Output Current (I_{OL}) draws 2 mA.
Rqad_0303	IC 5.1.5	The Input High Voltage (V_{IH}) for IC_DP (C4) and IC_DM (C8) shall be within 2,0 V and V_{CC} + 0,3 V for voltage class B (3,0 V) while the High Level Output Voltage (V_{OH}) is greater or equal V_{CC} - 0,45 V.
Rqad_0304	IC 5.1.5	Input Low Voltage (V_{IL}) for IC_DP (C4) and IC_DM (C8) shall be within -0,3 V and 0,8 V for voltage class B (3,0 V) while the Low Level Output Voltage (V_{OL}) is less or equal 0,45 V.

C.1.4 Buffer Characteristics

Reference: Inter-Chip USB [5] (IC), clause 9.2.

RQ number	clause	description
Rqad_0401	IC 9.2.2	The output rise time (t_R) and fall time (t_F) shall be within 0 ns and 10 ns on each data line (IC_DP and IC_DM). The rising time (t_R) and falling time (t_F) shall be measured between 10% and 90% of the actual signal swing (V_{OH} - V_{OL}) above V_{OL} .
Rqad_0402	IC 9.2.3	The time-difference between IC_DP crosses V_{CC} / 2 and IC_DM crosses V_{CC} / 2 shall be within 0 ns and 5 ns during J-to-K and K-to-J transitions.

C.1.5 Connection to IC_USB

Reference: Inter-Chip USB [5] (IC), clause 6.3.

RQ number	clause	description
Rqad_0501	IC 6.3 IC 1.5	The state of IC_DP (C4) and IC_DM (C8) shall be undefined, where V_{CC} is less or equal 0,72 V (VMIN).
Rqad_0502	IC 6.3 IC 1.5	The data line status shall be settled to SE0, i.e. IC_DP (C4) and IC_DM (C8) shall be low, where V_{CC} is greater than VMIN = 0,72 V and less than VOP = 1,32 V.
Rqad_0503	IC 6.3 IC 1.5	The peripheral shall not attach, when the voltage V_{CC} - Gnd is less or equal VOP (Voltage Operative). VOP = 1,32 V for class C' and VOP = 2,16 V for class B.
Rqad_0504	IC 6.3 IC 1.5	Within 20 ms after V_{CC} has crossed VOP (1,32 V at voltage class C' and 2,16 V at voltage class B) the peripheral shall pull up the IC_DP (C4) data line.
Rqad_0505	IC 6.3 IC 6.3.2 IC 7	The peripheral shall pull up the IC_DP (C4) data line with first pull up resistor (RPU1) only and RPU1 shall be within 1 kΩ and 3 kΩ.
Rqad_0506	IC 6.3 IC 6.3.2 IC 7	During Reset (within 20 ms after Reset starts by host) the peripheral shall insert second pull up resistor (RPU2) in series with the first pull up resistor (RPU1). RPU shall be within 30 kΩ and 150 kΩ.
Rqad_0507	IC 6.3	When the Reset has completed, the IC_USB shall be idle and its data lines shall merely be driven by terminations on the peripheral side.
Rqad_0508	IC 6.3	After Reset the peripheral shall be ready to receive a first SETUP packet from host after a maximum of 10 ms.
NOTE 1: Rqad_0501 is not testable, because the state is undefined and undefined can't be checked. NOTE 2: Rqad_0503 and Rqad_0504 must only be tested for voltage class C', because TS 102 600 [1] requires that the terminal and the UICC have to support voltage class C' (TS 102 600 [1], clause 7.1). So the attachment must take place at voltage class C'.		

C.1.6 Electrical Characteristics for Currents

Reference: Inter-Chip USB [5] (IC).

RQ number	clause	description
Rqad_0601	IC 8.2 IC 7	When the peripheral is operational, in receiving mode and with disconnected pull-down resistors, the input currents (I_{in}) of the peripheral IC_USB port shall be within -2 µA and 2 µA on IC_DP (C4) and IC_DM (C8) while they are connected to input voltage Gnd or V_{CC}.
Rqad_0602	IC 4.1	On the V_{CC} line the peripheral shall never source a measurable current.
Rqad_0603	IC 4.2 IC 7	Until a USB configuration is set an IC_USB peripheral shall consume less than 8 mA (V_{CC} current I_{CC}_init) from initial power-up (see note 2).
Rqad_0604	IC 7 IC 12.1	The maximum of peripheral power consumption during Suspend (I_{CC}_suspend) is 150 µA for all voltage classes.
NOTE 1: Rqad_0602 is not testable, because what is the definition of a measurable current. Also the peripheral should have no further power connection. NOTE 2: This requirement is more precise than the TS102 600 [1] Requirement RQ04_0401.		

C.1.7 Electrical Characteristics for Capacitive loads

Reference: Inter-Chip USB [5] (IC), clause 7.

RQ number	clause	description
Rqad_0701	IC 7	The Input equivalent load, i.e. the resulting capacitor for IC_DP (C4) pin and IC_DM (C8) pin during receiving, shall be less or equal 7 pF.
Rqad_0702	IC 7	The Input loads mismatch, i.e. the difference between the input equivalent loads, shall be within -1 pF and 1 pF.
Rqad_0703	IC 7	The Output load, i.e. the capacitive load driven by IC_DP (C4) pin and IC_DM (C8) pin during transmitting, shall be less or equal 18 pF.
Rqad_0704	IC 7	The Output loads mismatch, i.e. the difference between the output loads, shall be within -2 pF and 2 pF.
NOTE: Rqad_0703 and Rqad_0704 are no characteristic of the UICC. They are characteristics of the system that is connected with the UICC: The terminal inclusive adapter and other possible components.		

C.2 Additional Electrical test cases

C.2.1 Electrical characteristics during connection to IC_USB

C.2.1.1 Test case 1: Check timings and pull up resistors

C.2.1.1.1 Test execution

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

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

C.2.1.1.2 Initial conditions

- The UICC shall be connected to an Terminal simulator, but none of the contacts is activated.

C.2.1.1.3 Test procedure

Step	Direction	Description	RQ
1	User	Trigger the Terminal to be turned on	
2	T → UICC	Rise Voltage V_{CC} to VOP = 1,32 V (reduced by terminal simulator uncertainty) and wait for 25 ms	
3	UICC	UICC shall not attach: Do not activate pull up resistor on contact IC_DP (C4) or IC_DM (C8). The voltage on both contacts shall be Gnd	Rqad_0502 Rqad_0503
4	T	Rise Voltage V_{CC} up to voltage class C' (1,8V)	
5	T	When Voltage V_{CC} crosses VOP = 1,32 V start Time measuring of t_1	
6	UICC → T	UICC shall attach to terminal by activating the pull up resistor $RPU1_{C4}$ on contact IC_DP (C4) within $t_1 \leq \Delta tp_1 = 20$ ms	Rqad_0504 RQ04_0203
7	T	Measure first pull up Resistor $RPU1_{C4}$ on contact IC_DP (C4)	Rqad_0505
8	T → UICC	Start Reset of UICC, remain 20 ms in SE0 and then end Reset	
9	T	When voltage U_{C4} at contact C4 rises above threshold $V_{OL\ max}$ = 0,45V start Time measuring of t_2	
10	T	Check if IC_BUS state is Idle.	Rqad_0507
11	T → UICC	Start sending SOF as "Keep Alive" signal every 1 ms while $t_2 \leq 3$ ms	
12	T	Measure second pull up Resistor $RPU2_{C4}$ on contact IC_DP (C4)	Rqad_0506
13	T → UICC	When $t_2 = \Delta t6_{max} = 10$ ms send GetDeviceDescriptor()	
14	UICC → T	Start send DeviceDescriptor	Rqad_0508
NOTE: Gnd is reference voltage for all voltage measurements.			

C.2.2 Electrical characteristics during communication

C.2.2.1 Test case 1: Full-Speed Timings and uninfluenced electrical characteristics for voltage class C'

C.2.2.1.1 Test execution

The measurements of this test procedure can be run either against live data of communication between a terminal and an UICC or against pre-recorded data of such communication.

For the analysis an eye-diagram or equivalent measurement-techniques can be used.

The measurements of this test procedure shall only be executed on the data sent by the UICC.

Try to keep the UICC sending data. This can be achieved while terminal is sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time. The UICC has to answer to the command.

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

- For data of contact IC_DP (C4) and contact IC_DM (C8) separately.

C.2.2.1.2 Initial conditions

- Record/monitor data of contact V_{CC} (C1), IC_DP (C4) and IC_DM (C8).
- Set V_{CC} to 1,8 V (voltage class C').
- The USB-interface has been activated for voltage class C' (1,8 V) and next step is the first reset.

C.2.2.1.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Reset UICC after USB-Interface has been activated at voltage class C'	
2	T → UICC	Send GetDeviceDescriptor() with wLength = 8	
3	UICC → T	Send Device-Descriptor	
4	T	Get the maximum of packetsize that the UICC allows (Byte 8 in Device-Descriptor)	
5	T → UICC	Continue communication: Send GetDeviceDescriptor() or better GetConfigurationDescriptor() with wLength = maximum packetsize of UICC and try to keep the UICC sending data (e.g. sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time after UICC has answered the command before	
6	UICC → T	Response to the commands of the terminal	
(7)	(T)	Record communication in particular from UICC as long as enough data is recorded to determine results as precisely as needed: Repeat step 5 up to step 6	
8	User	Determine results against live data or against pre-record data: - Signaling data rate - SE0 width of EOP - Output High Voltage (V_{OH}) if signal is high (see notes 1 and 2) - Output Low Voltage (V_{OL}) if signal is low (see notes 1 and 2) - Output rise time and fall time (see note 2) - Time-difference during J-to-K and K-to-J transistions (see note 2)	Rqad_0101 Rqad_0102 Rqad_0201 Rqad_0202 Rqad_0401 Rqad_0402 RQ03_0102 RQ03_0301 RQ03_0302

NOTE 1: Gnd is reference voltage for all voltage measurements.
NOTE 2: After signal has reached steady state oscillation after signal change from high to low or low to high. Testconditions for High and Low Level Output Current (I_{OH} and I_{OL}) are ignored and tested in another test case.
NOTE 3: Respect actual V_{CC}.

C.2.2.2 Test case 2: Full-Speed Timings and uninfluenced electrical characteristics for voltage class B

C.2.2.2.1 Test execution

The measurements of this test procedure can be run either against live data of communication between a terminal and an UICC or against pre-recorded data of such communication.

For the analysis an eye-diagram or equivalent measurement-techniques can be used.

The measurements of this test procedure shall only be executed on the data sent by the UICC.

Try to keep the UICC sending data. This can be achieved while terminal is sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time. The UICC has to answer to the command.

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

- For data of contact IC_DP (C4) and contact IC_DM (C8) separately.

C.2.2.2.2 Initial conditions

- Record/monitor data of contact V_{CC} (C1), IC_DP (C4) and IC_DM (C8).
- Set V_{CC} to 3,0 V (voltage class B).
- The USB-interface has been activated for voltage class B (3,0 V) and next step is the first reset.

C.2.2.2.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Reset UICC after USB-Interface has been activated at voltage class B	
2	T → UICC	Send GetDeviceDescriptor() with wLength = 8	
3	UICC → T	Send Device-Descriptor	
4	T	Get the maximum of packetsize that the UICC allows (Byte 8 in Device-Descriptor)	
5	T → UICC	Continue communication: Send GetDeviceDescriptor() or better GetConfigurationDescriptor() with wLength = maximum packetsize of UICC and try to keep the UICC sending data (e.g. sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time after UICC has answered the command before	
6	UICC → T	Response to the commands of the terminal	
(7)	(T)	Record communication in particular from UICC as long as enough data is recorded to determine results as precisely as needed: Repeat step 5 up to step 6	
8	User	Determine results against live data or against pre-record data: - Signaling data rate - SE0 width of EOP - Output High Voltage (V_{OH}) if signal is high (see notes 1 and 2) - Output Low Voltage (V_{OL}) if signal is low (see notes 1 and 2) - Output rise time and fall time (see note 2) - Time-difference during J-to-K and K-to-J transistions (see note 2)	Rqad_0101 Rqad_0102 Rqad_0301 Rqad_0302 Rqad_0401 Rqad_0402 RQ03_0102 RQ03_0201 RQ03_0202

NOTE 1: Gnd is reference voltage for all voltage measurements.
NOTE 2: After signal has reached steady state oscillation after signal change from high to low or low to high. Testconditions for High and Low Level Output Current (I_{OH} and I_{OL}) are ignored and tested in another test case.
NOTE 3: Respect actual V_{CC}.

C.2.2.3 Test case 3: Electrical characteristics for voltage class C' at limits

C.2.2.3.1 Test execution

The measurements of this test procedure can be run either against live data of communication between a terminal and an UICC or against pre-recorded data of such communication.

For the analysis an eye-diagram or equivalent measurement-techniques can be used.

The measurements of this test procedure shall only be executed on the data sent by the UICC.

Try to keep the UICC sending data. This can be achieved while terminal is sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time. The UICC has to answer to the command.

First the Output Voltage Levels V_{OH} and V_{OL} are tested. After that the Input Voltage Levels V_{IH} and V_{IL}.

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

- For data of contact IC_DP (C4) and contact IC_DM (C8) separately.

C.2.2.3.2 Initial conditions

- Record/monitor data of contact V_{CC} (C1), IC_DP (C4) and IC_DM (C8).
- Set V_{CC} to 1,8 V (voltage class C').
- Prepare Terminal Simulator / Emulator so that during the UICC sends data and:
  - IC_DP (C4) or IC_DM (C8) is high that it drives 2 mA out of the UICC contact at high level.
  - IC_DP (C4) or IC_DM (C8) is low that it drives 2 mA into the UICC contact.at low level.

- The USB-interface has been activated for voltage class C' (1,8 V) and next step is the first reset.

C.2.2.3.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Reset UICC after USB-Interface has been activated at voltage class C'	
2	T	Prepare for testing Output Voltage Levels (V_{OH} and V_{OL}), see initial conditions	
3	T → UICC	Send GetDeviceDescriptor() with wLength = 8	
4	UICC → T	Send Device-Descriptor	
5	T	Get the maximum of packetsize that the UICC allows (Byte 8 in Device-Descriptor)	
6	T → UICC	Continue communication: Send GetDeviceDescriptor() or better GetConfigurationDescriptor() with wLength = maximum packetsize of UICC and try to keep the UICC sending data (e.g. sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time after UICC has answered the command before	
7	UICC → T	Response to the commands of the terminal	
(8)	(T)	Record communication in particular from UICC as long as enough data is recorded to determine results as precisely as needed: Repeat step 6 up to step 7	
9	T	Set the Output voltage of the Terminal on contact IC_DP (C4) and IC_DM (C8) to following values: $V_{OH} = V_{IH\ min} = 0,65 * V_{CC}$ and $V_{OL} = V_{IL\ max} = 0,35 * V_{CC}$	
10	T → UICC UICC → T	Continue communication with the UICC as mentioned in Step 3 and 4	Rqad_0203 Rqad_0204
11	T	Set the Output voltage of the Terminal on contact IC_DP (C4) and IC_DM (C8) to following values: $V_{OH} = V_{IH\ max} = V_{CC} + 0,3V$ and $V_{OL} = V_{IL\ min} = -0,3V$	
12	T → UICC UICC → T	Continue communication with the UICC as mentioned in Step 3 and 4	Rqad_0203 Rqad_0204
13	User	Determine results against live data or against pre-record data - Output High Voltage (V_{OH}) if signal is high (see notes 1 and 2) - Output Low Voltage (V_{OL}) if signal is low (see notes 1 and 2)	Rqad_0201 Rqad_0202 RQ03_0102 RQ03_0302
NOTE 1: Gnd is reference voltage for all voltage measurements. NOTe 2: After signal has reached steady state oscillation after signal change from high to low or low to high. NOTE 3: Respect actual V_{CC}.			

C.2.2.4 Test case 4: Electrical characteristics for voltage class B at limits

C.2.2.4.1 Test execution

The measurements of this test procedure can be run either against live data of communication between a terminal and an UICC or against pre-recorded data of such communication.

For the analysis an eye-diagram or equivalent measurement-techniques can be used.

The measurements of this test procedure shall only be executed on the data sent by the UICC.

Try to keep the UICC sending data. This can be achieved while terminal is sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time. The UICC has to answer to the command.

First the Output Voltage Levels V_{OH} and V_{OL} are tested. After that the Input Voltage Levels V_{IH} and V_{IL}.

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

- For data of contact IC_DP (C4) and contact IC_DM (C8) separately.

C.2.2.4.2 Initial conditions

- Record/monitor data of contact V_{CC} (C1), IC_DP (C4) and IC_DM (C8).
- Set V_{CC} to 3,0 V (voltage class B).
- Prepare Terminal Simulator / Emulator so that during the UICC sends data and:
  - IC_DP (C4) or IC_DM (C8) is high that it drives 2 mA out of the UICC contact at high level.
  - IC_DP (C4) or IC_DM (C8) is low that it drives 2 mA into the UICC contact.at low level.
- The USB-interface has been activated for voltage class B (3,0 V) and next step is the first reset.

C.2.2.4.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Reset UICC after USB-Interface has been activated at voltage class B	
2	T	Prepare for testing Output Voltage Levels (V_{OH} and V_{OL}), see initial conditions	
3	T → UICC	Send GetDeviceDescriptor() with wLength = 8	
4	UICC → T	Send Device-Descriptor	
5	T	Get the maximum of packetsize that the UICC allows (Byte 8 in Device-Descriptor)	
6	T → UICC	Continue communication: Send GetDeviceDescriptor() or better GetConfigurationDescriptor() with wLength = maximum packetsize of UICC and try to keep the UICC sending data (e.g. sending GetDeviceDescriptor() or GetConfigurationDescriptor() all the time after UICC has answered the command before	
7	UICC → T	Response to the commands of the terminal	
(8)	(T)	Record communication in particular from terminal as long as enough data is recorded to determine results as precisely as needed: Repeat step 6 up to step 7	
9	T	Set the Output voltage of the Terminal on contact IC_DP (C4) and IC_DM (C8) to following values: $V_{OH} = V_{IH\ min} = 2{,}0V$ and $V_{OL} = V_{IL\ max} = 0{,}8V$	
10	T → UICC UICC → T	Continue communication with the UICC as mentioned in Step 3 and 4	Rqad_0303 Rqad_0304
11	T	Set the Output voltage of the Terminal on contact IC_DP (C4) and IC_DM (C8) to following values: $V_{OH} = V_{IH\ max} = V_{CC} + 0{,}3V$ and $V_{OL} = V_{IL\ min} = -0{,}3V$	
12	T → UICC UICC → T	Continue communication with the UICC as mentioned in Step 3 and 4	Rqad_0303 Rqad_0304
13	User	Determine results against live data or against pre-record data - Output High Voltage (V_{OH}) if signal is high (see notes 1 and 2) - Output Low Voltage (V_{OL}) if signal is low (see notes 1 and 2)	Rqad_0301 Rqad_0302 RQ03_0102 RQ03_0202
NOTE 1: Gnd is reference voltage for all voltage measurements. NOTE 2: After signal has reached steady state oscillation after signal change from high to low or low to high. NOTE 3: Respect actual V_{CC}.			

C.2.2.5 Test case 5: Check power consumption I_{CC} and Input current I_{in}

C.2.2.5.1 Test execution

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

- For contact IC_DP (C4) and contact IC_DM (C8) separately.
- For voltage class C' and voltage class B separately

C.2.2.5.2 Initial conditions

- The USB-interface has been activated for voltage class C' (1,8 V) or voltage class B (3,0 V).

C.2.2.5.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Reset UICC	
2	T	Start measuring initial power consumption I_{CC_init} on contact C1 (V_{CC})	
3	T → UICC UICC → T	Continue initial process from GetDeviceDescriptor() to GetConfigurationDescriptor() inclusive.	
4	T	Stop measuring initial power consumption I_{CC_init} and check that I_{CC_init} was less than 8 mA	Rqad_0603
5	T → UICC	Suspend UICC by stopping sending SOFs and start measuring suspend power consumption $I_{CC\_suspend}$ on contact C1 (V_{CC})	
6	T	Check that $I_{CC\_suspend}$ is always less than 150 µA	Rqad_0604
7	T → UICC	Resume and Reset UICC and stop measuring power consumption I_{CC} on contact C1 (V_{CC})	
8	T	After one of the next SOFs is sent measure the input current I_{in} on contact IC_DP (C4) and on contact IC_DM (C8) before the next SOF must be sent	
9	T	Check that the input current $I_{in:}$ - flows into the UICC on contact IC_DP (C4) is less than 2 µA - flows out of the UICC on contact IC_DM (C8) is less than 2 µA	Rqad_0601
10	T	After the next SOF start forcing a K-State (IC_DP (C4) is low and IC_DM (C8) is high) and measure the input current I_{in} on contact IC_DP (C4) and on contact IC_DM (C8)	
11	T	Check that the input current I_{in}: - flows out of the UICC on contact IC_DP (C4) is less than 2 µA - flows into the UICC on contact IC_DM (C8) is less than 2 µA	Rqad_0601
NOTE 1: Measured currents are averaged values (e.g. over 1 ms), because spikes can occure. NOTE 2: To prevent interference use the time between two SOFs for measuring input current I_{in} . NOTE 3: After a SOF the IC_USB shall be in Idle-Mode: Contact IC_DP (C4) is high and contact IC_DM (C8) is low. NOTE 4: Step 10 and 11 check the other flow direction of input current I_{in} on contacts than step 8 and 9.			

C.2.2.6 Test case 6: Check Capacitive loads during transmitting and receiving

C.2.2.6.1 Test execution

It is very likely that the test- and measurement-equipment must be calibrated every time before a new UICC is tested, because the capacitive loads are so low that this equipment and the environmental conditions will influence the results.

So it is very unlikely that this test procedure can be automatized, because the DUT connection has to be broken during calibration.

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

- For voltage class C' and voltage class B.

C.2.2.6.2 Initial conditions

- The test- and measurement-equipment has to be calibrated for the test.
- The USB-interface has been activated for voltage class C' (1,8 V) or voltage class B (3,0 V).

C.2.2.6.3 Test procedure

Step	Direction	Description	RQ
1	T → UICC	Reset UICC after USB-Interface has been activated	
2	T → UICC	Send GetDeviceDescriptor()	
3	T	While the UICC is receiving, measure its input load on contact IC_DP (C4) and IC_DM (C8)	Rqad_0701
4	T	Determine the input load mismatch	Rqad_0702
5	UICC → T	Send the DeviceDescriptor	

Annex D (informative): Bibliography

- "Universal Serial Bus Common Class Specification", Revision 1.0.

NOTE: Available at http://www.usb.org/developers/devclass-docs.

Annex D (informative): Change history

The table below indicates changes that have been incorporated into the present document since it was created by TC SCP.

Change history								
Date	**Meeting**	**TC SCP Doc.**	**CR**	**Rv**	**Cat**	**Subject/Comment**	**Old**	**New**
2010-08	SCP-46	SCP(10)0206	-	-	-	Approval of the specification by TC SCP		7.0.0

History

Document history		
V7.0.0	March 2011	Publication