



**Smart Cards;
UICC-Terminal interface;
Physical and logical characteristics
(Release 17)**

[ETSI TS 102 221 V17.2.0 \(2022-08\)](https://standards.iteh.ai/catalog/standards/sist/75cfac77-1ef7-4886-9505-8bfc65c3eb0e/etsi-ts-102-221-v17-2-0-2022-08)

<https://standards.iteh.ai/catalog/standards/sist/75cfac77-1ef7-4886-9505-8bfc65c3eb0e/etsi-ts-102-221-v17-2-0-2022-08>

Reference

RTS/SET-T102221vh20

Keywords

smart card, embedded, SIM, UICC

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://standards.iteh.ai/> <https://portal.etsi.org/People/CommitteeSupportStaff.aspx> 5-8bfc65c3eb0e/etsi-

If you find a security vulnerability in the present document, please report it through our

Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2022.

All rights reserved.

Contents

Intellectual Property Rights	12
Foreword.....	12
Modal verbs terminology.....	13
Introduction	13
1 Scope	14
2 References	14
2.1 Normative references	14
2.2 Informative references.....	16
3 Definition of terms, symbols, abbreviations and coding conventions.....	16
3.1 Terms.....	16
3.2 Symbols.....	18
3.3 Abbreviations	19
3.4 Coding conventions.....	21
4 Physical characteristics.....	21
4.0a Introduction	21
4.0 UICC Form Factors	21
4.0.0 Generic requirements.....	21
4.0.1 ID-1 UICC	22
4.0.2 Plug-in UICC	22
4.0.3 Mini-UICC.....	22
4.0.4 4FF.....	23
4.1 ID-1 UICC.....	24
4.2 Plug-in UICC.....	24
4.3 Mini-UICC	24
4.4 Environmental conditions for card operation and storage	24
4.4.0 Standard UICC environmental conditions	24
4.4.1 Specific UICC environmental conditions	25
4.4.1.0 Specific UICC environmental conditions indication	25
4.4.1.1 Temperature range for specific UICC environmental conditions.....	25
4.4.1.2 High humidity	25
4.5 Contacts.....	25
4.5.1 Provision of contacts.....	25
4.5.1.1 Terminal.....	25
4.5.1.2 UICC	25
4.5.2 Contact activation and deactivation	26
4.5.2.1 Contacts assigned by the present document.....	26
4.5.2.2 Optional contacts.....	26
4.5.3 Inactive contacts	26
4.5.4 Contact pressure.....	26
5 Electrical specifications of the UICC - Terminal interface	26
5.0a Introduction	26
5.0 General requirements	27
5.1 Class A operating conditions.....	27
5.1.1 Supply voltage Vcc (contact C1)	27
5.1.2 Reset (RST) (contact C2).....	28
5.1.3 Programming voltage Vpp (contact C6)	28
5.1.4 Clock CLK (contact C3).....	28
5.1.5 I/O (contact C7)	29
5.2 Class B operating conditions.....	29
5.2.1 Supply voltage Vcc (contact C1)	29
5.2.2 Reset (RST) (contact C2).....	30
5.2.3 Clock CLK (contact C3).....	30
5.2.4 I/O (contact C7)	30

5.3	Class C operating conditions	31
5.3.1	Supply voltage Vcc (contact C1)	31
5.3.2	Reset (RST) (contact C2)	31
5.3.3	Clock CLK (contact C3)	31
5.3.4	I/O (contact C7)	32
5.4	Class D operating conditions	32
5.4.0	General	32
5.4.1	Supply voltage Vcc (contact C1)	32
5.4.2	Reset (RST) (contact C2)	33
5.4.3	Clock CLK (contact C3)	33
5.4.4	I/O (contact C7)	33
6	Initial communication establishment procedures	34
6.0	Introduction	34
6.1	UICC activation and deactivation	34
6.2	Supply voltage switching	34
6.2.0	UICC activation voltage	34
6.2.1	Supply voltage classes	34
6.2.2	Power consumption of the UICC during ATR	34
6.2.3	Application related electrical parameters	35
6.3	Answer To Reset content	36
6.3.0	Introduction	36
6.3.1	Coding of historical bytes	36
6.3.2	Speed enhancement	36
6.3.3	Global Interface bytes	37
6.4	PPS procedure	37
6.5	Reset procedures	37
6.5.1	Cold reset	37
6.5.2	Warm reset	37
6.5.3	Reaction to resets	38
6.6	Clock stop mode	38
6.7	Bit/character duration and sampling time	38
6.8	Error handling	38
6.9	Compatibility	39
7	Transmission protocols	39
7.0	Introduction	39
7.1	Physical layer	40
7.2	Data link layer	40
7.2.0	Introduction	40
7.2.1	Character frame	40
7.2.1.0	Structure, coding and timing	40
7.2.1.1	Low impedance I/O line behaviour	41
7.2.2	Transmission protocol T = 0	41
7.2.2.0	Introduction	41
7.2.2.1	Timing and specific options for characters in T = 0	41
7.2.2.2	Command header	42
7.2.2.3	Command processing	42
7.2.2.3.0	General description	42
7.2.2.3.1	Procedure bytes	42
7.2.2.3.2	Status bytes	42
7.2.2.4	Error detection and correction	43
7.2.3	Transmission protocol T = 1	43
7.2.3.0	Introduction	43
7.2.3.1	Timing and specific options for blocks sent with T = 1	43
7.2.3.1.0	Introduction	43
7.2.3.1.1	Information field size	43
7.2.3.1.2	Character waiting integer	43
7.2.3.1.3	Character waiting time	44
7.2.3.1.4	Block waiting time	44
7.2.3.1.5	Block guard time	44
7.2.3.1.6	Waiting time extension	44

7.2.3.1.7	Error detection code	44
7.2.3.2	Block frame structure	45
7.2.3.2.0	Overall structure	45
7.2.3.2.1	Prologue field	45
7.2.3.2.2	Epilogue field	47
7.2.3.2.3	Block notations	47
7.2.3.3	Error free operation	48
7.2.3.4	Error handling for T = 1	48
7.2.3.4.0	General description	48
7.2.3.4.1	Protocol initialization	49
7.2.3.4.2	Block dependent errors	49
7.2.3.5	Chaining	49
7.2.3.5.0	Chaining Mechanism	49
7.2.3.5.1	Rules for chaining	50
7.3	Transport layer	50
7.3.0	Introduction	50
7.3.1	Transportation of an APDU using T = 0	50
7.3.1.0	Introduction	50
7.3.1.1	Mapping of APDUs to TPDUs	50
7.3.1.1.0	General behaviour	50
7.3.1.1.1	Case 1	51
7.3.1.1.2	Case 2	51
7.3.1.1.3	Case 3	52
7.3.1.1.4	Case 4	53
7.3.1.1.5	Use of procedure bytes '61xx' and '6Cxx'	54
7.3.2	Transportation of a APDU using T = 1	55
7.3.2.0	General mechanism	55
7.3.2.1	Case 1	55
7.3.2.2	Case 2	55
7.3.2.3	Case 3	56
7.3.2.4	Case 4	56
7.4	Application layer	56
7.4.0	Overall description	56
7.4.1	Exchange of APDUs	57
7.4.2	CAT layer	57
7.4.2.0	Overview	57
7.4.2.1	Proactive command	57
7.4.2.2	ENVELOPE Commands	58
7.4.3	Application execution	58
7.5	Logical secure element Interfaces	59
8	Application and file structure	60
8.0	Introduction	60
8.1	UICC application structure	60
8.2	File types	60
8.2.0	Introduction	60
8.2.1	Dedicated files	61
8.2.2	Elementary files	61
8.2.2.1	Transparent EF	61
8.2.2.2	Linear fixed EF	61
8.2.2.3	Cyclic EF	61
8.2.2.4	BER-TLV structure EF	62
8.3	File referencing	62
8.4	Methods for selecting a file	62
8.4.0	Default state after UICC activation and ATR	62
8.4.1	SELECT by File Identifier referencing	63
8.4.2	SELECT by path referencing	64
8.4.3	Short File Identifier (SFI)	65
8.5	Application characteristics	65
8.5.0	Application selection types	65
8.5.1	Explicit application selection	65
8.5.1.1	SELECT by DF name	65

8.5.1.2	SELECT by partial DF name	66
8.5.2	Application session activation	66
8.5.3	Application session termination.....	66
8.5.4	Application session reset	67
8.5.5	Void.....	67
8.6	Reservation of file Ids	67
8.7	Logical channels.....	68
8.8	Shareable versus not-shareable files.....	69
8.9	Secure channels.....	69
8.10	Logical secure elements	70
9	Security features.....	70
9.0	Introduction	70
9.1	Supported security features	71
9.2	Security architecture.....	71
9.2.0	Overview and basic rules.....	71
9.2.1	Security attributes	71
9.2.2	Access mode	72
9.2.3	Security condition.....	72
9.2.4	Access rules	72
9.2.5	Compact format	72
9.2.6	Expanded format.....	73
9.2.7	Access rule referencing.....	73
9.3	Security environment	74
9.3.0	Description.....	74
9.3.1	Definition of the security environment.....	74
9.3.2	Logical Channels and Security Environment.....	75
9.4	PIN definitions	75
9.4.0	Introduction.....	75
9.4.1	Universal PIN	75
9.4.2	Application PIN	76
9.4.3	Local PIN.....	76
9.4.4	PINs and logical channels.....	76
9.5	PIN and key reference relationship	76
9.5.0	Introduction.....	76
9.5.1	Access condition mapping.....	76
9.5.2	PIN status indication.....	78
9.6	LSE isolation	79
10	Structure of commands and responses	79
10.0	Introduction	79
10.1	Command APDU	79
10.1.0	Structure and case.....	79
10.1.1	Coding of Class Byte	80
10.1.2	Coding of Instruction Byte	81
10.1.3	Coding of parameter bytes.....	82
10.1.4	Coding of Lc byte	82
10.1.5	Coding of data part	82
10.1.6	Coding of Le byte	82
10.2	Response APDU	82
10.2.0	Structure.....	82
10.2.1	Status conditions returned by the UICC	83
10.2.1.0	Introduction.....	83
10.2.1.1	Normal processing	83
10.2.1.2	Postponed processing	83
10.2.1.3	Warnings	83
10.2.1.4	Execution errors	84
10.2.1.5	Checking errors	84
10.2.1.5.0	Base checking errors.....	84
10.2.1.5.1	Functions in CLA not supported	84
10.2.1.5.2	Command not allowed.....	84
10.2.1.5.3	Wrong parameters	85

10.2.1.6	Application errors	85
10.2.2	Status words of the commands	86
10.3	Logical channels.....	88
11	Commands.....	88
11.0	Introduction	88
11.1	Generic commands.....	88
11.1.0	Introduction.....	88
11.1.1	SELECT.....	88
11.1.1.1	Functional description.....	88
11.1.1.2	Command parameters and data	89
11.1.1.3	Response Data.....	90
11.1.1.3.0	Base coding	90
11.1.1.3.1	Response for MF, DF or ADF	90
11.1.1.3.2	Response for an EF.....	90
11.1.1.4	File control parameters.....	91
11.1.1.4.1	File size.....	91
11.1.1.4.2	Total file size	91
11.1.1.4.3	File Descriptor	91
11.1.1.4.4	File identifier	92
11.1.1.4.5	DF name	92
11.1.1.4.6	Proprietary information	93
11.1.1.4.7	Security attributes.....	97
11.1.1.4.8	Short file identifier	99
11.1.1.4.9	Life cycle status integer.....	99
11.1.1.4.10	PIN status template DO	99
11.1.2	STATUS	100
11.1.2.1	Functional description.....	100
11.1.2.2	Command parameters.....	100
11.1.3	READ BINARY	101
11.1.3.1	Functional description.....	101
11.1.3.2	Command parameters.....	101
11.1.4	UPDATE BINARY	101
11.1.4.1	Functional parameters	101
11.1.4.2	Command parameters and data	102
11.1.5	READ RECORD	102
11.1.5.1	Functional description.....	102
11.1.5.2	Command parameters.....	103
11.1.6	UPDATE RECORD	103
11.1.6.1	Functional description.....	103
11.1.6.2	Command parameters and data	104
11.1.7	SEARCH RECORD	104
11.1.7.1	Functional description.....	104
11.1.7.2	Command parameters and data	105
11.1.8	INCREASE.....	106
11.1.8.1	Functional description.....	106
11.1.8.2	Command parameters and data	106
11.1.9	VERIFY PIN	107
11.1.9.1	Functional description.....	107
11.1.9.1.1	PIN verification	107
11.1.9.1.2	PIN retry counter	107
11.1.9.2	Void.....	108
11.1.9.3	Command parameters.....	108
11.1.10	CHANGE PIN	108
11.1.10.1	Functional description.....	108
11.1.10.2	Command parameters.....	109
11.1.11	DISABLE PIN	109
11.1.11.1	Functional description.....	109
11.1.11.2	Command parameters.....	110
11.1.12	ENABLE PIN	110
11.1.12.1	Functional description.....	110
11.1.12.2	Command parameters.....	111

11.1.13	UNBLOCK PIN.....	111
11.1.13.1	Functional description.....	111
11.1.13.1.1	PIN unblocking.....	111
11.1.13.1.2	UNBLOCK PIN retry counter.....	111
11.1.13.2	Void.....	112
11.1.13.3	Command parameters.....	112
11.1.14	DEACTIVATE FILE.....	112
11.1.14.1	Functional description.....	112
11.1.14.2	Command parameters.....	113
11.1.15	ACTIVATE FILE.....	113
11.1.15.1	Functional description.....	113
11.1.15.2	Command parameters.....	113
11.1.16	AUTHENTICATE.....	114
11.1.16.1	Functional description.....	114
11.1.16.2	Command parameters and data	115
11.1.17	MANAGE CHANNEL.....	117
11.1.17.1	Functional description.....	117
11.1.17.2	Command parameters and data	117
11.1.18	GET CHALLENGE.....	118
11.1.18.1	Functional description.....	118
11.1.18.2	Command parameters and data	118
11.1.19	TERMINAL CAPABILITY	118
11.1.19.1	Functional description.....	118
11.1.19.2	Command parameters and data	119
11.1.19.2.0	Base coding	119
11.1.19.2.1	Terminal power supply.....	119
11.1.19.2.2	Extended logical channels terminal support	119
11.1.19.2.3	Additional interfaces support.....	120
11.1.19.2.4	Additional Terminal capability indications related to eUICC	120
11.1.20	MANAGE SECURE CHANNEL.....	121
11.1.20.1	General functional description	121
11.1.20.2	Retrieve UICC Endpoints	122
11.1.20.2.0	Introduction	122
11.1.20.2.1	Functional description	122
11.1.20.2.2	Command parameters and data.....	122
11.1.20.3	Establish SA - Master SA	124
11.1.20.3.0	Introduction	124
11.1.20.3.1	Functional description	124
11.1.20.3.2	Command parameters and data.....	124
11.1.20.4	Establish SA - Connection SA	126
11.1.20.4.0	Introduction	126
11.1.20.4.1	Functional description	126
11.1.20.4.2	Command parameters and data.....	126
11.1.20.5	Establish SA - Start Secure Channel	128
11.1.20.5.0	Introduction	128
11.1.20.5.1	Functional description	128
11.1.20.5.2	Command parameters and data.....	128
11.1.20.6	Terminate Secure Channel SA	130
11.1.20.6.0	Introduction	130
11.1.20.6.1	Functional description	130
11.1.20.6.2	Command parameters and data.....	130
11.1.21	TRANSACTION DATA	132
11.1.21.1	General functional description	132
11.1.21.2	Command parameters and data	132
11.1.22	SUSPEND UICC	134
11.1.22.1	Functional description.....	134
11.1.22.2	UICC suspension.....	135
11.1.22.2.1	Introduction	135
11.1.22.2.2	Functional description	135
11.1.22.2.3	Command parameters and data.....	136
11.1.22.3	UICC resume.....	136
11.1.22.3.1	Introduction	136

11.1.22.3.2	Functional description	136
11.1.22.3.3	Command parameters and data	137
11.1.23	GET IDENTITY	137
11.1.23.1	Functional description	137
11.1.23.2	Command parameters and data	137
11.1.24	EXCHANGE CAPABILITIES	138
11.1.25	MANAGE LSI	138
11.1.25.1	Functional description	138
11.1.25.2	Command parameters and data	139
11.2	CAT commands	141
11.2.1	TERMINAL PROFILE	141
11.2.1.1	Functional description	141
11.2.1.2	Command parameters and data	141
11.2.2	ENVELOPE	141
11.2.2.1	Functional description	141
11.2.2.2	Command parameters and data	142
11.2.3	FETCH	142
11.2.3.1	Functional description	142
11.2.3.2	Command parameters and data	142
11.2.4	TERMINAL RESPONSE	142
11.2.4.1	Functional description	142
11.2.4.2	Command parameters and data	143
11.3	Data Oriented commands	143
11.3.0	Overview and generic mechanism	143
11.3.1	RETRIEVE DATA	144
11.3.1.1	Functional description	144
11.3.1.2	Command parameters and data	145
11.3.2	SET DATA	145
11.3.2.1	Functional description	145
11.3.2.2	Command parameters and data	146
12	Transmission oriented commands	147
12.0	Introduction	147
12.1	T = 0 specific commands	147
12.1.1	GET RESPONSE	147
12.1.1.1	Functional description	147
12.1.1.2	Command parameters	147
13	Application independent files	148
13.0	Introduction	148
13.1	EF _{DIR}	148
13.2	EF _{ICCID} (ICC Identification)	149
13.3	EF _{PL} (Preferred Languages)	150
13.4	EF _{ARR} (Access Rule Reference)	150
13.5	DF _{CD} (Configuration Data)	150
13.5.0	Introduction	150
13.5.1	EF _{LAUNCH PAD}	151
13.5.2	EF _{ICON}	154
13.6	EF _{UMPC} (UICC Maximum Power Consumption)	155
14	Application independent protocol	156
14.0	Introduction	156
14.1	File related procedures	156
14.1.1	Reading an EF	156
14.1.2	Updating an EF	156
14.1.3	Increasing an EF	157
14.2	PIN related procedures	157
14.2.0	Overview	157
14.2.1	PIN verification	157
14.2.2	PIN value substitution	158
14.2.3	PIN disabling	158
14.2.4	PIN enabling	158
14.2.5	PIN unblocking	158

14.3	Application selection procedures	159
14.3.1	Application selection by use of the EF _{DIR} file.....	159
14.3.2	Direct application selection.....	159
14.3.3	Direct application selection with partial AID	159
14.4	General application related procedures	159
14.4.1	Application session activation	159
14.4.2	UICC application interrogation.....	159
14.4.3	UICC application session termination	159
14.5	Miscellaneous procedures	159
14.5.1	UICC activation	159
14.5.2	UICC presence detection	160
14.5.3	UICC preferred language request	160
14.5.4	UICC logical channels.....	160
14.5.5	Power negotiation	160
14.5.6	UICC suspension	160
14.6	CAT related procedures.....	161
14.6.0	Scope of CAT related procedures	161
14.6.1	CAT Initialization procedure	161
14.6.2	Proactive polling.....	161
14.6.3	Support of commands	161
14.6.4	Support of response codes	161
14.6.5	Independence of applications and CAT tasks	161
14.6.6	Use of BUSY status response	161
14.6.7	Additional processing time	162
15	Support of APDU-based UICC applications over USB	162
Annex A (normative):	UCS2 coding of Alpha fields for files residing on the UICC	163
Annex B (informative):	Main states of a UICC	165
Annex C (informative):	APDU protocol transmission examples.....	166
C.1	Exchanges Using T = 0	166
C.1.0	Overview	166
C.1.1	Case 1 command	166
C.1.2	Case 2 command	166
C.1.3	Case 3 command	167
C.1.4	Case 4 command	167
C.1.5	Case 2 commands Using the '61' and '6C' procedure bytes	167
C.1.6	Case 4 command Using the '61' procedure byte	168
C.1.7	Case 4 command with warning condition	168
Annex D (informative):	ATR examples	169
Annex E (informative):	Security attributes mechanisms and examples.....	171
E.1	Coding	171
E.2	Compact format.....	171
E.2.0	Coding	171
E.2.1	AM byte	171
E.2.2	SC byte	171
E.2.3	Examples	172
E.3	Expanded format	172
E.3.0	Coding	172
E.3.1	AM_DO.....	172
E.3.2	SC_DO	172
E.3.3	Access rule referencing	173
E.3.4	Examples	173
Annex F (informative):	Example of contents of EF_{ARR} '2F06'	174
F.1	Sample content of the EF _{ARR}	174

Annex G (informative):	Access Rules Referencing (ARR)	175
G.1	Sample content of EF _{ARR}	175
G.2	Example of access rule referencing with SE ID	178
Annex H (normative):	List of SFI Values assigned in ETSI TS 102 221	179
H.1	List of SFI Values at the MF Level	179
Annex I (informative):	Resets and modes of operation	180
Annex J (informative):	Example of the use of PINs	181
J.1	Application having several ADFs	181
J.2	Two applications with two different security contexts.....	181
Annex K (informative):	Examples of the PIN state transition on multi verification capable UICC	182
K.0	Context	182
K.1	PIN state transition on the single logical channel	182
K.2	PIN state transition between logical channels	184
Annex L (informative):	Examples of SET DATA and RETRIEVE DATA usage	188
L.1	Examples of SET DATA and RETRIEVE DATA usage	188
L.2	Examples of RETRIEVE DATA usage with transport protocol T = 0	189
Annex M (informative):	Examples of ODD AUTHENTICATE instruction code usage	192
M.1	Examples of ODD AUTHENTICATE instruction code usage at applicative level.....	192
M.2	Examples of ODD AUTHENTICATE instruction code usage with transport protocol T = 0.....	193
Annex N (informative):	Change history	196
History		200

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Secure Element Technologies (SET). <https://standards.iteh.ai/catalog/standards/sist/75cfac7-1ef7-4886-9505-8bfc65c3eb0e/etsi-ts-102-221-v17-2-0-2022-08>

It is based on work originally done in the 3GPP in TSG-terminals WG3.

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

Version x.y.z

where:

- x the first digit:
 - 0 early working draft;
 - 1 presented to TC SET for information;
 - 2 presented to TC SET for approval;
 - 3 or greater indicates TC SET approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The present document defines a generic Terminal/Integrated Circuit Card (ICC) interface.

The aim of the present document is to ensure interoperability between an ICC and a terminal independently of the respective manufacturer, card issuer or operator. The present document does not define any aspects related to the administrative management phase of the ICC. Any internal technical realization of either the ICC or the terminal is only specified where these are reflected over the interface.

Application specific details for applications residing on an ICC are specified in the respective application specific documents. The Universal Subscriber Identity Module (USIM)-application for 3G telecommunication networks is specified in ETSI TS 131 102 [2].

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ETSI TS 102 221 V17.2.0 \(2022-08\)](#)

<https://standards.iteh.ai/catalog/standards/sist/75cfacb7-1ef7-4886-9505-8bfc65c3eb0e/etsi-ts-102-221-v17-2-0-2022-08>

1 Scope

The present document specifies the interface between the UICC and the terminal.

The present document specifies:

- the requirements for the physical characteristics of the UICC;
- the electrical interface for exchanging APDUs between the UICC and the terminal, based on ISO/IEC 7816-3 [11];
- the initial communication establishment and the transport protocols for this interface;
- a model which serves as a basis for the logical structure of the UICC APDU interface;
- communication commands and procedures for the UICC APDU interface;
- application independent files and protocols for the UICC APDU interface.

Starting from Release 17, the UICC may support Logical Secure Element interfaces, which allows it to host multiple logical secure elements. A special form of such a Logical Secure Element (LSE) is a logical UICC. Where required, the lower layers which represent the features common to all LSEs are denoted as LSE base. The applicability of the clauses in the present document to either the LSE base or to the logical UICC is given in the introduction of each affected clause.

The administrative procedures, initial card management and optional communication interfaces between the UICC and terminal are not within the scope of the present document.

2 References

2.1 Normative 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 referenced document (including any amendments) applies.

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

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

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

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

- | | |
|-----|---|
| [1] | ETSI TS 123 038: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Alphabets and language-specific information (3GPP TS 23.038)". |
| [2] | ETSI TS 131 102: "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Characteristics of the Universal Subscriber Identity Module (USIM) application (3GPP TS 31.102)". |
| [3] | ETSI TS 101 220: "Smart Cards; ETSI numbering system for telecommunication application providers". |
| [4] | ETSI TS 102 223: "Smart Cards; Card Application Toolkit (CAT)". |
| [5] | Recommendation ITU-T E.118: "The international telecommunication charge card". |

- [6] ISO 639 (all parts): "Codes for the representation of names of languages".
 - [7] ISO/IEC 7810: "Identification cards -- Physical characteristics".
 - [8] ISO/IEC 7811-1: "Identification cards -- Recording technique -- Part 1: Embossing".
 - [9] ISO/IEC 7816-1: "Identification cards -- Integrated circuit cards -- Part 1: Cards with contacts - Physical characteristics".
 - [10] ISO/IEC 7816-2: "Identification cards -- Integrated circuit cards -- Part 2: Cards with contacts - Dimensions and location of the contacts".
 - [11] ISO/IEC 7816-3: "Identification cards -- Integrated circuit cards -- Part 3: Cards with contacts - Electrical interface and transmission protocols".
 - [12] ISO/IEC 7816-4: "Identification cards -- Integrated circuit cards -- Part 4: Organization, security and commands for interchange".
 - [13] Void.
 - [14] Void.
 - [15] Void.
 - [16] Void.
 - [17] ISO/IEC 10646: "Information technology -- Universal Coded Character Set (UCS)".
 - [18] ETSI TS 102 600: "Smart Cards; UICC-Terminal interface; Characteristics of the USB interface".
 - [19] ETSI TS 102 613: "Smart Cards; UICC - Contactless Front-end (CLF) Interface; Physical and data link layer characteristics".
 - [20] ETSI TS 102 484: "Smart Cards; Secure channel between a UICC and an end-point terminal".
 - [21] ETSI TS 102 225: "Smart Cards; Secured packet structure for UICC based applications".
 - [22] ETSI TS 124 008: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008)".
 - [23] JEDEC JESD22-A101D.01: "Steady-State Temperature-Humidity Bias Life Test".
 - [24] OMA-ERELD- Smartcard-Web-Server-V1-1-20090512-A: "Enabler Release Definition for Smartcard-Web-Server". Approved Version 1.1 - 12 May 2009 (OMA).
 - [25] ISO/IEC 15948:2004: "Information technology -- Computer graphics and image processing -- Portable Network Graphics (PNG): Functional specification".
 - [26] IETF RFC 2046: "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types".
- NOTE: Available from <http://www.ietf.org/rfc/rfc2046.txt>.
- [27] ETSI TS 102 671: "Smart Cards; Machine to Machine UICC; Physical and logical characteristics".
 - [28] Void.
 - [29] ETSI TS 102 226: "Smart Cards; Remote APDU structure for UICC based applications".
 - [30] Void.
 - [31] ISO/IEC 9797-1:2011: "Information technology -- Security techniques -- Message Authentication Codes (MACs) -- Part 1: Mechanisms using a block cipher".
 - [32] ETSI TS 102 222: "Integrated Circuit Cards (ICC); Administrative commands for telecommunications applications".
 - [33] GSMA SGP.22: "RSP Technical Specification".