
**Integrated circuit cards — Enhanced
terminal accessibility using cardholder
preference interface**

*Cartes à circuit intégré — Amélioration de l'accès aux terminaux via une
interface d'acquisition des préférences du porteur de carte*

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 12905 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

Introduction

Card system terminals, which are commonly used worldwide in modern society and whose numbers are still growing, do not operate effectively enough for cardholders with special needs or senior citizens because most of those terminals only have uniform man-machine interfaces.

This International Standard aims to improve the man-machine interface through which cardholders interact with terminals by defining a mechanism by which terminal functions can be adjusted to the individual's preferences.

It can help terminal design to be more user-friendly by allowing the cardholder to carry his preferences within his card. This will benefit both ordinary cardholders and those with special needs.

The purpose of this International Standard is to prescribe the contents and the form of unifying assistance information that can be mutually used in international systems to improve interoperability. Moreover, this will benefit manufacturers as currently system developers have to design and fund for each system.

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Integrated circuit cards — Enhanced terminal accessibility using cardholder preference interface

1 Scope

This International Standard specifies a set of data elements to be personalized into an integrated circuit card, encoding cardholder preferences. These data elements are to be retrieved from the card and to be used to indicate to the terminal that the user has special needs regarding the user interface. It is not intended to standardize the actual application programming interface or other terminal-specific software allowing the functionality, nor does it cover the actual alignment of the card to the card-reader slot.

This International Standard is independent of the physical interface and is applicable to situations where the cardholder operates the card-accepting equipment (e.g. a cash dispenser, ticket machine, vending machine). It applies not only to ID-1 type cards, but also to SIM/UIM (ID-000) on mobile phones and form-factor-free contactless integrated circuit cards which are specified in ISO/IEC 14443.

This International Standard comprises:

- data elements containing the user preferences,
- the storage/retrieval formats for input and output of these data elements,
- security related to the information contained in these data elements,
- the access method to these data elements, and
- protection of cardholder information.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 7816-4:2005, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 7816-6:2004, *Identification cards — Integrated circuit cards — Part 6: Interindustry data elements for interchange*

ISO 639-1:2002, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

ISO/IEC 19785-3:2007, *Information technology — Common Biometric Exchange Formats Framework — Part 3: Patron format specifications*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
data element
item of information seen at the interface for which are specified a name, a description of logical content, a format and a coding

[ISO/IEC 7816-4:2005]

3.2
data object
information seen at the interface consisting of the concatenation of a mandatory tag field, a mandatory length field and a conditional value field

[ISO/IEC 7816-4:2005]

3.3
template
set of BER-TLV data objects forming the value field of a constructed BER-TLV data object

[ISO/IEC 7816-4:2005]

3.4
UCI dataset
set of data elements for each cardholder preference

4 Symbols and abbreviated terms

ACR	access control rule
b8..b1	bits one to eight of a byte
BCD	binary coded decimal
DO	data object
ICC	integrated circuit card
PIN	personal identification number
SMS	short message service
TLV	tag, length, value
UCI	universal cardholder information

5 Overview

5.1 Universal Cardholder Information

This standard specifies a set of data elements to be personalized into the card encoding cardholder preferences. A set of data elements is called Universal Cardholder Information (UCI).

The UCI is held on the card, supplied and approved by a cardholder and openly accessible by all. It may be used by the terminal and its applications to provide service in the form required by the cardholder.

The UCI core dataset is intended to be read before the cardholder uses the application. That is, it may be read just after the card is presented to the terminal or just after application selection.

5.2 Flexibility

The UCI should be specified in a flexible manner to cater for existing pre-defined situations, new and as yet undetermined environments (i.e. systems and terminal types), different application scenarios, and provider-specific requirements. UCI should be independent from specific systems or terminals.

In addition, the UCI may be modified either temporarily or permanently by cardholder request, for example, if the cardholder is subject to a change in his / her circumstances.

The implications of this are:

- many of the UCI dataset elements are optional, as determined by the cardholder, where the provision of personal preference information is concerned. Where optional data elements specified in this standard are used, the formats shall be as specified in this standard;
- UCI allows itself to be formally extended through the use of versions and version numbers, as well as informally extended on a case by case basis by providers and implementers who need to supply additional information in a standardised manner;
- a certificate or digital signature may optionally be associated with UCI data to warrant its authenticity and integrity;
- implementation of the on-card UCI application is not confined to its use in IC Cards compliant with ISO/IEC 7816. It may also be implemented on IC Cards compliant with other specifications providing that those cards support the provisions of this standard.

5.3 Privacy of user related information

User privacy is provided as follows:

- the terminal shall not retain the data elements or objects stored on the card;
- a set of the data elements which is used for user preference should not be used for personal identification purposes. It may be linked to the personal information or it may be used without such a link;
- the data elements which are defined in this standard are not intended as a description of any or all of the obstacles faced by cardholders;
- the UCI shall always be available;
- modification of UCI preferences data by user shall require the permission of the cardholder.

6 Requirements for interoperability

6.1 Basic Rules of UCI

The UCI dataset is accessible as chains of constructed data objects (DOs), with access mechanisms specified in this standard. Each constructed DO is known as one UCI Component. Constructed DOs shall use BER-TLV format. Constructed DOs shall use BER-TLV encoding according to ISO/IEC 7816-4.

The UCI dataset is recorded to the individual card for providing customization options when the cardholder uses the terminal (e.g. change the size of characters on screen or change the contrast of the screen). See Annex A for a full list of options.

Annex C shows the relationship between the data objects listed in Annex A and those listed in ISO/IEC 24786, *Information technology — User interfaces — Accessible user interface for accessibility settings* on information devices.

6.2 UCI Structure

There are two types of UCI - Global or Local. Global UCI is common to all applications in an ICC. Local UCI exists in each application file. For the Local UCI, different Access Control Rules (ACRs) may apply. Figure 1 shows the Global UCI and Local UCI.

The Global UCI shall be mandatory for any implementation complying with this standard. In addition, application files may contain application specific user preferences in each Local UCI after a successful application selection.

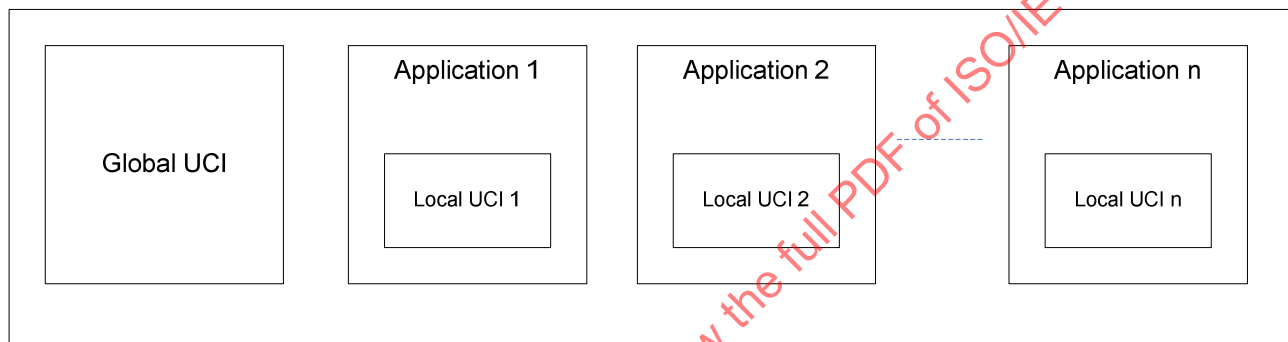


Figure 1 — Global UCI and Local UCI

6.3 Organization of UCI

6.3.1 Organization of Global UCI

The Global UCI shall be constructed as a logical hierarchy of Data Objects, both constructed and primitive (see ISO/IEC 7816-4:2005). A DO with tag '65' shall constitute Global UCI root, meaning that after initialization or after selection of Global UCI, Global UCI shall be accessible directly at the interface as a constructed DO with tag '65'.

Figure 2 illustrates the types of data element specified in Global UCI. It does not show all possible data elements or components.

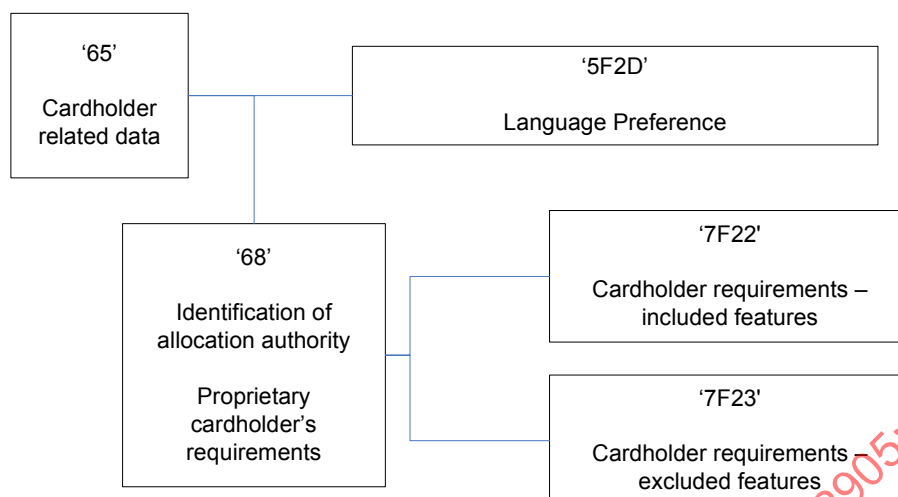


Figure 2 — Global UCI DOs

6.3.2 Organization of Local UCI

Figure 3 illustrates the types of data element specified in Local UCI. It does not show all possible data elements or components. Local UCI may include Tag '68' as root, Tag '7F22' and Tag '7F23'.

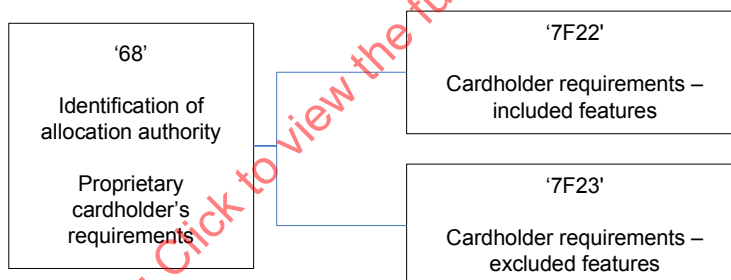


Figure 3 — Local UCI DOs

7 UCI organization and content

7.1 General structure of Global UCI

The Global UCI dataset as seen at the interface (card edge) is held in a card and shall be composed of Components, each of which shall be a single constructed DO identified by a tag as specified in Table 1.

Table 1 — Global UCI Components

Name	Tag	Mandatory Optional	Content
Global UCI	'65'	M	Global Universal Cardholder Information (UCI)
Preferred Language	'5F2D'	M	Cardholder preferred language according to ISO/IEC 7816-6 and ISO 639-1.
Tag allocation authority and proprietary cardholder's requirements	'68'	M	Template containing at least a tag allocation authority (tag '06', '41', '42' or '4F'), and, a data object by which this authority indicates proprietary cardholder's requirements, possibly related to a disability.
Proprietary cardholder's requirements by tag allocation authority.	'70'-'77' Except '73'	O	Non-interindustry DOs defined by a Tag Allocation Authority shall be encapsulated in the template of the DOs '70' to '77', along with a DO which identifies the Tag Allocation Authority.
Cardholder's requirements for included features	'7F22'	O	Data element containing a cardholder's requirements for included features.
Cardholder's requirements for excluded features	'7F23'	O	Data element containing cardholder's requirements for excluded features.

7.2 Global UCI components

Each Global UCI Components DO shall be formatted according to the structure (BER-TLV) and encoding specified in ISO/IEC 7816-6. The Global UCI is made up of DOs of the following sources.

7.2.1 Global UCI, Tag '65'

The Global UCI shall be constructed as a logical hierarchy of DOs, both constructed and primitive (see ISO/IEC 7816-4:2005). A DO with tag '65' shall constitute Global UCI root, meaning that after initialization or after selection of Global UCI, Global UCI shall be accessible directly at the interface as a constructed DO with tag '65'.

7.2.2 Cardholder preferred language, Tag '5F2D'

Language preferences, in desired priority order, to be used, for example, by the terminal to communicate with the Cardholder (display, printer, audio). The first language shall be mandatory. Up to 4 languages may be included. This DO has a variable length with value field of 2-8 bytes. The value field of this data object shall encode the language coded according to ISO 639-1 in 2 bytes. The first (left-most) language coded has highest priority and should be used by the terminal as the default value.

7.2.3 Tag allocation authority and proprietary cardholder's requirements. Tag '68'

Within the UCI Component, the special needs constructed DO (tag '68') template shall contain at least the DOs specified or referenced in this and following sub-clauses, containing the data elements for user preferences for the configuration of the terminal interface and environment. Refer to Annex A for a description of these data elements and to Annex B for a table for the Tags used for the BER-TLV encoding of these data elements.

The template of the DO '68' may in addition contain DOs encoding cardholder special needs defined in other standards or specifications, by using a compatible tag allocation scheme as defined in ISO/IEC 7816-6. The length of the UCI constructed DO is determined by the number of special needs code data elements present, as decided and confirmed by the cardholder.

The template contains at least a tag allocation authority (tag '06', '41', '42' or '4F'), and a DO by which this authority indicates the proprietary cardholder's requirements. The DO identifies the Tag Allocation Authority ('06' for an OID encoding a standard reference, tag '41' Country code (ISO 3166-1) and optional national data, tag '42' Issuer identification number (ISO/IEC 7812-1) and tag '4F' AID).

7.2.4 Proprietary cardholder's requirements, Tag '70'-'77' except '73'

DOs defined by a Tag Allocation Authority other than the present standard shall be encapsulated in the template of the DOs tag '70' to '77', along with a DO which identifies the Tag Allocation Authority (tag '06' for an OID encoding a standard reference, tag '41' national authority, tag '42' Issuer identification number).

7.2.5 Cardholder's requirements for included features, Tag '7F22'

Data element containing a cardholder's requirements for included features e.g. cardholder requires audio assistance from an ATM (automated teller machine).

7.2.6 Cardholder's requirements for excluded features, Tag '7F23'

Data element containing cardholder's requirements for excluded features e.g. cardholder is not able to use fingerprint verification.

7.3 General structure of Local UCI

The Local UCI dataset as seen at the interface (card edge) is held in a card and shall be composed of Components, each of which shall be a single constructed DO identified by a tag as specified in Table 2.

Table 2 — Local UCI Components

Name	Tag	Mandatory Optional	Content
Tag allocation authority and proprietary cardholder's requirements	'68'	M	Template containing at least a tag allocation authority (tag '06', '41', '42' or '4F'), and a DO by which this authority indicates proprietary cardholder's requirements, possibly related to a disability.
Proprietary cardholder's requirements by tag allocation authority.	'70'-'77' Except '73'	O	Non-interindustry DOs defined by a Tag Allocation Authority shall be encapsulated in the template of the DOs tag '70' to '77', along with a DO which identifies the Tag Allocation Authority.
Cardholder's requirements for included features	'7F22'	O	Data element containing a cardholder's requirements for included features.
Cardholder's requirements for excluded features	'7F23'	O	Data element containing cardholder's requirements for excluded features.

7.4 UCI data objects

In addition to DOs described in Table 1, UCI interindustry DOs described in Table 2 may be found within any template of the UCI data set having the meaning defined by ISO/IEC 7816-6. Table 3 shows General use DOs.

Table 3 — General use DOs

DO Name Controls	Tag	Definition and Additional Information
Taglist	'5C'	List of tags of DOs; use to indicate UCI Components to which a management Component applies.
Certificate	'7F21'	Used by the Card or UCI Issuer for traceability (Format not specified in this standard. A Country code is expected to specify the format if required for its UCI Components (tag '7F22' and '7F23'). It may be found within the template of the DO UCI (tag '7F22' and '7F23').
Object Identifier (OID)	'06'	DO identifying for the Tag Allocation Authority.
Discretionary data object	'53'	Use in the UCI for the Component plain text name (e.g. "CEN URI UCI" or "Universal Cardholder Information").
URL	'5F50'	May be used to point to a service provided by a server addressed by URL:
Display Message	'5F45'	Data element containing a message to display.

8 Construction of UCI

8.1 Construction of Global UCI

In a generic scenario, the structure of the template of the DO tag '65' may be of the form as shown in Table 4.

Table 4 — Example construction of Global UCI (Tag '65') General use data objects

Tag	L	Value		
'65'	var	Root of Global UCI Data objects		
		Tag	L	Value
		'5F2D'	var	Language (4 max)
				Language 1
				Language 2
				Language 3
				Language 4
		'68'	var	Tag allocation authority and proprietary cardholder's requirements
				Tag L Value
		'06'	var	Identification for Tag allocation authority. <OID> or '41' <IIN> or '42' <RID>
		'70'	var	Proprietary cardholder's requirement 1 by tag allocation authority.
		'71'	var	Proprietary cardholder's requirement 2 by tag allocation authority.
		'7F22'	var	Cardholder requirements –included features
			T1 L1	V1:Cardholder requirements –included feature 1
			T2 L2	V2:Cardholder requirements –included feature 2
			T3 L3	V3:Cardholder requirements –included feature 3
		'7F23'	var	Cardholder requirements – excluded features
			T1 L1	V1:Cardholder requirements –excluded feature 1
			T2 L2	V2:Cardholder requirements –excluded feature 2

8.2 Construction of Local UCI

In a generic scenario, the structure of the template of the DO '68' may be of the form as shown in Table 5.

Table 5 — Example construction of Local UCI (Tag '68') General use data objects

Tag	L	Value				
'68'	var	Tag allocation authority and proprietary cardholder's requirements				
		Tag	L	Value		
		'06'	var	Identification for Tag allocation authority. <OID> or '41' <IIN> or '42' <RID>		
		'70'	var	Proprietary cardholder's requirement 1 by tag allocation authority.		
		'71'	var	Proprietary cardholder's requirement 2 by tag allocation authority.		
		'7F22'	var	Cardholder requirements –included features		
				T1	L1	V1: Cardholder requirements –included feature 1
				T2	L2	V2: Cardholder requirements –included feature 2
				T3	L3	V3: Cardholder requirements –included feature 3
		'7F23'	var	Cardholder requirements – excluded features		
				T1	L1	V1: Cardholder requirements – excluded feature 1
				T2	L2	V2: Cardholder requirements – excluded feature 2

9 Procedure for reading UCI

Retrieval of the Global UCI components from the IC card may be done using any of the mechanisms described in ISO/IEC 7816-4. If all the procedures described hereafter fail to return the Global UCI components, the card is deemed not to have any Global UCI components.

The setting of Global UCI and Local UCI are out of scope in this standard.

It is not recommended to update and/or add to DOs for Global UCI. It is possible to update and/or add to DOs for the Local UCI. If the same DO(s) exist in both Global and Local UCI, the priority shall be the DO in the local UCI.

Global UCI components specified are either:

- prioritized over any authentication processes which relate to the cardholder. It is accessed freely; or
- accessible upon a successful PIN presentation.

Global UCI components may be stored in the card and accessed either as

- Case 1, a sequence of DOs directly stored in the EF.ATR/INFO file that shall support data object handling; or
- Case 2, single independent application with AID "E8 28 E4 69".

Case 1

Global UCI can be read using a read command function when the Global UCI components are available as a sequence of DOs stored in the EF_ATR/INFO.

Case 2

In case the Global UCI is implemented as an independent application, the implicit selection application is recommended. The UCI AID should be present in the historical bytes ('Fy' (y: length) +AID) or in the initial data string according to ISO/IEC 7816-4. Or, the Global UCI shall be selected using the SELECT DF command using the AID as DF name.

9.1 In case of Global UCI which exists in EF_ATR/INFO (Case 1)

Figure 4 shows the procedure for reading of Global UCI which exists in EF_ATR/INFO. When Global UCI does not exist in EF_ATR/INFO, go to Figure 5 for searching Global UCI.

- 1) Card enabled through contact or contactless interface
- 2) Check UCI_AID in historical byte
 - If UCI_AID exists, go to Case 2 (Select UCI_DF/DO)
 - If UCI_AID does not exist, go to 3.
- 3) Check the Global UCI in an EF_ATR/INFO
 - If the Global UCI exists in an EF_ATR/INFO, then go to 4.
 - If the Global UCI does not exist in EF_ATR/INFO, then go to Case 2 (Select UCI_DF/DO).
- 4) Read Global UCI and go to Selection of Application

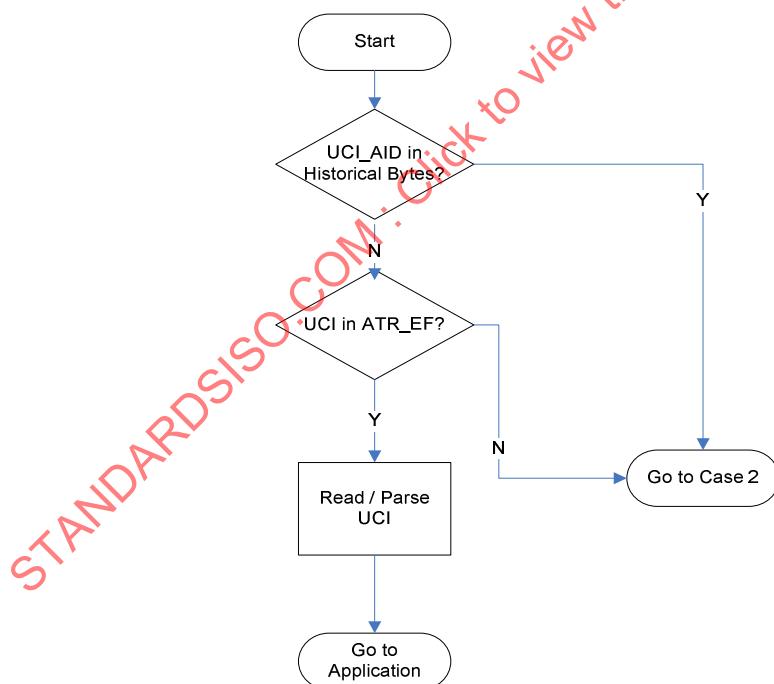


Figure 4 — Case 1: ICC has a UCI in EF_ATR/INFO

9.2 In case of Global UCI which exists in UCI_DF/DO (Case 2)

Figure 5 shows the procedure for reading of Global UCI which exists in UCI_DF. When Global UCI does not exist in ICC, ICC may have UCI in each application file.

- 1) Card enabled through contact or contactless interface or continue from Case 1;
- 2) Select UCI_DF/DO by the AID;
 - If the UCI_DF/DO exists in an ICC, go to 3.
 - If the UCI_DF/DO does not exist in an ICC, go to 5.
- 3) Check the access condition;
 - If the DF/DO has the access condition, clear the access condition and go to 4.
 - If the DF/DO does not have the access condition, go to 4
- 4) Read and parse the Global UCI. Use the information in the UCI to configure the terminal;
- 5) Select an Application;
- 6) Check the Local UCI;
 - If the Local UCI exists in the Application, go to 7.
 - If the Local UCI does not exist in the Application, go to 9.
- 7) Check the access condition;
 - If the DF/DO has the access condition, clear the access condition and go to 8.
 - If the DF/DO does not have the access condition, go to 8
- 8) Read and parse the Local UCI;
- 9) Go to processing the Application.

If there are the same DO(s) in both Global and Local UCI, the priority shall be the DO in the local UCI.



10 Maintenance

It is the intention that every user requirements data object, specified at the time of publication, should be listed in this International Standard. To allow the introduction, deletion or amendment of any data object, ISO/IEC JTC 1/SC 17/WG 4 will review applications for new data objects and will authorize publication of a list of requested data objects accepted by WG 4 on the ISO/IEC JTC 1/SC 17 web site. User requirements data objects published on the SC 17 web site will be incorporated in the next revision of this International Standard.

Annex A (normative)

Data Element Specification for users with special needs

A.1 User interface data objects

A.1.1 General remarks

The goal of each data object in this Annex is to;

- support the cardholder's preferred requirement, and
- enable the support of these functions by the terminal.

Data objects for cardholder's requirements are listed according to their properties. Some of them related to input/output functions are in Clause A.2; others related only to input function in Clause A.3 and others related only to output function in Clause A.4. Detailed coding is given in each clause.

For each data object, the following descriptors may be present:

- purpose (a short description of the use of the given data object);
- format (giving the size of the data object and possibly a symbolic format used to describe the content);
- content (the exact definition for the coding of the data object).

Absence of a data object in the card indicates that no special requirements apply in the area concerned.

Where data objects are not specified by the UCI, it is recommended either to decide each value by reference to ISO/IEC TR 29138 series, or to apply the relevant functionality of the terminal if available.

A.1.2 Principles

The following principles apply to the identification of user preference data objects within this standard:

- 1) user preference DOs are encoded in this standard using contextual class tags according to ISO/IEC 7816-6, which are stored in the tag '7F22' and '7F23' templates. When the same data object exists in each template, the priority should be 'exclude';
- 2) a data element is generally presented in the value field of a data object;
- 3) a data object is the concatenation of the following string of bytes;
 - mandatory tag field, referred to as a tag;
 - mandatory length field indicating the number of bytes of the value field;
 - conditional value field of L bytes (when 'L' is not equal to '00').

A.2 Coding of user requirements

A.2.1 General characteristics

A.2.1.1 Language

Purpose: To indicate up to 4 preferred languages in order of user preference.

Format: 2 alphabetic characters per language.

Content: This element is coded in accordance with ISO 639-1 tag '5F2D' as defined in ISO/IEC 7816-6.

This data object is addressed through the use of tag '5F2D'

NOTE — This sub clause corresponds to "5.4.17 Language" in EN 1332-4:2007.

A.2.1.2 Numeric, time and date presentation

Purpose: To indicate preferred numeric delimiter for showing the decimal point and preferred format for time and date.

Format: 1 byte binary.

Content: The coding of the settings for the numeric presentation byte shall be in accordance with Table A.1.

Table A.1 — Content of numeric, time and date presentation data object ('9F6A')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	x	x	x	Numeric
-	-	-	-	-	0	0	1	Use comma for decimal point
-	-	-	-	-	0	1	0	Use period (fullstop) for decimal point
-	-	-	-	-	1	0	0	Use space for decimal point
-	-	-	-	-	Any other values			Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	x	x	-	-	-	Time
-	-	-	0	1	-	-	-	Use 12 hour clock
-	-	-	1	0	-	-	-	Use 24 hour clock
-	-	-	Any other values		-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	x	-	-	-	-	-	Date presentation data
0	0	1	-	-	-	-	-	Use day, month, year
0	1	0	-	-	-	-	-	Use month, day, year
1	0	0	-	-	-	-	-	Use year, month, day,
Any other values			-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.28 Numeric, time and date presentation" in EN 1332-4:2007.

A.2.2 Special devices

A.2.2.1 SMS communication

Purpose: To indicate the SMS communication required.

Format: 1 byte binary.

Content: The coding of the SMS communication byte shall be in accordance with Table A.2.

Table A.2 — Content SMS communication data object ('9F5F')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	SMS input required
-	-	-	-	-	-	1	-	SMS output required
x	x	x	x	x	x	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.12 SMS communication" in EN 1332-4:2007.

A.3 Coding of user requirements for input

A.3.1 General characteristics

A.3.1.1 Input requirements

Purpose: To indicate the preferred method for input of data into the terminal.

Format: 1 byte binary.

Content: The coding of the input requirements bytes shall be in accordance with Table A.3.

Table A.3 — Content of the input requirements data object ('9F59')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Voice input required
-	-	-	-	-	-	1	-	Keyboard (hard) input required
-	-	-	-	-	1	-	-	Connect special keyboard
-	-	-	-	1	-	-	-	Wireless
-	-	-	1	-	-	-	-	Touchpanel
x	x	x	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE 1 — For SMS input or output. See Table A.2.

NOTE 2 — This sub clause corresponds to "5.4.10 Input requirements" in EN 1332-4:2007.

A.3.1.2 Time-outs

Purpose: To indicate a requirement for additional time beyond the normal time-out to complete user input processes, thus reducing the potential for errors caused by device time-outs.

Format: 1 byte coded as two BCD digits.

Content: The number of seconds of time required before a time-out or a series of time-outs shall come into force.

This data object is addressed through the use of tag '9F5C'.

NOTE — This sub clause corresponds to "5.4.16 Time-outs" in EN 1332-4:2007.

A.3.1.3 Menu selection mode

Purpose: To indicate preferred settings for menu selections.

Format: 1 byte binary.

Content: The coding of the settings for Preferred modes (e.g. select by number rather than highlight) byte shall be in accordance with Table A.4.

Table A.4 — Content of the menu selection data object ('9F73')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Menu selection mode
-	-	-	-	-	-	0	1	Select by highlight
-	-	-	-	-	-	1	0	Select from numbered list
-	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	x	x	x	x	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.35 Menu selection" in EN 1332-4:2007.

A.3.2 Input devices**A.3.2.1 Keyboard characteristics**

Purpose: To indicate the preferred keyboard characteristics.

Format: 2 bytes binary.

Content: The coding of the keyboard characteristics bytes shall be in accordance with Table A.5 and A.6.

Table A.5 — Content of the keyboard characteristics first data object ('9F5E')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	PIN pad top row
-	-	-	-	-	-	0	1	PIN pad top row denotes the digits 1,2,3
-	-	-	-	-	-	1	0	PIN pad top row denotes the digits 7,8,9
-	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	x	x	x			Alphanumeric layout
-	-	-	0	0	1	-	-	Alphanumeric layout (QWERTY)
-	-	-	0	1	0	-	-	Alphanumeric layout (AZERTY)
-	-	-	1	0	0	-	-	Alphanumeric layout (alphabetic order)
-	-	-	Any other values			-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	x	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

Table A.6 — Content of the keyboard input requirements second data object ('9F5E')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Repeat keys (e.g. auto-repeat when held down)
-	-	-	-	-	-	1	-	Chording input (e.g. for Braille)
-	-	-	-	-	1	-	-	Sticky keys
-	-	-	-	1	-	-	-	Debounce
x	x	x	x	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.11 Keyboard characteristics" in EN 1332-4:2007.

A.3.2.2 On-screen keyboard

Purpose: To indicate preferred presentation of an on-screen keyboard.

Format: 1 byte binary.

Content: The coding of the settings for the presentation of an on-screen keyboard byte shall be in accordance with Table A.7.

Table A.7 — Content of the on-screen keyboard data object ('9F69')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	X	Keyboard
-	-	-	-	-	-	0	1	Enhanced keyboard
-	-	-	-	-	-	1	0	Standard keyboard
-	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	x	x	x	x	Layout
-	-	-	-	0	1	-	-	Regular layout
-	-	-	-	1	0	-	-	Block layout
-	-	-	-	Any other values		-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	x	x	-	-	-	-	Keys
-	-	0	1	-	-	-	-	101 keys
-	-	1	0	-	-	-	-	102 keys
-	-	1	1	-	-	-	-	106 keys
-	-	Any other values		-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.27 On-screen keyboard" in EN 1332-4:2007.

A.3.2.3 Touchpanel screen

Purpose: To indicate the preferred layout and icon characteristics for a touch panel screen input device.

Format: 1 byte binary.

Content: The coding of the touchpanel screen byte shall be in accordance with Table A.8.

Table A.8 — Content of the touchpanel screen data object ('9F5A')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
1	-	-	-	-	-	-	-	Do not use touch-panel screen
0	-	-	-	-	-	x	x	Button size
0	-	-	-	-	-	0	1	Large button size required
0	-	-	-	-	-	1	0	Very large button size required
0	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
0	-	-	-	-	0	-	-	Finger entering touch-sensitive area
0	-	-	-	-	1	-	-	Finger exiting touch-sensitive area
x	x	x	x	x	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17 All bits set to zero

In the above table, "button" refers to the target area to be touched on the screen to activate the input. This data object is addressed through the use of tag '9F5A'.

NOTE — This sub clause corresponds to "5.4.14 Touchpanel screen" in EN 1332-4:2007.

A.3.2.4 Pointer buttons

Purpose: To indicate preferred pointer button settings.

Format: 1 byte binary.

Content: The coding of the settings for the pointer buttons byte shall be in accordance with Table A.9.

Table A.9 — Content of the pointer buttons data object ('9F67')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Switch primary and secondary buttons
-	-	-	-	-	x	x	-	Double click speed
-	-	-	-	-	0	1	-	Double click speed – Slow
-	-	-	-	-	1	0	-	Double click speed – Normal
-	-	-	-	-	1	1	-	Double click speed – Fast
-	-	-	-	-	0	0	-	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	1	-	-	-	Turn on Click Lock
x	x	x	x	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.25 Pointer buttons" in EN 1332-4:2007.

A.3.2.5 Pointer characteristics

Purpose: To indicate preferred pointer characteristics.

Format: 1 byte binary.

Content: The coding of the settings for the pointer characteristics byte shall be in accordance with Table A.10.

Table A.10 — Content of the pointer characteristics data object ('9F68')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Pointer speed
-	-	-	-	-	-	0	1	Pointer speed – slow
-	-	-	-	-	-	1	0	Pointer speed – normal
-	-	-	-	-	-	1	1	Pointer speed -fast
-	-	-	-	-	-	0	0	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	-	1	-	-	Snap to
-	-	-	-	1	-	-	-	Display pointer trails
-	-	-	1	-	-	-	-	Hide pointer while typing
-	-	1	-	-	-	-	-	Show location of pointer when designated key (CTRL) is pressed
-	1	-	-	-	-	-	-	Use keypad to move pointer
x	-	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. Bit 8 set to zero

NOTE — This sub clause corresponds to "5.4.26 Pointer characteristics" in EN 1332-4:2007.

A.3.2.6 Scrolling mode

Purpose: To indicate the preferred settings for scrolling mode.

Format: 1 byte binary.

Content: The coding of the preferred settings for scrolling mode (e.g. scrolling wheel, up/down, left/right buttons) and scrolling speed byte shall be in accordance with Table A.11.

Table A.11 — Content of the scrolling mode object ('9F74')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Scrolling/up-down
-	-	-	-	-	-	0	1	Scrolling wheel
-	-	-	-	-	-	1	0	Up / down buttons
-	-	-	-	-	-	1	1	Left / right buttons
-	-	-	-	-	-	0	0	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	x	x	-	-	Speed
-	-	-	-	0	1	-	-	Speed - low
-	-	-	-	1	0	-	-	Speed - normal
-	-	-	-	1	1	-	-	Speed - high
-	-	-	-	0	0	-	-	Reserved for future use by ISO/IEC/JTC 1/SC 17
x	x	x	x	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.36 Scrolling mode" in EN 1332-4:2007.

A.3.2.7 Non-keyboard input requirements

Purpose: To indicate the preferred method for input of data via a non-keyboard into the terminal.

Format: 1 byte binary.

Content: The coding of the input requirements byte shall be in accordance with Table A.12.

Table A.12 — Content of the non-keyboard input requirements data object ('9F6B')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	0	-	-	x	x	x	Voice input required
-	-	0	-	-	0	0	1	Voice input required - letter by letter
-	-	0	-	-	0	1	0	Voice input required - words
-	-	0	-	-	1	0	0	Voice input required - natural language
-	-	0	-	-	any other values			Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	1	-	-	-	Feedback on voice input
-	-	-	1	-	-	-	-	Pointing device
-	-	1	-	-	0	0	0	Voice input required – syllable unit
x	x	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero.

NOTE — This sub clause corresponds to "5.4.13 Non-keyboard input requirements" in EN 1332-4:2007.

A.3.3 Biometrics

A.3.3.1 Biometric characteristics

Purpose: To indicate the preferred biometrics.

Format: 2 + 1-4 x n byte binary.

Content: For people with physical or cultural problems in using specific biometric systems. The coding of the biometric characteristics byte shall be in accordance with Table A.13, A.14, A.15, A.16 and A.17.

Both biometric type and biometric subtype are optional and the required number of pairs shall be specified if the number of biometric instances in the second byte of biometric characteristics is not zero.

Table A.13 — Structure of the biometric characteristics

Tag	Length	Value	Presence
'9F7B'	2	Biometric characteristics. The second byte includes number of biometric instances. See Tables A.14 and A.15.	Mandatory
		Tag	Length
		'82'	1-3
			Value
			Biometric type, see Table A.16.
		'83'	1
			Biometric subtype, see Table A.17.
			Optional, use together with biometric type only

Table A.14 – Content of the biometric characteristics first data object

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Use PIN instead of biometric characteristics
-	-	-	-	-	-	1	-	Use biometric characteristic, not a PIN
-	-	-	-	-	1	-	-	Allow more time to use the biometric
-	-	-	-	1	-	-	-	Declare included biometric instances
-	-	-	1	-	-	-	-	Declare excluded biometric instances
x	x	x	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

Either included (tag '7F22') or excluded (tag '7F23') biometric instances shall be declared. If both bits are set, it shall mean a declaration of the excluded (tag '7F23') ones.

Table A.15 — Content of the biometric characteristics second data object

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
x	x	x	x	x	x	x	x	Number of either included or excluded biometric instances

Table A.16 — Content of the biometric type data object

Abstract value name	Value encoding	Subtype applies
No value available	'00'	
Multiple biometric types	'01'	
Face	'02'	
Voice	'04'	
Finger	'08'	x
Iris	'10'	x
Retina	'20'	x
Hand geometry	'40'	x
Signature/sign	'80'	
Keystroke	'01 00'	
Lip movement	'02 00'	
Thermal face	'04 00'	
Thermal hand	'08 00'	
Gait	'10 00'	
Body odor	'20 00'	
DNA	'40 00'	
Ear	'80 00'	x
Finger geometry	'01 00 00'	
Palm geometry	'02 00 00'	
Vein pattern	'04 00 00'	
Foot print	'08 00 00'	

Table A.17 — Content of the biometric subtype data object ('9F7B')

b8	b7	b6	b5	b4	b3	b2	b1	Biometric subtype
0	0	0	0	0	0	0	0	No information given
-	-	-	-	-	-	0	1	Right
-	-	-	-	-	-	1	0	Left
-	-	-	0	0	0	-	-	No meaning
-	-	-	0	0	1	-	-	Thumb
-	-	-	0	1	0	-	-	Pointer finger
-	-	-	0	1	1	-	-	Middle finger
-	-	-	1	0	0	-	-	Ring finger
-	-	-	1	0	1	-	-	Little finger
x	x	x	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This optional field denotes which sample of the biometric type is to be presented (e.g. right pointer finger). This field is only useful in conjunction with the field biometric type in cases denoted in Table A.16.

The definitions of biometric type and subtype shall be compliant with Table 11.5 and 11.6 in ISO/IEC 19785-3:2007.

A.3.4 Physical characteristics

A.3.4.1 Position of input device

Purpose: To enable automatic height positioning of a data input device to assist users in the entry of information.

Format: 1 byte coded as two BCD digits.

Content: The value of this object denotes the desired height of the centre of the input device in decimetres (multiples of 100 mm) from ground level.

This data object is addressed through the use of tag '9F5B'.

NOTE — This sub clause corresponds to "5.4.15 Position of input device" in EN 1332-4:2007.

A.4 Coding of user requirements for terminal output

A.4.1 Display devices

A.4.1.1 General characteristics

A.4.1.1.1 Screen colour

Purpose: To indicate preferred colours for the presentation of visual information.

Format: 1 byte binary.

Content: The coding of the screen colour byte shall be in accordance with Table A.18.

Table A.18 — Content of the screen colours data object ('9F52')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Use application default colours
-	-	-	-	x	x	x	-	Preferred colour for text according to the values specified below
-	x	x	x	-	-	-	-	Preferred background colour according to the values specified below
1	-	-	-	-	-	-	-	Plain background

Colour coding scheme for text and background:

- 000 : white;
- 001 : red;
- 010 : orange;
- 011 : yellow;
- 100 : green;
- 101 : blue;
- 110 : purple;
- 111 : black.

NOTE 1 — Settings for text and background colours should be different. These colours are just indication and if possible, to use vivid colours should be avoided.

NOTE 2 — This sub clause corresponds to "5.4.3 Screen colour" in EN 1332-4:2007.

A.4.1.1.2 Colour avoidance

Purpose: To indicate specific colours or combination of colours to be avoided when displaying visual information to the user.

Format: 1 byte binary.

Content: The coding of the colour avoidance byte shall be in accordance with Table A.19.

Table A.19 — Content of the colour avoidance data object ('9F53')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	0	0	0	1	Avoid display of information in red
-	-	-	-	0	0	1	0	Avoid red / green colour combination
-	-	-	-	0	1	0	0	Avoid blue / yellow colour combination
-	-	-	-	1	0	0	0	Maximum contrast monochrome
x	x	x	x	-	-	-	-	Reserved for future use by JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.4 Colour avoidance" in EN 1332-4:2007.

A.4.1.1.3 Interface complexity level

Purpose: To indicate the preferred level of complexity for dialogue or text presented to the user.

Format: 1 byte binary.

Content: The coding of the interface complexity level byte shall be in accordance with Table A.20.

Table A.20 — 9F5D Content of the interface complexity level data object

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Dialogue level
-	-	-	-	-	-	0	1	Simplified dialogue level required
-	-	-	-	-	-	1	0	Very simplified dialogue required
						Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	x	x	-	-	Text
-	-	-	-	0	1	-	-	Simplified text required
-	-	-	-	1	0	-	-	Very simplified text required
-	-	-	-	Any other values		-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	x	x	-	-	-	-	Text density
-	-	0	1	-	-	-	-	Low text density required
-	-	1	0	-	-	-	-	Very low text density required
-	-	Any other values		-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. Both bits set to zero

NOTE — This sub clause corresponds to "5.4.18 Interface complexity level" in EN 1332-4:2007.

A.4.1.2 Textual characteristics**A.4.1.2.1 Font**

Purpose: To indicate a requirement for specific type of fonts.

Format: 1 byte binary.

Content: The coding of the preferred style of font byte shall be in accordance with Table A.21.

Table A.21 — Content of the font data object ('9F65')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
1	-	-	-	-	-	-	-	Local language font
-	-	-	-	-	-	-	1	No moving or flashing text
0	-	-	-	-	x	x	-	Serif / sans-serif / mono-spaced font
0	-	-	-	-	0	1	-	Use serif font
0	-	-	-	-	1	0	-	Use sans-serif font
0	-	-	-	-	1	1	-	Use mono-spaced font
0	-	-	-	-	0	0	-	Reserved for future use by ISO/IEC JTC 1/SC 17
0	-	-	-	1	-	-	-	Use BDF
-	x	x	x	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.23 Font" in EN 1332-4:2007.

A.4.1.2.2 Character size

Purpose: This data object enables the preferred size of any text information to be provided to the terminal device.

Format: 1 byte coded as two BCD digits.

Content: The height of characters in millimetres. The width of characters shall be in proportion to the specified height for the particular font being displayed.

This data object is addressed through the use of tag '9F51'.

NOTE — This sub clause corresponds to "5.4.2 Character size" in EN 1332-4:2007.

A.4.1.2.3 Captions (subtitles)

Purpose: To indicate the type of captions.

Format: 1 byte binary.

Content: The coding of the preferred settings for speed of captions, veiling (the level of transparency of the background to the text), and enhanced captions (e.g. include description of sound effects) byte shall be in accordance with Table A.22.

Table A.22 — Content of the captions data object ('9F70')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Maximum speed of presentation
-	-	-	-	-	-	0	1	Maximum speed of presentation - slow
-	-	-	-	-	-	1	0	Maximum speed of presentation - normal
-	-	-	-	-	-	1	1	Maximum speed of presentation - fast
-	-	-	-	-	-	0	0	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	x	x	-	-	Veiling
-	-	-	-	0	1	-	-	Veiling - low
-	-	-	-	1	0	-	-	Veiling - medium
-	-	-	-	1	1	-	-	Veiling - high
-	-	-	-	0	0	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	1	-	-	-	-	Enhanced captions
x	x	x	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.32 Captions (subtitles)" in EN 1332-4:2007.

A.4.1.3 Non-textual characteristics

A.4.1.3.1 Symbols

Purpose: To indicate the preferred method of presentation of visual information, either via text, symbols, Braille or a combination of both.

Format: 1 byte binary.

Content: The content of this field is in accordance with Table A.23.

Table A.23 — Content of the symbols data object ('9F50')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Text required
-	-	-	-	-	-	1	-	Symbols required
-	-	-	-	-	1	-	-	Sign language required
-	-	-	-	1	-	-	-	Braille output required
-	-	-	1	-	-	-	-	The auxiliary information for cardholder preferred local language
x	x	x	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE 1 — If Braille, 'b4', is set the default setting of tag '9F6F' is Grade 1, 6 dot Braille.

NOTE 2 — This sub clause corresponds to "5.4.1 Symbols" in EN 1332-4:2007

A.4.1.3.2 Icons

Purpose: To indicate preferred presentation for icons.

Format: 1 byte binary.

Content: The coding of the icons style byte shall be in accordance with Table A.24.

Table A.24 — Content of the icons data object ('9F66')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Enlarge icons
-	-	-	-	-	-	1	-	Increase contrast
-	-	-	-	-	1	-	-	Show text description
-	-	-	-	1	-	-	-	Use application default colours for symbols
-	x	x	x	-	-	-	-	Preferred colour for symbol according to the values specified below
x	-	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. Bit 8 set to zero

Colour coding scheme for symbols:

- 000 : white;
- 001 : red;
- 010 : orange;
- 011 : yellow;
- 100 : green;
- 101 : blue;
- 110 : purple;
- 111 : black.

NOTE 1 — The symbol colour setting should be different from the background colour set using tag '9F52'. These colours are just indication and if possible, to use vivid colours should be avoided.

NOTE 2 — This sub clause corresponds to "5.4.24 Icons" in EN 1332-4:2007.

A.4.1.3.3 Animation

Purpose: To indicate the preferred settings for animation.

Format: 1 byte binary.

Content: The coding of the preferred settings for the speed of animation byte shall be in accordance with Table A.25.

Table A.25 — Content of the animation object ('9F76')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Turn off animation
-	-	-	-	-	x	x	0	Animation speed
-	-	-	-	-	0	1	0	Animation speed - low
-	-	-	-	-	1	0	0	Animation speed - normal
-	-	-	-	-	1	1	0	Animation speed - fast
-	-	-	-	-	0	0	0	Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	x	x	x	-	-	0	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.37 Animation" in EN 1332-4:2007.

A.4.1.3.4 Visible output of audible prompts

Purpose: To indicate the preferred settings for the visual signal generated to indicate an audible prompt.

Format: 1 byte binary.

Content: The coding of the preferred settings for the visible output of audible prompts byte shall be in accordance with Table A.26.

Table A.26 — Content of the visible output of audible prompts data object ('9F6E')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	0	0	0	1	No visual signal
-	-	-	-	x	x	x	0	Flash
-	-	-	-	0	0	1	0	Flash entire screen
-	-	-	-	0	1	0	0	Flash active window
-	-	-	-	1	0	0	0	Flash title bar of active window
-	-	-	-	Any other values			0	Reserved for future use by ISO/IEC JTC 1/SC 17
-	x	x	x	-	-	-	0	Colour settings for the visible signal when a full screen text mode application generates a sound
x	-	-	-	-	-	-	0	Reserved for future use by ISO/IEC JTC 1/SC 17. Bit 8 set to zero

Colour coding scheme for text and background:

- 000 : white;
- 001 : red;
- 010 : orange;
- 011 : yellow;
- 100 : green;
- 101 : blue;
- 110 : purple;
- 111 : black.

NOTE 1 — These colours are just indication and if possible, to use vivid colours should be avoided.

NOTE 2 — This sub clause corresponds to "5.4.39 Visible output of audible prompts" in EN 1332-4:2007.

A.4.1.3.5 Duration of a visible signal indicating audible output

Purpose: To indicate the duration of the visual signal in seconds when a full screen text mode application generates a sound.

Format: 1 byte coded as two BCD digits.

Content: The value is the duration of the visible signal specified as a number of tenths of a second.

This data object is addressed through the use of tag '9F7A'.

NOTE — This sub clause corresponds to "5.4.40 Duration of a visible signal indicating audible output" in EN 1332-4:2007.

A.4.1.3.6 Screen enhancement software

Purpose: To indicate a requirement for specific screen enhancement software.

Format: 1 byte binary.

Content: The coding of the selection of common settings for the screen enhancement software byte shall be in accordance with Table A.27.

Table A.27 — Content of the screen enhancement software data object ('9F64')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	-	1	Use default magnifying software
-	-	-	-	-	-	1	-	Use other magnifying software
-	-	-	-	-	1	-	-	Follow mouse cursor
-	-	-	-	1	-	-	-	Follow keyboard focus
-	-	-	1	-	-	-	-	Follow text editing
-	x	x	-	-	-	-	-	Magnification
-	0	1	-	-	-	-	-	Magnification - low
-	1	0	-	-	-	-	-	Magnification - medium
-	1	1	-	-	-	-	-	Magnification - high
-	0	0	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
x	-	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. Bit 8 set to zero.

NOTE — This sub clause corresponds to "5.4.22 Screen enhancement software" in EN 1332-4:2007.

A.4.1.4 Special devices

A.4.1.4.1 Braille display

Purpose: To indicate the settings for Braille display.

Format: 1 byte binary.

Content: The coding of Braille display settings byte shall be in accordance with Table A.28.

NOTE 1 — Tag 9F50 should be present and the Braille bit, b4, set.

Table A.28 — Content of the Braille display data object ('9F6F')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Grade
-	-	-	-	-	-	0	1	Grade 1 Braille
-	-	-	-	-	-	1	0	Grade 2 (contracted) Braille
-	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	x	x	-	-	Dot cell
-	-	-	-	0	1	-	-	6 dot cell
-	-	-	-	1	0	-	-	8 dot cell
-	-	-	-	Any other values		-	-	Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	1	-	-	-	-	Mark highlighted text
-	-	1	-	-	-	-	-	Mark bold, italic, underlined and strikeout text
-	1	-	-	-	-	-	-	Mark coloured text
x	-	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. Bit 8 set to zero.

NOTE 2 — This sub clause corresponds to "5.4.31 Braille display" in EN 1332-4:2007.

A.4.1.4.2 Optical Signal

Purpose: To indicate the settings for LED displays

Format: 1 byte coded as two BCD digits

Content: The coding of optical signals shall be in accordance with Table A.29

This data object is addressed through the use of tag '9F7D'

NOTE — Support for *OpticalSignalUnit* is provided in ISO/IEC 24727-4.

Table A.29 — Content of Optical Signal data object ('9F7D')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Signal required
-	-	-	-	-	-	0	1	Static signal required
-	-	-	-	-	-	1	0	Blinking signal required
-	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	-	1	-	-	Signal upon security protocol validation
-	-	-	-	1	-	-	-	Signal to prompt user input
x	x	x	x	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

A.4.1.5 Physical characteristics

A.4.1.5.1 Position of screen

Purpose: To enable automatic height positioning of a screen to assist users in the reading of information.

Format: 1 byte coded as two BCD digits.

Content: The value of this object denotes the desired height of the centre of a visual display in decimetres (multiples of 100mm) relative to the ground or floor level.

This data object is addressed through the use of tag '9F54'.

NOTE — This sub clause corresponds to "5.4.5 Position of screen" in EN 1332-4:2007.

A.4.1.5.2 Angle of screen

Purpose: To enable automatic pitch angle positioning of a screen to assist users in the reading of information.

Format: 1 byte coded as two BCD digits.

Content: The value of this object denotes the desired pitch angle of a visual display in degrees relative to the ground or floor. The plus sign of the pitch angle shall be a screen getting up toward users.

This data object is addressed through the use of tag '9F7C'.

A.4.2 Audible devices

A.4.2.1 General characteristics

A.4.2.1.1 Audio description

Purpose: To indicate the preferred settings for audio description.

Format: 1 byte binary.

Content: The coding of the settings for the level of description (e.g. how detailed is the description) byte shall be in accordance with Table A.30.

Table A.30 — Content of the audio description data object ('9F71')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Level of description
-	-	-	-	-	-	0	1	Level of description - low
-	-	-	-	-	-	1	0	Level of description - normal
-	-	-	-	-	-	1	1	Level of description - high
-	-	-	-	-	-	0	0	Reserved for future use by ISO/IEC JTC 1/SC 17
x	x	x	x	x	x	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.33 Audio description" in EN 1332-4:2007.

A.4.2.2 Textual characteristics**A.4.2.2.1 Screen reader**

Purpose: To indicate a requirement for specific reader software.

Format: 1 byte binary.

Content: The coding of the selection of preferred screen reader byte shall be in accordance with Table A.31.

Table A.31 — Content of the Screen reader data object ('9F61')

b8	b7	b6	b5	b4	b3	b2	b1	Meaning
-	-	-	-	-	-	x	x	Screen reader
-	-	-	-	-	-	0	1	Use default screen reader
-	-	-	-	-	-	1	0	Use other screen reader
-	-	-	-	-	-	Any other values		Reserved for future use by ISO/IEC JTC 1/SC 17
-	-	-	-	-	1	-	-	Announce events on screen
-	-	-	-	1	-	-	-	Speech output of input characters as they are typed
-	-	-	1	-	-	-	-	Move mouse pointer to the active item
-	-	1	-	-	-	-	-	Start narrator minimised
x	x	-	-	-	-	-	-	Reserved for future use by ISO/IEC JTC 1/SC 17. All bits set to zero

NOTE — This sub clause corresponds to "5.4.19 Screen reader" in EN 1332-4:2007.

A.4.2.2.2 Speech rate

Purpose: To indicate a requirement for preferred speech output rate.

Format: 1 byte coded as two BCD digits.

Content: The number of decawords (multiples of ten words) per minute.

This data object is addressed through the use of tag '9F63'.

NOTE — This sub clause corresponds to "5.4.21 Speech rate" in EN 1332-4:2007.

A.4.2.2.3 Speech output of non-alphanumeric characters

Purpose: To indicate preferred speech output of non-alphanumeric characters.

Format: 1 byte binary.

Content: The coding of the settings for the speech output byte shall be in accordance with Table A.32.