TDD Download feature over SMS on Alcatel mobile

Mobile Equipment / Server

Protocol

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Version	Date	Change note
0.1	16/10/01	Creation
0.2	02/11/01	Take into account the remarks of the version 0.1
0.3	09/11/01	Take into account the remarks of the version 0.2
1.0	16/11/01	Take into account the remarks of the version 0.3

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1 Introduction

1.1 Goal

This document aims to define the Alcatel transport protocol used between a mobile station and a server of contents for multimedia data download. This protocol is based on the standard SMS-PP protocol as defined in doc [1] and is named Terminal Data Download (TDD) through the document.

1.2 Reference documents

[1] 3GPP TS 23.040 v4.4.0
[2] 3GPP TS 23.038 "Alphabets and languages" v4.3.0
[3] Data format of Alcatel Mobile v1.0

2 System environment

Alcatel provides tools to convert existing format (gif, midi, etc…) to Alcatel format.

TDD user interface via PC-Internet
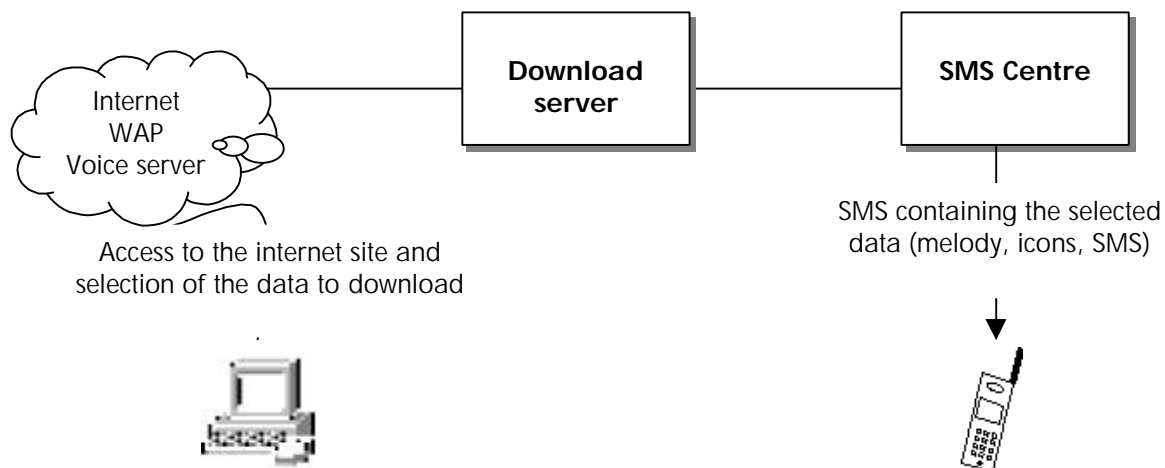
Principle:
The user can access to an Alcatel customer site. He can find on this site the TDD service, which provides the downloading of data toward a specific Alcatel mobile via SMS.

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3 SMS-PP Protocol

3.1 Standard SMS protocol overview

The Alcatel TDD protocol is based on standard SMS messages. This section contains no Alcatel specific information but just gives an overview of the standard SMS protocol.
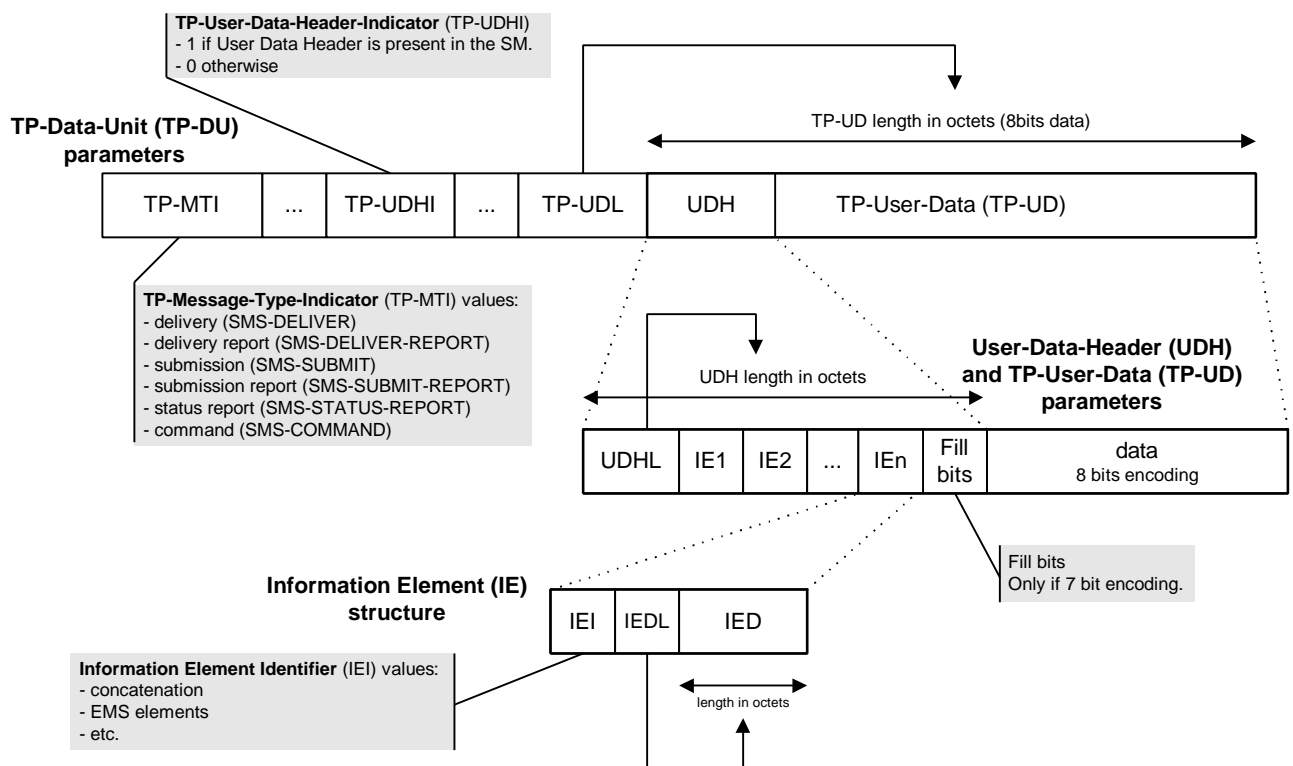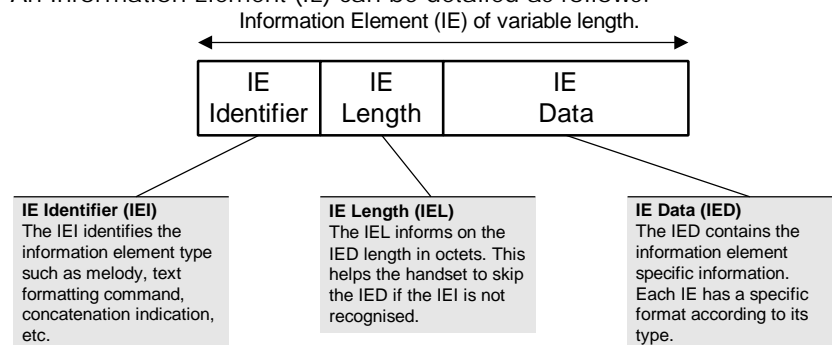
If you already have a good knowledge of standard SMS protocol then you can skip this section and proceed to the next section.

3.1.1 SMS structure summary

The structure of an SMS message is defined in the specification 3GPP 32.040 and can be summarized as follows.

TP-User-Data-Header-Indicator (TP-UDHI)
- 1 if User Data Header is present in the SM.
- 0 otherwise

TP-Data-Unit (TP-DU) parameters

TP-UD length in octets (8bits data)

| TP-MTI | ... | TP-UDHI | ... | TP-UDL | UDH | TP-User-Data (TP-UD) |

TP-Message-Type-Indicator (TP-MTI) values:
- delivery (SMS-DELIVER)
- delivery report (SMS-DELIVER-REPORT)
- submission (SMS-SUBMIT)
- submission report (SMS-SUBMIT-REPORT)
- status report (SMS-STATUS-REPORT)
- command (SMS-COMMAND)

UDH length in octets

User-Data-Header (UDH) and TP-User-Data (TP-UD) parameters

| UDHL | IE1 | IE2 | ... | IEn | Fill bits | data 8 bits encoding |

Fill bits
Only if 7 bit encoding.

Information Element (IE) structure

| IEI | IEDL | IED |

Information Element Identifier (IEI) values:
- concatenation
- EMS elements
- etc.

length in octets

An Information Element (IE) can be detailed as follows:

Information Element (IE) of variable length.

| IE Identifier | IE Length | IE Data |

IE Identifier (IEI)
The IEI identifies the information element type such as melody, text formatting command, concatenation indication, etc.

IE Length (IEL)
The IEL informs on the IED length in octets. This helps the handset to skip the IED if the IEI is not recognised.

IE Data (IED)
The IED contains the information element specific information. Each IE has a specific format according to its type.

For a TDD message, the UDH is always present. Hence TP-UDHI must always be set to 1.

For a TDD message, the UDH contains at least the TDD header information element. This information element is detailed in section 3.2.2.

3.1.2 SMS concatenation

If the data is too big to fit into a single SMS, then the data has to be split across several SMS messages. In that case the UDH also contains a concatenation information element. This concatenation IE indicates to the phone that several SMS actually compose the same message. It gives a message reference, the total number of fragments and the current fragment number.

The concatenation info is coded as follows :

IEI = 00 (1 byte)	IEDL = 03 (1 byte)	IED =	3 bytes : - Message reference number (same value for all segments) - Total number of messages (same value for all segments) - Sequence number of current message (starts at 1)

More information about this concatenation information element can be found in the specification 3GPP 23.040 section 9.2.3.24.1.

3.1.3 Acknowledgments/Billing

The SMS protocol provides an optional acknowledgment between the SMS service center and the phone.

To secure the billing of the service to the end-user, we recommend that you ask for this acknowledgment (if supported by your carrier). This will allow you to charge the end-user only if the phone has correctly received the data.

Also when you send a data to the phone and the phone memory is full, then the phone will send a negative acknowledgment back (if acknowledgment is requested).

3.2 Alcatel TDD protocol

This section gives the Alcatel specifics for implementing the TDD protocol over standard SMS messages.

3.2.1 TPDU Parameters

The TPDU parameters shall be set as follows :

– **TP-UDHI** = 1 (indicates that a TP-UDH is present within the TP-User-Data : mandatory)
– **TP_PID** = 00 (Recommended value for maximum network compatibility. Any other value is also accepted by the mobile)
– **TP-DCS** = F5h (class 1 : recommended, 8 bit-data : mandatory)

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3.2.2 TDD header information element

The UDH must contain the TDD header Information Element (IE) as defined below. In case of concatenation, this IE must be present in all concatenated SMS.

IEI = 80h (Alcatel proprietary value which identify a SMS of "data download" type).

IEDL = length of IED field.

IED :

Length of title/name and coding alphabet (1 byte)
Title/Name (0-n bytes)
Type of data (1 byte)
Length of data (2 bytes)

– **Length of title/name and coding alphabet :**

Bit 8 : coding alphabet used for the title/name
   0 : default GSM alphabet (cf. [2])
   1 : UCS2 (cf. [2]) Not supported now.

Bit 7 - 5 : *unused*

Bit 4 to 1 : length of title/name
The length of title/name shall be given in **number of characters**. Its maximum value is 15 ASCII characters or 12 characters in UCS2.

   Warning:
   - **the length is NOT the number of bytes because the GSM alphabet codes one character on 7 bits (cf. [2]).** Example for the title "Alcatel song". This is a 12 character title. Hence the length of title shall be set to 12. However using the GSM 7bits packed alphabet, this 12 character title will be encoded on 11 bytes. You can find more details about GSM 7bits alphabet in specification 3GPP 23.038 sections 6.1.2.1 and 6.2.1.
   - **The UCS2 codes one character on 2 bytes.**

– **Title/Name**

Title of the melody or name of the picture or SMS template coded with alphabet specified in the previous byte. If the title/name corresponds to a file on the server, the extension characters shall not be present.
   - **The supported ASCII characters are:**
      a – z
      A – Z
      0 – 9
      _ - : ,

      Note : in addition to the characters above, the mobile also supports all the GSM default alphabet characters except:
         '.' value 0x2E
         '/' value 0x2F

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'@'value 0x00

- **The supported UCS2 characters are:**
  Simplified Chinese
  Traditional Chinese
  Arabic
  Russian
  Serbian
  Thai
  Ukrainian
  Bulgare
  Macedonian

  If a character is not supported by the MMI, it is replace by space character.

Now the UCS2 alphabet is not supported for the name.

- **Type of data**

  Bit 8 : indicates if the data can be forwarded to another phone.
  　0 : the data cannot be forwarded
  　1 : the data can be forwarded using EMS

  You should set this flag according to the following:

  - If the data is not EMS compatible then the data cannot be forwarded and this flag shall be set to 0.

  - If the data is copyrighted and you don't want it to be forwarded (even if it is EMS compatible) then set the flag to 0.
  - If the data is EMS compatible and not copyrighted then you can set the flag to 1.

  Bit 7 to 4 : *unused*

  Bit 3 to 1 : indicates the type of data following the TDD header information element
  　000 : iMelody melody (see format in document [3])
  　001 : iAlcatel melody (see format in document [3])
  　010 : MSEQ melody (see format in document [3])
  　011 : VOX melody (see format in document [3])
  　100 : Alcatel picture (see format in document [3])
  　101 : Alcatel animation (see format in document [3])
  　110 : SMS template (see format in document [3])
  　111 : *unused*

- **Length of data**

  Byte 1 : MSB (most significant bit)
  Byte 2 : LSB (less significant bit)

3.2.3 Concatenation information element

This information element is only needed when the data is split over several SMS messages. This is the standard SMS concatenation information element as introduced in section 3.1.2 of this document.

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3.2.4 Data

Following the UDH is the data composing the object sent to the phone (icon, animation, melody, ...) in binary format.
The data formats for the different objects supported by Alcatel phones are defined in document [3].

3.3 Examples

If the data to download to the phone fits in one SMS the TP-UD structure looks as follows:

UDHL	TDD Header Information Element (as defined in section 3.2.2)	Object data in binary format, 8bits encoding

If the data to download to the phone does not fit in one SMS, concatenation information needs to be added in the UDH. For all segments the TP-UD structure looks like:

UDHL	Concatenation IE	TDD Header IE	Object Data in binary format, 8bits encoding

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