



SIEMENS



How to Create EMS Services

Developer Support Guidelines for the Enhanced Messaging Service

Version 1, February 2002

The Enhanced Messaging Service is proving to be the default messaging platform supported by the majority of mobile handset manufacturers and network operators during 2001, and will continue to be so during 2002 and beyond. It builds on the success and technology of SMS, both for messaging and service delivery, to offer users interoperability and richness in messaging through the support of pictures, sounds, animations and text formatting.

This document aims to provide mobile service developers and content providers the information they require in order to carry out the development of compelling content and services for EMS-enabled handsets of the following companies: Alcatel, Motorola, Siemens, Sony Ericsson.

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Chapter 1: 'Why Create EMS Services?' - An Introduction

1.1 General:

Enhanced Messaging Service provides developers and service providers with many rich opportunities to develop and provide compelling content and services that may be accessed from a large base of mobile telephones.

The aim of this document is to introduce you to the service, both from a commercial and a technological point of view. Commercially, this document should provide all of the information that you will require in order to gain an understanding of the benefits of developing to the EMS platform; and technically, the document should provide an authoritative starting point for understanding the basics of EMS and how it is implemented in the mobile telephones of the participating companies.

This document is specifically targeted towards:

- Content Providers and Aggregators
- Service Providers
- Carriers or Network Operators
- Software Developers

But what is EMS, and what does it allow you to do?

EMS may be thought of as an evolution of SMS or 'text messaging' through providing the ability to add multimedia elements (sound, pictures, etc.).

It will enable users to:

- Send an invitation to a friend to go for a cup of coffee by sending a picture of a coffee cup, with animated swirling aroma, and the text: '10 Minutes?'
- Send a simple Birthday message, with a picture of a Birthday cake, the words 'Happy Birthday Tarquin' and the Happy Birthday melody playing.
- Receive a new ring tone purchased from a web site, newspaper advert, etc.
- Communicate anytime, anywhere!!

1.2 Background:

EMS has been incorporated by the 3^d Generation Partnership Project ('3GPP' and, confusingly, involved in technical specification for much more than just 3G technologies) into the Short Messaging Service Standard.

It is an open standard for industry participants to rally to, and it is already supported by Alcatel, Motorola, Siemens, Sony Ericsson and many others. Further, it is now the messaging feature requested in all handsets by the GSMA (the Global System for Mobile Association that is the representative body for the GSM network operators, and hence the most broadly supported network technology globally) in their 'M-Services Guidelines'. These guidelines are used to assist in the development of interoperable, open technology platforms for enablers of applications (such as messaging) in the mobile environment, and specifically targeted towards standardizing requirements for feature support within handsets across vendors in order to facilitate the deployment of mobile services.

This neatly leads us to the commercial opportunities and reasons for developing for EMS handsets:

1. It is a broadly supported open standard, and will provide a massive customer base for the services developed
2. It uses existing infrastructure on operator's networks, hence their investment required to offer EMS is very low. Typically operator's already support the ability to send multiple SMS's as one message, and it is upgrades to their billing systems (to enable EMS to be billed at a particular tariff) that are the only investments required.
3. It has extremely broad support, both from the manufacturers listed above and others, to carry real weight within the industry.
4. EMS will be a durable messaging system due to its use of the SMS bearer, and the attendant benefits for all from consumers understanding of the SMS model (the GSM Association state that 'The worldwide explosion in the text message phenomena - or SMS - had reached around three quarters of a billion messages a day by end September (2001), mobile originated alone').
5. It provides a stepping-stone to the Multimedia Messaging Service (MMS) for users, and will co-exist alongside it in the future.
Today's users of SMS will adapt to EMS immediately, becoming familiar with enriching text messages with multimedia elements in an intuitive manner, and thereby preparing for the change to MMS as a natural evolution of mobile messaging.
6. **EMS-enabled handsets are already shipping in large volumes from e.g. Alcatel, Motorola, Siemens and Sony Ericsson!**

1.3 Understanding the Specifications

This document is not a description of the EMS standards, but attempts to both provide you with the background understanding of the relevant specifications, and the information that you require to delve into deeper depth in the future.

The relevant standards are:

- 3GPP TS 23.040 V4.1.0 (Release 4, 2000-10)
- 3GPP TS 23.040 V4.3.0 (Release 4, 2001-06)
- 3GPP TS 23.040 V4.4.0 (Release 4, 2001-09)
- 3GPP TS 23.040 V4.5.0 (Release 5, 2001-12)

To download these specifications go to:

ftp://ftp.3gpp.org/Specs/2000-10/Rel-4/23_series/
ftp://ftp.3gpp.org/Specs/2001-06/Rel-4/23_series/
ftp://ftp.3gpp.org/Specs/2001-09/Rel-4/23_series/
ftp://ftp.3gpp.org/Specs/2001-12/Rel-5/23_series/

- The sound format supported with EMS is the iMelody format as described in: Infrared Data Association, 'Specifications for Ir Mobile Communications (IrMC) iMelody v1.2'

And may be downloaded from:

<http://www.irda.org/standards/specifications.asp>

These will be reviewed in more detail in Chapter 3.

Although there is broad support for the features detailed within this document, this document is by its very scope and nature general, and all parties are advised to seek detailed information from each manufacturer when developing content and services for their individual products. As an example screen size and the inclusion of specific features may differ between models and manufacturers and there is an obvious risk that content will appear differently. (Please see Chapter 4)

At present Release 5 of the EMS specification is being developed, and should be finalized and issued by 3GPP in March 2002, although products supporting this new feature set will not be available for some time. This document solely focuses on the EMS feature set available now from EMS Release 4 devices.

Please see individual manufacturer's web sites for more detailed information, this document is a guide only, not an EMS content development kit. This document is not to be reproduced or changed without the express permission of the supporting manufacturers.

Chapter 2: 'What can EMS Do?' - A Description of the EMS Features

The Enhanced Messaging Service (EMS) uses standard SMS and allows the user to add fun visual and audible content to their message. For example, simple animations, pictures, melodies, sounds and even formatting of the text itself, everything mixed together seamlessly into one message.

SMS, and therefore EMS, are not actually sent from handset across the mobile network to handset as it appears to users, but instead messages are sent from handsets to a Short Message Service Center (SMSC) resident on the Operator's network, and then on to the receiving handset.

EMS has a 'Store and Forward' model – i.e. messages are forwarded to the receiving handset as soon as it is reachable, and a user does not have to access a network-based inbox to receive messages. Indeed EMS's can be received whilst a handset is making a voice call, browsing the Internet, etc. Further, delivery reporting is also supported to enable a user to check that a message has been successfully delivered.

Therefore, EMS has many advantages as a messaging platform for the mobile world, where convenience and ease of use are key.

2.1 Text Formatting

The following text formatting features are supported:

Alignment

- Left (default)
- Centre
- Right

Font size

- Normal (default)
- Large
- Small

Style

- Normal (default)
- **Bold**
- *Italic*
- Underlined
- ~~Strikethrough~~

2.2 Pictures

Pictures are contained within a single SM (Short Message, or 'segment' if describing an SM that is part of a concatenated message). It is possible to include either small (16*16 pixels), large (32*32 pixels) or pictures of variable size (maximum size 128 Bytes, where width is a multiple of 8 pixels). Larger pictures may be sent from content provider web sites by joining small pictures together using a special "join" message (UPI – user prompt indicator).

EMS Release 4 supports black and white pictures. All pictures are user defined – i.e. although they are either stored on the handset during manufacture, downloaded, or stored from other messages, they are called user-defined as the picture itself is sent over the air (see various 'predefined' media detailed below).

2.3 Animations

There are two different kinds of animations:

Predefined

There are a number of predefined animations. These animations are not sent over the air interface, only the identification of them. Basically the originating terminal sends an instruction to the receiving terminal to play, say, pre-defined animation number 9.

As soon as the position of the animation in the SM data is reached, the animation corresponding to the received number is displayed in a manner which is manufacturer specific. Animations are played as soon they are focused.

There are 6 predefined animations in Release 4.1.0 (0-5) and additional 9 ones as of Release 4.3.0 (0-14). Please find an overview of all these predefined animations below:

Animation	Description
0	I am ironic, flirty
1	I am glad
2	I am sceptic
3	I am sad
4	WOW!
5	I am crying
6	I am winking
7	I am laughing
8	I am indifferent
9	In love/ kissing

Please see individual manufacturer's web sites for more detailed information, this document is a guide only, not an EMS content development kit. This document is not to be reproduced or changed without the express permission of the supporting manufacturers.

10	I am confused
11	Tongue hanging out
12	I am angry
13	Wearing glasses
14	Devil

User Defined

The user-defined animations consist of 4 frames or pictures that are sent over the air interface. Two different sizes of animations are supported - small animations are 8 x 8 pixels and the large 16 x 16 pixels.

2.4 Sounds

These may be inserted into text messages to provide audible indications and experiences to the recipient. When they are received, they are played by the receiving handset at an appropriate point in the message.

Predefined

There are a number of predefined sounds. These sounds are not transferred over the air interface, only the identification of them. There are 10 different sounds that can be added in the message, and as soon as the sound mark is in focus (on the display), the sound will be played.

Below please find an overview of all these predefined sounds:

Sound	Description
0	Chimes high
1	Chimes low
2	Ding
3	Ta Da
4	Notify
5	Drum
6	Claps
7	Fan Fare
8	Chords high
9	Chords low

Please see individual manufacturer's web sites for more detailed information, this document is a guide only, not an EMS content development kit. This document is not to be reproduced or changed without the express permission of the supporting manufacturers.

User Defined

User defined sounds are sent over the air interface. They are monophonic only, use the iMelody format, and have a maximum length of 128 Bytes (without the use of the UPI, see section 2.6).

2.5 Concatenation

The EMS Standard includes the support for concatenated messages – the ability for the handset to automatically combine several Short Messages. This feature is extremely useful because of the restrictions on the amount of information that an SMS can carry - in GSM the amount of information that can be carried within an SMS is only 140 bytes.

The handset is therefore able to both send and receive longer, richer messages. The Standard allows up to 255 messages to be concatenated into one, however, current phones support anywhere between 3 and 10 segments, and each handset should be investigated for its level of support.

2.6 User Prompt Indicator

This feature introduced in 3GPP TS 23.040 Release 4 allows handsets to stitch pictures and user-defined sounds. It also allows the user to be prompted upon reception of the message to execute media specific actions (storage, handset personalisation, etc.). UPI is typically used by content providers when they send content to users. Please refer to tables in chapter 4 for more information about which products support this feature.

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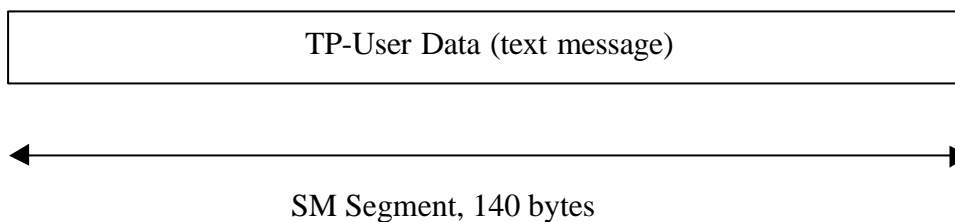
As mentioned previously, EMS is based on the standard mechanisms in GSM SMS (see Chapter **1.3 Understanding the Specifications**).

The use of the Transfer Protocol User Data Header (TP-UDH) enables the use of binary data in a normal Short Message (SM) prior to the text itself. The binary data (the object such as a picture or sound) consumes part of the 140 byte 'payload' within the SM (in GSM).

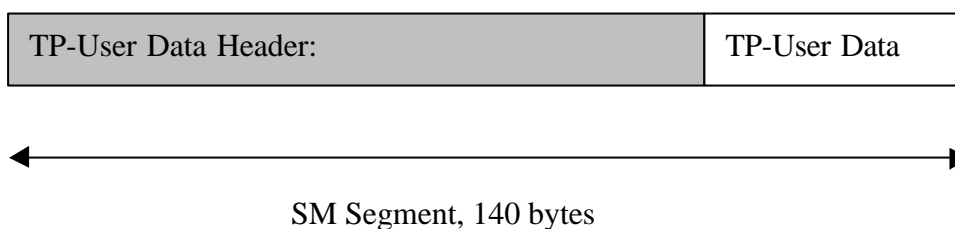
*(All quotations below are taken from the 3GPP TS 23.040 V4.3.0.
The information provided is for guidance only.
Please consult the relevant standards for a definitive interpretation.)*

This is represented pictorially below:

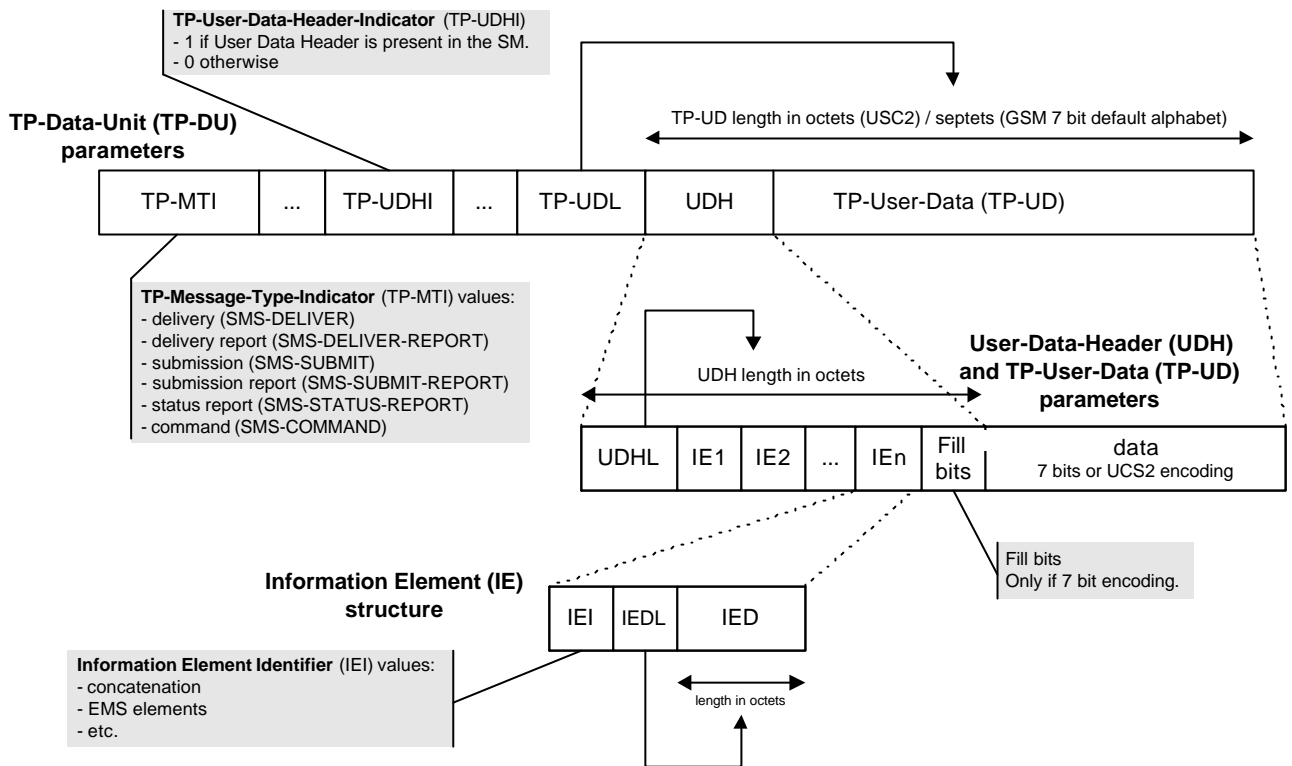
'Standard' SMS:



Enhanced Message:



More formally, at the application level, a short message is manipulated in the form of a Transport Protocol Data Unit (TPDU). The TPDU is a sequence of parameters containing information such as the class of the message, the length, embedded EMS elements and associated text. The structure of a TPDU is shown overleaf:



3.1 General TPDU Parameters

The TPDU parameters shall be set as follows:

- **TP-UDHI** = 1 (indicates that a User Data Header is present within the TP-User-Data : mandatory)
- **TP-PID** = (anything defined for SMS : 00 recommended)
- **TP-DCS** = "UCS2 (16 bits)" or "GSM 7 bit default alphabet"

The definition of the TP User-Data-Length (TP-UDL) field, which immediately precedes the "User Data Header Length (UDHL)", is unchanged and shall therefore be the total length of the TP-User-Data field including the Header, if present.

3.2 TP-User-Data

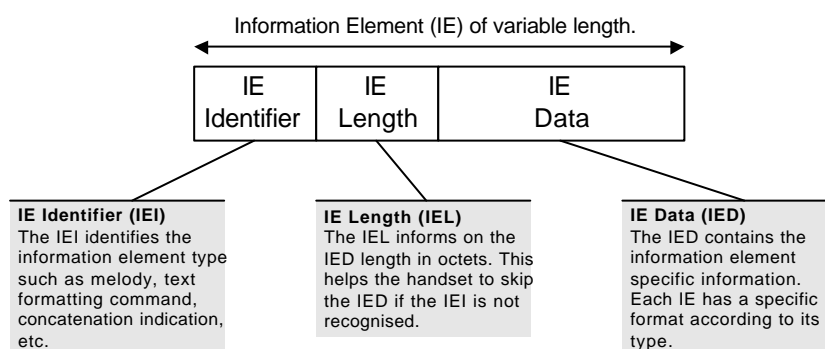
3.2.1 User Data Header

The User Data Header is composed of:

- the User Data Header Length (UDHL)
- followed by one or several Information Elements.

"The UDHL field shall be the integer representation of the number of octets within the "User-Data-Header" information fields which follow and shall not include itself in its count or any fill bits which may be present."

Information elements may appear in any order.



The Information Element Identifier octet shall be coded as follows:

VALUE (hex)	MEANING
00	Concatenated short messages, 8-bit reference number
08	Concatenated short message, 16-bit reference number
	Reserved for SMS use.
0A	Text Formatting
0B	Predefined Sound
0C	User Defined Sound (iMelody max 128 bytes)
0D	Predefined Animation
0E	Large Animation (16*16 times 4 = 32*4 =128 bytes)
0F	Small Animation (8*8 times 4 = 8*4 =32 bytes)
10	Large Picture (32*32 = 128 bytes)
11	Small Picture (16*16 = 32 bytes)
12	Variable Picture
13	User Prompt indicator
14-1F	Reserved for future EMS features

3.3 Concatenated messages:

This mechanism allows long messages to be concatenated in several short messages.

For 8 bit reference number, the following IEI and associated IEDL and IED shall be present in every segment of the concatenated SM:

IEI = 00 (hex)

IEDL = 3

IED = coded as follows

“Octet 1: Concatenated short message reference number

This octet shall contain a modulo 256 counter indicating the reference number for a particular concatenated short message. This reference number shall remain constant for every short message, which makes up a particular concatenated short message.

Octet 2: Maximum number of short messages in the concatenated short message.

This octet shall contain a value in the range 0 to 255 indicating the total number of short messages within the concatenated short message. The value shall start at 1 and remain constant for every short message, which makes up the concatenated short message. If the value is zero then the receiving entity shall ignore the whole Information Element.

Octet 3: Sequence number of the current short message.

This octet shall contain a value in the range 0 to 255 indicating the sequence number of a particular short message within the concatenated short message. The value shall start at 1 and increment by one for every short message sent within the concatenated short message. If the value is zero or the value is greater than the value in octet 2 then the receiving entity shall ignore the whole Information Element.

The IEI and associated IEI length and IEI data shall be present in every segment of the concatenated SM.”

For 16 bit reference number, the following IEI and associated IEDL and IED shall be present in every segment of the concatenated SM:

IEI = 08 (hex)

IEDL = 4

IED = coded as follows

"Octet 1-2: Concatenated short messages, 16-bit reference number

This octet shall contain a modulo 65536 counter indicating the reference number for a particular enhanced concatenated short message. This reference number shall remain constant for every short message which makes up a particular enhanced concatenated short message.

Octet 3: Maximum number of short messages in the enhanced concatenated short message. This octet shall contain a value in the range 0 to 255 indicating the total number of short messages within the concatenated short message. The value shall start at 1 and remain constant for every short message which makes up the enhanced concatenated short message. If the value is zero then the receiving entity shall ignore the whole Information Element.

Octet 4: Sequence number of the current short message.

This octet shall contain a value in the range 0 to 255 indicating the sequence number of a particular short message within the concatenated short message. The value shall start at 1 and increment by one for every short message sent within the concatenated short message. If the value is zero or the value is greater than the value in octet 3 then the receiving entity shall ignore the whole Information Element.

The IEI and associated IEI length and IEI data shall be present in every segment of the concatenated SM."

3.4 Pictures

There are two different types of pictures: fixed and the variable sizes.

3.4.1 Fixed Pictures

Sizes: 16x16 and 32x32 pixels

"The Information-Element-Data octet(s) shall be coded as follows:

Octet 1: position indicating in the SM data the instant the picture shall be displayed. Set to the number of characters from the beginning of the SM data after which the picture shall be displayed. This octet shall be coded as an integer value in the range 0 (beginning of the SM data) to the maximum number of characters included in the SM data of one single SM or one segment of a concatenated SM.

Octet 2: Pictures are coded from upper left to lower right and in each byte the most significant bit represent the pixel at the left. The pictures are plain black and white; no colours or grey scales are supported. The bitvalue "0" represents a white pixel and the bitvalue "1" represents a black pixel."

Example 16*16 picture

Byte 1	Byte 2
Byte 3	Byte 4
...	...
...	...
Byte 31	Byte 32

3.4.2 Variable Picture

The Information-Element-Data octet(s) shall be coded as follows:

Octet 1: Position indicating in the SM data the instant the picture shall be displayed in the SM data

Octet 2: Horizontal dimension of the picture. This octet shall contain the horizontal number of 8 pixels i.e. this value shall be multiplied by 8 to get the whole number of horizontal pixels.

Octet 3: Vertical dimension of the picture. This octet shall contain the vertical number of pixels.

Octet 4-n: This octet(s) shall contain a Variable Picture line by line from top left to bottom right, as described for the (16x16) & (32x32) pictures."

3.5 Animations

There are two kinds of animations: the predefined and the user defined animations.

3.5.1 Predefined animations

The Information-Element-Data octet(s) shall be coded as follows.

Octet 1: Position indicating in the SM data the instant the animation shall be displayed. Set to the number of characters from the beginning of the SM data after which the animation shall be displayed. This octet shall be coded as an integer value in the range 0 (beginning of the SM data) to the maximum number

of characters included in the SM data of one single SM or one segment of a concatenated SM.

Octet 2: Animation number. Shall be encoded as an integer value."

3.5.2 User defined animations

"The Information-Element-Data octet(s) shall be coded as follows:

Octet 1: Position indicating the instant the animation shall be displayed in the SM data.

Octet 2-n: Animations are coded as 4 sequential pictures, with the first picture sent first."

3.6 Sounds

Like the animation feature, there are two kinds of sounds: the predefined sounds and the user defined sounds that are in the " iMelody" format.

3.6.1 Predefined sounds

"The Information-Element-Data octet(s) shall be coded as follows.

Octet 1: Position indicating in the SM data the instant after which the sound shall be played. It will be set to the number of characters from the beginning of the SM data after which the sound shall be played.

This octet shall be coded as an integer value in the range 0 (beginning of the SM data) to the maximum number of characters included in the SM data of one single SM or one segment of a concatenated SM.

Octet 2: Sound number. Shall be encoded as an integer value."

3.6.2 User defined sounds (i.e. iMelody)

The format of the iMelody is constituted of a header, the melody and a footer.

Header:

Description	Example	Status
"BEGIN:IMELODY"<cr><line-feed>	"BEGIN:IMELODY"<cr><line-feed>	Mandatory
"VERSION:"<version><cr><line-feed>	"VERSION:1.2"<cr><line-feed>	Mandatory
"FORMAT:"<format><cr><line-feed>	"FORMAT:CLASS1.0"<cr><line-feed>	Mandatory
"NAME:"<characters-not-lf><cr><line-feed>	"NAME:My song"<cr><line-feed>	Optional
"COMPOSER:"<characters-not-lf><cr><line-feed>]	"COMPOSER:John Doe"<cr><line-feed>	Optional
"BEAT:"<beat><cr><line-feed>]	"BEAT:240"<cr><line-feed>	Optional
"STYLE:"<style><cr><line-feed>]	"STYLE:S2"<cr><line-feed>	Optional
"VOLUME:"<volume><cr><line-feed>]	"VOLUME:V8"<cr><line-feed>	Optional

<format> ::= "CLASS1.0"

iMelody also defines a "CLASS2.0" format.

<beat> ::= "25" | "26" | "27" | ... | "899" | "900"

<style> ::= "S0" | "S1" | "S2"

<volume-modifier> ::= "V+" | "V-" (changes volume + or – from current volume)

<volume> ::= "V0" | "V1" | ... | "V15" | <volume-modifier>

<characters-not-lf> ::= 'Any character in the ASCII character-set except <line-feed>.'

Footer:

| Description | Example | Status |
|------------------------------|------------------------------|-----------|
| "END:IMELODY"<cr><line-feed> | "END:IMELODY"<cr><line-feed> | Mandatory |

Melody:

| Description | Example | Status |
|----------------------------------|----------------------------------|-----------|
| "MELODY:"<melody><cr><line-feed> | "MELODY:c2d2e2f2"<cr><line-feed> | Mandatory |

The melody is composed as follow:

<melody> ::= { <silence> | <note> | <led> | <vib> | <backlight> | <repeat> |

<volume> }+

<volume-modifier> ::= "V+" | "V-" (changes volume + or – from current volume)

Please see individual manufacturer's web sites for more detailed information, this document is a guide only, not an EMS content development kit. This document is not to be reproduced or changed without the express permission of the supporting manufacturers.

<volume> ::= "V0" | "V1" | ... | "V15" | <volume-modifier>
 <led> ::= "ledoff" | "ledon"
 <vibe> ::= "vibeon" | "vibeoff"
 <backlight> ::= "backon" | "backoff"

 <repeat> ::= "(" | ")" | "@" <repeat-count>
 <repeat-count> ::= "0" | "1" | ...

 <silence> ::= "r" <duration> [<duration-specifier>]
 <note> ::= [<octave-prefix>] <basic-ess-iss-note> <duration> [<duration-specifier>]
 <duration> ::= "0" | "1" | "2" | "3" | "4" | "5"
 <duration-specifier> ::= "." | ":" | ";"
 <octave-prefix> ::= "*"0" | "*"1" | ... | "*"8" (A=55Hz) | (A=110Hz) | ... |
 (A=14080Hz)
 <basic-ess-iss-note> ::= <basic-note> | <ess-note> | <iss-note>
 <basic-note> ::= "c" | "d" | "e" | "f" | "g" | "a" | "b"
 <ess-note> ::= "&d" | "&e" | "&g" | "&a" | "&b"
 <iss-note> ::= "#c" | "#d" | "#f" | "#g" | "#a"

Duration:

| Value | Duration |
|-------|-----------|
| 0 | Full-note |
| 1 | ½-note |
| 2 | ¼-note |
| 3 | 1/8-note |
| 4 | 1/16-note |
| 5 | 1/32-note |

Duration Specifier:

| Value | Duration |
|-------|---------------------|
| | No special duration |
| . | Dotted note |
| : | Double dotted note |
| ; | 2/3 length |

The octave prefix only applies to the immediately following note. If not specified, the default octave-prefix is *4. i.e. A=880Hz.

The repeat blocks cannot be nested in this simple CLASS1.0 definition.

The default character set is UTF-8.

The maximum length for a melody is 128 bytes (this includes the melody header and footer).

3.7 Example of a «CLASS1» iMelody object:

| | |
|-------------------------------------------------|------------------|
| BEGIN:IMELODY
VERSION:1.2
FORMAT:CLASS1.0 | Mandatory Header |
| MELODY:&b2#c3V-c2*4g3d3V+#d1r3d2e2:d1V+f2f3. | Mandatory |
| END:IMELODY | Mandatory footer |

Example:

Example of the following message:

**(Melody2)(Anim1)(Anim2)HELLO(Picture1)(Anim2)HERE(Melody1)A TEST OF
CONCATENATED(Anim1)MESSAGE(Picture2)(Melody2)**

Picture 1: Large Picture
Picture 2: Variable picture, dx=16, dy=4
Mel1: melody with basic notes = 87 bytes
Mel 2: predefined sound "clap"
Anim1: predefined animation "WOW"
Anim2: predefined animation "I am glad"

For the first part of the SMS, these TPDU Parameters has to be filled as follow:

- TP-UDHI = 1 (to indicate there is a User Data Header)
- TP-PID = 00 (as a normal SMS)
- TP-DCS = 00

For the second part of the SMS, here is the TP User Data concatenated content with the position for each "Content" IE:

SMS n°1:

| | | | | | | |
|----------|-----------|---------------------|---------------------|---------------------|------|------------------|
| UDHL | IE Concat | IE Mel 2
Pos : 0 | IE Anim1
Pos : 0 | IE Anim2
Pos : 0 | Text | |
| = 1 byte | = 5 bytes | =4 bytes | = 4 bytes | =4 bytes | =5 | = 117 bytes free |

SMS n°2:

| | | | |
|----------|-----------|-------------------------|----------------|
| UDHL | IE Concat | IE Picture 1
Pos : 0 | |
| = 1 byte | = 5 bytes | =131 bytes | = 3 bytes free |

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SMS n°3:

| | | | | | | |
|----------|-----------|---------------------|--------------------|----------------------|------|----------------|
| UDHL | IE Concat | IE Anim2
Pos : 0 | IE Mel1
Pos : 4 | IE Anim1
Pos : 26 | Text | |
| = 1 byte | = 5 bytes | =4 bytes | = 90 bytes | =4 bytes | =33 | = 1 bytes free |

SMS n°4:

| | | | | |
|----------|-----------|-------------------------|--------------------|-----------------|
| UDHL | IE Concat | IE Picture 2
Pos : 0 | IE Mel2
Pos : 0 | |
| = 1 byte | =5 bytes | = 35 bytes | =4 bytes | = 95 bytes free |

Here are the details for IE Picture 1:

| | | | | | |
|----------|-----------|---------|---------|--------|------------------|
| IEI = 12 | IEDL = 04 | Pos : 0 | Dx = 16 | Dy = 4 | Data = 128 bytes |
|----------|-----------|---------|---------|--------|------------------|

3.8 Unrecognized Information Elements

EMS has been specifically designed to address the issues of inter-platform interoperability, and to ensure that EMS users are able to communicate across both different handsets and manufacturers.

The way this is achieved is through handsets ignoring those Information Elements within the User Data Header that they do not recognize. In this way those IE's that they do, which will always be at least the text, are still displayed.

3.9 User Data

The User Data part includes only text (according to TP DCS parameters). The alphabet that can be used:

- UCS2 (16 bits), this alphabet is used for encoding complex sets of symbols such as Arabic and Asian languages. With this alphabet, each message segment can contain up to 70 symbols.
- GSM 7 bit default alphabet. With this alphabet, each message segment can contain up to 160 characters.

Chapter 4: 'But What About the Handsets?' -

The following tables contain a breakdown, both by individual handset and by manufacturer, of the EMS features supported.

A reminder is made that not only will feature sets differ across devices and manufacturers, but that different products with the same feature sets may still display content differently due to screen characteristics, screen refresh rates, etc.

Developers and service providers are strongly advised to seek more detailed information from each respective manufacturer during the development of any content.

The links below will direct the reader towards respective sites where this information is available.

Alcatel: www.alcatel.com/wap

Motorola: www.motorola.com/developers/messaging/ems

Sony Ericsson: <http://www.ericsson.com/mobilityworld>

Siemens: www.siemens.com/mobile-partners

The tables overleaf are provided as a guide only to these feature sets, and again, developers and providers should seek further information at the links detailed above.

| EMS Features | One Touch
310-311 | One Touch
511/512 |
|------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|
| Sounds
Predefined sounds R4
User-Defined sounds
UPI for sounds | Supported
Supported
Not supported | Supported
Supported
Not supported |
| Animations
Predefined animations R4.3.0
User defined animations
Small
Large | Supported (1)
Supported
Supported
Supported | Supported (1)
Supported
Supported
Supported |
| Pictures
Pictures
Small
Large
Variable pictures
UPI for pictures | Supported
Supported
Supported
Not supported | Supported
Supported
Supported
Not supported |
| Text Formatting
Alignment
Font size
Style | Not supported | Not supported |
| Concatenation
MT
MO | Supported
Supported | Supported
Supported |

Explanation of comments:

(1): Implementation of the “predefined animations” as static “Smileys”.



| EMS Features | T 192i | T280i & m | V66i & m | V60i & m |
|------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|
| Sounds
Predefined sounds R4
User-Defined sounds
UPI for sounds | Supported
Supported
Not supported | Supported
Supported
Not supported | Supported
Supported
Not supported | Supported
Supported
Not supported |
| Animations
Predefined animations R4.3.0
User defined animations
Small
large | Supported
Supported
Supported
Supported | Supported
Supported
Supported
Supported | Supported
Supported
Supported
Supported | Supported
Supported
Supported
Supported |
| Pictures
pictures
Small
large
Variable pictures
UPI for pictures | Supported
Supported
Supported
Not supported | Supported
Supported
Supported
Not supported | Supported
Supported
Supported
Not supported | Supported
Supported
Supported
Not supported |
| Text Formatting
Alignment
Font size
Style | Not supported | Not supported | Not supported | Not supported |
| Concatenation
MT
MO | Supported
Supported | Supported
Supported | Supported
Supported | Supported
Supported |

Please see individual manufacturer's web sites for more detailed information, this document is a guide only, not an EMS content development kit. This document is not to be reproduced or changed without the express permission of the supporting manufacturers.

SIEMENS

| EMS Features | C45 | S45 (1) | ME45 (1) |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|
| Sounds
Predefined sounds R4
User defined sounds
UPI for sounds | Supported
Not supported
Not supported | Supported
Supported
Not supported | Supported
Supported
Not supported |
| Animations
Predefined animations R4.3.0
User defined animations
Small
Large | Supported (2)
Not supported
Not supported
Not supported | Supported (2)
Supported
Supported
Supported | Supported (2)
Supported
Supported
Supported |
| Pictures
Small
Large
Variable pictures
UPI for pictures | Not supported
Not supported
Not supported
Not supported | Supported
Supported
Supported
Not supported | Supported
Supported
Supported
Not supported |
| Text Formatting
Alignment
Font size
Style | Not supported
Not supported
Not supported | Supported (3)
Supported (4)
Supported (5) | Supported (3)
Supported (4)
Supported (5) |
| Concatenation
MT
MO | Not supported
Not supported | Supported (6)
Supported (7) | Supported (6)
Supported (7) |

Explanation of comments:

(1): Valid as of Software Release 21, commercially available in Q1/ 2002. Earlier Software Releases offer the same features as listed with C45.
 (2): Implementation of the "predefined animations" as static "Ducks".
 (3): Supported features: left, centre, right
 (4): Supported features: normal, large, small
 (5): Supported features: normal, underlined
 (6): max. 25 segments on flash plus number of segments supported by the individual SIM-card
 (7): max. 9 segments, with a maximum insertion capability for text of 765 characters



| EMS Features | T20 | T29 | R520 | T39 | T65 | T66 | T68 | R600 |
|------------------------------|---------------|---------------|---------------|---------------|-----------|---------------|---------------|-----------|
| Sounds | | | | | | | | |
| Predefined sounds R4 | Not supported | Not supported | Supported | Supported | Supported | Not supported | Supported | Supported |
| User-Defined sounds | Supported | Supported | Supported | Supported | Supported | Supported | Supported | Supported |
| UPI for sounds | Not supported | Not supported | Not supported | Not supported | Supported | Not supported | Not supported | Supported |
| Animations | | | | | | | | |
| Predefined animations R4.1.0 | Not supported | Not supported | Supported | Supported | Supported | Not supported | Supported | Supported |
| User defined animations | Not supported | Not supported | Supported | Supported | Supported | Not supported | Supported | Supported |
| Small | Not supported | Not supported | Supported | Supported | Supported | Not supported | Supported | Supported |
| large | Not supported | Not supported | Supported | Supported | Supported | Not supported | Supported | Supported |
| Pictures | | | | | | | | |
| Small | Supported | Supported | Supported | Supported | Supported | Supported | Supported | Supported |
| large | Supported | Supported | Supported | Supported | Supported | Supported | Supported | Supported |
| Variable pictures | Supported | Supported | Supported | Supported | Supported | Supported | Supported | Supported |
| UPI for pictures | Not supported | Not supported | Not supported | Not supported | Supported | Not supported | Not supported | Supported |
| Text Formatting | | | | | | | | |
| Alignment | Not supported | Not supported | Not supported | Not supported | Supported | Not supported | Not supported | Supported |
| Font size | Not supported | Not supported | Not supported | Not supported | Supported | Not supported | Not supported | Supported |
| Style | Not supported | Not supported | Not supported | Not supported | Supported | Not supported | Not supported | Supported |
| Concatenation | | | | | | | | |
| MT | 3 | 3 | 6 | 6 | 6 | 3 | 6 | 4 |
| MO | 3 | 3 | 6 | 6 | 6 | 3 | 6 | 4 |

END OF DOCUMENT