White Paper

September 2002

T100/T102

Sony Ericsson

Preface

Purpose of this document

The Sony Ericsson T100/T102 White Paper is designed to give the reader a deeper technical understanding of how the T100/T102 is designed, and of how it interacts with other media. This document will make it easier to integrate the T100/T102 with the IT and communications solutions of a company or organization.

People who can benefit from this document include:

- Corporate buyers
- IT professionals
- Software developers
- Support engineers
- Business decision-makers

More information, useful for product, service and application developers, is published on the Sony Ericsson Developer World. The site at http://www.SonyEricsson.com/developer/ contains up-to-date information about technologies, products and tools.

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Content

Product overview

The T100 will attract modern young people who appreciate attractive design, ease-of-use and, core features at an affordable price. The T100 is small in size and gives a glimpse of the new industrial design that is coming from Sony Ericsson, capturing the simplicity and minimalism of Scandinavian and Japanese design. The phone features enhanced messaging capabilities and will start shipping in Q4 2002.

Developed for GSM 900/1800 networks, the T100, and T102 for Mainland China, will be available in Eastern Europe, the Middle East, Africa, Latin America and Asia/Pacific. The phone will be introduced in some Western Europe markets during Q1 2003, and during the same time period there will be a GSM 850/1900 version for Latin Americas.

Key functions and features

Secure WAP

M-commerce is expected to be a growing part of the mobile Internet. Trading, banking and shopping have been possible via the Internet for quite some time, building upon the foundation of the built-in security features. It is these features that have been adapted to and implemented in the WAP protocol and the layer called WTLS, Wireless Transport Layer Security. The T100/T102 supports WAP 1.2.1, the version of the Wireless Application Protocol that includes WTLS class 2.

Messaging – EMS

EMS (Enhanced Messaging Service) lets users send black and white pictures, animations, sound effects and ring signals to each other.

The T100/T102 also supports Nokia's Picture Messaging by allowing the user to receive and store pictures included in messages sent from Nokia phones. These pictures can be used as background pictures. The max size of a picture is 2847 pixels (73x39).

It is, however, not possible to send pictures and ring signals from the T100/T102 to Nokia phones.

Picture editor

The user can edit pictures and symbols directly on the phone, to create new, personal pictures for inclusion in EMS messages. The Picture Editor allows the user to view the picture in the display and edit it with the pen tool.

The available tools include:

- Set line thickness (Pen size)
- Zoom in, zoom out
- Change picture width and height
- Select black or white pen

The T100/T102 has a set of predefined pictures for use with EMS, which also can be edited. New pictures can be received with EMS messages and saved in the phone.

T9™ Text Input for quicker messaging

The T100/T102 supports the predictive text input method T9™ Text Input. Predictive text input makes it fast and easy to write text messages. It works by searching a word database to anticipate which word you are writing. You only have to press each key once, even if the letter you want is not the first letter on the key.

The phone book

The phone book is one of the most used features of mobile phones. The phone book in the T100/T102 lets you save up to 100 contacts. An additional number of contacts can be saved on your SIM card. How many depends on what SIM card you are using.

Shortcuts

It is easy to access the phone numbers in the phone book when you make a call. Just press and hold down the button with the letter that the name you are looking for starts with. You instantly enter the phone book and find the first name that starts with that letter. Then you just scroll to find the name you are looking for.

Picture phone book - see who's calling

The T100/T102 lets you assign a picture or an icon stored in the phone to an entry stored in the phone book. When a person calls, a picture or an icon of your choice will be shown in the display as well as the name. It is also possible to assign a ring-signal to an entry in the phone book. When a person calls, that particular ring-signal will be heard, together with the name in the display.

The pictures used for Caller ID can be:

- Any of the EMS pictures stored in the phone from the start
- Pictures that have been received via EMS messages
- Any operator defined picture stored in My Pictures
- EMS pictures created with the Picture editor

The T100/T102 also supports name and number presentation as well as CLI restriction.

More in-phone functions and features

Up-to-date with the calendar

The calendar of the T100/T102 keeps the user on the right track. It has four different views: day, week, month and all tasks view.

Profiles

The profile feature: a group of settings preset to suit a certain environment. The profiles are also related to intelligent accessories such as a desktop charger or a portable handsfree; useful for company integration with call forwarding etc. Some phone accessories select a profile automatically. For example, when you attach a portable handsfree to your T100/T102, the *Port h-free* profile is chosen. There are five pre-programmed profiles: *Normal*, *Meeting*, *Outdoors*, *Port h-free (portable handsfree)*, *Home*.

You cannot create more profiles, but you can change the settings for a profile. A profile with no accessories associated to it, such as *Meeting* or *Normal*, must be chosen manually.

Option key

When writing a text message, press and hold the “#” key, and a list of options is displayed. When in the WAP browser, press and hold YES, for a list of options.

Games

For some people, playing a game is a good way to relax. The T100/T102 includes the following five games for different moods and skills:

- Ballpop
- Naval Fleet
- Q
- Yukon Struggle
- Wu Zi Qi

Accessories

The T100/T102 supports various accessories, such as *Portable handsfree HPE-14, Portable handsfree HPB-10*, *Car holder HCH-30*, *Car handsfree pack HCX-30* and *Desk Stand CDS-11*.

Start-up show

Another way to make the T100/T102 more personal is to have a user-defined start-up show. Every time the phone is turned on, an animation, with or without sound, appears in the display. There is one Sony Ericsson-defined show stored in the phone, and there might also be one operator-defined show. As with the background picture, the user-defined show can use any of the EMS pictures stored in the phone.

Background pictures

The user can have a background picture in the display, to bring extra life to the phone when it is in standby mode. The background pictures can be one of 10 pre-defined, replaceable pictures or an operator defined picture.

Services on the network

The T100/T102 supports the SIM Application Toolkit (online services), which makes it possible for operators to provide new services to existing users over the air, including new menus and functions in the phone.

Dual band support

Dual band support means that you can use the phone on two GSM networks; the T100 and T102 can be used on GSM 900 and 1800 networks.

Sleep mode

It is possible to extend the standby time in the T100/T102 by activating the sleeping mode function. This function turns off a part of the display to reduce the current consumption.

Ring signals

There are four ways to find a catchy ring signal for the T100/T102. One way is to choose any of the pre-programmed ring signals in the phone. Another way is to compose up to 10 new ring signals and choose one of them. It is also possible to download a ring signal from a WAP site or receive a catchy tune in an EMS message from a friend or a company that sells ring signals.

Technologies in detail

The T100/T102 includes features such as Enhanced messaging, where the consumer can send messages with pictures, sounds and animations. It also supports other new technologies such as browsing over WAP. The following chapter gives a more detailed explanation of these features.

Messaging

More than 15 billion text messages are sent worldwide between mobile phones each month (January, 2001). The consumers' needs to express themselves in ways beyond voice were highly underestimated by the industry when SMS was introduced in the late 90s. The success of SMS, however, is the springboard for existing and coming messaging services, such as Enhanced Messaging Service (EMS). The added value in SMS messaging will create new revenue which can be shared between the network operators, the application aggregators and the content providers.

EMS – Enhanced text messaging

EMS lets users send black and white pictures, animations, sound effects, ring signals and formatted text to each other. EMS is based on SMS text messaging and is a GSM standard developed by 3GPP, Third Generation Partnership Programme.

Unlike Nokia's Picture Messaging, EMS works with phones that do not support EMS, simply by allowing the receiving phone to ignore the EMS items and only display the text.

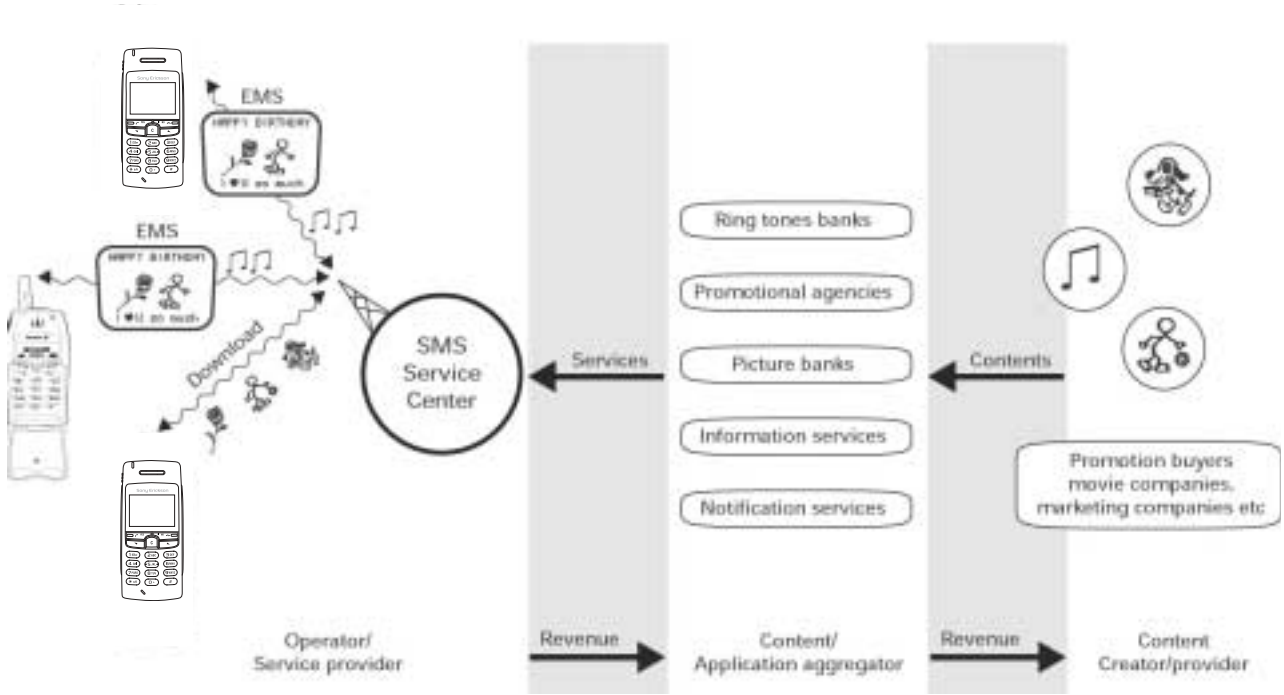

Figure 1. This diagram shows a model over the possibilities with Enhanced Messaging Service. When the Operator/Service provider enables EMS in the network, users will enjoy adding life to messages with sounds, melodies and pictures. New ranges of Content/Application aggregators on the operator network or the Internet can provide EMS contents and services to the users over SMS. Content Creators/ providers can see a new demand for creative contents. Also, promotional activities from movie companies, record labels etc can provide ring signals, movie snapshots and much more.

The T100/T102 supports most of the features specified in the EMS standard. It has a number of pre-defined EMS pictures stored in the phone, plus space for user-defined pictures that can be sent to other phones in EMS messages. Moreover, there are pre-programmed animations and sound effects that can be used to enhance a message and make it more personal.

WAP services

The typical WAP client is a small, portable device which is connected to a wireless network. This includes mobile phones, pagers, smart phones, PDAs and other small devices. In these devices, you have a limited user interface, low memory and computing power compared to desktop and laptop computers.

The WAP browser in the T100/T102 is compliant with WAP 1.2.1, including security according to WTLS class 2. It is designed for WML and cannot read ordinary HTML pages, but it is suitable for interaction with customer services, e.g. ticket reservation. It is also handy when you want to access text-based information, such as timetables, share prices, exchange rates, Internet banking and other interactive services.

Using WAP in the T100/T102

The built-in WAP browser gives the user portable, fast and secure access to a wide variety of services, with the possibility of personalized services. WAP in the T100/T102 offers new opportunities to companies and service providers:

Push service
A useful feature for companies and service providers to push contents or service indications to work groups or customers. This is used for notifications, mail alerts, messaging, news, stock quotes, contacts, meeting requests, games etc.

Provide settings
Using SMS messages, configuration settings can be sent over the air, OTA, so that the user does not need to configure the WAP access settings manually. WAP settings may also be customized by the operator.

Adapt to phone type
When creating a WAP service, you want to make sure that the user experience is what you intend, regardless of client device type. The function User Agent Profile is supported by the T100/T102 to allow the contents to be automatically optimized for the phone.

Standard bearer type
The T100/T102 accesses WAP over a standard GSM Data connection.

Option key when browsing
During WAP browsing, a long press on YES gives the user immediate access to a dynamic option menu when using WAP services, similar to a mouse right-click in PC programs.

Bandwidth efficiency
One of the key advantages WAP has over text-based HTML pages on mobile devices, is the bandwidth efficiency for communication. This is due partly to the fact that the WAP application is communicated to the wireless devices in the form of binary encoded data.

Easy create for WAP
Creating a WAP service is no harder than creating an Intranet/Internet service today since WML and WMLScript are based on well-known Internet technology. New market segments can be addressed by launching innovative mobile Value Added Services.

Using standard tools
It is possible for the service creator to use standard tools like ASP or CGI to generate content dynamically. You can utilize existing investments in databases etc that are the basis of existing Internet services. Create a service once and make it accessible on a broad range of wireless networks.

Maintain customer base
You can adapt existing Internet services to WAP. The actual binary encoding can be handled by the WAP Gateway which makes it possible to create WAP applications using the text-based language WML and other tools. In fact, existing HTML-based applications on the Internet can be viewed in the WAP browser, if an automatic conversion is performed in the WAP Gateway.

Improve productivity
Improve and simplify the communication flow within an organization by making information available to mobile users. A company or organization can use a WAP gateway to provide a secure connection to the company network for their users.

The WAP profiles
The T100/T102 holds a number of WAP profiles, each with a group of network settings and a home page. If you provide a corporate WAP service on your Intranet, it is useful to enter an Intranet WAP profile in user phones. The WAP profile holds network settings and user identification. Users can easily switch between corporate services and WAP services on the Internet, simply by switching WAP profile.

Connection-orientated WAP
The T100/T102 supports connection-oriented WAP over GSM Data. In general, this means that the connection between the WAP browser in the phone and the WAP Gateway is maintained in a session with error recovery services. This gives a high reliability with a reduced risk of errors in the transmission, and improves efficiency in WAP browsing.

Bearer type characteristics

The phone accesses WAP services over IP, which is provided over GSM Data.

Advantages with GSM data access:

- Circuit connection of data call, which means that the phone is connected during the entire WAP session.
- Comparably higher transmission speed than with SMS access.
- Pricing of GSM Data access can be compared to pricing of data calls in the network.
- GSM Data is suitable for Complex Pull services, Browsing and Data transfer.

The WAP Gateway provides services in the company's Intranet, a banking or stock trading service on the Internet, or access to other WAP applications on web addresses anywhere on the Internet.

GSM Data is not suitable for Provisioning, Pager service.

Security using WAP

The T100/T102 supports WAP 1.2.1, a version of the Wireless Application Protocol that includes WTLS class 2.

When using certain WAP services, the user may want more security than normal, for example when using banking services. The user establishes a secure connection between the phone and the WAP gateway.

To use such secure connections, certificates have to be saved in the phone. The T100/T102 comes with a number of pre-installed WAP certificates, so called Trusted certificates.

WTLS class 2 includes the following security features:

- Encryption of a message, ensuring that only the sender and the recipient can read the contents of a message.
- Server authentication, meaning that the message is encrypted and users can verify that they really are communicating with the WAP gateway they believe they are connected to.

Configuration of WAP settings

An easy way to perform the WAP configuration of a single phone is by using the step-by-step WAP configurator provided on the Sony Ericsson Mobile Internet. The configurator utilizes OTA provisioning, and is available on http://www.SonyEricsson.com, no login required.

A manual configuration is made using the menu system in the phone. This is described in the User's Guide.

To simplify configuring WAP settings in a number of phones, all settings can be sent as an SMS message to each phone. This makes it easy for an operator, a service provider or a company to distribute settings for Internet/Intranet, and WAP, without having to configure each phone manually.

- The OTA configuration message is distributed via SMS point-to-point.
- The setup information is a binary encoded XML message, according to WBXML. To receive information about OTA specifications, please contact your local Sony Ericsson representative for consumer products. A configurator that utilizes OTA provisioning can be tested on Sony Ericsson Mobile Internet.
- The user is not alerted about new settings until the ongoing browsing session ends. Furthermore, settings are not changed during an ongoing browsing session.
- The necessary user interaction is limited to receiving and accepting/rejecting the configuration message, and selecting which WAP profile to allocate the settings to.
- Security can be handled using a keyword identifier displayed on the screen as a shared secret between the SMS sender and recipient. It is important that the user can verify that the configuration message is authentic.

Push services

These are useful for sending updated WAP site contents or WAP links to mobile users. Examples of services that can be implemented using push services:

- Notification of new voice mails, etc. Instant messaging and chat.
- News, sport results, weather forecasts, financial information (stock quotes etc).
- Personal Information Manager (PIM) - delivery of contacts, meeting requests etc.

- Fill up a smart card with e-cash.
- Interactive games, e.g. play poker with a friend.

In the T100/T102, the user selects whether to allow push messages or not. There are two different forms of Push services:

Service Indication (SI)

This is basically a text message to the user containing a link to a URL carried by the SI. If the user decides to load the suggested URL, normal WAP browsing commences.

Service Loading (SL)

This means that the WAP site content is immediately loaded and executed on the client, or alternatively is loaded and stored in the cache for later use. In both cases, the SL is loaded without any user intervention.

When a service indication is received in the T100/T102, it is presented to the user in one of the following ways:

- High
  Immediately displays the message irrespective of current activity.
- Medium
  Message is immediately displayed, unless the user is engaged in another activity. In this case the message is indicated to the user, who retrieves it later from the inbox.
- Low
  Message is not immediately displayed. Instead it is put in the Inbox, and an indication is given in the standby screen.

In the T100/T102 push message inbox, a list shows the first part of each received message, newest first. The user decides to read or delete the message, and whether to load the suggested URL in the WAP browser.

Mobile Internet

The mobile Internet offers much more than mobile access to the Internet – it opens up a whole new range of situation-based services. Services that give us access to personalized communications, information and entertainment anytime, anywhere.

With the T100/T102, the mobile Internet is always with you. The default address for non-customized products is the address for Sony Ericsson Mobile Internet. This address can be changed by the user. Sony Ericsson customers can choose to have the address to their own WAP site assigned instead.

GSM data communication

The T100/T102 offers the user data connection anytime, anywhere, unmatched by fixed telephone networks. Each GSM channel is divided into eight repeating time slots. A normal GSM voice or data call is circuit switched, and only one time slot is used for each call. The data speed is, therefore, limited to 9,600 bps.

In-phone functions and features

*Subscription and/or network-dependent

A	Alarm clock with snooze function	Yes
B	Background light	Yes, blue
	Background pictures	Yes, 10 + 10 user customised + 1 operator customised
	Bookmarks (URL memory)	Yes, 25
C	Calculator	Yes
	Calendar	Yes, (day, week, month and all tasks view)
	Call barring*	Yes
	Call divert*	Yes
	Call hold*	Yes
	Call screening*	No
	Call list (last dialled, answered and missed calls)	Yes, 30 entries
	Call time/call cost (a.k.a Advice of Charge, Information/Charging)*	Yes
	Call transfer*	No
	Calling card service	No
	Calling Line Identification (CLI)	Yes, with name or number, personal ring signal and pictures.
	Clock	Yes
	Closed User Groups (CUG)*	10
	Conference calls*	Yes
	CSD, Circuit Switched Data*	Yes
D	Date	Yes
E	EMS (Enhanced Messaging Service)*	Yes
	EMS, own pictures/icons	20

	EMS, pre-defined pictures/icons	30
	EMS, animations	Yes, 15 pre-installed
	EMS, text formatting	Yes. Size, style and alignment. Not applicable on Chinese characters.
	EMS, sounds	10
F	Fixed Dialling Numbers (FDN)*	Yes
G	Games	Yes, 5 games. Ballpop, Naval Fleet, Q, Yukon Struggle and Wu Zi Qi.
I	Input methods	T9™ Text Input, multitap alphabetic (GSM standard), Bopomofo, Pinyin (simplified) and Stroke.
K	Keypad lock	Yes
L	Languages	34
N	Nokia Picture Messaging	Yes, receiving/storing
O	Option key	Yes, long press on # when writing EMS messages
P	Phone book	Up to 100 contacts in phone + SIM
	Phone book groups	10
	Phone lock	Yes
	Picture phone book	Yes
	Profiles	Yes, 5
R	Re-dialling, automatic	Yes
	Ring signals, pre-programmed	Yes, 10
	Ring signals, own/customized	Yes, 10/2
	Ring signals, exchange	Yes, via EMS
S	Shortcuts	Yes
	SIM Application Toolkit*	Yes
	SIM card lock	Yes
	Sleep mode	Yes
	SMS (Short Message Service)*	Yes
	SMS, long messages (a.k.a. concatenated SMS)*	Yes, up to 6 linked messages of 160 characters each
	SMS Cell Broadcast*	Yes
	SMS counter	Yes

	SMS templates	Yes, 10 templates of up to 25 characters each
	Speech coding	Enhanced and Full
	Speed dialling	Yes
	Start-up/Shutdown show	Yes
	Status menu	Yes
	Stopwatch	Yes
T	Timer	Yes
V	Vibrating alert	Yes
W	WAP browser	Yes, WAP 1.2.1 browser
	WAP certificates	VeriSign, GlobalSign, Baltimore, Entrust
	WTLS for added WAP security*	Yes, WTLS class 2

Network-dependent features

SMS and EMS messaging

The T100/T102 is capable of sending and receiving SMS, EMS messages and linked messages.

- With the Short Message Service, a user can send text messages containing up to 160 characters to and from GSM mobile stations
- With the linked SMS, the user can link several SMS messages together to create a longer message (network-dependent service)

A Service Centre (SC) acts as a a storage and forwarding centre.

SMS consists of two basic services:

- Mobile Originated SMS (from a mobile station to an SMS-C)
- Mobile Terminated SMS (from an SMS-C to a mobile station)

For Mobile Originated SMS, an SMS message is sent from a Mobile Station to the SMS-C where it is forwarded to its destination. This can be another Mobile Station, or a terminal in the fixed network.

A Mobile Terminated SMS is when an SMS message is forwarded from the SMS-C to a Mobile Station. When the Mobile Station receives the message, it returns a delivery report saying the transfer was successful.

Fixed dialling and Restricted calls

For a company or an organization, it can be useful to restrict phone calls. Fixed Dialling allows you to preset a number of digits, for example area codes. This restricts the user to making calls only to numbers which use the preset digits as leading digits. Fixed Dialling makes use of the PIN2, and it requires fixed dial fields on the SIM card. Check with your operator about this feature.

The Restrict Calls service allows you to block outgoing or incoming calls in certain situations, for example international calls.

Facts and figures

SIM application toolkit

The SIM Application Toolkit (SIM AT) is a smart card-centric method of deploying programs that apply only to GSM and to SMS and USSD transports. Programs must be distributed on smart cards. WAP is an Internet-centric method of deploying programs that is independent of network technology. Programs and content are kept centrally on web servers and downloaded as required. While there is some overlap, WAP is a particularly good choice when deploying programs that also have an HTML version for desktop use. Work is currently underway on building interfaces between the two technologies.

For an operator, a company or service provider, SIM AT offers a powerful way to deploy programs and services to users, without the need for new or upgraded equipment. All necessary setup and programming is distributed to users over the air, directly to their phones. In the T100/T102, a separate menu is available for functions residing on the SIM card. These can include submenus for controlling functions, and also functions which allow the phone to initiate calls, send data, and display information to the user.

SIM AT services supported by the T100/T102

Service		Mode	Support in T100/T102
CELL BROADCAST DOWNLOAD			Yes
DISPLAY TEXT		General: Support for packed and unpacked format in SMS default alphabet as well as UCS2 alphabet	Yes
	bit 1:	0 = normal priority	Yes
		1 = high priority	Yes
	bit 8:	0 = clear message after a delay	Yes
		1 = wait for user to clear message	Yes
GET INKEY		General: The GET_INKEY requires that the user press "Yes" to confirm his/her choice	Yes
	bit 1:	0 = digits (0-9, *, # and +) only	Yes
		1 = alphabet set	Yes
	bit 2:	0 = SMS default alphabet	Yes
		1 = UCS2 alphabet	Yes
	bit 3:	0 = character sets defined by bit 1 and bit 2 are enabled	Yes
		1 = character sets defined by bit 1 and bit 2 are disabled and the "Yes/No" response is requested	Yes
GET INPUT		General: No. of hidden input characters	20
	bit 1:	0 = digits (0-9, *, # and +) only	Yes
		1 = alphabet set	Yes

Service		Mode	Support in T100/T102
	bit 2:	0 = SMS default alphabet	Yes
		1 = UCS2 alphabet	Yes
	bit 3:	0 = ME may echo user input on the display	Yes
		1 = user input not to be revealed in any way	Yes
	bit 4:	0 = user input to be in unpacked format	Yes
		1 = user input to be in SMS packed format	Yes
	bit 8:	0 = no help information available	Yes
		1 = help information available	No
MORE TIME			Yes
PLAY TONE			Yes
POLLING OFF			Yes
POLL INTERVAL			Yes
PROVIDE LOCAL INFORMATION		'00' = Location Information (MCC, MNC, LAC and Cell Identity)	Yes
		'01' = IMEI of the ME	Yes
		'02' = Network Measurement results	Yes
		'03' = Date, time and time zone (DTTinPLI)	No
REFRESH		General: The reset option requests the user to wait while the phone restarts	Yes
		'00' =SIM Initialization and Full File Change Notification	Yes
		'01' = File Change Notification	Yes
		'02' = SIM Initialization and File Change Notification	Yes
		'03' = SIM Initialization	Yes
		'04' = SIM Reset	Yes
SELECT ITEM			Yes
SEND SHORT MESSAGE	bit 1:	0 = packing not required	Yes
		1 = SMS packing by the ME required	Yes
SEND SS			Yes
SEND USSD			No
SET UP CALL		General: Capability configuration	Yes
		Set-up speech call CallParty	No

Service	Mode	Support in T100/T102
	Subaddress DTMF support	Yes
	'00' = set up call, but only if not currently busy on another call	Yes
	'01' = set up call, but only if not currently busy on another call, with redial	Yes
	'02' = set up call, putting all other calls (if any) on hold	Yes
	'03' = set up call, putting all other calls (if any) on hold, with redial	Yes
	'04' = set up call, disconnecting all other calls (if any)	Yes
	'05' = set up call, disconnecting all other calls (if any), with redial	Yes
SET UP MENU		Yes
SMS PP DOWNLOAD		Yes

User interaction with SIM AT

DISPLAY TEXT

Text of up to 160 characters (80 UCS coded) is supported.

Text clearing times

- 6-20 seconds. 60-second timeout limit for the user to clear the text.

'Key' responses

- 'Long NO' – Proactive session terminated by user.
- 'NO' – Backward move in proactive session. Any other key clears display if the command is performed successfully.

GET INKEY

Prompt for a one-character input. Pressing 'YES' without entering a character gives warning message "Minimum 1 character".

'Key' responses

- 'CLR' clears current character.
- 'Long NO' terminates the proactive session.
- 'NO' – Backward move in proactive session.
- 'YES' – Command performed successfully.

GET INPUT

Prompt for character input. Pressing 'YES' without entering a character gives warning message "Minimum 'no.' characters". The phone will refuse to accept further input when maximum response length is exceeded.

MMI Maximum Response lengths

- Digits Only – 160 characters
- SMS default alphabet characters – 160 characters
- Hidden Characters (digits only) – 20 characters

'Key' responses

- 'CLR' clears current character/characters.
- 'Long No' terminates the proactive session.
- 'NO' – Backward move in proactive session.
- 'YES' – Command performed successfully.

REFRESH
A requirement to turn the phone off and then on again can be sent to the user with the text 'Operator has updated your SIM! Restart phone to update!'.

SELECT ITEM
Scroll to highlight item for selection. The maximum number of items supported by the phone within one Select Item command is 30.

'Key' responses
- Down arrow – Scroll down list.
- Up arrow – Scroll up list.
- Long 'No' terminates proactive session.
- 'NO' – Backward move in proactive session.
- 'YES' – Command performed successfully.

SEND SHORT MESSAGE
Default message "Sending message, please wait" can be replaced for the Alpha Identifier text, or suppressed completely if a null text is provided. Responses are "MESSAGE FAILED" or "MESSAGE SENT".

'Key' responses
- Long 'No' or 'NO' terminates the proactive session.

SET UP CALL
If the ME is on a call when the command 'Set up Call, putting all other calls on hold' is sent, the user will see the text 'Setting up a call current call will be held'. If the 'YES' key is pressed the current call will be put on hold and the new call set up. If the ME is on a call when the command 'Set Up Call, disconnecting all other calls' is sent, the user will see the text 'Setting up a call current call will be disconnected'. If the 'YES' key is pressed the current call will be disconnected and the new call set up.

SET UP MENU
Incorporates a SIM Application Toolkit Menu Item into the ME's main menu structure. From the standby display the right or left arrow buttons can be pressed to select the Menu Items. (Note: The SIM AT menu option is found in the 'Extras' menu.)

If an Alpha Identifier is supplied in the Set Up Menu command this is used as the SIM AT entry in the ME's main menu. If no alpha identifier is supplied and only one item provided, then this item is used as header. If no alpha identifier is supplied and several items are found in the menu, a default title is used. If the SIM AT Menu Item is selected using the 'YES' key all the items sent in the Set Up Menu command will be available for selection, in the same way as the Select Item command. A limit of 30 menu items has been set within this command.

'Key' responses
- Down arrow – Scroll down list.
- Up arrow – Scroll up list.
- Side key: Scrolls the menu.
- 'YES' – Envelope (Menu Selection).

Chinese versions

The T100 comes in different Chinese versions, the T100 for Hong Kong, Singapore, Malaysia and Taiwan, and the T102 for China Mainland. The only difference between these Chinese versions is that they support different languages and input methods.

Both the T100 version and the T102 contains a Lunar calendar.

For more information about the Chinese versions, see "Standard language configurations" on page 29.

Terminology and abbreviations

3GPP
3rd Generation Partnership Project.

API
Application Programming Interface.

Bearer
The method for accessing WAP from the phone, for example GSM Data (CSD) and SMS.

bFTP
binary File Transfer Protocol.

Bookmark
A URL and header/title stored in the phone.

Browsing session
From the first access of content until the termination of the connection.

Calling Line Identification (CLI)
Shows the number of the person calling you in your mobile phone display. You can then make an informed choice as to whether or not to take the call. Bear in mind that not all numbers can be displayed. To use this service, it must be supported by your network.

Card
A single WML unit of navigation and user interface. May contain information to present to the user, instructions for gathering user input, etc.

CB
Cell Broadcast. Cell Broadcast is a mobile technology that allows messages to be broadcast to all mobile handsets and similar devices within a designated geographical area. The broadcast range can be varied, from a single cell to the entire network. This technology is used in deploying location-based subscriber services, such as regional auctions, local weather, traffic conditions and “nearest” services (like requesting the nearest service station or restaurant).

CBMI
Cell Broadcast Message Identifier

CGI
Common Gateway Interface.

CS
Circuit Switched.

CSD
Circuit Switched Data.

Deck
A collection of WML cards.

DTMF or Touch Tone
Dual Tone Multi-Frequency signal – codes sent as tone signals. Used for telephone banking, accessing an answering machine, etc.

Dual band
GSM 900/1800. Your phone is a dual band phone, which means that you can use your phone on the GSM 900 and the GSM 1800 network.

e-GSM
Extended GSM, e-GSM, are new frequencies specifiied by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (Network-dependent). It allows operators to transmit and receive just outside GSM’s core 900 frequency band. This extension gives increased network capability, which favours both the user and the operators.

EFR
Enhanced Full Rate, speech coding.

EMS
Enhanced Message Service. Allows the user to add simple pixel pictures and animations, sounds and melodies to a text message. The EMS 3GPP standard also includes text formatting.

ETSI
European Telecommunications Standards Institute.

FR
Full Rate, speech coding.

Gateway
A WAP Gateway typically includes the following functions:

- A Protocol Gateway – the protocol gateway translates requests from the WAP protocol stack to the WWW protocol stack (HTTP and TCP/IP).
- Content Encoders and Decoders – the content encoders translate Web content into compact encoded formats to reduce the size and number of packets travelling over the wireless data network.

GIF
Graphics Interchange Format.

GSM
Global System for Mobile Communications. GSM is the world's most widely-used digital mobile phone system, now operating in over 100 countries around the world, particularly in Europe and Asia-Pacific. The GSM systems family includes GSM 900, GSM 1800 and GSM 1900.

GSM 900
There are different phases of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant.

GSM 1800
Also known as DCS 1800 or PCN, this is a digital network working on a frequency of 1800 MHz. It is used in Europe and Asia-Pacific.

HDML
Handheld Device Markup Language.

HDTP
Handheld Device Transport Protocol.

HSCSD
High Speed Circuit Switched Data.

HTML
HyperText Markup Language.

HTTP
HyperText Transfer Protocol.

Image
WBMP or GIF image contained in a Card.

ISP
Internet Service Provider.

ITTP
Intelligent Terminal Transfer Protocol.

LAN
Local Area Network.

ME
Mobile Equipment.

Micro browser
Accesses and displays the Internet contents in your mobile phone, just as an ordinary browser does in your computer. The micro browser uses small file sizes and the bandwidth of the wireless-handheld network.

MMI
Man-Machine Interface.

MS
Mobile Station.

MT
Mobile Termination.

OTA
Over-the Air Configuration. To provide settings for the phone by way of sending a message, SMS, over the network to the phone. This reduces the need for the user to configure the phone manually.

PDA
Personal Digital Assistant.

PDP
Packet Data Protocol.

Phone book
A memory in your mobile phone or SIM card where phone numbers can be stored and accessed by name or position.

Picture phone book
Lets you assign a picture or an icon stored in the phone to an entry stored in the phone book.

PIM
Personal Information Management.

SC
Service Centre (for SMS).

Service provider
A company that provides services and subscriptions to mobile phone users.

SI
Service Indication.

SL
Service Loading.

SIM card
Subscriber Identity Module card – a card that must be inserted in any GSM-based mobile phone. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized but both types have the same functions. Your phone uses the small plug-in card.

SMS
Short Message Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to your mobile phone. Messages are stored if the phone is off or out of reach ensuring that they reach you. To use this service, it must be supported by your network.

SS
Supplementary Services.

TCP/IP
Transmission Control Protocol/Internet Protocol.

TE
Terminal Equipment.

TLS
Transport Layer Security.

URL
Uniform Resource Locator.

USSD
Unstructured Supplementary Services Data.

VAS
Value Added Service.

WAE
Wireless Application Environment.

WAP
Wireless Application Protocol. Handheld devices, low bandwidth, binary coded, a deck/card metaphor to specify a service. A card is typically a unit of interaction with the user, that is, either presentation of information or request for information from the user. A collection of cards is called a deck, which usually constitutes a service.

WAP Application
A collection of WML cards, with the new context attribute set in the entry card.

WAP service
A WML application residing on a web site.

WBMP
WAP Bitmap.

WBXML
Wireless Binary Extensible Markup Language.

WDP
Wireless Datagram Protocol.

WML
Wireless Markup Language. A markup language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices.

WMLScript
WMLScript can be used to enhance the functionality of a service, just as, for example, JavaScript may be utilized in HTML. It makes it possible to add procedural logic and computational functions to WAP-based services.

Wireless Session Protocol.

WTLS
Wireless Transport Layer Security.

WWW
World Wide Web.

XML
Extensible Markup Language.

Related information

Documents

- The T100/T102 User's Guide
- Sony Ericsson T100/T102 FAQ
- AT Command Reference Manual
- WAP June2000 (WAP 1.2.1) Specification

Links

- http://www.SonyEricsson.com/
- http://www.SonyEricsson.com/wap/
- http://www.SonyEicsson.com/mobilityworld/
- http://www.extendedsystems.com/
- http://www.imc.org/
- http://www.3gpp.org/
- http://www.irda.com/
- http://www.etsi.fr/
- http://www.wapforum.org/
- http://www.imc.org/pdi/

Trademarks

Technical specifications

General

Product name	T100/T102
System	GSM phase 2 recommendations. GSM 900 and GSM 1800 (3GPP TS 51.010-1).
Speech coding	FR, EFR supported where available, for high speech quality
SIM card	Small plug-in card, 3V or 5V type
Type numbers	1102101-BV, 1102101-CN
SAR measurements: figures	European/Asian markets: SAR 10g max value, phone: 0.84 W/kg Australian market: SAR 1 g max value, phone: 1.3 W/kg SAR 1 g

Talk and standby times

Li-Ion, 650 mAh	Talk time	Up to 4,5 hours
	Standby time	Up to 200 hours

Exterior description

Size	99x43,5x17,7 mm
Weight	75 grams
Display size	101 pixels wide, 67 pixels high
Graphic display	4 grey scale
Text size	medium
Text rows	5 Latin 4 Chinese
Colour	Icy Blue Gentle Gold Fresh White
Keypad	17 keys and 2 volume keys (6 different keypads: Latin, Arabic, Thai, Hebrew, Chinese, Bopomofo)

Ambient temperatures

Operating	Max: +55×C, Min -10×C
Storage	Max: +70°C, Min -40°C
Charging	Max: +35°C, Min 0°C

Standard language configurations

Depending on software in the phone, these languages are supported:

Standard language config.	MMI	T9™ Text Input + other input methods	Keypad	Markets	Manual
1	English, Albanian, Arabic, Croatian, Czech, Greek, Hebrew, Russian, Serbian	English, Czech, Greek + Multitap, GDA, Cyrillic, Greek, Arabic, Hebrew, Numeric, URL	Latin Arabic Hebrew	Russia, Southern Africa, Israel, Czech Republic, Croatia, Boznia Herzegovina, Serbia, Greece, Albania	HR, CS, RU, SR, EN, ST, ZU, IW, EL, SQ
2	US English, English, Brazilian Portuguese, Bulgarian, Hungarian, LA Spanish, Polish, Romanian, Slovakian, Slovenian, Sotho, Zulu	English, Polish, Portuguese, Spanish + Multitap, GDA, Cyrillic, Greek, Numeric, URL	Latin	South Africa, Poland, Hungary, Slovak Republic, Slovenia, Bulgaria, Romania, Brazil, Mexico, Venezuela	EN, ST, ZU, PL, HU, SK, SL, BG, RO, BP, XL
3	English, Arabic, Estonian, Farsi, French, Latvian, Lithuanian, Russian, Turkish	English, French, Turkish + Multitap, GDA, Cyrillic, Arabic, Numeric, URL	Latin Arabic	Northern Africa, Turkey, Estonia, Latvia, Lithuania, Iran, Lebanon, Saudi Arabia, Bangladesh, India, Pakistan	FR, EN, TR, ET, RU, LV, LT, FA, AR
Asian	English, Malay, Tagalog, Vietnamese, Thai, Indonesian	English, Thai + Multitap, GDA, Numeric, URL	Latin Thai	Philippines, Indonesia, Thailand, Singapore, Malaysia, Vietnam, Sri Lanka, New Zealand, Australia	EN, IN, TH
Chinese	Chinese Simplified, English	English, Stroke, Pinyin (simplified) + Multitap, Numeric	Latin Stroke	Singapore, Malaysia	EN
	Chinese Simplified, English	English, Stroke, Pinyin (simplified) + Multitap, Numeric	Latin Stroke	China Mainland	ZS
	Chinese Traditional, English	English, Stroke, Pinyin (simplified) + Multitap, Numeric	Latin Stroke	Hong Kong	ZC
	Chinese Traditional, English	English, Stroke, Bopomfo + Multitap, Numeric	Latin Stroke Bopomofo	Taiwan	ZC

The user interface of the T100/T102 is available in 34 languages:

Albanian, American English (AE), Arabic, Brazilian-Portuguese (PB), Bulgarian, Chinese Simplified (ZS), Chinese Traditional (ZC), Croatian, Czech, English (EN), Estonian, Farsi, French (FR), Greek, Hebrew, Hungarian, Indonesian, Latin American Spanish (XL), Latvian, Lithuanian, Malay, Polish, Portuguese, Romanian, Russian, Serbian, Slovakian, Slovenian, Sotho, Tagalog, Thai, Turkish, Vietnamese and Zulu.

Speech coding

Dimension	Full rate	Enhanced full rate
Type	RPE/LPC with LTP	ACELP
Bit rate	13.0 Kbp/s	12.2 Kbp/s
Frame duration	20 ms	20 ms
Block length	260 bits	244 bits
Class 1 bits	182 bits	
Class 2 bits	78 bits	

Performance and technical characteristics

Dimension	GSM 900	GSM 1800
Frequency range	TX: 880 – 914 MHz RX: 925 – 959 MHz	TX: 1710 – 1785 RX: 1805 – 1880
Channel spacing	200 kHz	200 kHz
Number of channels	174 Carriers *8 (TDMA)	374 Carriers *8 (TDMA)
Modulation	GMSK	GMSK
TX Phase Accuracy	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)
Duplex spacing	45 MHz	95 MHz
Frequency stability	+/- 0.1	+/- 0.1
Voltage operation (nominal)	3.6 Volts	3.6 Volts
Transmitter RF power output	33 dBm Class 4 (2W peak)	30 dBm Class 1 (1W peak)
Transmitter Output impedance	50 Ω	50 Ω
Transmitter Spurious emission	Better than -36 dBm up to 1 GHz Better than -30 dBm over 1 GHz	Better than -36 dBm up to 1 GHz Better than -30 dBm over 1 GHz
Receiver RF level	Better than – 102 dBm	Better than – 102 dBm
Receiver RX Bit error rate	< 2.4%	< 2.4%

WAP browser technical data

Feature	Support in the T100/T102 WAP browser
Back to previous page	Yes
Bearer type GSMData (IP)	Yes, ISDN and analog
Bookmarks	Yes, up to 25 named bookmarks for easy access to frequently visited pages
Bookmark Export/Import	Yes, can be sent and received as link using SMS

Feature	Support in the T100/T102 WAP browser
Cache	Yes (size 5 kbytes)
Character sets *	UTF8 (Default), US-ASCII, Latin1, UCS2
Clear cache	Yes
Display	High resolution grey scale display (four grey scales)
Home page	Yes, up to 5 different, one for each WAP profile
Hyperlinks in Text	Yes, highlighted by inverse video
Hyperlinks in Images	Yes, indicated by a frame
Image Animation	No
Image Formats	GIF (interlaced and non-interlaced), no transparent layers
Network Settings	Up to 5 different settings available by selecting WAP profile (Intranet, Internet, Banking, Gateway etc)
OTA Support	Yes
PPP Authentication	PAP, CHAP and MS-CHAP
Reload page	Yes
Tables	Yes
User Agent Profiles	Yes, list of client characteristics - e.g. display size
WAP/WML	WAP June2000 (WAP 1.2.1)
WAP profiles	5 WAP profiles, each with its own settings
WTLS (security)	Yes, WTLS Class 1 - Encryption WTLS Class 2 - Encryption + Server Authentication. Root Certificates needed in phone

Cell broadcast service

Feature	Support in the T100/T102
User notification of the reception of a CB message	Message displayed on screen
Handling of reception of several unread messages	The last message overwrites the previous one
Support of all CBMI from 0 to 65535	Yes
File support	CBMI
Support CB SIM data download	Yes
Support of all applicable Data Coding Scheme values as defined in 3G TS 23.038 V3.3.0	Yes

Feature	Support in the T100/T102
Ability to display in an understandable way a message with a DCS “language unspecified” whatever language is set in the SIM card	Yes
Ability to extract a phone number or short number of a CB message to re-use it (to send an SMS or call the sender)	No
Support of multi-page CB messages	Yes

Short message service

Feature	Support in the T100/102
SMS Center Number	It is possible to pre-record the SMS Center Number.
Pictures	It is possible to insert a picture/an icon into the text message. EMS compliant mobile handsets will be able to see the picture correctly.
Input methods	Predictive text input
Message creation methods support	Predictive writing
Enhanced predictive writing method by:	
copy, cut and paste words	No
teaching of predictive words that are not in the predictive dictionary	Yes
Possibilities when creating a message:	
save a sent message in a “sent items” folder	Yes
insert a line in the message	No
assign a validity period to the message	Yes
print via IrDA	No
use predefined messages	Yes
Possibilities when receiving a message:	
reply to the sender	Yes (only to the sender, not to all or part of the message recipients)
forward the message	Yes
save the message in the inbox	Yes
get delivery time and date	Yes
print via IrDA	No
Possibilities of the previously sent message:	

Feature	Support in the T100/102
delivery report of the message	Yes
forward the message	Yes
print via IrDA	No
Possibilities of the previously received message:	
reply to the sender	Yes (only to the sender, not to all or part of the message recipients)
save the message in the Inbox	Yes
forward the message	Yes
Supported ways for replying to a received SMS:	
via SMS	Yes
via phone call (set up a call to the number contained in the message body)	Yes
via WAP call (go to the WAP address contained in the message body)	Yes
via USSD session	No
Possibility to offer the user the ability of sending an SMS to a list of recipients	Yes, using Phone Book groups
Possibility to write an e-mail address as a recipient adress	No
SMS storage	In the SIM and in the mobile handset.

Enhanced message service

Feature	Support in the T100/T102
Level of compliance supported by the mobile handset regarding the specifications described in release 99.	Enhanced Messaging Service (EMS) according to the standard 3GPP TS 23.040 v4.2.0, with the addition of the ODI feature from 3GPP TS 23.040 v5.0.0.
Number of messages that the mobile handset is able to handle to generate a concatenated message	6
Storage capacity	15 messages in the mobile handset. The total storage capacity depends on the storage space of the SIM.
Outgoing messages	It is possible to... • see how many short messages an EMS message consists of before sending it. • choose whether to send the message or not after writing it.

Feature	Support in the T100/T102
Incoming messages	• A pre-defined signal is heard once all parts of the message have been received or when a timeout occurs. • It is possible to re-use the content of an EMS message. Sounds, pictures, text formatting, can be inserted in a new message, if the object is not protected using ODI.
Concatenated messages	A receipt is received in the mobile handset when all parts of a concatenated message have been delivered.
Attachments	It is possible to attach pictures, animations and sounds to an EMS message.
Sounds	Chimes high, chimes low, ding, tada, notify, drum, claps, fanfare, chords high, chords low.
I-melody	Yes, version 1.2.
Melodies	It is possible to... • edit and create melodies by using the phone keypad. • send and receive melodies via EMS. • download melodies and commercial tunes from Web/WAP portals. • create melodies on Web/WAP portals.
WBMP	Yes
Picture sizes	16x16 mm, 32x32 mm, variable size receipts in black and white.
Pictures	It is possible to... • edit and create pictures by using the phone keypad. • send and receive pictures via EMS. • receive pictures in enhanced messages originated by service providers.
Animations	The mobile handset supports the following animations: I am ironic, I am glad, I am sceptic, I am sad, WOW!, I am crying. Plus the other 9 defined in 23.040 v4.3.0. It is possible to... • send and receive animations.
TP-PID field value given by the mobile handset before sending an EMS message	0x00

Images – downloading to phone

Feature	File type	Max. size	PC/Cable	PC/IrDA	Phone-to-phone	WAP
EMS icons	WBMP	WxH<=1024 pixels (32x32)	No	No	Yes	Yes
Background	GIF	WxH<=2847 pixels (73x39)	No	No	Yes	Yes

Consumer pack content

- 1 Mobile phone T100/T102
- 1 Standard battery BST-26
- 1 Standard charger, CST-13
- 1 User guide
- 1 Sony Ericsson Service and Support Leaflet
- 1 SAR leaflet
- 1 Wrist strap, only for Asia Pacific and China Mainland

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