White Paper

October 2005

Z300

Sony Ericsson

Preface

Purpose of this document

This White Paper will be published in several revisions as the phone is developed. Therefore, some of the headings and tables below contain limited information. Additional information and facts will be forthcoming in later revisions.

The aim of this White Paper is to give the reader an understanding of technology and its main applications, as well as the main functions and features of the phone.

Note: This document contains general descriptions for this specific Sony Ericsson mobile phone.

People who can benefit from this document include:

- Operators
- Service providers
- Software developers
- Support engineers
- Application developers

This White Paper is published by:

Sony Ericsson Mobile Communications AB,
SE-221 88 Lund, Sweden

Phone: +46 46 19 40 00
Fax: +46 46 19 41 00
www.SonyEricsson.com/

First edition (October 2005)
Publication number: LZT 108 8019 R1A

Sony Ericsson Developer World

On www.SonyEricsson.com/developer, developers will find documentation and tools such as phone White Papers, Developers Guidelines for different technologies, SDKs and relevant APIs. The website also contains discussion forums monitored by the Sony Ericsson Developer Support team, an extensive Knowledge Base, Tips & Tricks, example code and news.

Sony Ericsson also offers technical support services to professional developers. For more information about these professional services, visit the Sony Ericsson Developer World website.

Contents

Product overview

The Z300 is a small, elegant and compact clamshell that fits perfectly in your hand. The inside contains a large and easy-to-use keypad and a bright colour display. When the phone is folded, the keypad and the main display are protected, eliminating the risk of accidentally making a call while the phone is in a bag or pocket. On the outside there is a practical sub-display that shows who is calling.

The ergonomic keypad with large buttons makes it easy to browse through the phone menu. The 65k colour display offers crystal clear images making the phone fun to use. You can personalize the phone with Style-Up™ covers and integrated themes or download new content such as polyphonic ringtones and wallpapers.

With GPRS (General Packet Radio Services), the Z300 offers a fast and satisfying mobile Internet experience.


Sony Ericsson
Sony Ericsson
Sony Ericsson

Key functions and features

The Z300 has an innovative interface that enables fast and efficient use. The main menu that provides an overview of all functions and features in the phone, is easily reached by pressing the navigation key in standby. The main menu is accessible during an ongoing call, this feature allows multitasking - an air time generator.

Actions in the Z300 are always carried out in the most efficient way, and in standby there is a visible status bar at the top of the display. The status bar extends the usage of non-voice features by displaying icons and indicators of ongoing calls.

Clamshell

The new Z300 clamshell phone from Sony Ericsson has a unique design and is easy to use.

The Z300 features active clamshell functions. This means for example, that you can answer calls very easily by just opening the phone and end calls by closing the phone. You can also answer and end calls by pressing the Yes and No keys respectively.

The Z300 also features two displays. When the phone is open, the user can enjoy the ultimate viewing experience offered by the 65k full colour main display. The display has 128 x 128 pixels and offers the user maximum information with the least scrolling.

When the phone is closed, the 64 x 64 pixel status display is visible. This black on white display provides you with information even when the phone is closed. For example, when receiving an incoming call, the number (or name if you have the incoming number stored as an entry in the Phonebook) of the person who is calling is animated in the status display. The status display also shows other information such as the current time, and network and battery status.

MMS (Multimedia messaging)

Reacting to the enormous popularity of mobile phone messaging, Sony Ericsson has incorporated the latest messaging standard, along with a colour display for an enhanced imaging experience.

Say it in words, say it with pictures, animate it, add sound. Have fun putting together multimedia birthday and holiday greetings.

EMS (Enhanced Messaging Service)

Enhanced Messaging Service (EMS) adds a new powerful functionality to the well-known SMS standard. With it, mobile phone users can add life to SMS text messaging in the form of pictures, animations, sound and formatted text. This gives the users new ways to express feelings, moods and personality in SMS messages. Apart from messaging, users will enjoy collecting and swapping pictures and ringtones and other melodies, downloading them from the Internet or editing them directly on the phone.

EMS uses existing SMS infrastructure and industry standards, keeping investments to a minimum for operators and providing a familiar user interface and compatibility with existing phones and with other manufacturers.

Style-Up™ covers

One extra set of exchangeable front and back covers can be included in a customized kit. In general, these covers must be purchased seperately as accessories. Style-Up™covers come in an array of wonderful colours that allow you to change the appearance your Z300. Whether it is to complement an outfit with colour coordination, make a pleasant change to your phone, or simply match the way you feel Z300 Style-Up™ covers offer you a good choice.

The Style-Up™ covers can also be complemented with a matching wallpaper, pre-stored in the phone or downloaded from mobile Internet.

Ringtones

There are several ways to find a catchy ringtone for the Z300. One way is to choose any of the pre-programmed ringtones in the phone. It is also possible to download a ringtone from a WAP site or receive it in an EMS message from a friend or a company that sells ringtones. Up to 8 polyphonic ringtones

of 50kb can be downloaded. When the phone's memory is full the user must delete content in order to free up space for new content.

Display

The Z300 has two displays, the main display and the status display on the clamshell cover.

The Z300 main display is an STN LCD (Super Twisted Nematic Liquid Crystal Display) with 65k colours. It measures 128 x 128 pixels, which is larger than those offered by many other phones on the market. Compared to 4k colour displays, the contouring effect that arises in colour gradients is less visible on 4k colour displays, resulting in a smoother transition from, for example, a darker to a lighter nuance.

A large colour display makes it fun to browse content that is stored in your phone, like pictures, themes and wallpapers, and when online, using mobile Internet, you are able to enjoy colourful web pages. Such displays make gaming extra fun when you have some time to spare, for example while travelling or waiting for the bus.

The Z300 status display is a 64 x 64 pixel black on white display which provides you with information even when the phone is closed. The number of incoming calls is shown in the status display, along with other information such as the current time, and network and battery status.

Nokia Smart Messaging

The Z300 supports Nokia Smart Messaging by allowing the user to receive, store, and use pictures and ringtones included in messages sent from Nokia phones. The max size of a picture is 2016 pixels (72x28). It is also possible to send a Nokia push message

.

Internet 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 Internet browser in the Z300 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 services, such as ticket reservation. It is also handy when you want to access text-based information, for example newsreading, timetables, share prices, exchange rates, Internet banking and other interactive services.

AMR

AMR uses various modes to improve network conditions. When the channel is poor, source coding is reduced and channel coding is increased. This results in better network quality. With AMR this improvement is approximately 4-6 dB S/N for useable communication. This system allows network operators to prioritize capacity or quality per base station.

GPRS

GPRS uses Internet-style packet based technology. It uses the radio link only for the duration of time that it transfers data. GPRS offers the user the speed needed for satisfactory mobile Internet usability. The Z300 supports the GPRS 4+1 (Class 8) standard.

Dual band support

Dual band support means that you can use the phone on two types of GSM networks; the Z300 can be used on GSM 900 and 1800 networks.

Co-branding

It is possible for a co-brand inlay to be placed in the area below the keypad. Sony Ericsson offers high quality print on the co-brand inlay, with good resistance to external stress.

Settings

Operators can customize many settings in the phone, such as data communication settings, the download links in the menu system, and the handling of long text messages, for example.

Content

Much of the content in the phone can be customized. For example:

- Start-up display
- Polyphonic ringtones
- Themes
- Wallpapers
- Shut-down display
- MMS template

More in-phone functions

Keys to efficiency

The layout of the keys is one of many new and improved elements in the Z300, helping the user to find functions and features in the phone quickly and easily. Conveniently and ergonomically grouped together, the Yes and No keys, navigation keys, option key and the “C” key enable the user to navigate, select and perform actions.

Navigation key

The 4-directional + select key is designed to easily navigate the menu system. In a menu, it can be gently pressed to select a feature. You can create shortcuts from standby to various menus and use the navigation key for direct access. These keys can also be used when playing computer games.

Option key

The option key provides the user with a list of options while in a function.

- In standby, press to turn on or off silent mode, see the status menu.
- In standby, press and hold for instant WAP-access.
- During an ongoing call, press to control calling functions, for example, *Turn off tones*, *Hold call*, and *Join calls*.
- When writing a text message, press for a list of options, for example to insert an item in the message or to select text format or input language. Another way to access the input language menu when writing a text message, is by pressing and holding the “#” key.

“C” key

The “C” key is used to delete items and to turn sounds on and off.

Themes

The already popular themes in Sony Ericsson mobile phones have been further developed and improved in the Z300, enabling the user to personalize the phone with pictures, colours, wallpapers, and the like. The Z300 comes with four embedded themes and all their features are displayed in the 65k colour screen, which gives a unique user experience. As a customization, themes can be replaced by the operator.

Wallpapers

The user can have a wallpaper in the display, to bring extra life to the phone when in standby mode. The wallpaper can be one of the pre-defined, replaceable pictures or an operator defined picture. It is also possible for users to download wallpapers from WAP sites. File size is restricted to 50k each. When the phone’s memory is full the user must delete content in order to free up space for new content.

Games

The Z300 features three popular games for different moods and skills:

- Black Deal
- Minigolf
- Honey Cave 2

In addition to impressive graphics and sounds, the Z300 is also equipped with force-feedback functionality, a popular feature of many games that are developed for mobile phones today.

Start-up show

One way to make the Z300 more personal is to have a user-defined start-up show. Each time the phone is turned on, an animation or picture appears in the display. There is one Sony Ericsson-defined show stored in the phone, and it is also possible to have one operator/customer defined show. As with the wallpaper, the user-defined show can use any of the pictures stored in the phone.

Services on the network

The Z300 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.

Direct download links

The direct download link is a function designed to encourage downloading of content via WAP to enrich the user experience. Furthermore the download link also tries to influence the user to use WAP-based services and get used to using data oriented services on the network. Direct download links works with both GSM and GPRS.

The *Fun&Games* menu includes a *Download* link, which directs the user to, for example, the Sony Ericsson WAP site, where there are links to Pictures and Sounds, available for download. Please note that this menu is operator, network and subscription dependent.

It is possible for operators to include an additional link with their own URL and generic name for all languages.

T9™ Text Input for quicker messaging

The Z300 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. Of course, the Z300 also lets you add new words to the word database.

Phonebook

The phonebook is one of the most useful features of mobile phones. The phonebook in the Z300 lets you save up to 200 entries. An additional number of entries can be saved on your SIM card. The number depends on what SIM card you are using.

Picture Phonebook - see who's calling!

The Z300 lets you assign a picture or an icon stored in the phone to an entry stored in the Phonebook. When that person calls, a picture or an icon of your choice is shown in the display as well as the name. It is also possible to assign a ringtone to an entry in the phonebook. When that person calls, a particular ringtone is heard, and the name of the person calling is shown in the display.

The pictures used for Caller ID can be:

- Any of the EMS pictures that come with the phone.
- Pictures that have been received via EMS messages.
- Any operator-defined picture stored in *My Pictures*.
- Pictures downloaded via WAP, (for example from www.SonyEricsson.com/fun)

The Z300 also supports name and number presentation as well as CLI restriction.

Shortcuts

It is easy to access the phone numbers in the phonebook 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 phonebook and find the first name that starts with that letter. Then you just scroll to find the name you are looking for.

Up-to-date with the calendar

The calendar of the Z300 keeps you on the right track. It has four different views: day, week, month and the all tasks view.

Profiles

The profile feature is 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. Some phone accessories select a profile automatically. For example, when you attach a portable handsfree to your Z300, the *Port h-free* profile is chosen. There are seven pre-programmed profiles: *Normal*, *Meeting, In car, Outdoors*, *Port h-free (portable handsfree)*, *Home, Office and TTY Accessory*.

You cannot create more profiles, but you can change the settings for a profile.

Alarm clock

The Z300 has a built-in alarm clock, which can be set to ring at a specific time within 24 hours, or recurrently at a specific time on several days. You can have both these alarms set at the same time. Note that even if you have set your phone to silent, the alarm signals ring. The alarm clock also rings if the phone is turned off.

Auto time zone

The phone comes with an *Auto time zone* functionality. When this is enabled, you are prompted to update the time when your phone changes network and the time sent out from the network operator differs from the time in your phone. If you press Yes, the time is updated automatically. This functionality is useful while travelling abroad, across different time zones.

Technologies in detail

This chapter offers a detailed description of the technologies available in this product. Encompassing a broad and rich range of functionality, they facilitate basic functions such as calling as well as developments found in entertainment, imaging and connectivity.

Internet services

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 with new opportunities for business, individuals, and service providers.

Using the Internet with Z300

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

Provide settings
Using text 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 can 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 Z300 to allow the contents to be automatically optimized for the phone.

Several bearer types
The Z300 accesses WAP over a standard GSM Data connection as well as over a GPRS connection (network-dependent services.)

Option key while browsing
During browsing, a press on the option key gives the user immediate access to an option menu while using WAP services, similar to right-clicking the mouse 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 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 Z300 holds up to five 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 Z300 supports connection-oriented WAP over GSM as well as GPRS 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 provides high reliability with a reduced risk of errors in transmission, and improves efficiency in WAP browsing.

Bearer type characteristics

The Z300 accesses WAP services over IP. IP can be provided either over GSM Data or GPRS, depending on network services.

Typical differences that distinguish the bearer types are listed below.

GSM data access

- Circuit connection of data calls, means that the phone is connected during the entire WAP session.
- Pricing is comparable to that of data calls in the network.

GPRS access

- The connection is maintained “constantly”, with data transmitted in packets, and transmission capacity of the application in use on an as-needed basis.
- GPRS offers higher transmission speed than with GSM Data or SMS access.
- Pricing of GPRS can be dependent on the actual use of bandwidth, which means the user is charged for the volume of data transmitted, rather than the duration of the connection.
- While transmitting large amounts of data, bandwidth can be increased automatically to allow faster transmission speed.
- Ideal for complex pull services, browsing, data transfer, provisioning, pager services, messaging services, info services, push initiations.

Security using WAP

The Z300 supports WAP 1.2.1, a version of the Wireless Application Protocol that includes WTLS class 2.

While 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 Z300 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 Sony Ericsson step-by-step WAP configurator. The configurator utilizes OTA provisioning, and is available on www.SonyEricsson.com; no login required.

A manual configuration is done using the menu system in the phone. This is described in the user guide.

To simplify configuration of 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.
- 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 the 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. Instant messaging and chat.
- News, sport results, weather forecasts, financial information (such as stock quotes).
- Fill up a smart card with e-cash.
- Interactive games, for example, play poker with a friend.

In the Z300, 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 Z300, 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 Z300 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.

WAP with GPRS

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 Z300, the mobile Internet is always with you. The default address for non-customized products is the address to the Sony Ericsson WAP site. This address can be changed by the user, who may also add his or her own bookmarks to favourite WAP sites. Operators can take advantage of the customization possibilities offered by Sony Ericsson, and have the address of their own WAP site assigned instead.

Data connections

In order to browse via WAP, the user must have a data communication connection configured in the phone. This connection contains specific settings and parameters to connect to an appropriate server. Several data connections can be saved in the Z300. To make it easier for the user, data connections can be provided by the operator via OTA provisioning. For more information about configuration of WAP settings, see “Configuration of WAP settings” on page 17.

Advantages of data connections include:

- Once the data connections are defined and named, the user does not have to enter the settings for the connection again.
- Data connections can be re-used at any time.
- Individual data settings for working with WAP can be stored and activated as needed.
- Data connections can be used for both GSM Data and GPRS connection settings.
- Bearer type for WAP and corresponding bearer-specific parameters may be selected.
- Data connections contain the necessary settings for the Internet access point, including modem pool phone number or IP address, user ID and password.

General Packet Radio Services

The introduction of GPRS (General Packet Radio Services) is one of the key steps in the evolution of today’s GSM networks for enhancing the capabilities of data communication. Data traffic is increasing enormously (over both wired and wireless networks), with the growth in demand for Internet access and services paralleling that for mobile communications.

The demand for high-speed Internet access will be the key driver for coming generations of wireless services, and GPRS can deliver the necessary speed. GPRS allows creation of innovative services, makes it possible to address new and previously inaccessible market segments and increases customer loyalty.

GPRS applications can be developed as both horizontal and vertical. Vertical applications are specific, including those for operations such as reaching police and emergency, taxi, delivery or automated services (vending machines, supervision, vehicle tracking). Horizontal applications are more generic and include those for Internet access, e-mail, messaging, e-commerce and entertainment.

GPRS is able to take advantage of the global coverage of existing GSM networks. Applications developed for GPRS can be deployed on a large scale and can reap the associated benefits. GPRS also provides a secure medium for connections to banking and financial services.

Using GPRS in the Z300

Instead of occupying an entire voice channel for the duration of a data session, the Z300 sends/receives data in small packets, as needed, much like IP on the Internet. Because of this, the Z300 maintains a constant online connection, its data transmission abilities summoned by the application in use on an as-needed basis.

The GPRS specification includes four coding schemes – CS1, CS2, CS3 and CS4 – that allow data speeds of 9,050 bps, 13,400 bps, 15,600 bps and max 21,400 bps per slot, respectively. The Z300 works with all four coding schemes, but data speed naturally varies according to network configuration. At the moment, CS-3 and CS-4 are not supported in any live network, i.e, present speed is limited to 53,600 bps.

The GSM system limits the ability to use all eight time slots, so the Z300 uses up to four time slots for receiving data, and one slot for transmitting. This means the speed for receiving data is up to 85,600 bps and up to 21,400 bps for sending data.

Using GPRS with the Z300 has several advantages, for example:

- Constant connection
- High speed
- Automatic access to increased bandwidth while downloading large files such as pictures and sounds
- Cost efficiency
- Use of transmission capacity only when needed to reduce cost
- WAP over GPRS
- Access to Internet via WAP at high speed and with a constant connection.
- Provide settings
- Receive GPRS configuration settings from the provider over the air, OTA, making manual configuration unnecessary.
- User controlled settings
- Take advantage of full user control in the data connections menu, establishing multiple descriptions and accessing advanced settings for GPRS.

Interruption of GPRS data account

When the user is using WAP via GPRS on the Z300, the GPRS connection is automatically disconnected when the user answers an incoming call. However, when the call has ended, the user is given the possibility to resume the WAP session.

SIM application toolkit

The SIM Application Toolkit (SIM AT) is a smart card-centric method of deploying programs that applies 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 while 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 Z300, a separate menu is available for functions residing on the SIM card. These can include submenus for controlling functions, and also functions that allow the phone to initiate calls, send data, and display information to the user.

Messaging

MMS

An MMS message can contain text, graphics, animations, images, audio clips and ring melodies. For third party developers' information, please visit www.SonyEricsson.com/developer and look for the MMS developers guidelines.

Multimedia Messaging uses WAP (Wireless Application Protocol) or http as bearer technology which also can be powered by the transmission technology GPRS. The messages may include any combination of text, graphics, photographic images and music clips. MMS will serve as the default mode of messaging on all terminals, making total content exchange second nature. From utility to sheer fun, it offers benefits at every level and to every kind of user.

Over the air (OTA) configuration

Users can easily get MMS into their phone. MMS supports OTA, meaning that the user does not have to configure the settings manually. The configuration is done by the operator via OTA.

Note: The specification is in accordance with Ericsson Nokia OTA configuration v7.1.

MMS objects

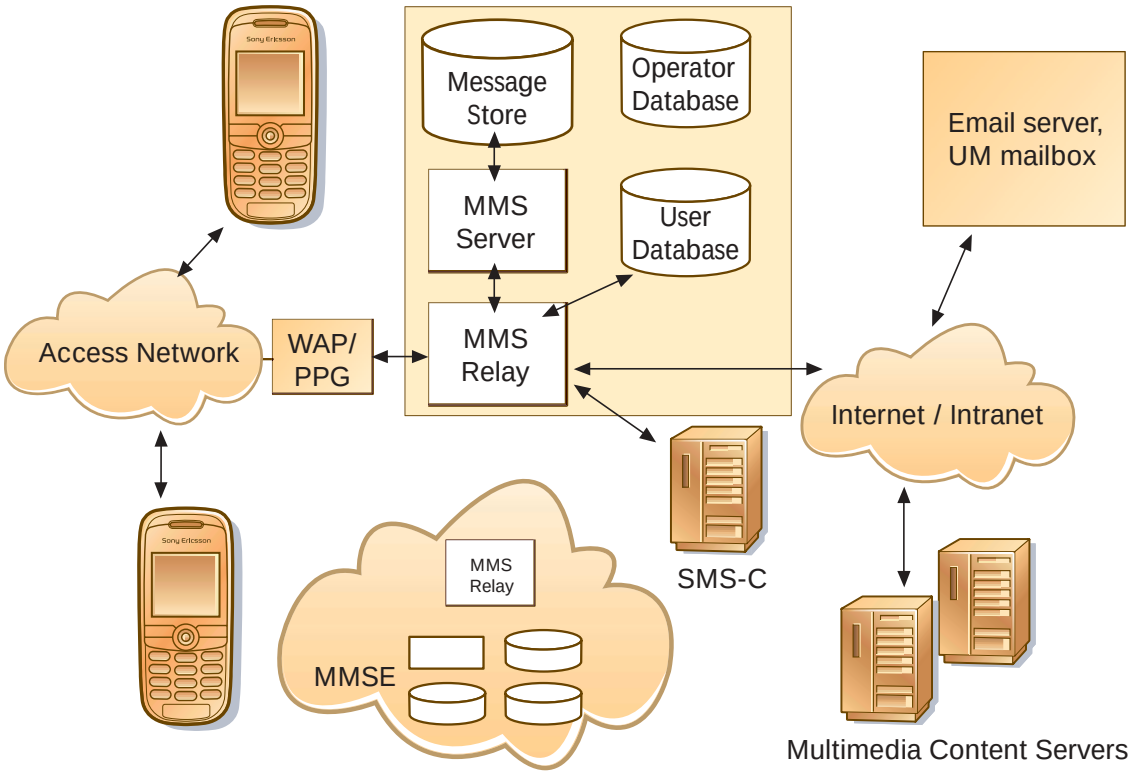
The key word to describe MMS content is rich. Complete with words, sounds and images, MMS content is endowed with the user's ideas, feelings and personality. An MMS message can contain text, sound and pictures.

MMS technical features

The MMS standard, just like that of SMS, offers store-and-forward transmission (instant delivery) of messages, rather than a mailbox-type model. MMS is a person-to-person communications solution, meaning that the user gets the message directly into the mobile phone. He or she does not have to call the server to get the message downloaded to the mobile. Unlike SMS, the MMS standard uses WAP as its bearer protocol. MMS will take advantage of the high speed data transport technology GPRS and support a variety of image and audio formats to facilitate a complete communications experience.

Architecture

The MMS Centre (MMS-C) is comprised of the MMS Server, the MMS Proxy-Relay and the MMS Store. The MMS Centre is the central element of the MMS network architecture, providing storage and operational support, enabling instant delivery of multimedia messages from terminal-to-terminal and supporting flexible addressing. The centre's MMS Proxy-Relay interacts with the application being run on the MMS-enabled terminal to provide various messaging services. WAP or http is used as the bearer of an MMS message between the MMS-C and the MMS client (application). The WAP Gateway is used for delivery and retrieval of messages. Information is read in the WAP browser.



Message conversion

The MMS-C is able to perform limited message conversion - for example, from MMS to SMS - so that processing and air time is not wasted in sending messages to mobile terminals that do not have adequate capability to receive them. It also handles service aspects such as store and forward, guaranteed delivery, subscriber preferences, operator constraints, and billing information. The MMS-C also vouches for high quality messaging, for example by format conversion. This means that the MMS-C recognizes which formats are supported in the mobile phone, and adapts the MMS messages to these formats.

EMS (Enhanced Messaging Service)

EMS uses existing SMS infrastructure and industry standards, keeping investments to a minimum for operators and providing a familiar user interface and compatibility with existing phones.

Sounds and melodies

EMS gives the user the ability to send and receive melodies. These melodies can be pre-defined sounds, sounds downloaded from the Internet, sounds received in SMS messages or sounds composed by the user on the phone keypad or a PC.

Several sounds and melodies can be inserted in one message, and they can be combined with pictures.

Pictures, animations and formatted text

Phones supporting EMS include a set of predefined animations for inserting in SMS messages. New pictures and animations are downloaded from the Internet or received in SMS messages. Several pictures can be inserted in one message, and they can be combined with sounds and melodies. The users can format text in messages with different styles and sizes.

Concatenated messages (long SMS)

A part of the EMS standard is the support for concatenated messages, which means that the phone is able to automatically combine several messages both when creating and receiving EMS. This is useful to be able to build and display messages with rich content since the amount of information in each SMS is limited by the SMS standards.

Compatible with SMS standards

Users have found EMS as easy to use as SMS. In January 2001, 15 billion SMS messages were sent every month worldwide. Roughly 80% of this traffic was user-to-user i.e. mobile phone users sending short messages to each other using the keypad of the phone to enter text. The remaining 20% consisted of downloads and notifications of different kinds.

Huge business potential

Network operators can now enhance their services and attract more customers by offering pictures, animations, ringtones and melodies for download at their portals. Operators can charge more per EMS message since it contains more data. Thereby EMS adds more value to the operators and to the end users.

Standards

The Enhanced Messaging Service (EMS) standard has evolved and is now stable and complete as a part of the 3rd Generation Partnership Project (3GPP) technical specification. Most major mobile phone manufacturers and most operators are actively contributing to the 3GPP standards.

EMS dynamics

An EMS message can be sent to a mobile phone that does not support EMS, or only supports part of EMS. All the EMS elements - text formatting, pictures, animations and sounds - are located in the message header. The EMS contents are ignored by a receiving phone that does not support the standard. Only the text message will be displayed to the receiver. This is true consumer-friendly standardization.

Examples of EMS contents and applications

A wide range of contents, applications and services may be developed. Below is a list of examples and areas where messaging can be enhanced with EMS.

User-to-user message

Messages usually originating from the keypad of a mobile phone can include pictures, animations, melodies, formatted text with EMS.

Voice and e-mail notifications

Notifying mobile phone users that they have new voice or fax mail messages waiting - including icons or melodies with EMS.

Unified messaging
The user typically receives a short message notifying them that they have a new message in their unified messaging box, with icons or formatted text further enhancing the message.

Ringtones
Downloading ringtones from the Internet.

News & commercials
World news illustrated, sports scores and news headlines, finance and stock market news with diagrams and tickers, commercial product promotions, weather reports with maps, tunes from TV commercials as ringtones.

Info & entertainment
Ringtones, e-greetings, football club logo, joke-of-the-day illustrated by pictures or sound, horoscopes, movie-related animation or theme song, TV show promotions, music artist promotions, lottery results, food and drink pictures and recipes, mood-related pictures.

Corporate
Flight schedules, pre-installed corporate logos, map snippets and travel info, company branded icons and ring tones, corporate e-mail notifications, affinity programmes where companies notify customers of product updates, banks notifying customers about new services and interest rates, call centres providing answers to questions about a product, vehicle positioning combining EMS with Global Positioning System (GPS) position information, job dispatch with delivery addresses for sales or courier package delivery, using EMS in a retail environment for credit card authorization, remote monitoring of machines for service and maintenance purposes.

Polyphonic ringtones

The Z300 uses the new and improved Oki chip for superior sound quality. The reason for changing from the Yamaha chip to the Oki chip was based on sound quality as opposed to the number of available voices.

Although Yamaha offers 40 voices only eight are based on wavetable or real music sounds. The remaining 32 voices are all FM generated, which means modulated tone generators. This influences the sound quality making it synthetic or toy-like. Treble instruments sound more like modulated noise. It also makes finding suitable content difficult in terms of matching the sound of other products.

The Oki chip bases its 32 voices on real music sounds from a wavetable (originally from Casio Musical Instruments). Consequently, the sound from the Oki chip is much more natural and musical. We have used Oki chips in a number of phones with good results (T30, T310, T610, T630, Z600 etc).

Protocol

The Z300 has a hardware synthesizer chip, built into the mobile phone. The software controls the MIDI files, and makes sure they fit into the hardware chip. It is possible to modify the dynamics of the sound.

The Z300 supports the MIDI 1.0 detailed specification. Please visit www.midi.com for more information.

Rich musical ringtones – 32 voices

The human ear can perceive sounds from approximately 20 Hz up to 20 kHz. In most GSM mobile phones, the speech sound range is from 300 Hz to 3400 Hz, which is good enough for speaking, but quite poor for music. The Z300 can handle up to more than 20 kHz, which means excellent sound quality.

The Z300 has a dedicated speaker for ringtones and sounds, to ensure the best possible sound quality. This speaker is situated on the back of the phone, ensuring that no discomfort is felt if a second call is received during an ongoing call.

The quality of the sound heard from the speakers depends on many different things, for example on the synthesizer, the amplifier, or the speakers. An important factor for sound quality is the number of voices. The human ear cannot separate each voice if the number of voices increases above 16 or so, because then the voices merge together. But the nuances in music increase, and the music is experienced as more sophisticated if the number of voices increases. Many modern sound modules in synthesizers used by musicians have 16, 24 or 32 note polyphony. The number of voices used in the Z300 is 32, which gives rich musical ringtones.

In-phone functions and features

*Subscription and/or network-dependent

A	Alarm clock with snooze function	Yes
B	AMR	Yes
	Background light	Yes
	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*	Yes
	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*	Yes
	Calling card service	No
	Calling Line Identification (CLI)	Yes, with name or number, personal ring-tone and pictures
	Clock	Yes
	Closed User Groups (CUG)*	10
	Conference calls*	Yes
	Copyright protection	Yes, possible with copyright protection via EMS.
	CSD, Circuit Switched Data*	Yes
D	Date	Yes
	Display (main)	Yes, 65k colours, 128 x 128 pixels
	Display (status)	Yes, black and white, 64 x 64 pixels
E	EMS (Enhanced Messaging Service)*	Yes
	EMS, pre-defined pictures/icons	20
	EMS, animations	Yes, 15 pre-installed

	EMS, text formatting	Yes. Size, style and alignment. Not applicable to Chinese characters
	EMS, sounds	10
F	Fixed Dialling Numbers (FDN)*	Yes
G	Games	Yes, 3 pre-installed: Black Deal, Minigolf, Honey Cave 2
	GPRS (General Packet Radio Service)	Yes, 4+1
I	Input methods	T9™ Text Input, multitap alphabetic (GSM standard), Latin, Bopomofo, Thai, Stroke, Arabic, Cyrillic, Hebrew, Hindi
K	Keypad lock	Yes
M	MMS	Yes
N	Nokia Smart Messaging	Yes
O	Option key	Yes
P	Phonebook	200 entries in phone + SIM
	Phonebook groups	10
	Phone lock	Yes
	Picture Phonebook	Yes
	Profiles	Yes, 7
R	Re-dialling, automatic	Yes
	Ringtones, monophonic	There are no predefined or user editable imelodies. Storage space is limited by avaiable memory.
	Ringtones, polyhonic	Yes
	Ringtones, exchange	Yes, monophonic via EMS. MIDI ringtones can be received via MMS
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 10 linked messages of 160 characters each
	SMS Cell Broadcast*	Yes
	SMS counter	Yes
	SMS templates	Yes, 10 predefined

	Speech coding	Enhanced, Full and Half rate coding, AMR
	Speed dialling	Yes
	Start-up show	Yes
	Status menu	Yes
	Stopwatch	Yes
T	Timer	Yes
V	Vibrating alert	Yes
W	Wallpaper	Yes
	WAP browser	Yes, WAP 1.2.1 browser
	WTLS for added WAP security*	Yes, WTLS class 2

Network-dependent features

SMS and EMS messaging

The Z300 is capable of sending and receiving SMS, EMS messages and concatenated 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.

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

This chapter offers readers a detailed listing of all the technical data relating to the product. Comprehensive descriptions of performance and technical characteristics are presented in table format for quick and easy access.

Technical specifications

General

Product name	Z300
System	GSM phase 2 recommendations. GSM 900, GSM 1800 (3GPP TS 51.010-1)
Speech coding	FR, EFR, HR supported where available, for high speech quality. AMR
SIM card	Small plug-in card, 3V type
Type numbers	AAB-1021021-BV, AAB-1021021-CN

Talk and standby times

Li-Polymer, 900 mAh	Talk time	Up to 5.5 hrs
	Standby time	Up to 250 hrs

Exterior description

Size	85,5 x 45 x 23 mm
Weight with battery	91g
Mechanics	Clamshell
Display size,	
Main display	128 pixels wide, 128 pixels high
Status display	64 Pixels wide, 64 pixels high
Colour display, main	65k colours
Colour	Granite (DPY 101-2892/XX) Amethyst (DPY 101 2893/XX)
Keypad	Keyboard supporting 16 keys (YES/NO-keys, C-key, Menu-key and numeric keys) plus five-way navigation key. Separate on/off key below keypad. Keypad language: Latin, Bopomofo, Thai, Stroke, Arabic, Cyrillic, Hebrew, Hindi
Speaker	Two speakers supporting two modes: receiver and ringer (polyphonic).
Volume keys	Volume up and volume down

Ambient temperatures

Operating	Max: +55°C, Min -10°C

Storage	Max: +70°C, Min -40°C
Charging	Max: +55°C, Min 0°C

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 Z300 WAP browser**
Back to previous page	Yes
Bearer type	Circuit switched CSD analogue and ISDN, packet switched GPRS.
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
Cache	Yes, 5 kb
Character sets *	UTF8 (Default), US-ASCII, Latin1, UCS2
Clear cache	Yes
Display, main	High resolution 65k colour
Display, status	Black-white

Feature	Support in the Z300 WAP browser
Home page	Yes, up to 5 different, one for each WAP profile
Hyperlinks in Text	Yes
Hyperlinks in Images	Yes, indicated by a frame
Image Animation	No
Image Formats	JPEG, WBMP, GIF (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 and 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

WAP operator technical data

Feature	Support for WAP in the Z300
WAP Browser	
Version	1,21 baseline
WAP Provisioning	
Total Parameter sets	5
Parameter set list	Name Startpage IP settings: CSD phone no., CSD Data rate, CSD dial type GPRS APN, password request, allow calls, authentication, quality of services IP address UserId and password Security on/off Show images on/off
Manual selection	Yes, between Analog (V32) and Digital (V110)
Parameter sets include	WAP/CSD, WAP/GPRS (different sets)

Feature	Support for WAP in the Z300
Factory pre-configuration	WAP/CSD (possibility to lock a setting), WAP/GPRS
OTA	WAP/CSD, WAP/GPRS configuration possible
Simultaneous OTA	WAP/CSD, WAP/GPRS configuration possible
Single OTA	one of WAP/CSD or WAP/GPRS configuration is possible
Bookmarks	Not empty by default
URL format	Underlined
Security mechanism	
OTA provisioning (if empty)	Operator verification through a code, included in the OTA data. This code is shown to the user who can choose installation or not.
Interface (if empty)	An Install question is asked with the code, if available. The user has to choose if a new WAP profile shall be created or an existing profile shall be replaced.
Re-provisioning (Set 1 filled)	As above
Interface (Set 1 filled)	As above
Carrier reset/provisioning	Yes, but not if the set is pre-configured in the factory and locked.
Applicative provisioning	
Preferred bearer customization	Yes
Other applications/features	No
Technologies	
Openwave OTA	No
Provisioning bearer	SMS
Parameter sets available	5
Parameter sets for OTA modification	5
PUSH	
Content types	
Service Indication (SI)	Yes
Service Loading (SL)	Yes
Cache Operation (CO) content type	No
Session Initiation Application (SIA)	No
Man Machine Interface	
SI/content retrieval postponing	Yes
SI menu structure accessibility	WAP services, Push inbox.

Feature	Support for WAP in the Z300
SL reception warning	The user can make a choice if a dialogue is wanted or not before loading the SL. WAP services/options/common/Push access/prompt.
SIA reception warning	No
Cache size limitations	If the inbox is full and a new push is received, the oldest push in the inbox will be discarded.
Number of push messages	Depending on the size of the push messages. Around 20 push messages with a size of 250 bytes can be stored.
Push de-activate	Yes. WAP services/options/common/Push access/Off.
Dynamic push menu changes	No. There are no changes in the menus when activating/deactivating push.
Security	
Mechanisms for push	None
Trust with PPG	Only pre-defined certificates.
WSP push sessions	1
Denial of service/spoofing	Yes
User agent profile	Yes
UA profile content sent at beginning of WSP session	No
URL sent pointing to the UA profile at the beginning of WSP session	Yes
URL location	On the manufacturer web site.
WTAI	Yes
WTA Make Call	Yes
WTA Send DTMF	No
WTA Add Phonebook	Yes
Other WTA/WTAI	No
SAR/WSP/HTTP GET solution to download content over WAP	Yes
Download Fun from Openwave	No
Other download content over WAP	Yes. Content limited to 2 kb is downloaded without using SAR.
Features	
Download application/product memory check	Yes
Downloaded object solution	Yes. The user is asked if the content is to be saved.

Feature	Support for WAP in the Z300
UAP indication for downloading	Yes
Other features	Yes. Store, delete, forward, use, manage.
Object formats	
Ringtones	audio/iMelody, other/eMelody, vMel, MIDI.
Wallpapers	Image/WBMP, GIF, JPG.
Pictures	Image/WBMP, GIF, JPG.
Audio files	used: i-Melody, MIDI, SMF. not used: audio/MPEG4, WAV
GRAPHICAL USER INTERFACE	
Man Machine Interface	
Soft keys	None
Separate/dedicated back or erase keys	No
Screen backlight on when browsing	Yes
Predictive writing for WAP sessions	Yes
“http://” string displayed automatically when entering URLs	Not displayed but the "http://" is added automatically to the URL.
Elements	
Number of display lines for a WAP connection	4 to 7 plus Title, depending on the selected font size.
Pop-up menus	Yes. Single select list to conserve space.
Radio buttons	Yes. Single select list to conserve space.
Check boxes	Yes. Boolean selection.
Push buttons	No
Horizontal rules	Yes. Separate sections of WML card.

GPRS technical data

Feature	Support in the Z300	
Compatible GPRS and SMG specifications	ETSI R97 SMG 31 bis	
Data rates	Multi slot class 8 supported (4+1) CS-1, CS-2, CS-3, CS-4 9,050 bps, 13,400 bps, 15,600 bps, 21,400 bps supported (network-dependent)	
Indicator of attachment to the GPRS service	Yes, an icon in the top left corner, a filled triangle if attached	
Indicator of PDP context activation	Yes, an icon on the right side. Animated globe	
Data volume counter	The Data volume counter details the volume of data exchanged in bytes for the up/down link for last call for each PDP context. The Total data counter details the sum of all GPRS sessions (i.e. not the sum of total data received + sent during the last GPRS session.) The total data counter can be reset by the user.	
Medium Access Modes	Dynamic allocation	
Support of Packet Control Channels (PBCCH/ PCCCH)	Yes	
Network operation mode	NOM I, II, III	
Support of GPRS/CS combined procedures	Yes	
Network control mode	NC0	
Support of access in 2 phases	Yes	
Support of PRACH on 11 bits	Yes	
Support of GPRS re-selection C31/C32	Yes	
Support of static and dynamic addressing	Yes	
Support of power control Uplink and Downlink	Uplink = yes, Downlink is a network feature	
Support of ciphering algorithms	GEA1	
Support of compression algorithms	No	
Support of the QoS modification procedure	Yes, when initiated by the network (not by the handset)	

Feature	Support in the Z300	
Downlink data rate	Up to 85,600 bps for packet data communication, using 4 time slots in coding scheme CS-4	
Uplink data rate	Up to 21,400 bps for packet data communication, using 1 time slot in coding scheme CS-4	
Mode of operation	Class B and Class C modes of operation supported. It is possible for the user to choose if the Circuit Switched services should be favoured.	
R Reference point	Physical layer: PPP is supported as L2 layer in the R reference point Authentication algorithms PAP, CHAP supported	
IP connectivity	PDP type IP is supported IP termination in mobile	
Application	WAP over GPRS supported (UDP/IP and GPRS-SMS) SMS over GPRS (SMS-MT, SMS-MO) supported	
QoS	QoS negotiation supported. Default requested QoS sent by the handset at PDP context activation is reliability Class 3. Peak/Mean/Delay/Precedence Class: subscribed. Precedence class supported (1,2,3) Reliability class 1-5 supported Delay classes supported (1,2,3,4) Mean and peak throughput rate limited by multi slot class 4 and CS-4	
PDP context	10 PDP context descriptions stored in mobile PDP context description is edited via application in mobile or via OTA Simultaneous PDP contexts not supported Network requested PDP context not supported	
SIM	GPRS aware, as well as non GPRS aware SIMs are supported	

Cell broadcast service

Feature	Support in the Z300
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 65534	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
Ability to display clearly a message with a DCS “language unspecified” whatever be the language 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 (SMS)

Feature	Support in the Z300
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 (T9)
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 the message in a “unsent items” folder	Yes
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
use predefined templates	Yes

Feature	Support in the Z300
Possibilities while 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
Possibilities for previously sent message:	
delivery report of the message	Yes
forward the message	Yes
Possibilities for 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
Enabling SMS to a list of recipients	Yes, using Phonebook groups
Possibility to write an e-mail address as a recipient address	No
SMS storage	In the SIM and in the phone.

Enhanced message service (EMS)

Feature	Support in the Z300
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	10
Storage capacity	10 or more messages - depending on size. Capacity cannot exceed 100 messages. The total storage capacity depends on the storage space of the SIM.
Outgoing messages	It is possible to choose whether to send the message or not after writing it.
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... • send and receive pictures via EMS. • receive pictures in enhanced messages originated by service providers.

Feature	Support in the Z300
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 colour animations.
TP-PID field value given by the mobile handset before sending an EMS message	0x00

Multimedia Message Service (MMS)

Feature	Support
MMS/CSD parameters and MMS/GPRS parameters placement	MMS is bound to an Internet profile. An Internet profile is bound to a Data Account. A Data Account contains either CSD parameters or GPRS parameters.
Possibility to pre-configure the MMS parameters in factory	• MMS/CSD: Yes • MMS/GPRS: Yes
Possibility to configure the MMS parameters by OTA provisioning	• MMS/CSD: Yes • MMS/GPRS: Yes
Possibility for all the parameters from the parameters set to be OTA provisioned at the same time	• MMS/CSD: Yes • MMS/GPRS: Yes
Possibility for only one parameter from the parameters set to be OTA provisioned	• MMS/CSD: No • MMS/GPRS: No
OTA provisioning solution	OTA Settings Specification v7.1 © Ericsson and Nokia
Supplier indication of realized interoperability tests between its MMS User Agent and MMS Relay/Server from other suppliers	Yes
Support of a standard or a proprietary procedure for OTA provisioning of MMS parameters	Proprietary
Functionalities that the user is able to set during message composition:	• message subject • message priority • email recipient address • message Cc recipient(s) address(es) • delivery report request • read report request • MSISDN recipient address
From where can the user insert multimedia elements into multimedia messages:	• File Manager • directly from • Contacts • Calendar
Possibility for sent messages to be memorized into a folder in handset memory	Yes
Actions that the user can perform after message notification:	• Auto Download • Always Ask
Actions that the user can perform after message retrieval:	• reply to the sender of the message SMS/MMS • reply to the sender and to Cc people SMS/MMS • forward the message MMS • delete the message • save message into terminal • call the sender of a message

Feature	Support
Multimedia codecs/formats supported for audio	AMR
Multimedia codecs/formats supported for image	JPEG, GIF87, GIF89A, WBMP, BMP
Supported formats for message presentation:	• message body + attachments (email presentation) • SMIL version as described in OMA MMS IOP document version 1.2
Maximum message size that can be handled by the handset for message	Content Class and Creation mode are applied. Also maximum size is possible to customize.
MMS User Agent will report problems to user in case of:	• message not sent causes no user subscription to service, if included in ResponseText (please see WAP209) • message not sent causes required functionality not supported by MMS Relay/Server, if included in ResponseText (please see WAP209) • message not sent causes insufficient credit (in case of prepaid charging), if included in ResponseText (please see WAP209)

USSD technical data

Feature	Support in the Z300
USSD support	GSM Phase 1/ 2 (Cross-phase compatibility). GPRS behaviour according to class B
Mode support -mode	MMI-mode supported. No application mode support (not needed for any application).
MMI-mode details	• USSD messages displayed until removed by user • It is possible to scroll up and down the text in USSD messages

Image format – technical data

Format	Visible	Max	Animation	Colours	Visible colours	Transparency support
GIF	128 x 128 pics	128 x 128 pixels	Yes	256	256	Yes
JPEG	128 x 128 pics	128 x 128 pixels	No	16.8 mil.	65k	No
WBMP	128 x 128 pics	128 x 128 pixels	No	Black/White	2	No

Images – downloading to phone

Feature	File type	Max. size	Phone-to-phone	WAP
EMS icons	WBMP	WxH<=1024 pixels	Yes	Yes
Images	GIF, WBMP; JPG	Limited by the memory	Yes	Yes

SIM AT services supported by the Z300

Service		Mode	Support in Z300
CELL BROADCAST DOWNLOAD			Yes
DISPLAY TEXT		Text of up to 240 characters (120 UCS2 coded.)	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	11
	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 = 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

Service		Mode	Support in Z300
	bit 8:	0 = no help information available	Yes
		1 = help information available	No
LAUNCH BROWSER			No
MORE TIME			Yes
PLAY TONE			Yes
POLLING OFF			Yes
POLL INTERVAL			Yes
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 DTMF			No
SEND SHORT MESSAGE	bit 1:	0 = packing not required	Yes
		1 = SMS packing by the ME required	Yes
SEND SS			Yes
SEND USSD			Yes
SET UP CALL		General: Capability configuration	Yes
		Set-up speech call CallParty	No
		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

Service	Mode	Support in Z300
	'05' = set up call, disconnecting all other calls (if any), with redial	Yes
SET UP IDLE MODE		No
SET UP MENU		Yes
SMS PP DOWNLOAD		Yes

User interaction with SIM AT

Display text
Text of up to 240 characters (120 UCS2 coded) is supported.

Text clearing times are 10-20 seconds. 60-second time-out 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 the maximum response length is exceeded.

MMI Maximum Response lengths:

- Digits Only – 160 characters
- SMS default alphabet characters – 160 characters
- Hidden Characters (digits only) – 11 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
When a Refresh - SIM Reset command is ececuted by the phone, it displays the message "Please wait" and then restarts.

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 by 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 sees the text 'Setting up a call current call will be held'.

Press the 'YES' key to put current call on hold and set up new call.

If the ME is on a call when the command ‘Set Up Call, disconnecting all other calls’ is sent, the user sees the text ‘Setting up a call current call will be disconnected’.

Press the ‘YES’ key to disconnect the current call and set up the new call.

Set up menu
Incorporates a SIM Application Toolkit Menu Item into the ME’s main menu structure. From the standby display, the navigation key can be used to scroll to and select the Menu Items. (Note: The SIM AT menu option is found in the ‘Connectivity’ 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 are 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:

- Navigation key down– Scroll down list.
- Navigation key up– Scroll up list.
- ‘YES’ – Envelope (Menu Selection).

Chinese version

The Z300 comes in two different versions, the Z300c for the Chinese market and the Z300i for the rest of the world.

Terminology and abbreviations

3GPP™ (3rd Generation Partnership Project)

3GPP is a trademark of ETSI in France and other juristictions

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

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

vary, from a single cell to the entire network. This technology is used to deploy 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
Dual Tone Multi-Frequency signal – codes sent as tone signals. Used for telephone banking, accessing an answering machine, etc.

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.

GPRS
General Packet Radio Services.

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.

HTML
HyperText Markup Language.

HTTP
HyperText Transfer Protocol.

ISP
Internet Service Provider.

LAN
Local Area Network.

ME
Mobile Equipment.

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.

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

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

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.

T9™

Text Input is a trademark or a registered trademark of Tegic Communications.

T9™ Text Input is a trademark or a registered trademark of Tegic Communications. T9™ Text Input is licensed under one or more of the following: U.S. Pat. Nos. 5,818,437, 5,953,541, 5,187,480, 5,945,928, and 6,011,554; Canadian Pat. No. 1,331,057, United Kingdom Pat. No. 2238414B, Hong Kong Standard Pat. No. HK0940329; Republic of Singapore Pat. No. 51383; Euro. Pat. No. 0 842 463 (96927260.8) DE/DK, FI, FR, IT, NL, PT, ES, SE, GB; and additional patents are pending worldwide.

TCP/IP
Transmission Control Protocol/Internet Protocol.

TE
Terminal Equipment.

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 GSM 1800 network.

URL
Uniform Resource Locator.

USSD
Unstructured Supplementary Services Data.

VAS
Value Added Service.

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.

WSP
Wireless Session Protocol.

WTLS
Wireless Transport Layer Security.

WWW
World Wide Web.

XML
Extensible Markup Language.

Related information

Documents

- The Z300 User Guide
- Sony Ericsson Z300 FAQ
- AT Command Reference Manual
- WAP June2000 (WAP 1.2.1) Specification

Links

- www.SonyEricsson.com
- www.SonyEricsson.com/fun
- www.SonyEricsson.com/developer
- www.imc.org
- www.esti.org
- www.openmobilealliance.org
- www.imc.org/pdi

Trademarks

Consumer pack content

- 1 Mobile phone Z300
- 1 Standard battery Neo BST-37, 900 mAh Li-technology battery
- 1 Standard charger, CST-13, 3V
- 1 User Guide, A7
- 1 Sony Ericsson Service and Support leaflet
- 1 SAR leaflet
- Crystal decoration

Index