White Paper

September 2003

Z600

Sony Ericsson

Preface

Purpose of this document

The Sony Ericsson Z600 White Paper is designed to give the reader a deeper technical understanding of how the Z600 is designed, and of how it interacts with other media. This document will make it easier to integrate the Z600 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 at http://www.SonyEricsson.com/developer, which contains up-to-date information about technologies, products and tools.

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/

Second edition (September 2003) R2A

Publication number EN/LZT 108 6812

Contents

Purpose of this document 2
Key functions and features 6
Two displays 6
Built-in camera 6
QuickShareTM 6
Exchangeable front and back covers 7
New and innovative user interface 7
Pictures 9
Multimedia in Z600 9
MMS (Multimedia Messaging Service) 10
MMS objects 11
Benefits 12
EMS (Enhanced Messaging Service) 13
Messaging using EMS 14
Java 16
Games 17
MIDI - Musical Instrument Digital Interface 19
Polyphonic ring signals 20
Bluetooth™ wireless technology 20
Using Bluetooth wireless technology in the Z600 21
Synchronize calendar and phone book 21
SyncML, an open standard for remote synchronization in the Z600 22
Local synchronization 24
WAP services 25
Bearer type characteristics 27
Gateway characteristics 27
Security using the WAP 28
Configuration of WAP settings 28
Push services 29
cHTML support 30
Mobile Internet 30
Data connections 30
Mobile positioning 30
General Packet Radio Services 31
Using GPRS in the Z600 31
Modem and AT commands 32
GSM data communication 32
AT commands support 33
Online Developer Resources 33
Sony Ericsson Developer Support 34
Infrared transceiver 34
Connection via infrared 34
Network-dependent features 41
SIM application toolkit 42
SIM AT services supported by the Z600 43
User interaction with SIM AT 46
Security and M-commerce technical data 47
Terminology and abbreviations 47
Related information 50

Technical specifications 51
General technical data 52
Exterior description 52
Ambient temperatures 53
Supported Man-Machine Interface (MMI) languages 53
Current consumption, talk and standby times 54
Speech coding 54
Cell broadcast service 54
Short message service 56
Enhanced message service 58
Multimedia message service 60
Bluetooth technical data 62
Performance and technical characteristics 62
Tone and percussion maps in the Z600 63
Percussion map 66
WAP browser technical data 67
WAP Operator technical data 69
GPRS technical data 73
Built-in GSM data modem technical data 76
E-mail client technical data 76
USSD technical data 78
Image format technical data 78
Images – downloading to phone 78
SyncML technical data 80
Infrared transceiver technical data 80

Product overview

Z600 is a dynamic and easy to use high-end mobile phone. It offers complete imaging and messaging capabilities that allow family and friends to capture, share and preserve those special moments.

Designed for fun-loving people, the Z600 features a distinctive clam shell body cloaked in vibrant, youthful colours. This visual statement is complemented by extensive functionality and offers the user endless possibilites in mobile communications.

Z600 features an active flip, two displays and its built-in camera makes taking a picture quick and easy. Pictures can be used as wallpapers, in multimedia messages and in the phone book.

Key functions and features

Two displays

The Z600 features two displays. When in the open position, the user can enjoy the ultimate viewing experience afforded by the 65,536 full colour LCD. The LCD has 128x160 pixels and is a 2” film diode (TFD) type which is driven by a diode as opposed to a transistor. The display has a 16 bits pixel memory depth. Camera pictures, picture messages and gaming are all enhanced by the crisp, sharp colours afforded by the TFD. The screen also offers the user maximum information with the least scrolling.

When in the closed position, a status display with 91x29 pixels is visible. This black & white display has a blue background and lets you see who is calling when a call comes in and also shows information such as time, network and battery status.

Built-in camera

The built-in camera is capable of taking still pictures up to common image format (CIF) resolution (352x 288 pixels) and 24 bit colour depth. The lens is recessed into the front cover of the Z600. The viewfinder will fill up the whole screen, irrespective of the resolution at which the picture is taken. A dedicated hardware button provides fast access to the camera application.

Images are stored in the phone’s filing system and are therefore available for other applications to use. The number of images that can be stored depends on the available file space, which is shared with other applications. The viewfinder will give an estimation of the number of images remaining, assuming that all of the free storage is available for the camera application and using the current settings for size and quality. Approximate JPEG file sizes are 20 kbytes for CIF.

Saved images may be viewed in the image viewer application, and are available for use by other applications in Z600 such as MMS and e-mail.

The camera is optimised for ‘point-and-shoot’ speed. The first press on the CommuniCam button will switch on the viewfinder. Each subsequent press on the button will then act as a shutter release and take a picture.

QuickShare™

The Sony Ericsson QuickShare™ is the smartest, fastest and easiest way to share images. By combining several imaging features and capabilities in the Z600, QuickShare™ lets you take a picture with two rapid clicks and then in four further steps send it anywhere in the world.

It is also possible to exchange pictures directly over Bluetooth connections and even drag and drop pictures to and from the Z600 and a PC.

Exchangeable front and back covers

Exchangeable front and back covers are available as accessories. These covers come in an array of wonderful colours that allow the user to change the look of their Z600.

Whether it's to complement an outfit with colour coordination, make a pleasant change to your existing phone, or simply match the way you feel, Z600 exchangeable covers offer endless possibilities.

New and innovative user interface

The Z600 has a new, innovative user interface which enables the user to manage the phone in an easy and efficient way. Combined with attractive graphics in a wide variety of styles, the new user interface gives the user a new and stimulating experience.

The development of the new user interface is founded on usability tests performed on a wide range of mobile phones - Sony Ericsson phones as well as competitors'. The result is a new interface that is easier and quicker to use than the vast majority in products on the market.

The keys to efficiency

The lay out of the keys is one of the many new and improved elements in the Z600, helping the user to find functions and features in the phone quickly and easily. Conveniently and ergonomically grouped together on the front, the two soft keys, a navigation key, the back key and the "C" key enable the user to navigate, select and perform actions.

Actions and options
The left and right soft keys perform the actions shown immediately above these keys in the display. The most frequently used actions are always available on the left soft key. Other actions are accessible on the right soft key, directly on the key or via the More list. Since most of the common actions are carried out by the left soft key, the back key is conveniently placed immediately under it.

Back and delete
The Back key enables the user to go back one step at the time. It makes it easy to find the way back, but more importantly gives the possibility to recover from mistakes. To press and hold the Back key is an instant return to stand by.

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

- Press and hold in Stand by - activate silent mode
- Press and hold during ongoing call - mute
- Normal press during incoming call - mute ring

More Features

The key features in the phone are easily accessible, and the main menu is reached by a press with the navigation key in stand by. It is also accessible during an ongoing call, which allows for multitasking - an air time generator. The main menu gives an overview of all functions and features in the phone.

Actions in the Z600 are always carried out in the most efficient way, and there is always 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 actions.

The already popular Themes in Sony Ericsson mobile phones have been further developed and improved in the Z600, enabling the user to personalize the phone with pictures, colours, wallpapers, etc. The Themes and all their features are displayed in the large 65k colour screen, which gives a unique user experience.

Technologies in detail

Pictures

Pictures is the Z600's image viewer. It enables you to view and organise your photographs, including pictures taken by the built-in camera plus images loaded from elsewhere, such as received via e-Mail. Pictures supports image types JPEG, GIF, Animated GIFs and WBMP.

Pictures can be viewed in thumbnail and full screen mode. Thumbnail images may be ordered by name, date, size or type. In full screen mode the user can browse through the images and rename or delete them. It is also possible to send them as e-mail, MMS messages or via Bluetooth and infrared. Simply select a picture, add a message and send just like an SMS message or build a slide show with several images and your favourite sound clips.

Pictures of loved ones can be saved in Contacts. When a contact calls (or the user calls that contact), the picture is displayed with the details of the call. This is known as Picture Phone Book.

Pictures may be loaded up to the Internet. Sony Ericsson Mobile Internet has an on-line album enabling you to share pictures and video clips: wap.sonyericsson.com

Multimedia in Z600

Graphics

Graphics (tables, charts, diagrams and layouts) have a major impact on the way we work. The Z600 supports JPEG (max 640x480), GIF (max 160x120), WBMP (max 320x320) and animated GIFs. With MMS, the user can personalize the appearance of the display – for example the background colours and the background picture.

Audio

With the sound recorder function in the Z600, it is easy to make a voice recording, for example a personal rendition of “Happy Birthday”. The audio function in the Z600 also allows downloading of sounds and melodies.

Themes

With themes, the user can change the appearance of the display, for example the background colours and the background picture. The phone comes with a number of pre-defined pictures, and it is possible to download additional themes. The maximum number of themes is limited only by the amount of memory.

MMS (Multimedia Messaging Service)

One of the key features in the Z600 is the Multimedia Messaging Service (MMS), this is expected to become the preferred messaging method of mobile terminal users, since there are virtually no limits to the content of an MMS transmission. An MMS message (also known as a Picture Message) from the Z600 can contain text, pictures, graphics, animations, images, audio clips and ring melodies. For more detailed information, see “*Multimedia messaging service*” on page 53. For third-party developers’ information, please visit www.SonyEricsson.com/developer and look for the *MMS Developers’ guidelines*.

Defined and specified by 3GPP as a standard for third generation implementation, MMS completes the potential of messaging. Sending digital postcards and PowerPoint-style presentations is expected to be among the most popular user applications of MMS. Eagerly awaited by young users in particular, MMS is projected to fuel the growth of related market segments by as much as forty percent.

Figure 1. An MMS message can contain images, music, audio and graphics.

Using the Wireless Application Protocol (WAP) as bearer technology and powered by the high-speed transmission technologies EDGE, GPRS and UMTS (W-CDMA), Multimedia Messaging allows users to send and receive messages that look like PowerPoint-style presentations. The messages may include any combination of text, graphics, photographic images, speech and music clips. MMS messaging 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.

MMS objects

Although MMS is a direct descendant of SMS, the difference in content is dramatic. The size of an average SMS message is about 140 bytes, while the maximum size of an MMS message is limited only by the memory. That is why the key word to describe Picture Message 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 one or more of the following:

Text
As with SMS and EMS, an MMS message can consist of normal text. The text can consist of up to 1000 characters. The main difference between an EMS and MMS message is that in an MMS message, text can be accompanied not only by simple pixel images or melodies but by photographic images, graphics, audio clips and in the future, video sequences.

Templates
The Z600 comes with a number of MMS predefined templates, for example templates for birthday cards, meeting requests etc.

Audio
MMS provides the ability to send and receive full sound (iMelody and AMR) messages. Not only can users share a favourite song or ring signal with a friend, they can also use the mobile phone to record sound and send it along with a message. Because sound includes speech as well as music, this extra dimension of an MMS message makes for enhanced immediacy of expression and communication. Rather than sending a downloaded birthday jingle in EMS, for example, a user can send a clip of his or her own personal rendition of "Happy Birthday".

Pictures and themes
By using the built-in digital camera in the Z600 users can take a snapshot and immediately send it to a recipient. The ability to send pictures is one of the most exciting attributes of MMS, as it allows users to share meaningful moments with friends, family and colleagues.

Mobile picture transmission also offers inestimable utility in business applications, from sending on-site pictures of a construction project to capturing and storing an interesting design concept for later review. Editing a picture by adding text allows users to create their own electronic postcards, an application that is expected to substantially cut into the traditional postcard-sending market.

Themes (downloaded or pre-defined) can be exchanged via MMS.

SMIL presentations
SMIL stands for Synchronized Multimedia Integration Language and is pronounced "smile". SMIL in the Z600 allows the user to the create and transmit PowerPoint-style presentations on the mobile device. SMIL is an advanced XML-based protocol, and Sony Ericsson MMS supports a subset of this protocol. Using a simple media editor, users can incorporate audio and animated GIFs along with still images, animations and text to assemble full multimedia presentations.

The idea of SMIL is to allow the user to customize the page timing in PowerPoint-style presentations. The user can decide in which order the image and text will be displayed, as well as for how long the images and text lines are to be shown in the display

PIM communication with MMS
With MMS in the Z600, it is easy to send and receive business cards, calendar entries and notes.

Business card (vCard)
With MMS in the Z600, the user can send a business card.

Calendar entry (vCal)
With the vCal function the user can enclose a vCal entry when sending a meeting request via MMS.

Notes
The Z600 supports vNote. Notes can be sent via MMS.

Benefits

Essentially enabling the mobile terminal to serve as image processor and conveyor, Multimedia Messaging accommodates the exchange of important visual information as readily as it facilitates fun. Business and leisure usage of MMS will be dynamically merged, resulting in enhanced personal efficiency for users and increased network activity for operators. In short, MMS affords total usage for total communication

Because MMS uses WAP as its bearer technology and is being standardized by 3GPP, it has wide industry support and offers full interoperability, which is a major benefit to service providers and end users. Ease-of-use resulting from both the gradual steps of the messaging evolution and the continuity of user experience gained from interoperability is assured.

The MMS server, through which MMS messages are sent, supports flexible addressing (to both normal phone numbers (MSISDN) and e-mail accounts), which makes user interface more friendly and allows greater control for operators. The MMS server, moreover, is responsible for the instant delivery feature of MMS.

MMS technical features
The MMS standard, just like 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 doesn't have to call the server to get the message downloaded to the mobile phone. Unlike SMS, the MMS standard uses WAP as its bearer protocol. MMS will take advantage of the high speed data transport technologies EDGE and GPRS and support a variety of image, video and audio formats to facilitate a complete communication 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 terminal-to-e-mail, 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 is used as 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.

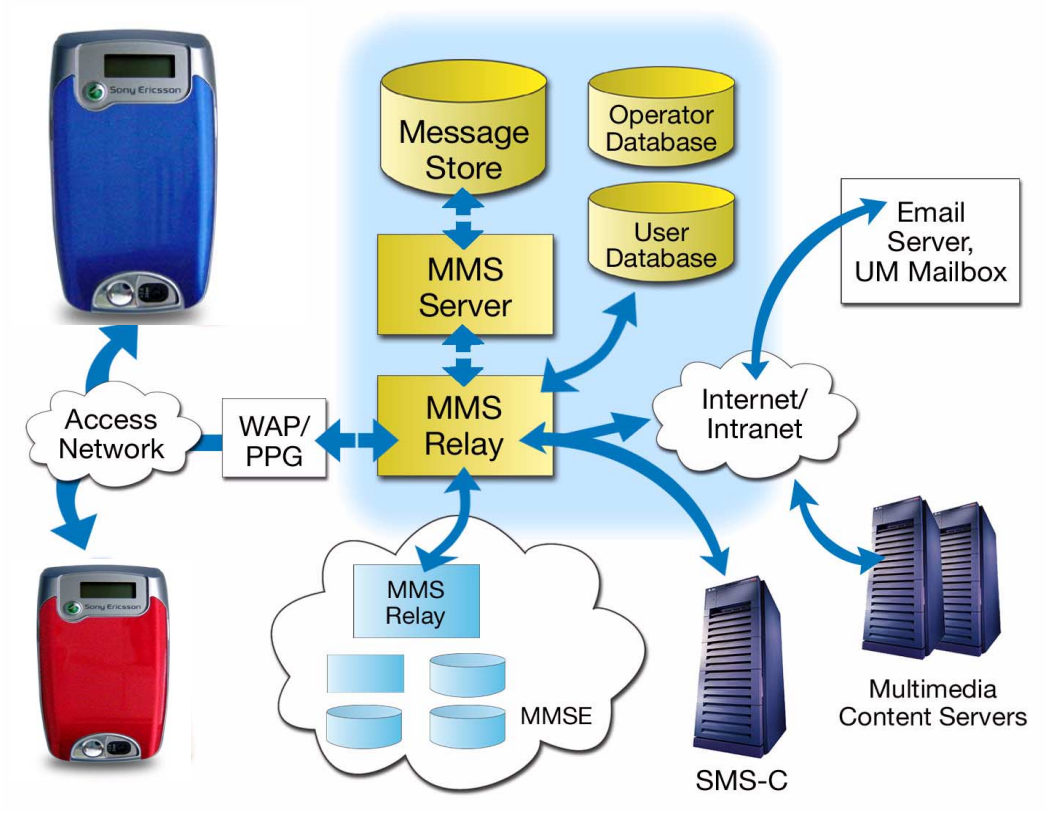


Figure 2. The architecture of MMS

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, e.g. 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.

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.

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 can be pre-defined sounds, downloaded from the Internet, received in SMS messages or 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 and animations

Phones supporting EMS include a set of predefined animations. New pictures and animations can be downloaded from the Internet or received in SMS messages.

Pictures can be created and edited in the phone using a built-in Picture Editor. Several pictures can be inserted in one message, and they can be combined with sounds and melodies.

Messaging using EMS

Concatenated messages

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 will find EMS as easy to use as SMS. At the moment 15 billion SMS messages, are sent every month worldwide. Roughly 80% of this traffic is 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% is shared by downloads and notifications of different kinds.

Huge business potential

Network operators can now enhance their services and attract more customers by offering pictures, animations, ring signals 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) was first submitted to the standards committees by Ericsson. Ericsson presented the outline structure of EMS to the relevant ETSI/ 3GPP committees. The major mobile phone manufacturers and most operators are actively contributing to the 3GPP standards. Hence the EMS standard has evolved and is now stable and complete as part of the 3rd Generation Partnership Project (3GPP) technical specification.

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 i.e. text formatting, pictures, animations and sounds are located in the message header. The EMS contents will be 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.

Internet e-mail alerts
An Internet e-mail alert is provided in the form of a short message that typically details the sender of the e-mail, the subject field and first few words of the e-mail message, and in this case formatted text is excellent to identify message elements.

Ring signals
Downloading ring signals 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 ring signals.

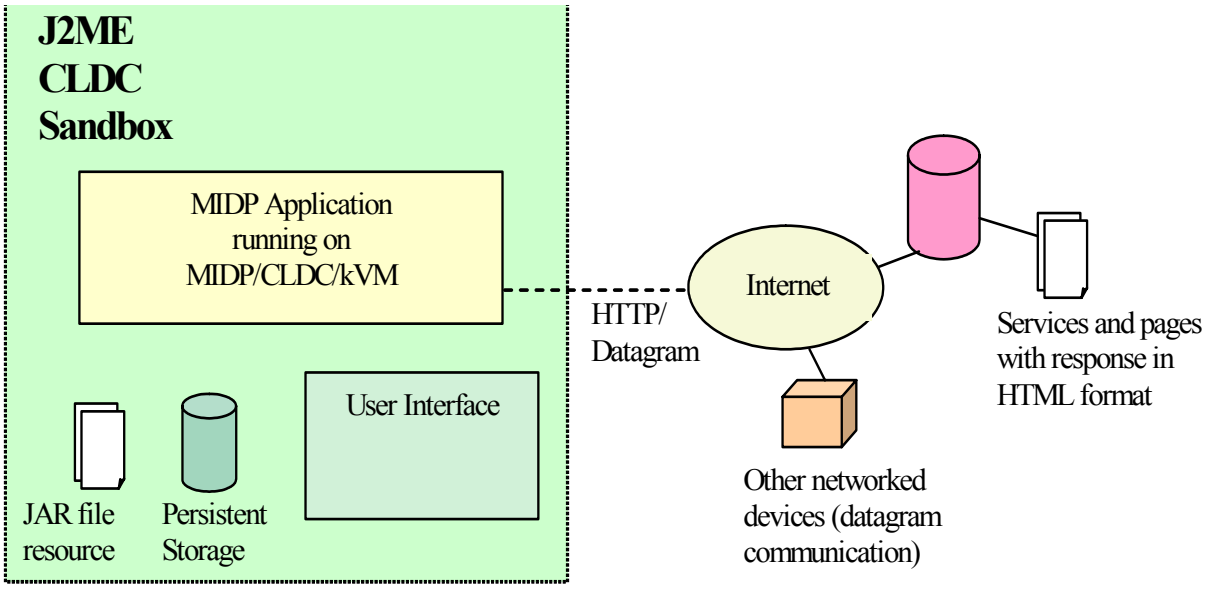
Info & entertainment
Ring signals, e-greetings, football club logo, joke-of-the-day illustrated by pictures or sound, horoscopes, movie related animation or theme song, TV show promotions, music artist promotions, lottery results, food and drinks pictures and recipes, mood-related pictures.

Corporate
Flight schedules, pre-installed corporate logos, map snippets and travel info, company branded icons and ring signals, corporate e-mail notifications, affinity programmes where companies notify customers of product updates etc., 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.

Using WAP, WAP and SMS for download

Already today services exist on the Internet where users can create melodies, and view icons and pictures, subscribe to entertainment and informations services. These may develop further in the future to support access via PC over the Internet, from the phone using WAP and even with an SMS request interface.

Java



The Z600 supports J2ME CLDC/MIDP. It is ready to run applications written for handheld computers and mobile phones.

Applications are easily downloaded directly to the Z600 using the browser, or may be installed from a connected PC. Applications such as the currency converter can obtain the latest exchange rates from the Mobile Internet and then make up-to-date calculations. It is also possible to access and download data from a company server.

Z600 supports JSR-135 allowing control of the synthesizer for MIDI, I-melody and Tone sequence playback.

Sandbox security concept

J2ME/CLDC uses a sandbox security concept which includes a number of system components working together to ensure that untrusted applications cannot gain access to system resource.

Selection keys

When executing a MIDP application a lower portion of the screen is reserved for displaying selection keys associated with the application. The appearance of this soft key area at runtime depends on which base class the displayed application is derived from.The left soft key is for the first command in the command list and the right soft key is for the “More” list and “Help”.

Optional download features

The browser can download JAR/JAD files from WAP and HTML pages provided that the server supports the actual file types. Z600 can also download JAD/JAR files from ordinary WAP servers provided that they support the mime type for each of the file types.

Supported protocols

The Z600 supports “Sun OTA recommended practice for J2ME CLDC/MIDP” and ordinary MIDP 1.0 applications without extension API’s.

Sony Ericsson Online Support

Some online resources are available to all developers for free. All that is needed is to register as an Ericsson Mobility World Community member. After registration, access is granted to selected technical product information and development tools as well as limited access to interactive and static online support resources.

General information

Implementation	
CLDC	1.0
MIDP	1.0
JSR	135
Support	Over the Air Recommended Practice
Permissions	Net Access

Memory	
Heap size (RAM)	256 KB
Max no.of applications	50
Size of applications	Approximately 60 KB
File system size	Up to 2 MB
Number of simultaneous executing applications	One

Note: For more information see *"Java in Sony Ericsson mobile phones"* at www.SonyEricsson.com/developer

Games

Z600 has four games pre-loaded and more can be easily downloaded. The games download is made possible by a true virtual machine. The Sony Ericsson portal for downloading of free games for the Z600 is accessible with only one key press in the games menu. The openness of the downloadable games solution is dedicated to provide an enhanced gaming experience.

Downloadable games can fully take advantage of the phone´s interfaces, such as TCP/IP, SMS/MMS, 32 voices polyphonic sounds, and vibrator. The virtual machine executes the downloading of games for the optimal game experience. The user can download an unlimited number of games as long as the file system allows it, i e until the phone memory is full.

The downloading concept includes certification of the games, which makes it possible to create a revenue chain and favourable business opportunities for network operators and content providers. The virtual machine uses true sandbox technology for the highest level of security.

mophun ™

mophun™ is a software based gaming console for mobile terminals. It offers the user optimized graphics and interaction access to ensure the best possible gaming experience.

mophun™ gamelets will drive traffic and increase revenue for operators.

mophun RTE

The mophun™ runtime environment consists of a virtual machine that requires less than 40kb of memory. Its small size means that it can fit inside the instruction cache of the host CPU. It has a native code interface that requires as little as 10 machine instructions (depending on the host system) overhead for calls to native functions.

Gaming API

The gaming API provides all the functionality a game requires. It provides platform independent video access, input, sound and communication. It also features a query interface that lets you adapt a game to the capabilities of the device. The API consists of 100% native code that ensures the best possible performance.

Because different platforms have varying capabilities, this gaming API has been created with differentiators such as a built in sprite engine, map engine, different color depth tiles and transparency support etc. With this gaming API it is possible to isolate code and data into modules that can be loaded according to the capabilities of various platforms. It is possible to have both grayscale and color graphics resources but only load the specific resources that are compatible with the surrounding system. Games that do not provide multiple resources are not a problem because the mophun™ system automatically handles the conversions. Indeed, future extensions even include a 3D API.

Secure gamelets

mophun™ gamelets are executed in a secure sandbox environment that eliminates any possibility of illegal actions. A secure layer exists between the mophun™ application and the “real” system interfaces. Security is further enhanced as result of the gamelets having to be digitally signed before execution on the mobile terminal is possible. Gamelets are signed in the publishing process after being screened for malicious content.

Software development kit

The mophun™ SDK is built with GNU tools using open standards. It is non-proprietary and is offered to developers completely free of charge. Games are written in C/C++ or assembler and the kit was built by game developers. A general PC can be used to both write and test the software without any need to access the real device. Source level debugging is available for both the Linux and Windows versions of the SDK.

Emulation profiles for the target mophun™ enabled mobile terminal are included in the SDK. It also ships with a full set of binary utilities for manipulation and handling of code, data and resources.

Certification and deployment

Each game must be certified by Synergenix Interactive AB before it can be run on a mobile phone. This ensures there is no offensive content, that the game is of sufficient quality and that the gameplay and functionality conform to settled standards.

A game file can be downloaded via WAP or cable from an operator’s page or from any publisher’s WAP page. If the download is supposed to be in one session, the file size should be less that 60 000 bytes.

Game file sizes

Each game has its own directory in the file system. A game directory in the Z600 can contain up to 16 different files but together they may not exceed an aggregate of 480 000 bytes.The maximum size of files for downloading depends on the size of the WAP gateway. When provisioning mophun games that are larger than the WAP gateway limitation, the games may be split up in portions and reassembled on the mobile terminal.

Functions

Send/receive via TCP/IP link	Yes
Send/receive via SMS	Yes
Send/receive via Bluetooth	Yes
Send/receive via infrared	Yes
Vibrator on/off	Yes
Backlight on/off	Yes
Colour support	Yes
Certification control of games	Yes
True sandbox technology	Yes
True file support	Yes
Sprite detection collision	Yes
Built-in Unicode including Chinese	Yes

Getting started

In order to receive the mophun™ SDK developers must go to http:// www.mophun.com and download the free software. Developers will also benefit

from the full support package that is available at http://www.SonyEricsson.com/developer Everything needed to begin developing games for SonyEricsson mobile phones is available at these sites free of charge.

Game controls

Use the navigation key to move up, down, left or right and to select an item, or use the keys as follows:

—	Select the options that might appear in the display immediately above these keys.	—
⮌ Press once to go back one level in the menus. Press and hold to return to standby. Exit the game.		C Delete numbers, letters or an item from a list.

1 left and up	2 up	3 right and up
4 left	5 select or fire	6 right
7 left and down	8 down	9 right and down

Other useful key functions:

- Press **START** to start a new game.
- Press **EXIT** to finish a game.
- Press **MORE** to delete, view game info, or view memory status.

Note: *The above text and control panel does not apply to Java games.*

MIDI - Musical Instrument Digital Interface

The Z600 contains an advanced MIDI composer that allows the user to compose melodies and ring signals in polyphonic sound. A MIDI signal or file does not contain any music. It contains binary data (information) of how a melody is played and when this data reaches a synthesizer, the synthesizer will translate the binary data to music, when connected to an amplifier with speakers so that the sound becomes audible.

The development from the iMelody format to the MIDI format means a revolution to the sound quality. The MIDI files are small, and perfect for mobile devices, which have limited storage capacity.

MIDI is a specification for a communications protocol principally used to control electronic musical instruments. MIDI is today a well known standard used by musicians, composers and arrangers.

Composing

You can compose and edit melodies to use as ring signals. A melody consists of four tracks - *Drums*, *Basses*, *Chords* and *Accents*. A track contains a number of music blocks. The blocks consist of prearranged sounds with different characteristics. The blocks are grouped into *Intro*, *Verse*, *Chorus*, and

Break, depending on where in the melody they fit in. You compose a melody by adding music blocks to the tracks.

Polyphonic ring signals

Protocol

The Z600 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, and it is possible to make the sound escalate, start quietly and grow louder.

The Z600 Sony Ericsson mobile phone completely supports the MIDI 1.0 detailed specification. Please visit http://www.midi.org/ for more information.

Excellent sound quality – 32voices

The human ear can hear 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 Z600 can handle up to 15000 Hz, equivalent to an FM stereo radio, which means excellent sound quality.

Z600 has a dedicated speaker to ensure the best possible sound quality. This speaker is situated on the back of the phone ensuring no discomfort is felt if a second call is received during an ongoing call. It also ensures louder ring signals and removes the need for escalating rings signals.

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 about 16, then the voices merge together. But the nuances in the 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 Z600 is 32, which gives excellent sound quality.

Wavetable synthesis

Sony Ericsson has chosen to implement the Wavetable synthesis, which consists of sampled real instruments, which gives a much higher quality than the FM-synthesis. Especially the treble is more distinguished.

Touch correct feature

The so called “Touch correct” feature makes dynamic compression possible. This equalizes the amplitude of the instruments included in the MIDI file, which greatly improves the sound quality, especially in melodies with big differences in amplitude.

Bluetooth™ wireless technology

The Z600 features built-in *Bluetooth* wireless technology. Its short-range radio link operates in the globally available 2.4 GHz radio frequency band, ensuring fast and secure communications up to a range of 10 metres.

Bluetooth wireless technology is designed to be fully functional even in noisy radio frequency environments. All data transfer is protected by advanced error-correction methods, ensuring a high level of data security. *Bluetooth* wireless technology facilitates instant connections, which are maintained even when the devices are not within line of sight. High-quality voice transmission is provided under adverse conditions, making it possible to use a headset connection to the Z600 at all times.

Ericsson was a founding partner of the Bluetooth Special Interest Group (SIG). *Bluetooth* wireless technology devices that are expected to be available in the near future, include:

- Headsets for wireless voice transmission and remote call control
- PCs, laptops, PDAs, palmpads for data transfer, synchronization etc.
- PC cards for *Bluetooth* wireless technology in laptops and PDAs
- MP3 music player
- Other phones for exchanging business cards, ring signals, playing games etc.
- Digital still and motion video cameras
- Printers, hard disks and other storage devices
- Handheld scanners for text, barcodes and images
- Household appliances with built-in logic, as well as games and entertainment devices
- Access points in hotel lobbies and airports for connecting to computer networks and the Internet
- Car handsfree solutions

Using Bluetooth wireless technology in the Z600

Key benefits include:

- True wireless connection
- Cable replacement for connecting to headsets, computers, networks, printers and other devices.
- The Z600 identifies and maintains several devices in a pairing list.
- Radio link
- No line of sight required; the phone can remain in a briefcase or in a pocket, as long as no solid objects are in between (whereas infrared requires line of sight).
- Secure and fast
- Data connection with a Bluetooth PC/laptop turns the phone into a modem for connecting to the Internet and for data transfer (faster than infrared or cable).
- Synchronization
- Fast synchronization, even without line of sight, of calendar and phone book with PC/laptop and PDA, and quick exchange of business cards, calendar events and melodies with other phones and devices.

Synchronize calendar and phone book

In everyday life, access to an updated calendar and addresses of friends and business colleagues is greatly appreciated. To be truly mobile, users must be able to carry their important information with them. Equipping mobile phones with Personal Information Manager (PIM) programs such as calendars, to-do lists and address books gives users access to their most important data anywhere and anytime. The information is kept updated by synchronizing with the information at the office or at home.

Hierarchical phone book with contacts

The Z600 features a hierarchical phone book. For every contact, details such as name, home, work and mobile numbers, pager number, e-mail

address and other information can be stored. The hierarchical phone book in the Z600 is compatible with most groupware and agenda programs, such as Microsoft Outlook, enabling smooth local synchronization of contact information between the phone and a PC, via cable, *Bluetooth* wireless technology or IR. For remote synchronization of Contacts and Calendar over WAP, the Z600 supports SyncML.

SyncML, an open standard for remote synchronization in the Z600

SyncML – background

The SyncML Initiative Ltd. was founded by Ericsson, IBM, Lotus, Motorola, Matsushita, Nokia, Palm Inc., Psion and Starfish Software in February 2000. Supported by more than 60 software and hardware developers, the SyncML Initiative Ltd. seeks to develop and promote a globally open standard for remote synchronization, called SyncML. Unlike many other synchronization platforms, SyncML is an open industry specification that offers universal interoperability. Because it uses a common language, called XML, for specifying the messages that synchronize devices and applications, SyncML has been called the only truly future-proof platform for enabling reliable and immediate update of data. The benefit for the end user is that SyncML can be used almost anywhere and in a wide variety of devices, regardless of application or operating system.

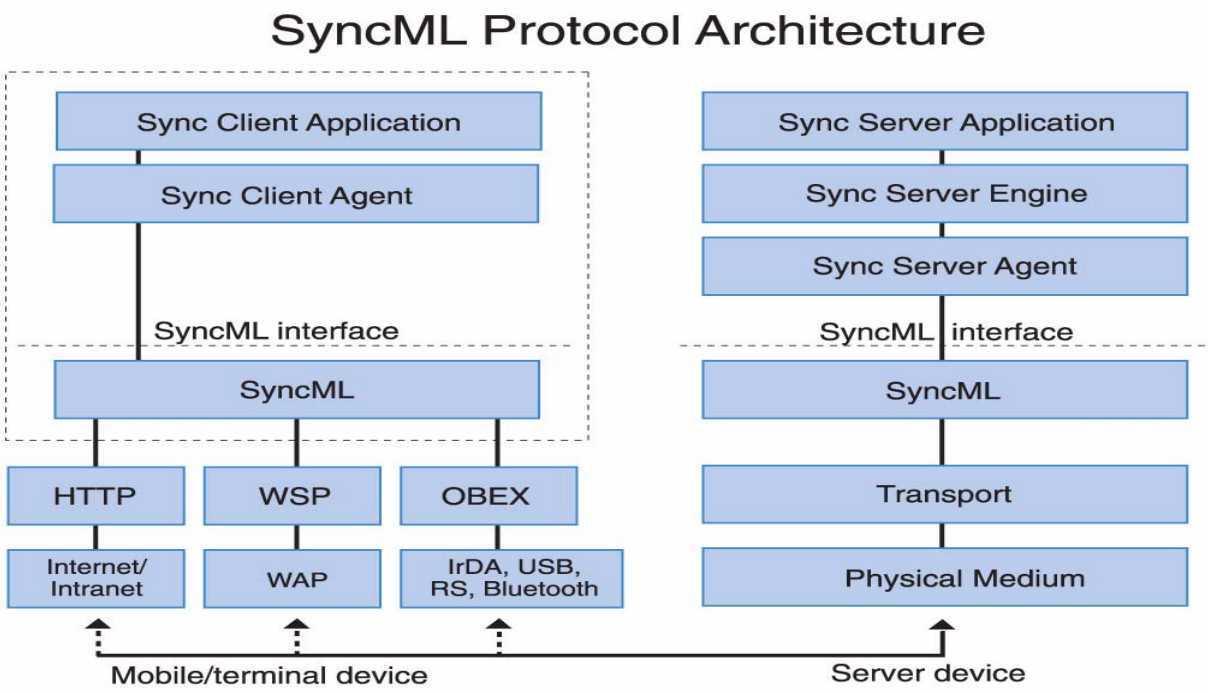
What is SyncML?

SyncML is the common language for synchronizing all devices and applications over any network. SyncML leverages Extensible Markup Language (XML), making SyncML a truly future-proof platform. With SyncML any personal information, such as e-mail, calendars, to-do lists, contact information and other relevant data, will be consistent, accessible and up to date, no matter where the information is stored. For example, a calendar entry made to a mobile device on a business trip is equally available to a secretary in a network calendar. SyncML is the ultimate choice for remote synchronization.

In the Z600 SyncML supports remote synchronization of the calendar and phone book, designed for the requirements of the wireless world

SyncML is designed specifically with the wireless world's tight requirements in mind. SyncML minimizes the use of bandwidth and can deal with the special challenges of wireless synchronization, such as relatively low connection reliability and high network latency. SyncML supports synchronization over WAP, fixed networks, infrared, cable or *Bluetooth* wireless technology.

In the Z600 SyncML enables synchronization over WAP – an ultimate solution for travellers.



Benefits of a common synchronization protocol

End users
Today's user of mobile devices probably uses a different synchronization product with every device. Each technology can synchronize only a few applications, or is limited to a particular type of network connection. This arrangement is expensive to install, confusing to configure and operate, and costly to administer. With SyncML, users will be able to buy devices that synchronize with a broader range of data.

Device manufacturers
Device manufacturers will benefit from a common protocol that will make the device interoperable with a broader range of applications, services, and network and transmission technologies.

Service providers
Service providers moving into the growth area of application hosting are particularly concerned that a proliferation of synchronization technologies will make it impossible to deploy and support their customers in a cost-effective manner. To support the range of data types and devices in use today, service providers must install and configure multiple server infrastructures, maintain and support that infrastructure, and maintain compatibility and performance. The alternative now available, to use a single solution for data connectivity, involves the risk of a tight coupling to a propriety solution. With SyncML, they will be able to provide connectivity to a wider selection of applications.

Application developers
Choosing to support multiple synchronization technologies enables an application to support more types of devices and networked data, but that choice comes at a cost. With SyncML, application developers will be able to develop an application that can connect to a more diverse set of devices and network data.

Network operators
As multiple applications that need remote synchronization over WAP are developed, there will be an automatic growth of revenue for network operators.

Local synchronization

Open standard

Synchronization is possible with almost any groupware or office program, since the synchronization method complies with the open standard IrMC 1.1, as specified by the Infrared Data Association – reference http://www.irda.org. IrMC 1.1 brings together the following standards:

- vCard 2.1 for address book information
- vCalendar 1.0 for appointment and to-do information
- ObEx (Object Exchange) for data exchange

Bluetooth wireless technology or infrared

The Z600 synchronizes using the same protocol, regardless of connection type. It connects via *Bluetooth* wireless technology, infrared or cable. The cable is connected either directly to the phone or to the desktop charger.

Automatic synchronization

When infrared or *Bluetooth* wireless technology is switched on in the phone, the synchronization process starts automatically, as soon as the phone is within range of a compatible port on a PC or handheld device (a suitable synchronization program must be running on the device).

Intelligent process

A synchronization engine performs the task of synchronizing. For local synchronization, the synchronization engine is an application that runs on the desktop computer. The synchronization engine compares, updates and resolves conflicts to ensure that the information in the phone is the same as that in the computer.

Local synchronization software and the Z600

PCs equipped with XTNDConnect For Sony Ericsson will perform synchronization with Microsoft Outlook. For other groupware environments (Lotus Notes, etc.), the full version of XTNDConnect PC is required. By using *Bluetooth* wireless technology, infrared, USB or the RS 232 Cable, you can easily perform a fast, local synchronization.

Integration between XTNDConnect For Sony Ericsson and Microsoft Outlook provides an embedded menu for one-key synchronization.

To enhance functionality and compatibility further, the synchronization software can easily be upgraded.

The number of units that can talk to each other is unlimited. One phone can be partner with several PCs. This ensures that information from both the work PC and the home PC can be synchronized with the phone. For users that have both a desktop PC and a laptop (free version XTNDConnect PC) or a PDA (free version XTNDConnect PC), it is an efficient way to synchronize data with the phone. This way, data can also be transferred between PCs to keep them in sync.

If the synchronization software is upgraded to a full version of XTNDConnect PC, one PC can be partnered with several different phones. This is vital if, for example, each member in a work group has his/her own Z600, and needs to synchronize with a PC. It makes it easy, for example, to download a common company phone directory to the phone book in each company mobile phone. With the full version of the synchronization software, other phone types and handheld devices, such as PDAs and Windows CE computers, can also be synchronized.

XTNDConnect for Sony Ericsson

This synchronization software can be downloaded-from www.SonyEricsson.com/developer and provides a powerful set of functions:

- Z600 phone book and calendar synchronization with Microsoft Outlook.
- An embedded synchronization in Microsoft Outlook, providing one-key synchronization and allowing the user to control the synchronization process with easy-to-use settings.
- PC applications supported by XTNDConnect For Sony Ericsson:
- Microsoft Outlook 97, 98, 2000
- Platforms for using XTNDConnect For Sony Ericsson:
- Windows 98, Me (Millennium Edition), Windows NT 4.0 and 2000.
- Pentium II recommended
- 64 MB RAM recommended (minimum 32 MB)
- Other requirements:
- 20 MB free hard disk space
- *Bluetooth* wireless technology, infrared, or cable connection
- Support is handled by Sony Ericsson.

XTNDConnect PC

All users of the Z600 can easily upgrade to the full version of the synchronization software. A number of features and supported applications will then be added, including XTNDConnect Phone Viewer.

- Phone book and calendar synchronization for the Z600.
- XTNDConnect Phone Viewer for easy data entry. All data can be created, viewed and edited on a PC.
- PC applications supported by XTNDConnect PC (full upgraded version):
- Microsoft Outlook 97, 98, 2000
- Lotus Notes 4.5, 4.6, R5
- Lotus Organizer 4.1, 5.0, 97, 97 GS, 6.0
- Symantec ACT! 3.05, 4.0, 2000
- NetManage Ecco Pro 4.0
- GoldMine 3.0, 4.0 (Standard-Edition)
- Platforms for using XTNDConnect PC:
- Windows 98, Me (Millennium Edition), Windows NT 4.0, 2000 and XP.
- Pentium II recommended
- 64 MB RAM recommended (minimum 32 MB)
- Other requirements:
- 20 MB free hard disk space
- *Bluetooth* wireless technology, infrared, or cable connection
- An embedded synchronization in Microsoft Outlook, providing one-key synchronization and allowing the user to control the synchronization process with easy-to-use settings.
- Handheld devices supported include the Z600, palm-sized and handheld devices using Windows CE and PalmOS/ Casio Personal Organizers.

WAP services

The Z600 has a WAP browser, supporting WAP 2.0 (WML 1.3). WAP 2.0 optimizes usage of higher bandwidths and packet-based connections of wireless networks.

The built-in WAP browser in the Z600 gives the user portable, fast and secure access to a wide variety of services, including personalized services, with new opportunities for business, individuals and service providers.

Using the WAP browser

The WAP browser in the Z600 is compliant with WAP 2.0 and includes WTLS class 3 as well as mechanisms for digital signatures. It supports WML and XHTML. The WAP browser in the Z600 is also designed to access information such as timetables, share prices, exchange rates, Internet banking and other interactive services.

Direct Links

There are direct links in the menu system for easy download of e.g. pictures and melodies from WAP sites.

Push services
Businesses and service providers can “push” content or service indications to work groups and/or customers. Examples of pushed content would be mail alerts, messaging, news, stock quotes, contacts, meeting requests, etc.

Support of XHTML
The WAP browser supports the markup languages of WAP 2.0. It supports WAP 1.2.1 + XHTML Mobile Profile 1.0 + WCSS (XHTML-MP), XHTML Basic, a subset of XHTML-MP, IHTML, WAP Cascading Style Sheets (WCSS), WML version 1.3 and WMLScript. The subsets of the WAP standard XHTML are supported by all major WAP browsers. WAP pages authored in XHTML and WCSS can be displayed in standard PC browsers such as IE and Netscape. WAP pages authored in WML can be displayed in WAP browsers only. It is preferable, therefore, that developers use XHTML and CSS to develop content as these are pure WAP standards. WML and WMLScript are for backwards compatibility.

All of the basic XHTML and IHTML features are supported, including text, images, links, checkboxes, radio buttons, text areas, headings, horizontal rules and lists. For IHTML also blink and marquee, but not tables.

Support for cookies
Z600 has support for cookies (client based), an application used by WAP sites to store site-specific information in the browser between visits to the site. Cookies give the site owner a possibility to see when a person has visited their site. They also save the user from having to enter the same information (e.g. the password or user ID) more than once. Cookies are often used by e-commerce sites (shopping carts and wish lists).

Style sheets
Z600 supports style sheets offering content developers more control over the way their WAP pages are displayed.

Sending bookmarks
WAP 2.0 enables the sending of bookmarks via infrared as well as via SMS.

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
The User Agent Profile function allows WAP content to be automatically optimized for the Z600, ensuring the intended user experience.

Several bearer types
The Z600 accesses the WAP over a standard GSM Data connection as well as over a GPRS connection (network-dependent services.)

Bandwidth efficiency
Unlike traditional Internet services, WAP services are relayed to wireless devices as binary encoded data, maximizing bandwidth efficiency. A GPRS connection further increases efficiency.

Easy create for WAP
Creating a WAP service is no harder than creating an Internet/intranet service, as WML and WMLScript are based on well-known Internet languages such as HTML and JavaScript.

Using standard tools
Service creators can use standard tools such as ASP (Active Server Page) or CGI (Common Gateway Interface) to generate content dynamically. Services can be created once and then made accessible on a broad range of wireless networks.

Maintain customer base
Existing services can be adapted to WAP. The necessary binary encoding is handled by a WAP Gateway, allowing HTML-based services to be viewed on the WAP browser of the Z600. An XHTML page can be viewed in both the WAP browser and in any standard Web (HTML) browser.

Improve productivity
A business can use a WAP gateway to provide a secure connection to its corporate network, improving internal communication flow by making information available to mobile as well as office users.

The WAP profiles
A WAP profile holds network settings and user identification, allowing the user to switch easily between corporate services and WAP services on the Internet, simply by switching WAP profile.

The Z600 has dynamic WAP profile handling, which means that the user can add, edit and delete WAP profiles. There are up to 5 WAP profiles.

During WAP browsing, the options button gives the user immediate access to a dynamic option menu for WAP services, similar to a mouse right-click in PC programs.

Bearer type characteristics

The Z600 accesses WAP services over IP. IP can be provided either over GSM Data, HSCSD or GPRS, depending on network services.

Typical differences which distinguish the bearer types are listed below.

High Speed Data
High Speed Data (HSCSD) increases speeds for circuit switched data by allowing the phone to use a coding scheme with a high capacity, and to use two time slots for receiving data. The download speed is increased to up to 28,800 bps. The speed for sending data is limited to 14,400 bps. The data rate can be increased several times by the use of rate adaption, interworking with ISDN. This also provides additional features, such as quick call set-up capability.

GPRS access
The connection is maintained “constantly”, with data transmitted in packets, and transmission capacity being used by the application in use on an as-needed basis.

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.

When 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.

GSM data access
Circuit connection of data calls, which means that the phone is connected during the entire WAP session.

Pricing is comparable to that of data calls in the network.

Gateway characteristics

A WAP Gateway provides Internet/intranet as well as WAP services to the mobile browser. A Gateway is identified by an IP number, depending on access type.

End-to-end gateway navigation
The WAP 2.0 supports E2E (End-to-End) Gateway navigation, making it possible for example for a bank to redirect its clients from the Internet gateway to its own gateway.

Security using the WAP

For certain WAP services, such as banking services, a secure connection between the phone and WAP gateway is necessary. An icon in the display of the Z600 indicates when a secure connection is in use.

The Z600 is based on the WAP 2.0 (WML 1.3) specification suite, in which security functionality is specified by a technology called Wireless Transport Layer Security (WTLS). The WAP protocols for handling connection, transport and security are structured in layers, with security handled by the WTLS layer, operating above the transport protocol layer. WTLS classes define the levels of security for a WTLS connection:

- WTLS class 1 – encryption with no authentication.
- WTLS class 2 – encryption with server authentication.
- WTLS class 3 – encryption with both server and client authentication.

Server authentication requires a server certificate stored at the server side and a trusted certificate stored at the client side.

Client authentication requires a client certificate stored at the client side and a trusted certificate stored at the server side.

A Wireless Identity Module (WIM) can contain both trusted and client certificates, private keys and algorithms needed for WTLS handshaking, encryption/decryption and signature generation. The WIM module can be placed on a SIM card and is then referred to as a SWIM card.

Certificates

To use secure connections, the user needs to have certificates stored in the phone. There are two types of certificates:

Trusted certificate
A certificate that guarantees that a WAP site is genuine. If the phone has a stored certificate of a certain type, it means that the user can trust all WAP gateways that use the certificate. Trusted certificates can be pre-installed in the phone, in the SWIM or they can be downloaded from the trusted supplier's WAP page.

Client certificate
A personal certificate that verifies the user's identity. A bank that the user has a contract with may issue this kind of certificate. Client certificates can be pre-installed in the SWIM card.

WIM locks (PIN codes)

There are two types of WAP security locks (PIN codes) for a SWIM, which protect the subscription from unauthorized use. The PIN codes should typically be provided by the supplier of the SWIM.

Access lock
An access lock protects the data in the WIM. The user is asked to enter the PIN code the first time the SWIM card is accessed when establishing a connection.

Signature lock
A signature lock is used for confirming transactions, much like a digital signature.

In the Z600, the user can check which transactions have been made with the phone when browsing. Each time the user confirms a transaction with a signature lock code, a contract is stored in the phone. The contract contains details about the transaction.

Configuration of WAP settings

An easy way to perform WAP configuration in the Z600 is to use the step-by-step WAP configurator available on http://www.SonyEricsson.com. The configurator utilizes OTA provisioning.

Manual configuration is done using the menu system in the phone. This is described in the User's guide.

Over-the-air provisioning of WAP settings

To simplify the configuration of WAP settings in the Z600, all settings can be sent to the phone as an SMS message. This makes it easy for an operator, a service provider or a company to distribute settings for Internet/intranet, and WAP, without the user having to configure the phone manually. This also makes it easy to upgrade services, as no manual configuration is required.

- The OTA configuration message is distributed via SMS point-to-point.
- The setup information is a binary encoded XML message (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 www.SonyEricsson.com
- The user is alerted about new settings when the ongoing browsing session ends. Settings are not changed during an ongoing browsing session.
- 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. Therefore the user can verify that the configuration message is authentic.

Push services

Examples of WAP services that can be pushed include:

- Notification of new e-mail, voice mail, etc.
- News, sports results, weather forecasts, financial information (stock quotes etc.).
- Personal Information Manager (PIM) - delivery of contacts, meeting requests etc.
- Smart card e-cash.
- Interactive games.

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

Service Indication (SI)

An SI service sends to the browser a text message with a URL of a WAP page. If the user decides to load the URL, normal WAP browsing commences. When an SI is received by the Z600, the user can load it immediately, postpone it or delete it. Received SIs are stored in the Push Inbox and can be viewed and loaded at a later time. The Push Inbox displays a list containing the first part of each received message. The list is sorted by action attribute (high/medium/low) or reception time of the message.

Service Loading (SL)

An SL service sends and displays a WAP page if accepted by the user. If the SL is not accepted, it is loaded and stored in the cache for later use. The user can start the browser and load the page from the cache manually.

cHTML support

Compact HTML or cHTML is defined as a subset of HTML 2.0, HTML 3.2 and HTML 4.0 specifications. This means that Compact HTML inherits its flexibility and portability from standard HTML. Z600 supports cHTML to facilitate development of I -mode applications for the handset. I-mode is a Japanese service for transferring packet-based data to handheld devices and is owned by NTT DoCoMo. cHTML does not use WAP as a transmission method.

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 that give the user access to personalized communications, information and entertainment, anytime, anywhere.

Data connections

In order to browse via WAP or use an Internet connection, 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 Z600. To make it easier for the user, data connections can be provided by the operator via OTA provisioning.

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, e-mail or the Internet 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 all the necessary settings for the Internet access point, including modem pool phone number or IP address, user ID and password.

Mobile positioning

The geographic location of mobile subscribers can be used to provide them with related information and a variety of services. Sony Ericsson's Mobile Positioning System (MPS) gives operators a fast and cost-effective way to establish and roll out location-based services.

For users of the Z600, the integration of mobile positioning with WAP services means that a complete range of service and information tools is available.

More information regarding possibilities with and technologies for mobile positioning is available at http://www.SonyEricssonMobile.com/mps.

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. Users want access to the Internet while they are away from their offices and homes, and surveys have found that the vast majority of business professionals want the ability to send and receive e-mail, browse the WAP and transmit text and graphics on a portable device. That is why the main applications driving Mobile Internet development are e-mail clients and WAP browsers.

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 innovative services to be created, enabling new and previously inaccessible market segments to be addressed and increasing 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 private networks, banking and financial services.

With GPRS, the Z600 sends data in "packets" at a very high speed. The Z600 remains connected to the network at all times, using transmission capacity only when data is sent or received.

Using GPRS in the Z600

Instead of occupying an entire voice channel for the duration of a data session, the Z600 sends/receives data in small packets, as needed, much like IP on the Internet. Because of this, the Z600 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 21,400 bps respectively. The Z600 works with all four coding schemes, but data speed will naturally vary 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 Z600 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 Z600 has several advantages, for example:

- Constant connection
- Keep an open connection to an e-mail system or the company network, staying online to receive and send messages at all times. All connection settings can be managed by using the data connections feature.
- High speed
- Gain access automatically to increased bandwidth when downloading large files, images etc.
- Cost efficient
- Use transmission capacity only when needed, thus reducing costs.
- WAP over GPRS
- Access the Internet via WAP at high speed and with a constant connection.
- E-mail over GPRS
- Remain connected to an e-mail system while reading and preparing messages, (which are sent at a high speed).
- Data communication

- Transfer data and access the Internet or an intranet with a PC, PDA or handheld device connected via *Bluetooth* wireless technology, infrared or cable.
- Data and voice
- Maintain a data connection, for example, a constant connection to an e-mail system when conducting a voice call.
- 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 browsing with a Z600 the GPRS connection will be automatically disconnected when an incoming call is received. This is the default behaviour. However, it is possible for operators to customize the phone in such a way as to ensure that the user is asked if they wish to remain connected when an incoming call is received.

Modem and AT commands

The Z600 contains a complete GSM/GPRS modem. This provides data and e-mail communication, as well as Internet/intranet access, for a connected PC, PDA or handheld device. Once the PC/PDA is connected to the phone using a cable, *Bluetooth* wireless technology or infrared, and the appropriate software is installed, the modem in the phone works in a similar way to a PC Card modem, or an external modem.

In the Z600, AT commands are used for:

- controlling the data communication between the PC and the remote service
- configuring and requesting settings and behaviours in the phone, from a connected PC or PDA

GSM data communication

The built-in data capability turns the phone into a modem when connected to a PC/PDA. The Z600 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.

High Speed Data gives a faster speed

High Speed Data (HSCSD) increases speeds for circuit switched data by allowing the phone to use a coding scheme with a high capacity, and to use two time slots for receiving data. The download speed is increased to up to 28,800 bps. The speed for sending data is limited to 14,400 bps. The data rate can be increased several times by the use of rate adaption, interworking with ISDN. This also provides additional features, such as quick call set-up capability.

GPRS enables constant connection and high speed

With GPRS, the connection is maintained “constantly”, and data is transmitted in packets. Pricing of GPRS can be dependent on the actual use of bandwidth, which means very low cost when no data is sent or received, while the phone remains connected. When transmitting large amounts of data, bandwidth can be increased automatically to allow faster transmission speed, up to 85,600 bps download speed.

AT commands support

This section outlines the AT commands supported by the Z600. The information here can be of use for advanced users, to indicate the possibilities they have to:

- develop new communications software
- add the Z600 to an application's list of compatible modems
- adjust the settings of their mobile telephone and modem

The modem in the Z600 supports the V.25ter command set, which is the standard communication set used by modems.

The Z600 is compatible with industry de facto extensions, ETSI 07.05, 07.07 and 07.10.

Overview of AT command functions

AT commands are used to configure the mobile telephone, to request information about the current configuration or operational status of the mobile phone, and to test availability and request the range of valid parameters, when applicable, for an AT command.

The built-in modem can be set to any one of three modes of operation. These are:

Off-line command mode

The command mode for entry of AT commands, when the device is first turned on.

On-line data mode

Allows "normal" operation of the built-in modem, for exchanging data or facsimiles with a remote modem.

On-line command mode

For sending AT commands to the built-in modem while remaining connected to a remote modem.

The AT commands are grouped as follows:

- Control and Identification
- Call Control
- Interface Commands
- Data Compression
- Mode Management
- Audio Control
- Accessory Menus
- Accessory Authentication
- Voice Call Control
- Accessory Identification
- GSM DTE-DCE Interface Commands
- GSM Call Control
- GSM Data
- GSM High Speed Circuit Switched Data
- GSM Network Services
- GSM USSD
- GSM Facility Lock
- GSM Mobile Equipment, Control and Status
- GSM Mobile Equipment Error Control
- GSM SMS and PDU Mode
- GSM GPRS
- GSM Phonebook
- GSM Clock, Date and Alarm Handling
- GSM Subscriber Identification
- Ericsson Specific AT Commands for GSM
- MMI Settings
- Voice Control
- OBEX
- WAP Browser

Online Developer Resources

On www.SonyEricsson.com/developer, developers will find discussion forums monitored by our Sony Ericsson Developer Support, a searcheable knowledge base of support queries and solutions, Tips & Tricks, example code, and so on. To stay up to date on development issues, register and subscribe to the monthly Sony Ericsson Developer Newsletter.

Sony Ericsson Developer Support

Sony Ericsson offers developers professional technical support services. The service can be purchased from www.SonyEricsson.com/developer There are two levels of support, described below:

- The **Basic Developer Support** is an annual support service that provides developers with all the basics to successfully develop world-class applications for Sony Ericsson products. With this support contract, developers get access to high-quality e-mail support with same-day response and resolution times, five technical support incidents as well as the ability to purchase more.
- The **Advanced Developer Support** is an annual support service that equips professional developers with everything they need to successfully develop world-class applications for Sony Ericsson products. With this support contract, developers get access to a high-quality e-mail support with fast response and resolution times, and up to 50 technical support incidents.

Infrared transceiver

Infrared communication creates a data link between two communications devices through an infrared beam of light. On the Z600, this link is used to connect with desktop computers, PDAs, Sony Ericsson handheld computers, laptop PCs, other phones and other hardware supporting the standard. The Infrared Data Association (IrDA) has set the hardware and software standards that form the infrared communication links. The Z600 complies with the IrMC 1.1 specification, which defines how mobile telephony and communication devices can exchange information. In the Z600, the IrMC 1.1 specification is also used for communication via a cable.

Key benefits of using the Z600 with its built-in infrared transceiver:

- True wireless communication
- Low power consumption
- Secure data transmission with the IrDA DATA standard
- Ability to send and receive e-mail and data on the connected PC/PDA
- Ability to connect to the Internet or intranet/LAN from the connected PC/PDA
- Ability to manage the phone book from a PC
- Exchange of business cards and calendar events with vCard/vCalendar compatible devices
- Exchange of ring signals between compatible phones

Connection via infrared

IrDA is a point-to-point communication link between two infrared ports. The infrared beam has to be directed towards the target infrared port and as long as the two infrared ports are within sight and range, the devices exchange data. For optimal performance, place the Z600 within a metre and at an angle of 30 degrees to the infrared port on the PC/PDA, or other phone. An advantage of the necessary proximity of devices is reduced risk of transmitting data to other nearby devices. An infrared link is a serial connection, which means that data bits are sent one after another in a long stream. The IrDA–SIR Data Link Standard is a protocol that makes transmission of data faultless. The standard provides a high level of noise immunity, which means that the connection is not affected by fluorescent light, sunlight and electromagnetic fields – making it suitable for the modern office environment.

Connection via cable

The infrared connection is not always the best solution when connecting to a PC/PDA. Indeed, it is not always even possible. The DRS-11 cable and the USB cable DCU-11 provides the same connectivity between the phone and another unit.

The DRS-11 cable supports a subset of the signals in the RS-232 standard.

Facts and figures

**Subscription and/or network-dependent*

A	Antenna connector, external for HF kits	Yes
B	Background light	Yes
	Background pictures, pre-defined	Yes
	Background pictures, downloadable	Yes, only limited by memory
	Bluetooth wireless technology support	Yes, built-in
	Bookmarks (URL memory)	Yes, (25)
	Built-in antenna	Yes
	Business card exchange	Yes
C	Call functions	
	Call counter	Yes, outgoing and total (not incoming)
	Call barring*	Yes
	Call divert*	Yes
	Call hold*	Yes
	Call list (last dialled, answered and missed calls)	Yes, 30 entries

	Call screening*	Yes
	Call time/call cost (a.k.a Advice of Charge, Information/Charging)*	Yes
	Call transfer*	Yes
	Calling card service	Yes
	Calling Line Identification (CLI)	Yes. Either as the number of the caller, or as a picture, icon or personal ring signal assigned to the number of the caller.
	Conference calls*	Yes
	Camera	Yes.
	Chat application	Yes, SMS as radio bearer, developed in-house.
	Clock	Yes, with automatic Time Zone*
	Closed User Groups (CUG)*	Yes
	Colour display	Yes, 65536 colours, 128x160 pixels
	Connected Line Identity Presentation (COLP)	Yes
	Contacts	Yes
	Copyright protection	Yes, possible with copyright protection via EMS, MMS, IR and Bluetooth.
	CSD, Circuit Switched Data*	Yes
D	Date	Yes
	Display light	Yes
E	EDGE (enhanced Data rates for Global Evolution)*	No
	E-mail address storage	Yes
	E-mail client	Yes, supporting IMAP4, POP3, SMTP.
	EMS (Enhanced Messaging Service)*	Yes, with 30 pre-defined pictures, 15 pre-defined animations and 4 melodies.
	External antenna connector	Yes
F	File system	Yes. At the purchase of the Z600 phone, there is up to 2.0 Mb of memory space for own objects such as pictures, sounds and themes. Customized kits may vary.
	Fixed Dialling Numbers (FDN)*	Yes

G	Games	Yes, 4 pre-loaded and more games available for download at Sony Ericsson Mobile Internet.
	GPRS (General Packet Radio Services)*	Yes, up to 85,6 kbps (multislot class 8, 4+1 time slots)
H	High Speed Data (HSCSD)*	Yes, multislot class 2
I	Image browser	Yes. Gives access to pictures stored in the phone.
	Imaging support	Yes
	Infrared port	Yes
	Input methods	T9 Text Input, multitap alphabetic (GSM standard)
J	Java	Yes
K	Keypad lock	Yes
L	Languages	45
M	Melody composer	Yes, Music DJ
	Memory check	Yes, dynamic memory allocation: 2.0 Mb
	MMS (Multimedia Messaging Service)	Yes
	Mobile chat	Yes
	Modem (data)	Yes, built-in (max. data rate 108,800 bit/s.)
N	Navigation key	Yes, five-way
	Notes	Yes, up to 10 – depending on size.
P	Personal management	
	Calculator	Yes
	Calendar	Yes
	Alarm clock with snooze function	Yes
	Stopwatch	Yes
	Timer	Yes
	Code memo	Yes
	Organizer	Yes
	Phone book	
	Capacity	510 numbers in phone + SIM
	Maximum number of ADN read from the SIM	255

	Maximum number of FDN read from the SIM	55
	Phone book user groups	Yes, 10
	Phone lock	Yes
	Pictures	
	Total storage capacity	Limited by the memory
	Number of pre-loaded pictures	TBD
	Possibility to download	Yes, storage capacity limited by memory
	Possibility to create	Yes, storage capacity limited by memory
	Picture editor	Yes, stand-alone picture editor facility. Here the user can create new and edit existing pictures (WBMP).
	Picture phone book	Yes
	Pictures, exchange	Yes, via EMS, MMS, infrared and *Blue-tooth* wireless technology
	Polyphonic ring signals	Yes, 32 voice
	Predictive text input	Yes
	Profiles	Yes, 7
R	Re-dialling, automatic	Yes
	Ring signals	
	Total storage capacity	Limited by the memory
	Preloaded	24
	Possibility to download	Yes, storage capacity only limited by the memory
	Possibility to compose	Yes, storage capacity only limited by the memory
	Exchange	Yes, via EMS, MMS, infrared and *Blue-tooth* wireless technology
S	Screen saver	Yes
	Shortcuts	Yes
	Silent mode	Yes
	Silent mode: activation	Long “C”
	SIM relative features	
	SIM voltage	3V and 5V

	Number of networks that the handset can manage on the SIM card	60
	SDN support	Yes, 15. Located in Phonebook menu/ Special numbers/ Service numbers
	SIM Application Toolkit*	Yes
	SIM card copy	Yes
	SIM card lock	Yes (support of GID 1 and GID 2)
	Sleep mode	Yes
	SMS (Short Message Service)*	Yes
	SMS, long messages (a.k.a. concatenated SMS)*	Yes, up to 10 messages of 160 characters each.
	SMS Cell Broadcast*	Yes
	SMS counter	Yes
	SMS templates	Yes, up to 10 templates of 30 characters each
	Sound browser	Yes. Gives the user access to sounds stored in the phone.
	Sound handling	Yes (iMelody, AMR and MIDI)
	Speaker phone	No
	Speech coding	Enhanced, Full and Half Rate. AMR supported where available.
	Speed dialling	Yes
	Start-up/Shutdown shows	Yes
	Status menu	Yes
	Swatch Internet Time	No
	Synchronization with PC	Yes, via RS232 cable, USB, infrared and *Bluetooth* wireless technology
	SyncML	Yes
T	Themes, pre-loaded	Yes, 4
	Themes, downloadable	Yes, limited only by memory
	Themes, exchange	Yes, via MMS, infrared and *Bluetooth* wireless technology
	Two Line Service (a.k.a Alternate Line Service, ALS)	Yes

U	USB protocol support	No, but through the DCU-10 accessory (USB to System Connector cable + drivers) you can get the USB functionality, though not charging
	USB physical interface support	No, only with accessory
	Connection to a PC USB port	No, only with accessory
	Battery recharging through USB port	No
	Maximum data rate through USB port (bit/s)	46080
V	Vibrating modes	Yes
	Vibrating only	Yes
	Vibrating then ringing	No
	Vibrating + ringing	Yes
	Voice recognition	Yes, dialling, answering and rejecting with HF, redial, switch profile, record/play memos and “magic word”. Maximum contacts: 34.
	Voice command	Yes, maximum number of functions: 6
	Voice coding	Yes
	Voice memo	Yes, the total time is only limited by the memory. The maximum number of voice memos is 20. Voice memos cannot be used as ring signals.
W	WAP browser	Yes, WAP 2.0 browser with support for XHTML and CHTML.
	WTLS for added WAP security*	Yes, WTLS class 1, 2, 3 and signText

Network-dependent features

SMS and EMS messaging

The Z600 is capable of sending and receiving SMS and 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 up to 10 SMS messages together to create a longer message (network-dependent service)

A Service Centre (SC) acts as a storage and forwarding centre. The Z600 also supports using SMS as a bearer type for connecting to WAP.

SMS consists of two basic services:

- Mobile Originated SMS
- Mobile Terminated SMS

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 the user 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.

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

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. 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 Z600, 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 Z600

Service		Mode	Support
CALL CONTROL			Yes
CELL BROADCAST DOWN-LOAD			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 confirms 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
	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 (see note)	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

Service		Mode	Support
LAUNCH BROWSER			Yes
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)	Yes
		'04' - Language setting	Yes
		'05' - Timing setting	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			Yes
SEND SHORT MESSAGE	bit 1:	0 = packing not required	Yes
		1 = SMS packing by the ME required	Yes
SEND SS			Yes
SEND USSD			Yes

Service		Mode	Support
SET UP CALL		General: Capability configuration	Yes
		Set-up speech call CallParty Subaddress DTMF support	No
			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 re-dial	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 re-dial	Yes
		'04' = set up call, disconnecting all other calls (if any)	Yes
		'05' = set up call, disconnecting all other calls (if any), with re-dial	Yes
SET UP EVENT LIST		'00' = MT call	Yes
		'01' = Call connected	Yes
		'02' = Call disconnected	Yes
		'03' = Location status	Yes
		'04' = User activity	No
		'05' = Idle screen available	Yes
		'06' = Card reader status	Not Applica-ble
		'07' = Language selection	Yes
		'08' = Browser termination	Yes
		'09' = Data available	No
		'OA' = Channel status	No
SET UP IDLE MODE TEXT			Yes, 1 row of text is sup-ported
SET UP MENU			Yes
SMS PP DOWNLOAD			Yes

User interaction with SIM AT

DISPLAY TEXT

Text of up to 240 characters (120 UCS coded) is supported. Text clearing times are 5-20 seconds and a 60-second time-out limit for the user to clear the text.'Key' responses:

- 'Long Back' – Proactive session terminated by user.
- 'Back' – 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 'Ok' without entering a character gives warning message "Minimum 1 character". 'Key' responses:

- 'C' clears current character.
- 'Long Back' terminates the proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

GET INPUT

Prompt for character input. 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) – 20characters

'Key' responses:

- 'C' clears current character.
- 'Long Back' terminates the proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

REFRESH

When a refresh command is executed by the phone, it requests the user to wait while the phone restarts. A notification will be made if it is demanded that the SIM card initializes again.

SELECT ITEM

Scroll to highlight item for selection. 'Key' responses:

- Navigation key press down– Scroll down list.
- Navigation key press up– Scroll up list.
- Long 'Back' terminates proactive session.
- 'Back' – Backward move in proactive session.
- 'OK'– 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. Default responses are "MESSAGE FAILED" or "MESSAGE SENT". 'Key' responses:

- Long 'Back' or 'Back' ends 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 'OK' 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 'OK' 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.

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 several items are found in the menu, a default title is used. If the SIM AT Menu Item is selected by pressing 'Select' all the items sent in the Set Up Menu command will be available for selection, in the same way as the Select Item command.

Security and M-commerce technical data

Feature	Support in the Z600 for m-commerce
Dual-slot	No
Associated with a STK card, allowing ISO B0' bank card payments	If separate card, no
Associated with a STK card, allowing EMV bank card payments	If separate card, no
Certified by the “GIE Carte Bancaire”	If separate card, no
WIM support	If separate card, no
Ability to use a WIM application embedded on a SIM/ USIM card	Yes
WIM application embedded on a SIM/USIM card the default WIM application	Yes
Number of smart card readers in the handset	1
Provisioning of the following SATK commands: Perform Card APDU, Power Off Card, Power On Card, Get Reader Status	No
Release of SIM Application Toolkit supported	R99 with exceptions (missing AT commands, for example “Launch browser” and “Show icon” – still under investigation)
Information to the user while in secured mode (WTLS)	Yes, via icon
Is an incoming class 2 SMS transferred to the SIM even when another application (a browser) is running?	Yes
Access to the WIM	WIM can only be accessed by native applications, e.g. the browser

Terminology and abbreviations

3GPP
3rd Generation Partnership Project.

AMR
Adaptive Multi Rate. Audio format for speech sounds.

API
Application Programming Interface.

ASP
Active Server Page. Server technology that generates WAP pages dynamically.

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

bFTP
binary File Transfer Protocol.

Bluetooth
Bluetooth wireless technology is a secure, fast, point-to-multipoint radio connection technology. It is a specification for a small-form factor, low-cost radio solution providing links between mobile computers, mobile phones and other portable handheld devices, and connection to the Internet. For more information, http://www.bluetooth.com.

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

Browsing session
The period from the first access of content until the termination of the connection.

Calling Line Identification (CLI)
Shows the number of the caller, or a picture assigned to the number of the caller in the mobile phone display. Not all numbers can be displayed. Network-dependent service.

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

CDMA
Code division Multiple Access. A generic term that describes a wireless air interface based on code division multiple access technology.

CDC
Connected Device Configuration. A J2ME configuration aimed at, for example, PDAs.

CHTML

Compact Hyper Text Markup Language.

CLDC
Connected Limited Device Configuration. A J2ME configuration aimed at, for example, mobile phones.

DRM
Digital Rights Management.

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.

HTTP
Hyper Text Transfer Protocol.

IDE
Integrated Development Environment

J2ME
Java 2 Platform, Micro Edition. A Java platform targeting "micro" devices with small processors and memory capacities, such as mobile phones, communicators and PDAs.

JAD
Java Application Descriptor (file).

JAR
Java Archive (file).

LAN
Local Area Network.

ME
Mobile Equipment.

Micro browser
Accesses and displays Internet content in a mobile phone, using small file sizes and the bandwidth of the wireless-handheld network.

MIDP
Mobile Information Device Profile. A J2ME profile connected to the CLDC configuration and aimed at mobile phones.

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 an SMS message 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 the mobile phone or SIM card where phone numbers can be stored and accessed by name or position.

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. The Z600 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 a mobile phone.

SS
Supplementary Services.

SyncML
An open standard for synchronization of all devices and applications over any network.

TCP/IP
Transmission Control Protocol/Internet Protocol.

UMTS
Universal Mobile Telecommunications System. The telecommunications system, incorporating mobile cellular and other functionality, that is the subject of standards produced by 3GPP.

URL
Uniform Resource Locator.

USSD
Unstructured Supplementary Services Data.

VAD
Voice Activated Dialling.

VAS
Value Added Service.

vCalendar
vCalendar defines a transport and platform-independent format for exchanging calendar and scheduling information for use in PIMs/PDAs and group schedulers. vCalendar is specified by IETF.

vCard
vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as Internet mail, voice mail, WAP browsers, telephony applications, call centres, video conferences, PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

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 WAP 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 WAP (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 WAP.

XML
Extensible Markup Language.

XHTML
Extensible HyperText Markup Language.

Related information

Documents

- The Z600 User's Guide
- Sony Ericsson Z600 FAQ
- AT Command Reference Manual
- WAP June2000 (WAP 2.0) Specification

Software

- XTNDConnect PC, upgraded version from Extended Systems Inc.

Links

- http://www.SonyEricssonmobile.com/
- http://wap.SonyEricssonmobile.com/
- http://www.gprsworld.com/
- http://www.extendedsystems.com/
- http://www.bluetooth.com/
- http://www.imc.org/
- http://www.3gpp.org/
- http://www.irda.org/
- http://www.etsi.fr/
- http://www.wapforum.org/
- http://www.imc.org/pdi/
- http://www.syncml.org/
- http://www.SonyEricsson.com/developer
- http://www.w3.org/TR/xhtml-basic/

Trademarks and acknowledgements

Technical specifications

The consumer pack includes:

- Mobile Phone Z600
- Battery
- Travel Charger
- CD containing Windows SW package for the phone;
  Extended Systems XTNDConnect Server synchronization, Sony Ericsson applications to create and manage content in the mobile phone, Connection Wizard to create dial-up connections for CSD, HSCSD, GPRS.
- User's guide, including Battery Information
- Accessory leaflet
- Service and Support Leaflet

General technical data

Product name	Z600
System	Tri-band. GSM phase 2 recommendations. GSM 900 (3GPP TS 51.010-1), GSM 1800 (3GPP TS 51.010-1) and GSM 1900 (NATWG 03), e-GSM supported
Speech coding	Enhanced, Full and Half Rate. AMR supported where available for high speech quality
SIM card	Small plug-in card, 3 V and 5V type
Type number	TBD

Exterior description

Size	90x48x27.9 mm (incl. exchangeable front and back cover)
Weight	110 grams (incl. Standard battery)
Status display	Gray scale 91x29 pixels
Main display	Full graphical display TFD (active-matrix) 128 x 160 pixels 65536 colours 16 bits/pixel memory depth. Pixel size: 0.249x0.249mm: 2” panel Colour depth: 16 bits represented by two byte (5 bits red, 6 bits green and 5 bits blue) 1st Byte d0-d7: G3G4G5R1R2R3R4R5 2nd Byte d0-d7: B1B2B3B4B5G0G1G2 Response time (black to white) <100ms 1) Type: graphical Resolution: 128 x RGB x 160 pixels. Size: Minimum viewing area: 32 x 38 mm Technology: TFD LCD, 65536 colours Colours displayed together: 65536 colours Size (lines): 9 Backlight colour: 1 Fonts: 3
2nd display	91x80 pixels Active area 18.19 x 5.79 mm Viewing area 20.36 x 7.83 mm Glass size (mm) 12.23 (+/-0.2) + end seal (0.8 max) 200 x 200 µm pixel pitch (dot size 0.19 x 0.19 mm & gap 0.01 x 0.01mm Black and white Blue backlight
Antenna	Built-in

Text size	1
Colours	1
Battery	TBD
Network LED	No
Exchangeable covers	Yes
Keypad	5-way navigation key, 18 keys, volume keys, camera key, power button, Web access key. Keypad lock: from standby, Lock keys in More list. It is also possible to select Auto key lock in the Settings menu. Use of several keys simultaneously (e.g. for games) is possible.

Ambient temperatures

Operating	Max: +50×C, Min -10×C
Storage	Max: +85×C, Min -40×C
Charging	Max: +45×C, Min +4×C

Supported Man-Machine Interface (MMI) languages

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

Albanian (SQ), Arabic (AR), Brazilian Portuguese (PB), Bulgarian (BG), Canadian French (CF), Czech (CS), Croatian (HR), Danish (DA), Dutch (NL), English (EN), Estonian (ET), Farsi (FA), Finnish (FI), French (FR), German (DE), Greek (EL), Hebrew (IW), Hungarian (HU), Indonesian-Bahasar (IN), Italian (IT), Latin American Spanish (XL), Latvian (LV), Lithuanian (LT), Malay (MS), Norwegian (NO), Philippine-Tagalog (TL), Polish (PL), Portuguese (PT), Romanian (RO), Russian (RU), Serbian (SR), Sesotho (ST), Slovakian (SK), Slovenian (SL), Spanish (ES), Swedish (SV), Thai (TH), Turkish (TR), US English (AE), Vietnamese (VI), Zulu (ZU).

Current consumption, talk and standby times

Dimension	Value in GSM 900
Transmission current	55 mA (min) 215 mA (max)
Standby current	2,45 mA (min), (paging rate 9, 1 neighbour present) 4,5 mA (max), (paging rate 2, 16 neighbours present)
Talk time	Up to 9 hrs
Standby time	Up to 300 hrs

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	

Cell broadcast service

Feature	
User notification of the reception of a CB message	Message displayed on screen
Handling of reception of several unread messages	The messages are queued in order to be read in the same order they were received.
Support of all CMBI from 0 to 4096	Yes
File support	CBMI and CBMID
Support CB SIM data download	Yes

Feature	
Support of all applicable Data Coding Scheme values as defined in 3G TS 23.038 V3.3.0 (with the exception of Language preference)	Yes
Ability to display in a 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	Yes
Support of multi-page CB-messages	Yes

Short message service

Feature	Support in the Z600
SMS Service Centre Number	It is possible to pre-record the SMS Service Centre Number.
Pictures	It is possible to insert a picture or an icon into the text message. EMS compliant mobile handsets will be able to see the picture correctly.
Input methods	Predictive text input or multitap
Reply to messages	It is possible to reply to received messages by SMS, phone call,...
Message creation methods support	Predictive writing or multitap
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 or a “SIM archive” folder	Yes
insert a line in the message	Yes
assign a validity period to the message	Yes
print via IrDA	No
use pre-defined 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)
resend the message	Yes
forward the message	Yes
save the message in the “SIM archive”	Yes
get delivery time and date	Yes
print via IrDA	No
Possibilities of the previously sent message:	
delivery report of the message	Yes
forward the message	Yes
save the message in the “SIM archive” or “Sent items” folders	Yes
know the remaining capacity storage	Yes

Feature	Support in the Z600
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 “SIM archive”	Yes
forward the message	Yes
know the remaining capacity storage	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 or by adding more recipients
Possibility to write an e-mail address as a recipient address	Yes, if SMS type=e-mail
SMS storage	In the SIM and in the handset.
Nokia Picture Messaging	Yes

Enhanced message service

Feature	Support in the Z600
Level of compliance supported by the handset regarding the specifications described in release 99.	Enhanced Messaging Service (EMS) according to the standard 3GPP TS 23.040 v4.3.0, with the addition of the ODI feature from 3GPP TS 23.040 v5.0.0.
Number of messages that the handset is able to handle to generate a concatenated message	10
Capacity storage	100 messages
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.
Incoming messages	• A 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, animations and text formatting can be aved in the terminal and then inserted in a new message, if the object is not protected using ODI.
Concatenated messages	A receipt is received in the 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.
Text formatting	• Centred, left and right aligned text. • Small, normal and large font size. • Bold, italic, underlined and strikethrough style.
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.... • send and receive melodies via EMS. If the melodies are not protected by copyright. • download melodies and commercial tunes from WAP/WAP portals. • create melodies on WAP/WAP portals. • Music DJ in the terminal only supports MIDI-format
WBMP	Yes
Picture sizes	16x16 mm, 32x32 mm, variable size receipts in black and white.

Feature	Support in the Z600
Pictures	It is possible to... • edit and create pictures by using the phone keypad. • send and receive pictures via EMS. If the pictures are not protected by copyright. • create pictures on WAP/WAP portals. • download pictures from WAP/WAP portals. • receive pictures in enhanced messages originated by service providers.
Animations	The handset supports the following animations: I am ironic, I am glad, I am sceptic, I am sad, WOW!, I am crying. I am winking, I am laughing, I am indifferent, I am in love, I am confused, Tongue hanging out, I am angry, Wearing glasses, Devil. It is possible to... • send and receive animations.
TP-PID field value given by the handset before sending an EMS message	0x00

Multimedia message service

Feature	Support in the Z600
MMS/CSD parameters and MMS/GPRS parameters placement	MMS is bound to a WAP profile. A WAP 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 specified by Sony Ericsson and Nokia
MMS User Agent functional entity will be a separate entity from WAP browser:	Yes
MMS User Agent support	WAP WTA, WAP UAProf and WTA Public.
Supplier indication of realized inter operability 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* • MSISDN recipient address • *e-mail* recipient address • message *Cc* recipient(s) address(es) • *delivery report* request • *read-reply* report request • *message* priority
From where can the user insert multimedia elements into multimedia messages:	• terminal memory • directly from camera
Supplier indication if MMS User Agent will be able to handle a network-based address book	No
Possibility for sent messages to be memorized into a folder in handset memory	Yes
Actions that the user can perform after message notification:	• retrieve the message immediately • defer message retrieval • reject message

Feature	Support in the Z600
Actions that the user can perform after message retrieval:	• reply to the sender of the message • reply to the sender and to Cc people • forward the message • delete the message • save message into terminal
Multimedia codecs/formats supported for audio	AMR,
Multimedia codecs/formats supported for video	None
Multimedia codecs/formats supported for image	Baseline JPEG, wbmp, GIF 89a
MMS User Agent provides:	• text formatting facilities (only textsize) • coloured text/background (Viewer/player supports coloured text and background.) • predictive writing
Supported formats for message presentation:	• message body + attachments (e-mail presentation) • SMIL version as described in “Nokia/Ericsson MMS Conformance document (not WML and SMIL 2.0 Boston)
Maximum message size that can be handled by the handset for message	Unlimited
Possibility to configure unconditional message modification (such as media modification in messages)	Yes
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)

Instant messaging/ Chat

Feature	Support in the Z600
Support of instant messaging	No
Chat application	Yes, SMS as the radio bearer.

Bluetooth technical data

Dimension	Support in the Z600
Bluetooth capability statement	This product is manufactured to meet *Bluetooth* Specification 1.0b and is designed to work with V1 devices.
Bluetooth functions	Dial-up Networking Profile File Transfer Profile Generic Access Profile Generic Object Exchange Profile Headset Profile Object Push Profile Serial Port Profile Synchronization Profile Basic Imaging Profile Handsfree Profile
Connectable devices	All products supporting *Bluetooth* spec. 1,0b or 1.1 and at least one of the above profiles.
Coverage area	Up to 10 metres (33 feet)
Transmission power	1mW (0dBm)
Frequency band	2.4 GHz - the unlicensed ISM band
Power consumption	Standby current: < 0.3 mA Voice mode: 10-35 mA Data mode average: 5 mA [0.3-30 mA, 20 kbps, 25%]
Data transmission rate	up to 108 kbps with one time slot
Specific commands working with the SIM card	No
Support of multipoint connections	No

Performance and technical characteristics

Dimension	GSM 900/E-GSM 900	GSM 1800	GSM 1900
Frequency range	TX: 880 – 914 MHz RX: 925 – 959 MHz	TX: 1710 – 1785 RX: 1805 – 1880	TX: 1850 – 1910 RX: 1930 – 1990
Channel spacing	200 kHz	200 kHz	200 kHz

Dimension	GSM 900/E-GSM 900	GSM 1800	GSM 1900
Number of channels	174 Carriers *8 (TDMA)	374 Carriers *8 (TDMA)	299 Carriers *8 (TDMA)
Modulation	GMSK	GMSK	GMSK
TX Phase Accuracy	< 5º RMS Phase error (burst)	< 5º RMS Phase error (burst)	< 5º RMS Phase error (burst)
Duplex spacing	45 MHz	95 MHz	80 MHz
Frequency stability	+/- 0.1	+/- 0.1	+/- 0.1
Voltage operation (nominal)	3.6 Volts	3.6 Volts	3.6 Volts
Transmitter RF power output	33 dBm Class 4 (2W peak)	30 dBm Class 1 (1W peak)	30 dBm Class 1 (1W peak)
Transmitter Output impedance	50 W	50 W	50 W
Transmitter Spurious emission	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to GSM spec.)	< - 30 dBm (according to GSM spec.)	< - 30 dBm (according to GSM spec.)
Receiver RF level	Better than – 102 dBm	– 102 dBm	– 102 dBm
Receiver RX Bit error rate	< 2.4%	< 2.4%	< 2.4%

Tone and percussion maps in the Z600

The Z600 has a tone bank of 128 (0-127) sampled instruments. The instruments are complemented by 47 percussion sounds, see table number two. Echo effects are possible.

Tone map

GM	Poly	GM Tone Map	GM	Poly	GM Tone Map
0	1	Acoustic Grand Piano	65	1	Alto Sax
1	1	Bright Acoustic Piano	66	1	Tenor Sax
2	2	Electric Grand Piano	67	1	Baritone Sax
3	2	Honky-tonk Piano	68	1	Oboe
4	1	Electric Piano 1	69	1	English Horn
5	1	Electric Piano 2	70	1	Bassoon
6	1	Harpsichord	71	1	Clarinet

Tone map

GM	Poly	GM Tone Map	GM	Poly	GM Tone Map
7	1	Clavi	72	1	Piccolo
8	1	Celesta	73	1	Flute
9	1	Glockenspiel	74	1	Recorder
10	2	Music Box	75	1	Pan Flute
11	1	Vibraphone	76	2	Blown Bottle
12	1	Marimba	77	2	Shakuhachi
13	1	Xylophone	78	1	Whistle
14	1	Tubular Bells	79	1	Ocarina
15	2	Dulcimer	80	2	Lead 1 (square)
16	2	Drawbar Organ	81	2	Lead 2 (sawtooth)
17	2	Percussive Organ	82	2	Lead 3 (calliope)
18	2	Rock Organ	83	2	Lead 4 (chiff)
19	2	Church Organ	84	2	Lead 5 (charang)
20	1	Reed Organ	85	2	Lead 6 (voice)
21	2	Accordion	86	2	Lead 7 (fifths)
22	1	Harmonica	87	2	Lead 8 (bass + lead)
23	2	Tango Accordion	88	2	Pad 1 (new age)
24	1	Acoustic Guitar (nylon)	89	2	Pad 2 (warm)
25	1	Acoustic guitar (steel)	90	2	Pad 3 (polysynth)
26	1	Electric Guitar (Jazz)	91	2	Pad 4 (choir)
27	1	Electric Guitar (clean)	92	2	Pad 5 (bowed)
28	1	Electric Guitar (muted)	93	2	Pad 6 (metallic)
29	1	Overdriven Guitar	94	2	Pad 7 (halo)
30	1	Distortion Guitar	95	2	Pad 8 (sweep)
31	1	Guitar Harmonics	96	2	Fx1 (rain)
32	1	Acoustic Bass	97	2	Fx2 (soundtrack)
33	1	Electric Bass (finger)	98	2	Fx3 (crystal)
34	1	Electric Bass (pick)	99	2	Fx4 (atmosphere)
35	1	Fretless Bass	100	2	Fx5 (brightness)
36	1	Slap Bass 1	101	2	Fx6 (goblins)

Tone map

GM	Poly	GM Tone Map	GM	Poly	GM Tone Map
37	1	Slap Bass 2	102	2	Fx7 (echoes)
38	1	Synth Bass 1	103	2	Fx8 (sci-fi)
39	1	Synth Bass 2	104	1	Sitar
40	1	Violin	105	1	Banjo
41	1	Viola	106	1	Shamisen
42	1	Cello	107	1	Koto
43	1	Contrabass	108	1	Kalimba
44	1	Tremolo Strings	109	2	Bag pipe
45	1	Pizziano Strings	110	2	Fiddle
46	1	Orchestral Harp	111	1	Shanai
47	1	Timpani	112	1	Tinkle Bell
48	1	String Ensemble 1	113	1	Agogo
49	1	String Ensemble 2	114	2	Steel Drums
50	1	Synth String 1	115	1	Woodblock
51	2	Synth String 2	116	1	Taiko Drum
52	1	Choir Aahs	117	1	Melodic Tom
53	1	Voice Oohs	118	2	Synth Drum
54	2	Synth Voice	119	1	Reverse Cymbal
55	2	Orchestra Hit	120	1	Guitar Fret Noise
56	1	Trumpet	121	1	Breath Noise
57	1	Trombone	122	2	Seashore
58	1	Tuba	123	1	Bird Tweet
59	1	Muted Trumpet	124	1	Telephone Ring
60	2	French Horn	125	1	Helicopter
61	1	Brass Section	126	2	Applause
62	2	Synth Brass 1	127	1	Gunshot
63	2	Synth Brass 2			

Percussion map

No.	Percussion name	No.	Percussion name
35	Acoustic Bass Drum	59	Ride Cymbal2
36	Bass Drum 1	60	Hi Bongo
37	Side Stick	61	Low Bongo
38	Acoustic Snare	62	Mute Hi Conga
39	Hand Clap	63	Open Hi Conga
40	Electric Snare	64	Low Conga
41	Low floor Tom	65	High Timbale
42	Closed Hi-Hat	66	Low Timbale
43	High Floor Tom	67	High Agogo
44	Pedal Hi-Hat	68	Low Agogo
45	Low tom	69	Cabasa
46	Open Hi-Hat	70	Maracas
47	Low-Mid Tom	71	Short Whistle
48	Hi-Mid Tom	72	Long Whistle
49	Crash Cymbal 1	73	Short Guiro
50	High Tom	74	Long Guiro
51	Ride Cymbal 1	75	Clavas
52	Chinese Cymbal	76	Hi Wood Block
53	Ride Bell	77	Low Wood Block
54	Tambourine	78	Mute Cuica
55	Splash Cymba 1	79	Open Cuica
56	Cowbell	80	Mute Triangle
57	Crash Cymba 2	81	Open Triangle
58	Vibraslap		

WAP browser technical data

Feature	Support in the Z600 WAP browser
Back to previous page	Yes
Bearer type GPRS (IP)	Yes
Bearer type GSM Data (IP)	Yes, HSCSD, 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 and vBookmark format via IR and BT
Cache	Yes (size 6 kbyte)
Character sets *	UTF8 (Default), USASCII, Latin1, UCS2
Clear cache	Yes
Colour	Colour display
Home page	Yes, up to 5 different, one for each WAP profile
HTML version for WAP browser	xHTML, mobile 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), WBMP, no transparent layers, JPG
Network Settings	Up to 5 different settings available by selecting WAP profile (Intranet, Internet, Banking, Gateway etc.)
OTA Support	Yes
PPP Authentication	PAP, CHAP supported
Reload page	Yes
Tables	Yes
User Agent Profiles	Yes, list of client characteristics - e.g. display size
WAP/WML WAP	WAP 2.0/ WML 1.3

Feature	Support in the Z600 WAP browser
	*) When creating WML applications, it is recommended that you always save the page contents as UTF8, and that this is clearly indicated in the pages before publishing. This ensures that the contents of the application can be viewed, regardless of character sets used in gateways and the phone. All characters are not supported in all phones. The software version depends on which market the phone is associated to. Also, please note that the phone may not support input on a WAP Service which uses certain characters (languages), even if those characters are supported for browsing in the phone.
WAP browser	WAP 2.0 baseline
WAP profiles	Dynamic - up to 5 WAP profiles, each with its own settings
WTLS (security)	Yes, WTLS Class 1 - Encoding WTLS Class 2 - Encoding + Server Authentication. Root Certificates needed in phone WTLS Class 3 - Encoding + Server Authentication + Client Certification. Root Certificates needed in phone + special SIM cards Sign text

WAP Operator technical data

Feature	Support in the Z600 for WAP
WAP Browser	
Version	2.0 baseline
HTML	XHTML, mobile profile
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, data compression, header compression, quality of services IP address, datamode (conn.less or oriented) UserId and password Security on/off Show images on/off Response timer
Manual selection	Yes, between Analog (V32) and Digital (V110)
Parameter sets include	WAP/CSD, WAP/GPRS (different sets)
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	WAP/CSD, WAP/GPRS is not 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.

Feature	Support in the Z600 for WAP
SWIM	Not used for provisioning. The SWIM is only used for WAP security, both WTLS connections and digital signatures.
SWIM certificate	Both client and trusted certificates can be used for WTLS connections and digital signatures. No new certificates can be stored and no old ones can be removed by the terminal.
Applicative provisioning	
Preferred bearer customization	Yes
E-mail customization	No
Other applications/features	Yes. MMS, SyncML
Technologies	
SonyEricsson and WAP Forum provisioning over SMS and Cell Broadcast	Yes
Openwave OTA	No
Other	Yes. The Ericsson-Nokia solution.
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	Yes
Session Initiation Application (SIA)	Yes
Man Machine Interface	
SI/content retrieval postponing	Yes
SI menu structure accessability	WAP services, Push inbox
SL reception warning	The user can make a choice if a dialog is wanted or not before loading the SL. WAP services/options/common/Push access/prompt
SIA reception warning	Yes

Feature	Support in the Z600 for WAP
Number of push messages	Depending on the size of the push messages. Around 20 push messages with a size of 500 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	Sending a SIA is the most trustful.
WSP push sessions	1
Denial of service/spoofing	
User agent profile	
UA profile content sent at beginning of WSP session	No
OA profile content size	
URL sent pointing to the UA profile at the beginning of WSP session	Yes
URL location	On the manufacturer WAP site.
WTAI	
WTA Make Call	Yes
WTA Send DTMF	Yes
WTA Add Phone Book	Yes
Other WTA/WTAI	No

DOWNLOAD	
WAP solutions	
SAR/WSP/HTTP GET solution to download content over WAP	Yes
Download Fun from Openwave	No
Other download content over WAP	Yes. Downloaded without using SAR is limited to 10kB
Features	
Download application/product memory check	Yes
Downloaded object solution	Yes. The user is asked if the content is to be saved.
UAP indication for downloading	Yes

Feature	Support in the Z600 for WAP
Other features	Yes. Store, delete, forward, use, manage.
Object formats	
Ringing tones	audio/iMelody, other/eMelody, vMel.
Wallpapers	Image/WBMP, GIF, JPEG.
Pictures	Image/WBMP, GIF, JPEG.
Games	Yes, 4-6 pre-loaded and 5-7 at Sony Ericsson Mobile Internet.
JAVA applications	Yes
Screen savers	Image/GIF, JPEG
Audio files	audio/MPEG4 not used,MP3 not used, WAV not used
Skins	Application /skin
Video	Video/MPEG4 not used

GRAPHICAL USER INTERFACE	
Man Machine Interface	
Soft keys	Yes
Separate/dedicated back or erase keys	Yes
Screen backlight on when browsing	Yes
Predictive writing	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, in XHTML
Radio buttons	Yes, in XHTML.
Check boxes	Yes, in XHTML.
Buttons	Available as XHTML form controls.

GPRS technical data

Dimension	Support in the Z600
Compatible GPRS and SMG specifications	ETSI R97 SMG 31 bis
Data rates	Multislot 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 bottom 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	Fixed and 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 and GEA2
Support of compression algorithms	Yes, V42bis and IP header compression

Dimension	Support in the Z600
Support of the QoS modification procedure	Yes, when initiated by the network (not by the handset)
Interfaces to external devices supported by the handset and available for a GPRS link	IrDA, RS-232, AT commands. IrDA, Datarate=SIR & MIR RS232, autobaud, max 460kbit/s Bluetooth, v1.0B+Critical errata, Certified and listed Supported Bluetooth profiles: DUN, FAX, Headset, Synch, Object push
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: Support of RS232 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 or TE (laptop, PDA) supported
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 multislot class 4 and CS-4
PDP context	10 PDP context descriptions stored in mobile PDP context description is edited via application in mobile, AT-command 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

Dimension	Support in the Z600	
AT commands supported	• AT+CGDCONT - DEFINE PDP CONTEXT • AT+CGQREQ - Quality of Service Profile (REQUESTED) • AT+CGQMIN - Quality of Service Profile (Minimum Acceptable) • AT+CGATT - PACKET DOMAIN SERVICE ATTACH OR DETACH	• AT+CGACT - PDP CONTEXT ACTIVATE OR DEACTIVATE • AT+CGDATA - ENT

Built-in GSM data modem technical data

Dimension	Support in the Z600	
Standards	AT commands industry standard, ETSI 07.05 and 07.07 and 07.10, V.25ter command set supported	
Data rates, Circuit Switched (CSD)	Download data rate	Up to 19,200 or 28,800 bps (depending on base rate) no compression, with V.42bis compression up to four times higher transmission rates depending on the data type
	Upload data rate	Up to 9,600 or 14,400 bps (depending on base rate) for GSM Data communication, no compression with V.42bis compression up to four times higher transmission rates depending on the data type
Data rates, GPRS	See GPRS Technical data	

E-mail client technical data

Feature	Support in the Z600 e-mail client
Attachment	Yes (outgoing, images only)
Bearer type GPRS (IP)	Yes
Bearer type GSM Data (IP)	Yes, HSCSD, ISDN and analog
Character sets *	US ASCII (All variants)
	ISO8859-1 (All variants)

Feature	Support in the Z600 e-mail client
	ISO8859-2 All variants
	ISO8859-5 All variants
	ISO8859-10 All variants
	KOI8-R All variants
	WIN1251 All variants WIN1252 (All variants UTF7 (All variants)
	UTF8 All variants
	GB2312
	BIG5
	GB18030
OTA Support	Yes
Supported protocols	POP3, IMAP4, SMTP

USSD technical data

Feature	Support in the Z600
USSD support	GSM Phase 1/ 2 (Cross-phase compatibility). GPRS behavior 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	160x160 pics	160x160 pixels	50 frames (1 frame/ 100ms)	256	65535 (5:6:5=RGB; less blue colours)	
JPEG	160x160 pics	640x480 pixels	No	16.8 mil.	65535	
WBMP	160x160 pics	320x320 pixels	No	Black/ White	2	

Images – downloading to phone

Feature	File type	Max. size	PC/ Cable	PC/ IrDA	PC/ BT	Phone-to-phone	WAP	MMS
EMS icons	WBMP	WxH<=1024 pixels	Yes	Yes	Yes	Yes	Yes	Yes
MMS	GIF, WBMP, JPG	Limited by the memory	Yes	Yes	Yes	Yes	Yes	Yes

Feature	**File type**	Max. size	PC/ Cable	PC/ IrDA	PC/ BT	Phone-to-phone	WAP	MMS
Background	GIF, WBMP; JPG	Limited by the memory	Yes	Yes	Yes	Yes	Yes	Yes
MMS template		Send 30k, Receive 50k	No	No	No	No	No	Yes
Animations	Animated GIF	Limited by the memory	Yes	Yes	Yes	Yes	Yes, 1)	Yes
Themes	GIF (propriety, THM)	Limited by the memory	Yes	Yes	Yes	Yes	Yes	No
Screensaver	Animated GIF	Limited by the memory	Yes	Yes	Yes	Yes	Yes	Yes

Exceptions:

MMS: GIF, WBMP, JPG, 128x160 pics

EMS icons: WBMP max WidthxHeight<=1024 pixels (e.g. 32x32=1024)

Themes: GIF, JPG max, 128x160 pixels

WAP: Can not show animations in the WAP Browser. You can download maximum 3kb. The animation will be shown in the Image Browser if it’s saved in the phone.

GIF: Animations used as background images or user greetings displays first frame only.

SyncML technical data

Feature	Support for Sync ML in the Z600
SyncML compliance	The handset is fully SyncML compliant (it passed both SyncML Conformance and Inter operability testing [SyncFest])
Basic data formats	Contacts: vCard 2.1, Calendar: vCalendar 1.0, Tasks: vTodo 1.0.
Possibility for operators to extend SyncML functionality	No
Possibility to synchronize other handsets using SyncML	No
Transport method for SyncML messages	WSP (i.e. using a WAP connection)
Synchronization application placement	Inside the handset
Possibility for the user to configure login parameters (e.g. username and password) to access the remote database	Yes
Configuration parameters that can be entered/modified by the user	Server URL, Server UserID, Server PWD, Paths to databases (Calendar, Contacts, Tasks) UserID and PWD for Databases, Databases to be synced (on/off), WAP Account, Sync Sound
Mechanisms used by the handset to capture changes made by the end user (i.e. how does the SyncML client in your handset know which changes were made to the address book)	It uses a change log where it marks the contact as updated
Ability to deal with multiple servers	No
Ability to perform conflict resolution actions	No

Infrared transceiver technical data

Signal in RS-232	Support in DRS-11
CD (Carrier Detect)	No. Set statically
CTS (Clear To Send)	Yes

DSR (Data Service Ready)	Statically connected with DTR
DTR (Data Terminal Ready)	Statically connected with DSR
GND (Signal Ground)	Yes
RI (Ring Indication)	No. Set statically
RTS (Request To Send)	Yes
Rx (Received Data)	Yes
Tx (Transmitted Data)	Yes

Index

Numerics
3GPP 14

A
Abbreviations 47
Acknowledgement 50
Architecture 12
  MMS Centre 12
assembler 18
AT Command Functions 33
Audio 11

B
Backlight 18
Bluetooth 18
Bluetooth devices 21
Bluetooth technical data 62
Built-in GSM data modem technical data 76

C
Cell broadcast service 54
Certification 18
cHTML support 30
colour support 18
Compatibility 14
Compatible with old phones 14
Connection via desktop charger 24
Current consumption, talk and standby times ..54

D
deployment 18
Desktop charger 24
Documents 50

E
E-mail client technical data 76
Enhanced message service 58
Exterior description 53

F
Fixed Dialling 42

G
Game file sizes 18
Games 54
Gaming API 18
General Packet Radio Service 31
GPRS 31
GPRS access characteristics 27
GPRS technical data 73
Graphics 9
GSM Data access characteristics 27
GSM system support 52

I
Image format technical data 78
Images, downloading to phone 78
Info & entertainment 15
infrared 18

L
Languages, MMI 53
Links 50

M
MMS Centre 12
MMS content
  audio 11
  graphics 9
  SMIL presentations 11
  text 11
  video 11
MMS Technical features
  architecture 12
MMSC 12
Mobile Internet 29
Modem and AT Commands 32
mophun RTE 17
Multimedia message service 60
Music block 19

N
News & commercials 15

O
Online Services 42
OTA configuration 13, 29
Overview of AT command functions 33

P
Performance and technical characteristics 62
Push inbox 29
Push services 29

R
Related information 50
Restricted Calls 42

Ring signals 15
Ring signals and melodies
music block 19
track 19

S
sandbox 18
Secure gamelets 18
Short message service 56
SIM Application Toolkit 42
SIM AT Services 43
SIM card type 52
SMIL presentations 11
SMS 18
SMS access characteristics 27
SMS request 15
SMS standard 14
Software 50
Software developement kit 18
Sony Ericsson Developer Support 34
Speech coding 54
Sprite detection 18
Supported MMI languages 53
Synchronization software 25
Synchronization, local 24
SyncML 22
SyncML technical data 80
Synergenix Interactive AB 18

T
TCP/IP link 18
Technical Specifications 51
Terminology and abbreviations 47
Text 11
Touch correct feature 20
Trademarks and acknowledgements 50
True file support 18
Two displays 6

U
Unicode 18
Unified messaging 15
User-to-user 14
USSD technical data 78

V
Vehicle positioning 15
Vibrator 18
Video 11

W
WAP browser technical data 63
WAP Operator technical data 69
WAP, security 28
Weight 52

X
XTNDConnect PC 25