K600

The Stylish 3G Phone

Sony Ericsson

Preface

Purpose of this document

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

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

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

People who can benefit from this document include:

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

Sony Ericsson Developer World

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

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

Document history

Change history		
2005-02-28	Version R1A	First edition
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Contents

Product overview

This product is a small mass-market 3G phone of slim design and impressive functionality. Speed and multitasking make this phone suitable for business usage. Video call is the future of mobile communications and this phone has it.

Encased in a slim, futuristic design, this phone offers easy access to 3G services by the use of a direct button for video calling. The high speed offered through 3G, facilitates multitasking. You can talk and browse the web, talk and send messages, pictures or video clips, talk and download music or stream videos - these are all examples of multitasking.

The dual front design with a 1.3 megapixel camera offers imaging that includes taking pictures and record video clips horizontally. Easy-to-use imaging communication provides a dedicated camera button to minimize the number of steps for taking and sending a picture or video clip.

It further contains advanced messaging and connectivity technology, with a rich offering of multimedia and entertainment functions. With the USB cable you can easily transfer files between your phone and computer. The phone also supports a full range of accessories to further achieve flexibility.

A powerful gaming solution for Advanced Java 3D™ with cutting-edge graphics, multi-player games and a large 1.8 inch 262k TFD colour screen lets the user get the most out of the phone when technology meets design and creates a friendly user atmosphere.

Note: To be able to give updated information about the implemented technology and functionality of this product as soon as possible, this White Paper will be released in updated revisions.

Key functions and features

The K600 is a triple mode (UMTS and GSM-GPRS) mobile phone. It supports handover (GSM–UMTS, UMTS–GSM) and simultaneous sessions (one voice and one packet data session or two packet data sessions).

The evolution of mobile communications towards 3G will greatly increase the scope for new applications and services such as video telephony and remote access to corporate networks. 3G brings multimedia into mobile phones, and it is in this area that Sony Ericsson can show its vast experience in consumer electronics and entertainment – music, pictures and games – as well as its mobile technology leadership.

3G

3G is going to be the catalyst for a whole new set of mobile services, enabling you to access advanced services anywhere, anytime. You will be freed from the confines of cables, fixed access points and low connection speeds and you will have access to entertainment and on-demand services to a much greater extent than before.

Screen

An eye-catching feature of this phone is the large colour screen. It measures 176 pixels wide and 220 pixels high (176 x 220) in portrait mode and has 262,000 colours, allowing high-quality colour imaging.

Sound

You can listen to sound in the phone via the speaker (earpiece), the loudspeaker, the high-quality stereo headset or other compatible accessories.

System

This phone supports UMTS (Global System for Mobile Communications), GSM + EGSM 900/DCS 1800/PCS 1900, GPRS (General Packet Radio Service), Multislot class 10 (4+2) and HSCSD (Highspeed Circuit Switched Data).

Improved battery capacity

The phone has top class talk- and standby time. Battery description: 3.6V, 900mAh, Lithium Ion. Standby time: Up to 370 hours (GSM) and up to 290 hours (UMTS). Talk time: Up to 8 hours 15 minutes (GSM) and up to 2 hours 10 minutes (UMTS). Video talk time: Up to 1 hour 40 minutes.

Activity menu

Get direct access to new events, bookmarks and shortcuts. By using the activity menu (right button on the front of the phone) the user can easily handle missed calls, new text, picture messages, task reminders, shortcuts and get quick access to favourite Internet bookmarks. It is also possible to get a direct overview of applications that are running in the background, for example the media player or the FM radio.

Video telephony

With the speed of UMTS, the K600, and video call functionality, you can now share the latest news face-to-face with your family or friends. The video call key at the front of the phone is an easy way of starting a video call. During a video call, you can switch cameras from the front camera to the back camera. When using the back camera, you hold the phone horizontally and you can share what you are seeing with the video call recipient. Apart from the person you are talking to, you can choose to see either yourself in the phone display or an alternative picture from the File manager. The alternative picture can be customized.

1.3 Megapixel camera

 With the 1.3 Megapixel camera, you always have the camera with you. Take a picture and send it away as part of a multimedia message or as an email attachment.

Video clips

 You can record your own video clips and send them to your friends or transfer to your computer.

Digital zoom

The camera has up to 4x zoom (depending on selected image size) and 32x playback zoom.

Picture light

The camera has a built in high quality light to improve taking pictures in darker environments.

Video call

The CIF camera which is placed above the phone display and also the back camera allow you to participate in a video call with a friend.

QuickShare ™

Sony Ericsson's constant ambition of making products easier to use, has had a great outcome: QuickShare™.

QuickShare is the fastest, easiest and smartest ever way to share images. With just a few clicks, moments can be captured with the integrated camera and be shared with friends!

But there is more to QuickShare than sending images with a picture or email message. Quick-Share is about ease of use of all the imaging features of the product. Images can be shared phone to phone, with Bluetooth, across the room or between a phone and other paired devices such as PDAs, PCs or printers. For example, it would be possible to print a picture directly from the phone using a Bluetooth enabled printer.

Full graphic 262k colour screen

The large 1.8 inch colour screen, 176 x 220 pixels, enhances viewing, facilitating high-quality multimedia and entertainment.

User Interface (UI)

From standby, the phone features a user interface built on the "desktop" concept, which is widely used in many computer operating systems. From here, navigation between different main functions in the phone is done by selecting one of the 3D icons which is represented.

Media player

The Media player converts the phone into a portable MP3, MPEG4, Real®8 and H263 player. Play music and video clips, streamed or downloaded. The folder system enables you, for example, to organize your favourite songs into groups and create simple playlists. A *Play and pause* function has been added. Mega Bass™ is built in for powerful low frequencies and bass reflex enclosures.

Radio

The new RDS (Radio Data System) FM radio is built-in and offers instant and easy access to FM radio channels. The user also has the possibility of using it as an alarm clock signal.

The radio can be listened to with the portable handsfree accessory (Stereo Headset) or via the internal speaker. With the radio, up to 20 favourite channels can be stored with the preset function. The portable handsfree needs to be connected at all times when listening to the radio, since it works as an antenna.

The RDS function brings you information directly in the display which is sent out by the currently tuned in radio station.

Streaming and downloading

You can view videos and listen to music that you find on a web site by streaming them to your phone. By streaming media such as audio and video clips, multimedia is available in real time with minimal downloading or waiting time. This means that you can start to listen to the music or view a video clip before the complete file is downloaded to the phone. Media such as audio files, video clips or slide shows can be played back at any time.

USB connectivity

A USB (Universal Serial Bus) cable is included in the kit. The idea of the USB is to allow an easy connection of the mobile phone to a computer. The user needs to install the USB cable drivers from a CD, and can then use the drag-and-drop functionality in the computer to transfer files between the phone and the computer.

MMS

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

With MMS, there are many interesting applications to subscribe to, for example, stock information, movie trailers and weather reports.

PlayNow™

Content such as music, video and images may be previewed before purchase. A unique direct-link to download music, video, games, themes and images, which is easy to use and promises you best-selling content for mobile download. By selecting PlayNow™, you can, for example, go straight to a live list of Top Music Hits.

Content formats that are supported

All formats that are supported in the phone will be possible to download. Music, video and images may be previewed before purchase. The music format is MIDI, MP3, MP4, Real8 or WAV (Polyphonic 72 voices or more).

How the service works

This service is owned by Sony Ericsson or hosted by Sony Ericsson for a network operator. The PlayNow™ or other premium content is maintained and managed, for example by Sony Music or Sony Pictures. The content on offer can easily be suited to a specific region or operator.

Implementation costs for network operators are minimal and server communication is based on existing, well-established standards. Sony Ericsson offers first or second line support according to the agreement on hosting a white label service or not. High level co-operation is available for the design, look and feel, of content management.

Operator benefits

This service is aimed at providing quality and quantity revenue for network operators. This is truly an ARPU (Average Revenue Per User) driver with low costs for operators. The process involves:

• Downloading a list

• Previewing content
• Choosing content
• Buying content

Note: The availability of this unique application is limited to specific markets, where relevant infra-structure and agreements have been set up.

Other technical details

Security - Server communication is protected by TLS (Transport Layer Security) and SSL (Secure Socket Layer).

Forward lock - Content cannot be exchanged with other devices by the user, it is limited to use or delete.

Java 2 Micro Edition™

Download extra content with Java™, for example, new information- and enter-tainment-based applications. This gives users a chance to personalize the functions and features in their phones, and developers the opportunity to create new applications.

Gaming

Gaming is already a very popular feature in mobile phones, and with Advanced Java, users can add new games and skill levels to further enhance the entertainment value of Sony Ericsson phones.

3D Games

Java 3D gaming software introduces and supports cutting-edge 3D graphics. Audio developments such as 72 tones polyphonic sound and force feedback provide a much richer experience. With operator support, there is the possibility for multi player games to play against friends. The large 1.8 inch TFD screen adds to a lasting gaming experience. Downloading graphic intensive games, matching up to the size of the built-in memory, is also possible.

Bluetooth™ wireless technology

Using built-in Bluetooth wireless technology, communication with other Bluetooth devices is supported via a radio link. Unlike infrared, Bluetooth is not dependent on line-of-sight communication.

Several devices can be connected to the phone using Bluetooth up to 10 metres away. For example, the phone can be answered with a Bluetooth headset, when it rings and the user can send images to another phone at the same time. Several mobile phones can take part in a Bluetooth supported game and the phone and a computer can exchange data such as images, video clips, business e-cards, music files and calendar data.

Copyright protection – DRM

DRM (Digital Rights Management) features the rights and copy protection of downloaded content (audio, pictures, music tones, video, entertainment features such as games etc.).

Content-based services have great market potential. Sony Ericsson supports OMA Phase 1 DRM mechanisms as a key enabler for content-based services, with active participation in evolving standardization work within OMA (Open Mobile Alliance). Furthermore, any additional market requirements for DRM will be monitored.

Design features

Display and keypad areas

The 1.8 inch display area accommodates relatively large keys on the keypad area.

The keys are aligned in a vertically grouped form.

The display and key areas are designed with a sophisticated metal look.

Ergonomics and balance

The phone strives for a perfect balance in your hand. Ergonomics link together with design.

Front

A video call key is situated at the left side of the phone. The easiest way of initiating a video call is by pressing the video call key.

The activity menu button is situated at the right side of the phone. It gives you direct access to new events, Internet bookmarks and shortcuts. It is also possible to get a direct overview of applications that are running in the background.

The circular background form around the navigation key is designed to complement the circular form of the camera on the camera front.

Battery cover

The battery cover is designed to be removed by sliding the two catches on the side of the phone and lifting the cover away.

Camera

The active lens cover protects and gives the back of the phone a digital camera look. Just turn the cover and begin to explore the true meaning of imaging with your phone. The picture light helps to improve taking pictures in a dark environment.

More in-phone functions

Navigation key

The 4-directional + select key is designed to easily navigate the menu system. In a menu, it can be pressed to select a feature. It can also be used as a **joystick** with games.

Improved User Interface

Selection keys and the key assignment give a very efficient interaction design with full flexibility to handle all the new features and applications. Sony Ericsson has focused on user-centred design and extensive usability testing to solidify the new UI paradigm. This ensures visibility in actions and system status and consistency between applications and similar actions. The large, high-resolution colour screen is easily managed with the navigational key.

This phone also supports a brand-new horizontal camera user interface.

Setup wizard

The setup wizard makes it possible for the user to quickly and easily prepare the phone for use.

At the first start-up, the setup wizard starts and helps the user with a couple of core settings whilst giving hints about the functionality of some important keys.

The setup wizard includes:

- setting the language
- setting time and time format
- setting date and date format
- the possibility to import contacts from a SIM card
- hints about keys such as the **Back** and **C** keys.

Tips and tricks

Tips and tricks inform the user about what features the phone provides and how to effectively use the phone. The user will, for example, learn how to mute an incoming call, how to turn T9 on or off and how to enter Contacts in a quick way. By viewing the Tips and tricks which can be found in the Settings menu, you can enhance the usage of your phone.

In phone promotion video

When the setup wizard is completed a short video clip which shows a couple of the different functions in the phone will follow directly. The user can choose to either view it directly or to view it later. The video clip contains helpful information on how to get started with the phone. It is by default stored in the File manager in Videos.

PIM (Personal Information Management)

The user can stay up to date with his or hers everyday events by synchronizing the phone contacts, calendar appointments and tasks in the phone with

similar programs in a computer. The USB cable which comes with the phone, the built in Infrared or Bluetooth feature can be used together with the synchronization software which is available on the CD in the kit.

MusicDJ™

Polyphonic sounds and the MIDI format has revolutionized the sound quality of ringtones in mobile phones.

By using the MusicDJ™ the user can play, compose, edit and send melodies. The built-in sound synthesizer uses wave tables, real instrument sounds, with 72 voices polyphony. The new composer has an improved graphical user interface to simplify melody handling. All new and edited melodies are stored in MIDI format.

VideoDJ™

Create a movie by mixing video clips, pictures, sound and text which has already been created or stored in the phone. The video formats that can be edited are 3GP files of QCIF size, coded in H263. You can add JPG image files and AMR sound files. The finished result can be sent by using email, MMS, Bluetooth or infrared.

File management

There is a file manager similar to that found on many computers. In the file manager, the user has an overview of the contents of the phone as well as how much memory is allocated to each function and feature. Folders can be created, renamed, deleted and files can be moved between them.

From the file manager, the user can view picture and slide shows, as well as play music and video.

Moving images

In line with more advanced file management, the K600 supports Macromedia® Flash Lite™ 1.1 images as well as SVG-Tiny animations.

The Macromedia Flash Lite player is pre-installed in the phone, allowing users to take advantage of the features of Flash images. Flash images can be embedded as moving objects on a Web page or they can be available as stand-alone Web pages. It is possible to interact with flash images using the

navigation key. Flash images can be included in picture messages. The pre-defined Pictures folder in My items, enables users to logically organize their images.

SVG-Tiny is a subset of the SVG standard and has been developed for use with PDAs and mobile phones. An SVG animation is a text file, based on XML, that contains specific illustration tags and attributes that define how the animation should be presented. The K600 decodes the tags and the animation is presented in the phone. SVG animation can be included in picture messages. The user can also attach an SVG image to contacts in the phonebook.

GPRS (General Packet Radio Service)

GPRS uses Internet-style packet-based technology. GPRS gives the benefits of a permanently available connection to the mobile Internet, but only uses the radio link for the length of time it takes to transfer data. GPRS offers the user the speed needed for satisfactory mobile Internet usability. The phone supports GPRS Multislot Class 10 (4+2).

WAP 2.0 supporting XHTML™ MP 1.2

The WAP browser supports the markup languages of WAP 2.0 – XHTML Mobile and XHTML Basic. These two subsets of the Web standard XHTML are supported by all major Web browsers. An XHTML page can be viewed in both the WAP browser and in any standard Web browser. All of the basic XHTML features are supported, including text, images, links, check boxes, radio buttons, text areas, headings, horizontal rules and lists.

In addition to XHTML, the WAP browser supports WML. The user can navigate between WML and XHTML pages. WAP 2.0 also supports cookies, often used by Web sites to store site-specific information in the browser between visits to the site. Cookies are often used by e-commerce sites (in shopping carts and wish lists for example), and to save the user from entering the same information more than once.

Cascading Style Sheets (CSS)

Before style sheets were introduced on the Web, developers had little control over the presentation of their Web pages. An XHTML document specifies the structure of the content, which part is a paragraph, which part is a heading, and so on. It does not specify how it shall be presented. Browsers use a default presentation for documents without style sheets. By adding a style sheet to the document the developer can control the presentation of the document, the colours, fonts, and layout.

On the Web, the de facto standard style sheet language is Cascading Style Sheets, specified by the W3C and implemented in Internet Explorer, Netscape, and Opera. For mobile phones, the OMA has identified a subset of CSS and extended it with OMA specific style rules. The CSS subset and the OMA extensions are called Wireless CSS (WCSS).

The WAP browser supports WCSS 1.1.

My friends (Wireless Village)

To ensure inter operability of mobile instant messaging and presence services, Sony Ericsson, Ericsson, Motorola and Nokia have created the Wireless Village Solution, an open standard. The protocol is bearer-independent and can be implemented in different networks. The Wireless Village Instant Messaging and Presence Service (IMPS) includes three primary features:

Presence

Presence information of other Wireless Village users is received and displayed to indicate their willingness to communicate. The user's own presence information is also sent for others to view. If the user is interested in another person's presence status, he or she can search for this person. If the person is found, the user may subscribe to his/her presence information. The presence information is displayed in a contact list.

Instant messaging

Instant messaging means "point-to-point messaging" between Wireless Village users. An instant message history of the communication is logged in a file, which can be read off line. This is a sub-set file of the whole communication and is limited by memory.

Groups

The user may join a chatroom and chat with the other participants/members.

Email

With inbox, outbox, save draft and reply options, there are all the functions needed for effective email communication in a powerful mobile phone. Constantly connected to a POP3, SMTP or IMAP4 email server anywhere on the Internet, the phone stores messages dynamically, depending on available memory, and updates the inbox automatically and over the air. Check email anywhere. Reply to email on the move. Friends, family and business contacts know that when they send email, it can be received, read and acted on immediately. Pictures can be included in outgoing emails and attachments that are received. Hyperlinks in emails are supported.

Personalization

With themes it is possible to change many settings in the phone, for example colours, images and ringtones, making it more personal. The phone comes with a number of preloaded themes and pictures, and more can be downloaded and exchanged – sports, movie, seasonal and other themes will be available on Sony Ericsson or operator sites. Other personalizable features are the start-up screen and the screen saver. Specific pictures and ringtones can also be set for each separate name in the contacts.

Technologies in detail

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

3G

Mobile telephony allowed us to talk on the move. The Internet turned raw data into helpful services that people found easy to use in their everyday lives. Now, these two technologies are converging to create third-generation mobile services.

In simple terms, 3G (third-generation) services combine high speed radio access with IP (Internet Protocol)-based services. This does not just mean fast mobile connection to the Web, it means totally new ways to communicate, access information, conduct business, learn and be entertained. It promises liberation from slow, cumbersome equipment and immovable points of access.

Increased 3G data rates, together with extended multimedia and entertainment content, will enhance the use of mobile Internet in a revolutionary way. Gaming will increase the user benefits even more.

The step towards IP is vital. IP is packet-based, allowing users to be "online" at all times, having to pay only for the sent or received data. The connectionless nature of IP also makes access a lot faster: file downloads take less time and we can be connected to a network within a few seconds.

3G introduces wideband radio communications, with incredible access speeds. Compared with today's mobile networks, 3G will significantly boost network capacity, much needed in densely populated areas – thus operators will be able to support more users, as well as offer more sophisticated services.

This phone is a dual mode phone. Thus the user will be able to use his or her K600 without having to think about which system is being used – the handover between the two systems is going to be seamless.

Using 3G scenarios

3G will change our working habits and social lives in many ways. The services that 3G has to offer will help us to manage our personal information, simplify tasks such as grocery shopping, make better use of our time, and offer services that are just fun to use. People can easily share a moment with their friends, family and work in other geographical sites in a video call. 3G will also help new, flexible working practices, such as working from home and remote access to corporate networks outside traditional working hours. Operators will be able to develop innumerable new service opportunities to attract and retain new customers:

- Your train is delayed so you are late for a meeting. By initiating a video call with the people at the meeting, you can still attend, and even see the sketches made at the meeting.
- Parents see their child walk for the first time, and know that the grandparents would love to see this. They initiate a video call to the grandparents' computer. The grandparents are thrilled with joy, and the child can hear their encouraging voices and see their happy faces.

- Business people can use the time they spend travelling, fixing things that are usually hard to get time for, for example to log on to their bank account, check the balance and pay a few bills - all through their 3G device.
- On vacation, people can make reservations when they get to their destination by using their 3G handset to obtain up-to-date information, including hotel vacancies. Having booked a room, they can use their phone to view video clips of local tourist attractions and talk to someone from the local tourist information bureau at the same time.
- A maintenance engineer, repairing some equipment at a client's premises, has a problem. Using his 3G mobile phone, he can contact his department and then download a demonstration video that guides him through the repair process.
- People can also share a moment with their friends and family in other geographical sites by capturing the moment with the video recorder and then sending them the video clip in a picture message.

Multiple sessions

With regard to simultaneous connectivity, multiple sessions, Sony Ericsson supports the 3GPP™ (3rd Generation Partnership Project) specification 3GPP TS 22.101 which states that 3GPP specifications shall enable the user of a single terminal to establish and maintain several connections simultaneously. It shall efficiently cater for applications which have variable requirements relating to specific QoS (Quality of Service) parameters (for example throughput) whilst meeting other targets.

Examples of use cases in 3G mode

- One voice and one packet data session:

Photo: A voice call is connected, a photo is taken with the integrated camera and sent, either via MMS or via email.

- Two simultaneous packet data sessions:

Streaming: A WAP browsing session is ongoing, an audio or video clip streaming session is started, for example, from a hyperlink.

Gradual change and development of 3G

The third-generation is a technology shift taking mobile telephony to a higher level. The term describes a new generation of wireless systems that offer services and functions far beyond the era when mobile phones were used for voice calls only.

When taking GSM customers into the world of 3G, operators will not have to switch their networks from one system to another. The move from 2G to 3G optimizes the existing infrastructure, enabling it to co-exist with the new WCDMA system.

GSM equipment – enhanced with GPRS – and its functions will continue to exist within the 3G system. Old and new technology will complement each other and form a highly flexible network system, with a capacity that gives new meaning to mobility.

GSM and WCDMA development

Building the network
The combining of GSM with GPRS, and the introduction of WCDMA technology in a new spectrum, can be done gradually. The new wideband technology can be deployed in parallel with the enhancement of the existing spectrum, re-using parts of the GSM infrastructure.

Even when WCDMA is fully expanded, GSM-based parts of the network will continue to play a crucial role in serving the operators' needs for capacity. All spectrum assets will be valuable, as there will be a substantial increase in both the number of subscribers and the volume of traffic in the networks. With a seamless solution, operators will have a flexible network where the systems interact according to current demand.

User experience
For the consumers, using a network consisting of GSM, GPRS and WCDMA parts will be a seamless experience. GPRS allows qualified mobile Internet applications, while the introduction of WCDMA brings a whole new set of user services, using the full potential of wideband data transport.

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How 3G works

3G brings together two powerful forces: wideband radio communications and IP-based services. Together, these enable advanced multimedia services.

Making 3G a reality depends on technology developments in different areas. These include amendments to the radio interface to support wideband communications, as well as amendments in the core network. Supporting technologies such as WAP, Bluetooth, Java, MMS and streaming, are also important.

GPRS

Short for General Packet Radio Service, GPRS is a standard for wireless communications.

GPRS provides packet data, rather than circuit switched data. This means that as a user you pay for data sent and received, and not for time spent online. There is, more or less, a permanent connection at all times.

GPRS is implemented by adding new packet data nodes and upgrading existing nodes, to provide a routing path for packet data between the mobile terminal and a gateway node. The gateway node will provide interworking with external packet data networks for access to the Internet and intranets.

Benefits
- Faster data speeds and "permanent connection" mobility.
- Instantaneous connection set-up.
- Connection to an abundance of data sources around the world, through support for multiple protocols, including IP.

WCDMA

WCDMA (Wideband Code Division Multiple Access) is a wideband radio technique that provides far higher data rates than other radio techniques available today, up to 384 kbps, and highly efficient use of radio spectrum.

The higher bandwidth that WCDMA provides will deliver the full potential of 3G. For example, WCDMA allows simultaneous access to several voice, video and data services.

WCDMA is fully compliant with IMT-2000 (International Mobile Telecommunications-2000) and is the air interface technology for standards in the 2 GHz band (the IMT-2000 core band), known as UMTS (Universal Mobile Telecommunication System) in Europe and ARIB (Association of Radio Industry Businesses) in Japan.

UMTS

UMTS and WCDMA are often used as synonyms. The European Telecommunications Standard Institute (ETSI) chose the name UMTS to define the system when positioned in the 2.1 GHz band, which will be the case in Europe and other parts of the world where this frequency is available. In the Americas though, WCDMA will have to use other parts of the frequency band.

UMTS is part of the International Telecommunications Union's IMT-2000 vision of a global family of 3G mobile communications systems. UMTS includes WCDMA radio access technologies together with a core network specification based on the GSM/MAP (Mobile Application Part) standard. Please visit the 3GPP site for more information at www.3gpp.org.

Handover/service continuity

The scope of this text includes service requirements for handover maintaining continuity of service to a wireless terminal, as it moves between the radio coverage area, or "cells", associated with different base station sites. This functionality is called "handover". It is a key requirement to allow for dual or multi-mode terminals to handover traffic from UTRAN to other radio systems such as GERAN and vice versa.

This part describes the general principles for service continuity within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio

Access Network and other radio systems such as GSM/GPRS. As a principle, the requirements on service continuity characteristics should be according to the target network on which the service is maintained.

Service continuity

Service continuity should support the following scenarios:

- Continuity of active circuit switched services when moving within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and GSM/GPRS coverage areas.

- Continuity of active and packet switched sessions when moving within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and GSM/GPRS coverage areas.

General operational considerations

Mechanisms defined to support service continuity between different radio systems or radio access modes should effectively cope with a number of coverage scenarios:

- Limited coverage in a "sea" of coverage provided by another radio system or radio access mode.
- Selective operation at a geographical boundary, with extensive UMTS Radio Access Network coverage on one side, and extensive coverage from another radio system on the other side.
- Geographically co-located areas of UMTS Radio Access Network coverage and another radio system.

Performance requirements

Temporary degradation of service caused by handover

During intra-UMTS Radio Access Network handover or handover from UMTS Radio Access Network to GSM/GPRS, degradation of service should be no greater than during intra-GSM/GPRS handover.

The duration of the discontinuity experienced by packet switched and circuit switched real time services should be shorter than that in the handover of voice calls over GSM/GPRS.

Requirements on multiple bearer services handover from UMTS Radio Access Network to GSM/GPRS

Consideration must be given to services that may involve multiple bearer services (and simultaneous sessions). The mapping between UMTS Radio Access Network bearer services and GSM/GPRS bearer services depends on many factors such as data rate, delay constraints, error rate etc. In the event that certain UMTS Radio Access Network bearer services cannot be handed over to GSM/GPRS, the handover of some of the bearers to maintain the service should not be precluded.

In the case where a user equipped with a dual mode terminal is in UMTS Radio Access Network coverage, and has multiple PDP contexts activated (for instance to support multimedia), then it is preferable to handover one PDP context, rather than dropping all of them.

As a first priority only the PDP contexts which have an associated QoS that can be supported by the GSM/GPRS should be candidates for handover.

If there are still multiple PDP contexts as "handover candidates", then the operator should choose which PDP is maintained. When roaming, the serving network should make this decision. The operator may choose to either:

- Drop all of the PDP contexts.
- Choose one based upon criteria such as duration, amount of traffic transferred, etc.

Handover in the K600

This phone is compliant with the 3GPP R99 December 2002 release.

GSM to UMTS

The product supports circuit switched voice handover from GSM to UMTS.

UMTS to GSM/GPRS

The product supports packet switched data handover and circuit switched voice handover from UMTS to GSM/GPRS.

GPRS

The introduction of GPRS was a big step in the evolution of the GSM networks for enhancing the capabilities of data communication. Data traffic has increased (over both wired and wireless networks), with the growth in demand for Internet access and services paralleling that of mobile communications.

We can now see that the demand for high-speed Internet access is the key driver for coming generations of wireless multimedia and entertainment services, and GPRS is important as a stepping stone when we enter the 3G network era. GPRS has allowed innovative services to be created and granted access to new and previously inaccessible market segments, which will be further developed with 3G.

GPRS is able to take advantage of the global coverage of existing GSM networks. Applications developed for GPRS have been deployed on a large scale and have thus reaped the associated benefits.

With GPRS, the K600 sends data in "packets" at a very high speed. The phone remains connected to the network at all times, using transmission capacity only when data is sent or received.

Instead of occupying an entire voice channel for the duration of a data session, the K600 sends and receives data in small packets, as needed, much like IP on the Internet. Thanks to this, the phone is always online, using transmission capacity only when data is sent or received. The K600 is compatible with GPRS R99.

The GSM system limits the ability to use all eight time slots, so the K600 uses up to four time slots for receiving data, and up to one slot for transmitting.

Information about the identity of the phone and the characteristics of the connection are described in the PDP (Packet Data Protocol) context. This information is stored both in the phone and in the mobile network, so that each phone is identified and "visible" to the system.

Using GPRS with the K600 has many advantages, for example:

- Constant connection
  Keep an open connection to an email 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.
- Email over GPRS
  Remain connected to an email system while reading and preparing messages, (which are then sent at high speed).

- Data communication
  Transfer data and access the Internet or an intranet with a computer, PDA or handheld device connected via Bluetooth, infrared or cable.
- Data and voice
  Maintain a data connection when conducting a voice call.

- Provide settings
  Receive GPRS configuration settings from the provider OTA (over the air), 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.

Standards, architecture and protocol

The architecture, protocols and codecs for PSS (Packet Switched Streaming) follow the 3GPP specifications to ensure interoperability between business solutions. Sony Ericsson fully supports the 3GPP standard, but will also meet the market requirements of supplementary formats and codecs.
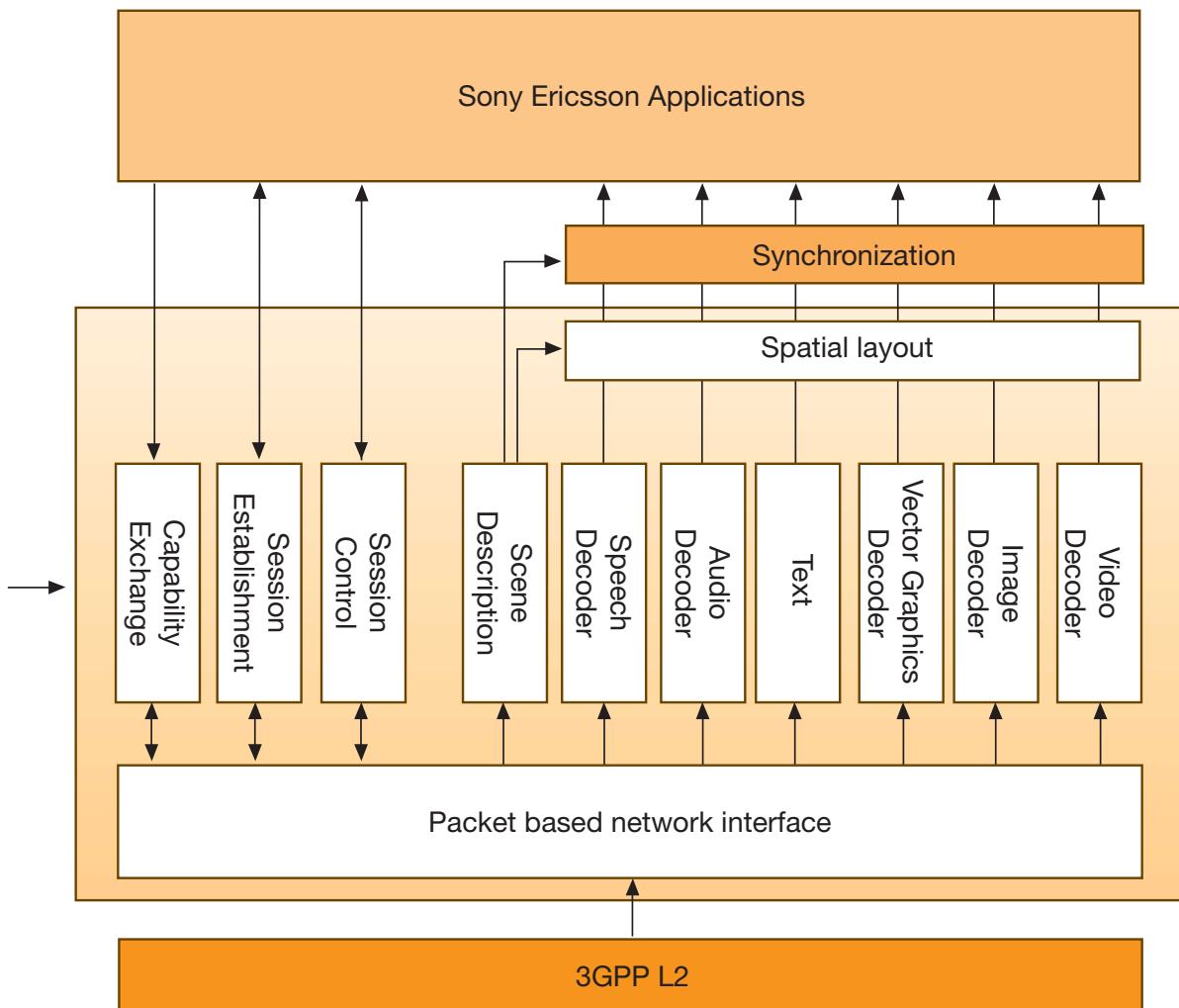

Figure 1. Functional components of a PSS client

Figure 1 shows the functional components of a PSS client. The functional components can be divided into control, scene description, media codecs and the transport of media and control data. TS 26.233 "Transparent end-to end packet switched streaming service (PSS); General description" defines the simple and extended PSS.

The control-related elements are session establishment, capability exchange and session control.

- Session establishment refers to methods of invoking a PSS session from a browser or directly by entering an URL in the user interface of the terminal.

- Capability exchange enables choice or adaptation of media streams depending on different terminal capabilities.
- Session control deals with the set-up of the individual media streams between a PSS client and one or several PSS servers. It also enables control of the individual media streams by the user. It may involve VCR-like presentation control functions like start, pause, fast forward and stop when presenting media.

The scene description consists of spatial layout and a description of the temporal relation between different media that is included in the media presentation. The first gives the layout of different media components on the screen and the latter controls the synchronization of the different media.

The PSS includes media codecs for video, still images, vector graphics, text, audio, and speech.

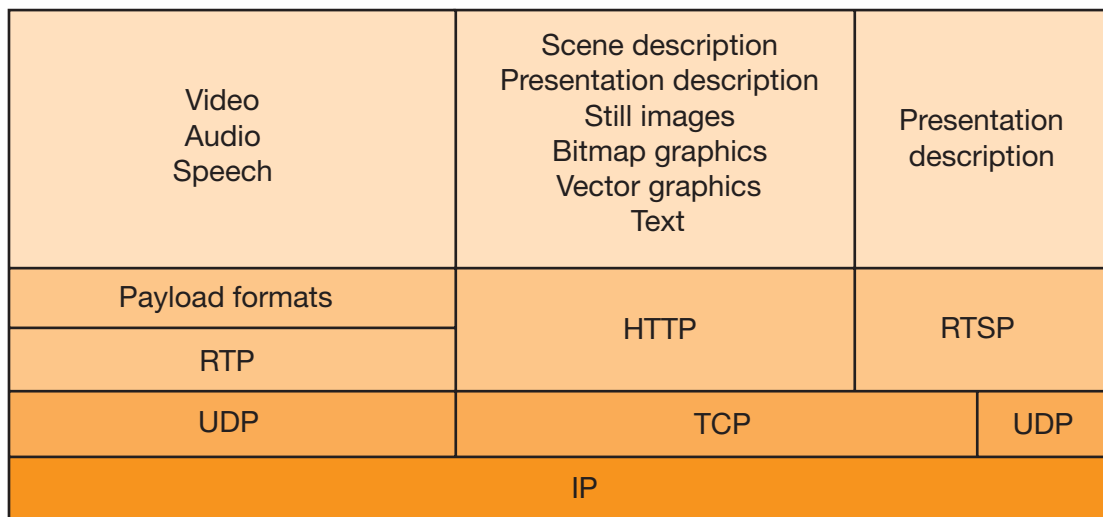| Video Audio Speech	Scene description Presentation description Still images Bitmap graphics Vector graphics Text	Presentation description
Payload formats	HTTP	RTSP
RTP		
UDP	TCP	UDP
IP		

Figure 2. Overview of the protocol stack

Figure 2 describes the media transport protocol stack. Transport of media and control data consists of the encapsulation of the coded media and control data in a transport protocol. This is shown in figure 1 as the "packet based network interface" and displayed in more detail in the protocol stack of figure 2.

Imaging and Entertainment

1.3 Megapixel camera

With the integrated 1.3 Megapixel camera with digital zoom, the user can take pictures and video clips and save them in the phone memory. The user can send them as an attachment in an email or a picture message. The pictures or video clips can also be sent via Bluetooth, infrared or cable.

A large viewfinder is presented in the display and QuickShare™ offers a minimal number of steps that take you to the send options as follows:

* 3 steps for camera: start, capture and send.
* 3 steps for video: start, capture and send.

Using the camera or video
The camera and video is started via the active lens cover, via the camera button or via the phone menu system.

Shoot modes
There is a number of different shoot modes for different user scenarios:

Frames
A shoot mode that lets you apply funny pre-drawn picture frames to your images.

Panorama pictures
The camera can create panorama pictures by stitching together several different pictures into one large picture. This is done with the help of a unique image processing technique.

This feature is very user friendly. The user simply takes a picture and then moves the camera slightly sideways and then takes a new picture. This can be repeated several times until the user selects to save the panorama where all the different pictures are stitched together.

Burst mode
A useful function when taking photos of objects that move quickly in the scene: it rapidly takes 4 pictures in a row automatically.

Image formats
The camera is able to take pictures in the following resolutions:

* Small - QQVGA (160x120 pixels)
* Medium - VGA (640x480 pixels)
* Large - 1.3 Megapixel (1280x1024 pixels)

Megapixel pictures
Megapixel pictures can be used when a larger viewing area is required, for example, when uploading a picture to a computer.

Video format
Video clips can be recorded, played and sent using the following codec:

* 3GPP (H.263 and AMR)

More camera features
The camera has full **automatic exposure control** that selects the optimal exposure time needed to get an excellent picture. When operating the viewfinder, the camera adjusts the exposure time.

The lighting conditions found indoors and outdoors may differ significantly. This may give rise to false colours in photographs. To compensate for this, the Megapixel camera is equipped with **automatic white balance**. This feature automatically adjusts for different lighting environments in order to produce images with correct colours under most conditions.

The camera also has a **high quality light** to improve taking pictures in darker environments.

Video calls

With the camera, the user can participate in a video call. While the camera is capturing the user, he or she can see the other participant on the screen.

As you enter video call mode by pressing the video call key or via the desktop menu, the CIF camera at the front of the phone is on. This is ideal if you want the video call recipient to see you in the phone display. During a video call, it is possible to switch camera to the back camera. This gives you a horizontal camera mode instead of a vertical camera mode. You hold the phone horizontally, and you can share what you are seeing with the video call recipient. You open the camera lens cover at the back by turning the lens cover.

The user can show an alternative picture instead of a picture of him/herself in a video call. You can choose an alternative picture from the File manager. This picture can be customized.

The speed of UMTS, the K600, and video call functionality, bring you as close as you can get when being apart. Like your own live TV broadcast, you can now share the latest news face-to-face with your friends back home.

Note: *Video calling using the K600 can only take place in UMTS networks and with other video-capable UMTS phones that support the* 3GPP™ *standard 3G-324M.*

Media player

The media player supports different audio and video formats, streaming as well as download and playback.

To avoid including ringtones in the All music list, all ringtones have been collected in a separate ringtone folder. The All music list ignores all files in the Ringtones folder.

Playlists

One of the most central media player features is the use of playlists. This feature allow users to easily access locally stored music and movie files along with online streaming media. It is possible to create, sort or manage playlists using media files that are stored in the phone memory.

Playlists relieve the user of handling their media files directly through the file browser enabling music tracks to be moved or removed to multiple lists without affecting the file structure.

This reinforces the role of the media player as a competitive product to standalone MP3 players as well as an entertaining application to just play around and be creative with.

Auto Generated Playlists

There are two automatically generated playlists in the media player; All music and All video. These playlists differ from others in that they cannot be deleted, edited or renamed and that they update themselves by browsing the Sound/Video catalogue. These playlists contain all available sound and video files in the phone memory.

Navigation

When accessing the media player from the desktop, a list of available playlists is presented including All music and All video. Additionally, there is one customizable direct link that takes you to an operator created music list. Any user-created playlists follow in alphabetical order.

Minimize

To be able to use other phone features while running a playlist, the user can minimize the media player GUI, just like any program on a computer. This is indicated with a minimized icon in the status bar.

Play modes

The media player has two different play modes: random and loop.

- Random plays a randomly selected file from the current playlist. Played files are de-selected and not repeated.
- Loop restarts the playlist when reaching the last item in the list.

Music

The media player is a multi-format digital audio player which enables the user to carry and play a selection of favourite songs. A range of audio formats are supported:

- AAC
  Advanced Audio Coding. AAC is the latest audio coding standard, defined in the MPEG-4 standard and is used for high-quality audio compression. AAC provides higher quality than MP3 at the same bit rate, or for the same audio quality it uses a 30 percent lower bit rate. It supports the coding of multichannel audio, with up to 48 main channels and 16 low-frequency channels. The AAC offers three different profiles to facilitate trade off between quality, memory and processing power requirements. They are: Main Profile (MP), Low Complexity (LC) and Scalable Sampling Rate (SSR). AAC-LC is supported.

- AMR
  Adaptive Multi Rate. A medium quality compressed sound format.

- MIDI
  Musical Instrument Digital Interface.
  Unlike the other formats, MIDI is not a recording of music, but a description which enables a local synthesizer to play the music from the instructions included in the MIDI file. Since a MIDI file only represents player information, it is far more concise than formats that store the sound directly. An advantage is very small file sizes. A disadvantage is the lack of specific sound control. MIDI is ideal for polyphonic ringtones.

- MP3
  MP3 is the file extension for MPEG audio layer 3. Layer 3 is one of three coding schemes (layer 1, layer 2 and layer 3) for the compression of audio signals. Layer 3 uses a very efficient compression method, removing all irrelevant parts of a sound signal that the human ear cannot perceive. The result is, for example, CD digital audio (CDDA) converted to MP3 with almost untouched quality, compressed by a factor of around 12. The high compression of audio in MP3 files makes them relatively small, though MP3 files can be created with different size and quality compromises. The small file size,

together with the excellent sound quality, are the main reasons for the MP3-format's massive popularity when sharing music over the Internet.

- WAV
  Windows media audio. A wave file is an audio file format created by Microsoft, that has become a standard computer audio file format for everything from system and game sounds to quality audio. A wave file is identified by a file name extension of WAV (.wav). Used primarily in PCs, the wave file format has been accepted as a viable interchange medium for other computer platforms, such as Macintosh. This allows content developers to freely move audio files between platforms for processing, for example. In addition to the uncompressed raw audio data, the wave file format stores information about the file's number of tracks (mono or stereo), sample rate, and bit depth.

Songs are stored in the File manager. In the folder system the user can organize songs into groups. In the Media Player the user can create simple playlists of songs.

Songs may be collected in numerous ways, including Internet download and file transfer from a computer.

The media player is intelligently aware of other applications in the phone:

- Playback is paused when a telephone call is made or received.

- Playback is paused if the user starts another application which requires the audio channels to be dedicated to it.

- Playback of MP3 files continues if the user switches to another application, providing music whilst using other applications such as the calendar or contacts, or playing games.

Polyphonic ringtones

Background

The word "polyphony" means producing several tones at the same time. Almost all music that we listen to consists of polyphonic melodies.

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

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.

Please visit www.midi.org for more information.

SP-MIDI

SP-MIDI stands for Scalable Polyphony MIDI. SP-MIDI is based on the MIDI format and adapted for mobile phones and other portable products. The objective is to secure inter operability between products with different sound capabilities.

Sound recorder

The sound recorder can record both voice memos and call conversations. Sound recorder saves recordings directly to memory. The size and length of recordings are limited by available storage space.

Sounds are recorded in AMR format and saved in Sounds. Recorded sounds can also be set as ringtones.

Video clips

Moments can easily be shared with friends and family in other geographical sites by capturing the moment with the video recorder and then sending the video clip in a picture message. The video recorder supports QCIF and SubQCIF.

In order to view video clips in the phone, the media player supports download and playback of MPEG-4 and H.263 formats.

Video clips may be downloaded from the Internet or copied from a connected computer.

Files must be of types MP4 or 3GP, having video encoded in MPEG-4 Simple Visual Profile and audio in AAC or AMR format. Video can be encoded in H.263. The phone encodes video in H.263 Profile 0 Level 10 format.

Streaming support

The media player can be launched from hyperlinks in the WAP browser, SDP files in the file manager or in messages through hyperlinks. Content is streamed using RTSP (Real Time Streaming Protocol) session control.

DRM

Digital Rights Management, DRM, is a technology that enables secure distribution, promotion, and sale of digital media. Examples of such content include images, wallpapers and screen savers with themes from films, music tones from musical artists, and branded games. In other words, content providers can control how users may use different types of content in devices, such as mobile phones, smartphones or PDAs. Content providers can also control the use of content in related services, such as MMS.

Sony Ericsson is actively focusing on technology standardization for the DRM concept, and supports the ongoing standardization work and activities of the OMA (Open Mobile Alliance). Sony Ericsson is fully committed to open standard solutions in the

mobile environment and is a principal driver of many open standard initiatives. This will ensure the interoperability of mobile terminals in the DRM area and also result in a strong, competitive DRM standard.

How DRM works

The control of the content in digital media is executed by defining usage rights for the content. The usage rights give the content providers flexibility in the way they can publish and sell content. Rights can be defined so that a picture can be used by subscribers only, and rights can be defined so that a music tone can be played only a limited number

of times or for a limited period of time. Rights can also be defined so that the user is not able to forward content to other devices.

Note: All supported image, audio and video formats can be protected by DRM.

Packaging of rights and content

Rights and content can be packaged together and delivered to the device as one DRM package. As an alternative, content can be delivered to the device first, followed by the rights later being pushed to the device, for example via SMS. The kind of service and business model adopted by the content provider determines how the content and rights should be packaged and delivered to the device.

Protection properties

Content protection according to the OMA DRM standard gets special properties. Content with forward lock protection has the "Send to" option disabled, which prevents it from further distribution.

Unless the content is encrypted, the user cannot copy DRM content to other devices since the "Send to" option is disabled for pictures, music tones, etc. that are OMA DRM protected. Content providers may choose to protect some content, but leave some content unprotected.

Package and delivery

The OMA DRM standard defines two ways to package and deliver rights and content to a device: combined or separated.

Combined delivery

Rights and content are packaged together into one DRM Package and delivered to the device. In the simplest case, no special rights are defined. The content is just put into a DRM package, thus protected from being copied out from the device by the user. This special case is called **forward-lock**. It is useful for all types of content that the provider wants to charge for.

Separate delivery

Rights are defined and sent in a push message. The content is encrypted and made available for users to download to their devices. The decryption key is put into the rights file. Since the content is

encrypted, users cannot access it before the rights have also arrived in the device. In this case, the content can be freely distributed on the network, only users with the rights file can access the content. Content providers can deliver the rights to the user using push technology.
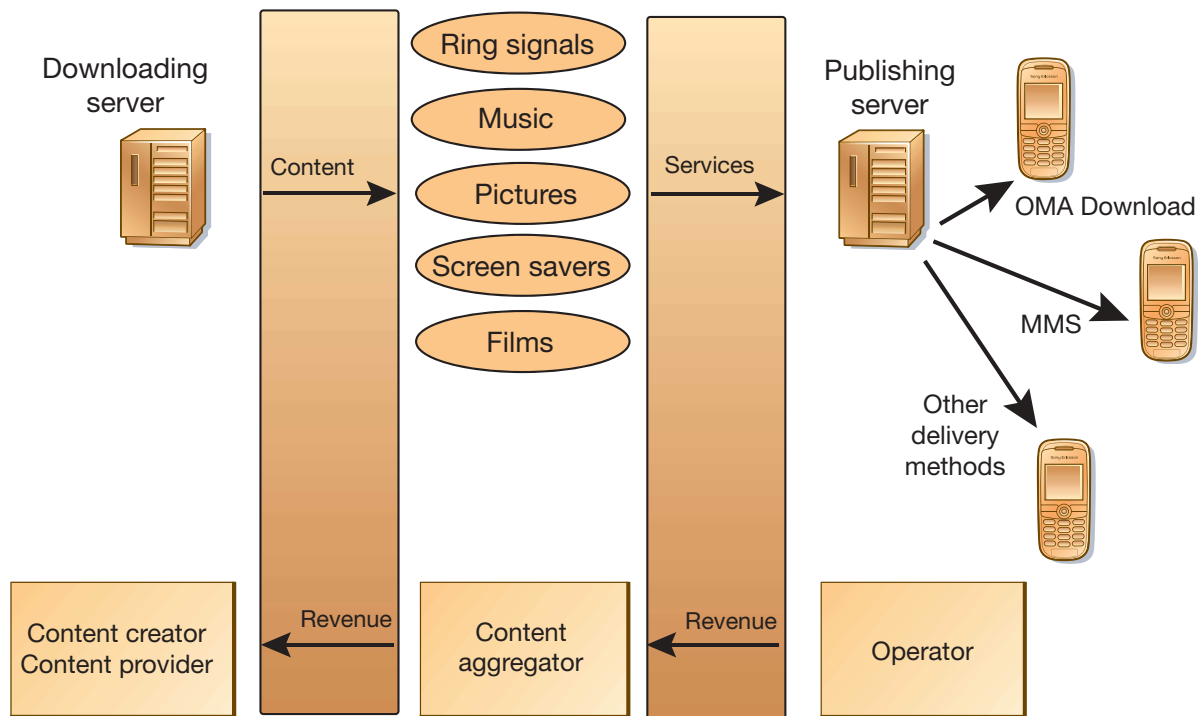
Downloading servers and publishing servers

When using a mobile phone, the users do not have to be aware of the network architecture. During a content downloading session, typically many physical servers are involved. Sometimes transactions may take place between different companies' servers.

The actual content may be put on one server, the downloading server. The content can be reached, for example, through references from one or many other servers, the publishing servers. The content creator puts his or her content on the downloading server through an interface to the content provider.

The user navigates to the publishing server and selects the content, or rather a link to or description of the content. The content is then downloaded from the actual downloading server.

When content is downloaded to the device, operators generate revenues from the user via, for example, their billing system. Operators might in their turn be billed for rights by the content aggregator, content provider or directly by the content creator.

The flow of revenues and content. The content is viewed and selected from a publishing server and downloaded to the mobile phone from a downloading server. The revenue is in this case collected from the user by the operator and transferred to the content creator via the content aggregator.

Streaming

Streaming media is a method of making audio, video clips and other multimedia available in real-time.

The term streaming refers to the technique it is based on. Previously an entire file had to be downloaded before it could be played, whereas the use of streaming means the end user can almost immediately begin to watch or listen to the content of a requested file. The data in the file is broken down into small packets that are sent in a continuous flow, a stream, to the end user. It is then possible to begin viewing the file while the rest of the packets are transferred.

Applications

The applications which can be built on top of the streaming services can be classified into on demand, and live information delivery applications. Examples of the first category are music and video clips, news on demand as well as on demand instruction material. Live delivery of radio and television are examples of live information delivery. The following video and music codec is supported:

- MPEG-4 Simple Visual Profile Level 0
- H.263 Profile 0 Level 10
- AAC
- AMR
- MP4
- 3GP

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Examples of usage

Streaming of music (on demand)

Browse to a Web page to check out the latest top ten list of pop music, to see if there are any new songs. Select a few songs, stream the music to the phone and listen to the songs through the stereo headset or via the built-in loudspeaker.

Streaming of news (on demand)

Browse to a morning paper's Web page to check the news. Select the five-minute version of the latest financial news, stream the news to the phone, and watch it on the bus on the way to work.

Streaming/download of music video (on demand)

Browse to a Web page and decide to check out the latest rock videos. Select a video to watch, click the link and then stream a one-minute version of the video. Download and pay for the complete video. A memory check is automatically performed to make sure that the phone has enough free memory.

Streaming of live radio (broadcast)

Check out and listen to a favourite radio station. Browse to the home page and start to stream the content. The content is audio or audio with pictures of the artist.

Streaming of live traffic information (broadcast)

Find out if there is a traffic jam on the highway before heading home. Browse a page for local traffic information. If there is a traffic jam, take an alternative route home.

User-created content (Web album)

Show friends how fantastic the beach is whilst on vacation. Record a video clip and upload it to a Web album. Friends can then stream or download the clip to their computer or phone.

Market and revenue possibilities

As streaming means "seeing the product without having it", it can be extensively used in the music and film industry. There are also great revenue possibilities for subscription-based content; for example, the user can subscribe to several on demand services such as news and traffic information.

Gaming

Gaming is now seen as a standard feature in mobile phones, where Sony Ericsson promises to be a step ahead in this regard. This is not only due to faster download capability on the network. There are some other reasons why the actual gaming experience is better – the way Java has been implemented, the fact that more processing power has been dedicated to the games, the large 262k colour screen and more sophisticated graphics with Java 3D and the Mascot API. The result is games with improved graphics that react faster to user commands when using the navigational key as a joystick or game controller. The phone takes mobile gaming to new heights.

Supporting J2ME™ (Java 2 Micro Edition), the phone lets users download and run new games and applications. This is a great way to upgrade the game gallery, install work-supportive programs and personalize the phone.

SMIL

SMIL stands for Synchronized Multimedia Integration Language and is pronounced "smile". SMIL is an advanced XML-based protocol, and Sony Ericsson's MMS implementation supports a subset of the SMIL 2.0 protocol according to OMA MMS IOP document version 1.2.

The use of SMIL in a product allows the user to create and transmit PowerPoint-style presentations on the mobile device. Using a media editor, users can incorporate text, audio, images, video clips and animations to assemble full multimedia presentations. Apart from the media editor in the phone, multimedia presentations can be created in a media editor on a computer by using MMS Home Studio that can be found on the CD that comes with the phone. 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 on the display.

Media types

There are certain media formats that support continuous media (speech, audio and video). The following media types are supported for SMIL:

- AMR narrow band speech codec MIME media type
- MPEG-4 AAC audio codec MIME media type
- MPEG-4 video codec MIME media type
- H.263 video codec MIME media type

The media types for JPEG and GIF can be used both in the 'content-type' field in HTTP and in the "type" attribute in SMIL 2.0. The following media types are to be used:

- JPEG MIME media type
- GIF MIME media type

All these media are pointed out by MIME (Multipurpose Internet Mail Extensions) types.

Messaging

My friends

The My friends function offers more options when messaging. It is easy to create a list of favourite contacts from the My friends server. It is possible to see which contacts are online and what mood they are in. To see contacts online, users have to be connected to the My friends server. It is also possible to send and receive instant messages and join community chats.

Log in to the My friends server

Users can select to log in to their My friends server each time they want to send or receive instant messages, or they can be logged in automatically when they turn on their phone.

List of contacts

It is easy to create a list of contacts - people to send messages to on a regular basis. It is possible to add names from the My friends server. You can also create nicknames for the contacts in a list that are connected to the My friends server.

Status

Users can view the status of their contacts and choose to show their own status to others. They can also change their own status.

Chatroom

A chatroom can be started by a service provider or by an individual My friends user. Chatrooms can be saved either by saving a chat invitation or by searching for a specific chatroom.

Strangers

A stranger is someone that is not in the list of contacts. An icon indicates a message from a stranger. Users can add a stranger to their list of contacts, or block a stranger. If they do not perform any actions, strangers disappear when the user logs out from the My friends server.

Blocking contacts and strangers

Contacts or strangers can be blocked so they cannot view a user's status or send messages to the user.

Online contact alert

Users can select to be notified when a contact comes online. The notification is indicated by an icon and a sound.

MMS

Multimedia Messaging uses WAP or HTTP as bearer technology which also can be powered by the transmission technology GPRS. This allows users to send and receive messages that look like Power Point presentations. The messages may include any combination of text, graphics, photographic images, speech, music clips and video. MMS will serve as the default mode of messaging on all terminals, making total content exchange second nature. From utility to sheer fun, it offers benefits at every level and to every kind of user.

Over the air (OTA) configuration

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

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

MMS objects

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 a picture message is 300 kB. The key word to describe MMS content is rich, complete with words, sounds and images, MMS content is endowed with the user's ideas. A picture message can contain one or more of the following:

Text

As with SMS and EMS (Enhanced Messaging Service), a picture message can consist of normal text. The length of the text is limited to 5000 characters.

Audio

MMS provides the ability to send and receive full sound messages. Not only can users share a favourite song or music tone with a friend, they can also use the mobile phone to record a sound and send it along with a message. As sound includes speech as well as music, this extra dimension to a picture message allows for a spontaneous and immediate personal expression in communication messaging. Rather than sending a downloaded birthday jingle in EMS, a user can, for example, send a clip of his or her own personal rendition of "Happy Birthday". The phone supports the MIDI format.

Pictures and video clips

By using the integrated camera, users can take a picture or video clip and immediately send it to a recipient. 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.

PIM communication with MMS

By using MMS, it is easy to handle PIM (Personal Information Manager) information. The user can send and receive business cards (vCard), calendar entries such as appointments (vCal) and notes.

Templates

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

MMS technical features

The MMS standard, just like that of SMS, offers store-and-forward transmission (instant delivery) of messages, rather than a mailbox-type model.

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-email, and supporting flexible addressing. The centre's MMS Proxy-Relay interacts with the application being run on the MMS-enabled terminal to provide various messaging services. WAP or HTTP is used as the bearer of an MMS message between the MMS-C and the MMS client (application). The WAP Gateway is used for delivery and retrieval of messages.

Message conversion

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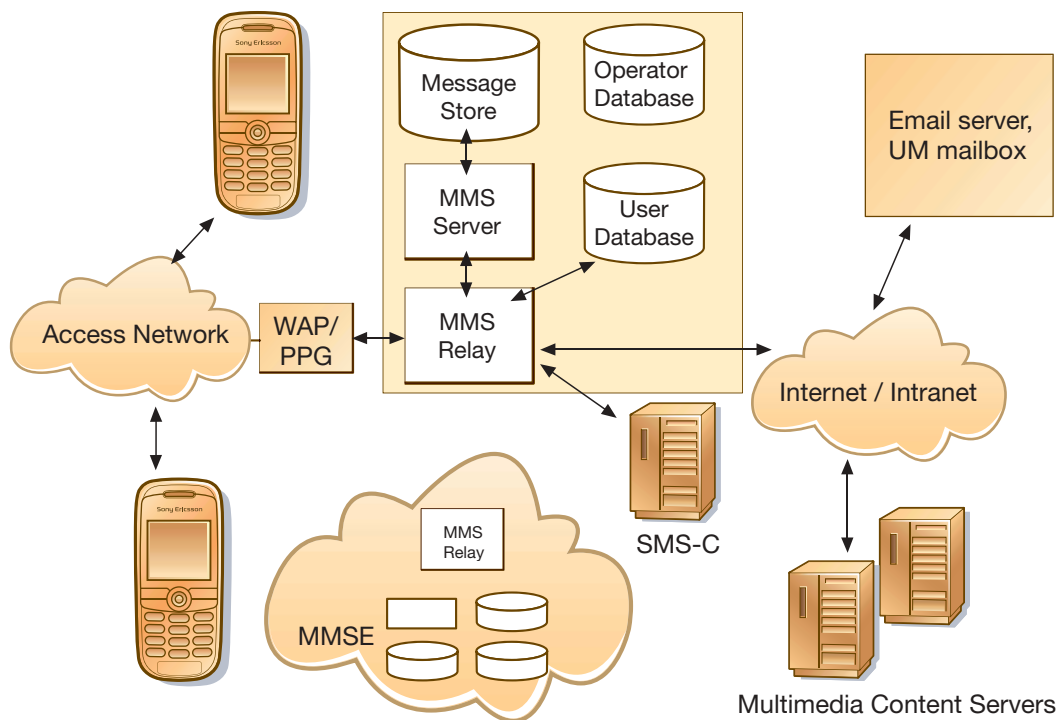
The architecture of MMS

Connectivity

Positioning

The basic cost-efficient positioning method available in 3G networks relies on measuring round-trip time. In 3G it is called Cell-ID + TA (Timing in Advance).

Time difference measurement, involving several base stations, can be used to obtain a more accurate position.

Positioning methods are already used to support location-based information services such as ©YellowPages, restaurant guides, traffic information, directions and friend finder applications. Typically WAP, SMS or voice has been used as delivery mechanisms. Java and MMS will add new possibilities to deliver attractive location-based applications.

Bluetooth

Bluetooth is built-in. The K600 has Bluetooth power class 2, using maximum 4 dBm radio link, which operates in the globally available 2.4 GHz radio frequency band, ensuring fast and secure communications up to a range of 10 metres.

Note: In the few countries where the use of Bluetooth is not allowed, the Bluetooth function will be disabled. In countries where only 0 dBm is allowed, the output power will be limited accordingly.

Bluetooth facilitates instant connections, which are maintained even when the devices are not in the line of sight. Enhanced audio quality voice transmission is provided under adverse conditions, making it possible to use a headset connection to the phone at all times.

Using Bluetooth in the product

True wireless connection
Connect without cables to headsets, car handsfree equipment, computers/PDAs, digital still cameras and other devices.

Up to 16 added devices
The phone identifies and maintains up to 16 paired devices which are displayed in a list.

Radio link
No line of sight required; the phone can remain in a briefcase or in a pocket (whereas infrared requires line of sight).

Secure and user-friendly
Data connection with a Bluetooth computer/laptop or PDA turns the phone into a modem for connecting to the Internet and for data transfer.

Synchronization
Fast synchronization, even without line of sight, of calendar, notes and phone book with computer/laptop.

Range
The range is up to 10 meters. When searching, devices in close range are discovered first.

Business cards
Quick exchange of business cards, notes and calendar events with other phones and devices.

Imaging and music
Music files, images and video clips can be exchanged with another mobile phone, computer or laptop. Images and video clips can also be exchanged with a digital still camera.

It is also possible to view images on a TV or other display via an accessory, such as the Bluetooth Media Viewer MMW-100.

Audio quality

The phone uses an algorithm that repairs lost audio packets. When needed, a new packet is inserted with content based on previous packets. This, in conjunction with re-transmissions, the high sensity and high output power radio will enhance the audio quality compared to a standard Bluetooth device.

File sharing

By using the Server role of the File Transfer Profile, the phone enables the user to use a computer to manage content files that reside in the phones file system. Most computer Bluetooth applications provide an explorer like user interface for the file transfer service. When connecting to the phone, the computer application will show some of the folders that the user can find under the File Manager icon on the phones standby screen, i.e. Pictures, Sounds, Videos, Themes and Others. The content in the Games and Applications folder is not exposed in the file transfer server. Opening one of these folders will show a list of files related to that folder, e.g. images in the Pictures folder. Using the computer application the user can now: retrieve files from phone to computer, delete files from the phone and transfer files from the computer to the phone using the normal drag and drop mechanisms provided by the computer.

Media viewing

The phone can send images and sounds to a media viewer device, for example the MMW-100 TV adaptor accessory. The user can also conveniently run a slide show on the TV showing a set of phone camera pictures for family and friends. After selecting an image in the Pictures folder under the File manager icon, the user can select the Remote screen option under More. The phone will then connect to a Bluetooth device that can receive images and when the user then selects View, the image is transferred to the remote screen and displayed. When the user then selects another image, that image is transferred to the remote screen and displayed.

Profiles

The following Bluetooth profiles are supported in the phone:

- Dial-up Networking Profile
- Generic Access Profile
- Generic Object Exchange Profile
- Object Push Profile
- Serial Port Profile
- Handsfree Profile
- Headset Profile
- Synchronization Profile
- Basic Imaging Profile
- File Transfer Profile
- Human Interface Device (HID) Profile
- SyncML OBEX binding
- JSR-82 Java API

Remote control

By using the Bluetooth HID (Human Interface Device) Profile v1.0, the phone is able to act as a HID device. This means that when connected to a computer, the phone works like a combined keyboard and mouse. By assigning specific combinations of computer keyboard key presses to each key on the phone keypad, the user can use the phone as a remote control device for computer applications.

The phone keypad is configured for control of a certain computer application through a special type of HID configuration file consisting of an XML file for the keypad and an image for the display. HID configuration files can be dowloaded into the phone using the normal file transfer mechanisms. Users can even modify the files themselves on their computers. A few configuration files pre-loaded in the phone enable the user to navigate on a computer desktop and control presentations and media players.

System Functions

User Settings

The following keys can be configured through the HID configurations files: 0-9, #, * and volume up and volume down. For each of these keys, a UsageID from the HID usage tables can be assigned.

The navigational key and the two action keys are not configurable, they always provide functions for moving the mouse and performing right and left mouse clicks.

Characteristics

The HID configuration files, and the set of preloaded HID configuration files, are customizable. The configuration files can be modified by the user if transferred to, and opened on, a computer.

Used Enablers and bearers

The HID based remote control function works over Bluetooth. It is possible to download the HID configuration files via Bluetooth, infrared or a cable as well as via WAP. It is also possible to transfer the files to another device using Bluetooth or infrared.

Power save mode

The phone uses sniff mode on headset, handsfree and HID connections which means reduced power consumption and shorter connection set-up times.

IrDA

IrDA (Infrared Data Association) 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 can exchange data. For optimal performance, place the phone within 20 centimetres and at an angle of max 30 degrees to the infrared port on the computer/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 and electromagnetic fields – making it suitable for the modern office environment.

Object Exchange via infrared (IrObex) supports transferring objects between compatible phones and computers. These objects are not only limited to ring signals, but even pictures, bookmarks and other files in the file system.

Key benefits of using the phone 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 email and data on the connected computer/PDA
- Ability to connect to the Internet from the connected computer/PDA
- Ability to synchronize the phone book from a computer
- Exchange of business cards and calendar events with vCard/vCalendar compatible devices
- Exchange of ringtones and other files between compatible phones
- Ability to attach a photo from a digital camera in outgoing email
- Ability to send and exchange notes with vNote compability devices

Connection via cable

The infrared connection is not always the best solution when connecting to a computer/PDA. Indeed, it is not always even possible. The USB cable provides connectivity between the phone and a computer and is included in the phone kit.

Synchronization and data transfer

In everyday life, access to an updated calendar, notes and details 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, task 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. The growing use of groupware such as Microsoft® Outlook® means that more and more meetings are booked electronically in daily business life.

The phone uses the SyncML 1.1 protocol for synchronization. This means that it has compatibility to synchronize with a wide variety of devices over a number of different communications media.

SyncML – an open standard for synchronization

SyncML background

Leading the way in providing remote synchronization capability, Sony Ericsson realizes that interoperability of remote synchronization is of utmost importance if mobile data usage is to become as widespread as generally predicted. That is why Ericsson, along with IBM, Lotus, Motorola, Matsushita, Nokia, Palm Inc., Psion and Starfish Software, founded the SyncML initiative in February 2000. Supported by more than 600 software and hardware developers, the SyncML initiative 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.

The phone uses SyncML for both local synchronization (for example, with a computer using Bluetooth or a cable connection) and remote synchronization over WAP and HTTP.

Designed for 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, HTTP or OBEX. As an open, future-proof standard, SyncML is the synchronization choice for any device or application of the mobile information society.

What information can be synchronized in the phone?

| Application	Remote sync	Local sync
Contacts	Yes	Yes
Calendar	Yes	Yes
Tasks	Yes	Yes
Notes	Yes	Yes

Remote synchronization

Remote synchronization takes place over the air using HTTP and is the ideal way to keep the phone up to date.
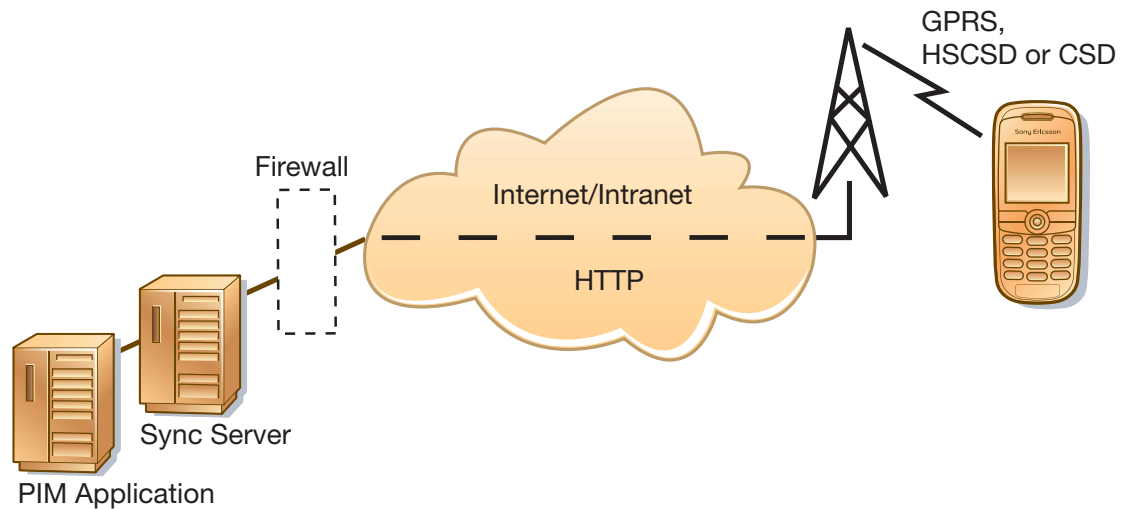
Third-party service providers offering synchronization services to corporate personal information management (PIM) applications, such as Microsoft® Exchange, can also supplement added capability with SyncML.

Local synchronization

The phone is supplied with computer software for local synchronization.
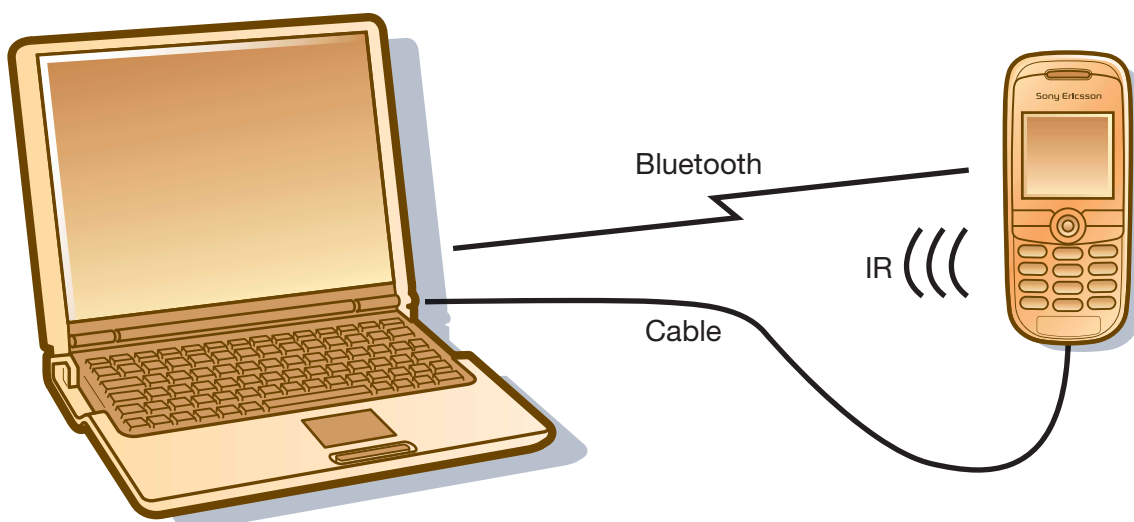
Bluetooth, infrared or cable

The phone synchronizes using SyncML, regardless of connection type. It connects via Bluetooth, infrared or cable. The cable is connected directly to the phone or alternatively via a desktop charger connector.

Ways of synchronizing:

- via a USB cable.
- via Bluetooth.
- via the infrared port.

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.

Compatibility

Computer software supplied with the phone enables synchronization with the following:

- Microsoft® Outlook® 2000, 2002, 2003.

- Windows Address Book.

Computer requirements are as follows:

- Microsoft® Windows® 2000, Me, XP.
- Minimum recommended hardware configuration for the version of Windows in use.
- 120 MB free space on hard disk.

File Transfer Utility

A utility is provided which enables files to be transferred to and from the phone connected to a computer. Typical uses for this include:

- Archiving pictures taken on the phone to computer storage.
- Moving images to the phone to use in personalization, picture messages etc.
- Moving sound clips to/from the phone for personalization.
- Synchronizing mobile phone contacts, appointments, tasks and notes (PIM).

Object exchange – 'Send'

The phone lets the user transfer objects via Bluetooth, infrared, USB cable and messaging. This is presented to the user via 'Send' commands in applications. Simply select an item such as a contact, select 'Send' and select the method to be used for sending. Typical applications are to beam an appointment to other people, or to receive a new wallpaper.

Applications can be sent using the following transfer methods:

| Application	Cable	Infrared	Bluetooth	SMS/EMS	MMS	Email
Contact	Yes	Yes	Yes	Yes	Yes	No
Appointment	Yes	Yes	Yes	No	Yes	No
Tasks	Yes	Yes	Yes	No	Yes	No
Notes	Yes	Yes	Yes	No	Yes	No
Image	Yes	Yes	Yes	No	Yes	Yes
Video clip	Yes	Yes	Yes	No	Yes	Yes
Theme	Yes	Yes	Yes	No	Yes	Yes
Sound	Yes	Yes	Yes	Yes*	Yes	Yes
Bookmark	Yes	Yes	Yes	Yes	Yes	Yes
Voice memo	Yes	Yes	Yes	No	Yes	Yes

* Only an iMelody can be sent in an EMS.
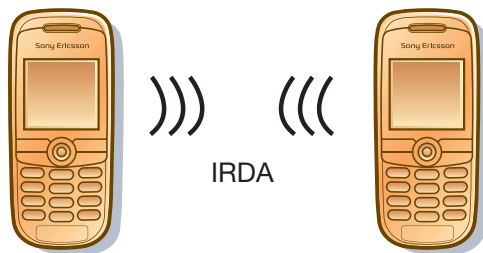
To perform a 'Send' beam operation using infra-red, the two devices are lined up and the sender initiates the transfer.

IRDA
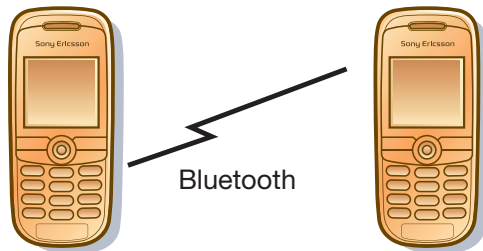
To beam over Bluetooth, a scan finds the other activated (discoverable) devices within range. The user can then select the required device and send the information across.

Bluetooth

GPRS
HSCSD
or CSD
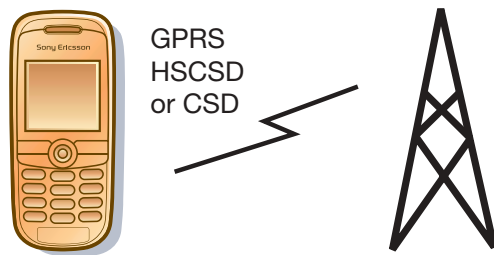
When sending via SMS, MMS or email, the required message type is created with the selected object attached. It is then sent over the air.

Device Management

Device Management in this product is achieved by supporting Over The Air provisioning 7.1 (OTA), OMA Client Provisioning 1.1 (CP) and OMA Device Management (DM) 1.1.2.

OTA and CP are transmitted to the terminal from the network using SMS, the initiation of the provisioning can be done e.g. by the user using a provisioning service or by the operator. When receiving an OTA or CP the user is asked to install new settings.

DM utilizes GPRS as bearer (basic network connectivity needs to be in place) of the provisioning data and allows the operator to access the phone and check and set different settings such as Network connectivity (GPRS), email, MMS, WAP and JAVA. For example, if a user is having problems with connecting to the Internet then he/she can contact their operator and ask them to go in and check the settings in the phone via a DM server. When this happens the DM server which the operator is using connects to the phone and the phone asks the user to approve the DM server to access the phone. If the user allows access then the settings are checked and if found faulty then corrected. To be able to do this the phone has to be equipped with DM account settings. Either the user receives the settings from an operator or the settings are already in the phone when it is sold. The DM server is able to collect information directly from the phone and to send back the correct settings to the user.

SyncML is the protocol that both DM and Remote sync uses when they are active.

Java

Java 2 Micro Edition (J2ME)

This phone supports the following functions:

- CLDC 1.1 (JSR 139)

- MIDP 2.0 (JSR 118)

- Wireless Messaging API (JSR 120)

- Mobile Media API (JSR 135)

- Java Technology for the Wireless Industry (JSR 185)

- Java API for Bluetooth (JSR 82)

- PDA Optional Packages for J2ME Platform (JSR 75)

More information about the specific J2ME features support is available in J2ME Developers Guideline at Sony Ericsson Developer World www.sonyericsson.com/developer

Java 3D

This phone supports real-time 3D graphics rendering. This handset supports two different 3D graphics APIs.

- Mascot Capsule Micro3D Version 3

- Mobile 3D Graphics API for J2ME (JSR 184)

More information about Java 3D on Sony Ericsson mobile handsets, refer to the Java 3D Developers Guidelines available at Sony Ericsson Developer World www.sonyericsson.com/developer

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Facts and figures

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

Technical specifications

General technical data

System	Tri-band GSM Release 99 recommendations. GSM 900, GSM 1800, EGSM and WCDMA FDD mode supported, GSM 1900 and e-GSM mode supported.
Speech coding	HR, FR, EFR, AMR supported where available, for high speech quality.
GSM SIM/ UMTS SIM card	GSM SIM - GSM 11.11, UMTS SIM - 3GPP™ TS 31.102. Small plug-in card, 1,8 V and 3 V.
Memory (user free)	Up to 33 MB (depending on software configuration/file content).
Data transfer speeds	Up to 384 kbps (downlink) Up to 128 kbps (uplink)

Exterior description

Length	104,3 mm
Width	45 mm
Thickness	19,2 mm
Weight (including battery)	105 g
Graphic display	Type: Full graphical Resolution: 176 x 220 pixels Technology: TFD Colours displayed together: 262,000 (18 bit) Backlight colour: White
Antenna	Built-in, and an external antenna connector for advanced car hands-free accessory.
Colour	Aluminium Silver
Battery	3.6V, 900mAh, Lithium Ion
Network LED	Green
Keypad	Keyboard supporting 17 keys plus joystick, +- sidekeys, a video call key and activity menu button.
Co-branding area	6,5 x 20,5 mm
Exchangable covers	No

Performance and technical characteristics

Dimension	GSM 900/E-GSM 900	GSM 1800	GSM 1900	WCDMA
Frequency range (MHz)	TX: 880 – 915 RX: 925 – 960	TX: 1710 – 1785 RX: 1805 – 1880	TX:1850 –1910 RX:1930 – 1990	TX:1920 – 1980 RX:2110 – 2170
Channel spacing	200 kHz	200 kHz	200 kHz	5 MHz with 200 kHz channel rasters
Number of channels	174 Carriers *8 (TDMA)	374 Carriers *8 (TDMA)	299 Carriers *8 (TDMA)	277
Modulation	GMSK	GMSK	GMSK	QPSK
TX Phase Accuracy	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)	Error Vector Magnitude: <17.5%
Duplex spacing	45 MHz	95 MHz	80 MHz	190 MHz
Frequency stability	+/- 0.1ppm	+/- 0.1ppm	+/- 0.1ppm	+/- 0.1 ppm
Voltage operation (nominal)	3.6 V	3.6 V	3.6 V	3.6 V
Transmitter RF power output	33 dBm Class 4 (2 W peak)	30 dBm Class 1 (1 W peak)	30 dBm Class 1 (1 W peak)	24dBm Class 3 (0.25 W peak)
Transmitter Output impedance	50 ohm	50 ohm	50 ohm	50 Ω
Transmitter Spurious emission (according to specification)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz	< - 30 dBm	< - 30 dBm	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™ spec.)
Receiver RF sensitivity	Better than – 102 dBm	– 102 dBm	– 102 dBm	Better than -106.7 dBm @ 12.2 kbps CS voice
Receiver RX Bit error rate	< 2.4%	< 2.4%	< 2.4%	< 0.1%

Battery information

Battery	Standard battery (Li Ion) 3.6V, 900 mAh
Charging time	At least 90% charged within 2 hours. Fully charged within 2.5 hours.

Talk time	Up to 8 hours 15 minutes (GSM) Up to 2 hours 10 minutes (UMTS)
Video Talk time	Up to 1 hour 40 minutes
Standby time	Up to 370 hours (GSM) Up to 290 hours (UMTS)

1.3 Megapixel camera

Facts and figures	
Picture sizes (resolution) Megapixel camera	QQVGA (160x120 pixels) VGA (640x480 pixels) 1.3 Megapixel (1280x1024 pixels) QCIF (176 x 144 pixels - applicable only for video recording and telephony, not for still images) SQCIF (128 x 96 pixels - applicable only for video recording and telephony, not for still images)
Colour depth	24 bit (8 bit per RGB channel), 262k colours
Camera memory	Using phone memory; no memory dedicated to the camera only.
Digital zoom	Up to 4x zoom, depending on selected picture size.
Photo light	Yes
Auto focus	No
Night mode	Yes
Self-timer	Yes
Effects	Negative/ Solarize/ Sepia/ Black&White/ Off
White balance	Auto/ Incandescent/ Fluorescent/ Daylight/ Cloudy
Picture quality	Choose between Normal and Fine
Time and date	Add a time and date to a picture

Video telephony

Facts and figures	
Picture sizes (resolution)	QCIF (176 x 144 pixels) SQCIF (128 x 96 pixels)
Digital zoom	Back camera: 4x zoom Front camera: 2x zoom
Night mode	Yes

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Facts and figures	
White balance	Auto
Brightness	Yes
Camera quality	Smooth/Normal/Sharp
Video coding	H.263, Profile 0.
Audio coding	AMR

Media player

File format	Video: MP4 (MPEG4 and AAC), 3GP (H.263 AMR and AAC), Real8. Audio: AAC, AMR, MP3, G-MIDI level 1 with 72 voices polyphony, WAV (up to 16 KHz sample-rate), XMF, Real8.
Streaming transport	RTSP according to 3GPP™
Video decoding	MPEG-4 Simple Visual Profile Level 0 H.263 Profile 0 Level 10 H.263 Profile 3Level 10, Real8.
Audio decoding	AAC, AMR, MPEG layer 3, Real8.
Features	Automatic loop of songs in folder Automatic pause on telephone call.

Radio with RDS

System	VHF/FM
Output	Portable handsfree Internal speaker
Save channels	Yes, 20 presets
Antenna	Portable handsfree

Pictures

Formats	JPEG, BMP, GIF (including animated), PNG, WBMP, SVG-tiny
Sharing via	Infrared, Bluetooth, MMS, email, computer file transfer, USB

Image decoders

Decoder	Details	Size	Colour depth	File format
GIF	87a/89a			
JPEG	ISO/IEC JPEG • Baseline DCT • Progressive DCT • Non-differential • Huffman coding • Symbol 'SOF2'	Megapixel		• JFIF v1.02 • EXIF
BMP	The bitmap image format used by Windows®.	XRAM dependent, default is VGA	24 bit	

Image encoders

Decoder	Details	Size	Colour depth	File format
GIF	89a			
JPEG	ISO/IEC JPEG • Baseline DCT • Non-differential • Huffman coding • Symbol 'SOF0'	Megapixel		JFIF v1.02
BMP	The bitmap image format used by Windows®.	XRAM dependent, default is VGA	24 bit	

Short Messaging Service

Feature	Support
SMS Centre Number	It is possible to pre-load the SMS 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 and multitap.
Reply to messages	It is possible to reply to received messages by SMS, MMS, phonecall or email.
Message creation methods support	Predictive writing and multitap.
Copy, cut and paste words	No

Feature	Support
Teaching of predictive words that are not in the predictive dictionary	Yes
Possibilities when creating a message:	
save a sent message in a "Sent items" folder	Yes
assign a validity period to the message	Yes
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).
forward the message	Yes
save the message on SIM	Yes
get delivery time and date	Yes
Possibilities of the previously sent message:	
delivery report of the message	Yes
forward the message	Yes
save the message on SIM	Yes
Possibilities of the previously received message:	
reply to the sender	Yes (only to the sender, not to all or part of the message recipients).
save the message in the Inbox	Yes
forward the message	Yes
Supported ways for replying to a received SMS:	
via SMS	Yes
via phone call (set up a call to the number contained in the message body)	Yes
via WAP call (go to the WAP address contained in the message body)	Yes
via USSD session	No
Print via infrared	No
Possibility to offer the user the ability of sending a text message using SMS to a list of recipients	Yes, using groups in Contacts, or by adding up to 20 recipients to the text message.

Feature	Support
Possibility to write an email address as a recipient address	Yes, if SMS type = email.
SMS storage	On the SIM and in the phone.
Nokia Picture Messaging	Yes

Enhanced Messaging Service

Feature	Support
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	20
Capacity storage	200 and the space left on the SIM card.
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, and animations can be inserted in a new message, if the object is not protected using ODI.
Concatenated messages	If you have requested a delivery report, a receipt is received in the phone, when all parts of a concatenated message have been delivered.
Insert objects	It is possible to add pictures, animations and sounds to an EMS message.
Sounds	Chimes high, chimes low, ding, tada, notify, drum, claps, fanfare, chords high, chords low.
I-melody	Yes, version 1.2.

Feature	Support
Melodies	It is possible to... • send and receive melodies via EMS, if the melodies are not protected by DRM. • download melodies and commercial tunes from WAP/WAP portals. • create melodies on WAP/WAP portals.
WBMP	Yes
Picture sizes	16x16 pixels, 32 x32 pixels, variable size in black and white.
Pictures	It is possible to... • edit pictures by using the phone keypad. • send and receive pictures via EMS, if the pictures are not protected by DRM. • 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: Angry, Crying, Flirty, Happy, Kiss, Sad, Tongue, Wow, Confused, Devil, Glasses, Indifferent, Laughter, Sceptical and Wink as specified in 3GPP™ TS 23.040 v4.3.0. It is possible to... • send and receive animations.
TP-PID field value given by the handset before sending an EMS message	0x00

Multimedia Messaging Service

Feature	Support
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

Feature	Support
Possibility for only one parameter from the parameters set to be OTA provisioned	• MMS/CSD: No • MMS/GPRS: No
OTA provisioning solution	OTA Settings Specification v7.1 © Ericsson and Nokia
Supplier indication of realized interoperability tests between its MMS User Agent and MMS Relay/Server from other suppliers	Yes
Support of a standard or a proprietary procedure for OTA provisioning of MMS parameters	Proprietary
Functionalities that the user is able to set during message composition:	• message subject • message priority • email recipient address • message Cc recipient(s) address(es) • delivery report request • read report request • MSISDN recipient address
From where can the user insert multimedia elements into multimedia messages:	• File Manager • directly from camera • Contacts • Calendar
Possibility for sent messages to be memorized into a folder in handset memory	Yes
Actions that the user can perform after message notification:	• Auto Download • Always Ask
Actions that the user can perform after message retrieval:	• reply to the sender of the message SMS/MMS • reply to the sender and to Cc people SMS/MMS • forward the message MMS • delete the message • save message into terminal • call the sender of a message
Multimedia codecs/formats supported for audio	AMR, AMR-WB, AU, WAV, MP3, MP4, MIDI, RMF, iMelody, 3GPP, XMF, Real8.
Multimedia codecs/formats supported for video	MP4, Packet Video, 3GPP™, SDP, Real8.
Multimedia codecs/formats supported for image	JPEG, GIF87, GIF89A, PNG, SVG, WBMP, BMP, Flash.
Supported formats for message presentation:	• message body + attachments (email presentation) • SMIL version as described in OMA MMS IOP document version 1.2
Maximum message size that can be handled by the handset for message	Content Class and Creation mode are applied. Also maximum size is possible to customize.

Feature	Support
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)

Bluetooth technical data

Dimension	Support
Bluetooth capability statement	This phone is manufactured to meet Bluetooth Specification 2.0.
Bluetooth functions	Dial-up Networking Profile Generic Access Profile Generic Object Exchange Profile Headset Profile Object Push Profile Serial Port Profile Synchronization Profile Basic Imaging Profile Handsfree Profile Headset Profile Basic Imaging Profile File Transfer Profile Human Interface Device (HID) Profile SyncML OBEX binding JSR-82 Java API
Connectable devices	All products supporting Bluetooth spec. 1.1, or higher, and at least one of the profiles above.
Coverage area	Varies due to radio performance on remote device and the occurrence of obstacles. Up to 10 metres (33 feet).
Transmission power	2mW (3 dBm)
Frequency band	2.4 GHz - the unlicensed ISM band.
Power consumption	GSM host processor excluded: • Standby, Bluetooth On mode: <0.9mA • Voice mode: 24 mA • Data mode average: 25mA
Data transmission rate	Up to 600 kbps asynchronous and up to 350 kbps synchronous from an application level.

Specific commands working with the SIM card	No

SIM AT services supported

Service	Mode		Support
CALL CONTROL BY SIM			Yes
DATA DOWNLOAD TO SIM	Cell Broadcast		Yes
	SMS		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

Service		Mode	Support
GET INPUT		General: No. of hidden input characters	252
	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	Yes
LAUNCH BROWSER			Yes
MORE TIME			Yes
PLAY TONE			Yes
POLLING OFF			Yes
POLL INTERVAL			Yes
PROVIDE LOCAL INFORMA-TION		'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 Notifi-cation	Yes
		'03' = SIM Initialization	Yes
		'04' = SIM Reset	Yes

Service	Mode		Support
SELECT ITEM			Yes
SEND DTMF			Yes
SEND SHORT MESSAGE	bit 1:	0 = packing not required 1 = SMS packing by the ME required	Yes Yes
SEND SS			Yes
SEND USSD			Yes
SET UP CALL		General: Capability configuration Set-up speech call CallParty Subaddress DTMF support	Yes 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	Yes
		'05' = Idle screen available	Yes
		'06' = Card reader status	Not Applicable
		'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 supported

Service	Mode	Support
SET UP MENU		Yes
TIMER MANAGEMENT		Yes
OPEN CHANNEL		No
CLOSE CHANNEL		No
RECEIVE DATA		No
SEND DATA		No
GET CHANNEL STATUS		No

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 the 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. UI Maximum Response lengths:

* Digits Only – 160 characters.
* SMS default alphabet characters – 160 characters, or 1530 characters if concatenation is activated.

* Hidden Characters (digits only) – 20 characters.

'Key' responses:

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

Select item

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

* Navigational key press down – Scroll down list.
* Navigational 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 discon-nected'. 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.

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.

WAP browser technical data

Feature	Support in the 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 100 named bookmarks for easy access to frequently visited pages.
Bookmark Export/Import	Yes, can be sent and received using vBookmark format via Infrared, Bluetooth, SMS, MMS and email.
Cache	Yes (size 300 kB).
Character sets *	UTF-8 (Default), UTF-16, USASCII, Latin1, UCS2.
	*) When creating WML applications, it is recommended that to always save the page contents as UTF-8, 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.
Clear cache	Yes
Colour	Colour display.
Home page	Yes, up to 10 different; one for each WAP profile.
HTML version for WAP browser	XHTML, Mobile Profile 1.2
Hyperlinks in Text	Yes, highlighted as blue underlined text.
Hyperlinks in Images	Yes, indicated by a frame
Image Animation	Yes
Image Formats	GIF (interlaced and non-interlaced) WBMP, no transparent layers, JPEG, PNG, BMP.

Feature	Support in the browser
Network Settings	Up to 10 different settings available by selecting WAP profile (Internet, Banking, Gateway etc.).
OTA Support	Yes
PPP Authentication	PAP, CHAP supported.
Reload page	Yes
Security	WTLS class 1-3 TLS version 1, Client authentication SSL version 3, Client authentication WIM on SIM ICC X.509 certificate support, WAP Profile WMLScript signText WPKI OTA download of trusted certificates
Tables	Yes
User Agent Profiles	Yes, list of client characteristics - for example display size.
WAP/WML WAP	WAP 2.0/WML 1.3
WAP browser	WAP 2.0
WAP profiles	Dynamic - up to 10 WAP profiles, each with its own settings.

WAP operator technical data

Feature	Support for WAP	
WAP Browser		
Version	2.0 baseline	
HTML	XHTML Mobile Profile	
WAP Provisioning types	**The Ericsson-Nokia OTA solution** Over the Air Settings Specification, v7.1 © Ericsson and Nokia	**OMA Client provision-ing (v1.0)**
Total Parameter sets	10 (shared between the WAP provisioning types). < or = 10 (total number of WAP profiles).	

Feature	Support for WAP	
Parameter set list	name, homepage and homepage title (1st bookmark element), proxy/GW address, bookmarks (remaining bookmark elements), CSD phone number, CSD data rate, CSD dial type, GPRS APN, protocol authentication, GW authentication, secure connection on/off	name, homepage, proxy/GW address, CSD phone number, CSD data rate, CSD dial type, CSD response timer, GPRS APN, protocol authentication, GW authentication, GPRS QoS
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.	
Security mechanism		
Bearer	*The Ericsson-Nokia solution*	*OMA Client Provisioning*
OTA via SMS	Operator verification through a code that can be included in the OTA configuration data. This code is shown to the user who can choose to install or not.	Uses security mechanism (SEC) methods according to WAP-183-ProvCont-20010724-a (see www.openmobilealliance.org).
Interface		
Bearer	*The Ericsson-Nokia solution*	*OMA Client Provisioning*
OTA via SMS	A question whether to install, with the code if available is asked. The user may have to choose whether to create a new WAP profile or to replace an existing WAP profile.	For NETWPIN the user is asked to accept to install received settings. For USERPIN, USERNETWPIN and USERPINMAC the user is subsequently asked to enter a PIN code that is a shared secret between the service provider and the user.
Re-provisioning Interface	**The Ericsson-Nokia solution**	**OMA Client Provisioning**

Feature	Support for WAP	
OTA via SMS	Same interface as above.	If the settings previously installed were privileged or have higher priority, the settings might not be possible to install again unless the terminal is reset, otherwise as above.
Carrier reset/provisioning	Yes, but not if the set is pre-configured in the factory and locked.	
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.	
Applicative provisioning		
Preferred bearer customization	Yes	
Email customization	Yes, but not through WAP provisioning.	
Other applications/features	Yes (MMS, SyncML, Wireless Village).	
Technologies		
OMA Client provisioning	Yes, WAP provisioning document v1.0.	
Openwave OTA	No	
Other	Yes. The Ericsson-Nokia solution. OTA Settings Specification v7.1.	
Provisioning bearer	SMS	
Parameter sets available	< or = 10 (total number of WAP profiles)	
Parameter sets for OTA modification	< or = 10 (total number of WAP profiles)	
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	

Feature	Support for WAP
SI menu structure accessability	Messaging, Inbox
SL reception warning	The user can make a choice if a dialogue is wanted or not before loading the SL. Messaging/Settings/Push/Allow push msg/Always ask
SIA reception warning	Yes. The user can make a choice if a dialogue is wanted or not before loading the SIA.
Cache size limitations	The oldest push in the inbox will be discarded.
Number of push messages	Depending on the size of the push messages. Around 20 push messages with a size of 500 bytes can be stored.
Push de-activate	Yes (Messaging/Settings/Push/Allow push msg).
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	The White List is supported.
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

Feature	Support for WAP
Other download content over WAP	Yes. Content download limited to 300 kB when using WTP protocol. No download limit when using HTTP protocol.
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
Other features	Yes. Store, delete, forward, use, manage.
Object formats	
	All formats that are supported in the phone will be possible to download.s
GRAPHICAL USER INTERFACE	
Man Machine Interface	
Selection keys	Yes
Separate/dedicated back or erase keys	Yes
Display 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	Up to 8 rows (or 7 rows plus 1 title row), depending on the selected font size. Each row is 21 pixels in height (a title row is 28 pixels).
Pop-up menus	Yes, in XHTML.
Radio buttons	Yes, in XHTML.
Check boxes	Yes, in XHTML.
Buttons	Available as XHTML form controls.

USSD technical data

Feature	Support
USSD support	GSM Phase 1/2 (Cross-phase compatibility).

Feature	Support
Mode support	UI-mode supported. SAT initiated USSD supported.
UI-mode details	• It is possible to scroll the text up and down in USSD messages. • It is possible to highlight embedded numbers and take actions accordingly.

GPRS technical data

Dimension	Support
Compatible GPRS and SMG specifications	3GPP™ Release 99 December 2002.
Data rates	Multislot class 10 supported (4+2) CS-1, CS-2, CS-3, CS-4 9,050 bps, 13,400 bps, 15,600 bps, 21,400 bps supported (network-dependent).
Medium Access Modes	Dynamic allocation
Support of Packet Control Channels (PBCCH/PCCCH)	Yes
Network operation mode	NOM I, II, III
Support of GPRS/CS combined procedures	Yes
Network control mode	NC0 and 2
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, GEA2
Support of compression algorithms	Yes, V42bis and IP header compression.
Mode of operation	Class B and Class C modes of operation supported.
R Reference point	Physical layer: Support of RS232 PPP is supported as L2 layer in the R reference point Authentication algorithms PAP, CHAP supported

Dimension	Support	
IP connectivity	PDP type IP is supported IP termination in mobile or TE (laptop, PDA) supported	
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 are supported, maximum 2.	
SIM	GPRS aware, as well as non-GPRS aware; SIM cards are supported.	
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

SyncML technical data

Feature	Support for Sync ML
SyncML compliance	The handset is fully SyncML 1.1 compliant (it passed SyncML Conformance testing).
Basic data formats	Contacts: vCard 2.1, Calendar: vCalendar 1.0, vTasks v1.0, vTodo v1.0, Notes: text/plain
Possibility for operators to extend SyncML functionality.	No
Possibility to synchronize other handsets using SyncML.	No
Transport method for SyncML messages.	HTTP, WSP (i.e. using a WAP connection), OBEX (Infrared, USB, Bluetooth)
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 and Notes) UserID and PWD for Databases, Databases to be synchronized (on/off), WAP Account, Synchronization interval and Remote initiation. Can be provisioned with Ericsson Nokia OTA Settings Specification v7.1 and OMA Client provisioning v1.1.

August 2005

Feature	Support for Sync ML
Mechanisms used by the handset to capture changes made by the end user (i.e. how does the Syn-cML client in the 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.	Yes
Ability to perform conflict resolution actions.	No

Terminology and abbreviations

3GPP™

3rd Generation Partnership Project

AAC

Advanced Audio Coding

AMR

Adaptive Multi Rate.
Audio format for speech sounds.

API

Application Programming Interface

ARPU

Average Revenue Per User

Bearer

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

Bookmark

A URL and header/title stored in the phone.

Browsing session

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

Card

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

CDDA

Compact Disc Digital Audio

CDMA

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

Cell-ID

Cell identification

CIF

Common Intermediate Format

CLI

Calling Line Identification 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.

Contacts

A memory in the mobile phone or SIM card where phone numbers and information such as email address, web address, picture and voice command can be stored and accessed by name or position.

CS

Circuit Switched

CSD

Circuit Switched Data

CSS

Cascading Style Sheet

Deck

A collection of WML cards.

DRM

Digital Rights Management; controlling copying and distribution of contents, with respect to intellectual property rights.

DTMF or Touch Tone

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

Dual band

GSM 900/1800.

e-GSM

Extended GSM. New frequencies specified by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (Network-dependent). It allows operators to transmit and receive just outside GSM's core 900 frequency band. This extension gives increased network capability.

EFR

Enhanced Full Rate, speech coding.

EMS

Enhanced Messaging Service. Allows the user to add simple pixel pictures and animations, sounds and melodies to a text message.

ETSI

European Telecommunications Standards Institute.

FM

Frequency Modulation of the (radio) carrier wave.

FR

Full Rate, speech coding.

Gateway

A WAP Gateway typically includes the following functions:

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

GIF

Graphics Interchange Format

GPRS

General Packet Radio Services

GSM

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

GSM system

The GSM system family includes GSM 900, GSM 1800 and GSM 1900. There are different phases of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant.

GSM 1800

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

HR

Half Rate, speech coding.

HSCSD

High Speed Circuit Switched Data

HTML

HyperText Markup Language

HTTP

HyperText Transfer Protocol

IrMC

Infrared Mobile Communications standard

IrDA

Infrared Data Association

ISP

Internet Service Provider

ITTP

Intelligent Terminal Transfer Protocol

JPEG

Joint photographer expert group

LED

Light Emitting Diode

LAN

Local Area Network

LPC

Linear Predictive Coding

LTP

Long Term Predictor

MIDI

Musical Instrument Digital Interface

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.

MIME

Multipurpose Internet Mail Extensions.

MMI

Man-Machine Interface. See UI.

MMS

Multimedia Messaging Service, can also be called Picture messaging. A picture message can, for example, include text, pictures, video clips, sound recordings.

MP3

Short for "MPEG-1 layer 3", an effective audio coding scheme.

MPEG4/MPG4

MPEG-4 extends the earlier MPEG-1 and MPEG-2 algorithms with synthesis of speech and video, fractal compression, computer visualisation and artificial intelligence-based image processing techniques.

MS

Mobile Station

MT

Mobile Termination

Music tones

Ringtones or mastertones, a name for shortened and DRM-protected MP3 ringtones.

ODI

Object Distribution Indicator

OMA

Open Mobile Alliance

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

PIM

Personal Information Management

PNG

Portable Network Graphic

QCIF

Quarter Common Intermediate Format

QVGA

Quarter Video Graphics Array

RPE

Regular Pulse Excited codec.

RTSP

Real Time Streaming Protocol session control.

SMS-C

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 phone uses the small plug-in card.

SMS

Short Messaging Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone.

SP-MIDI

SP-MIDI stands for Scalable Polyphony MIDI.

SS

Supplementary Services

SSL

Secure Socket Layer

TA

Timing in Advance

TCP/IP

Transmission Control Protocol/Internet Protocol

TLS

Transport Layer Security

Triple band

GSM 900/1800/1900

UI

User interface

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.
The global address of documents and other resources on the World Wide Web.

USSD

Unstructured Supplementary Services Data

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, Web browsers, telephony applications, call centres, conferences, PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

VGA

Video Graphics Array

VHF

Very high frequency. A band of radio frequencies falling between 30 and 300 MegaHertz.

WAP

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

WAP Application

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

WAP service

A WML application residing on a web site.

WAV

Windows media audio video.

WBMP

Wireless BitMap.
A graphic format optimized for mobile computing devices.

WML

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

WMLScript

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

WSP

Wireless Session Protocol

WTLS

Wireless Transport Layer Security

WWW

World Wide Web

XHTML

Extensible HyperText Markup Language

XML

Extensible Markup Language

Related information

Documents

- Sony Ericsson User Guide
- Sony Ericsson FAQ
- AT Command Reference Manual

- WAP 2.0 Specifications

Links

- www.SonyEricsson.com/
- www.SonyEricsson.com/fun
- www.SonyEricsson.com/support
- www.SonyEricsson.com/developer
- www.ericsson.com/mobilityworld/
- www.midi.org
- www.extendedsystems.com
- www.gsmworld.com/
- www.bluetooth.com
- www.imc.org

- www.3gpp.org
- www.irda.org
- www.etsi.fr
- www.wapforum.org
- www.imc.org/pdi/
- www.syncml.org
- www.w3.org/TR/SVGMobile/
- www.w3.org/TR/xhtml-basic/
- www.java.sun.com

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