

# White paper

January 2008

## T280i

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Elegant metal phone



Sony Ericsson

# Preface

## Purpose of this document

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This White paper will be published in several revisions as the phone is developed. Therefore, some of the headings and tables in this document 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 the main functions and features of this phone.

People who can benefit from this document include:

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

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# Sony Ericsson Developer World

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On [www.sonyericsson.com/developer](http://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

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### Change history

2008-01-15	First revision	R1A
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# Contents

<b>Product overview .....</b>	<b>5</b>
Key features .....	6
Images .....	8
<b>Technologies in detail .....</b>	<b>9</b>
Functions and features .....	10
<b>Facts and figures .....</b>	<b>19</b>
Technical specifications .....	20
General technical data .....	20
Performance and technical characteristics .....	20
USSD technical data .....	21
GPRS technical data .....	21
SIM AT services supported .....	22
Imaging/Messaging .....	27
1.3 Megapixel camera .....	27
Pictures and animations .....	27
Image decoders .....	27
Image encoders .....	27
Short Messaging Service .....	28
Enhanced Messaging Service .....	29
Multimedia Messaging Service .....	30
Connectivity .....	33
Browser technical data .....	33
Operator technical data .....	34
Java™ .....	37
Bluetooth™ technical data .....	37
<b>Abbreviations .....</b>	<b>39</b>
<b>Related information .....</b>	<b>42</b>
Documents .....	42
Links .....	42
Trademarks and acknowledgements .....	42

# Product overview

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T280i is an easy to use and affordable FM radio phone with elegant classic design.

The radio features an RDS (Radio Data System) function that brings information directly to the screen, and a headset is included in the kit. The FM radio and the camera can be reached from shortcuts on the navigation key.

It also features polyphonic ringtones with 32 voices and up to 10 MB user-free memory for storage of phone content such as pictures, ringtones, themes and games.

A built-in 1.3 MP camera makes it easy to take momentary pictures of everyday life and then view the pictures at any time on the screen. The pictures can also quickly be shared with friends using Bluetooth™ or MMS (Multimedia Messaging Service).

Connect your phone to other devices using the built-in Bluetooth™ feature for fast and easy file transfer.

**Note:** To provide updated information about the implemented technology and functionality of this product, this White paper will be released in updated revisions.

# Key features

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## **RDS FM Radio**

The FM radio with RDS (radio data system) offers instant and easy access to FM radio channels. The RDS function brings information directly to the screen, which is sent out by the currently tuned in radio station. Just plug in the handsfree that works as an antenna and start listening to desired music. The radio can also be used as an alarm signal.

## **1.3 Megapixel camera**

With the user friendly 1.3 MP camera, taking pictures becomes easy and fun. Taking a picture and sending it as part of a multimedia message or as an email attachment is just a few clicks away.

## **SMS**

SMS (Short Message Service) enables you to send text messages using your mobile phone.

## **Picture Messaging (MMS)**

Multimedia Messaging Service is a logical extension of SMS and EMS. MMS enables you to combine sound and image into multimedia messages.

## **1.7 inch colour screen**

The 1.7 inch (128x160 pixels) full graphic 65k colour TFT (Thin Film Transistor) screen facilitates high-quality viewing.

## **WML and XHTML Web browser support**

Browse the Internet and look at Web sites.

## **Gaming**

Gaming is a very popular feature in mobile phones, and with Java™, users can download new games and skill levels to further enhance their entertainment experience. Two embedded games are included in the phone at purchase.

## **Java™**

Download additional applications which are information- and entertainment-based. This gives users a chance to personalize the functions and features in their phones, and developers the opportunity to create new applications.

## **Bluetooth™ wireless technology**

Several devices (simultaneous Bluetooth™ connections) can be connected up to 10 metres (33 feet) away using Bluetooth wireless technology. For example, when the phone rings, it can be answered with a Bluetooth headset, and images can be sent 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, vCards, music files and calendar data. Bluetooth version 2.0 is supported.

## **Polyphonic sound**

Polyphonic ringtones, 32 simultaneous sounds.

## **Calendar**

Fully functional calendar with Today or All view. Simple calendar with task reminder.

## **Alarm**

Set a time and your phone will ring at that time.

## **Vibrating alert**

The phone vibrates and you feel when a call comes in.

# Images

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# Technologies in detail

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This chapter offers a detailed description of the technologies available in this product.

# Functions and features

The following table is a description of the features in this product. It also compares this product with two other Sony Ericsson products.

Feature	T280i	T250	K200
<b>Alarm clock</b>	Yes	Yes	Yes
<b>Antenna</b>  Built-in	Yes	Yes	Yes
<b>Backlight</b>  Illuminates your phone screen	Yes	Yes	Yes
<b>Battery</b>	3.6V, 780mAh, Lithium Polymer	3.6V, 780mAh, Lithium Polymer	3.6V, 900 mAh, Lithium Polymer
<b>Battery charging time</b>	At least 90% charged within 2 hours	At least 90% charged within 2 hours	At least 90% charged within 2 hours
<b>Bluetooth™ wireless technology</b>  Wireless connectivity between devices. Support for specification of the Bluetooth System, version 2.0	Yes	No	No
<b>Business card exchange</b>  Exchange contact information	No	No	No
<b>Calculator</b>	Yes	Yes	Yes
<b>Calendar</b>	Yes. Fully functional calendar with Today and All view. Reminder can be set. No synchronisation	Yes. Fully functional calendar with Today and All view. Reminder can be set. No synchronisation	Yes. Fully functional calendar with Today and All view. Reminder can be set. No synchronisation
<b>Call list</b>  View calls made and calls received	Yes	Yes	Yes
<b>Camera</b>	1.3 MP	VGA	VGA
<b>Camera key</b>	Yes. Shortcut on the navigation key	Yes. Shortcut on the navigation key	Yes. Shortcut on the navigation key

Feature	T280i	T250	K200
<b>Chinese input method</b>  Text input methods based on Simplified or Traditional Chinese; Bopomofo, Pinyin or Stroke	Yes	Yes	Yes
<b>cHTML</b>  A mobile device adapted version of the standard Internet communications protocol HTML	No	No	No
<b>Clock</b>  Visible clock on the screen	Yes	Yes	Yes
<b>Co-branding area</b>	8 x 22 mm	8 x 22 mm	7 x 22 mm
<b>Colour</b>	Metallic Black Light Champagne	Black Silver	Metallic Black Light Champagne
<b>Contacts</b>	Yes. Phonebook with fields for phone number, and name. Save up to 300 contacts (900 phone numbers in total)	Yes. Phonebook with fields for phone number, and name. Save up to 300 contacts (900 phone numbers in total)	Yes. Phonebook with fields for phone number, and name. Save up to 300 contacts (900 phone numbers in total)
<b>Conference calls</b>  Support for multi-party calling	Yes	Yes	Yes
<b>Content online</b>  Downloadable pictures and ringtones are available online	Yes	Yes	Yes
<b>Copyright protection - DRM</b>  DRM (Digital Rights Management) features the rights and copy protection of downloaded content (audio, pictures, music tones, entertainment features such as games etc.)	Yes, OMA v 1.0. Forward lock only.	Level 1 forward lock	Yes download support level 1
<b>CSS</b>  Cascading Style Sheets, the de facto standard style sheet language on the Web, specified by W3C	Yes. Wireless CSS 1.1.	No	No

Feature	T280i	T250	K200
<b>Design</b>	Stick phone, gloss finish front, painted back cover	Stick phone, gloss finish front, painted back cover	Stick phone, gloss finish front, painted back cover
<b>Device Management (DM)</b>  DM utilizes GPRS as bearer of the provisioning data (basic network connectivity needs to be in place) and allows the operator to access the phone and check and set different settings such as Network connectivity (GPRS), MMS, and WAP. DM is achieved by supporting Over The Air provisioning 7.1 (OTA), OMA Client Provisioning 1.1 (CP) and OMA DM 1.1.2	Yes	Yes	Yes
<b>Digital camera menu</b>	Yes	No	No
<b>Digital zoom</b>	Yes. 2X for VGA. 4X for QVGA	No	No
<b>Email</b>  Built-in email client with inbox, outbox, compose, send and other functions	No	No	No
<b>EMS (Enhanced Messaging Service)</b>  Text messaging with pictures and sounds	Yes	Yes	Yes
<b>Exterior description</b>  Length (mm): Width (mm): Thickness (mm):	100.2 44.7 12.7	100.2 44.7 12.7	102.5 45.5 16.7
<b>Fast port</b>  A system connector which enables faster data transfer from phone to PC and PC to phone	Yes (no PC connection support)	Yes (no PC connection support)	No
<b>File manager</b>  Folder structure storage to help you save and organize pictures, sounds and other phone content	Yes	Yes	Yes
<b>Frames</b>  Before you take a picture, you can choose to have a frame surrounding the picture	No	No	No

Feature	T280i	T250	K200
<b>Games download</b>  Replace your in-phone games with new ones	Yes	No	No
<b>Games embedded</b>	Yes	Yes	Yes
<b>GPRS</b>  General Packet Radio Services – a communications standard enabling packet data transfer similar to Internet at 28.8–58.6 Kbps. It is recommended that you have GPRS to use MMS and content download services	Yes Class 8	Yes Multislot class 8 supported (4+2)	Yes Multislot class 8 supported (4+2)
<b>High Speed Data</b>  HSCSD – a communications standard enabling GSM data transfer at 14.4–28.8 Kbps	No	No	No
<b>HTML</b>  HyperText Markup Language, the standard Internet communications protocol	Yes	No	No
<b>Icon Desktop</b>  A graphic icon desktop with interactive icons	Yes The user can select: • Grid view (9 icons)	Yes The user can select: • Grid view (9 icons)	Yes The user can select: • Grid view (9 icons) • Single icon view (6 icons)
<b>IMAP Idle</b>	No	No	No
<b>Infrared port</b>  A wireless connector enabling you to connect your phone to a laptop or other infrared device in order to share pictures and sounds	No	Yes	Yes
<b>Instant messaging</b>  Chat – several people can take part in a mobile messaging session	No	No	No
<b>Java™</b>  Support for J2ME™ technology	Yes	No	No

Feature	T280i	T250	K200
<b>Keypad</b>	Keypad with 12 keys, 2 selection keys, Call key, End/on/off key, 4 way navigation with preset shortcuts	Keypad with 12 keys, 2 selection keys, Call key, End/on/off key, 4 way navigation with preset shortcuts	Keypad with 12 keys, 2 selection keys, Call key, End/on/off key, 4 way navigation with preset shortcuts
<b>Keypad lock</b>  Lock the phone keys to prevent activation of a function in the phone	Yes	Yes	Yes
<b>Lunar calendar</b>  A calendar system used in China and other parts of Asia. A lunar month is determined by the period required for the moon to complete its full cycle of 29.5 days	Yes	Yes	Yes
<b>Media player</b>  Play digital music and video clips	No	No	No
<b>Memory (built-in)</b>  Phone memory that is free for the user to use for pictures, sounds, and more	Up to 10 MB	Up to 3.0 MB	Up to 2.0 MB
<b>Menu shortcuts</b>  Support for dedicating shortcuts to frequently used phone functions	Yes. Fixed shortcuts	Yes. Fixed shortcuts	Yes. Fixed shortcuts
<b>MMS (Multimedia Messaging Service)</b>  Picture messaging with text and sound	Yes. MMS1.2 features except for vCalendar	Yes	Yes
<b>MMS video</b>  Support in the phone for sending video using MMS	No	No	No
<b>Modem</b>  GSM Internet dial-up support	No	No	No
<b>Networks</b>	GSM (R97) Dual-band: • 900/1800 • 850/1900	GSM (R97) Dual-band: • 900/1800 • 850/1900	GSM (R97) Dual-band: • 900/1800 • 850/1900

Feature	T280i	T250	K200
<b>OTA settings</b>  WAP and other settings can be sent over-the-air to the phone	Yes	Yes	Yes
<b>PhotoDJ™</b>	No	No	No
<b>Picture gallery</b>  A thumbnail image gallery	No	No	No
<b>Picture phonebook</b>  Add a picture to a saved contact. The picture appears on the screen when the saved contact calls	No	No	No
<b>Picture wallpaper</b>  Background picture seen on the screen when the phone is in standby mode	Yes	Yes	Yes
<b>PIM Sync (Personal Information Management)</b>  Synchronize the phone with a PC	No	No	No
<b>Polyphonic ringtones</b>	32	32	32
<b>Predictive text input</b>  When you write text, predictive text input software predicts what word you are writing and finishes it for you. The prediction is based on previous words used and a customizable dictionary	Yes	Yes	Yes
<b>Redial</b>  Identify and redial the most recent caller	No	No	No
<b>RSS Feeds</b>  Use your phone to view up-to-the-minute news and other content from selected Web sites and blogs	No	No	No
<b>Screen</b>  Type: Size: Resolution: Technology: Colours displayed together: Backlight colour:	Full graphical 1.7 inches 128x160 pixels TFT 65,000 (16 bit) Blue	Full graphical 1.7 inches 128x160 pixels TFT 65,000 (16 bit) Blue	Full graphical 1.6 inches 128x128 pixels CSTN 65,000 (16 bit) Blue

Feature	T280i	T250	K200
<b>Screen saver</b>  When the phone has not been used for a while, a screen saver activates and the phone goes into 'sleep mode'	No	No	No
<b>Shut down menu</b>  Shut down the phone, lock the keys, turn on silent or activate a profile	No	No	No
<b>SIM card lock</b>  Protect your SIM card with a four-digit PIN code	Yes	Yes	Yes
<b>Sleep mode</b>  A power saving feature that minimizes battery power consumed when the phone is in standby	Yes	Yes	Yes
<b>SMS, long (Text messaging)</b>  Concatenated SMS text messaging	Yes, up to 6 concatenations	Yes, up to 6 concatenations	Yes, up to 6 concatenations
<b>Sony Ericsson Remote Update Service</b>  Download the latest operator approved version of the mobile phone software over the air	No	No	No
<b>Sony Ericsson Update Service</b>  Download the latest operator approved version of the mobile phone software via a computer	No	No	No
<b>Sound recorder</b>  A mini recording device in your phone that lets you record voice messages or other sounds	No	No	No
<b>Speakerphone</b>  Loudspeaker suitable for using the phone as an office handsfree	Yes	Yes	Yes
<b>Speed dialling</b>  Allocating contacts in your phonebook to specific keys on the keypad	Yes	Yes	Yes
<b>Standby time</b>	Up to 300 hours	Up to 300 hours	Up to 300 hours



Feature	T280i	T250	K200
<b>Status view</b>  Shows the network being used, time and other status information	Yes	Yes	Yes
<b>Stopwatch</b>	Yes	Yes	Yes
<b>Style-Up™ covers</b>  Exchangeable covers to alternate the look of your phone	No	No	No
<b>Synchronization PC</b>  Synchronize and share phone content with a computer	No	No	No
<b>Talk time</b>	Up to 7 hours	Up to 7 hours	Up to 8 hours
<b>Tasks</b>  Keep track of important things to do	No	No	No
<b>Themes display</b>  Phone menu texts and background graphics	Yes	Yes	Yes
<b>Time Line Search (Time View)</b>  Search for pictures and videos by month or day	No	No	No
<b>Timer</b>  Set your phone to alert after a specific time lapse	Yes	Yes	Yes
<b>USB connectivity support</b>  Connect the phone to a computer using a USB cable	No	No	No
<b>Vibrating alert</b>  The phone vibrates when a call comes in or when an alarm goes off	Yes	Yes	Yes
<b>Video player</b>  Record, play and transfer video clips to another phone or a computer	No	No	No
<b>Video streaming</b>  Real time streaming of video, for example, live cam	No	No	No

Feature	T280i	T250	K200
<b>Voice control</b>  Voice answer, reject and call. Assign voice commands to items in your phone book	No	No	No
<b>Voicemail</b>  Support for voicemail operator service including automatic answering and message recording	Yes	Yes	Yes
<b>WAP</b>  A mobile Internet standard enabling you to access specially designed Internet sites. WAP 2.0 supports colour and interactive lists	Yes, 2.0	Yes, 1.2.1	Yes, 1.2.1
<b>XHTML</b>  A mobile Internet standard enabling you to access specially designed Internet sites.	Yes XHTML Mobile profile 1.0	No	No
<b>Weight</b>  With battery:	82 g	82 g	82 g

# Facts and figures

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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	GSM phase 2 recommendations. Dual-band GSM 900/1800 or 850/1900
Speech coding	HR, FR, EFR, AMR supported where available, for high speech quality
GSM SIM/USIM card	Small plug-in card, 1.8 V and 3 V
Memory (user free)	Up to 10.0 MB
Data transfer speeds	Up to 85.6 Kbps (downlink) Up to 21.4 Kbps (uplink)

## Performance and technical characteristics

Dimension	GSM 850	GSM 900	GSM 1800	GSM 1900
Frequency range (MHz)	TX: 824–849 RX: 869–894	TX: 880–915 RX: 925–960	TX: 1710–1785 RX: 1805–1880	TX: 1850–1910 RX: 1930–1990
Channel spacing	200 kHz	200 kHz	200 kHz	200 kHz
Number of channels	124 Carriers *8 (TDMA)	174 Carriers *8 (TDMA)	374 Carriers *8 (TDMA)	299 Carriers *8 (TDMA)
Modulation	GMSK	GMSK	GMSK	GMSK
TX Phase Accuracy	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)
Duplex spacing	45 MHz	45 MHz	95 MHz	80 MHz
Frequency stability	+/- 0.1ppm	+/- 0.1ppm	+/- 0.1ppm	+/- 0.1ppm
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)	33 dBm Class 4 (2 W peak)	30 dBm Class 1 (1 W peak)	30 dBm Class 1 (1 W peak)
Transmitter Output impedance	50 ohm	50 ohm	50 ohm	50 ohm
Transmitter Spurious emission (according to specification)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz	< - 30 dBm	< - 30 dBm

Dimension	GSM 850	GSM 900	GSM 1800	GSM 1900
Receiver RF sensitivity	Better than – 102 dBm	Better than – 102 dBm	– 102 dBm	– 102 dBm
Receiver RX Bit error rate	< 2.4%	< 2.4%	< 2.4%	< 2.4%

## USSD technical data

Feature	Support
USSD support	GSM Phase 1/2 (Cross-phase compatibility) GPRS behaviour according to class 8
Mode support mode	UI-mode supported SAT initiated USSD supported
UI-mode details	It is possible to scroll up and down in USSD messages.

## GPRS technical data

Dimension	Support
Compatible GPRS and SMG specifications	Release 99 according to ETSI specification
Data rates	Multislot class 8 supported (4+1). CS-1, CS-2, CS-3, CS-4. 9.050 bps, 13.400 bps, 15.600 bps, 21.400 bps supported (network-dependent)
Indicator of attachment to the GPRS service	Yes, an icon in the top left corner, a filled triangle if attached
Indicator of PDP context activation	With a Globe icon on status bar
Medium Access Modes	Dynamic allocation
Support of Packet Control Channels (PBCCH/PCCCH)	Yes
Network operation mode	NOM I, II, III
Support of GPRS 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

<b>Dimension</b>	<b>Support</b>
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	No
Support of the QoS modification procedure	Yes, when initiated by the network (not by the mobile phone)
Downlink data rate	Up to 85.600 bps for packet data communication, using 4 time slots in coding scheme CS-4
Uplink data rate	Up to 21.400 bps for packet data communication, using 1 time slots in coding scheme CS-4
Mode of operation	Class B mode of operation supported
IP connectivity	PDP type IP is supported. IP termination in mobile or TE (laptop, PDA) supported
Application	WAP over GPRS supported (UDP/IP)
QoS	QoS negotiation supported. Default requested QoS sent by the mobile phone at PDP context activation is reliability Class 3. Peak/Mean/Delay/Precedence. Class: subscribed. Precedence class supported (1,2,3). Reliability class 1-5 supported. Delay classes supported (1,2,3,4). Mean and peak throughput rate limited by multi slot class 4 and CS-4
PDP context	10 PDP context descriptions are saved in the phone. PDP context description is edited via application in mobile, AT-command or via OTA.
SIM	GPRS aware, as well as non-GPRS aware, SIM cards are supported

## SIM AT services supported

<b>Service</b>	<b>Mode</b>	<b>Support</b>
CALL CONTROL BY SIM		Yes
DATA DOWNLOAD TO SIM	Cell Broadcast SMS	Yes Yes

Service	Mode	Support
DISPLAY TEXT	Text of up to 240 characters (120 UCS2 coded)	No
	bit 1: 0 = normal priority	Yes
	1 = high priority	Yes
	bit 8: 0 = clear message after a delay	Yes
	1 = wait for user to clear message	Yes
GET INKEY	General: The GET_INKEY requires that the user confirms his/her choice.	Yes
	bit 1: 0 = digits (0-9, *, # and +) only	Yes
	1 = alphabet set	Yes
	bit 2: 0 = SMS default alphabet	Yes
	1 = UCS2 alphabet	Yes
	bit 3: 0 = character sets defined by bit 1 and bit 2 are enabled.	Yes
	1 = character sets defined by bit 1 and bit 2 are disabled and the Yes/No response is requested.	Yes
GET INPUT	General: No. of hidden input characters	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 screen	Yes
	1 = user input not to be revealed in any way	Yes
	bit 4: 0 = user input to be in unpacked format	Yes
	1 = user input to be in SMS packed format	Yes
	bit 8: 0 = no help information available	Yes
	1 = help information available	No
LAUNCH BROWSER		No
MORE TIME		Yes
PLAY TONE		Yes
POLLING OFF		Yes
POLL INTERVAL		Yes

Service	Mode	Support
PROVIDE LOCAL INFORMATION	'00' = Location Information (MCC, MNC, LAC and Cell Identity)	Yes
	'01' = IMEI of the ME	Yes
	'02' = Network Measurement results	Yes
	'03' = Date, time and time zone (DTTinPLI)	Yes
	'04' - Language setting	Yes
	'05' - Timing advanced	Yes
REFRESH	General: The reset option requests the user to wait while the phone restarts	Yes
	'00' =SIM Initialization and Full File Change Notification	Yes
	'01' = File Change Notification	Yes
	'02' = SIM Initialization and File Change Notification	Yes
	'03' = SIM Initialization	Yes
	'04' = SIM Reset	Yes
SELECT ITEM		Yes
SEND DTMF		Yes
SEND SHORT MESSAGE	bit 1: 0 = packing not required	Yes
	1 = SMS packing by the ME required	Yes
SEND SS		Yes
SEND USSD		Yes



Service	Mode	Support
SET UP CALL	General: Capability configuration	No
	Set-up speech call CallParty	No
	Sub address DTMF support	Yes
	'00' = set up call, but only if not currently busy on another call	Yes
	'01' = set up call, but only if not currently busy on another call, with redial	No
	'02' = set up call, putting all other calls (if any) on hold	Yes
	'03' = set up call, putting all other calls (if any) on hold, with redial	No
	'04' = set up call, disconnecting all other calls (if any)	Yes
	'05' = set up call, disconnecting all other calls (if any), with redial	No
EVENT DOWNLOAD	'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	N/A
	'07' = Language selection	Yes
	'08' = Browser termination	No
	'09' = Data available	No
	'0A' = Channel status	No
SET UP IDLE MODE		Yes, 1 row of text is supported
SET UP MENU		Yes
TIMER MANAGEMENT		Yes
OPEN CHANNEL		No
CLOSE CHANNEL		No
RECEIVE DATA		No

Service	Mode	Support
SEND DATA		No
GET CHANNEL STATUS		No

## User Interaction with SIM AT

### Display text

Text clearing times are 2-35 seconds and a 30-second time-out limit for the user to clear the text. 'Key' responses:

- 'Back' – Backward move in proactive session.

'OK'/'Back' clears the screen 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:

- '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
- Hidden Characters (digits only) – 20 characters

'Key' responses:

- 'Clear' – Clear current character.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

### Select item

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

- Navigation key press down – Scroll down list.
- Navigation key press up – Scroll up list.
- '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:

- 'Back' – End the proactive session.

### Set up menu

Incorporates a SIM Application Toolkit Menu Item into the 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 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.

# Imaging/Messaging

## 1.3 Megapixel camera

### Facts and figures

Picture sizes (resolution)	1.3 (1280x1024)
Colour depth	16 bit (RGB 565), 65k colours
Camera memory	Phone memory, no memory dedicated to the camera only

## Pictures and animations

Formats	JPEG, PNG, GIF (including animated)
Sharing via	MMS, EMS, Bluetooth

## Image decoders

Decoder	Details	Size	Colour depth	File format
JPEG	ISO/IEC JPEG Baseline DCT Progressive DCT Non-differential Huffman coding Symbol 'SOF2'	1.3M - 1280x1024		JFIF v1.02 EXIF

## Image encoders

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

## 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 phones 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 or phone call
Message creation methods support	Predictive writing and multitap
Copy, cut and paste words	No
Teaching of predictive words that are not in the predictive dictionary	No
Possibilities when creating a message:	
save a sent message in a "Sent messages" folder	Yes
insert a line in the message	Yes
assign a validity period to the message	No
use pre-defined messages	No
Possibilities when receiving a message:	
reply to the sender	Yes
forward the message	Yes
save the message on the SIM card	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 the SIM card	Yes
know the remaining capacity storage	Yes
Possibilities of the previously received message:	
reply to the sender	Yes
save the message on the SIM card	Yes
forward the message	Yes
know the remaining capacity storage	Yes

Feature	Support
Supported ways of replying to a received text message:	
via SMS	Yes
via MMS	No
via email	No
via phone call (set up a call to the number contained in the message body)	Yes
via WAP (go to the WAP address contained in the message body)	Yes
via USSD session	No
Possibility to send a text message to a list of recipients	Yes
Possibility to write an email address as a recipient address	Yes
SMS storage	On the SIM card and in the phone
Nokia Picture Messaging	No

## Enhanced Messaging Service

Feature	Support
Level of compliance supported by the mobile phone 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 v4.3.0
Number of messages that the mobile phone is able to handle to generate a concatenated message	6
Capacity storage	450 and the space left on the SIM card (50 messages)
Outgoing messages	It is possible to: <ul style="list-style-type: none"> <li>• See how many short messages an EMS message consists of before sending.</li> <li>• Choose whether to send the message or not after writing.</li> </ul>
Incoming messages	<ul style="list-style-type: none"> <li>• A signal is heard once all parts of the message have been received or when a timeout occurs.</li> <li>• It is possible to re-use the content of an EMS message. Sounds and pictures can be inserted in a new message, if the object is not protected using ODI.</li> </ul>
Concatenated messages	A receipt is received in the mobile phone when all parts of a concatenated message have been delivered

Feature	Support
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
Melodies	It is possible to: <ul style="list-style-type: none"> <li>• Send and receive melodies via EMS, if the melodies are not protected by ODI.</li> <li>• Download melodies and commercial tunes from WAP portals.</li> <li>• Create melodies on WAP portals.</li> </ul>
WBMP	Yes
Picture sizes	16x16 pixels, 32x32 pixels, variable size in black and white.
Pictures	It is possible to: <ul style="list-style-type: none"> <li>• Send and receive pictures via EMS, if the pictures are not protected by ODI.</li> <li>• Create pictures on WAP portals.</li> <li>• Download pictures from WAP portals.</li> <li>• Receive pictures in enhanced messages originated by service providers.</li> </ul>
Animations	The mobile phone supports the following animations: Angry, Crying, Flirty, Happy, Kiss, Sad, Tongue, Wow, Confused, Devil, Glasses, Indifferent, Laughter, Sceptical and Wink as defined in 3GPP™ TS 23.040 v4.4.0. It is possible to: <ul style="list-style-type: none"> <li>• Send and receive colour animations.</li> </ul>
TP-PID field value given by the mobile phone before sending an EMS message	0 x 00

## Multimedia Messaging Service

Feature	Support
MMS/GPRS parameters placement	MMS is connected to an Internet profile. An Internet profile is connected to a Data Account. A Data Account contains GPRS parameters
Possibility to pre-configure the MMS parameters in factory	MMS/GPRS: Yes
Possibility to configure the MMS parameters by OTA provisioning	MMS/GPRS: Yes

Feature	Support
Possibility for all the parameters from the parameters set to be OTA provisioned at the same time	MMS/GPRS: Yes
Possibility for only one parameter from the parameters set to be OTA provisioned	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:	<ul style="list-style-type: none"> <li>• Email recipient address</li> <li>• Message Cc recipient(s) address(es)</li> <li>• MSISDN recipient address</li> </ul>
The user can insert multimedia elements into multimedia messages from:	<ul style="list-style-type: none"> <li>• File Manager</li> <li>• Camera</li> <li>• Contacts</li> <li>• Calendar</li> </ul>
Possibility for sent messages to be memorized into a folder in the phone memory	Yes
Actions that the user can perform after message notification:	<ul style="list-style-type: none"> <li>• Always download</li> <li>• Roaming</li> <li>• Always ask</li> </ul>
Actions that the user can perform after message retrieval:	<ul style="list-style-type: none"> <li>• Reply to the sender of the message (SMS/MMS)</li> <li>• Forward the message (MMS)</li> <li>• Delete the message</li> <li>• Call the sender of a message</li> <li>• View details</li> <li>• Save items</li> </ul>
Multimedia codecs/formats supported for audio	I-Melody, MIDI, MP3, AMR
Multimedia codecs/formats supported for image	JPEG, GIF87, GIF89A, WBMP, BMP, PNG
Supported formats for message presentation:	<ul style="list-style-type: none"> <li>• Message body + attachments</li> <li>• SMIL version as described in OMA MMS IOP document version 1.0</li> </ul>

Feature	Support
Maximum message size that can be handled by the phone for a message	Maximum size is possible to customize (from 100 to 300KB)
MMS User Agent will report problems to the user in case of:	<ul style="list-style-type: none"><li>• Message not sent causes no user subscription to service, if included in ResponseText</li><li>• Message not sent causes required functionality not supported by MMS Relay/Server, if included in ResponseText</li><li>• Message not sent causes insufficient credit (in case of prepaid charging), if included in ResponseText</li></ul>



# Connectivity

## Browser technical data

Feature	Support in the browser
Back to previous page	Yes
Bearer type GPRS (IP)	Yes
Bookmarks	Yes, up to 100 named bookmarks for easy access to frequently visited pages in a list view
Bookmark Export/Import	Yes, can be sent and received using SMS
Cache	Yes (size 30 kB)
Character sets*	UTF-8 (Default), USASCII, Latin1, UCS2.  *) When creating WML applications, it is recommended to always save the page content as UTF-8, and that this is clearly indicated in the pages before publishing. This ensures that the application content 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 screen
Home page	Yes, up to 10 different; one for each WAP profile
HTML version for browser	Mobile Profile 1.0, WML 1.0/1.1/1.3.
Hyperlinks in Text	Yes, highlighted as blue text
Hyperlinks in Images	Yes, indicated by a frame
Image Animation	Yes
Image Formats	GIF (including animated) WBMP, no transparent layers, JPEG, BMP
Network Settings	Up to 10 different settings available by selecting WAP profile
OTA Support	Yes
PPP Authentication	PAP supported
Reload page	Yes
User Agent Profiles	Yes, list of client characteristics - for example, screen size
WAP/WML	WAP 2.0
Internet profiles	Up to 10 Internet profiles, each with its own settings

## Operator technical data

Feature	Support for WAP	
WAP Browser		
Version	WAP 2.0	
WAP Provisioning types	OMA Client provisioning (v1.1)	
Total Parameter sets	10 (shared between the provisioning types). < or = 10 (total number of profiles)	
Parameter set list	Name, homepage and homepage title (1st bookmark element), proxy/GW address, bookmarks (remaining bookmark elements), GPRS APN	Name, homepage, proxy/GW address, GPRS APN
Parameter sets include	GPRS	
Factory pre-configuration	GPRS	
OTA	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 <a href="http://www.openmobilealliance.org">www.openmobilealliance.org</a>
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 to create a new profile or to replace an existing 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	
<b>Applicative provisioning</b>		
Preferred bearer customization	No	
Email customization	No	
Other applications/features	Yes (MMS)	
<b>Technologies</b>		
OMA Client provisioning	Yes, WAP provisioning document v1.1	
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 Internet profiles)	
Parameter sets for OTA modification	< or = 10 (total number of Internet profiles)	
<b>PUSH</b>		
<b>Content types</b>		
Service Indication (SI)	Yes	
Service Loading (SL)	Yes	
Cache Operation (CO) content type	Yes	
Session Initiation Application (SIA)	Yes	
<b>Man Machine Interface</b>		
SI/content retrieval postponing	Yes	
SI menu structure accessibility	Internet, push inbox	
SL reception warning	The user can make a choice if a dialogue is wanted or not before loading the SL	
SIA reception warning	Yes	
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 saved	
Push de-activate	Yes	

<b>Feature</b>	<b>Support for WAP</b>
Dynamic push menu changes	No, there are no changes in the menus when activating or deactivating push
<b>Security</b>	
Mechanisms for push	No
WSP push sessions	No
HTTP push session	No
<b>User agent profile</b>	
UA profile content sent at beginning of WSP session	Yes
URL sent pointing to the UA profile at the beginning of a WSP session	Yes
URL location	On the manufacturer WAP site
<b>WTAI</b>	
WTA Make Call	Yes
WTA Send DTMF	Yes
WTA Add Phonebook	Yes
<b>DOWNLOAD</b>	
<b>WAP solutions</b>	
HTTP GET solution to download content over WAP	Yes
Download Fun from Openwave	No
Other download content over WAP	Yes, download limit (HTTP protocol)
Download application/product memory check	Yes
Downloaded object solution	Yes. The user is informed where the content is saved and asked if it should be used at once or later
UAP indication for downloading	Yes
Other features	Yes. Save, delete, forward, use and manage
<b>Object formats</b>	
	All formats that are supported in the phone will be possible to download
<b>GRAPHICAL USER INTERFACE</b>	
<b>Man Machine Interface</b>	
Selection keys	Yes

Feature	Support for WAP
Separate/dedicated back or delete keys	Yes
Screen backlight on when browsing	Yes
Predictive writing	Yes
“http://” string displayed automatically when entering URLs	Yes
<b>Elements</b>	
Pop-up menus	Yes, in XHTML
Radio buttons	Yes, in XHTML
Check boxes	Yes, in XHTML
Buttons	Available as XHTML form controls

## Java™

Feature	Functionalities
Java™ Platform, Micro Edition	<ul style="list-style-type: none"> <li>• CLDC 1.1 (JSR 139)</li> <li>• MIDP 2.0 (JSR 118)</li> <li>• Wireless Messaging API (JSR 120)</li> <li>• Java™ Technology for the Wireless Industry (JSR 185)</li> <li>• File system packet API of the PDA Optional Packages for J2ME™ Platform (JSR 75-FC)</li> <li>• Mobile Media API (JSR 135 - Audio playback and snapshot only)</li> </ul>

## Bluetooth™ technical data

Feature	Support
Bluetooth capability statement	This phone supports Bluetooth Specification, version 2.0 with enhanced data rate (EDR)
Bluetooth profiles	Generic Access Profile Generic Object Exchange Profile Handsfree Profile Headset Profile Object Push Profile
Connectable devices	All products supporting Bluetooth spec. 1.1, or higher, and at least one of the profiles above
Coverage area	Class 2, typical +3 dBm or 2 mW
Transmission power	Class 2, typical +3 dBm or 2 mW

Feature	Support
Frequency band	2.4 GHz – the unlicensed ISM band
Power consumption	<p>GSM host processor excluded:</p> <ul style="list-style-type: none"><li>• Standby, Bluetooth On mode: &lt;0.6 mA</li><li>• Voice to headset (HV3 master): 11 mA (7 mA with EDR functionality, 2EV3 master). Dependent on various parameters whether the phone is master or slave</li><li>• Data mode average: 27mA at 172.8 kbps symmetrical (DH1)</li></ul>

# Abbreviations

## **3GPP™**

3rd Generation Partnership Project. Collaboration between a number of telecommunications standards bodies to specify 3G. 3GPP also maintains and develops the specifications for GSM.

## **AMR**

Adaptive Multi-Rate. 3GPP standard for speech coding (compression).

## **API**

Application Programming Interface

## **CS**

Circuit Switched. Connection from A to B which has a fixed bandwidth and is maintained over a period of time, for example a voice telephone call.

## **CS-1 to CS-4**

Coding Scheme. Determines the data rate per timeslot in GPRS.

## **CSD**

Circuit Switched Data. CSD is a GSM service providing a CS data connection at a rate of 9.6 or 14.4 Kbps.

## **CSS**

Cascading Style Sheet

## **DM**

Device Management. 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), MMS and WAP.

## **DRM**

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

## **DTMF**

Dual Tone Multi Frequency. A method of coding digits as a combination of two audible tones.

## **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. An extension of SMS enabling pictures, animations, sound and text formatting to be added to text messages. 3GPP has included EMS in the standards for SMS.

## **ETSI**

European Telecommunications Standards Institute

## **FR**

Full Rate, speech coding.

## **GIF**

Graphics Interchange Format. Format for storing images which also supports animated images. Highly compressed by limiting the colour palette to 16 or 256 colours.

## **GPRS**

General Packet Radio Services

## **GSM**

Global System for Mobile Communications. The GSM system family includes GSM 850, GSM 900, GSM 1800 and GSM 1900.

## **HR**

Half Rate, speech coding

## **HSCSD**

High Speed Circuit Switched Data

## **HTML**

HyperText Markup Language

## **HTTP**

HyperText Transfer Protocol

## **IETF**

Internet Engineering Task Force

## **JPEG**

Joint Photographic Experts Group, best known for the JPG format for still image compression.

## **MIDI**

Musical Instrument Digital Interface

## **ME**

Mobile Equipment (phone excluding SIM card)

## **MMI**

Man-Machine Interface. Same as User Interface (UI).

## **MMS**

Multimedia Messaging Service, logical extension of SMS and EMS. MMS defines a service enabling sound and images to be combined into multimedia messages.

## **MPEG**

Moving Picture Experts Group. A working group of ISO/IEC in charge of the development of standards for coded representation of digital audio and video.

## **ODI**

Object Distribution Indicator. Part of EMS release 4.3, ODI is a mechanism for controlling distribution of content (pictures, melodies etc.) within short messages.

## **OMA**

Open Mobile Alliance, promotes interoperability and a wireless standard for delivering email, textbased Web pages and data to mobile phones, PDAs, pagers and other mobile terminals.

## **OTA**

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

## **PDA**

Personal Digital Assistant

## **PDP**

Packet Data Protocol

## **PIM**

Personal Information Management. Generic term for applications such as Contacts, Calendar and Tasks

## **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.

## **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.

## **SS**

Supplementary Services

## **SSL**

Secure Socket Layer

## **UI**

User interface

## **URL**

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

## **USSD**

Unstructured Supplementary Services Data. Narrow-band GSM data service.

## **VGA**

Video Graphics Array. Graphics standard introduced by IBM, with a resolution of 640x480 pixels.

## **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.

## **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.

## **WSP**

Wireless Session Protocol

## **XHTML**

Extensible HyperText Markup Language

# Related information

## Documents

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- Sony Ericsson User guide
- Sony Ericsson FAQ
- AT Command Reference Manual
- WAP 1.2.1 Specifications

## Links

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- [www.sonyericsson.com/](http://www.sonyericsson.com/)
- [www.ericsson.com/mobilityworld/](http://www.ericsson.com/mobilityworld/)
- [www.midi.org](http://www.midi.org)
- [www.extendedsystems.com](http://www.extendedsystems.com)
- [www.gsmworld.com/](http://www.gsmworld.com/)
- [www.imc.org](http://www.imc.org)
- [www.imc.org/pdi/](http://www.imc.org/pdi/)
- [www.etsi.fr](http://www.etsi.fr)
- [www.wapforum.org](http://www.wapforum.org)
- [www.w3.org/TR/xhtml1-basic/](http://www.w3.org/TR/xhtml1-basic/)
- [www.cognimatics.com](http://www.cognimatics.com)
- [www.java.sun.com](http://www.java.sun.com)

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