

White  
paper

May 2008

# T303

---

Small is beautiful



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 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

This White paper is published by:

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

Phone: +46 46 19 40 00

Fax: +46 46 19 41 00

[www.sonyericsson.com/](http://www.sonyericsson.com/)

© Sony Ericsson Mobile Communications AB,  
2008. All rights reserved. You are hereby granted  
a license to download and/or print a copy of this  
document.

Any rights not expressly granted herein are  
reserved.

First edition (May 2008 )

Publication number: EN/LZT 108 9810 R3A

This document is published by Sony Ericsson Mobile Communications AB, without any warranty\*. Improvements and changes to this text necessitated by typographical errors, inaccuracies of current information or improvements to programs and/or equipment, may be made by Sony Ericsson Mobile Communications AB at any time and without notice. Such changes will, however, be incorporated into new editions of this document. Printed versions are to be regarded as temporary reference copies only.

\*All implied warranties, including without limitation the implied warranties of merchantability or fitness for a particular purpose, are excluded. In no event shall Sony Ericsson or its licensors be liable for incidental or consequential damages of any nature, including but not limited to lost profits or commercial loss, arising out of the use of the information in this document.

# Sony Ericsson Developer World

---

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

---

---

### Change history

2008-05-29	R3A	Third revised edition
2008-04-17	R2A	Second revised edition
2008-02-28	R1A	First revised edition

# Contents

<b>Product overview .....</b>	<b>4</b>
Key features .....	5
Images .....	7
<b>Technologies in detail .....</b>	<b>8</b>
Functions and features .....	9
<b>Facts and figures .....</b>	<b>17</b>
Technical specifications .....	18
General technical data.....	18
Performance and technical characteristics .....	18
USSD technical data .....	19
GPRS technical data .....	19
SIM AT services supported .....	20
Music player .....	24
Radio with RDS .....	25
1.3 MP camera .....	25
Pictures and animations .....	25
Image decoders.....	25
Image encoders.....	26
Short Messaging Service.....	26
Enhanced Messaging Service .....	28
Multimedia Messaging Service.....	29
Bluetooth™ technical data .....	30
Java™ .....	31
Web browser data .....	31
Operator technical data.....	32
<b>Abbreviations .....</b>	<b>36</b>
<b>Related information .....</b>	<b>39</b>
Documents .....	39
Links .....	39
Trademarks and acknowledgements .....	39

# Product overview

---

T303 is a combination of seeming opposites: small yet versatile, beautiful yet robust, appealing yet affordable. It is a compact slider, with a height of only 83 mm. A multitude of media functions is contained inside its metal-and-glass housing. The smooth sliding mechanism in combination with the soft rounded shape further contribute to the overall quality feeling of the phone.

The music player is a perfect tool for listening to songs. The music can easily be organized into personal playlists.

With the RDS FM radio, the user can preset channels and enjoy favourite tunes through the stereo headphones.

The 1.3 MP camera enables the user to take pictures of everyday life and view them anytime on the screen, or share them with friends using Bluetooth™ or MMS (Multimedia Messaging Service).

Other notable features of T303 are TrackID™ music recognition, MP3 ring tones, games, alarm, calculator, calendar, predictive text input, SMS, phonebook, and Java MIDP 2.0.

**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

---

## **FM radio with RDS**

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 your music. The radio can also be used as an alarm signal.

## **Music player**

Play music files and radio recordings. The folder system enables the user to, for example, browse through favourite tracks and create simple playlists.

## **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 picture message is quick and simple.

## **1.8-inch colour screen**

The 1.8-inch (128x160 pixels), full graphic, 65k colour, TFT (Thin Film Transistor) screen provides a high-quality display.

## **Short Message Service (SMS)**

SMS lets you send text messages using your mobile phone.

## **Picture messaging**

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

## **WML/HTML-MP Web browser support**

Browse the Internet and look at Web sites.

## **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. Images can be wirelessly sent to another phone. The phone and a computer can exchange data such as images, music files and calendar data. Bluetooth version 2.0 is supported.

## **Java™**

Download additional information and entertainment 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 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.

### **TrackID™**

TrackID™ can identify a track playing on the phone radio, or in the room. The phone samples a few seconds of the song, then connects to an online database, which identifies the song and returns title, artist and album information.

### **Polyphonic sound**

Polyphonic ringtones, 32 simultaneous sounds.

### **Calendar**

Fully functional calendar with day or month view, and a task reminder.

### **Alarm**

Set a time and your phone will ring at the time. Choose the radio to be your alarm ringtone and wake up to your favourite station.

### **Vibrating alert**

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

# Images

---





# Technologies in detail

---

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	T303	T250	T280
<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>	3.6 V, 930 mAh, Lithium Polymer	3.6 V, 780 mAh, Lithium Polymer	3.6 V, 780 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 within a range of up to 10 metres (33 feet). Support for specification of the Bluetooth System, version 2.0	Yes	No	Yes
<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	1.3 MP
<b>Camera key</b>	Yes, shortcut on the navigation key	Yes, shortcut on the navigation key	Yes, shortcut on the navigation key
<b>Chinese input method</b>  Text input methods based on Simplified or Traditional Chinese; Bopomofo, Pinyin or Stroke	Yes	Yes	Yes

<b>Feature</b>	<b>T303</b>	<b>T250</b>	<b>T280</b>
<b>Clock</b>  Visible clock on the screen	Yes	Yes	Yes
<b>Co-branding area</b>	8 x 22 mm	8 x 22 mm	8 x 22 mm
<b>Colour</b>	Dark metal: black front, black back Bright metal: silver front, silver back	Black Silver	Metallic Black Light Champagne
<b>Contacts</b>	Yes, phonebook with fields for phone number, and name. Save up to 500 contacts (1500 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 and so on)	Level 1 forward lock	Level 1 forward lock	Level 1 forward lock
<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	Yes Wireless CSS 1.1
<b>Design</b>	Slider phone, hairline finish front, hairline finish and rubber/plastic back	Stick phone, gloss finish front, painted back cover	Stick phone, gloss finish front, painted back cover

Feature	T303	T250	T280
<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	No	Yes	Yes
<b>Digital camera menu</b>	Yes	No	Yes
<b>Digital zoom</b>	Yes, 2x for VGA 4x for QVGA	No	Yes, 2x for VGA 4x for QVGA
<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):	83 47 14.7	100.2 44.7 12.7	100.2 44.7 12.7
<b>Fast port</b>  A system connector which enables faster data transfer from phone to computer and computer to phone	Yes (no computer connection support)	Yes (no computer connection support)	Yes (no computer connection support)
<b>File manager</b>  Folder structure storage to help you save and organize pictures, sounds and other phone content	Yes	Yes	Yes
<b>FM radio with RDS</b>  FM radio with presets, auto and manual search. The handsfree is used as an antenna. The radio can also be used as an alarm signal	Yes Frequency range 87.5-108 MHz, channel search step 0.05 MHz	Yes	Yes
<b>Games download</b>  Add more games to your phone	Yes	No	Yes
<b>Games embedded</b>	Yes	Yes	Yes

<b>Feature</b>	<b>T303</b>	<b>T250</b>	<b>T280</b>
<b>GPRS</b> General Packet Radio Services – a communications standard enabling packet data transfer similar to Internet at 28.8–56.6 Kbps. It is recommended that you have GPRS to use MMS and content download services	Yes, multislot class 10 supported (4+2)	Yes, multislot class 8 supported (4+1)	Yes, multislot class 8 supported (4+1)
<b>HTML</b> HyperText Markup Language, the standard Internet communications protocol	Yes	No	Yes
<b>Icon Desktop</b> A graphic icon desktop with interactive icons	Grid view (9 icons)	Grid view (9 icons)	Grid view (9 icons)
<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	No
<b>Java™</b> Support for J2ME™ technology	Yes	No	Yes
<b>Keys - navigation and more</b>	4+1 way navigation key with preset shortcuts 2 selection keys Shortcut key C key Call key End/on/off key	4 way navigation with preset shortcuts 2 selection keys Call key End/on/off key	4 way navigation with preset shortcuts 2 selection keys Call key End/on/off key
<b>Keys - keypad</b>	12 alphanumeric	12 alphanumeric	12 alphanumeric
<b>Keys - side and other</b>	No	No	No
<b>Keypad lock</b> Lock the phone keys to prevent activation of a function in the phone	Yes	Yes	Yes

<b>Feature</b>	<b>T303</b>	<b>T250</b>	<b>T280</b>
<p><b>Lunar calendar</b></p> <p>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</p>	Yes	Yes	Yes
<p><b>Memory (built-in)</b></p> <p>Phone memory that is free for the user to use for pictures, sounds and more</p>	Up to 8.0 MB	Up to 3.0 MB	Up to 10 MB
<p><b>Menu shortcuts</b></p> <p>Dedicated shortcuts to frequently used phone functions</p>	Yes (fixed shortcuts)	Yes (fixed shortcuts)	Yes (fixed shortcuts)
<p><b>MMS (Multimedia Messaging Service)</b></p> <p>Picture messaging with text and sound</p>	Yes	Yes	Yes, MMS1.2 features except for vCalendar
<p><b>Music player</b></p> <p>A digital music player. The user can play music files, and to organize tracks into groups and create simple playlists. A practical play/stop function makes it easy to listen to music</p>	Yes	No	No
<p><b>Networks</b></p>	GSM (R99) Triband: <ul style="list-style-type: none"> <li>• 900/1800/ 1900</li> <li>• 850/1800/ 1900</li> </ul>	GSM (R97) Dualband: <ul style="list-style-type: none"> <li>• 900/1800</li> <li>• 850/1900</li> </ul>	GSM (R97) Dualband: <ul style="list-style-type: none"> <li>• 900/1800</li> <li>• 850/1900</li> </ul>
<p><b>OTA settings</b></p> <p>WAP and other settings can be sent over-the-air to the phone</p>	Yes	Yes	Yes
<p><b>Picture gallery</b></p> <p>A thumbnail image gallery</p>	Yes	No	No
<p><b>Picture phonebook</b></p> <p>Add a picture to a saved contact. The picture appears on the screen when the saved contact calls</p>	Yes	No	No
<p><b>Picture wallpaper</b></p> <p>Background picture seen on the screen when the phone is in standby mode</p>	Yes	Yes	Yes

<b>Feature</b>	<b>T303</b>	<b>T250</b>	<b>T280</b>
<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	Yes	No	No
<b>Screen</b>  Type: Size: Resolution: Technology: Colours displayed together: Backlight colour:	Full graphical 1.8 inches 128x160 pixels TFT 65,000 (16 bit) Blue	Full graphical 1.7 inches 128x160 pixels TFT 65,000 (16 bit) Blue	Full graphical 1.7 inches 128x160 pixels TFT 65,000 (16 bit) Blue
<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	Yes	No	No
<b>SIM card lock</b>  Protect the 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 Update Service</b>  Download the latest operator approved version of the mobile phone software via a computer	Yes	No	No
<b>Sound recorder</b>  A mini recording device in your phone that lets you record voice messages or other sounds	Yes	No	No

<b>Feature</b>	<b>T303</b>	<b>T250</b>	<b>T280</b>
<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 400 hours	Up to 300 hours	Up to 300 hours
<b>Status view</b>  Shows the network being used, time and other status information	Yes	Yes	Yes
<b>Stopwatch</b>	Yes	Yes	Yes
<b>Talk time</b>	Up to 9 hours	Up to 7 hours	Up to 7 hours
<b>Tasks</b>  Keep track of important things to do	Yes	No	No
<b>Themes display</b>  Phone menu texts and background graphics	Yes	Yes	Yes
<b>Timer</b>  Set your phone to alert after a specific time lapse	Yes	Yes	Yes
<b>TrackID™</b>  A service for music recognition	Yes	No	No
<b>USB connectivity support</b>  Connect the phone to a computer using a USB cable	No (but support for USB charging and USB mass storage)	No	No
<b>Vibrating alert</b>  The phone vibrates when a call comes in or when an alarm goes off	Yes	Yes	Yes
<b>Voicemail</b>  Support for voicemail operator service including automatic answering and message recording	Yes	Yes	Yes



<b>Feature</b>	<b>T303</b>	<b>T250</b>	<b>T280</b>
<b>WAP</b> A mobile Internet standard enabling you to access specially designed Internet sites	Yes, 2.0	Yes, 1.2.1	Yes, 2.0
<b>WAP 2.0 XHTML™</b> A mobile Internet standard enabling you to access specially designed Internet sites. WAP 2.0 supports colour and interactive lists	Yes, XHTML Mobile profile 1.0	No	Yes, XHTML Mobile profile 1.0
<b>Weight</b> With battery:	93 g	82 g	82 g

# Facts and figures

---

This chapter gives 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/GPRS, Tri-band 900/1800/1900 and 850/1800/1900 MHz
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 8 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:1850–910 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	+/- 0.1 ppm	+/- 0.1 ppm	+/- 0.1 ppm	+/- 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)	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
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 10
Mode support mode	UI-mode supported SAT initiated USSD supported
UI-mode details	Ability 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 10 supported (4+2). CS-1, CS-2, CS-3, CS-4 9.05 Kbps, 13.4 Kbps, 15.6 Kbps, 21.4 Kbps 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	No
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
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

<b>Dimension</b>	<b>Support</b>
Support of the QoS modification procedure	Yes, when initiated by the network (not by the mobile phone)
Downlink data rate	Up to 85.6 Kbps for packet data communication, using 4 time slots in coding scheme CS-4
Uplink data rate	Up to 21.4 Kbps for packet data communication, using 1 time slots in coding scheme CS-4
Mode of operation	Class B and Class C modes 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 and GPRS-SMS)
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	No Yes
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

Service	Mode	Support
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: number 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
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	No
	'05' = Timing advanced	No

Service	Mode	Support
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	No
	'03' = SIM Initialization	Yes
	'04' = SIM Reset	Yes
SELECT ITEM		Yes
SEND DTMF		Yes
SEND SHORT MESSAGE	bit 1: 0 = packing not required	No
	1 = SMS packing by the ME required	No
SEND SS		Yes
SEND USSD		Yes
SET UP CALL	General: capability configuration	Yes
	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
SET UP EVENT LIST	'05' = set up call, disconnecting all other calls (if any), with redial	No
	'00' = MT call	Yes
	'01' = Call connected	Yes
	'02' = Call disconnected	Yes
	'03' = Location status	Yes
	'04' = User activity	Yes

Service	Mode	Support
	'05' = Idle screen available	Yes
	'06' = Card reader status	N/A
	'07' = Language selection	Yes
	'08' = Browser termination	Yes
	'09' = Data available	Yes
	'OA' = Channel status	Yes
SET UP IDLE MODE		Yes, 1 row of text is supported
SET UP MENU		Yes
TIMER MANAGEMENT		No
OPEN CHANNEL		No
CLOSE CHANNEL		No
RECEIVE DATA		No
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 reached. 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.

## Music player

File types	Formats	Extensions
Ringtones	MP3 MIDI SP-MIDI AMR-WB AMR-NB SMAF MXMF I-melody	.mp3 .mid .amr, .3gp .amr, .3gp
Music files	MP3 MXMF AMR MIDI	.mp3 .amr .mid

Feature	Support
Automatic pause on telephone call	Yes
Playlists	Yes
Play modes	Shuffle, Loop
Equalizer	No
Minimizing the music player	Yes

## Radio with RDS

Feature	Options
Output	Portable handsfree Internal loudspeaker External loudspeakers
Save channels	Yes, 20 presets (9 direct keys)
Antenna	Stereo portable handsfree
Radio recording	Normal quality High quality

## 1.3 MP camera

Facts and figures	
Picture sizes (resolution)	1.3 MP (1280x1024)
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
GIF	87a/89a	128x160 pixels	256 bit	GIF
JPEG	ISO/IEC JPEG Baseline DCT Progressive DCT Non-differential Huffman coding Symbol 'SOF2'	1.3 M - 1280x1024		JFIF v1.02
BMP	The bitmap image format used by Windows®	XRAM dependent, default is VGA	24 bit	
WBMP				

## Image encoders

Encoder	Details	Size	Colour depth	File format
GIF	89a			
JPEG	ISO/IEC JPEG Baseline DCT Non-differential Huffman coding Symbol 'SOF0'	VGA		JFIF v1.01
BMP	The bitmap image format used by Windows®	XRAM dependent, default is VGA	24 bit	
WBMP				

## Short Messaging Service

Feature	Support
SMS service centre number	The SMS centre number can be preloaded
Pictures	A picture or an icon can be inserted into the text message. EMS compliant mobile phones will be able to see the picture correctly
Input methods	Zi predictive text input and multitap
Reply to messages	Received messages can be replied to by SMS, MMS or phone call
<b>Message creation methods support</b>	Zi predictive writing and multitap
Copy and paste words	Yes
Teaching of predictive words that are not in the predictive dictionary	Yes
<b>Options when creating a message</b>	
Save a sent message in a Sent messages folder	Yes
Insert a line in the message	Yes
Assign a validity period to the message	Yes
Use pre-defined messages	Yes
<b>Options when receiving a message</b>	
Reply to the sender	Yes
Forward the message	Yes
Save the message on the SIM card	Yes
Get delivery time and date	Yes

<b>Feature</b>	<b>Support</b>
<b>Options of the previously sent message</b>	
Delivery report of the message	Yes
Forward the message	Yes
Save the message on the SIM card	Yes
Know the remaining capacity storage	No, but notification when 95% full
<b>Options of the previously received message</b>	
Reply to the sender	Yes
Save the message on the SIM card	Yes
Forward the message	Yes
Know the remaining capacity storage	No, but notification when 95% full
<b>Supported ways of replying to a received text message</b>	
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
Option to send a text message to a list of recipients	Yes
Option to write an email address as a recipient address	No
SMS storage	On the SIM card and in the phone
SMS storage capacity in phone memory	250 SMS in phone memory
Nokia Picture Messaging	Yes

## Enhanced Messaging Service

Feature	Support
Number of messages that the mobile phone is able to handle to generate a concatenated message	6
Capacity storage	500 contacts, 250 SMS* and the space left on the SIM card *1 EMS can contain up to 6 SMS
Outgoing messages	See how many short messages an EMS message consists of before sending. Choose whether to send the message or not after writing
Incoming messages	A signal is heard once all parts of the message have been received or when a timeout occurs. Option 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
Concatenated messages	A receipt is received in the mobile phone when all parts of a concatenated message have been delivered
Insert objects	Options 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	Receive (always) and send melodies via EMS, if the melodies are not protected by ODI. Download melodies and commercial tunes from WAP portals. Create melodies on WAP portals
WBMP	Yes
Picture sizes	16x16 pixels, 32x32 pixels, variable size in black and white
Pictures	Send and receive pictures via EMS, if the pictures are not protected by ODI. Create pictures on WAP portals. Download pictures from WAP portals. Receive pictures in enhanced messages originated by service providers
Animations	The mobile phone supports the following animations: Angry, Confused, Crying, Devil, Flirty, Glasses, Happy, Indifferent, Kiss, Laughter, Love, Sad, Sceptical, Tongue, Wink and Wow, as defined in 3GPP™ TS 23.040 v4.4.0 Options to send and receive colour animations
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
Option to pre-configure the MMS parameters in factory	MMS/GPRS: Yes
Option to configure the MMS parameters by OTA provisioning	MMS/GPRS: Yes
Option for all the parameters from the parameters set to be OTA provisioned at the same time	MMS/GPRS: Yes
Option 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	Email recipient address Message Cc recipient(s) address(es) MSISDN recipient address
The user can insert multimedia elements into multimedia messages from	Browser File manager Camera Contacts Calendar Sound recorder
Option for sent messages to be memorized into a folder in the phone memory	Yes
MMS storage capacity in phone memory	Up to 50 MMS
Actions that the user can perform after message notification	Always download Roaming Always ask
Actions that the user can perform after message retrieval	Reply to the sender of the message (MMS) Forward the message (SMS/MMS) Delete the message Call the sender of a message View details Save items

<b>Feature</b>	<b>Support</b>
Multimedia codecs/formats supported for audio	SP-Midi, G-Midi, SMF0, SMF1, AMR, MP3, iMelody
Multimedia codecs/formats supported for image	JPEG, GIF87, GIF89A, WBMP, BMP
Formats for message presentation	Message body + attachments SMIL version as described in OMA MMS IOP document version 1.0
Maximum message size that can be handled by the phone for a message	Maximum size can be customized
MMS User Agent will report problems to the user in case of:	Message not sent causes no user subscription to service, if included in ResponseText Message not sent causes required functionality not supported by MMS Relay/Server, if included in ResponseText Message not sent causes insufficient credit (in case of prepaid charging), if included in ResponseText

## Bluetooth™ technical data

<b>Dimension</b>	<b>Support</b>
Bluetooth capability statement	Bluetooth Specification, version 2.0
Bluetooth profiles	Generic Access Generic Object Exchange Handsfree Headset Object Push
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	Class 2, typical +4 dBm or 2.5 mW
Frequency band	2.4 GHz – the unlicensed ISM band
Power consumption	Standby, Bluetooth On mode: <0.6 mA (GSM host processor excluded)
Data transmission rate	Up to 600 Kbps asymmetric and up to 350 Kbps symmetric from an application level

# Java™

Feature	Functionalities
Java™ Platform, Micro Edition	CLDC 1.1 (JSR 139) MIDP 2.0 (JSR 118) Wireless Messaging API (JSR 120) Java™ Technology for the Wireless Industry (JSR 185) File system packet API of the PDA Optional Packages for J2ME™ Platform (JSR 75-FC) Mobile Media API (JSR 135 - Audio playback and snapshot only)

## Web browser data

Feature	Support in the browser
Back to previous page	Yes
Bearer type GPRS (IP)	Yes
Bookmarks	Yes, up to 20 named bookmarks for easy access to frequently visited pages, with folders supported
Bookmark Export/Import	Yes, can be sent and received using SMS
Cache	Yes (size 100 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 1.3
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



Feature	Support in the browser
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 1.2.1/WML 1.3
Internet profiles	Up to 10 Internet profiles, each with its own settings

## Operator technical data

Feature	Support for WAP	
<b>WAP browser</b>		
Version	2 baseline	
<b>Security mechanism</b>		
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>
<b>Interface</b>		
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
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>Feature</b>	<b>Support for WAP</b>
<b>Applicative provisioning</b>	
Preferred bearer customization	No
Email customization	No
Other applications/features	Yes (MMS)
<b>Technologies</b>	
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
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>Feature</b>	<b>Support for WAP</b>
<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 available fo download
<b>GRAPHICAL USER INTERFACE</b>	
<b>Man Machine Interface</b>	
Selection keys	Yes
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>	

<b>Feature</b>	<b>Support for WAP</b>
Pop-up menus	Yes, in XHTML
Radio buttons	Yes, in XHTML
Check boxes	Yes, in XHTML
Buttons	Available as XHTML form controls

# 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.

## **CSS**

Cascading Style Sheets

## **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. Controls 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.

## **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

**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.

**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

---

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

## Links

---

- [www.sonyericsson.com](http://www.sonyericsson.com)
- [www.sonyericsson.com/support](http://www.sonyericsson.com/support)
- [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/xhtml-basic](http://www.w3.org/TR/xhtml-basic)
- [www.cognimatics.com](http://www.cognimatics.com)

## Trademarks and acknowledgements

---

XHTML™ is a trademark or registered trademark of the W3C.

Microsoft®, Windows® is either a registered trademark or a trademark of Microsoft Corporation in the United States and/or other countries.

The Predictive Text Technology is used under license from Zi Corporation.

The Bluetooth™ word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Sony Ericsson is under licence.

The Liquid Identity logo and TrackID are trademarks or registered trademarks of Sony Ericsson Mobile Communications AB.

TrackID™ is powered by Gracenote Mobile MusicID™. Gracenote and Gracenote Mobile MusicID are trademarks of Gracenote, Inc.

WALKMAN, Memory Stick Micro, and Sony are trademarks or registered trademarks of Sony Corporation.



Ericsson is a trademark or registered trademark of Telefonaktiebolaget LM Ericsson.

3GPP™ is a trademark of ETSI in France and other jurisdictions.

Java and all Java based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries.

End-user license agreement for Sun Java. J2ME.:

1. Restrictions: Software is confidential copyrighted information of Sun and title to all copies is retained by Sun and/or its licensors. Customer shall not modify, decompile, disassemble, decrypt, extract, or otherwise reverse engineer Software. Software may not be leased, assigned, or sub licensed, in whole or in part.

2. Export Regulations: Software including technical data, is subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Customer agrees to comply strictly with all such regulations and acknowledges that it has the responsibility to obtain licenses to export, re-export, or import Software.

Software may not be downloaded, or otherwise exported or re-exported (i) into, or to a national or resident of, Cuba, Iraq, Iran, North Korea, Libya, Sudan, Syria (as such listing may be revised from time to time) or any country to which the U.S. has embargoed goods; or (ii) to anyone on the U.S. Treasury Department's list of Specially Designated Nations or the U.S. Commerce Department's Table of Denial Orders.

3. Restricted Rights: Use, duplication or disclosure by the United States government is subject to the restrictions as set forth in the Rights in Technical Data and Computer Software Clauses in DFARS 252.227-7013(c) (1) and FAR 52.227-19(c) (2) as applicable.

All other trademarks and copyrights are the property of their respective owners.