

# Nokia Customer Care

## 1 - General Information

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## RA-2/3 Product Selection

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This service manual documents features, functioning and repair of two products, RA-2 and RA-3, which are variants of the same product.

RA-2 is a traditional triple band GSM phone (900, 1800, 1900 MHz), and RA-3 uses the same bands except the lowest band is 850MHz. RA-2/3 automatically switches between bands. It also supports high-speed, flexible data connections with EGPRS (EDGE) and Wireless LAN.

RA-2/3 features also Bluetooth, infrared and USB connectivity.

**Figure 1:View of Nokia 9500**



### ■ RA-2/3 features

#### **Hardware characteristics**

- Speech codecs: HR, FR, EFR, AMR
- *Displays:* Cover: up to 65k color (active matrix) (128 x 128), active area: 27.3 x 27.3 mm, PDA: up to 65 k color (transflective) (640 x 200), active area: 110 x 34.5 mm

- Clamshell with user changeable A-cover, x-press on™
- Full QWERTY with 8 (1 user configurable) app. shortcut keys
- Small SIM supporting 1.8 & 3.0 V
- Multimedia memory card with “hot swap”
- Integrated hands free speaker (16 mm)
- Integrated VGA camera
- Ringing tunes: MIDI, WAV, AAC/MP3, AMR (ringing volume: 105 dB from 5cm distance)
- Audio formats: MP3, MPEG-4 (AAC), Real Audio, MIDI
- Video formats: H.263, MPEG-4, Real Video
- Pop-Port™, USB2.0 slave, full speed up to 12Mbit/s

**UI features**

- Desk structure, grouping in desk main level
- MMS, SyncML device management, presentation editor
- OMA provisioning
- VGA camera (viewfinder in cover, framerate 15 fps)
- Simultaneous CS voice and wireless LAN browsing
- User configurable application key
- Opera 6.x browser with smart rendering (HTML 4.01 / XHTML)

**Supported bearers**

- CSD, HSCSD, GPRS multislots class 10, class B, EGPRS class 10
- WLAN 802.11b (Wi-Fi, 2.4 GHz, 11Mbit/s)
- Bluetooth, InfraRed (115 kbps)

**Messaging**

- E-mail (IMAP4, POP3, SMTP, SyncML)
- “Always-on” e-mail/ push experience
- SMS, Fax, MMS

**Browsing**

- HTML/XHTML (Opera 6.x)
- HTML 4.01
- JavaScript 1.3

**Office**

- Documents, sheet, presentation (editor also)

***PIM & Sync***

- Calendar, contacts, to-do
- SyncML 1.1.1, local sync (PC Suite)

***Device Management***

- SyncML Device Management
- OMA client provisioning, Smart messaging
- Admin module (PC SUITE)

***Security***

- SSL 3.0 /TLS 1.0
- Remote locking (via SMS)
- Nokia VPN client (on product CD)
- IPv6/IPv4, IPSec
- MMC Lock
- OMA DRM forward lock
- WLAN security (e.g. WPA 1.0 and Cisco CCX)

***PC connectivity (MS and Lotus Notes compatibility)***

- Backup / restore, file transfer
- Synchronization (SyncML)
- Admin module
- IP Passthrough

***Java***

- MIDP 2.0
- Personal profile Java as separate SIS packet (on product CD)

***Other/Entertainment/etc.***

- Some additional sw by 3<sup>rd</sup> parties to inbox (e.g. games...)
- End-to-end Alliance Solutions
- *IBM*: Websphere Everyplace Access (WEA) client, Sametime client, Sync email & PIM, device management (IBM Tivoli)
- *Oracle*: Collaboration Suite (OCS), Solution for mobile email, calendar, directory service, contacts

***Additional 3<sup>rd</sup> party solutions/applications possible***

- Messaging: BlackBerry, NokiaOne, NMAG, etc.
- PIM&Sync: BlackBerry, NokiaOne, NMAG, etc.

- Database: Citrix ICA client, IBM DB2, Oracle 9iLite
- Office: zip manager, pdf-reader
- Security: Antivirus, FileCrypto
- Device Management:CA Unicenter
- Games (Symbian and Java)
- Dictionaries, calculators
- Multimedia players (MP3 player etc.)
- Planning applications, Maps, Route planning...

**Digital services**

- OTA settings (WDS in Europe)
- Wallpapers, logos, ringing tunes

**■ Product and module list**

Description	RA-2 product code	RA-3 product code
Basic 9500 sales package	0630742	0630744
System module	0202266	0202366



## Technical Specifications

### ■ General specifications

Unit	Dimensions (mm) (L x W x T)	Weight (g)	Volume (cm <sup>3</sup> )
Transceiver with PB-5L 1300mAh Li-Po battery pack	148 x 56 x 24	222 (with PB-5L battery)	178

### ■ Main RF characteristics

**RA-2 (EU variant GSM900/1800/1900) & RA-3 (US variant GSM850/1800/1900)**

Parameter	Unit
Cellular system	GSM850/900, GSM1800, GSM1900
Modulation schemes	GMSK, 8-PSK
RX frequency band	GSM850: 824 ... 849 MHz GSM900: 925 ... 960 MHz GSM1800: 1805... 1880 MHz GSM1900: 1930 ... 1990 MHz
TX frequency band	GSM850: 869 ... 894 MHz GSM900: 880 ... 915 MHz GSM1800: 1710... 1785 MHz GSM1900: 1850 ... 1910 MHz
Output power GMSK	GSM850: +5 ... +33 dBm (3.2 mW ... 2 W) GSM900: +5 ... +33 dBm (3.2 mW ... 2 W) GSM1800: +0 ... +30 dBm (1.0 mW ... 1 W) GSM1900: +0 ... +30 dBm (1.0 mW ... 1 W)
Output power 8-PSK	GSM850: +5 ... 27 dBm (3.2 mW ... 0.5 W) GSM900: +5 ... 27 dBm (3.2 mW ... 0.5 W) GSM1800: +0 ... 26 dBm (1.0 mW ... 0.4 W) GSM1900: +0 ... 26 dBm (1.0 mW ... 0.4 W)
Duplex spacing	GSM850: 45 MHz GSM 900: 45 MHz GSM 1800: 95 MHz GSM 1900: 80 MHz
Number of RF channels	GSM 850: 124 GSM 900: 174 GSM 1800: 374 GSM1900: 299
Channel spacing	200 kHz (each band)

Parameter	Unit
Number of TX power levels GMSK	EGSM: 15 GSM 900: 15 GSM 1800: 16 GSM 1900: 16
Number of TX power levels 8-PSK	GSM 850: 12 GSM 900: 12 GSM 1800: 14 GSM 1900: 14
Sensitivity, static channel (+25°C)	EGSM: -102 dBm GSM 900: -102 dBm GSM 1800: -102 dBm GSM 1900: -102 dBm
Frequency error, static channel	< 0.1 ppm
RMS phase error	< 5.0 °
Peak phase error	< 20.0 °

## Mobile Enhancements

**Table 1: Battery**

Battery	Type	Product code
Li-Po (1300mAh)	BP-5L	0670390

**Table 2: Chargers**

Chargers	Type	Product code
Switcher charger (Europe)	ACP-12E	0675294
Switcher charger (US)	ACP-12U	0675303
Mobile charger (cigarette lighter charger)	LCH-12	0675328
AC fast charger (Europe)	ACP-9E	0675149
Travel charger (Europe)	ACP-8E	0675195
Charger	ACP-7E	0675144
Charger	ACP-7X	0675145
Mobile charger	LCH-9	0675120
Retractable charger	AC-1E	0675349

**Table 3: Audio accessories**

Audio accessories	Type	Product code
Mono headset, Boom Headset	HDB-4	0694094
Stereo headset	HDS-3	0694093
Fashion stereo headset	HS-3	0694156
Retractable headset	HS-10	0694126
Standard headset	HS-5	0694121
Wireless Headset	HDW-2	0694113
Wireless Clip-on Headset	HS-3W	0694135
Wireless Headset	HS-4W	0694159
Loopset	LPS-4	0630443
FM Radio Headset (Pop-port)	HS-2R	0694129
TTY adapter	HDA-10	0694115

**Table 4: Connectivity accessories**

Connectivity accessories	Type	Product code
Desk stand with sync.	DT-4	0675362
Memory Card	DTS-64	0273026
Memory Card	DTS-128	0274289
Connectivity cable	DKU-2	0730238

**Table 5: Car kits**

Car kits	Type	Product code
Basic Car Holder	CR-6	0650062
Antenna Coupler	AD-13	0263401
Full Car Kit	CARK-126	0085197
Wireless Carkit	CARK-112	0085192
Wireless Car Kit	CK-1W	0080774
Headrest handsfree	BHF-1	0694102
BHF Headrest handsfree	BHF-3	0694158

**Table 6: Other accessories**

Other accessories	Type	Product code
Observation camera	PT-2	0630608
Digital Pen	SU-1B	0710000
Image viewer	SU-2	0263167
Image frame, operates via IR	SU-4	0710001
Image Frame with GSM module	SU-7	0710002
Medallion, operates vi IR	RX-3	0772045
Medallion 2, operates via IR	RX-4	0710144
Kaleidoscope	RX-11	0710145