DIGITAL CELLULAR TELEPHONE SCH-A850

User's Manual

SAMSUNG ELECTRONICS

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Please read this manual before operating your phone, and keep it for future reference .

Safety Quick Guide

Read these guidelines before using your wireless phone. Failure to comply with these guidelines may be dangerous or illegal. For more detailed safety information, see “Health and Safety Information” on page 89.

Road safety comes first
Do not use a hand-held phone while driving; park the vehicle first.

Switch off when refuelling
Do not use the phone at a refuelling point (service station) or near fuels or chemicals.

Switch off on aircraft
Wireless phones can cause interference. Using them on aircraft is both illegal and dangerous.

Switch off in hospital
Switch off your phone near medical equipment. Follow any regulations or rules in force.

Interference
All wireless phones may get interference which could affect performance.

Respect special regulations
Follow any special regulations in force in any area and always switch off your phone whenever it is forbidden to use it, or when it may cause interference or danger (in a hospital for example).

Radio frequency exposure information
In August 1996, the Federal Communications Commisision (FCC) of the U.S. adopted an updated safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated transmitters. The design of this phone complies with the FCC guidelines and those standards.

To maintain compliance with FCC RF exposure guidelines, if you wear a handset on your body, use the Samsung-supplied or approved carrying case, holster, or other body-worn accessory.

If you do not use a body-worn accessory, ensure the antenna is at least one inch (2.5cm) from your body when transmitting. Use of non-approved accessories may violate FCC RF exposure guidelines.

Use sensibly
Use only in the normal position (to ear). Avoid unnessary contact with the antenna when the phone is switched on.

Accessories and batteries
Use only SAMSUNG-approved accessories and batteries.

Use qualified service
Only qualified service personnel may install or repair your phone.

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Your Phone

Key Descriptions

Key	Functions
MENU	: Enters the menu facility. Also, scrolls through the menu options.
OK	: *In the menu facility,* selects a menu function or stores information that you have entered (such as a name) in the phone memory. *In Standby mode*, enters the Mail Kit Menu.
Navigation	: *In the menu facility*, scroll through the menu tions and phonebook memory. up: searches phonebook by name. down: enters Memo Pad. left: enters Scheduler. right: enters Voice Memo.
SEND	Makes or answers a call. *In Standby mode*, redials the last outgoing number when pressed twice.
CLR	: Deletes characters from the display. *In the menu facility*, returns to the previous menu level.
END/⏻	Ends a call. Also switches the phone on and off when pressed and held. *In the menu facility*, returns to Standby mode and cancels your input.
Volume	: *During a call*, adjusts the voice volume. *In Standby mode with the phone open*, adjusts the ringer volume. *In the menu facility*, scrolls through the menu options.

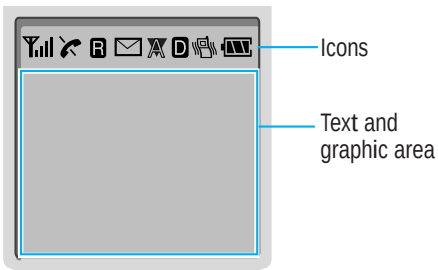
Key Descriptions (continue...)

Key	Functions
*	: When held down to access the voice dial function in idle mode.
#	: *When held down to toggle between the silent mode on and off*

Display

Layout

The display comprises two areas; an upper line of fixed icons, and the lower text and graphic area. The following icons display at power-on:



Icons

Signal strength : Shows the received signal strength. The greater the number of bars, the better the signal strength.

Service: Appears when a call is in progress.

No service indicator: Appears when you are outside a service area. When it appears, you cannot make or receive calls. Wait a little while for a signal or move into an open area.

Roaming: Appears When you are out of your home area and have registered with a different network (when travelling in other countries, for example).

New Message: Appears when a new text message has been received.

Analog mode: Indicates the analog mode.

Digital mode: Indicates the digital mode.

Vibrator on: Appears when a vibrate mode is on. An incoming call will vibrate the phone rather than ring it.

Battery strength: Shows the level of your battery. The more bars you see, the more power you have left.

Backlight

The display is illuminated by a backlight. When you press any key, the backlight illuminates. It turns off if no key is pressed within a given period of time.

Service Light

The service light is at the top right of the phone. It flashes to indicate incoming call or message. Also, the service light flashes for a few seconds when you turn on the phone.

Unpacking

- **Handset**
- **Battery**
- **Travel Adapter**
- **QRG**
- **User Manual**
- **CD**

Getting Started

Charging a Battery

Your phone is powered by a rechargeable Li-ion battery. A travel adapter is provided with your phone. Use only approved batteries and chargers. Ask your local SAMSUNG dealer for further details.

The phone can be used while the battery is charging.

Note: You must fully charge the battery before using your phone for the first time.

1. Connect the lead from the travel adapter to the bottom of the phone. Check that the arrow on the lead connector is facing towards the front of the phone.

2. Connect the adapter to a standard AC wall outlet.

The LEDs on the front of the charger indicate the following:

Red indicates that the battery is charging.

Green indicates that the battery is fully charged.

Yellow indicates that the battery is operating at a temperature that is too high or too low, or that something is not plugged in correctly. Check the charger and battery for proper connections.

3. When charging is finished, disconnect the adapter from the power outlet.

   Disconnect the adapter from the phone by pressing the grey tabs on either side of the connector and pulling the connector out.

Low Battery Indicator

You can easily tell if your battery needs to be recharged by checking the battery strength indicator in the upper-right corner of your phone's display. The presence of all three bars indicates a full charge, two bars indicates a smaller charge, and one bar indicates an even smaller charge. No bars (the battery icon is empty) means your battery must be charged.
When the battery charge level gets low, the battery sensor blinks an empty battery icon ( ), sounds a tone. If the battery level gets too low, the phone will turn off automatically. Unfortunately, if this happens you'll lose whatever you are doing, including dropping your call. Watch the battery strength icon and make sure your battery is adequately charged.

Switching the Phone On / Off

1. Open the phone.

2. Hold down the SEND key for more than one second to switch the phone on.

   The service light on the right of the phone flashes, and an alert sounds. When the system locates services, the greeting message displays along with the date and time.

   If the phone is out of service, the icon appears in the display. In this case, you cannot place and receive calls. You can try again later when service is available.

3. When you wish to switch the phone off, hold down the END/⏻ key for more than two seconds.

Call Functions

Making a Call

In Standby mode, key in the area code and phone number and press the SEND key.

Correcting the Number

To clear ...	Then ....
The last digit displayed	Press the **CLR** key.
The whole display	Hold down the**CLR** key for more than one second.

Ending a Call

When you have finished your call, briefly press END/⏻ or close the phone.

If you press END/⏻, the call time (length of the call) displays briefly and the phone returns to Standby mode.

Redialing the Last Call

To redial the last call you made, press SEND twice quickly.

Your phone stores the last 10 incoming or outgoing calls. To recall any of these numbers, proceed as follows.

1. If there are any characters on the display, clear the display by holding down **CLR** for more than one second.
2. Press SEND. The list of outgoing calls are displayed.
3. Use the navigation key to scroll through the list until you select the required name or number.
4. Press SEND to dial the number displayed.

Speed Dialing

Once you have stored phone numbers in the phone book memory, you can dial them easily whenever you want.

You can dial the stored phone number automatically without pressing the SEND key. See below.

One-Touch Dial

Memory locations 01 through 09 are special one-touch locations. You can dial the phone numbers stored in the Phone Book memory from 01 through 09 simply by pressing one button.

Press and hold the third digit of the memory location containing the number to be dialed.

For example: Location no. 009
Press and hold **9**.

The number (and name) stored is displayed, then dialed.

Two-Touch Dial

Memory locations 10 through 99 are special two-touch locations.

Press the second digit briefly, then hold down the third digit of the memory cell.

For example: Location no. 023
Press 2 briefly and hold down 3.

The number (and name) stored is displayed, then dialed.

Three-Touch Dial

Memory locations 100 through 169 are special three-touch locations.

Press the first and the second digit briefly, then hold down the third digit of the memory cell.

For example: Location no. 123
Press 1 and 2 briefly, then hold down 3.

The number (and name) stored is displayed, then dialed.

Pause Dialing

When you call automated system, like banking services, you are often required to enter a password or account number. Instead of manually entering the numbers each time, you can store the numbers in your Phone Book, separated by special characters called pauses.

Your phone has two pause dialing methods:
- Pause dialing from the Phone Book
- Manual pause dialing

Storing Pauses in a Phone Book Entry

To store a number in your Phone Book that contains pauses:

1. Enter the phone number you want to store (such as the bank's tele-service phone number).

2. Press the **MENU** key.

   The letter "p" displays in the number, meaning that a hard pause will occur at that point in the dialing sequence.

   Note: The digits before the "p" dial the tele-service. The "p" stops the dialing and waits for the tele-service to prompt you for a number. The number following the "p" is your account number, PIN, etc.

3. Enter the digits that need to follow the pause (such as your account number).

4. Store the number in your Phone Book as you normally would by pressing the **OK** key and following the screen prompts.

Pause Dialing from a Stored Phone Book Entry

1. Dial the number from the Phone Book.

2. Wait for the appropriate prompt for the number (credit card number, bank account number, etc.).

3. When prompted, press the SEND key to send the DTMF number that follows your hard pause.

   "SENDING DTMF" flashed on the display and the transmitted tone sounds.

Manual Pause Dialing

You can enter pauses manually during the dialing process.

1. Enter the phone number of the service you want to connect to (such as a bank's tele-service phone number).

2. Press the **MENU** key to insert a pause.

   The phone displays a "p" meaning a pause. Enter the number to be sent after the pause and then press the SEND key.

3. After connecting, press the SEND key again to transmit the additional number at the prompt from the tele-service.

Answering a Call

When somebody calls you, the phone rings and the phone icon is displayed in the middle of the external display.

If the caller can be identified, the caller's phone number (or name if pre-stored in your Phone Book) is displayed. If the caller cannot be identified, only the phone icon appears.

1. To answer a call, open the phone. If the phone is already open, press the SEND key.
2. End the call by closing the phone or pressing the END/⏻ key.

   Note: You can answer a call while using the phone book or menu features. The current operation will be interrupted.

In-Use Options

Your phone provides a number of functions that you can use during a call. You may not utilize all of these functions at all times. Many of the in-call options are network services.

Press the **MENU** key during a call to access the following in-call options:

Mute/Quit: allows you to switch your phone's microphone off, so that the other party cannot hear you.

Example: You wish to say something to another person in the room but do not want the other party to hear you.

Calls: allows you to access the **Calls** menu.

Phone Book: allows you to access the **Phone Book** menu.

Silent /Quit: does not transmit the key tones. It allows you to press keys without hearing annoying key tones during a call.

Note: To communicate with answering machines or computerized telephony systems, the **Silent keys** option must be disabled.

Send Tel #: sends DTMF tones of your number.

My Phone #: shows your phone number.

Version: allows you to view the software and hardware version of your phone.

Send DTMF: sends DTMF tones of the currently displayed number. DTMF (Dual Tone Multi Frequency) tones can be used to control electronic phone services such as bank-by-phone or voicemail. During a call, key in the digits you want to send as DTMF tones, for example, the bank account number and password. Then select this in-call option.

Using Caller ID

This feature tells you who is calling you by displaying the caller's number when the phone rings. If a caller's name and number are stored in your Phone Book, the corresponding name is also displayed. If you call someone who has this feature, your phone number will be displayed on the their phone.

Note: Contact your service provider to setup the Caller ID service.

Viewing Missed Calls

Your phone keeps a list of calls that you do not answer when the phone is on and service is available. The phone indicates a missed call by displaying a text notification on the screen. Additionally, if caller information is available, the screen displays the phone number of the most recent missed call.

Press SEND to call the displayed number, or the **OK** key to save the number in Phone Book.

Dropped Calls

A dropped call can occur during a conversation in response to a signal fade or leaving a service area. In this case, the call ends and "Call Dropped" displays.

Failed Calls

A failed call can occur if your phone is out of calling range or the network is temporarily busy. Your phone responds to a failed call by displaying an appropriate message: "Call Failed Out of Range" or "Call Failed Network Busy."

Three-Way Calling

This feature enables you to conduct conference calls with two separate parties at the same time. The phone records each party into the Outgoing Calls Log. Also, You are billed airtime for each outgoing call separately.

Note: Contact your service provider to activate Three-Way Calling.

To place a Three-Way call:

1. During a conversation, press SEND . The phone places the other party on hold.

2. Enter the phone number for the third party, and then press SEND . The phone dials the third party.

3. When you are connected to the third party, press SEND again to begin your three-way call.

If one of the callers (not you) hangs up, you and remaining caller stay connected. If you initiated the call and you hang up first, all three parties are disconnected.

Call Waiting

Call Waiting lets you receive a second call during conversation. Your phone notifies you of a call waiting by beeping an displaying “Call Waiting.”

Your phone provides the option of turning the Call Waiting feature on and off (if you have subscribed to the service). Call Waiting is on by default in the phone. If you choose to have a undisturbed conversation, simply turn off the feature for the current call.

Note: Contact your service provider to activate the Call Waiting service.

To answer a waiting call:

1. To answer the call, press SEND . The phone connects the calling party, and places the current party on hold.

2. Press SEND again to switch between two parties.

Note: If you do not respond to a Call Waiting notification, the phone will forward the call to voicemail or another number that you have set up. Contact your service provider for more information.

Call Forwarding

This feature provides the option of forwarding incoming calls to another phone number, even while your phone is off. Activating Call Forwarding does not affect outgoing calls made from this phone. Contact your service provider to activate Call Forwarding.

Adjusting the Volume

During a call, if you want to adjust the voice volume, use the volume keys on the left side of the phone.

In Standby mode, you can adjust the ring volume using the same keys.

Quick Switching to Slient Mode

You can quickly switch your phone to the silent mode with a touch of **#** . Press and hold the key. The silent icon appears in the display.

Press and hold # again to exit the silent mode.

This feature is convenient when you are in a hurry to mute the phone sound such as when in a theater.

Entering Text

Changing Text Input Mode

When using your phone, you will need to enter text at many times. For example, when storing a name in the Phone Book, creating your personal greeting or scheduling events in your calendar. You can enter alphanumeric characters into your phone by using your phone's keypad.

When you are prompted to enter text, the current text entry method will appear in the bottom of the display as T9, Abc, 123 or SYM.

To change the input mode, press **MENU** and then press the navigation key to scroll to the mode you want and press **OK** .

T9 Mode

The T9 predictive text input mode allows you to enter words easily with a minimum of key presses. As you press each key, the phone selects a letter that makes up the word that it thinks you are typing, based on a built-in dictionary. As a new letter is added, the word changes based on the key that you have pressed.

1. When you are in the T9 predictive text input mode, start entering a word by pressing keys **2** to **9**. Press each key only once for one letter.

   The word that you are typing appears in the display. It may change with each key that you press.

2. Enter the whole word before editing or deleting any keystrokes.

3. If the word is correct, start entering the next word.

   Otherwise, press **0** repeatedly to display alternate word choices for the keys that you have pressed.

4. Complete each word with a space by pressing the **#** key.

To type words not found in the T9 mode, change the text input mode to the ABC mode.

To delete letters, press **CLR**. Press and hold down **CLR** to erase entire words.

Alpha Mode

When typing in **Alpha** mode, you should press key labeled with the required letter:
-Once for the first letter
-Twice for the second letter
-And so on.

For example, you press 2 three times quickly to display the letter “C” , 5 two times quickly to display the letter “K”. So, this method is called Multi-tap typing.

Refer to the table on next page for the list of characters assigned on each key.

List of characters available:

Key	Characters in the Order Displayed
1	1 . @ ? ! & : ’ & #
2	A B C 2 y
3	D E F 3
4	G H I 4
5	J K L 5
6	M N O 6
7	P Q R S 7
8	T U V 8
9	W X Y Z 9
0	0

(Caps Lock mode)

To shift the case of the next letter(s) that you type, press * one or more times. There are three shift states: Lower Case is indicated by abc in the right corner of the display, Initial Capital is Abc, and Capitals Lock is ABC.

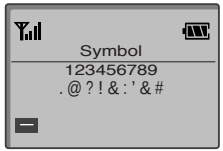
The cursor moves to the right when you press a different key. When entering the same letter twice (or a different letter on the same key), just wait for a few seconds for the cursor to move right automatically, and then select the next letter.

If you enter a specific word in this mode the first time, the word is automatically added to your phone's database, and offers the new word as an option for its keystroke sequence when you are in the T9(English) mode.

- Press # to insert a space.
- To move the cursor left or right through your text message, press the navigation key.
- Press **CLR** one or more times to clear letters to the left.

Symbol Mode

Symbol mode enables you enter symbols into a text message.



Press the navigation key to display more symbols up to Set 6.

Press keys corresponding to the desired mark, then the phone automatically switches back to the text entry mode used just prior to selecting the Symbol mode.

Number Mode

Number mode enables you to enter numbers into a text message. Press keys corresponding to the desired digits, and manually switch back to text entry mode of choice.

Using the Menus

The phone offers a range of functions that allows you to tailor the phone to your needs. These functions are arranged in menus and submenus.

The menus and submenus can be accessed by scrolling or by using the shortcuts.

Accessing a Menu Functions by Scrolling

1. In Standby mode, press the **MENU** key to access the menu facility. Scroll with the navigation key to reach the desired main menu. Press the **OK** key.

2. If the menu contains any submenus,find the one you want by scrolling with the navigation key. Press the **OK** key to enter the submenu.

   If the menu you have selected contains submenus, repeat this step.

3. Scroll with the navigation key to find the setting of your choice. Press the **OK** key to confirm the chosen setting.

Notes:

- You can return the previous menu level by pressing the **CLR** key.
- You can exit the menu without changing the menu settings by pressing SEND .

Accessing a Menu Functions by Using its Shortcut

The menu items (menu, submenus and setting options) are numbered and can be accessed quickly by using their shortcut number.

1. In Standby mode, press the **MENU** key to access the main menu.

2. Within three seconds, key in the first digit of the shortcut number. Repeat this for each digit of the shortcut number.

3. Find the setting of your choice pressing the navigation key and then press the **OK** key.

Note: The numbers assigned to each menu function are indicated on the list on the next page.

Your Phone's Main Menu

Main menu	Main menu 1	Main menu 2
1. Get It Now	1. Get Tunes & Tones	1. Get New 2. Recore New 3~12. Pre-loaded sound
	2. Get Pix	1. Take Pix 2. Pix Gallery 3.Pix Place 4. Pix Services
	3. Get Fun & Games	1. Get New
	4. Get News & Info	1. WAP Browser Launch
	5. Get Going	1. Get New
2. Messaging	1. New Text Msg 2. New Pix Msg 3. New Hand. Msg 4. Inbox 5. Sent 6. Drafts 7. Voicemail 8. E-Mail	
3. Contacts \	1. New Contact 2. Contact List 3. Groups 4. Speed Dials	
4. Recent Calls	1. Missed 2. Received 3. Dialed 4. All 5. View Timers	
5. Settings & Tools	1. Tools	1. Calendar 2. Alarm Clock 3. World Clock 4. Note Pad 5. Calculator 6. Voice
	2. Sounds	1. Master Volume 2. Call Sounds 3. Alert Sounds 4. Keypad Volume 5. Earpiece Volume 6. Service Alerts 7. Power On/Off
	3. Display	1. Banner 2. Backlight 3. Contrast 4. Wallpaper 5. Dispaly Theme 6.Fonts 7. Power On/Off Anim
	4. System	1. System Select 2. NAM Selection 3. Device Info 4. Location 5. Security 6. Language 7. Short cut key
	5. Call Settings	1.Answer Options 2. Auto Retry 3. TTY Mode 4. One Touch Dial 5. Voice Privacy 6. Call Restrictions 7. Data Settings 8. DTMF Tones
	6. Clock Format	1. Main Clock 2. Front Clock
	7. Ringer ID	
	8. Picture ID	

Get It Now

Note: Only available within Verizon Wireless Enhanced Services Area.

With Get It Now, you can download full featured applications such as games, personalized ring tones, and pictures. You can also use it to send and receive instant messages, email, or browse the web to catch up on all the latest information.

If you receive a call while using Get It Now, the application is put on hold during the call. Once the call ends, your Get It Now session resumes where you left off.

Messaging

Your phone can receive voicemail notification, text messages, and pages. Also, your phone can send text messages and pages if your system supplier provides this service.

When the phone receives a message, an alert sound, a text notification display and the name and phone number of the caller if available. The New Message icon remains on the screen until you read the new text, numeric page or WebBrowser message, or until you listen to the new voicemail messages.

Incoming messages are received even when your phone is in Lock mode. However, the screen will not display information about the message. To access a message, or to return a call other than an emergency or priority number, unlock the phone to proceed.

If you are on a conversation, and you receive an incoming message, your phone automatically mutes the ringer (this is to avoid ringing in your ear while you are trying to converse).

New Text Msg *Menu 2-1*

You can create short text messages, and numeric pages, to send to other mobile numbers.

Note: Transmitting message is only supported in digital networks, and if service is provided by your service provider.

New Pix Msg

Menu 2-2

You can add sounds and attach a V-card or Phonebook entry to your Pix/Flix Msg. This is also known as Multimedia Messaging (MMS).

New Hand. Msg

Menu 2-3

You can add videos and attach a V-card or Phonebook entry to your Hand. Msg. This is also known as Multimedia Messaging (MMS).

Inbox

Menu 2-4

Your phone can store up to 100 pages and text messages, depending on the length of the message. If the message memory is full, a message is displayed and the phone rejects additional messages until you erase the stored messages.

Press up or down navigation key to scroll to the desired one of the messages in the list and press **OK**. The phone displays the message contents. If necessary, press up or down navigation key to scan through the contents.

Sent

Menu 2-5

Your phone stores messages in the Outbox, regardless of whether the message was successfully transmitted. Verify if and when a message or e-mail was successfully transmitted by enabling the Delivery Ack feature.

Note: Delivery Ack may not be available on all GSM networks and when roaming off the Verizon Wireless Network.

Drafts

Menu 2-6

Saved/Draft messages are those that have been composed but never sent. You can return to the Saved/Draft folder at any time to view, edit, or send a Saved/Draft message.

Voicemail

Menu 2-7

Voice mail allows callers to leave voice messages, which can be retrieved any time. The procedure for checking voice mail varies, depending upon the mode of operation (GSM or CDMA).
Once your voice mail account has been set up, you can use the SMS Inbox folder (under the Message menu) to view details of voice messages in your voice mailbox.

E-Mail

Menu 2-8

You can use the e-mail service from the WAP browser. Selecting this menu loads the WAP browser and then gives you access to the e-mail service supplied by your service provider. For further details about the service, contact the service provider.

Contacts

Up to 500 entries can be stored in phone memory. A large number of entries can also be stored on the SIM card. The exact number depends upon the SIM card type. Each entry in the Phonebook can have up to five associated numbers and two e-mail addresses. Each phone number can be up to 32 digits long, including hard pauses, while associated names and e-mail addresses can be up to sixteen characters long.
The memory (speed dial) location of your choice for each entry can also be specified. Memory locations can be marked secret to prevent unauthorized viewing.

New Contacts

Menu 3-1

New phonebook entries When you add information to your Phonebook, you can add it as a new entry or as an existing entry.

Contact List

Menu 3-2

This menu allows you to find an entry using a person's name, speed dialing number, or group name in your Contacts.

Groups *Menu 3-3*

You can place any Phonebook entry into one of five categories, called "Groups." Groups allow you to search your Phonebook faster, quickly send messages to one or more group members, and more.

Speed Dials *Menu 3-4*

Once you have stored phone numbers in Contacts, you can set up to 100 speed dial entries, and then dial them easily whenever you want, simply by pressing and holding the associated number key(s) in Standby mode.

Recent Calls

Use Recent Calls to view received, dialed, and missed calls for your phone. You can also use Recent Calls to erase your call history and view Call Timers.

Note: Functionality of Recent Calls is dependent upon availability with the service provider's network and whether or not Caller ID is enabled.

Missed *Menu 4-1*

This option lets you view the last 10 calls missed. (if you are subscribed to the caller ID service). When you access this menu, the last missed calls are displayed.

Received *Menu 4-2*

This option lets you view the last 10 calls received. (if you are subscribed to the caller ID service). When you access this menu, the last incoming calls are displayed.

Dialed *Menu 4-3*

IThe phone stores up to 10 outgoing calls you dialed. When you access this menu, the list of outgoing calls is displayed.

All

Menu 4-4

View Timers

Menu 4-5

Use the View Timers sub menu to view various timers for calls made and received from your phone. You can also reset any of your call timers, with the exception of the Lifetime timer.

Settings & Tools

This menu allows you to configure your display, sounds, network preferences, security options, and more.

Tools

Menu 5-1

Calendar

Menu 5-1-1

Schedule up to eight events for any day by indicating each event's start and end time. Set alarms for events so that you can be alerted before an event takes place. Events scheduled for future dates automatically appear on your Today events schedule for the present day.

Alarm Clock

Menu 5-1-2

Your phone has an alarm clock that can be set to go off once, or recur daily at a specific time. Once set, the alarm clock is easy to change or turn off.

World Clock

Menu 5-1-3

World Clock allows you to view the time of day or night in any part of the world.

Note Pad

Menu 5-1-4

Create and store notes in Note Pad. You can't prioritize or set an alert for stored notes. Return to Memo Pad anytime to review and edit your notes.

Calculator

Menu 5-1-5

You can perform calculations, including addition, subtraction, multiplication and division using your phone.

Voice

Menu 5-1-6

You can use Voice command, Voice Memo, TTS, and Voice settings in this menu.

Sounds

Menu 5-2

You can use the Sounds menu to customize various sound settings, such as the:

- ringer volume and type.
- key tone and alert sounds.
- tones that sound while using the phone's functions.

Display

Menu 5-3

The Display sub menu affects the menu style, standby mode animation, backlight settings, and more.

Banner: Create your own personalized greeting that appears in the display when your phone is in standby mode.

Contrast: You can set the contrast for the main display as well as the front display.

Backlight: Choose settings for the LCD, Keypad, and Power Save\

Wallpaper: allows you to set the background image (wallpaper) to be displayed in Standby mode.

Animation : Choose the media that appears in the display when you turn the phone on, off, or when the phone is in standby mode.

System

Menu 5-4

This menu provides you with the options for selecting a network and changing a phone number.

Call Settings

Menu 5-5

Call Settings allows you to select the method for answering incoming calls, setting redial options, setting data rates for data calls, and more.

Answer options

Answer Options contains the sub menus Call Answer and Auto Answer. Call Answer allows you to select the method for answering incoming calls, while Auto Answer allows you to select the delay time before a call is picked up.

Auto Retry

Auto Retry automatically redials busy numbers after a preset period of time.

One Touch Dial
Voice Privacy
Call Restrictions

This feature allows you to restrict all of the outgoing calls, incoming calls, and access and use of Contacts.

Data

Use the Data sub menu to set the baud rate for data calls and when data mode is to be used.calls.

Voice Services

In this menu, you can use voice-related features.

DTMF Tones

Clock Format *Menu 5-6*

Main Clock:In most situations, your phone automatically adjusts to the local time. In case your clock doesn't update automatically, you can set the clock manually.
Front Clock (under clock setup) is used to select the cities that you wish appear in your display when you choose Dual Clock as one of your wallpaper options in the display Setup menu.

Ringer ID *Menu 5-7*

Picture ID *Menu 5-8*

Health and Safety Information

Exposure to Radio Frequency (RF) Signals

Your wireless phone is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission (FCC) of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on the safety standards that were developed by independent scientific organizations through periodic and through evaluation of scientific studies.

The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless phones employs a unit of measurement known as Specific Absorption Rate (SAR). The SAR limit recommended by the FCC is 1.6W/kg.*

*In the U.S. and Canada, the SAR limit for mobile phones used by the public is 1.6 watts/kg (W/kg) averaged over one gram of tissue. The standard incorporates a substantial margin of safety to give additional protection for the public and to account for any variations in measurements.

SAR tests are conducted using standard operating positions specified by the FCC with the phone transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the phone while operating can be well below the maximum value. This is because the phone is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output of the phone.

Before a new model phone is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government adopted requirement for safe exposure. The tests are performed in positions and locations (e.g., at the ear and worn on the body) as required by the FCC for each model. While there may be differences between the SAR levels of various phones and at various positions, they all meet the government requirement.

The FCC has granted an Equipment Authorization for this model phone with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model phone is on file with the FCC and can be found under the Display Grant section of http://www.fcc.gov/oet/fccid after searching on FCC ID printed in the label on the phone.

For Body Operation

To maintain compliance with FCC RF exposure requirements, use only belt-clips, holsters or similar accessories that maintain a 1.5 cm. separation distance between the user's body and the back of the phone, including the antenna. The use of belt-clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided.

The minimum distance for this model phone is written in the FCC certification information from the body. None compliance with the above conditions may violate FCC RF exposure guidelines.

For more Information concerning exposure to radio frequency signals, see the following websites:

Federal Communications Commission (FCC)
http://www.fcc.gov

Cellular Telecommunications Industry Association (CTIA):http://www.wow-com.com

U.S.Food and Drug Administration (FDA)
http://www.fda.gov/cdrh/consumer

World Health Organization (WHO)
http://www.who.int/peh-emf/en

Precautions When Using Batteries

• Never use any charger or battery that is damaged in anyway.

• Use the battery only for its intended purpose.

• If you use the phone near the network's base station, it uses less power; talk and standby time are greatly affected by the signal strength on the cellular network and the parameters set by the network operator.

• Battery charging time depends on the remaining battery charge, the type of battery and the charger used. The battery can be charged and discharged hundreds of times, but it will gradually wear out. When the operation time (talk time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

• If left unused, a fully charged battery will discharge itself over time.

• Use only Samsung-approved batteries and recharge your battery only with Samsung-approved chargers. When a charger is not in use, disconnect it from the power source.
Do not leave the battery connected to a charger for more than a week, since overcharging may shorten its life.

• Extreme temperatures will affect the charging capacity of your battery: it may require cooling or warming first.

• Do not leave the battery in hot or cold places, such as in a car in summer or winter conditions, as you will reduce the capacity and lifetime of the battery. Always try to keep the battery at room temperature. A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged. Li-ion batteries are particularly affected by temperatures below 0 °C (32 °F).

• Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes a direct connection between the + and – terminals of the battery (metal strips on the battery), for example when you carry a spare battery in a pocket or bag. Shortcircuiting the terminals may damage the battery or the object causing the short-circuiting.

• Dispose of used batteries in accordance with local regulations. Always recycle. Do not dispose of batteries in a fire.

Road Safety

Your wireless phone gives you the powerful ability to communicate by voice - almost anywhere, anytime. But an important responsibility accompanies the benefits of wireless phones, on that every user must uphold.

When driving a car, driving is your first responsibility. When using your wireless phone behind the wheel of a car, practice good common sense and remember the following tips:

1. Get to know your wireless phone and its features such as speed dial and redial. If available, these features help you to place your call without taking your attention off the road.

2. When available, use a hands free device. If possible, add an additional layer of convenience and safety to your wireless phone with one of the many hands free accessories available today.

3. Position your wireless phone within easy reach. Be able to access your wireless phone without removing your eyes from the road. If you get an incoming call at an inconvenient time, if possible, let your voice mail answer it for you.

4. Let the person you are speaking with know you are driving; if necessary, suspend the call in heavy traffic or hazardous weather conditions. Rain, sleet, snow, ice, and even heavy traffic can be hazardous.

5. Do not take notes or look up phone numbers while driving. Jotting down a “to do” list or flipping through your address book takes attention away from your primary responsibility, driving safely.

6. Dial sensibly and assess the traffic; if possible, place calls when you are not moving or before pulling into traffic. Try to plan calls when your car will be stationary. If you need to make a call while moving, dial only a few numbers, check the road and your mirrors, then continue.

7. Do not engage in stressful or emotional conversations that may be distracting. Make people you are talking with aware you are driving and suspend conversations that have the potential to divert your attention from the road.

8. Use your wireless phone to call for help. Dial 9-1-1 or other local emergency number in the case of fire, traffic accident or medical emergencies. Remember, it is a free call on your wireless phone!

9. Use your wireless phone to help others in emergencies. If you see an auto accident, crime in progress or other serious emergency where lives are in danger, call 9-1-1 or other local emergency number, as you would want others to do for you.

10. Call roadside assistance or a special non-emergency wireless assistance number when necessary. If you see a broken-down vehicle posing no serious hazard, a broken traffic signal, a minor traffic accident where no one appears injured, or a vehicle you know to be stolen, call roadside assistance or other special non-emergency wireless number.

Operating Environment

Remember to follow any special regulations in force in any area and always switch off your phone whenever it is forbidden to use it, or when it may cause interference of danger.

When connecting the phone or any accessory to another device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

As with other mobile radio transmitting equipment, users are advised that for the satisfactory operation of the equipment and for the safety of personnel, it is recommended that the equipment should only be used in the normal operating position (held to your ear with the antenna pointing over your shoulder).

Electronic Devices

Most modern electronic equipment is shielded from radio frequency (RF) signals. However, certain electronic equipment may not be shielded against the RF signals from your wireless phone.
consult the manufacturer to discuss alternatives.

Pacemakers
Pacemaker manufacturers recommend that a minimum separation of 6 inches (15 cm) be maintained between a wireless phone and a pacemaker to avoid potential interference with the pacemaker. These recommendations are consistent with the independent research by and recommendations of Wireless Technology Research.

Persons with pacemakers:

- Should always keep the phone more than 6 inches (15cm) from their pacemaker when the phone is switched on;
- Should not carry the phone in a breast pocket;
- Should use the ear opposite the pacemaker to minimize the potential for interference.
- If you have any reason to suspect that interference is taking place, switch off your phone immediately.

Hearing Aids
Some digital wireless phones may interfere with some hearing aids. In the event of such interference, you may want to consult your hearing aid manufacturer to discuss alternatives.

Other Medical Devices
If you use any other personal medical devices, consult the manufacturer of your device to determine if they are adequately shielded from external RF energy. Your physician may be able to assist you in obtaining this information. Switch off your phone in health care facilities when any regulations posted in these areas instruct you to do so.Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Vehicles
RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles. Check with the manufacturer or its representative regarding your vehicle.

You should also consult the manufacturer of any equipment that has been added to your vehicle.

Posted Facilities
Switch off your phone in any facility where posted notices so require.

Potentially Explosive Atmospheres

Switch off your phone when in any area with a potentially explosive atmosphere and obey all signs and instrutions. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Users are advised to switch off the phone while at a refueling point (service station). Users are reminded of the need to observe restrictions on the use of radio equipment in fuel depots (fuel storage and distribution areas), chemical plants or where blasting operations are in progress.

Areas with a potentially explosive atmosphere are often but not always clearly marked. They include below deck on boats; chemical transfer or storage facilities; vehicles using liquefied petroleum gas (such as propane or butane); areas where the air contains chemicals or particles, such as grain, dust or metal powders; and any other area where you would normally be advised to turn off your vehicle engine.

Emergency Calls

This phone, like any wireless phone, operates using radio signals, wireless and landline networks as well as user-programmed functions which cannot guarantee connection in all conditions. Therefore, you should never rely solely upon any wireless phone for essential communications (for example, medical emergencies).

Remember, to make or receive any calls the phone must be switched on and in a service area with adequate signal strength. Emergency calls may not be possible on all wireless phone networks or when certain network services and/or phone features are in use. Check with local service providers.

To make an emergency call:
1. If the phone is not on, switch it on.
2. Key in the emergency number for your present location (for example, 911 or other official emergency number). Emergency numbers vary by location.
3. Press the <SEND> key.

If certain features are in use (keyguard, restrict calls, etc.), you may first need to turn those features off before you can make an emergency call. Consult this document and your local cellular service provider.

When making an emergency call, remember to give all the necessary information as accurately as possible. Remember that your phone may be the only means of communication at the scene of an accident - do not cut off the call until given permission to do so.

Other Important Safety Information

- Only qualified personnel should service the phone, or install the phone in a vehicle. Faulty installation or service may be dangerous and may invalidate any warranty which may apply to the unit.
- Check regularly that all wireless phone equipment in your vehicle is mounted and operating properly.
- Do not store or carry flammable liquids, gases or explosive materials in the same compartment as the phone, its parts or accessories.
- For vehicles equipped with an air bag, remember that an air bag inflates with great force. Do not place objects, including both installed or portable wireless equipment in the area over the air bag or in the air bag deployment area. If in vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.
- Switch off your phone before boarding an aircraft. The use of wireless phones in aircraft may be dangerous to the operation of the aircraft, and may be illegal.
- Failure to observe these instructions may lead to the suspension or denial of telephone services to the offender, or legal action, or both.

Care and Maintenance

Your phone is a product of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfill any warranty obligations and allow you to enjoy this product for many years. When using your phone, battery, charger, or any accessory:

- Keep it and all its parts and accessories out of small children's reach.
- Keep it dry. Precipitation, humidity and liquids contain minerals that will corrode electronic circuits.
- Do not use or store it in dusty, dirty areas as its moving parts can be damaged.
- Do not store it in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store it in cold areas. When the phone warms up (to its nomal operating temperature), moisture can form inside the phone, which may damage the phone's electronic circuit boards.
- Do not drop, knock or shake it. Rough handling can break internal circuit boards.

- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean it. Wipe it with a soft cloth slightly dampened in a mild soap-and-water solution.
- Do not paint it. Paint can clog the device's moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorized antennas, modifications of attachments could damage the phone and may violate regulations governing radio devices.
- If the phone, battery, charger, or any accessory is not working properly, take it to your nearest qualified service facility. The personnel there will assist you, and if neccessary, arrange for service.

Acknowledging Special Precautions and the FCC and Industry Canada Notice

Cautions

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. **FCC Compliance Information**

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received. Including interference that may cause undesired operation.

Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Appendix A: CERTIFICATION INFORMATION (SAR)

THIS MODEL PHONE MEETS THE GOVERNMENT'S REQUIREMENTS FOR EXPOSURE TO RADIO WAVES.

Your wireless phone is a radio transmitter and receiver. It is designed and manufactured not to exceed theemission limits for exposure to radio frequency(RF) energy set by the Federal Communications Commission of the U.S.Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on safety standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless mobile phones employs a unit of measurement known as the Specific Absorption Rate(SAR). The SAR limit set by the FCC is 1.6 W/kg. SAR Tests are conducted using standard operating positions accepted by the FCC with the phone transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the phone while operating can be well below the maximum value. This is because the phone is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output.

Before a new model phone is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the governmentadopted requirement for safe exposure. The tests are performed in positions and locations(e.g., at the ear and worn on the body) as required by the FCC for each model.

The highest SAR values for this model phone as reported to the FCC are Head: 1.45W/Kg(CDMA), 1.43(PCS), Body-worn: 1.02W/Kg(CDMA), 0.92(PCS) Body-worn operations are restricted to Samsungsupplied, approved or none Samsung designated accessories that have no metal and must provide at least 1.5cm separation between the device, including its antenna whether extended or retracted, and the user's body. None compliance to the above restrictions may violate FCC RF exposure guidelines

The FCC has granted an Equipment Authorization for this model phone with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model phone is on file with the FCC and can be found under the Display Grant section of http://www.fcc.gov/oet/fccid after searching on FCC ID A3LSCHA850.

In the United States and Canada, the SAR limit for mobile phones used by the public is 1.6 watts/kilogram(W/kg) averaged over one gram of tissue.
The standard incorporates a substantial margin of safety to give additional protection for the public and to account for any variations in measurements.

Appendix B: Guide to Safe and Responsible Wireless Phone Use

Cellular Telecommunications & Internet Association

"Safety is the most important call you will ever make."

A Guide to Safe and Responsible Wireless Phone Use

TENS OF MILLIONS OF PEOPLE IN THE U.S. TODAY TAKE ADVANTAGE OF THE UNIQUE COMBINATION OF CONVENIENCE, SAFETY AND VALUE DELIVERED BY THE WIRELESS TELEPHONE. QUITE SIMPLY, THE WIRELESS PHONE GIVES PEOPLE THE POWERFUL ABILITY TO COMMUNICATE BY VOICE-ALMOST ANYWHERE, ANYTIME-WITH THE BOSS, WITH A CLIENT, WITH THE KIDS, WITH EMERGENCY PERSONNEL OR EVEN WITH THE POLICE. EACH YEAR, AMERICANS MAKE BILLIONS OF CALLS FROM THEIR WIRELESS PHONES, AND THE NUMBERS ARE RAPIDLY GROWING.

But an important responsibility accompanies those benefits, one that every wireless phone user must uphold. When driving a car, driving is your first responsibility. A wireless phone can be an invaluable tool, but good judgment must be exercised at all times while driving a motor vehicle-whether on the phone or not.

The basic lessons are ones we all learned as teenagers. Driving requires alertness, caution and courtesy. It requires a heavy dose of basic common sense-keep your head up, keep your eyes on the road, check your mirrors frequently and watch out for other drivers. It requires obeying all traffic signs and signals and staying within the speed limit. It means using seatbelts and requiring other passengers to do the same.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

But with wireless phone use, driving safely means a little more. This brochure is a call to wireless phone users everywhere to make safety their first priority when behind the wheel of a car. Wireless telecommunications is keeping us in touch, simplifying our lives, protecting us in emergencies and providing opportunities to help others in need. When it comes to the use of wireless phones, safety is your most important call.

Wireless Phone “Safety Tips”

Below are safety tips to follow while driving and using a wireless phone which should be easy to remember.

1. Get to know your wireless phone and its features such as speed dial and redial. Carefully read your instruction manual and learn to take advantage of valuable features most phones offer, including automatic redial and memory. Also, work to memorize the phone keypad so you can use the speed dial function without taking your attention off the road.

2. When available, use a hands free device. A number of hands free wireless phone accessories are readily available today. Whether you choose an installed mounted device for your wireless phone or a speaker phone accessory, take advantage of these devices if available to you.

3. Position your wireless phone within easy reach. Make sure you place your wireless phone within easy reach and where you can grab it without removing your eyes from the road. If you get an incoming call at an inconvenient time, if possible, let your voice mail answer it for you.

4. Suspend conversations during hazardous driving conditions or situations. Let the person you are speaking with know you are driving; if necessary, suspend the call in heavy traffic or hazardous weather conditions. Rain, sleet, snow and ice can be hazardous, but so is heavy traffic. As a driver, your first responsibility is to pay attention to the road.

5. Do not take notes or look up phone numbers while driving. If you are reading an address book or business card, or writing a “to do” list while driving a car, you are not watching where you are going. It’s common sense. Don’t get caught in a dangerous situation because you are reading or writing and not paying attention to the road or nearby vehicles.

6. Dial sensibly and assess the traffic; if possible, place calls when you are not moving or before pulling into traffic. Try to plan your calls before you begin your trip or attempt to coincide your calls with times you may be stopped at a stop sign, red light or otherwise stationary. But if you need to dial while driving, follow this simple tip-dial only a few numbers, check the road and your mirrors, then continue.

7. Do not engage in stressful or emotional conversations that may be distracting. Stressful or emotional conversations and driving do not mix-they are distracting and even dangerous when you are behind the wheel of a car. Make people you are talking with aware you are driving and if necessary, suspend conversations which have the potential to divert your attention from the road.

8. Use your wireless phone to call for help. Your wireless phone is one of the greatest tools you can own to protect yourself and your family in dangerous situationswith your phone at your side, help is only three numbers away. Dial 9-1-1 or other local emergency number in the case of fire, traffic accident, road hazard or medical emergency. Remember, it is a free call on your wireless phone!

9. Use your wireless phone to help others in emergencies. Your wireless phone provides you a perfect opportunity to be a "Good Samaritan" in your community. If you see an auto accident, crime in progress or other serious emergency where lives are in danger, call 9-1-1 or other local emergency number, as you would want others to do for you.

10. Call roadside assistance or a special wireless nonemergency assistance number when necessary. Certain situations you encounter while driving may require attention, but are not urgent enough to merit a call for emergency services. But you still can use your wireless phone to lend a hand. If you see a broken-down vehicle posing no serious hazard, a broken traffic signal, a minor traffic accident where no one appears injured or a vehicle you know to be stolen, call roadside assistance or other special non-emergency wireless number.

Careless, distracted individuals and people driving irresponsibly represent a hazard to everyone on the road.

Since 1984, the Cellular Telecommunications Industry Association and the wireless industry have conducted educational outreach to inform wireless phone users of their responsibilities as safe drivers and good citizens. As we approach a new century, more and more of us will take advantage of the benefits of wireless telephones.
And, as we take to the roads, we all have a responsibility to drive safely.

"The wireless industry reminds you to use your phone safely when driving."

Cellular Telecommunications & Internet Association
For more information, please call 1-888-901-SAFE.
For updates: http://www.wowcom.com/consumer/issues/driving/articles.cfm?ID=85

Appendix C: Consumer Update on Wireless Phones

U.S. Food and Drug Administration

1. What kinds of phones are the subject of this update?

The term wireless phone refers here to hand-held wireless phones with built-in antennas, often called cell, mobile, or PCS phones. These types of wireless phones can expose the user to measurable radiofrequency energy (RF) because of the short distance between the phone and the user s head. These RF exposures are limited by Federal Communications Commission safety guidelines that were developed with the advice of FDA and other federal health and safety agencies. When the phone is located at greater distances from the user, the exposure to RF is drastically lower because a person's RF exposure decreases rapidly with increasing distance from the source. The so-called "cordless phones," which have a base unit connected to the telephone wiring in a house, typically operate at far lower power levels, and thus produce RF exposures well within the FCC's compliance limits.

2. Do wireless phones pose a health hazard?

The available scientific evidence does not show that any health problems are associated with using wireless phones. There is no proof, however, that wireless phones are absolutely safe. Wireless phones emit low levels of radiofrequency energy (RF) in the microwave range while being used. They also emit very low levels of RF when in the stand-by mode. Whereas high levels of RF can produce health effects (by heating tissue), exposure to low level RF that does not produce heating effects causes no known adverse health effects. Many studies of low level RF exposures have not found any biological effects. Some studies have suggested that some biological effects may occur, but such findings have not been confirmed by additional research. In some cases, other researchers have had difficulty in reproducing those studies, or in determining the reasons for inconsistent results.

3. What is FDA's role concerning the safety of wireless phones?

Under the law, FDA does not review the safety of radiation-emitting consumer products such as wireless phones before they can be sold, as it does with new drugs or medical devices. However, the agency has authority to take action if wireless phones are shown to emit radiofrequency energy (RF) at a level that is hazardous to the user. In such a case, FDA could require the manufacturers of wireless phones to notify users of the health hazard and to repair, replace or recall the phones so that the hazard no longer exists.

Although the existing scientific data do not justify FDA regulatory actions, FDA has urged the wireless phone industry to take a number of steps, including the following:

Support needed research into possible biological effects of RF of the type emitted by wireless phones; Design wireless phones in a way that minimizes any RF exposure to the user that is not necessary for device function; and Cooperate in providing users of wireless phones with the best possible information on possible effects of wireless phone use on human health

FDA belongs to an interagency working group of the federal agencies that have responsibility for different aspects of RF safety to ensure coordinated efforts at the federal level. The following agencies belong to this working group:

National Institute for Occupational Safety and Health Environmental Protection Agency Federal Communications Commission Occupational Safety and Health Administration National Telecommunications and Information Administration

The National Institutes of Health participates in some interagency working group activities, as well. FDA shares regulatory responsibilities for wireless phones with the Federal Communications Commission
(FCC). All phones that are sold in the United States must comply with FCC safety guidelines that limit RF exposure. FCC relies on FDA and other health agencies for safety questions about wireless phones.

FCC also regulates the base stations that the wireless phone networks rely upon. While these base stations operate at higher power than do the wireless phones themselves, the RF exposures that people get from these base stations are typically thousands of times lower than those they can get from wireless phones. Base stations are thus not the primary subject of the safety questions discussed in this document.

4. What is FDA doing to find out more about the possible health effects of wireless phone RF?

FDA is working with the U.S. National Toxicology Program and with groups of investigators around the world to ensure that high priority animal studies are conducted to address important questions about the effects of exposure to radiofrequency energy (RF).

FDA has been a leading participant in the World Health Organization International Electromagnetic Fields (EMF) Project since its inception in 1996. An influential result of this work has been the development of a detailed agenda of research needs that has driven the establishment of new research programs around the world. The Project has also helped develop a series of public information documents on EMF issues.

FDA and the Cellular Telecommunications & Internet Association (CTIA) have a formal Cooperative Research and Development Agreement (CRADA) to do research on wireless phone safety. FDA provides the scientific oversight, obtaining input from experts in government, industry, and academic organizations. CTIA-funded research is conducted through contracts to independent investigators. The initial research will include both laboratory studies and studies of wireless phone users. The CRADA will also include a broad assessment of additional research needs in the context of the latest research developments around the world.

5. What steps can I take to reduce my exposure to radiofrequency energy from my wireless phone?

If there is a risk from these products—and at this point we do not know that there is—it is probably very small. But if you are concerned about avoiding even potential risks, you can take a few simple steps to minimize your exposure to radiofrequency energy (RF). Since time is a key factor in how much exposure a person receives, reducing the amount of time spent using a wireless phone will reduce RF exposure.

If you must conduct extended conversations by wireless phone every day, you could place more distance between your body and the source of the RF, since the exposure level drops off dramatically with distance. For example, you could use a headset and carry the wireless phone away from your body or use a wireless phone connected to a remote antenna

Again, the scientific data do not demonstrate that wireless phones are harmful. But if you are concerned about the RF exposure from these products, you can use measures like those described above to reduce your RF exposure from wireless phone use.

6. What about children using wireless phones?

The scientific evidence does not show a danger to users of wireless phones, including children and teenagers. If you want to take steps to lower exposure to radiofrequency energy (RF), the measures described above would apply to children and teenagers using wireless phones. Reducing the time of wireless phone use and increasing the distance between the user and the RF source will reduce RF exposure.

Some groups sponsored by other national governments have advised that children be discouraged from using wireless phones at all. For example, the government in the United Kingdom distributed leaflets containing such a recommendation in December 2000. They noted that no evidence exists that using a wireless phone causes brain tumors or other ill effects. Their recommendation to limit wireless phone use by children was strictly precautionary; it was not based on scientific evidence that any health hazard exists.

7. Do hands-free kits for wireless phones reduce risks from exposure to RF emissions?

Since there are no known risks from exposure to RF emissions from wireless phones, there is no reason to believe that hands-free kits reduce risks. Hands-free kits can be used with wireless phones for convenience and comfort. These systems reduce the absorption of RF energy in the head because the phone, which is the source of the RF emissions, will not be placed against the head. On the other hand, if the phone is mounted against the waist or other part of the body during use, then that part of the body will absorb more RF energy. Wireless phones marketed in the U.S. are required to meet safety requirements regardless of whether they are used against the head or against the body. Either configuration should result in compliance with the safety limit.

8. Do wireless phone accessories that claim to shield the head from RF radiation work?

Since there are no known risks from exposure to RF emissions from wireless phones, there is no reason to believe that accessories that claim to shield the head from those emissions reduce risks. Some products that claim to shield the user from RF absorption use special phone cases, while others involve nothing more than a metallic accessory attached to the phone. Studies have shown that these products generally do not work as advertised. Unlike "hand-free" kits, these so-called "shields" may interfere with proper operation of the phone. The phone may be forced to boost its power to compensate, leading to an increase in RF absorption. In February 2002, the Federal trade Commission (FTC) charged two companies that sold devices that claimed to protect wireless phone users from radiation with making false and unsubstantiated claims. According to FTC, these defendants lacked a reasonable basis to substantiate their claim.

9. What about wireless phone interference with medical equipment?

Radiofrequency energy (RF) from wireless phones can interact with some electronic devices. For this reason, FDA helped develop a detailed test method to measure electromagnetic interference (EMI) of implanted cardiac pacemakers and defibrillators from wireless telephones. This test method is now part of a standard sponsored by the Association for the Advancement of Medical instrumentation (AAMI). The final draft, a joint effort by FDA, medical device manufacturers, and many other groups, was completed in late 2000. This standard will allow manufacturers to ensure that cardiac pacemakers and defibrillators are safe from wireless phone EMI.

FDA has tested hearing aids for interference from handheld wireless phones and helped develop a voluntary standard sponsored by the Institute of Electrical and Electronic Engineers (IEEE). This standard specifies test methods and performance requirements for hearing aids and wireless phones so that that no interference occurs when a person uses a compatible phone and a compatible hearing aid at the same time. This standard was approved by the IEEE in 2000.

FDA continues to monitor the use of wireless phones for possible interactions with other medical devices. Should harmful interference be found to occur, FDA will conduct testing to assess the interference and work to resolve the problem.

10. What are the results of the research done already?

The research done thus far has produced conflicting results, and many studies have suffered from flaws in their research methods. Animal experiments investigating the effects of radiofrequency energy (RF) exposures characteristic of wireless phones have yielded conflicting results that often cannot be repeated in other laboratories. A few animal studies, however, have suggested that low levels of RF could accelerate the development of cancer in laboratory animals. However, many of the studies that showed increased tumor development used animals that had been genetically engineered or treated with cancer-causing chemicals so as to be pre-disposed to develop cancer in the absence of RF exposure. Other studies exposed the animals to RF for up to 22 hours per day. These conditions are not similar to the conditions under which people use wireless phones,

so we don t know with certainty what the results of such studies mean for human health.

Three large epidemiology studies have been published since December 2000. Between them, the studies investigated any possible association between the use of wireless phones and primary brain cancer, glioma, meningioma, or acoustic neuroma, tumors of the brain or salivary gland, leukemia, or other cancers. None of the studies demonstrated the existence of any harmful health effects from wireless phone RF exposures. However, none of the studies can answer questions about long-term exposures, since the average period of phone use in these studies was around three years.

11. What research is needed to decide whether RF exposure from wireless phones poses a health risk?
A combination of laboratory studies and epidemiological studies of people actually using wireless phones would provide some of the data that are needed. Lifetime animal exposure studies could be completed in a few years. However, very large numbers of animals would be needed to provide reliable proof of a cancer promoting effect if one exists. Epidemiological studies can provide data that is directly applicable to human populations, but

10 or more years follow-up may be needed to provide answers about some health effects, such as cancer. This is because the interval between the time of exposure to a cancer-causing agent and the time tumors develop - if they do - may be many, many years. The interpretation of epidemiological studies is hampered by difficulties in measuring actual RF exposure during day-to-day use of wireless phones.

Many factors affect this measurement, such as the angle at which the phone is held, or which model of phone is used.

12. Which other federal agencies have responsibilities related to potential RF health effects?

Additional information on the safety of RF exposures from various sources can be obtained from the following organizations.

FCC RF Safety Program:
http://www.fcc.gov/oet/rfsafety/

Environmental Protection Agency (EPA):
http://www.epa.gov/radiation/

Occupational Safety and Health Administration's (OSHA):
http://www.oshaslc.
gov/SLTC/radiofrequencyradiation/index.html

National Institute for Occupational Safety and Health (NIOSH):
http://www.cdc.gov/niosh/emfpg.html

World health Organization (WHO):
http://www.who.int/peh-emf/

International Commission on Non-Ionizing Radiation Protection:
http://www.icnirp.de

National Radiation Protection Board (UK):
http://www.nrpb.org.uk

Updated 4/3/2002: US Food and Drug Administration
http://www.fda.gov/cellphones

Glossary

Airtime - Actual time spent talking on the wireless phone. Most carriers bill customers based on how many minutes of airtime they use each month.

Antenna - A device for transmitting or receiving signals. The size and shape of antennas is determined, in part, by the frequency of the signal they receive. Wireless phones and the base station must have antennas.

Base Station - The fixed radio transmitter/receiver that maintains communications with mobile radio telephones within a given area. (Typically called a cell or cell site)

CDMA - (Code Division Multiple Access) A spread-spectrum approach to digital transmission. With CDMA, each conversion is digitized and then tagged with a code. The mobile phone deciphers only a particular code to pick the right conversation off the air. The transmitted signal is just above noise level across the available bandwidth.

Channel - Communications signals transmit along paths called channels.

Codec - Compression & Decompression.

Deactivation - The process of rendering a wireless phone inactive.

DTMF - (Dual-tone Modulated Frequency) You send DTMF signals when you enter numbers by pressing the digit keys.

EVRC - (Enhanced Variable Rate Codec) EVRC is a new global standard for compressing and decompressing voice signals. EVRC uses a lower bit rate (the number of bits sent per second) than existing CDMA vocoders, while providing significant improvements in voice quality. This technology enables your phone to provide superb voice quality while benefiting from the ability to process more cellular voice calls using less bandwidth than the voice codecs in CDMA networks today.

Frequency - A measure based on time, as one or more waves per second, in an electrical or light wave information signal. A signal's frequency is stated in cycles-per-second or Hertz (Hz).

Hands-Free - A feature that permits a driver to use a wireless phone without lifting or holding the handset - an important safety feature for automobiles, tractors and most other motorized vehicles.

LCD - (Liquid Crystal Display) Commonly used to refer to the screen display on the wireless phone.

LED - (Light Emitting Diode) Commonly used to refer to a small light on the wireless phone or on the Desktop Charger. The LED lights on the phone to indicate an incoming call. The lights on the charger indicate that battery charging is taking place.

Prepend - The addition of a prefix, such as an area code, to a phone number.

RF - Radio Frequency

Roaming - The ability to use a wireless phone to make and receive calls in places outside of the home service area.

Service Charge - The amount paid each month to receive wireless service.

Standby Time - The amount of time a fully charged wireless portable or transportable phone can be on and idle without being in use. (See Talk Time)

Talk Time - The length of time a person can talk on a portable or transportable wireless phone without recharging the battery.

Vocoder - Voice Coder. A device used to convert speech into digital signals.

Wireless - Radio-based Systems that allow transmission of telephone or data signals through the air without a physical connection, such as a metal wire (copper) or fiber optic cable.