

# **User Guide**

VX1000

Ver. 1.0

2005. 04. 28

## LIMITED WARRANTY STATEMENT

### 1. WHAT THIS WARRANTY COVERS:

LG offers you a limited warranty that the enclosed subscriber unit and its enclosed accessories will be free from defects in material and workmanship, according to the following terms and conditions:

- (1) The limited warranty for the product extends for ONE (1) year beginning on the date of purchase of the product.
- (2) The limited warranty extends on to the original purchaser of the product and is not assignable or transferable to any subsequent purchaser/end user.
- (3) This warranty is good only to the original purchaser of the product during the warranty period as long as it is in the U.S., including Alaska, Hawaii, U.S. Territories and Canada.
- (4) The external housing and cosmetic parts shall not be covered under these limited warranty terms.
- (5) Upon request from LG, the consumer must provide information to reasonably prove the date of purchase.
- (6) The customer shall bear the cost of shipping the product to the Customer Service Department of LG. LG shall bear the cost of shipping the product back to the consumer after the completion of service under this limited warranty.

### 2. WHAT THIS WARRANTY DOES NOT COVER:

- (1) Defects or damages resulting from use of the product in other than its normal and customary manner.
- (2) Defects or damages from abnormal use, abnormal conditions, improper storage, exposure to moisture or dampness, unauthorized modifications, unauthorized connections, unauthorized repair, misuse, neglect, abuse, accident, alteration, improper installation, or other acts which are not the fault of LG, including damage caused by shipping blown fuses spills of food or liquid.
- (3) Breakage or damage to antennas unless caused directly by defects in material or workmanship.
- (4) That the Customer Service Department at LG was not notified by consumer of the alleged defect or malfunction of the product during the applicable limited warranty period.
- (5) Products which have had the serial number removed or made illegible.
- (6) The limited warranty is in lieu of all other warranties, express or implied either in fact or by operations law, statutory or otherwise, including, but limited to any implied warranty of marketability or fitness for a particular use.
- (7) Damage resulting from use of non-LG approved accessories.
- (8) All plastic surfaces and all other externally exposed parts that are scratched or damaged due to normal customer use.
- (9) Products operated outside published maximum ratings.

(10) Products used or obtained in a rental program.

(11) Consumables (such as fuses).

### **3. STATE LAW RIGHTS:**

No other express warranty is applicable to this product. THE DURATION OF ANY IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MARKETABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN. LG INFOCOMM INC. SHALL NOT BE LIABLE FOR THE LOSS OF THE USE OF THE PRODUCT, INCONVENIENCE, LOSS OR ANY OTHER DAMAGES, DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR INABILITY TO USE, THIS PRODUCT OR FOR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING THE IMPLIED WARRANTY OF MARKETABILITY APPLICABLE TO THIS PRODUCT. Some states do not allow the exclusive of imitation of incidental or consequential damages or limitations on how long an implied warranty lasts; so these limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

### **4. HOW TO GET WARRANTY SERVICE:**

To obtain warranty service, please call the following telephone number from anywhere in the continental United States:

LG Infocomm Inc.  
201 James Record Road Huntsville, AL 35824  
Tel. 1-800-793-8896 Fax. 1-800-448-4026  
[www.lgeservice.com](http://www.lgeservice.com)

**DO NOT RETURN YOUR PRODUCT TO THE ABOVE ADDRESS.** Please call or write for the location of the LGIC authorized service center nearest you and for the procedures for obtaining warranty claims.

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## SUBJECT

The VX1000 phone has been designed to operate on the latest digital mobile communication technology, Code Division Multiple Access (CDMA). This CDMA digital technology has greatly enhanced voice clarity and can provide a variety of advanced features. Currently, CDMA mobile communication technology has been commercially used in Cellular and Personal Communication Service (PCS). The difference between them is the operating frequency spectrum. Cellular uses 800MHz and PCS uses 1.9GHz. The VX1000 can operate on 1.9GHz or 800 MHz frequency, we usually call it dual-band phone. This phone is the one of Digital Dual mode - 800Mhz CDMA, 1900Mhz PCS, 1500Mhz GPS.

The CDMA technology adopts DSSS (Direct Sequence Spread Spectrum). This feature of DSSS enables the phone to keep communication from being crossed and to use one frequency channel by multiple users in the same specific area, resulting that it increases the capacity 10 times more compared with that in the analog mode currently used. Soft/Softer Handoff, Hard Handoff, and Dynamic RF power Control technologies are combined into this phone to reduce the call being interrupted in a middle of talking over the phone.

Cellular and PCS CDMA network consists of MSO (Mobile Switching Office), BSC (Base Station Controller), BTS (Base station Transmission System), and MS (Mobile Station). The following table lists some major CDMA Standards.

| CDMA Standard       | Designator                                                                           | Description                                                                                                                                           |
|---------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic air interface | TIA/EIA-95A<br>TSB-74<br>ANSI J-STD-008<br>TIA/EIA-IS2000                            | CDMA Dual-Mode Air Interface 14.4kbps radio link protocol and inter-band operations IS-95 adapted for PCS frequency band cdma2000 1xRTT Air Interface |
| Network             | TIA/EIA/IS-634<br>TIA/EIA/IS/651<br>TIA/EIA/IS-41-C<br>TIA/EIA/IS-124                | MAS-BS<br>PCSC-RS<br>Intersystem operations<br>Nom-signaling data comm.                                                                               |
| Service             | TIA/EIA/IS-96-B<br>TIA/EIA/IS-99<br>TIA/EIA/IS-637<br>TIA/EIA/IS-657<br>IS-801       | Speech CODEC<br>Assign data and fax<br>Short message service<br>Packet data<br>Position Determination Service (gpsOne)                                |
| Performance         | TIA/EIA/IS-97<br>TIA/EIA/IS-98<br>ANSI J-STD-018<br>ANSI J-STD-019<br>TIA/EIA/IS-125 | Cellular base station<br>Cellular mobile station<br>PCS personal station<br>PCS base station<br>Speech CODEC                                          |

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## Introduction

### Highlights

Congratulations! Your new mobile phone will change your way of communicating and is a compact, lightweight personal communication system with added features for the person on the go. Our advanced digital mobile communication technology allows you to do the followings.

- ✍✍ Main Chipset : MSM6050, Memory(64Mbits NOR Flash + 32Mbits PSRAM)
- ✍✍ Display : Main LCD(96 x 32 pixels, 0.22\*0.23 dot pitch, Mono colors STN)
- ✍✍ CMX 3.x compliant (32 Poly)
- ✍✍ 4 Phone Book(4 calling buttons)
- ✍✍ Power Management IC : LDO's, Charger controller, Comparator etc.
- ✍✍ E911(gpsOne)
- ✍✍ Simple function and small size for children.

### Important Information

This user' s guide provides important information on the use and operation of the phone. Please read all the information carefully prior to using the phone for the best performance and to prevent any anticipated damage to or misuse of the phone. Any unapproved change or modification will void your warranty.

### Check Accessories

Your mobile phone comes with standard accessories of a Adapter and a rechargeable battery. Please make sure that those accessories are all included.

## Before You Start

### Safety Instructions

**WARNING!** To reduce the electric shock, do not expose your phone in high humidity areas, such as the bathroom, swimming pool.

**IMPORTANT!** Please read the SAFETY AND GENERAL INFORMATION on page 68 prior to using your phone.

### FCC RF Exposure Information

**WARNING!** Read this information before operating the phone

In August 1996 the Federal Communications (FCC) of the United States with its action in Report and Order FCC 96-326 adopted an updated safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC regulated transmitters. Those guidelines are consistent with the safety standard previously set by both U.S. and international standards bodies. The design of this phone complies with the FCC guidelines and these international standards.

#### CAUTION

Use only the supplied or and approved antenna. Use of unauthorized antennas, modifications could impair call quality, damage the phone or result in violation of FCC regulations. Do not use the phone with the damaged antenna. If the damaged antenna comes into contact with the skin, a minor burn may result. Please contact your local dealer for replacement of the antenna.

### Body-worn Operation

This device was tested for typical body-worn operations with the back of the phone kept 0.59 inches (1.5 cm ) from the body. To comply with FCC RF exposure requirements, a minimum separation distance of 0.59 inches (1.5 cm ) must be maintained between the user' s body and the back of the phone, including the antenna, whether extended or retracted. Third-party belt-clips, holsters and similar accessories containing metallic components should not be used. Body-worn accessories that cannot maintain 0.59 inch (1.5 cm ) separation distance between the user' s body and the back of the phone, and have not been tested for typical body-worn operations may not comply with FCC RF exposure limits and should be avoided.

### Vehicle Mounted External Antenna (optional, if available.)

A minimum separation distance of 7.9 inches (20 ) must be maintained between the user/bystander and the vehicle mounted external antenna to satisfy FCC RF exposure

requirements.

*For more information about RF exposure, please visit the FCC website at [www.fcc.gov](http://www.fcc.gov)*

### **FCC Part 15 Class B Compliance**

This device and its accessories comply with part 15 of FCC rules. Operation is subject to the following two conditions: (1) This device and its accessories may not cause harmful interference, and (2) this device and its accessories must accept any interference received, including interference that cause undesired operation.

### **Caution For Battery Use**

-  Do not disassemble.
-  Do not short-circuit.
-  Do not exposure to high temperature : 60 (140 )
-  Do not incinerate.

### **Caring for Battery Use**

-  Must be recycled or disposed of properly

### **Caution For Adapter (Charger) Use**

-  Using the wrong battery charger could cause damage to your phone and void your warranty may burst causing injury to person and damage.
-  The charger or adapter is intended for indoor use only.
-  The charger or adapter is intended for indoor use only.

Do not expose the battery charger or adapter to direct sunlight nor use it in any place of high humidity, such as the bathroom.

## Getting Started

### View of Phone

1. **END/PWR Switch:** Lets you power the phone on or off.
2. **Antenna:** Fixed antenna provides optimum reception for 800MHz/ 1900 MHz frequencies.
3. **Power On Indicator :** Illuminates red when the phone powers on or when you receive incoming calls. Flashes red when you have messages or scheduled alarms.
4. **Headset Jack:** Provides connection for an optional headset.
5. **Volume Control Keys:** Adjust the Ring Volume in the Main Menu or the Voice Volume during a call. The keys also scroll through months in the Calendar or pages in the MiniBrowser.
6. **OK:** Lets you place a call, receive a call, end a call or select menu options.

### Installing and Removing the Battery

To install the battery, insert the bottom of the battery into the opening on the back of the phone. Then, push the battery down until the latch clicks.

To remove the battery, press down on the latch and remove the battery from the phone.

### Turning Your Phone On and Off

To turn your phone on, move the On/Off Switch (near the antenna) to the ON position. Your phone performs a short self-test before letting you know it is operational.

If your phone does not turn on, make sure the battery is installed correctly and is adequately charged or has external power (via the AC Adapter, Cigarette Lighter Adapter or Hands-Free Car Kit).

To turn your phone off, move the On/Off Switch to the OFF position.

### Power Save Mode

When the phone is in an area without service for 15 minutes, it stops searching for service and enters into the power Save Mode. When your phone activates this feature, **Power Save** is displayed on your screen. The phone automatically checks for service periodically or you can check manually by pressing any key.

**Display Icons**

Display icons are the symbols your phone uses to communicate important information. They are as follows:

| ICON                                                                                | DESCRIPTION         |
|-------------------------------------------------------------------------------------|---------------------|
|    | Antenna             |
|    | In use              |
|    | No service          |
|   | Vibrate             |
|  | Roaming             |
|  | 1x Service          |
|  | Digital Service     |
|  | Full Charge Battery |
|  | Empty Battery       |

**Antenna**

The antenna on your VX1000 provides maximum reception without the inconvenience of extending or retracting it.

**!!! WARNING – CHOKING HAZARD – ANTENNA MAY BECOME DISLODGED**

**Attempting to remove or repeated twisting of the antenna will loosened the materials securing it into antenna. Once the antenna is loosened or removed, only an authorized Verizon Wireless representative can restore the antenna’s original integrity. Do not attempt to remove or twist the antenna.**

## Signal Strength

The quality of each call you make or receive depends on the signal strength on your area. The number of bars in the Signal Strength icon informs you of the current strength. The more bars, the stronger the signal.

## Battery Capacity

Your Verizon Wireless VX1000 is equipped with a Lithium Ion (LiIon) battery. It allows you to recharge your battery before it is fully drained. The battery provides approximately hours of continuous digital talk time or approximately 120hours of continuous digital standby time.

**Note:** Long backlight settings affect the battery's talk and standby times.

When the battery reaches 5% of its capacity, the battery icon blinks. When there is about one minute of talk time left, the phone sounds an audible alert every 30 seconds and then powers down.

If the battery's charge is completely run down, it takes 2 to 3 hours to fully recharge. It is not necessary to let the battery completely run down before recharging.

To charge your batteries, use only Verizon Wireless approved charging accessories.

## Using the AC Adapter

To charge the battery, plug the AC Adapter into a standard wall outlet and connect it to the phone via the I/O Connector on the bottom of the phone. The battery Charge Status icon flashes during charging. When the battery is fully charged, the battery icon stops flashing.

## Using Your Phone

### Placing a Call

When the phone is turned on, check the Signal Strength icon to see if you are in a Verizon Wireless Service Area or authorized PCS CDMA provider's service area.

1. Press number Key , if saved phone number exists then display name or number depend on name field,

press SEND/YES Key then dialing to saved phone numer.

2. When you are finished with your call, press END/NO Key

## Roaming With Your Phone

When you use your phone outside the Verizon Wireless Network, it's called roaming. If you're roaming in areas where agreements are in place with PCS CDMA providers, you will pay the roaming rate plus long-distance charges, where they apply. (See "Display Icons" for network indication icons.) Always dial using 10 digits (area code + number) when calling from outside your Verizon Wireless Home Service Area.

## Calling Experience

When you use your phone on other PCS CDMA networks, your calling experience and call quality will be quite similar to what you experience when making calls within the Network. Although certain calling features may not be available, your phone calls are still private and secure.

## Adjusting Voice Volume During a Call

During a call, you can adjust voice volume by pressing side key

## Emergency Call

1. press long a E911 Key.
2. 'Call 911?' displayed, then press long a Send Key.

## Incoming Call Notification

your phone notifies you of incoming calls in the following ways:

 The phone rings or vibrates

 The screen displays an incoming call message

 The phone number of the caller is displayed if the phone number is available

 The caller's name is displayed if the phone number is in your Phone Book

## Answering Calls

To answer incoming Verizon Wireless calls, press Any Key except the End/Side keys.

.

## New Entry

 To Update phonebook, transfer name/number through PST tool.

## Adjusting the Ring Volume

To Adjusting the Ring Volume, press the up/down Side Key in idle screen.

- Ringer 4+Vib
- Ringer 4(high volume)
- Ringer 3
- Ringer 2
- Ringer 1(low volume)
- Vib Only

## Roaming on to Other Service Providers

Roaming occurs when you are in an area serviced by another authorized service provider. When this situation occurs, the  icon and Digital Roam are displayed. If there is no service available, the  icon is displayed.

## Safety Guidelines

Provided herein is the TIA Safety Information for Wireless Handheld phones. Inclusion of this text in the terminal unit's owner's manual is required for CTIA Certification.

## **TIA Safety Information**

Provided herein is the complete TIA Safety Information for Wireless Handheld phones. Inclusion of the text covering Pacemakers, Hearing Aids, and Other Medical Devices is required in the owner's manual for CTIA Certification. Use of the remaining TIA language is encouraged when appropriate.

### **EXPOSURE TO RADIO FREQUENCY SIGNALS**

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Your wireless handheld portable telephone is a low power radio transmitter and receiver. When it is ON, it receives and also sends out radio frequency (RF) signals.

In August, 1996, the Federal Communications Commissions (FCC) adopted RF exposure guidelines with safety levels for hand-held wireless phones. Those guidelines are consistent with the safety standards previously set by both U.S. and international standards bodies:

ANSI C95.1 (1992)\*

NCRP Report 86 (1986)

ICNIRP (1996)

Those standards were based on comprehensive and periodic evaluations of the relevant scientific literature. For example, over 120 scientists, engineers, and physicians from universities, government health agencies, and industry reviewed the available body of research to develop the ANSI Standard (C95.1).

The design of your phone complies with the FCC guidelines (and those standards).

### **ANTENNA CARE**

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Use only the supplied or an approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the phone and may violate FCC regulations.

### **PHONE OPERATION**

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**NORMAL POSITION:** Hold the phone as you would any other telephone with the antenna pointed up and over your shoulder.

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\* American National Standards Institute; National Council on Radiation Protection and Measurements;  
International Commission on Non-Ionizing Radiation Protection

**TIPS ON EFFICIENT OPERATION:**

- ?? For your phone to operate most efficiently:
- ?? Extend your antenna fully.

Do not touch the antenna unnecessarily when the phone is in use. Contact with the antenna affects call quality and may cause the phone to operate at a higher power level than otherwise needed.

\* American National Standards Institute; National Council on Radiation Protection and Measurements;  
International Commission on Non-Ionizing Radiation Protection

**DRIVING**

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Check the laws and regulations on the use of wireless telephones in the areas where you drive. Always obey them. Also, if using your phone while driving, please:

- ?? Give full attention to driving -- driving safely is your first responsibility;
- ?? Use hands-free operation, if available;
- ?? Pull off the road and park before making or answering a call if driving conditions so require.

**ELECTRONIC DEVICES**

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Most modern electronic equipment is shielded from RF signals. However, certain electronic equipment may not be shielded against the RF signals from your wireless phone.

**Pacemakers**

The Health Industry Manufacturers Association recommends that a minimum separation of six (6") inches be maintained between a handheld 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 six inches from their pacemaker when the phone is turned 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, turn your phone OFF 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 service provider [or call the customer service line to discuss alternatives.]  
Optional for each phone manufacturer.

### **Other Medical Devices**

If you use any other personal medical device, 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.

Turn your phone OFF 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**

Turn your phone OFF in any facility where posted notices so require.

## **AIRCRAFT**

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FCC regulations prohibit using your phone while in the air. Switch OFF your phone before boarding an aircraft.

## **BLASTING AREAS**

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To avoid interfering with blasting operations, turn your phone OFF when in a “blasting area” or in areas posted: “Turn off two-way radio.” Obey all signs and instructions.

## **POTENTIALLY EXPLOSIVE ATMOSPHERES**

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

Areas with a potentially explosive atmosphere are often, but not always marked clearly. Potential areas may include: fueling areas (such as gasoline stations); below deck on boats; fuel or 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.

#### **For Vehicles Equipped with an Air Bag**

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An air bag inflates with great force. DO NOT place objects, including either 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.

#### **Consumer Recycling Information and Logo**

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Wireless...The New Recyclable

Your wireless phone can be recycled. Recycling your wireless phone reduces the amount of waste disposed in landfills and allows recycled materials to be incorporated into new products.

CTIA and its members encourage consumers to recycle their phones and have taken steps to promote the collection and environmentally sound recycling of end-of-life wireless devices.

As a wireless phone user, you have an important role in ensuring that this phone is recycled properly. When it comes time to give this phone up or trade it in for a new one, please remember that the phone, the charger, and many of its accessories can be recycled. It's easy. To learn more about CTIA's Recycling Program for Used Wireless Devices, including information on where to recycle wireless devices near you, please visit [www.recyclewirelessphones.com](http://www.recyclewirelessphones.com).



## **FDA Consumer Update**



The U.S. Food and Drug Administration's Center for Devices and Radiological Health Consumer Update on Mobile Phones

**1. 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.

**2. 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 subject of the safety questions discussed in this document.

### **3. 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 far below the FCC safety limits.

**4. 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.

**5. 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.

**6. 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.

**7. How can I find out how much radiofrequency energy exposure I can get by using my wireless phone?**

All phones sold in the United States must comply with Federal Communications Commission (FCC) guidelines that limit radiofrequency energy (RF) exposures. FCC established these guidelines in consultation with FDA and the other federal health and safety agencies. The FCC limit for RF exposure from wireless telephones is set at a Specific Absorption Rate (SAR) of 1.6 watts per kilogram (1.6 W/kg). The FCC limit is consistent with the safety standards developed by the Institute of Electrical and Electronic Engineering (IEEE) and the National Council on Radiation Protection and Measurement. The exposure limit takes into consideration the body's ability to remove heat from the tissues that absorb energy from the wireless phone and is set well below levels known to have effects.

Manufacturers of wireless phones must report the RF exposure level for each model of phone to the FCC. The FCC website (<http://www.fcc.gov/oet/rfsafety>) gives directions for locating the FCC identification number on your phone so you can find your phone's RF exposure level in the online listing.

**8. What has FDA done to measure the radiofrequency energy coming from wireless phones ?**

The Institute of Electrical and Electronic Engineers (IEEE) is developing a technical standard for measuring the radiofrequency energy (RF) exposure from wireless phones and other wireless handsets with the participation and leadership of FDA scientists and engineers. The standard, “Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques,” sets forth the first consistent test methodology for measuring the rate at which RF is deposited in the heads of wireless phone users. The test method uses a tissue-simulating model of the human head. Standardized SAR test methodology is expected to greatly improve the consistency of measurements made at different laboratories on the same phone. SAR is the measurement of the amount of energy absorbed in tissue, either by the whole body or a small part of the body. It is measured in watts/kg (or milliwatts/g) of matter. This measurement is used to determine whether a wireless phone complies with safety guidelines.

**9. 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.

#### **10. 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.

#### **11. 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.

## **12. Where can I find additional information?**

For additional information, please refer to the following resources:

?? FDA web page on wireless phones  
(<http://www.fda.gov/cdrh/phones/index.html>)

?? Federal Communications Commission (FCC) RF Safety Program  
(<http://www.fcc.gov/oet/rfsafety>)

?? International Commission on Non-Ionizing Radiation Protection  
(<http://www.icnirp.de>)

?? World Health Organization (WHO) International EMF Project  
(<http://www.who.int/emf>)

?? National Radiological Protection Board (UK) (<http://www.nrpb.org.uk/>)

## Consumer Information on SAR (Specific Absorption Rate)

### **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 the emission limits for exposure to radiofrequency (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 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, or SAR. The SAR limit set by the FCC is 1.6W/kg. \* Tests for SAR are conducted using standard operating positions specified by the FCC with the phone transmitting at its 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 phone model 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. The highest SAR value for this model phone when tested for use at the ear is 1.24W/g and when worn on the body, as described in this user guide, is 0.839mW/g, (Body-worn measurements differ among phone models, depending upon available accessories and FCC requirements). [Labeling Committee note : if applicable, if body-worn SARs are required]. While there may be differences between the SAR levels of various phones and at various positions, they all meet the government requirement for safe exposure.

The FCC has granted an Equipment Authorization for this model phone with all reported SAR levels evaluated as in compliance with the FCC RF emission guidelines. SAR information on this model phone is on file with the FCC and can be found under the Display Gant section of <http://www.fcc.gov/oet/fccid> after searching on FCC ID: BEJVB1000.

Additional information on Specific Absorption Rates (SAR) can be found on the Cellular Telecommunications Industry Association (CTIA) web-site at <http://www.wow-com.com>.

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\* In the United States 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.