

GAO

Report to the Honorable  
Anthony D. Weiner, House of  
Representatives

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April 2003

# TELECOMMUNICATIONS

## FCC Should Include Call Quality in Its Annual Report on Competition in Mobile Phone Services



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# Highlights

Highlights of [GAO-03-501](#), a report to the Honorable Anthony D. Weiner, House of Representatives

## Why GAO Did This Study

Over the past decade, Americans have come to rely increasingly on mobile phones to meet their business and personal needs. However, because of the nature of radio transmission and other constraints, consumers are not always able to complete calls or to hear their calls clearly. As reliance on mobile phones has increased, state officials, consumer groups, the media, and others have raised concerns about the extent of call quality problems. With regard to call quality, GAO agreed to describe the regulatory framework; determine the extent to which consumers are experiencing problems; and discuss actions for improving call quality suggested by interested parties.

## What GAO Recommends

GAO recommends that FCC include call quality in its mandated annual report analyzing whether there is effective competition in the market for mobile phone services. Including call quality in this analysis would provide an ongoing record to help FCC and the Congress determine whether market competition is sufficient to ensure that carriers are meeting consumers' expectations and desires regarding call quality or whether further regulatory action is needed. In response, FCC stated that to, the extent possible, it plans to include information related to call quality in its future annual reports on competition in mobile phone services.

[www.gao.gov/cgi-bin/getrpt?GAO-03-501](http://www.gao.gov/cgi-bin/getrpt?GAO-03-501).

To view the full report, including the scope and methodology, click on the link above. For more information, contact William B. Shear at (202) 512-4325 or [shearw@gao.gov](mailto:shearw@gao.gov).

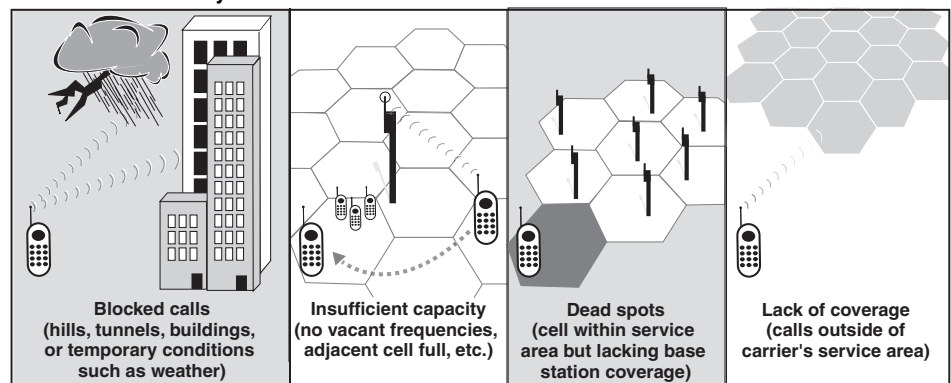
## TELECOMMUNICATIONS

# FCC Should Include Call Quality in its Annual Report on Competition in Mobile Phone Services

## What GAO Found

In establishing a regulatory framework for mobile phone services, the Congress directed the Federal Communications Commission (FCC) to encourage competition among carriers. FCC believes that competition enables consumers to choose carriers that offer a desired level of call quality and that regulatory action establishing a minimum level of call quality would not be beneficial in a competitive environment. The Congress requires FCC to report annually on whether or not there is effective competition in mobile phone services. While call quality has been identified as a factor that affects consumers' choices of a carrier, FCC does not discuss call quality in this report.

### Common Call Quality Problems Associated with Mobile Phones



Source: GAO.

To assess the extent to which consumers are experiencing call quality problems—such as blocked or dropped calls, insufficient capacity, dead spots, or lack of coverage—we included questions on a national survey of adult consumers, conducted in November 2002. Our survey indicated that about four-fifths of adult mobile phone users were satisfied with their service, about one-tenth were dissatisfied, and the remainder indifferent. However, we also found that consumers are experiencing some call quality problems. For example, we estimate that about one-fifth of users were unable to successfully complete 10 percent or more of their calls, because their mobile phone network dropped the calls. Only limited information on call quality problems is available to the public or FCC.

Interested parties have proposed actions that could provide consumers with better information to help them choose a carrier that matches their needs or would set industrywide call quality standards for all consumers. However, some of the suggested actions could drive up the price of service, limit the entry of new carriers, or lead to a reduction of service in regions that are technically difficult or costly to serve. The carriers themselves say that they are taking actions to improve call quality and further regulation is not needed.

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**Abbreviations**

CDMA	code division multiple access
CTIA	Cellular Telecommunications & Internet Association
FCC	Federal Communications Commission
FTC	Federal Trade Commission
GSM	global system for mobile communications
MHz	megahertz
NARUC	National Association of Regulatory Utility Commissioners
OFTEL	Office of Telecommunications
TDMA	time division multiple access

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United States General Accounting Office  
Washington, D.C. 20548

April 28, 2003

The Honorable Anthony D. Weiner  
House of Representatives

Dear Mr. Weiner:

Over the past decade, mobile phone service has gone from being a luxury item to an everyday part of life.<sup>1</sup> In 2002, over 140 million Americans had mobile phone service, and these customers used about 55.5 billion minutes of mobile phone service a month.<sup>2</sup> As the public has come to rely more on mobile phones for its business and personal needs, concerns have been raised by state officials, consumer groups, the media, and others about call quality—the ability to make and complete calls with good sound quality.

You asked us to examine several issues related to the regulation and assessment of mobile phone call quality. We agreed to (1) describe the regulatory framework that exists regarding mobile phone call quality, (2) determine the extent to which consumers are experiencing call quality problems, and (3) discuss actions for improving call quality suggested by interested parties.

To meet these objectives, we reviewed laws and regulations governing the mobile phone industry. At the federal level, we spoke to officials at the Federal Communications Commission (FCC)—the agency that oversees the mobile phone industry—regarding their views on the regulatory framework; the extent of problems with call quality, including consumer complaints; and potential actions to improve call quality. We contacted state public utility commissions to determine how they regulate mobile phone service in their states. Thirty-three states provided information. We also spoke to officials in attorney general offices and/or public utility commissions in California, New York, Illinois, Massachusetts, Nebraska, New Jersey, and Texas. To obtain data on call quality and other information, we contacted officials at the six largest national mobile phone service carriers: AT&T Wireless Services, Inc. (AT&T Wireless); Cingular

<sup>1</sup>For purposes of this report, the term mobile phone service includes the provision of mobile phone services by cellular, broadband personal communications service, and digital specialized mobile radio carriers.

<sup>2</sup>Data provided by the Cellular Telecommunications & Internet Association (CTIA), an industry trade association.

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Wireless, LLC (Cingular); Nextel Communications, Inc. (Nextel); Sprint PCS; T-Mobile USA, Inc. (T-Mobile USA, formerly VoiceStream); and Verizon Wireless, LLC (Verizon Wireless). We also contacted officials at other firms—Telephia, Inc.; LCC International, Inc.; and Scoreboard—that collect network data. In addition, we spoke to an official at the Federal Trade Commission (FTC) concerning consumer complaints they have received about mobile phone service. We also spoke to consumer advocates, financial analysts, and attorneys engaged in class-action lawsuits against carriers about various aspects of the mobile phone industry.

We contracted with a market research firm to administer 26 questions as part of a national telephone survey conducted in November 2002. Our questions addressed issues such as experiences with certain call quality problems, satisfaction with the quality of mobile phone service, complaint-making practices, and factors involved in decisions to change companies. We projected the results of the survey to the population of adult mobile phone users. However, we are concerned about the potential for those who did not respond to the survey to differ from those who did respond in some way that could affect the results. We have no explicit reason for suspecting that the survey suffers from this shortcoming. Instead, our concern arises out of the large sample of telephone numbers (about 19,000) dialed to produce about 1,000 survey respondents, about 550 of whom use mobile phones.

In addition, we contacted a number of experts who are knowledgeable about mobile phone issues to give us their opinions about potential actions the federal government might take to improve call quality. This report also draws on information collected for our recent report on spectrum management issues.<sup>3</sup> We conducted our work from March 2002 through March 2003 in accordance with generally accepted government auditing standards. For a more detailed discussion of our scope and methodology, see appendix I.

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## Results in Brief

Under the regulatory framework for mobile phone service, FCC generally relies on competitive market forces to determine mobile phone call quality.

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<sup>3</sup>See U.S. General Accounting Office, *Telecommunications: Comprehensive Review of U.S. Spectrum Management with Broad Stakeholder Involvement Is Needed*, [GAO-03-277](#) (Washington, D.C.: January 2003).

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The Omnibus Budget Reconciliation Act of 1993 provided a regulatory framework that directed FCC to encourage the promotion of competitive market conditions for mobile phone service and limited the ability of the states to regulate it. In the 1993 Act and other legislation, the Congress granted FCC flexibility in regulating mobile phone services. In implementing this legislation, FCC has taken actions to encourage the growth of competitive markets that have resulted in most parts of the country having several competing carriers. FCC believes that this competitive market will provide consumers with the level of call quality they desire and that adopting federal regulations that require a certain minimum level of call quality are not necessary. At the direction of the Congress, FCC reports annually on whether or not there is effective competition in the market for mobile phone services. Over the last 7 years, these reports have included key aspects of mobile phone service—such as the number of competitors in the marketplace, trends in subscribership and the prices of service, deployment in rural areas, and features provided by carriers—but have not included information on call quality.

Concerns about mobile phone call quality have been raised by state officials, consumer groups, the media, and others. Based on the results of our consumer survey, conducted in November 2002, we estimate that nearly 83 percent of mobile phone users were satisfied with their service at that time, about 9 percent were dissatisfied, and the remainder were indifferent.<sup>4</sup> In addition, we estimate that about 47 percent of adult mobile phone users believed their call quality was improving, while about 5 percent believed that their call quality was getting worse. We also found that users were experiencing some call quality problems, including a lack of coverage, limited network capacity at times, dropped calls, and poor sound quality. For example, we estimate that 22 percent of users were unable to successfully complete 10 percent or more of their calls, because the calls were dropped by the network. Data sources other than consumer surveys would be useful in assessing the extent of mobile phone call quality problems; however, these data were either not available or were of limited usefulness because they were not collected systematically. The major carriers are not required to report data on the performance of their mobile phone networks (such as the number of dropped calls or detailed coverage information) to FCC, and they declined to provide us with those data as well. The carriers said that this information was proprietary and would be

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<sup>4</sup>All percentage estimates from the survey have sampling errors of plus or minus 8 percentage points or less, unless otherwise noted. For details, see appendix I.

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difficult to interpret, even if made available. Carriers also declined to provide us with their data on customer complaints. Complaint data from other sources, such as state public utility commissions, were not useful in determining the extent of call quality problems for a number of reasons, including inconsistencies in the method of collecting and classifying complaints.

Interested parties, such as state officials and consumer advocates, have suggested possible actions to address call quality concerns. These actions would have varying potential benefits and drawbacks. For example, some of the possible actions that have been proposed would give consumers more information on carriers' coverage areas, their rates of dropped and blocked calls, or complaints against them prior to consumers choosing a carrier. Some interested parties have also suggested that carriers give consumers longer trial periods before they commit to a long-term contract with a carrier. These actions could better enable consumers to choose the carrier that best meets their needs regarding call quality. Some parties would also like to see minimum industrywide call quality standards set for the carriers. Others have noted, however, that some of the suggested actions have drawbacks that could potentially drive up the price of mobile phone service, limit the entry of new carriers and thus affect competition in the marketplace, or lead to a reduction of service in regions that are technically difficult or costly to serve, such as mountainous or sparsely populated rural areas. The carriers say that they are taking actions to improve call quality and further regulation is not needed. However, they maintain that their ability to improve call quality is hampered by financial and regulatory constraints, such as local government land use and zoning restrictions on the siting of new base stations for transmitting and receiving mobile phone signals.

To assist FCC in determining whether further action concerning mobile phone call quality is necessary, we are recommending that FCC include call quality in its mandated annual report analyzing whether there is effective competition in the market for mobile phone services. In commenting on a draft of this report, FCC generally agreed with our recommendation stating that, to the extent possible, it would include information related to call quality in its future reports on competition in mobile phone services. However, FCC noted some difficulties in implementing the recommendation, such as data not being readily available, the lack of objective performance standards, and difficulties in measuring call quality against consumer expectations.



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## Background

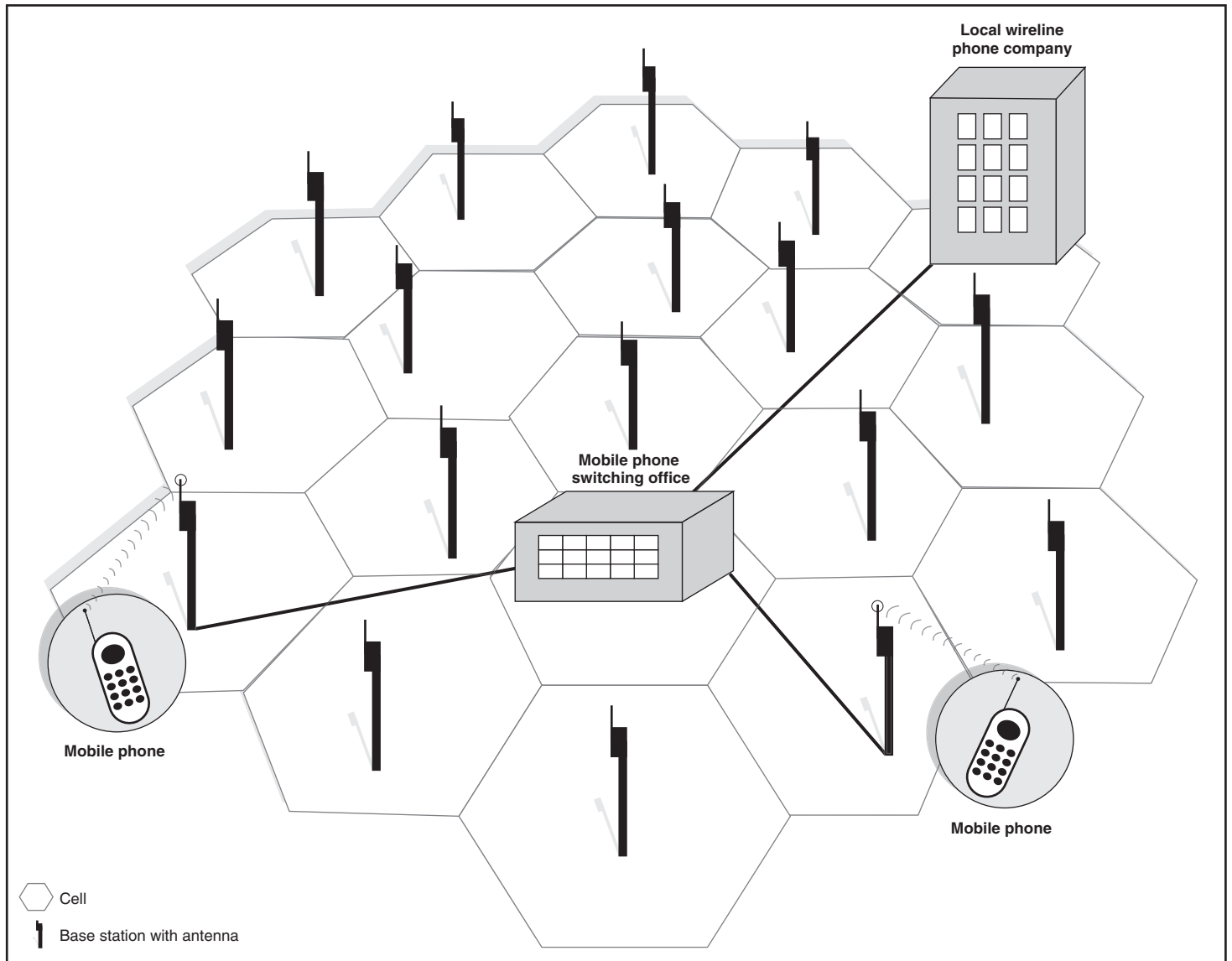
Carriers deliver mobile phone service by subdividing large geographic areas into smaller overlapping sections called cells.<sup>5</sup> Each cell has a base station equipped with an antenna to receive and transmit radio signals to the mobile phones within its coverage area. This area can vary in size from under a mile to 20 miles from the base station. Mobile phones are low-powered radio transceivers (a combination radio transmitter and receiver) that use radio waves to communicate with the base stations. A mobile phone's communications are generally associated with the base station of the cell in which it is presently located. When a call is initiated, the base station assigns a radiofrequency to the mobile phone from among the group of frequencies that the station controls. The number of frequencies available at a base station will depend primarily on the amount of radiofrequency spectrum assigned to the carrier by FCC, the number of base stations in the carrier's service area, and the carrier's signaling standard.<sup>6</sup> Each base station is linked to a mobile phone switching office, which is also connected to the local wireline telephone network. The mobile phone switching office directs calls to the desired locations, whether to another mobile phone or a traditional wireline telephone. This office is also responsible for handing off calls from one cell to another in a smooth and seamless manner as a customer changes locations during a call. Figure 1 provides a simplified picture of the key components of a mobile phone system.

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<sup>5</sup>Mobile phone service carriers offer three types of service—cellular, personal communications service, and digital specialized mobile radio—each with specific system characteristics that are not apparent to users.

<sup>6</sup>The radiofrequency spectrum is the medium that enables wireless communications of all kinds, such as mobile phone and paging services, radio and television broadcasting, radar, and satellite-based services.

**Figure 1: Key Components of a Mobile Phone System**



Source: GAO.

FCC is the federal agency that oversees interstate telecommunications in the United States, including mobile phone service. The mobile phone industry began to develop in the mid-1980s when FCC awarded radiofrequencies to two cellular carriers in each geographic market. FCC awarded one cellular license to the incumbent wireline telephone company

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and a second license to an independent carrier. If there was only one applicant for the second license, that applicant received the license. When more than one applicant applied, FCC used comparative hearings, which give competing applicants a quasi-judicial forum in which to argue why they should be awarded a license instead of other applicants. Later, at the direction of the Congress, FCC held lotteries to award licenses. In establishing the rules under which the cellular phone industry would operate, FCC made several key decisions:

- All carriers would use the same analog technology to provide service.
- Within 3 years of receiving a construction permit, carriers would have to build networks that could theoretically serve the areas for which they obtained a license. At the end of the 3 years, licenses for those areas that could not theoretically be served might be made available to some other carrier.
- Carriers would have to inform customers of the area in which reliable service could be expected.
- No other call quality standards would be required. That is, no minimum requirements concerning the probability that calls would be completed with good sound quality were established. FCC considered establishing such standards, but decided to let the marketplace determine the level of call quality.
- Carriers would have to notify FCC if they turned away a customer because of a lack of capacity and state how they intended to remedy this lack of capacity.<sup>7</sup>

Since it was first launched, the industry has migrated from using only analog technologies to primarily using digital technologies. Originally carriers used an analog technology that is similar to that used for the transmission of FM radio broadcasts. While analog technologies are still being used, most service is now provided with digital technologies, which have several advantages over analog technologies: they provide for better security, allow for services such as caller identification, allow noise to be

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<sup>7</sup>As other mobile phone services began to develop, FCC granted carriers greater flexibility.

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reduced on calls, and conserve on the use of scarce spectrum resources.<sup>8</sup> FCC did not specify a single digital technology. Instead, carriers were free to adopt one of several signaling standards: code division multiple access (CDMA), time division multiple access (TDMA), and global system for mobile communications (GSM). In addition, Nextel Communications uses a technology called integrated Digital Enhanced Network, a derivative of TDMA.<sup>9</sup>

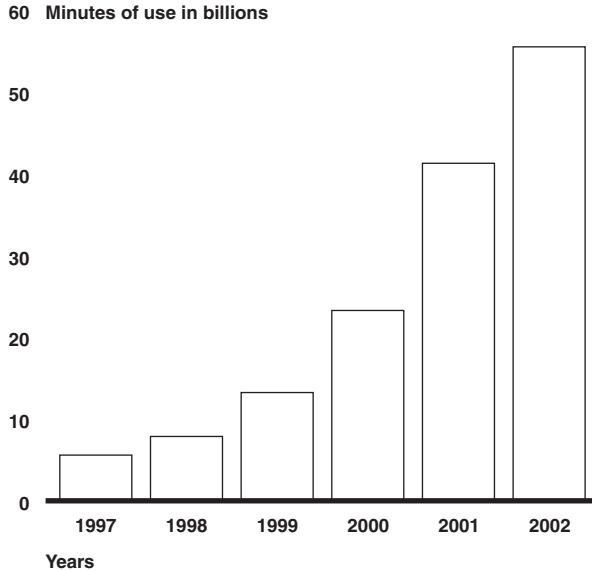
The industry has grown dramatically over time. In terms of annual revenues, the industry has mushroomed: from about \$482 million in 1985 to over \$27 billion in 1997 and then to over \$76 billion in 2002. In recent years, from 1997 through 2002, average monthly minutes of use of mobile phone use grew almost 900 percent, from about 5.6 billion minutes per month in 1997 to about 55.5 billion in 2002 (see fig. 2). This growth resulted not only from an increase in subscribership but also from a marked increase in the average number of minutes used by each subscriber.

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<sup>8</sup>In 1988, FCC permitted cellular carriers to use digital technology but required carriers to continue to offer analog service as well. In 2002, FCC provided a 5-year period to sunset the rules governing the provision of analog service by cellular carriers.

<sup>9</sup>With CDMA, a spread spectrum approach to digital transmission, each conversation is digitized and then tagged with a code. The mobile phone is then instructed to decipher only a particular code to pluck the right conversation off the air. TDMA allows a large number of users to access (in sequence) a single radio frequency channel without interference by allocating unique time slots to each user within each channel. GSM, a standard that was developed in Europe, uses a TDMA scheme, under which separate time slots are used to send and receive calls.

**Figure 2: Estimated Average Number of Minutes of Mobile Phone Service Used Per Month in the United States, 1997-2002**



Source: Cellular Telecommunications & Internet Association.

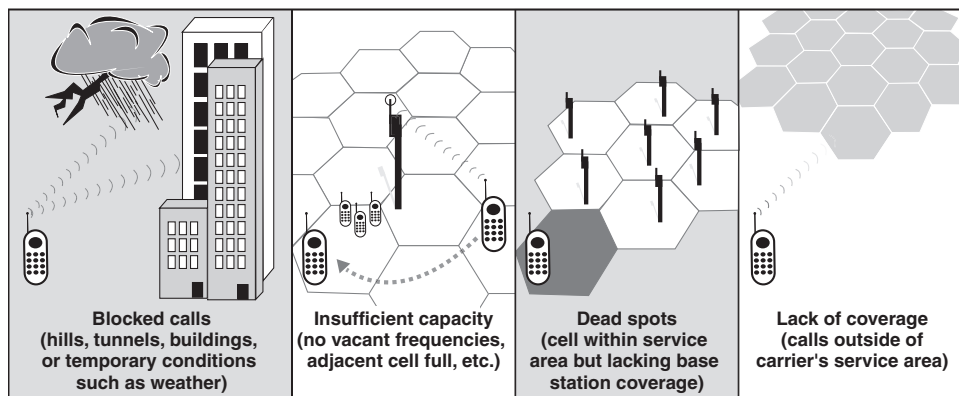
Note: GAO analysis of CTIA data.

To subscribe to mobile phone service, a customer must sign-up with a mobile phone service carrier, either by signing a contract and choosing a plan, or by purchasing prepaid minutes of airtime and buying a phone that works with the prepaid service. Most customers sign contracts that specify a geographically based rate plan and the size of the block of minutes the customer is buying for a flat monthly fee. New customers sometimes pay up-front fees for “network activation” of their phones and usually agree to pay an “early termination fee” if they should quit a carrier’s network before the date specified on the contract. In return for signing the contract, customers often receive mobile phones, suitable for their carrier’s network, at a price lower than that which they would have to pay without a service contract.

Because of the nature of radio transmission, the amount of radiofrequency spectrum allocated by FCC for mobile phone service, and the challenge of building the infrastructure to meet a rapidly growing consumer base, consumers are not always able to complete their phone calls or to hear them clearly. The following, some of which are illustrated in figure 3, are examples of such call quality concerns.

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- Consumers may not be able to complete calls because the radiofrequencies used for mobile phone service can be blocked by terrain, such as hills, or by man-made structures. The structural features of some buildings can block signals from reaching the interior of the buildings. Similarly, signals may not be able to penetrate into subways or tunnels.
  - Consumers' calls may be disrupted by temporary conditions, such as weather or interference from other wireless devices.
  - A consumer may be unable to initiate a call because the local base station's available radiofrequencies are all in use by other consumers. The consumer may receive a fast busy signal instead of a dial tone or some other indication that frequencies are not available.
  - Consumers' calls may be dropped when moving from a cell that has capacity to an adjacent cell that cannot handle additional calls because it is already at capacity.
  - A consumer's call may not be connected because of a "dead spot" within a carrier's service area where there is no base station coverage. This may be due to decisions made by carriers concerning the building of base stations, or difficulties in finding a suitable location or obtaining zoning approval to construct additional base stations.
  - Consumers may be unable to initiate calls because their service carrier does not cover the area from which the call is being made and the carrier does not have an agreement with a competitor to serve its subscribers under a "roaming" agreement.

**Figure 3: Common Call Quality Problems Associated with Mobile Phones**



Source: GAO.

## Under the Regulatory Framework for the Mobile Phone Industry, FCC Relies on Competitive Market Forces to Determine Call Quality and Has Not Set Specific Quality Standards

Beginning in 1993, the Congress enacted legislation aimed at developing a regulatory framework that would treat commercial carriers in a consistent manner and encourage the growth of competitive markets for mobile phone services. FCC has acted to implement this regulatory framework and is relying on consumer choice in a competitive marketplace to determine the level of call quality, rather than setting a minimum standard for the industry to meet. At the direction of the Congress, FCC analyzes and reports on competitive market conditions in the mobile phone industry annually. To date, these reports have included issues such as the number of carriers, prices, and subscribership but not call quality.

## The Congress Has Promoted Development of Competitive Mobile Phone Markets

In the early 1990s, types of mobile phone services other than cellular had been or were about to be developed. These new services were demonstrating that greater competition could exist in this marketplace; however, two different regulatory regimes had developed: one for the original cellular service and another for newer mobile phone services that used other technologies or portions of the radiofrequency spectrum. In 1993, the Congress enacted legislation—the Omnibus Budget Reconciliation Act (1993 Act)—that promoted consistent regulation of commercial mobile phone service carriers and established the promotion of competition as a fundamental goal for the development of mobile phone

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policies and regulation. The 1993 Act included several provisions to achieve these goals:

- All commercial mobile phone services were to be regulated similarly, without regard to the specific technology or radiofrequency spectrum used by a carrier.<sup>10</sup>
- FCC was to auction spectrum licenses when more than one user wanted to use certain frequencies for the transmission of mobile phone calls. This method of assigning licenses requires mobile phone service carriers to pay for the right to use the spectrum and awards the spectrum to the carrier willing to pay the highest price for it under certain conditions.
- Numerous licenses were to be auctioned in each mobile phone market so that a wide variety of bidders could participate.
- FCC was given the authority to refrain from applying certain provisions of the Communications Act of 1934 that FCC found to be unnecessary under specific statutory criteria. For example, FCC did not apply provisions that restricted market entry or exit.<sup>11</sup>
- FCC was required to report annually on competitive market conditions in the industry. The report was to include an identification of the number of competitors in various commercial mobile services, an analysis of whether or not there is effective competition, an analysis of whether any competitors have a dominant share of the market, and a statement of whether additional providers or classes of providers would be likely to enhance competition.

In addition, the 1993 Act preempted states and local governments from regulating the entry of or the rate charged by any mobile service carrier. However, states could petition FCC for authority to regulate commercial

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<sup>10</sup>Commercial mobile phone service carriers were to be treated as common carriers and regulated under Title II of the 1934 Communications Act.

<sup>11</sup>FCC was authorized to refrain from applying certain provisions of Title II that they found to be unnecessary under specific statutory criteria. However, FCC was required to apply sections 201, 202, and 208 of the Communications Act of 1934. Respectively, these provisions provide for service and interconnection upon reasonable request and terms; no unjust or unreasonable discrimination; and complaint procedures. 47 U.S.C. §§ 201, 202, and 208.



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rates under certain conditions. Shortly after the 1993 Act was enacted, eight states<sup>12</sup> sought the right to continue regulating wireless rates. FCC denied all of the petitions. One state appealed the denial of its petition, and the court affirmed FCC's decision.<sup>13</sup> However, the 1993 Act expressly reserved to the states the right to regulate other "terms and conditions" of commercial mobile phone service, and FCC has provided guidance over time on the scope of these rights. For example, FCC has concluded that billing information, practices, and disputes fall within other terms and conditions and may be regulated under state contract or consumer law. Similarly, FCC has found that state contract or consumer fraud laws governing disclosure or rates are generally not preempted and that as a general matter, state courts are not preempted from awarding damages to customers of commercial mobile phone carriers, based on violations of state contract or consumer fraud laws. Several lawsuits are now before state courts making claims against carriers under state fraud or consumer protection laws.

In the 1996 Telecommunications Act (1996 Act), a law that deregulated various aspects of the telecommunications industry, the Congress provided FCC with additional tools that could be used to promote competition in the mobile phone service industry. The 1996 Act requires FCC to refrain from imposing unnecessary regulation on telecommunications carriers, including mobile phone carriers.<sup>14</sup> The 1996 Act also requires that every 2 years FCC engage in a review (the biennial review) of its rules, including those related to mobile phone service, to determine whether any of them are no longer necessary as a result of meaningful competition among the carriers. In addition, the 1996 Act requires FCC to take actions that would allow consumers to keep their phone number when changing among wireline telephone companies, referred to as local number portability. Further, the 1996 Act preserved the rights of states and localities to use land-use and zoning laws to regulate the placement of carriers' base station

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<sup>12</sup>The states were Arizona, California, Connecticut, Hawaii, Louisiana, New York, Ohio, and Wyoming.

<sup>13</sup>*Connecticut Dept. for Pub. Util. Control v. FCC*, 78 F.3d 842 (2<sup>nd</sup> Cir 1996).

<sup>14</sup>The 1996 forbearance standard is similar to the standard included in the 1993 Act. See 47 U.S.C. §160, 47 U.S.C. §332(c).

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antennas.<sup>15</sup> This has enabled states and localities to affect both the level of competition and the quality of mobile phone calls.

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### FCC Has Promoted Competitive Markets to Determine the Level of Call Quality

In implementing the 1993 and 1996 Acts, FCC has taken several actions to promote competition in the mobile phone market. These actions included auctions, spectrum caps, and local number portability.

*Auctions:* From 1994 through 2002, FCC conducted 42 auctions for spectrum dedicated to various kinds of wireless phone services. In accord with the 1993 Act, FCC's licensing scheme has also helped to ensure that many carriers were available in each geographic market. In every region, FCC authorized up to eight different mobile phone licenses.

*Spectrum cap:* Until recently, FCC limited the number of radiofrequencies any one carrier could have rights to in any one market. By limiting any one carrier to 45 megahertz (MHz) of spectrum in any metropolitan market or 55 MHz in any one rural market, FCC aimed to prevent any one mobile phone service carrier from dominating a market. As a result of the 2000 biennial review, FCC phased out the cap, fully eliminating it on January 1, 2003. In doing so, FCC asserted that competition in mobile phone markets was robust enough that it was no longer appropriate to impose caps on spectrum rights.

*Local number portability:* FCC extended the 1996 requirement that local number portability be implemented for wireline telephone customers to include mobile customers as well. FCC concluded that while the 1996 Act did not specifically require local number portability for mobile phone service carriers, making it a requirement would serve the public interest by promoting competition among the various types of telephone services and facilitating consumer choice. Because of certain implementation issues, FCC has extended the deadline for mobile phone service carriers that operate within the 100 largest metropolitan areas to offer local number portability from the original deadline of June 30, 1999, until November 24, 2003.

As a result of these actions, industry developments, and consumer interest, FCC, in its most recent annual report on competitive conditions in the

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<sup>15</sup>Certain limitations were placed on this authority. For example, states or local governments must not unreasonably discriminate among carriers of functionally equivalent services.

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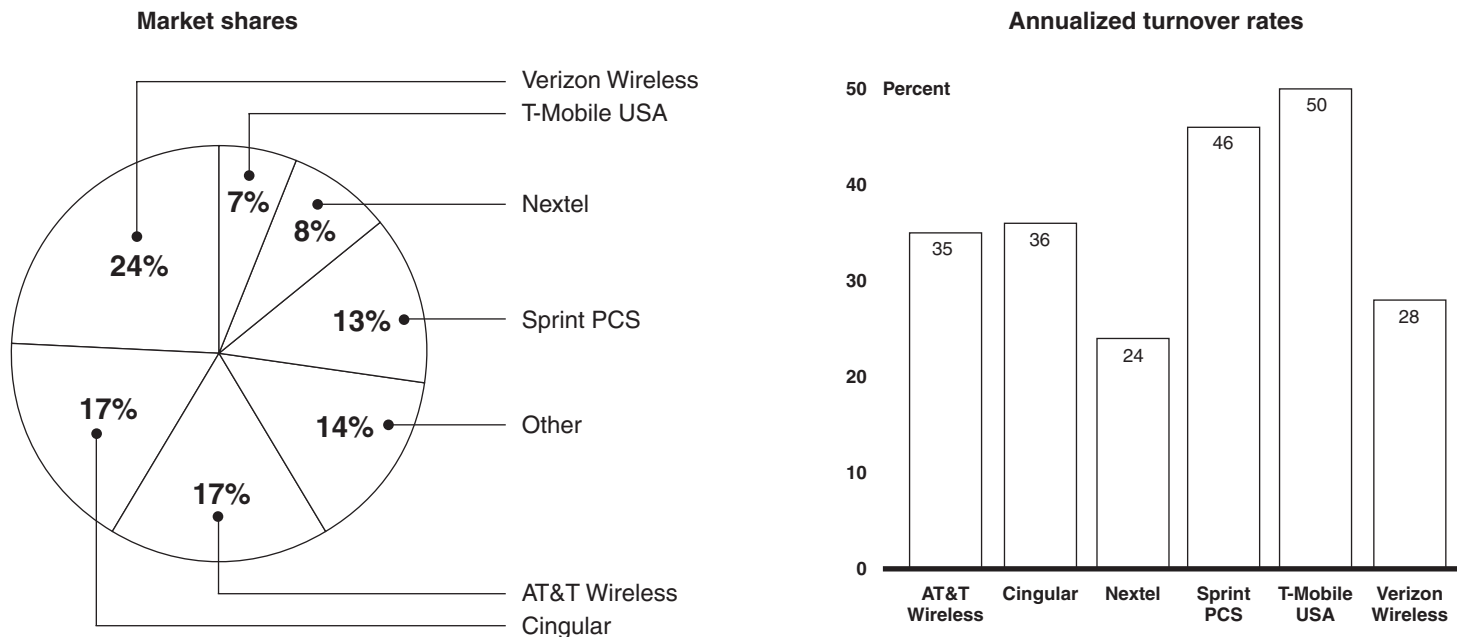
mobile phone industry,<sup>16</sup> noted that the industry has experienced increased numbers of competitors in various markets, innovation, lower prices for consumers, and increased diversity of service offerings. Regarding the number of competitors, for example, FCC reported that 94 percent of the U.S. population lives in counties with access to three or more mobile phone carriers, and 80 percent lives in counties with at least five carriers. FCC reported further that there are six national carriers: AT&T Wireless, Cingular, Nextel, Sprint PCS, T-Mobile USA, and Verizon Wireless. Other large regional carriers, including ALLTEL Corp., Western Wireless Corp., United States Cellular Corp., and Dobson Communications Corp., are also active in the market.

Data we obtained from Yankee Group, Inc. (a market research firm specializing in telecommunications issues) for the third quarter of 2002 are consistent with the competitive picture of the industry provided by FCC's annual report. These data, presented in figure 4, show that none of the six national carriers dominates the national market. Their market shares range from T-Mobile USA's 7 percent to Verizon Wireless's 24 percent. This figure also shows that each of the carriers was experiencing a substantial level of customer turnover during 2002, ranging on an annualized basis from Nextel's 24 percent to T-Mobile USA's 50 percent. The percentage of mobile phone customers who change carriers in a given year suggests that carriers are actively competing.

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<sup>16</sup>See Federal Communications Commission, *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, FCC 02-179 (Washington, D.C.: July 3, 2002).

**Figure 4: U. S. Market Shares and Annualized Turnover Rates for Mobile Phone Service Carriers, Third Quarter, 2002**



Source: Yankee Group.

Note: GAO analysis of Yankee Group data.

FCC has concluded that competition is sufficient to provide incentives for carriers to meet consumers' expectations and desires for call quality. For example, in its 2000 biennial review to determine whether any of its rules were no longer necessary as a result of the development of meaningful competition among mobile phone service carriers, FCC removed requirements that carriers provide consumers with information showing their reliable coverage areas. These requirements had been placed on the original cellular services, but had not been placed on newer mobile phone services. FCC found that although carriers providing newer mobile phone services were not required to supply consumers of these services with coverage information, they nevertheless provided these consumers with the same types of information that they provided to consumers of the original cellular services. As a result, FCC concluded that competitive pressures were strong enough to ensure that carriers would continue to supply consumers with information on coverage, even after FCC removed

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the requirement.<sup>17</sup> However, some consumer advocates have questioned whether competitive pressures are strong enough to ensure that carriers will provide consumers with adequate information on coverage. Recently, in February 2003, the Chairman of FCC stated that competition provides incentives for carriers to improve call quality.<sup>18</sup> Specifically, he noted that to attract and keep customers, carriers are having to offer better packages of rates, coverage, and service quality than their competitors.

Although FCC relies primarily on the marketplace to determine the level of call quality, it has also acted to provide consumers with additional information on the nature of mobile phone service and the types of problems that consumers may encounter. FCC now provides the public with information on the quantity and types of complaints and inquiries it receives concerning mobile phone service. This information is updated quarterly. FCC provides additional information to consumers through its brochure on mobile phone service, which is posted on FCC's Web site<sup>19</sup> and appears in appendix III of this report. This brochure explains the nature of mobile phone service, including coverage, other call quality issues, pricing, and handset features. FCC has also suggested questions that consumers should ask carriers when purchasing service and recommended that consumers obtain information from neighbors and coworkers concerning the call quality they receive from various carriers. In addition, FCC has taken action to promote the public interest in the area of implementing enhanced 911 service (E-911) for mobile phones. This service will allow emergency responders to determine the location of a mobile phone caller within some specified area.

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<sup>17</sup>At the same time, FCC removed the requirement that cellular service carriers notify FCC if they lacked the capacity to service certain customers.

<sup>18</sup>Letter from FCC Chairman Michael Powell to Senator Charles E. Schumer, dated February 5, 2003.

<sup>19</sup>See [www.fcc.gov/cgb/wirelessphone.pdf](http://www.fcc.gov/cgb/wirelessphone.pdf).

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## FCC Reports Annually on Competitive Market Conditions in the Mobile Phone Industry but Does Not Include Information on Call Quality

At the direction of the Congress, FCC has issued seven annual reports and analyses of competitive market conditions in mobile phone services. The Congress stated that the report should include an identification of the number of competitors in various commercial mobile services, an analysis of whether or not there is effective competition, an analysis of whether any competitors have a dominant share of the market, and a statement of whether additional providers or classes of providers would be likely to enhance competition. FCC's reports have concentrated on a discussion of the structure of the industry, especially the number of competitors in the marketplace and their location. In addition, the reports include a discussion of the number of subscribers, the prices charged for services, deployment in rural areas, and information on features provided by carriers.

Call quality is an important aspect of mobile phone service, and FCC said that carriers appear to be competing for customers in this area. However, FCC has not included call quality, beyond a discussion of the number of carriers providing service, in its annual analysis of whether or not there is effective competition in mobile phone services. By way of contrast, the Office of Telecommunications (OFTEL) in the United Kingdom, the regulatory body that monitors competition in telecommunications markets in that country, includes call quality in its reports on competition in the mobile phone industry.<sup>20</sup> As part of its ongoing monitoring of competition, OFTEL conducts quarterly surveys of mobile phone users. From these surveys OFTEL has reported that reception quality and geographic coverage are among the most important reasons for consumers in that country to choose a carrier. In addition, OFTEL has used the information it collects on network performance and other factors to determine that there is effective competition among carriers regarding those aspects of service that we have identified as call quality.

Although, at the time of our review, FCC had not indicated that it planned to include call quality in its annual report on competitive market conditions in the mobile phone service industry in the future, it was attempting to improve the overall quality of the data used in that report. For example, FCC held hearings in February 2002 in order to improve the quality of the data that would be used in its seventh annual report, which was released in

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<sup>20</sup>See for example United Kingdom Office of Telecommunications, *Effective competition review: mobile—A Statement issued by the Director General of Telecommunications*, (London, U.K.: Sept. 26, 2001).

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July 2002. Participants at those hearings noted several shortcomings in the data used for the report and analysis of competitive market conditions, including FCC's almost sole reliance on unaudited data from industry trade associations and financial analysts, the failure to include consumer input, and the lack of credible data on prices and profits. Hearing participants also noted a marked contrast between the data regularly collected in other industries such as the airline and electricity industries. In those industries, oversight agencies have access to data on operations and the actual prices paid by consumers. With regard to measuring the extent of competition, FCC has noted some limitations in the data they collect for their congressionally mandated annual report. Specifically, in the seventh report, FCC noted that—as a result of treating carriers that serve any part of a county as if they served the entire county—the report likely overstates the number of carriers serving consumers in various locations. Thus, both the amount of coverage and the extent of competition are likely to be overstated.

In recognition of these continuing data limitations, FCC issued a Notice of Inquiry in December 2002 seeking comment on how it could gain more detailed, comprehensive, and independent data to use in its 2003 report on competitive market conditions.<sup>21</sup> According to the notice, FCC was looking for data that would allow it to evaluate the extent to which consumers can choose among mobile phone service carriers as well as services and technologies. Specifically, FCC was looking for information on a broad range of items related to the structure and performance of the industry. And, for the first time, FCC included quality of service as an area that might be explored in the report. The 13 organizations that responded to the inquiry either did not comment on service quality or asserted that data on service quality were not needed. The consumer advocates who have raised concerns about call quality did not respond to this notice. Two of the consumer advocates said that they support efforts for FCC to collect and report more information on call quality, but they did not respond to the notice because of more pressing priorities at that time.

In some other countries, such as Australia, France, and the United Kingdom, regulators collect network performance information or survey consumers to determine their level of satisfaction or the extent to which

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<sup>21</sup>See Federal Communications Commission, *Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, Notice of Inquiry, FCC 02-327* (Washington, D.C.: Dec. 13, 2002).

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they are knowledgeable about certain aspects of mobile phone service. For example, in France, the French regulatory authority for telecommunications conducts its own tests of call quality to determine if certain carriers are meeting the call quality requirements specified in their licenses. These tests have generally been conducted in cities with 50,000 or more inhabitants. As noted above, in the United Kingdom, OFTEL conducts quarterly surveys of business and residential phone users. These surveys allow the agency to track consumer satisfaction rates as well as measure consumer knowledge about mobile phone service, including the availability of a range of price plans. In addition, OFTEL collects network performance and capital investment data from mobile phone service carriers. In Australia, the Australian Communications Authority also collects and publishes information on various aspects of consumer satisfaction and quality in its annual report on telecommunications performance.

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### Concerns Have Been Raised, but Available Data Are Inconclusive on Extent of Call Quality Problems

Interested parties, such as state officials and consumer advocates, have raised concerns about mobile phone call quality. Fully assessing the extent of call quality problems would likely require network performance data from the carriers as well as information on the extent to which consumers are satisfied or dissatisfied with the call quality of their mobile phone service. Carrier network performance data are not available to the public and are not reported to FCC. Carrier data on complaints are also not available and customer complaint data from other sources, such as FCC, FTC, states, and consumer organizations, do not provide reliable measures of the extent to which customers are dissatisfied with their call quality. Consequently, we have only the results of our survey of mobile phone customers on which to base our assessment of the extent of call quality problems. We estimate from the results of this survey that, while mobile phone customers are experiencing call quality problems, a fairly high percentage are satisfied with their current overall level of call quality.

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### Concerns Have Been Raised about Mobile Phone Call Quality

Some state utility commissioners have been expressing concerns about what they say are an increasing number of consumer complaints about mobile phone service. Their trade association, the National Association of Regulatory Utility Commissioners (NARUC), sponsored panels on mobile phone service issues at their quarterly meetings held in July and November 2002. The topics covered by the panels included local number portability, service quality, cost, and best practices for carriers to better serve their customers. However, NARUC's Consumer Affairs Committee defeated a



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proposed resolution to have mobile phone carriers provide consumers with adequate service area coverage information when making purchase decisions and to have FCC monitor this information. As a result of the panel discussion held in July and carriers' desires to talk to state commissioners about the issues raised there, in October 2002 NARUC and FCC facilitated an informal discussion of these issues between concerned state officials and mobile phone service carriers. Following this meeting, NARUC began developing a list of suggestions for FCC and mobile phone service carriers. These suggestions included FCC reporting on complaints by carrier and carriers giving consumers a 15- to 30-day period during which they could opt out of new service contracts.

At least two states are investigating whether carriers' advertising claims about call quality are being met. An official with the New York Attorney General's office told us that the office is concerned that two major carriers advertise coverage areas that appear more extensive than they, in fact, are. Meanwhile, the California Public Utilities Commission is investigating whether another major carrier has adequate coverage in customers' area of use and sufficient system capacity to meet the claims it makes about its service. A number of lawsuits raising questions involving coverage claims have also been filed in state courts.

The press and consumer advocates have raised concerns about call quality as well. For example, over the last couple of years, articles on these issues have appeared in several well-known, widely read publications, including *Forbes Magazine*, the *Wall Street Journal*, the *Washington Post*, and the *New York Times*. In addition, several consumer advocacy groups—including the Wireless Consumers Alliance, AARP (formerly known as the American Association of Retired Persons), and Consumers Union—have raised concerns about the coverage and price information consumers receive when buying mobile phone service, consumers' ability to complete calls, and the cost of terminating contracts if call quality is not adequate.

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## Carriers Provided Limited Information on Extent of Call Quality Problems

Carriers said that information on blocked and dropped calls is collected at each base station in their networks. However, none of this network performance data is publicly available nor are the carriers required to report this information to FCC. As part of our effort to determine the extent to which calls cannot be completed or lack clarity, we asked the six largest carriers if they would be willing to provide us such data. All of the carriers declined. The reasons given for not providing the data include the following:

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- The information is business sensitive and proprietary. Revealing it could damage a carrier's competitiveness by alerting its competitors to the strengths and weaknesses of its network.
  - The information would not be useful to consumers trying to compare one carrier's performance with that of another carrier. Data would not be suitable for comparisons because carriers do not measure performance using a single set of standards. Also, systems using different transmission technologies respond differently to overcrowding on the network.
  - The information might not be completely accurate. For example, if callers turn off the power on their phones to end a call instead of pressing the "end" button, the network might record that as a dropped call.
  - Because their networks are changing rapidly, network performance data would be out-of-date before it could be used.
  - Performance is affected by various transient factors, such as time of year, weather, and unusual periods of demand that tax network capacity.

While carriers did not provide us with detailed information on blocked and dropped calls, network officials at two carriers said that their goal was to have a 98 percent call-completion rate. That is, the calls would go through and not be dropped before they were completed at least 98 percent of the time on average. These officials and those at other carriers said that 98 percent is generally the industry standard; however, they noted further that this standard for completed calls is a network average. Thus, even if carriers were meeting that standard, performance at various geographic locations or times of day could differ substantially from the network average. Because consumers use their phones at specific locations and times of day, these network averages may not be useful in helping them compare one carrier with another.

Network information can also be collected through "drive tests," which are generally performed along major road arteries at various times of the day. These tests are done in moving vehicles that use computers to simultaneously place calls on the networks of various carriers. The computer then records whether calls went through and whether they were dropped within some specified call time, such as 2 minutes. These tests are performed by the carriers themselves and by contractors such as Telephia.

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Data from drive test contractors are also proprietary; however, Telephia has performed tests for CTIA—an industry trade association—and Consumers Union, and these entities have shared that information with the public.

- CTIA's July 2001 study measured various aspects of mobile phone call quality in core urban and suburban areas. The study found that between November 1999 and April 2001 there was no change in overall call quality as measured by the percentage of time a call goes through with adequate sound quality. During this period, the percentage of blocked calls went down in both the core urban and suburban areas, while dropped calls rose in suburban areas. Telephia concluded that, at the time of their study, on average, consumers could place, hold, and complete calls of acceptable audio quality 96 to 99 percent of the time.
- In the February 2002 issue of *Consumer Reports*, Consumers Union published averages of call quality data that Telephia had collected in 9 major metropolitan areas—New York, Boston, Philadelphia, the District of Columbia, Los Angeles, Dallas, Houston, Chicago, and Detroit—in October 2001. These data show that on Telephia's 5-point scale—with 1 being the worst service and 5 the best—call quality ranged from a low of 3.3 in Houston to a high of 4.7 for Philadelphia. Consumers Union notes that these are averages of individual carrier data. In its February 2003 issue of *Consumer Reports*, Consumers Union used a survey of its subscribers to rank carriers for the first time in six major cities.

Some carriers also said that they have detailed coverage and service maps that are based on engineering models that predict service rather than on actual service data. Again, carriers did not share these maps with us for several reasons similar to those for not providing actual network performance data. The reasons included competitiveness, accuracy, and timeliness of data.

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### Consumer Complaint Data Provide a Limited Indication of Call Quality Concerns

Consumer complaint data are a potential source of information on customer dissatisfaction with their mobile phone service, but these data are either not publicly available or suffer from methodological limitations. The carriers were unwilling to share information on the quantity and kinds of complaints they receive. Some complaint data are available from other sources, including federal and state government agencies, consumer advocates, and Web sites. However, these complaint databases are not adequate to determine the extent of call quality problems because they do

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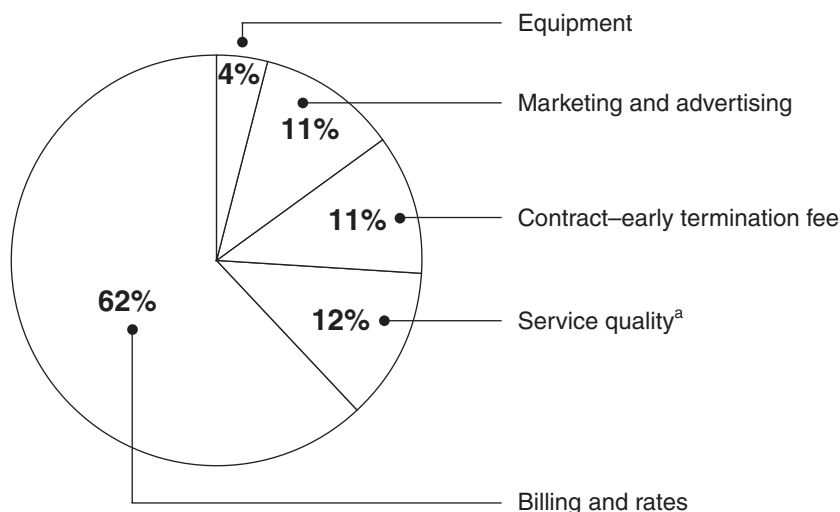
not employ a scientific method in collecting the data. Instead, they depend on individual, dissatisfied consumers to know where to call or write, and to take the time to do so. In addition, many of the groups collecting complaints said that the categorization of complaints was difficult and, as a result, complaints were probably not being categorized in a consistent manner.

*Federal government:* FCC takes complaints about mobile phone service that it receives from consumers and others and refers them to consumers' carriers for resolution. FCC defines a complaint as a communication received from or on behalf of an individual that alleges harm or injury and seeks relief. It accepts complaints from consumers by phone, by facsimile, through the Internet, or by electronic or regular mail.<sup>22</sup> FCC has been receiving consumer complaints about mobile phone services and referring them to consumers' carriers since the mid-1980s. In the spring of 2001, FCC began categorizing complaints and, in fall 2001, began publishing complaints by category. However, officials cautioned that their complaint numbers could include requests for information as well as complaints, and that the existence of a complaint against a carrier does not necessarily indicate wrongdoing by that carrier. FCC also said that it tracks complaints to identify trends in types of complaints or to determine if a carrier has received excessive numbers of complaints. In either instance, FCC said that it contacts carriers and asks them to provide an explanation. Based on feedback from carriers and consumers, FCC estimated that as a result of this process, consumer complaints are resolved to the satisfaction of the consumer close to 80 percent of the time. Should complaints go unresolved or should a carrier receive excessive numbers of complaints without an acceptable justification, a carrier could be subject to an FCC enforcement action. FCC officials noted that they have not been categorizing complaints for a long enough time to show any trends. In 2002, FCC logged about 14,000 consumer complaints about mobile phone service. As figure 5 shows, over 60 percent of the complaints concerned billing and rate issues. The next largest categories were service quality (a category that includes call quality issues), contract-early termination fee, and marketing and advertising.

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<sup>22</sup>Complaints can be filed by phone at 1-888-Call-FCC (1-888-225-5322) voice, 1-888-Tell-FCC (1-888-835-5322) TTY; by facsimile at 202-418-0232; through the Internet at [www.fcc.gov/cgb/complaints.html](http://www.fcc.gov/cgb/complaints.html); by e-mail at [fccinfo@fcc.gov](mailto:fccinfo@fcc.gov); or by mail to Federal Communications Commission, Consumer & Governmental Affairs Bureau, Consumer Complaints, 445 12<sup>th</sup> Street, SW, Washington, D.C. 20554.

**Figure 5: FCC Mobile Phone Consumer Complaints by Category, 2002**



Source: FCC.

Note: GAO analysis of FCC data.

<sup>a</sup>FCC includes those items that we have identified as call quality, such as dropped calls and dead spots, in its service quality category; however, it also includes complaints about not being able to use a mobile phone because the carrier had ceased to do business in the consumer's area or ceased to do business altogether.

FTC also receives complaints about mobile phone service and forwards them to FCC.<sup>23</sup> FTC compiled their mobile phone complaint data by the complaining consumer's state and by the carrier's state, but could not categorize the data by type of complaint. According to an FTC official, in 2000, 2001, and the first half of 2002, FTC's mobile phone complaints were equal to or less than one-half of 1 percent of all of the complaints FTC received about all products.

*State public utility commissions:* State public utility commissions vary on whether they collect complaints about mobile phone service. Thirty-three state commissions responded voluntarily to our request for information on how they regulate mobile phone service or categorize complaints. Of these

<sup>23</sup>FTC has broad law enforcement responsibilities under the Federal Trade Commission Act, 15 U.S.C. § 41 et seq. With certain exceptions, the statute provides the agency with jurisdiction over nearly every economic sector. Certain entities, such as depository institutions and common carriers (e.g., telephone companies), as well as the business of insurance, are wholly or partly exempt from FTC jurisdiction.

state commissions, 23 said that they direct consumers with complaints to their state attorneys general, FCC, or the mobile phone service carrier identified in the complaint. Six state commissions reported that they collect and categorize complaint data from mobile users. While most of the commissions who collect data categorize some complaints as billing complaints, they use a variety of categories for the other complaints they receive. For example, one state categorizes its other complaints as tower issues, while another state uses many categories, including dead zones and dropped calls, company practices, service quality, and contracts. Of the state commissions we heard from, California was the only one that provided us with specific data on call quality complaints gathered over a number of years. As table 1 shows, complaints about call quality were about 8 percent of total mobile phone complaints for 2002.

**Table 1: Consumer Complaints about Mobile Phone Service Filed with the California Public Utilities Commission, 1999-2002**

Year	Company practices	Disputed bills	Call quality <sup>a</sup>	Contract issues	Miscellaneous <sup>b</sup>	Totals
1999	47	1,135	205	9	518	<b>1,914</b>
2000	112	1,550	231	13	363	<b>2,269</b>
2001	232	3,379	459	37	901	<b>5,008</b>
2002	117	1,386	186	13	585	<b>2,287</b>

Source: California Public Utilities Commission.

Note: GAO analysis of California Public Utilities Commission data.

<sup>a</sup>Includes dead zones, dropped calls, and static.

<sup>b</sup>Miscellaneous includes a variety of issues such as billing format and back billing issues, cramming, advertising and marketing issues, rate design, and taxes and surcharges.

*Consumer advocates:* Two consumer groups—the Better Business Bureau and the Wireless Consumer Alliance—said that they receive and collect complaints about mobile phone service. However, both groups said that they do not collect complaints in a systematic way and use broad, general categories to classify complaints. The Better Business Bureau collects complaints on mobile phone equipment, supplies, and services. The Bureau said that, between 1998 and 2002, complaints in this category rose from 615

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complaints to 21,534 complaints.<sup>24</sup> The Bureau was unable to identify whether the increase in complaints was attributable to call quality issues or to other issues in the mobile phone industry. Some consumer advocates, such as the Utility Consumer's Action Network in San Diego, California, have Web sites where consumers can post information about carriers' dead spots—locations within carriers' coverage areas where service is not available. Generally, these data are not verified nor are they regularly updated if service becomes available.

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## Our Survey on Call Quality Yielded Mixed Results

To obtain information about the extent to which consumers are concerned about various aspects of mobile phone call quality, we included questions on call quality in a national telephone survey of adults conducted in November 2002. We projected the results of the survey to the population of adult mobile phone users. However, we are concerned about the potential for those who did not respond to the survey to differ from those who did respond in some way that could affect the results. We have no explicit reason for suspecting that the survey suffers from this shortcoming. Instead, our concern arises out of the large sample of phone numbers dialed to produce about 1,000 survey respondents. Some users may not have answered the call because they could not identify the caller on their caller identification system. Others may not have been available during the calling time, and still others may have been unwilling to participate in the survey when they were contacted. (Appendix I includes a discussion of the survey methodology and its limitations; appendix II includes the survey instrument and the responses.) The results of the survey provided mixed evidence on the extent to which consumers are troubled by call quality problems.

Based on the survey responses, we found that a fairly high percentage of consumers were satisfied with the overall call quality of their mobile phone service. Using the results of our survey of mobile phone users, we estimate that about 83 percent of consumers were satisfied with their call quality and about 9 percent were dissatisfied. The sampling error for our survey was plus or minus 8 percentage points or less unless otherwise noted. The other users were neither satisfied nor dissatisfied (see fig. 6). In addition, we estimate that about 47 percent of adult mobile phone users believed their call quality was improving, while about 5 percent believed that their

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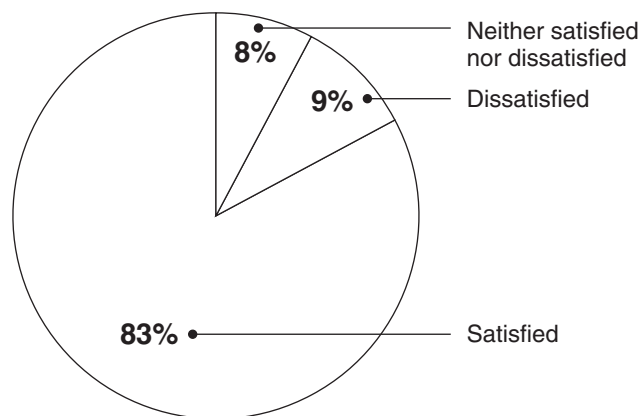
<sup>24</sup>According to CTIA, mobile phone subscribership grew by over 103 percent between December 1998 and December 2002.

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call quality was getting worse. The other users believed that call quality had not changed since they acquired their phones. Finally, we estimate that 83 percent of adult mobile phone users would not be willing to pay more for better quality calls, while 12 percent would be willing to pay more and another 5 percent would be willing to pay more under certain conditions.

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**Figure 6: Overall Customer Satisfaction with Call Quality, November 2002 Consumer Survey**



Source: GAO.

Despite the many mobile phone customers who appeared to be satisfied with their overall call quality, a number of survey respondents reported that they were experiencing specific problems. Using the results of our survey, we found that although some mobile phone users never had problems placing calls, some had problems occasionally, and others experienced call quality problems on 10 percent or more of their calls (see table 2). As shown in the last column of table 2, we estimate that about one-fifth of customers were not able to get through on 10 percent or more of their calls because the cell from which they were calling was at capacity, and about one-third of customers could not complete 10 percent or more of their calls because they were in a cell where their carrier did not provide service.



**Table 2: Mobile Phone Call Quality Problems Based on November 2002 Consumer Survey**

Type of problem <sup>a</sup>	Percent of users who did not experience the problem	Percent of users who had problem on fewer than 10 percent of their calls	Percent of users who had problem on 10 percent or more of their calls
No coverage	22	44	34
Fast busy	32	47	21
Dropped calls	39	39	22
Poor sound	32	38	30

Source: GAO.

Note: Row percentages may not add to 100 due to rounding. Individual respondents may have reported having several problems. Therefore, the column percentages cannot be added to determine the total percentage with or without problems.

<sup>a</sup>No coverage – consumers cannot complete calls because their carrier does not provide service in the cell where they are placing the call and does not have a roaming agreement with another carrier that provides service in that cell.

Fast busy – consumers cannot complete calls because the cell from which they are calling is at capacity. Dropped calls – consumers lose connections during a call because they have moved into a cell where their carrier either does not have service or the cell is at capacity.

Poor sound – consumers cannot hear their calls clearly because of static or feedback

Our survey also indicates that call quality problems vary, depending on where consumers are when they are making or receiving calls. For example, we estimate that about 45 percent of users experienced problems when they are in buildings, 37 percent when they were in a vehicle, and 18 percent when they were outside. Carriers and other experts note that reception inside buildings may not reflect the call quality being provided in the area. As mentioned earlier, buildings may be constructed of materials that do not allow mobile phone radio waves to pass easily into their interiors. We found that some businesses have added devices, such as antennas and signal repeaters, inside their buildings to facilitate better in-building coverage. In buildings where multiple carriers serve customers or residents, such as shopping centers, office buildings with multiple tenants, or apartment buildings, improving call quality may be the responsibility of the building owner rather than any one service carrier.

Our survey also sheds some light on why consumers change carriers. We estimate from our survey that about 73 percent of consumers made carrier decisions for themselves, while the remaining 27 percent had someone else, such as an employer or family member, choose their carrier. For consumers who made carrier decisions for themselves, we estimate that 35

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percent had changed carriers since they first acquired mobile phones and that better call quality was an important incentive for those changes. Yet, call quality may have been a less important incentive than getting a better price. That is, we estimate that for about 55 percent of the consumers who had changed carriers, obtaining better call quality was a very or somewhat important reason for the change. However, we estimate that for a larger proportion of consumers who had changed carriers—about 83 percent of them—price was very or somewhat important. Because only a small number of survey respondents had changed carriers—about 145, the sampling error for these estimates is plus or minus 13 percentage points or less.

The ability of consumers to take advantage of the range of choices in the marketplace, which provides incentives for carriers to respond to customer demands for call quality, depends to some degree on customers being able to switch from lower-quality carriers to higher-quality carriers. We estimate that while about 35 percent of those who made carrier decisions for themselves had changed carriers since they first started using their phones, about another 28 percent wanted to change carriers, but did not. We asked customers who wanted to change carriers, but didn't, whether certain factors were important to their decision. These factors included having to pay a fee to terminate a contract before the contract period ended and not being able to keep their current mobile phone number—the local number portability issue—or their handsets when they change carriers. Respondents could cite more than one reason as being important. We estimate that for about two-thirds of adult mobile phone users who wanted to change carriers but did not, the termination fee was a very or somewhat important factor. Further, we estimate that for about 41 percent of adult mobile phone users, the lack of local number portability was very or somewhat important; and for a similar proportion, not being able to keep their handset was a very or somewhat important factor. Because only a small number of survey respondents—about 115—had considered, but not changed carriers, the sampling error for these estimates is plus or minus 15 percentage points or less.

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## Interested Parties Have Suggested Actions for Improving Call Quality

Interested parties, such as state officials and consumer advocates, who have raised concerns about mobile phone call quality have also suggested actions—such as local number portability or mandating that certain information be provided to consumers—that might lead indirectly to changes in call quality by making the market more competitive or providing consumers with better information. Some interested parties have also

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suggested actions, such as establishing minimum call quality standards, by which call quality might be improved more directly. All of the suggestions have various benefits and drawbacks.

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### Local Number Portability Could Increase the Competitiveness of Mobile Phone Markets

Several interested parties have supported adoption of local number portability, which will make the market for mobile phone service more competitive by reducing the costs to consumers of changing carriers. This may affect the level of call quality because customers who are dissatisfied with their current carrier will be more likely to change to a carrier with better call quality if they do not have to experience the costs and inconvenience associated with changing their mobile phone numbers. As a result, carriers would have a greater incentive to upgrade their call quality to keep their customers. The costs and inconvenience associated with changing a mobile phone number are likely to grow for consumers as mobile phone service becomes an ever more important part of everyday life. Carriers are now scheduled to implement local number portability in November 2003.<sup>25</sup>

Other countries have had varying experiences with number portability and support for it varies among U.S. carriers. Officials of Hong Kong, China said that local number portability has increased the competitiveness of their mobile phone market and has led to a dramatic fall in the price of that service. Australian officials have reported, however, that not many consumers are changing carriers and taking their numbers with them. They report that termination fees may still be discouraging customers from changing carriers prior to the expiration of their contracts. Some U.S. carriers have said that implementing local number portability is difficult and expensive and will thus offset the savings consumers experience from not having to change their phone numbers. These carriers have been successful in getting FCC to extend the deadline for implementing local

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<sup>25</sup>Under FCC's rules promulgated in its *Memorandum Opinion and Order*, FCC-02-215 (Washington, D.C.: July 2002) a commercial mobile phone carrier located in one of the largest 100 metropolitan statistical areas that receives a request by February 24, 2003, from another carrier must be capable of providing local number portability by November 24, 2003. For requests received after February 24, 2003, carriers must be capable of providing local number portability, depending on the upgrades needed, within 30 to 180 days after November 24, 2003, or 30 to 180 days after receiving the request, whichever is later. Outside of the largest metropolitan statistical areas, the other carriers must be able to provide local number portability within 6 months of the request or within 6 months of November 24, 2003, whichever is later.

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number portability from the original June 1999 to the new November 2003 deadline.<sup>26</sup>

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### Many Proposals that Center on Giving Consumers More Detailed Information Are Difficult to Implement

Many of the actions that have been proposed to give consumers more information about call quality—more detailed coverage information, information on dropped and blocked calls by carrier, or data on complaints against various carriers—could be meaningful to consumers choosing among carriers if they were measured consistently across carriers. This issue was evident in Australia where the Australian Communications Authority requires that carriers report regularly on a set of key performance indicators defined by the Authority. In its 2001 to 2002 Telecommunications Performance Report, however, the Authority did not publish these data because, while all of the carriers were in compliance with the requirements, they were not reporting these data to the Authority in a consistent, comparable manner.<sup>27</sup>

We have already noted several issues that make it difficult to measure call quality or complaints. For example, we have described how blocked or dropped call rates and coverage might change over relatively short periods of time because of changes in carriers' networks or other transient factors such as weather. In addition, we have described how collecting and reporting complaints is difficult because of the need to classify them consistently and to determine if they are valid. Officials at FCC, the carriers, and state officials we spoke with mentioned several other limitations to finding consistent measurements of call quality:

- Carriers might have to start measuring things that they had not previously been measuring. This would likely raise costs for these carriers. A representative of smaller carriers said that providing any additional information to FCC would be especially burdensome for

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<sup>26</sup>CTIA and a major carrier have challenged how FCC applied the forbearance standard when requiring mobile phone service carriers to offer local number portability. In [FCC-02-205](#), FCC denied a petition to permanently refrain from enforcing local number portability requirements for mobile phone service carriers; instead, FCC granted a 1-year extension in the implementation of this requirement to November 2003. These parties have continued to contest the implementation of local number portability in the courts.

<sup>27</sup>See Australian Communications Authority, *Telecommunications Performance Report 2001-2002* (Melbourne, Australia: November 2002).

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them because these carriers do not have staff to collect and report the data.

- An official at one carrier explained that measurements could be created that give carriers using one technology an advantage over those using a different technology. That is, because TDMA technologies have a fixed capacity while CDMA technologies can trade off increased capacity for poorer sound quality, certain measures, such as number of times callers find the network overloaded, could benefit carriers that use CDMA over those who use TDMA.
- An FCC official noted that carriers might manage their businesses to improve their scores on whatever is being measured and reported rather than to better satisfy customers. For example, if the percent of dropped calls has to be reported, carriers may let sound quality deteriorate rather than drop the call.
- If the information comes directly from the carriers, someone—FCC or state officials—would need to monitor the measurements to ensure that all carriers were complying with the regulations, and this could add to the cost of government oversight.

As a result of these potential drawbacks, FCC and industry participants and representatives note that efforts to require FCC or carriers to report more detailed call quality information or complaints could drive up the price of mobile phone service, limit entry of new carriers, create an uneven playing field in terms of carriers using various technologies, provide the marketplace with measurements that may not reflect better service, and drive up the costs of government oversight of the industry.

According to some parties, giving customers longer trial periods before they have to commit to a 1- or 2-year contract—an option that provides customers with a first-hand opportunity to ascertain whether a carrier's call quality meets their needs—could avoid some of these potential drawbacks. The Consumer & Governmental Affairs Bureau at FCC recommends that consumers read contracts thoroughly and insist on being given a period of time to test the phone and service before being tied to a long-term contract. FCC officials noted that no information from carriers is going to be tailored to the specific usage patterns of individual consumers. For example, because some building materials block radio signals in areas where carrier information shows that service is available, service may not be available inside some buildings where customers want to use mobile phones. The

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largest carriers have been extending their trial periods and now generally allow 14 to 30 days. Some interested parties have suggested that longer periods of up to 2 months would be more effective. However, giving longer trial periods may raise the cost of signing up customers and could lead to an increase in the price of service.

FCC, industry representatives, and the press have also noted that consumers have access to various sources of information other than the carriers. For example, some have pointed to the brochure on the FCC Web site, which is included as appendix III in this report. In addition, they noted that information is available from news and magazine stories and from various Internet sites. Finally, they noted that one of the best sources of information on call quality may be neighbors and coworkers who are using their phones in ways that are similar to a new customer's potential use.

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### Suggestions Included Setting Minimum Call Quality Standards

To more directly affect call quality, some interested parties suggested that carriers should be required to meet certain minimum quality standards, such as a minimum percentage of calls that must be successfully completed. As a result, consumers could expect that all calls would meet these minimum standards. This proposal would require establishing and measuring a common set of network performance standards. In addition, some entity would need to oversee compliance with the standard. FCC officials said that requiring a specific level of service quality, such as a percentage of calls that must be completed, might actually reduce the amount of competition and service in the mobile phone market. Officials said, for example, that if a certain level of service had to be provided, some carriers now offering service might have to leave a particular market. If fewer carriers provide service in these markets, prices would likely rise, and consumers would likely have fewer choices. Moreover, in rural, mountainous, and other hard-to-serve areas where some service is now available, requiring minimal levels of service might discourage carriers from serving these areas at all.

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### Carriers Say They Are Taking Actions to Improve Call Quality

The national carriers we spoke with said that they recognize that call quality is important to consumers and that they are taking actions to improve call quality. However, carriers noted that they face financial and regulatory constraints when they attempt to add base stations to either provide service where none previously existed or increase network capacity. These constraints include the following:

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- Adding base stations involves capital expenditures. While carriers had easy access to capital markets in the 1990s, the downturn in the telecommunications industry made it more difficult for carriers to access these markets. In addition, carriers and financial analysts noted that carriers are facing a number of regulatory requirements—such as local number portability and E-911 service—and that, to meet these requirements, they must use scarce capital resources that could be used to build out their networks.
  - Adding base stations also involves securing suitable locations and zoning approvals. According to industry data, almost 36,000 antennas were installed between June 2000 and June 2002. Officials at all six of the national carriers we spoke with said that local zoning provisions limit their ability to site antennas in the most desirable locations. Some of these carriers said that it often takes many months to obtain permission to construct antennas.

Carriers noted that they could offset some of the need to build more base stations if the federal government would allocate additional radiofrequency spectrum for commercial mobile phone service. However, other commercial and government users are already using other parts of the spectrum that are suitable for mobile phone service. Thus, providing more spectrum has proved to be a difficult and contentious issue.<sup>28</sup>

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## Conclusions

As Americans have come to rely more on mobile phones to meet their business and personal needs, it is important that FCC evaluate whether competition is adequate to ensure that mobile phone consumers are receiving the level of call quality they desire and expect. However, FCC has not yet undertaken such an evaluation in its annual report on competitive market conditions in the mobile phone service industry. Collecting and analyzing information on call quality would provide an ongoing record to help determine whether the current regulatory framework for call quality is adequate or whether certain actions—such as establishing call quality

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<sup>28</sup>See U.S. General Accounting Office, *Defense Spectrum Management: More Analysis Needed to Support Spectrum Use Decisions for the 1755-1850 MHz Band*, [GAO-01-795](#) (Washington, D.C.: August 2001); *Telecommunications: Better Coordination and Enhanced Accountability Needed to Improve Spectrum Management*, [GAO-02-906](#) (Washington, D.C.: September 2002); and [GAO-03-277](#).

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standards, mandating additional consumer information, or reducing local government control over the siting of new base stations—are needed.

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## Recommendation for Executive Action

To assist FCC in determining whether further regulatory action concerning mobile phone call quality is necessary, FCC should include call quality in its congressionally mandated annual report on competitive market conditions in the mobile phone industry. This report should incorporate an analysis of whether market competition is effective in ensuring that carriers are meeting consumers' expectations and desires regarding call quality.

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## Agency Comments

We provided a draft of this report to FCC for review and comment. In its comments, which are reprinted in appendix IV, FCC said that it believes that the ability of consumers to make informed choices in the marketplace is critical to the growth of mobile phone services. FCC noted that competition and deregulation in the mobile phone industry have benefited consumers in several ways, including lower prices and an increased diversity of service offerings. FCC also noted that for carriers to attract and maintain customers, they must continue to offer better packages of rates, network coverage, and call quality than their competitors. FCC believes that these competitive forces will continue to compel carriers to monitor and improve the quality and performance of their networks. Regarding our recommendation, FCC agreed, to the extent possible, to include information related to call quality in its future reports on competition in mobile phone services. However, FCC noted some difficulties in implementing the recommendation, such as data not being readily available, the lack of objective performance standards, and difficulties in measuring call quality against consumer expectations.

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As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 5 days after the date of this letter. At that time, we will send copies of this report to the appropriate congressional committees; the Chairman, FCC; and other interested parties. We will make copies available to others upon request as well. In addition, the report will be available at no charge on the GAO Web site at [www.gao.gov](http://www.gao.gov). If you have any questions about this report,



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please contact me at 202-512-4325 or [shearw@gao.gov](mailto:shearw@gao.gov). Key contacts and major contributors to this report are listed in appendix V.

Sincerely yours,

A handwritten signature in black ink that reads "William B. Shear". The signature is written in a cursive style with a large initial 'W' and a long, sweeping tail on the 'r'.

William B. Shear  
Acting Director, Physical Infrastructure Issues

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# Scope and Methodology

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To respond to the objectives of this report, we gathered information from a variety of sources. First, we reviewed the relevant literature on mobile phone networks, the relevant laws and regulations governing the delivery of mobile phone service, and studies of competition and consumer satisfaction in the mobile phone industry in the United States and selected foreign countries. Second, we obtained the views of a variety of experts on various aspects of mobile phone call quality. These experts included government officials from the Wireless Telecommunications Bureau and Consumer & Governmental Affairs Bureau at FCC, FTC, and the offices of attorneys general or public utility commissions in California, New York, Illinois, Massachusetts, Nebraska, New Jersey, and Texas. We also contacted representatives of the six nationwide U.S. mobile phone service carriers—AT&T Wireless, Cingular, Nextel, Sprint PCS, T-Mobile USA, and Verizon Wireless. Representatives of all of the carriers except AT&T Wireless answered our questions in person or over the phone; AT&T Wireless responded to questions in writing. In addition, we interviewed representatives of the mobile phone industry's primary trade group, the Cellular Telecommunications & Internet Association; consumer advocates; lawyers representing various interested parties; financial analysts; consulting firms; companies that install equipment to improve call quality; and companies that conduct drive tests of the networks. Third, we provided questions on call quality for a nationwide phone survey of adult consumers that included questions on multiple topics submitted by various organizations. Finally, we reviewed Web sites to determine the types and quality of information on call quality available to consumers on the Internet.

To better understand the regulatory framework we reviewed the FCC rulemakings and notices that set up the original cellular rules, and other relevant rulemakings, hearings, and notices that relate to setting rules of the operation of mobile phone markets. We also examined the Communications Act of 1934, Omnibus Budget Reconciliation Act of 1993, and Telecommunications Act of 1996, the three major pieces of legislation that set the statutory framework for mobile phone markets. In addition, we reviewed several recent cases and court rulings, including several focusing upon the jurisdictions of the state and federal government over this sector. Furthermore, we examined FCC's recent annual reports on competitive market conditions in the mobile phone service industry. Finally, we spoke with mobile phone industry representatives and financial analysts to learn their views on the extent of competition.

To determine the extent to which consumers are experiencing call quality problems, we sought data regarding call quality problems through several means.

*Carriers and other firms:* We asked the six nationwide carriers for their data on the extent of call quality problems and other aspects of their services, including billing, contracts, marketing, and customer service. We also asked the carriers about factors they see affecting call quality. While all of the carriers provided us with some information about their networks, they did not provide us with geographic specific call quality data that we would need to help determine the extent of call quality problems. The carriers also provided us with information about factors that affect call quality, and we obtained further information on these factors by speaking with companies in investment banking, antenna leasing, and the development and manufacturing of mobile phone equipment. Finally, we contacted several companies that collect network performance data, including Telephia Inc., LCC International Inc., and Scoreboard. Some of these companies conduct “drive tests”<sup>1</sup> for the carriers. During these tests, computers are used to simultaneously place calls on the networks of various carriers. The computers then record whether calls went through and whether they were dropped within some specified call time, such as 2 minutes.

*Consumer complaints:* We attempted to determine the extent of call quality problems, as experienced by consumers. The six nationwide carriers were unwilling to share information on customer surveys or complaint data. We contacted the state public utility commissions to learn whether they collect complaint data on mobile phone service or otherwise regulate mobile phone service. Thirty-three state commissions responded voluntarily to our request for information on whether they regulate mobile phone service or categorize complaints. Of the six states that collect complaints, California and Texas provided us with their data. We collected consumer complaint data from FCC and FTC. We turned to consumer groups that collect such complaints—including the Wireless Consumer Alliance and Better Business Bureau—as well. Because none of these sources adhere to a common standard for categorizing complaints or a system to ensure that several sources are not collecting complaints from the same consumer, we were not able to use these data to reach overall conclusions about the extent to which consumers are experiencing call

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<sup>1</sup>Drive tests are generally performed in vehicles traveling along major road arteries.

quality problems. Finally, we reviewed sources of information on the Internet. Several sites allow consumers to report their experiences with their mobile phone service; however, none of the sites we visited said that they verify the information or delete it when it is no longer timely.

*Consumer surveys:* We collected data from consumer surveys. We spoke to officials at Yankee Group, J.D. Power & Associates, and AARP about the surveys they have conducted. Because these surveys did not provide all of the information about call quality in which we were interested, we also contracted with an international market research firm to administer 26 questions as part of a nationwide, multipurpose, Random Digit Dialing telephone survey of adults conducted between November 8 and 10, 2002. Our questions addressed issues such as call quality, satisfaction with the quality of mobile phone service, complaint-making practices, and factors involved in decisions to change companies. Five hundred fifty-two of the 1,027 survey respondents had mobile phones and answered at least some of the 25 questions in addition to the preliminary screener question. The survey results were weighted by various demographic characteristics—gender, age, race, and education level.

The survey results are derived from a sample of the population. This sample was one of a large number of samples that might have been drawn from that population. The results from the sample that was actually selected are subject to sampling error; that is, the extent to which they differ from what would have been obtained if information had been gathered from the entire population. We express confidence in the precision of survey results as 95-percent confidence intervals, for example, plus or minus 8 percentage points. For this survey, we estimate that for the survey questions that applied to all of the respondents who used mobile phones (417 or more) the 95-percent confidence intervals are plus or minus 8 percentage points, or less. Because fewer respondents answered the questions relating to changing carriers (between 112 and 144), the confidence intervals for these estimates are generally larger—plus or minus 15 percentage points, or less.

Practical difficulties encountered in conducting this survey may introduce nonsampling errors as well. As in any survey, differences in the wording of questions, the sources of information available to respondents, and the types of people who do not respond may have led to errors that we could not assess. We took several steps to minimize some of these nonsampling errors. For example, we developed our survey questions with the aid of a survey specialist and pretested the questions. However, we are concerned

about the potential for those who did not respond to the survey to differ from those who did respond in some way that could affect the results. We have no explicit reason for suspecting that the survey suffers from this shortcoming. Instead, our concern arises out of the large sample of phone numbers dialed to produce about 1,000 survey respondents—a response rate of about 13 percent of the estimated eligible population.<sup>2</sup> The survey results were weighted so that the overall demographic characteristics of our sample match the gender, age, race, and educational characteristics of the national population as measured in the Census Bureau’s March 2001 Current Population Survey. We have no basis for determining to what extent this weighting adjusted for the views of the 87 percent of the sample who were not interviewed.

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<sup>2</sup>Of the 19,194 numbers called, 4,572 numbers were ineligible for reasons such as the respondent’s telephone was not working or the number was not a residential household number. Of the remaining 14,622 numbers, for 1,027 of the numbers, an eligible respondent completed the survey; for 2,055 of the numbers, the telephone was answered, but the interview was not completed for reasons such as the appropriate respondent was not available or refused to participate in the survey. For the other 11,540 numbers, no interview was conducted for reasons such as there was no answer or the call was answered by an answering machine. As a result, we were not able to determine if these numbers met the eligibility requirements for our survey. Of these 11,540 telephone numbers, we estimate that 4,646 were eligible, for an overall estimated total of 7,728 numbers that met the eligibility requirements for our survey.

# Results of Consumer Survey on Mobile Phone Service

The following results, which are based on responses to our national telephone survey of adults in the United States, were used in our analysis of the extent to which consumers are experiencing call quality problems. Not shown are some of the interviewer's transitions between questions or explanations of the options for answering. After each question, the number of responses (n) that were included in our analysis is noted. For questions where the number of responses is greater than 400, the sampling error is plus or minus 8 percentage points or less. For the other questions the sampling error is plus or minus 15 percentage points, or less. Percentages may not add up to 100 percent due to rounding.

Question 1: Do you have a cell phone? (n=1,026)

Yes	56%
No	44%

Question 2: About how many times a week do you try to use your cellular phone to either make or receive phone calls? (n=566)

None	6%
1 - 20 times	55%
21- 50 times	20%
Over 50 times	20%

Question 3: How often do you have a problem making a call because you are in an area where there is no service? (n=567)

Never	22%
Less than 10 percent of the time	44%
Between 10 percent and one-third of the time	21%
More than one-third of the time	12%

Question 4: How often do you have a problem with getting a call through because you get a fast busy signal or a message that says the call failed? (n=566)

Never	32%
Less than 10 percent of the time	47%
Between 10 percent and one-third of the time	16%
More than one-third of the time	5%

Question 5: How often do you have a problem with a call being cut off or dropped before you finish a call? (n=566)

Never	39%
Less than 10 percent of the time	39%
Between 10 percent and one-third of the time	16%
More than one-third of the time	6%

**Appendix II**  
**Results of Consumer Survey on Mobile Phone**  
**Service**

**Question 6:** How often do you have a problem hearing or understanding what the other person on the phone is saying because of a bad connection or an echo? (n=569)

Never	32%
Less than 10 percent of the time	38%
Between 10 percent and one-third of the time	21%
More than one-third of the time	9%

**Question 7:** Where do any of these problems with the quality of your calls most often occur? (n=519)

Inside a building	45%
Traveling in a car or other vehicle	37%
Somewhere else outside	18%

**Question 8:** Now we would like to sum up your satisfaction with the overall quality of your cellular calls, including how often the calls go through, stay connected, and can be clearly heard. Are you satisfied, dissatisfied, or neither with the overall quality of your calls? (n=566)

Satisfied	83%
Very satisfied	47%
Somewhat satisfied	36%
Dissatisfied	9%
Very dissatisfied	3%
Somewhat dissatisfied	6%
Neither	8%

**Question 9:** Since you first started using cellular phones, do you think that the general quality of your cellular calls, including how often the calls go through, stay connected, and can be clearly heard, has improved, gotten worse or stayed the same? (n=563)

Improved	47%
Somewhat improved	25%
Greatly improved	22%
Gotten worse	5%
Gotten somewhat worse	4%
Gotten much worse	1%
Stayed the same	47%

**Appendix II**  
**Results of Consumer Survey on Mobile Phone**  
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**Question 10:** Consider the accuracy of the bills you receive for your cellular phone service and think about whether you have been charged for calls or services you didn't make or didn't sign up for. Would you say that you are satisfied, dissatisfied, or neither with the accuracy of your bills? (n=543)

Satisfied	81%	
Very satisfied		57%
Somewhat satisfied		24%
Dissatisfied	11%	
Very dissatisfied		4%
Somewhat dissatisfied		7%
Neither	8%	

**Question 11:** Considering what you pay for the package you get, the features you get on the phone, any problems you may have, and the quality of service you receive, are you satisfied, dissatisfied, or neither with the value you get for the money you pay? (n=548)

Satisfied	78%	
Very satisfied		45%
Somewhat satisfied		33%
Dissatisfied	15%	
Very dissatisfied		5%
Somewhat dissatisfied		10%
Neither	8%	

**Question 12:** Would you be willing to pay more than you are now paying to have higher overall call quality, including more completed calls, fewer dropped calls, and better connections? (n=565)

Yes	12%
No	83%
It depends	5%

**Question 13:** Have you been able to use your cell phone in all the areas and places you had expected when you purchased your service? (n=562)

Yes	74%
No	26%

**Question 14:** In the past year, did you ever complain about the quality of your calls to your cellular phone company? (n=571)

Yes	19%
No	81%

**Question 15:** In the past year, did you ever complain about the quality of your calls anywhere else, like the FCC, a state agency, the Better Business Bureau? (n=571)

Yes	1%
No	99%



**Appendix II**  
**Results of Consumer Survey on Mobile Phone**  
**Service**

Question 16: Have you used your cellular phone for 2 years or less or for more than 2 years? (n=571)

2 years or less	37%
More than 2 years	63%

Question 17: Are you the person who decides which cellular phone company's service you will use, or does someone else like another family member or employer make that decision for you? (n=569)

I decide	73%
Someone else decides	27%

Question 18: Since you first became a cellular service customer, have you changed your cellular phone company? (n=417)

Yes	35%
No	65%
Changed because original company quit providing service	0%

Question 19: How important in your decision to change cellular companies were call quality problems such as calls not going through, calls not staying connected, or not being clearly heard? (n=142)

Very	34%
Somewhat	21%
Not at all	45%

Question 20: How important in your decision to change cellular companies were billing problems such as incorrect charges or confusing billing? (n=144)

Very	28%
Somewhat	19%
Not at all	53%

Question 21: How important was the cellular phone handset provided by your new cellular company in motivating you to change cellular companies? This includes things like available features, or phone style and appearance. Were the differences in handsets very, somewhat, or not at all important? (n=142)

Very	15%
Somewhat	27%
Not at all	58%

Question 22: How important was getting a lower price in your decision to change cellular companies? (n=144)

Very	57%
Somewhat	26%
Not at all	17%

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**Appendix II**  
**Results of Consumer Survey on Mobile Phone**  
**Service**

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Question 23: Have you ever wanted to change your cellular phone company but did not change for some reason? (n=417)

Yes	28%
No	72%

Question 24: We would like to know why you may not have changed cellular companies, even though you wanted to. How important was a contract termination fee required by your current cellular company in keeping you from changing cellular companies? Was the contract termination fee very, somewhat, or not at all important? (n=112)

Very	52%
Somewhat	18%
Not at all	25%
No termination fee applied	6%

Question 25: How important was having to get a new telephone number in keeping you from changing cellular companies? Was having to change telephone numbers very, somewhat, or not at all important? (n=114)

Very	23%
Somewhat	18%
Not at all	58%
Number not changed	1%

Question 26: How important was the inability to continue using your current cellular phone handset in keeping you from changing cellular companies? Was having to change handsets very, somewhat, or not at all important? (n=113)

Very	21%
Somewhat	21%
Not at all	57%
Handset stayed same	1%

# FCC Fact Sheet on Mobile Phone Service

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Among its duties, FCC's Consumer & Governmental Affairs Bureau educates and informs consumers about telecommunications services. To this end, the Bureau has produced a number of consumer alerts and fact sheets, six of them dealing with mobile phone service. Among these, is a new fact sheet called *What You Should Know About Wireless Phone Service*. Posted on FCC's Web site at [www.fcc.gov/cgb/wirelessphone.pdf](http://www.fcc.gov/cgb/wirelessphone.pdf), the new fact sheet has been accessed an average of 60,000 to 70,000 times per month, according to FCC officials. This fact sheet appears on the following page.

what you should know *about*

# Wireless Phone Service



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# Coverage...



*“Coverage” refers to the geographic area where mobile telephone subscribers can use their cell phones\*. Cell phones must be able to receive or “pick up” a signal from a mobile telephone carrier’s network. Coverage varies by carrier and is determined by the extent to which carriers have built out their networks.*

## ■ ANALOG vs. DIGITAL

There are essentially two types of coverage: analog and digital. Calls made on digital networks are clearer, more secure, and more feature-rich than calls made on analog networks. Because analog technology has been in use since the 1980s, virtually every part of the country where people live has analog coverage. Carriers have deployed digital technology more recently and, therefore, digital service plans and coverage tend to be available in the more populated and highly-traveled areas of the country. The FCC estimates approximately 97% of the U.S. population lives in counties that have some digital coverage. Significant portions of the country’s land area do not have access to digital service. Carriers are constantly upgrading their networks to expand the areas where they can offer digital mobile telephone service.

## ■ A BRIEF HISTORY

During the 1980s, the FCC licensed cellular spectrum in the 800 MHz band to two cellular carriers in virtually every market in the country. These carriers began building out their networks and offering analog cellular service. In 1994 the FCC began auctioning additional mobile telephone spectrum in the 1900 MHz band for Personal Communication Services (PCS). The carriers who purchased this spectrum began building out digital technology and offering digital mobile telephone services. Cellular carriers in the 800 MHz band have upgraded most of their networks from analog to digital technology in order to expand capacity and improve the quality of service. During the late 1990s, carriers operating in spectrum bands allocated for Specialized Mobile Radio (SMR) service began upgrading their networks with digital technology and offering mobile telephone service in competition with cellular and PCS operators. Mobile telephone carriers using these various spectrum bands continue to deploy digital technology in their networks today.

## ■ WHERE CAN I USE MY CELL PHONE?

This is determined mainly by where your carrier owns spectrum licenses and where it has built out its network within its license areas. Analog networks cover almost every area of the country, whereas digital networks, while extensive, are not everywhere. The extent to which individual carriers have built out their networks in a given market varies.

Even if your carrier has not built out its network in a given area, you may be able to connect to or “roam on” another carrier’s network. If your carrier has an agreement with another carrier, and if you have a type of handset that allows roaming, you may be able to connect. (See “The Handset,” page 3.) Most handsets that allow roaming have an indicator to let subscribers know when they are outside their home calling area and/or out of reach of their carrier’s network. How much you will pay for calls in different areas depends on your pricing plan. (See “Pricing,” page 4.)

\*The term “cell phones” generally refers to all mobile phones that operate on any of the three types of mobile telephone spectrum: cellular, PCS, or digital SMR.



### ■ DROPPED CALLS, DEAD SPOTS & BUSY SIGNALS

Even where a carrier offers coverage in a specific geographic area, you may not be able to complete a given call due to limitations in network architecture and capacity. When a carrier fails to hand off a call in progress, as you travel from one part of the carrier's network to another, a "dropped call" results. When many customers use a carrier's network at the same time, its capacity becomes constrained. Other customers trying to connect will hear a busy signal instead of being able to complete their calls. Topography can also affect coverage, causing "dead spots." A dead spot is an area where service is not available because the signal between the handset and the cell tower is blocked, usually by hilly terrain, excessive foliage, or tall buildings. Carriers are constantly improving and upgrading their networks in order to minimize these types of problems.

### ■ THE HANDSET

Coverage is also affected by the type of mobile telephone handset a user owns. "Single-mode" phones can connect to either a digital or an analog network but not both. "Dual-mode" handsets can be used on both analog and digital networks. "Tri-mode" handsets can be used on analog and two types of digital networks. The more networks your phone can be used with the better chance you have to pick up service nationwide. The strength of the antenna and quality of the engineering in a mobile handset can also affect your ability to pick up a certain type of signal or any signal at all.



### ■ IN-BUILDING COVERAGE

Coverage maps are meant to give users a general idea of where their phones will work when outside or in a car. However, carriers' network signals often fade inside buildings or in underground locations such as basements, parking garages or subways. Carriers are increasingly putting special facilities inside some of these areas to enhance coverage, but they are by no means universal. Therefore, you should not necessarily expect to be able to use your phone in these types of locations.

### ■ READING THE FINE PRINT

Carriers provide coverage maps on their Web sites and in stores where their products are sold. However, these maps carry the disclaimer that they are provided for informational purposes only and that actual coverage may vary from what is displayed on the map. Reasons for this variance include the dynamics of topographical and network capacity constraints on any given day.

**GREAT DEAL  
CALL ANYWHERE \***



# Pricing...



*Most wireless pricing plans include a certain number of minutes per month (often called a “basket” or “bucket” of minutes) for a certain price; any minutes over that specified amount are charged on a per-minute basis. Any unused minutes at the end of the month usually expire. Carriers generally offer several variations of these types of plans with increasing baskets of minutes at increasing monthly fees. Carriers also vary their service plans by where subscribers can use their phones without incurring additional roaming and long distance fees.*

## ■ NIGHT & WEEKEND vs. “ANYTIME” MINUTES

Many carriers offer plans that include a basket of minutes that can be used anytime during the month plus a larger basket of minutes that can be used during certain times, generally nights and/or weekends. Which time periods constitute “night” and “weekend” vary by carrier.

## ■ PEAK & OFF-PEAK MINUTES

Before the advent of “bucket” pricing plans, carriers charged subscribers a per-minute fee for each minute of airtime on every call. Some carriers still offer these types of plans today. With these plans, calls made during certain “peak” times of the day - generally business hours - often cost more, and calls made during other “off-peak” times - generally nights and weekends - often cost less. Again, which times constitute “night” and “weekend” vary by carrier.

## ■ WHO PAYS FOR INCOMING CALLS?

With the majority of pricing plans, consumers pay for both outgoing and incoming calls. In the case of bucket plans, the minutes from both outgoing and incoming calls are usually deducted from a customer’s monthly bucket of minutes. However, some carriers offer pricing plans where all or some of the minutes of incoming calls are free to customers.

## ■ MINUTES OR SECONDS?

In general, mobile carriers charge by the minute. When you use a fraction of a minute, many carriers round up to the next minute, charging or deducting subscribers a full minute when only a portion of it is used. However, some carriers offer plans that round to the nearest second instead of minute.

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■ **ROLLOVER MINUTES**

With most "bucket" pricing plans, any unused minutes expire at the end of the month. However, some carriers offer consumers the option to roll their unused minutes over to the next month.

■ **"NATIONWIDE" PRICING PLANS**

All of the major mobile carriers offer pricing plans that allow customers to purchase a bucket of monthly minutes to use on a nationwide basis without incurring roaming or long distance charges. Consumers should be aware that how carriers define "nationwide" varies. For some carriers, this means being able to use your phone anywhere in the country where any type of signal is available at no additional charge. For other carriers, it means being able to send and receive calls only on the carrier's network without incurring roaming and long distance fees. These carriers' networks generally extend through the country's more populated and highly-traveled locations but do not cover the entire United States.

■ **ROAMING**

Carriers have traditionally charged per-minute roaming fees on calls made from the network of the carrier that has a roaming arrangement with your carrier from a location outside of a customer's home calling area. However, several carriers have eliminated these fees in their "nationwide" pricing plans.

■ **LONG DISTANCE**

Cell phone users have traditionally had to pay additional fees for "long distance" calls. Long distance calls are generally calls made to locations outside of a customer's home coverage area. However, some carriers may define long distance calls differently for purposes of their pricing plans. Several carriers offer pricing plans that eliminate per-minute long distance fees. Some plans charge no long distance fees for calls made from a customer's home calling area, some for calls made from anywhere on a carrier's network, and some for calls made from anywhere in the United States. Whenever a long distance call is made, the mobile telephone carrier determines which long distance carrier will complete the call, unlike with landline service where the customer chooses the long distance carrier.

■ **PREPAID SERVICES**

With prepaid service, consumers purchase a handset and pay for a fixed amount of minutes prior to making any calls. There is usually a set time period in which unused minutes will expire. Prepaid minutes are often subject to peak and off-peak airtime rates. When prepaid customers have used up their minutes, they can refill them. Carriers do not obtain credit history reports on prepaid subscribers as they generally do with other subscribers.

■ **ACTIVATION FEES**

Many carriers charge a one-time fee to customers when they initiate service, called an "activation fee." Carriers will sometimes waive this fee as part of a promotional pricing plan.



■ **SPECIAL OPTIONS**

Special options (also known as vertical services) include such things as call waiting, Caller ID, voicemail, call forwarding, and three-way calling. Carriers offer these to customers as add-on features beyond simply dialing and talking. Some of these options are included in the monthly price of most digital calling plans, while others are generally offered at an additional monthly or per-use charge. Many of these features may not be available on analog networks.

■ **SHORT MESSAGING SERVICES (SMS)**

SMS provides the ability to send and receive short text messages to and from mobile handsets. Some carriers charge a few cents per message to use SMS, and many offer SMS packages which include a set number of messages for a flat monthly fee.

■ **MOBILE DATA SERVICES**

In addition to SMS, many carriers now offer mobile data services that allow customers to exchange e-mail messages, download games and ringtones, send digital photos, or access the Internet via a handset, PDA, or laptop. There are generally a variety of pricing options for these mobile data services, including per-minute, per megabyte, or unlimited usage for a flat monthly fee. Consumers are encouraged to review all of the information on the specific capabilities of these services and their pricing options before purchasing.

■ **SERVICE AGREEMENTS**

Most carriers require new subscribers to sign one-year contracts or service agreements when they sign up for a new service plan. Most charge an "early termination fee" to users who cancel their service plans prior to the end of that year. Some carriers offer additional incentives to subscribers who sign up for two-year service agreements. Consumers should carefully read any potential service contract prior to signing up for service.

■ **TRIAL PERIODS**

Many carriers, including all six nationwide carriers, permit customers to cancel service without paying the termination fee if service is cancelled within a certain period of time after the service contract is signed. These "trial periods" generally range from 14 to 30 days, depending on the carrier. Consumers are encouraged to find out the length of a carrier's trial period before signing a service contract, and may wish to consider the length of trial periods as a factor in selecting a wireless carrier. In addition, consumers should use this time period to determine whether their carrier provides adequate coverage in the areas where they use their phones most frequently, such as at home or on their commute to and from work.

■ **MONTHLY BILLS**

The format of monthly bills varies by wireless carrier. Some carriers automatically provide detailed content, such as a list of every call made that month its duration, and whether it was roaming or long distance. Other carriers offer detailed billing as an option for an additional monthly fee. Consumers should get information from carriers on billing before signing up for service, and may wish to consider billing and bill format options as a factor in selecting a wireless carrier.

6

## WHAT TO CONSIDER WHEN BUYING A HANDSET

### MODE

Is the phone single or multi-mode? Can it operate on analog or digital networks, or both? Does it indicate when it's roaming?

### STORAGE

How many phone numbers and other data can the handset store?

### SCREEN SIZE

This can be an important factor for viewing phone numbers and other stored data, as well as wireless Web content.

### SPECIAL OPTIONS

What types of "vertical features," such as Caller ID, call waiting, and voicemail, are included with the handset and service plan?

### VOICE FEATURES

Does the phone have voice-activated dialing?  
Does it have a speaker phone?

### BATTERY LIFE

What are the handset's talk time and standby time? Standby time is the number of hours or days the phone can stay on before the battery will run out. Talk time is the number of hours a user can talk on the phone before the battery will run out. These times can vary with analog and digital service. Also, a handset's battery will affect its size and weight.

### SAR RATING

The Specific Absorption Rate (SAR) is a measure of the level of human exposure to radiofrequency (RF) emissions from a handset. You can obtain information on SAR ratings of specific handsets on the FCC Web site at: [www.fcc.gov/oet/rfsafety/#sar](http://www.fcc.gov/oet/rfsafety/#sar).

### MOBILE DATA CAPABILITIES

Does the handset have the ability to access the carrier's wireless web services and/or send and receive text messages?

### HEARING AID COMPATIBILITY

Hearing aids generally work with cellphones that use analog signals but not currently with those that use digital signals. More information about hearing aid compatibility is on the FCC's Consumer & Governmental Affairs Bureau webpage at: <http://www.fcc.gov/cgb/dro/hearing.html>



## Where To Get More Information...

### ■ FEDERAL COMMUNICATIONS COMMISSION

www.fcc.gov  
e-mail: fccinfo@fcc.gov

1-888-225-5322 (CALL-FCC) - VOICE  
1-888-835-5322 (TELL-FCC) - TTY

### ■ CARRIERS

The Web sites and toll-free numbers of the 10 largest mobile carriers in the United States, listed below, provide information on where these carriers offer service, the extent of their network coverage, pricing plans and other services they offer, and the corresponding handsets and accessories they sell.

ALLTEL	<a href="http://www.alltel.com">www.alltel.com</a>	(800) 255-8351
AT&T Wireless	<a href="http://www.attws.com">www.attws.com</a>	(800) 888-7600
Cellular One/Western Wireless	<a href="http://www.cellularonewest.com">www.cellularonewest.com</a>	(800) 635-0304
Cingular Wireless	<a href="http://www.cingular.com">www.cingular.com</a>	(866) 246-4852
Leap Wireless/Cricket Communications	<a href="http://www.cricketccommunications.com">www.cricketccommunications.com</a>	(866) 274-2538
Nextel	<a href="http://www.nextel.com">www.nextel.com</a>	(800) 639-8359
Qwest	<a href="http://www.qwestwireless.com">www.qwestwireless.com</a>	(800) 899-7780
Sprint PCS	<a href="http://www.sprintpcs.com">www.sprintpcs.com</a>	(800) 480-4727
T-Mobile	<a href="http://www.tmobile.com">www.tmobile.com</a>	(800) 937-8997
US Cellular	<a href="http://www.uscellular.com">www.uscellular.com</a>	(888) 944-9400
Verizon Wireless	<a href="http://www.verizonwireless.com">www.verizonwireless.com</a>	(866) 256-4646

### ■ CONSUMER INFORMATION WEB SITES

The following Web sites provide consumer information on mobile telephone service, such as side-by-side comparisons of the service plans available in a given area, general advice on purchasing a mobile phone, educational information on wireless technology, user ratings of phones and pricing plans, listings of dead spots by location and carrier and answers to commonly-asked questions.

<a href="http://www.cellmania.com">www.cellmania.com</a>	<a href="http://www.deadzones.com">www.deadzones.com</a>
<a href="http://www.dealtime.com">www.dealtime.com</a>	<a href="http://www.ldwiz.com/cellular">www.ldwiz.com/cellular</a>
<a href="http://www.getconnected.com">www.getconnected.com</a>	<a href="http://www.cnet.com">www.cnet.com</a>
<a href="http://www.point.com">www.point.com</a>	<a href="http://www.wirelessadvisor.com">www.wirelessadvisor.com</a>

### ■ OTHER CONSUMER INFORMATION

Consumer Reports ([www.consumerreports.org](http://www.consumerreports.org)) provides free consumer information on its Web site, including details on the various mobile service plans available in major U.S. markets and their accompanying handsets. With an online or print subscription, consumers can obtain a full ratings report and comparison of mobile service plans and handsets.

J.D. Power ([www.jdpower.com](http://www.jdpower.com)) provides ratings on its Web site of all of the wireless carriers in major U.S. cities. The carriers are rated on various criteria, including call quality, cost and customer service.

CTIA ([www.wow-com.com](http://www.wow-com.com)) is a trade association representing the wireless industry. Its Web site contains tips for consumers on purchasing mobile service as well as an overview of all mobile handsets that have hands-free accessories.

AARP, the American Association of Retired Persons ([www.aarp.org](http://www.aarp.org)), provides on its Web site a published survey entitled *Understanding Consumer Use of Wireless Telephone Service* that discusses various issues related to wireless service and older consumers.

NOTE: The sources listed on this page represent a sample of the consumer information available to the public on wireless issues and is not meant to be a complete list. In addition, the FCC does not vouch for the accuracy of the information contained in these Web sites and publications.

# Comments from the Federal Communications Commission



CHAIRMAN

Federal Communications Commission

Washington, D.C.

April 11, 2003

Mr. William B. Shear  
Acting Director, Physical Infrastructure Issues  
United States General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Shear:

Thank you for sharing the General Accounting Office's ("GAO's") draft report, titled "FCC Should Include Call Quality in Its Annual Report on Competition in Mobile Phone Services." GAO's draft report recommends that the Federal Communications Commission ("FCC" or "Commission") include call quality in its mandated annual report analyzing whether there is effective competition in the market for mobile phone services ("Competition Report"). The FCC values GAO's analysis of the call quality issue and shares the belief that the ability of consumers to make informed choices in the marketplace is critical to the growth of mobile phone services. To that end, to the extent possible, the FCC plans to include information related to call quality in its future Competition Reports.

As the mobile telephone market matures, we believe that the industry has already witnessed marked improvement in both call quality and network performance. In this regard, we note your survey indicates that most consumers are satisfied with the overall call quality of their mobile phone service. Moreover, other competitive indicators such as the number of cell sites deployed, the extent of digital coverage, minutes of use, and subscribership have all increased substantially. And, perhaps most significantly, the per-minute price of mobile telephone service has fallen dramatically, thereby allowing more consumers access to mobile telephone services.

As GAO recognizes in its draft report, the FCC has focused on a deregulatory paradigm for the commercial mobile industry, which we believe has been successful in allowing for marketplace forces to improve consumer benefits for the more than 140 million consumers who subscribe to wireless services. The rapid proliferation of wireless services, in large part due to this deregulatory approach, has had an enormous impact on our country, consumers, and public safety. From the Commission's perspective, and as indicated in our annual reports analyzing the competitive conditions in the commercial mobile telephone industry, our pro-competitive, deregulatory policies are working in the wireless industry, and the state of this industry from a consumer perspective is strong. Competition and deregulation have resulted in lower prices and an increased diversity of service offerings, which in turn have stimulated rapid growth in the demand for wireless services and substantial consumer benefits. In this competitive environment, in order for wireless carriers to attract and maintain customers, they must continue to offer better packages of rates, network coverage, and call quality than their competitors. We

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believe that these competitive forces will continue to compel carriers to monitor and improve the quality and performance of their networks. Thus, as the mobile telephone industry continues to evolve, we believe that call quality will also benefit from further improvements.

Market forces not only provide an incentive for carriers to make call quality a high priority, they have also created an incentive for numerous third parties to produce consumer information on mobile telephone service. As a result, there is considerable data currently available to consumers, and most of it is at little or no cost. The sources of information include publications, trade associations, marketing and consulting firms, and at least eight websites dedicated to giving consumers an overview and comparison of the mobile telephone services available in their area. Some of these information sources even rate carriers on call quality issues. Moreover, as noted in the draft report, the FCC has developed a pamphlet that helps consumers evaluate wireless services (available on our website at <http://www.fcc.gov/cgb/wirelessphone.pdf>). This wide variety of information, in conjunction with trial periods offered by service providers, allows consumers to determine for themselves whether a carrier's coverage and services meet their individual needs.

The Commission remains dedicated to allowing market forces to work in order to provide high quality mobile phone services. To that end, we believe that the strongest way for a consumer to let a provider know of dissatisfaction with service quality is to change service providers. However, as noted in your Report, consumers surveyed who wanted to change carriers, but did not do so, identified the inability to keep their mobile telephone number, or lack of wireless local number portability ("LNP"), as an important factor in making that decision. The Commission has been aware of this issue and wireless LNP implementation is scheduled to begin this November. We believe that this initiative will further reduce the transaction costs for consumers wishing to change providers.

With respect to GAO's recommendation that the FCC should include call quality in its Competition Report, we note that the Commission's past seven Competition Reports have been written in accordance with Section 332 (c)(1)(C) of the Telecommunications Act.<sup>1</sup> And, although the Seventh Annual CMRS Competition Report did not track technical data on call quality, *per se*, it did, like the reports before it, include important consumer information on numerous advances in service innovations. We believe that such service innovations are generally an indication of competition in a market, and are, among other things, often representative of improvements in call quality. Similarly, the Commission's past Competition Reports have included discussions of the rollout of digital service. Digital service has provided better call quality, greater reliability, and additional calling features for consumers. Our annual Competition Reports have also focused on trends in pricing plans, churn and service provision, all of which affect a consumer's ability to respond to a particular carrier's call quality. Furthermore, in the Commission's recent Notice of Inquiry,<sup>2</sup> we sought additional information

<sup>1</sup> 47 U.S.C. § 332(e)(1)(C).

<sup>2</sup> Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, *Notice of Inquiry*, 17 FCC Rcd 24923 (2002).

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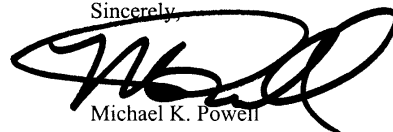
on call quality, asking whether “quality of service” is an available metric that will give us insight into the level of competition in the provision of CMRS services, whether “CMRS providers’ cost of capital affect service availability, including...the quality of service,” and how quality of service, among other performance metrics, vary between the United States and other countries.<sup>3</sup> The Commission also asked specifically “How would the Commission measure service quality?”<sup>4</sup>

As GAO concludes, specific data on call quality is not readily available. Call quality, particularly dropped calls, is a reflection of a carrier’s density of coverage, and fundamentally, coverage is driven by a carrier’s ability to place additional cellular towers, which is a difficult and cumbersome process because of the environmental, zoning, historical preservation, and endangered species issues involved. Thus, these sorts of call quality issues are difficult to identify and categorize. To the limited extent other countries have collected quality of service data independently, what they have found is that such data is often subjective, of questionable reliability, and costly to acquire. From our perspective, this lack of available data is further complicated by the fact that there are no current objective performance standards. Without an objective measurement system, reporting such data may not serve to inform consumers.

The FCC is concerned that call quality is not reliably measurable against consumer expectations as recommended by your Report. Because consumer expectation and desire is a subjective standard, it would seem quite difficult for the Competition Report to analyze to what degree competition has met such a benchmark. In order to be more responsive to consumer concerns in future Competition Reports, the Commission can, however, isolate the available quantifiable information relating to call quality in a manner that better allows the reader to understand and locate this topic within the report.

I commend you and your staff for your fine work in helping to develop ideas for improving access to information on call quality issues, both for the FCC and for consumers. We support efforts to ensure that consumer needs are met in this area.

Sincerely,



Michael K. Powell

<sup>3</sup> See *id.* at para. 4.

<sup>4</sup> *Id.* at para. 18.

# Key Contacts and Major Contributors

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## Staff Acknowledgments

In addition to those named above, David Dornisch, Christine Houle, Sara Ann Moessbauer, Tom Taydus, Ed Warner, and Mindi Weisenbloom made key contributions to this report.

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