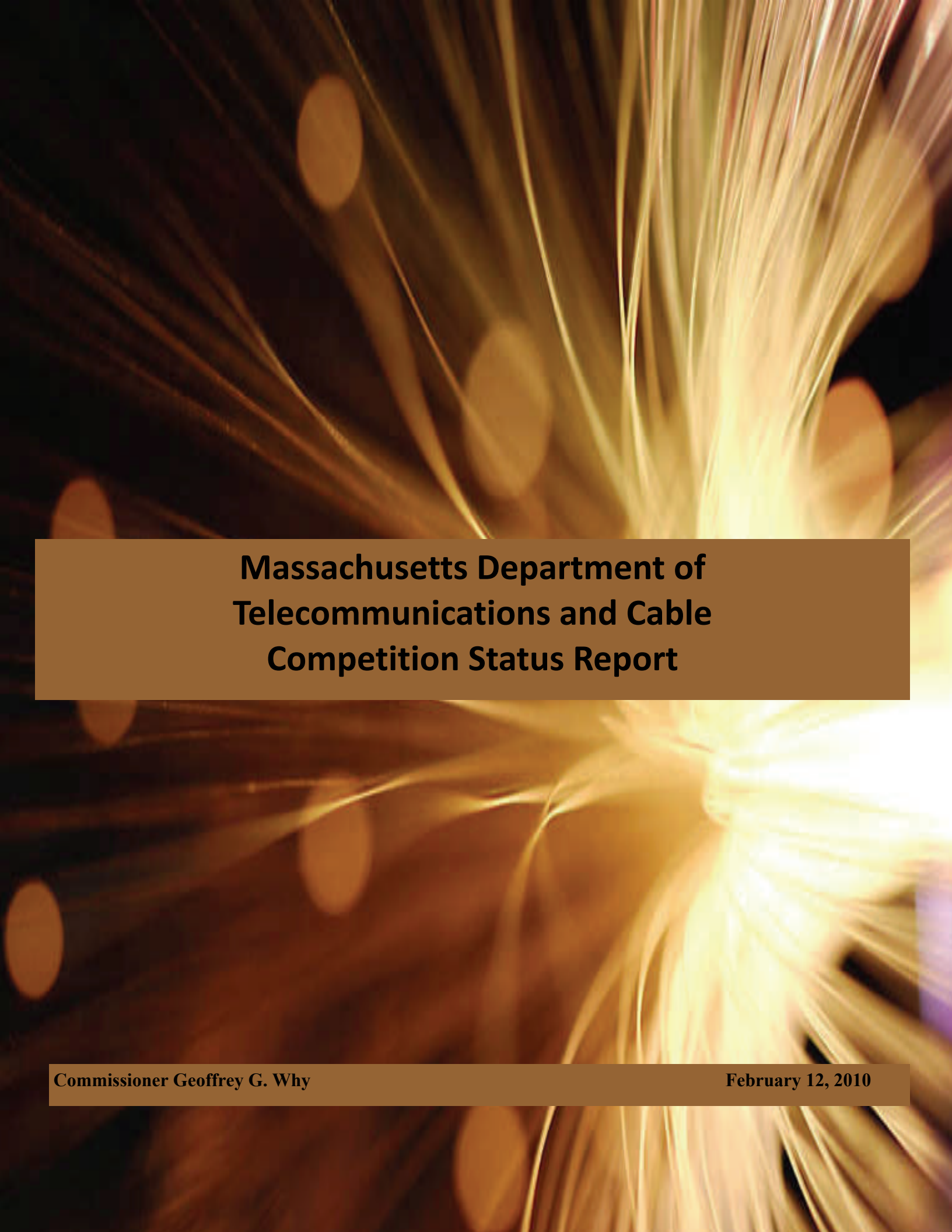

Massachusetts Department of Telecommunications and Cable Competition Status Report

Commissioner Geoffrey G. Why

February 12, 2010

Acknowledgments

I would like to express my gratitude to those individuals and organizations that assisted the Department of Telecommunications and Cable in the development of this initial Competition Status Report. A special acknowledgement is extended to former DTC Commissioner Sharon Gillett, under whose direction and leadership the DTC initiated this effort. I also wish to thank DTC Staff for their efforts, with special recognition to Joseph Tiernan and Armine Simonyan, Analysts in the Competition Division, who deserve the primary credit for the development and production of this Report.

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Massachusetts Geographic Information System (MassGIS).

Additionally, the following organizations provided pointed assistance and response to specific requests from the DTC in a timely manner and on a purely voluntary basis:

Massachusetts Executive Office of Labor and Workforce Development.

Massachusetts State 911 Department.

Federal Communications Commission.

NeuStar, Inc.

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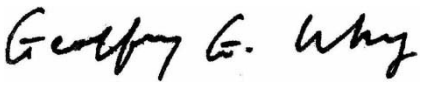
AT&T, Inc.; Braintree Electric Light Department; Broadview Networks, Inc.; Bullseye Telecom, Inc.; Charter Communications; Comcast Cable Communications, Inc.; Comtel Telecom Assets, LP; Cox Communications, Inc.; DIRECTV, Inc.; DSCI Corp.; Fairpoint Communications; Granby Telephone Company; Norwood Light Broadband; One Communications Corp.; PAETEC; RCN Corp.; Richmond Telephone Company; Shrewsbury Electric and Cable Operations; Sprint Nextel Corp.; Time Warner Cable; T-Mobile USA, Inc.; Verizon Communications, Inc.; XO Communications.

Thank you all for your time and assistance.

Sincerely,



Geoffrey G. Why

Commissioner

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EXECUTIVE SUMMARY

I. Introduction

Since the break-up of AT&T 25 years ago, the communications industry has experienced dramatic change with the introduction of competition in the marketplace and the rapid development of technological innovation. Federal and state regulatory agencies have carefully managed oversight policies to encourage the continued development of competitive and efficient markets that welcome the entry of new technologies while also maintaining consumer safeguards. The Department of Telecommunications and Cable (DTC) is the state agency charged with regulating the telecommunications and cable industries in Massachusetts. This "Competition Status Report" (Report), the first of its kind issued by the DTC, is intended to provide consumers, industry, and government entities, among others, with an informational snapshot of telecommunications and cable competition throughout Massachusetts.[1] In some ways, this Report serves as a benchmark of the competitive nature of the marketplace, and lays the foundation for future reports to more thoroughly examine the benefits generated by competition and the challenges that remain ahead.

The DTC's mission is to:
1. Regulate the telecommunications and cable industries in accordance with statutory obligations imposed by the Commonwealth of Massachusetts and the federal government;
2. Ensure consumers receive **high quality communications at just and reasonable rates;**
3. **Promote sustainable competition** which will increase consumer welfare for all Massachusetts residents;
4. Maintain and enforce consumer protections, consistent with the public interest, particularly where market forces alone are not sufficient to do so, including investigating and responding to inquiries and complaints from consumers and carriers; and
5. Provide expert input into the development of telecommunications-related policies **for the State**.

A. Purpose

The primary purposes of the Report are to:

- evaluate competition for traditional wireline telephone (voice) and cable television (video) services;
- discuss the mass market emergence of wireless voice service;
- establish a baseline for comparison of trends in the communications industry;
- more fully understand statewide and regional differences in availability and use of telecommunication services, as well as the differences between the residential and small-to-medium business (SMB) markets; and
- identify any competitive or consumer issues that may require regulatory solutions.

The Report examines residential users of both voice and video services and SMB users of voice services. The Report does not consider internet access services, such as broadband, because the DTC does not regulate or oversee these services, and their study is more properly conducted by the Massachusetts Broadband Institute.

[1] The Report also satisfies a newly-adopted statutory reporting requirement contained in M.G.L. c. 25C §6, adopted in 2008, that requires the DTC to report on the condition of the telecommunications industry and make policy recommendations as necessary.

The Report also excludes large business voice and data customers because their purchases are typically highly individualized and well-informed by commercial market research.

B. Measuring Competition

The Report uses three dimensions to measure the extent of competition:

- **Availability** of choices: for any customer, choice may range from non-existent to robust, depending on how many different networks reach the home or business.

- **Adoption** of services: if alternatives are available but not widely taken up by users, competition is not as robust as availability alone would indicate. Factors affecting adoption include pricing, quality, and marketing. Time in the market also affects adoption. A new service may be potentially highly competitive but show little adoption until customers migrate to it. Information available to the DTC concerning these adoption factors was limited, therefore the Report's adoption analysis is restricted to subscriber counts.[2]

- **Geography**: because statewide averages often mask important variations across Massachusetts, the Report analyzes availability and adoption results for seven different regions identified in economic reports published by the University of Massachusetts Donahue Institute: (1) Berkshire, (2) Pioneer Valley, (3) Central, (4) Northeast, (5) Boston Metro, (6) Southeast, and (7) Cape and Islands (see, for example, Figure 1 below). This breakout assesses the level of competition separately for each area to better understand regional disparities.

Through the Report, the DTC offers previously unavailable public information about the status of competition in the telephone and cable television markets in Massachusetts. However, given the defined scope of the Report, and the limitations in the availability of data, the Report only examines part of the competitive equation by identifying the voice and video alternatives that exist and analyzing the extent of consumer adoption.[3] The Report does not, for example, examine the pricing of communications services, nor does the Report consider broadband technologies and the effects of the convergence of voice, video, and data services on the marketplace. The Report also examines competitive options for consumers without being tied to formalistic economic or regulatory classifications.

II. Wireline Voice Services (Telephone)

A. Overview

Wireline Voice service is a product delivered to a specific location (i.e. a residence or place of business) that at a minimum delivers basic telephone services to the customer. In Massachusetts, the incumbent Wireline Voice

[2] The Report also provides limited data related to Service Quality; however, this should not be confused with a thorough analysis of product quality. Service Quality information presented in the Report pertains only to complaints about regulated services received by the DTC's Consumer Division, and a summary of the number of complaints and service inquiries received by incumbent providers for both wireline voice and cable video services.

[3] In some instances, the DTC needed more complete sources of data, such as information held by providers, to conduct a more comprehensive analysis. However, the DTC could not access some of this data due to confidentiality concerns or because the DTC lacks authority to compel public reporting of such data. If the DTC were provided such authority, it would ensure that the DTC had the necessary tools to produce more complete and detailed reports in the future.

provider, Verizon, is the predominant provider of Wireline Voice services. However, in recent years, cable providers have upgraded their video networks to offer voice services. For most Massachusetts consumers, these cable operators represent the sole competitive alternative to the incumbent for Wireline Voice services.
This Report recognizes three basic platforms by which a Wireline Voice operator provides service to its Massachusetts consumers:

- **Incumbent Local Exchange Carriers (ILEC):** ILECs are the traditional local telephone companies that have served Massachusetts consumers for decades. As Figure 1 below shows, Verizon is the ILEC for 347 municipalities in Massachusetts, with four rural telephone companies each serving one of the remaining four municipalities. ILECs own and maintain most of the infrastructure that constitutes the public telephone network. Because of their ownership and maintenance role in the telephone network, ILECs have a number of duties in furtherance of two basic but distinctive governmental goals: (1) that all residential and business consumers have reasonable access to Wireline Voice (i.e. Carrier of Last Resort); and (2) that all telephone carriers must be permitted open and non-discriminatory access to an ILEC's network in furtherance of a competitive market for Wireline Voice.

- **Cable Voice providers:** Currently, Cable television providers such as Charter, Comcast, and Time Warner, among others, are the main wireline alternatives to the ILECs for residential voice services. Cable television companies have invested in network technology upgrades, making it possible to offer most of their customers with voice service, called Cable Voice. During the past decade, Cable Voice has developed from a new entrant voice service offering to being a widely adopted alternative in the residential voice market.

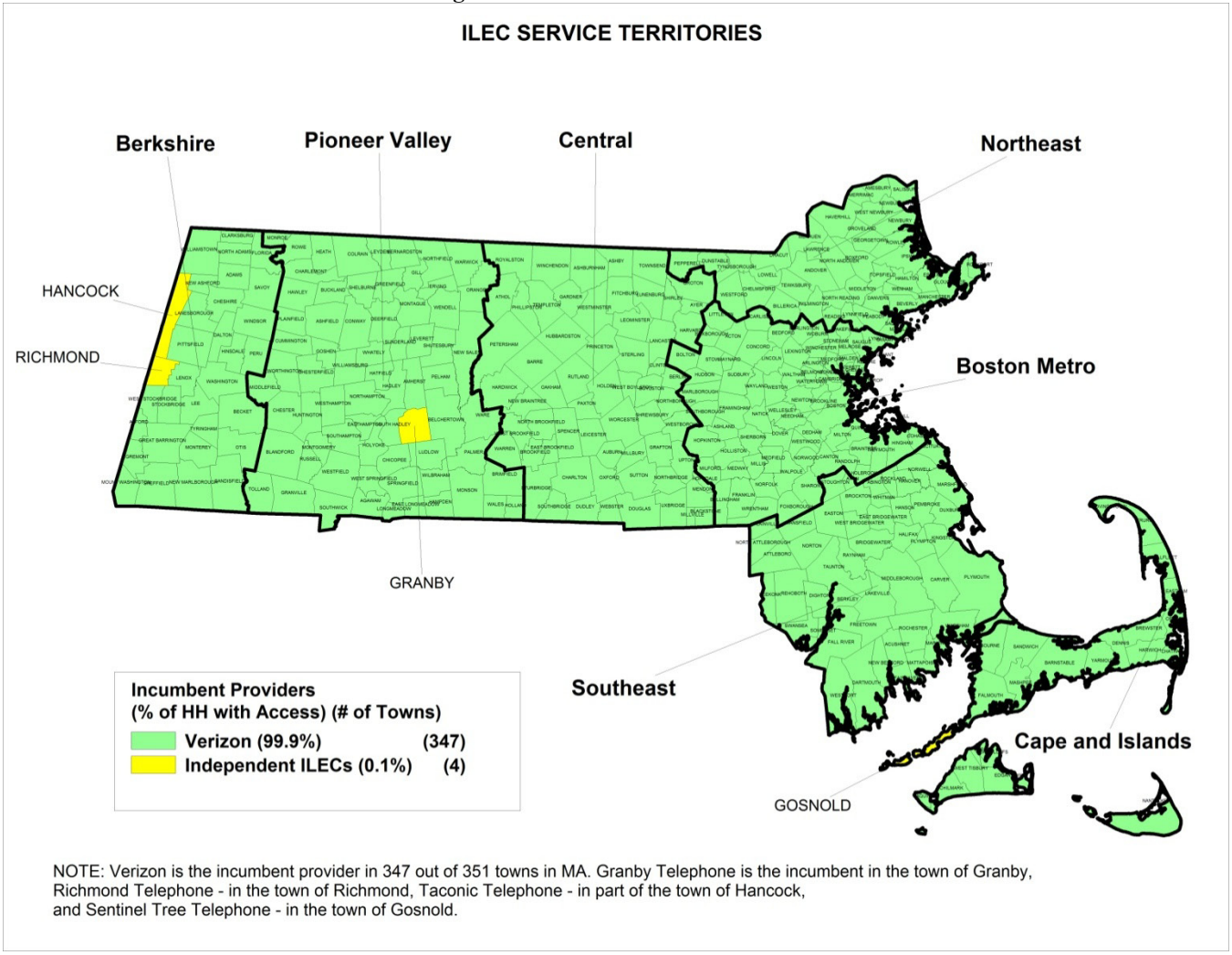
- **Competitive Local Exchange Carriers (CLECs):** CLECs include companies such as AT&T, One Communications, and XO Communications, among others. To provide service to residential consumers, CLECs typically lease some part of the ILEC's network infrastructure. However, recent changes in federal guidelines have greatly increased the cost of such leasing arrangements, and, as a result, CLECs generally do not actively serve the residential market. However, CLECs are still very active in the SMB market.

B. Residential Wireline Voice

1. Availability

As shown in Figure 1, wireline service is universally available from ILECs such as Verizon, which reflects the long-standing "Carrier of Last Resort" obligation that state regulation requires.

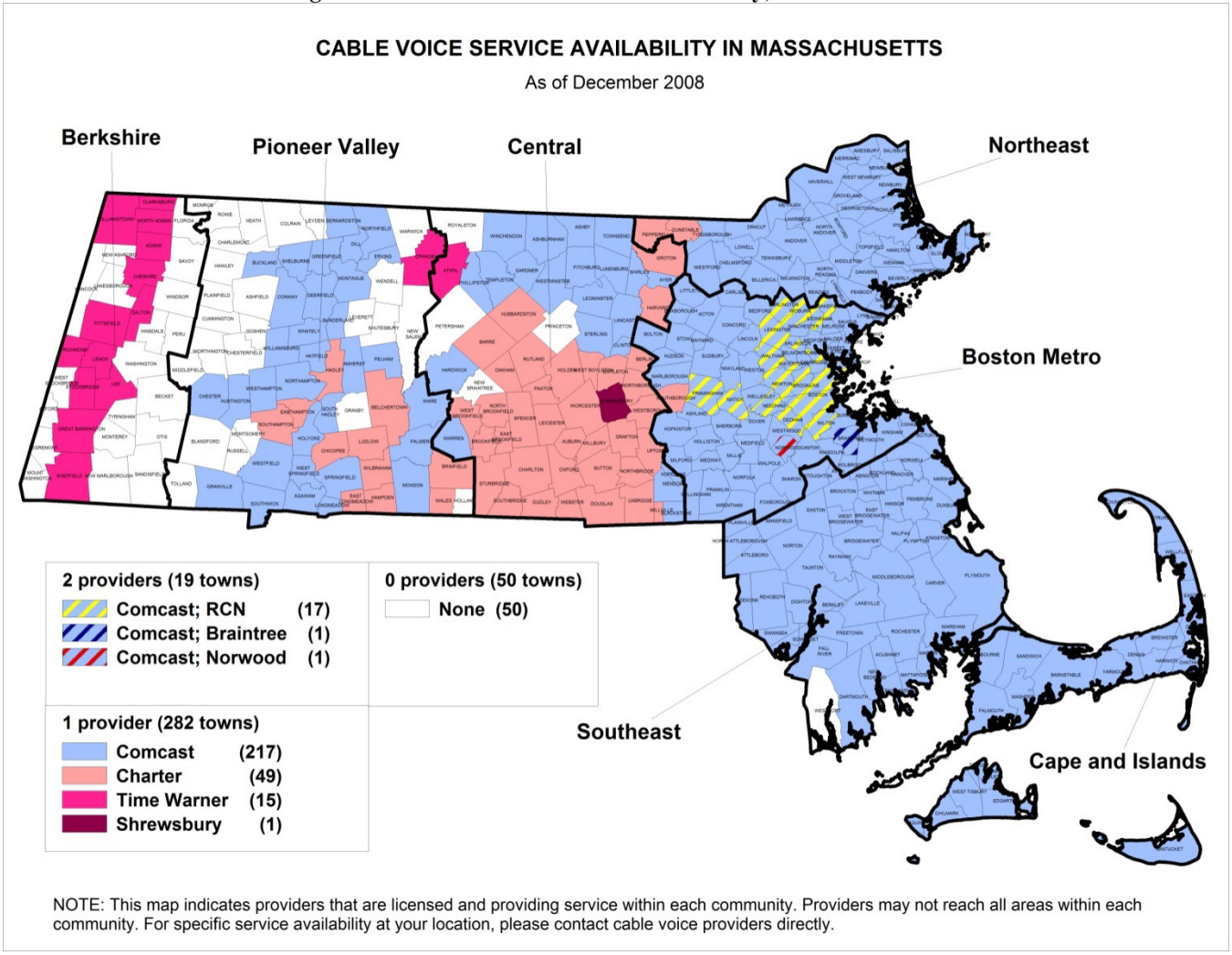
Figure 1: ILEC Service Territories



As shown in Figure 2, cable companies provide service to most communities in the state, **with notable gaps in service existing particularly in Western Massachusetts**.

- 301 of the 351 Massachusetts municipalities have at least one cable service carrier providing voice services.
- 19 Boston Metro region communities have a choice of two different cable-based voice providers.
- About 97% of households statewide have access to service from at least one Cable Voice provider.
- There are approximately 28,000 households in the 50 communities without access to a Cable Voice provider.
- When analyzing availability of service within all 351 municipalities, approximately 70,000 households lack access to Cable Voice service. Household availability of Cable Voice service ranges from 99.4% in the Cape and Islands region to 85.5% in the Berkshire region.

Figure 2: Residential Cable Voice Availability, December 2008



2. Adoption

In some regions of the state, consumers are experiencing changes in the Wireline Voice marketplace. Verizon is still the dominant provider of residential Wireline Voice service in Massachusetts, with approximately 64% market share statewide. However, by December 2008, Cable Voice providers had approximately 33% of the Wireline Voice market. By contrast, CLEC market share decreased substantially, and by December 2008, CLECs served about 2% of the market. As recently as June 2005, Verizon had almost 80% of the residential market, while Cable Voice providers had only 13%, with CLECs just over 7%. Not surprisingly, where Cable Voice service is less widely available, such as in the Berkshire region, the adoption rate of Cable Voice service is not as high as it is in the Boston Metro and Northeast regions, where the service is widely available. Consumers in towns not served by a Cable Voice competitor generally do not have any Wireline Voice competition.

3. Residential Voice Summary Findings

- **The residential Wireline Voice market is essentially a two-provider market: the ILECs and Cable Voice providers.** The number of available competitive providers for Wireline Voice services has decreased dramatically for residential customers. In particular, as a result of changes in federal regulation in 2005 which made it much more expensive to serve the residential market, relatively few CLECs actively market services to residential consumers.

- **Residential customers, at a high percentage, are using competitive voice services from cable providers.** In recent years, cable providers have steadily gained market share, and competition between Verizon and cable companies is robust in certain select areas. However, regional distinctions persist, and many rural customers that live in the 50 communities in Massachusetts that lack any Cable Voice provider have little or no competitive options for Wireline Voice service.

- **Consumers who purchase their communications services (voice, video, and internet) through a bundle have experienced an increase in competitive alternatives.** Moderate to low-income consumers, including elderly consumers, or consumers who simply want a no-frills, low-cost voice product essentially have only one provider option—Verizon. Cable providers do not offer basic plans, and the remaining CLECs that serve the residential market appear to primarily provide premium bundled services and/or service on a pre-paid basis. These trends also have impacted low-income consumers eligible for Lifeline and Link-Up service because most Cable Voice providers do not offer service through these government assistance programs.

- **Consumer protections, such as safeguards from unreasonable disconnection of service and fair resolution of billing disputes, may suffer in today's residential market, as cable companies providing voice service using new technologies (i.e., interconnected Voice over Internet Protocol (VoIP)) have not yet extended many state-mandated consumer protections to their customers.** Furthermore, the DTC believes that many Cable Voice customers may not be aware of this gap in consumer safeguards. The DTC's position is that these consumer safeguards should be extended to this type of VoIP service like other Wireline Voice services.

- **Wireline Voice service quality during the reporting period, as measured by complaints to the DTC and service quality reports submitted by Verizon, show that service quality in general has met the DTC's standards, although there appear to be disparities in some rural areas of the state.** Massachusetts rural consumers experience noticeably pronounced service quality problems as compared to consumers in more densely populated urban areas. During the summer of 2009, the DTC opened an inquiry into Service Quality in the four westernmost counties (Berkshire, Franklin, Hampden, and Hampshire) of the state to investigate possible regional disparities in service quality. This inquiry remains open.

C. Business Wireline Voice Services

1. Availability

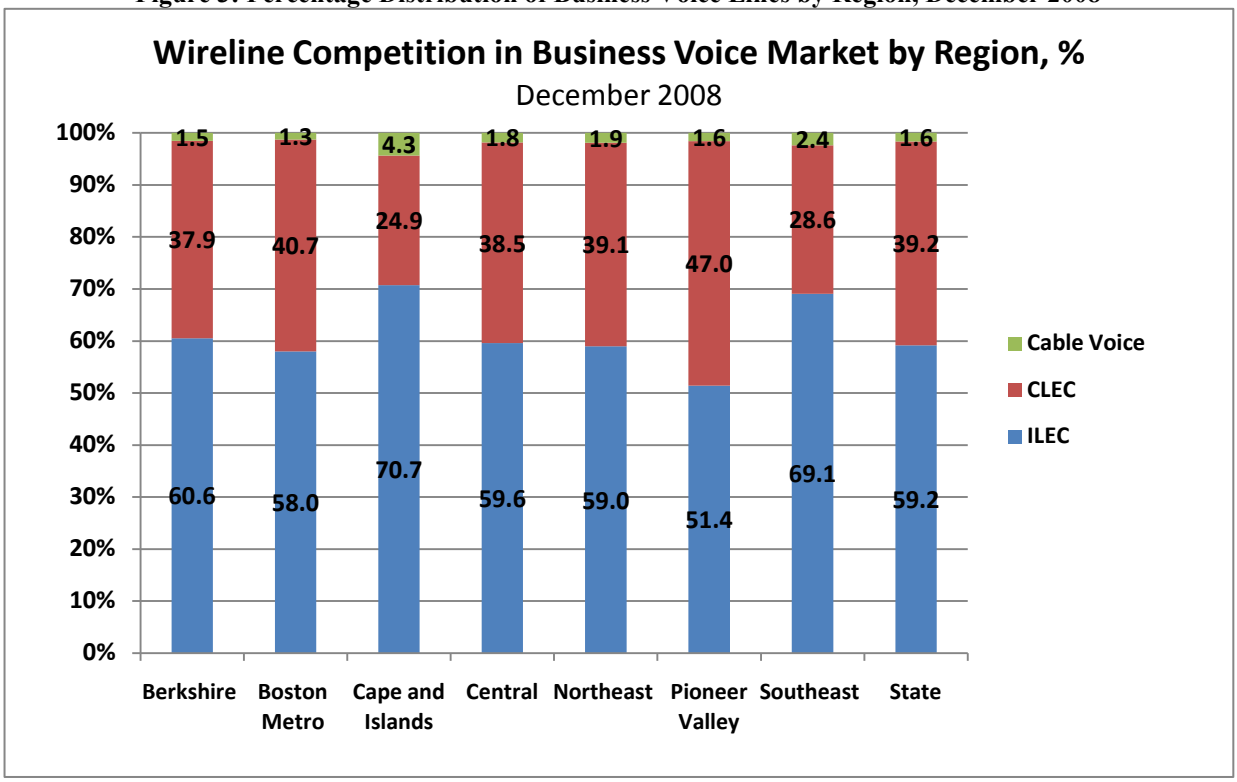
Because of its ubiquitous network, ILEC service is available to all SMBs in the state. Unlike the residential voice market, a relatively large number of CLECs offer wireline services to businesses throughout the state. Additionally, within the last year, Cable Voice carriers have begun marketing services to SMB consumers, though generally, data on business Cable Voice services were not available for the first three years of the study period.

Because CLEC services are offered over the ILEC's network, CLECs have nearly ubiquitous service in Massachusetts.

2. Adoption

Similar to residential Wireline Voice service, ILECs still hold the largest portion of the SMB voice market. As of December 2008, ILECs served about 996,600 business lines, or 59% of the market. CLECs represent the primary competition for SMB customers, while cable providers served a very small number of customers. As of December 2008, CLECs served about 660,500 end-user business lines (39% of the SMB market), an end-user line increase of more than 26% since 2005. With the recent wider-scale introduction of Cable Voice as a product offering to SMB consumers, the market share for this platform became measureable, but still is comparatively very small with about 27,700 end-user business lines (2% of the SMB market) by year end 2008. Figure 3 breaks down ILEC, CLEC, and Cable Voice market shares by region for 2008.

Figure 3: Percentage Distribution of Business Voice Lines by Region, December 2008



3. Business Voice Summary Findings

- **Competition in the Wireline Voice market for SMBs is robust.** Unlike trends realized in the Residential Wireline market, CLECs have collectively gained greater market share as measured by number of SMB lines served, up from 31% in 2005 to 39% in 2008. SMBs in more densely populated areas have the highest number of competitive alternatives, but even in rural areas, at least several competitive alternatives exist.

- **Despite the presence of multiple competing providers, the overall number of competitors has declined over the last decade, and the market trend is toward dominance by large competitors.**

- **Cable companies are just entering the business voice market and do not yet have a significant market presence.** However, they could be a major player in the future given their wide network coverage area.

III. Wireless Voice Service

A. Overview

Over the last decade, Wireless Voice has grown from a niche offering into a mass market product. Because of advances in technology and other factors that have decreased the cost of deployment, Wireless Voice providers have made their service widely available, allowing widespread adoption. Wireless Voice carriers that operate in Massachusetts are AT&T Wireless, Sprint/Nextel, T-Mobile, and Verizon Wireless.[4]

The DTC analyzes Wireless Voice separately from Wireline Voice because of the different characteristics of the service and the differing ways in which consumers use the service. Generally speaking, Wireless Voice customers are individuals rather than households. Most consumers seemingly view Wireline and Wireless Voice services as complementary services, choosing to subscribe to a Wireline Voice service for household use and to Wireless Voice service for mobility purposes.

Some residential consumers have adopted Wireless Voice as their only voice service. This trend, known as "cord-cutting" or "wireless substitution," has been made possible in part by consumers' ability to more freely "port" or transfer their phone numbers from wireline to wireless providers. Changes in E-911 rules that require location recognition from wireless phones have also had the effect of increasing the viability of wireless substitution. Wireless carriers are required to provide location information to public safety officials when a caller dials 911, however, there are limits on the specificity of the address and location that can be provided from a wireless service, particularly in locations such as multi-dwelling units.

B. Availability

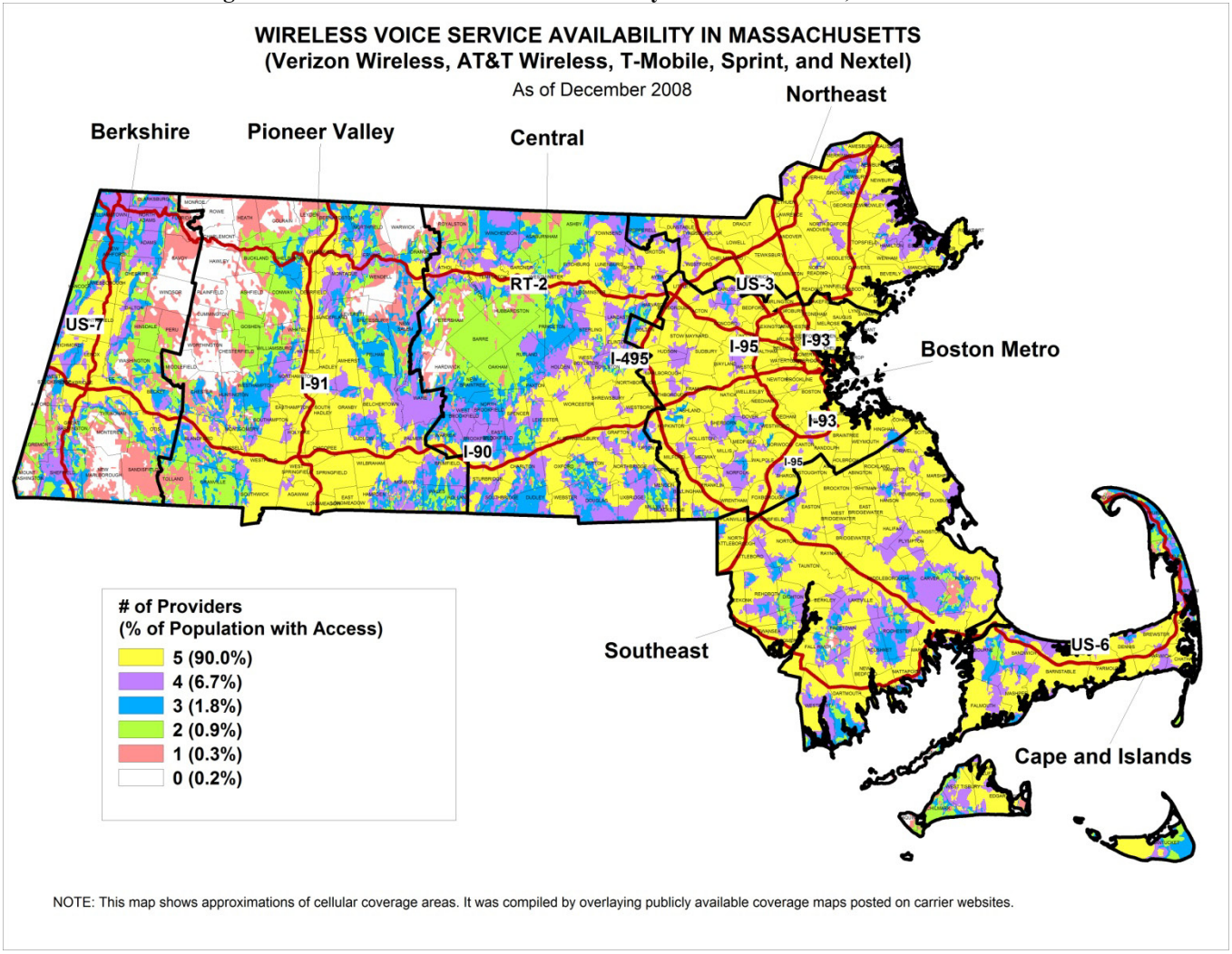
According to coverage maps provided by wireless carriers, approximately 99.8% of Massachusetts households can receive a signal from at least one of the five network-based Wireless Voice service carriers. Conversely, approximately 14,600 households (0.2%) cannot access a signal from any of the five Wireless Voice carriers.

[4] In 2004, Sprint and Nextel merged, forming Sprint Nextel Corporation. Sprint Nextel currently operates as one single company on two separate wireless networks. Therefore, this Report analyzes five wireless networks provided by four companies operating in Massachusetts.

These households are spread across 58 towns, largely located in mountainous areas in western Massachusetts, as shown in Figure 4.

Service coverage estimates do not take into account limiting factors such as signal strength, weather variations, and obstructions which increase the propensity for low signal strength or dropped calls. Therefore, Wireless Voice service availability may not be as ubiquitous as suggested by the coverage maps. Generally speaking, rural consumers experience lower wireless coverage quality where there are fewer cell towers, the distance between towers is greater, and foliage and terrain obstructions are more prevalent. Wireless carriers may also specifically decide to not cover a given geographic area based on the difficulty of the terrain or the lack of potential customers.

Figure 4: Wireless Voice Service Availability in Massachusetts, December 2008



C. Adoption

As of December 2008, over **5.7 million Massachusetts consumers** subscribed to a Wireless Voice service, representing an increase of 33.2% since June 2005. With the growing availability of these services, some consumers are opting to forgo their home telephone and subscribe exclusively to Wireless Voice service. As of

December 2008, the DTC estimates that about 278,300 (11.3%) Massachusetts households have "cut the cord." This number has almost tripled since June 2005.

Wireless substitution has the potential to continue to increase as more residential customers embrace wireless technology. For example, a Centers for Disease Control and Prevention study indicates that while the majority of wireless substitution is occurring among consumers below the age of 30, older consumers are becoming more willing to substitute wireless for wireline telephones. In addition, new Wireless Voice service providers are creating offerings for the moderate to low-income segments of the population that are more cost-effective and more consistent with their lifestyles (e.g., moving residences frequently).

D. Wireless Voice Summary Findings

- **Statewide, most consumers have access to service from at least one wireless carrier, although service coverage may suffer from the limiting factors mentioned earlier.**

- **Regionally, the pattern of service disparity seen in the provision of Wireline Voice services also persists for wireless signal coverage.** The zero coverage areas are prevalent across the Berkshire and Pioneer Valley regions, while much of the Boston Metro region is covered by at least three Wireless Voice carriers.

- **Wireless phones are primarily used as a complement to Wireline Voice services. However, a growing number of consumers are going all-wireless, particularly those in densely populated areas and among younger demographic groups.** As such, Wireless Voice offerings are typically premium-based services, giving consumers a range of options and ancillary functions. Accordingly, Wireless Voice service is not currently considered a true substitute to Wireline Voice service from a regulatory or economic standpoint.

IV. Video Services (Television)

A. Overview

Video services operate under a different regulatory framework from voice services, and traditionally competition is only available from companies that own and operate their own networks. Video services are offered over both wired (e.g., cable) and wireless (e.g. satellite) networks. Historically, consumers only received cable video services from companies that held the first cable video franchise in a municipality. A cable video franchise permits the franchise holder to run cables through the public rights-of-way, including along telephone poles or in underground conduits. In recent years, consumers in a growing number of communities have been offered a competitive alternative for Cable Video service.

The Report identifies two types of Cable Video providers:

- **Incumbent:** The companies, or their predecessors, that held the initial cable franchise in a municipality are considered the Incumbent providers. Six Incumbent cable companies who provide service are: Charter, Comcast, Cox, Russell (municipal), Shrewsbury (municipal), and Time Warner.

- **Overbuilder:** An alternative wire-based network built by a competitor separate from the Incumbent Cable Video network is referred to as an "Overbuilder". Four companies provide service as an Overbuilder in Massachusetts: Braintree (municipal), Norwood (municipal), RCN, and Verizon FiOS.

Wireless video networks do not fall under the scope of the DTC's authority; and the DTC consequently will not analyze them in detail in this report. The two types of wireless video services available to consumers include (1) Satellite TV (referred to as Direct Broadcast Satellite or DBS), offered by both DirecTV and Dish Network for a monthly fee; and (2) digital broadcast television (free over-the-air TV), which completed its federally mandated transition to all-digital broadcasting in June 2009.

B. Availability

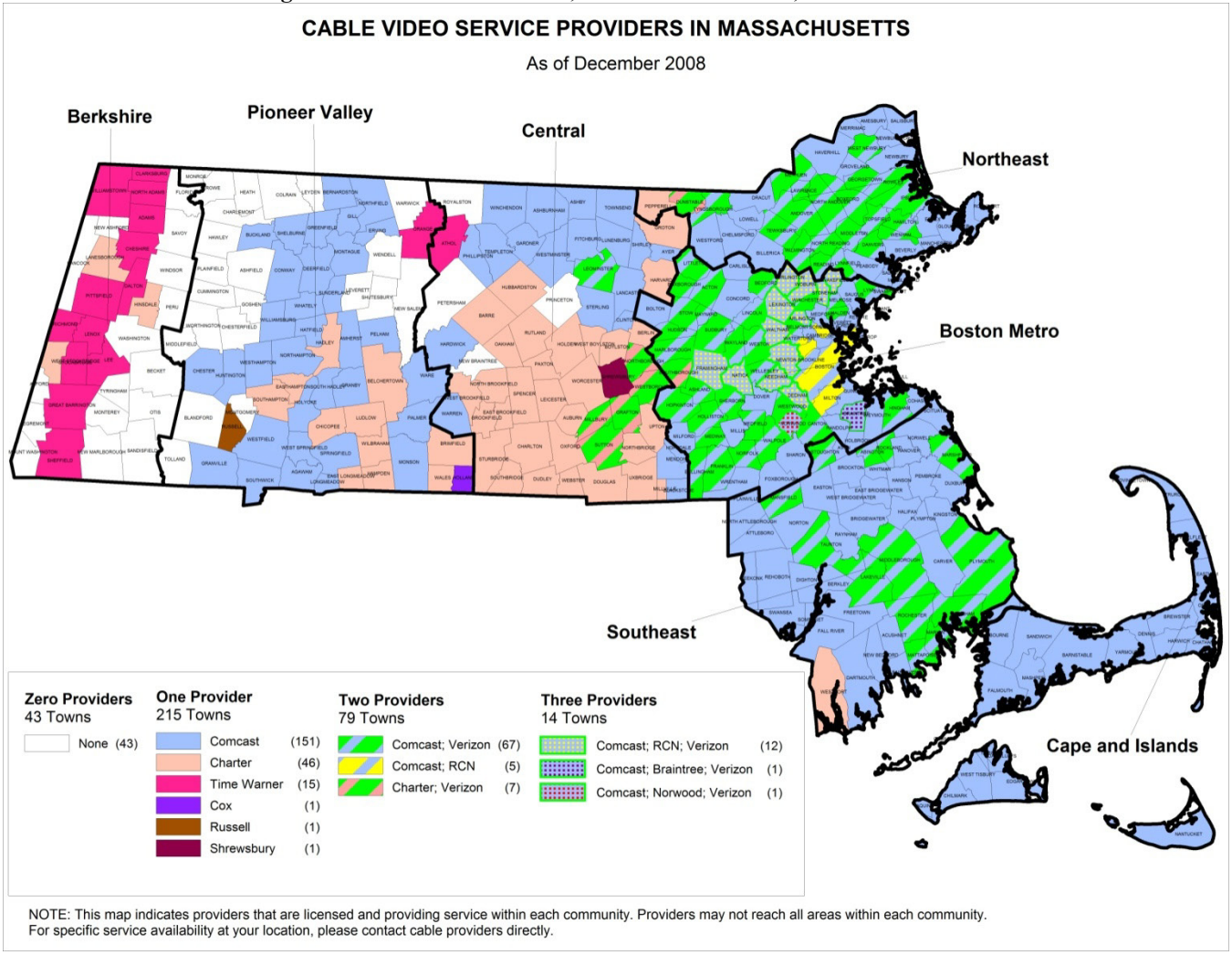
Unlike Wireline Voice service, Cable Video is not available to every household in Massachusetts. Cable Video service is offered in 308 of the state's 351 municipalities. Forty-three municipalities, primarily concentrated in Western Massachusetts, have no Cable Video provider. As of December 2008, 214 municipalities had only one Cable Video provider, 80 municipalities had two providers, and 14 had three providers (see Figure 5). Cable Video service is available to 2.38 million (97.6%) households statewide, but 58,000 (2.4%) households remain unserved.

Service availability is directly correlated to both the number of households in franchise areas and population density. No region has 100% coverage from Incumbent cable providers because cable franchise agreements commonly set population density limits below which a provider is not required to build-out infrastructure, leaving low density neighborhoods in many municipalities without service.

Similar to voice services, regional disparities exist in the Cable Video market. For example, the Cape and Islands region has the highest Incumbent coverage rate (99.4% of households with access to Incumbent Cable Video service), while the Berkshire region has the lowest Incumbent coverage rate (90% of households with access to Incumbent Cable Video service). There are 22,000 households that lack access to Incumbent Cable Video service in the Boston Metro region (2.2% of the region's households), which represents the largest gross number of unserved households located within any single region.

Regional distinctions are also clear in the Overbuilder market. Overbuilder service is concentrated in densely populated areas, centering on the Boston Metro region, and have little presence elsewhere. Consumers throughout the Berkshire, Cape and Islands, and Pioneer Valley regions have no Overbuilder service choices available. Overbuilders also generally cover few or no households not already served by the Incumbent cable provider. By December 2008, about 972,000 (40%) households statewide had an option to choose service from at least one Overbuilder, and 450,000 (19%) households statewide had access to service offerings from an Incumbent provider and two Overbuilders. Again, these areas with three competing providers are limited to 14 municipalities, all within the Boston Metro region.

Figure 5: Cable Video Service, All Active Providers, December 2008



C. Adoption

A large majority of Massachusetts consumers have adopted Cable Video service. By year end 2008, 2.11 million (87%) Massachusetts households subscribed to cable video service. An additional 214,000 households (8.8%) subscribed to DBS video services. Therefore, only approximately 116,000 (4.8%) households do not subscribe to any video service and rely upon over-the-air broadcast signals or do not receive video content within their homes.

Incumbent carriers remain the predominant providers of Cable Video service, as 77% of all households with access to an Incumbent subscribe to that service. However, the growth of Overbuilder service availability has been accompanied by a rapid growth in subscriber rates, nearly tripling between 2005 and 2008, with approximately 23% of households with access subscribing to Overbuilder service. Between 2005 to 2008, total Cable Voice subscribers increased by 108,666 (5.5%). Much of this growth in subscribership appears to be attributed to Overbuilder service expanding the overall market by encouraging new subscribership to Cable Voice. Indeed, Incumbents have experienced a relatively small subscriber loss (approximately 40,000 subscribers) while Overbuilders experienced a net increase of about 140,000 subscribers over the study period. Much of the increase in subscribership to Overbuilder service is attributable to the expansion of the Cable Video

product offered by Verizon FiOS, which was the first to introduce an Overbuilder offering to 74 communities between 2005 to 2008, and the second Overbuilder present in 14 additional communities.

Regional distinctions are present in adoption patterns. For example, only 67% of households in the Boston Metro region subscribe to Incumbent service, the lowest Incumbent adoption rate in the state. This can be attributed to the large presence of Overbuilders in the Boston Metro region. For those households with access to Overbuilder service, adoption rates are relatively similar across regions, varying between 17% to 24%.

D. Video Summary Findings

- **Overall, eastern Massachusetts consumers are experiencing increasing competition in video services.** With the entry of Verizon into the video market in 2005, the number of communities with two wireline video providers has increased. By June 2009, Verizon's video service was available in 96 communities, all in eastern Massachusetts, and consumers have switched to Verizon's service in noticeable numbers.

- **The Incumbent cable providers are still dominant by a significant margin.** A large number of communities still are served by only the Incumbent and satellite service.

- **Many consumers in communities where there are one or more providers lack coverage because of build-out limitations.** More troubling, 43 communities do not have cable service, and consumers are unlikely to have cable service unless providers are required to serve these towns.

- **As measured by complaints with the DTC and annual service quality reports submitted by providers, Cable Video service quality during the reporting period is volatile.** For example, the frequency of complaints received directly by cable operators noticeably increased from 2005 to 2006, then sharply declined the following year. Such volatility appears to be tied to specific and localized events, such as regional service interruptions or the loss of specific channels.

V. Report Conclusions

- **Many residential and business customers in densely populated areas of the state have competitive alternatives for voice and video services.**

- **The incumbent providers in the voice and video markets are still the dominant providers in the state.**

- **In less populated areas and for some segments of the market (e.g., moderate to lower income consumers), competitive alternatives do not exist to the same degree or have declined as a result of changing market conditions.** Consumers who simply want a no-frills, low-cost basic voice product, including low-income and elderly consumers and consumers with serious medical conditions, essentially have only one provider option, the ILECs.

- **Because of changing industry conditions, the communications markets (voice and video) in Massachusetts (and nationwide) have become more concentrated and dominated by a handful of**

large providers. In particular, this has reduced the number of competitive alternatives and providers in voice markets (both wireline and wireless), possibly to the detriment of consumers, especially residential consumers.

- **Because of these trends, policymakers may need to examine whether there are ways to increase provider diversity in the residential voice market; to address the lack of cable service in 43 towns in the state; to examine apparent disparities in voice and video service quality; and to respond to the diminishing Wireline Voice service options for consumers seeking low-cost, low-frills telephone service, among other issues identified by the Report.** The DTC fully intends to examine these issues to determine whether regulatory and/or legislative recommendations may be developed to appropriately address these market conditions.

COMPETITION STATUS REPORT

I. Introduction

A. Purpose of the Competition Status Report

The Massachusetts Department of Telecommunications and Cable (DTC) is the state agency charged with regulating the telecommunications and cable industries in Massachusetts.[1] This "Competition Status Report" (Report), the first of its kind issued by the DTC, provides an evaluation of telecommunications and cable competition throughout the Commonwealth of Massachusetts.

The DTC's mission is comprised of five objectives:

1. To **regulate the telecommunications and cable industries** in accordance with statutory obligations imposed by the Commonwealth of Massachusetts and the federal government;
2. To **ensure** consumers receive **high quality communications services at just and reasonable rates;**
3. To **promote sustainable competition** which will increase consumer welfare for all Massachusetts residents;
4. To **maintain and enforce consumer protections,** consistent with the public interest, particularly where market forces alone are not sufficient to do so, including investigating and responding to inquiries and complaints from consumers and carriers; and
5. To **provide expert input** into the development of telecommunications-related policies **for the State.**

Through the Report, the DTC satisfies a newly-adopted statutory reporting requirement.[2] The data contained in the Report will serve as a basis of expert input for effective policies to promote sustainable competition and protect consumers. To that end, the DTC looks to the data to understand the state of competition, including regional differences in availability and adoption of telecommunications services, as well as differences between the small-to-medium business (SMB)[3] and residential telecommunications markets. The Report promotes competition in Massachusetts by providing consumers accurate information about available competitive options in telecommunications and cable services and by sharing information with industry participants regarding which areas of Massachusetts are most in need of investment.

The scope of the Report includes the status of competition for telephone (voice) and cable television services (video) in Massachusetts. The Report analyzes residential users of voice and video services, and SMB users of voice services. Internet access services, such as "broadband," are excluded from the Report's analysis because such services are not within the DTC's regulatory purview and the study of those services is better conducted by the Massachusetts Broadband Institute.[4] Large business customers are also excluded from the Report's analysis because they are sophisticated organizations and their voice purchases are typically highly individualized and well-informed by extensive market research.

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[1] Formerly, the Department of Telecommunications and Energy (DTE) regulated telecommunications and cable companies, together with energy utilities. Effective April 2007, the DTE ceased to exist, with the DTC assuming its duties and powers to regulate telecommunications and cable companies. 2007 Mass. Acts c. 19, §§ 1-54.

[2] M.G.L. c. 25C §6, adopted in 2008, requires the DTC to report on the condition of the telecommunications industry and make policy recommendations as necessary.

[3] SMBs are those enterprises with less than five hundred employees.

[4] *See* www.masstech.org/broadband.

B. Massachusetts' regional boundaries

The availability, adoption, and quality of voice and video service in Massachusetts is directly impacted by the state's regional population density and geography. Accordingly, the DTC breaks out the Report's data separately by regions, as shown in Figure 1 below, for the available voice and video services. The DTC discusses the regional differences in the Report and includes a supporting appendix.

Figure 1: Regions Used in Report

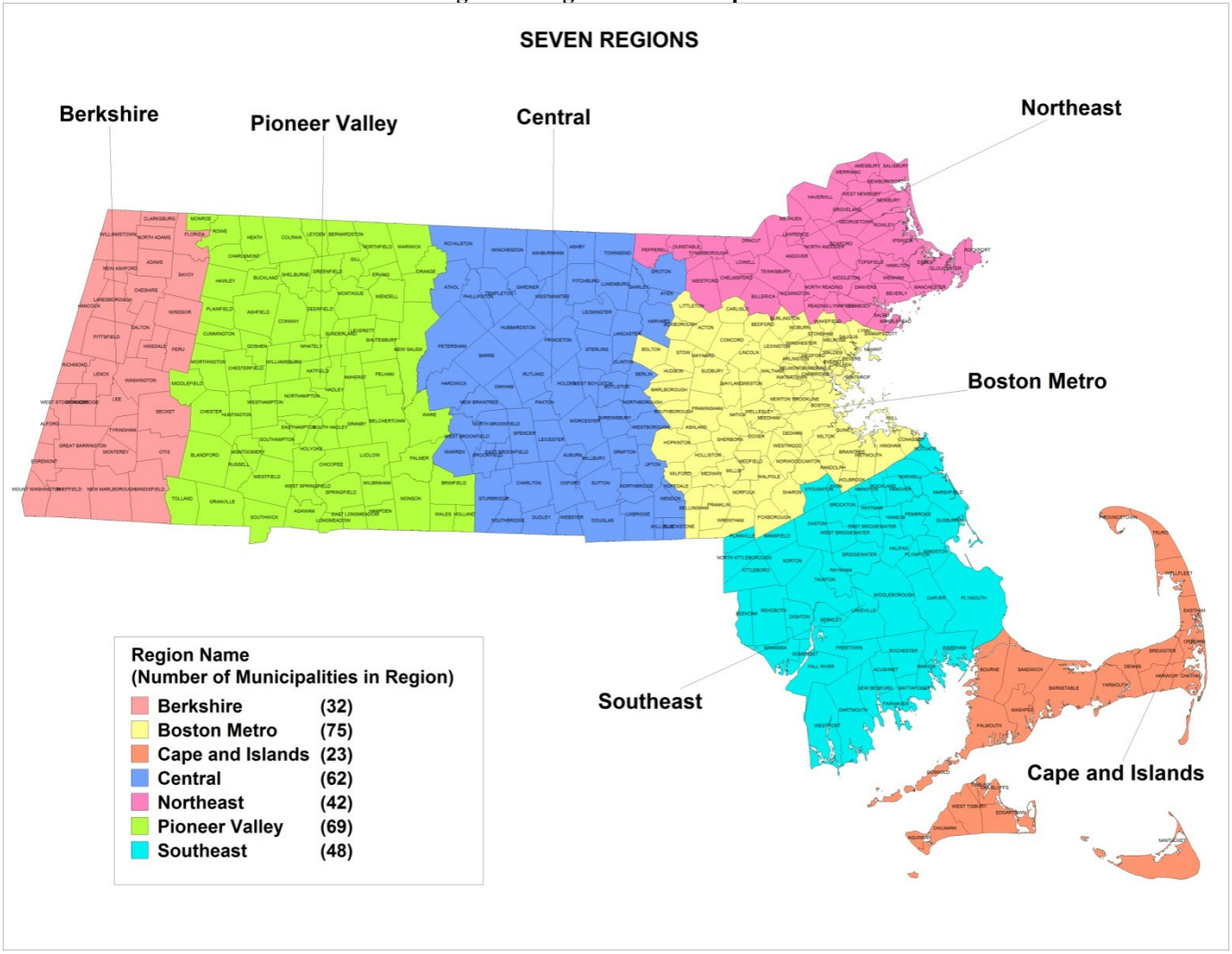

Figure 1 illustrates the seven regions used for analysis: Berkshire, Boston Metro, Cape and Islands, Central, Northeast, Pioneer Valley, and the Southeast. These region names and boundaries are defined by the University of Massachusetts Donahue Institute.[5]

[5] The Donahue Institute reports economic and public policy statistics about Massachusetts, and publishes *Mass*Benchmarks, a journal of the Massachusetts economy in cooperation with the Federal Reserve Bank of Boston. *See* http://www.massbenchmarks.org/regions/regions.htm.

C. The Report is not a regulatory document

The Report is a DTC informational document and its intent is to quantify the extent of competition of available voice and video services. The Report considers the functional differences that alternative services may have relative to traditional voice or video service. The DTC, however, does not take a position on whether any alternative services that are discussed in the Report meet the economic definition of a substitute for traditional voice or video services. The Report is not a regulatory document and the DTC makes no findings or rulings herein.

D. Note on the Report's methodology

The DTC uses three dimensions to measure competition in the Report. The first dimension is **availability** of service choices: for a customer, the choices range from non-existent to robust, depending on the number of different networks that reach the home or business. The second dimension is **adoption** of services: if competitive alternatives are available but not widely adopted by users, then competition is not as robust as availability alone would suggest. Factors affecting adoption include pricing, quality, and marketing. Another important sub-factor of adoption is *time*, as a new service may be highly competitive but may be lightly adopted due to its limited time in the market. The impacts of factors affecting adoption, however, are not addressed in the Report, because such analysis is beyond the scope of this Report. Finally, as noted in section I.B. above, **geography** is the third dimension essential to the analysis in the Report.

The DTC drew its data for the Report from a variety of sources which are detailed within the Methodology in Appendix D. These sources include the following data sets:

- Demographic data collected by the U.S. Census Bureau, Massachusetts Executive Office of Labor and Workforce Development, and Massachusetts Geographic Information System (MassGIS).
- Voluntary carrier responses to a DTC letter requesting information on their service territories and product offerings.
- Regulatory filings submitted by the carriers to the DTC, as required by Massachusetts and federal law.
- Data collected by the Federal Communications Commission (FCC) and other telecommunications bodies, including the North American Numbering Plan Administrator (NANPA).

Within practical limitations of time and budget, the DTC exhausted all sources of public data to compile the data necessary to conduct relevant analysis. However, much of the public data is incomplete or imprecise.[6] Better sources of data, such as information held by providers, are not accessible due to confidentiality issues or because the DTC lacks authority to compel such data. If the Legislature conferred such authority, the DTC would have the tools needed to produce more complete and useful reports in the future.

II. Competition in the Wireline Voice Market

A. Regulatory background

The telecommunications industry operates pursuant to principles and guidelines set forth by the federal Telecommunications Act of 1996[7] (1996 Act or Act). Through the Act, a primary intent of Congress was to foster

[6] Due to the rounding of calculations, some of data depicted in the Tables and Figures which are included in the Report may not add up to 100%.

[7] Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996).

competition for telephone services by prescribing certain obligations upon providers that controlled most of the nation's telecommunications infrastructure. In addition to "opening" access to the telecommunications network, the Act affirmed the right of cable companies to compete directly against local exchange carriers.[8] The Act also placed certain limitations on state regulatory authority of telecommunications services with the intent of promoting a nationally competitive telecommunications marketplace.[9]

Companies that provide local voice services are identified as Local Exchange Carriers (LECs) by the Act. Moreover, the Act identified two categories of LECs: Incumbent Local Exchange Carriers (ILECs) and Competitive Local Exchange Carriers (CLECs). ILECs are descendants of the former Regional Bell Operating Companies (RBOCs).[10] Collectively, the ILECs own much of the nation's public switched telephone network (PSTN) infrastructure.[11] Prior to the Act, a majority of the nation's local telecommunications services were provided by RBOCs operating as monopoly enterprises and delivering these services via the PSTN that they owned and maintained. Substantial provisions of the Act required ILECs to grant CLECs access to their monopoly infrastructure and services in an effort to allow entry into the telecommunications market and promote competition.

The Act prescribed three general means by which the ILECs were obligated to provide network access to carriers and assist competitive entry: (1) resale (Resale); (2) leased facilities (Leased Facilities); and (3) interconnection to the public telephone network by the network owned by a CLEC (Own Network). Providing carrier access to the RBOCs' networks ensures that customers utilizing services from different companies can connect and talk with one another. Additionally, because of the enormous costs of deploying the telecommunications equipment (such as switches, wires, and poles) to create independent networks, the Act granted competitors the right to lease network infrastructure that was already in operation. By allowing the networks to be leased, the intent was to mitigate the amount of capital necessary to begin service as a CLEC. The basic three-tiered structure by which carriers access ILEC infrastructure remains intact but has evolved into its current configuration.

The first means of access, Resale, permits CLECs to resell the services provided by the ILEC.[12] In effect, the CLEC uses all elements of the ILEC's telecommunications network to deliver voice service to its customer, and the CLEC's primary duty is to provide the customer with billing and customer service. There are two means by which a CLEC could utilize Resale. First, by purchasing ILEC services discounted from the retail cost, or, second, by utilizing an Unbundled Network Element Platform (UNE-P).[13] The key difference between these Resale services was the method by which the cost of the service for the CLEC was calculated. In short, because UNE-P was based on a forward-looking cost, and because it allowed the CLECs greater flexibility in service offerings, CLECs that delivered voice services through the Resale platform primarily utilized UNE-P.[14] However, after

[8] *Id.*

[9] *Id*.

[10] These entities, also called "Baby Bells," were created as a result of the break-up of AT&T by consent decree in 1984.

[11] The PSTN is the telephone network to which all telephone providers, both wireless and wireline, are connected in order to provide voice communication services to the public. In other words, when a person makes a telephone call, that call ultimately connects through the PSTN to reach the party receiving the call, no matter what type of phone is used by the called or calling parties.

[12] *See* 47 U.S.C. §§ 251(b)(1) and 251(c)(4).

[13] *See, e.g.*, 47 U.S.C. § 251(c)(3); *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 and Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, CC Docket Nos. 96-98 and 95-185, First Report and Order, FCC No. 96-325, ¶ 397 (rel. August 8, 1996) ("*Local Competition Order*").

[14] UNE-P technically was considered a Leased Facilities option under FCC rules, but because of its functional similarity to Resale, we discuss it in this Report under Resale.

several contentious years between CLECs, ILECs, and the FCC on implementation of unbundling, the FCC ruled in 2005 that ILECs were no longer required to offer UNE-P to the CLECs, effectively eliminating the Resale option.[15] As a result, CLECs have found that providing Resale service to consumers at a discount from the retail cost offered by an ILEC does not provide enough of a margin to make Resale provision profitable, particularly in the residential voice marketplace.

With Leased Facilities, a CLEC still relies heavily upon an ILEC's network infrastructure, particularly the local access line, in order to deliver voice service to its customer.[16] However, the CLEC also deploys certain network elements of its own, particularly the switching component, allowing the CLEC some level of flexibility in developing and packaging its product offerings to customers. Generally, CLECs have found Leased Facilities to be an inefficient and expensive means of providing service to residential consumers.

With Own Network, CLECs develop and deploy their own telecommunications network to the customer's premises and rely on the ILEC network only to "interconnect" the two networks, thus allowing customers on the CLEC network to make and receive calls to customers on the ILEC network.[17] In the residential marketplace, cable carriers have been able to upgrade their video networks, and many cable companies now offer voice services over their Own Networks. Other CLECs still find a significant investment barrier to entry into the residential marketplace as an Own Network carrier and primarily utilize this platform for business consumers.

B. Regulatory roles

The DTC is responsible for regulating the telecommunications and cable industries in accordance with state and federal statutory obligations.[18] The DTC strives to promote competition and protect the state's consumers in a manner consistent with the public interest, including investigation of, and response to, carrier and consumer inquiries and complaints related to telecommunications and cable services.

Both Massachusetts and federal laws govern residential telephone service within the state, and both the FCC and the DTC promulgate telephone regulations affecting the provision of telephone service within the state. Under federal law, telephone service is governed by the Communications Act of 1934, as amended by the Act. The FCC is generally responsible for regulating interstate and international communications by radio, television, wire, satellite, and cable in all of the 50 states, the District of Columbia, and U.S. territories. Under Massachusetts law, telecommunications services are generally governed by G.L. chapters 159 and 166 and regulations thereunder. The DTC is generally responsible for regulating intrastate telecommunications services (i.e., those services, such as in-state telephone calls, that originate and terminate within Massachusetts), including ILECs, CLECs, and cable companies that provide wired voice services (Cable Voice). In addition, the DTC's regulatory authority is also affected by federal statutes, rulings by the FCC, and rulings by state and federal courts.

In most geographic areas, both nationally and in Massachusetts, the ILECs were generally the pre-Act providers of local voice service. Before 1996, ILECs were monopolies with the exclusive right and responsibility for

[15] *In the Matters of Unbundled Access to Network Elements and Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, WC Docket No. 04-313 and CC Docket No. 01-338, Order on Remand, (rel. Feb. 4, 2005) ("*Triennial Review Remand Order*").

[16] See e.g. *Local Competition Order* ¶ 172.

[17] *Id.*

[18] *See generally*, Mass. Gen. Laws Chapters 159, 166, and 166A.

providing local exchange telephone service in defined geographic or service areas. The Act began the advent of major changes in the telecommunications industry and how it is regulated.

The DTC generally endorses competitive markets over regulation as the best way to achieve economic efficiency, technological innovations, and a greater sensitivity to customer demands. The DTC follows this regulatory framework and has encouraged the development of competitive telecommunications markets in Massachusetts since the break-up of AT&T in 1984. The DTC's encouragement of competition in the marketplace grows out of longstanding policies and precedents spanning over two decades. The DTC's goal is to evolve regulatory requirements and oversight to match the evolution of market forces, in order to more closely match the level of regulation to the state of the marketplace.[19]

Aside from federal market entry requirements, all telecommunications service providers doing business in Massachusetts, excluding wireless providers, which are exempted by the FCC, must register and file a tariff with the DTC. Apart from building their own facilities to serve customers, providers wishing to operate in Massachusetts have two modes of entry available: (1) lease Unbundled Network Elements (UNEs) from an ILEC or network components from another carrier and provide service using the leased facilities combined with their own network; or (2) purchase a retail service from another carrier (usually Verizon New England, Inc. (Verizon)) at a wholesale discount rate, then resell it under its own brand. The DTC has authority over ILECs' wholesale provisioning of UNEs.[20] The DTC ensures that the state's ILECs provide UNEs in a non-discriminatory manner and ensures that the rates at which they are leased are just and reasonable.[21] In addition, the DTC develops the wholesale discount rate for resale pursuant to FCC methodology.[22] Through these actions, among others, the DTC is able to fulfill its role in promoting sustainable competition; ensuring that consumers receive high quality telecommunications services at just and reasonable rates; and ensuring that consumer protections are maintained and enforced, particularly where competitive markets are unable to do so.

C. Classifications and platforms for telephone services

1. Overview

The DTC has identified three platforms by which wired voice services (Wireline Voice) are delivered to consumers by service providers: ILEC, CLEC, and Cable Voice. The DTC's classifications are not fully consistent with traditional industry treatment. For example, Cable Voice providers are traditionally considered CLECs by the industry. The DTC's classification of Wireline Voice providers in this manner, however, is consistent with how consumers, particularly residential consumers, view the providers.

In addition to Wireline Voice, residential consumers are increasingly being offered opportunities to obtain telecommunications services through alternative means, including wireless services. Over the last decade, cellular technology has allowed wireless voice service (Wireless Voice) to become its own market segment. Wireless Voice is examined separately in Section III of the Report.

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[19] For example, the DTC recently instituted a cap on the CLEC intrastate switched access charges as a response to a market inefficiency. *See In re Verizon New England, Inc., MCImetro Access Transmission Servs. of Mass., Inc., d/b/a Verizon Access Transmission Servs., MCI Commc'ns Servs., Inc., d/b/a Verizon Bus. Servs., Bell Atlantic Commc'ns, Inc., d/b/a Verizon Long Distance, and Verizon Select Services, Inc. for Investigation under Ch. 159, § 14, of the Intrastate Access Rates of Competitive Local Exchange Carriers*, D.T.C. 07-9, Final Order (June 22, 2009).

[20] *See* 47 U.S.C. § 252(d)(3)

[21] *Id.*

[22] *Local Competition Order* ¶ 619.

In many ways, the delivery of alternative telecommunications services remain dependent upon the infrastructure deployed by Wireline Voice providers, particularly ILECs, in order reach a wider consumer base (Table 1). To date, consumers appear to be adopting alternative telephone service, particularly Wireless Voice, primarily to supplement or complement, rather than replace, Wireline Voice.[23]

2. ILECs

ILECs are traditional local telephone companies that have served Massachusetts consumers for decades. ILECs own and operate ubiquitous networks of utility poles, telephone wiring, switching equipment, and other infrastructure in their service territories. As previously mentioned, the largest ILECs are descendants of RBOCs, also known as the "Baby Bells." RBOCs and other large independent ILECs served most of the nation's local voice customers prior to the Act. Before the Act, ILECs were monopolies vested with the exclusive right and responsibility for providing local telephone service in their defined service areas.

The ILECs have a number of duties in furtherance of two basic but distinctive governmental goals: (1) that all residential and business consumers have reasonable access to Wireline Voice; and (2) that all telephone carriers must be permitted open and non-discriminatory access to an ILEC's network in furtherance of a competitive market for Wireline Voice.

With regard to the goal of providing all consumers with reasonable access to Wireline Voice, ILECs in Massachusetts serve two roles: first, as a carrier of last resort (COLR), and second, as a basic service provider (Basic Service Provider). As a COLR, ILECs must ensure that all households within their service territory have reasonable access to connect to the PSTN.[24] In addition, ILECs may not refuse service to anyone without cause.[25] As the Basic Service Providers, ILECs offer consumers basic service that allows them to receive and make telephone calls within the local network at a regulated reasonable rate.

With regard to promoting competition, there are several federal and state requirements imposed upon ILECs. ILECs must permit reasonable access to their network infrastructure, and the rates that ILECs are permitted to charge for access to their network infrastructure are regulated.[26]

In Massachusetts, Verizon is the successor to the state's RBOC, New England Telephone and Telegraph Company, and is the ILEC for over 99 percent of the state. In addition, there are four ILECs operating in rural Massachusetts, each serving a single community: Granby Telephone serving Granby; Richmond Telephone serving Richmond; Sentinel Tree Telephone serving Gosnold; and Taconic Telephone which serves part of the town of Hancock.

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[23] See *infra* Section III.G.

[24] The ILEC is designated as the carrier-of-last-resort for local exchange service. Therefore, the ILEC is required to offer originating and terminating service in all exchanges. *See* Petition of the Attorney General for a Generic Adjudicatory Proceeding Concerning Intrastate Competition By Common Carriers, D.P.U. 1731 at 76 (Oct. 18, 1985) ("D.P.U. 1731").

[25] *Id.*

[26] *See generally*, Telecomms. Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996) (codified as amended in numerous sections of 47 U.S.C. & 15 U.S.C. § 79z-5c).

3. CLECs

Under the Act, CLECs are permitted to provide Wireline Voice in the formerly exclusive ILEC service territories. The intent of the Act was to increase competition and, as noted above, CLECs had three options under the Act by which they would be able to provide local telephone service to residential and business consumers:

- **Resale:** A CLEC may purchase telecommunications services from the ILEC at regulated wholesale rates and then resell those services at retail prices. The CLEC provides its customer with billing and customer service, but is dependent upon the ILEC for the delivery of all telephone services;
- **Leased Facilities:** A CLEC may lease parts of an ILEC network (e.g., UNE loops[27]) and provide its own switching to terminate calls to end users. By leasing only part of the ILEC network, the CLEC has greater flexibility in the telecommunications services and packages it may offer to customers in addition to providing customers with billing and customer services. However, the CLEC still relies upon the ILEC's infrastructure to deliver telecommunications service; and
- **Own Network:** A CLEC may construct its own telecommunications network facilities and has the right to "interconnect" to the ILEC network so the CLEC customers can make and receive calls from other customers on the PSTN.

The larger CLECs operating in Massachusetts include One Communications, AT&T Corp., PAETEC Communications, and XO Communications.

4. Cable Voice

Cable video providers did not initially offer voice services. Most cable providers have upgraded their infrastructure during the past decade, and now offer voice services. Cable providers that offer Cable Voice are intermodal network competitors, because the providers have traditionally provided a service distinct from Wireline Voice and because they connect to customers using their own local access network infrastructure facilities.

The Act affirmed the rights of cable companies to interconnect to the PSTN, allowing Cable Voice consumers to connect and talk with other voice consumers (i.e., ILEC, CLEC, and wireless voice consumers). Cable Voice providers control the network infrastructure used to deliver telephone service; address service quality issues; maintain control over network investment and maintenance; and provide customer service and billing operations.

There are seven Cable Voice providers operating in Massachusetts. Four of the providers are privately-held companies: Time Warner Communications (Time Warner), Charter Communications (Charter), Comcast Communications (Comcast), and RCN Corp. (RCN). Municipalities are the other three providers: Shrewsbury Cable (Shrewsbury), Braintree Electric Light Department (Braintree), and Norwood Light Broadband (Norwood). Some Cable Voice providers deliver voice services to their customers using Voice over Internet Protocol (VoIP), in which voice signals are transmitted using Internet protocols.[28]

[27] In its most basic form, the loop is the pair of copper wires that connects the telephone company's central office to the telephone set or system at the customer's premises.

[28] Verizon FiOS is not considered a Cable Voice provider in this Report because it is owned by the ILEC.

Table 1: Voice Platforms

Platform	Technology	Coverage	Operators in MA
ILECs	Wireline. Own all infrastructure.	Verizon serves 347 MA towns. The four independent ILECs each serve one town.	• Verizon • Granby Telephone • Richmond Telephone • Taconic Telephone • Sentinel Tree Telephone
CLECs	Wireline. Typically lease infrastructure access from ILECs.	Bound to ILEC service area.	Include: • One Communications • AT&T Corp. • PAETEC • XO Communications
Cable Voice	Cable wires. Own all infrastructure.	Limited to town boundaries and household density requirements in franchise agreement.	• Time Warner • Charter • Comcast • RCN • Three municipal companies

D. Residential Service

1. Availability

a) Introduction

For residential consumers in Massachusetts seeking local services, the changes in the legal landscape governing telecommunications services discussed above have brought recent change and uncertainty into the Wireline Voice markets. During the nearly ten years following the Act, a relatively high number of CLECs were competing for residential consumers. Generally speaking, CLECs offering service to residential customers have become increasingly marginalized in recent years. As a result, the number of residential lines served by CLECs began steadily declining in 2005. This decline in consumers served by CLECs is primarily the result of a 2005 FCC ruling[29] that eliminated mandated access to the ILECs' UNE-P service, which impaired the ability of CLECs to earn a profitable return when they attempted to utilize the Resale platform to deliver services to residential consumers. There have also been several mergers within the telecommunications industry which consolidated the number of companies operating nationally. Through DTC's observation of the Massachusetts market, it is apparent that CLECs have shifted business strategy as a result of these and other developments, and many no longer serve the residential market. While a number of CLECs still provide service to the residential marketplace,

[29] *In re Unbundled Access to Network Elements*, Order on Remand, 20 F.C.C.R. 2533.

many do so only to "grandfathered" consumers and do not actively market services to residential consumers. Those CLECs that are actively marketing residential services appear to be doing so to niche residential market classes.

In contrast, cable companies have been upgrading their video network infrastructure and are now offering Cable Voice over their own networks to residential consumers. Cable Voice providers that offer voice service over their own network have greater flexibility to offer a variety of telephone service packages that are distinct from the ILEC and CLEC telephone service offerings. While consumers have fewer providers to choose from for Wireline Voice service, the remaining providers appear to offer at least the same, and possibly, greater variety of plans and services.

b) ILECs

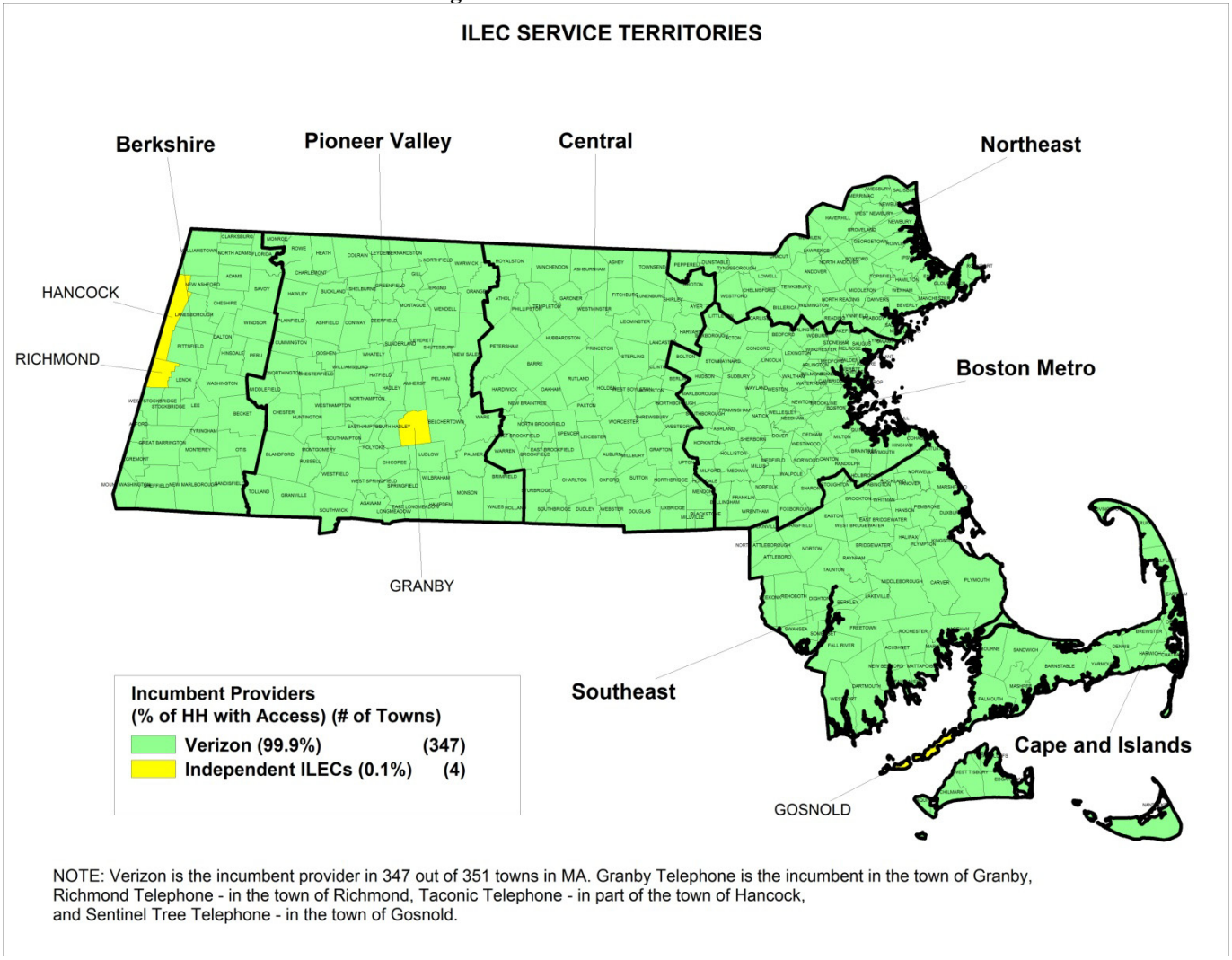
As noted above, five ILECs operate in Massachusetts. Verizon, the predominant carrier for Wireline Voice in the state, is the incumbent provider in 347 of the 351 towns in the state, serving 99.9 percent of all households (Figure 2).

For the calculation of households covered by ILECs detailed in Table 2, every household within each of the five Massachusetts ILEC territories are assumed to be covered by the ILECs. The assumption is based on the requirement that an ILEC make reasonable efforts to offer ubiquitous service throughout its service territory as the COLR.

Table 2: Summary of ILEC Service Availability

ILEC	Towns Covered	Households Covered
Verizon	**347**	**2,437,717 (99.9%)**
Granby Telephone	Granby	2,254
Richmond Telephone	Richmond	637
Taconic Telephone	Hancock	290
Sentinel Tree Telephone	Gosnold	46
Total Independent ILECs	**4**	**3,227 (0.1%)**
Total ILECs	**351**	**2,440,944 (100%)**

Figure 2: ILEC Service Territories



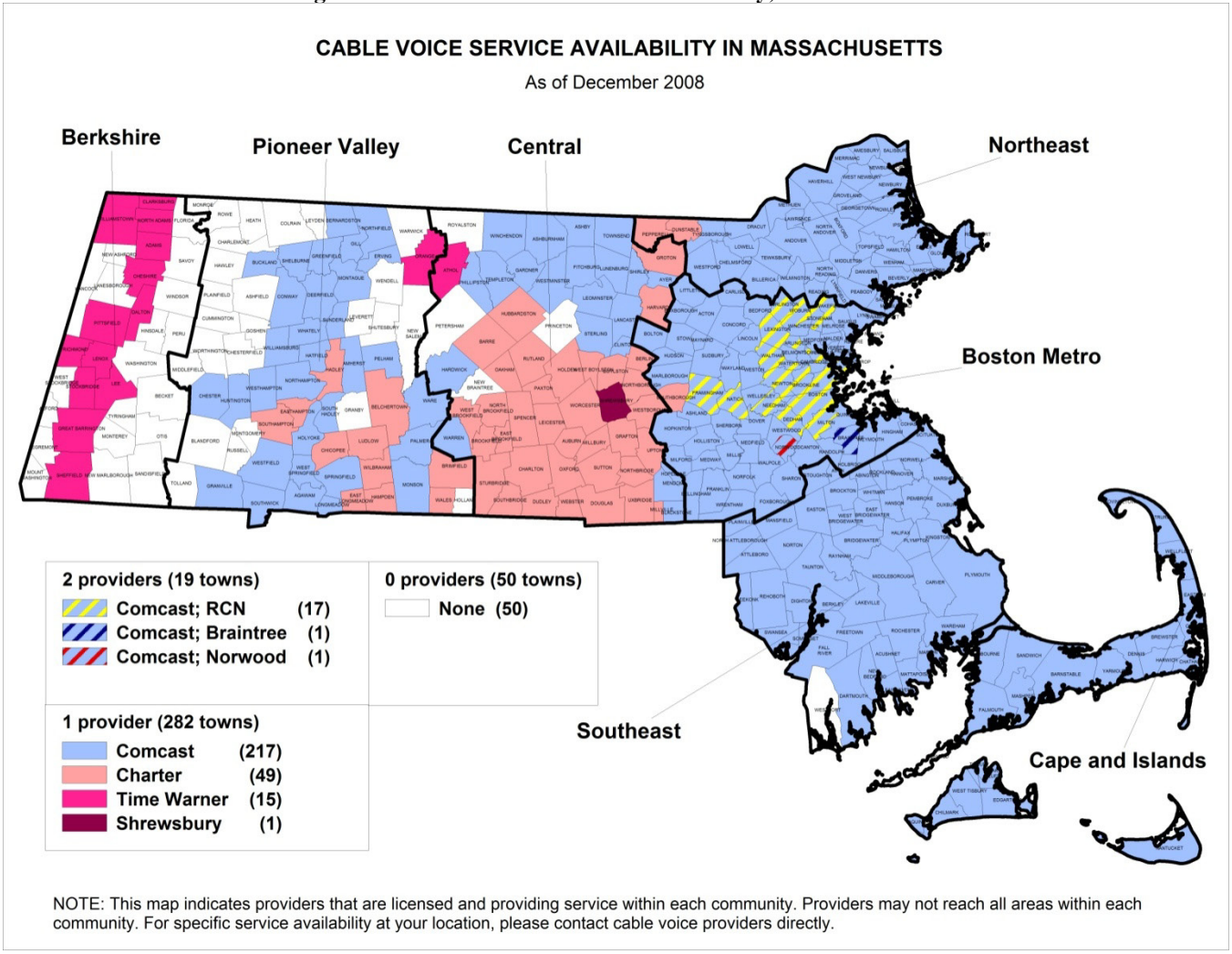
NOTE: Verizon is the incumbent provider in 347 out of 351 towns in MA. Granby Telephone is the incumbent in the town of Granby, Richmond Telephone - in the town of Richmond, Taconic Telephone - in part of the town of Hancock, and Sentinel Tree Telephone - in the town of Gosnold.

c) Cable Voice

Cable Voice is available from the cable companies licensed to provide cable video services in Massachusetts communities. Cable Voice is limited to locations that are passed by the cable network and where the cable network has been upgraded to deliver voice service. There are 308 municipalities in Massachusetts with at least one cable company providing video services and Cable Voice is available in 301 of those municipalities. Of the 301 municipalities with access to Cable Voice, 19 have two cable companies offering voice service. Every municipality with two competing cable companies offering Cable Voice is located in the Boston Metro region, indicating significant regional disparities in this level of competition.

Figure 3 details the Cable Voice provider(s) within each municipality. It is important to note that while Figure 3 indicates the presence of a Cable Voice provider, it does not necessarily follow that all of the municipality's households are able to access Cable Voice since cable companies are not obligated to reach all of the households in the municipalities in which they provide service.

Figure 3: Residential Cable Voice Availability, December 2008



Overall, Cable Voice is available to 97.1% of all Massachusetts households (Figure 4 and Table 3). Of the approximately 70,000 households (2.9% of all state households) without access to Cable Voice, about 12,000 households (17%) have access to Cable Video. There are two primary reasons that specific cable franchises do not provide voice services in Massachusetts: (1) lack of network upgrade; and/or (2) absence of an interconnection agreement. Cable networks were originally designed to offer video services. In recent years, however, advances in technology allowed cable companies to upgrade their networks enabling them to offer broadband and voice services over the same networks. In Hinsdale, Lanesboro, West Stockbridge, and Westport, four municipalities served by Charter, the company has not yet installed the necessary upgrade to its video network in order to provide Cable Voice. In the municipalities of Granby, which is served by Comcast, and Holland, which is served by Cox, the companies upgraded their networks but do not offer Cable Voice because interconnection agreements between the cable companies and the ILEC are not in place.

Figure 4: Distribution of Residential Cable Voice Availability by Number of Providers and Regions, 2008

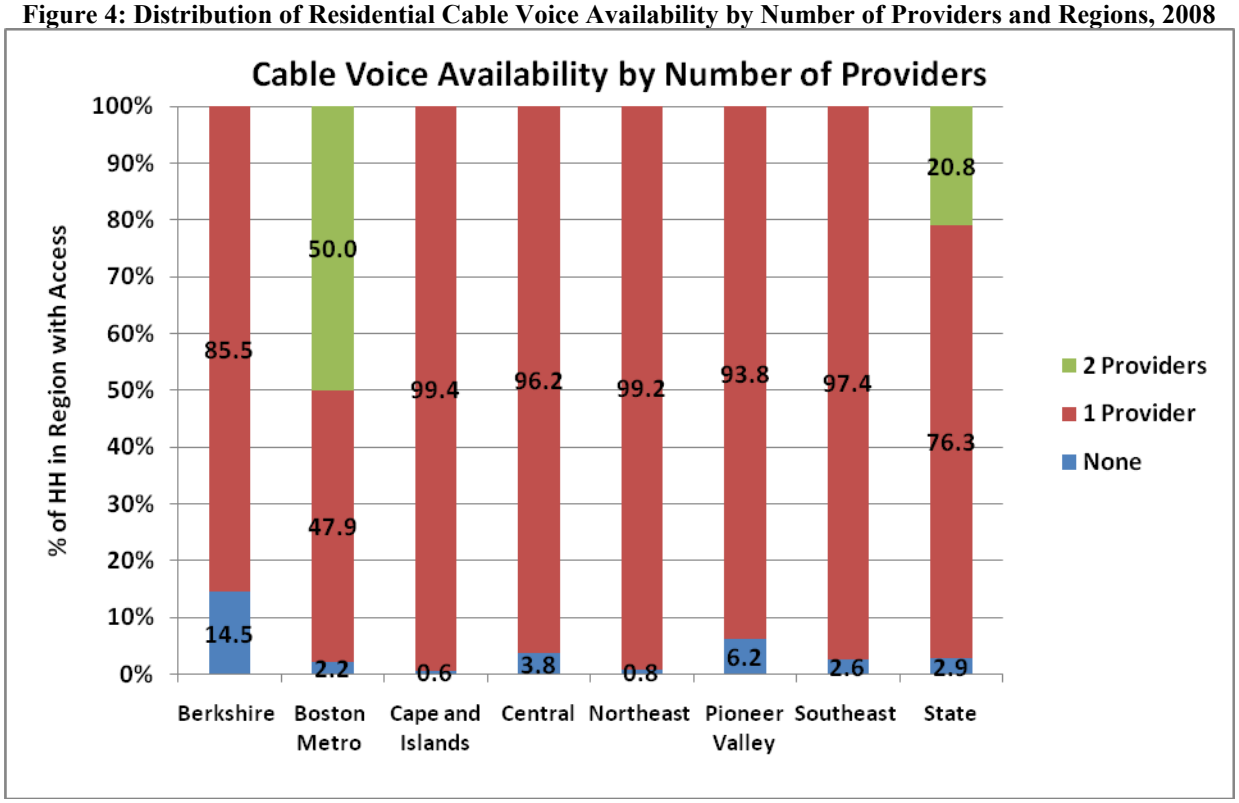


Table 3: Summary of Residential Cable Voice Availability, 2008

Competitors	Region	Availability
No Cable Voice provider	Commonwealth	70,000 households *(2.9%)*
	Regional Distribution:	*% of State Total*
	Boston Metro	*31.7%*
	Pioneer Valley	*22.9%*
	Central	*15.1%*
	Berkshire	*11.6%*
Two providers	Commonwealth	508,800 households *(20.8%)*
	Concentrated in Boston Metro	*100%*

d) CLECs

As discussed above, CLECs may utilize the ILEC infrastructure through Leased Facilities or the Resale option to provide Wireline Voice to residential consumers. Accordingly, CLECs should be able to offer Wireline Voice to consumers throughout the state. However, the provision of Wireline Voice by CLECs to residential consumers is declining. Resale is the predominant platform by which CLECs provide Wireline Voice to residential consumers and by year-end 2007, there were 22 CLECs providing Wireline Voice by Resale to residential consumers. Only five of these CLECs had more than a thousand Resale lines statewide.

Resale makes up only approximately 2% of the Massachusetts residential Wireline Voice market. While theoretically resellers should be able to provide service to more than 99% of the households reached by Verizon, it is apparent that providers utilizing the Resale platform only market their services to a niche market. This is a direct result of changes to the Resale platform resulting from the 2005 FCC ruling on UNE-P.[30] Due largely to low revenue margins on Resale service provided on a mass market basis, CLECs operating on the Resale platform are generally serving customers for one of the following three reasons: (1) offering service to low-income customers who qualify for subsidy programs (e.g. Lifeline); (2) offering service on a pre-paid only basis (e.g. customers with credit history concerns); and (3) continued provision of service to "grandfathered" customers who adopted the carrier's service prior to the 2005 rule change.

In 2007, four CLECs used the Leased Facilities platform and seven CLECs used the Own Network platform. Combined, they provided service to less than 1% of the total residential market. The DTC speculates that these CLECs provide service to large residential complexes, a specific niche of the residential Wireline Voice market.

2. Adoption

a) Introduction

The number of subscribers for Wireline Voice by residential consumers was in steady decline between 2005 and 2008. The overall decline is attributable to a number of factors, including the cancellation of customers' second lines used for dial-up services when households move to broadband service and an increase in the rate of households choosing to forego any type of Wireline voice service. When comparing the market share among the three different platforms (ILEC, CLEC, and Cable Voice) during the period between 2005 and 2008, the ILEC platform maintained its position as the predominant provider of residential Wireline Voice.[31] Despite a drop in the total number of lines served, ILECs provided approximately 64% of residential lines by year-end 2008. Cable Voice providers gained market share during the period, more than doubling, and providing about 33% of residential lines in Massachusetts by the end of 2008.

b) ILECs

Figure 5 below shows the total loss in the number of residential lines provided by ILECs between 2005 and 2008. During this period, ILECs lost approximately 642,000 (31%) residential voice lines across the state. The number of ILEC lines dropped by approximately 27 lines per 100 households.

Despite the losses experienced by ILECs in the residential Wireline Voice market, ILECs still provide a predominant share of the lines to residential households (Figures 13 and 14).

[30] *In re Unbundled Access to Network Elements*, Order on Remand, 20 F.C.C.R. 2533.

[31] A "market share" is the percentage of lines served by the platform as a percentage of the total lines provided in the entire market place.

Figure 6 shows the regional breakdown of ILEC residential subscribers as of December 2008. The lower adoption rates per 100 households in certain regions (for example, Boston Metro and Northeast) seem to indicate where the ILEC is facing greater levels of competition for voice services.

Figure 5: ILEC Residential Lines, June 2005-December 2008

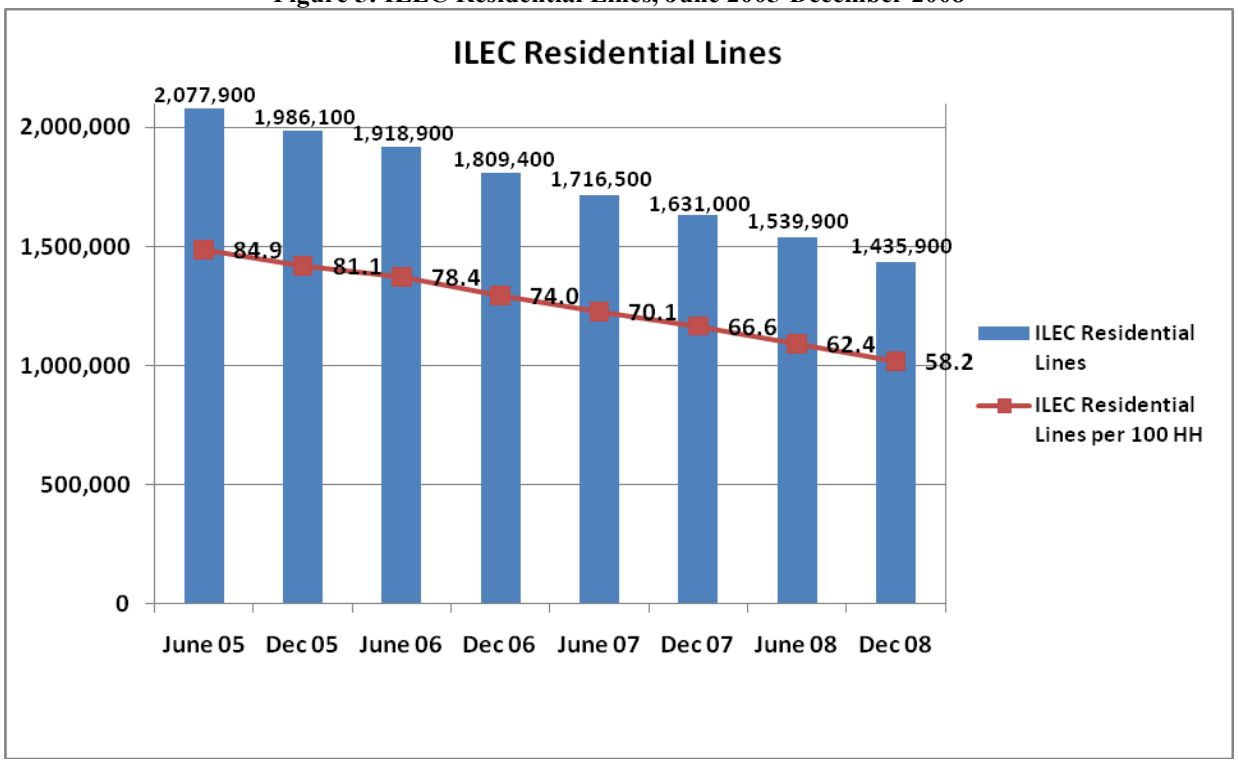
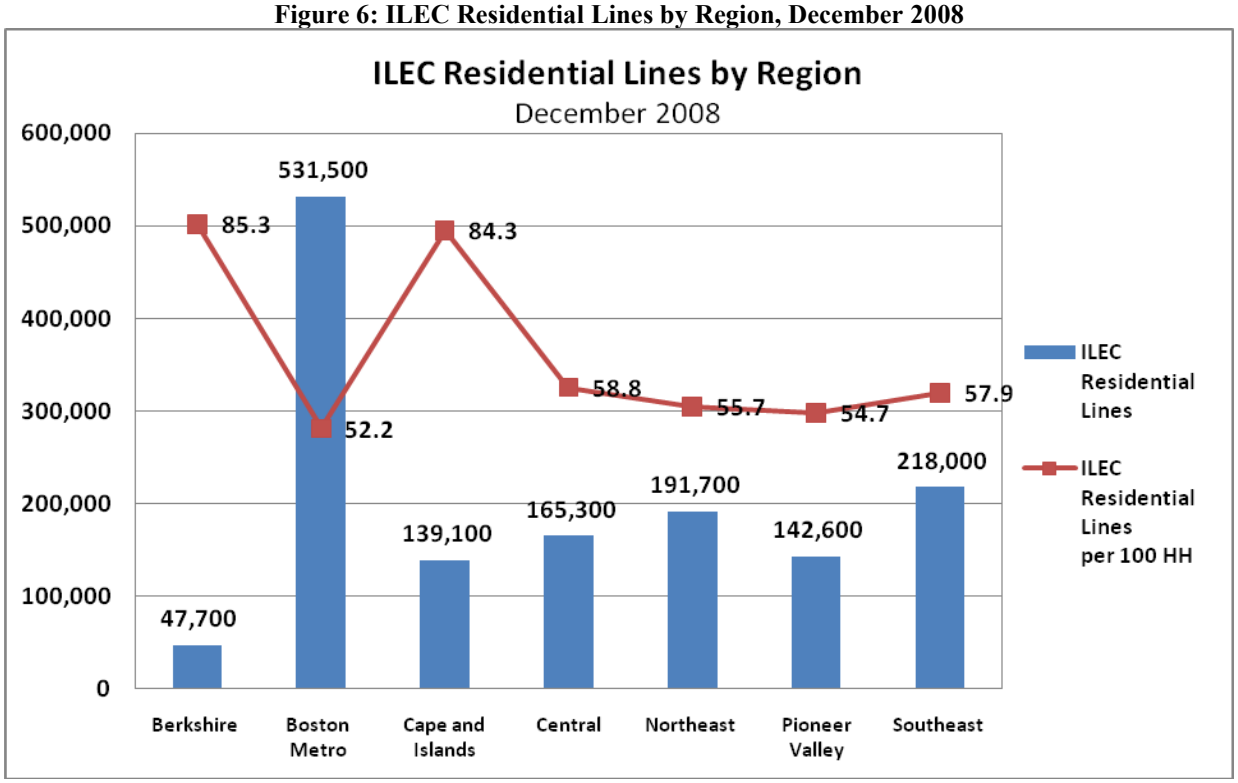


Figure 6: ILEC Residential Lines by Region, December 2008



c) Cable Voice

Cable Voice was the only Wireline Voice platform that experienced market growth between 2005 and 2008. As shown in Figure 7, the number of residential Cable Voice lines grew by about 403,000 (118%) lines between 2005 and 2008. This rate more than doubled the number of Cable Voice lines provided per 100 households statewide, from 14 to 30.2 lines.

Despite the growth of Cable Voice, there is an adoption disparity among the state's seven regions. The adoption disparity across the regions correlates with access to Cable Voice. In areas where Cable Voice is not as widely available to households, such as the Berkshire region, adoption of Cable Voice is not as robust as it is in the Boston Metro and Northeast regions, where the service is more ubiquitous.

Figure 8 shows the regional breakdown of Cable Voice lines as of December 2008. The lower adoption rates per 100 households, for example, in the Berkshire region, correspond to those regions with the lowest availability of Cable Voice service.

Figure 7: Residential Cable Voice Lines, June 2005-December 2008

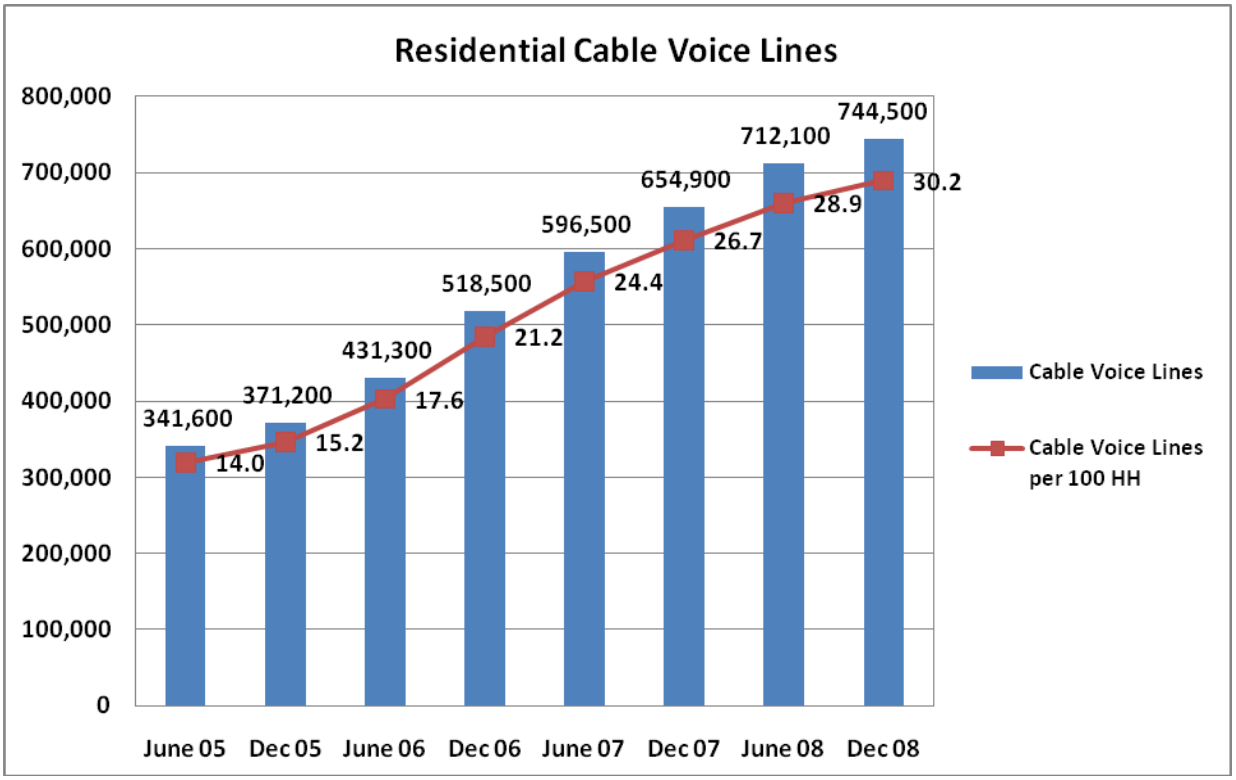
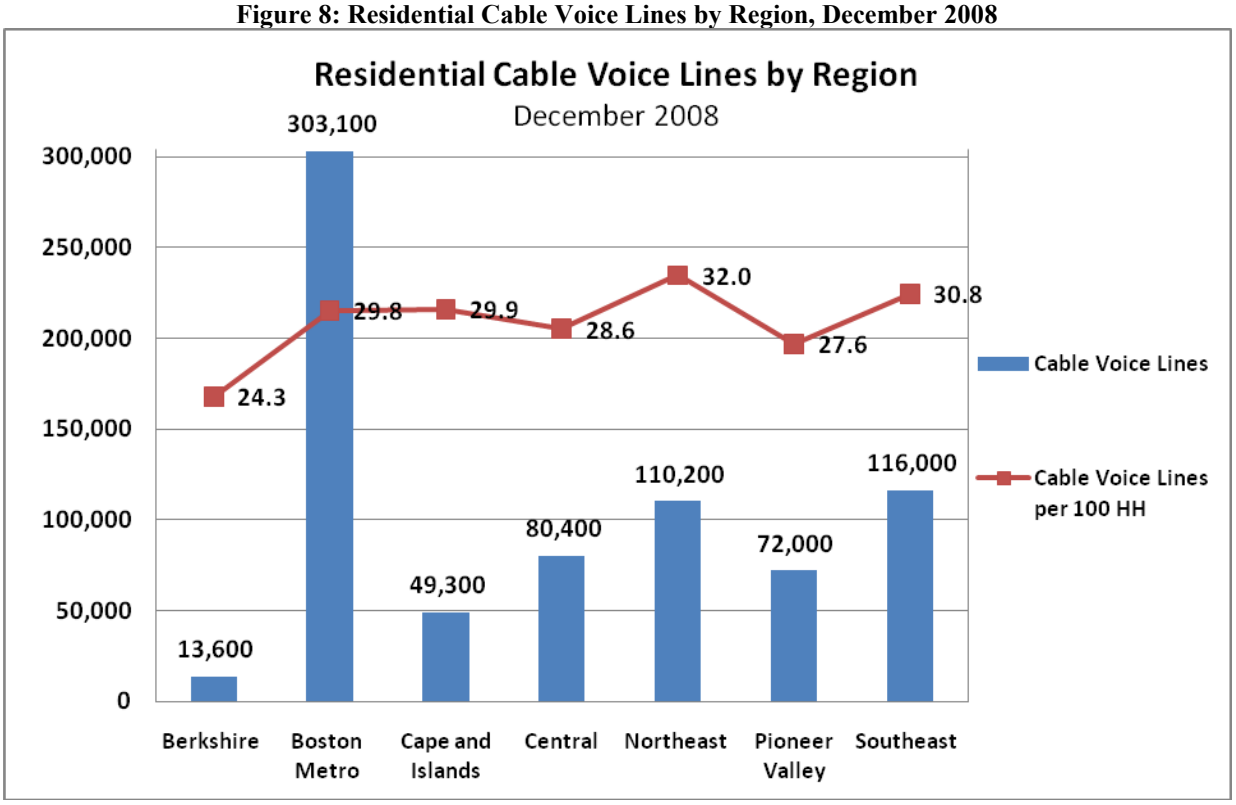


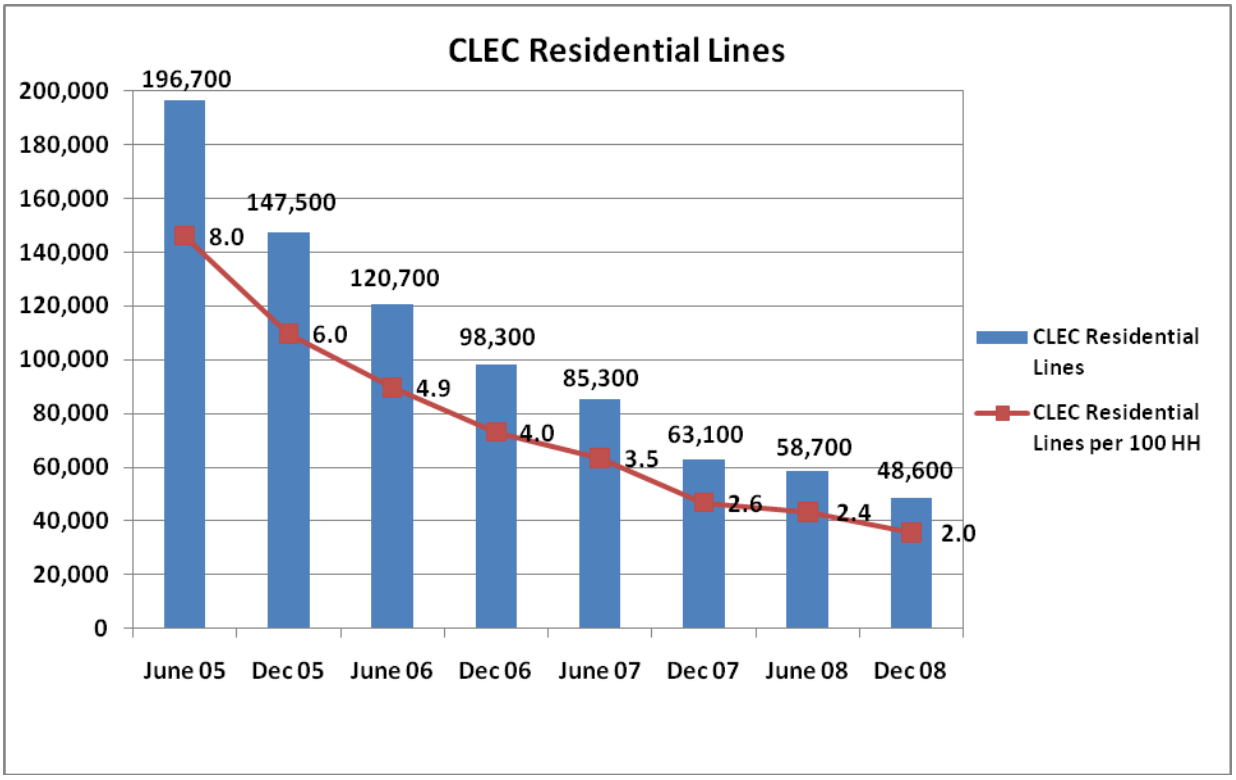
Figure 8: Residential Cable Voice Lines by Region, December 2008



d) CLECs

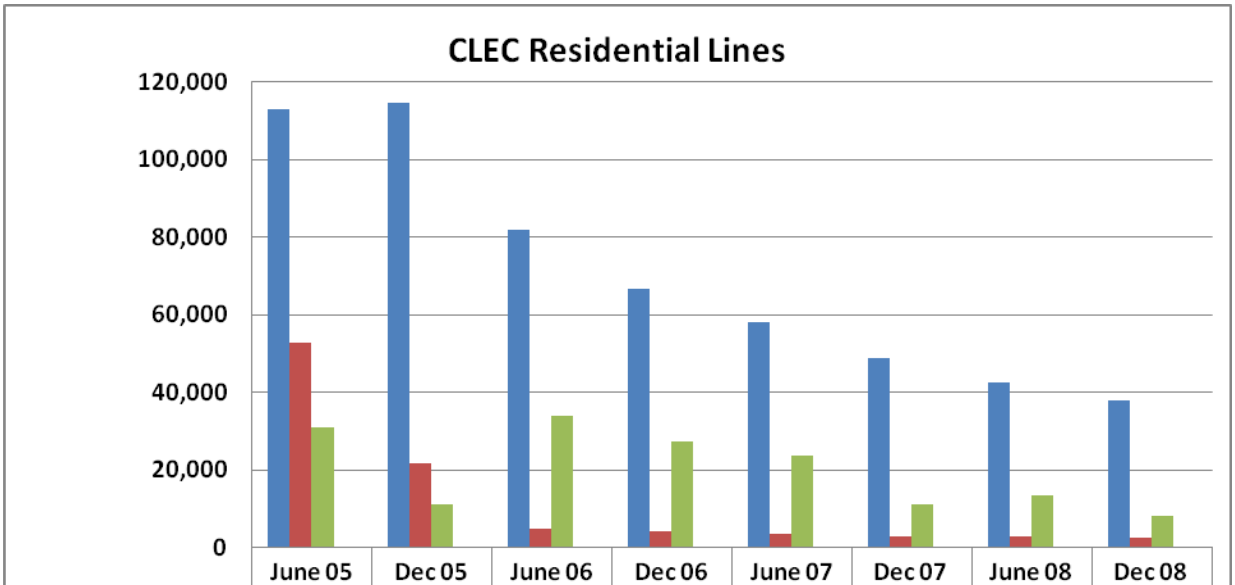
During the period between 2005 and 2008, CLECs lost about 148,000 (75.3%) lines throughout the state as shown in Figure 9. The number of lines served by CLECs per 100 households declined from 8 to 2 over this period. By the end of 2008, CLECs' share of residential Wireline Voice lines dropped to 2.2% from 7.5% in June 2005 (Figure 14).

Figure 9: CLEC Residential Lines, June 2005-December 2008



Each of the three CLEC platforms (Resale, Leased Facilities, and Own Network) experienced line losses during the period between 2005 and 2008 (Figure 10). Resale service lost the highest number of lines (74,900). However, the provision of Leased Facilities to residential consumers declined by the highest percentage, about 95%, from 52,700 to 2,500. The loss in Leased Facilities lines is largely explained by the exit from the market of MCI, the largest CLEC utilizing the Leased Facilities platform to provide residential Wireline Voice. In 2006, MCI declared bankruptcy and was subsequently acquired by Verizon. As a result of the acquisition, most of MCI's existing subscribers became Verizon subscribers, and consequently, ILEC consumers.

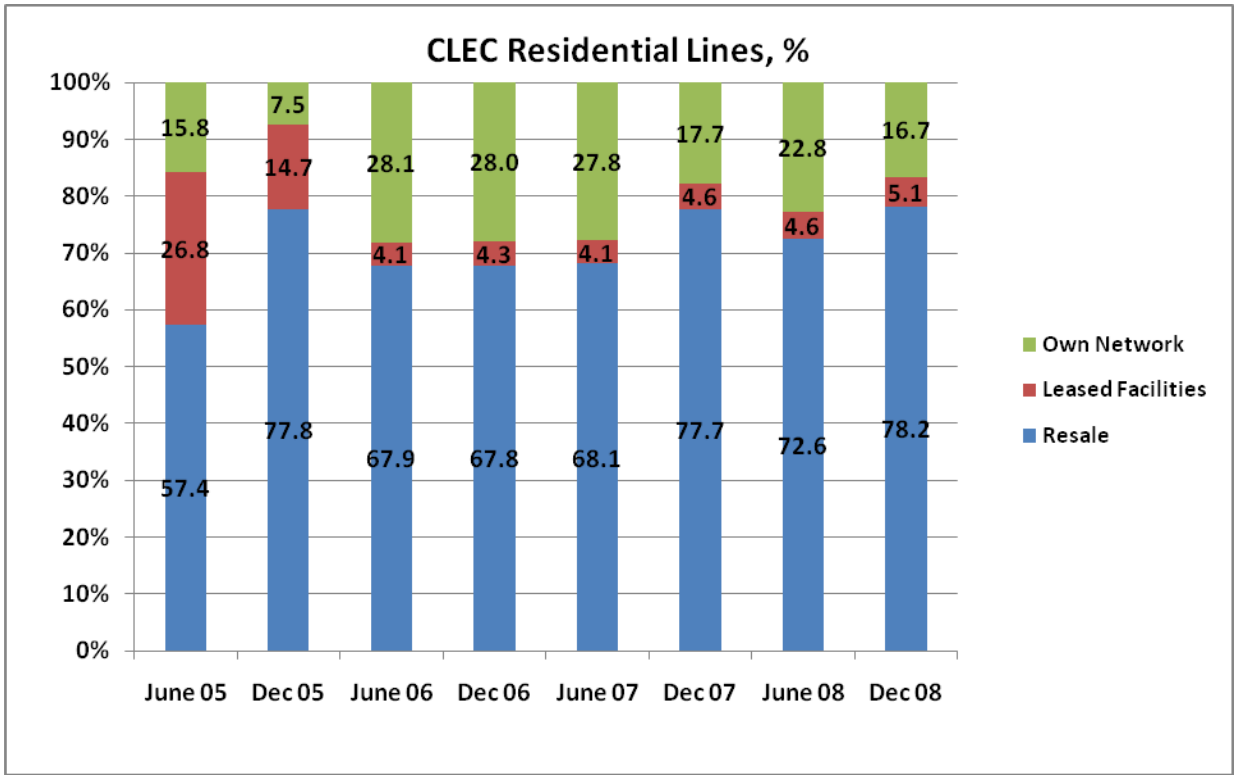
Figure 10: Distribution of CLEC Residential Voice Lines by Platform Type, June 2005-December 2008



	June 05	Dec 05	June 06	Dec 06	June 07	Dec 07	June 08	Dec 08
Resale	112,900	114,700	81,900	66,600	58,100	49,000	42,600	38,000
Leased Facilities	52,700	21,700	4,900	4,200	3,500	2,900	2,700	2,500
Own Network	31,100	11,100	33,900	27,500	23,700	11,200	13,400	8,100
Total Lines	196,700	147,500	120,700	98,300	85,300	63,100	58,700	48,600

Figure 11 below shows Resale as the most widely utilized CLEC platform. While the CLECs are losing residential lines, CLEC consumers are increasingly being provided Wireline Voice via the Resale platform, demonstrating that the network and voice service quality received by CLEC consumers is almost exclusively dependent upon the ILEC (i.e., Verizon) in these areas.

Figure 11: Percentage Distribution of CLEC Residential Voice Lines by Platform Type, June 2005-December 2008



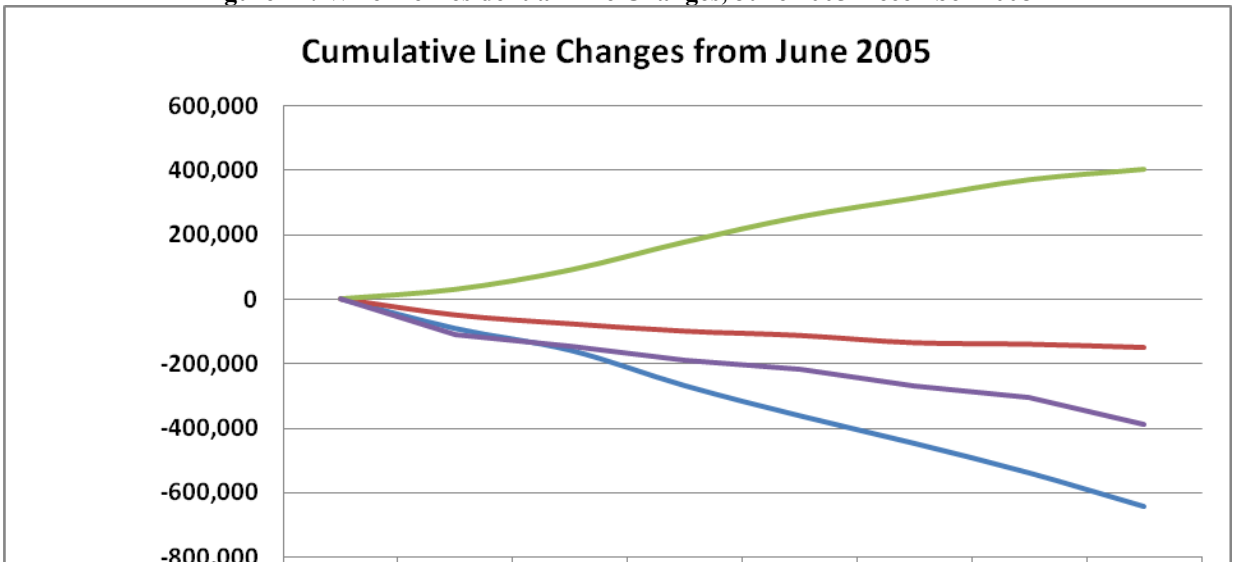
e) Wireline Voice adoption comparison

The total number of Wireline Voice lines provided to households statewide declined by 387,200 (14.8%) during the period between 2005 and 2008 (Table 4 and Figure 12). Of the three Wireline Voice platforms, only Cable Voice experienced a gain in the number of residential lines served. This gain by Cable Voice did not offset the total number of lines that were lost.

Table 4: Change in Wireline Residential Voice Lines by Platform, June 2005-December 2008

Platform	Change in Residential Lines
ILECs, gain(+)/loss(-)	-642,000
CLECs, gain(+)/loss(-)	-148,100
Cable Voice, gain(+)/loss(-)	+402,900
Net Line Change, gain (+)/loss(-)	-387,200

Figure 12: Wireline Residential Line Changes, June 2005-December 2008



	June 05	Dec 05	June 06	Dec 06	June 07	Dec 07	June 08	Dec 08
ILEC	0	(91,800)	(159,000)	(268,500)	(361,400)	(446,900)	(538,000)	(642,000)
CLEC	0	(49,200)	(76,000)	(98,400)	(111,400)	(133,600)	(138,100)	(148,100)
Cable Voice	0	29,600	89,700	176,900	254,900	313,300	370,500	402,900
Net Line Change	0	(111,400)	(145,300)	(190,000)	(217,900)	(267,200)	(305,600)	(387,200)

Figures 13 and 14 examine the statewide changes in market share during the period between 2005 and 2008. The Figures show that ILECs lost 15 percentage points of their residential market share, but maintained their position as the predominant platform, providing approximately 64% of the residential Wireline Voice lines in Massachusetts. Overall, the share of the residential market served by competitive providers increased because Cable Voice rapidly emerged as a significant choice for residential consumers. As a platform, the Cable Voice market share grew from 13.1% to 33.4% during the period.

Presently, as Cable Voice providers and ILECs increasingly offer and market their services in bundles of voice along with video and Internet service, including premium features, many moderate and lower-income consumers, including the elderly and those consumers with serious medical conditions, seeking low-cost, basic telephone service today have just one wireline provider option: the ILECs. Cable voice providers do not offer low-cost basic telephone service, and the few CLECs that still serve residential customers and offer basic voice service generally do so at significantly higher rates than the ILEC and/or only on a pre-paid basis. In addition, the poorest of this group, low-income consumers that qualify for federal and state subsidized basic telephone service programs, known as Lifeline[32] and Link-Up,[33] similarly have few options. Cable voice providers and CLECs no longer offer, or never offered, Lifeline and Link-Up services or services very similar to them. [34] Therefore, ILECs are the only

[32] The Lifeline Assistance Program is a federal/state program that offers eligible consumers a discount on their monthly bills for basic telephone services. This program is made available to those consumers who meet certain eligibility requirements.

[33] Link-Up is a federal/state program that helps eligible households reduce the cost of installing telephone service. This program pays some of the cost of connecting local telephone service to the home or activating service.

[34] The one exception is RCN, which offers service through the Lifeline program in the 17 municipalities served by the company.

wireline option for consumers seeking assistance through the Lifeline and/or Link-Up programs.[35] As a result, moderate-to-low-income consumers are not benefitting from competitive trends in the Wireline Voice market to the same extent as higher-income demographic groups.

In addition, residential customers, including the most vulnerable consumers who depend on consumer protections (i.e., the poor, elderly and those with serious medical conditions) may suffer in today's residential market through loss of safeguards from unreasonable disconnection of service and fair resolution of billing disputes. For instance, certain companies providing voice service through interconnected VoIP may not extend many of the most important state-mandated consumer protections to their customers.[36] These VoIP providers argue that they are not required to provide these consumer protections because they claim that they are not subject to state regulation.[37] The DTC is concerned that many residential customers ordering service from these VoIP providers are unaware of the providers' refusal to provide certain consumer safeguards. The DTC's policy is to regulate this type of VoIP service like other Wireline Voice services,[38] and, thus, the DTC is seeking to enforce compliance with these state consumer protections.

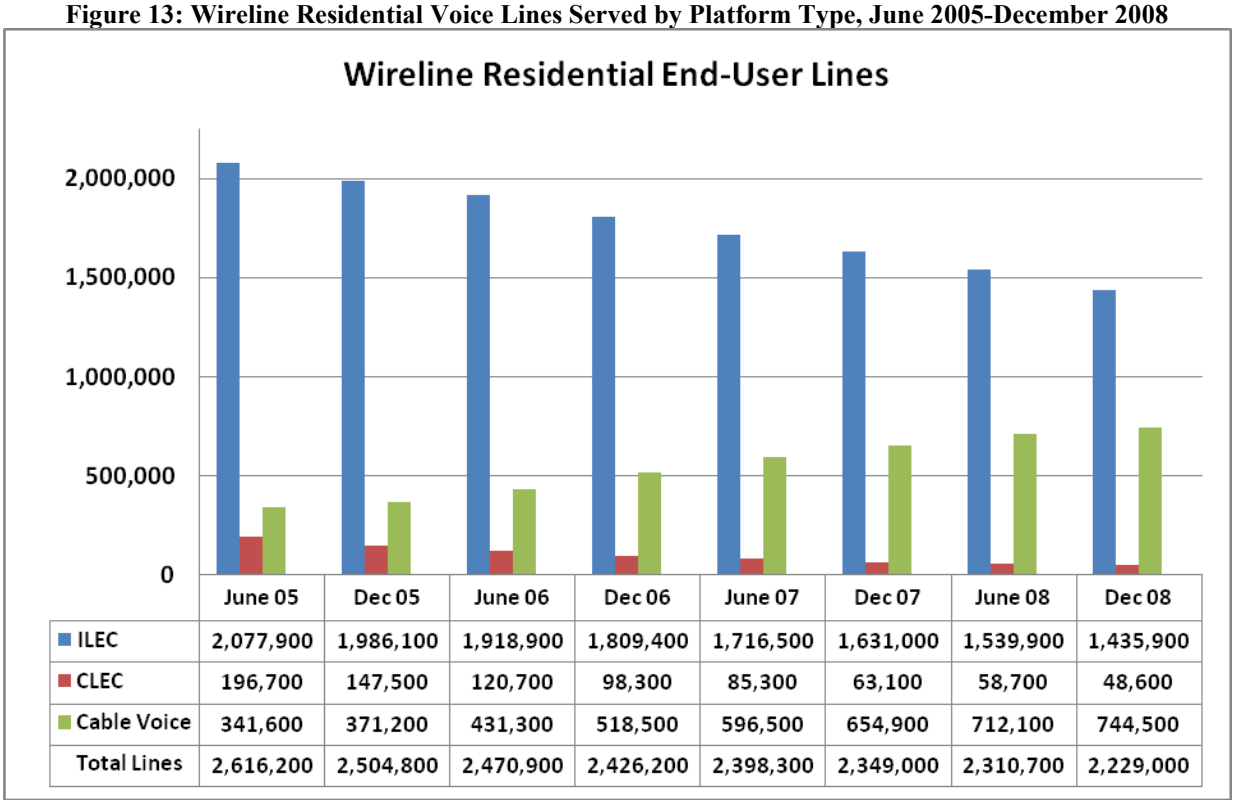
[35] In December 2008, TracFone, a wireless provider, was certified as an Eligible Telecommunications Carrier in Massachusetts, thus, enabling TracFone to provide service through the Lifeline program. TracFone does not provide wireless service through its own facilities and network, therefore the company's service territory is not discussed in section III.E, *infra*.

[36] *See e.g.*, Letter from Stacey L. Parker, Senior Director, Regulatory Affairs, Comcast Phone of Massachusetts, Inc. to Michael Isenberg, Director, Competition Division, Massachusetts Department of Telecommunications and Cable, at 3 (May 12, 2008) (stating "Comcast IP Phone is not subject to state regulation and therefore is not subject to [state law], or the rules relating to residential billing and termination practices"); Letter from John L. Conroy, Vice President, Regulatory Massachusetts, Verizon New England Inc. d/b/a Verizon Massachusetts to Michael Isenberg, Director, Competition Division, Massachusetts Department of Telecommunications and Cable, at 3 (Aug. 19, 2009) (stating "it is Verizon['s] position that [FiOS Digital Voice] is not subject to state regulation … [but Verizon's policies] are consistent with the major items included" in the DTC's billing and termination regulations).

[37] *Id*.

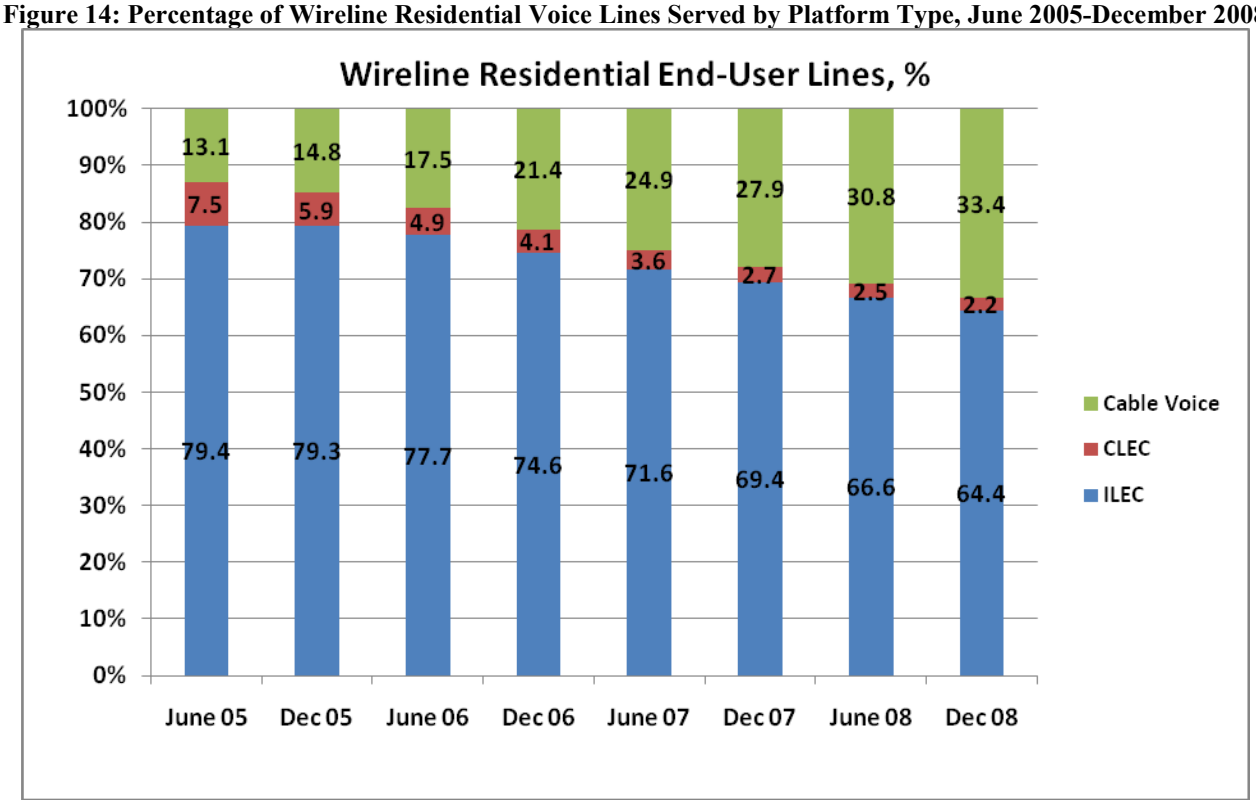
[38] *See e.g.*, Letter from Michael Isenberg, Director, Competition Division, Massachusetts Department of Telecommunications and Cable to Stacey L. Parker, Senior Director, Regulatory Affairs, Comcast Cable Communications, Inc., at 4 (Nov. 14, 2008); Letter from Michael Isenberg, Director, Competition Division, Massachusetts Department of Telecommunications and Cable to John Conroy, Vice President, Regulatory Massachusetts, Verizon New England Inc. d/b/a Verizon Massachusetts, at 1-2 (Sept. 22, 2009); Reply Comments of the Massachusetts Department of Telecommunications and Cable to the Federal Communications Commission, *In the Matter of High-Cost Universal Service Support* (WC Docket No. 05-337); Federal-State Joint Board on Universal Service (CC Docket No. 96-45); *Lifeline and Link-Up* (WC Docket No. 03-109); *Universal Service Contribution Methodology* (WC Docket No. 06-122); *Numbering Resource Optimization* (CC Docket No. 99-200); *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* (CC Docket No. 96-98); *Developing a Unified Intercarrier Compensation Regime* (CC Docket No. 01-92); *Intercarrier Compensation for ISP-Bound Traffic* (CC Docket No. 99-68); *IP-Enabled Services* (WC Docket No. 04-36), at 7-10 (filed Dec. 22, 2008).

Figure 13: Wireline Residential Voice Lines Served by Platform Type, June 2005-December 2008



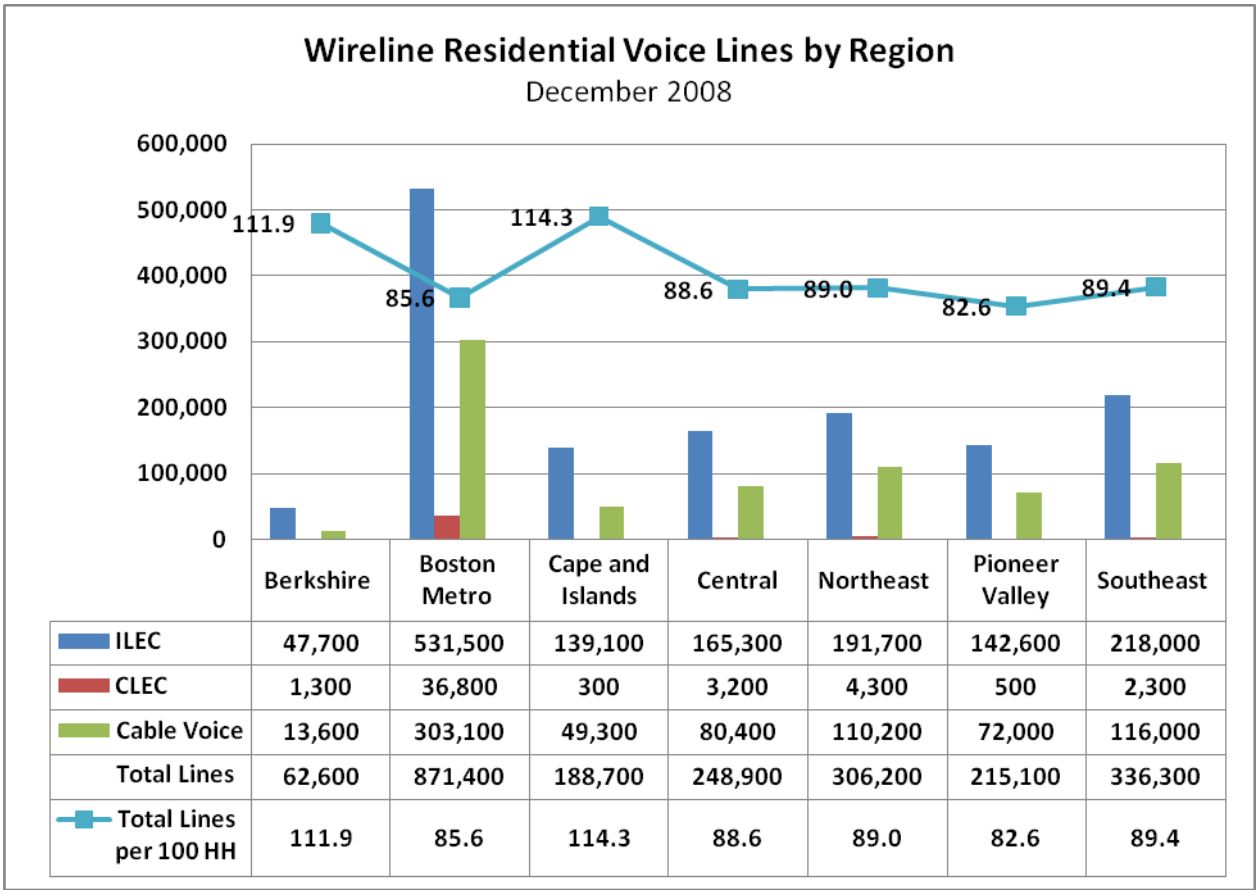
	June 05	Dec 05	June 06	Dec 06	June 07	Dec 07	June 08	Dec 08
ILEC	2,077,900	1,986,100	1,918,900	1,809,400	1,716,500	1,631,000	1,539,900	1,435,900
CLEC	196,700	147,500	120,700	98,300	85,300	63,100	58,700	48,600
Cable Voice	341,600	371,200	431,300	518,500	596,500	654,900	712,100	744,500
Total Lines	2,616,200	2,504,800	2,470,900	2,426,200	2,398,300	2,349,000	2,310,700	2,229,000

Figure 14: Percentage of Wireline Residential Voice Lines Served by Platform Type, June 2005-December 2008



Figures 15 through 16 examine the market share differences across the seven regions in 2008. These figures reveal marked geographic differences in adoption trends in Massachusetts.[39] The adoption rate of Cable Voice in the Berkshire region is a comparatively low 21.7%, which is likely a result of lower Cable Voice availability within the Berkshire region compared to other regions. In the Boston Metro region, the only region in which some households have access to two Cable Voice providers, the Cable Voice adoption rate is about 35%, with about 61% of residential customers utilizing ILEC service.

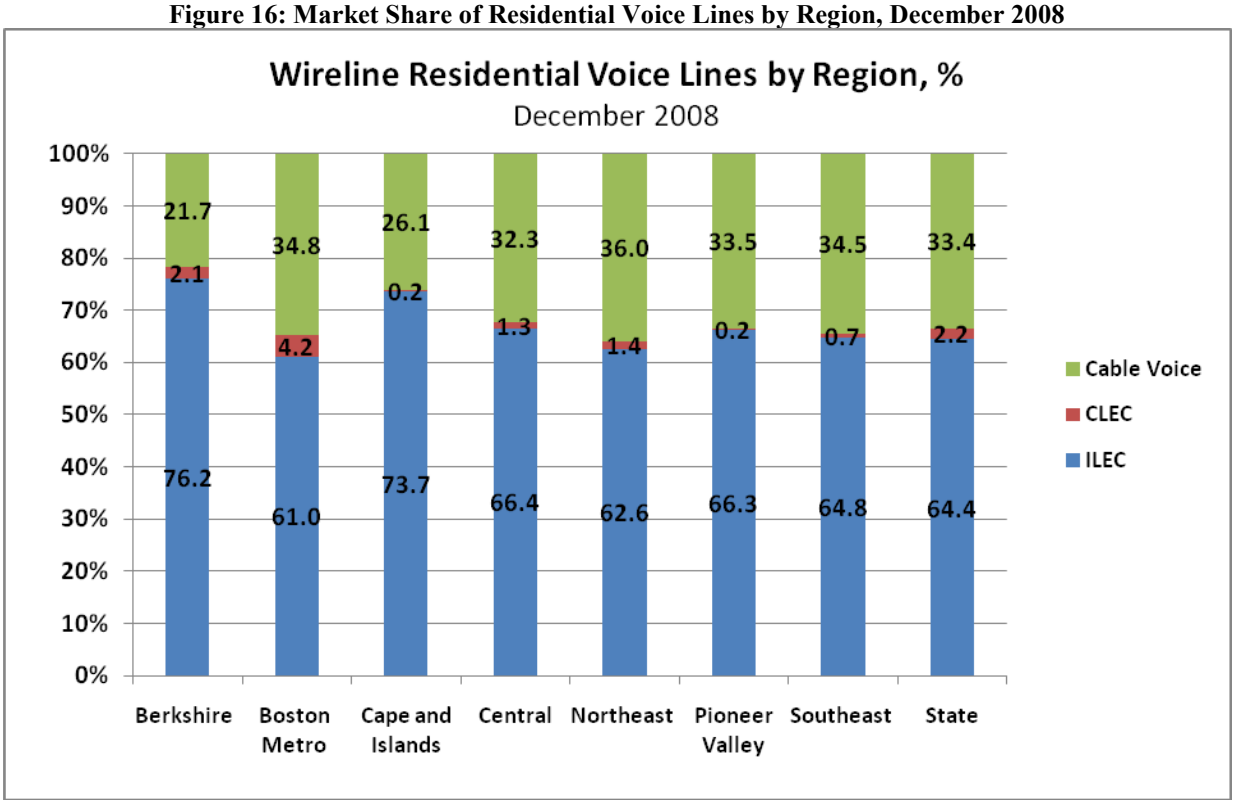
Figure 15: Distribution of Wireline Residential Voice Lines by Region, December 2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast
ILEC	47,700	531,500	139,100	165,300	191,700	142,600	218,000
CLEC	1,300	36,800	300	3,200	4,300	500	2,300
Cable Voice	13,600	303,100	49,300	80,400	110,200	72,000	116,000
Total Lines	62,600	871,400	188,700	248,900	306,200	215,100	336,300
Total Lines per 100 HH	111.9	85.6	114.3	88.6	89.0	82.6	89.4

[39] Figure 15 indicates that there are in total more than 100 Wireline Voice lines per 100 households in the Berkshire and Cape and Islands regions. Possible explanations for this anomaly include higher numbers of in-home businesses within these regions that require multi-line services into the house and higher adoption rates of dedicated dial-up ISP lines, among others reasons.

Figure 16: Market Share of Residential Voice Lines by Region, December 2008



3. Service Quality

a) Introduction

One of the DTC's responsibilities is to oversee the quality of service provided by telecommunications providers in Massachusetts.[40] The DTC fulfills this responsibility through a variety of means, including investigating individual complaints; regularly monitoring performance metrics; and investigating aggregated complaints in situations where there may be a pattern of sub-standard performance in specific geographic locations. As a function of service quality oversight, the DTC regularly collects information from two primary sources: (1) complaints investigated by the DTC's Consumer Division (Consumer Division) regarding all Wireline Voice providers; and (2) Verizon's Service Quality Index (SQI).[41]

The Consumer Division complaint data examined by the DTC contains a range of individual complaint types received between 2005 and 2008, including billing-related complaints and complaints related to both customer service and network performance (collectively, quality-related complaints). The monthly Verizon SQI reports include a range of quality-related performance metrics, most of which are provided exclusively on an aggregated basis. These reports also include local information on the number of network performance troubles reported by consumers; the latter information is discussed presently. According to both the Consumer Division and the data in Verizon SQI reports, the state experienced a decline in the frequency of Wireline Voice complaints between 2005

[40] G.L. c. 159, § 16

[41] Verizon is required to provide monthly Quality of Service reports pursuant to its regulation plan, established by D.P.U. 94-50, as modified by D.T.E. 01-31.

and 2008. However, the data indicates that regional distinctions exist, particularly a higher frequency of billing complaints from the Boston Metro region and greater frequency of network troubles reported from the Berkshire region as compared to the balance of the state.

b) DTC Consumer Division

The Consumer Division is responsible for the enforcement of laws and regulations affecting residential telecommunications and cable services.[42] The mission of the Consumer Division is to protect consumers from unjust practices and to monitor the quality of service provided by companies regulated by the DTC in furtherance of the DTC's mission.[43] The DTC accepts complaints filed by residential consumers regarding Wireline Voice, including Cable Voice, and intervenes on their behalf if the consumer fails to resolve the issue directly with the company. Generally, the DTC only responds to complaints from residential Wireline Voice consumers, because they are perceived to require more assistance than business customers in resolving disputes. In addition, wireless consumers traditionally have sought assistance from the FCC and the Massachusetts Attorney General's Office for wireless telephone complaints. Accordingly, the Consumer Division generally does not accept complaints from business customers or for wireless services.

In 2008, the Consumer Division received a total of 1,993 complaints, or 8.9 complaints for every 10,000 subscribers in the state (see Figure 17). For purposes of this discussion, complaints are divided into three categories: (1) billing complaints (Billing), which are complaints related to possible errors for services provided or rates charged to a consumer (Figure 18); (2) service quality complaints (SQ), which encompass complaints regarding poor customer service as well as network troubles, such as static on a line or an interruption of service, that negatively affect the delivery of voice service (Figure 19); and (3) miscellaneous complaints, which are complaints that could not be categorized as either Billing or SQ related.[44] Statewide, in 2008, 70% of complaints were Billing-related, 25% SQ-related and 5% were miscellaneous.

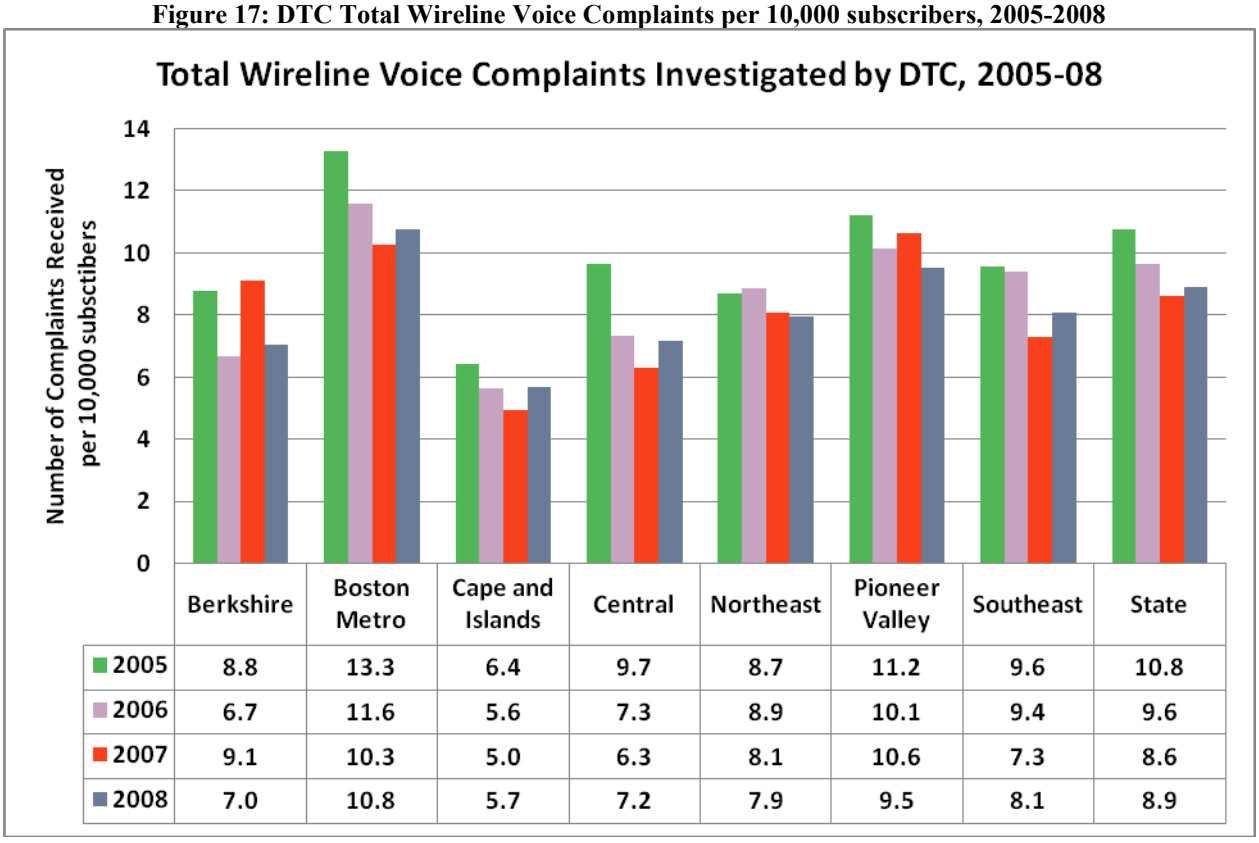
The highest number of complaints in 2008 was from the Boston Metro region, with 10.8 complaints for every 10,000 consumers. Conversely, the lowest number was from the Cape and Islands region, with 5.7 complaints per 10,000 consumers. In particular and consistent with the previous three years, the frequency of Billing related complaints in the Boston Metro region (7.5) is noticeably higher compared to the cumulative statewide Billing-related frequency rate (6.2).

[42] G. L. c. 25C, § 1 (2007).

[43] Department of Telecommunications and Cable, Consumer Division website, *available at* http://www.mass.gov/DTC.

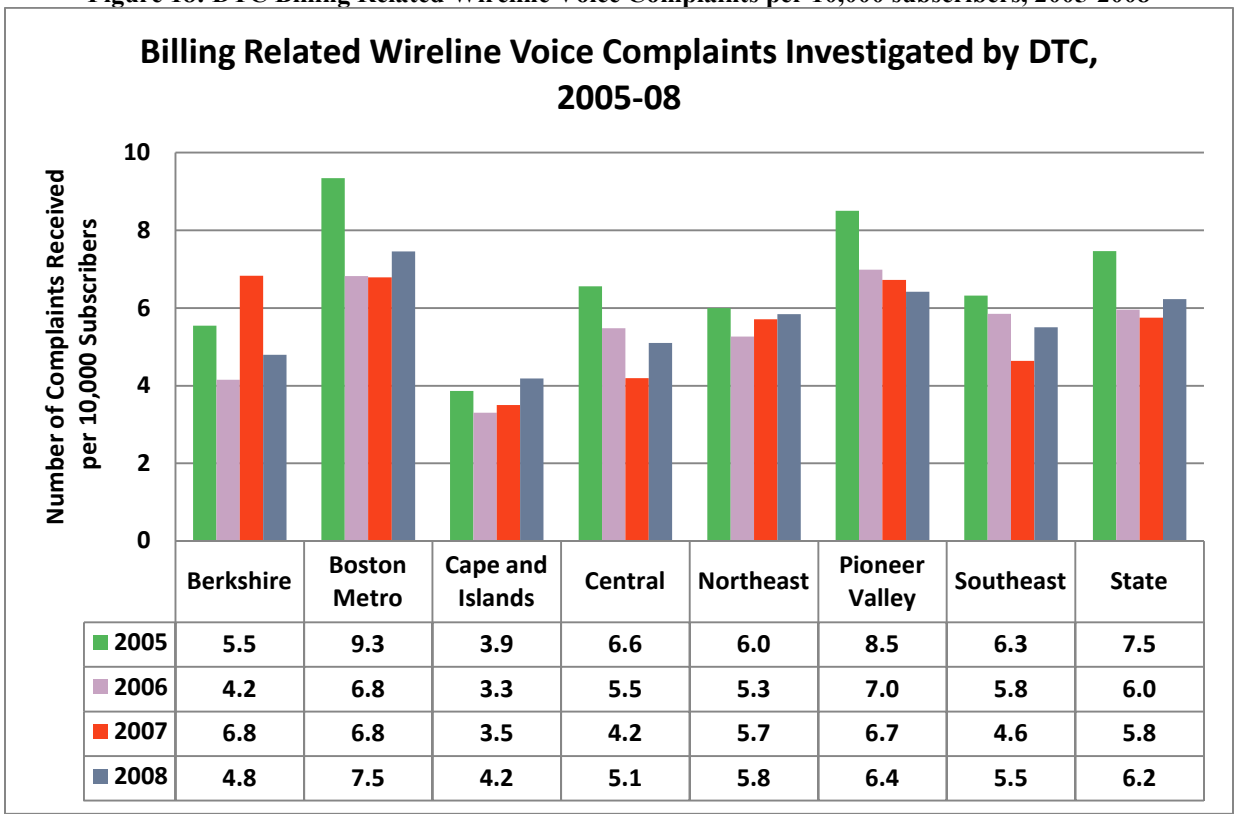
[44] Region-specific frequency rates for miscellaneous complaints are not provided due to the comparatively low number of miscellaneous complaints received.

Figure 17: DTC Total Wireline Voice Complaints per 10,000 subscribers, 2005-2008



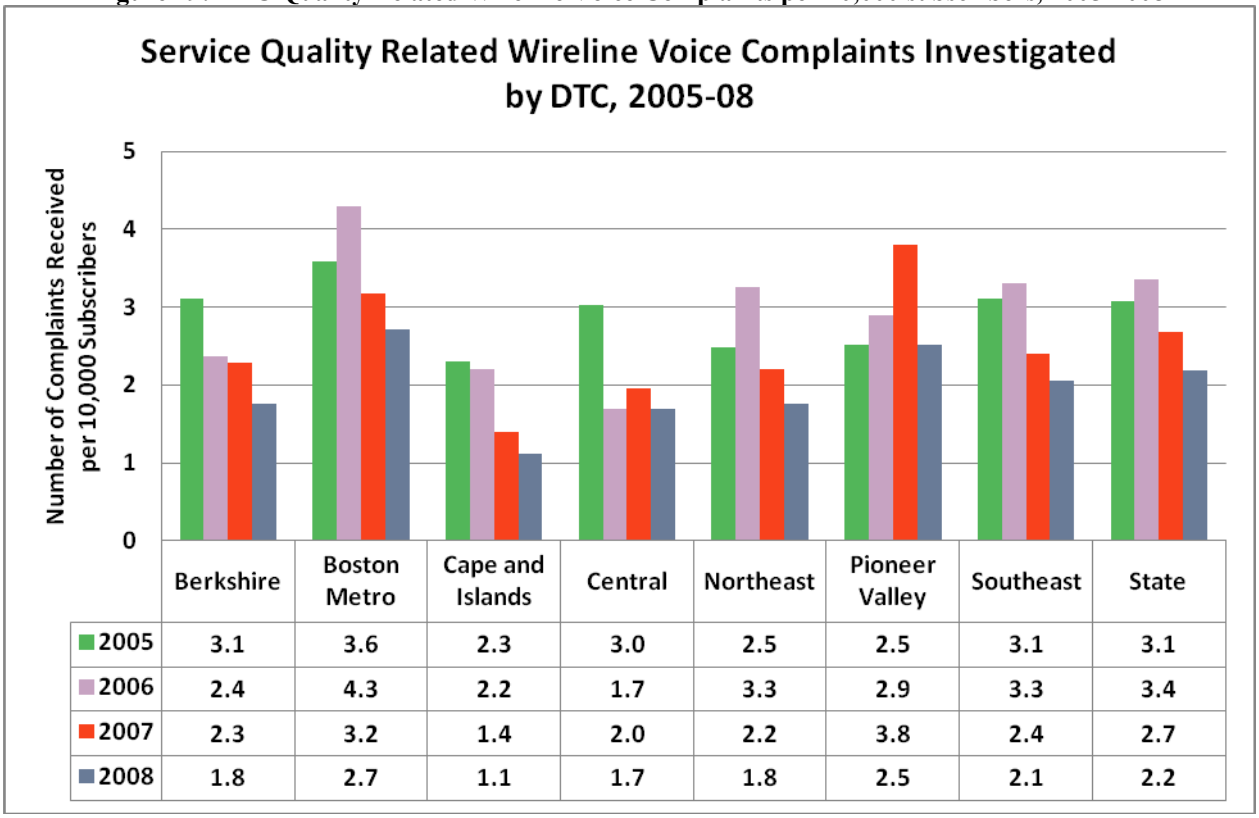
	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	8.8	13.3	6.4	9.7	8.7	11.2	9.6	10.8
2006	6.7	11.6	5.6	7.3	8.9	10.1	9.4	9.6
2007	9.1	10.3	5.0	6.3	8.1	10.6	7.3	8.6
2008	7.0	10.8	5.7	7.2	7.9	9.5	8.1	8.9

Figure 18: DTC Billing Related Wireline Voice Complaints per 10,000 subscribers, 2005-2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	5.5	9.3	3.9	6.6	6.0	8.5	6.3	7.5
2006	4.2	6.8	3.3	5.5	5.3	7.0	5.8	6.0
2007	6.8	6.8	3.5	4.2	5.7	6.7	4.6	5.8
2008	4.8	7.5	4.2	5.1	5.8	6.4	5.5	6.2

Figure 19: DTC Quality Related Wireline Voice Complaints per 10,000 subscribers, 2005-2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	3.1	3.6	2.3	3.0	2.5	2.5	3.1	3.1
2006	2.4	4.3	2.2	1.7	3.3	2.9	3.3	3.4
2007	2.3	3.2	1.4	2.0	2.2	3.8	2.4	2.7
2008	1.8	2.7	1.1	1.7	1.8	2.5	2.1	2.2

c) Verizon's Network Trouble Reports

Verizon's SQI report provides an overview of the company's system maintenance and customer service results on a monthly basis for Massachusetts.[45] Specifically, the monthly SQI reports provide information pertaining to the following performance measures: frequency of network trouble reports (Trouble Calls or Trouble Reports); service outage restoral time; service appointments missed; trouble reports for installation services; and the average speed by which Verizon answers certain customer service calls, including directory assistance and toll assistance requests. Verizon aggregates this information both statewide and by dividing the state into three reporting districts, identified as MassBay, North/Northeast, and Bay Path. If the company does not meet a pre-determined standard for a combination of the performance measures, Verizon is subject to a financial penalty.[46] Since the SQI became effective in May 1995, Verizon has been subject to penalty under this service quality performance plan

[45] Verizon is required to provide monthly Quality of Service reports pursuant to its regulation plan established by D.P.U. 94-50, as modified by D.T.E. 01-31. The reports are part of Verizon's SQI, which is a self-executing service quality plan designed to encourage Verizon to provide reasonable service throughout the state or risk financial penalties.

[46] There are two means by which Verizon's service quality performance is calculated: (1) **Score Performance:** Seven of the 12 performance measures are scored on a 0-2 point scale system for each of the 3 reporting districts (42 possible points); the other 5 measures are scored on the same scale for statewide performance (10 possible points), resulting in a possible maximum score of 52. If the performance point level falls below 33 for a month, Verizon faces a financial penalty; (2) **Standard Miss**: All 12 measures are evaluated on a statewide-only basis. If 3 or more of the 12 performance measures fall below the standard performance level threshold in a month, Verizon is subject to a financial penalty. See *Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Regulatory Plan to succeed Price Cap Regulation for Verizon New England, Inc. d/b/a Verizon Massachusetts' intrastate retail telecommunications services in the Commonwealth of Massachusetts*, D.T.E. 01-31 at Attachment C, *Verizon Massachusetts Retail Service Quality Plan*.

twice.[47] Verizon's data does not include billing-related complaints and does not identify the type of network troubles that customers report. Verizon's data also is not audited.

The SQI Reports also provide information pertaining to the frequency for which Verizon's customers call in Trouble Calls on a localized basis. A Trouble Call is a complaint that prompts Verizon to investigate whether interference is causing interruption or poor quality of voice service.[48] For each of the three reporting districts, Verizon must meet a performance standard of not more than 2.25 Trouble Calls for every 100 lines within the reporting district. In addition to the district reporting requirement, Verizon is also subject to a localized requirement for this particular performance measure. Trouble Calls are the only performance measure within the SQI Plan that are subject to localized performance standards. Verizon is obliged to take immediate corrective action within a wire center if the monthly SQI reports consistently demonstrate that customers served by a wire center are reporting at least four Trouble Calls for every 100 lines.[49]

The dual-level reporting requirement uniquely attributed to the Trouble Call performance measure (i.e. district and local) allows this Report to evaluate Trouble Calls in two methods. First, the Report will review the annual number of Trouble Calls received by Verizon within each of the seven regions over a four-year period (2005-2008). Second, the Report will evaluate localized Trouble Call performance over the same four-year period.

Figure 20 presents the annual number of Trouble Calls received by Verizon from 2005 through 2008 for every 100 voice lines the company serves across each of the seven regions.[50] The Boston Metro region consistently reported the lowest frequency rate of Trouble Calls, with an annual average of 14.9 Trouble Calls per 100 lines reported within the Boston Metro region for the 4 year period.[51] Conversely, the Berkshire region reported the highest Trouble Call frequency rate for 3 of the 4 years, with an annual average of 24.4 Trouble Calls per 100 lines over the full 4 year period within this region. [52] In the first half of 2009, the DTC began an investigation into Verizon's telephone service quality in western Massachusetts.[53] The investigation was initiated after the DTC

[47] Verizon's predecessor, NYNEX, was required to reduce its rates by approximately $20 million due to penalties for failure to meet service quality index standards. *Bell Atlantic Merger*, D.P.U. 96-78 at 4 (1997) (referencing *NYNEX*, D.P.U. 95-83 (1995), and *NYNEX*, D.P.U. 96-68 (1996), resulting in an aggregate rate reduction of $68 million, approximately $20 million of which was attributable to penalties for failure to meet the service quality index standard).

[48] This performance metric measures the total number of initial trouble calls from a customer. Follow-up related Trouble Reports from the same customer are excluded from the calculation of the trouble call rate until the time Verizon considers the original Trouble Report resolved.

[49] *See Town of Middlefield, Mass., Pursuant to G. L. c. 159, § 24*, *Regarding the Quality of Verizon Mass.' Tel. Serv.*, D.T.C./D.T.E. 06-6.

[50] As noted, Verizon is required to meet a monthly minimum performance standard not exceeding more than 2.25 calls for every 100 lines within each of the three reporting districts. If this requirement is aggregated to an annual basis, the company's performance standard would be no more than 27 Trouble Calls for every 100 lines. The data does not identify whether the trouble calls were reported by residential or business customers.

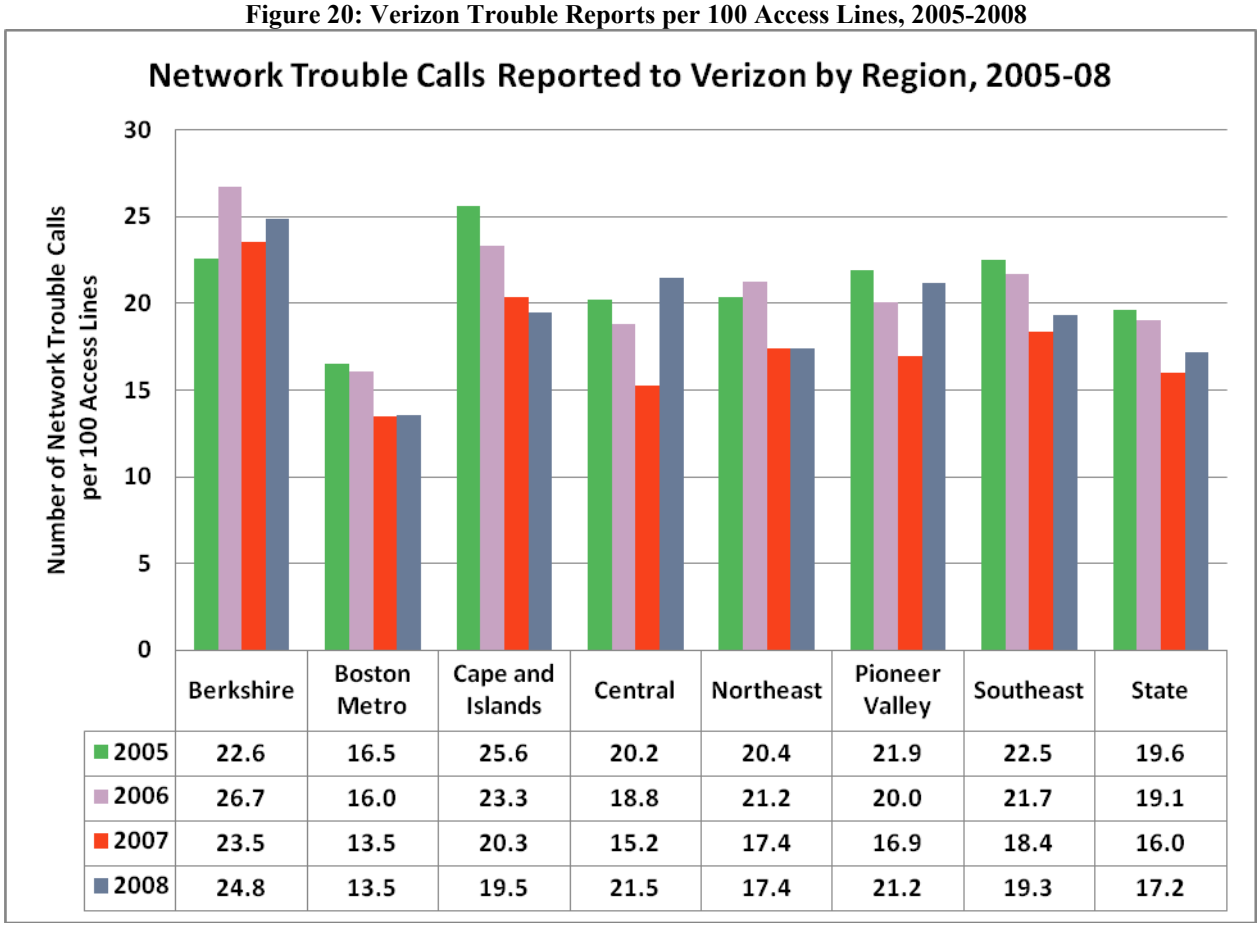
[51] Verizon provides its Trouble Call data for every wire center, thereby allowing Trouble Calls to be aggregated and presented consistent with the seven regions utilized for this Report. The presentation of Trouble Call data in this Report is different than how the data is aggregated by Verizon for evaluation in the SQI monthly reports.

[52] Verizon is required to report service quality performance for three districts within Massachusetts. The geographic boundaries for these three districts are not consistent with the geographic boundaries of the seven regions utilized within this Report.

[53] *Investigation by the Dep't of Telecomms. & Cable on its own motion, pursuant to G. L. c. 159, § 16, of the telephone service quality of Verizon New England Inc., d/b/a Verizon Mass., in Berkshire, Hampden, Hampshire, & Franklin Counties*, D.T.C. 09-1, Order to Open Investigation, 18-19 (June 1, 2009) ("*Service Quality Investigation*").

received complaints regarding Verizon's telephone service quality by the towns of Middlefield,[54] Hancock, Rowe, Shutesbury, and 49 comments in support of the investigation in response to the DTC's Request for Comment.[55] After opening the investigation, the DTC received additional complaints regarding Verizon's telephone service quality by the towns of Egremont and Leverett. To date, the investigation remains open.

Figure 20: Verizon Trouble Reports per 100 Access Lines, 2005-2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	22.6	16.5	25.6	20.2	20.4	21.9	22.5	19.6
2006	26.7	16.0	23.3	18.8	21.2	20.0	21.7	19.1
2007	23.5	13.5	20.3	15.2	17.4	16.9	18.4	16.0
2008	24.8	13.5	19.5	21.5	17.4	21.2	19.3	17.2

Figures 21 and 22 present the localized frequency of Trouble Calls. Figure 21 displays the average annual number of Trouble Calls per 100 voice lines for the three-year period. The map shows a wide range in the frequency of Trouble Calls among the state's communities, from a low of an average of 5 annual Trouble Calls per 100 voice lines in the City of Boston to a high of 54 in Blandford.

[54] The Town of Middlefield and Verizon entered into a settlement agreement on December 16, 2008, which resolved the compliance phase of the investigation. In its final order in the case, the DTC found Verizon's service quality unreasonable. *In re the Bd. of Selectmen of the Town of Middlefield, Mass., Pursuant to G. L. c. 159, § 24, Regarding the Quality of Verizon Mass.' Tel. Serv.*, D.T.C./D.T.E. 06-6, Joint Motion for Approval of Settlement Agreement, approved by the DTC on Dec. 16, 2008.

[55] *Service Quality Investigation*, D.T.C. 09-1, Order to Open Investigation at 3-4.

Figure 21: Verizon's Annual Average Trouble Reports by Exchange, 2005-2008

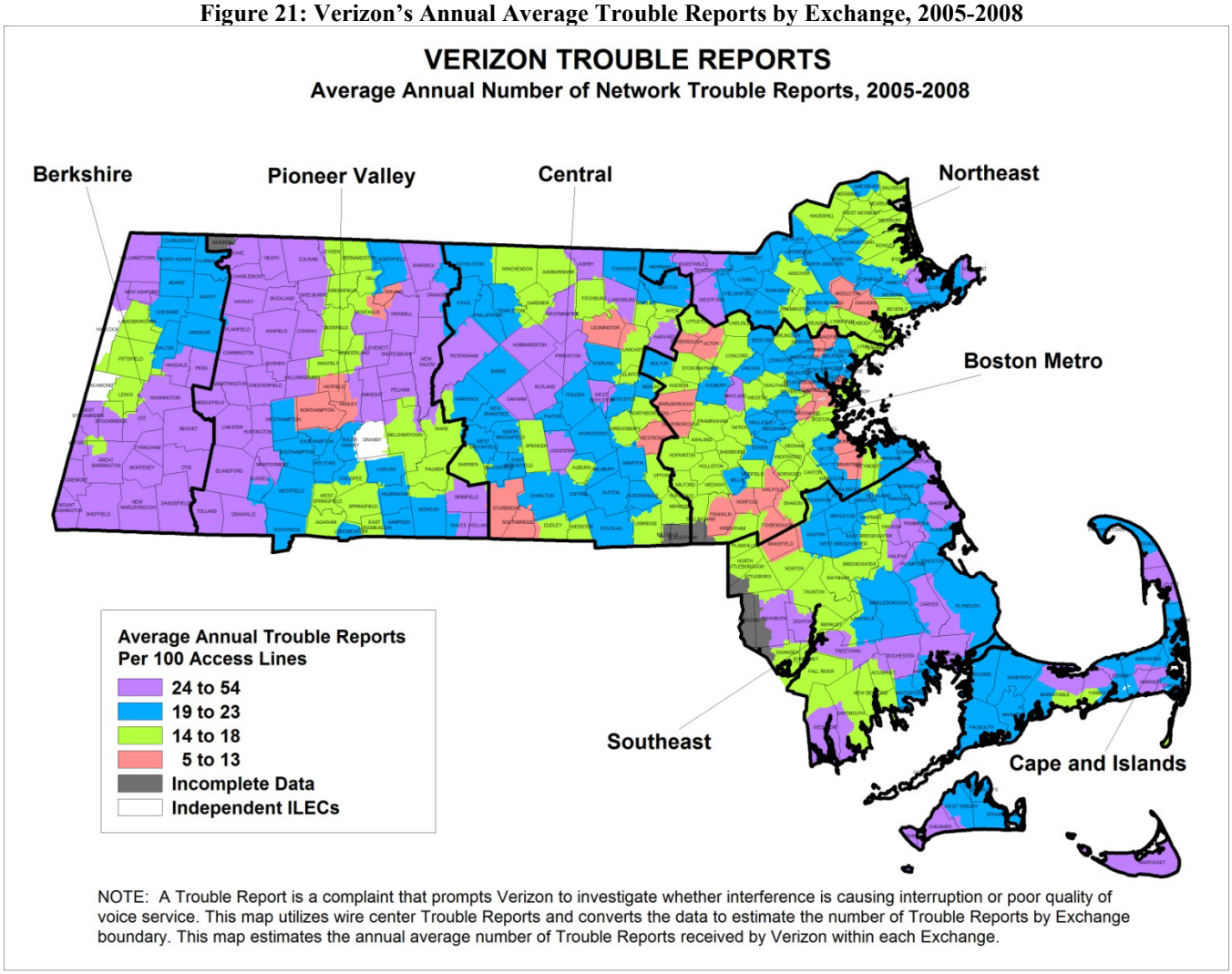
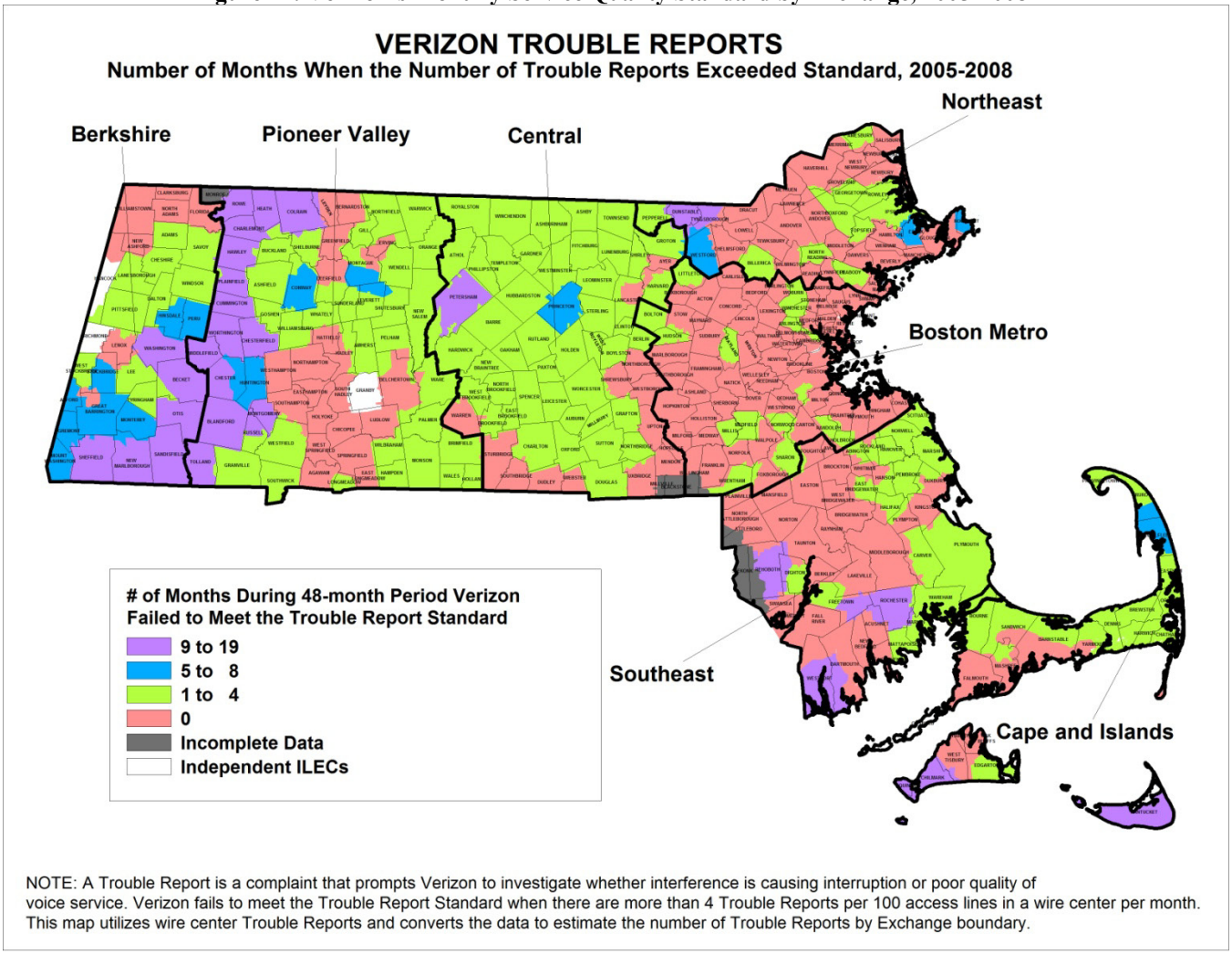


Figure 22 shows the number of months in which a particular area exceeded Verizon's SQI target of no more than four Trouble Calls per 100 voice lines during the period between January 2005 and December 2008. Of 268 exchanges,[56] 123 (46%) met Verizon's Trouble Report standard for each of the 48 months. The worst performing exchange by this measurement was Beckett, where Verizon failed to meet the standard in 19 of the 48 months.

[56] An exchange is the geographic coverage area served by a Central Office.

Figure 22: Verizon's Monthly Service Quality Standard by Exchange, 2005-2008



NOTE: A Trouble Report is a complaint that prompts Verizon to investigate whether interference is causing interruption or poor quality of voice service. Verizon fails to meet the Trouble Report Standard when there are more than 4 Trouble Reports per 100 access lines in a wire center per month. This map utilizes wire center Trouble Reports and converts the data to estimate the number of Trouble Reports by Exchange boundary.

E. Business Voice

1. Availability

a) Introduction

Similar to the residential Wireline Voice market, the Act also was intended to introduce competition for business customers, including SMB Wireline Voice consumers (Business Voice). Unlike the residential Wireline Voice market, numerous CLECs have navigated market and regulatory changes since the enactment of the Act and have actively participated in the Business Voice market. Conversely, the Business Voice market has not been traditionally served by Cable Voice carriers, who only recently began to widely market services to SMB consumers.

Competition in the Business Voice market is more robust in the densely populated areas of the state. As discussed below, SMBs have access to and are using the services of multiple CLECs throughout Massachusetts. However, the DTC currently lacks the information necessary to quantify the effect this competition has had on SMBs.

b) ILECs

ILECs are obligated to make a reasonable effort to offer service to any requesting SMB within their territory. Therefore, as Table 5 illustrates, ubiquitous coverage is presumably available to all SMBs in Massachusetts. ILEC service territories in the Business Voice market are identical to the residential Wireline Voice market.[57]

Table 5: Summary of ILEC Service Availability to SMB Consumers

ILEC	Towns Covered	SMBs Covered
Verizon	**347**	**171,429 (99.9%)**
Granby Telephone	Granby	116
Richmond Telephone	Richmond	51
Taconic Telephone	Hancock	23
Sentinel Tree Telephone	Gosnold	14
Total Independent ILECs	**4**	**204 (0.1%)**
Total ILECs	**351**	**171,633 (100%)**

c) CLECs

(1) Overview

CLEC carriers utilize all three of the available platforms (Resale, Leased Facilities, and Own Network) to offer service to Massachusetts SMB consumers. As detailed below, CLECs serve approximately one-third of the Business Voice market. Because CLECs, particularly for the Resale and Leased Facilities platforms, use the ILEC infrastructure for service delivery, their availability in Massachusetts should be nearly ubiquitous. The DTC estimates the service territories for CLECs based upon where CLECs were actively providing Business Voice as of year-end 2007. As Figures 23 and 24 below illustrate, over 77% of all SMBs in Massachusetts were located in areas that are served by at least 11 different CLECs.[58] Thus, SMBs throughout Massachusetts should have multiple CLECs and competitive alternatives to choose from, with SMBs in densely populated areas having the largest selection of CLECs and competitive alternatives. Even in rural areas, at least several competing Business Voice providers are available to SMBs.

[57] *See supra* Figure 2, *at 11*.

[58] For purposes of this Report, only CLECs providing more than 1,000 voice lines in Massachusetts are considered presently. *See supra* Methodology Section, at Appendix D-3 for further explanation.

Figure 23: CLECs Business Voice Service Provision in Massachusetts, December 2007

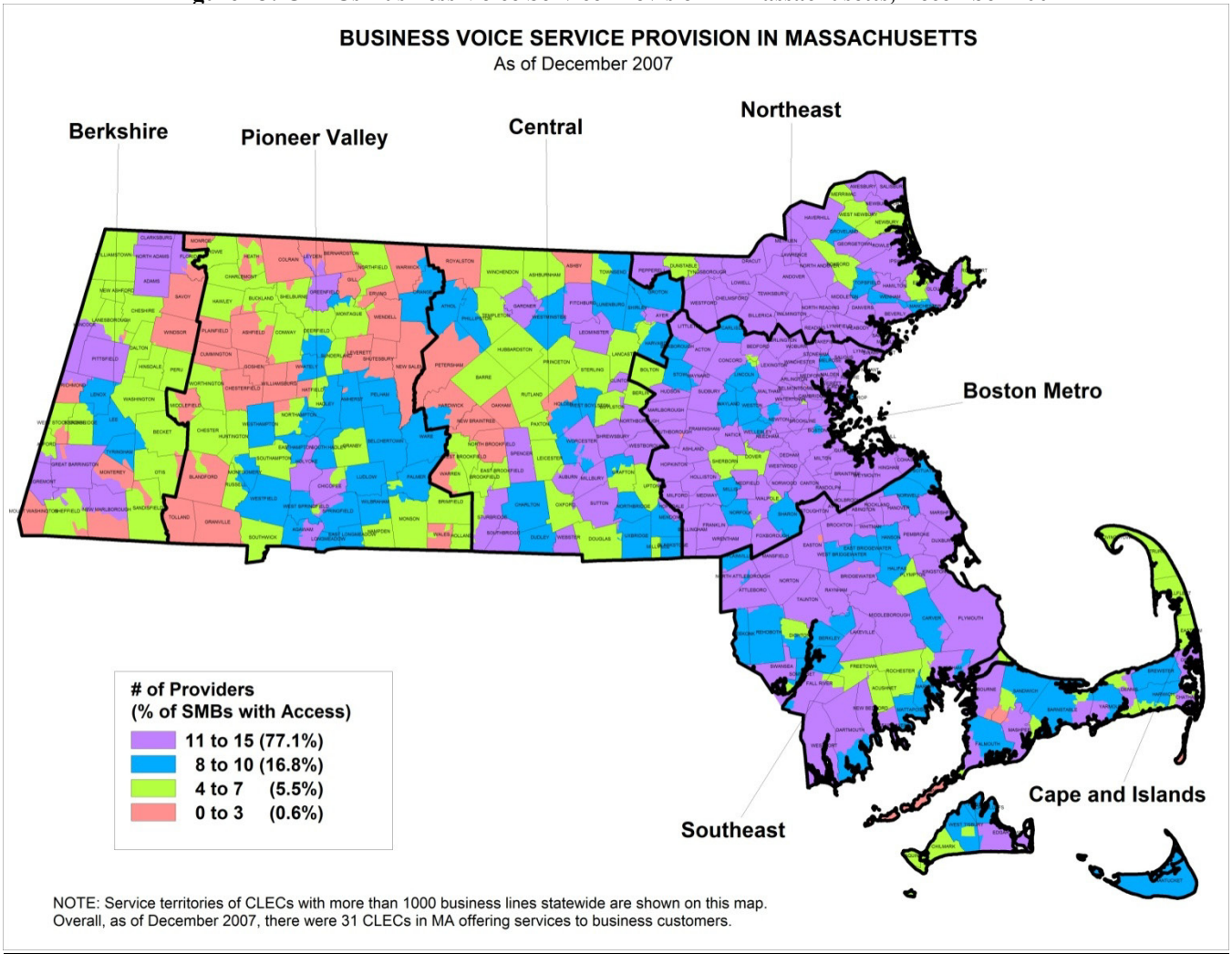
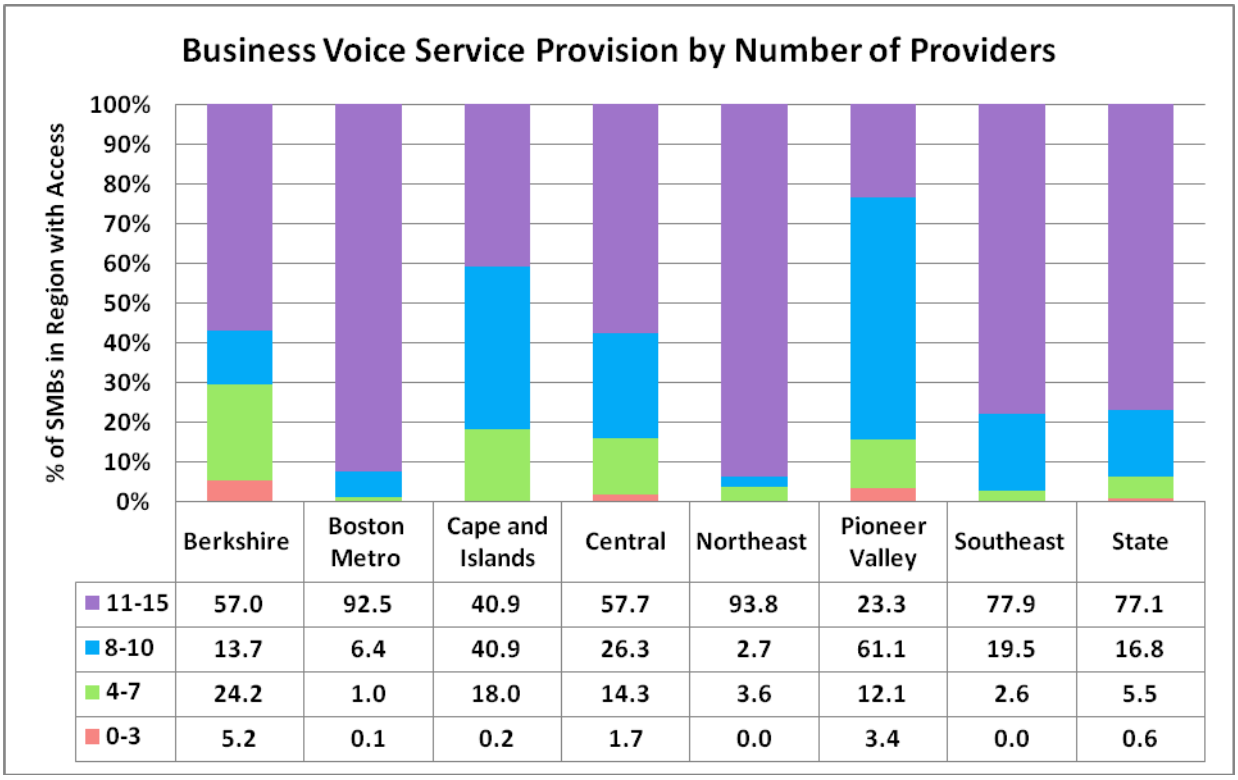


Figure 24: CLECs Business Voice Service Provision by Number of Providers and Regions, 2007



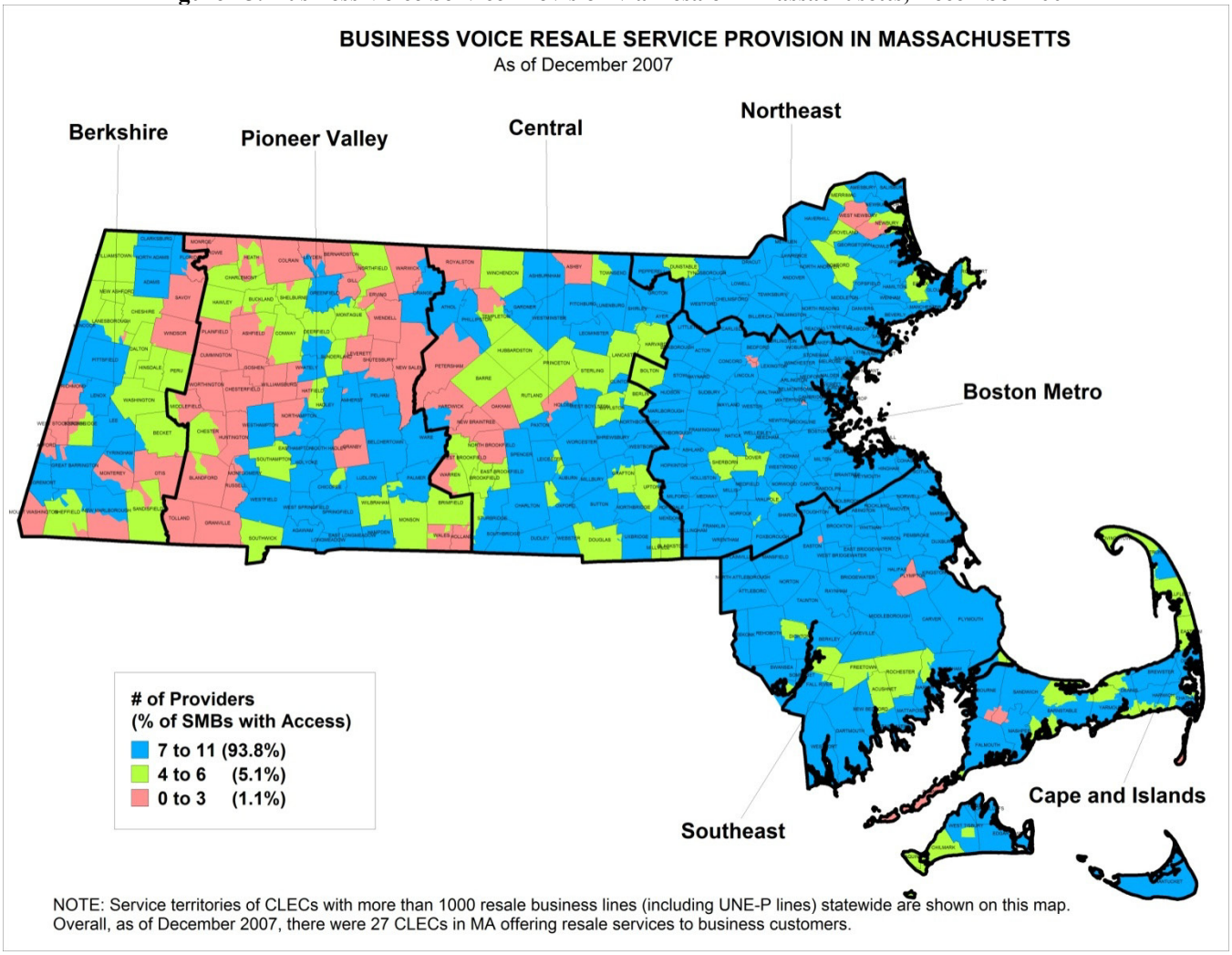
	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
11-15	57.0	92.5	40.9	57.7	93.8	23.3	77.9	77.1
8-10	13.7	6.4	40.9	26.3	2.7	61.1	19.5	16.8
4-7	24.2	1.0	18.0	14.3	3.6	12.1	2.6	5.5
0-3	5.2	0.1	0.2	1.7	0.0	3.4	0.0	0.6

(2) Resale

The provision of Resale service is wholly dependent upon ILEC infrastructure in order to deliver the voice product. Although a CLEC has no technical limitations upon its service territories, its product offerings are limited to reselling services as provided and structured by the ILEC, with resellers differentiating themselves from the ILEC on price and customer service. Despite these limitations, resale to SMBs accounts for approximately 22% of the Business Voice market.

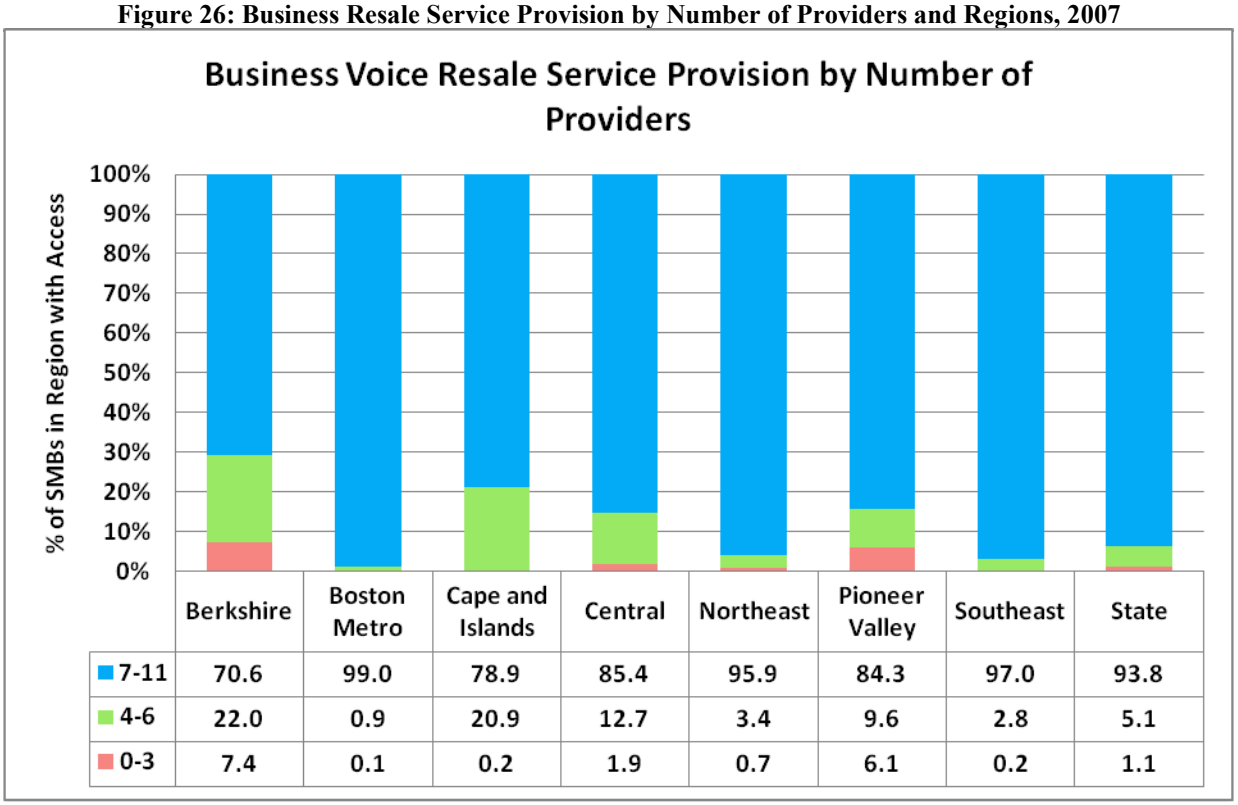
By year-end 2007, there was a maximum of 11 different resellers in any given region providing Business Voice. As illustrated in Figures 25 and 26, over 93% of Massachusetts SMBs are located in areas where at least seven resellers provide Business Voice. For every region in the state, at least 70% of SMBs are located in areas with at least seven resellers.

Figure 25: Business Voice Service Provision via Resale in Massachusetts, December 2007



NOTE: Service territories of CLECs with more than 1000 resale business lines (including UNE-P lines) statewide are shown on this map. Overall, as of December 2007, there were 27 CLECs in MA offering resale services to business customers.

Figure 26: Business Resale Service Provision by Number of Providers and Regions, 2007



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
7-11	70.6	99.0	78.9	85.4	95.9	84.3	97.0	93.8
4-6	22.0	0.9	20.9	12.7	3.4	9.6	2.8	5.1
0-3	7.4	0.1	0.2	1.9	0.7	6.1	0.2	1.1

SMBs with the fewest reseller provider options are predominantly located in the Berkshire and Pioneer Valley regions, and about 1% of SMBs in Massachusetts are located in areas with less than four resellers. Table 6 summarizes the availability of reseller service to SMB consumers based upon where service was provided in 2007.

Table 6: Summary of Business Voice Service Provision from Resellers, 2007

Competitors	Region	Availability
Access to at least one provider	Commonwealth	99.96% of SMBs
No access	Commonwealth	73 SMBs *(0.04%)*
	Regional Distribution:	*% of State Total*
	Pioneer Valley	*54.8%*
	Central	*28.8%*
	Berkshire	*16.4%*
Maximum providers (11)	Commonwealth	56,300 SMBs *(32.8%)*
	Regional Distribution:	*% of State Total*
	Boston Metro	*55.7%*
	Northeast	*19.8%*
	Southeast	*15.5%*

(3) Leased Facilities

By year-end 2007, CLECs were actively using the Leased Facilities platform throughout Massachusetts, with as many as six to eight CLECs providing Business Voice using Leased Facilities in five regions. While Leased Facilities providers are largely dependent upon the ILEC for the "last-mile"[59] delivery of the voice product, they provide their own switching equipment. In effect, this allows CLECs to create their own voice product offerings and often allows the CLECs to develop their own data (broadband) package to supplement the voice service product offering. While it requires significant capital investment, Leased Facilities providers are able to offer products distinct from ILEC offerings.

As detailed in Figures 27 and 28, over 93% of SMBs are located in areas served by at least four Leased Facilities CLECs. Additionally, 56% of the state's SMBs are located in areas served by at least six Leased Facilities providers. About 6% of the state's SMBs are located in areas served by less than four Leased Facilities providers. These areas are primarily located in the Berkshire, Cape and Islands, Central, and Pioneer Valley regions.

[59] The wiring between an end-user and the telephone company's central office is commonly referred to as the "last-mile."

Figure 27: Leased Facilities-based Business Voice Service Provision in Massachusetts, December 2007

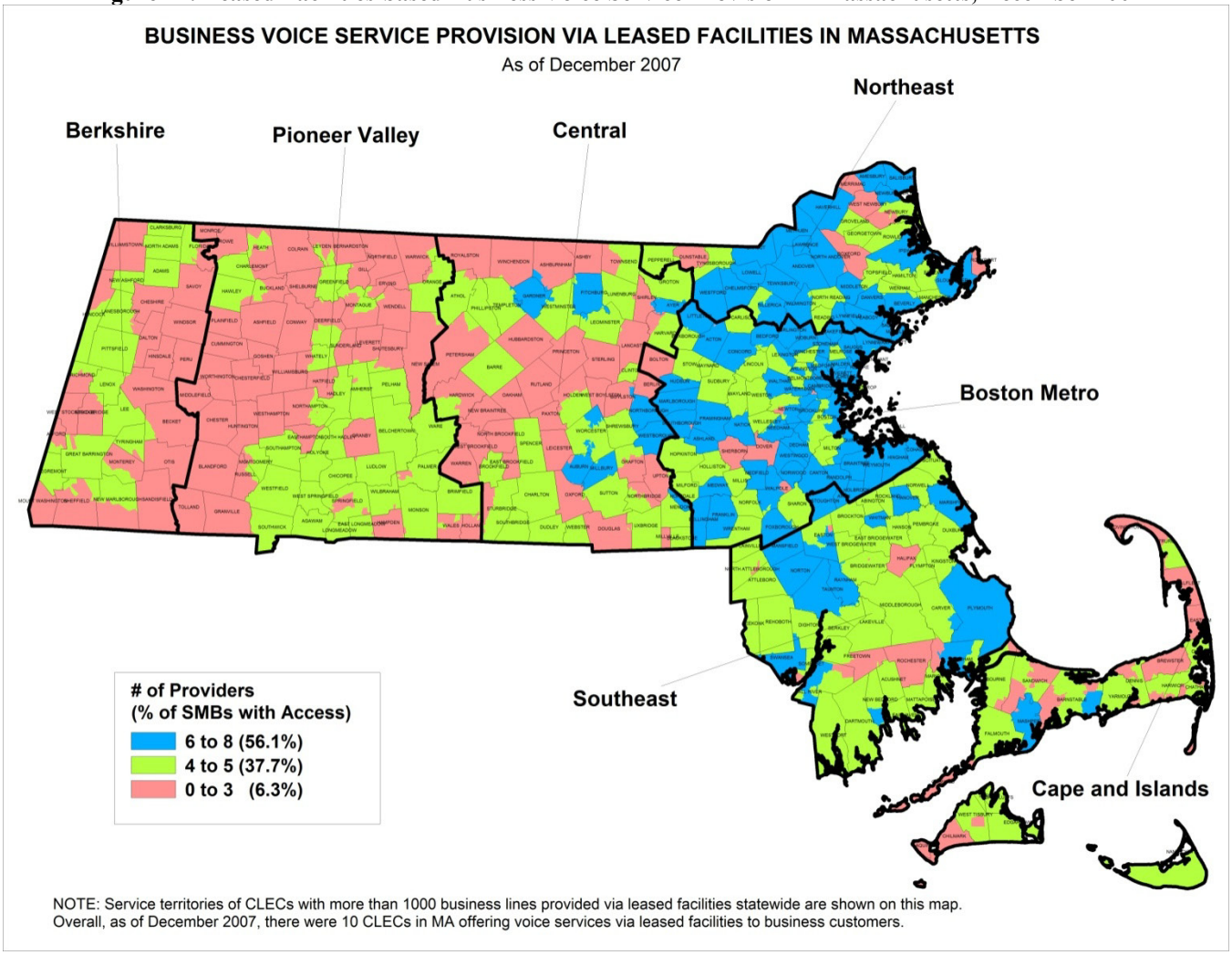
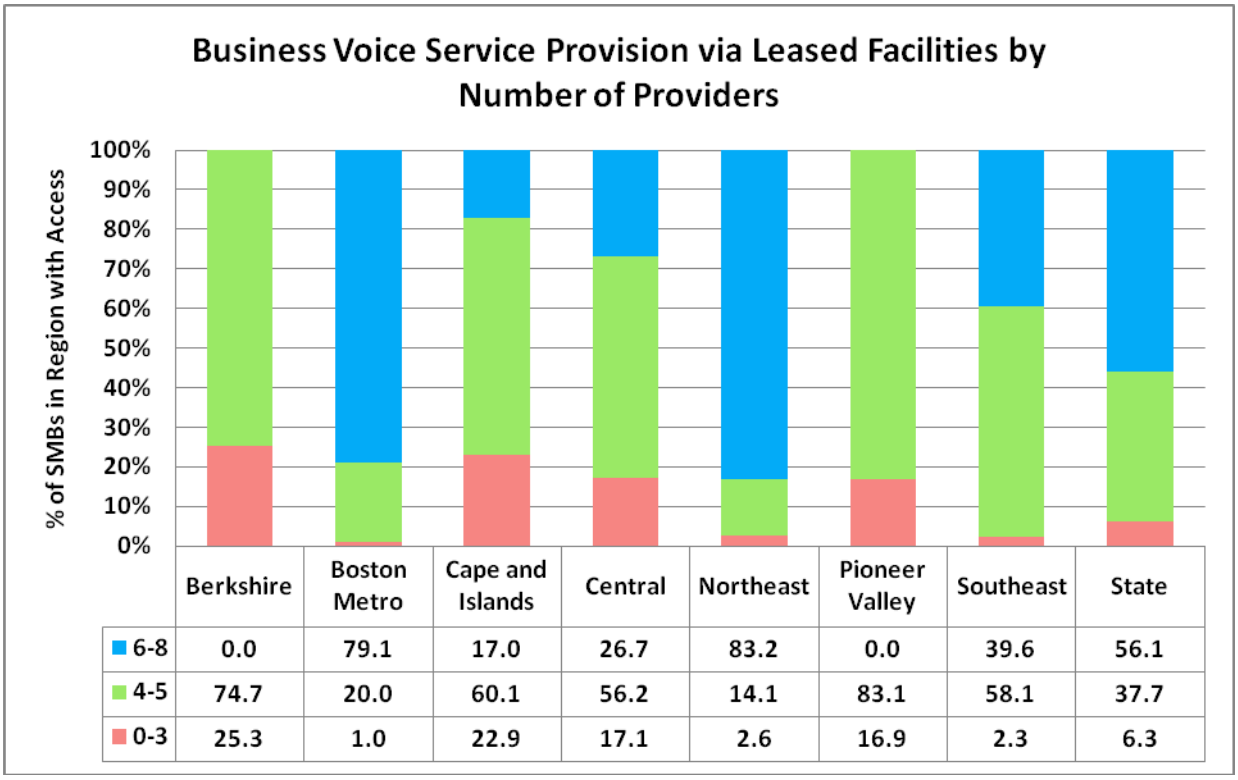


Figure 28: CLECs Business Voice Service Provision via Leased Facilities by Number of Providers and Regions, 2007



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
6-8	0.0	79.1	17.0	26.7	83.2	0.0	39.6	56.1
4-5	74.7	20.0	60.1	56.2	14.1	83.1	58.1	37.7
0-3	25.3	1.0	22.9	17.1	2.6	16.9	2.3	6.3

The availability of Leased Facilities Business Voice is summarized in Table 7.

Table 7: Summary of Business Voice Service Provision via CLECs Leased Facilities, 2007

Competitors	Region	Availability
Access to at least one provider	Commonwealth	99.96% of SMBs
No access	Commonwealth	74 SMBs *(0.04%)*
	Regional Distribution:	*% of State Total*
	Central	*55.4%*
	Berkshire	*21.6%*
	Pioneer Valley	*21.6%*
Maximum providers (8)	Commonwealth	11,200 SMBs *(6.6%)*
	Regional Distribution:	*% of State Total*
	Boston Metro	*70.1%*
	Northeast	*29.9%*

(4) Independent CLEC Own Networks

CLEC Own Network facilities are independent from the PSTN except for interconnections that allow customers on a CLEC-owned network to communicate with customers on the PSTN. The DTC does not collect, and CLECs are not obligated to provide, specific information on the location of CLEC Own Network facilities. Due to a lack of publicly-available information, the availability of CLEC-owned network services cannot be quantitatively analyzed.

d) Cable Voice

Until recently, Cable Voice providers generally served few SMBs. By the end of 2008, however, most cable companies offered products for SMBs with up to eight voice lines. The availability of Cable Voice is determined by two factors:

1. Availability of voice service on the cable system in the town within which the business is located; and
2. Proximity of the business to a residential district served with cable.

The second factor restricts the availability of Cable Voice to SMBs, because the build-out requirements in cable franchise agreements use household density as the guiding metric. Accordingly, cable networks were not built to serve business and industrial parks where few residences are located. Many cable companies have recently begun extending their cable networks in an effort to provide service to these areas. Due to the recent expansion of this service and limited availability of information, the availability of Cable Voice to SMBs cannot be quantitatively analyzed.

2. Adoption

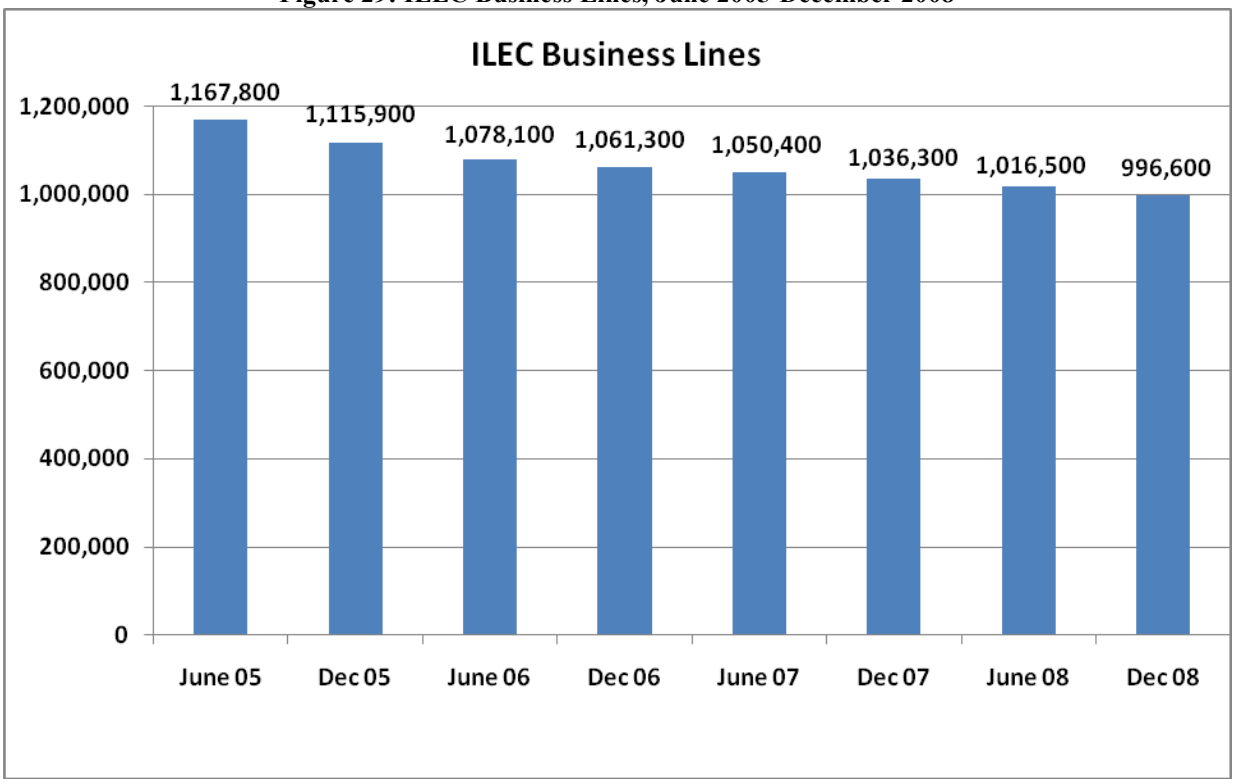
a) Introduction

As with residential Wireline Voice service, ILECs remain the predominant providers of Business Voice to SMBs, serving 59% of all SMB consumers statewide as of December 2008. However, unlike the residential Wireline Voice market, CLECs are actively providing service in the Business Voice market, serving approximately 39% of the business lines as of December 2008. Statewide, SMBs generally have the option of selecting Business Voice from an ILEC and multiple CLECs. There are, however, measurable differences between regions. Additionally, Cable Voice providers have only recently entered the Business Voice market in a measurable way. As Cable Voice carriers begin to widely offer Business Voice services, it is possible that SMBs will adopt Cable Voice service in significant numbers in the future. Wireless competition for business customers is not considered in this Report due to the lack of reliable data. Moreover, the DTC does not have adequate information to discuss whether this competitive environment has benefitted end-users in the form of lower prices, innovations in service, or superior service quality.

b) ILECs

As of December 2008, ILECs served approximately 996,600 Business Voice lines statewide, a 14.7% decrease from June 2005 (Figure 29). Between June 2005 and December 2008, ILECs lost approximately 171,200 Business Voice lines. The decline of ILEC Business Voice lines slowed in 2007 (25,000 lines lost) compared to 2006 (54,600 lines lost). In 2008, ILEC line losses increased compared to 2007 (39,700 vs. 25,000 lines lost), however, 2008 line losses were lower in comparison to 2006.

Figure 29: ILEC Business Lines, June 2005-December 2008



c) CLECs

(1) Overview

As of December 2008, CLECs served about 660,500 end-user Business Voice lines (Figure 30). In the period from June 2005 to December 2008, CLECs gained 137,800 Business Voice lines, an increase of 26.4%. Business Voice lines comprised 93% of CLEC end-user lines by the end of the period.

On average, from June 2005 to December 2008, CLECs provided about 56% of their end-user Business Voice lines via a Resale platform, 36% via a Leased Facilities platform, and 9% via their Own Network (Figures 31-32). Although the Resale platform was the predominant platform by which CLECs served SMB customers in 2008, the share of the Resale platform fell substantially as compared to the other platforms, and was only marginally greater than the Leased Facilities platform as of December 2008.

Figure 30: CLEC Business Lines, June 2005-December 2008

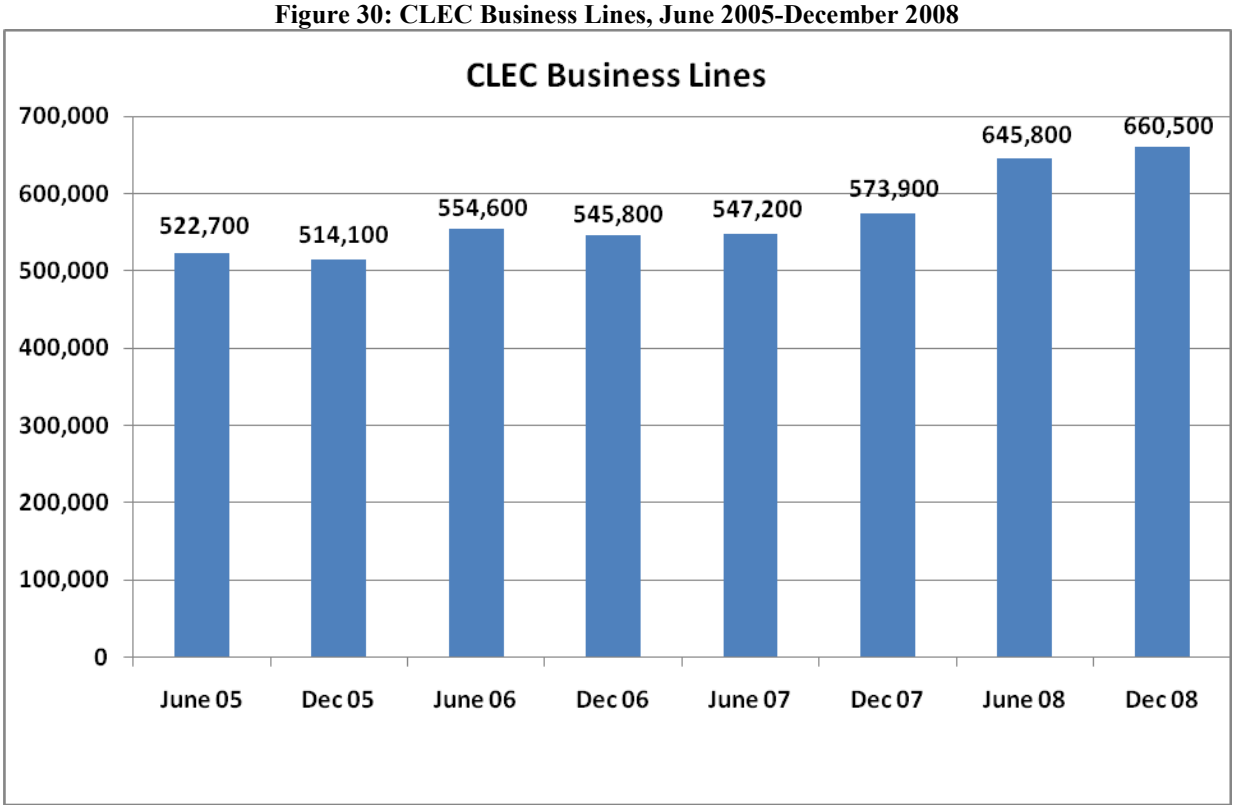
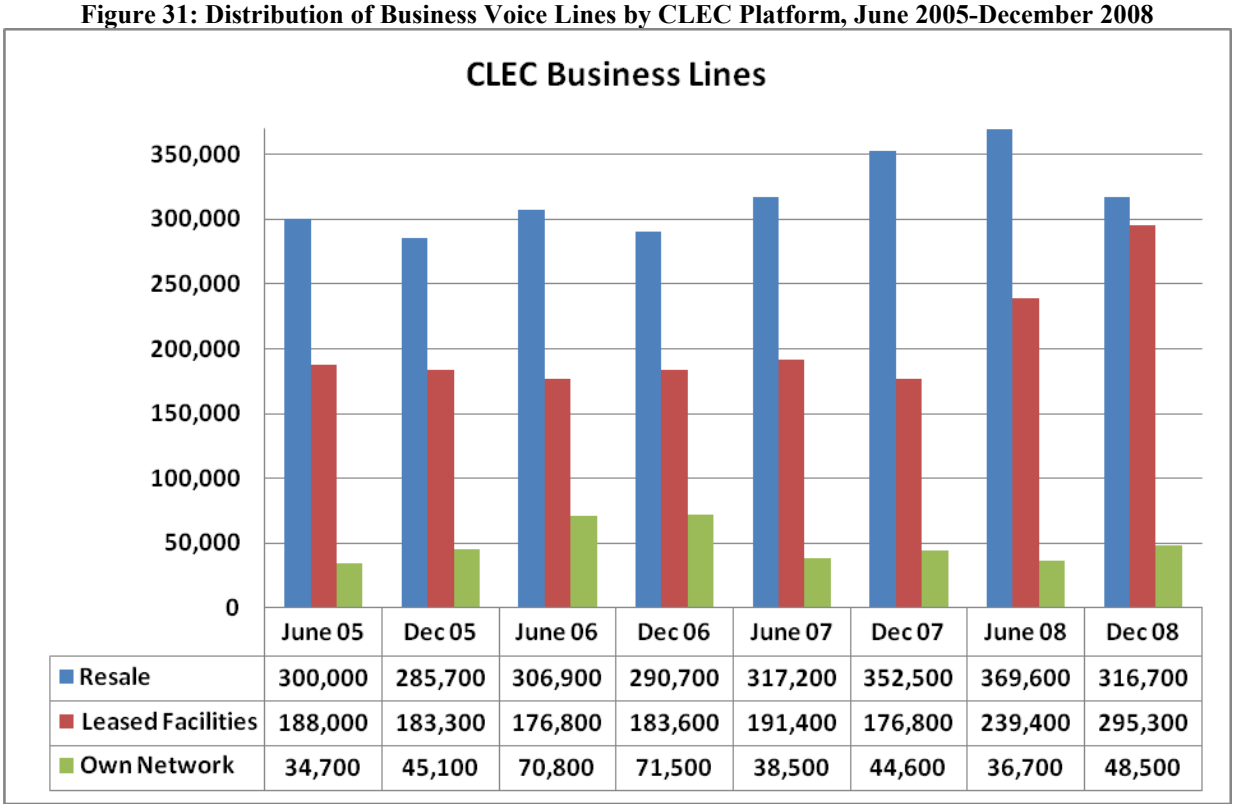
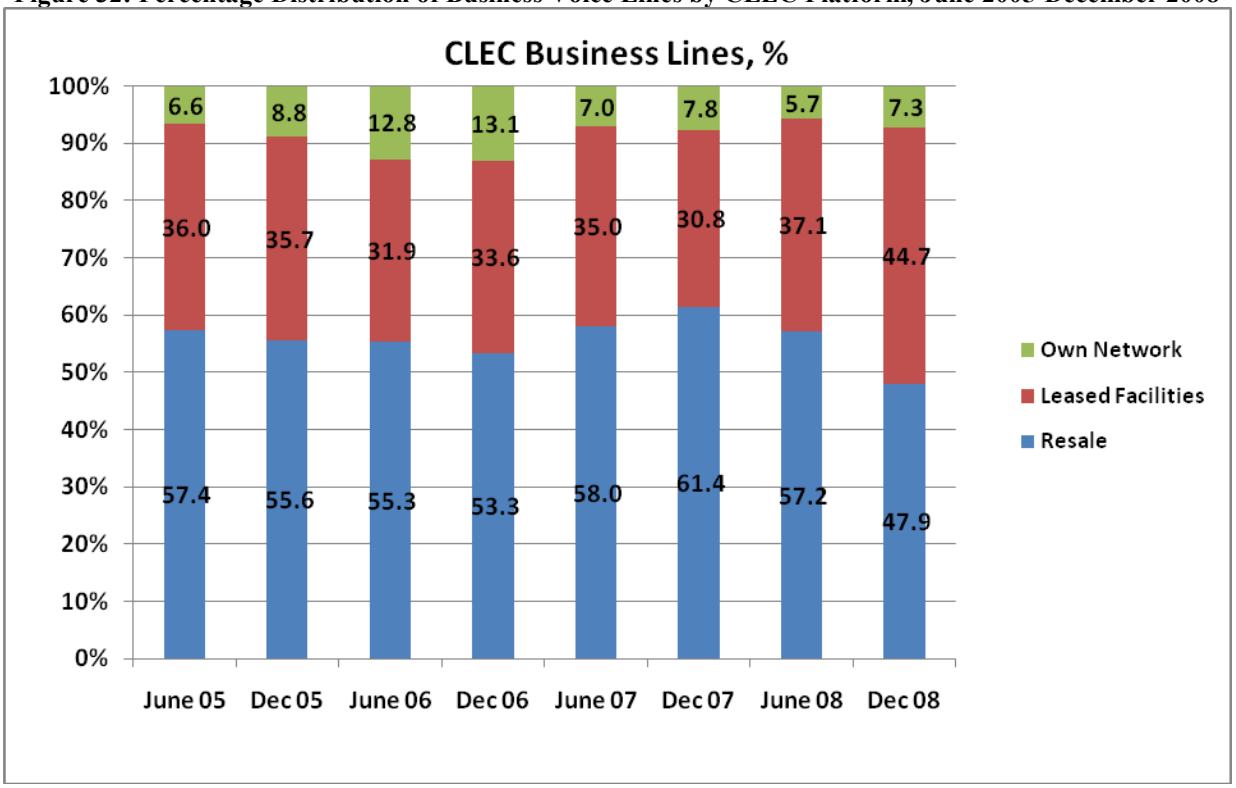


Figure 31: Distribution of Business Voice Lines by CLEC Platform, June 2005-December 2008



	June 05	Dec 05	June 06	Dec 06	June 07	Dec 07	June 08	Dec 08
Resale	300,000	285,700	306,900	290,700	317,200	352,500	369,600	316,700
Leased Facilities	188,000	183,300	176,800	183,600	191,400	176,800	239,400	295,300
Own Network	34,700	45,100	70,800	71,500	38,500	44,600	36,700	48,500

Figure 32: Percentage Distribution of Business Voice Lines by CLEC Platform, June 2005-December 2008



(2) Resale

As of December 2008, CLECs provided approximately 316,700 Business Voice lines via Resale, a 5.6% increase from June 2005.

(3) Leased Facilities

As of December 2008, CLECs provided about 295,300 Business Voice lines via Leased Facilities, a 57.1% increase from June 2005.

(4) Independent CLEC Own Networks

As of December 2008, CLECs provided about 48,500 Business Voice lines via Own Network, a 39.8% increase from June 2005.

d) Cable Voice

By December 2008, only 2% of all business subscribers were served by Cable Voice providers. There is insufficient information on the provision of cable voice to SMBs prior to 2008 to support quantitative analysis.

e) Comparative discussion across all platforms

As discussed above, ILECs hold the largest portion of the Business Voice market. However, the share of Business Voice consumers served by CLECs increased from 2005 to 2008. Competitive pressure from Cable Voice in the Business Voice market was negligible, making up no more than 4.3% of the Business Voice market in any Massachusetts region as of December 2008. There is great potential that the adoption of Cable Voice by SMB consumers will increase as cable companies make multi-line Business Voice products more widely available.

Overall, the size of the Business Voice market in Massachusetts decreased by approximately 5,700 lines (0.3%) from 2005 to 2008 (see Table 8). A number of factors may have contributed to the decline in the size of the total Business Voice market, including service substitution or shifts in employment patterns. An evaluation of such factors is outside the scope of the Report.

Despite the decrease in the size of the Business Voice market, CLECs realized a total gain of about 137,800 (26.4%) Business Voice lines served, which resulted in a market share gain of 8.3 percentage points (see Figures 33 and 34).

The number of SMB lines served by ILECs declined by approximately 171,200 (14.7%) during the 2005-2008 period, resulting in a market share decrease of 9.9 percentage points. About 80% of ILEC Business Voice line losses were offset by the increase in the CLECs Business Voice lines served.

Figure 33: Market Shares of Business Voice Services, June 2005

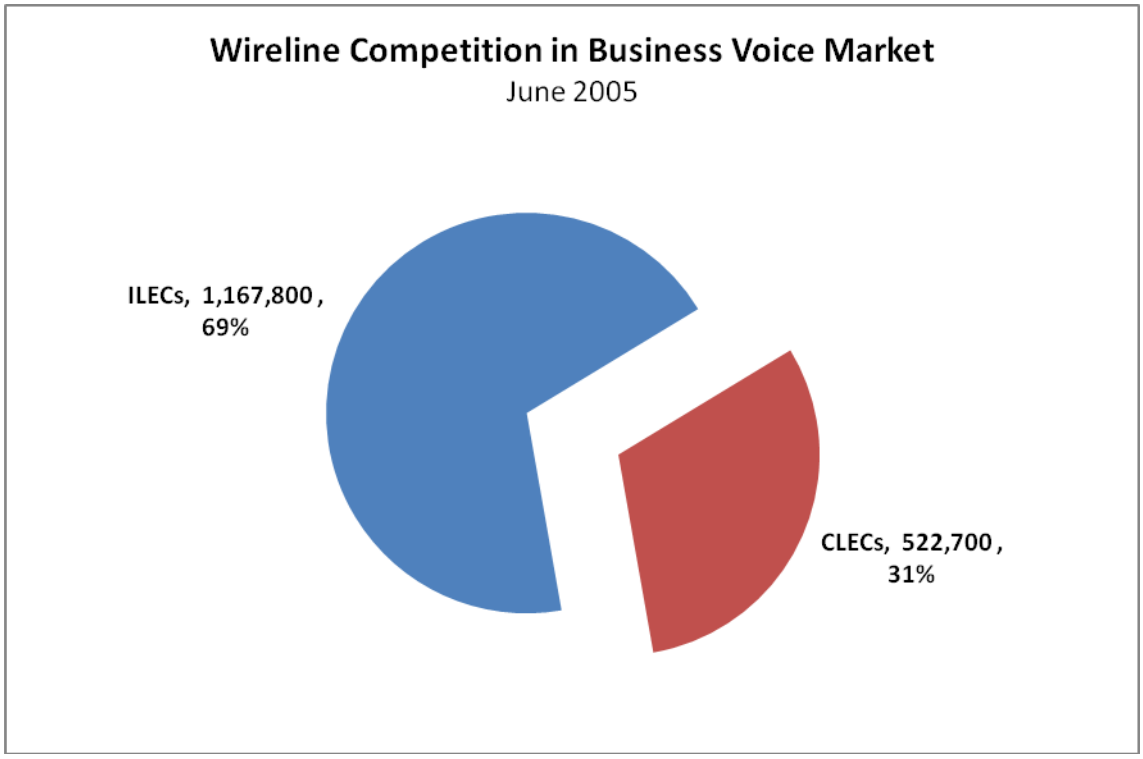


Figure 34: Market Shares of Business Voice Services, December 2008

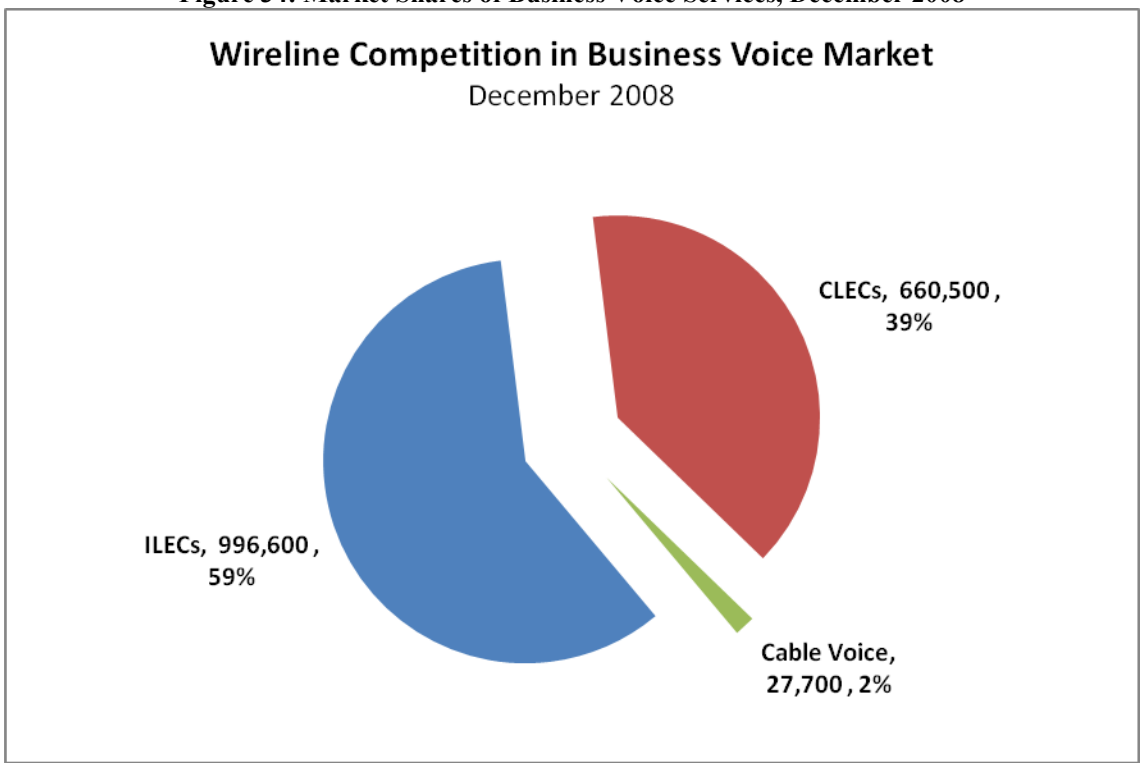
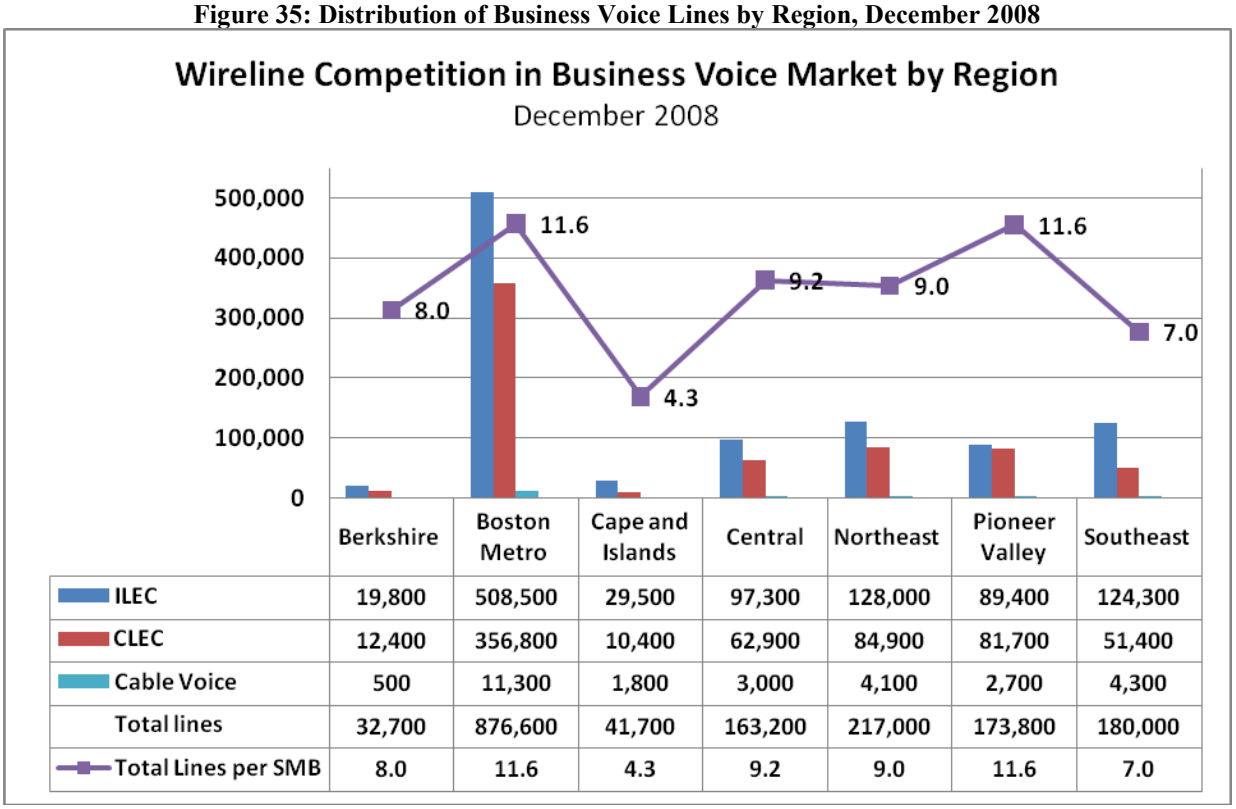


Table 8: Change in Business Voice Lines, June 2005-December 2008

Platform	Change in Business Lines
ILECs, gain(+)/loss(-)	-171,200
CLECs, gain(+)/loss(-)	+137,800
Cable Voice, gain(+)/loss(-)	+27,700
Net Line Change, gain(+)/loss(-)	-5,700

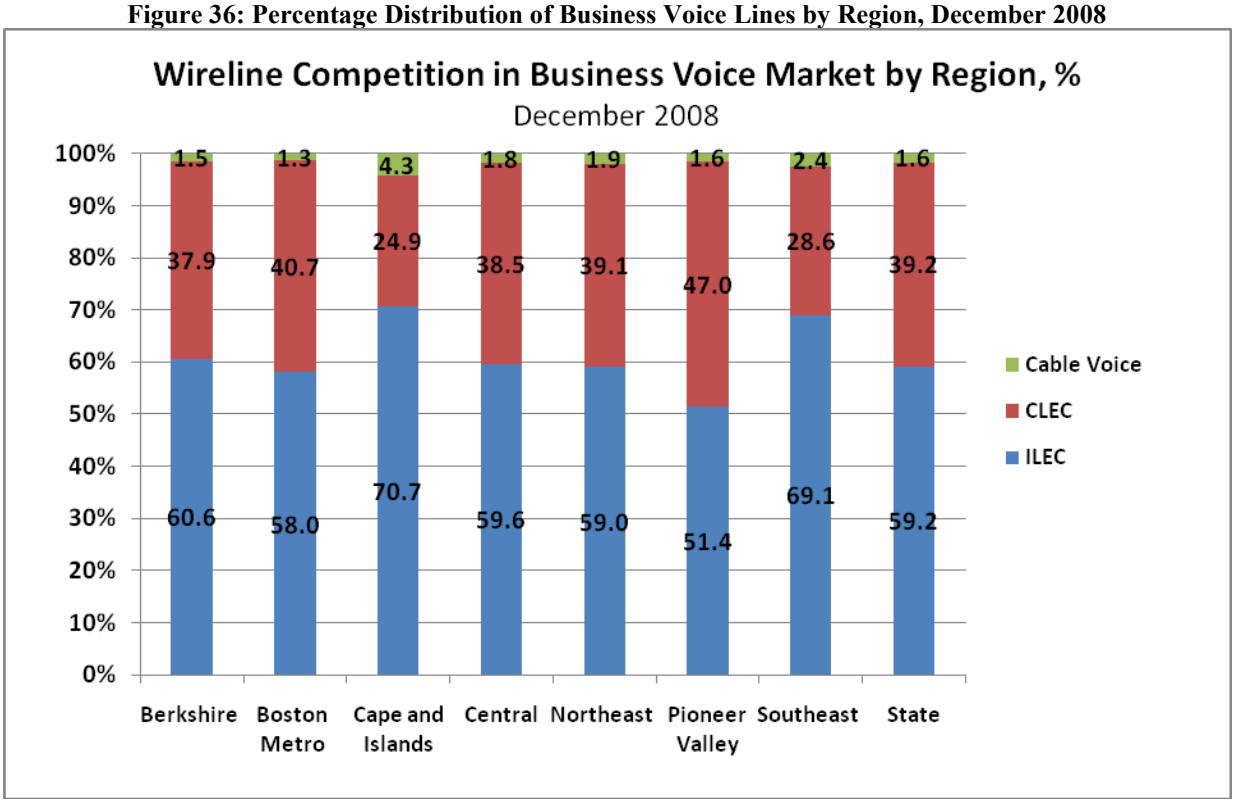
As reflected in Figures 35 and 36, CLECs had their highest Business Voice market share in the Pioneer Valley region, at 47%, and their lowest share in the Cape and Islands region, at 24.9%. The Cape and Islands region had the highest share of ILEC and Cable Voice subscribers at 70.7% and 4.3%, respectively.

Figure 35: Distribution of Business Voice Lines by Region, December 2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast
ILEC	19,800	508,500	29,500	97,300	128,000	89,400	124,300
CLEC	12,400	356,800	10,400	62,900	84,900	81,700	51,400
Cable Voice	500	11,300	1,800	3,000	4,100	2,700	4,300
Total lines	32,700	876,600	41,700	163,200	217,000	173,800	180,000
Total Lines per SMB	8.0	11.6	4.3	9.2	9.0	11.6	7.0

Figure 36: Percentage Distribution of Business Voice Lines by Region, December 2008



III. Competition in the Wireless Voice Market

A. Introduction

Wireless Voice has traditionally been recognized as a product that serves a market distinct from Wireline Voice.[60] Wireless Voice is adopted by individuals, as opposed to households, and provides consumers with mobile communications services. Functionally, a single wireless number may be utilized by consumers for both personal and business purposes and is oftentimes used to supplement or complement existing Wireline Voice services. Within the past decade, Wireless Voice has evolved from an expensive, niche product offering accessible by very few consumers into a mass market product both in Massachusetts and across the country. This evolution can be traced to advances in technology and the expanded availability and reliability of wireless networks. Such advances in wireless technology have decreased the costs of deployment and allowed Wireless Voice providers to make services widely available. This, in turn, has contributed to the widespread adoption of this service.

A Wireless Voice service provider is an entity that offers telephone service to consumers in the form of wireless phones ("cell phones" or "wireless handsets"). The Wireless Voice providers that currently operate in Massachusetts are AT&T Wireless, Verizon Wireless, T-Mobile, and Sprint/Nextel.[61] The data and assumptions

[60] For further discussion on this topic, see *Voice, Video and Broadband: The Changing Competitive Landscape and its Impact on Consumers*, United States Department of Justice (November 2008). http://www.usdoj.gov/atr/public/reports/239284.pdf

[61] In 2004, Sprint and Nextel merged, forming Sprint Nextel Corporation. However, in this analysis, they are treated as individual wireless providers due to the difference in coverage and network technology of the two brands.

in this section of the Report are based upon publicly-available mapping information provided by the Wireless Voice providers operating in Massachusetts as of November 2008.[62]

Based upon the data provided, most Massachusetts consumers could access at least one Wireless Voice service provider, and many of those consumers have supplemented their residential Wireline Voice service with a Wireless Voice service. In addition, an increasing number of residential consumers have chosen to adopt Wireless Voice as the only voice service within their households (known as "cord-cutting" or "wireless substitution").

B. Wireless market background

A wireless telephone service made available to the public is, at its most basic, a mobile two-way voice communication service that transmits calls through radio waves from cell phones to wireless towers and antennas in order to connect to the PSTN. There are different levels of radio waves that can be used to transmit wireless calls. These different levels are associated with specific radio spectrum frequencies. A mobile wireless service may be either a terrestrial wireless service or a satellite wireless service, though most wireless service providers are terrestrial (typically the facilities-based providers and resellers).[63]

The availability and reliability of wireless service is dependent upon, and can be affected by, several factors, including: a wireless caller's distance from a cell phone tower, weather, terrain, foliage, man-made structures (such as buildings), the frequency of the spectrum on which the network operates, and the number of customers trying to connect to the network at the same time. Generally, service is less available in remote areas. This is because there are fewer cell towers, the distance between towers is greater, and foliage and terrain obstructions are more prevalent in remote areas. Wireless Voice providers may also decide against providing service in an area because of its topography or number of potential customers. Areas in which it is difficult to make and receive wireless calls are sometimes referred as "dead zones" or "coverage holes."

Wireless Voice providers do not have an obligation to provide basic dial tone services or ubiquitous coverage. As such, Wireless Voice offerings are typically premium-based services, giving consumers a range of options and ancillary functions. Generally, because this is a market-driven product, availability of service is mostly limited to densely populated communities or high-volume transportation routes.

C. Wireless regulatory roles

Wireless Voice is regulated primarily at the federal level. The Communications Act of 1934 gave the FCC exclusive authority to license the radio frequencies used in wireless communications. Ever since the mid-1970s, the FCC has exercised that authority and set aside and licensed radio frequencies for wireless telephone service. Until 1993, Wireless Voice was subject to the same system of dual state and federal regulation that still governs traditional Wireline Voice. The FCC regulated interstate tariffs, rates, and services, and states regulated intrastate tariffs, rates, and services. This dual authority, however, changed after passage of the Omnibus Budget Reconciliation Act of 1993 (Omnibus Act).[64]

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[62] MetroPCS and Pocket Wireless entered the Massachusetts Wireless Voice market in 2009. Accordingly, these carriers are not included in the data analyzed in the Report.

[63] According to the FCC, only five mobile satellite service providers provided commercial wireless service in the United States as of January 2009. Each of these five providers operates in a different satellite service frequency and differing satellite orbital configurations.

[64] The Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002(b), amending the Communications Act of 1934 and codified at 47 U.S.C. § 332(c).

The Omnibus Act amended the Communications Act of 1934 and created two new regulatory categories of Wireless Voice: (1) commercial mobile radio services (CMRS); and (2) private mobile service.[65] CMRS is a category of services that encompasses *all* mobile telecommunications services that are provided for profit and make interconnected service available to the public (or to such classes of eligible users as to be effectively available to a substantial portion of the public, as specified by FCC regulations). According to the FCC, Congress created the statutory classification of CMRS in order to promote the consistent regulation of mobile radio services that are similar in nature. These "similar in nature" services, for instance, include cellular services, broadband personal communications services ("broadband PCS"), and specialized mobile radio ("SMR") services.

Wireless Voice rates are generally unregulated and are intended to be governed by market forces. The Omnibus Act denied states the "authority to regulate the entry of or the rates charged by any" CMRS or private mobile service providers.[66] The FCC has exempted wireless providers from filing interstate tariffs under its forbearance authority.

Although Congress preempted states and local authorities from regulating radio spectrum and wireless rates and tariffs, Congress explicitly preserved the power of state and local authorities to regulate "other terms and conditions" of wireless service.[67] Thus, for example, states and local authorities have authority with regard to the placement of radio towers, cell sites and other facilities, as well as the authority to implement and enforce certain consumer protections.[68]

D. Wireless classifications

There are three primary types of Wireless Voice providers: (1) facilities-based providers; (2) resellers (often referred to as Mobile Virtual Network Operators); and (3) satellite providers. Facilities-based providers are Wireless Voice providers that own most or all of their network facilities over which wireless calls are transmitted and connected to the PSTN. In Massachusetts, the facilities-based providers are AT&T Wireless, Verizon Wireless, T-Mobile, Sprint/Nextel, and, since January 2009, MetroPCS and Pocket Wireless. Resellers purchase airtime from facilities-based providers and resell the services to the public for profit. One example of a reseller operating in Massachusetts is TracFone. Satellite providers, as their name suggests, operate through the use of a satellite as a part of their network.

This Report focuses solely on Wireless Voice provided by facilities-based providers in Massachusetts as of December 2008.

E. Availability

Although the availability of Wireless Voice can be measured and analyzed using a number of different methods, based on the limited availability of public data, this Report utilizes two analytical tools to measure the availability of these services in Massachusetts: (1) the number of people covered based on where the population resides; and

[65] Private mobile services are not regulated by the Department. Examples of private mobile services include public safety and railroad networks, among others. For more discussion see *http://wireless.fcc.gov/services/index.htm?job=service_home&id=private_land_radio*.

[66] Congress provided states with the ability to petition the FCC for permission to regulate CMRS rates if certain criteria were met. 47 U.S.C. § 332(c)(3)(A)(i).

[67] *Id.*

[68] The MDTC does not regulate wireless services at the present time, *see generally*, *Investigation by the Department of Public Utilities. upon its own motion on Regulation of Commercial Mobile Radio Services*, D.P.U. 94-72, Order (rel. Aug. 5, 1994).

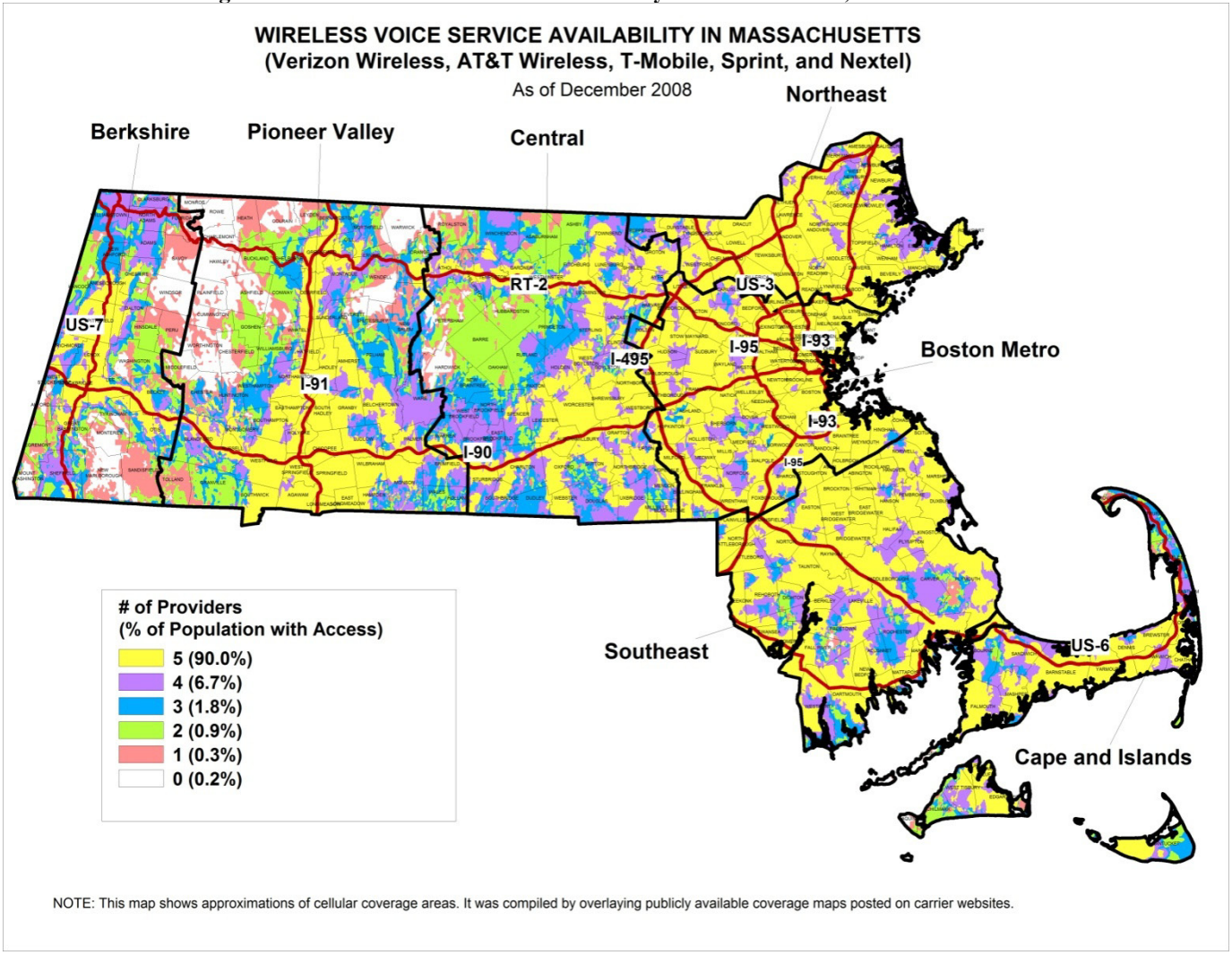
(2) the amount of total terrain covered. "People covered" estimates are based upon coverage areas and the manner by which Wireless Voice is adopted (individuals as opposed to households).[69] "Terrain covered" is the land area covered by Wireless Voice. These measurements do not account for factors that may affect service quality such as signal strength, dropped calls, and dead zones. Additionally, the data and assumptions in the Report are based upon publicly-available mapping information provided by the Wireless Voice providers operating in the state, which are not verified by the DTC. Wireless Voice providers are under no obligation to cover all the land area in any given coverage area. Coverage areas are based upon market metrics such as population density and locations of highly traveled roadways. Accordingly, there are relatively large pockets of areas with little or no presence from any of the Wireless Voice providers. Independent studies verifying carrier coverage claims would provide a valuable resource when analyzing Wireless Voice service availability. The DTC believes that Wireless Voice availability may likely be overstated on a statewide, regional, and local basis.[70]

By year-end 2008, five carriers provided wireless coverage in Massachusetts: Verizon Wireless, AT&T, T-Mobile, Sprint, and Nextel. Based on the information provided by these carriers, Figure 37 below depicts predicted and approximate outdoor coverage of Wireless Voice availability in Massachusetts. This Report does not guarantee that coverage will be available in all covered geographic areas represented on the map. Additionally, although the coverage areas of the five Wireless Voice providers are distinct from one another, the coverage areas overlap in certain locations.

[69] Generally speaking, and as discussed below in the Adoption section, Wireless Voice subscriber lines are attributed to individuals as opposed to households. This differs from Wireline Voice service, where one line is normally subscribed to and shared by an entire household.

[70] This Report is not a complete analysis of Wireless Voice availability. The Report is intended to provide an overview of the reach of Wireless Voice within Massachusetts.

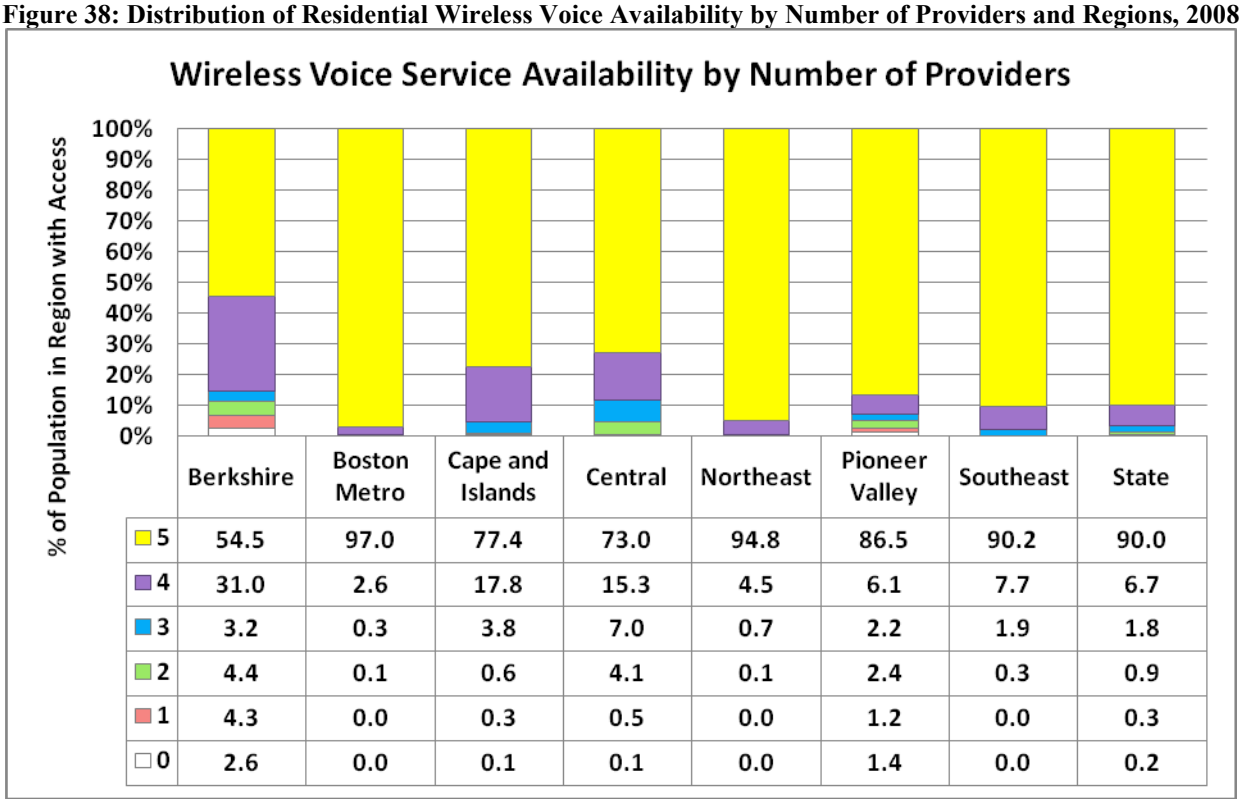
Figure 37: Wireless Voice Service Availability in Massachusetts, December 2008



In reviewing Wireless Voice coverage based on population, estimates based on the data below (Figure 38 and Table 9) indicate that Wireless Voice from at least one provider is available to over 99% of the state's population.[71] There are 14,600 people (0.2%) unreached by wireless signals, spread across 58 towns largely located in mountainous areas in western Massachusetts. On the other hand, 5.7 million people (90%) receive wireless signals from all five of Massachusetts' wireless carriers. They tend to be located in populous areas or near main roads and highways. Three eastern regions (Boston Metro, Northeast, and Southeast) have nearly ubiquitous wireless coverage when taking into account all the coverage for each of the Wireless Voice providers, while the lowest coverage by population is 97.4% in the Berkshire region. Not surprisingly, coverage correlates with population density and flatter topography, as wireless signals are blocked by obstacles such as terrain and foliage.

[71] The DTC is NOT estimating that service from a particular Wireless Voice carrier is available to 99% of the state's population. Instead, the DTC's coverage estimates are based upon an aggregation of the marketed coverage areas for all Wireless Voice providers, which have not been independently verified by the DTC. For the wireless coverage area claimed by any particular carrier, please visit the carrier's website.

Figure 38: Distribution of Residential Wireless Voice Availability by Number of Providers and Regions, 2008



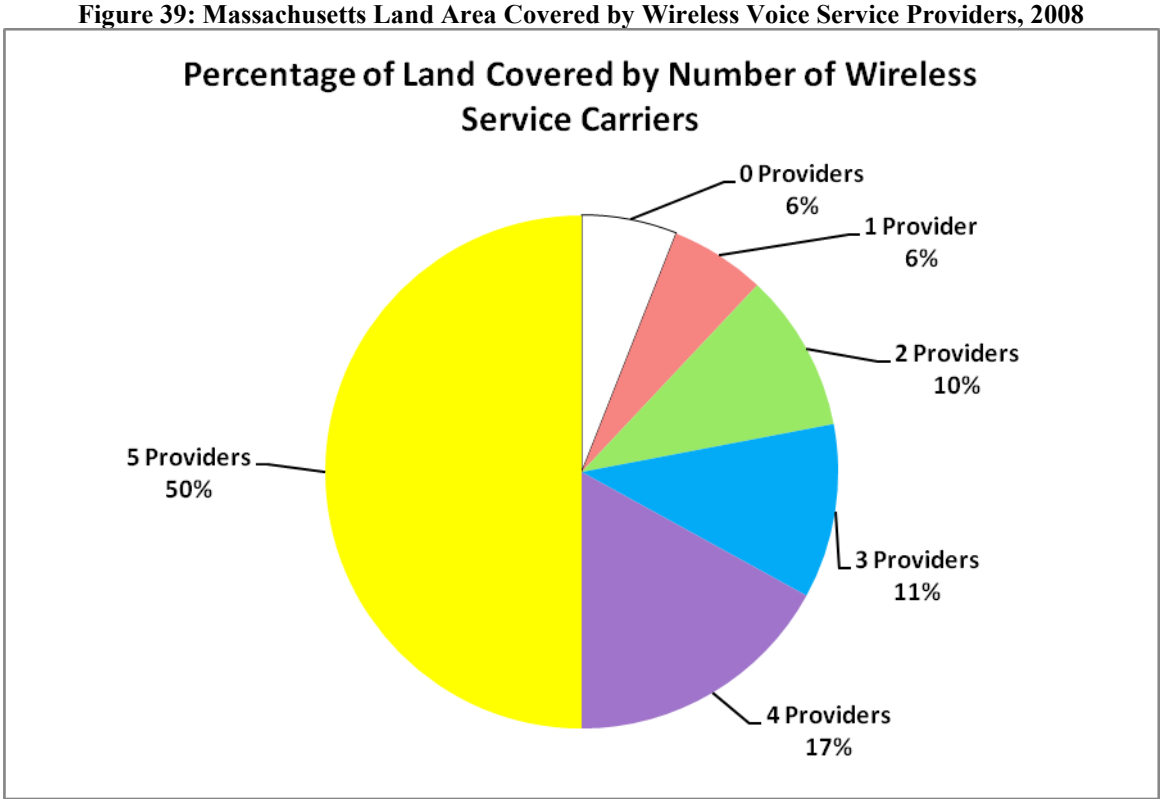
	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
5	54.5	97.0	77.4	73.0	94.8	86.5	90.2	90.0
4	31.0	2.6	17.8	15.3	4.5	6.1	7.7	6.7
3	3.2	0.3	3.8	7.0	0.7	2.2	1.9	1.8
2	4.4	0.1	0.6	4.1	0.1	2.4	0.3	0.9
1	4.3	0.0	0.3	0.5	0.0	1.2	0.0	0.3
0	2.6	0.0	0.1	0.1	0.0	1.4	0.0	0.2

Table 9: Summary of Residential Wireless Voice Service Availability, 2008

Competitors	Region	Availability
No wireless provider	Massachusetts	14,600 people *(0.2%)*
	Regional Distribution:	*% of State Total*
	Pioneer Valley	*67.2%*
	Berkshire	*24.2%*
	Central	*7.1%*
One wireless provider	Massachusetts	19,000 people *(0.3%)*
	Regional Distribution:	*% of State Total*
	Pioneer Valley	*43.8%*
	Berkshire	*30.8%*
	Central	*20.8%*
Maximum wireless providers (5)	Massachusetts	5.7 million people *(90.0%)*

In reviewing Wireless Voice coverage by the amount of terrain covered by Wireless Voice signals, based on the estimates below (Figure 39), approximately 471 square miles (6%) of the land area in Massachusetts is without any Wireless Voice service from any of the five providers. In addition, there is great disparity in the amount of terrain covered by wireless signals across the seven regions. Areas with zero-coverage are prevalent in the Berkshire and Pioneer Valley regions. On the other hand, the entire Boston Metro region is covered by at least three Wireless Voice providers. When comparing the amount of terrain covered against population density, the data indicates that the best wireless coverage is located in the more densely populated areas of the state.

Figure 39: Massachusetts Land Area Covered by Wireless Voice Service Providers, 2008



F. Adoption

By year-end 2008, over 5.7 million Wireless Voice phones were active in Massachusetts. This number represents almost 88.5 Wireless Voice lines for every 100 residents in the state (Figure 40). The available data does not distinguish between residential and business Wireless Voice subscribers. Available information suggests that many Wireless Voice lines serve a dual-purpose, with many subscribers utilizing the same Wireless Voice number for both personal and business functions.[72]

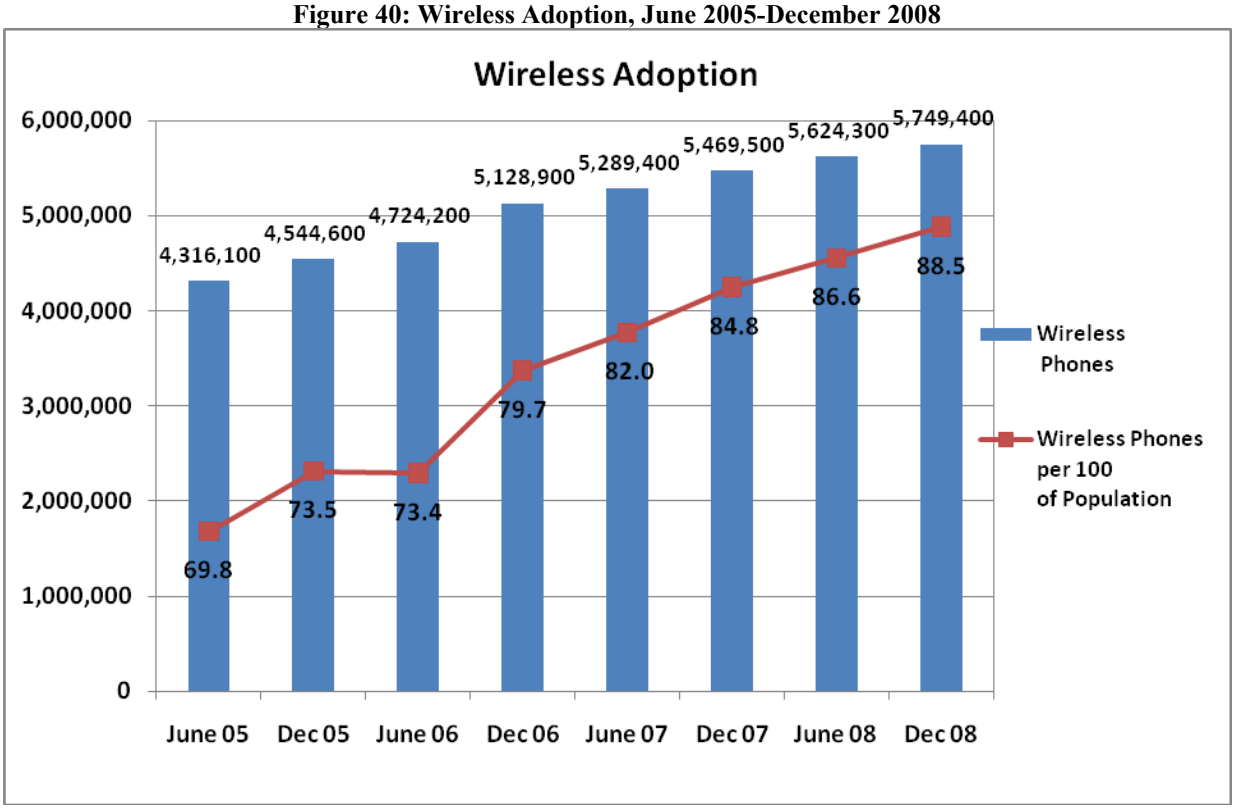
When comparing the total number of lines served, the Wireless Voice market is larger than the market served by Wireline Voice providers. This may be due to a number of factors. First, a household may adopt one or two Wireline Voice lines that are shared among all members of that household, whereas a household may subscribe to

[72] For further discussion on this topic, see *Substantiating Business Use of Employer-Provided Cell Phones*, Internal Revenue Service Notice 2009-23 (June 8, 2009).

one Wireless Voice line for each member of the household. Some individuals may also subscribe to more than one Wireless Voice line.

Wireless Voice subscribership is highest in the Boston Metro region, averaging slightly greater than one wireless phone per person. If, as we assume, not every individual in the Boston Metro region subscribes to Wireless Voice service, it is reasonable to conclude that the frequency of individuals subscribing to multiple Wireless Voice services is highest in the region. Wireless subscribership is lowest in the Southeast region, averaging only 71.9 Wireless lines for every 100 residents.

Figure 40: Wireless Adoption, June 2005-December 2008



G. Substitution

A developing trend in the voice markets is "wireless substitution" or "cord cutting." For most consumers in Massachusetts, Wireline and Wireless Voice services are complementary services. That is, a consumer subscribes to Wireline Voice for household use and subscribes to Wireless Voice for mobility purposes. With the growth of Wireless Voice availability, a growing number of consumers are opting to forego Wireline Voice completely and subscribe exclusively to Wireless Voice. This trend has been made possible in part by providing consumers with the ability to "port" or transfer their phone numbers among various voice providers. [73]

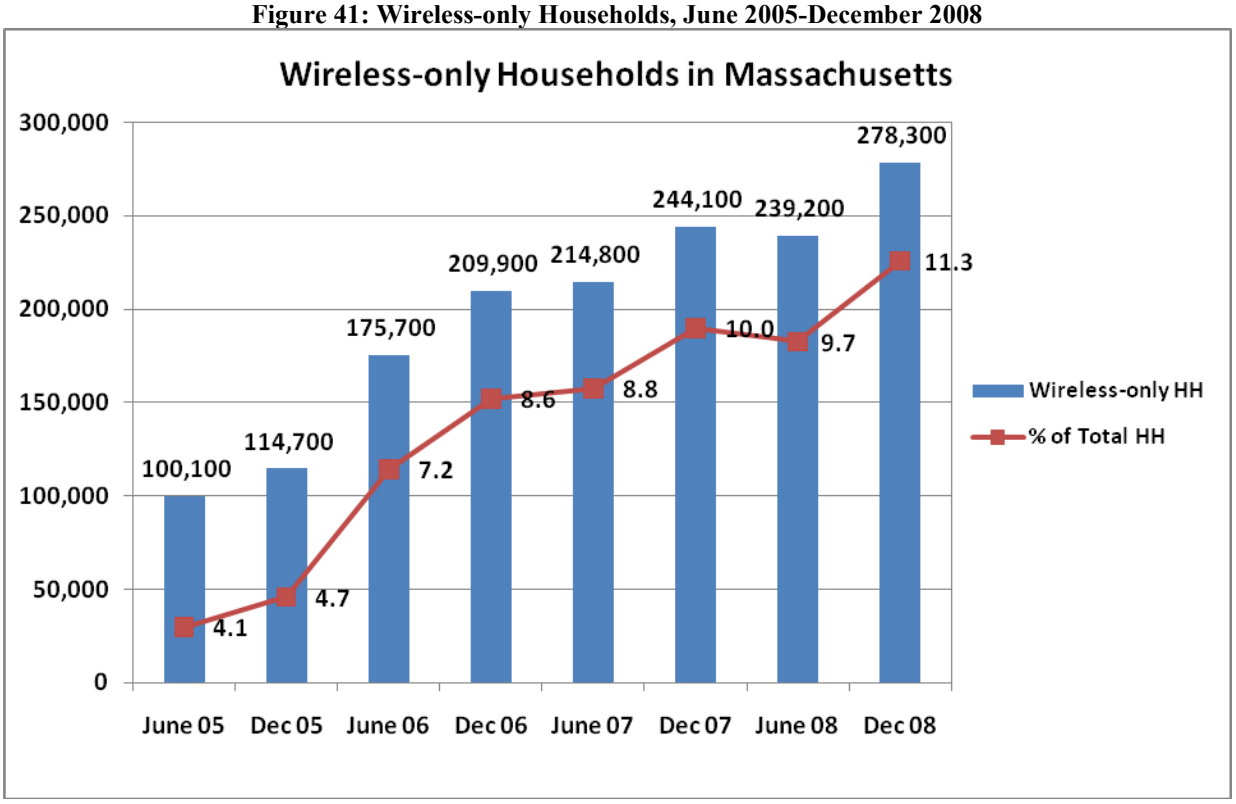
Additionally, changes in E-911 location recognition rules require wireless carriers to provide location information to public safety authorities when a caller dials 911 from a wireless phone. In part, this has had the effect of increasing the rate of wireless substitution. However, there are limits on the specificity of the address and

[73] Additionally, consumers' ability to move the phone number originally assigned to their Wireline Voice service to their Wireless Voice service has increased the rate of wireless substitution.

location that can be provided from a wireless service, particularly in locations such as multi-dwelling units. For example, wireless 911 calls may automatically identify an address or building as the call origination point, but it cannot pinpoint the precise address or even floor from where the call is coming from.[74]

According to a December 2008 survey conducted by the Centers for Disease Control and Prevention,[75] approximately one in five (20.2%) of the nation's households subscribes exclusively to Wireless Voice. This strongly suggests a growing trend as evidenced by the 12.9 percentage point increase since the NHIS June 2005 survey. Using the data from this same survey, the DTC estimates that about 278,300 (11.3%) Massachusetts households chose to cut the cord as of year-end 2008. Figure 41 shows that the number of cord-cutting households in Massachusetts almost tripled in a four-year period, from just over 100,000 households in June 2005.

Figure 41: Wireless-only Households, June 2005-December 2008



H. Effect of Wireless Substitution on the Wireline Market

As shown in the Wireline Voice section, there were about 387,000 fewer residential lines provided by Wireline Voice providers in 2008 compared to June 2005. Wireless Voice substitution (Wireless Substitution) partially explains this market drop. Table 10 below shows the change in residential lines between 2005 and 2008, similar to Table 4 presented previously. However, Table 10 takes into account estimates of Wireless Substitution's

[74] For more discussion on this topic, please see http://www.fcc.gov/cgb/consumerfacts/wireless911srvc.html and http://www.usatoday.com/tech/wireless/phones/2009-08-17-cellphones_N.htm?loc=interstitialskip

[75] In May and December of each year, the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) release selected estimates of telephone coverage for the civilian non-institutionalized U.S. population based on data from its National Health Interview Survey (NHIS). The estimates are based on in-person interviews conducted by the NCHS.

impact on the residential Wireline Voice market. As this Table and Figures 42 through 44 demonstrate, even when factoring in households that subscribe solely to Wireless Voice service, the residential voice market still decreased by about 209,000 lines or 7.7% over this period.

Net line losses which are not explained by increases in Wireless Voice-only households likely result from such factors as the cancellation of customers' second lines used for dial-up services when households move to broadband service. Another likely factor is the increasing use of so-called "over-the-top" Internet voice service providers that utilize a consumer's existing broadband internet connection to provide voice service.[76] However, the DTC does not have data to estimate the effect of these services.

Additionally, it is reasonable to assume that a large number of "substituting" customers have become Verizon Wireless customers, the second largest Wireless carrier nationwide,[77] a factor that should be taken into account when considering the true impact of wireless substitution on ILEC wireline losses.

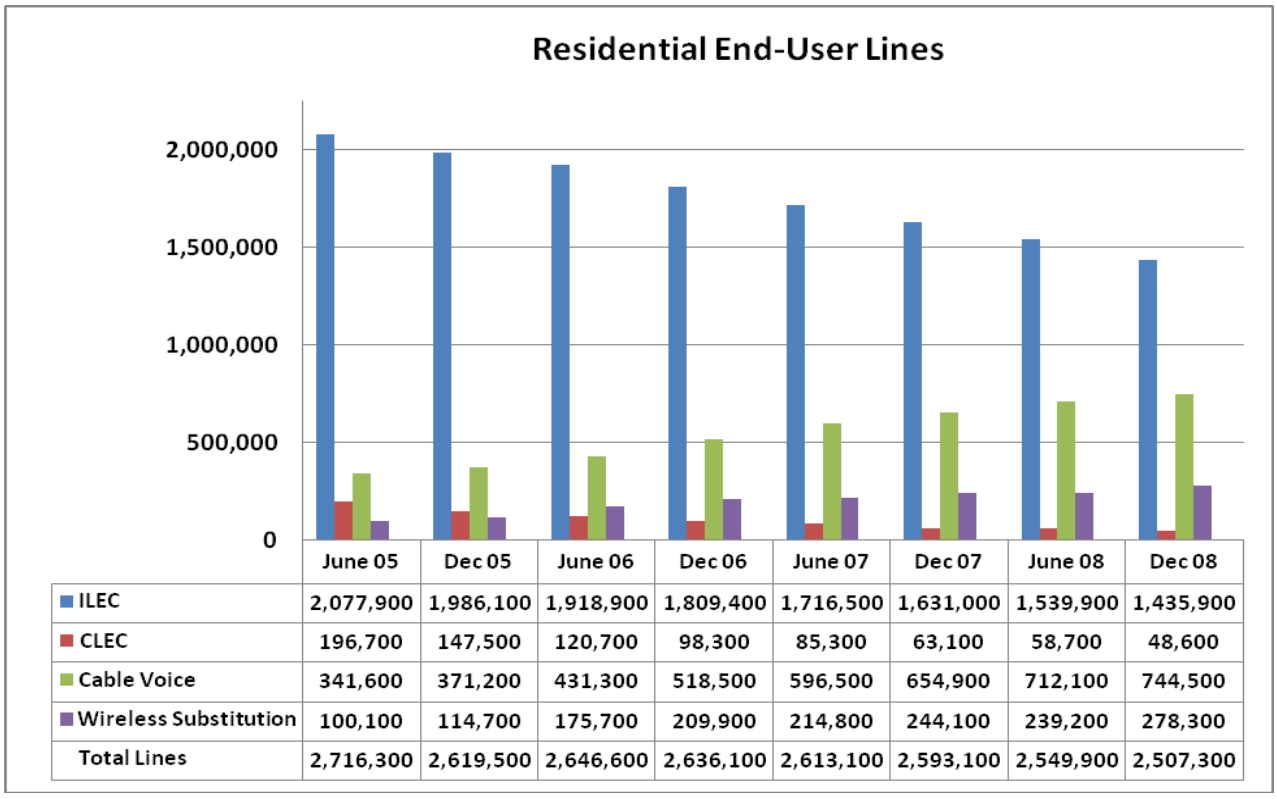
Table 10: Change in Residential Voice Lines with Wireless Substitution by Platform, June 2005-December 2008

Platform	Change in Residential Lines
ILECs, gain(+)/loss(-)	-642,000
CLECs, gain(+)/loss(-)	-148,100
Cable Voice, gain(+)/loss(-)	+402,900
Wireless Substitution, gain(+)/loss(-)	+178,200
Net Line Change, gain(+)/loss(-)	-209,000

[76] Examples of these services include Vonage, Skype, and Magic Jack.

[77] See *Thirteenth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Service,* Federal Communications Commission (January 16, 2009).

Figure 42: Residential Voice Services Adoption with Wireless Substitution, June 2005-December 2008



	June 05	Dec 05	June 06	Dec 06	June 07	Dec 07	June 08	Dec 08
ILEC	2,077,900	1,986,100	1,918,900	1,809,400	1,716,500	1,631,000	1,539,900	1,435,900
CLEC	196,700	147,500	120,700	98,300	85,300	63,100	58,700	48,600
Cable Voice	341,600	371,200	431,300	518,500	596,500	654,900	712,100	744,500
Wireless Substitution	100,100	114,700	175,700	209,900	214,800	244,100	239,200	278,300
Total Lines	2,716,300	2,619,500	2,646,600	2,636,100	2,613,100	2,593,100	2,549,900	2,507,300

Figure 43: Percentage Distribution of Residential Voice Lines with Wireless Substitution, June 2005-December 2008

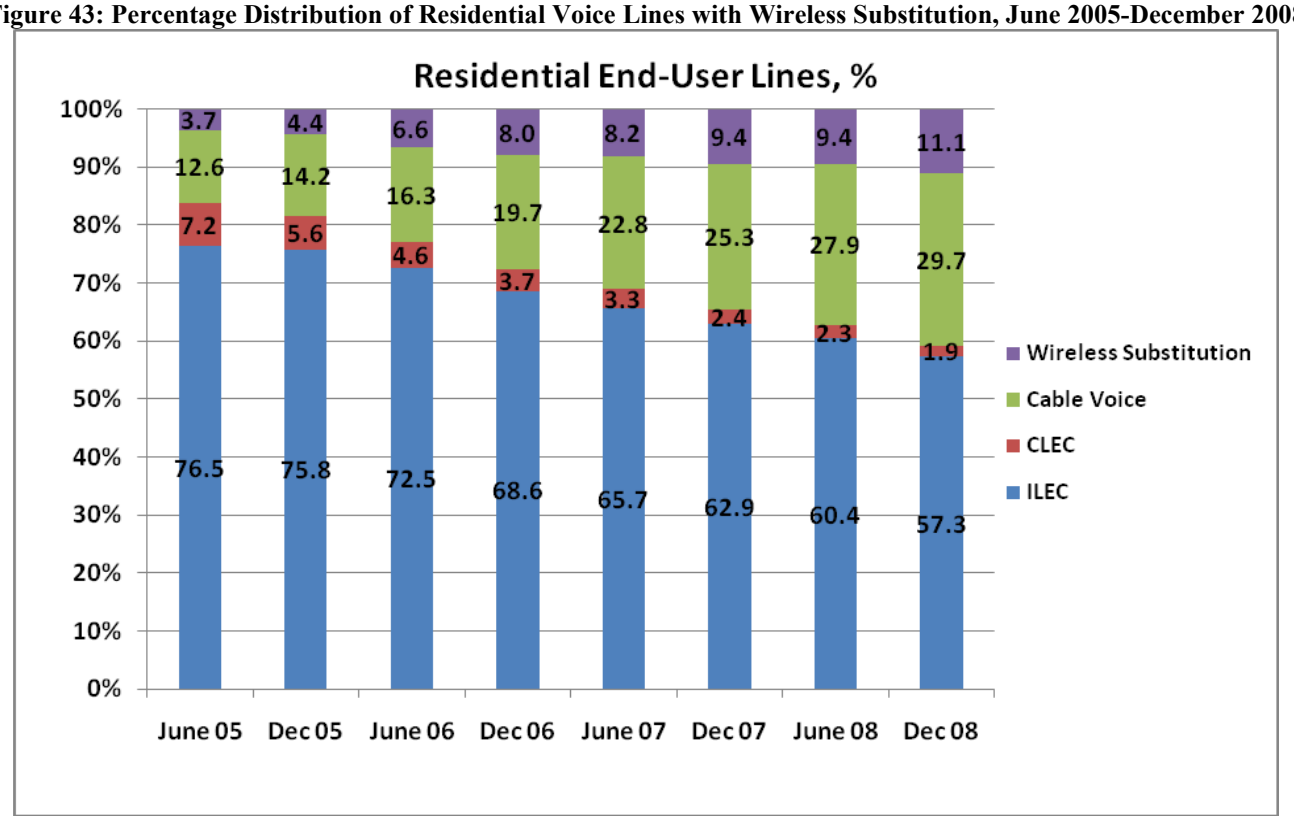
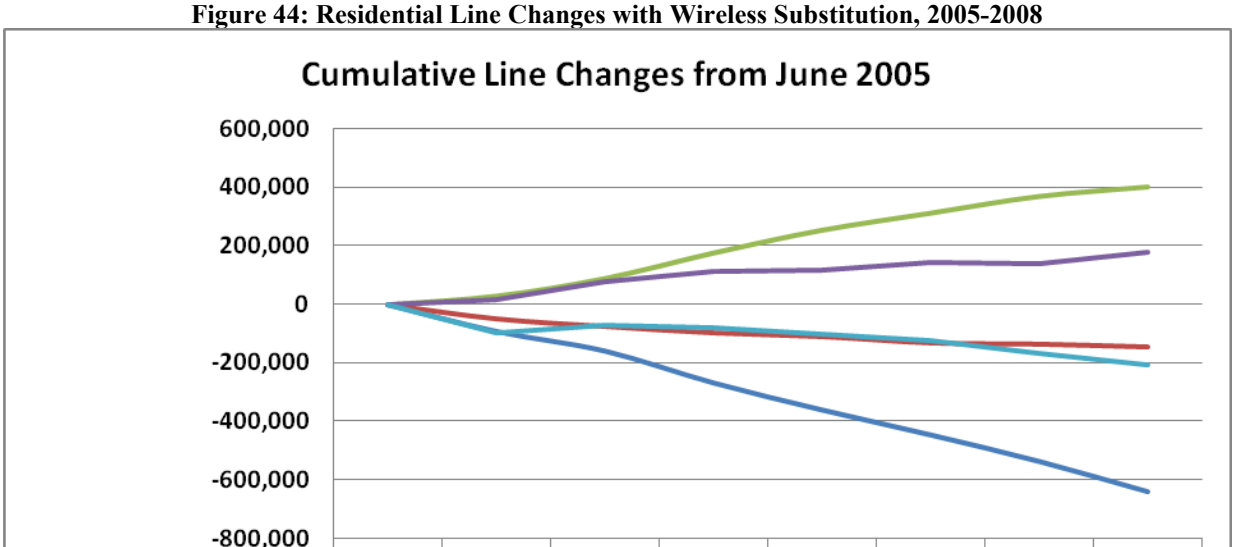


Figure 44: Residential Line Changes with Wireless Substitution, 2005-2008



	June 05	Dec 05	June 06	Dec 06	June 07	Dec 07	June 08	Dec 08
ILEC	0	(91,800)	(159,000)	(268,500)	(361,400)	(446,900)	(538,000)	(642,000)
CLEC	0	(49,200)	(76,000)	(98,400)	(111,400)	(133,600)	(138,100)	(148,100)
Cable Voice	0	29,600	89,700	176,900	254,900	313,300	370,500	402,900
Wireless Substitution	0	14,600	75,600	109,800	114,700	144,000	139,100	178,200
Net Line Change	0	(96,800)	(69,700)	(80,200)	(103,200)	(123,200)	(166,500)	(209,000)

Figures 45 and 46 show annual estimates of the number of Massachusetts households subscribing to a voice service, either Wireline or Wireless, for the previous decade. These estimates are known as telephone penetration rates. Figure 45 demonstrates a consistent penetration rate for 2001-2003, with about 98.5% of Massachusetts households adopting a voice service during that period. However, penetration rates decreased over the following three year period, to a low of 95.5% in 2006. It is beyond the scope of this Report to examine the specific causes for this penetration decrease, however, there are indications that consumers were not voluntarily dropping voice service. At least one study found that some low-income consumers, who previously subscribed to Wireline Voice chose to "cut the cord" in order to lower their overall cost of service, only to later cancel Wireless Voice when it proved more expensive than anticipated.[78] Many of these same consumers were then unable to restore their Wireline Voice because of the consumer's inability to afford a deposit or to pay a previous credit balance.[79] Penetration rates have increased since 2006, with only 1.2% of households without service in 2008, consistent with the penetration rate found earlier in the decade. This recent increase may be explained, at least partially, by an increase in the availability of pre-paid calling plans, particularly from wireless providers.

[78] Carolyn Gideon & David Gabel, *Disconnecting: Universal Service on the Decline* (2006), (draft research paper) at 12-13.

[79] *See id.*

Figure 45: Telephone Service Penetration Rates in Massachusetts, 2001-2008

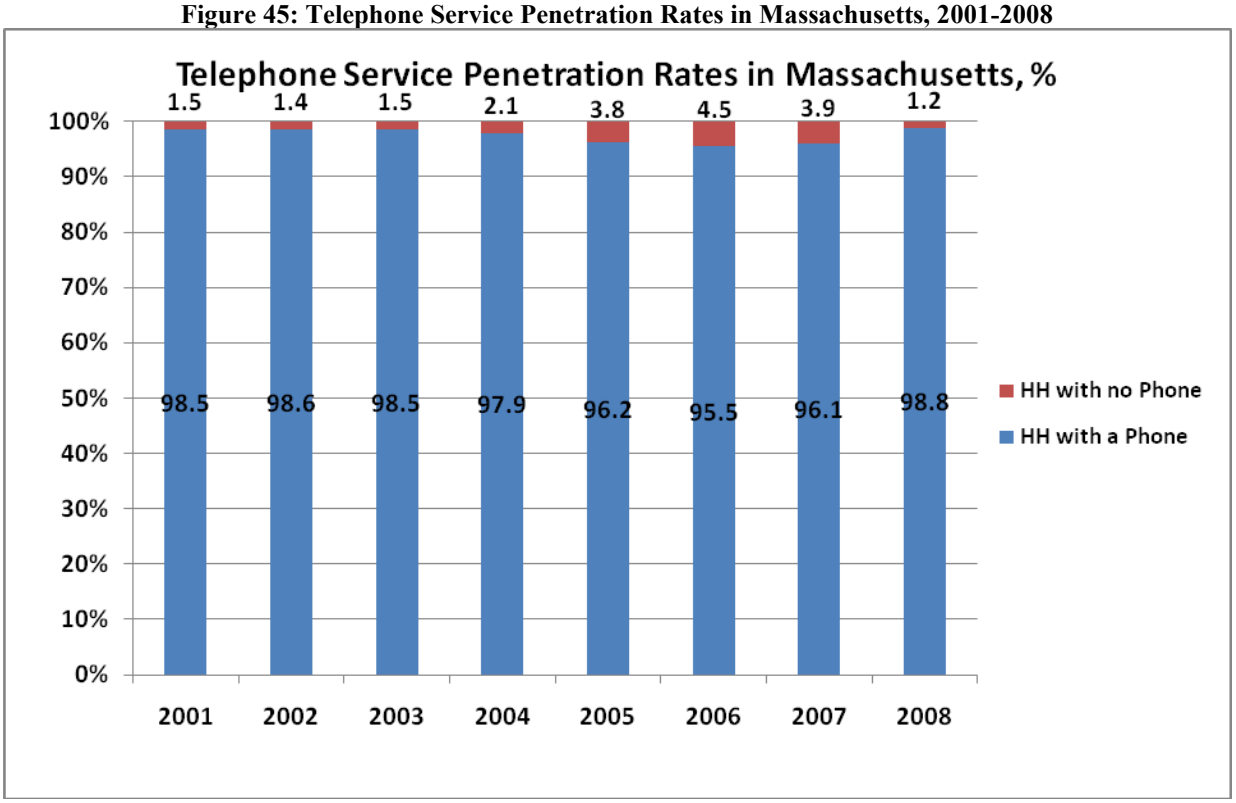
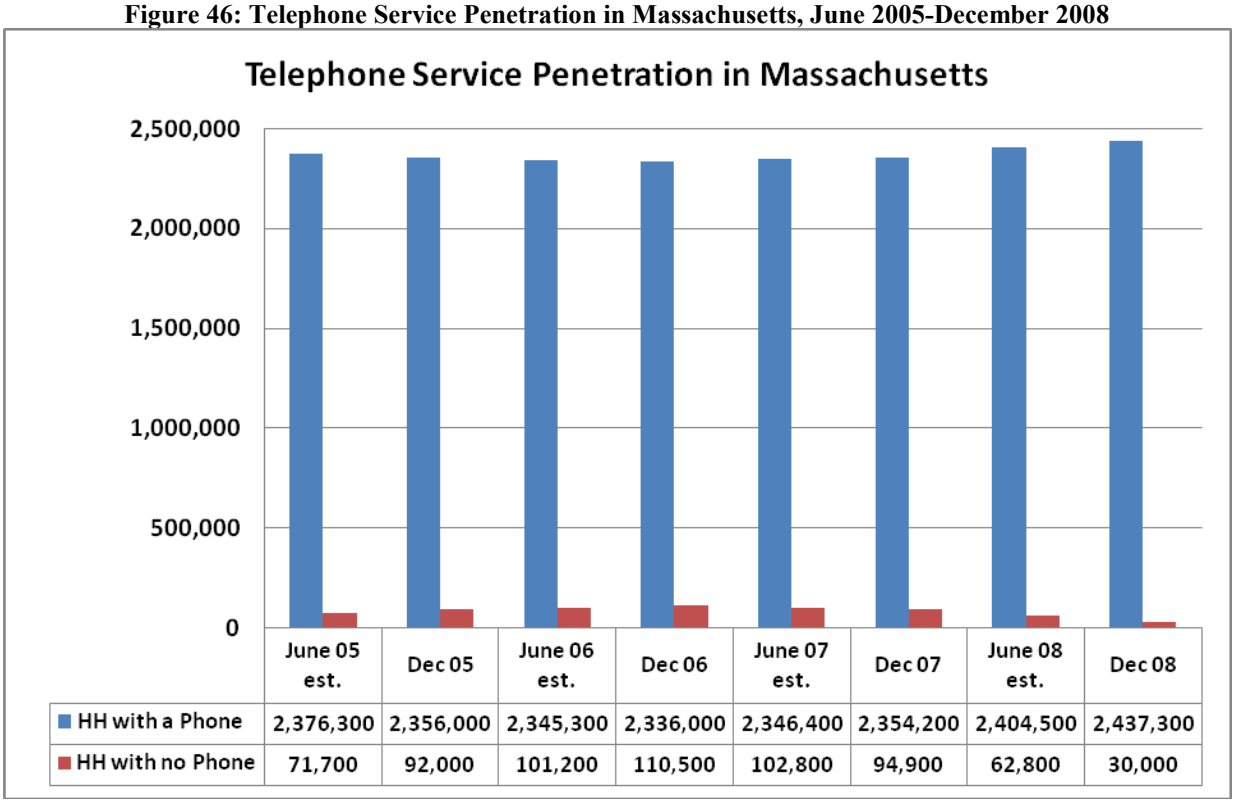


Figure 46: Telephone Service Penetration in Massachusetts, June 2005-December 2008



	June 05 est.	Dec 05	June 06 est.	Dec 06	June 07 est.	Dec 07	June 08 est.	Dec 08
HH with a Phone	2,376,300	2,356,000	2,345,300	2,336,000	2,346,400	2,354,200	2,404,500	2,437,300
HH with no Phone	71,700	92,000	101,200	110,500	102,800	94,900	62,800	30,000

IV. Competition in the Video Market

A. Introduction

Massachusetts residents have a variety of options to obtain video service. These include over-the-air broadcast signals picked up with an antenna; subscribing to a direct broadcast satellite (DBS) provider; or subscribing to video services provided by a cable company (Cable Video). Cable Video is the principal means that Massachusetts consumers obtain video services. There are 2.11 million Cable Video subscribers in Massachusetts, comprising 86% of all Massachusetts households. Cable Video is available in all or parts of 308 of Massachusetts' 351 municipalities. There are 43 cities and towns, primarily located in the Berkshire and Pioneer Valley regions, which are not served by a Cable Video provider.

B. Video market background

Consumers receive video service on their televisions through a variety of options. The three main options are: (1) over-the-air broadcast signals transmitted by individual broadcast stations and received by an antenna located at the consumer's premises; (2) a subscription to a Cable Video provider; or (3) a subscription to a DBS provider.[80] Consumers do not pay to receive over-the-air broadcast signals whereas consumers do pay for the subscriptions to receive Cable Video or DBS services. Under federal definition, both Cable Video and DBS providers are multichannel video program distribution (MVPD) providers. In other words, MVPD subscriptions offer consumers multiple channel packages, unlike over-the-air broadcasters, which traditionally offered single channels to consumers located within their broadcasting area(s).[81]

Like wireless communications, each video service utilizes radio frequency spectrum at some point in the provisioning of service. For example, over-the-air broadcasters and DBS providers transmit television signals from antennas and/or satellites over specifically-allotted spectrum that are received at the consumer's premises, whereas Cable Video providers receive television and/or satellite signals at specialized antennas (called "headends"). The signals are then retransmitted with additional content through physical connections directly to Cable Video consumers' households.

Over-the-air broadcast television was the first and only video service available to consumers for many years. Local television stations transmitted signals that were received by antennas, allowing consumers to view these different local broadcasts through different channels on their television sets. The further a broadcast signal had to travel to reach a consumer the weaker the signal, until eventually the signal ended all together. In addition, reception was affected by interference from other sources, such as weather, topography, and other broadcast signals.

One response to reception problems was community antenna television (CATV) systems, which were the precursors to modern Cable Video. CATV systems arose in the late 1940s in order to provide better reception of broadcast stations. This was done by placement of antennas in locations that could receive better and/or more

[80] For a discussion of other means by which consumers may receive video content, including Internet video, wireless video services, and broadband service providers, refer to *In re Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, 13th Annual Report*, FCC 07-206 (rel. Jan. 16, 2009). The DTC does not have sufficient data to project what, if any, impact these emerging technologies will have on competition for video service.

[81] Traditionally, only one television station, or channel, was transmitted over-the-air by a broadcaster through an analog signal. However, as of June 12, 2009, broadcasters were required, as part of the DTV Transition, to switch their over-the-air signals to a digital format. Digital signals require less "space" than analog signals in order to transmit information. As a result, traditional broadcasters are now able to transmit multiple stations "over-the-air" at once.

numerous television signals. Households were connected to those antennas through physical wire or cable connections. Unlike basic over-the-air broadcast video service, households paid to receive the CATV system service. Beginning in the 1960s, CATV systems came to be known as cable television services when they started offering their own stations in addition to the original over-the-air broadcast stations. CATV systems were granted exclusive franchises by the state or local licensing authority and over the years became the predominant provider of video content for consumers.

The Act recognized this and sought to spur competition between the cable provider with an exclusive license (the Incumbent) and new entrants, known as overbuilder operators (Overbuilder). In Massachusetts, RCN was the first private company to offer service as an Overbuilder, targeting a number of communities within the Boston Metro region beginning around 1998. Cable Video competition since has further expanded, particularly with the introduction of Verizon FiOS in a number of communities in the Boston Metro, Central, Northeast and Southeast regions.

C. Video regulatory roles

Regulation of video services occurs at the federal, state, and local levels. However, over-the-air broadcasting and DBS services are regulated exclusively at the federal level. State and local authorities only have regulatory authority over Cable Video.

Congress appointed the FCC to be the federal regulator over video services. The FCC's original authority was established in the Communications Act of 1934 and has since expanded. Currently, the FCC's general video authority includes issues such as allocation and licensing of video spectrum and satellite signals; oversight of broadcast signals and broadcast programming; carriage of television broadcast signals by cable and satellite providers; commercial leased access; program access; over-the-air reception devices; open video systems; commercial availability of set-top boxes; and the accessibility of closed captioning and video description on television programming. The FCC creates and enforces regulations designed to ensure and promote competition among cable companies, satellite companies, and other video programming service providers. In 1984, Congress adopted the Cable Communications Policy Act of 1984, which among other things, defined jurisdictional boundaries among federal, state, and local authorities for regulating cable company systems.
Congress placed strict limits on a licensing authority's ability to regulate rates for cable services or to require specific programming services. Consumer protection, however, remained within the general powers of the state and falls within the purview of permissible local regulations, so long as the regulations are not "specifically preempted" or "inconsistent" with federal law.[82]

The Massachusetts Legislature established the DTC's predecessor in 1971 to regulate the provision of cable services in the state with dual authority granted to the state's cities and towns.[83] Local municipalities act as the issuing authorities for cable franchise licenses by negotiating and granting these licenses to cable operators.[84] The DTC, on the other hand, has general regulatory authority over cable services.[85] Pursuant to its authority, the DTC oversees cable television franchising, franchise renewal, and the transfer of cable franchises within the state.[86]

[82] 47 U.S.C. §§ 552(d)(1) and 556(c).

[83] *See* St. 1971, c. 1103, preamble.

[84] State law and regulations in Massachusetts require cable operators to apply for franchises at the municipal level. *See* Mass. Gen. Laws c. 166A, §§ 3-5; 207 C.M.R. §§ 3.02-3.04.

[85] G. L. c. 25C, § 1; G. L. c. 166A, § 2.

[86] *Id.*

Additionally, the DTC enforces consumer protection standards and maintains statistical data from cable providers on rates, terms and conditions, market share, and financial performance. Finally, the DTC regulates subscribers' rates for basic service tier programming, equipment, and installation in communities that: (1) have requested rate regulation, and (2) do not have effective competition from a second cable operator.[87] The DTC reviews proposed basic service tier rates to determine whether such rates are just and reasonable and in compliance with applicable federal law.[88] In terms of its licensing oversight authority, the DTC addresses licensing disputes that arise at the local level, serving as the appellate body. The DTC also conducts an extensive educational program for communities involved in the licensing process, regarding the applicable substantive and procedural requirements at the local, state, and federal levels.[89]

D. Classifications and platforms

1. Incumbents

For purposes of the Report, the DTC considers the initial licensee in any community to be the Incumbent. In recent years, the cable industry has undergone a substantial amount of consolidation. In each instance, the provider acquiring a franchise serves as the Incumbent in that municipality. There are six Incumbents serving Massachusetts municipalities. These include four private providers and two providers operated by the towns of Russell and Shrewsbury. Combined, Incumbent providers serve all or parts of 308 municipalities in Massachusetts. In over 200 municipalities, the Incumbent is the only Cable Video option for residents.

The four private Incumbents in Massachusetts are Charter, Comcast, Cox, and Time Warner. Comcast maintains the largest presence in the state, serving 237 municipalities in six of the seven regions. Charter is second, serving 53 municipalities primarily in the Central and Pioneer Valley regions. Time Warner currently serves 15 Massachusetts municipalities, 13 of which are located in the Berkshire region. Cox is the Incumbent carrier in the town of Holland.

2. Overbuilders

A Cable Video provider offering an alternative to the Incumbent is an Overbuilder, because the company builds a new cable network "over" the routes used by the Incumbent's network. There are two private Overbuilders serving communities in Massachusetts: Verizon FiOS and RCN. There also are two municipally operated Overbuilders in Braintree and Norwood. In 14 municipalities, all within the Boston Metro region, two Overbuilders offer Cable Video in addition to the Incumbent.

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[87] Effective competition is determined by the FCC and means that (a) fewer than 30 percent of the households in the franchise area subscribe to the cable service of a cable system; or (b) the franchise area is (i) served by at least two unaffiliated multichannel video programming distributors each of which offers comparable video programming to at least 50 percent of the households in the franchise area; and (ii) the number of households subscribing to programming services offered by multichannel video programming distributors other than the largest multichannel video programming distributor exceeds 15 percent of the households in the franchise area; or (c) a multichannel video programming distributor operated by the franchising authority for that franchise area offers video programming to at least 50 percent of the households in that franchise area. 47 C.F.R. § 76.905.

[88] State and federal authorities do not regulate rates for non-basic tiered services, for any pay-per-channel programming (i.e., premium movie channels), and pay-per-program services (i.e., a pay-per-view sports event).

[89] *See, e.g., The Cable Licensing Process; A Practical Guide to Initial Licensing,* Massachusetts Department of Telecommunications and Energy, June 2005. http://www.mass.gov/Eoca/docs/dtc/catv/factsheet/initialguidefnl.pdf

3. Other

a) Satellite

DBS is available in Massachusetts from Dish Network and DirecTV. Premium video content is broadcast from satellites in orbit above the U.S. DBS service is theoretically available to every household in Massachusetts. However, service availability is restricted by obstructions impeding the broadcast signal from the satellite. These obstructions are primarily geographic terrain, buildings, and foliage, and are difficult to estimate or predict without direct measurement. In addition, property managers for multiple dwelling units frequently do not allow residents to install DBS receiving equipment.[90] Accordingly, this Report does not conduct a quantitative analysis of DBS video service availability in Massachusetts.

b) Over-the-air broadcast

Over-the-air broadcast signals refer to television channel signals, transmitted via ground-based transmitters, which can be received free of charge by anyone with an appropriate receiver or tuner. By June 12, 2009, the federal government required that all over-the-air broadcasters switch their transmission format from the National Television System Committee (NTSC), or analog standard, to the Advanced Television System Committee (ATSC), or digital broadcasting standard. This transition is referred to as the DTV Transition. While the new ATSC broadcast standard allows for enhanced or high definition audio and video transmission, the technology is not compatible with the older NTSC equipment. As a result, consumers who wish to view over-the-air television must now have a television or set-top box with an ATSC tuner. Similar to DBS, several factors, including distance from the transmission source, and geographic and atmospheric conditions, can affect the ability to receive an over-the-air broadcast. One limitation of the ATSC technology is the "digital cliff" effect. That is, unlike an analog signal, which gradually fades as signal strength drops, digital signals must be received in full or they are unintelligible. In some remote areas where analog signals were previously received with a low signal strength (i.e., with a fuzzy or static picture), a digital signal may not be received at all (i.e., no picture). In light of the difficulty in estimating over-the-air signal availability without direct measurement, the Report does not conduct a quantitative analysis of over-the-air broadcast signal availability in Massachusetts.

E. Availability

1. Introduction

Cable Video is offered in all or parts of 308 Massachusetts municipalities by at least one provider. Approximately 60,000 (3%) households in Massachusetts cannot subscribe to Cable Video because either there are no cable facilities in their municipalities or the license between their municipality and the cable provider does not mandate universal Cable Video access for the municipality. Unlike ILECs, Incumbent cable providers are under no legal obligation to offer service to all households within a franchise area.[91] Rather, the number of households passed by a Cable Video provider is often negotiated between the licensing authority and the provider. The provider is then under a contractual obligation to offer service to households as dictated by the license.

[90] The FCC has found that if a tenant has exclusive use to an exterior area such as a balcony or patio, the tenant generally has the right to install DBS receiving equipment. In circumstances where the tenant does not have exclusive use of an exterior area, the tenant may be prohibited from installing DBS receiving equipment. For more discussion on this topic, *see* http://www.fcc.gov/cgb/consumerfacts/consumerdish.html.

[91] This is in contrast with the Carrier of Last Resort requirements of ILECs for telephone service.

Housing density is a key factor when cable companies build out their local infrastructure. Neighborhoods or municipalities with low housing density may not be considered sufficiently profitable by a Cable Video provider to warrant service. There are 43 rural, low-density municipalities located principally in the Berkshire, Pioneer Valley, and Central regions not currently served by an Incumbent.

While so-called "Overbuilder" cable competition has existed since 1998, in recent years it has increased significantly in eastern Massachusetts, with the buildout by Verizon of its FiOS network. As of December 2008, approximately 1.01 million (41%) Massachusetts households have the option of at least one Overbuilder. Additionally, approximately 208,700 (8.6%) households in Massachusetts--all in the Boston Metro region--have access to service offerings from an Incumbent provider and two Overbuilders.[92] Because Overbuilders typically provide service in communities with a relatively high population density, the expansion of competing cable service has been limited geographically, with most communities in central and western Massachusetts still being served by just one cable provider. As of June 2009, 208 municipalities, mostly in the Berkshire, Pioneer Valley, Central, and Cape and Islands regions, only have access to Incumbent Cable Video services.

2. Incumbents

Incumbents offer Cable Video service in all or parts of 308 (88%) of the state's 351 municipalities, with approximately 2.42 million (99%) households located within these municipalities. Due to build-out provisions in licenses between Cable Video providers and the municipalities that dictate the extent of cable availability, Cable Video is available to approximately 2.38 million (97.6%) Massachusetts households. There are approximately 15,000 households located in the 43 municipalities that are not served by a Cable Video provider, accounting for less than 1% of the state's total number of households.

Figure 47 shows the Incumbent Cable Video provider in each Massachusetts municipality. There are four private Incumbents in Massachusetts: Charter, Comcast, Cox, and Time Warner. Additionally, there are two municipally-owned providers operating in the towns of Russell and Shrewsbury.[93]

[92] Pursuant to a November 14, 2008, DTC motion granting confidential treatment for the availability of Verizon FiOS Video services, the Department will discuss actual availability of Overbuilder video services by premises. A "premise" may be either an individual household or a business unit.

[93] There are a handful of municipalities served by two Incumbents. In each case, both Incumbents serve a distinct territory and do not compete with one another. Only the Incumbent with majority presence in the municipality is presented on the cable provider maps.

Figure 47: Incumbent Cable Video Providers by Town, December 2008

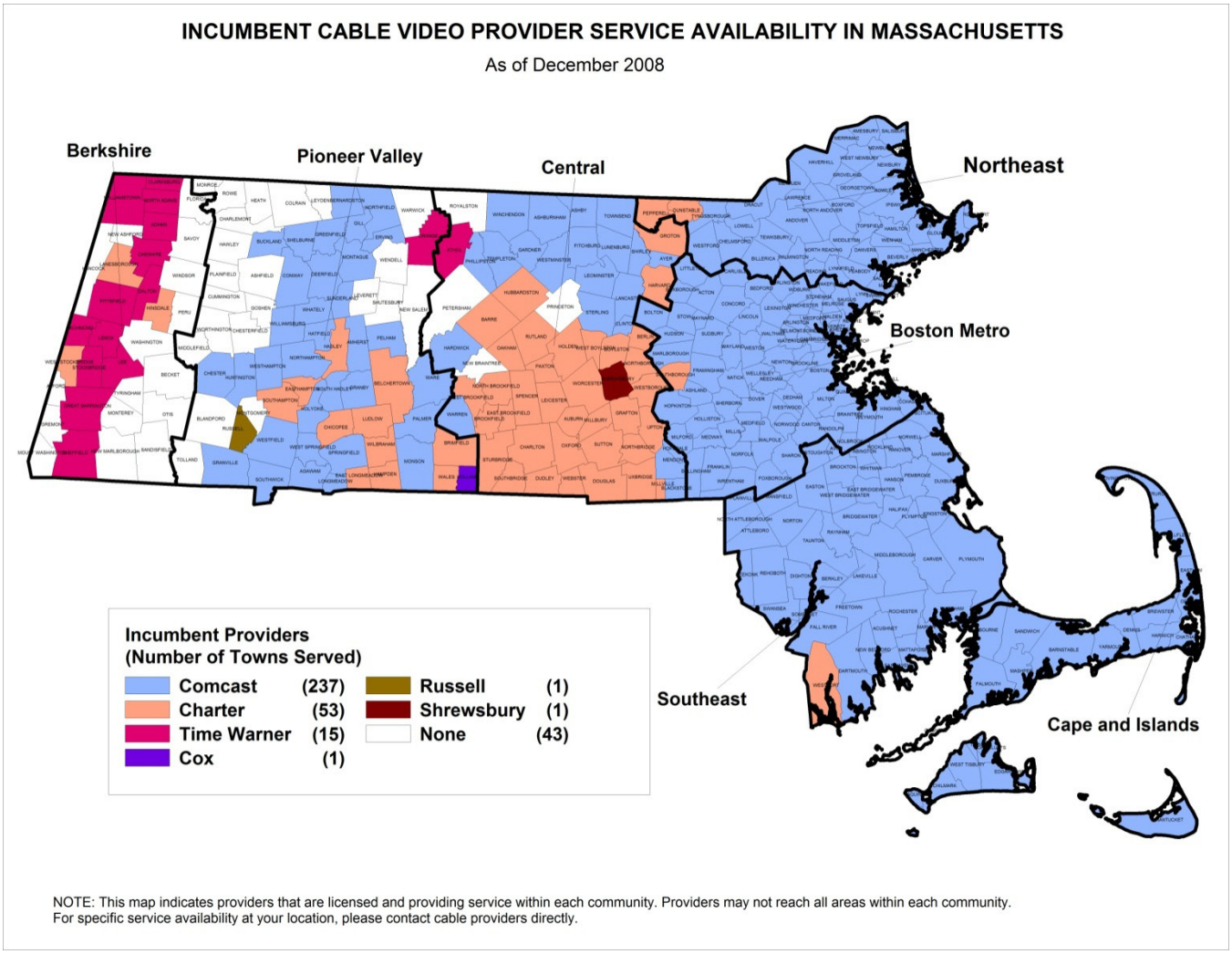


Figure 48 illustrates the percentage of households with access to Incumbent cable service, separated by region. The Cape and Islands region has the highest Incumbent coverage rate (99.4% of households with access to Incumbent Cable Video service), while the Berkshire region has the lowest Incumbent coverage rate (90% of households with access to Incumbent Cable Video service). This includes 16 Berkshire region municipalities that are not served by a single cable provider. There are 22,000 households that lack access to Incumbent Cable Video service in the Boston Metro region (2.2% of the region's households). This represents the largest gross number of unserved households located within any single region. However, every municipality in the Boston Metro region has an Incumbent offering service.

Figure 48: Percentage of Region Households with Access to Incumbent Cable Video Service, 2008

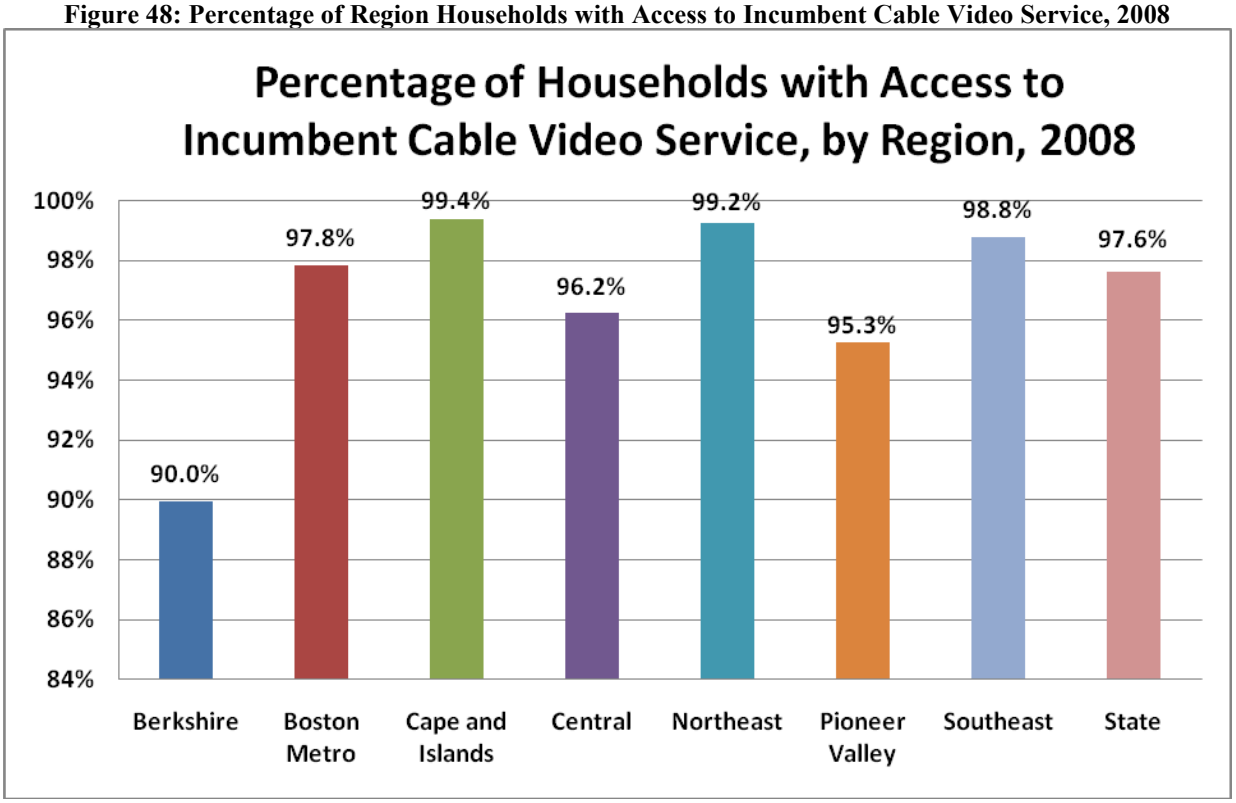
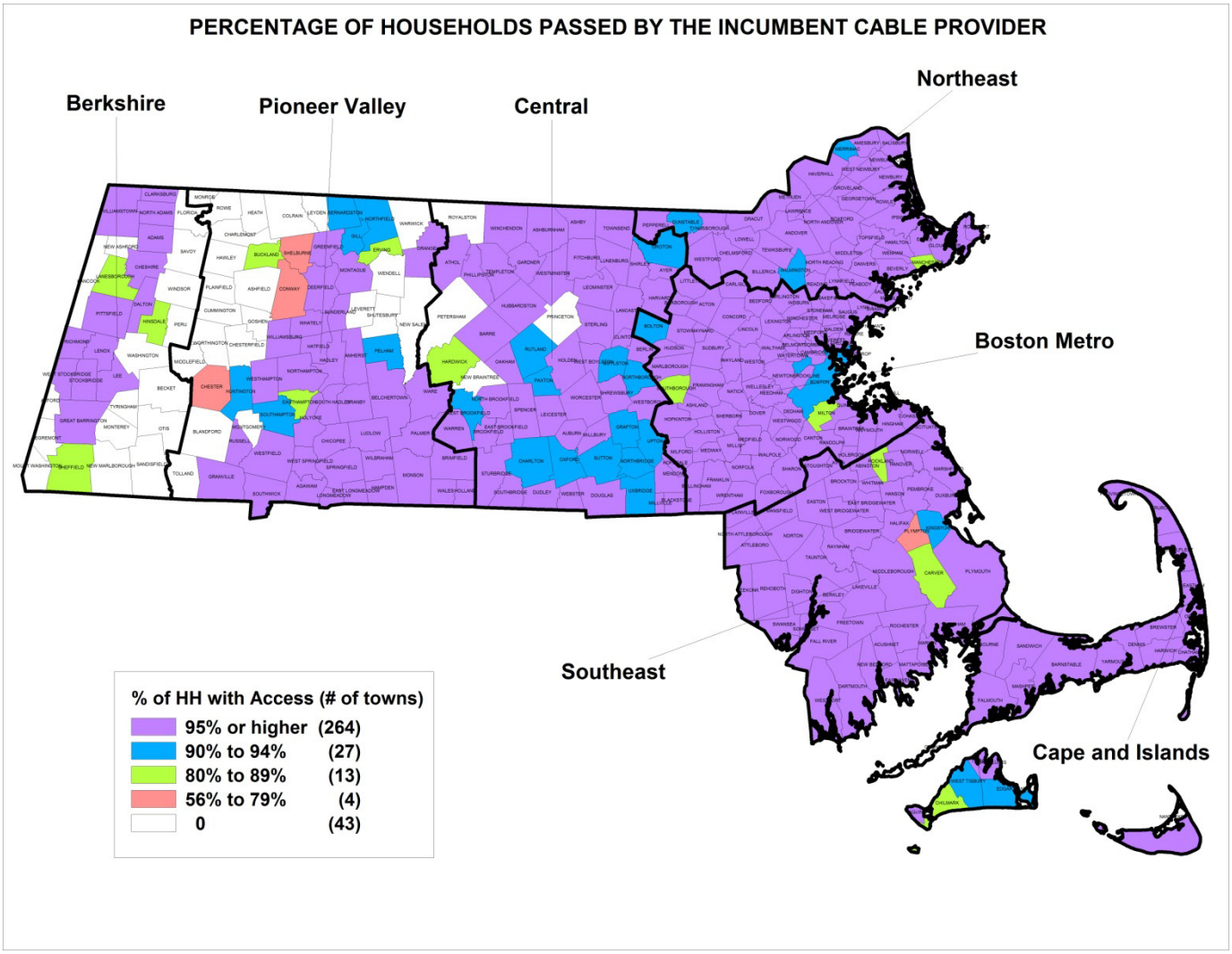


Figure 49 shows the percentage of housing units in each town with access to Cable Video service. This map takes into account the location of primary housing units within municipalities and the build-out of cable infrastructure in each municipality. As Figure 49 shows, for 264 municipalities with a Cable Video provider (86% of municipalities statewide), service is available to at least 95% of the town's households. Conversely, there are four towns (1.2%) served by a Cable Video provider where less than 80% of the town's households have access to cable service.

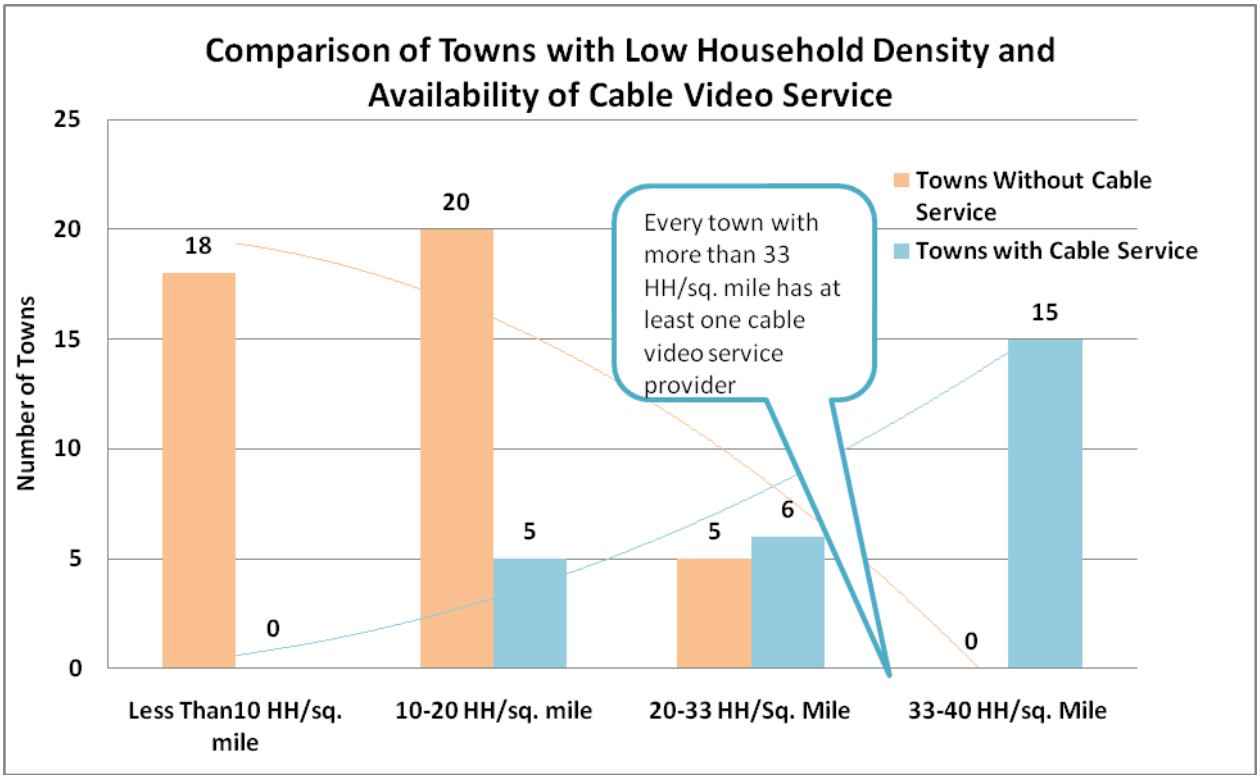
Figure 49: Percentage of Municipal Households with Access to Cable Video Service Offering, 2008



Particular communities or neighborhoods may not have Cable Video service for a variety of reasons, but household density appears to be a key factor. For example, many cable licenses require that the Cable Video provider build to all households with a density greater than 15 to 30 households per linear road mile. All households that fall below the range dictated within a franchise agreement are served solely at the discretion of the Cable Video provider. Unlike the provision of Wireline Voice by ILECs, Cable Video providers are not legally obligated to serve all households within a given municipality. Without a legal requirement to do so, providers are unlikely to offer Cable Video to residents of these underserved and un-served municipalities as it may not be sufficiently profitable.

All municipalities with a density greater than 33 households per square mile are served by at least one Cable Video provider. Figure 50 depicts the availability of Cable Video service for the 69 municipalities in which household density is less than 40 households per square mile. As this figure suggests, Cable Video providers have an economic incentive to serve municipalities with higher average household densities. Only 16 of the 59 (27%) municipalities where there are less than 33 households per square mile are served by a Cable Video provider.

Figure 50: Low Household Density Towns and the Presence of a Cable Video Provider, 2008



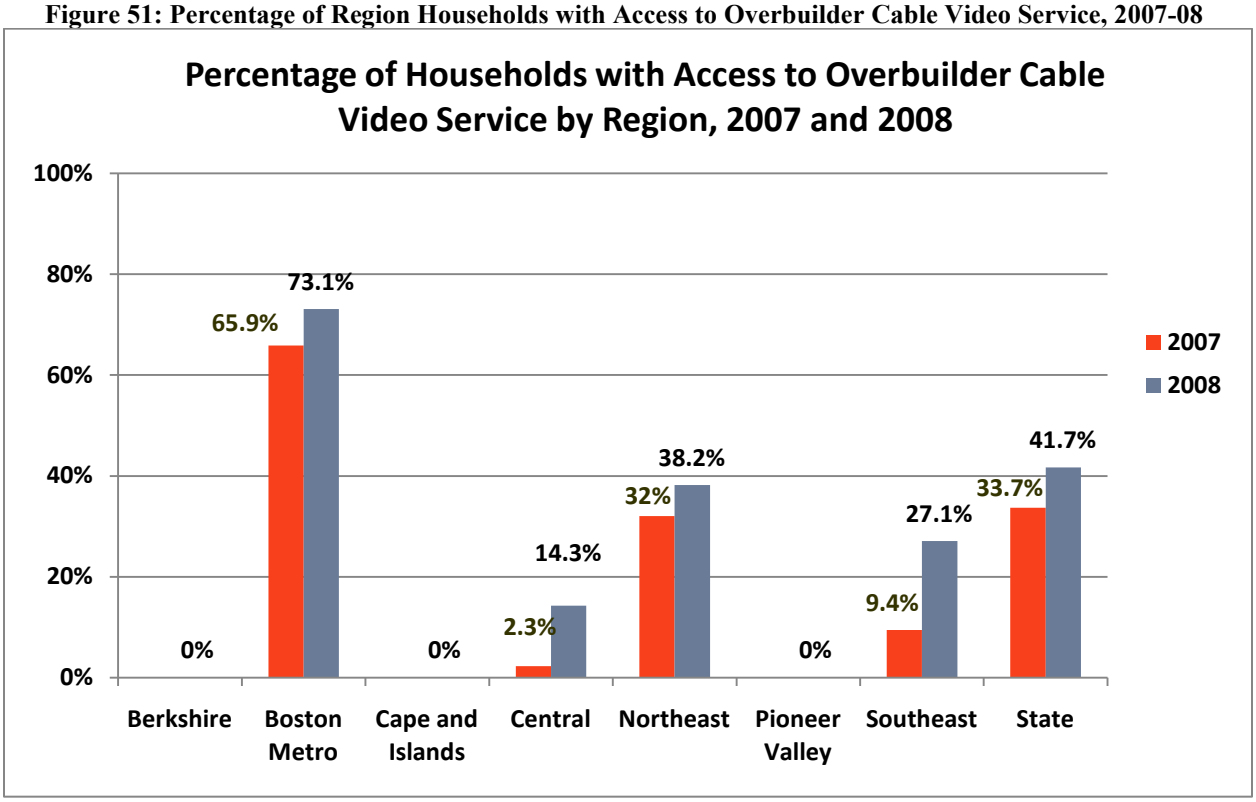
3. Overbuilders

The number of municipalities with at least one Overbuilder has increased on a nearly monthly basis since 2005. The growth is attributable to the deployment of the FiOS video service by Verizon. In 2005, Overbuilders, primarily RCN, served only 19 municipalities. By 2007, 52 municipalities were served by at least one Overbuilder, and by December 2008, 80 municipalities were served by at least one Overbuilder. This expansion in municipalities served has greatly increased the number of households with a competitive Cable Video option. In just one year, the percentage of the state's households with access to at least one Overbuilder option increased by eight percentage points (see Figure 51).[94]

As Figure 51 also demonstrates, there is a significant amount of regional disparity for Overbuilder access. Three regions do not have any access to Overbuilder service (Berkshire, Cape and Islands, and Pioneer Valley). Moreover, in only one region (Boston Metro), access to Overbuilder service is available to greater than 50% of the region's households. The percentage of region households with access to Overbuilder service has rapidly increased in recent years for each of the remaining three regions (Central, Northeast, and Southeast); however, as of December 2008, at least 60% of each of these regions' households still lacked a Cable Video option from an Overbuilder.

[94] Household availability to Overbuilder service is an estimate based upon Incumbent service availability within those municipalities that have active Overbuilder franchises, see *Infra* at Appendix D-7.

Figure 51: Percentage of Region Households with Access to Overbuilder Cable Video Service, 2007-08



In the Boston Metro region, two Overbuilders are presently operating simultaneously within 14 municipalities. However, the municipalities served by at least one Overbuilder are located in only four of the seven regions: Boston Metro, Central, Northeast, and Southeast.[95] The vast majority of municipalities with access to Cable Video Overbuilder service are located in the Boston Metro and Northeast regions. Verizon is the only Overbuilder that offers service outside the Boston Metro region. Figures 52 through 54 show the expansion of Cable Video Overbuilder service by municipality from December 2007 through June 2009.

[95] Significantly, as of June 2009, only seven municipalities in the Central region were served by an Overbuilder and four of those seven municipalities have a contiguous border with a municipality in the Boston Metro region.

Figure 52: Cable Video Service, All Active Providers, December 2007

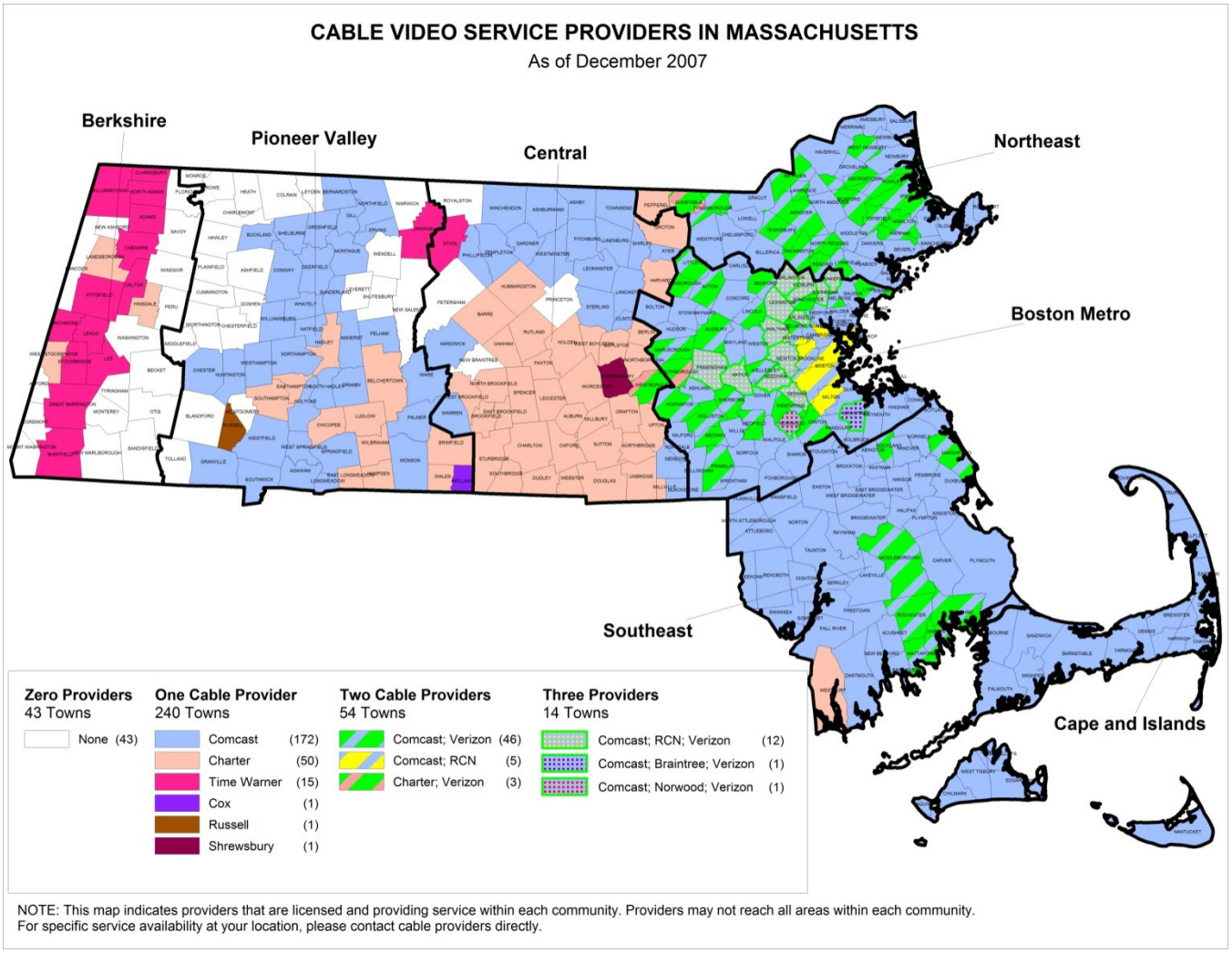


Figure 53: Cable Video Service, All Active Providers, December 2008

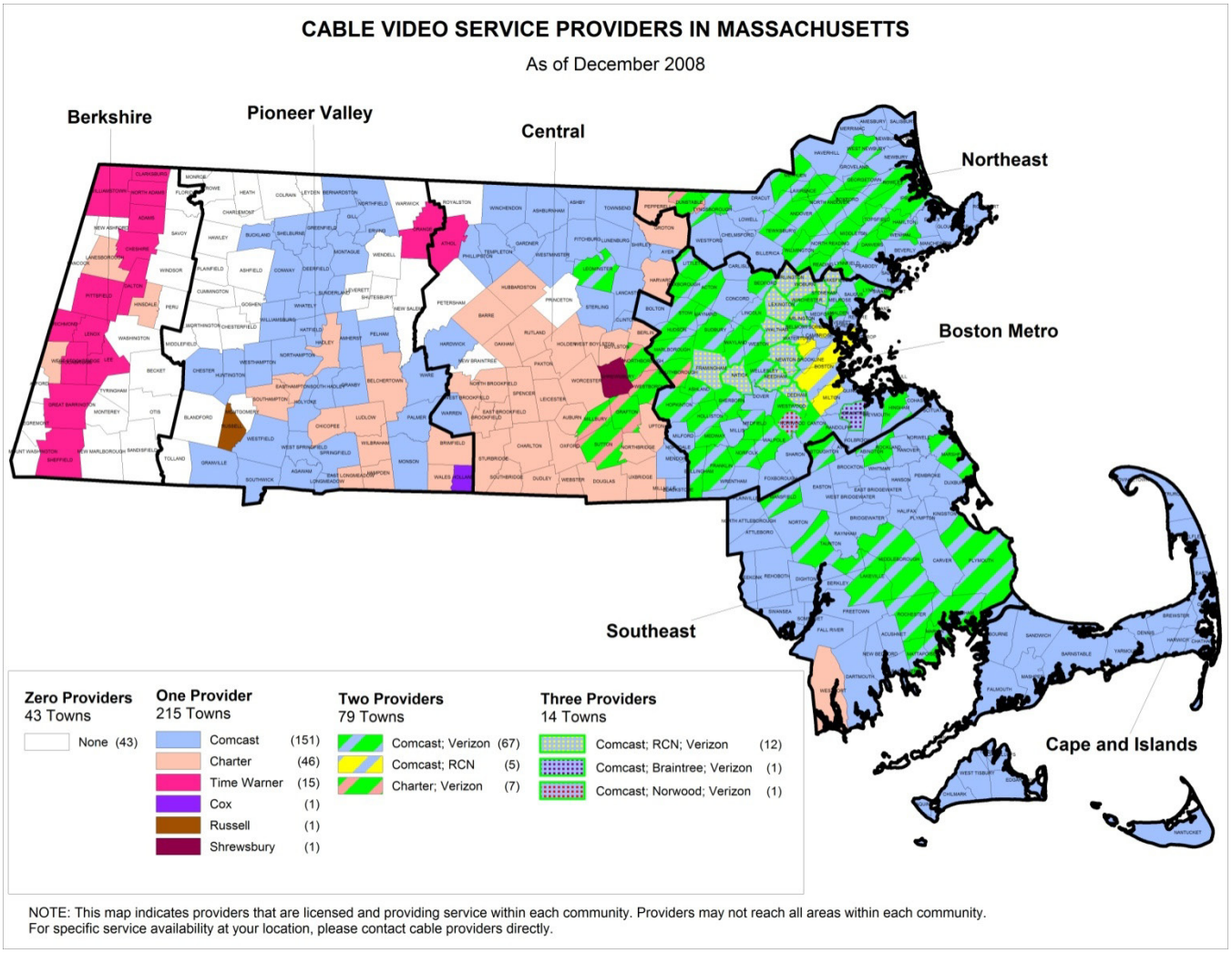
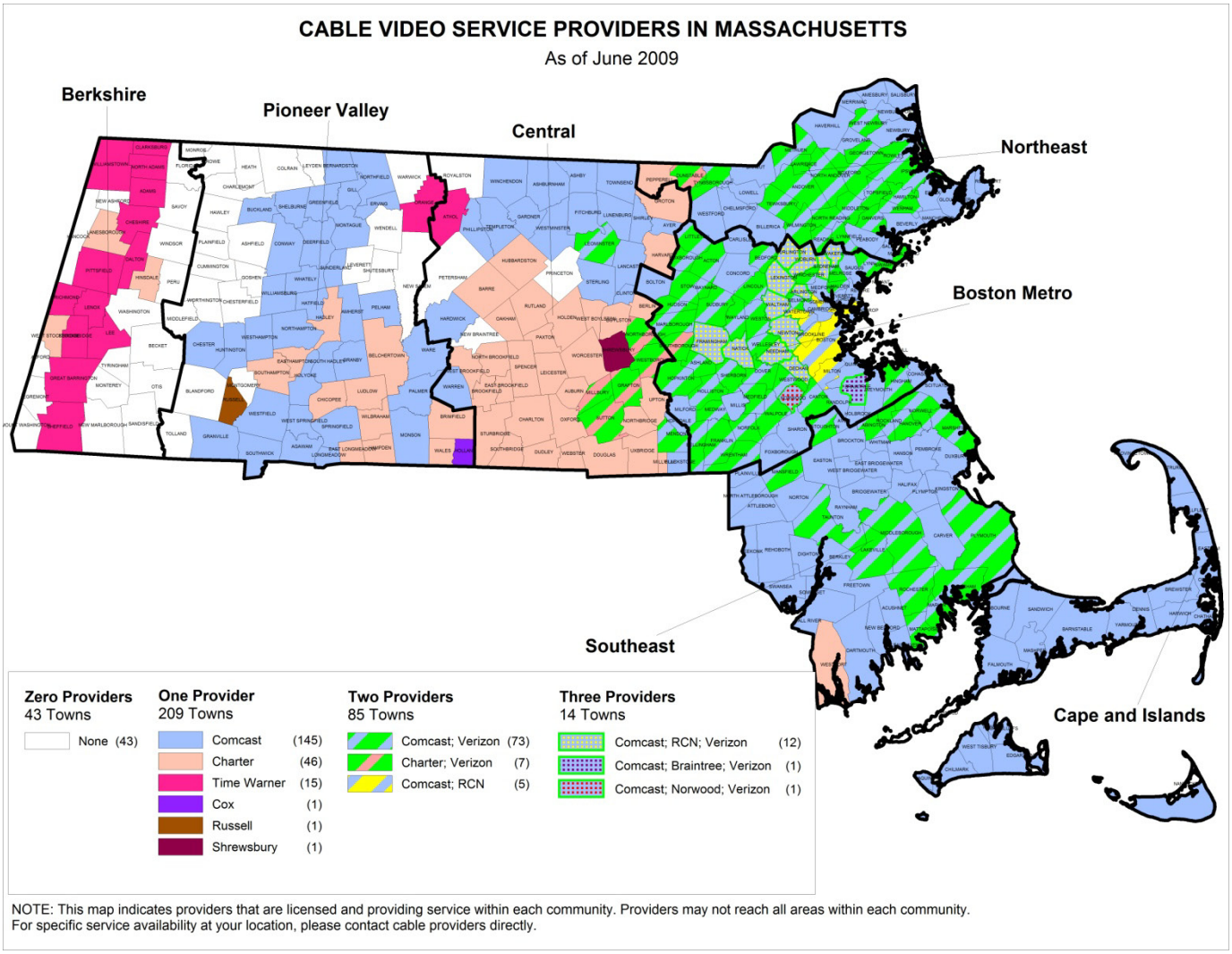


Figure 54: Cable Video Service, All Active Providers, June 2009

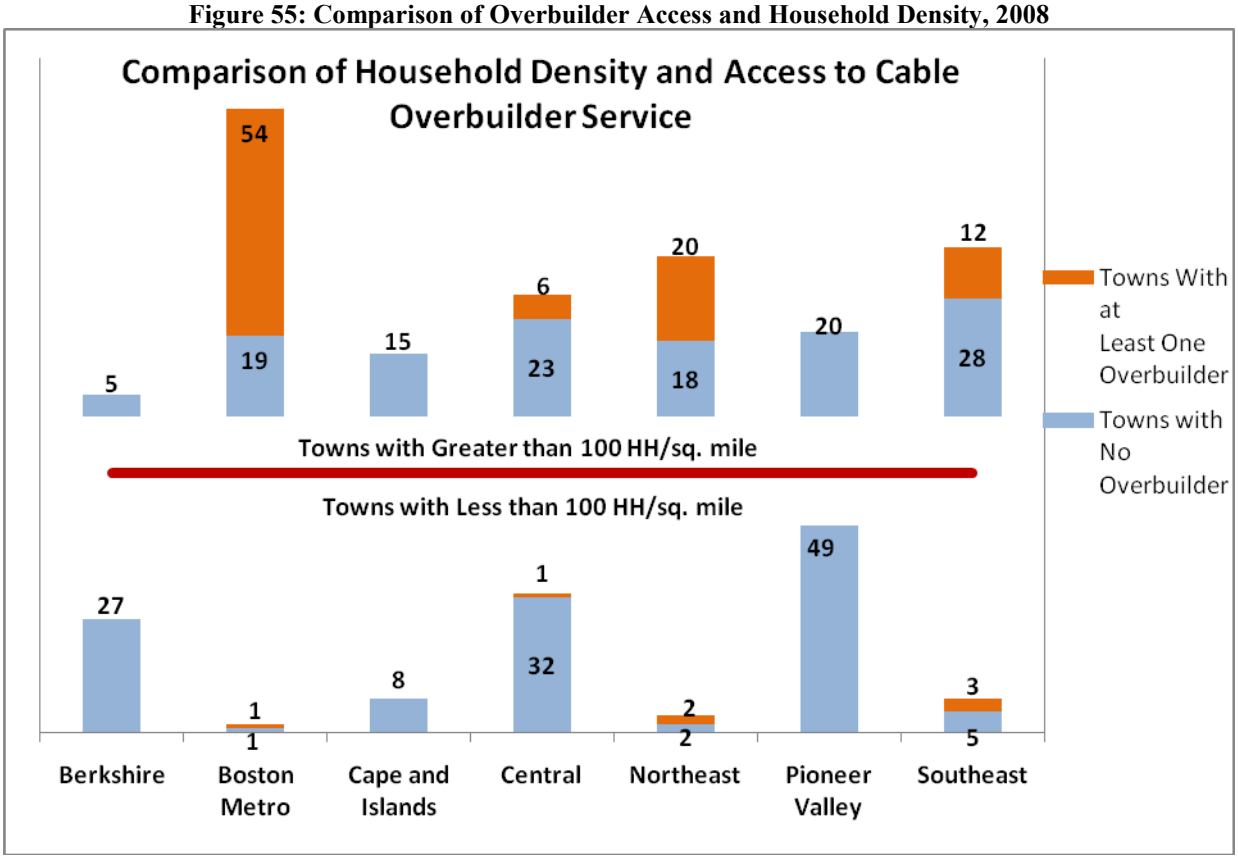


Overbuilders are concentrated in high density communities. Statewide, the average household density for the 96 communities that have granted a license to at least one Overbuilder is over 603 homes per square mile, compared to an average of 359 homes per square mile for all municipalities with at least one Cable Video provider (i.e., an Incumbent). Of the 96 municipalities with an Overbuilder franchise agreement, only seven, or 7.2% of the municipalities, have a household density less than 100 homes per square mile. However, 131 municipalities throughout Massachusetts have a household density higher than 100 homes per square mile but lack a franchise agreement with an Overbuilder. This suggests that the number of municipalities with service from Overbuilders may continue to grow, particularly in the Boston Metro, Central, Northeast, and Southeast regions. Conversely, municipalities with lower density figures, primarily in the Berkshire, Pioneer Valley, and Cape and Islands regions, are less likely to be served by an Overbuilder.

Figure 55 shows the categorization of towns as determined by housing density coupled with a count of towns with an Overbuilder present as of December 2008. Municipalities for each region are categorized as either above or below a density of 100 housing units per square mile. These towns are also categorized by the presence of at least one Overbuilder. None of the combined 40 municipalities with greater than 100 households per square mile in the Berkshire, Pioneer Valley and Cape and Islands regions are served by an Overbuilder. This suggests that while

housing density is a key determinant, it is not the only factor used by providers to determine where to build out, at least initially, Cable Video infrastructure.

Figure 55: Comparison of Overbuilder Access and Household Density, 2008



F. Adoption

1. Introduction

By year-end 2008, 2.11 million (86%) Massachusetts households subscribed to Cable Video, an increase of 4 percentage points from 2005. An additional 214,000 households (8.8%) subscribed to DBS. Approximately 116,000 households (4.8%) did not subscribe to any video service and relied upon over-the-air broadcast signals or did not receive video programming within their homes.

From 2005 to 2008, the number of households subscribing to Cable Video increased from 2 million to 2.11 million households. Over this period, the Cable Video market share of Incumbents decreased measurably, from 95.7% to 89%. The growth of subscribers coupled with declining market share of Incumbents suggests that new entrants in the Cable Video market increase the total adoption rate for Cable Video. Figure 56 displays the number of statewide subscribers to Cable Video by platform between 2005 and 2008, and also presents the market share of Cable Video subscribers held by the two platforms. This figure demonstrates that Overbuilders, particularly Verizon, are gradually gaining subscribers; however, Incumbent carriers are still the predominant providers of Cable Video. Figure 57 presents the percentage of Cable Video subscribers within each region by platform in 2008. As Figure 57 displays, there are only two regions (Boston Metro and Northeast) where at least 10% of Cable Video subscribers are adopting service from an Overbuilder, suggesting that Incumbents are still by

far the predominant providers of Cable Video services, even in those regions where Overbuilder presence has increased significantly.

Figure 56: Statewide Adoption and Platform Market Share of Cable Video Service, 2005-2008

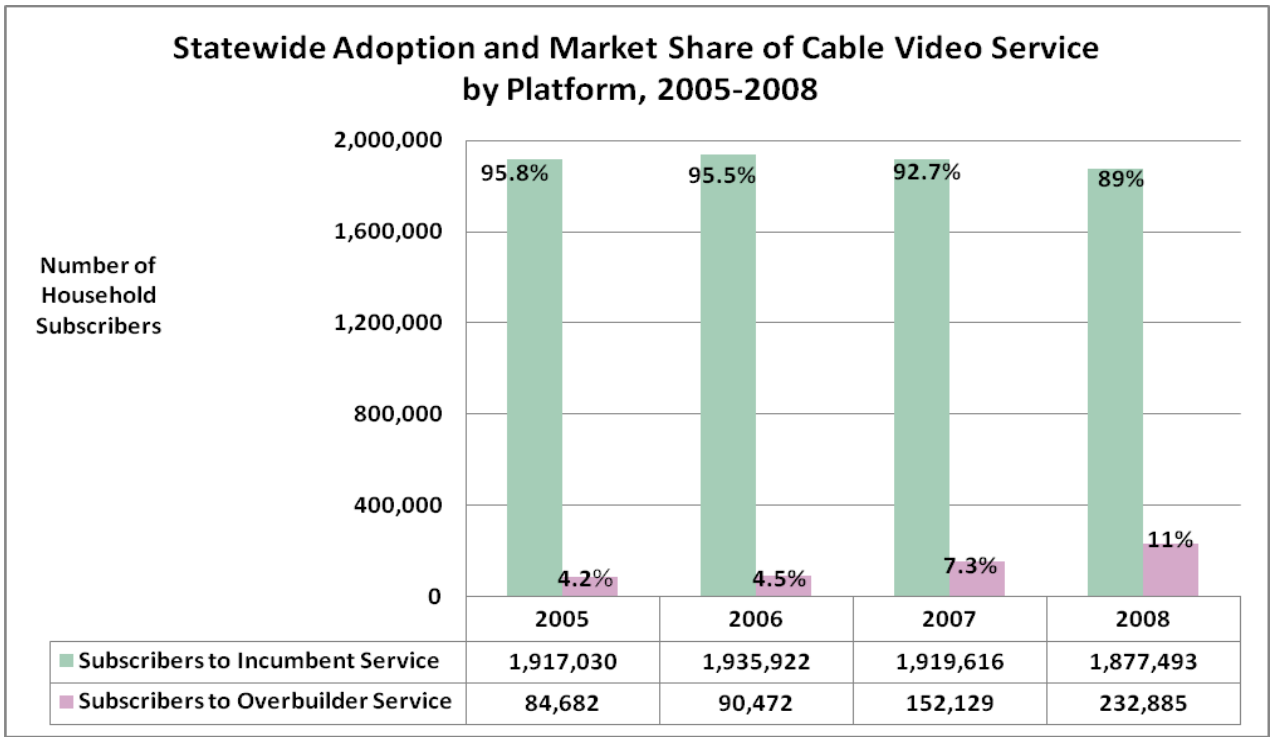
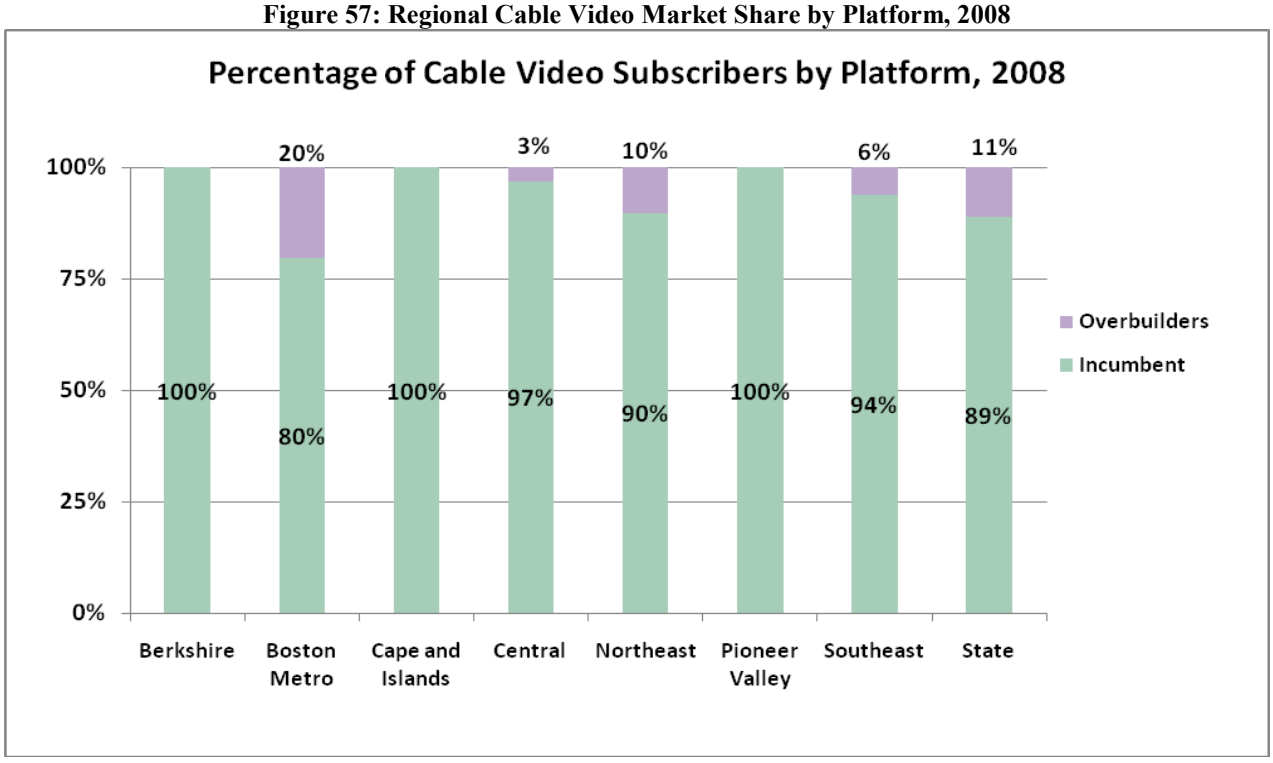


Figure 57: Regional Cable Video Market Share by Platform, 2008



2. Incumbents

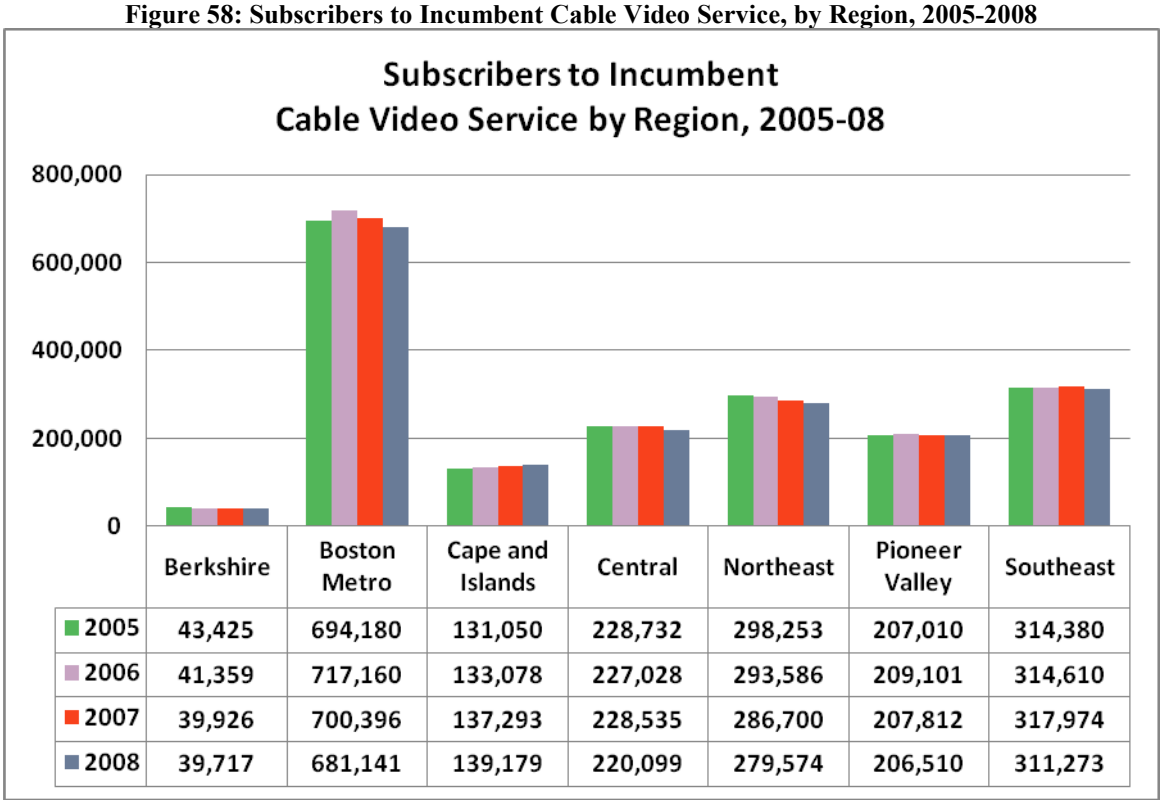
From 2005 to 2008, subscribers of Incumbent service averaged about 1.91 million, with a peak in 2006 of 1.94 million households to a low in 2008 of 1.88 million households. Considering there was only a 3% difference between the peak and the low, adoption rates of Incumbent Cable Video service remained relatively stable over the four year period. By year-end 2008, 77% of Massachusetts households with access to service from an Incumbent subscribed to the service. The Incumbent adoption rate is very similar across all of the regions except for the Boston Metro and Cape and Islands regions. While Overbuilders are seeing growth in adoption of service as their availability expands, particularly in the Boston Metro region, Incumbents are still predominant by a wide margin in all seven regions of the state.

In the Boston Metro region, 70% of households subscribe to an Incumbent, the lowest Incumbent adoption rate in the state. The presence of Overbuilders in the region accounts for the lower Incumbent adoption rate.

The adoption rate in the Cape and Islands region exceeds the number of primary households within the region. The high number of subscribers is attributable to the large number of secondary vacation homes in this region.[96] Available data suggests that in 2008, 83% of all housing units in the region subscribed to an Incumbent.

Figure 58 presents the number of Incumbent subscribers in each region.

Figure 58: Subscribers to Incumbent Cable Video Service, by Region, 2005-2008



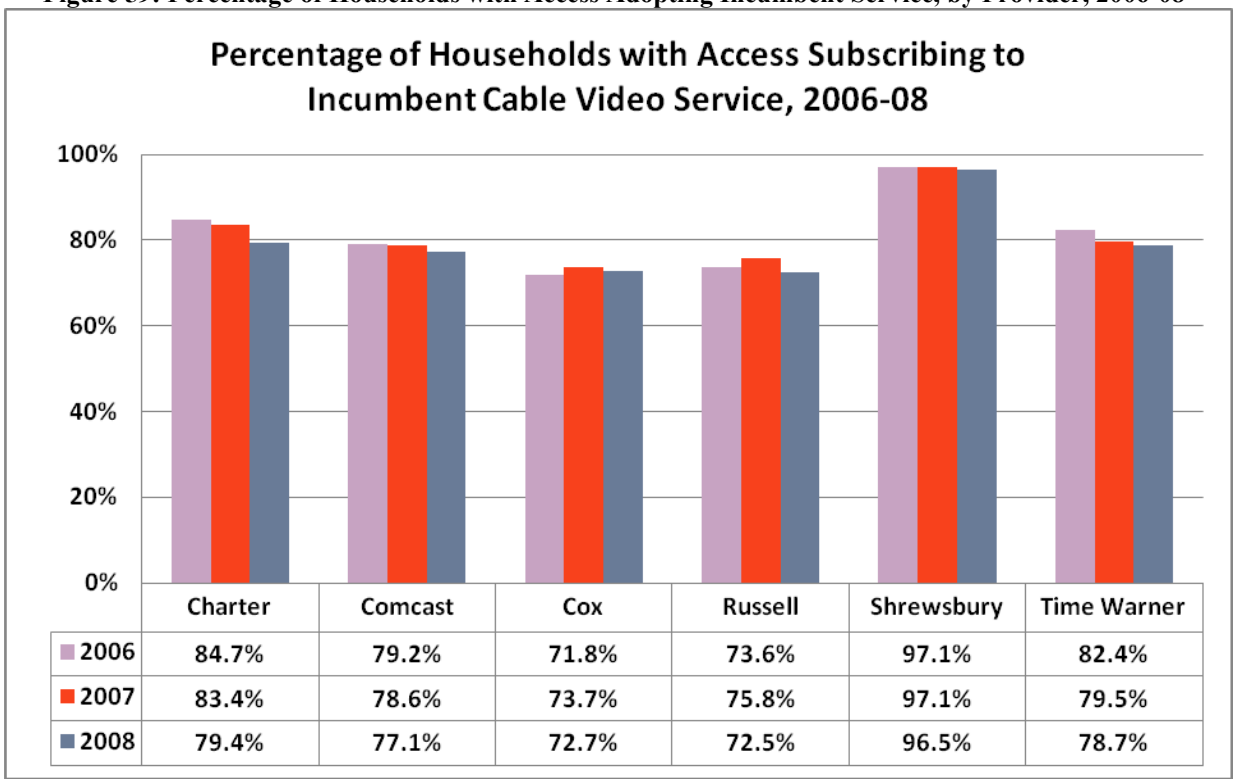
	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast
2005	43,425	694,180	131,050	228,732	298,253	207,010	314,380
2006	41,359	717,160	133,078	227,028	293,586	209,101	314,610
2007	39,926	700,396	137,293	228,535	286,700	207,812	317,974
2008	39,717	681,141	139,179	220,099	279,574	206,510	311,273

Figure 59 presents 2006-2008 adoption rates for each of the six Incumbents in Massachusetts. These adoption rates are calculated using an estimate of the number of households passed by each provider. There is little variation among the three Incumbents that provide Cable Video to multiple municipalities in Massachusetts

[96] The Cape and Islands region has approximately 107,700 primary housing units, of which 99.42% are passed by Cable Video. The region has approximately 60,000 housing units that are secondary or vacation residencies not captured by our data sets.

(Charter, Comcast and Time Warner). Comcast has the lowest adoption rate of these providers, but also faces the greatest amount of competition from Overbuilders. Of the 66 municipalities with service from at least one Overbuilder by year-end 2007, 63 (95%) were Comcast franchise areas. The three single-franchise territory providers (Cox, Russell, and Shrewsbury) reflect a wide range of adoption rates. None of these municipalities have Overbuilders so these fluctuations indicate demographic conditions within the communities that affect the take rate (or penetration rate) for Cable Video.

Figure 59: Percentage of Households with Access Adopting Incumbent Service, by Provider, 2006-08



	Charter	Comcast	Cox	Russell	Shrewsbury	Time Warner
2006	84.7%	79.2%	71.8%	73.6%	97.1%	82.4%
2007	83.4%	78.6%	73.7%	75.8%	97.1%	79.5%
2008	79.4%	77.1%	72.7%	72.5%	96.5%	78.7%

3. Overbuilders

Figure 56 above shows that total subscribers to Overbuilder service increased by 148,200 (175%) between 2005 to 2008. This subscriber gain appears to be due to a number of factors, including gains by Overbuilders and, as mentioned earlier, an overall expansion of the Cable Video market where Overbuilders have begun offering service.

Figures 60 and 61 below compare the subscriber percentages for the two Cable Video platforms using an estimate for households with access to each service from 2007 to 2008. These figures show that the Incumbent subscriber rate dropped by two percentage points, while the Overbuilder rate increased by 5 percentage points (i.e., approximately 23% of households with Overbuilder access subscribe to the service) statewide.

Figure 60: Percentage of Households with Access Adopting Cable Video by Platform, 2007

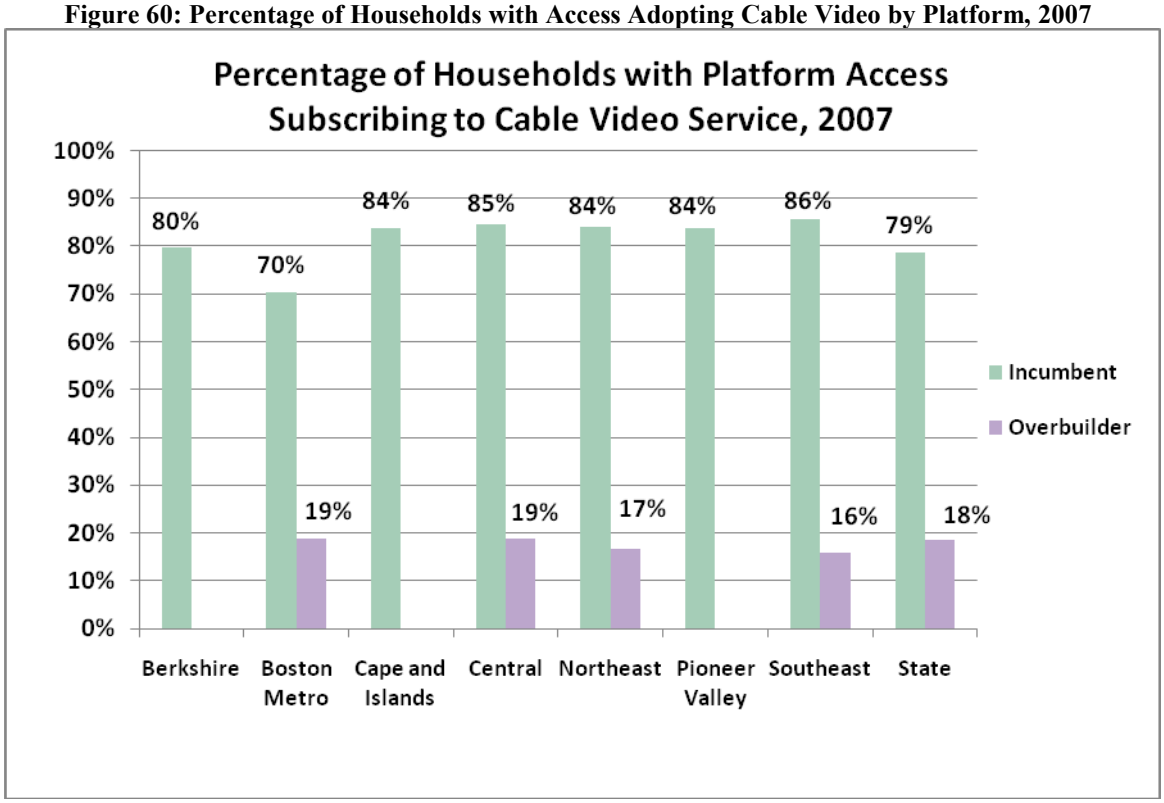
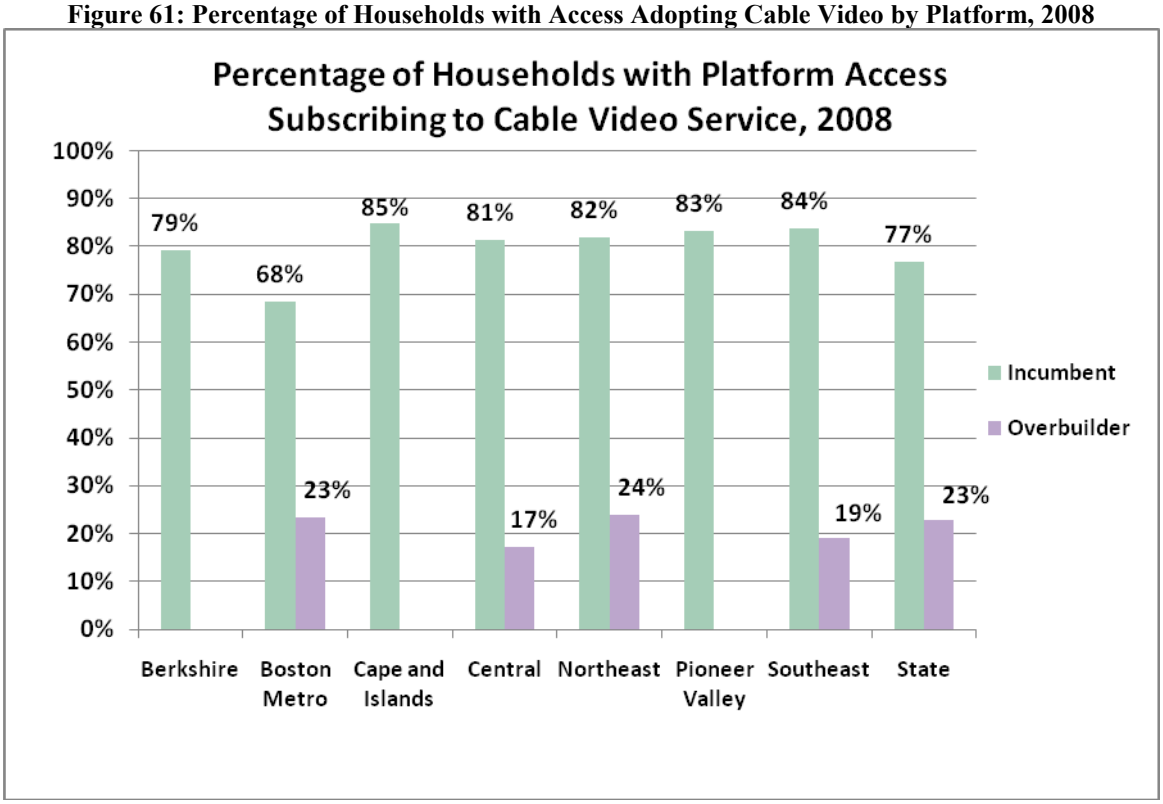


Figure 61: Percentage of Households with Access Adopting Cable Video by Platform, 2008



By contrast, Figures 62 and 63 present the number of subscribers against all of the region's households. The disparity of the adoption rate for Overbuilder service between Figures 60-61 and Figures 62-63 is due to the relative lack of households that actually had access to Overbuilder service by year-end 2007. Where Overbuilder service is available, roughly one-fifth of the households subscribe to the service (Figure 61), but this constitutes only about 10% of the total households in Massachusetts (Figure 63).

Figure 62: Percentage of All Region Households Adopting Cable Video by Platform, 2007

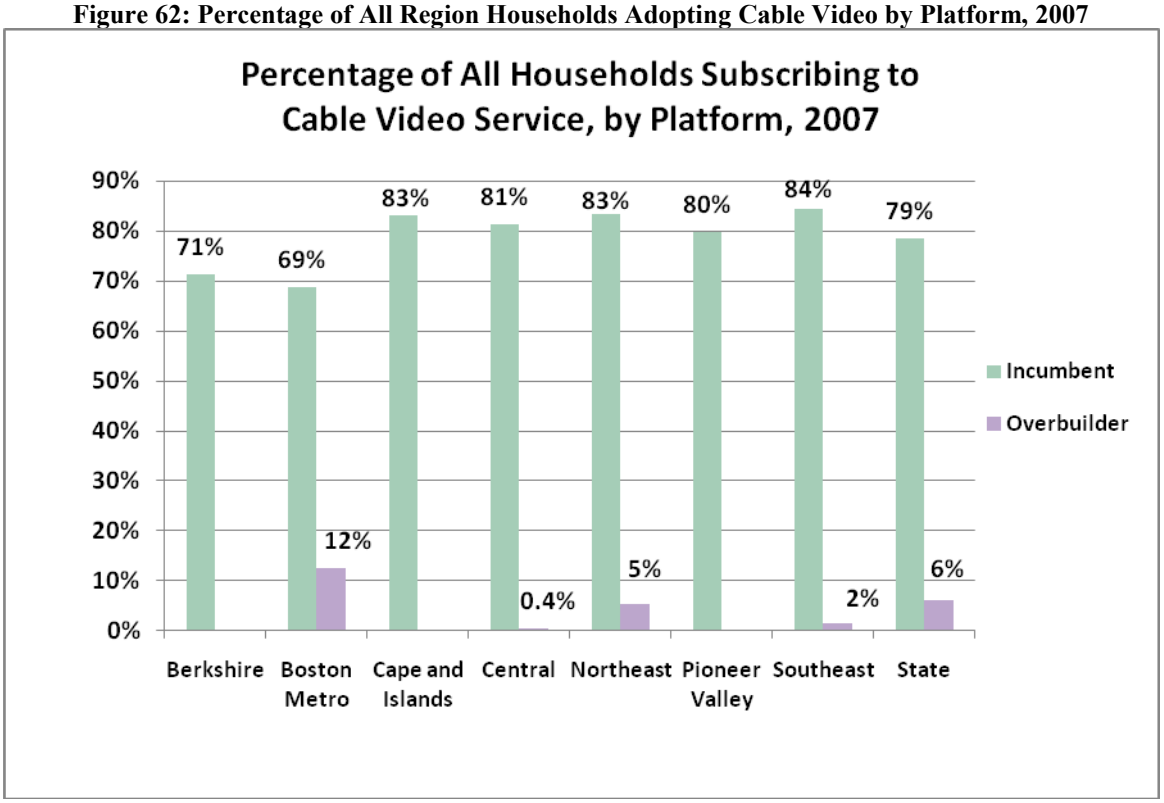
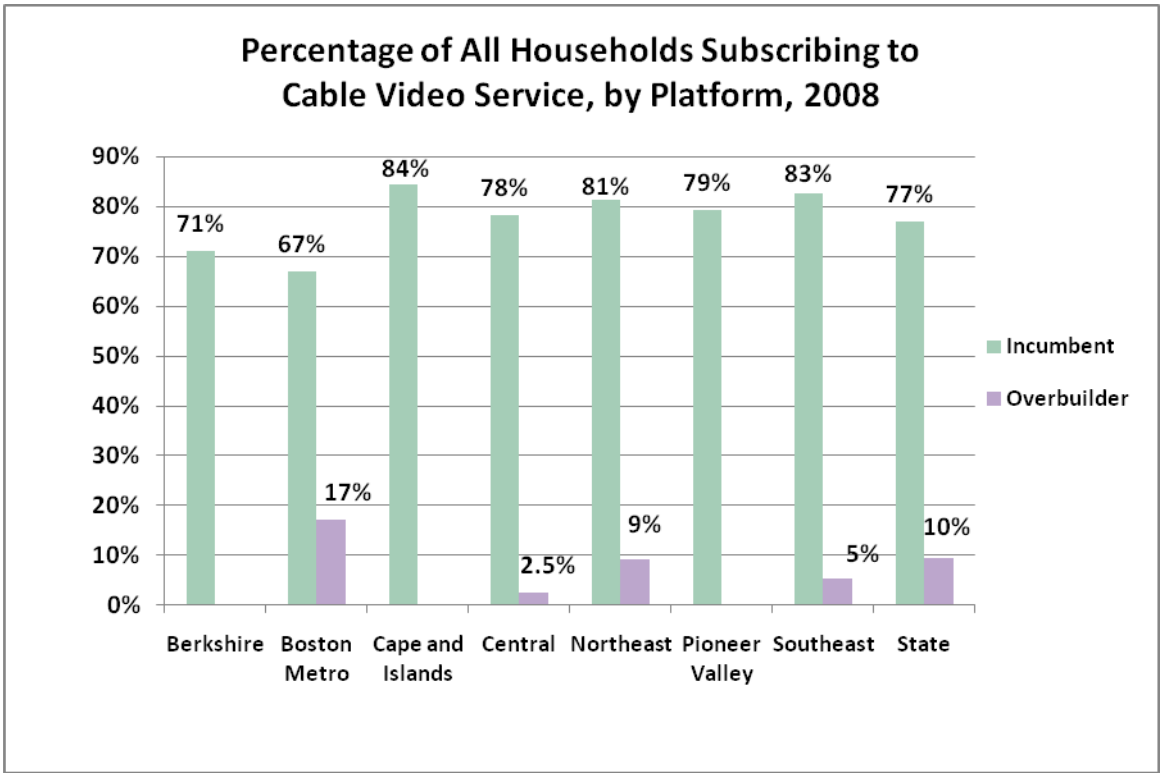


Figure 63: Percentage of All Region Households Adopting Cable Video by Platform, 2008



Another illustration of the impact of Overbuilder service can be seen in Figures 64 through 66. These three charts compare the combined adoption rates for municipalities where cable competition was available by year end 2008. Figure 64 shows Cable Video adoption in municipalities without an Overbuilder option. Figure 65 shows Cable Video adoption in municipalities with at least one Overbuilder present, and Figure 66 shows Cable Video service adoption in municipalities with two Overbuilders.

The charts show that the presence of a single Overbuilder does not significantly impact the household take rate[97] for Cable Video (Figures 64-65). However, the data shows that the Incumbent clearly loses some market share to the Overbuilder. Figure 66 shows that the presence of three Cable Video providers increases the likelihood that more households will subscribe to Cable Video from either the Overbuilders or the Incumbents. The DTC believes that this is likely the result of aggressive marketing and discount pricing in those municipalities.

[97] The take rate is the percentage of households that subscribe to any Cable Video service provider.

Figure 64: Platform Adoption Comparison in Communities with no Overbuilder, 2008

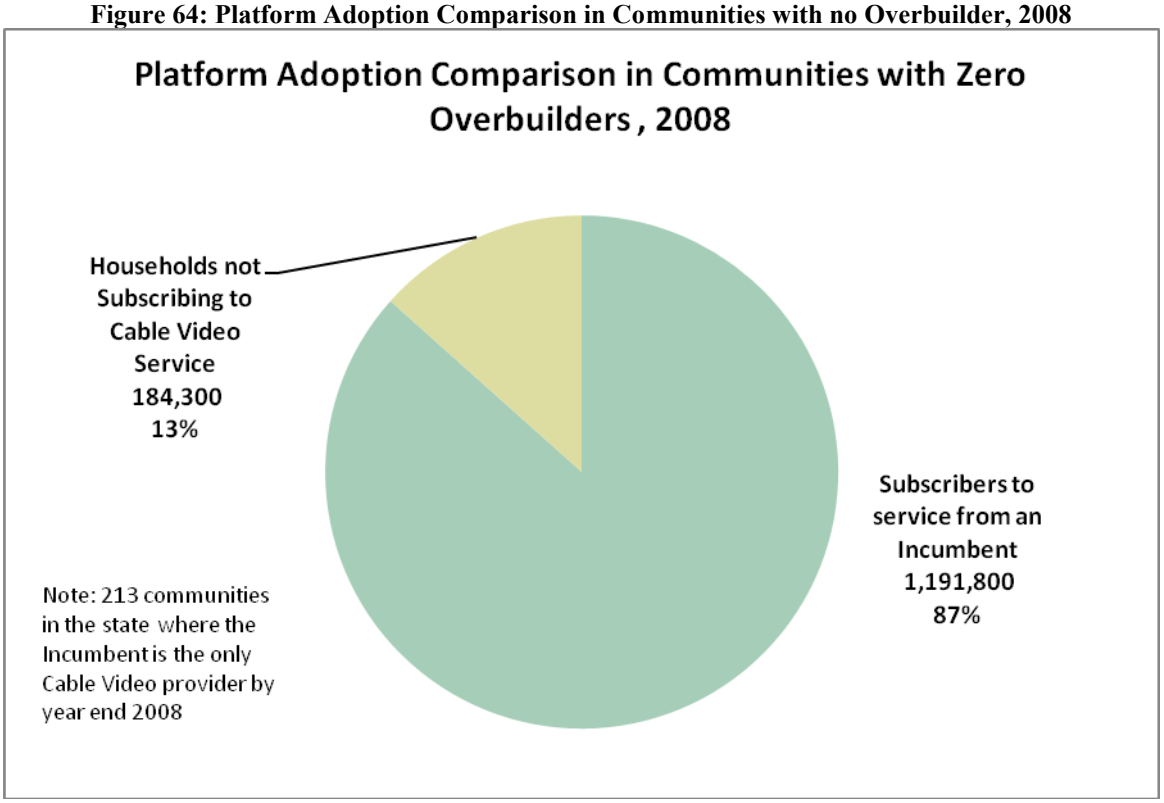


Figure 65: Platform Adoption Comparison in One Overbuilder Communities, 2008

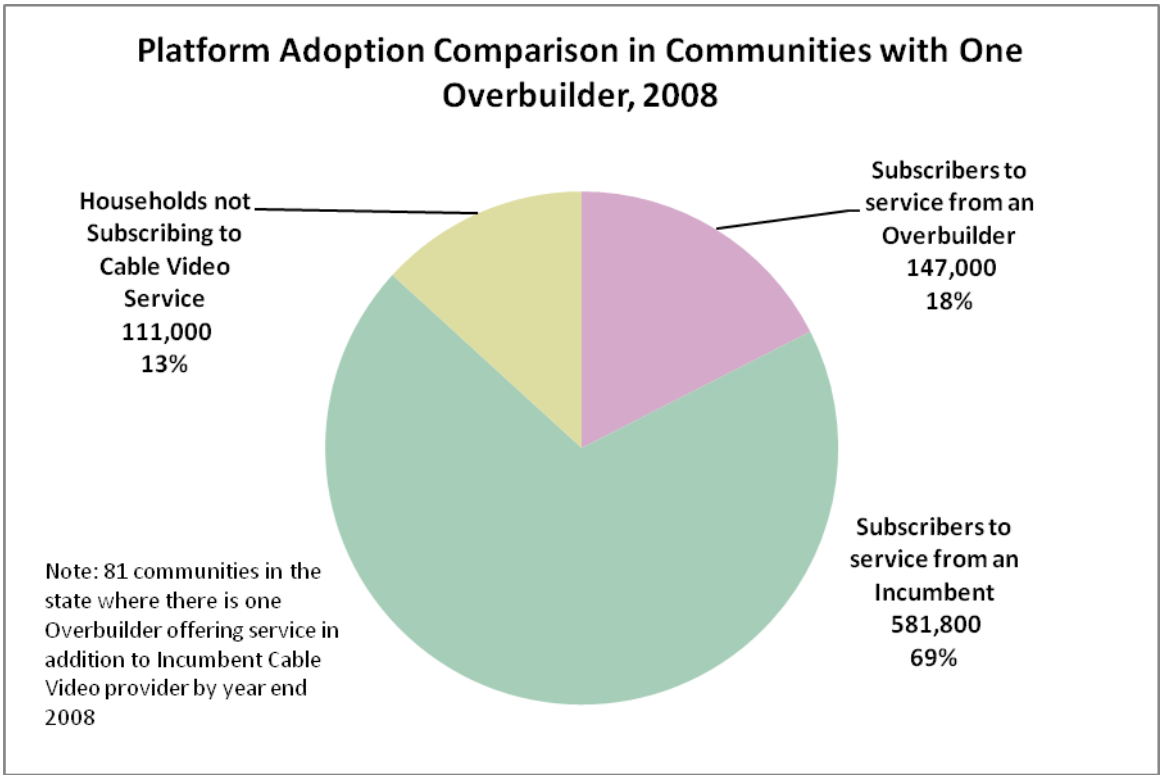


Figure 66: Platform Adoption Comparison in Two Overbuilder Communities, 2008

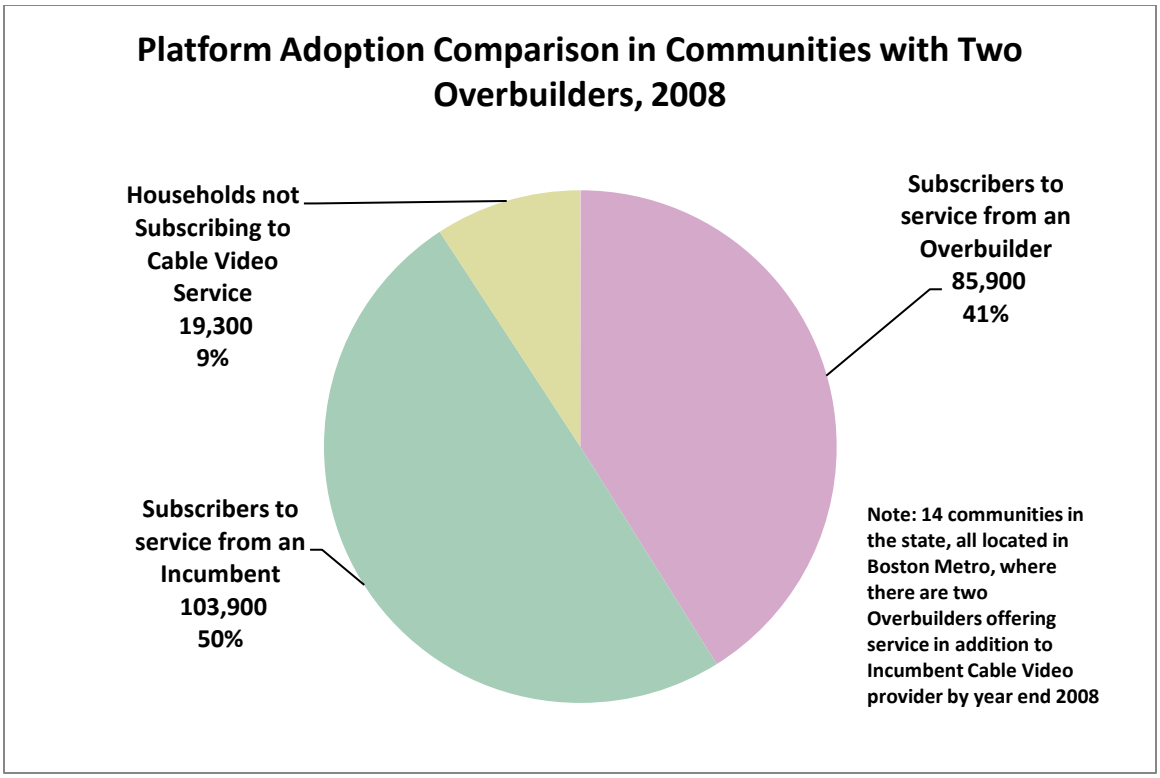
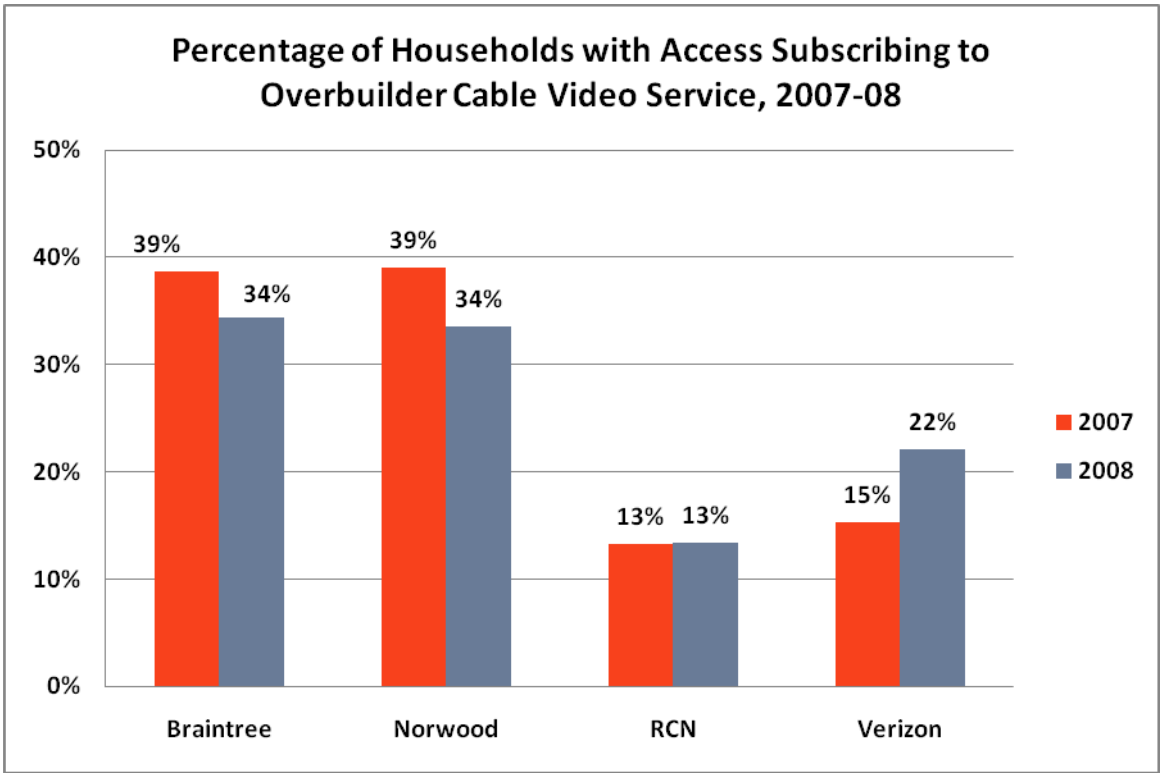


Figure 67 presents the subscriber rates for Overbuilders in 2007 and 2008, using an estimate of households with access to each provider. This figure shows that the two municipal Overbuilders, Braintree and Norwood, have much higher subscriber rates than the two private Overbuilders. The DTC lacks information that might explain this difference in take rates between the private and municipal Overbuilders.

Figure 67: Percentage of Households with Access Subscribing to Overbuilder Cable Video by Provider, 2007-08



G. Service Quality

1. Introduction

To assess service quality and performance of cable video providers, the DTC regularly collects information from two sources: (1) complaints received by the DTC's Consumer Division, and (2) DTC Form 500, which every cable video provider must file annually with the DTC.[98] This discussion on service quality focuses on the frequency of complaints in Massachusetts pertaining to billing and service quality issues. The number of complaints received directly by the Cable Video providers decreased during the 2005-2007 period. However, complaints related to Cable Video service received by the DTC's Consumer Division increased during the same period.

2. DTC Consumer Division

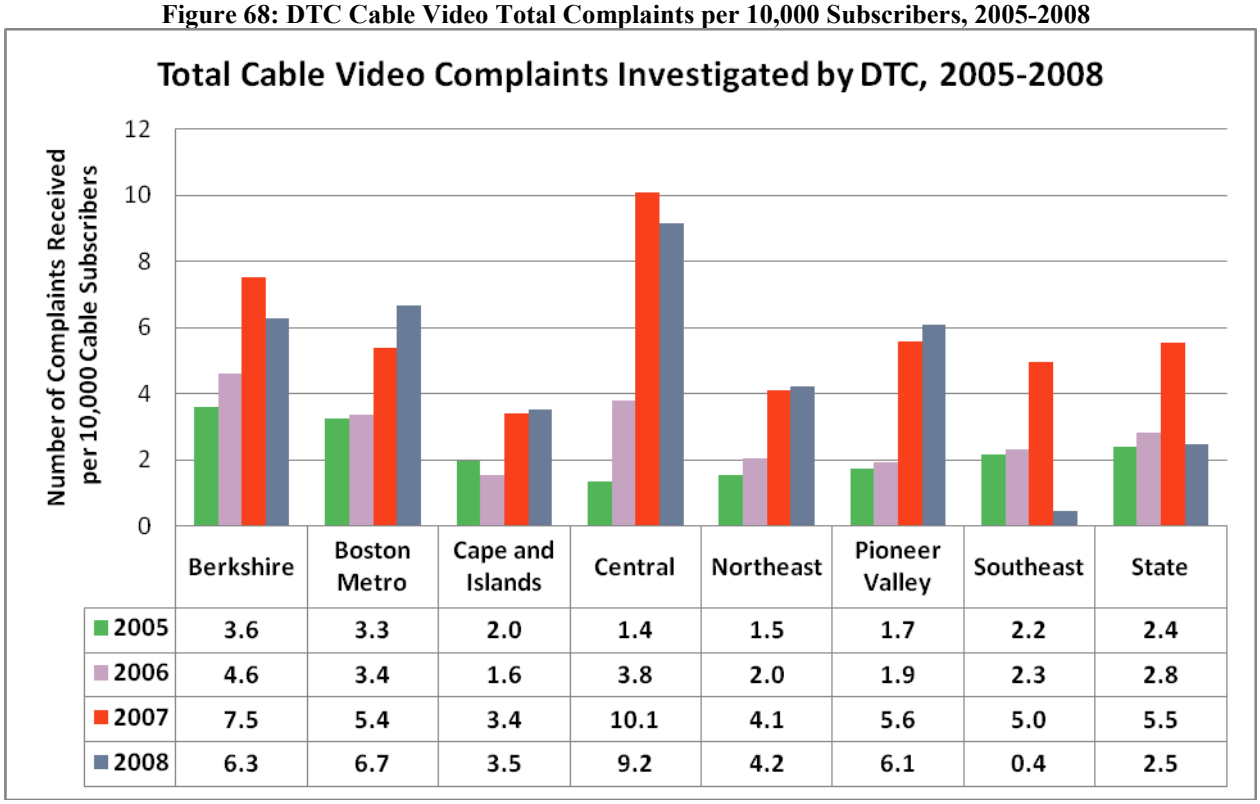
Similar to Consumer Division responsibilities for residential voice services, the Division also investigates and resolves complaints regarding Cable Video. The Consumer Division accepts complaints filed by residential consumers regarding Cable Video and will intervene on their behalf after the consumer first attempts to resolve

[98]G.L. c. 166A, §10.

the issue directly with the provider. The Consumer Division does not accept complaints relating to other video services, such as DBS or complaints related to programming content.

The frequency of complaints to the DTC's Consumer Division was relatively consistent for 3 of the 4 years from 2005 to 2008, ranging between 2.4 to 2.8 complaints per 10,000 subscribers statewide (Figure 68). The one exception is 2007, when the complaint rate nearly doubled to 5.5 complaints per 10,000 subscribers. For this Report, complaints were identified as either related to (1) a service quality issue, (2) a billing issue, or (3) a miscellaneous complaint. The annual frequency of complaints related to a service quality issue is provided in Figure 69, which shows a statewide range of complaints from a low of 0.6 to high of 2.5 complaints per 10,000 subscribers from 2005 to 2008. The annual frequency of complaints related to a billing issue is provided in Figure 70, which shows a statewide range of complaints from a low of 1.3 to a high of 3.0 complaints per 10,000 subscribers for the 4 year period.[99]

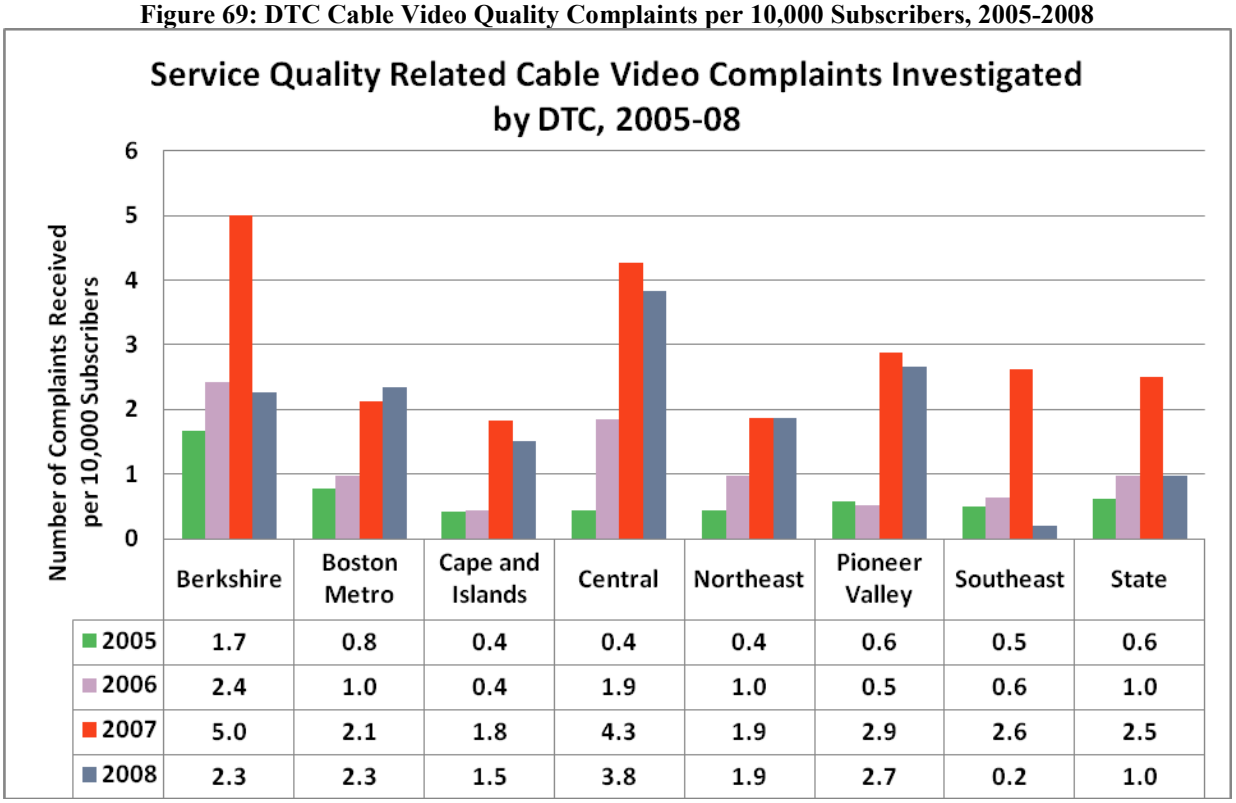
Figure 68: DTC Cable Video Total Complaints per 10,000 Subscribers, 2005-2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	3.6	3.3	2.0	1.4	1.5	1.7	2.2	2.4
2006	4.6	3.4	1.6	3.8	2.0	1.9	2.3	2.8
2007	7.5	5.4	3.4	10.1	4.1	5.6	5.0	5.5
2008	6.3	6.7	3.5	9.2	4.2	6.1	0.4	2.5

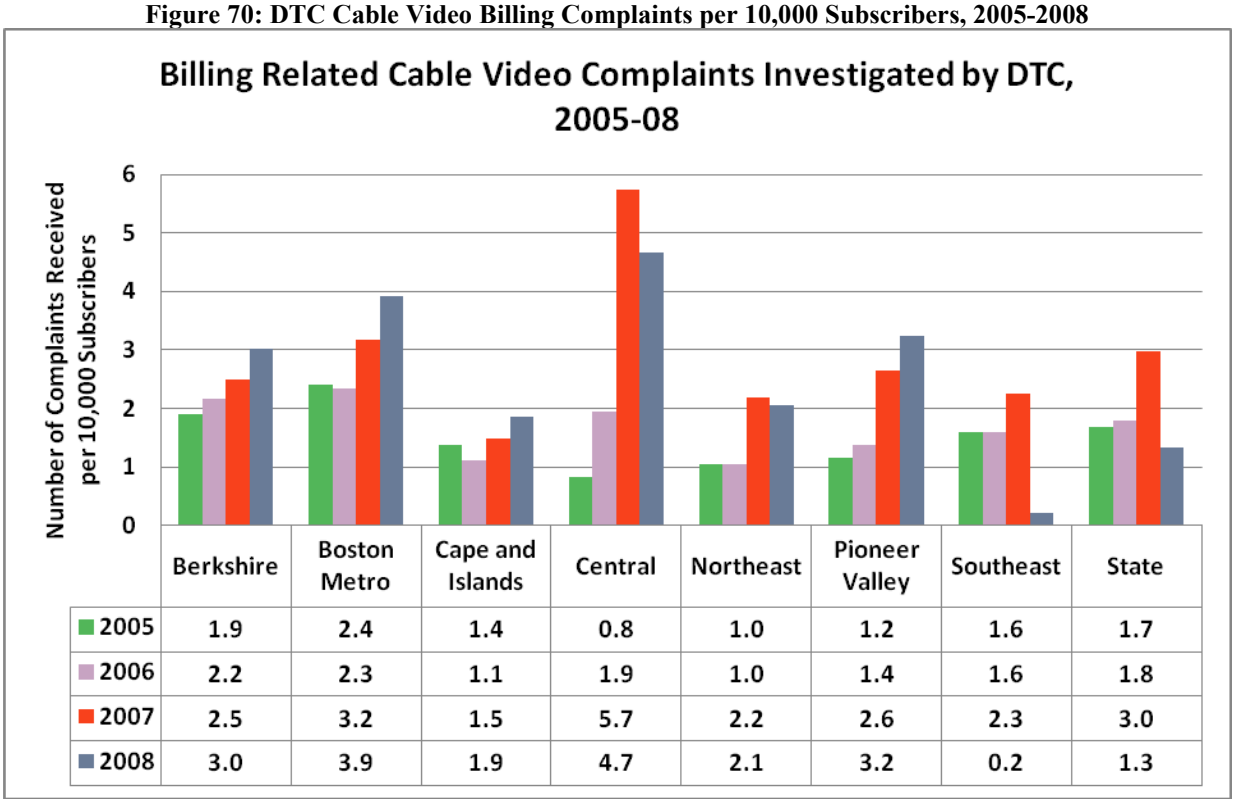
[99] Miscellaneous complaints are not provided due to the comparatively minimal amount of miscellaneous complaints received.

Figure 69: DTC Cable Video Quality Complaints per 10,000 Subscribers, 2005-2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	1.7	0.8	0.4	0.4	0.4	0.6	0.5	0.6
2006	2.4	1.0	0.4	1.9	1.0	0.5	0.6	1.0
2007	5.0	2.1	1.8	4.3	1.9	2.9	2.6	2.5
2008	2.3	2.3	1.5	3.8	1.9	2.7	0.2	1.0

Figure 70: DTC Cable Video Billing Complaints per 10,000 Subscribers, 2005-2008



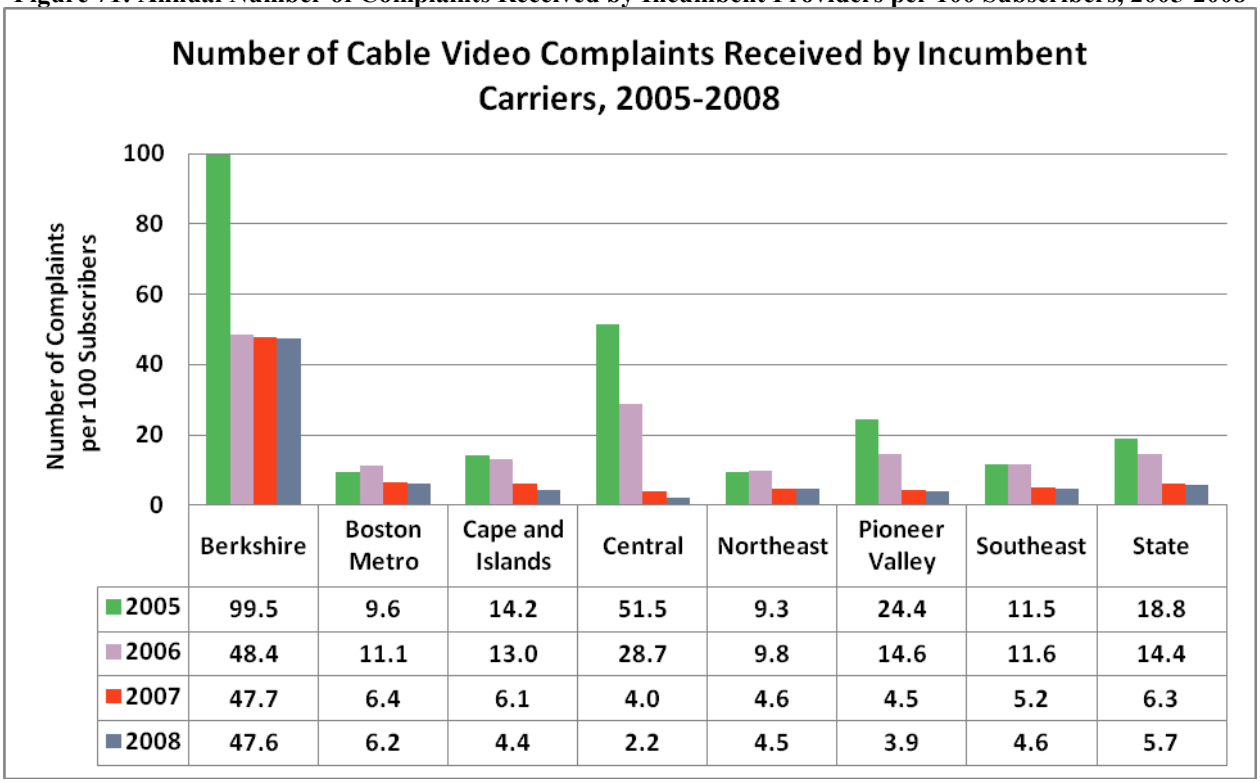
	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	1.9	2.4	1.4	0.8	1.0	1.2	1.6	1.7
2006	2.2	2.3	1.1	1.9	1.0	1.4	1.6	1.8
2007	2.5	3.2	1.5	5.7	2.2	2.6	2.3	3.0
2008	3.0	3.9	1.9	4.7	2.1	3.2	0.2	1.3

3. Form 500 annual reports

Form 500 annual reports collect the number of complaints reported to each cable service provider by their subscribers. These complaints include billing, service quality, and other miscellaneous complaints related to a subscriber's Cable Video. Cable Video providers are required to submit complaint data for each municipality they serve. For the purpose of the Report's analysis, only data from complaints regarding Incumbents are presented.

In all regions, according to Form 500 data, the reported number of complaints received by Incumbent providers decreased annually between 2005 to 2008 (Figure 71). Statewide, the rate of complaints decreased from 18.8 complaints for every 100 Incumbent Cable Video subscribers in 2005, to 5.7 complaints for every 100 Incumbent Cable Video subscribers in 2008, this is a 70% decrease in complaint frequency to Incumbent Cable Video providers. The Berkshire region consistently reported the highest complaint frequency, with a range between 47.6 to 99.5 complaints for every 100 subscribers, well above any other region in the state.

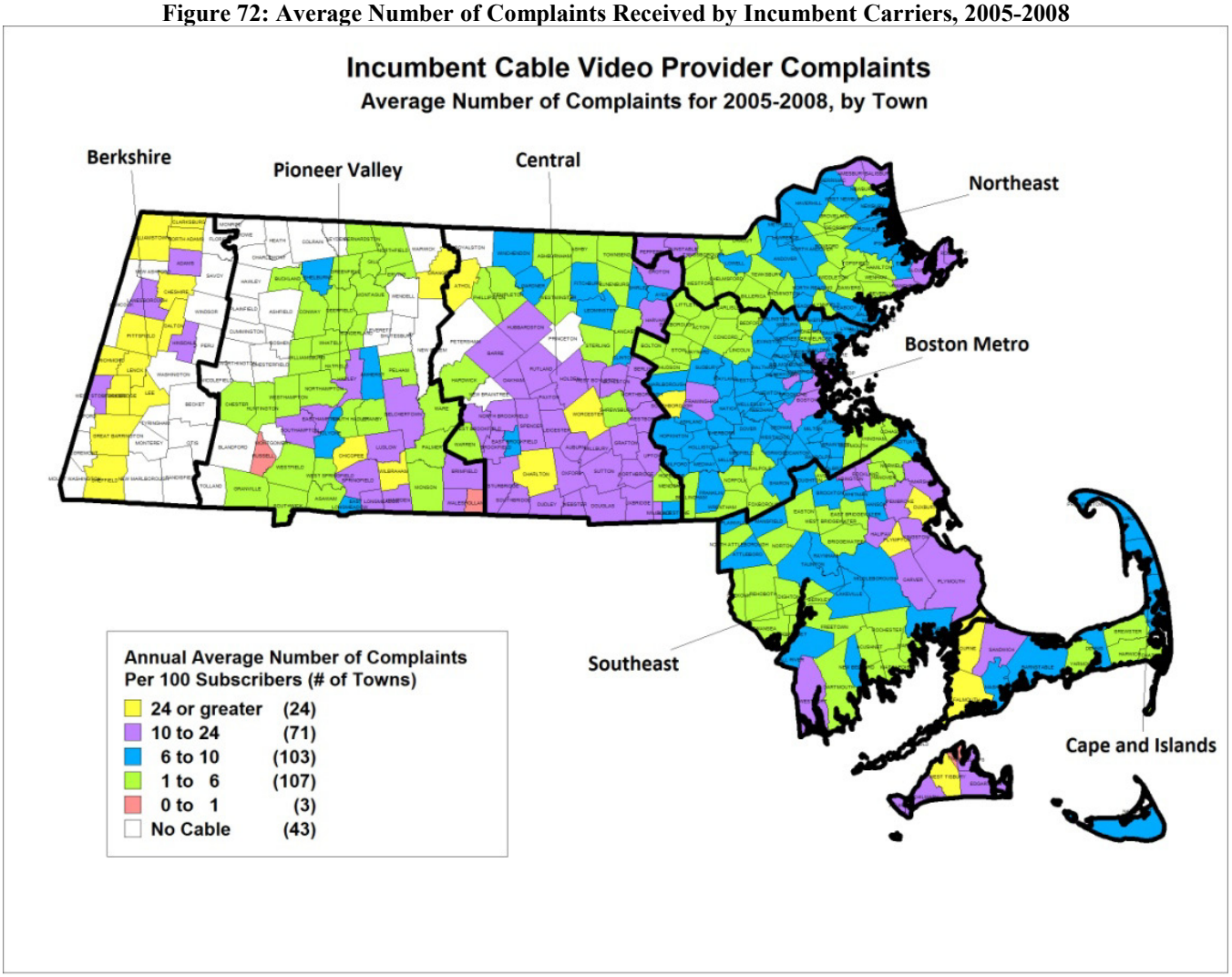
Figure 71: Annual Number of Complaints Received by Incumbent Providers per 100 Subscribers, 2005-2008



	Berkshire	Boston Metro	Cape and Islands	Central	Northeast	Pioneer Valley	Southeast	State
2005	99.5	9.6	14.2	51.5	9.3	24.4	11.5	18.8
2006	48.4	11.1	13.0	28.7	9.8	14.6	11.6	14.4
2007	47.7	6.4	6.1	4.0	4.6	4.5	5.2	6.3
2008	47.6	6.2	4.4	2.2	4.5	3.9	4.6	5.7

Figure 72 shows the breakdown of the average number of complaints received by Incumbent Cable Video providers from 2005 to 2008 in each municipality. The map illustrates that the average annual frequency exceeded 24 complaints per 100 subscribers in 24 municipalities, the vast majority of these municipalities are located in the Berkshire region. By contrast, there were less than 6 complaints per 100 subscribers per year for the 4 year period in 107 communities.

Figure 72: Average Number of Complaints Received by Incumbent Carriers, 2005-2008



V. Competition Status Report Conclusion

Generally, competition in the voice and video markets in Massachusetts is thriving for many residential and business customers, particularly in densely populated areas of the state. However, in less densely populated areas and for some segments of the market, especially moderate to lower income consumers, competitive alternatives either do not exist to the same degree or have declined as a result of changing market conditions. While evaluation of the residential market by income level and price of service are outside the scope of this Report, market dynamics suggest that Massachusetts consumers with the ability to purchase bundled services are the most likely beneficiaries of the current landscape in the telecommunications and cable market.

Traditionally, voice and video services were provided by distinct carrier groups. Voice services were provided to consumers by telephone companies, and video services were provided by cable companies or through over-the-air signals. A number of factors have caused a change in this dynamic, especially within the past decade. These factors include the emergence of broadband services, and advances in technology and market efficiencies, which have lead to a convergence of voice, video, and data service offerings. In Massachusetts, the predominant ILEC, Verizon, is now offering video services, while the traditional video providers (cable companies) are offering voice

services. Both categories of companies also are offering broadband internet services over their networks. This integration of traditionally distinct providers/products has advantaged those consumers who purchase bundles of voice, video and internet service, or packages of premium voice service, to which Verizon and the cable companies are increasingly targeting their marketing efforts. Consumers who simply want a no-frills, low-cost basic voice product, which primarily includes moderate to lower-income consumers, including low-income and elderly consumers and consumers with serious medical conditions, essentially have only one provider option, the ILECs. Cable voice providers do not offer basic plans, and the diminishing viability for CLECs' participation in the residential market has further limited the ability of consumers to choose from basic plan options. These trends also have impacted low-income customers eligible for Lifeline service, because most Cable Voice providers do not offer Lifeline and Link-Up service. Wireless service cannot yet be considered a true substitute to Wireline Voice, though some recent-entry wireless providers are targeting customers eligible for Lifeline service. Regional disparities persist for wireless availability, similar to conditions for availability of alternative wireline offerings.

The Incumbent providers in the voice and video markets remain the predominant providers in the state, although the telephone market is significantly more competitive. More specifically, because of changing industry conditions, the communications markets in Massachusetts have become more concentrated and dominated by a handful of large providers. This has reduced the number of competitive alternatives and providers in voice markets (but apparently not the variety of services), possibly to the detriment of consumers, especially residential consumers. Because of these trends, policymakers may need to examine whether there are ways to increase provider diversity in the residential voice market; to address the lack of cable service in 43 towns in the state and in those areas of communities where cable operators have chosen not to build out, as well as to generally address similar regional disparities in availability and service quality; and to respond to the diminishing Wireline Voice service options for consumers seeking low-cost, basic telephone service, among other issues identified in the Report.

Glossary of Terms

Analog standard: A system utilizing a continuous signal to transmit data (as opposed to a digital system).

Basic Service: A tier of Cable Video service, often price regulated, which includes local broadcast channels and community access programming.

Broadband: Term commonly used by consumers to refer to high-speed, high-capacity internet service.

Competitive Local Exchange Carrier: Non-incumbent wireline voice service provider authorized under state and federal regulations to compete with ILECs to provide local telephone service within the ILEC service territory.

Consumer Division: The division within the DTC that is responsible for responding to inquiries and complaints from consumers.

Coverage holes (dead zones): Areas that wireless carriers do not cover, typically because of the physical terrain and/or lack of customers, in which it is impossible to make and receive wireless calls.

Department of Telecommunications and Cable: The state agency charged with regulating the telecommunications and cable industries.

Department of Telecommunications and Energy: The DTC's predecessor, which regulated telecommunications and cable companies, as well as energy utilities. The DTE ceased to exist effective April 11, 2007.

Digital: System using a binary code to represent information. Digital signals are modular, as opposed to the analog system in which signals are continuous.

Digital Television transition: The transition from analog signal to digital signal of full-power television station broadcasts as required by federal legislation.

Direct Broadcast Satellite: The broadcast delivery system commonly referred to as "satellite television." This television system works by transmitting broadcast signals to orbiting satellites, which receive the signal, amplify it, and transmit it back to earth. A small receiver dish and receiver unit enables consumers to receive these signals.

Effective competition petition: A petition submitted by cable operators to the Federal Communications Commission seeking a determination that they are subject to effective competition. If a determination of effective competition is made, that operator is no longer subject to regulation by the local franchising authority.

Enhanced 911 (E911): An advanced form of 911-service in which the caller's telephone number is cross referenced to a database which provides the emergency dispatcher with the caller's location.

Facilities-Based service provider: Voice service provider that fully owns its own network infrastructure that connects the provider to its subscribers.

Incumbent Local Exchange Carrier: The dominant and "traditional" wireline voice service providers that provide local telephone service in specific geographic or "service" areas.

Interconnection Agreement: A contract between telecommunications providers allowing different carriers to connect calls to each other's customers.

Intermodal competitive platform: A system that provides voice services by connecting different technologies to the PSTN, e.g. cable VoIP and wireless voice.

Overbuild Cable Video service (Overbuild or Overbuilder): A Cable Video service provider who offers an alternative to the incumbent.

Partial Facilities-Based service provider: A voice services provider that partially owns its own network infrastructure, but the initial connection and line from the customer to the provider is owned by another provider. This connection is leased from that other provider.

SQI Report: A report filed by Verizon with DTC providing an overview of the company's customer service and outage results on a monthly basis for Massachusetts.

Switch: A channeling device which facilitates two-way communication. In a traditional circuit-switch telephone network, switches are utilized to establish dedicated voice and/or data connection between multiple parties.

Trouble Call (Trouble Report): A complaint that prompts Verizon to investigate whether interference is causing interruption or poor quality of voice service.

Unbundled network elements (UNE): Parts of the telecommunications network that are defined as physical and functional elements of the network, which include, but are not limited to, local loops, switched ports, and dedicated and common transport facilities. These elements are leased from Verizon by partial facilities-based providers.

UNE-Platform: Is a complete set of UNEs that represents a complete end-to-end circuit. CLECs have traditionally used this ILEC service to provide service to their customers.

Voice over Internet Protocol (VoIP): A technology that allows a consumer to make voice calls using a broadband Internet connection instead of a regular telephone line. VoIP technology sends voice over the Internet as packets of data, which are then reassembled on the receiving end rather than connecting directly over a single dedicated open circuit.

Wireless substitution: The act whereby a consumer replaces Wireline Voice service for a Wireless Voice service as the household's sole voice service.

Wireless voice service: Voice service provided through the use of a radio spectrum, antenna and/or satellite.

Wireline voice service: Voice service provided through physical connections to a consumer's premises such as copper wire, coaxial cable, or fiber optic cable.

Glossary of Abbreviations

1996 Act or the Act	**Telecommunications Act of 1996**
AT&T	**AT&T Corporation**
Billing	**Billing complaints**
Braintree	**Braintree Electric Light Department**
Business	**Business customers**
Cell phones	**Cellular phones**
Charter	**Charter Communications**
CLEC(s)	**Competitive Local Exchange Carrier(s)**
Comcast	**Comcast Communications**
Consumer Division	**DTC Consumer Division**
Cox	**Cox Communications**
DBS	**Direct Broadcast Satellite**
Donahue Institute	**University of Massachusetts Donahue Institute**
DTC	**Department of Telecommunications and Cable**
DTE	**Department of Telecommunications and Energy**
E911	**Emergency 911**
FCC	**Federal Communications Commission**
FiOS	**Verizon Communication's Fiber Optic Service**
Form 500	**FCC Form 500**
HH	**Households**
HH/Sq. mile	**Households per. sq. mile**
ILEC(s)	**Incumbent Local Exchange Carrier(s)**
Incumbent	**Incumbent Voice or Video provider**
IPTV	**Internet Protocol Television**
Leased Facilities	**Leased Facilities Platform**

LATAs	**Local Access and Transport Areas**
MA	**Massachusetts**
MCI	**MCI Communications**
NCHS	**Center for Disease Control and Preventions' National Center for Health statistics**
NHIS	**National Health Interview Survey**
Report	**Competition Status Report**
NANPA	**North American Numbering Plan Administrator**
Norwood	**Norwood Light Broadband**
Overbuilder	**Overbuilder Video Provider**
Own Network	**Own Network Platform**
PSTN	**Public Switched Telephone Network**
RCN	**RCN Corporation**
RBOC	**Regional Bell Operating Company**
Resale	**Resale platform**
Russell	**Russell Cable Company**
Shrewsbury	**Shrewsbury Electric Light Company**
SMB	**Small to Medium-sized Business**
Sprint/Nextel	**Sprint/Nextel Corporation**
SQ	**Service Quality**
SQI Report	**Verizon Service Quality Index Report**
Time Warner	**Time Warner Communications**
UNE	**Unbundled Network Element**
UNE-L	**UNE loop**
UNE-P	**Unbundled Network Element Platform**
Verizon	**Verizon Massachusetts or Verizon Communications**

Video	**Video providers(s) or services**
VoIP	**Voice over Internet Protocol**
Wireless	**Wireless provider(s) or services**

REGION BINDERS

Berkshire

I. Residential Voice

Figure BE-1: Availability of ILEC Voice Providers, by Town, December 2008

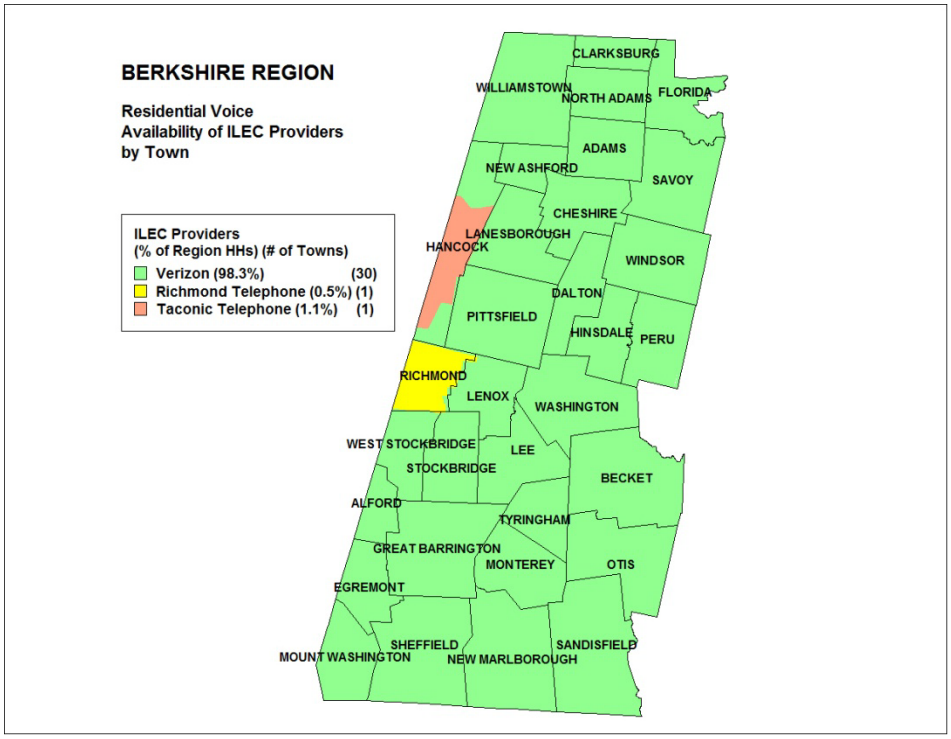


Figure BE-2: Availability of Cable Voice Providers, by Town, December 2008

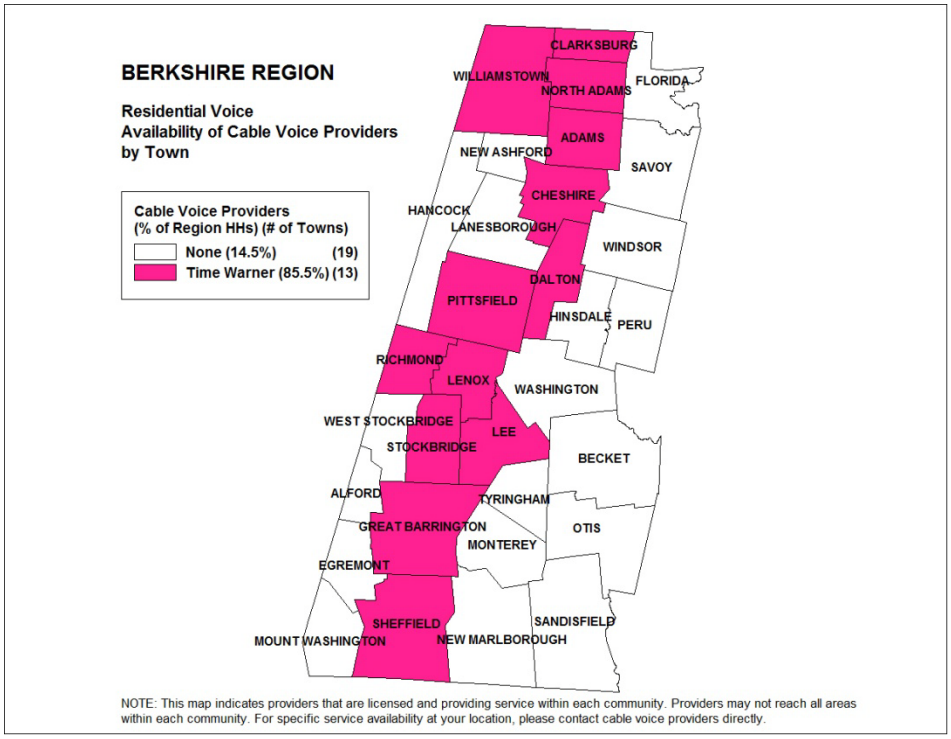


Figure BE-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

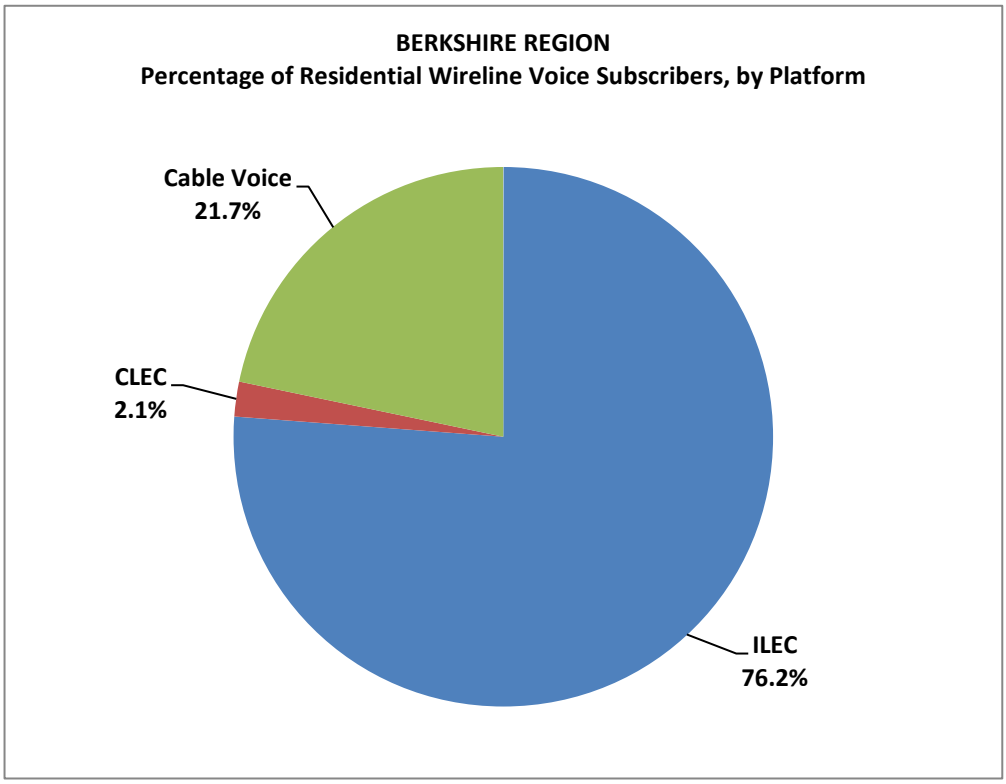


Figure BE-4: Verizon's Average Annual Trouble Reports, 2005-2008

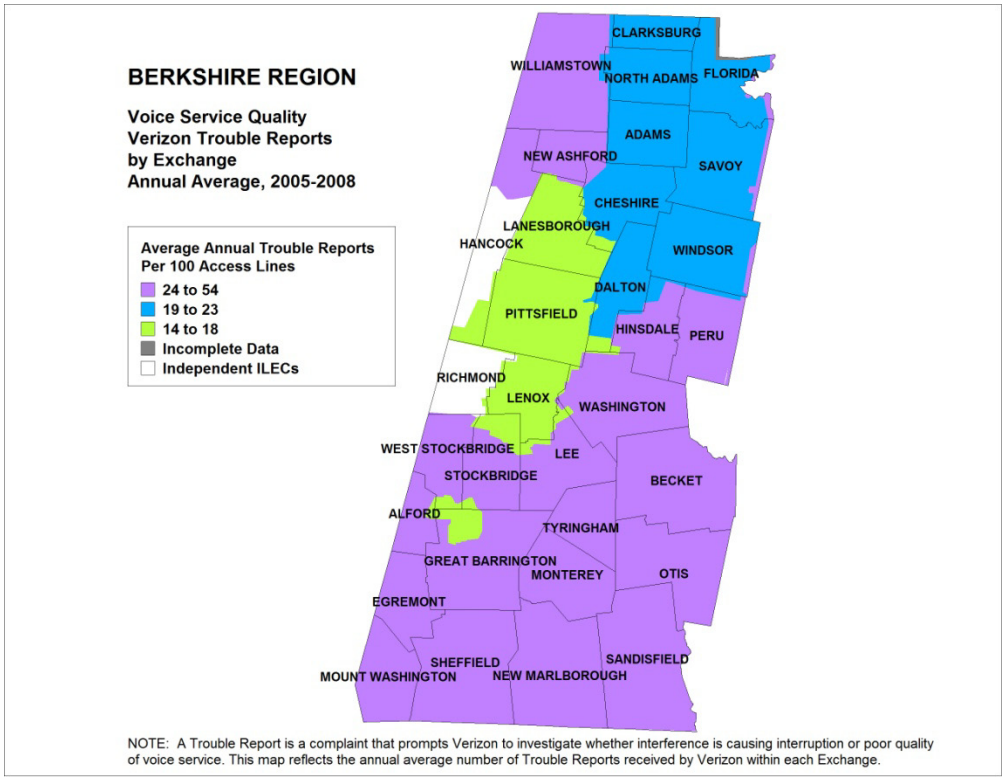
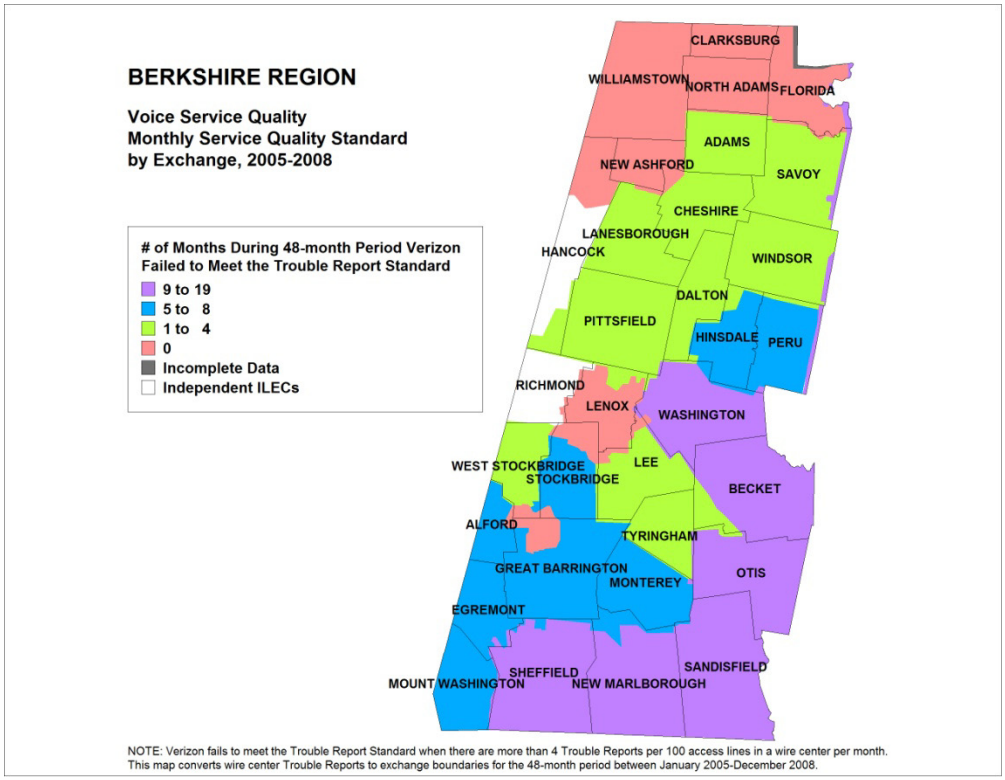


Figure BE-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure BE-6: Business Voice Provision by Number of CLEC Providers, December 2007

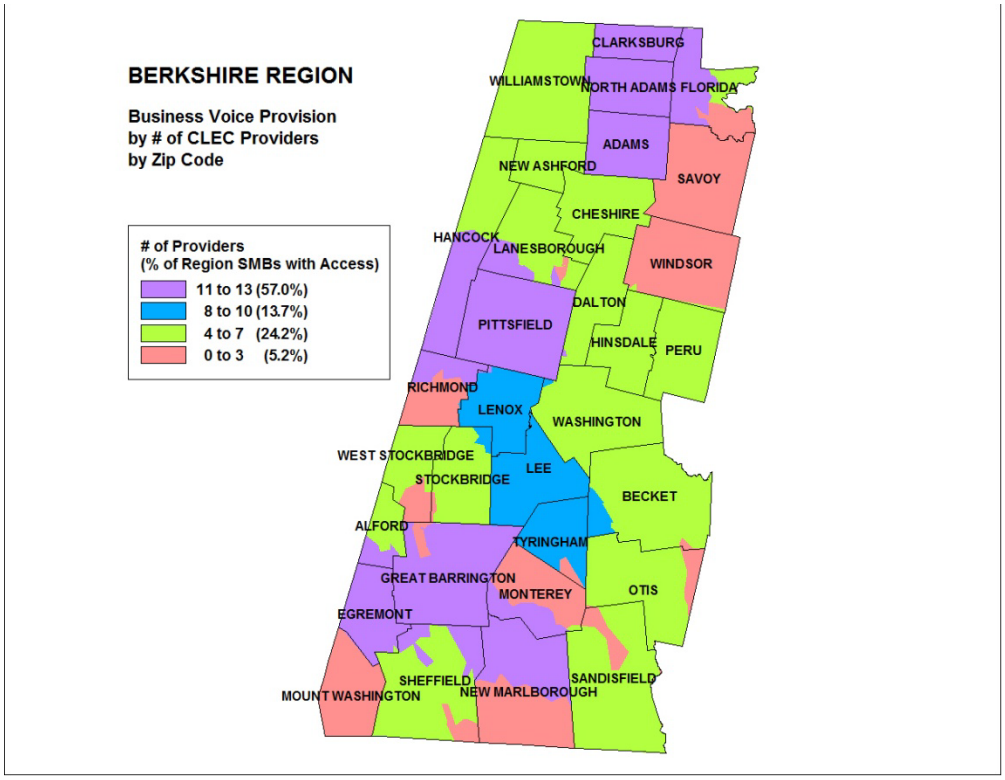


Figure BE-7: Business Voice Provision by Number of Resale Providers, December 2007

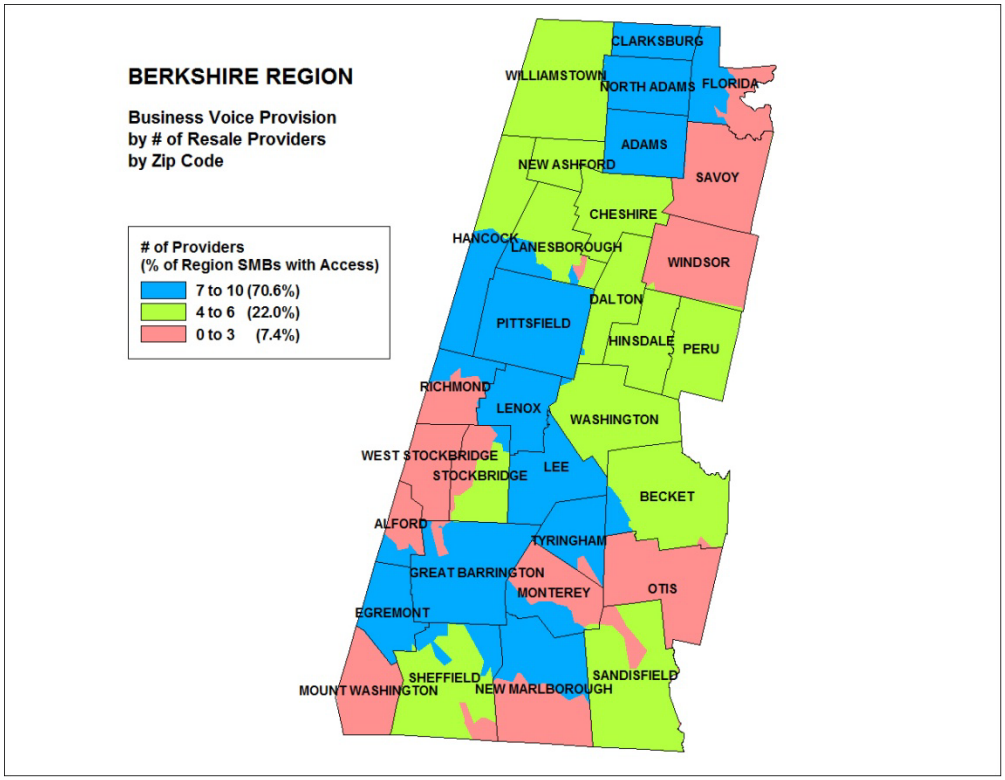


Figure BE-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

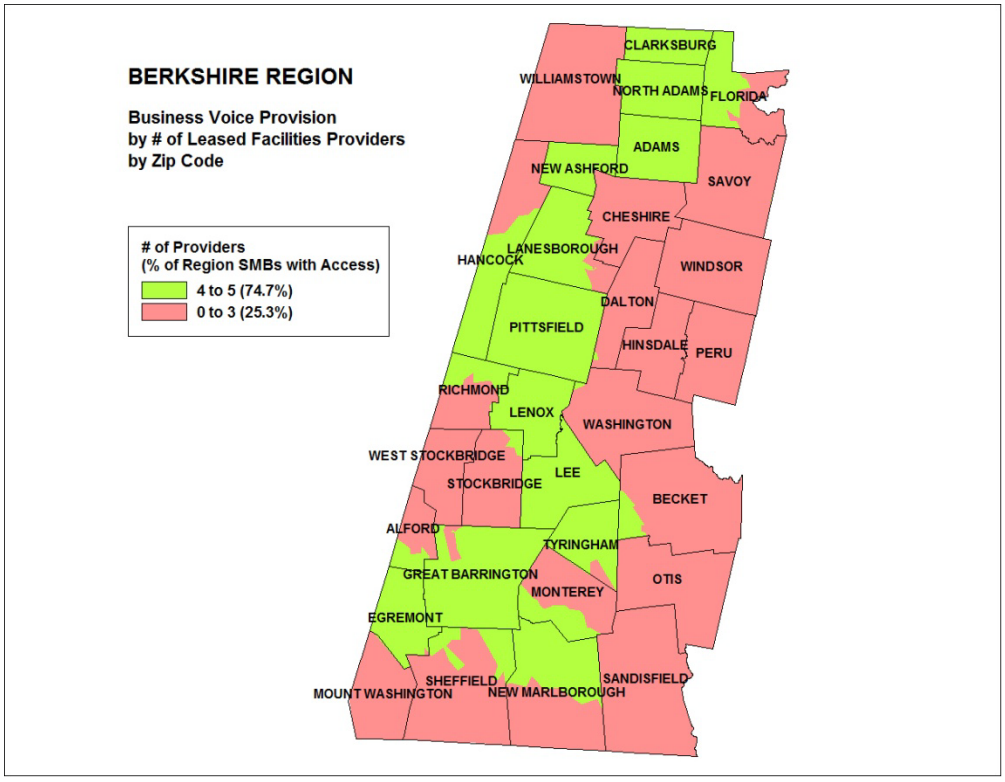
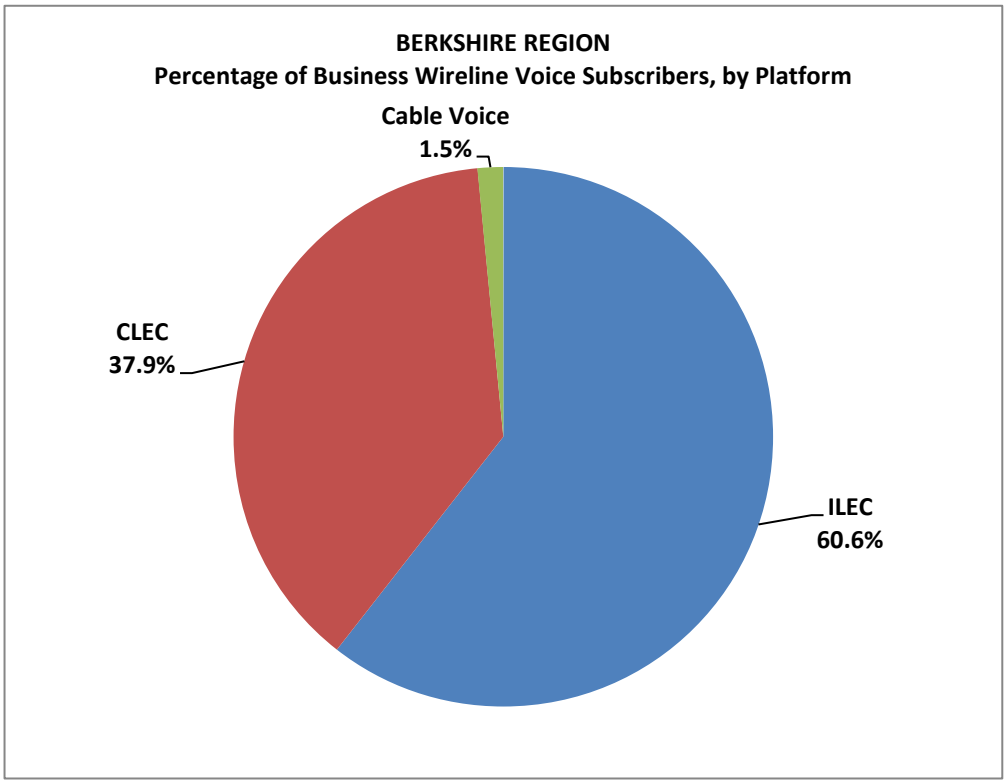


Figure BE-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure BE-10: Availability of Wireless Voice by Number of Providers, December 2008

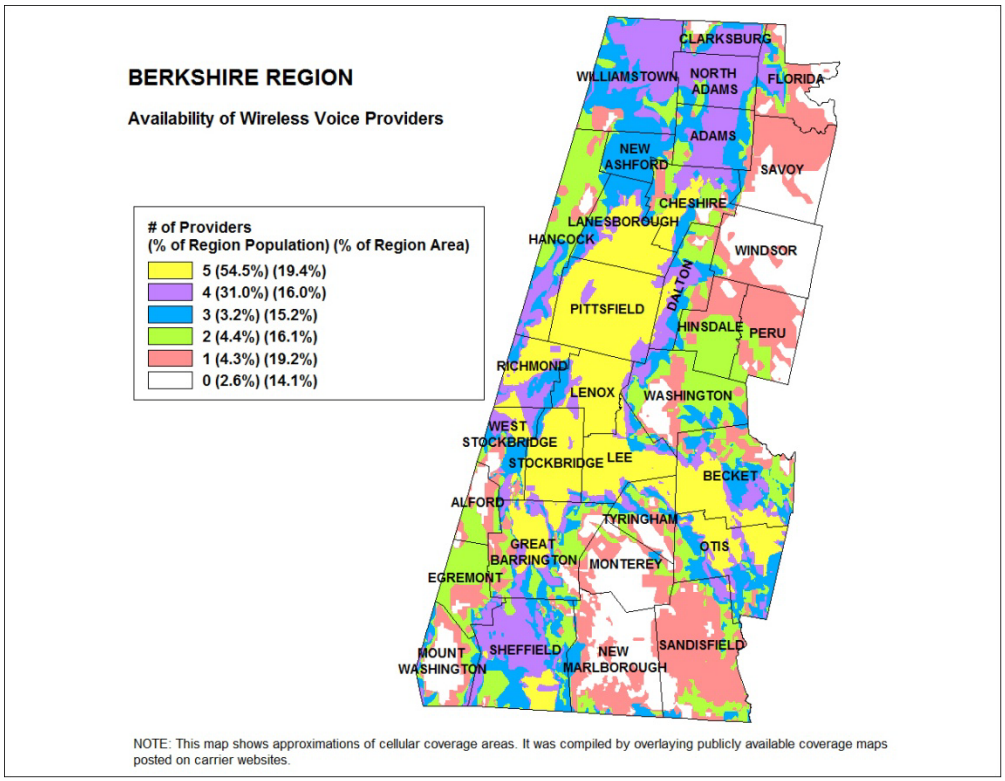
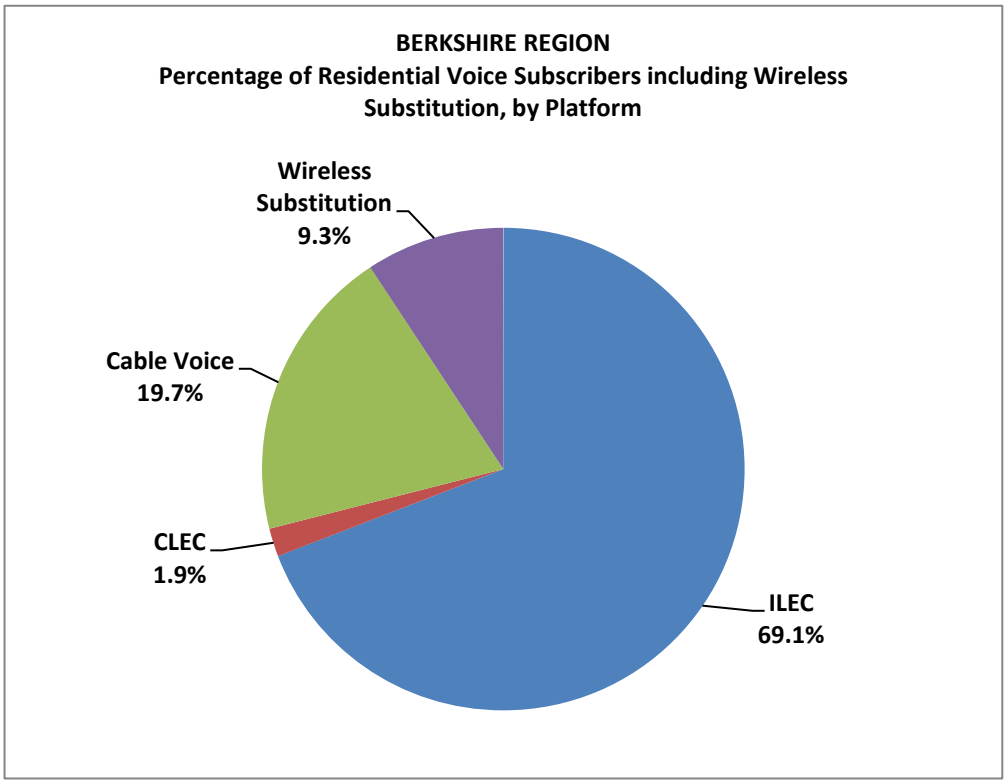


Figure BE-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure BE-12: Incumbent Cable Video Service Providers, 2008

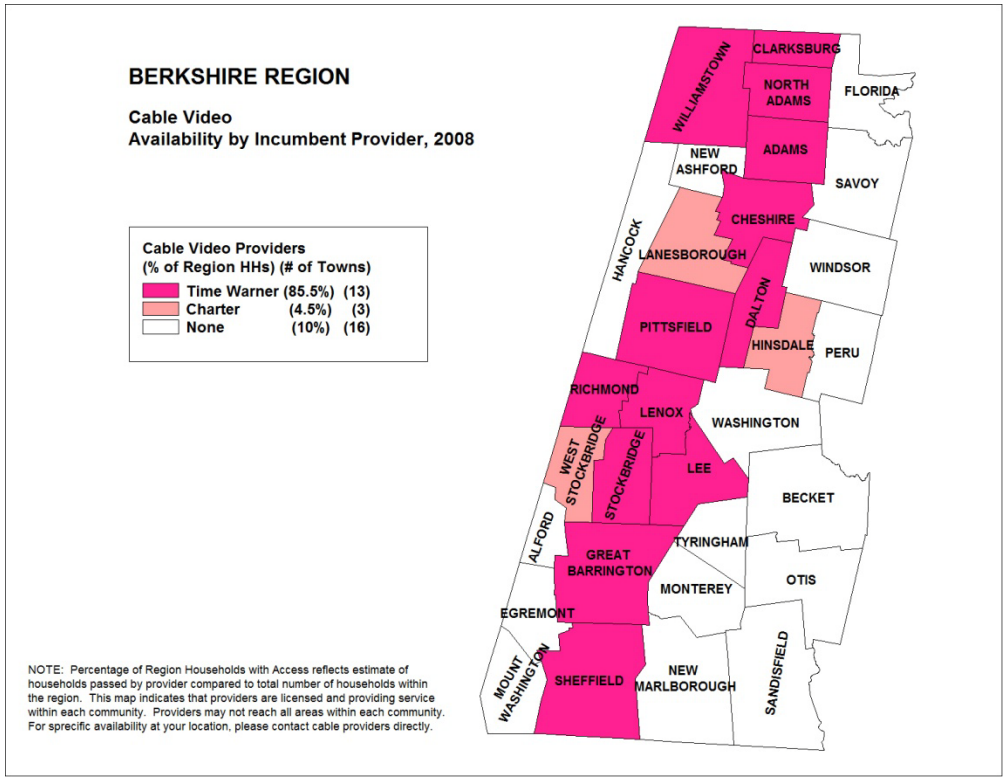


Figure BE-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

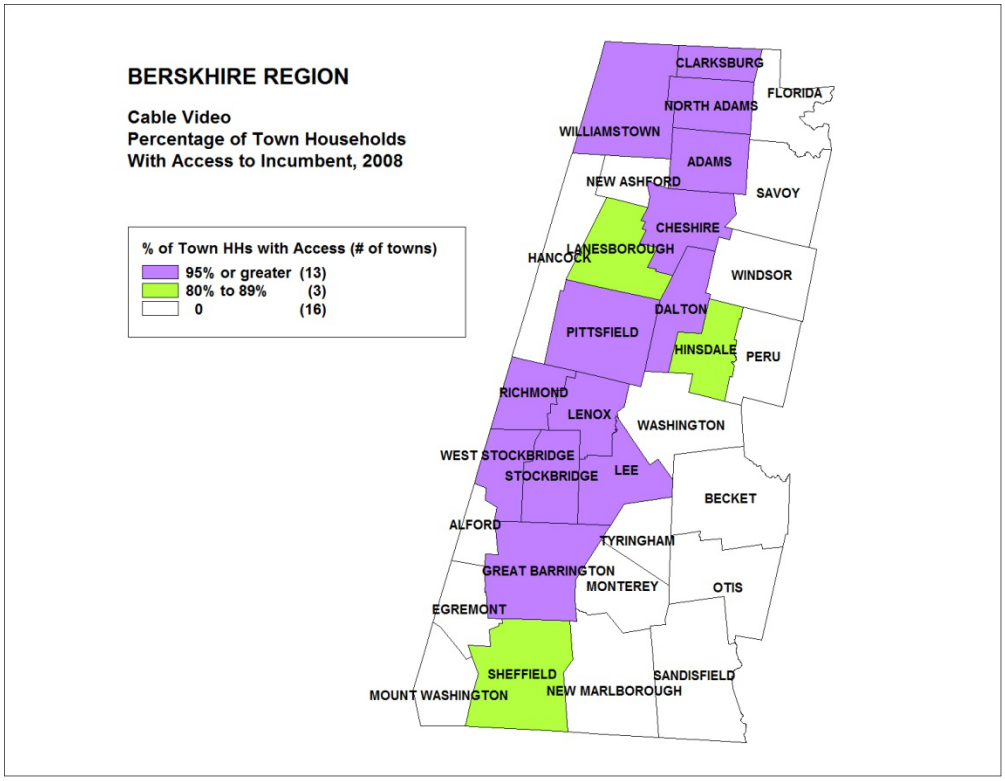


Figure BE-14: Cable Video Subscribers, by Provider, 2005-2008

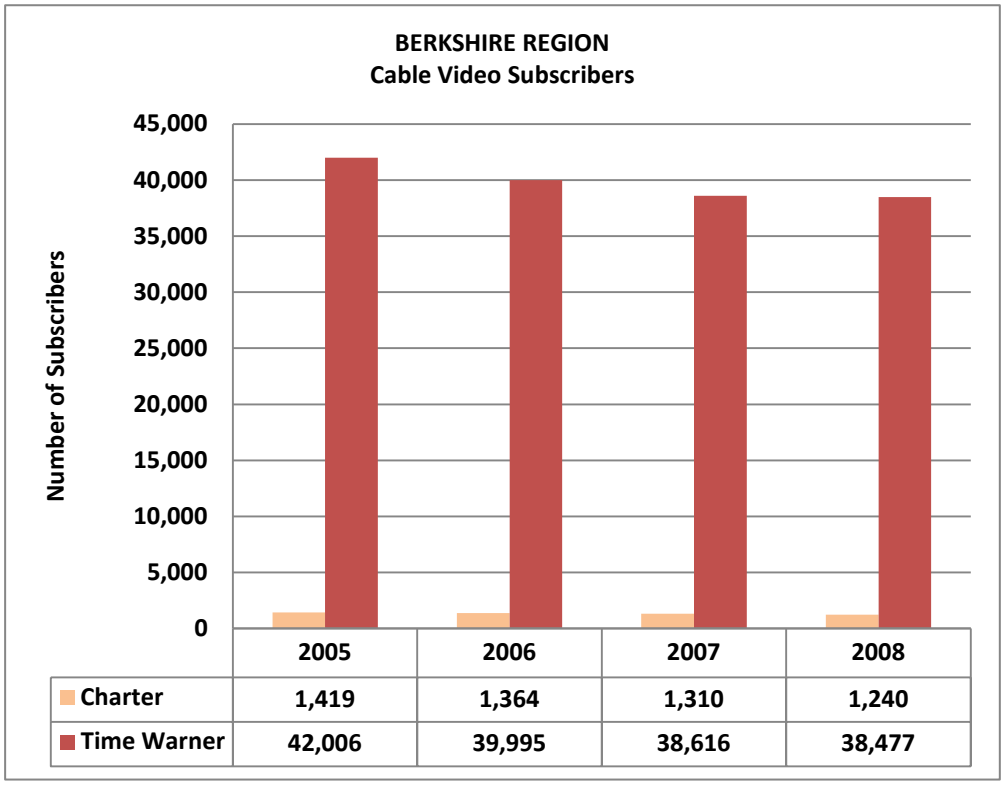
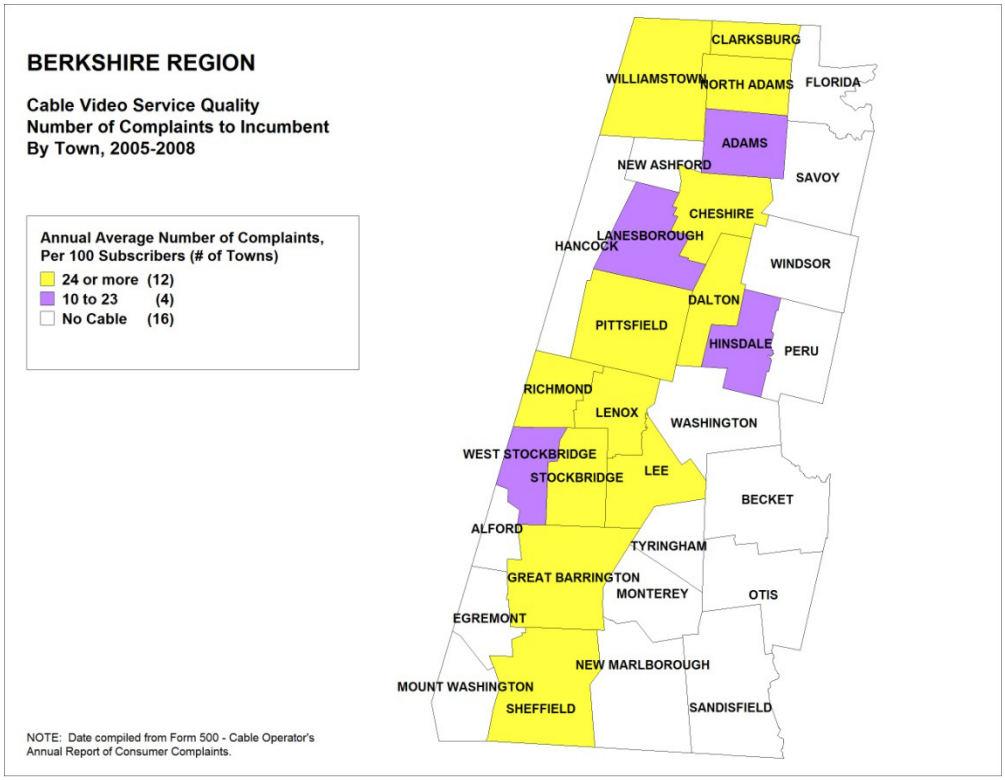


Figure BE-15: Incumbent Cable Video Provider Complaints, 2005-2008



Boston Metro

I. Residential Voice

Figure BM-1: Availability of ILEC Voice Providers, by Town, December 2008

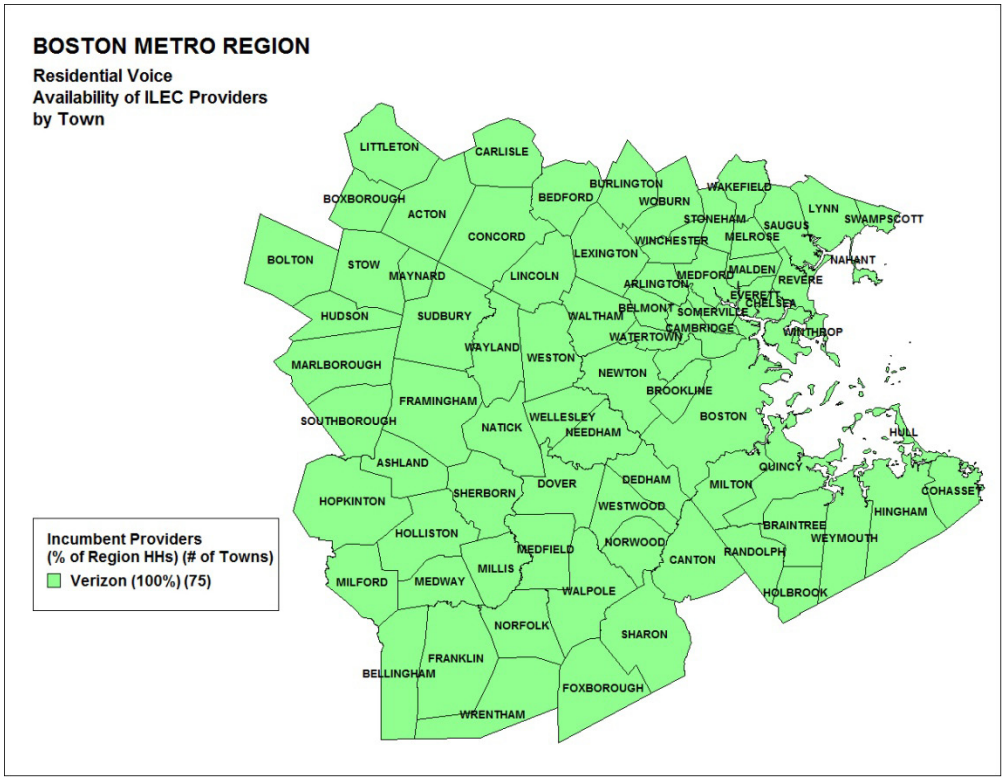


Figure BM-2: Availability of Cable Voice Providers, by Town, December 2008

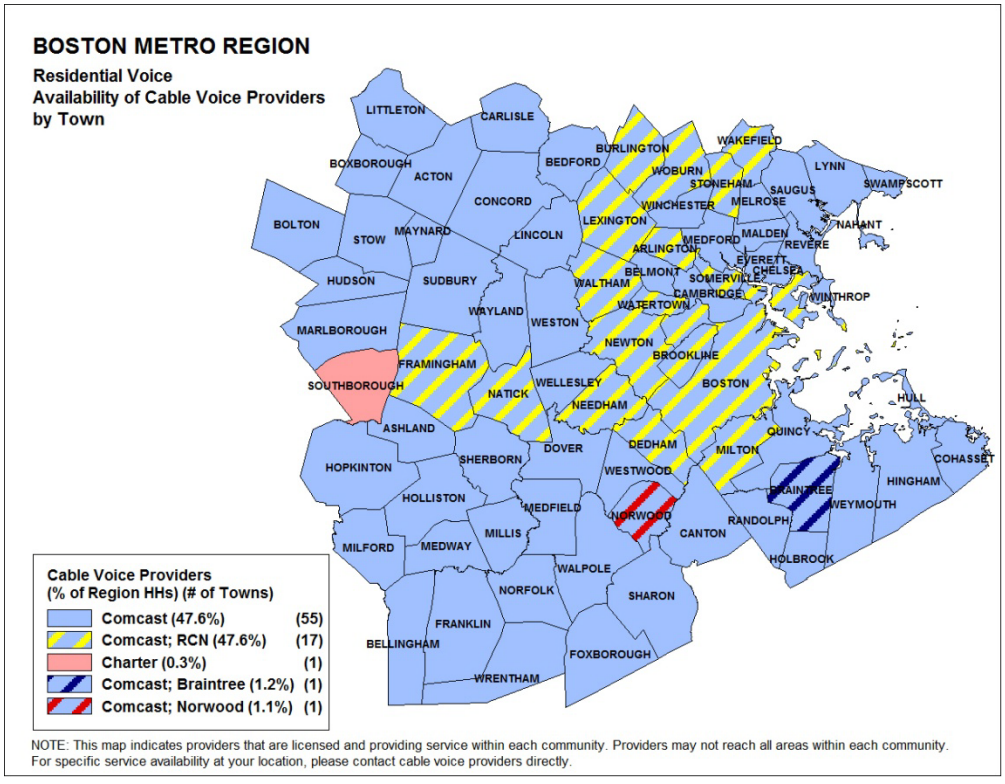


Figure BM-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

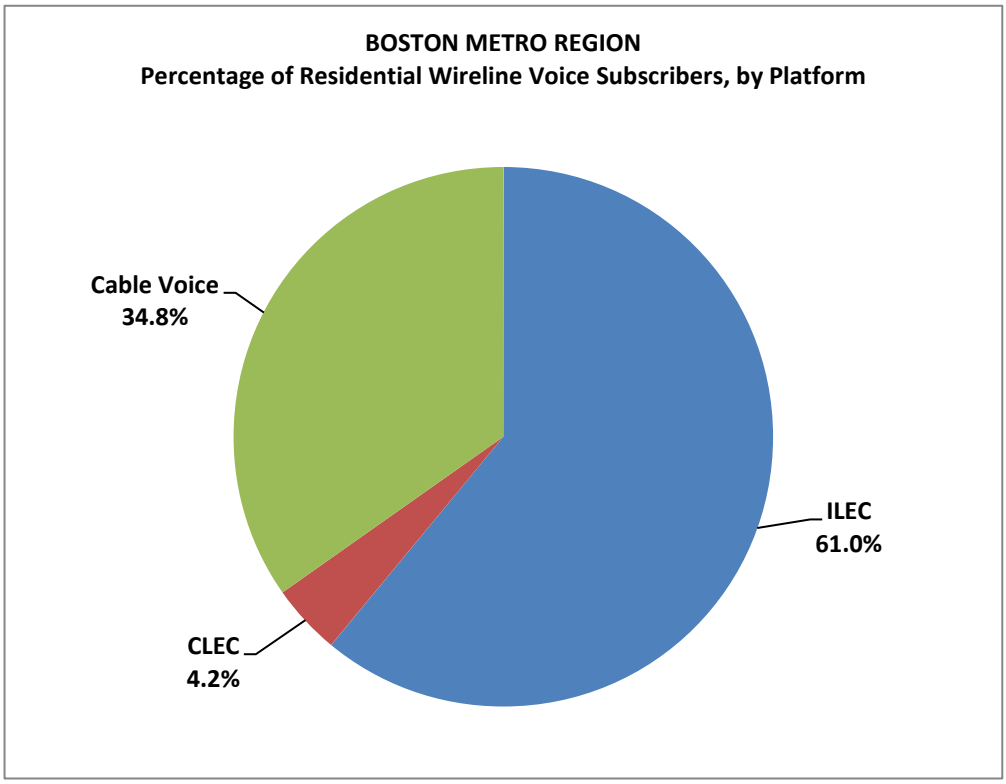


Figure BM-4: Verizon's Average Annual Trouble Reports, 2005-2008

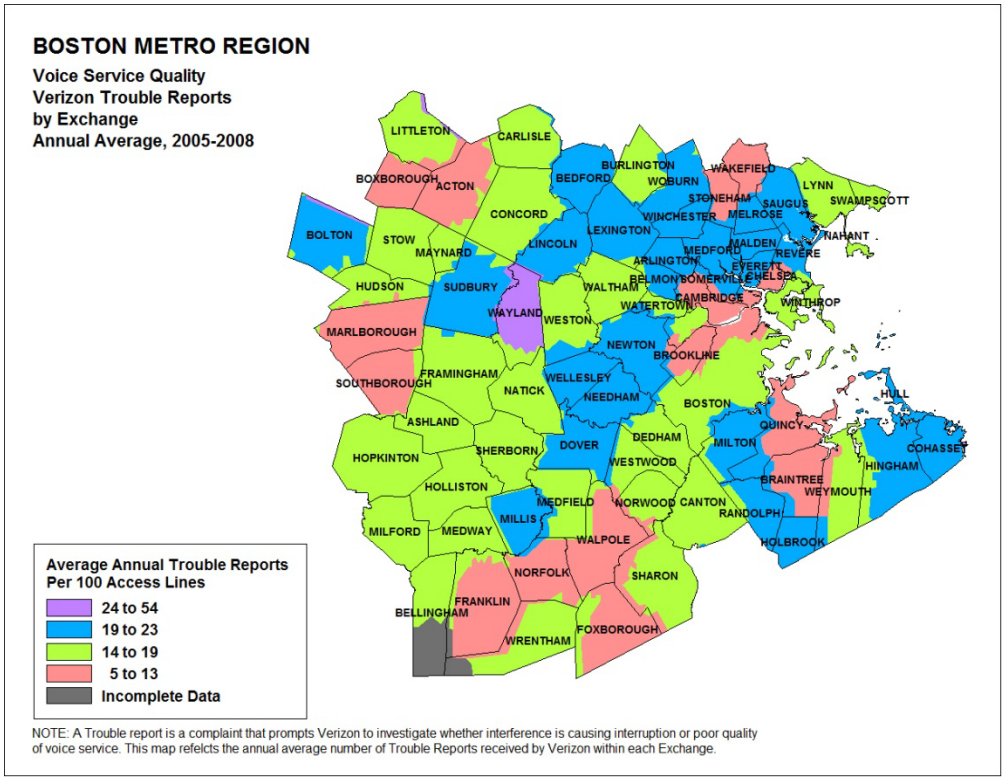
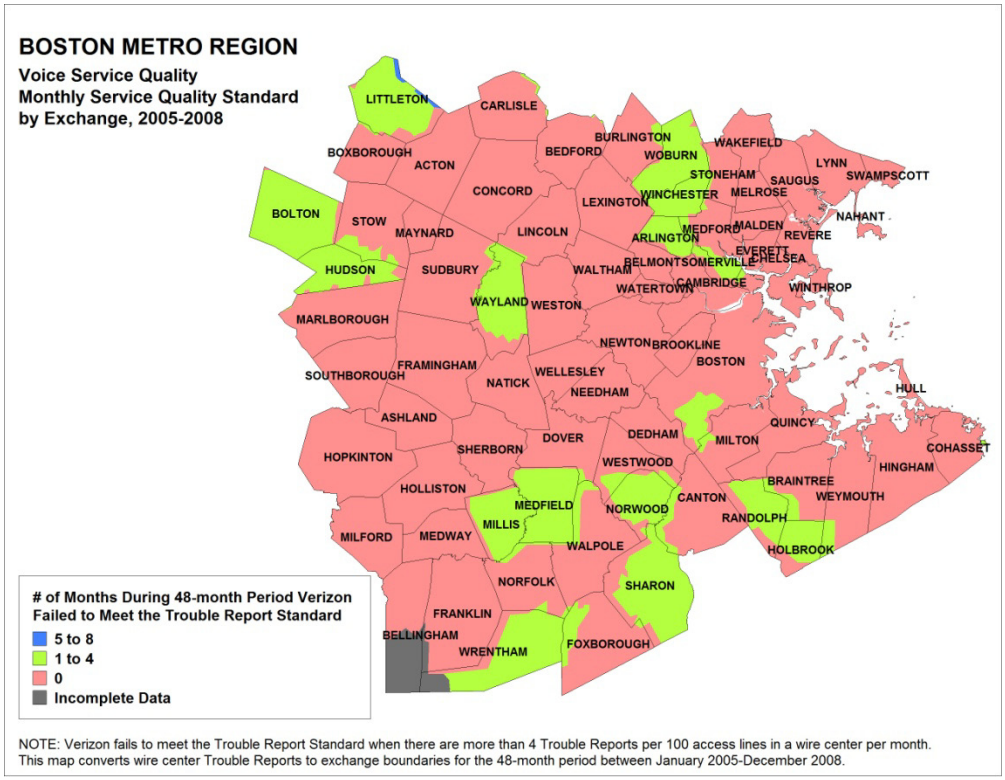


Figure BM-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure BM-6: Business Voice Provision by Number of CLEC Providers, December 2007

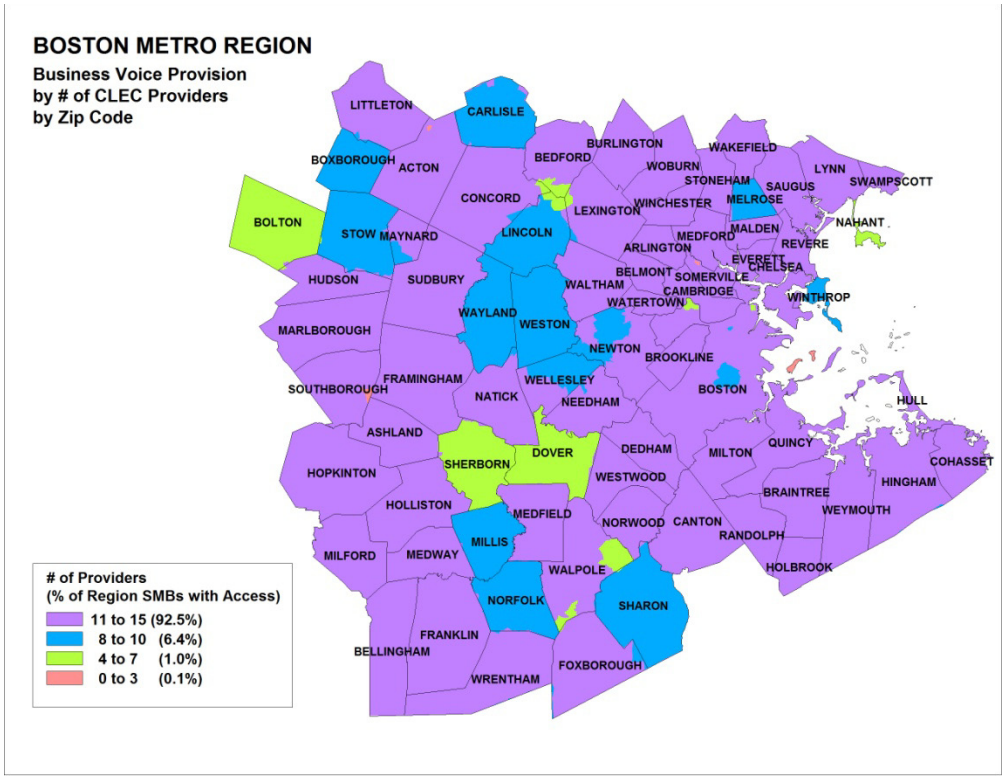


Figure BM-7: Business Voice Provision by Number of Resale Providers, December 2007

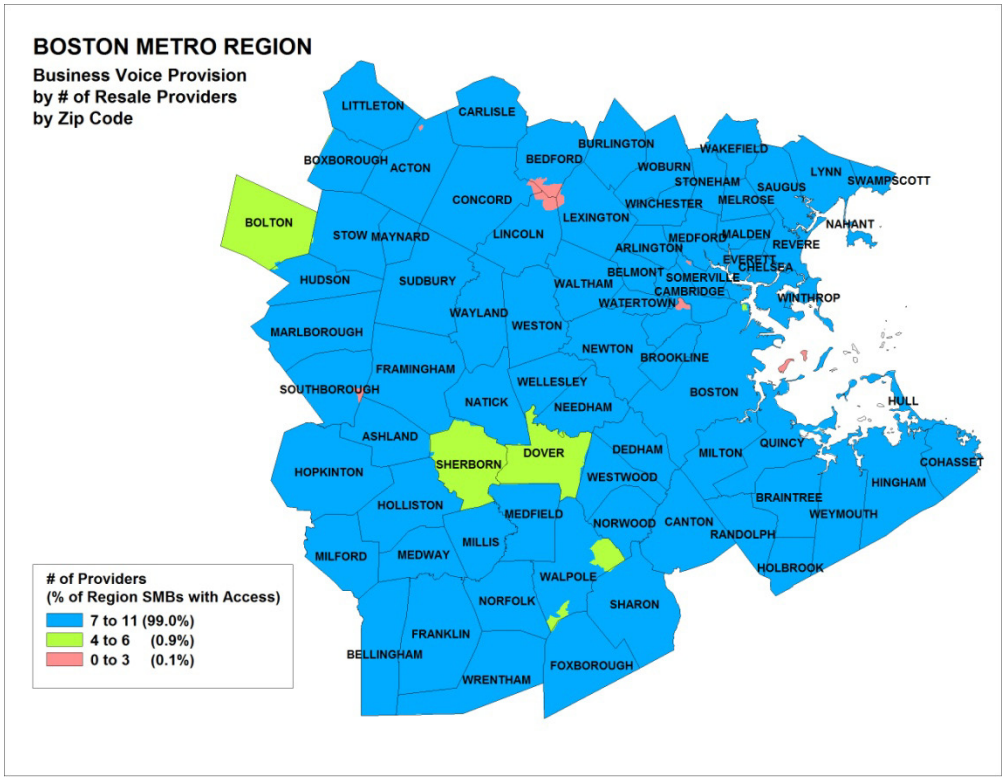


Figure BM-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

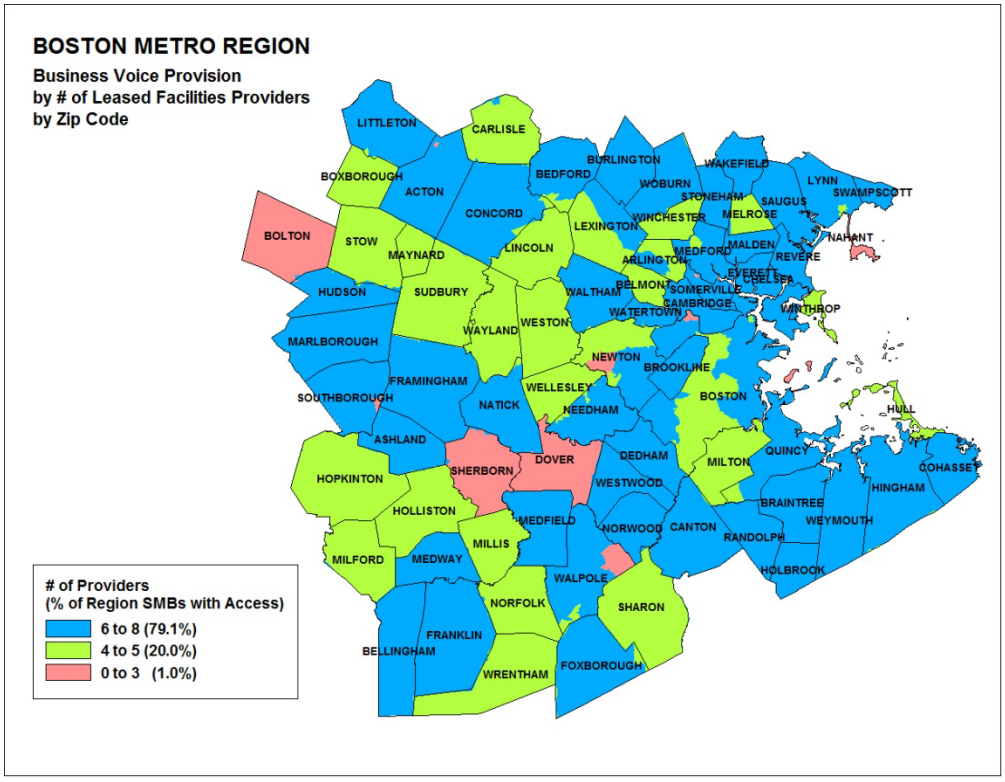
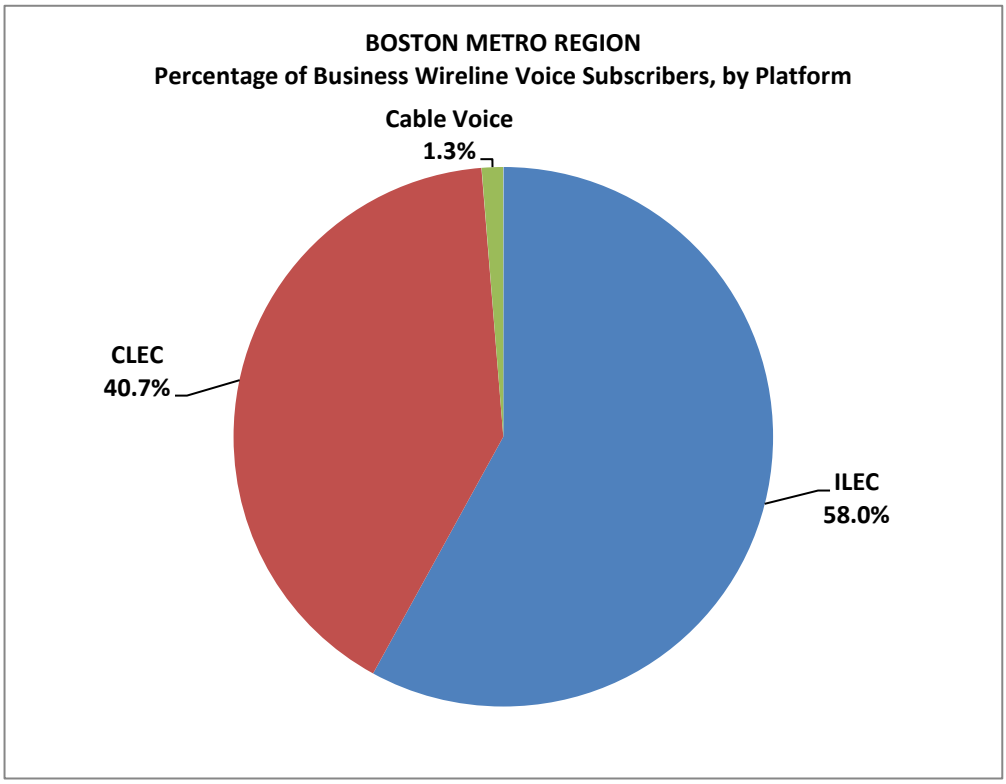


Figure BM-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure BM-10: Availability of Wireless Voice by Number of Providers, December 2008

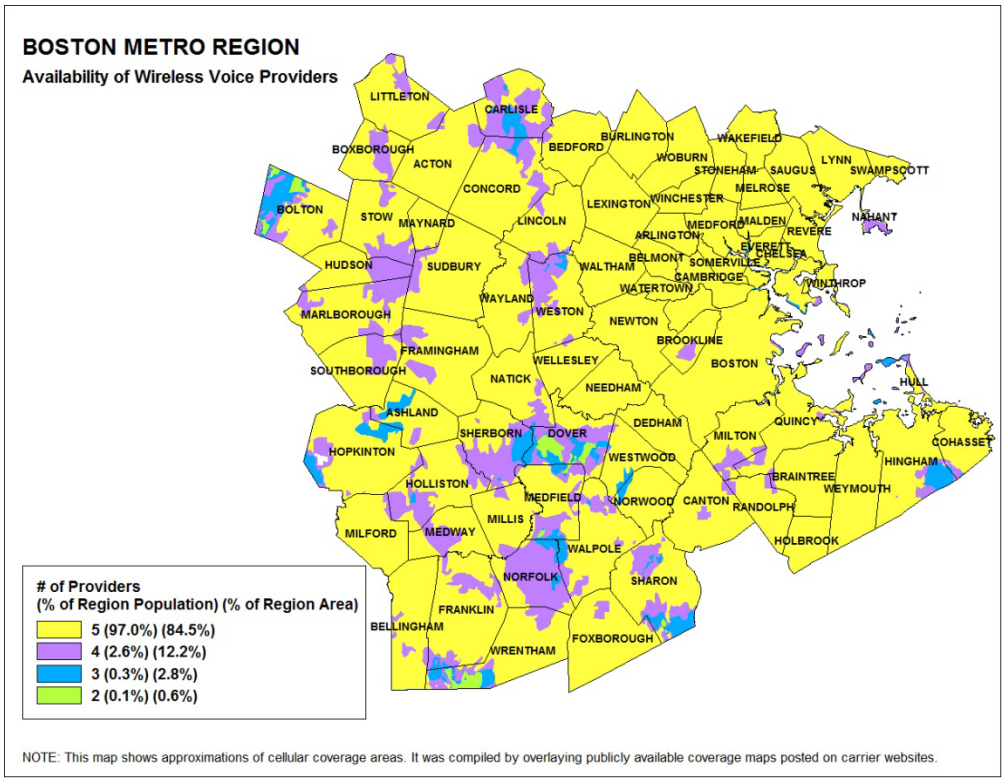
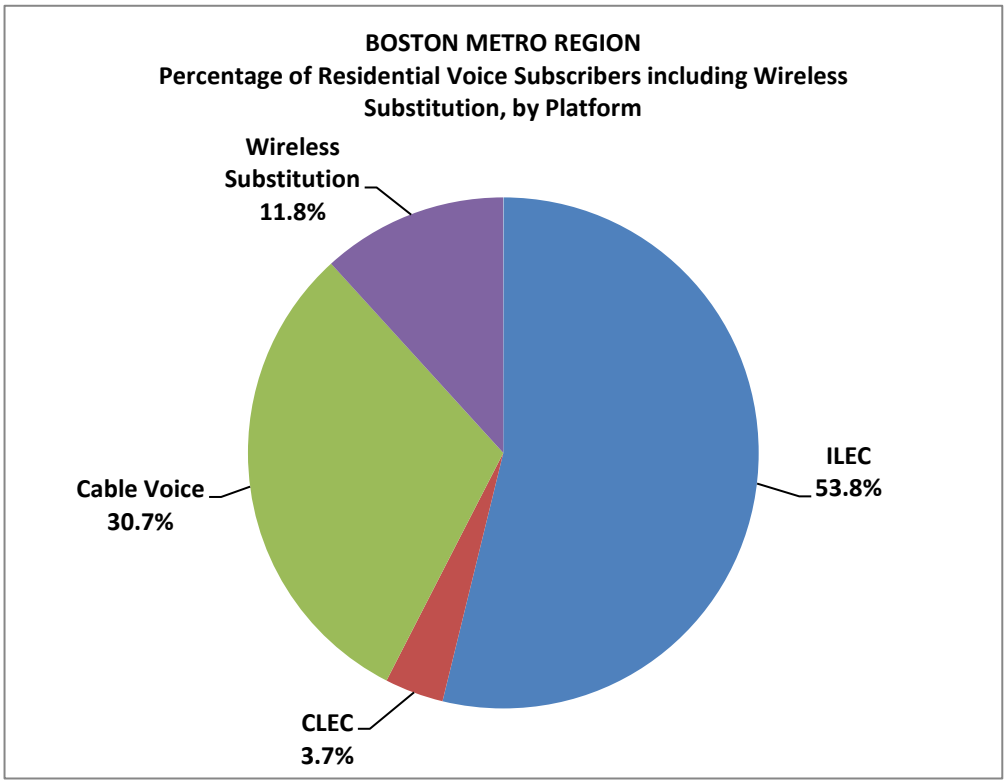
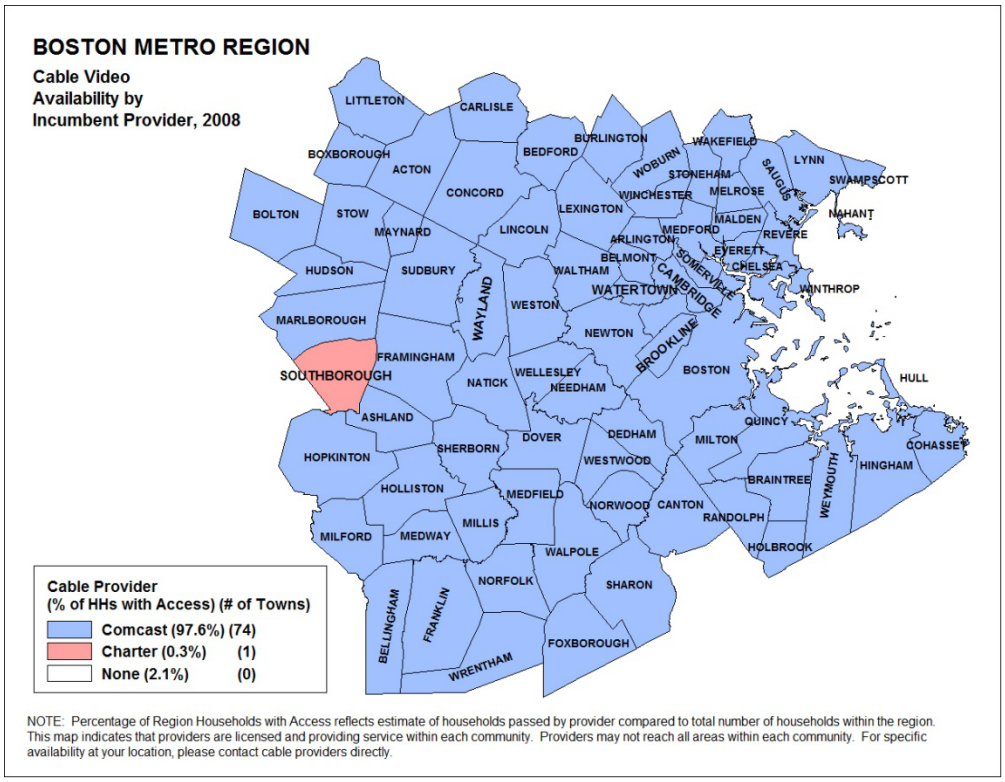


Figure BM-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure BM-12: Incumbent Cable Video Service Providers, 2008



NOTE: Percentage of Region Households with Access reflects estimate of households passed by provider compared to total number of households within the region. This map indicates that providers are licensed and providing service within each community. Providers may not reach all areas within each community. For specific availability at your location, please contact cable providers directly.

Figure BM-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

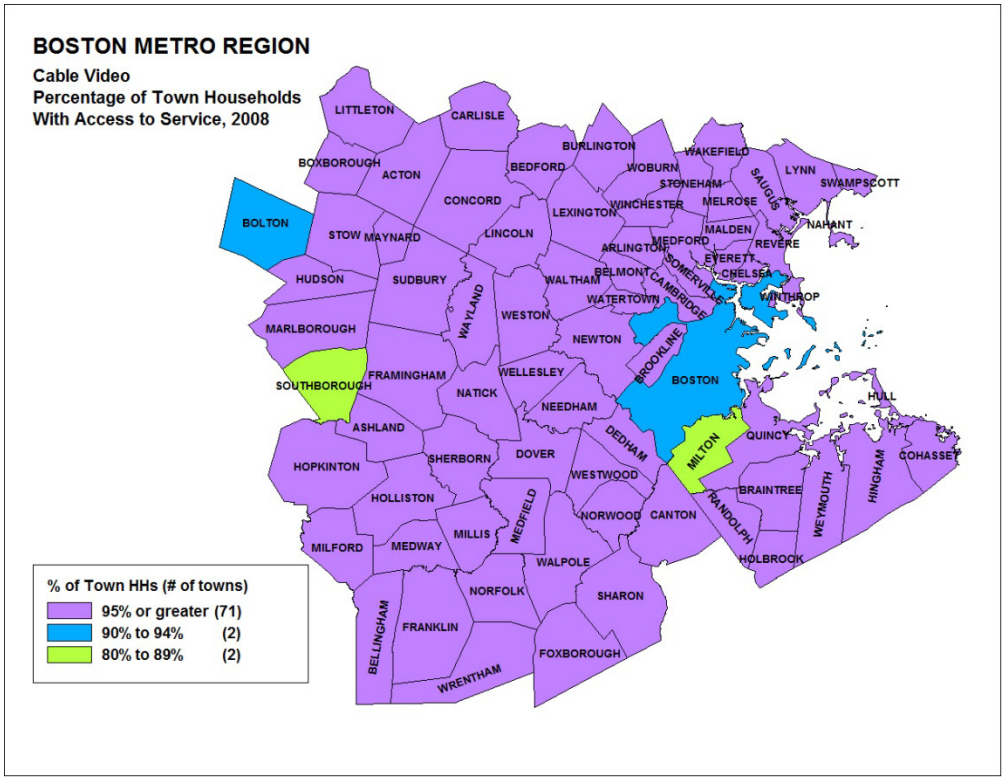


Figure BM-14: Active Cable Video Service Providers, December 2007

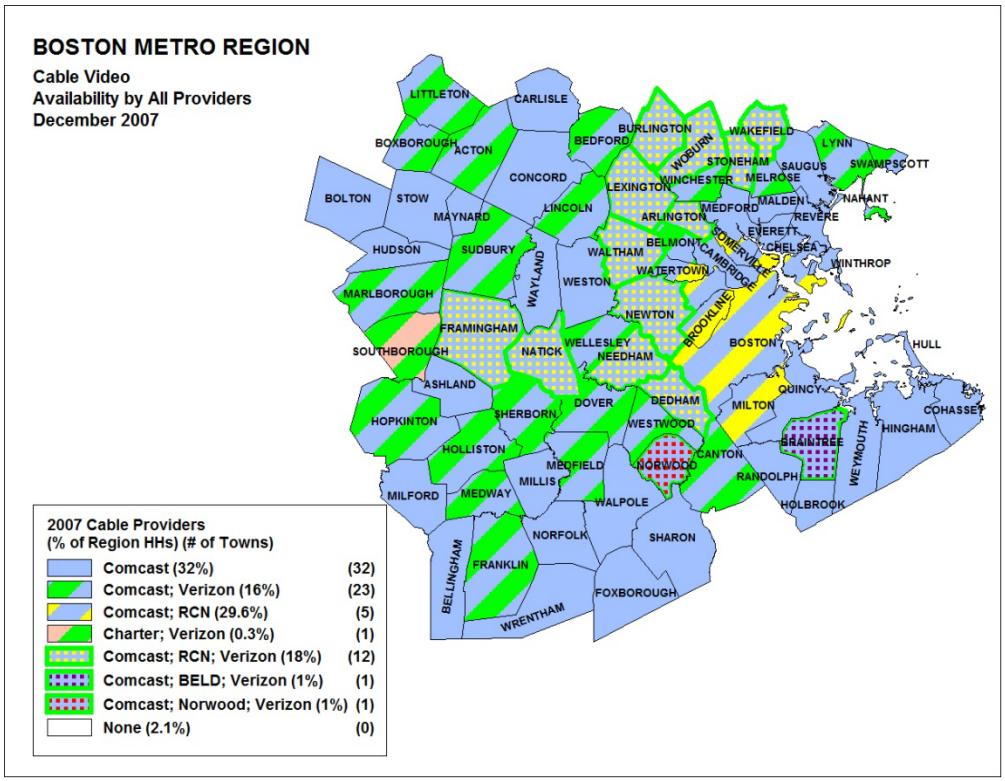


Figure BM-15: Active Cable Video Service Providers, December 2008

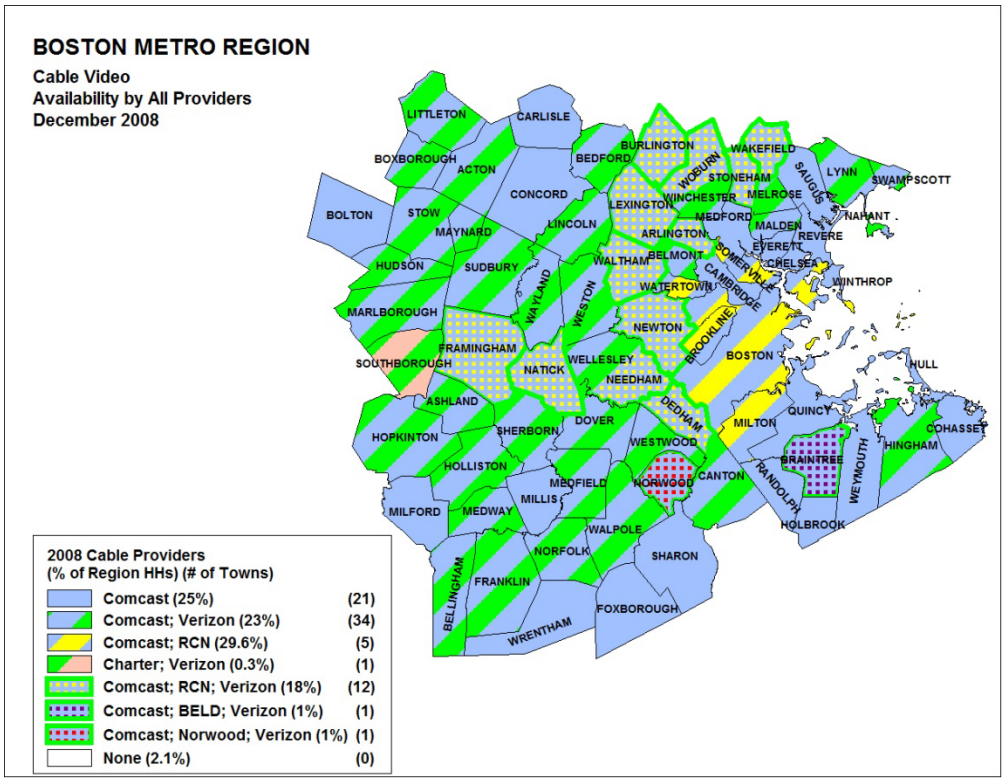


Figure BM-16: Active Cable Video Service Providers, June 2009

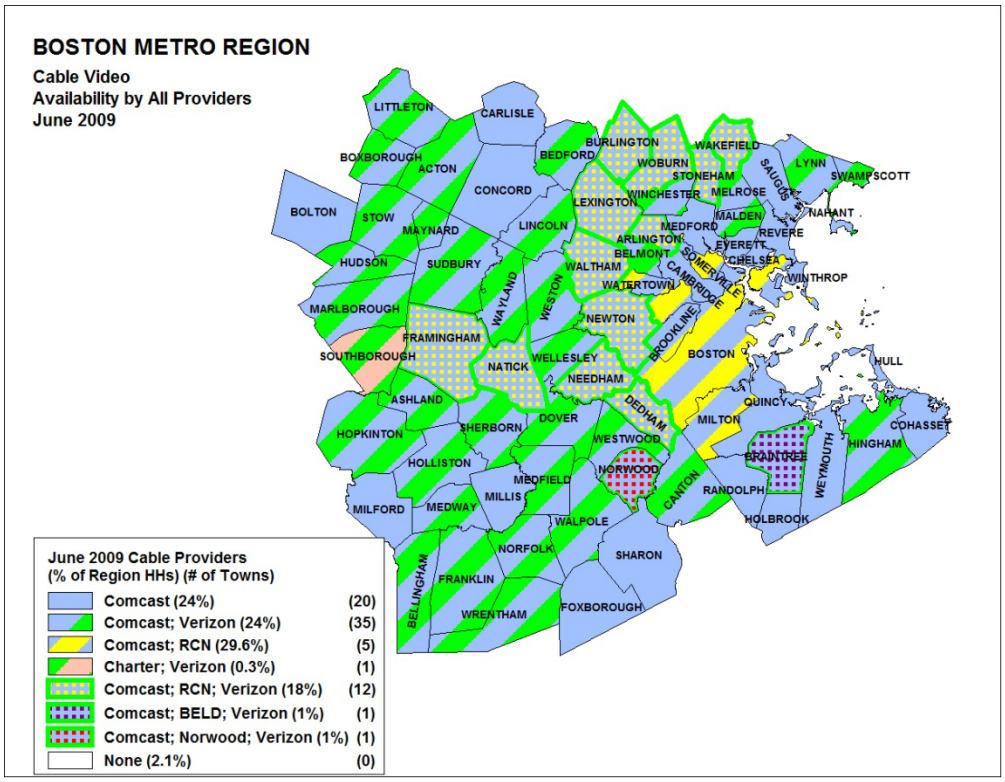
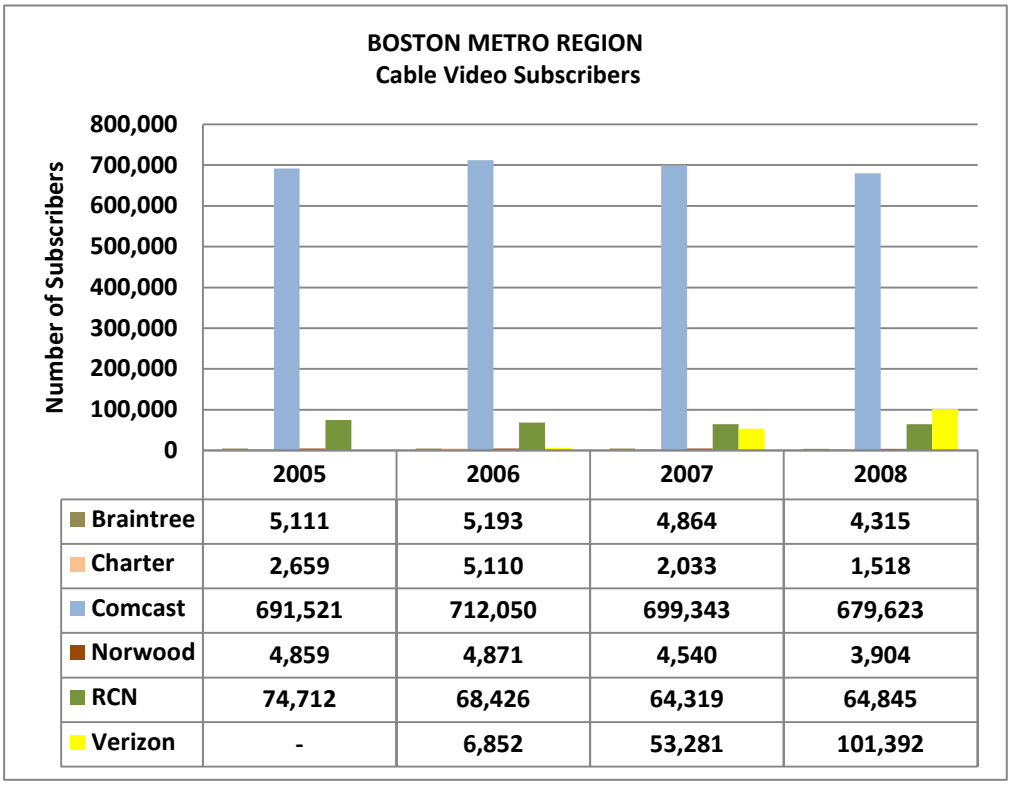
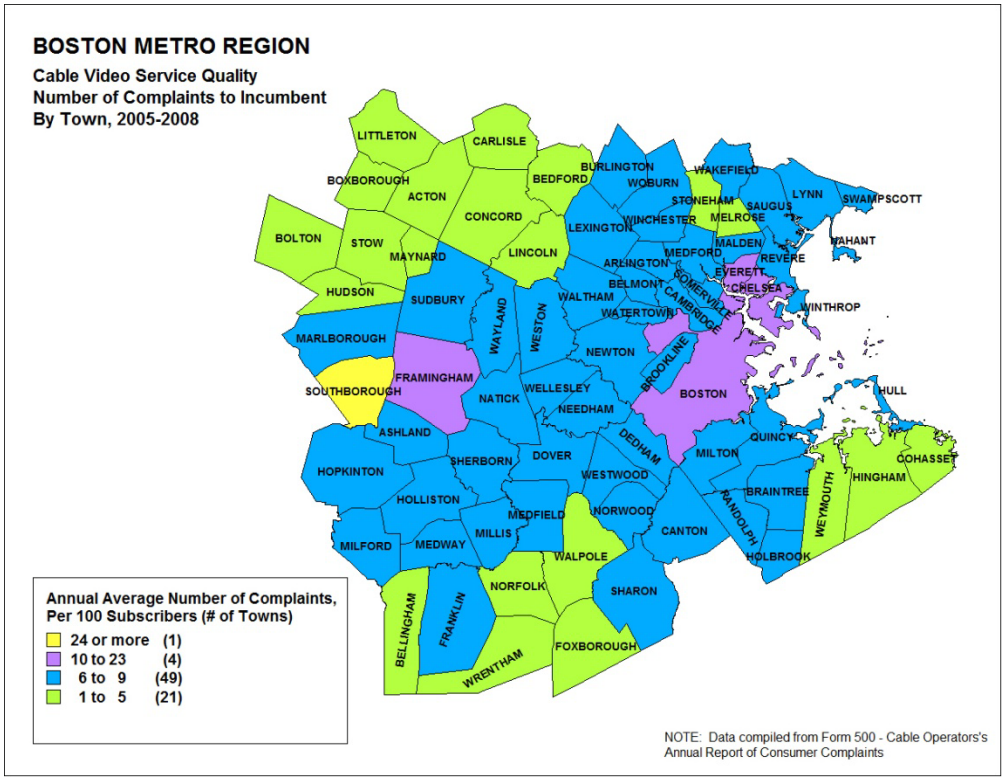


Figure BM-17: Cable Video Subscribers, by Provider, 2005-2008



	2005	2006	2007	2008
Braintree	5,111	5,193	4,864	4,315
Charter	2,659	5,110	2,033	1,518
Comcast	691,521	712,050	699,343	679,623
Norwood	4,859	4,871	4,540	3,904
RCN	74,712	68,426	64,319	64,845
Verizon	-	6,852	53,281	101,392

Figure BM-18: Incumbent Cable Video Provider Complaints, 2005-2008



Cape and Islands

I. Residential Voice

Figure CI-1: Availability of ILEC Voice Providers, by Town, December 2008

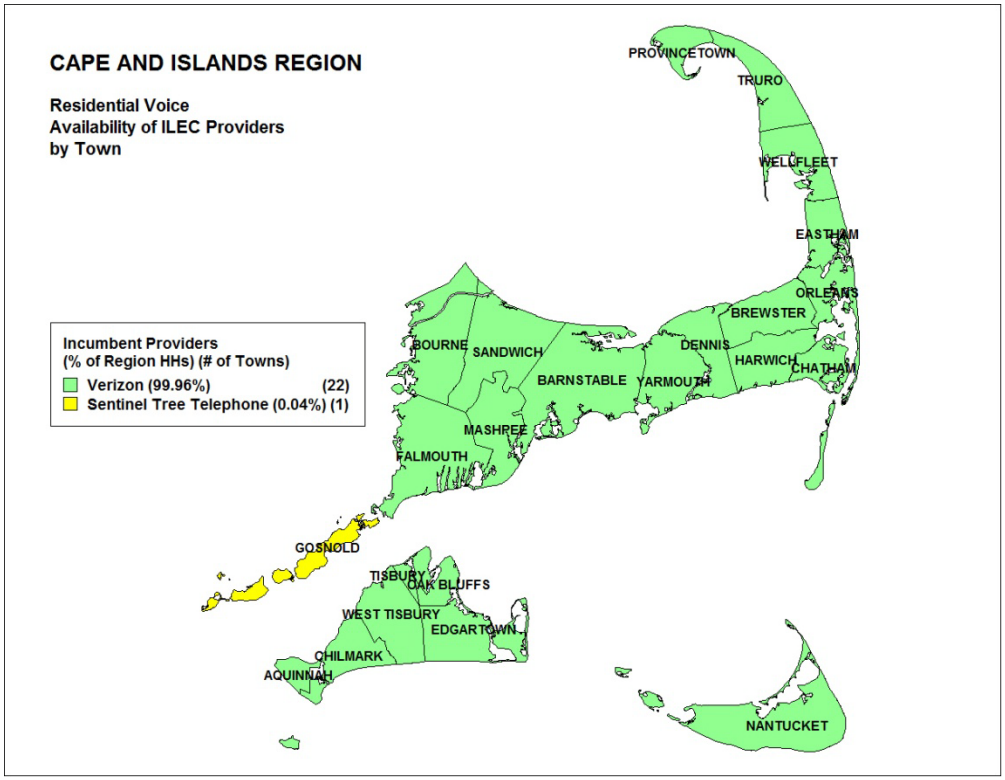


Figure CI-2: Availability of Cable Voice Providers, by Town, December 2008

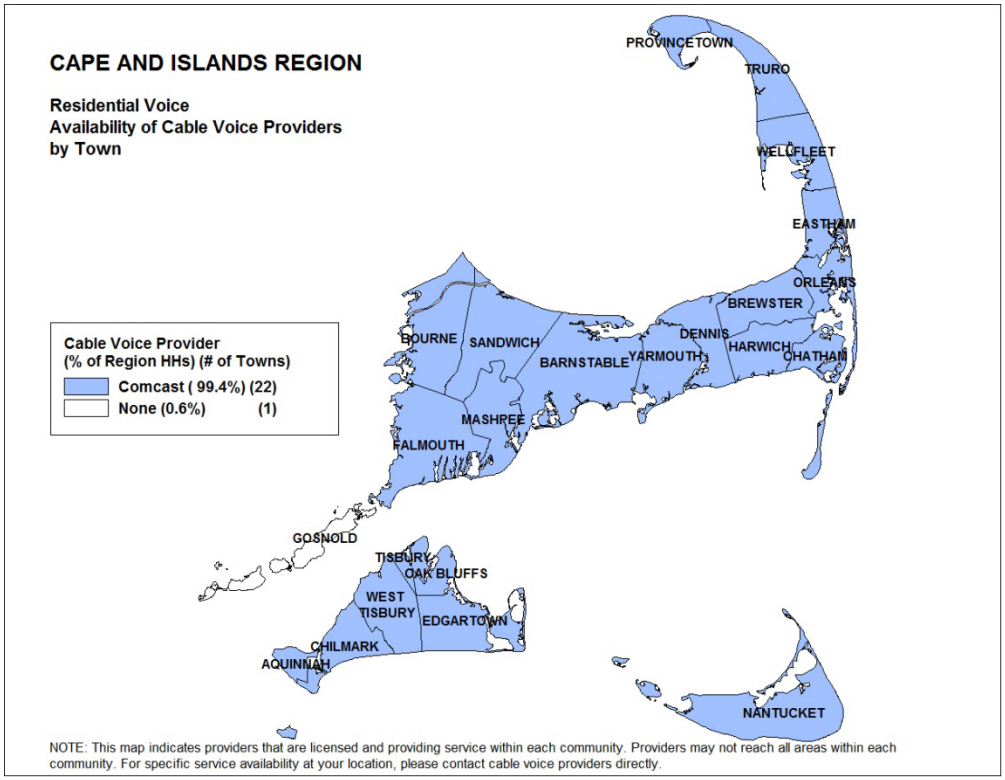


Figure CI-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

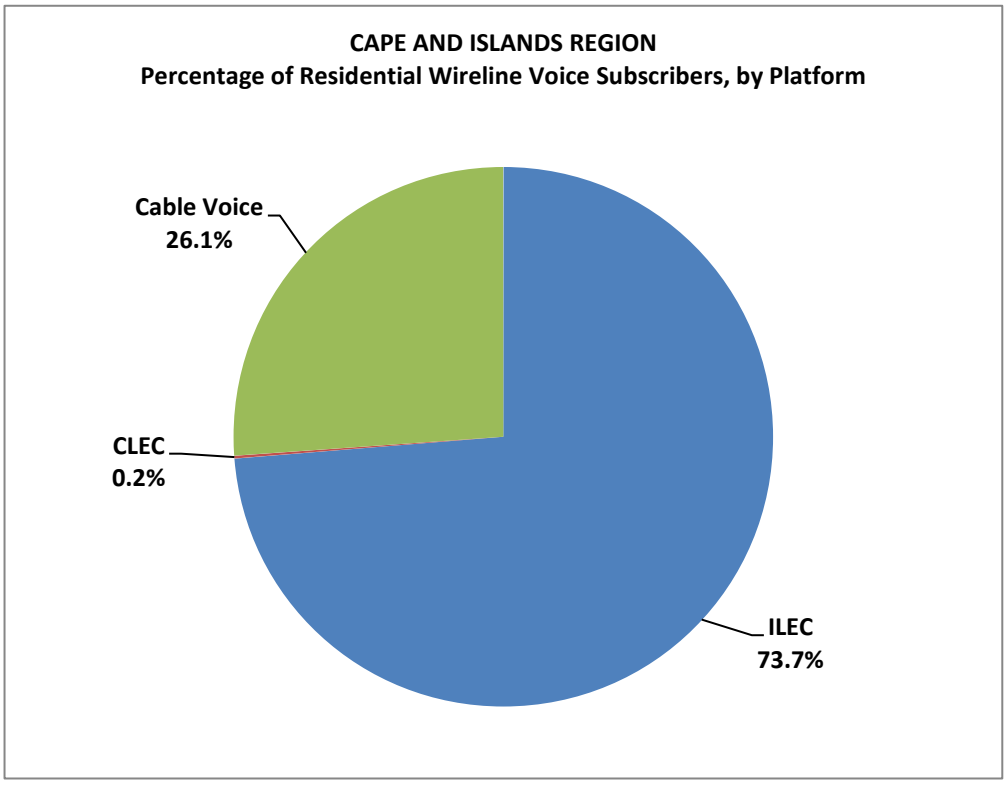


Figure CI-4: Verizon's Average Annual Trouble Reports, 2005-2008

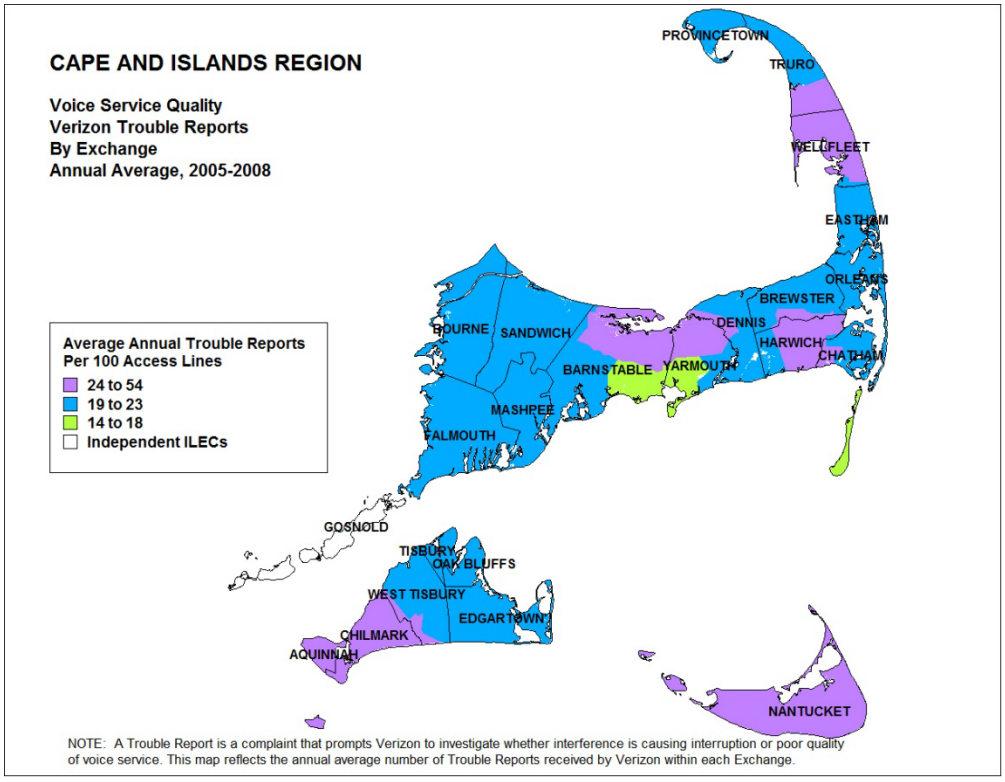
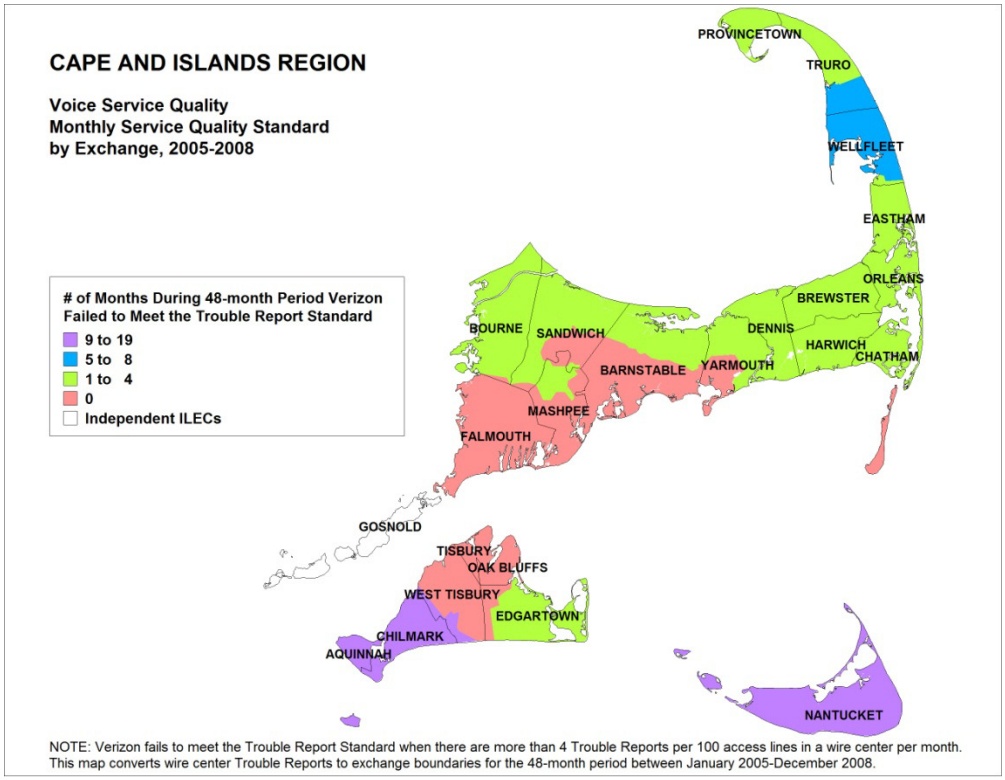


Figure CI-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure CI-6: Business Voice Provision by Number of CLEC Providers, December 2007

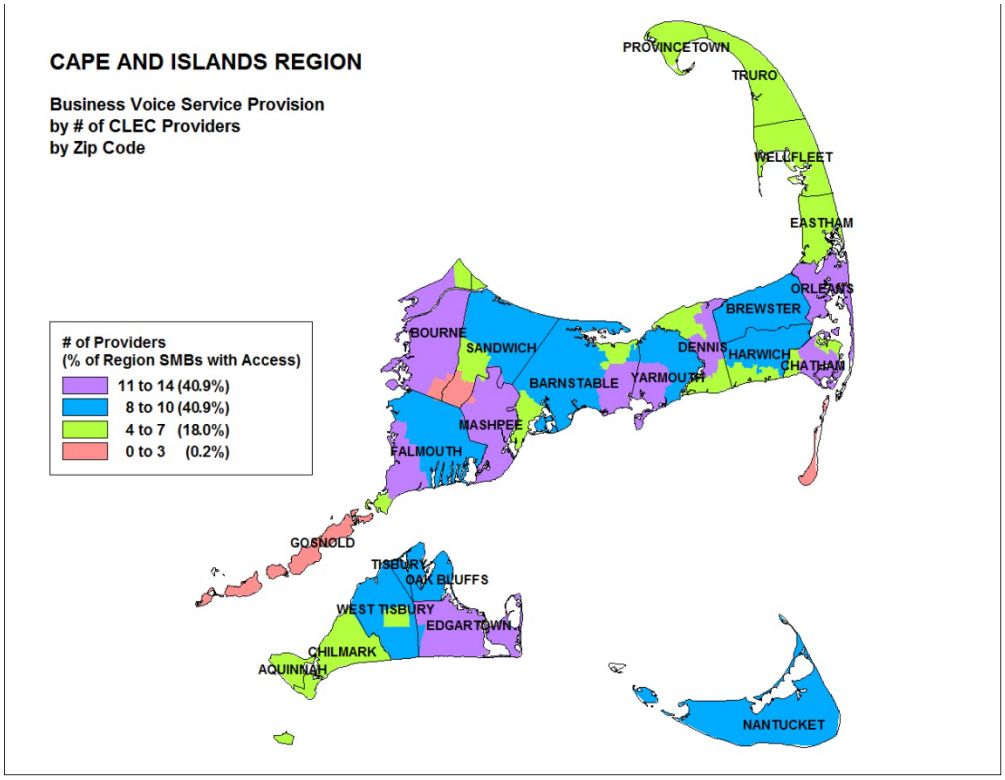


Figure CI-7: Business Voice Provision by Number of Resale Providers, December 2007

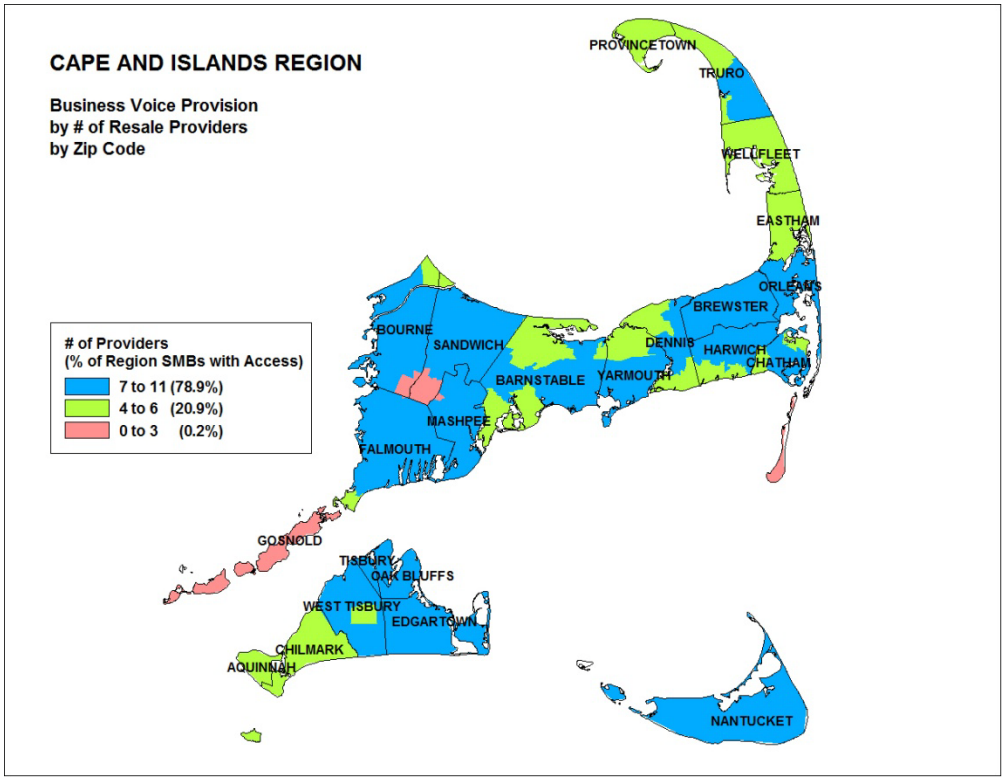


Figure CI-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

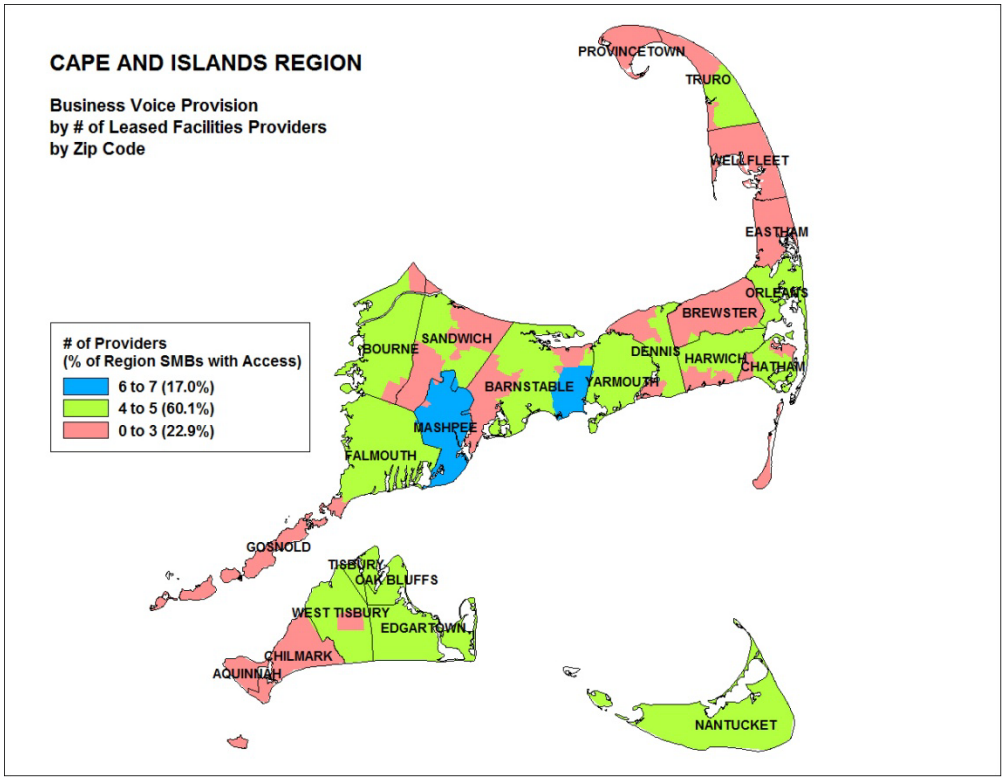
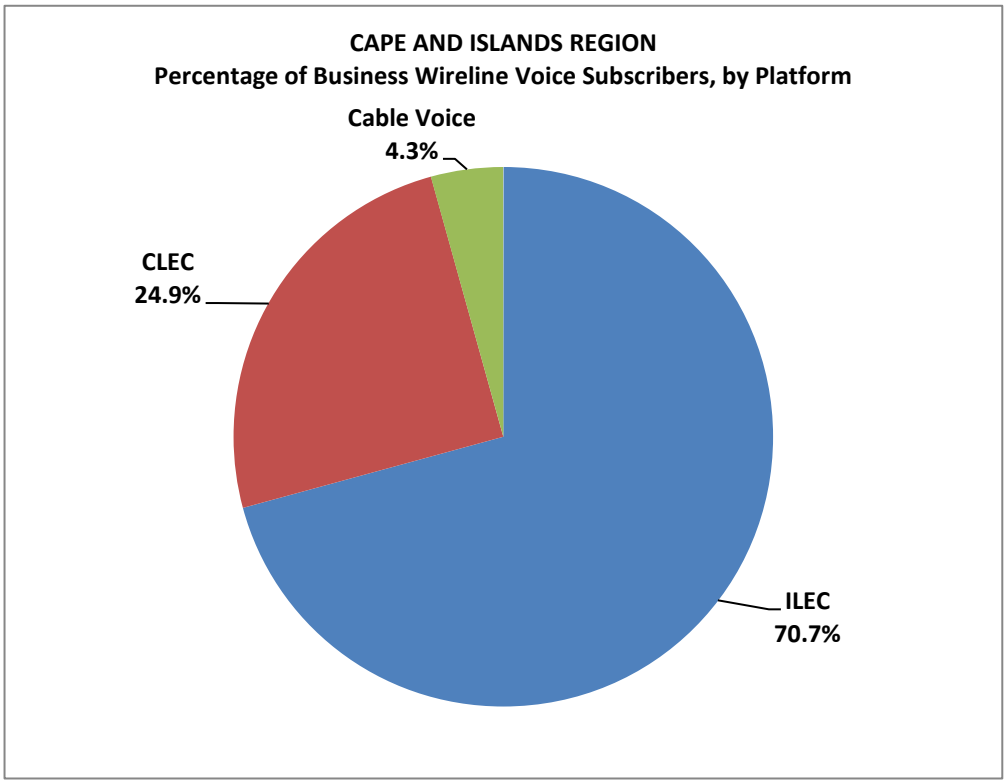


Figure CI-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure CI-10: Availability of Wireless Voice by Number of Providers, December 2008

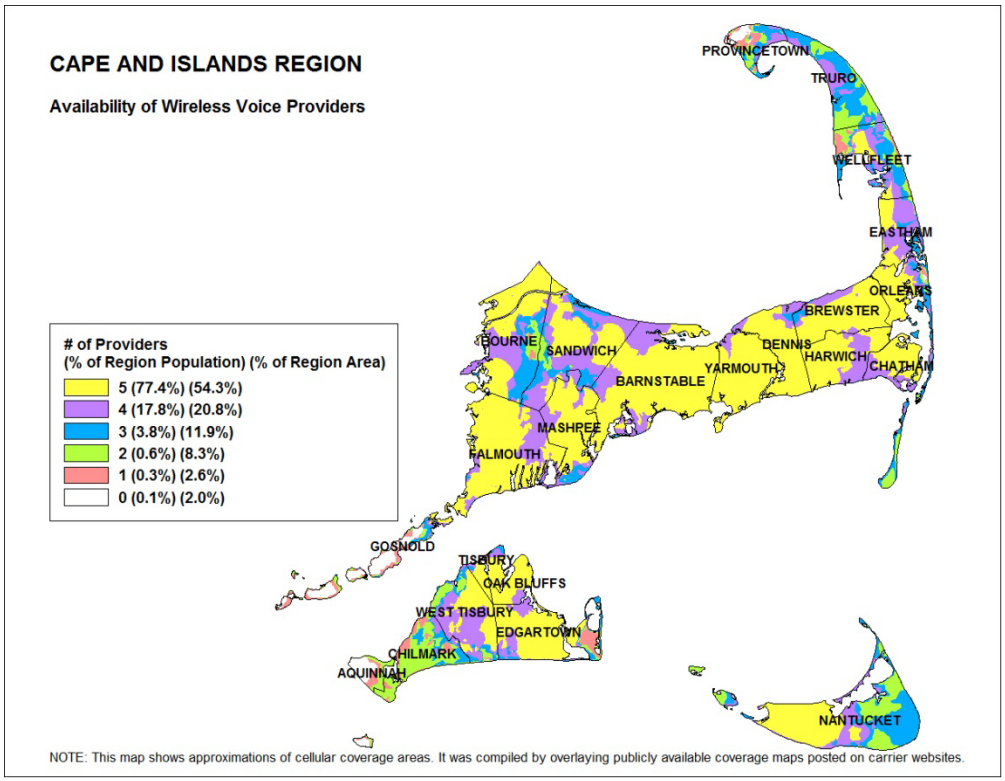
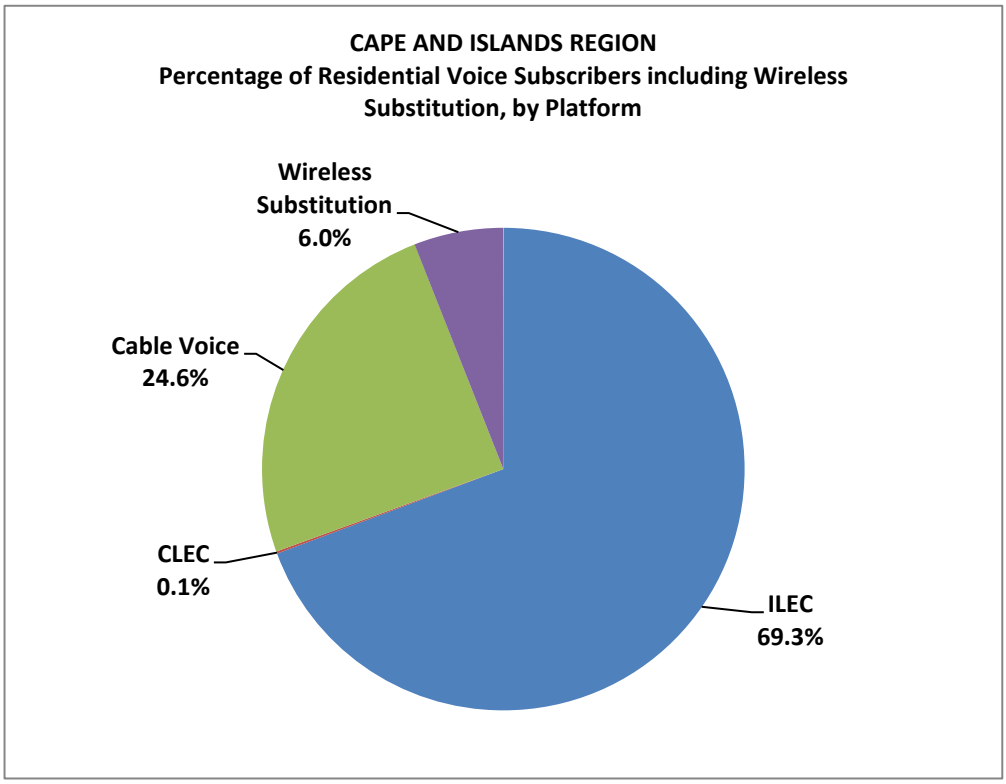


Figure CI-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure CI-12: Incumbent Cable Video Service Providers, 2008

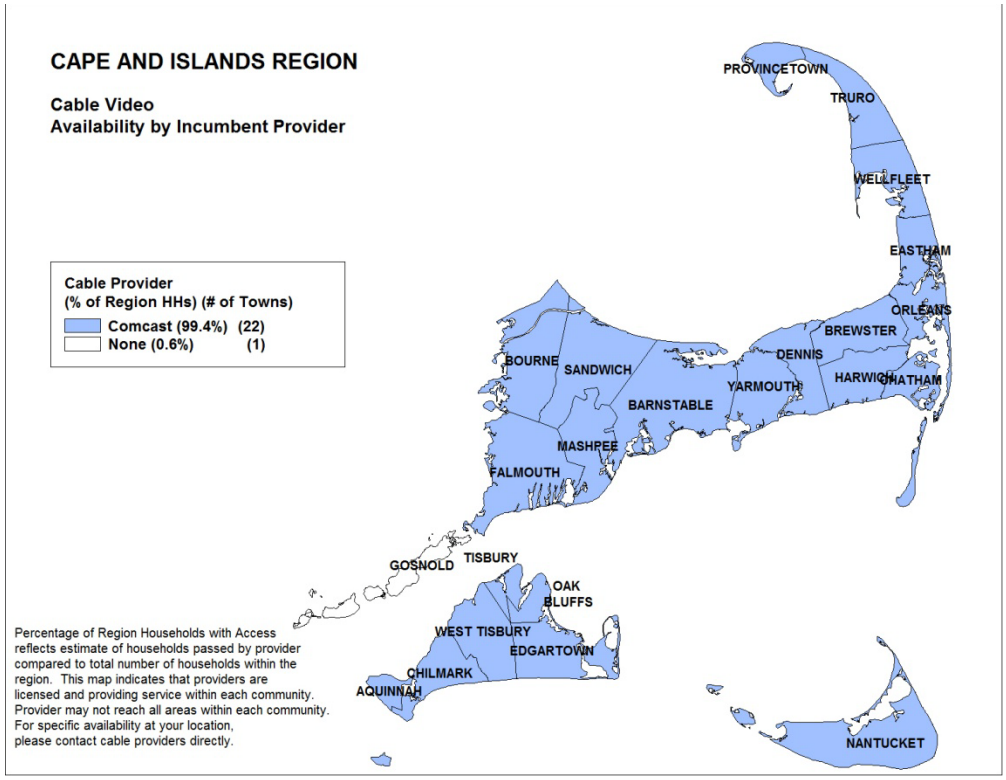


Figure CI-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

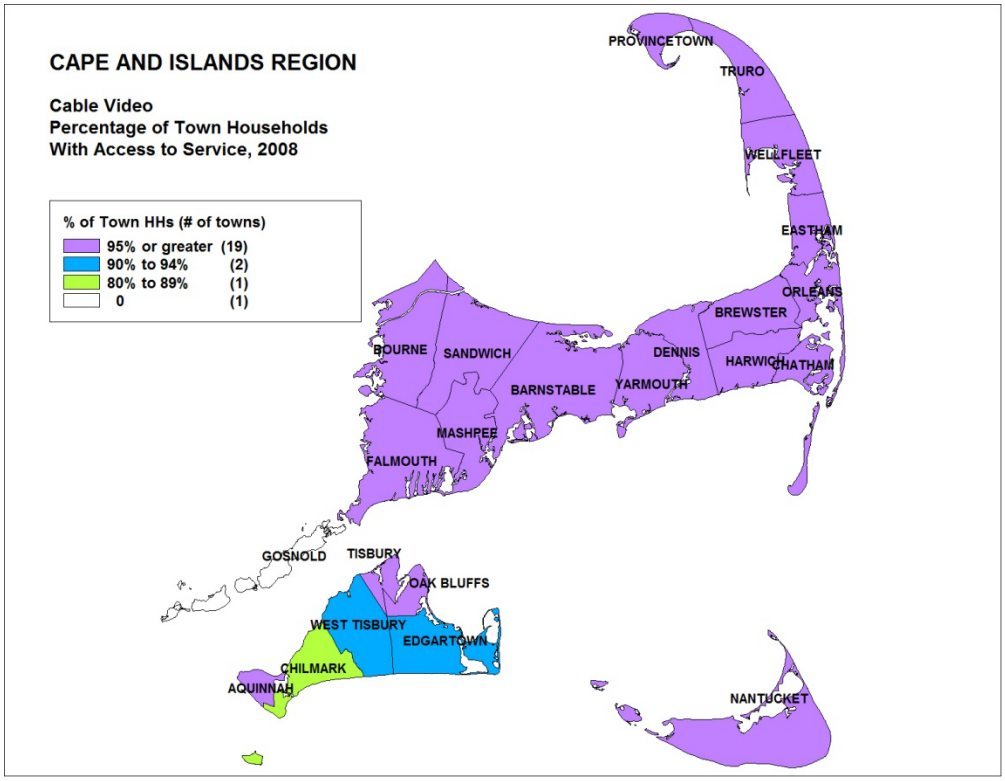


Figure CI-14: Cable Video Subscribers, by Provider, 2005-2008

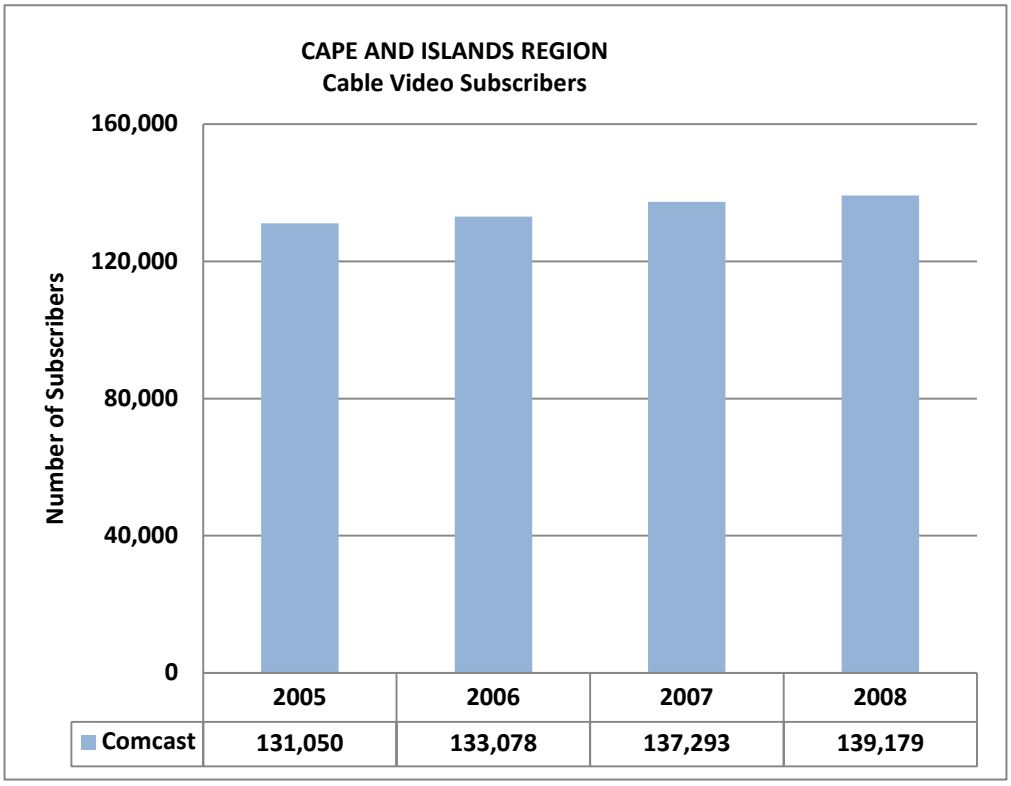
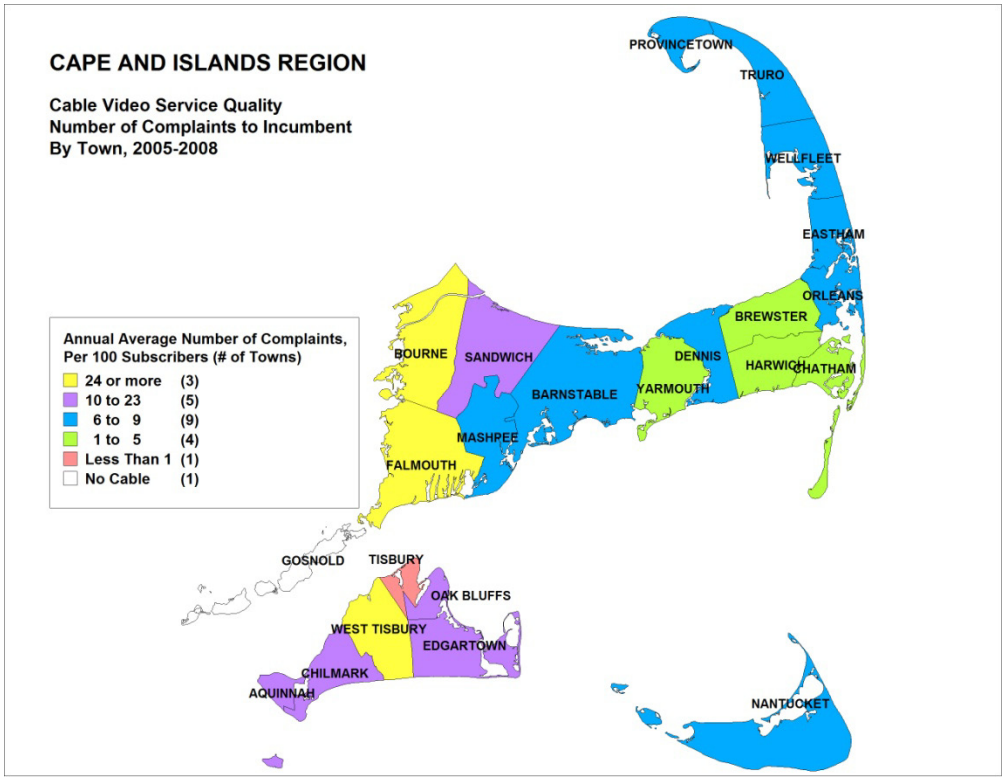


Figure CI-15: Incumbent Cable Video Provider Complaints, 2005-2008



Central

I. Residential Voice

Figure CE-1: Availability of ILEC Voice Providers, by Town, December 2008

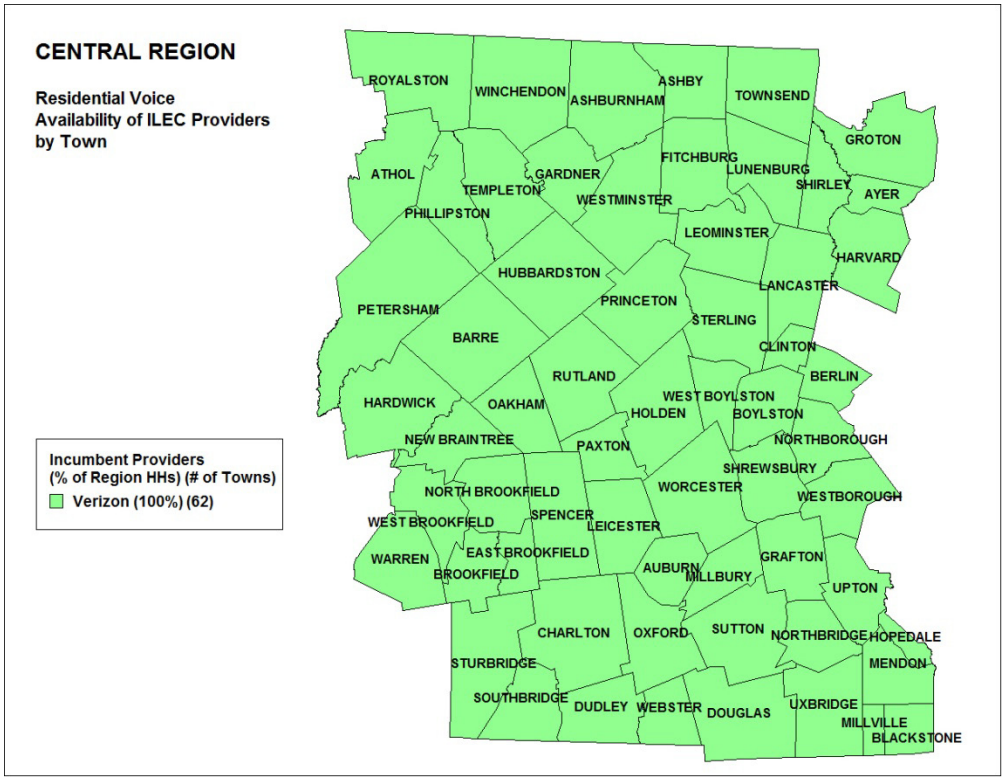


Figure CE-2: Availability of Cable Voice Providers, by Town, December 2008

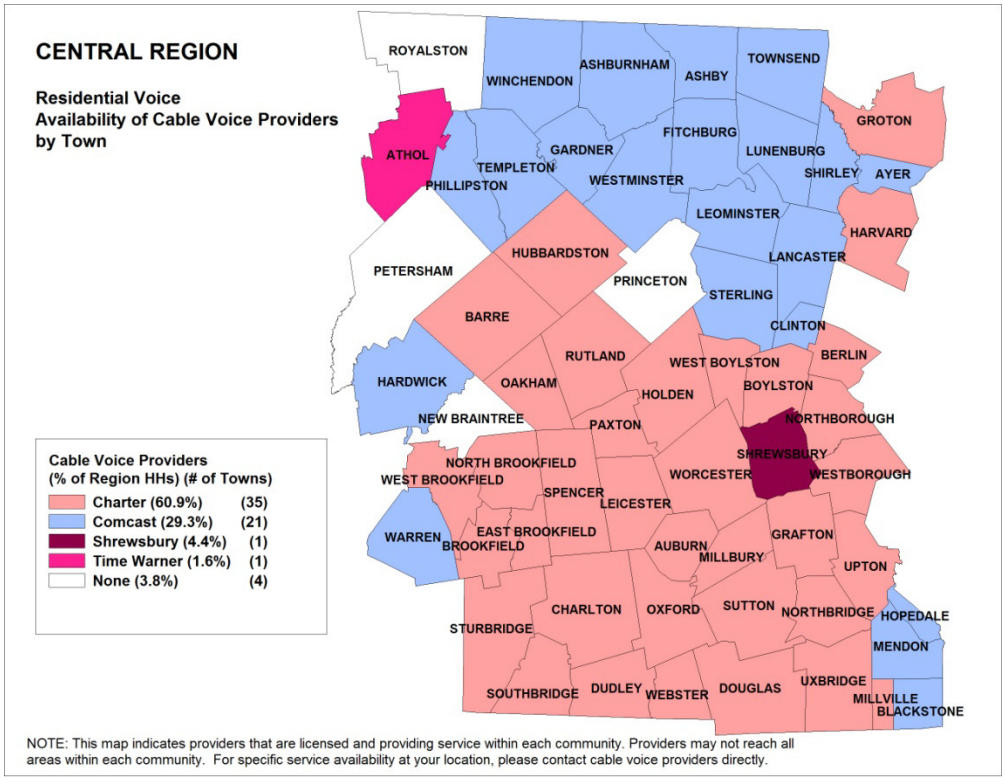


Figure CE-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

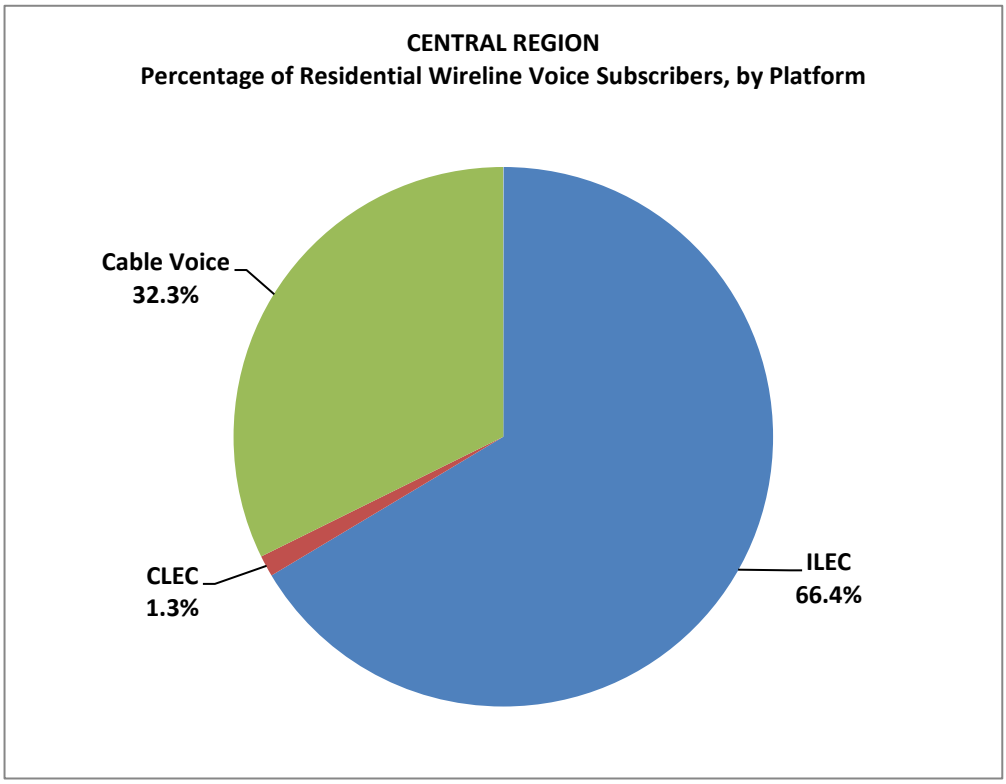


Figure CE-4: Verizon's Average Annual Trouble Reports, 2005-2008

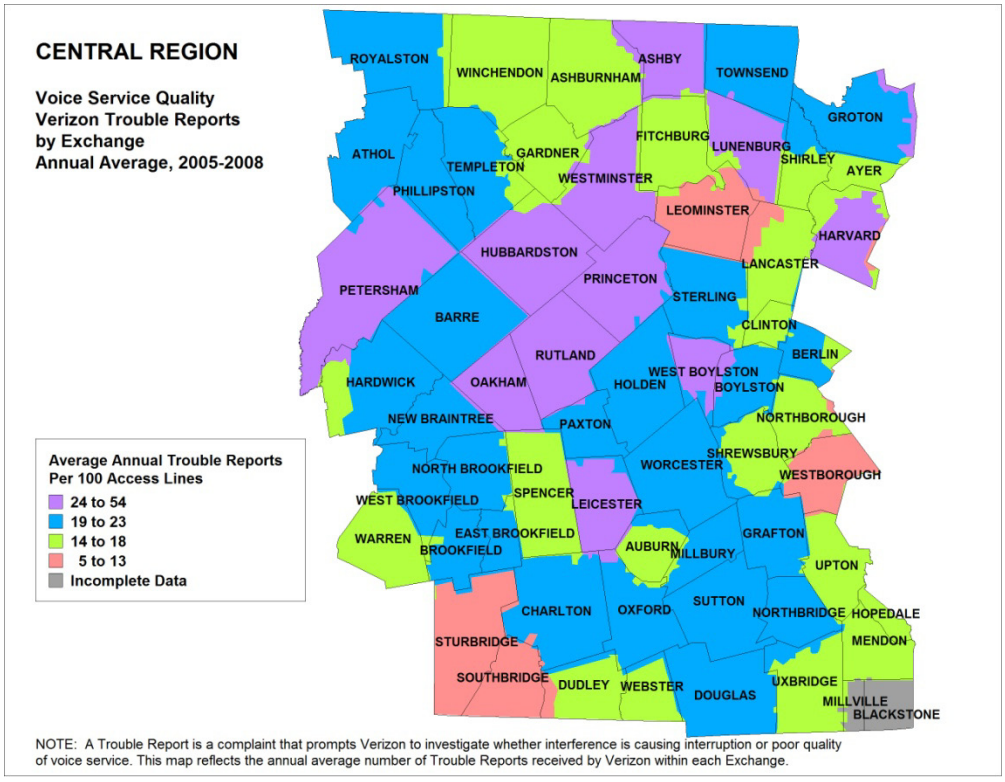
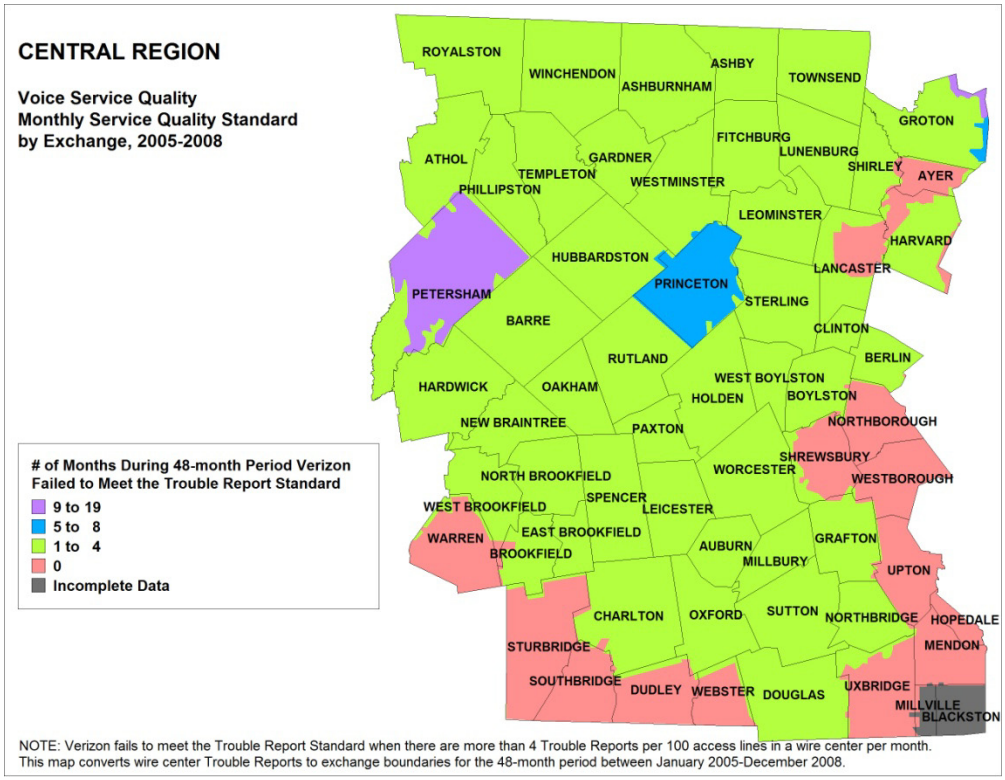


Figure CE-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure CE-6: Business Voice Provision by Number of CLEC Providers, December 2007

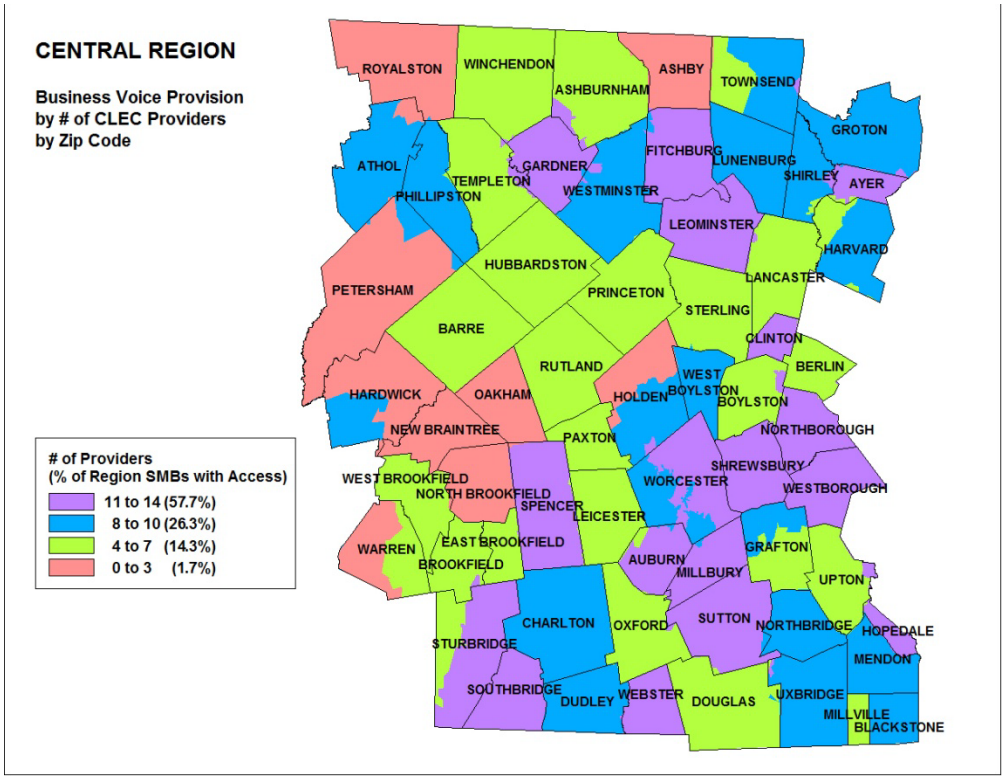


Figure CE-7: Business Voice Provision by Number of Resale Providers, December 2007

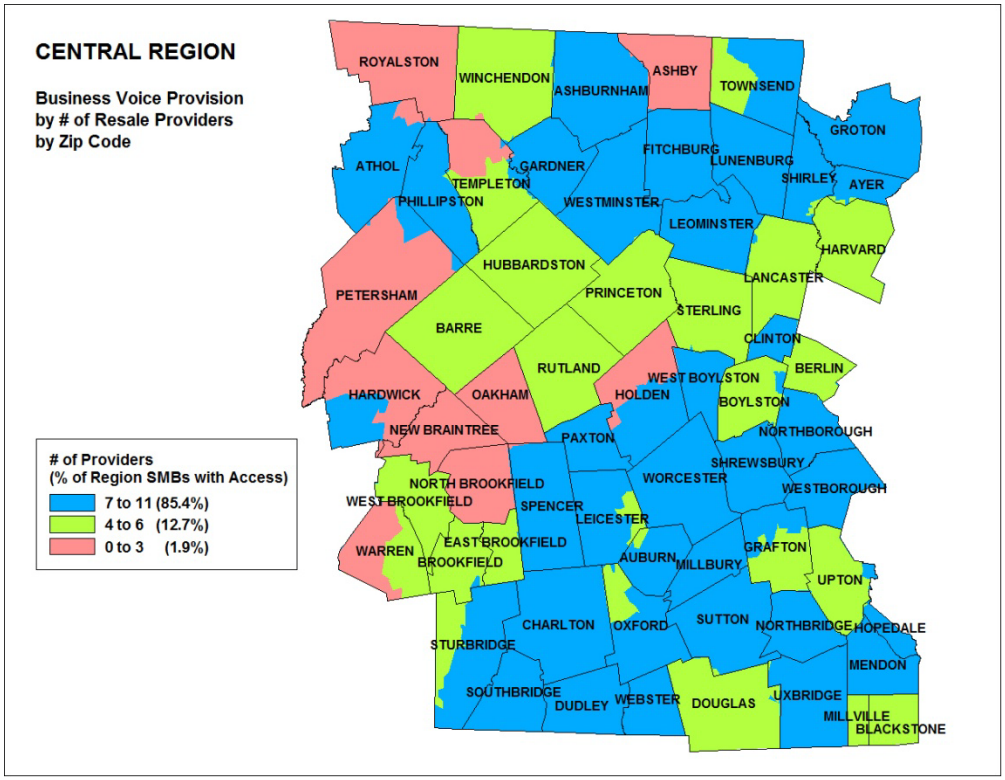


Figure CE-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

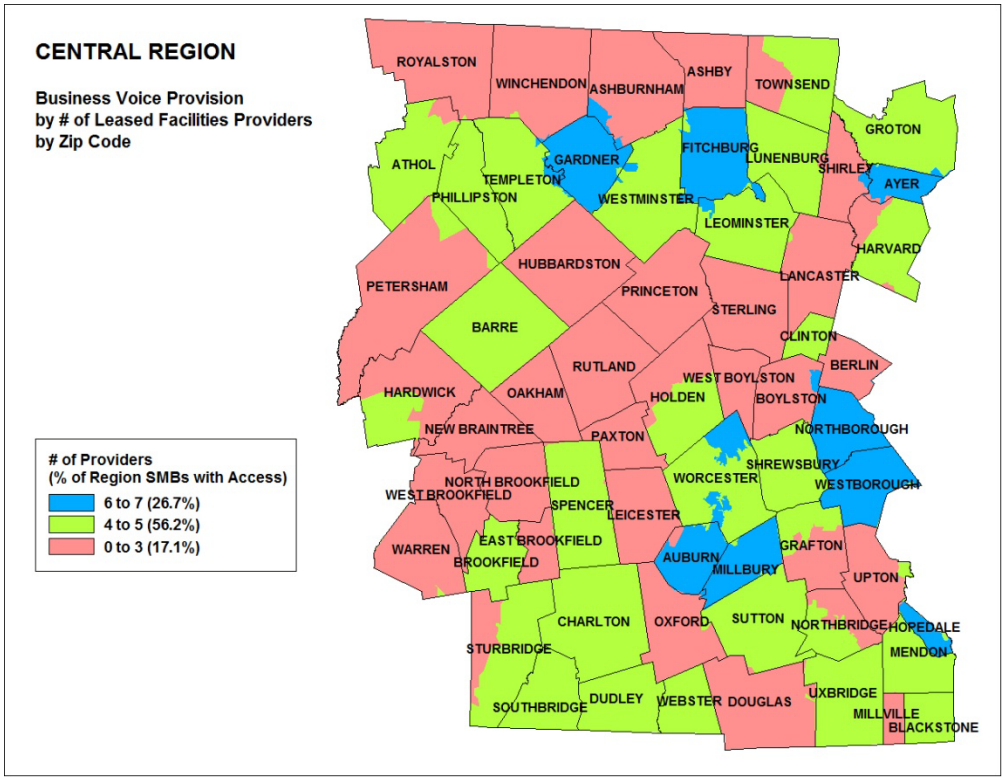
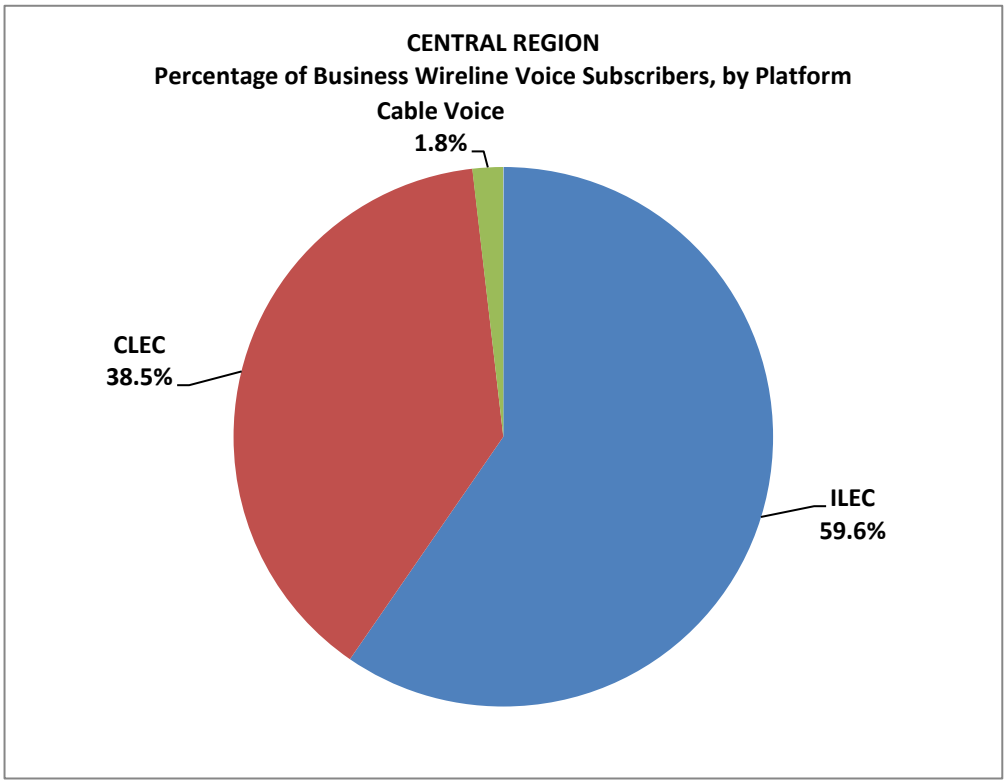


Figure CE-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure CE-10: Availability of Wireless Voice by Number of Providers, December 2008

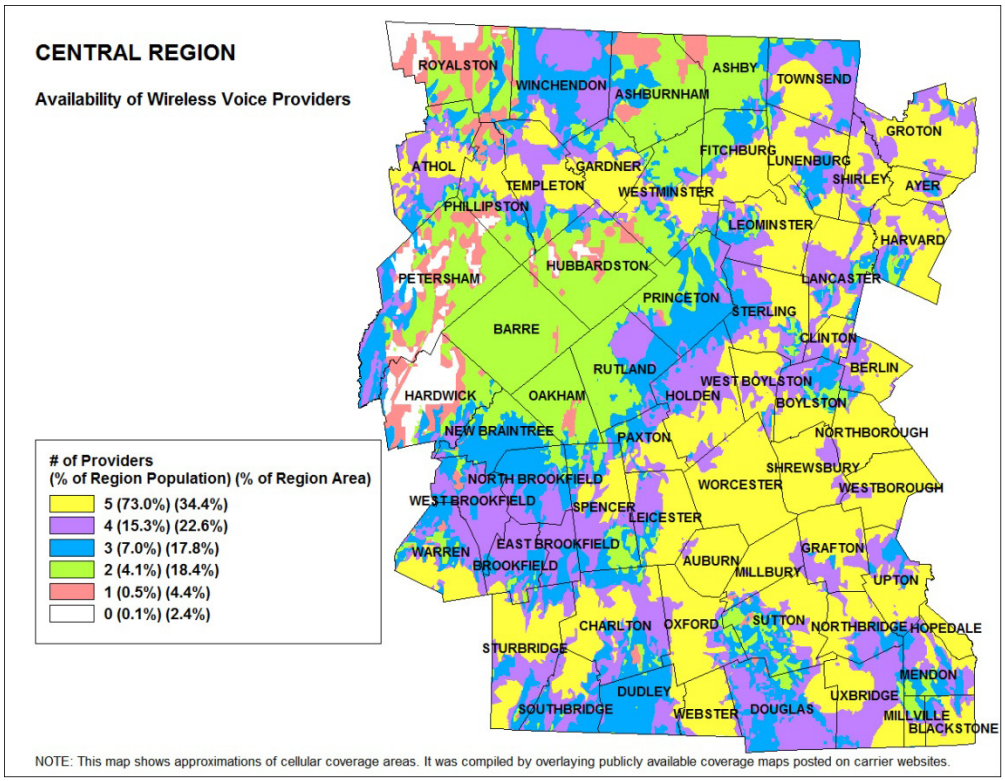
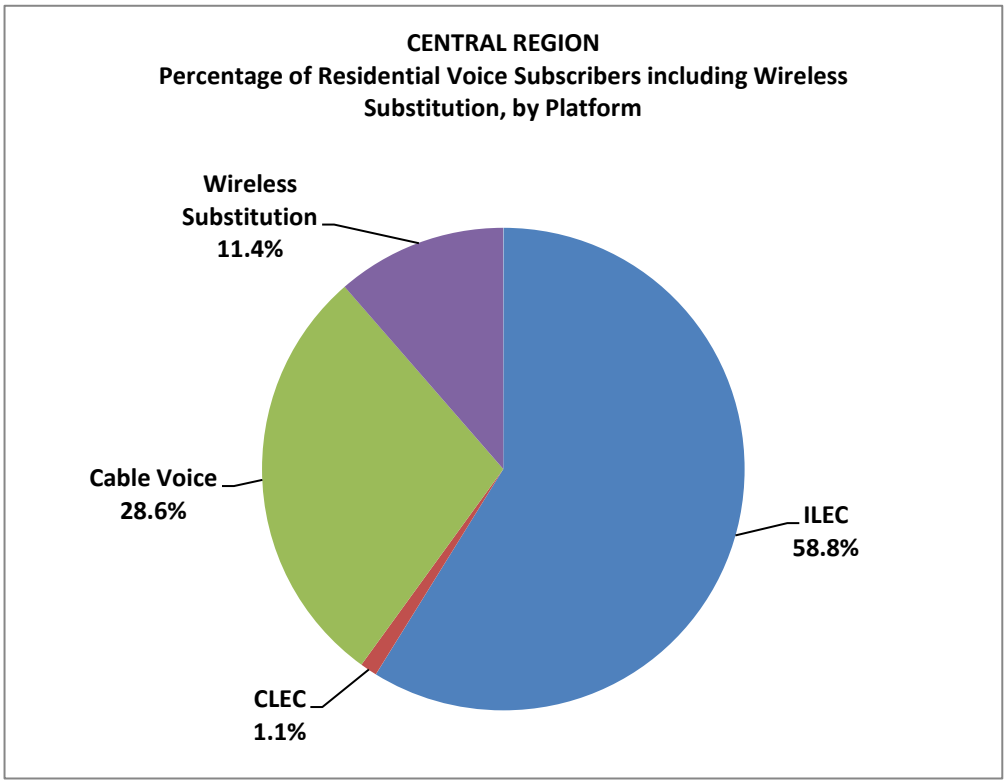


Figure CE-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure CE-12: Incumbent Cable Video Service Providers, 2008

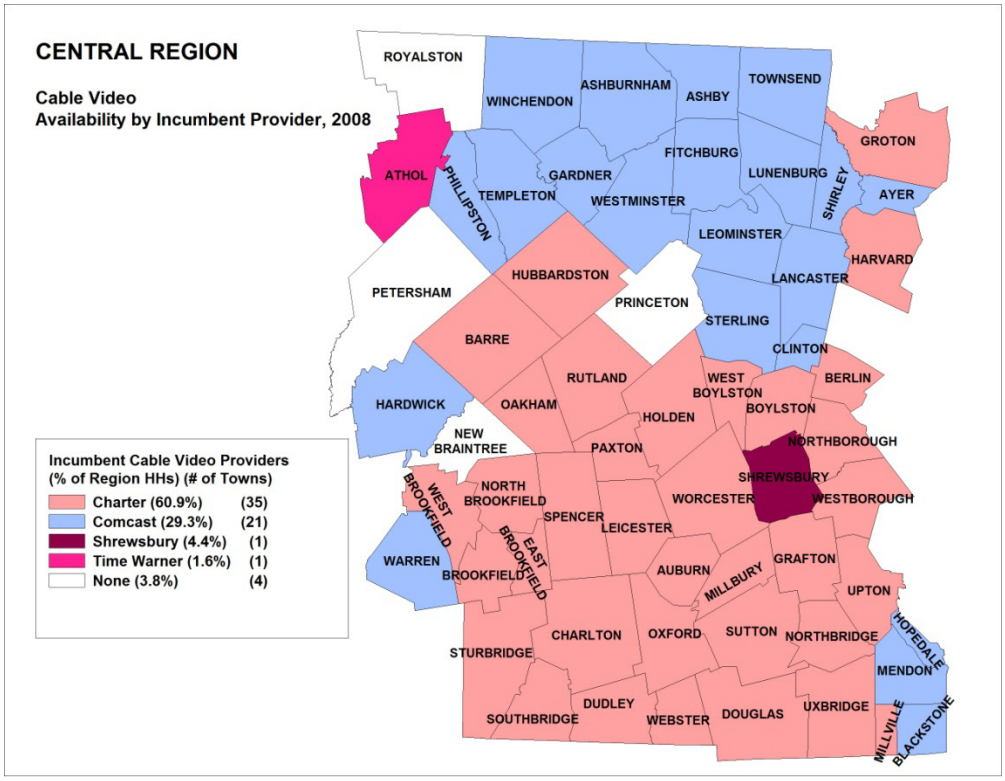


Figure CE-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

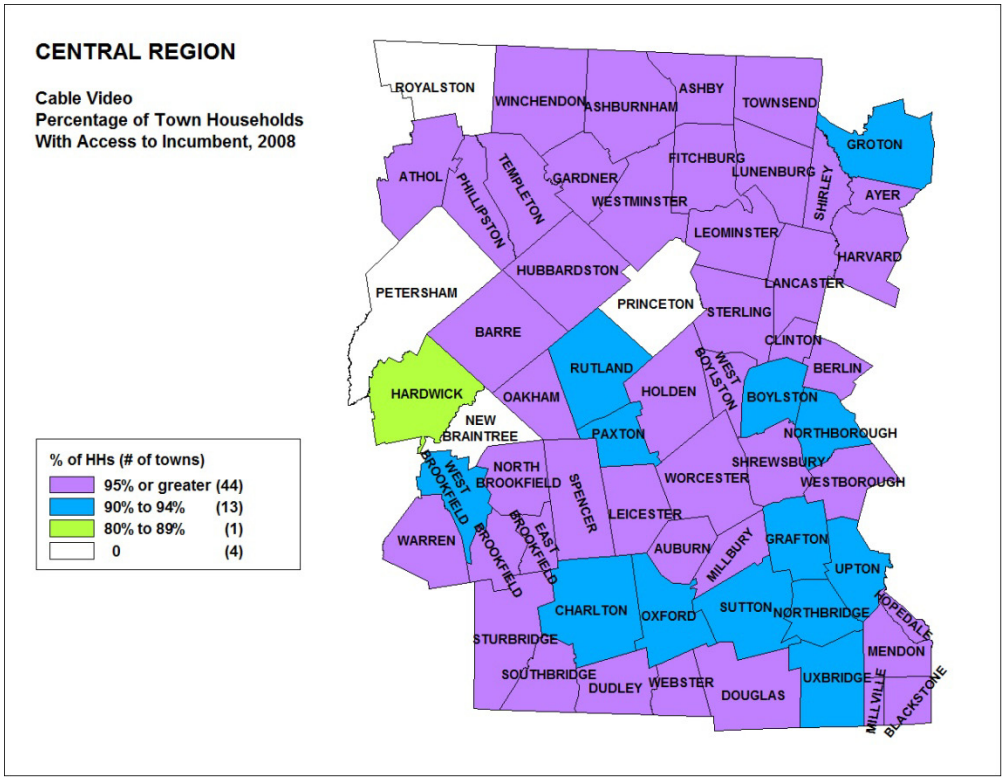


Figure CE-14: Active Cable Video Service Providers, December 2007

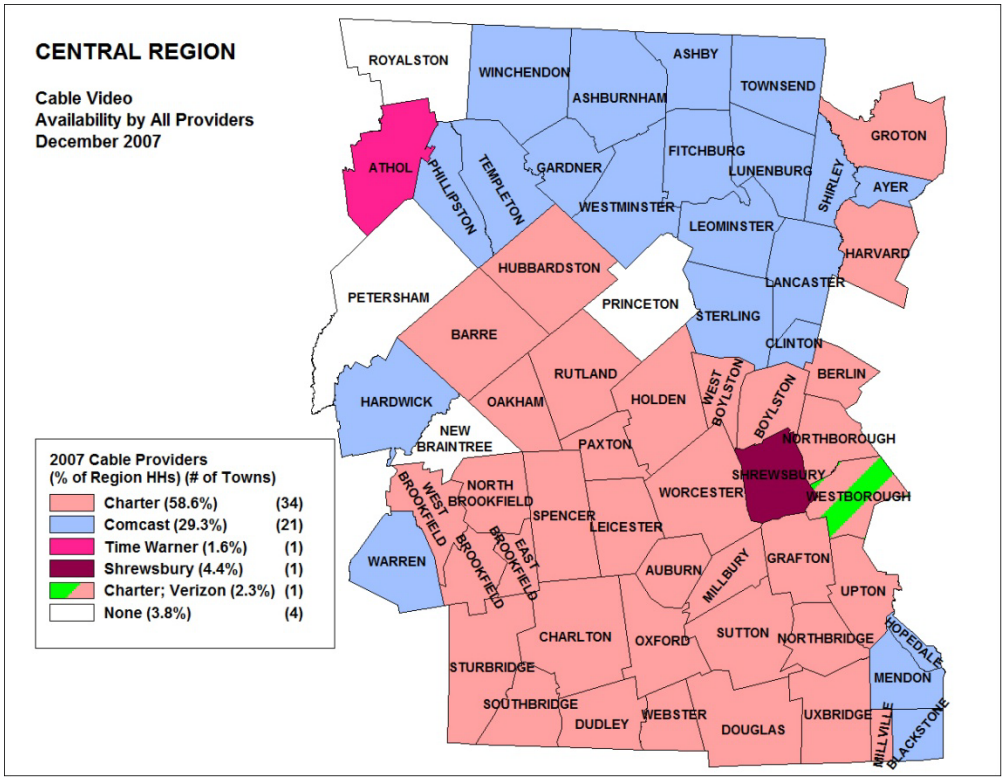


Figure CE-15: Active Cable Video Service Providers, December 2008

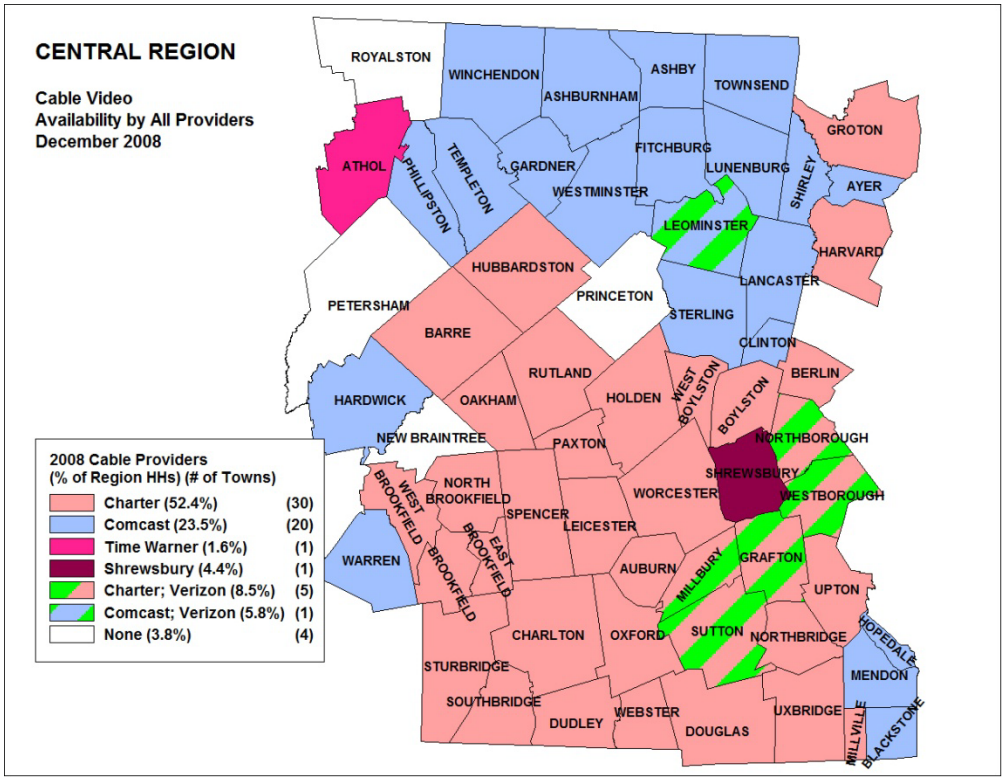


Figure CE-16: Active Cable Video Service Providers, June 2009

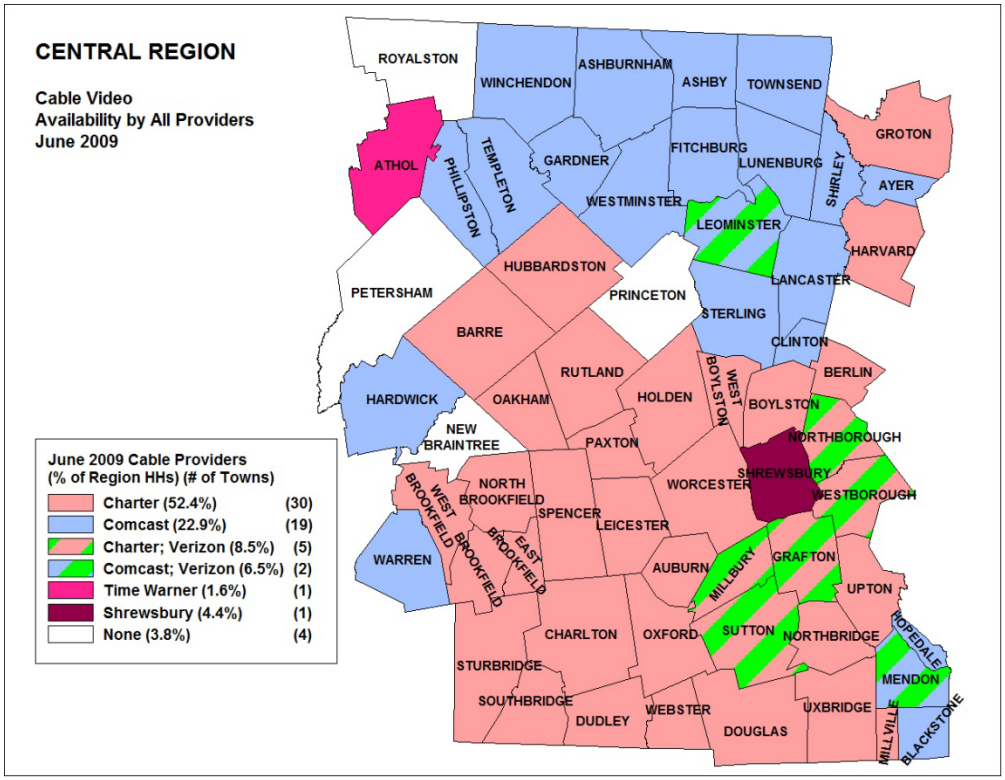
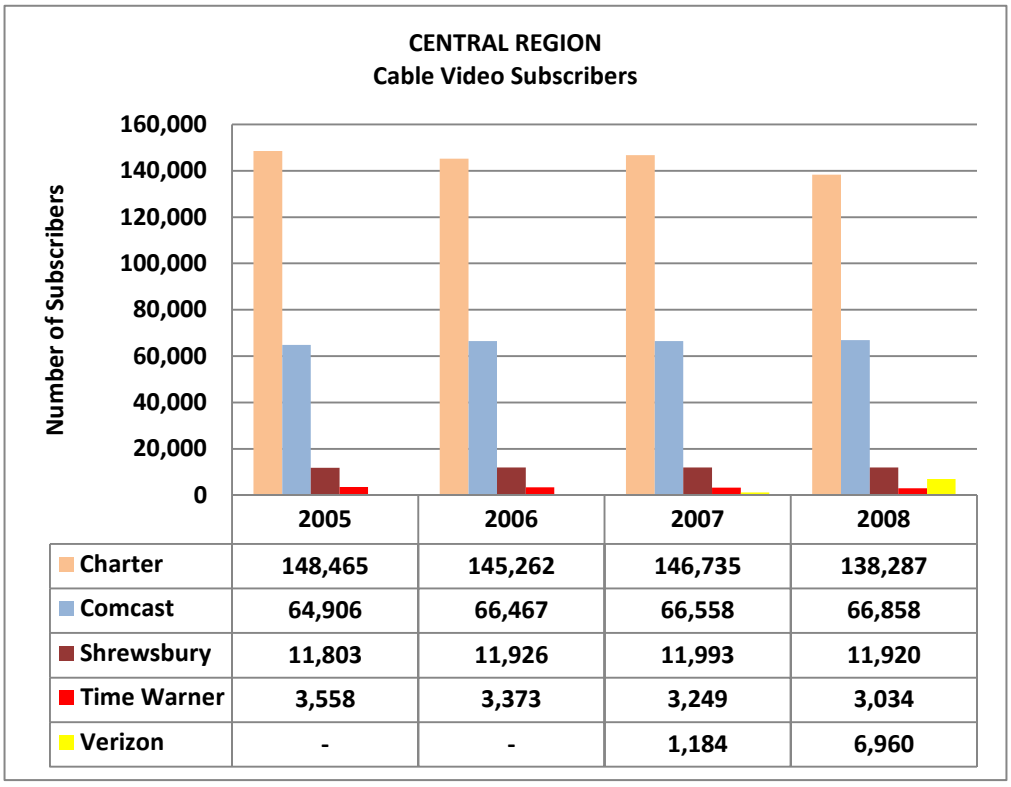
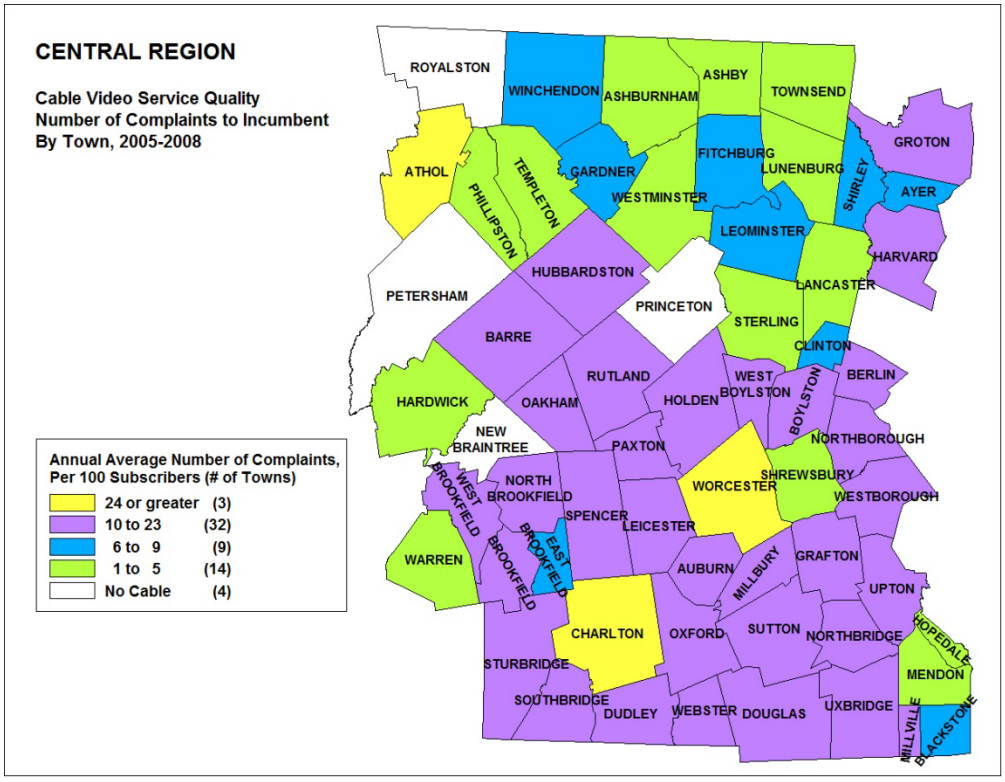


Figure CE-17: Cable Video Subscribers, by Provider, 2005-2008



	2005	2006	2007	2008
Charter	148,465	145,262	146,735	138,287
Comcast	64,906	66,467	66,558	66,858
Shrewsbury	11,803	11,926	11,993	11,920
Time Warner	3,558	3,373	3,249	3,034
Verizon	-	-	1,184	6,960

Figure CE-18: Incumbent Cable Video Provider Complaints, 2005-2008



Northeast

I. Residential Voice

Figure NE-1: Availability of ILEC Voice Providers, by Town, December 2008

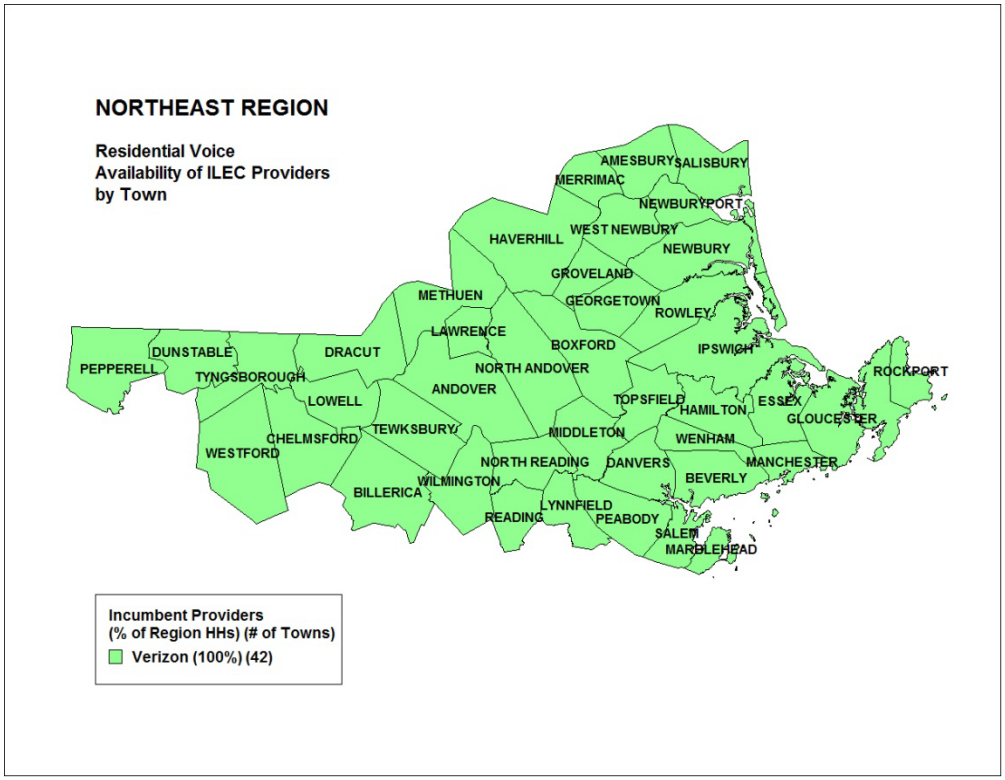


Figure NE-2: Availability of Cable Voice Providers, by Town, December 2008

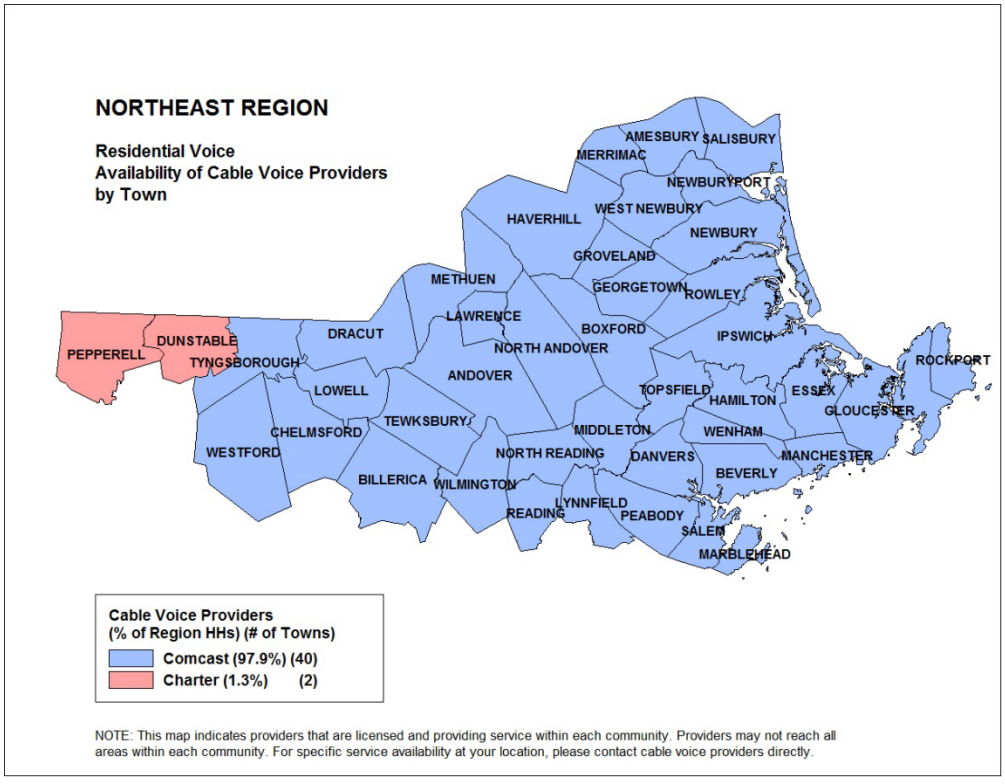


Figure NE-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

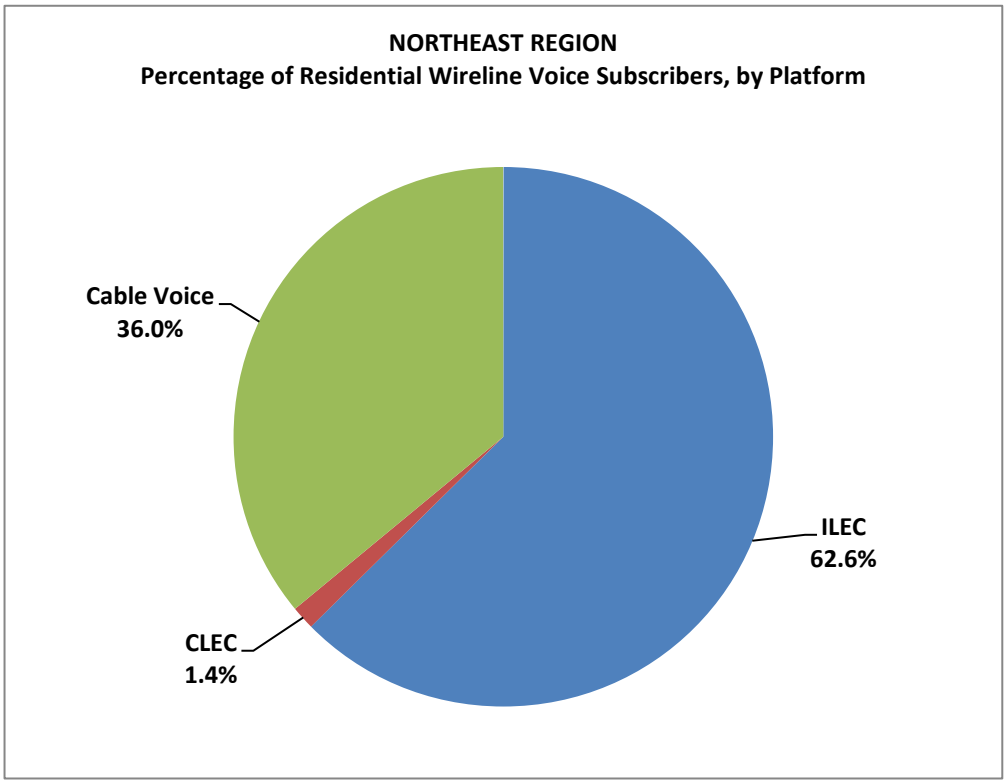


Figure NE-4: Verizon's Average Annual Trouble Reports, 2005-2008

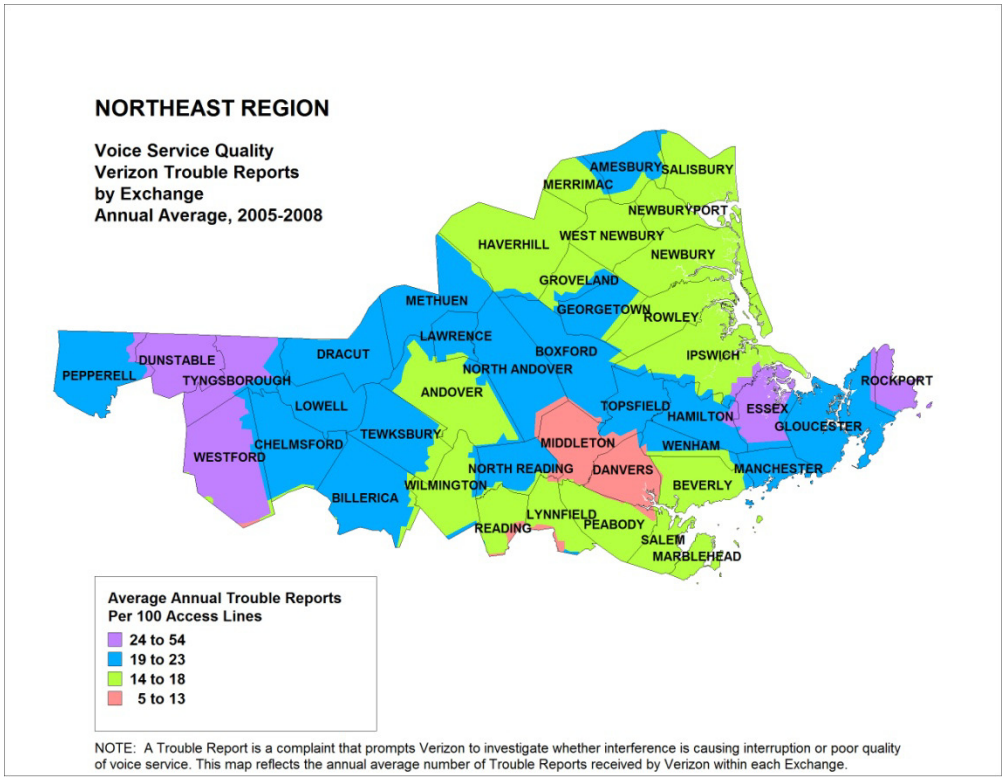
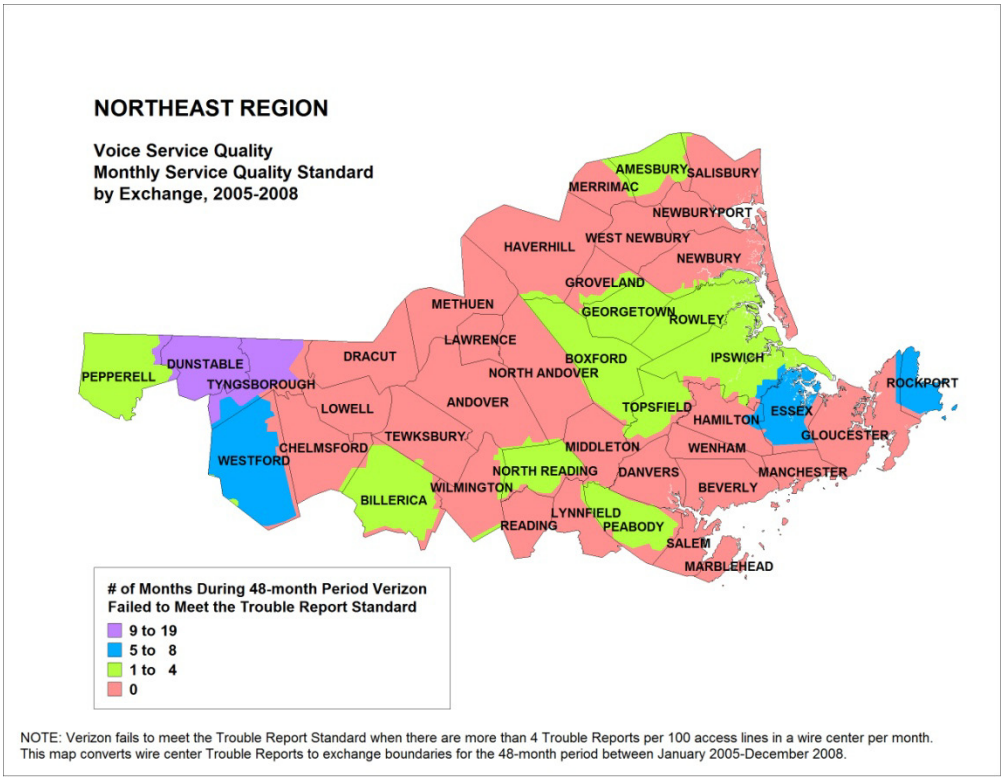


Figure NE-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure NE-6: Business Voice Provision by Number of CLEC Providers, December 2007

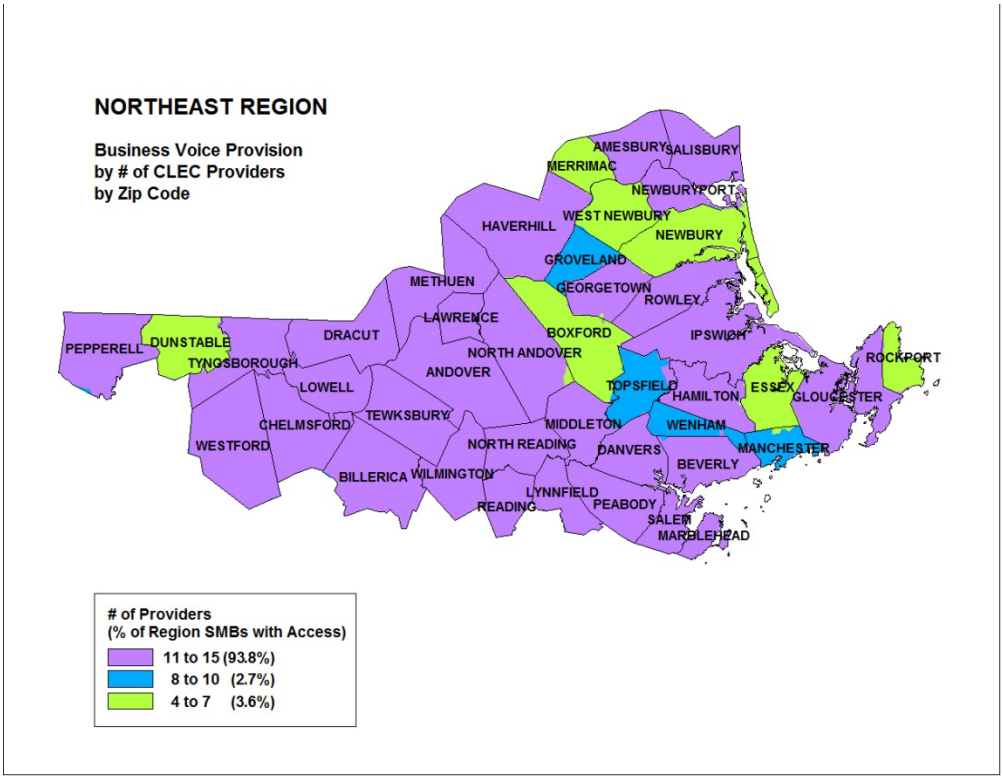


Figure NE-7: Business Voice Provision by Number of Resale Providers, December 2007

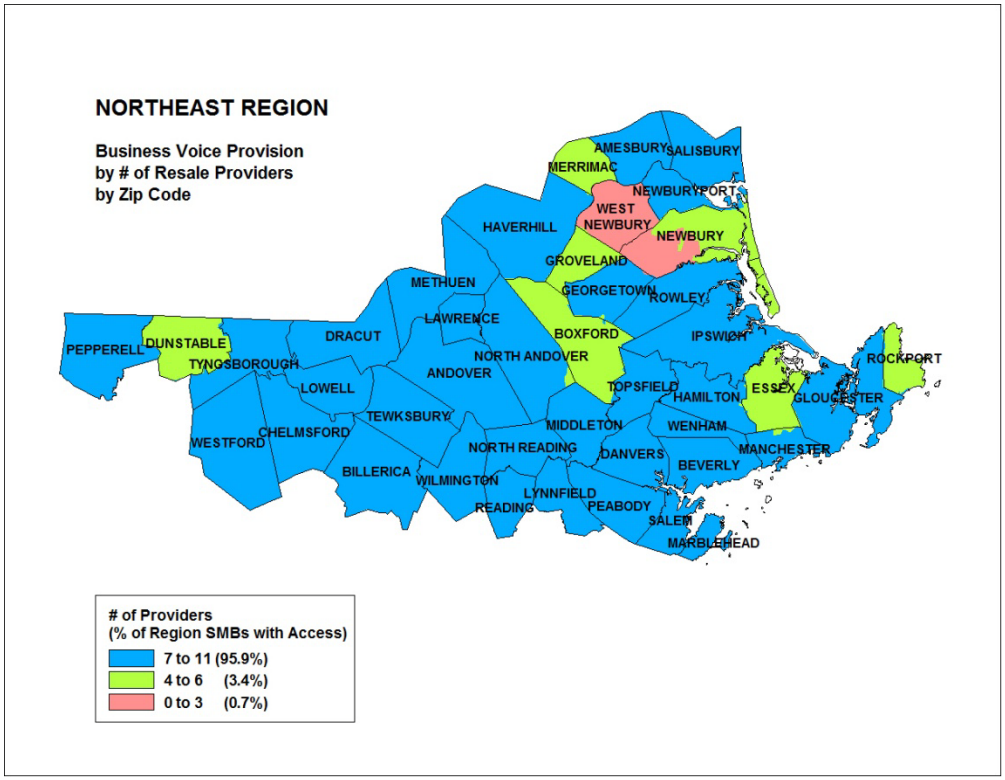


Figure NE-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

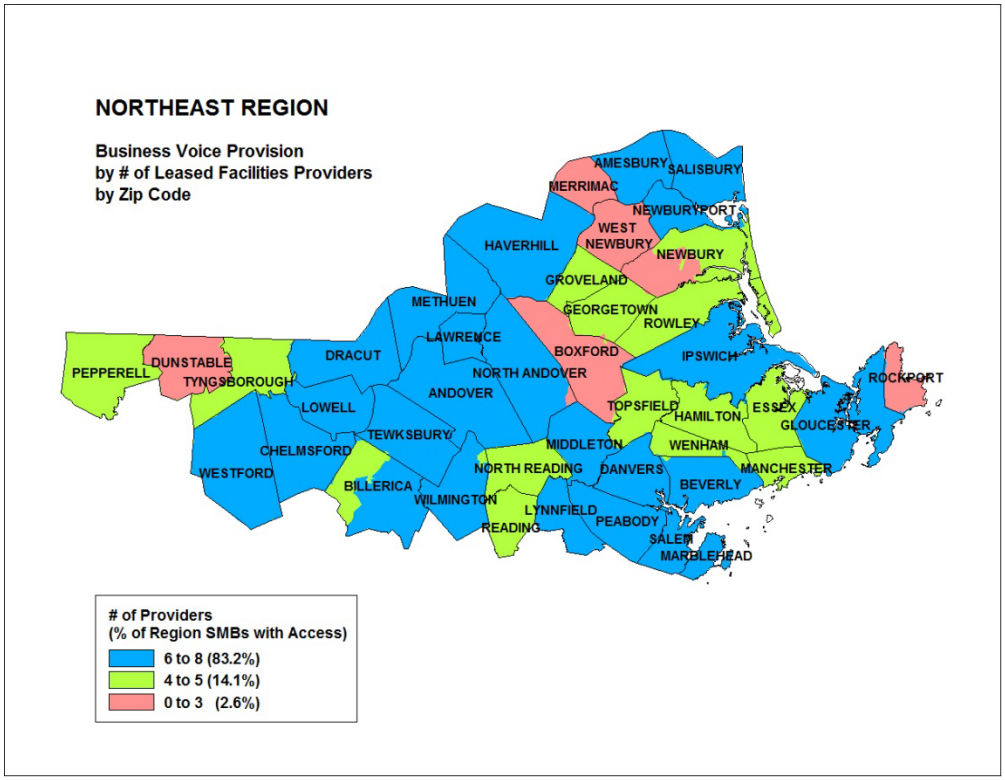
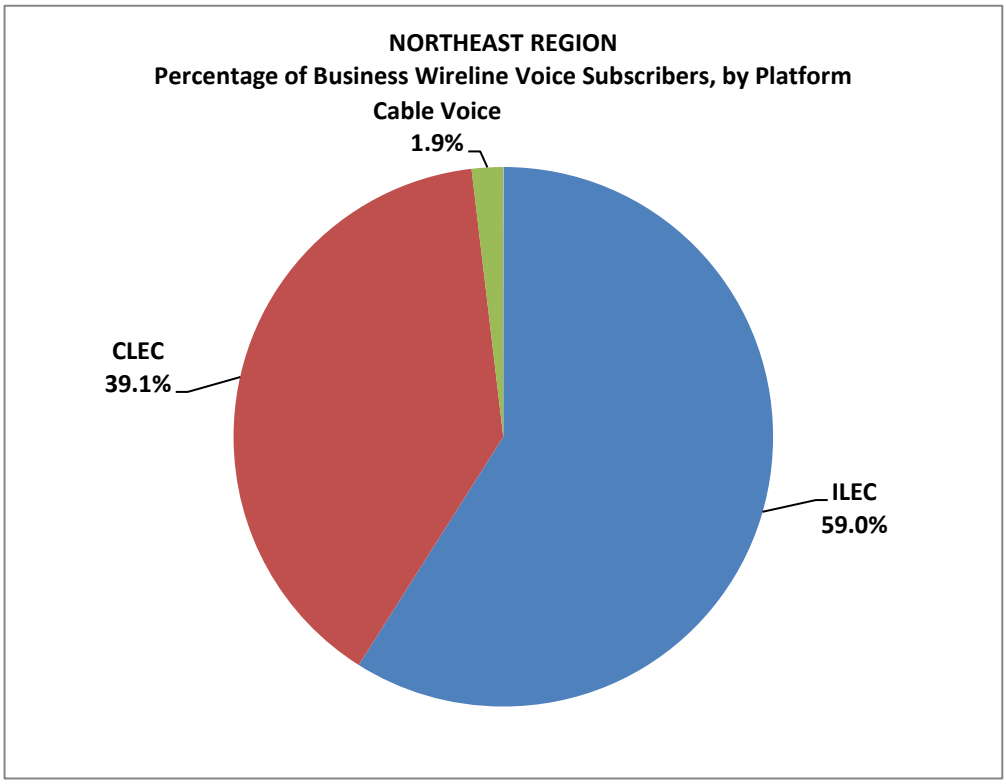


Figure NE-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure NE-10: Availability of Wireless Voice by Number of Providers, December 2008

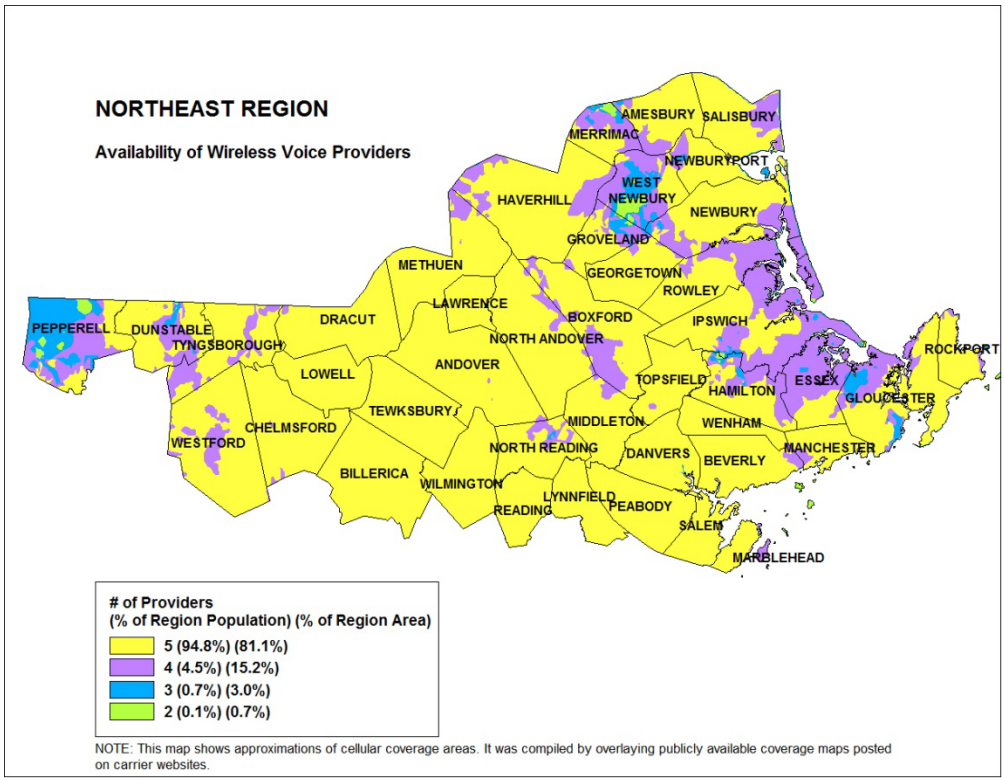
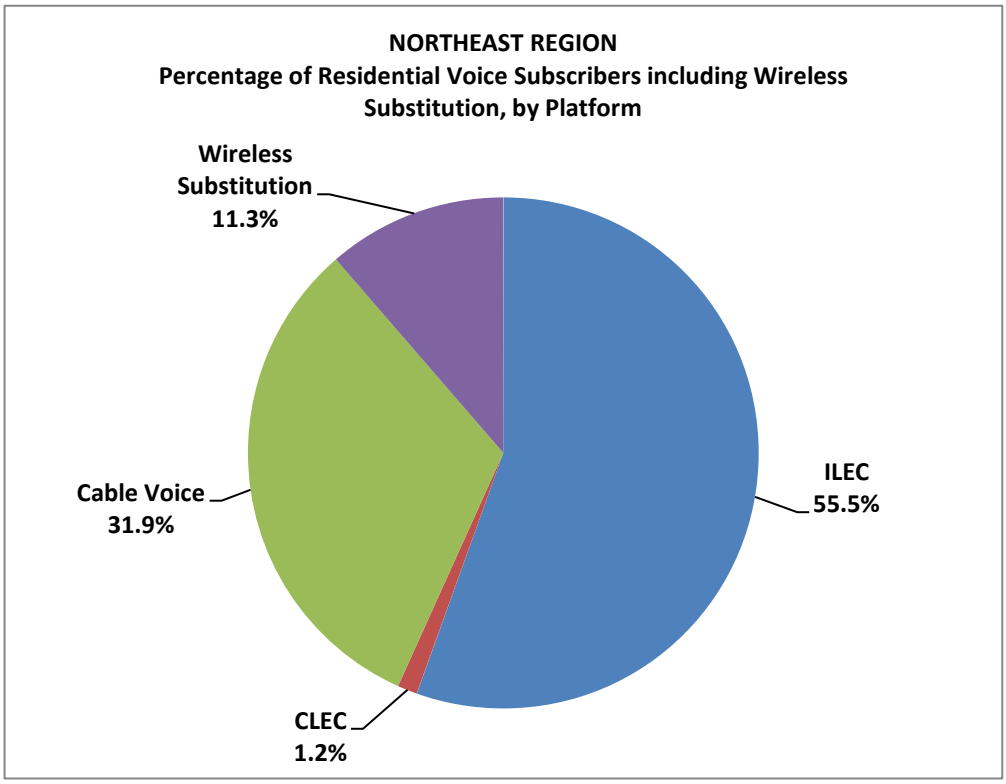


Figure NE-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure NE-12: Incumbent Cable Video Service Providers, 2008

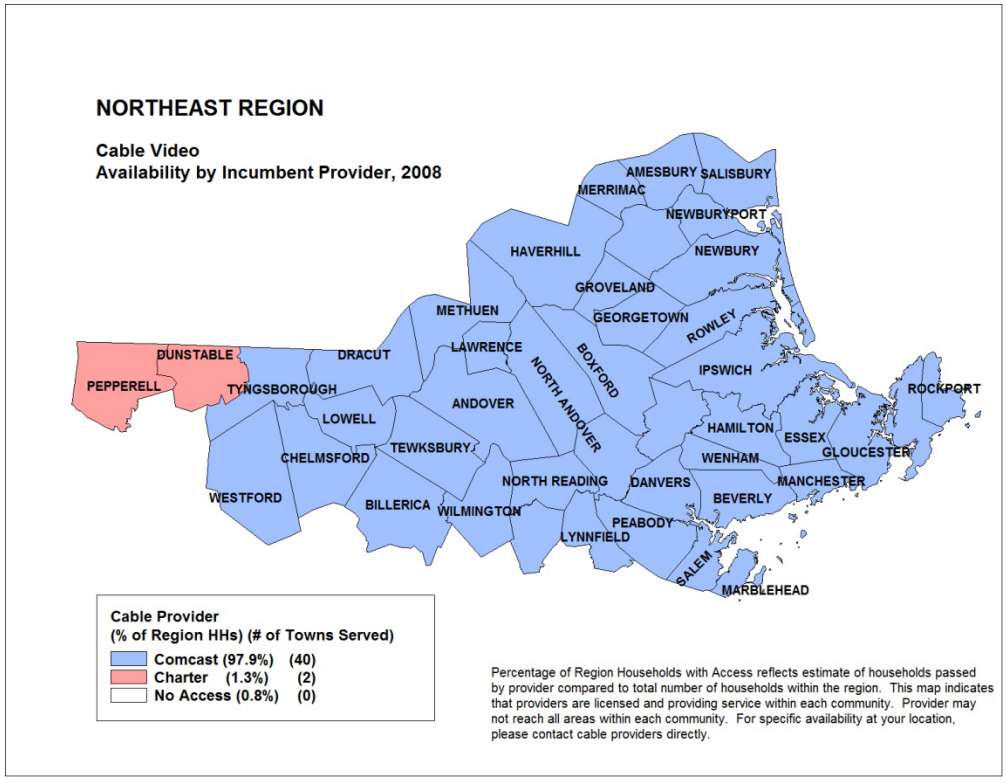


Figure NE-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

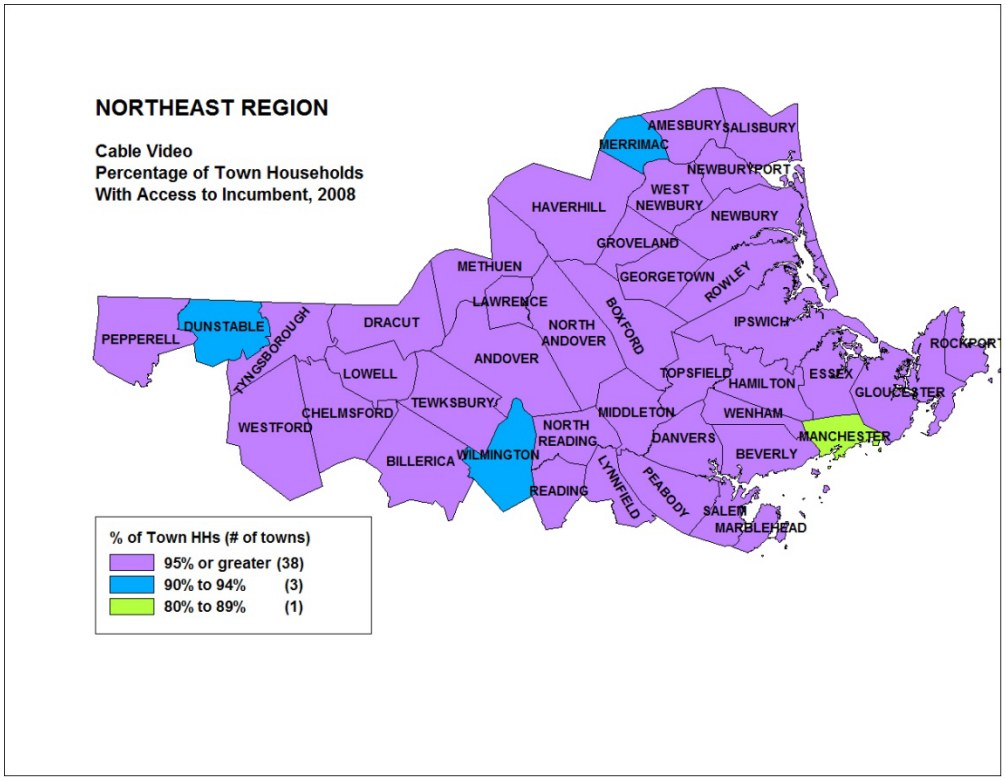


Figure NE-14: Active Cable Video Service Providers, December 2007

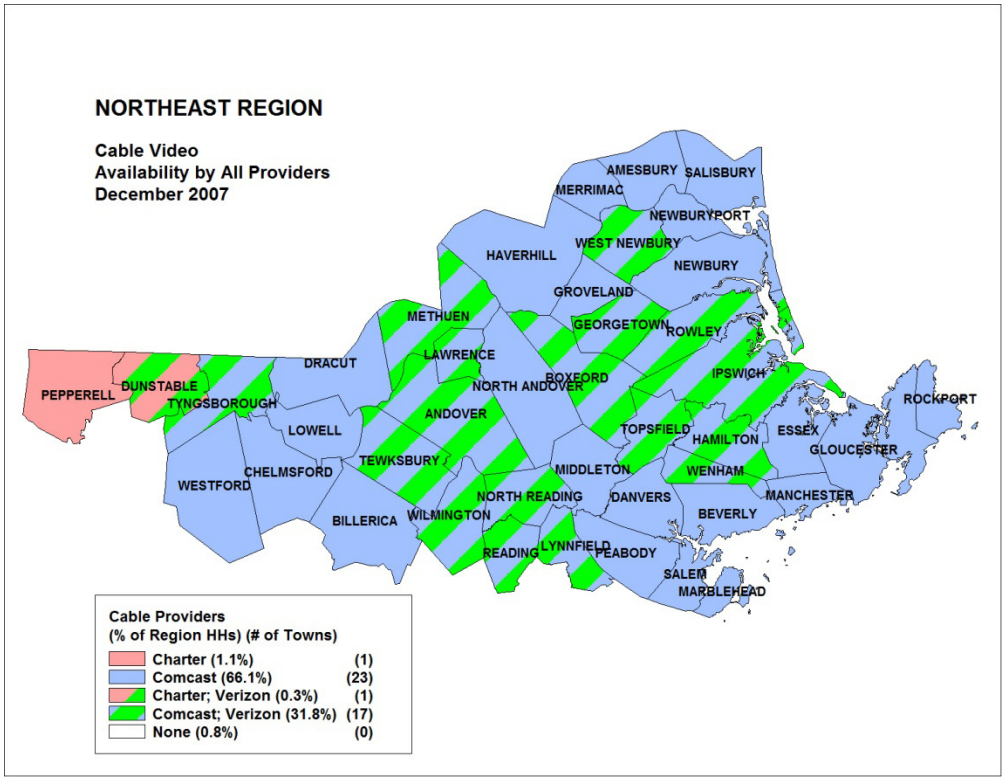


Figure NE-15: Active Cable Video Service Providers, December 2008

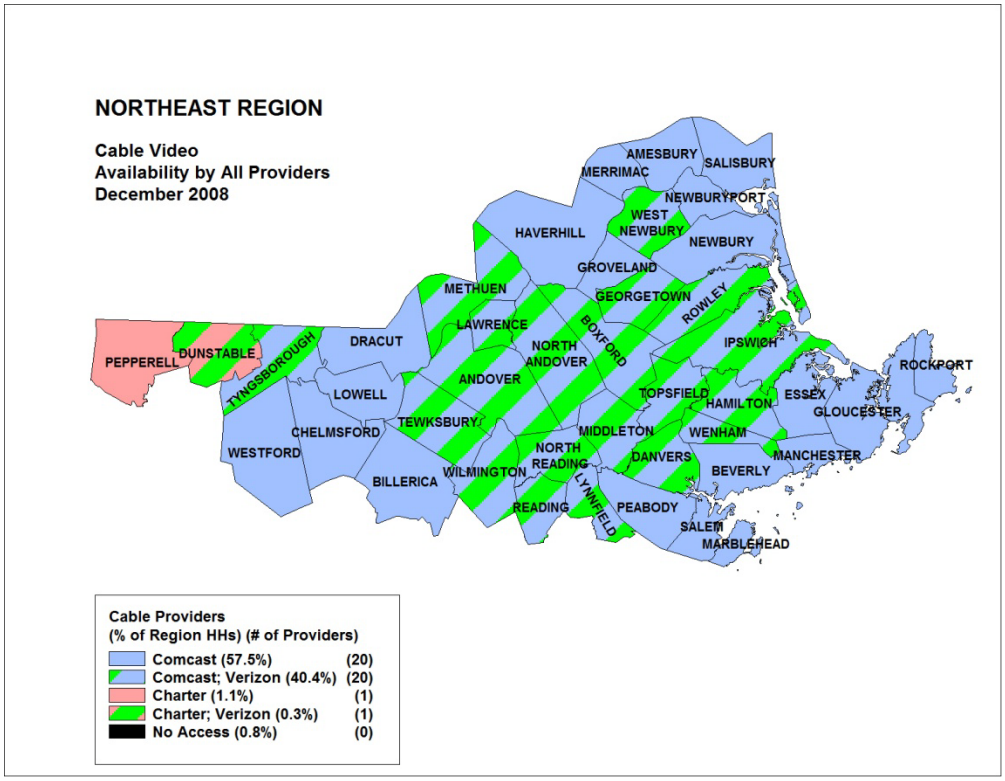


Figure NE-16: Active Cable Video Service Providers, June 2009

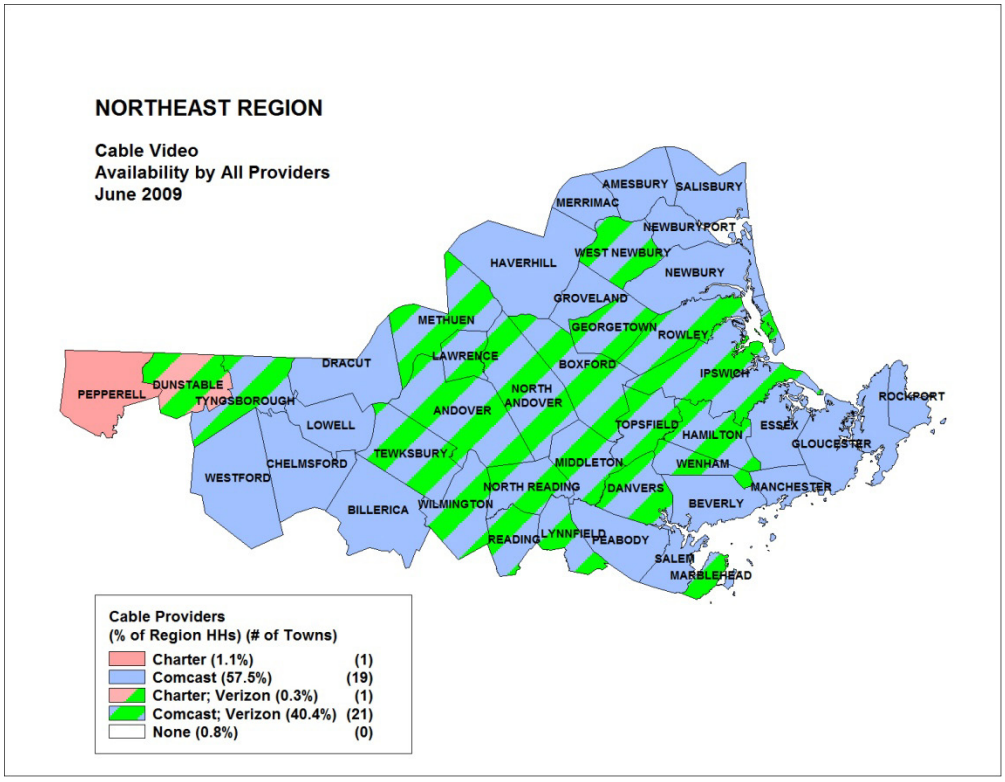
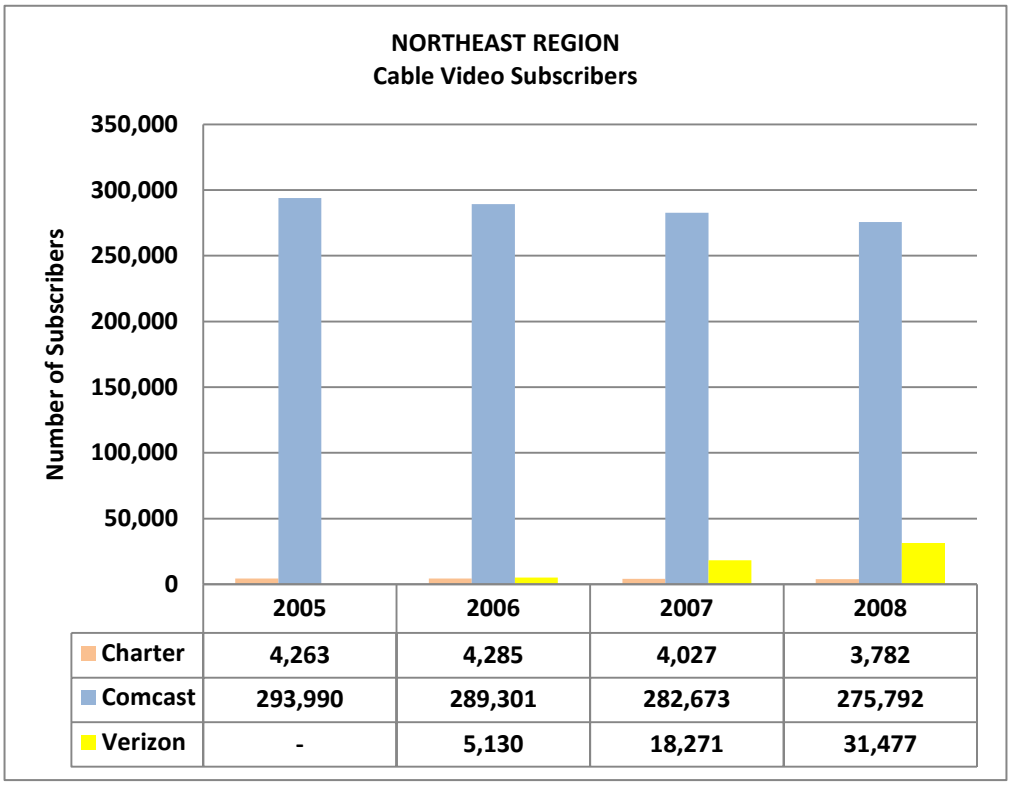
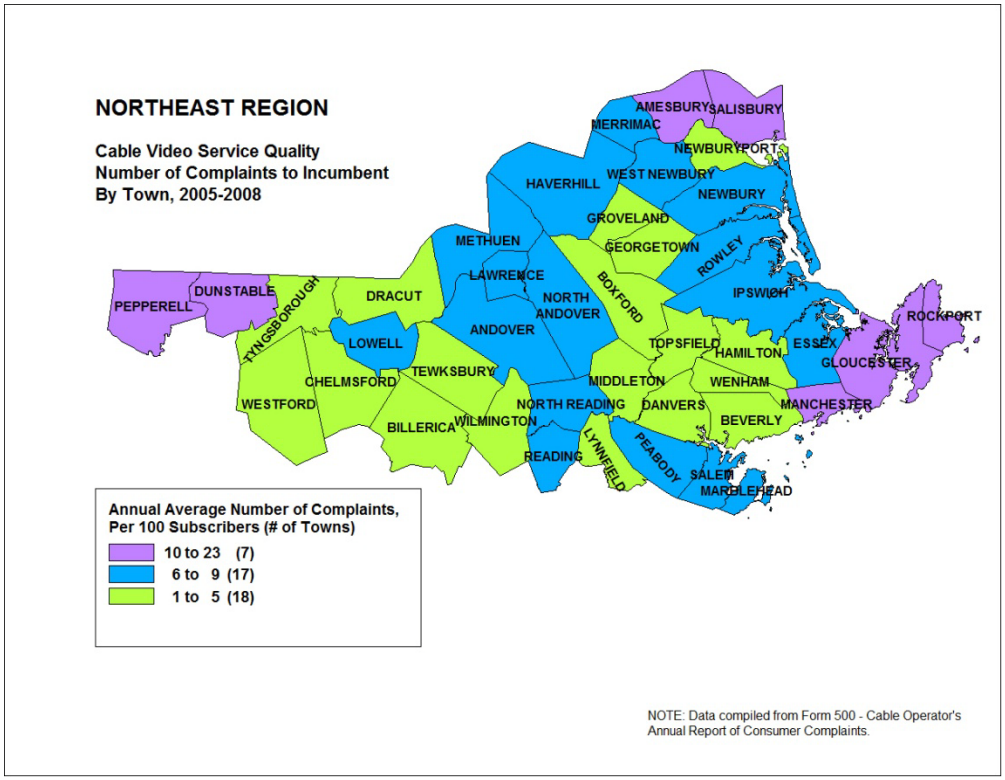


Figure NE-17: Cable Video Subscribers, by Provider, 2005-2008



	2005	2006	2007	2008
Charter	4,263	4,285	4,027	3,782
Comcast	293,990	289,301	282,673	275,792
Verizon	-	5,130	18,271	31,477

Figure NE-18: Incumbent Cable Video Provider Complaints, 2005-2008



Pioneer Valley

I. Residential Voice

Figure PV-1: Availability of ILEC Voice Providers, by Town, December 2008

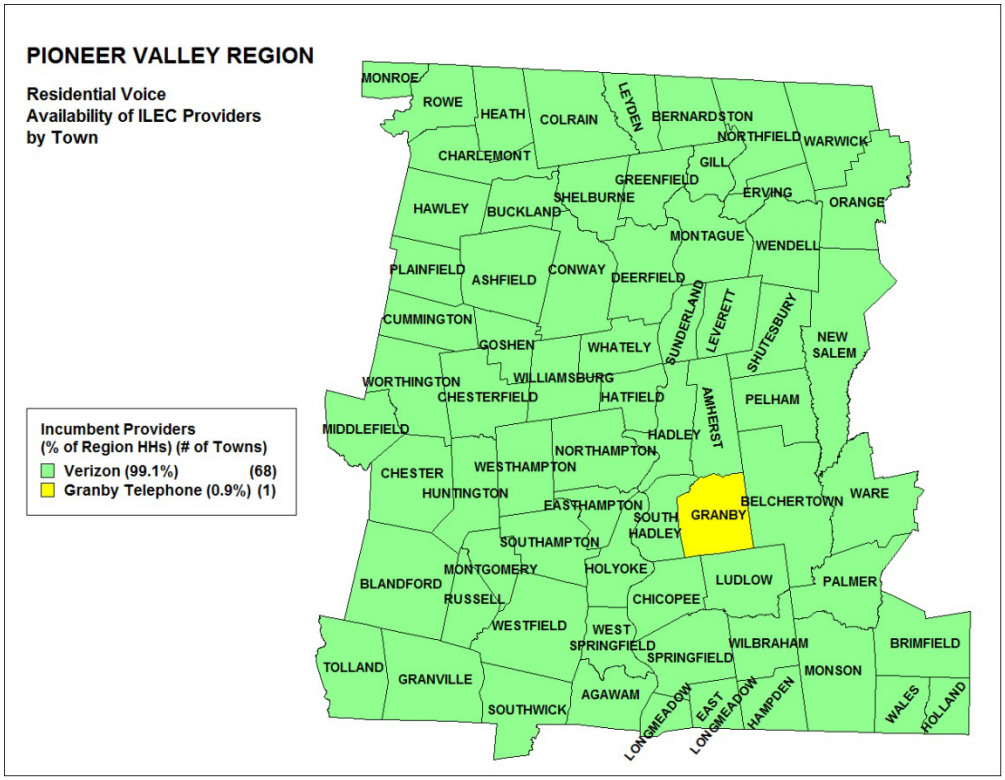
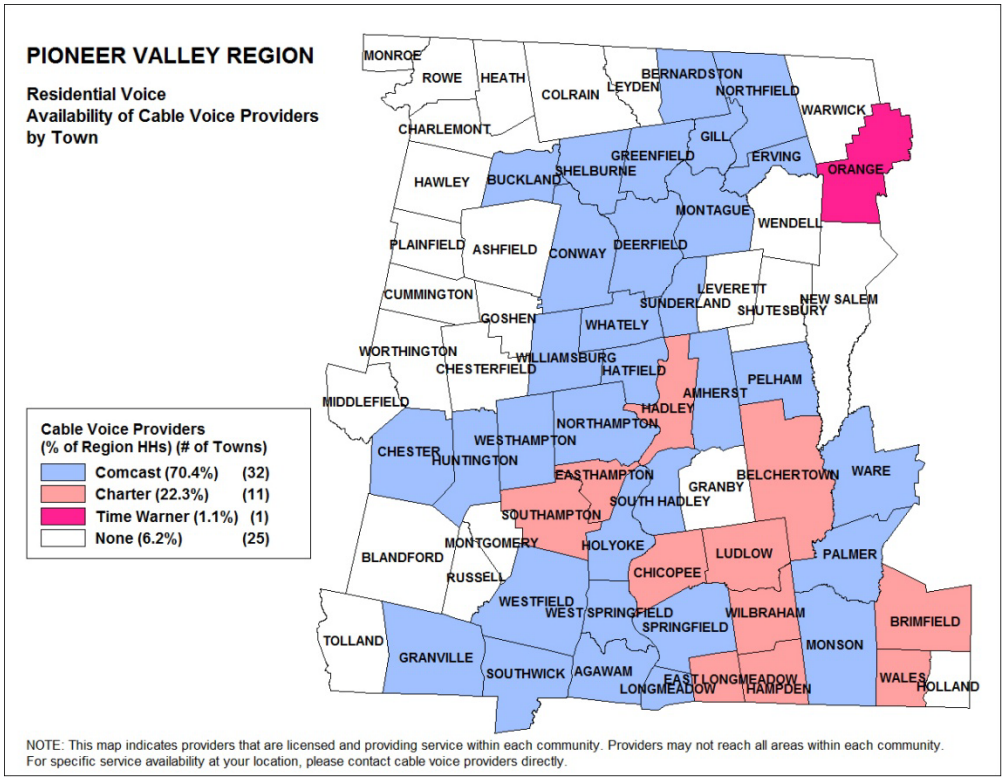


Figure PV-2: Availability of Cable Voice Providers, by Town, December 2008



NOTE: This map indicates providers that are licensed and providing service within each community. Providers may not reach all areas within each community. For specific service availability at your location, please contact cable voice providers directly.

Figure PV-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

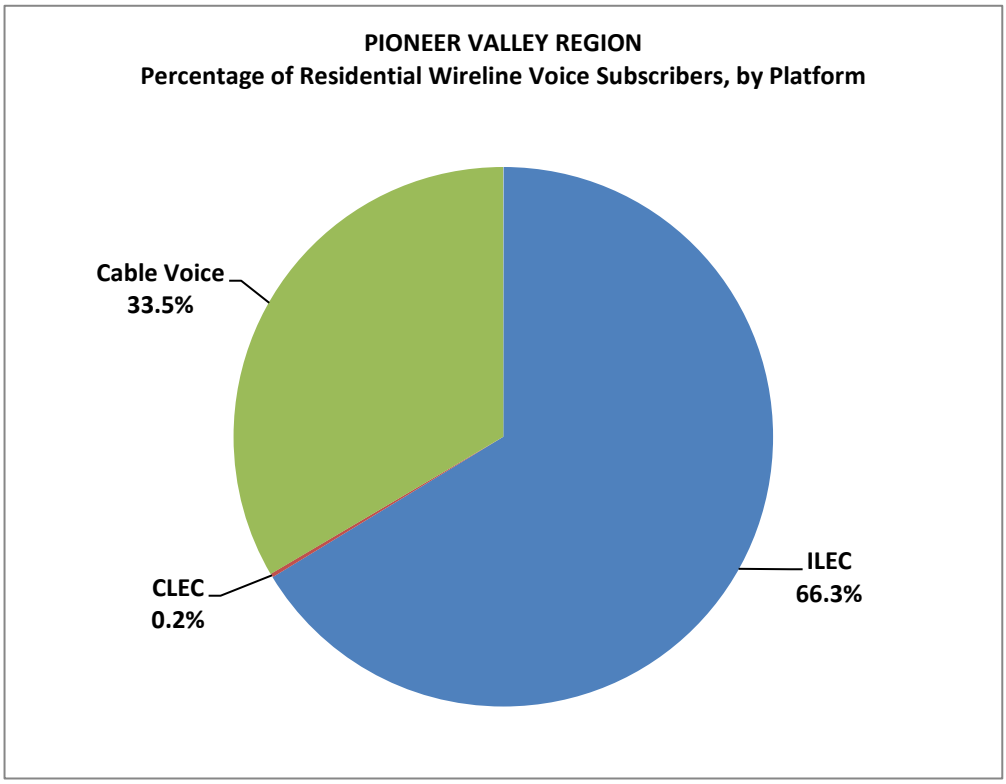


Figure PV-4: Verizon's Average Annual Trouble Reports, 2005-2008

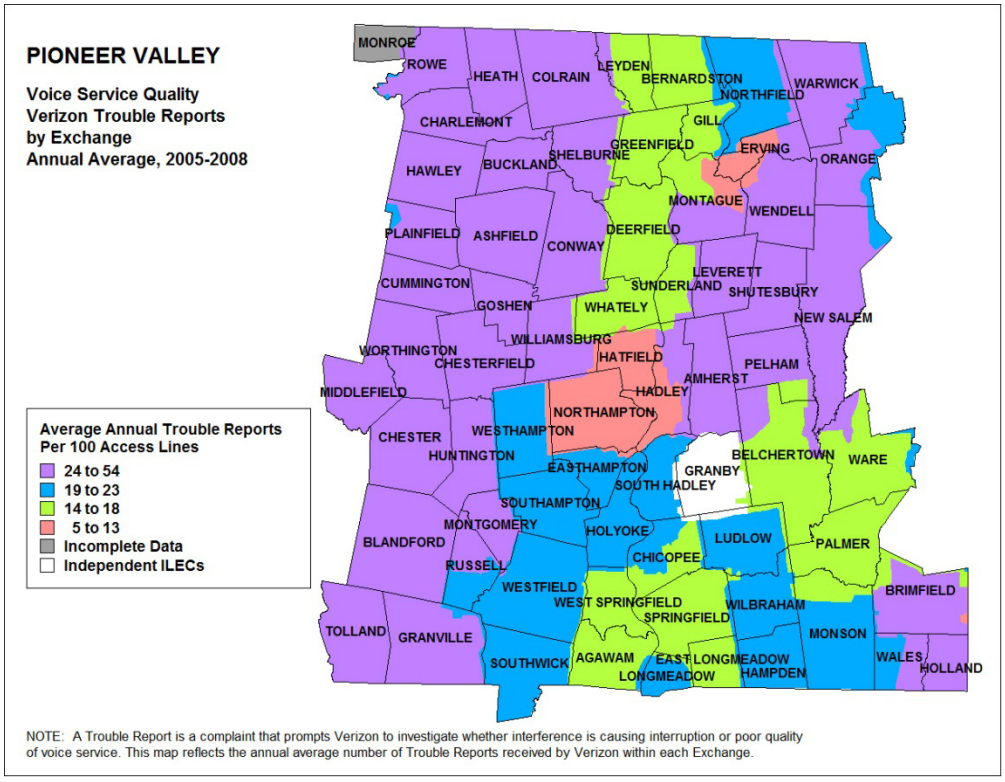
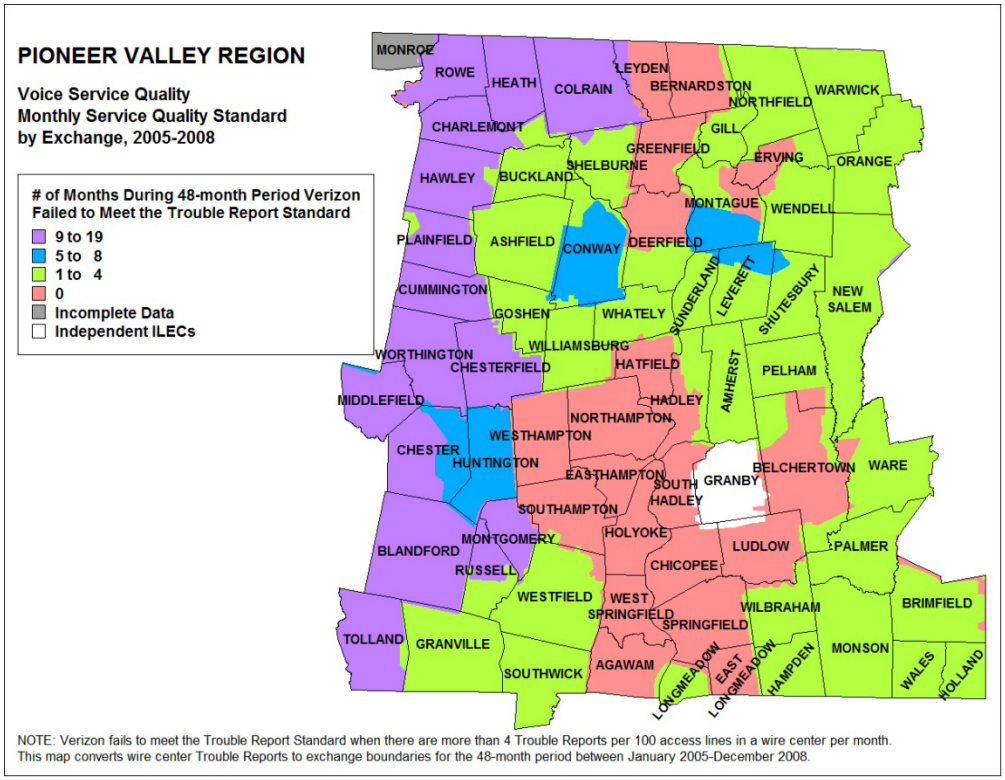


Figure PV-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure PV-6: Business Voice Provision by Number of CLEC Providers, December 2007

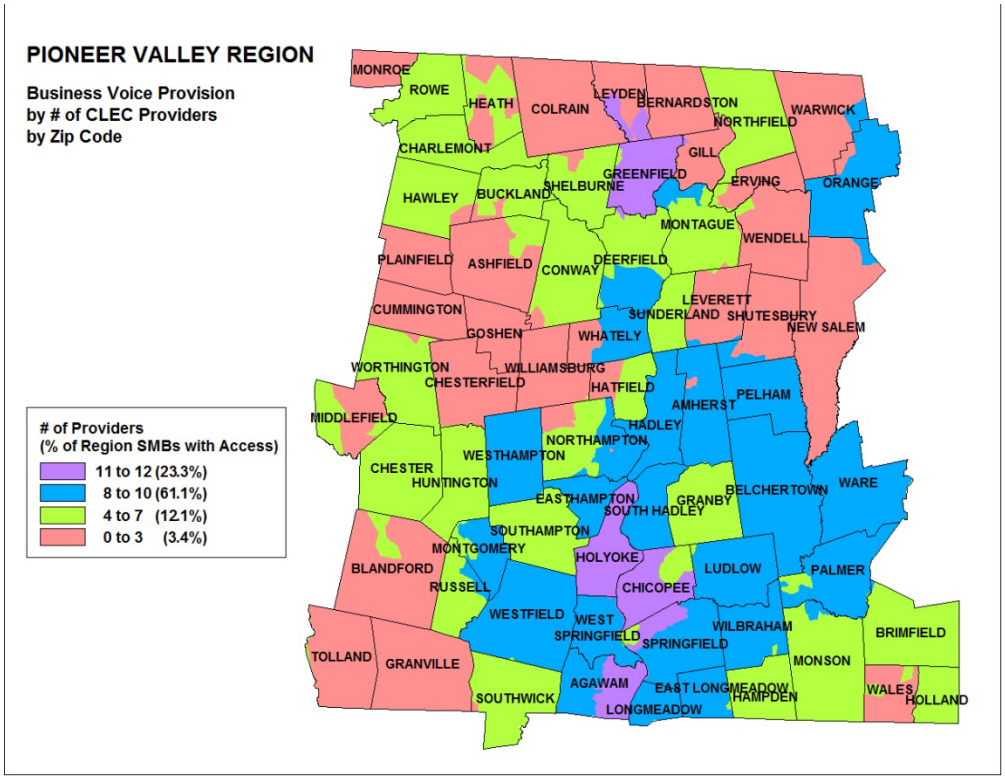


Figure PV-7: Business Voice Provision by Number of Resale Providers, December 2007

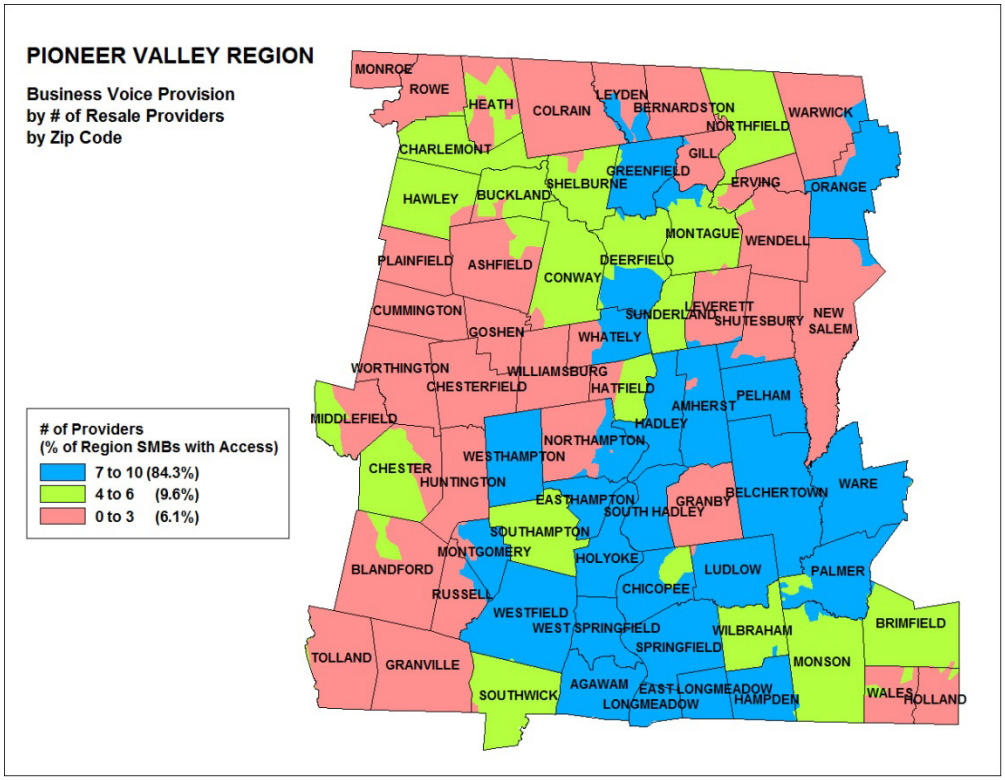


Figure PV-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

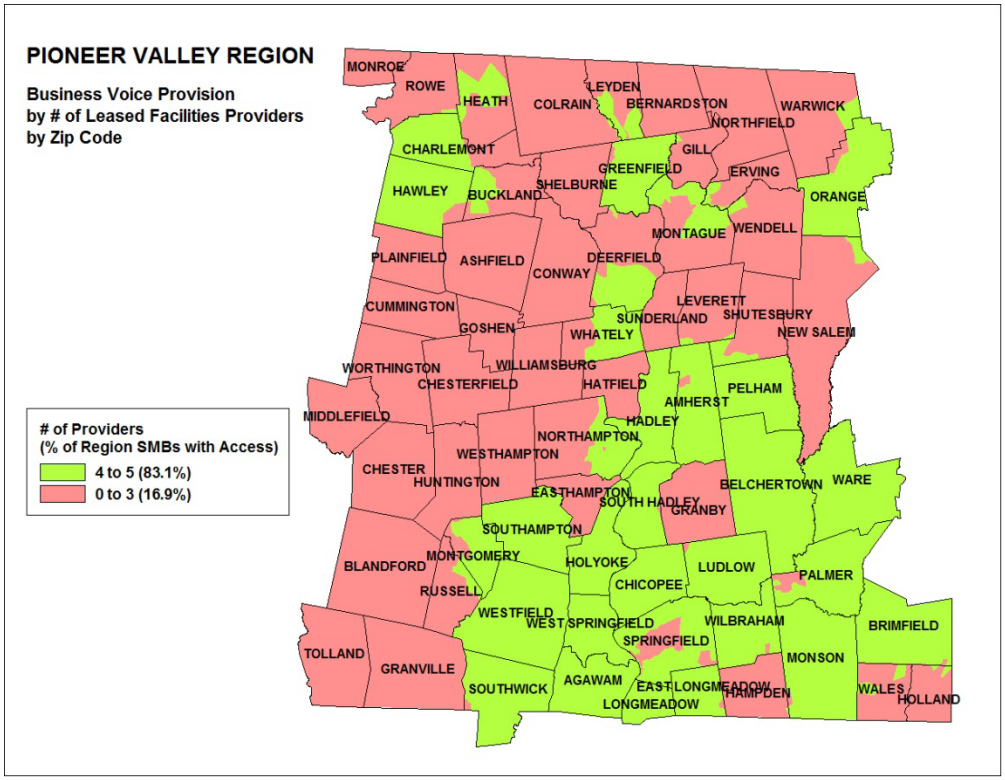
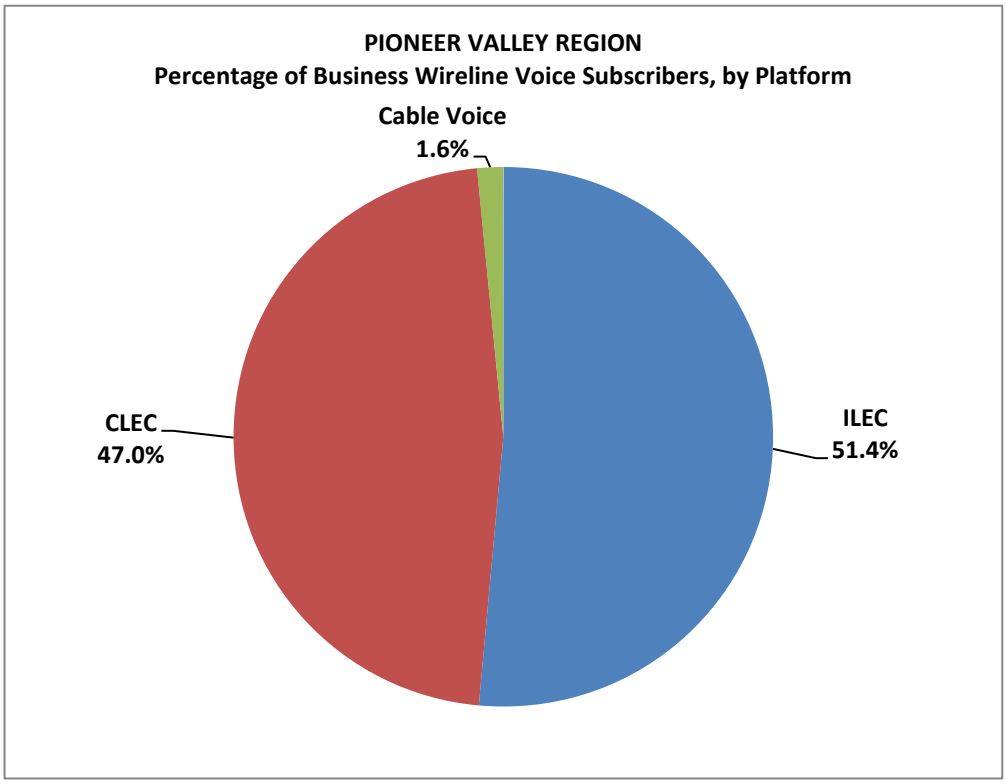


Figure PV-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure PV-10: Availability of Wireless Voice by Number of Providers, December 2008

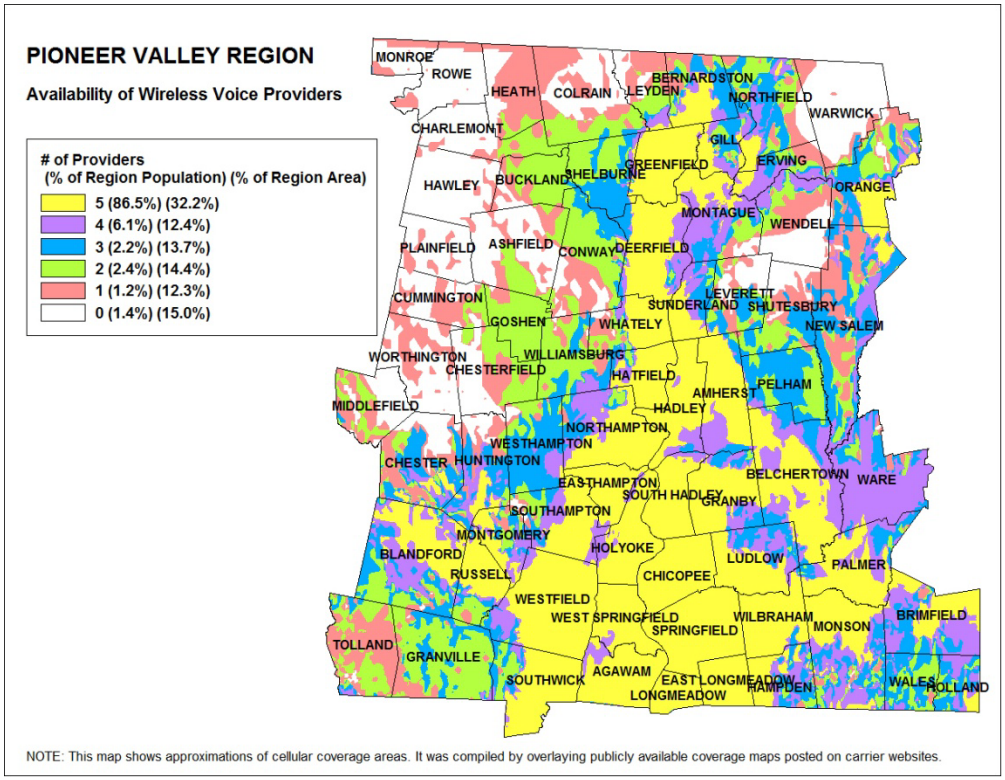
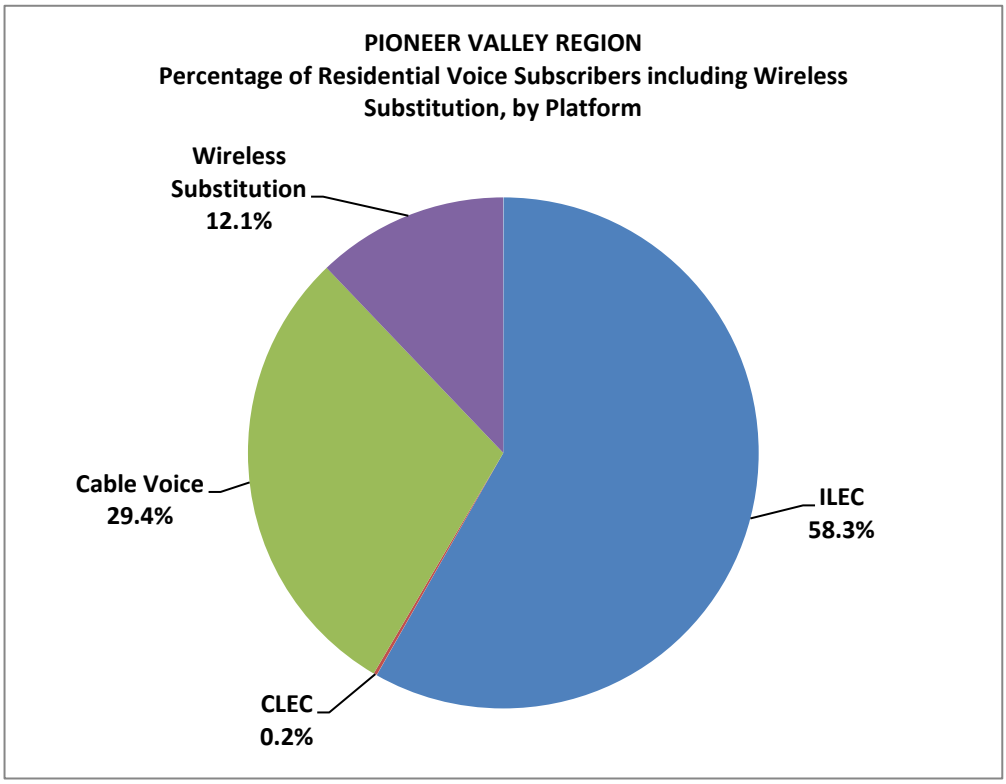


Figure PV-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure PV-12: Incumbent Cable Video Service Providers, 2008

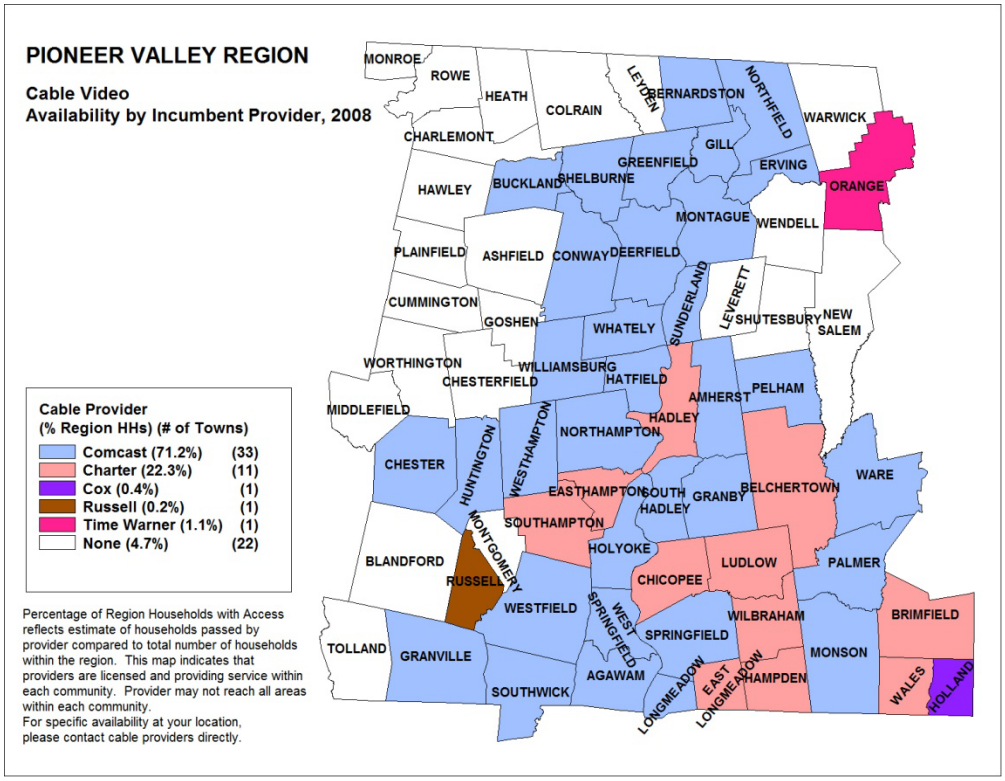


Figure PV-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

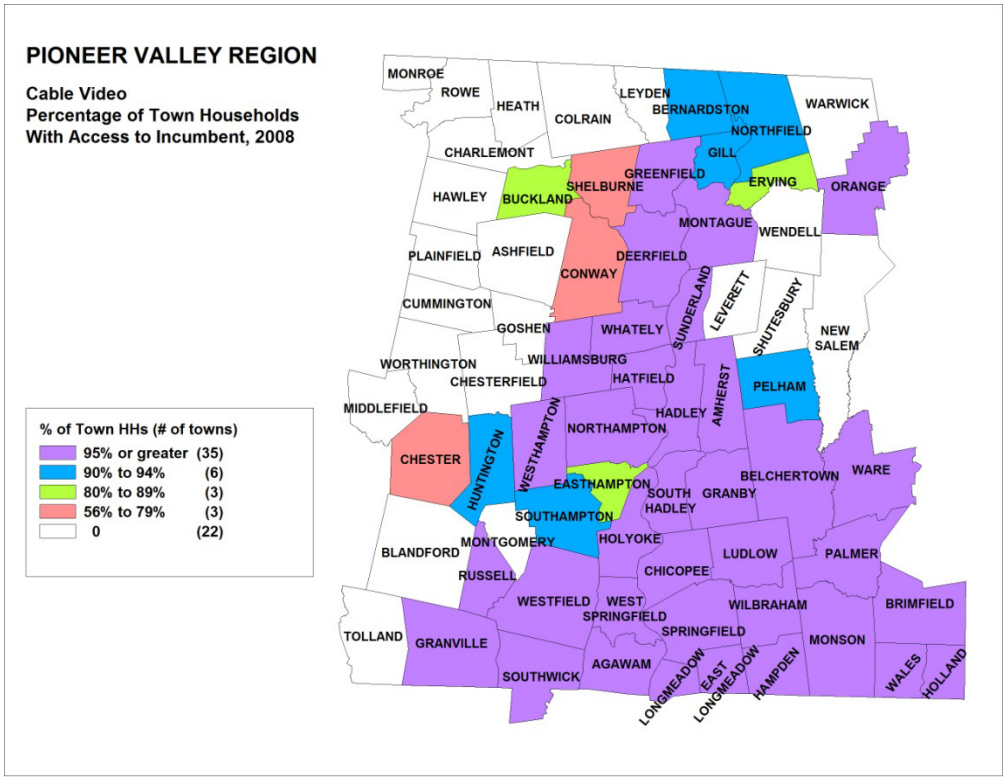
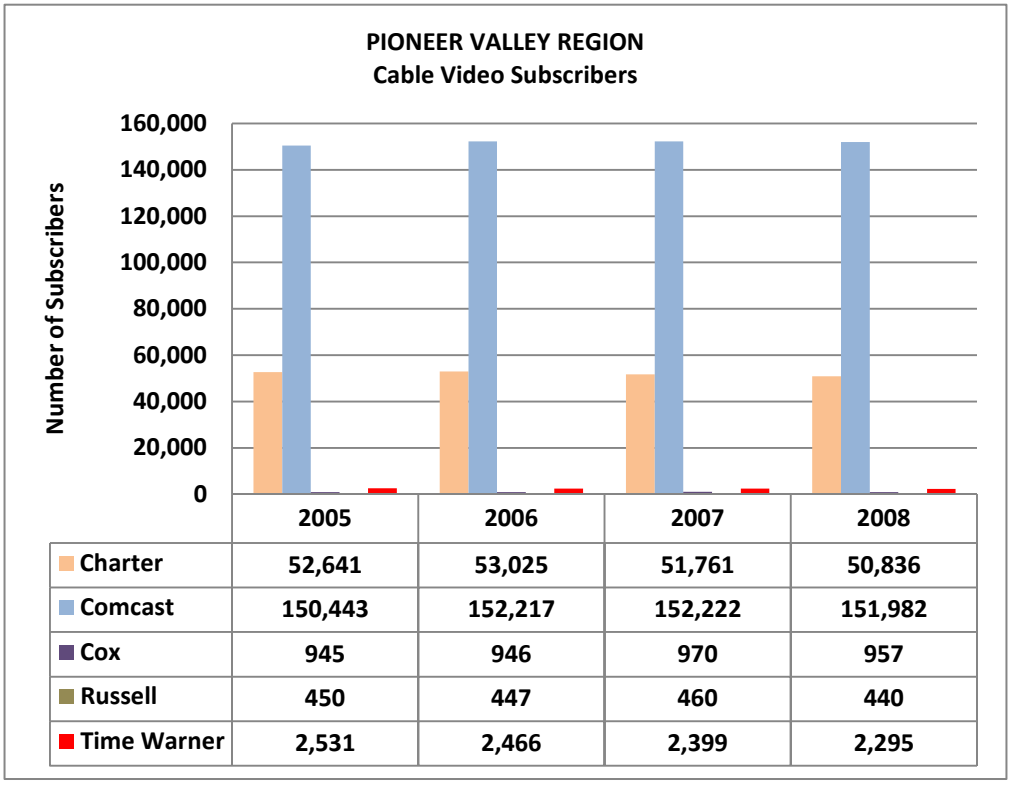
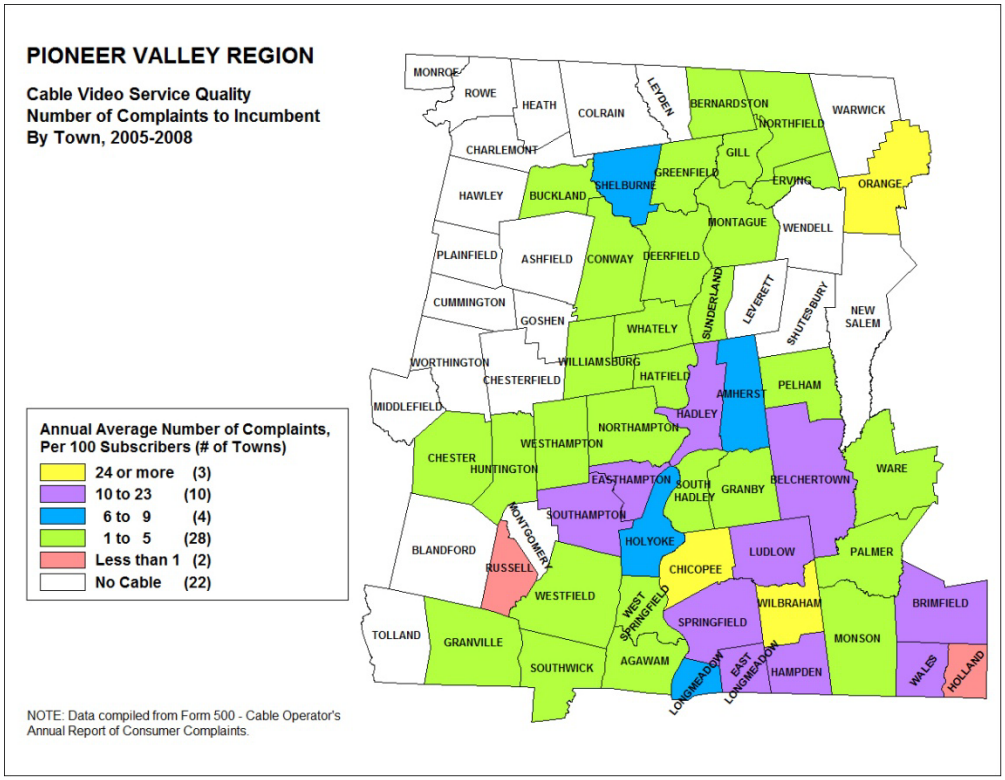


Figure PV-14: Cable Video Subscribers, by Provider, 2005-2008



	2005	2006	2007	2008
Charter	52,641	53,025	51,761	50,836
Comcast	150,443	152,217	152,222	151,982
Cox	945	946	970	957
Russell	450	447	460	440
Time Warner	2,531	2,466	2,399	2,295

Figure PV-15: Incumbent Cable Video Provider Complaints, 2005-2008



Southeast

I. Residential Voice

Figure SE-1: Availability of ILEC Voice Providers, by Town, December 2008

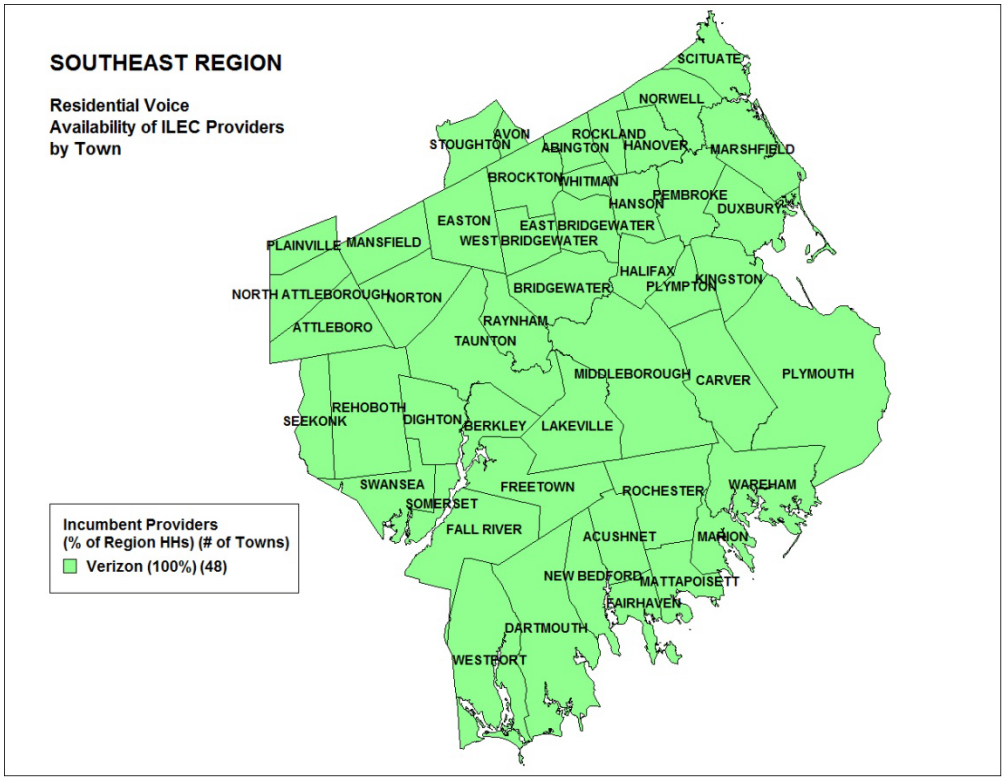


Figure SE-2: Availability of Cable Voice Providers, by Town, December 2008

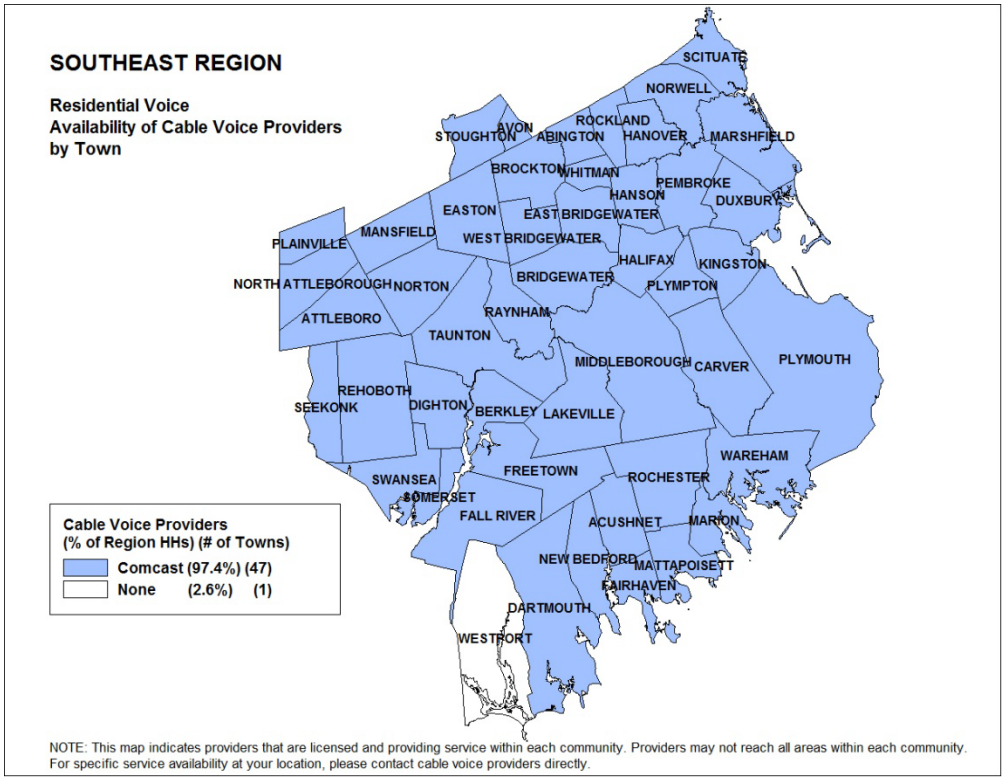


Figure SE-3: Market Shares for Residential Wireline Voice, by Platform, December 2008

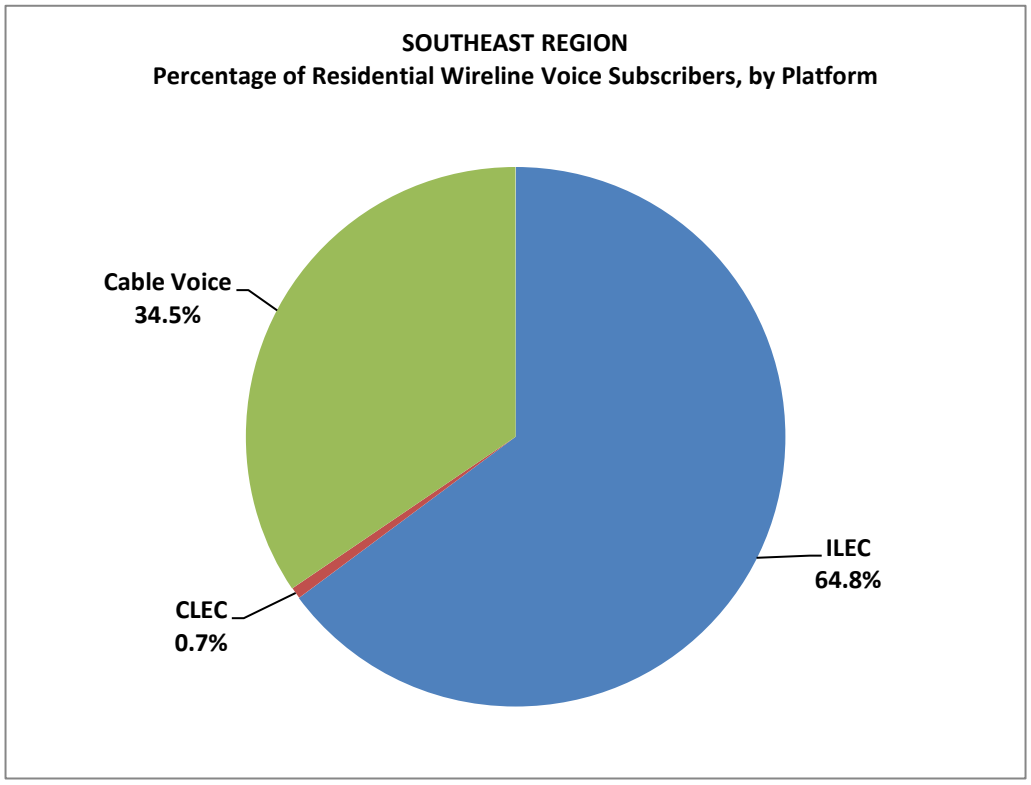


Figure SE-4: Verizon's Average Annual Trouble Reports, 2005-2008

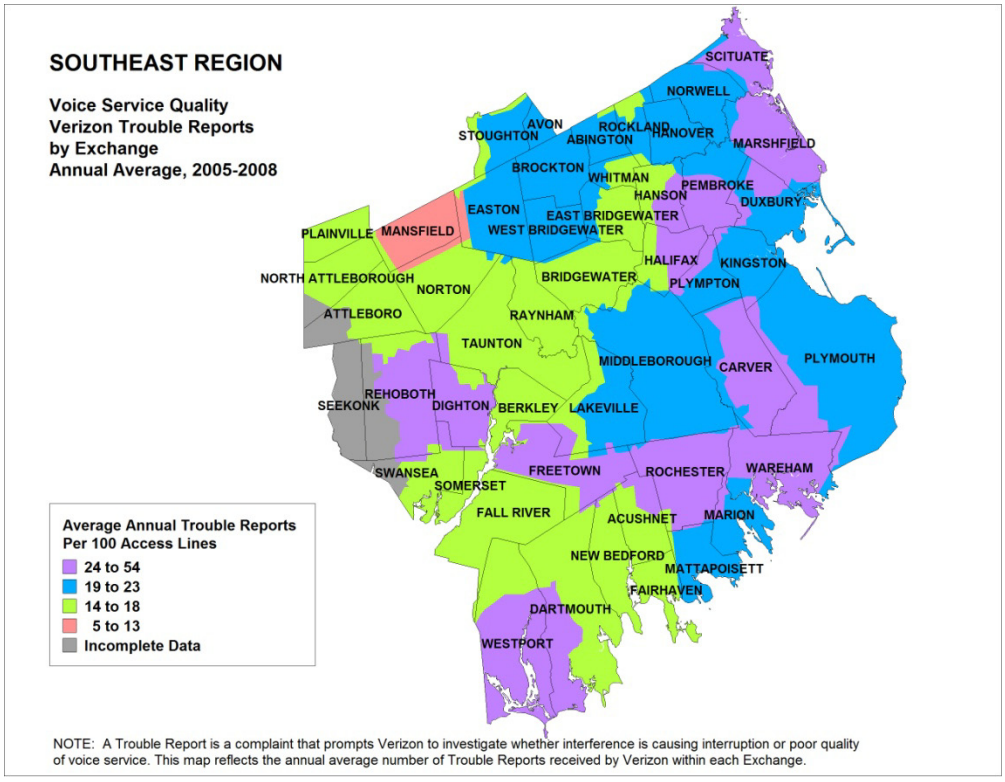
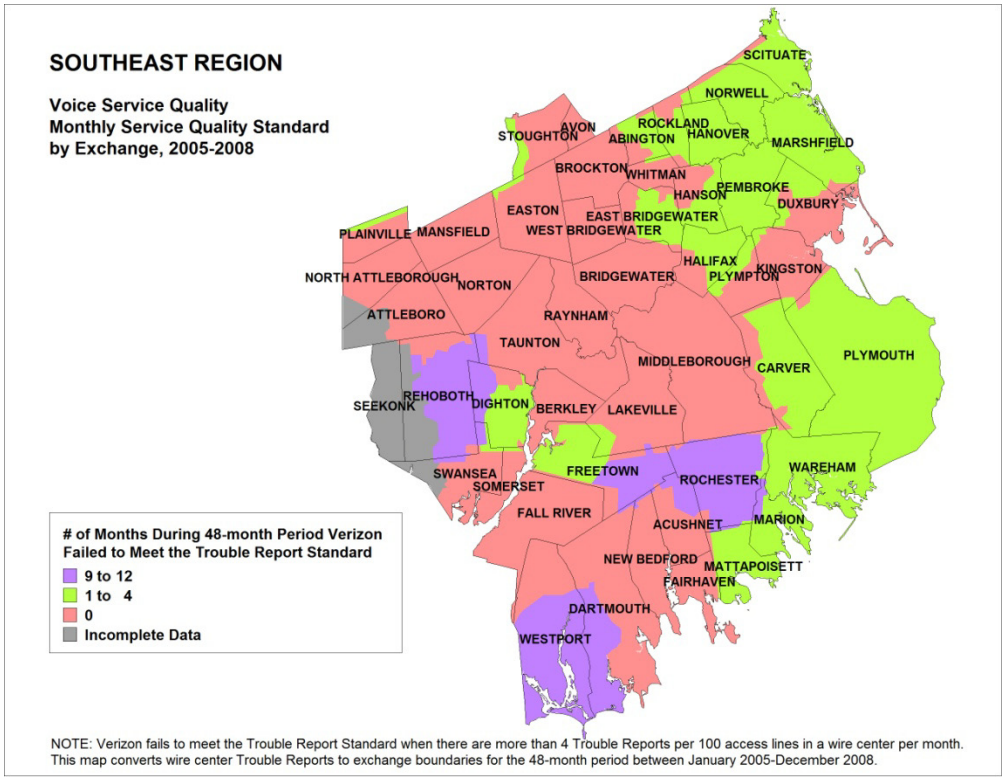


Figure SE-5: Verizon's Monthly Service Quality Standard, 2005-2008



II. Business Voice

Figure SE-6: Business Voice Provision by Number of CLEC Providers, December 2007

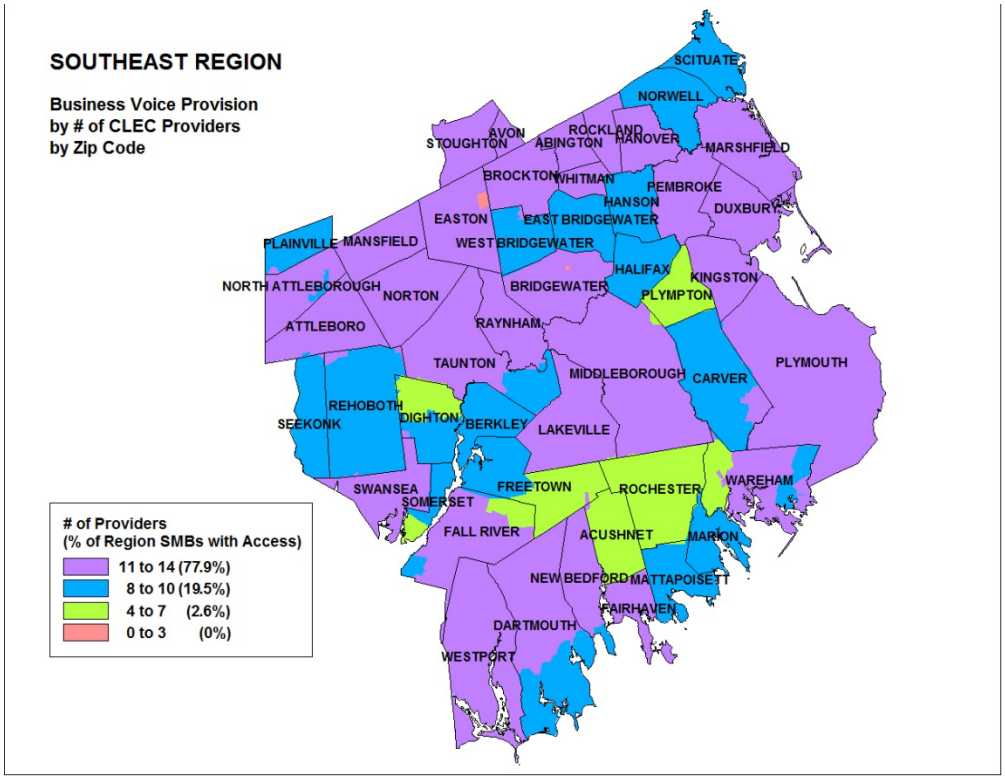


Figure SE-7: Business Voice Provision by Number of Resale Providers, December 2007

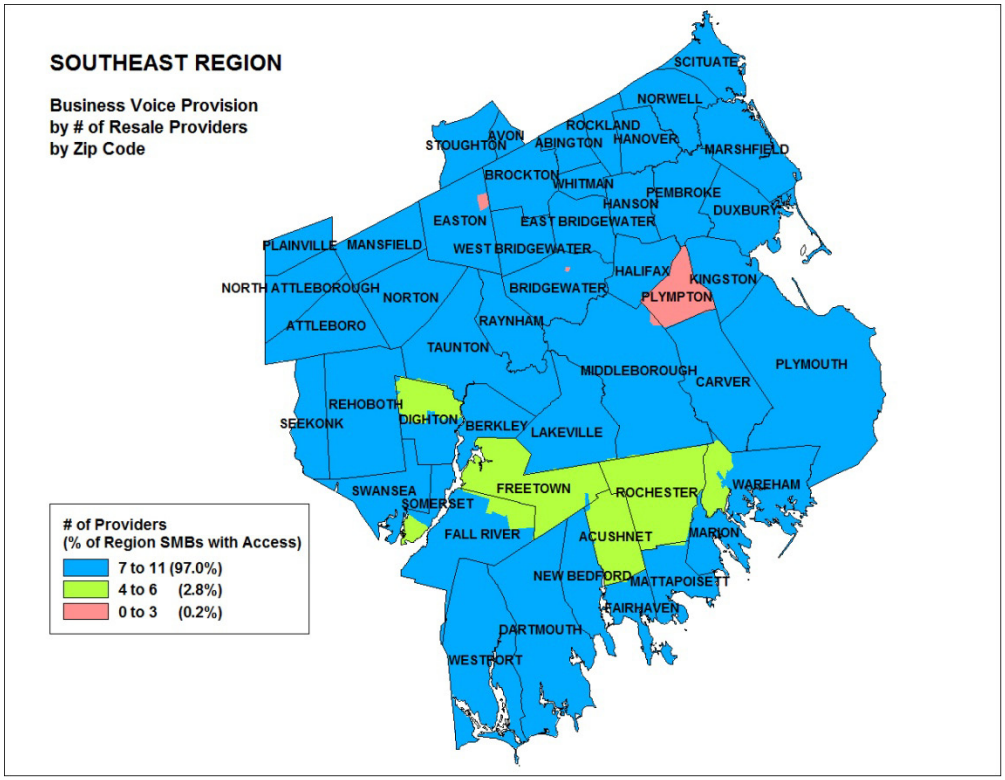


Figure SE-8: Business Voice Provision by Number of Leased Facilities Providers, December 2007

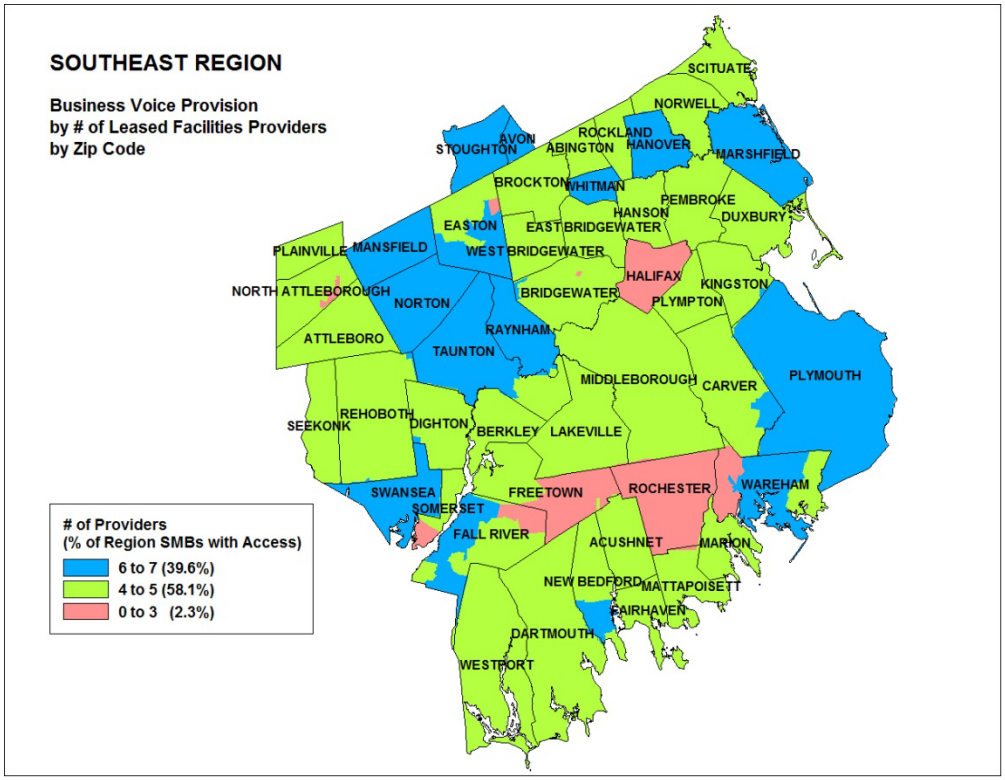
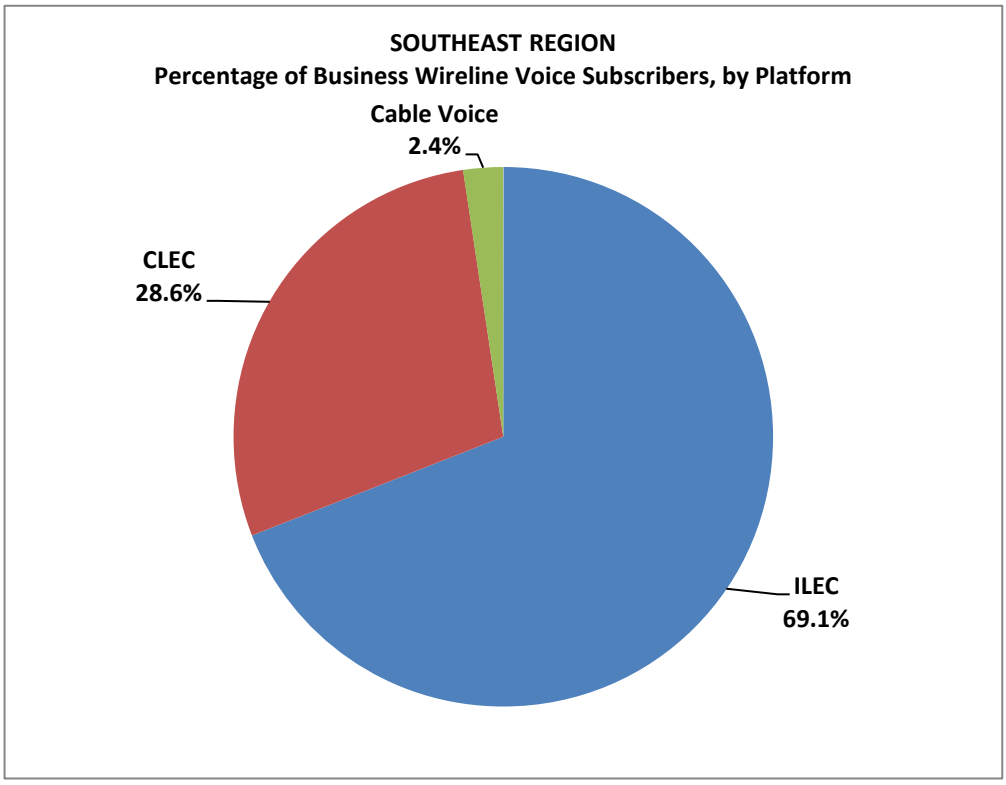


Figure SE-9: Market Shares for Business Voice Services by Platform, December 2008



III. Wireless Voice

Figure SE-10: Availability of Wireless Voice by Number of Providers, December 2008

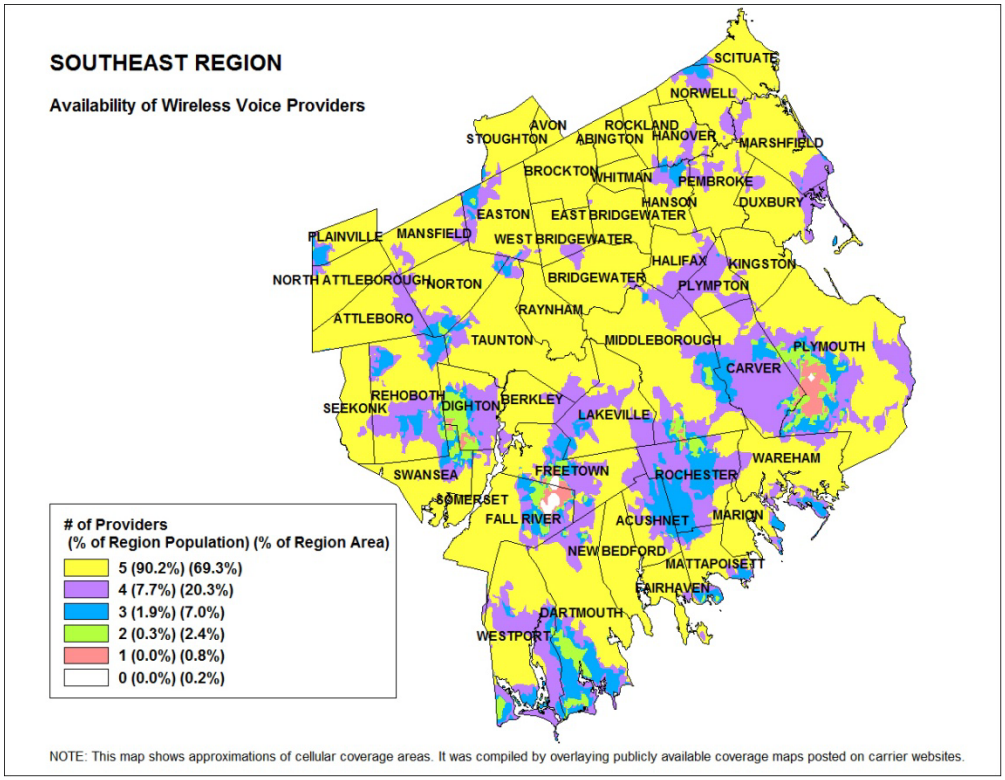
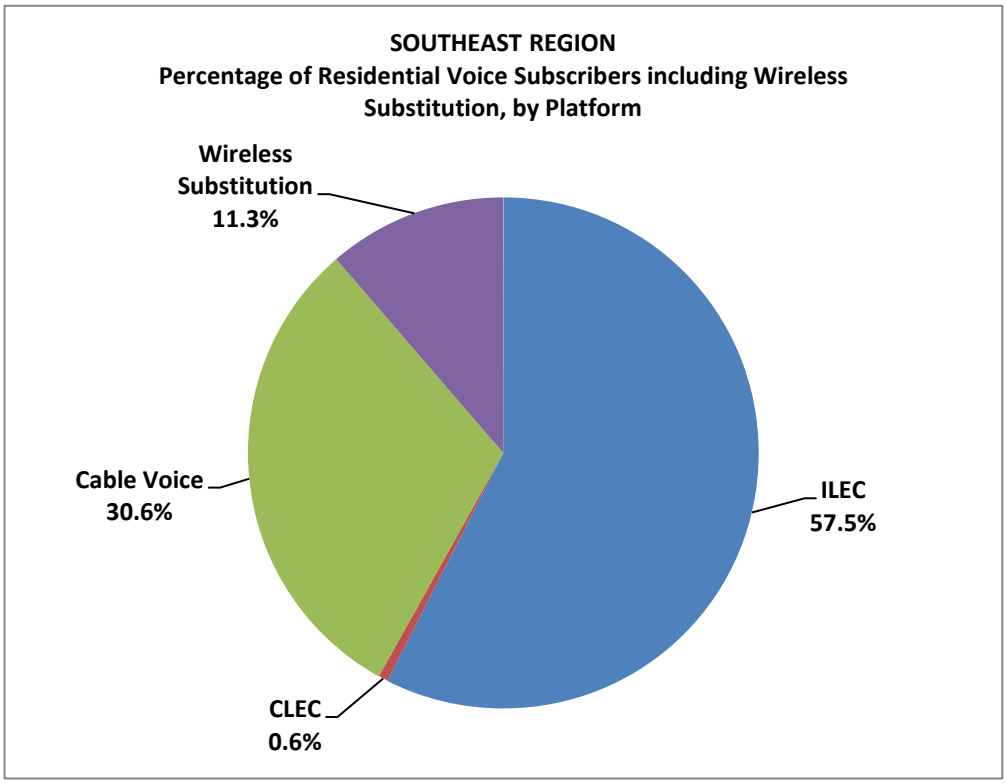


Figure SE-11: Market Shares for Residential Voice Services Including Wireless Substitution, December 2008



IV. Cable Video

Figure SE-12: Incumbent Cable Video Service Providers, 2008

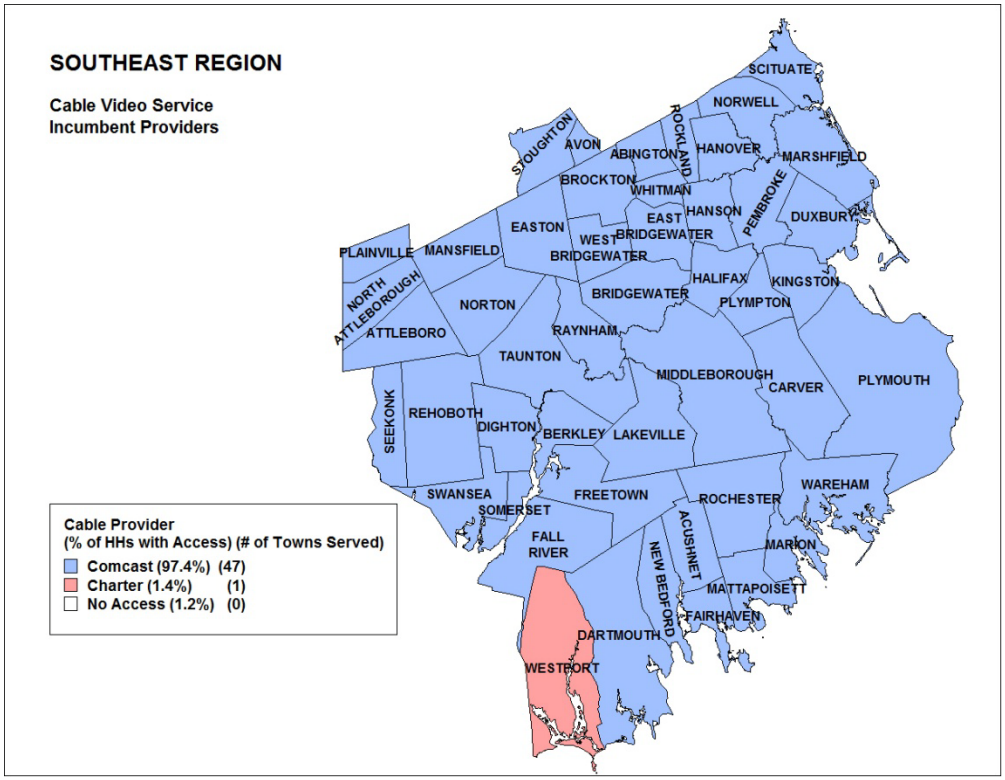


Figure SE-13: Percentage of Households Passed by the Incumbent Cable Provider, 2008

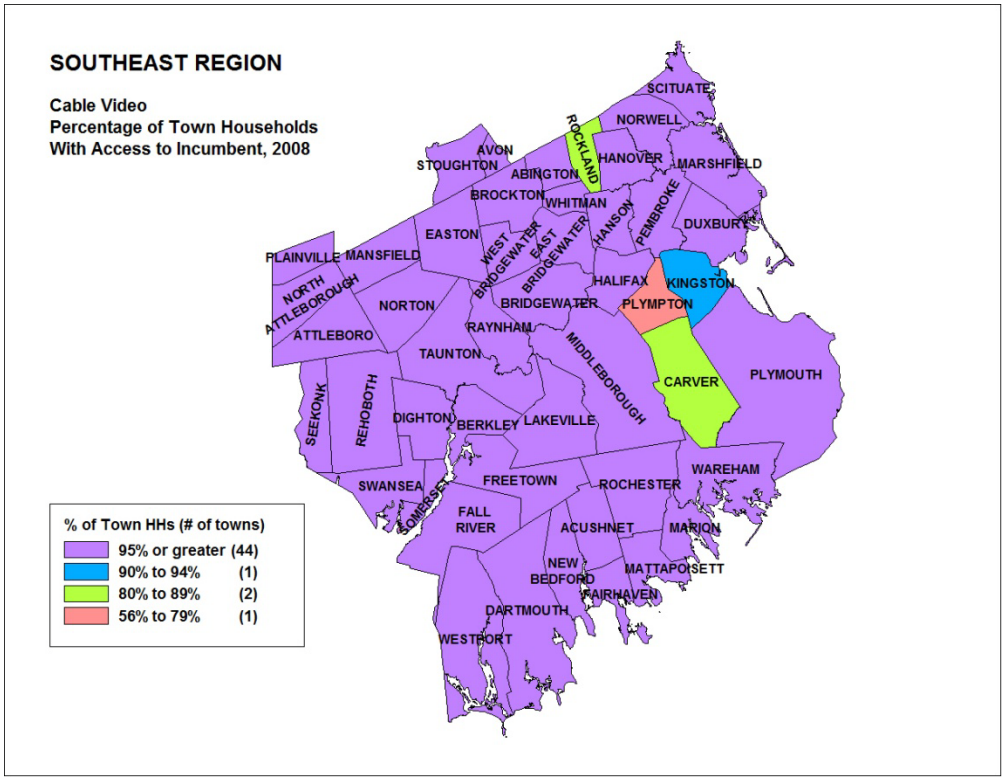


Figure SE-14: Active Cable Video Service Providers, December 2007

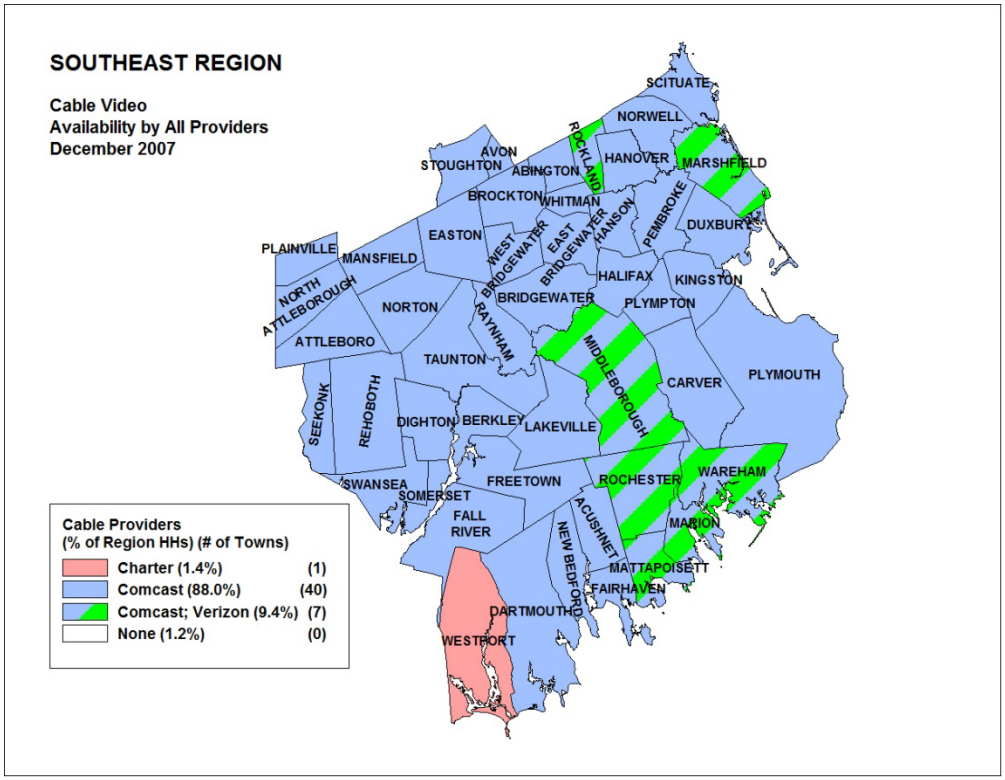


Figure SE-15: Active Cable Video Service Providers, December 2008

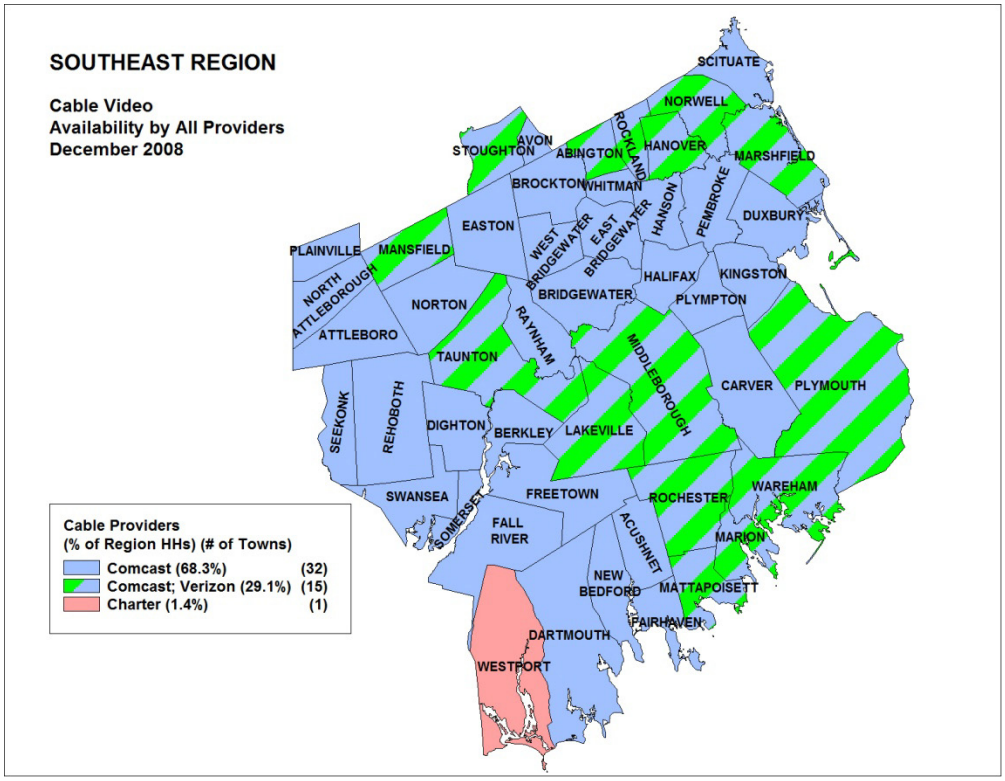


Figure SE-16: Active Cable Video Service Providers, June 2009

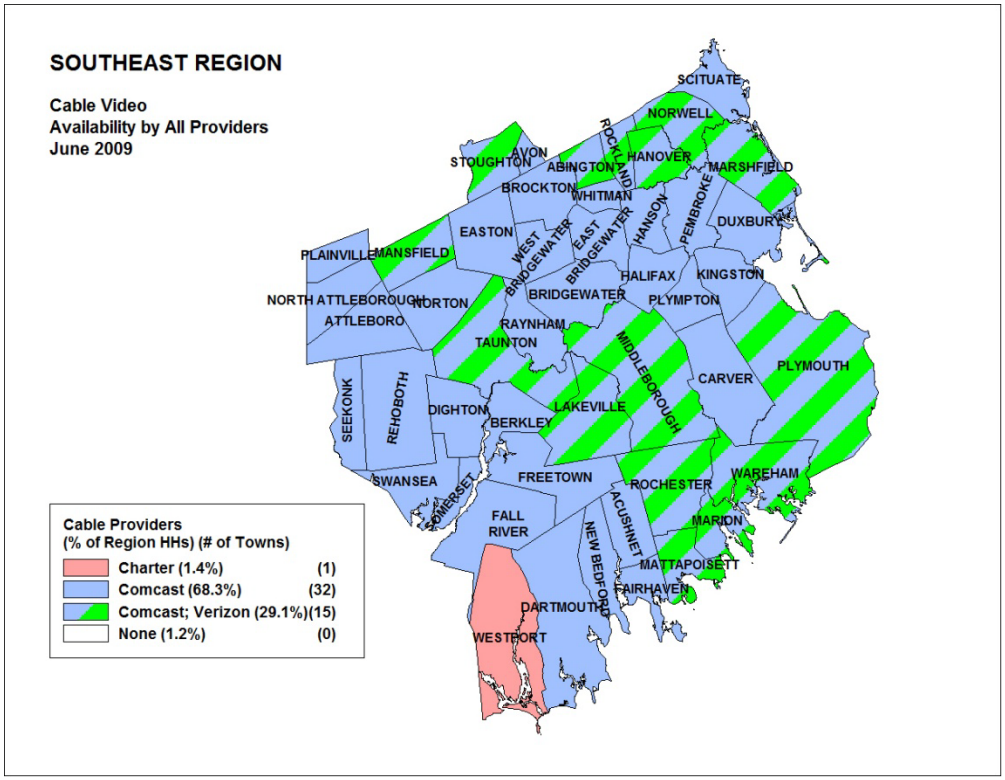
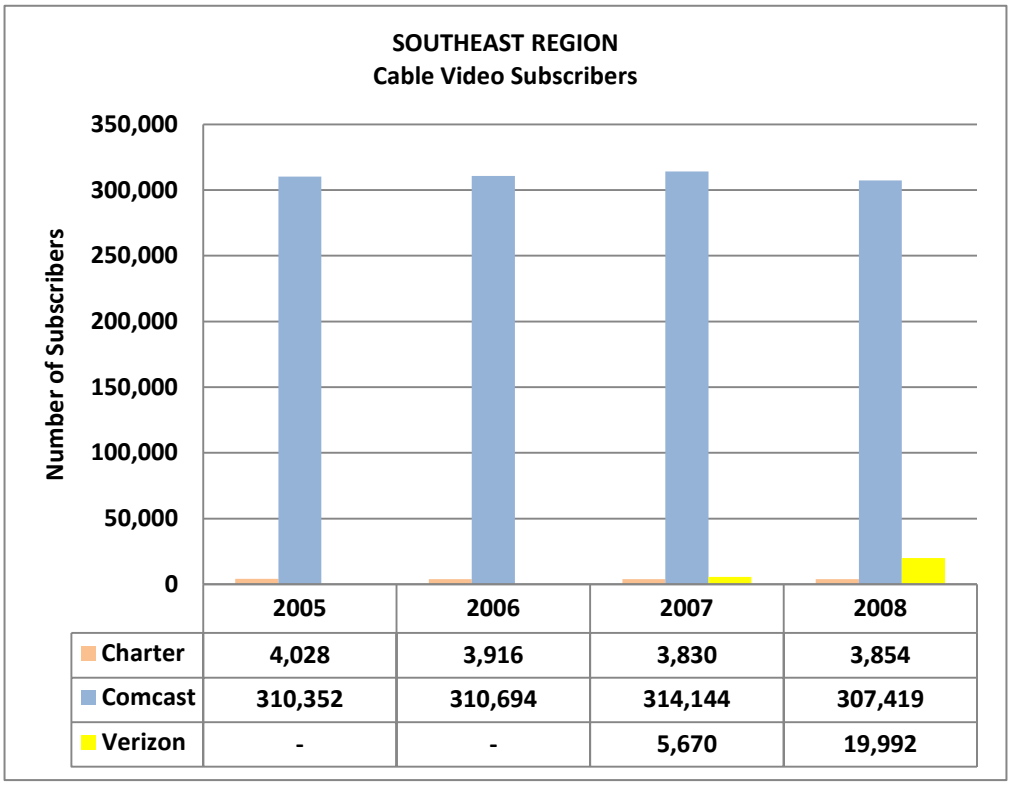
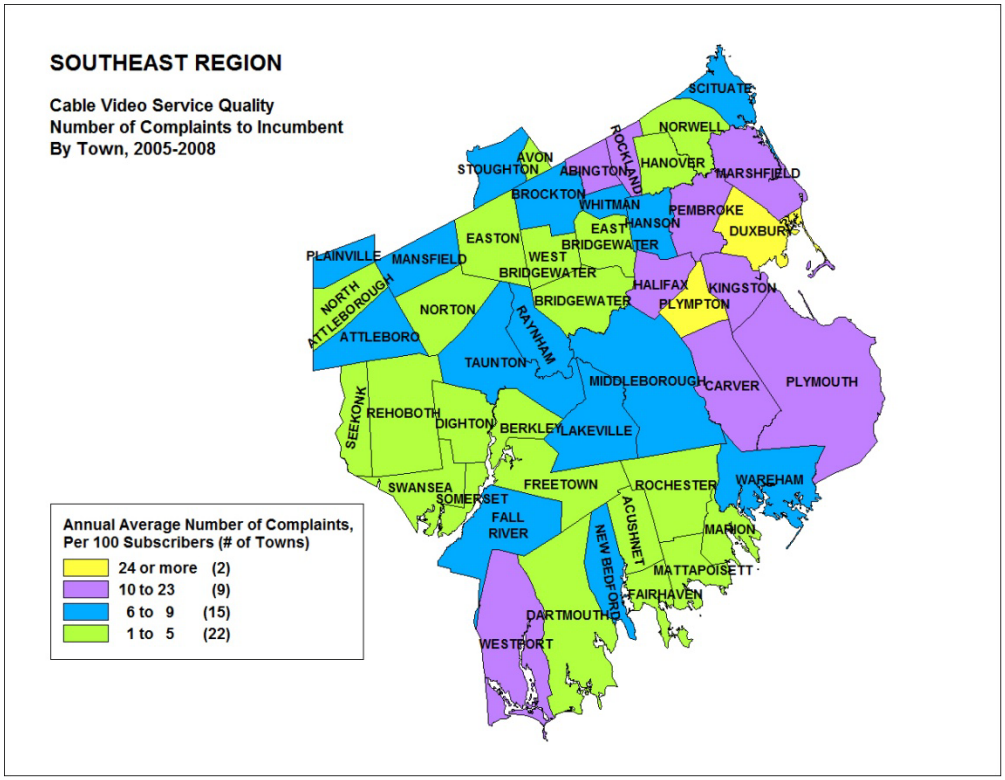


Figure SE-17: Cable Video Subscribers, by Provider, 2005-2008



	2005	2006	2007	2008
Charter	4,028	3,916	3,830	3,854
Comcast	310,352	310,694	314,144	307,419
Verizon	-	-	5,670	19,992

Figure SE-18: Incumbent Cable Video Provider Complaints, 2005-2008



Report Methodology

The "Report Methodology" appendix provides an explanation of how the DTC calculated the availability, adoption, and service quality estimates provided in the Competition Status Report (Report). The source of the most detailed and accurate industry-related data is the carriers themselves. However, the DTC currently lacks the necessary authority to compel production of much of this data, except that already required to be reported to the DTC. For other data, the DTC believes it has authority to compel production, but the litigation process of compelling production of that data would have taken too long for such data to be of use in this report. Therefore, for much of the industry-related data presented in the Report, the DTC relied upon a combination of secondary sources and estimates derived from more granular demographic data.

For each industry-related Figure and Table presented in the Report, this appendix provides four pieces of information. First, a general discussion of the process for the calculations and estimates is provided under the heading "Method". That is followed by an informal bibliography that lists each data source utilized in the calculation and presentation of the data under the heading "Sources". Under the heading "Confidentiality of Data", there is a numerical link for each of the Sources discussed in the previous heading. For each data source indicated, the DTC identifies the availability to publicly access the source data. For most situations where the most granular data is not publicly-accessible, the DTC identifies publicly-accessible reports from the author of the source information. Under the final heading, "Potential Errors", the DTC attempts to summarize the causation and, where possible, direction of inaccuracies that may result from the DTC's calculations and estimates.

1. Residential Wireline Voice Service

1.1 Availability

ILEC Availability (see Table 2; and Figure 2): **Method:** (a) As a "Provider of Last Resort," ILEC is obligated to make reasonable efforts to offer service to every household within the ILEC territory; (b) ILEC covered percentage: estimating number of households with access to Verizon's and Independent ILECs' services, by overlaying map identifying point-specific locations of residential structures with Massachusetts Community Boundaries. **Sources:** (1) Massachusetts Land Use, 1999, Massachusetts Office of Geographic and Environmental Information (MassGIS); (2) US Census 2000 population Tiger files reprocessed through MassGIS, 2003; (3) Community Boundaries Map, MassGIS. **Confidentiality of Data:** (1) None, MassGIS Land Use data is publicly available, see http://www.mass.gov/mgis/lus.htm; (2) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm; (3) None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm.

Cable Voice Availability (see Figures 3-4; and Table 3): **Method:** (a) Identification of cable provider within each municipality determined through cable franchise licenses (308 municipalities with at least an Incumbent provider); (b) Number of households passed determined by overlaying electronic street-level cable plant maps with map identifying point-specific locations of residential structures (284 municipalities with electronic cable strand maps); (c) For those communities where no electronic cable plant maps were available (24 municipalities), the Department of Telecommunications and Cable (DTC) estimated number of homes passed as required by cable franchise license agreement. For those municipalities without a full-build-out requirement in franchise agreement, DTC estimated number of households captured within the negotiated density requirement by overlaying Land Use dataset with

NAVTEQ Roads data layer; (d) DTC utilized Cable Rate cards to identify those municipalities where Cable Voice is a service offering from the licensed provider; (e) For Overbuilder providers, availability estimates are based upon cable plant of the Incumbent within a licensed community. **Sources:** (1) Cable plant maps provided by individual carriers as of Summer 2008; (2) US Census 2000 population Tiger files reprocessed through MassGIS, 2003; (3) Massachusetts Land Use, 1999, MassGIS; (4) Community Boundaries Map, MassGIS; (5) 2008 Cable Rate Cards to identify those municipalities where Cable Voice is a service offering; (6) Street Geocoding Data for Massachusetts, NAVTEQ, Chicago, Il, May 2008, through MassGIS. **Confidentiality of Data:** (1) None, cable plant maps for all cable companies are publicly available per statutory requirement as part of the cable licensing process; (2) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm; (3) None, MassGIS Land Use data is publicly available, see http://www.mass.gov/mgis/lus.htm; (4)None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm; (5) None, Cable Rate Cards are publicly available; (6) Street Geocoding metadata is proprietary subject to terms of NAVTEQ software license. **Potential Errors:** (1) When overlaying cable plant maps with Land Use maps, there is potential that not all cable strands are properly aligned to the corresponding streets, which in some areas may cause an overestimation of houses passed, and in other areas may cause an underestimation of households passed; (2) Land Use as of 1999, does not account for new housing growth since 1999;[1] (3) Estimates calculated availability if a housing structure is within 200 feet of the cable strand, actual obligation for cable provider to offer service is dictated according to requirements specified in each cable license, of which 200 feet from cable strand was determined to be representative; (4) Use of Incumbent Cable Voice cable plant to estimate Overbuilder Cable Voice availability may over or under estimate actual availability to Overbuilder service.

1.2 Adoption

ILEC Adoption (see Figures 5-6, 13-16, and 42-44; and Tables 4 and 10): **Method:** (a) Statewide subscriber data from FCC Form 477, including statewide split of residential subscribers; (b) regional allocation derived by (b1) allocating wire center distribution of access lines reported in Verizon Service Quality Index Report, then (b2) calculating number of Verizon statewide business lines per employee in Massachusetts; applying statewide coefficient to the number of employees in each region to determine number of business lines in each region, and (b3) obtain estimate of residential lines within each region as a balancing item by subtracting regional business lines as calculated in b2 from total lines in region as calculated in b1; (c) Regional employee data used in b2 is obtained from the total number of employees reported by the Massachusetts Executive Office of Labor and Workforce Development (EOLWD) on 16 Workforce Investment Areas (WIA); (d) add Independent ILECs[2] (Richmond Telephone Company, Taconic Telephone, and Granby Telephone) residential lines from FCC Form 477 to obtain total ILEC residential lines on region level. **Sources:** (1) Federal Communications Commission (FCC) Form 477, June 2005 through December 2008; (2) Verizon Service Quality Index Report, December 2008; (3) Establishment and Employment by Size, EOLWD, March 2008; (4) US Census 2000 population Tiger files reprocessed through MassGIS, 2003. **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment"(see http://www.fcc.gov/wcb/iatd/comp.html); (2) None, Verizon Service Quality Index Monthly Reports are

[1] This is true for all the methods where this datasource has been used.

[2] No data are available for Sentinel Tree Company on FCC Form 477.

publicly available; (3) None, data from the EOLWD are publicly available, see http://lmi2.detma.org/lmi/sizeclass.asp; (4) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm. **Potential Errors:** The statewide coefficient for the number of employees per Verizon's business lines may not be uniform throughout the regions, therefore regional allocation estimates of ILEC business lines may result in regional inaccuracies.

Cable Voice Adoption (see Figures 7-8, 13-16, and 42-44; and Tables 4 and 10): **Method:** Statewide subscriber data for June 2005 through June 2008 obtained from E911 filings; statewide subscriber data for December 2008 obtained from FCC Form 477; to determine regional allocation of Cable Voice adoption, DTC applied a cable industry-based allocation factor utilizing region-specific distribution of Cable Video adoption, adjusting for those Cable Video communities without Cable Voice offerings. **Sources:** (1) SETB E911 database, June 2005-June 2008; (2) FCC Form 477 December 2008; (3) Annual Cable Franchise Fee Filings, 2005-2008; (4) US Census 2000 population Tiger files reprocessed through MassGIS, 2003. **Confidentiality of Data:** (1) Company-specific data reported to E911 database is proprietary; (2) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment" (see http://www.fcc.gov/wcb/iatd/comp.html); (3) None, Annual Cable Franchise Fee filings are publicly available; (4) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm. **Potential Errors:** (1) Regional allocation of Cable Voice subscribers assumes uniform timing for availability of Cable Voice offering throughout Massachusetts and also assumes adoption rate for Cable Voice correlates with adoption rate of Cable Video; (2) It is apparent that some companies omitted the number of voice subscribers served via "IP" technology for Form 477 reports prior to December 2008 reporting period, Form 477 is also utilized to determine allocation of voice lines to residential and business subscribers. The FCC revised Form 477 reporting instructions effective for the December 2008 to capture voice subscribers served by both circuit-switch and IP technology. For this reason, estimates of Cable Voice lines serving residential consumers may be over-estimated, and estimates of Cable Voice lines serving SMB consumers may be under-estimated for June 2005 through June 2008, however we do not expect these errors would be significant.

CLEC Adoption (see Figures 9-12, 13-16, and 42-44; and Tables 4 and 10): **Method**: Statewide subscriber data and distribution of residential and business subscribers by platform type (resale, leased facilities, own network) derived from FCC Form 477; regional allocation calculated by regionally allocating each CLEC's utilization of numbers as determined by North American Numbering Plan Administration's (NANPA) Numbering Resource Utilization Forecast (NRUF) database. For those CLECs that do not obtain numbers directly from NANPA, regional allocation of statewide subscribers is a two stage process: (a) the CLEC's service territory is determined upon the zip codes reported as served by the CLEC in FCC Form 477; (b) the statewide subscriber count for the CLEC is allocated according to distribution of the population within the zip codes served by the CLEC. **Sources:** (1) FCC Form 477, June 2005 through December 2008; (2) NRUF database, February 1, 2009; (3) Massachusetts Land Use, 1999, MassGIS; (4) US Census 2000 population Tiger files reprocessed through MassGIS, 2003; (5) Zip Code boundaries obtained from ESRI, Redlands, California, 2007, through MassGIS. **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment"(see http://www.fcc.gov/wcb/iatd/comp.html); (2) Proprietary, DTC entered into non-disclosure agreement with NANPA for company-specific number utilization data; (3) None, MassGIS Land Use data is publicly available, see http://www.mass.gov/mgis/lus.htm; (4) None, US

Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm; (5) Zip code boundary metadata is proprietary subject to terms of ESRI software license. **Potential Errors:** (1) For those CLECs that do not obtain phone numbers directly from NANPA, allocation is estimated based upon population of zip codes served by each of the providers. Across each region there is no reason to think that error is systemic in one direction; (2) NRUF database may overestimate numbers assigned to carriers in particular areas, as it may include numbers that carriers provide to unaffiliated carriers, such as VoIP providers, resulting in possibility that region allocation estimates may be over-stated in some regions and under-stated in other regions.

1.3 Service Quality

DTC Voice complaints (see Figures 17-19): **Method:** All Voice Complaints derived from DTC Consumer Division database received from January 1, 2005 through December 31, 2008. Complaints sorted by municipality to determine region allocation. "Billing" complaints comprised of the following in-take codes: Billing, Credit, Cramming, Service Denial, Marketing, Rate, Regulation, and Slamming. "Service Quality" complaints comprised of the following in-take codes: Installation, Missed Appointment, and Service Quality. **Sources:** DTC Consumer Division Database. **Confidentiality of Data:** Generally, information regarding complaints made to the DTC is publicly available, except for items containing sensitive personal information (for example, the account number of affected complainant). **Potential Errors:** There were 192 Telecom complaints that could not be mapped, resulting in 2.1% of investigated complaints over the test period that are not accounted for within the Report.

Verizon Trouble Calls (See Figures 20-22): **Method:** For every wire center, Verizon provides monthly reports for the number of lines served and the number of Trouble Calls reported per 100 access lines. For this report DTC calculated the actual number of trouble calls per month per wire center. All wire center data was then assigned to an exchange boundary where possible, however DTC was unable to determine the wire centers serving five exchange boundaries statewide, these exchange boundaries appear as "Incomplete Data." For region-wide estimates, monthly Trouble Call and access line data was annualized before normalizing for the number of Trouble Calls per 100 access lines. **Sources:** (1) Verizon Monthly Service Quality Index Report filings, 2005-2008; (2) Verizon MA Tariff No. 10 at section 1.6, identification of Verizon exchange boundaries; (3) Community Boundaries Map, MassGIS. **Confidentiality of Data**: (1) None, Verizon monthly Service Quality Index reports are publicly available; (2) None, Verizon tariffs are publicly available; (3) None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm. **Potential Errors:** (1) The boundaries for wire centers and exchanges may not be coterminous resulting in localized inaccuracies; (2) DTC developed the exchange boundary map by sourcing a paper map; this likely results in localized exchange boundary differences caused by projection errors.

2. Business Wireline Voice Service

2.1 Availability

Total Small and Medium Business Units: **Method:** Aggregate number of businesses with 500 or fewer employees for every zip code for each of the seven regions. **Sources:** (1) Zip Code Business Patterns by Employment Size Class, U.S. Census Bureau, 2006 (note: this database excludes most government employees, railroad employees, and self-employed persons); (2) Zip Code boundaries obtained from ESRI, Redlands, California, USA , 2007, through MassGIS. **Confidentiality of Data:** None, data available from U.S. Census Bureau, see

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=EAS&_submenuId=datasets_5&_tabId=EAS2; (2) Zip code boundary metadata is proprietary subject to terms of ESRI software license.

ILEC Availability (see Table 5): **Method:** (a) As "Provider of Last Resort," ILEC is obligated to make reasonable efforts to offer service to every SMB within the ILEC territory; (b) ILEC covered percentage: estimating number of SMBs with access to Verizon's and Independent ILECs' services, by overlaying U.S. Census Bureau 2006 Zip Code level data on the number of SMB establishments with the MassGIS Community Boundaries. **Sources:** (1) Zip Code Business Patterns by Employment Size Class, U.S. Census Bureau, 2006 (note: this database excludes most government employees, railroad employees, and self-employed persons); (2) Zip Code boundaries obtained from ESRI, Redlands, CA, 2007, through MassGIS. (3) Community Boundaries Map, MassGIS. **Confidentiality of Data:** (1) None, data available from U.S. Census Bureau, see http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=EAS&_submenuId=datasets_5&_tabId=EAS2, (2) Zip code boundary metadata is proprietary subject to terms of ESRI software license; (3) None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm.

CLEC Availability (see Figures 23-24): **Method**: (a) From FCC Form 477 December 2007 identify those CLECs providing at least 1,000 lines to SMBs statewide, including via Resale, Leased Facilities, and Own Network platforms. Also from Form 477, carriers identify those zip codes served by the carrier; (b) create CLEC coverage map by calculating the total number of CLECs providing service in each of the zip codes as defined in (a) providing service in each of the zip codes; (c) overlay CLEC coverage map with "Total Small and Medium Business Units" data layer; (d) CLEC covered percentage: calculate percentage of SMBs in each region with access to different number of CLECs. **Sources:** (1) FCC Form 477, December 2007; (2) Zip Code boundaries obtained from ESRI, Redlands, CA, 2007, through MassGIS; (3) Zip Code Business Patterns by Employment Size Class, U.S. Census Bureau, 2006 (note: this database excludes most government employees, railroad employees, and self-employed persons); (4) Community Boundaries Map, MassGIS. **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment"(see http://www.fcc.gov/wcb/iatd/comp.html); (2) Zip code boundary metadata is proprietary subject to terms of ESRI software license; (3) None, data available from U.S. Census Bureau, see http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=EAS&_submenuId=datasets_5&_tabId=EAS2; (4) None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm. **Potential Errors**: Map of both SMB locations and CLEC service areas are zip code-based and not building location unit-specific; potential that there are areas within zip codes where an SMB may be located but lack actual service from any CLEC. This results in potential to over-estimate actual number of SMBs with access to CLEC services.

Reseller Covered (see Figures 25-26; and Table 6): **Methodology** is similar to the CLEC Covered. As mentioned in "CLEC Covered," zip code-based service areas are not platform-specific, but company-specific. The Reseller Covered map shows service territories of CLECs with at least 1,000 business lines statewide provided via Resale platform.

Leased Facilities Covered (see Figures 27-28; and Table 7): **Methodology** is similar to the CLEC Covered. As mentioned in "CLEC Covered," zip code-based service areas are not platform-specific, but company-specific. The Leased Facilities Covered map shows service territories of CLECs with at least 1,000 business lines statewide provided via Leased Facilities platform.

Own Network Covered: **Not applicable.** As mentioned in "CLEC Covered," zip code-based service areas are not platform-specific, but company-specific. CLEC Own Network facilities are independent from the

PSTN except for interconnections that allow customers on a CLEC-owned network to communicate with customers on the PSTN. The DTC does not collect, and CLECs are not obligated to provide, specific information on the location of CLEC Own Network facilities.

Cable Voice Covered: **Not Applicable.** Cable Voice service offerings to SMB market emerged on a wide-scale basis in 2008; DTC data was not able to account for this emerging service.

2.2 Adoption

ILEC Adoption (see Figures 29 and 33-36; and Table 8): **Method:** (a) Statewide subscriber data from FCC Form 477, including statewide split of business subscribers; (b) regional allocation derived by (b1) allocating wire center distribution of access lines reported in Verizon Service Quality Index Report, then (b2) calculating number of Verizon statewide business lines per employee in Massachusetts, applying statewide coefficient to the number of employees in each region to determine number of business lines in each region. (c) Regional employee data used in b2 is obtained from the total number of employees reported by the EOLWD on 16 Workforce Investment Areas (WIA); (d) add Independent ILECs[3] (Richmond Telephone Company, Taconic Telephone, and Granby Telephone) business lines from FCC Form 477 to obtain total ILEC business lines on region level. **Sources:** (1) FCC Form 477, June 2005 through December 2008; (2) Verizon Service Quality Index Report, June 2005-December 2008; (3) Establishment and Employment by Size, EOLWD, March 2008. **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment"(see http://www.fcc.gov/wcb/iatd/comp.html); (2) None, Verizon Service Quality Index Monthly Reports are publicly available; (3) None, data from the EOLWD are publicly available, see http://lmi2.detma.org/lmi/sizeclass.asp;. **Potential Errors:** The statewide coefficient for the number of employees per Verizon's business lines may not be uniform throughout the regions, therefore regional allocation estimates of ILEC business lines may result in regional inaccuracies.

CLEC Adoption (see Figures 30-36; and Table 8): **Method:** Statewide subscriber data and distribution of business subscribers by platform type (resale, leased facilities, own network) derived from FCC Form 477; regional allocation calculated by regionally allocating each CLEC's utilization of numbers as determined by NRUF database. Exclude Adoption numbers for specific companies, including Level 3 Communications and Global Crossing, which are not providing substantial service to the SMB market. For those CLECs that do not obtain numbers directly from NANPA, regional allocation of statewide subscribers is a two stage process: (a) the CLEC's service territory is determined upon the zip codes reported as served by the CLEC in FCC Form 477; (b) the statewide subscriber count for the CLEC is allocated according to distribution of employees located within the zip codes served by the CLEC. **Sources:** (1) FCC Form 477, June 2005 through December 2008; (2) NRUF database, February 1, 2009; (3) Zip Code Business Patterns by Employment Size Class, U.S. Census Bureau, 2006 (note: this database excludes most government employees, railroad employees, and self-employed persons). **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment", see http://www.fcc.gov/wcb/iatd/comp.html; (2) Proprietary, DTC entered into non-disclosure agreement with NANPA for company-specific number utilization data, however 1000-number block level assignments are made publicly available by NANPA; (3) None, data available from

[3] No data are available for Sentinel Tree Company on FCC Form 477.

U.S. Census Bureau, see http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=EAS&_submenuId=datasets_5&_tabId=EAS2. **Potential Errors:** (1) For those CLECs that do not obtain phone numbers directly from NANPA, allocation is estimated based upon population of zip codes served by each of the providers. Across each region there is no reason to think that error is systemic in one direction; (2) NRUF database may overestimate numbers assigned to carriers in particular areas, as it may include numbers that carriers provide to unaffiliated carriers, such as VoIP providers, resulting in possibility that region allocation estimates may be over-stated in some regions and under-stated in other regions.

Cable Voice Adoption, 2008 (see Figure 34-36; and Table 8): **Method:** Statewide subscriber data for December 2008 obtained from FCC Form 477; to determine regional allocation of cable voice adoption, DTC applied a cable-industry-based allocation factor utilizing region-specific distribution of cable video adoption, adjusting for those cable video communities without cable voice offerings. For business breakdown of cable voice subscribers, DTC used the statewide percent of business cable voice subscribers as reported in FCC Form 477 as of December 2008. **Sources:** (1) FCC Form 477 December 2008; (2) Annual Cable Franchise Fee Filing, 2008. **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment" (see http://www.fcc.gov/wcb/iatd/comp.html); (2) None, Annual Cable Franchise Fee filings are publicly available. **Potential Errors:** Regional allocation of Cable Voice subscribers assumes uniform timing for availability of Cable Voice offering throughout Massachusetts and also assumes adoption rate for Cable Voice correlates with adoption rate of Cable Video.

3. Wireless Voice Service

3.1 Availability

Wireless Availability (see Figures 37-39; and Table 9): **Method**: DTC developed Wireless Voice coverage map by overlaying unique coverage maps as reported by individual Wireless Voice carriers. To determine population covered by Wireless Voice service, Wireless Coverage map was overlaid with Land Use map identifying point-specific locations of residential structures and map of population allocation as determined by US Census. To determine amount of terrain covered by Wireless Voice service, Wireless Coverage map was overlaid with map of community boundaries. For illustrative purposes, several state and interstate highways are displayed in Figure 37. **Sources:** (1) Three carriers (AT&T, Sprint Nextel Corporation, and T-Mobile) voluntarily provided statewide wireless voice coverage maps as displayed on each provider's website as of December 2008; (2) For Verizon Wireless coverage area, DTC aggregated localized snapshots of voice coverage displayed on the carrier's website in December 2008.; (3) Massachusetts Land Use, 1999, MassGIS; (4) US Census 2000 population Tiger files reprocessed through MassGIS, 2003; (5) Community Boundaries Map, MassGIS; (6) Street Geocoding Data for Massachusetts, NAVTEQ, Chicago, Il, May 2008, through MassGIS. **Confidentiality of Data:** (1 & 2) None, coverage maps publicly available via carrier websites (*see* AT&T Wireless: http://www.wireless.att.com/coverageviewer/#?type=voice; Sprint Nextel: http://coverage.sprint.com/IMPACT.jsp; T-Mobile: http://www.t-mobile.com/COVERAGE/; Verizon Wireless: http://www.verizonwireless.com/b2c/CoverageLocatorController); (3) None, MassGIS Land Use data is publicly available, see http://www.mass.gov/mgis/lus.htm; (4) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm; (5) None, MassGIS community boundary data is publicly available, see

http://www.mass.gov/mgis/towns.htm; (6) Street Geocoding metadata is proprietary subject to terms of NAVTEQ software license. **Potential Errors:** Coverage areas are approximations of outdoor cellular coverage and do not guarantee service in all areas represented, this may result in estimates for population with access and terrain covered to be over-stated.

3.2 Adoption

Wireless Adoption (see Figure 40): **Method:** Statewide subscriber data from FCC Form 477. Regional distribution of subscriber counts determined by rate center proportions of utilized numbers assigned to each carrier according to NRUF database. **Sources:** (1) FCC Form 477, June 2005 through December 2008; (2) NANPA NRUF Database, February 1, 2009; (3) US Census 2000 population Tiger files reprocessed through MassGIS, 2003. **Confidentiality of Data:** (1) Massachusetts-specific data gathered through FCC Form 477 is obtained by DTC pursuant to a September 12, 2008 non-disclosure agreement between the DTC and FCC. The FCC produces publicly available semi-annual summaries of Form 477 data, referred to as "Local Telephone Competition and Broadband Deployment" (see http://www.fcc.gov/wcb/iatd/comp.html) (2) Proprietary, DTC entered into non-disclosure agreement with NANPA for company-specific number utilization data, however, 1000-number block level assignments are made publicly available by NANPA; (3) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm. **Potential Errors:** (1) By its nature wireless service is mobile. Utilization of NRUF database for regional allocation merely indicates the assignment of phone numbers and not necessarily where the end-user is utilizing the service; (2) Regional allocation may not be as accurate as could be, because NRUF database may overestimate numbers assigned to carriers, as it may include numbers that carriers provide to unaffiliated carriers, such as VoIP providers; (3) Data presented combines both residential and business wireless subscribers; DTC is not able to calculate residential/business subscriber split of total wireless subscribers. FCC did not instruct wireless carriers to report this split on Form 477 through the June 2008 reporting period.

Wireless Substitution (see Figures 41-44; and Table 10): **Method:** For Wireless Substitution estimate, DTC utilized the Centers for Disease Control and Prevention's (CDC) estimated rate of adults living in wireless-only households within its Northeast Region (includes Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania). DTC applied CDC estimated rate of adults living in wireless-only households to the total Massachusetts population of age 18 and over to obtain number of adults living in wireless-only households. DTC then applied the number of adults living in wireless only households to average number of adults per household to estimate the number of wireless-only households. **Sources:** (1) Centers for Disease Control and Prevention's National Health Interview Survey, July-December 2008, (2) Population estimates derived from American Community Survey, U. S. Census Bureau, 2005-2008, estimates for Massachusetts counties. **Confidentiality of Data:** (1) None, publicly available from CDC, see http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200905.htm; (2) ACS estimates are publicly available, see http://www.census.gov/acs/www/Products/. **Potential Errors:** Wireless Substitution estimate based on the Northeast region may over- or underestimate wireless substitution taking place in Massachusetts.

Telephone Service Penetration Rates (see Figure 45-46): **Method:** Annual values derived from telephone penetration rate reported in the American Community Survey (ACS). Half-annual estimates based on constructing new data points using average values of annual telephone service penetration rates. **Source:** Estimates derived from American Community Survey, U. S. Census Bureau, 2001-2008, at C25403, Tenure by Telephone Service Available. **Confidentiality of Data:** ACS estimates are publicly available, see http://www.census.gov/acs/www/Products/.

4. Video Services

4.1 Availability

Incumbent Cable Video Availability (see Figures 47-55): **Method:** (a) Identification of cable provider within each municipality determined through cable franchise licenses (308 municipalities with at least an Incumbent provider); (b) Number of households passed determined by overlaying electronic street-level cable plant maps with map identifying point-specific locations of residential structures (284 municipalities with electronic cable strand maps); (c) For those communities where no electronic cable plant maps were available (24 municipalities), the Department of Telecommunications and Cable (DTC) estimated number of homes passed as required by cable franchise license agreement. For those municipalities without a full-build-out requirement in franchise agreement, DTC estimated number of households captured within the negotiated density requirement by overlaying Land Use dataset with NAVTEQ Roads data layer. For estimates to determine ratio of housing units passed, DTC utilized Primary Housing Unit data as reported in the US Census 2000 for 6 of the 7 regions (Berkshire, Boston Metro, Central, Northeast, Pioneer Valley, and Southeast). For Cape and Islands region, DTC utilized estimates of primary plus secondary housing units derived from University of Massachusetts Donahue Institute. DTC determined this was necessary because of the relatively high number of seasonal housing units (37%) as a percentage of the total number of housing units within the Cape Islands region. **Sources:** (1) Cable plant maps provided by individual carriers as of Summer 2008; (2) US Census 2000 population Tiger files reprocessed through MassGIS, 2003; (3) Massachusetts Land Use, 1999, MassGIS; (4) Community Boundaries Map, MassGIS; (5) Street Geocoding Data for Massachusetts, NAVTEQ, Chicago, Il, May 2008, through MassGIS; (6) "Housing Units by Tenure and Vacancy Status," UMass Donahue Institute estimates derived from 2000 U.S. Census; (7) Municipal Cable Television Licenses. **Confidentiality of Data:** (1) None, cable plant maps for all cable companies are publicly available per statutory requirement as part of the cable licensing process; (2) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm; (3) None, MassGIS Land Use data is publicly available, see http://www.mass.gov/mgis/lus.htm; (4)None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm; (4) None, (5) Street Geocoding metadata is proprietary subject to terms of NAVTEQ software license; (6) Data from the Donahue Institute is publicly available, see http://www.massbenchmarks.org/statedata/data.htm; (7) Licenses are available from municipal cable licensing boards, and collectively from the DTC (*see* www.mass.gov/dtc).. **Potential Errors:** (1) When overlaying cable plant maps with Land Use maps, there is potential that not all cable strands are properly aligned to the corresponding streets, which in some areas may cause an overestimation of houses passed, and in other areas may cause an underestimation of households passed; (2) Land Use as of 1999, does not account for new housing growth since 1999;[4] (3) Estimates calculated availability if a housing structure is within 200 feet of the cable strand, actual obligation for cable provider to offer service is dictated according to requirements specified in each cable license, of which 200 feet from cable strand was determined to be representative; (4) Use of Incumbent cable plant to estimate Overbuilder availability may over or under estimate actual availability to Overbuilder service; (5) Land Use dataset and Census data reprocessed by MassGIS does not consider secondary housing units, this results in possibility that DTC projection estimates for availability on Cape and Islands region is over-stated.

Overbuilder Cable Video Availability (See Figures 51-55): **Method:** For each region, identify only those municipalities where Overbuilder service from BELD, Norwood, RCN, and/or Verizon FiOS was offered as of December 2007, December 2008, and June 2009. For Overbuilder providers, estimates of housing units with access to service is estimated based upon the location of Incumbent Cable Video plant within those municipalities with at least one Overbuilder present, see “Incumbent Cable Video Availability”,

[4] This is true for all the methods where this datasource has been used.

infra., for further detail regarding estimates of Cable Video availability. **Sources:** (1) Cable plant maps provided by individual carriers as of Summer 2008; (2) US Census 2000 population Tiger files reprocessed through MassGIS, 2003; (3) Massachusetts Land Use, 1999, MassGIS; (4) Community Boundaries Map, MassGIS; (5) Street Geocoding Data for Massachusetts, NAVTEQ, Chicago, Il, May 2008, through MassGIS; (6) Municipal Cable Television Licenses. **Confidentiality of Data:** (1) None, cable plant maps for all cable companies are publicly available per statutory requirement as part of the cable licensing process; (2) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm; (3) None, MassGIS Land Use data is publicly available, see http://www.mass.gov/mgis/lus.htm; (4) None, MassGIS community boundary data is publicly available, see http://www.mass.gov/mgis/towns.htm; (4) None, (5) Street Geocoding metadata is proprietary subject to terms of NAVTEQ software license; (6) Licenses are available from municipal cable licensing boards, and collectively from the DTC (*see* www.mass.gov/dtc). **Sources:** (1) Cable Strand maps provided by individual carriers (Charter, Comcast, Cox, Shrewsbury, and Time Warner) as of Summer 2008; (2) MassGIS Land Use to Housing Allocation Data (2000 U.S. Census Bureau housing data allocated over 1999 Land Use ortho imagery). **Confidentiality of Data:** (1) None, cable plant maps utilized for these estimates are publicly available per statutory requirement as part of the cable licensing process. Verizon currently is only licensed cable provider in Massachusetts that has not submitted cable plant maps per statutory requirement for those municipalities where the company is licensed as a cable provider to offer FiOS video service. Verizon alleges it is not under an obligation to submit cable plant maps. (2) None, MassGIS data is publicly available. **Potential Errors:** (1) When overlaying cable plant maps with Land Use maps, there is potential that not all cable strands are properly aligned to the corresponding streets, however there is no reason to think this error is systemic in one direction; (2) Land Use as of 1999, does not account for new housing growth since 1999; (3) Estimates calculated availability if a housing structure is within 200 feet of the cable strand, actual obligation for cable provider to offer service is dictated according to requirements specified in each cable license; (4) Use of Incumbent Cable Video cable plant to estimate Overbuilder Cable Video availability may over or under estimate actual availability to Overbuilder service. Cable plant maps utilized for these estimates are publicly available per statutory requirement as part of the cable licensing process. Verizon currently is only licensed cable provider in Massachusetts that has not submitted cable plant maps per statutory requirement for those municipalities where the company is licensed as a cable provider to offer FiOS video service. Verizon alleges it is not under an obligation to submit cable plant maps. DTC determined that due to market Overbuilder presence of FiOS service, the Overbuilder Cable Video platform availability estimates would be based upon the Incumbent Cable Video availability proxy method.

4.2 Adoption

Incumbent Cable Video Adoption (see Figures 56-66): **Method:** Aggregate carrier-specific subscriber counts for each municipality with cable franchise. **Sources:** (1) Annual Cable Franchise Fee Filing, 2005-2008; (2) US Census 2000 population Tiger files reprocessed through MassGIS, 2003. **Confidentiality of Data:** (1) None, Annual Cable Franchise Fee filings are publicly available from municipal licensing boards and collectively at DTC, see www.mass.gov/dtc; (2) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm.

Overbuilder Adoption (see Figures 56-57, 60-63, and 65-67): **Method:** Aggregate carrier specific subscriber counts for each municipality with cable franchise; (b) Overbuilder Adoption Percentage: number of Overbuilder service subscribers per estimate of total primary housing units covered by Overbuilders. **Sources:** (1) Annual Cable Franchise Fee Filing, 2005-2008; (2) 2000 U.S. Census. **Confidentiality of Data:** (1) None, Annual Cable Franchise Fee filings are publicly available from municipal licensing boards and collectively at DTC, see www.mass.gov/dtc; (2) None, U.S. Census data are publicly available, see http://www.census.gov/main/www/cen2000.html.

Satellite Adoption (see discussion at IV. F. 1.): **Method:** Estimate of platform based statewide subscribers to a direct broadcast satellite service. **Source:** (1) Response to DTC Voluntary Request for Data. **Confidentiality of Data:** (1) Voluntary responses to data request is publicly available. **Potential Errors**: Data is not audited, was provided as an industry estimate of statewide subscribers.

Over-the-Air Adoption (see discussion at IV. F. 1.): **Method:** Assume all households not subscribing to pay service (either Incumbent, Overbuilder, or Satellite) are receiving video content over-the-air. **Source:** (1) US Census 2000 population Tiger files reprocessed through MassGIS, 2003. **Confidentiality of Data:** (1) None, US Census population data reprocessed through MassGIS is publicly available, see http://www.mass.gov/mgis/census2000.htm. **Potential Errors:** Not every household in Massachusetts is receiving video content. Additionally, there may be households receiving video content through broadband service, DTC did not estimate these broadband-only consumers because this is an emerging technology. Due to errors, DTC estimates of over-the-air video content consumers are possibly over-stated.

4.3 Service Quality

DTC Cable Video Complaints (see Figures 68-70): **Method:** All Cable Video Complaints derived from DTC Consumer Division database received from January 1, 2005 through December 31, 2008. Complaints sorted by municipality to determine region allocation. "Billing" complaints comprised of the following in-take codes: Billing, Credit, Cramming, Service Denial, Marketing, Rate, and Regulation. "Service Quality" complaints comprised of the following in-take codes: Installation, Missed Appointment, and Service Quality. Complaints were normalized by combining annual Cable Video subscribers for all providers, both Incumbent and Overbuilder. **Sources:** (1) DTC Consumer Division Database; (2) Annual Cable Franchise Fee Filing, 2005-2008. **Confidentiality of Data:** (1) Generally, information regarding complaints made to the DTC is publicly available, except for items containing sensitive personal information (for example, the account number of affected complainant); (2) None, Annual Cable Franchise Fee filings are publicly available from municipal licensing boards and collectively at DTC, see www.mass.gov/dtc. **Potential Errors:** Over the test period, there were 47 complaints that could not be mapped, resulting in 1.3% of complaints that are not accounted for within the Report.

Incumbent Complaints Received (see Figures 71-72): **Method:** All Incumbent Cable Video complaints derived from Annual Form 500 filings for 2005 through 2008. Complaints sorted by municipality to determine region allocation. "Billing" complaints comprised of the following in-take codes: Billing, Defective Notice, and Marketing. "Service Quality" complaints comprised of the following in-take codes: Equipment, Failure to respond to Original Complaint, Installation, Missed Appointment, Programming, Reception, Service Interruption and Service Quality. "Miscellaneous" complaints comprised of the following in-take codes: Other, Other: Damage, and Unable to Contact. Complaints were normalized by combining annual Cable Video subscribers for Incumbent providers. **Sources**: (1) Cable Form 500: Cable Operator's Annual Report of Consumer Complaints, 2005-2008; (2) Annual Cable Franchise Fee Filing, 2005-2008. **Confidentiality of Data:** (1) Cable Form 500 reports are publicly available from municipal licensing boards; (2) Annual Cable Franchise Fee filings are publicly available from municipal licensing boards and collectively at DTC, see www.mass.gov/dtc.