

**HOW INTERNET PROTOCOL-ENABLED SERVICES
ARE CHANGING THE FACE OF COMMUNICA-
TIONS: A VIEW FROM TECHNOLOGY COMPA-
NIES**

HEARING

BEFORE THE

SUBCOMMITTEE ON TELECOMMUNICATIONS AND
THE INTERNET

OF THE

COMMITTEE ON ENERGY AND
COMMERCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

FEBRUARY 9, 2005

Serial No. 109-12

Printed for the use of the Committee on Energy and Commerce



Available via the World Wide Web: <http://www.access.gpo.gov/congress/house>

U.S. GOVERNMENT PRINTING OFFICE

99-910PDF

WASHINGTON : 2005

For sale by the Superintendent of Documents, U.S. Government Printing Office
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HOW INTERNET PROTOCOL-ENABLED SERVICES ARE CHANGING THE FACE OF COMMUNICATIONS: A VIEW FROM TECHNOLOGY COMPANIES

WEDNESDAY, FEBRUARY 9, 2005

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ENERGY AND COMMERCE,
SUBCOMMITTEE ON TELECOMMUNICATIONS
AND THE INTERNET,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:36 a.m., in room 2123 of the Rayburn House Office Building, Hon. Fred Upton (chairman) presiding.

Members present: Representatives Upton, Stearns, Gillmor, Whitfield, Cubin, Shimkus, Wilson, Pickering, Radanovich, Bass, Walden, Terry, Ferguson, Sullivan, Blackburn, Barton (ex officio), Markey, Engel, Wynn, Gonzalez, Inslee, Boucher, Towns, and Brown.

Staff present: Will Nordwind, policy coordinator; Howard Waltzman, chief counsel; Neil Fried, majority counsel; Jaylyn Jensen, senior legislative analyst; Andy Black, deputy staff director; Julie Fields, special assistant to the policy coordinator; Jon Tripp, deputy communications director; Billy Harvard, legislative clerk; Johanna Shelton, minority counsel; Peter Filon, minority counsel; and Turney Hall, staff assistant.

Mr. UPTON. If someone could get the doors in the back there. Good morning. We have a busy day in this committee and subcommittee all day long. I want to thank and welcome all of our returning subcommittee members, including our able ranking member, Mr. Markey, suffering from a tough Irish loss. You know, Notre Dame's only about 2 miles from my district, you know. I want to extend a warm welcome to all of the new subcommittee members. We are ready to begin.

Today, we are beginning a series of hearings on Internet Protocol, or IP-enabled services. These hearings will serve as a foundation for our effort this year to modernize our telecommunication laws so that we bring them up to speed to today's and tomorrow's technology and its marketplace. Today, we will hear from some of the world's biggest and brightest stars in the high tech constellation, and we will hear how their companies are manufacturing equipment and infrastructure for the new IP-enabled world.

These companies are building the engines and the networks which will bring to the consumer a converged world of IP-enabled

voice, video, and data, enabling a dramatic change in the way that we communicate, shop, work, learn, and entertain.

Testimony of today's witnesses will prove that now is the time for Congress to come together to update our obsolete telecommunication laws, because the telecommunications marketplace has evolved dramatically since the Telecommunications Act of 1996 became law. As the 1996 Act was debated in the Congress, the telecommunications marketplace was virtually dominated by the Bell companies who provided local voice services over traditional circuit-switched copper networks, and several carriers who provided the long distance service. Consequently, much of the debate focused on injecting competition into the plain old telephone service in both the local and long distance markets as we knew them then. The regulations implementing the 1996 Act relied on the government to manage this competition. And no surprise, when the government anointed itself the chief regulator in lieu of market forces, investment in the telecommunications sector initially rose, but then it sharply dropped, and to make matters worse, the wrongheaded regulatory decisions resulted in numerous legal challenges, causing the FCC to rewrite many regulations in order to comply with the various successive court remands. And as a result, there has been a dark cloud of regulatory uncertainty hanging over the tech sector industry, further depressing investment in that industry.

Despite these hindrances, tremendous advances in technology have emerged since 1996, and they have begun to do an end run around the wrongheaded government managed regulation. And without a doubt, intermodal, facilities-based competition has taken root, as IP-enabled voice, video, and data are being delivered into homes and businesses over multiple technological platforms. All of this robust competition is a byproduct of those free market forces that have been allowed to take root where government, by and large, has kept its hands off. Our experience with implementation of the 1996 Act should teach us not to repeat the mistakes of the past. I suspect we know—we knew no better then, but we know better now. What our experience with the 1996 Act should have taught us is that investment in innovation goes into the less regulated space.

As we speak, there are multiple government proceedings at both the Federal and the State level concerning the proper regulatory treatment under the 1996 Act of broadband, VoIP, and other advanced IP-enabled services. Hanging in the balance is whether these services will be managed by the government, or in the alternative, allowed to flourish in open markets, where they have already begun to show great promise.

My fear is that if the government chooses a path of regulation, then we will see these emergent technologies smothered by the new red tape. But it is not enough to just rely on regulatory proceedings to ensure that these new technologies are not choked off by regulation. Congressional action is essential. Congress must retool the 1996 Act to bring it up to speed to today and tomorrow's marketplace in technology, so that the specter of the government trying to manage this competition is foreclosed once and for all.

I look forward to statements by our distinguished witnesses today, and I yield for an opening statement to the ranking member of the subcommittee, Mr. Markey.

[The prepared statement of Hon. Fred Upton follows:]

PREPARED STATEMENT OF HON. FRED UPTON, CHAIRMAN, SUBCOMMITTEE ON
TELECOMMUNICATIONS AND THE INTERNET

Good morning. I want to welcome back all of the returning Subcommittee Members, including our able Ranking Member, Ed Markey.

I also want to extend a warm welcome to all of the new Subcommittee Members. We have a big year ahead of us—so let us begin!

Today, we are beginning a series of hearings on Internet Protocol—or “IP”—enabled services. These hearings will serve a foundation for our effort this year to modernize our telecommunications laws so that we bring them up to speed to today’s—and tomorrow’s—technology and marketplace.

Today we will hear from some of the world’s brightest stars in the hi-tech constellation, and we will hear how their companies are manufacturing equipment and infrastructure for the new IP-enabled world. These companies are building the engines and networks which will bring to the consumer a converged world of IP-enabled voice, video, and data—enabling a dramatic change in the way we communicate, shop, work, learn, and entertain.

The testimony of today’s witnesses will prove that now is the time for Congress to come together to update our obsolete telecommunications laws because the telecommunications marketplace has evolved dramatically since the Telecommunications Act of 1996 became law.

As the ’96 Act was debated in Congress, the telecommunications marketplace was virtually dominated by the Bell Companies who provided local voice services over traditional, circuit-switched copper networks and several carriers who provided the long distance service. Consequently, much of the debate focused on injecting competition into the “plain old telephone service” in both the local and long distance markets as we knew them then.

The regulations implementing the ’96 Act relied on the government to manage this competition, and—no surprise—when the government anointed itself the chief regulator in lieu of market forces, investment in the telecommunications sector initially rose, but then sharply dropped. To make matters worse, the wrong-headed regulatory decisions resulted in numerous legal challenges, causing the FCC to rewrite many regulations in order to comply with the various, successive court remands. As a result, there has been a dark cloud of regulatory uncertainty hanging over the tech sector industry, further depressing investment in the industry.

Despite these hindrances, tremendous advances in technology have emerged since 1996 and have begun to do an end-run around the wrong-headed government managed regulation. Without a doubt, inter-modal, facilities-based competition has taken root as IP-enabled voice, video, and data are being delivered into homes and businesses over multiple technological platforms.

All of this robust competition is a by-product of those free-market forces that have been allowed to take root where government, by and large, has kept its hands-off. Our experience with implementation of the ’96 Act should teach us to not repeat the mistakes of the past. I suspect we knew no better then; but we know better now. What our experience with the ’96 Act should have taught us is that investment and innovation goes into the less regulated space.

As we speak, there are multiple government proceedings at both the federal and state level concerning the proper regulatory treatment under the ’96 Act of broadband, VoIP, and other advanced, IP-enabled services. Hanging in the balance is whether these services will be managed by the government or, in the alternative, allowed to flourish in open markets, where they have already begun to show great promise. My fear is that if the government chooses a path of regulation, then we will see these emerging technologies smothered by red tape.

But it’s not enough to just rely on regulatory proceedings to ensure that these new technologies are not choked-off by regulation. Congressional action is essential.

Congress must retool the ’96 Act—to bring it up to speed to today’s—and tomorrow’s—marketplace and technology—so that the specter of the government trying to manage this competition is foreclosed once and for all.

I look forward to hearing from today’s distinguished witnesses.

Mr. MARKEY. I thank you, Mr. Chairman, and I thank you for putting together this incredible all star cast. We haven’t had a

panel like this before our committee in several years, and I just think that this is an incredible way to begin what is going to be a very important year in telecommunications policy.

Yesterday was the ninth anniversary of the signing of the Telecommunications Act of 1996. After years of a small number of companies saying have the government keep their hands off of the private sector, in the 1996 Act, through brilliant government policy, we opened up a digital free for all, so that dozens of companies could now begin to engage in the deployment of the digital technology that had been denied us as a country by a small number of companies. And we have gone, from 1996 to zero deployment of broadband in the United States to a point where, today, 85 percent of all homes in our country have access to digital broadband at their homes. Now, that is an incredible result after only 9 years. In other words, this digital technology had been out there for a decade or longer up to 1996, but until the government got in and created this policy, it had been going nowhere, because a small number of companies had held it hostage. So this is an incredible victory, 85 deployment. Now, those small number of companies have tried to destroy, and unfortunately have been too successful, in destroying a lot of their competition. But nonetheless, we already have 48 million Americans that have broadband, 24 percent of adult Americans have high speed access at home. That is a remarkable figure, representing a tripling of broadband adoption in just the last 3 years. Yet, we must also reflect on the fact that while half of American consumers with incomes over \$75,000 a year now have broadband access, half of those who earn less than \$30,000 have no Internet access at all. So clearly, more work needs to be done with respect to deployment in less affluent areas, and also with respect toward creating a competitive climate, which makes broadband service more affordable to all Americans.

And while we have had regulatory setbacks with ill-considered decisions by the FCC, destroying the competition that dozens of companies were providing, there is a deal which is still at the heart of the Telecommunications Act, which I cut with Jack Fields back in 1993, which prohibits the telephone companies from buying cable companies inside of their own service areas, and vice versa, because one of the key goals which I had back then was to make sure we had, at a minimum, a two wire world, where the telephone companies wouldn't get into the cable business by buying cable companies inside of their own region, but ultimately be forced to deploy their own services, no matter how long it took, because they promised that they could get it done.

Now, I think that is still a good regulatory framework, having a two wire world at a minimum, because we need some place where companies who are providing services technology can go. Companies that are needing to upgrade on an ongoing basis because they are competing against each other. And while a duopoly is not an ideal marketplace, we at least have that that we can rely upon, so that we can foster policies which add wireless competition, satellite competition, competition from electric utilities, and perhaps municipal utilities as well, into that competitive mix. In the digital era, our national goal should be affordable, ubiquitous access to multiple broadband providers to the Internet for all Americans. Com-

petition rather than subsidies should remain our preferred route to achieve such affordable ubiquity of broadband service. We must also ensure that affordable broadband reaches remote areas of the country where competitive deployment may not occur. And again, the government has the responsibility to make sure that happens for more remote parts of the country, where urban America is being served, this is something where the urban parts of America understand why the rural parts of the country do need the government to help them to provide that access.

In addition, there must be legal prohibitions against economic redlining in the deployment of such services. And across America's broadband networks, consumers must be permitted to reach the information sources and services of their choice in unfettered fashion without hindrance from network operators. We should reexamine the Telecommunications Act with an eye toward building upon the progress made in cracking open these new markets to new competition and innovation. We need these hearings to bring all members of this panel up to speed on the marketplace changes fostered by the Telecommunications Act, and I am pleased that we begin that process today, and look forward to our upcoming hearings that will focus on voice service, video, and data services jurisdictional issues and consumer interests.

Mr. Chairman, you get an A plus for this incredible hearing that will kick off this year of history. Thank you.

Mr. UPTON. Thank you. I thank my friend. I recognize the chairman of the full committee, Mr. Barton, for an opening statement.

Chairman BARTON. Thank you, Chairman Upton. I also commend you on this hearing, and I want to thank our panelists for being here this morning. I am going to put my entire written statement in the record. I just want to compliment our witnesses, and I also want to tell you how important it is that we get this right as we begin to decide what to do to reform or tweak the Telecommunications Act of 1996.

I can give an example of why it is important. I went to the Super Bowl this weekend, and the Monday after the Super Bowl, I went over to Disney World, and I was at Epcot Center, and I was theoretically deep under the sea, in The Living Seas, looking at an exhibit of Kirk Douglas wrestling a giant squid outside of the submarine Nautilus, and my little Blackberry went off, and the staff here in Washington was worried that I was having too much fun, and so they sent me an email over the—a wireless email about this hearing and several other hearings, and asked for an immediate answer. Now, you wouldn't think, if I am sitting there watching Kirk Douglas wrestle the giant squid, that I would be able to do this, but I did, and so for about 5 minutes, we went back and forth, and the staff up here was happy that I was working some, and life went on.

Now, what you folks are talking about doing, if we get the law right, is absolutely amazing. And it is important that we get it right, because each of you right now, as I understand it, is regulated in a little bit different way, because of how you got started and what you are doing, and the purpose of this hearing is to not only talk about convergence of the technology, but convergence of regulation, or lack of regulation and freedom at the Federal level,

so that we can unleash the competitiveness and all the economic growth that will happen if we get it right.

So I want to thank you all for coming in again, and thank Mr. Upton for the hearing.

[The prepared statement of Hon. Joe Barton follows:]

PREPARED STATEMENT OF HON. JOE BARTON, CHAIRMAN, COMMITTEE ON ENERGY
AND COMMERCE

Mr. Chairman, thank you for calling this hearing today. We truly have a blockbuster panel. We have the CEOs of the leading technology companies in the world.

Mr. Chairman, the Internet has revolutionized communications. The Internet has created new communications mediums. In the 1990s, consumers were introduced to electronic mail. Email enabled a person hooked up to a computer and the Internet anywhere in the world to correspond with anyone else in the world also hooked up to a computer and the Internet.

Now, we have more sophisticated Internet Protocol (IP) services. These services transmit voice, video, and data in packets of ones and zeros over the Internet and private networks. IP-enabled services provide enhanced features such as interactive video, unified messaging (including video messaging), "nomadic" voice access, customized voice mail boxes, and the ability to program a phone to forward to a cell phone or work phone if unanswered.

IP-enabled services are in the process of transforming the communications industry. As that transformation occurs, Congress needs to act to ensure that all companies have the right incentives to invest and innovate. Congress has the opportunity to enact legislation as significant to the communications industry as the Communications Act of 1934.

If we create the right rules for IP-enabled services, Congress will be paving the way for strong economic growth. If our economy is going to continue to grow, it will be because of investment and innovation in IP technology. But if we permit regulators to stifle IP-enabled services and fail to adopt new legislation, we will have missed a significant opportunity to ensure that the United States remains the pre-eminent source of technological innovation.

Mr. Chairman, thank you for holding this hearing. I look forward to the testimony of our witnesses. This distinguished panel will provide us with the "big picture" with respect to IP technology. And I hope our colleagues will join us in passing legislation that removes obstacles to IP deployment.

Mr. UPTON. Thank you, Mr. Chairman. Mr. Towns.

Mr. TOWNS. Thank you very much, Mr. Chairman, for holding this hearing, and let me thank the witnesses as well. I look forward to even future hearings on this topic, as we embark on updating our Nation's telecommunication laws. Nearly 10 years ago, when we completed the Telecommunications Act, the Internet was just beginning to blossom. As we tried to fashion a bill that spurred competition, the Act really did not even consider the Internet. In fact, the word Internet is hardly even mentioned. Thus, it seems odd to me that the FCC and the courts are making statutory interpretations of how IP service should be treated under the law, when the Act did not even contemplate this technology. I am hopeful that our committee, working with our counterparts in the Senate, will send the President a bill, this Congress, that reflects our new competitive landscape.

As we consider changes, I think it is important to reflect on what we have learned from the 1996 Act. While some of the regulatory revisions we have made helped lay the groundwork for competition, I think a strong argument can be made that it has been the advent of IP technology that is creating the competition this committee sought. Voice Over Internet Protocol, enabled television are breaking down traditional lines of competition. Additionally, it is bringing new competitors into the market. So we should remember that

technology will often outpace the regulations we try to implement here in the Congress.

While IP-enabled services are clearly the future, the vast majority of consumers still use traditional phone networks. Consequently, I believe our challenge is to create a regulatory environment that encourages investment and forces competition and innovation, while still protecting consumers who use traditional phone networks.

Mr. Chairman, on that note, I yield back, and I am anxious and eager to hear from the witnesses.

Mr. UPTON. Thank you. Mr. Radanovich.

Mr. RADANOVICH. Good morning, and thank you, Mr. Chairman, for—again, for putting together a fine panel. I am looking forward to the testimony, and I won't speak much more than that. Being a new member of the committee, I am real interested in getting up to speed, and you have provided some of the best resources for that, so I want to thank you and the Chairman for that, and I look forward to the testimony.

[The prepared statement of Hon. George Radanovich follows:]

PREPARED STATEMENT OF HON. GEORGE RADANOVICH, A REPRESENTATIVE IN
CONGRESS FROM THE STATE OF CALIFORNIA

Mr. Chairman, thank you for holding the first in what is to be a series of hearings that will examine how broadband and IP-based services are changing the ways in which we communicate, obtain information, and entertain ourselves, as well as how these new technologies and services should or should not be regulated in order to enhance competition, innovation and deployment.

In the last several years, the United States has continually fallen behind the other industrialized countries in terms of the percentage of the American population that subscribe to residential broadband services. I hope that this hearing and the subsequent hearings will provide us with the reasons why we are lagging behind, and help us develop policies that will increase broadband deployment in the U.S., which will help Americans compete in a global economy.

Additionally, it has become increasingly clear over the last few years, that the current communications laws and regulations do not and cannot adequately address IP-based technologies and services. When Congress enacted the 1996 Telecommunications Act, IP-based services were unheard of. For the past few years, the FCC, state regulators and the courts all have been attempting to force-fit these new technologies and services into out dated traditional telephone and cable regulatory structure without much success. Therefore, it seems that it is time for Congress to develop legislation to update the communications laws and create national policies that are reflective of today's marketplace, that increase competition and consumer choices, and that are flexible enough to ensure that the innovative technologies and services of the future will not be stifled by restrictive regulations.

I hope that today's witnesses will provide us with suggestions on how Congress should move forward.

Thank you Mr. Chairman.

Mr. UPTON. Mr. Walden. Mr. Terry. Mr. Ferguson.

Mr. FERGUSON. Thank you, Mr. Chairman. I will just say I am delighted to be a new member of the subcommittee, looking forward to getting to work in the awesome task that we have ahead of us this year. I also want to welcome Pat Russo, a constituent, and Lucent Technologies, of course, is headquartered in my district. We are proud to have them. They have done extraordinary work over the years, and they have much more extraordinary work to do in the future. We also have a major Siemens presence in our district, so I want to thank the panel for being here, welcome them, and we really look forward to their input and others from the in-

dustry, as we seek to recraft our telecommunications legislative infrastructure.

When Chairman Barton was talking before about his experience in Sea World, I thought he was going to say that rewriting the Telecom Act of 1996 is going to be like wrestling a giant squid. But I—he didn't say that, so hopefully, our task will be a little bit easier than that, but I certainly look forward to our work this year, and I yield back.

Mr. UPTON. We are glad to have you on the subcommittee as well. Ms. Blackburn. Mr. Bass.

Mr. BASS. Thank you, Mr. Chairman, and I thank you very much for scheduling this hearing. This is going to be a very interesting year for those of us who are interested in the—in reauthorizing the Telecom Act of 1996, and I would like, if I could, to make three quick points as we begin this debate. The first one, or the first objective that we ought to be pursuing, is developing a mechanism that will free consumers from waiting for new services and competition because of the merry-go-round that exists between FCC rules and planning, and then the lawsuit process that occurs immediately thereafter. And it just seems to—it seems that the FCC is hamstrung in what it can do, because of the fact that everything seems to automatically go to court.

Second, I hope in the process of making decisions on developing a new plan, that we don't try to pick winners or losers, or not focus on one technology versus another, but rather, we focus on the consumers themselves, and what services they are offered, and what level of competition they can benefit from, and in what ways government can either help or hinder their experience, because they ultimately are the objective of this reauthorization.

Finally, I hope that we keep in mind the peculiar and important needs of rural areas of America, because telecommunications, like roads, bridges, and airports, are a very important form of communication, and probably represent the greatest hope for less wealthy, poorer parts of the country to compete in the international marketplace. It is just as easy for somebody to sell a service in a rural area as it is in an urban area if they have access to good telecommunications, and I represent areas of the country that are extremely rural, but beautiful. The environment and the quality of life is wonderful, and telecom and telecom reform is probably the best hope for long term economic recovery for these parts of the country. So I hope that we move forward expeditiously over the next year to reauthorize the Telecommunications Reform Act, and I look forward to hearing from our witnesses today, and I yield back.

Mr. UPTON. Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman, and I want to welcome our panelists, and many of you who know who follow this issues, is I co-chair the E911 Caucus, along with my colleague Anna Eshoo on the other side, and there is a Senate caucus too, with Senator Burns and Senator Clinton. In the waning minutes of the last Congress, we were successful, with the chairman's help, to get E911 legislation passed and signed by the President, which is—so our—my focus will be on that, and it should be of no surprise. Last week, a girl in Texas tried desperately to call 911 from her home

phone as she watched her parents being shot by a home intruder. Her family had switched to Voice Over Internet Protocol technology, but that phone service did not include 911 capabilities. She ran from phone to phone in her house trying to call the police, but wasn't able to do so. Hence, a problem.

We want to encourage you to help us address that and make sure in anything that we do, we move to make sure that all these services that we need, especially first line response public service and safety is included. In fact, we will probably demand that from our side that that occur, but we need your expertise, and we need your technological assistance. The E911 issue is a lot more complicated than people think, because you have the PSAPS, you have the local exchanges, so—but please work with us to make sure that we can limit this application of really a tragedy, and with that, Mr. Chairman, thank you, and I yield back.

[The prepared statement of Hon. John Shimkus follows:]

PREPARED STATEMENT OF HON. JOHN SHIMKUS , A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF ILLINOIS

Thank you Mr. Chairman. I want to highlight 3 stories from recent weeks on telecommunication technologies, all of which stress the need for Congress to be active on E911 and make sure E911 is part of our technology future.

Earlier this month a couple in Nebraska died during a snow storm. Despite repeated attempts to call 911 from their cell phone, they could not be located. The technology that could have located them is not new. We have been talking about it for years in the Committee. The problem is parts of the country are still not equipped to handle 911 calls from cell phones, and with the leadership of Chairman Upton we are addressing this problem.

Last week a girl in Texas tried desperately to call 911 from her home phone as she watched her parents being shot by a home intruder. Her family had switched to VoIP technology, but their phone service did not include 911 capabilities. She ran from phone to phone in her house trying to call the police, but was unable to do so.

A doctor from the University of Chicago has invented an implantable device to detect emerging heart attacks. The new device can detect a rise in enzymes that usually lead to heart attacks. While still in the developmental stage, the goal is to incorporate wireless technology to enable the device to send 911 signals when a heart attack is about to occur. Imagine a fireman knocking at your door and telling you that you are about to have a heart attack!

We should not place roadblocks on the next generation of telecommunication technologies, but government does have a role in making sure this new technology serves a public good.

Mr. UPTON. Thank you. Mr. Stearns.

Mr. STEARNS. Thank you, and good morning, Mr. Chairman, for holding this first, I believe, of several hearings we will be having on Internet Protocol-Enabled services. They are changing the face of telecommunications. I think we all remember back in 1996, when we passed the bill, we weren't fully cognizant of the enormous innovations that would occur in technology, and now, don't necessarily fit in this inflexible framework we established in 1996, and they demand different treatment and classifications.

As a result, we must now figure out how we can provide a more flexible framework that will provide regulatory certainty, incentives to invest in the infrastructure in order to help this industry and these technologies to flourish. Congressman Boucher joined with me, and we introduced a bill that proposed to provide the certainty necessary to encourage companies to deploy these IP services. Our goal was to ensure that the Federal Government treats

these new applications with a light regulatory touch. This is not just in regard to Voice Over Internet Protocol, but all these IP-enabled services. The FCC and the Federal courts will have their say as well, of course. I was encouraged by the leadership of Chairman Powell in this regard, and I was pleased by the FCC's recent ruling in the Vonage decision. On the other hand, the Ninth Circuit Court's decision in the Brand X case leaves much to be desired, and I imagine that the telecommunication industry is obviously carefully watching these decisions, with great concern.

The technology that we will be discussing in this hearing and others are truly wonderful, almost killer services, as we talk about, that can provide all the communications, information, and entertainment applications with even less effort on the side of the consumer.

I think this is what companies such as Motorola and Lucent, for example, are going to be talking about. This seamless mobility—in fact, this is what all the companies will be trying to provide the American consumer, this seamless mobility. The best possible communication products from the latest and most innovative technologies. It is these inventors and entrepreneurs and businesses that do the hard work in this country, and we all benefit, and so again, Mr. Chairman, I thank you for your holding this hearing.

[Additional statements submitted for the record follow:]

PREPARED STATEMENT OF HON. PAUL E. GILLMOR, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF OHIO

I thank the Chairman for holding this important hearing. I believe that today will give us an important, and much needed, first opportunity to learn the basics about an exciting Internet-Protocol technology that enables providers to offer voice, video, and data services on one platform in a more cost-effective manner, benefiting consumers in terms of price and opportunity.

More importantly, while most of us have heard of "IP," and many of our constituents are beginning to subscribe to services like VOIP through companies such as Vonage, many, including myself, are anxious to learn more about what exactly this revolutionizing technology is, how it works, and what it means for the telecommunications sector and all who use it.

I welcome the well-balanced panel of witnesses, look forward to their testimony, and again, thank the Chairman and yield back the remainder of my time.

PREPARED STATEMENT OF HON. BARBARA CUBIN, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF WYOMING

Thank you, Mr. Chairman.

I look forward to our hearing today on the changing face of communications, and specifically how Internet Protocol (IP)-enabled services will deliver content and communications in the not-too-distant future. The Internet has not only revolutionized how we conduct research, exchange written communication and shop, but its use of "information packets" has profoundly affected the function of what we have traditionally considered non-Internet services like voice and video.

This brave new world requires that we look beyond the historic paradigm that says you cannot get voice and video through the same source. In fact, we have to embrace the reality that the consumer will be more empowered than ever before to choose their means of communication; be it wireline, wireless or cable, and that requires even regulatory treatment for historically disparate services.

This is a truly exciting time, and one where innovation is rewarded. It also requires that we in Congress review the overall assumptions upon which the Telecom Act is based. Yes the lines between voice, video and data communications have been blurred, and yes we are on the precipice of exciting new ways to interconnect, but we need to ensure that those of us in rural America are not left using 19th Century technology in a 21st Century world. That will be the challenge for the Congress as we tackle changes to this nearly 10-year old law.

I look forward to hearing from our distinguished panel on these matters Today and want to continue our dialog as we tackle legislation addressing these matters. I yield back the balance of my time.

PREPARED STATEMENT OF HON. JOHN SULLIVAN, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF OKLAHOMA

Thank you Mr. Chairman. As a new member of this Subcommittee, I look forward to hearing from these companies today about these services and the future of these technologies.

Telecommunications in the United States today is a complicated regulatory and statutory landscape. Many new technologies are converging to create a dynamic, ever-changing world, and one that the FCC and Congress struggle to keep up with. This year will be particularly eventful, and I am honored to be a member of this subcommittee at this critical juncture.

I believe that the free market must be allowed to operate, without over-regulation, monopolistic practices, or forced competition. It is important for our nation to encourage competition, innovation, and the flourishing of new technologies. This can only be done with free market principles are adhered to.

It is also critically important that taxpayer dollars are being used effectively. Waste, fraud and abuse in any form must not be allowed to continue.

The changing landscape of VOIP services will have profound effects on how we all live our lives, and I welcome the panelists and look forward to hearing their testimony.

Mr. UPTON. Thank you. We are, in fact, joined, as all the members of the subcommittee indicated, an all star lineup. And we are delighted that you could join us this morning.

We are joined by Mr. Edward Zander, the Chairman and CEO of Motorola; Dr. Irwin Jacobs, Chairman and CEO of QUALCOMM; Mr. Andy Mattes, President and CEO of Siemens Communications; Ms. Patricia Russo, Chairman and CEO of Lucent; and Mr. Michael Quigley, CEO of Alcatel. And ladies and gentlemen, we appreciate you being here with us today. We also very much appreciate sharing your testimony with us yesterday so we were able to review it in advance. That testimony will be made part of the record in its entirety. We would like to limit your remarks, your opening statements, to no more than 5 minutes.

And Mr. Zander, we will begin with you. Welcome.

Mr. ZANDER. Chairman Upton—

Mr. UPTON. You need to turn that mike switch.

STATEMENTS OF EDWARD J. ZANDER, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, MOTOROLA; IRWIN MARK JACOBS, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, QUALCOMM, INC.; ANDY MATTES, PRESIDENT AND CHIEF EXECUTIVE OFFICER, SIEMENS COMMUNICATIONS, INC.; PATRICIA RUSSO, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, LUCENT CORPORATION; AND MICHAEL QUIGLEY, CHIEF EXECUTIVE OFFICER, ALCATEL USA

Mr. ZANDER. Okay. I got you. Chairman Upton, Ranking Member Markey, and members of the subcommittee, good morning and thank you for holding today's hearings. I am thrilled to help kick the Telecom Act Reform you will lead in Congress. Before I begin, I would like to thank many of you for your efforts, particularly at the end of the last session, to enact the Spectrum Relo Bill. I enjoyed working with you on that immensely important piece of legislation. As you know, spectrum is vital to our vision.

I serve as chairman and CEO of Motorola, a company with a 76 year heritage of innovation in telecom. In many ways, Motorola was the first high tech startup. We helped the world discover the power of mobile communications through RF, cellular, and telephony technologies. Today, we are blown past the age of the Internet into the age of personal technology and total mobility. Among other things, we are transforming the device formerly known as the cell phone—

Mr. UPTON. We are just going into session. That is—

Mr. ZANDER. That is our communications. Among other things, we are transforming the device formerly known as the cell phone into a universal remote control for life. Everything the tech industry predicted in the late 1990's is starting to come true. It took a little longer than we thought, and the wakeup call of 2000 was healthy for all of us. But today's statistics, especially globally, are staggering. 10 years ago, there were 38 million Internet users. Now, more than 800 million, growing geometrically. One billion short messages or SMS messages are sent every day, and that is also growing exponentially. People's love for technology is insatiable. If you have teenagers, you know what I mean. Everything we think is cool is so 20 minutes ago. As my chief marketing officer taught me last month, people are no longer looking for wow experience, they are looking for things like this, a whoa experience. But our experience with technology is still amazingly complex. We all have things that don't talk to one another, car door openers, credit cards, cell phones, PCs, PDAs, wireless email devices, with dozens of different interfaces, hundreds of different passwords, that somehow just won't work together.

We not only have to simplify people's experiences with technology, we have to tie it together, make it greater than the sum of the parts. That is why Motorola is committed to something we call seamless mobility. Imagine if the Internet followed you, if there was a broadband connection in every molecule of the air around us. Imagine if all of our devices, our cars, our homes, spoke the same language. If our ability to connect with our friends, our families, our favorite music and shows, all of the news and all of the knowledge of the Internet was always with us, simply, seamlessly, wherever we went, wherever we wanted, in all of the spaces of our lives. That is seamless mobility. That is the world Motorola envisions, and we are investing in the technologies, innovation, and relationships it will take to make seamless mobility real.

We have no illusions we can do it alone. We don't believe one device or one technology will win. Seamless mobility means changing the rules of the game. We are ready, but we need your help. The U.S. has always led the world in innovation. To lead in the post-Internet age, this means a different take on regulation, and a lighter touch. For Motorola and tech companies everywhere to freely compete, we ask Congress to establish a unified and rationalized Federal model for all IP-enabled services. We applaud Congressman Pickering, Stearns, and Boucher for their leading efforts in this area. There can be no more silos for cable, wired, and wireless. We and our customers want to be seamless.

You have stated the clear need for the reform of the Act, and like my industry peers gathered here, I am committed to working with you to achieve meaningful, transforming change. Like you, I believe it is time to enable the future of communications. Let us get it started, ladies and gentlemen. Thank you.

[The prepared statement of Edward J. Zander follows:]

PREPARED STATEMENT OF EDWARD J. ZANDER, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, MOTOROLA

Good morning Chairman Upton and Ranking Member Markey. I would like to thank you for holding today's hearing. I am excited to be with you today to help kick off the Telecom Act reform that you will lead in this Congress. This is an historic initiative, and on behalf of Motorola, I am delighted to serve with you on the front-end of this important effort.

It is an honor to be here before you with industry colleagues to discuss our technology vision. We call it Seamless Mobility. You have articulated the clear need to reform the Telecom Act to bring it into the Internet age, and I am committed to working with you to achieve this very important objective. It has been nearly a decade since the last major overhaul of the Act, and it is now time to make the necessary changes that will enable the future of communications.

Before I begin today's testimony, I would be remiss if I did not thank you, Chairman Barton as well as Congressmen Dingell, Markey, and Pickering for your tremendously successful efforts, particularly at the end of the last session, to enact the Spectrum Relocation bill as a part of HR 5419. It is an immensely important piece of legislation that will spur economic growth in the US through the deployment of powerful broadband wireless services across the nation.

BACKGROUND ON MOTOROLA

I serve as the Chairman and CEO of Motorola, the original high-tech start-up. We have over 75 years of world-changing innovation, a rich portfolio of patents, an amazing team of technologists, and a passionate commitment to R&D.

Just look at these Motorola firsts:

- The car radio
- Walkie-talkies for the American soldiers of WWII and every major war since
- Affordable color TVs
- 1st responder mission critical radio communications technologies
- Carriage of Neil Armstrong's voice to earth from the moon
- The pager, and
- The cell phone

Motorola is unique in that the company designs consumer devices and infrastructure for virtually every communications sector. Our products include: 1st responder networks; cable infrastructure and consumer equipment; wireline and wireless communications infrastructure and consumer equipment, including both commercial and private systems; and, telematics communications equipment embedded in vehicles. Now, we are working to make the cell phone—as we know it—obsolete. It is becoming a much more sophisticated mobile device. We call it the 3rd screen, after the TV, and the PC.

SEAMLESS MOBILITY

Central to Motorola's commitment and vision for the future of communications is a concept we call "Seamless Mobility." Seamless Mobility is about the connected experience as people move between environments and switch their activities among devices and networks. It occurs transparently to the user.

Providing a Seamless Mobility experience across all user environments—home, vehicle, office, and beyond—is a key characteristic of Motorola's approach. Motorola's Seamless Mobility vision provides complete end-to-end communications that can lower communications costs, increase user efficiencies, and create new capabilities.

With Seamless Mobility, devices will adapt to their owners. Devices will know where consumers are, their preferences, their schedule, where they want to go and what they want to do when they get there. Our mobile devices will be capable of secure payments for parking with the touch of a key. Cars and homes will be capable of storing, sharing and continuously updating consumer information to make life simpler, smarter, safer, synchronized and more fun. All the while, these communications capabilities will travel seamlessly with the consumer across domains, with the transition between networks imperceptible to the consumer.

Consumers want more *mobility* with the *least effort* possible. Seamless Mobility accelerates the intersection of these two concepts. The result is a continuity of experience which is valuable to users as they live their lives.

Seamless Mobility increases as full mobility increases and user effort decreases. By focusing on solutions that deliver full mobility with the least effort, Seamless Mobility will boost the adoption rate for mobile communications further.

Digitization is driving a number of applications, but the applications that provide a Seamless Mobility experience will drive the future. Enhanced privacy and security will also be critical to satisfy the economic interests of content owners and users' needs. The future is about full mobility, which requires mobility across different types of coexisting networks " a heterogeneous continuum of Internet Protocol (IP) packet and circuit switched networks.

The future is also about users wanting to be "always on" and needing to know what is happening somewhere else. This will require sessions that seamlessly cross networks and devices.

The device formerly known as the cell phone has come a long way from its original "portable telephone" application when Motorola created it in 1983. It has moved from a simple phone without wires to a broad ranging communications device. Technology has allowed devices to grow applications from wireless access to display, to audio, to processing power in MIPS, memory in Mbits, and faster data rates. And it is not over. Many advanced technologies have yet to be implemented. When they arrive, they will enable:

1. Continuous communications
2. Spontaneous sharing
3. Being right there " experiencing together
4. Making life simpler
5. Making life more productive
6. Personalizing experiences to desires or current situation

Motorola believes that when this occurs, the demand for mobile communications will soar. This, in turn, creates opportunities for new kinds of services, applications, infrastructure, devices, platforms, and components.

Seamless Mobility Will Enrich Our Lives And Foster Inclusion

Anyone who has ever used a personal device, such as a mobile phone, pager, PDA, or PC, has said, "This is fine, but wouldn't it be great if my device could..." We, at Motorola, are turning your personal device wishes from "wish it could" to "now it can."

Imagine if you, Chairman Upton, were able to receive your draft opening remarks on your handheld device, in the same word processing program you use on your PC, as you were flying back to Washington from Kalamazoo.

Then, imagine if you could easily review those remarks, make edits and email the document back to your staff using your handheld device. Using the same device you then send a video mail regarding today's hearing to Mr. Markey, using the airplane's onboard wireless capabilities.

After you land, imagine driving to the Hill and receiving notifications from1 your automobile that there are road improvements taking place on the 14th Street Bridge which are causing traffic congestion. Your car advises you to take Memorial Bridge, instead, and gives you step-by-step instructions for the detour.

As you are driving, you receive a notification in your vehicle from your home monitoring system that your home alarm had not been engaged when your kids left the house for school and you are asked whether you would like it to be turned on.

Then imagine you make a phone call in the car, using the vehicle's wireless capability. As you drive into the garage, the call transfers from the cellular network, to a Wi-Fi network. After you park the car and turn it off, the call transfers to your mobile device. As you walk into your office, the call transfers from the Wi-Fi network to your office PBX. All of this is done seamlessly, without interrupting your communication.

This is a small snapshot of what is possible in the digital age and this is Motorola's vision of Seamless Mobility.

Seamless Mobility Will Drive Economic Growth And Productivity

With full mobility, we can harness the power of technology for consumers and the economy. The actions you take, in this Telecom Act reform initiative, can drive this reality. Enacting deregulatory policies will accelerate and amplify the adoption of mobile technology and increase users from 1.5 Billion today to the next Billion. Together, we can drive the largest number of revenue generating opportunities since the early days of the Internet

Indeed, with technology solutions to interoperability among other products, appliances, equipment, and devices in our homes, offices and autos, we could become a lot more productive and stimulate significant economic growth.

With the digitization of things, the expansion of broadband, and the explosion of smart devices, Motorola is making this type of communication possible.

Seamless Mobility in Action—Examples

Seamless Mobile Handset

Jenny has a dual mode handset and is on a cellular call. As she travels she reaches a point where her cell coverage is at risk; her handset recognizes a possible call-drop, and senses a wireless local area network access point, which picks up the call as Jenny continues talking. Her call is now being delivered via VoIP and not a cellular circuit. As Jenny's call was converted to a different network, she continued speaking, and the entire conversion remained transparent to her and the other speaker.

Seamless Video

As he commutes home from his office, Sam has a multimode handset and is participating in a video conference via a 3G data network. When he arrives home, his handset detects his home's wireless network and moves the conference to the house network. But Sam wants to participate in this conference via his PC, which uses a broadband network and a larger screen. Transparent to Sam and the other participants, his home's network is informed of his choice and the conference is moved from the handset to the PC. Because Sam's home infrastructure includes a set-top box and television, he could have used his television and the network would still have moved the conference to his target device. This type of session handover can work in small offices, residences, hotspots, or enterprises.

Seamless Home Delivery

Serviceman Tom receives a message from headquarters that Jenny's liquid propane gas tank is below 10 percent of capacity. A text message is sent to Jenny's mobile phone while she is commuting to work, which when acknowledged, sends a message to her home network to open the gate. The service distribution center checks Tom's position, schedule, and fuel level. Delivery is set between 3:00-5:00 pm, after verifying Jenny's account is in good standing. Tom receives an updated route for distribution on his GPS system, minimizing the distance driven. The final estimated level in Tom's truck tank is communicated to the distribution center to set fill level for tomorrow's scheduled deliveries. An accurate level before and after fill determines the charge for delivered propane. Jenny's bank account is automatically debited, and her house is comfortably warm when she arrives home.

Seamless Business Travel

Sam is flying to Boston on a business trip. When he arrives in Boston he knows there is a multi-hour drive to reach his customer's office. He transacts an auto rental agreement remotely, using his electronic assistant and biometric authentication feature. He receives directions to the rental car via his electronic assistant, and the car door unlocks when it senses his presence. As he enters the car, his electronic assistant loads the destination into the car's navigation system to help Sam drive in a city with which he is unfamiliar. Once Sam fastens his seat belt, the vehicle's intelligence system scans metadata to locate a local radio station that meets Sam's music preferences, which are stored in his user profile at the auto rental firm.

Seamless Auto Service

While driving home one night, Jenny's car operates poorly. The on-board diagnostics system decides that the problem requires dealer attention, and communicates this to Jenny via the car console. When she arrives home, Jenny's car connects with the manufacturer's service website via her home broadband connection, and reports the symptoms. It consults Jenny's appointment calendar in her mobile phone, and schedules an appointment convenient for her. It confirms the appointment in her calendar and arranges a reminder for her on the car console the next time she turns it on. Apprised of the appointment via a diagnostic signature passed from the manufacturer's website to Jenny's dealer, the dealer orders the correct parts and they await her arrival for the appointment.

Seamless 1st Response

A joint federal, state, and local taskforce targeting a terrorist cell in the U.S. is planning a series of simultaneous raids that must be carefully coordinated. A federal SWAT team is preparing to move into a residence in the Washington, D.C. suburbs and is communicating via two-way radio with state and local police who will

assist in sealing off the area. The taskforce virtual command center is tying together all agencies involved in the event, including DHS and DOJ. It is also communicating with undercover agents who are using covert radio gear while they follow suspects en route to the house. Simultaneously, a law enforcement agent traveling to the scene in a vehicle on I-95 is talking to the command center on a public carrier's push to talk phone. Down in Richmond, Virginia, agents are collecting evidence from a storage facility and are communicating by voice with the command center by means of a second carrier's push to talk phone and uploading pictures and other data by means of dedicated high speed, broadband spectrum. All voice communications are interoperable with one another because all the devices comply with the national standard for public safety radio interoperability—the Project 25 Standard.

The Architecture

Motorola has identified four elements of a basic, conceptual architecture, spread across homes, vehicles, workplaces, and public spaces between them:

1. Devices
2. Heterogeneous networks
3. Local servers/gateways
4. Global servers/services.

This architecture builds on Motorola's strengths in traditional and evolving mobile devices, infrastructure, in-vehicle, and home communications. It incorporates a continuum of existing and emerging wide-area systems, including CDMA, GSM, 3G, 802.16, and 4G. It also includes the co-existence of shorter range systems, such as 802.11 and ultra-wide band wireless (UWB) that may be deployed in homes, vehicles, enterprises, or hot spots. All of these systems are connected to a common IP core network through a gateway.

In each space there is a local area network and a communications gateway. The LAN provides connectivity in the space that may be wired or wireless. The gateway permits mobility within a space as well as assists with seamless transitions between spaces.

To enable the user experiences, devices run client software to connect via gateways and/or directly to networks that find their way through other networks to a converged core, and ultimately to common user services. The network is IP-based with gateways to legacy networks. For example, a communication starts with VoIP across a wireless LAN with a handover to a legacy cellular network.

IP-ENABLED SERVICES & MOTOROLA

The Committee has begun to explore the new, advanced types of Internet-enabled communications that are increasingly being introduced. IP-enabled services, including VoIP, are truly transformative and will offer consumers a number of important benefits including lower prices and cutting-edge products and services. Your policy leadership can support and expedite this transition.

Motorola is at the forefront of these technologies and we are dedicating substantial resources toward bringing the promise of IP to the marketplace. We are working with cable operators, wireline, and wireless service providers to roll out VoIP products and services as quickly as possible. Motorola is advancing the deployment of VoIP in every industry sector with specific products, services, and resources.

For example, last year, Motorola and Verizon announced a multi-year contract for Motorola to provide digital video network infrastructure and digital video consumer premise equipment in support of Verizon's launch of video service on the company's new Fiber to The Premises (FTTP) network next year. Verizon's plans for new FTTP deployment to homes and businesses include California, Florida, Texas, Delaware, Maryland, Massachusetts, New York and Pennsylvania. Verizon plans to pass some 1 million homes and business with new technology this year, and some 2 million additional in the next.

Motorola also supplies solutions to major cable operators in the U.S. including Comcast, Time Warner, Cox, Charter, and Adelphia. These operators are moving from traditional video services to other innovative services, including VoIP, in scores of major markets.

Motorola also manufactures data networking and VoIP products for both network operators and retail customers. For instance, from our full line of retail products for home data networking, Motorola supplies the telephony adapter used by a number of independent VoIP service providers. In addition, Motorola has begun to distribute VoIP products. Last year, we announced an agreement with WorldGate Communications to begin distribution of the Ojo personal video phone. The Motorola Ojo personal video phone is expected to be available to consumers and businesses in the fall of this year.

IMPORTANCE OF IP TO SEAMLESS MOBILITY

As I've stated, providing a Seamless Mobility experience across all user environments—home, vehicle, office, and beyond—is a key characteristic of Motorola's approach to its development of VoIP products and services. In our vision of Seamless Mobility, wired and wireless communications networks will converge and be accessed by a single device providing wireless VoIP telephony services that extend to the wide area cellular network outside—without dropping calls. User services connected and transported by Internet protocols are a key facilitator of a Seamless Mobility experience. Among these Internet-based services, the advancement of VoIP is a critical element in making this vision a reality.

The effective use of these Internet protocols that are so critical to the Seamless Mobility experience depends primarily on the continued evolution of networking technology. As Congress examines VoIP services, the decisions this Committee makes can help establish a framework for the future stages of this evolution. VoIP applications will be among the first applications deployed to consumers as they move to Seamless Mobility.

Including this hearing, Motorola is encouraged by the high level of government interest in the treatment of IP-enabled services. During his recent technology briefing at the Commerce Department, President Bush saw innovative uses of new IP-enabled products, such as Motorola's home monitoring system and the Ojo personal video phone.

The President experienced how a consumer can activate the monitoring system in his or her home using a mobile phone, and receive a text alert back to the handset if a motion sensor is triggered. Using an ordinary high-speed broadband Internet connection, the President was able to use the Ojo videophone to make a face-to-face conversation with remote individuals, complete with streaming full-motion video and high-fidelity audio. These are just a few examples of some of the exciting new products and services that IP technology is bringing to the marketplace.

CONCLUSION & RECOMMENDATIONS

The continued progress of these and other new IP-enabled products depends upon the legal approach Congress adopts for IP-enabled services. Manufacturers, service providers and investors need legal and regulatory certainty in order to aggressively ramp up deployment of these new services. Industry needs decisive action by Congress preempting state regulation of IP-enabled services. We simply cannot fully invest in the design, manufacture, distribution and promotion of IP-enabled products while unsure of whether or which State or Federal regulations apply.

While we applaud the FCC's decision establishing federal jurisdiction for Vonage, that decision is now being litigated. Motorola and other companies not only struggle with uncertainty, we spend time, money and other resources in state and federal regulatory proceedings and multiple rounds of litigation in order to establish what the rights and responsibilities are for IP-enabled services. These resources could be much better deployed crafting technology solutions to the wants and needs of all users of mobile technologies.

The Congress must act to preempt state regulation of VoIP. With this legal clarity IP-enabled products will launch from technology demonstrations to the homes of American consumers. Because VoIP will be one of the first widely available IP-enabled services, it is especially important that Congress act to establish the proper regulatory framework for VoIP quickly.

To realize our vision of Seamless Mobility, Motorola is encouraged that the Committee has considered legislating a light regulatory touch for IP-enabled technologies. Congressmen Pickering, Boucher, and Stearns are to be commended for their leadership efforts in this area.

The Congress must clarify the jurisdictional nature of IP-enabled services, beginning with VoIP, and establish a unified and rationalized regulatory paradigm for new advanced IP-enabled services that are agnostic to the platform. Such transformative transmissions should not be subject to each of the differing sets of legacy regulations that apply to each platform subset of the Seamless Mobility experience. That approach may have been needed in the analog world, but it is inappropriate for the new Internet economy.

A unified, deregulatory approach for these new services will provide needed certainty and pour rocket fuel on the investment fire that is burning in our industry.

For example, a discrete communication that originates, traverses, and or terminates on a variety of different platforms such as wireless, broadcast, fiber, traditional telephone lines, or satellite, should not be subject to disparate and multiple regulatory treatments. With the advent of Seamless Mobility, the network supports the consumer no matter where they are—the law should not impose artificial phys-

ical constraints either. The consumer's IP-enabled device allows them to move freely between networks to the platform that can do the job best, most efficiently, and cost-effectively. The law ought to align with this vision.

Another recommendation I would urge the Congress to consider is establishing a requirement that the FCC must provide an annual report, for the next 5 years, identifying regulatory actions it has taken to break down the competitive barriers between services, and the status of competition between various IP-enabled platforms whether they be cable, wireline, wireless or broadcast. The report should also identify any roadblocks to cross competition and provide recommendations to eliminate such roadblocks, either through regulatory actions or through legislation. Such analysis by an expert agency will be useful in identifying areas for action.

Seamless Mobility will keep the US apace with competition and innovation in other parts of the world. Without changes in US policy, Seamless Mobility will not reach its most robust deployment. The European Commission is examining these very same questions and is expected to conclude a light regulatory touch for Internet-based services within the year. Thereafter, member countries will follow on with their policies in a consistent manner. Meanwhile, administrations within Asia have promoted national policies to support the fullest deployment of these advanced technology solutions for the betterment of their citizenry. From a competitiveness standpoint, Motorola applauds this Committee for its commitment to pursue appropriate policies to ensure domestic leadership in the global race for technology dominance in the Internet Age.

Finally, Mr. Chairman, spectrum is a foundational resource needed to deliver Seamless Mobility. Motorola greatly appreciates the focus that you and the Committee leadership are placing on ending the Digital Television transition by a fixed date. Such certainty is critical to planning for valuable subsequent uses for the spectrum, such as the mission critical homeland security communications needs of our 1st Responders across the country and the deployment of advanced high-speed mobile broadband technologies. The discussion around fixing the date at December 31, 2006 and providing a technology solution to ensure that every household continues to enjoy access to free over-the-air television is a powerful plan that will work.

SUMMARY

Seamless Mobility is about simplifying our lives as we communicate with business colleagues, friends, and family while on-the-go. Motorola's innovations will improve communication and interactions, and will enrich our lives as technology becomes even more widespread and indispensable. Decisions made by Congress as it examines VoIP services and beyond will establish a framework for the future stages of this evolution.

With Seamless Mobility, we can harness the power of technology for all Americans and our economy. This is a truly historic initiative before us today. Your leadership and the decisions you make throughout the reform of the Telecom Act can change the Internet from one people must seek out to one that seeks us and surrounds people with productivity, enrichment, inclusion, and innovation. I commit Motorola to work with you to make the Internet Age powerful for us all.

Mr. UPTON. Thank you very much. Dr. Jacobs.

Mr. JACOBS. Thank you, Mr. Chairman. I am going to——

Mr. UPTON. Again, you have got to turn that mike button.

STATEMENT OF IRWIN MARK JACOBS

Mr. JACOBS. Thank you very much, Mr. Chairman. I have some slides that hopefully will be appearing here. A bit of a PowerPoint to follow some of the latest technology. Get those on.

Mr. UPTON. She is working that over here.

Mr. JACOBS. Thank you. In any case, I will be talking about mobility, about access to the Internet, wideband access to the Internet, using mobile devices. And the mobile devices we are talking about these days are very powerful. We have that. Next slide, please.

[Slide.]

The capability of a cell phone, of course, to carry voice has been with us now for over a decade. The ability to carry high data rates

to provide position location, to handle the E911 type problems, but other issues. Many capabilities, much computing power, now going into the phones. Next slide, please.

[Slide.]

As you look at the growth of the number of phones we are moving toward, a prediction of 775 million phones being sold in the year 2009. We are now about half of that. And if you compare that to the growth in notebooks, in smart phones, in desktop PCs, all of those, the lines you can barely see there are much lower, and so clearly, the impact of the mobile phone is going to be even more massive than it is today. Next slide, please.

[Slide.]

We are moving to a situation now that we have third generation of cellular, supporting the high data rate Internet connections. All of the accepted approaches to that are based on CDMA technology, and are moving ahead very quickly, as we see in the next slide, please.

[Slide.]

There, the growth of third generation, the access to it, is now over 140 million. There are three different flavors of that, but it has been such that, for example, I was just in India, stopped in several cities, and in each of those cities, I was able to immediately get high data rate access on my laptop. So the technology is moving ahead. Next slide, please.

[Slide.]

I won't go into great details here, but—there is a lot more on this chart—but in fact, the ability to—of a handset now to supply audio is approaching that of CD quality, to support gaming, 3 dimensional projections, of that of the Game Boys of a short while, cameras 4 to 6 megapixels, video, DVD quality, and processing, a very high level of computing power in the phone, such that I think for many people, a phone may end up being their main device, their main computer, with in fact, a display and a keyboard that connects up automatically by a personal area network, wireless network, where they might be.

How is all of this being done? It is being accomplished because of Moore's Law, the ability to put more and more transistors on a single part. Next slide, please.

[Slide.]

And it means that we can have all of these capabilities on a single chip in a phone, and therefore, provide them at low cost, with large battery power. Next slide, please.

[Slide.]

One interesting aspect of this has been moving toward what is called the ability to have a third screen, one that is with you at all times, delivering video to it. And one of our major operators, Verizon, has now offered such a service, and perhaps you can bring that up and demonstrate that. It is interesting that in this conference room, in this building, despite all of the walls, et cetera, we have a very strong signal here supporting up to 2 megabits per second of data rate. So next slide, please.

[Slide.]

The service is called V Cast, and it provides video, as we found that in many areas, having this high data rate connection to the

Internet is being used to get news clip, sporting, educational materials, et cetera, in both video and audio. Next slide, please.

[Slide.]

One of the issues, of course, with having these complicated devices—in fact, having all of the complicated services we have been talking about, is having simple user interfaces, ones that people are familiar with. We have been moving toward one that, in fact, looks like a standard TV set, a movie guide on that TV set. Next slide, please.

[Slide.]

We do have the need to support these capabilities less expensively, and we are going in the technology to support this over mobile communications at high data rates, but we are also supplementing that with the use of a UHF channel—we have channel 55 throughout the US—to support direct broadcast to the—or multicasting to the handsets in a very cost effective way. So we expect that this, in fact, is going to support many services. Next slide.

[Slide.]

In fact, being able to download capabilities to the phones, including this user interface, is important. Next slide, please.

[Slide.]

And we are seeing a very strong use of the Internet to deliver new applications to the phones. Next slide, please.

[Slide.]

One of those, of course, does involve the precise position location, E911 capabilities, including also mapping capabilities that are now available to the phone. Next slide, please.

[Slide.]

One important next application is moving Voice over Internet Protocol, making use of the phones, and that is well underway. We are going to get higher capacity, I believe, as well as higher quality with VoIP. Next slide, please.

[Slide.]

An interesting application already in—being demonstrated in some countries, the rural—the need for rural Internet has been mentioned, doing this economically. The ability, therefore, to support this, for example, a demonstration down in Chile, another one with Lucent support down in Brazil. Next slide.

[Slide.]

Taking these capabilities immediately to rural areas and making them available, next slide. In that van, for example, that drove around, that had the high broadband Internet capability through wireless, one had a number of desks set up, next slide, and you can see the children very much enjoying the ability to have that in areas where, in fact, they had never seen a computer, never mind a connection before. Next slide.

[Slide.]

The commercial networks also supply high security, and so it is possible, therefore, to support a number of the public safety functions that I know that you are very much interested in, and so the whole ability to support not just, as was mentioned, two wires to the home, but wireless in a fully mobile environment, is very important. I think that this committee has to be very careful, therefore, with making spectrum more available—next slide, please.

[Slide.]

Maintaining the current allocations of wireless licensed spectrum below a gigahertz, where it is least expensive to provide services in all areas, making sure that unlicensed devices do not interfere in the licensed spectrum, reducing the capacity, and encouraging the FCC not to impose any regulatory barriers and impede delivery of Voice over Internet Protocol to the wireless platforms.

Thank you very much.

[The prepared statement of Irwin Mark Jacobs follows:]

PREPARED STATEMENT OF IRWIN MARK JACOBS, CHAIRMAN AND CEO, QUALCOMM,
INCORPORATED

I am pleased to join the Subcommittee to discuss and demonstrate how technological convergence is today supporting delivery of advanced features and services to wireless customers. The rapid deployment of two national and several regional broadband wide-area wireless networks, the increasing computing power and memory resident in today's wireless devices, and diverse software applications now available for these Internet-connected wireless devices have combined to efficiently deliver new multimedia applications and services in a mobile, rather than fixed or hot spot, environment. These Internet Protocol (IP) enabled applications include, but are not limited, to video streaming, video on demand, digital imaging, gaming, location based services, high speed Internet access, e-medicine, e-government, e-education, and many more.

The rapid deployment of these services and their wide availability to the American people are in part the result of US telecommunications policies that have re-allocated substantial new spectrum to commercial licensed use, permitted licensee flexibility in the utilization of that spectrum, and maintained a single national authority at the Federal Communications Commission (FCC) for the regulation of wireless services in the United States. Over the past fifteen years, the pro-competitive, technology neutral policies, coupled with a general "hands-off" approach to government regulation of the Internet, has allowed the wireless industry to grow rapidly to a point where currently over 170 million Americans subscribe to wireless services.

Advanced Wireless Networks Provide National and Regional High-Speed Access

The first key driver of wireless convergence is the current and accelerating deployment of regional and national high speed wireless networks using third-generation (3G) code-division multiple access (CDMA) technology on licensed spectrum. These networks are providing ubiquitous network access to IP services wherever and whenever customers need to connect. Around the world, wireless operators are deploying 3G wireless systems based on CDMA technology including WCDMA/UMTS and CDMA2000 1X and CDMA2000 1xEV-DO. These national and regional deployments are significant because they are providing customers reliable wide-area wireless access to broadband services over licensed spectrum.

For example, in the case of WCDMA/UMTS, although commercial network launches have really only begun in earnest over the past 12 months, we see that over 60 regional or national networks have been launched to date in dozens of countries in Europe and Asia, with over 16 million subscribers globally at the end of 2004. These subscribers enjoy wide-area wireless access at peak data speeds of 384 kbps. These WCDMA deployments will accelerate rapidly in 2005, and we will soon see WCDMA wide-area networks throughout much of the developed world, and the addition of many millions of WCDMA subscribers globally in nations and regions where wireless access is economically the best option for broadband internet connectivity.

In the case of CDMA2000 1xEV-DO (also referred to as EV-DO), deployed for over two years in South Korea, then across Japan, and now being rapidly deployed across the U.S., over 11 million subscribers currently enjoy peak data rates of 2.4 Mbps on 16 networks in Asia and the Americas. In the United States, Verizon Wireless has launched EV-DO in over 30 major metropolitan markets, a footprint that extends service to over 75 million Americans. It is notable too that these wide-area deployments do not represent a disparate set of individual "hot spots," but rather large contiguous service areas featuring seamless hand-offs and seamless roaming, not only between EV-DO equipped cell sites but also to CDMA2000 1X service at the boundaries of EV-DO coverage.

The significance of these networks for technology convergence is that wireless devices can now maintain reliable high-speed wireless connectivity over wide-area regional and national footprints deployed on licensed spectrum. For example, a business traveler taking the metroliner train from Washington, DC to New York City can maintain a high-speed wireless data connection continuously during her entire trip. Using this connection, this traveler can access her corporate intra-net as well as the Internet and other applications while fully mobile just as if she were working in her office.

It is important to note here that these national and regional wireless networks are deployed in licensed spectrum. There has been much discussion recently of the benefits of unlicensed spectrum and services, with some advocating that the U.S. government allocate additional prime, high-value spectrum (that spectrum below 1 GHz) to unlicensed use. At QUALCOMM, we are heavy users of local-area network unlicensed wireless services on our campus, and nation-wide users of wide-area licensed wireless services when we are off our campus now on a fixed monthly charge, “all-we-can-eat” basis. I think that our example illustrates the complementary nature of unlicensed and licensed wireless services—unlicensed is useful in the local area, like an individual office suite that is not prone to significant interference from other unlicensed users, while licensed wireless services are needed to provide wide area service everywhere else. As national and regional wide-area network are playing and will continue to play a crucial role in meeting the Internet connectivity needs of American citizens, I recommend that the Congress maintain and expand spectrum currently allocated for licensed wide-area use and seek to clear and auction that spectrum as soon as possible.

Economics and protection from interference plays an important role here. It costs billions of dollars to build out a national or regional wireless network. Corporations are not prepared to make that level of investment without certainty that they will be able to serve customers at the expected level of service quality without the threat of harmful interference. In an unlicensed regime, no one can be sure that they will be able to sell a wireless service even in a local area without the threat of harmful interference from another unlicensed operator or device. I believe that it is this uncertainty that has dampened commercial enthusiasm for project like the “Cometa” unlicensed network that was proposed by a well-financed team of major corporations but then ultimately abandoned.

Those of us who build and operate commercial licensed wireless systems also worry about the impact of unlicensed “overlays” and “underlays” in spectrum licensed for commercial mobile radio systems. Our research indicates that operation of these devices impacts the accuracy of the GPS measurements taken by our cellphones when E-911 calls are placed, and similarly impacts the call quality particularly in certain coverage areas. What is especially difficult for network operators is that they might experience inference from an unlicensed wireless device (which generates a customer complaint), and by the time they can get a technician into the field to investigate the complaint, the source of interference has moved on, leaving them unable to diagnose and correct the problem.

Some observers have also suggested that “smart” or “cognitive” radios can permit multiple unlicensed and licensed devices to share spectrum. At QUALCOMM we have conducted research and examined the literature in this area, and found such capability to be complex and expensive and not of dependable reliability. Without proven results and standards, there will always be a commercial incentive for individuals and businesses to take short cuts when fielding devices that depend on intelligence to avoid interference, resulting in more interference in a particular location than anyone planned or that the government authorized. Since, as we noted earlier, it is difficult to locate and police sources of harmful interference, we may end up in a situation where network performance is intermittently impaired and we are unable to diagnose and correct it.

Modern CDMA wireless networks that are enabling the advancements we are discussing today operate efficiently at low power levels. They can rapidly lose capacity and performance and require higher transmitted power in an effort to overcome interference from unlicensed devices. Efficient, low power systems, both cellular and GPS, are by their nature more susceptible to interference than higher power, less efficient systems. Given the enthusiasm in some quarters for unlicensed wide-area services, I feel the need to urge the limitation of unlicensed uses to local area, low power uses to protect existing and planned services over wide-area licensed systems from harmful interference.

The Processing Power & Functionality in Wireless Devices Enable Advanced Services

The growing processing power and functionality in the chips inside wireless handsets are also contributing substantially to convergence. CDMA wireless handsets are now increasingly smaller and faster devices that can deliver and receive voice, music, video and 3D graphics. These features enable wireless subscribers to enjoy useful, interactive applications and services on their phones. We will soon deliver a chipset that will enable a wireless device to roam across multiple 3G networks—permitting a global convergence of wireless access.

As a point of reference, the processing power of the chipsets that power today's advanced cell phones trail the processing power of personal computers by only a few years. That is to say, the new cell phone in your pocket today has the computing power of the desktop PC you might have purchased only two or three years ago. And that trend is continuing. With the 7000 series of cellphone chipsets that QUALCOMM announced this year, dubbed the "convergence platform," cellphone manufacturers will have access to dual processors on a single chipset, and that chipset will enable phones to provide the following advanced features:

- *Two-way video streaming*—smooth, high resolution video streaming at 30 frames per second (the same frame replacement rate as your TV at home).
- *Outstanding audio quality* for MP3 features and surround sound.
- *Extreme 3D graphics*—up to 4 million triangles per second and 7 million 3D pixels per second for game-console quality graphics.
- *6.0 Megapixel camera*—for high quality imaging.
- *Position location* using GPS coupled with high resolution maps.
- *VGA*—improved high resolution display.
- *Support of ancillary devices for medical monitoring and security*

These features will support services such as: point-to-point video telephony for mobile conferencing, interactive gaming, downloadable feature-length movies, downloadable music, streaming video, photos, and more. Because these functionalities are resident on the chipset, handset manufacturers will be able to build wireless devices with these capabilities in the same form factors that customers expect in their wireless devices today.

This new chipset series will also support multiple 2G and 3G standards including all major common air interfaces, including:

- CDMA2000 1X
- CDMA2000 1xEV-DO Rev 0 and Rev A
- IS-95 A/B
- WCDMA (UMTS)/HSDPA
- GSM/GPRS/EDGE

Since the chipsets powering wireless devices will operate on the major 3G networks in use globally, these networks will also "converge" in that customers will enjoy ubiquitous high-speed data services regardless of location or of the 3G air interface provided in a specific location.

A notable present example of the "convergence" of new capabilities enabled by 3G CDMA data networks and high-speed processors in cell phones is the "V CAST" service launched this month by Verizon Wireless. The V CAST service uses Verizon Wireless's EV-DO high speed data network to download media content including:

- High-quality video-on-demand of;
 - current news, weather, sports and entertainment programming
 - music videos and short programs specifically designed for mobile phones, and
- 3D games.

Using V CAST, customers can also download branded video content such as:

- News Corp. and 20th Century Fox,
- "24: Conspiracy," "Sunset Hotel" and "Love & Hate"—specifically designed for mobile phones,
- NBC newscasts made exclusively for mobile phones, and
- MTV Networks' VH1, Comedy Central

The V CAST service supports the downloads of video clips of up to 5 minutes in length, with high quality sound and video with the same 30 second video frame replacement rate used for traditional television. As an example of the continuing convergence of services enabled by wireless networks and devices, last week Verizon Wireless and Warner Music Group announced the launch of the nation's first mobile music video download service on V CAST. Using this service, Warner Music will be the first major music company to make its music video catalog of artists available for download to consumers in the U.S. on their wireless phones.

I have given you examples of wireless handset features that will inform and entertain, but the wireless industry is also working hard to deploy features that will

enhance both the personal security of individual customers and also our collective homeland security. The most important of these safety features is wireless enhanced 911 (E-911). I say this because the National Emergency Numbering Association reports that wireless customers dial “911” on their wireless phones over 120,000 times each day in the United States. I am pleased to report that according to official reports filed in at the FCC by wireless operators, at least 1,628 public safety answering points in the US (these are the 911 dispatch centers) are equipped to receive E-911 position location data from wireless phones. Fully 136 million people live in the cities and counties served by these dispatch centers, which are spread over 39 states. In a recent report to the FCC, Sprint PCS reported that they have now sold a total of 33 million wireless phones equipped with GPS position location to locate wireless customers when they dial “911” in an emergency.

The deployment in the near future of streaming video capabilities on wireless phones will permit emergency personnel to not only tell the hospital about a patient’s injuries but also to show the doctor in real time exactly what they are observing at a rescue site.

Software Downloads Bring Desktop Functionality to Mobile Environment

The software used by these wireless handsets and networks is also contributing to the convergence of rich and diverse services. An example of how software advancements and facilitating technological convergence is QUALCOMM’s BREW¹ platform. Using BREW-enabled handsets, wireless customers are able to download and operate software applications in a mobile setting that heretofore could only be utilized on stationary desktop computers. By utilizing BREW to make more applications available to wireless customers, we have observed an explosion in new access, including over 200 million cumulative individual BREW application downloads by November of 2004. These applications downloaded to wireless devices that are BREW-enabled include:

- *Communications*—instant messaging, email, photo sharing, greeting cards and other interactive message delivery,
- *Location*—mapping, navigation, traffic, city guides and other position location specific content,
- *Productivity*—mobile address/contacts synchronization to office applications and helpful tools that increase personal efficiency,
- *Games*—single-player and interactive multi-player games,
- *m-Commerce*—financial transactions such as account balance, point-of-purchase, product/merchandise purchase, stock trades and more,
- *Entertainment*—ring tones, music, video, comics, screen savers, wall papers,
- *Information*—flight tracking, news, weather, sports and other magazine-oriented content.

BREW enables access to these multiple applications by serving as a common platform for wireless applications. Sitting “on top” of a phone’s chip system software, the BREW platform has access to chip-level features allowing it to download and run applications directly on the phone. By dynamically allocating the phone’s random access memory for applications as they are running and by using local storage and processing the BREW platform optimizes the phone’s memory allocation.

Advancements in Wireless Multimedia Capabilities Will Continue

Advancements in multimedia convergence over wireless systems will only accelerate over time. For example, QUALCOMM recently announced plans for a subsidiary (MediaFLO USA) to deploy and operate a nationwide “mediacast” network, delivering many channels of high-quality video and audio programming to third-generation mobile phones at mass market prices. QUALCOMM intends to offer the network as a shared resource for U.S. CDMA2000 and WCDMA cellular operators, enabling them to deliver mobile interactive multimedia to their wireless subscribers without the cost of network deployment and operation. Subscribers to this service will enjoy access to a broad range of high-quality content from the entertainment industry’s leading media companies. MediaFLO USA will aggregate and distribute the content that is available to all MediaFLO partners and will provide seamless integration of this content with unique content that individual operators provide to maintain their competitive differentiation. The system will give TV stations and networks, cable TV and satellite operators and networks, and other content providers a major new distribution channel that complements their current offerings, enabling them to reach their audiences when they are away from home and on the go. U.S. consumers will gain access to compelling media services whenever and wherever they want them.

¹ Binary Runtime Environment for Wireless

The nationwide mediacasting network will deliver multimedia content to wireless mobile devices in the 700 MHz spectrum for which QUALCOMM holds licenses covering the entire nation. The network will support 50-100 national and local content channels, including up to 15 live streaming channels and numerous clip-cast and audio channels. This content will be delivered in an easy-to-use and familiar format at quality levels that dramatically surpass current mobile multimedia offerings through the use of QVGA video at up to 30 frames per second and high-quality stereo audio. I should point out here, however, that QUALCOMM will not be able to deploy this service nationally until the broadcasters who currently are operating in channel 55 complete their conversion to digital and relinquish their analog channel. Since this conversion is moving at a pace that is much slower than Congress anticipated when it enacted its digital transition plan, we believe that a new hard end date in statute will be required to ensure that the transition moves forward and the public can enjoy these new services.

Advancements Will Allow VoIP Over Wireless Data Networks

QUALCOMM recently announced enhancements to current CDMA2000 EV-DO networks that will enable rich wireless multimedia services such as high-speed transfer of bandwidth-intensive files (including high-quality pictures, video and music), interactive 3D gaming as well as multicasting services.

Revision A to CDMA2000 1xEV-DO supports peak data rates of 3.1 Mbps on the forward link and 1.8 Mbps on the reverse link, 192 forward-link and reverse-link channels and four-way receive diversity, delivering eight times the user capacity compared to EV-DO Revision 0. Optimized for packet data service, Revision A provides one of the lowest costs per bit when compared with other wireless wide area network (WAN) technologies. CDMA2000 EV-DO Revision A also includes support for low-latency applications, including a variety of IP-based services such as Voice over Internet Protocol (VoIP) and real-time conversational services such as push to talk, video telephony and instant multimedia—an extension of push to talk that combines immediate voice with simultaneous delivery of video and pictures, offered over a cellular and/or PCS platform. As a result, VoIP will not be only a desktop phenomenon—advanced wireless networks using the technologies we have discussed today will enable mobile wireless VoIP delivering high quality and high capacity while lowering capital and operating costs.

National Policies to Help Facilitate These Advancements

To facilitate this digital convergence and the delivery of additional Internet Protocol enabled services over wireless networks the US Congress can:

1. Make more spectrum available for advanced wireless services by establishing in law a hard end date of December 31, 2006 to end the digital TV transition.
2. Maintain the current allocations of licensed wireless spectrum below 1 GHz.
3. Ensure that before unlicensed devices are permitted to operate in licensed spectrum that there is clear and convincing proof that they will not cause harmful interference to the licensed services.
4. Encourage the FCC not to impose any regulatory barriers that impede the delivery of VoIP over PCS or cellular platforms.

Support of the policy goals listed above will ensure that the operators that deliver advanced wireless services have access to the additional spectrum necessary to carry multimedia services like video to wireless devices. These policies have enabled wireless operators to quickly evolve the technologies used on specific bands of licensed spectrum without the need for any new approvals from the FCC, and to deliver new Internet based services to wireless devices without the need for government involvement. The result is that Americans now enjoy access to the fastest national wireless network in the world, and wireless devices with the richest feature sets available anywhere. These policies will ensure that wireless networks and technologies can “converge” as rapidly as possible, yielding the greatest benefits to American consumers and to our national economy.

Mr. UPTON. Thank you very much. Mr. Mattes.

STATEMENT OF ANDY MATTES

Mr. MATTES. Chairman Upton and members of the subcommittee, it is a pleasure and an honor being here today, and presenting Siemens’ view on IP convergence.

As you may know, Siemens is one of the largest electrical and electronic companies around the globe. We do employ some 70,000

people in the United States, with employment in every single State within the United States. Globally, we employ some 430,000 people and operate in 190 countries. The largest segment of our portfolio is IP communications. Our target markets are consumers, enterprises, and service providers, including wireless, wireline, and cable operators.

Convergence is taking place at many levels. IP-based broadband networks will change the way we communicate, work, and play. For example, SBC and BellSouth are deploying IP-centric solutions as we speak today. Technological advancements are also rapidly changing the way the industry is structured in order to meet customer needs. The use of IP-based services is spreading dramatically, and this is the reason why communication platforms are converging.

It is only in a truly IP-converged broadband environment, with standard based platforms and end user empowerment that such seamless unification becomes reality. This would represent a world where there are no longer artificial boundaries between fixed line networks, mobile networks, and cable networks. CableVision, for example, is adding 1,000 new subscribers to their Voice over IP service every working day. There would no longer be a multitude of email boxes and voicemail boxes. Users will not be forced to learn how to use different interfaces, and to access their information, and to communicate is going to be a whole lot easier.

Through our close work with our carriers, service providers, businesses, and end users, we believe we know some of the communication issues that are top priority. Businesses tell us that their employees need communication tools to make them more effective, productive, and more responsive to their customer needs. Carriers and service providers tell us that they need to offer new services and create new business models. And end users are telling us that they want to bring all of these devices and networks and applications together in a way to achieve a better work/life balance. At Siemens, we call all of this LifeWorks, because we believe that IP convergence can make life work better.

As we look across markets, we see the impact and potential of IP everywhere. Converged IP-based broadband networks will dramatically address many of the Nation's challenges, from reducing healthcare costs, improving delivery, protecting national security, and providing a more satisfying quality of life. Siemens applauds the subcommittee for recognizing these significant changes, and for moving forward in creating a public policy framework that embraces the new converged IP-based world.

In considering changes to the Act, we recommend that Congress adopt policies that follow these guiding principles. First, the overriding goal of any policy should be to promote the accelerated design, development, and deployment and adaptation of converged packet-based broadband infrastructures, applications, and services. The FCC's recent order exempting new fiber-based broadband networks from regulation is a good model to follow.

Second, in our view, Voice over Internet Protocol is not a service, but a technology that enables a multitude of new services. Therefore, we recommend that this technology be exempt from traditional telecommunications regulations. We applaud Congressmen

Pickering, Stearns, and Boucher for their efforts to accelerate the debate on how to approach these new technologies and applications and balance existing social needs with tomorrow's technology.

Third, new rules should be applied evenly across network platforms. Providers who are similarly situated should face the same rules when providing the same services. With this in mind, Congress should regulate down.

Fourth, when reforming universal service, Siemens recommends that Congress take the opportunity to bring the universal service program into the IP future as well. We understand the funding challenges. However, Siemens recommends searching for innovative ways to create incentives for providers, schools, libraries, and rural health providers to invest in next generation infrastructure. In this way they, just like the rest of us, will be able to take advantage of cost savings and new applications driven by IP-based convergence.

It is absolutely necessary that the United States match the pace with other developed countries in terms of broadband penetration. I am surprised that the most innovative country in the world ranks number 13 in terms of per capita broadband penetration, with only about 32 million broadband subscribers. All Americans must benefit from the rich media experiences now offered by the Internet.

And finally, as Congress considers new policies and rules, it should look to what has happened under the Federal wireless regulatory model. Consumers are the winners in this market through significant price reductions and the explosion of new services and technologies. The hands-off approach has paved the way for this consumer-focused and fast growing environment.

Thank you again for giving Siemens the exciting opportunity to testify before this panel. We look forward to working with you to help shape policies that will help drive the development and deployment of next generation networks for all Americans.

[The prepared statement of Andy Mattes follows:]

PREPARED STATEMENT OF ANDY MATTES, PRESIDENT AND CEO, SIEMENS COMMUNICATIONS, INC.

Chairman Upton, Ranking Member Markey, and members of the subcommittee, it is an honor and privilege to appear before you today to discuss Siemens' view of convergence and the emerging IP-based world. My name is Andy Mattes and I am the President and CEO of Siemens Communications USA. Mr. Chairman, with your permission, I will submit my entire written statement for the record and will summarize briefly.

As you may know, Siemens is one of the largest electronic and electrical engineering companies in the world. Our largest market is the United States where we employ over 70,000 people with employment in every state. Globally we employ over 430,000 people and operate in 190 countries. We are a market leader in energy and power generation, industry and automation, information and communications, healthcare, transportation and lighting. The largest segment is our portfolio focused on IP communications devices, applications, and infrastructure for the individual, for the enterprise, and service providers including wireless, wireline and cable.

Convergence is taking place at many levels: We're seeing convergence of the television and the personal computer, of wireless and wireline networks and devices, and of voice, data, and video. IP-based broadband network infrastructures will change the way we communicate, work and play. Technological advancements are also rapidly changing the way industry is structured to meet consumer needs. The use of IP-based services is spreading dramatically and this is the reason why communications platforms are converging.

Since passage of the Telecommunications Act of 1996, fixed-line long distance no longer is the sole player in that market. Wireless carriers are long distance pro-

viders, local providers and Internet access providers. Your current cable company is not your old cable company. They are now providing voice, data and Internet access. Existing rules designed to spur wireline vs. wireline competition may no longer be relevant. Real competition is facilities-based, which is now occurring across industries.

True packet-based convergence is crucial to allowing multimedia applications and services to seamlessly coexist on a streamlined asset base. These new pathways will enable the dramatic improvement in asset utilization rates for enhanced capital and operational efficiency, along with the improved price-performance characteristics required to restore a sound economic foundation to spur the industry's continued innovation and growth.

In addition to broadband access and transport infrastructures, IP-based applications and related servers, media gateways, soft-switching platforms and related management systems must be allowed to be packaged as key building blocks for the future.

The end-game is seamless unification of communications domains with end-user applications. It is only in a truly IP-converged, broadband environment with standards-based platforms and end-user empowerment that such seamless unification becomes possible. This would represent a world where there are no longer artificial boundaries between fixed-line networks, mobile networks, and cable networks. There would no longer be multiple e-mail boxes and voicemail boxes. Users will not be forced to learn how to use different interfaces to access their information and communicate.

Users want simpler communication tools and more efficient communications. We currently have more choices than ever before, but these very choices have made our communication more convoluted and redundant. Trying to manage all of today's communications devices, applications and networks is like trying to run an airport without air traffic control—there is no synchronization or communication.

Through our close work with carriers, service providers, businesses and end-users, we believe we know which communication issues are top priority. Businesses tell us that employees need communication tools to make them more effective, more productive and more responsive to customer needs. Carriers and service providers tell us they need to offer new services and create new business models. And end users are telling us they want to bring all of these devices and networks and applications together to achieve a better work-life balance. At Siemens, we call all of this LifeWorks because we believe that IP convergence can make life work better.

Perhaps the biggest and most exciting development is the advent of the wireless world. Today, we're like a tether ball tied to our desk. Our communications world is based around the idea of a wired world where wireless augments our communications. The communications world of tomorrow will be built around the idea of a wireless voice, data and entertainment infrastructure augmented by a wired network. That represents a complete reversal of today's paradigm.

As we look across markets, we see the impact—and potential—of IP everywhere. Converged IP-based broadband networks will dramatically address many of the nation's challenges, from reducing health care costs and improving delivery, protecting national security and providing a more satisfying quality of life.

Hospitals using innovative and secure communications technology can operate with less cost, because they have fewer medication errors, fewer mistakes, earlier detection rates and better overall clinical outcomes. We know because Siemens builds and provides the communications infrastructure for "digital" hospitals across the country.

Building and information security is enhanced by convergence solutions that marry physical access with network security and identity management. At Delaware State University, for example, students use Siemens smart cards to enter their dorm rooms, access the campus computer network, buy text books, and pay for meals in the cafeteria.

Emergency responders will benefit by instant conferencing and presence awareness—something like the buddy list for the telephone so that you know who is available even before you dial.

And **consumers** will benefit because of things like dual-mode devices—a handset that will work over a WiFi network at home and over the public wireless network outside of the home. They'll be able to receive one bill for payment convenience. And they'll finally be able to end the communications chaos caused by so many devices, applications and networks.

Siemens applauds the subcommittee for recognizing these significant changes and for moving forward in creating a public policy framework that embraces the new converged IP-based world. In considering changes to the Act, we recommend that Congress adopt policies that follow these guiding principles.

First, the overriding goal of any policy should be to promote the accelerated design, development, deployment and adoption of converged, packet-based broadband infrastructures, applications and services. The FCC's recent order exempting new fiber-based broadband networks from regulation is a good model to follow.

Second, in our view, Voice over Internet Protocol is not a service, but a technology that enables multiple new services. Therefore, we recommend that this technology be exempt from traditional telecommunications regulation. We applaud Congressmen Pickering, Stearns and Boucher for their efforts to accelerate the debate on how to approach these new technologies and applications and balance existing social needs with tomorrow's technologies.

Third, new rules should be applied evenly across network platforms. Providers who are similarly situated should face the same rules when providing the same services. With this in mind, Congress should regulate down.

Fourth, when reforming universal service, Siemens recommends that Congress take the opportunity to bring the universal service program into the IP future as well. We understand the funding challenges. However, Siemens recommends searching for innovative ways to create incentives for providers, schools, libraries, and rural health providers to invest in next-generation infrastructure. In this way, they, just like the rest of us, will be able to take advantage of cost savings and new applications driven by IP-based convergence.

And it is absolutely necessary that the United States match the pace with other developed countries in terms of broadband penetration. I am surprised that the most innovative country in the world ranks 13th in terms of per capita broadband penetration with only about 32 million broadband subscribers. All Americans must benefit from the rich media experiences now offered by the Internet.

And finally, as Congress considers new policies and rules it should look to what has happened under the federal wireless regulatory model. Consumers are the winners in this market, through significant price reductions and the explosion of new services and technologies. The hands-off approach has paved the way for this consumer-focused and fast-growth environment.

Thank you again for giving Siemens the exciting opportunity to testify before this panel. We look forward to working with you to help shape policies that will help drive the deployment of next-generation networks for all Americans.

Mr. UPTON. Thank you. Ms. Russo.

Ms. RUSSO. Thank you, Chairman Upton, and members of the committee—

Mr. UPTON. Again, you have to hit that mike button.

Ms. RUSSO. Yes. Keep forgetting. Chairman Upton, members of the subcommittee.

Mr. UPTON. You might get it just a little closer to you, to—

Ms. RUSSO. Is that better?

Mr. UPTON. That is better. Yes.

Ms. RUSSO. Okay.

Mr. UPTON. It will move.

STATEMENT OF PATRICIA RUSSO

Ms. RUSSO. Thank you. Thank you for inviting me to testify. I am proud to represent the 31,500 Lucent and Bell Labs employees all around the world, and I thank you for the opportunity.

As you know, Bell Labs has spent over 100 years creating technologies that have a profound impact on the communications and computing world. The industry has come a long way since Congress passed the Telecom Act of 1996. Today, IP-based technologies have dramatically changed the cost and reach paradigms, and will soon enable the seamless delivery of blended voice, video, and data services to any type of device across any kind of network. Many of the technologies that drive today's networks are fundamentally different than those that drove networks when the Act was developed. Therefore, it only stands to reason that the regulatory requirements must be updated as well.

If permitted to achieve their full potential, IP-enabled services can help create value and more choice for consumers and businesses, drive innovation and investment in the sector, stimulate economic growth, drive efficiencies in industries like healthcare and education, and help the United States maintain a global technology leadership position. For this to happen, we believe it is critical for Congress to adopt a Federal policy framework that recognizes the changes in technology and the market, and is designed to promote and enable the converged lifestyle services that people are demanding. To do that, we need to minimize, in some cases, perhaps eliminate economic and entry regulation into the communications marketplace. In today's increasingly mobile world, our market research tells us that people want communications services that are simple, seamless, and secure, as well as personal, portable, and reliable.

As my colleagues today have described, people want to check their investments, send photographs, download music, access educational information, make dinner reservations, and hold teleconferences using any end user device, and they want to be able to access these broadband services at home, at work, or anywhere in between. Lucent's Bell Labs has developed technologies and solutions that make it possible for these IP-enabled services to be deployed simply and cost effectively. Many are available today, with many more to come.

We are currently a major provider of open standards based IP multimedia subsystems, or IP-enabled third generation wireless technologies, like CDMA-EVDO and UMTS, to service providers around the world. We also provide the core backbone over which IP-enabled services travel in what is called the optical and data domain, and we are leveraging these networks and operations environment to offer IP-enabled services faster. We believe they can become an engine of growth, and fundamentally change the way we work and play.

This is already at work in consumer and business environments. For example, Lucent's Active Phonebook application allows groups of colleagues to access instant messages on a portable device, download slides for a critical presentation, find out who is available to have a real time discussion, and set up that teleconference all at the same time. It does this within an environment that allows for privacy. The same technology could be invaluable to teams of first responders, soldiers in the field, or even a group of friends or family members who simply want to stay in touch more conveniently.

It is also becoming increasingly clear that, enabled by IP, the distinction between wireless, wireline, and cable offers will continue to blur over the next few years. Our own product line demonstrate that convergence in real, and that communications markets are competitive. Therefore, Lucent is breaking down the barriers between our own product lines by developing a common IP platform to enable converged services across our portfolio.

This committee is beginning the process of rethinking the Telecommunications Act, and how to best create an environment that enables consumers and businesses to realize the full potential of these technologies. Obviously, that requires change. Let me preface

my recommendations by saying that any legislative action should promote investment and choice, should provide for the requirements of critical emergency needs and our national security, and should provide the industry some flexibility around aligning itself to best serve its market and its constituents.

I have a few recommendations. First, given the fundamental differences between communications in the traditional and IP worlds and the complexities involved, I believe Congress needs to take a very thoughtful approach to the development of the appropriate environment for IP services. I believe that minimal regulation is better, and equal treatment for the same services should be considered. Fundamentally, this should happen at the Federal level. Today's communications are all about convergence, converging networks, converging technologies, converging applications, and converging devices. We are very mindful that new technologies will co-exist with existing infrastructures for some time, and the full transformation to next generation networks will take time. If Congress works to break down existing barriers, it could serve to facilitate and accelerate the rollout of IP services.

Second, I would urge you to consider new means to promote and facilitate the deployment of broadband access platforms, both fixed and wireless, upon which these services depend. I would recommend that Congress ensure that sufficient allocations of cleared licensed spectrum are available on a timely basis to service providers that are rolling out powerful new third generation networks. It would also be useful to explore ways to expedite the provisioning of broadband access that enables the delivery of such services.

And last, I would ask Congress to consider increased support for favorable R&D tax treatment and other mechanisms that will support increasing research into these new technologies. This will encourage the development of new services, and will add value to our economy, and continue to help this country maintain its leadership.

Your leadership in each of these areas will help all of us at this table to continue to develop ever more compelling solutions that will help the United States maintain leadership in the area of communications.

Thank you, Mr. Chairman, for the opportunity to testify.

[The prepared statement of Patricia Russo follows:]

PREPARED STATEMENT OF PATRICIA RUSSO, CHAIRMAN AND CEO, LUCENT
TECHNOLOGIES

Chairman Upton, Ranking Member Markey, and members of the subcommittee, I'm Pat Russo, Chairman and CEO of Lucent Technologies. I'm proud to represent the 31,500 Lucent employees around the world, and I thank you for the opportunity to testify before this distinguished Committee.

Lucent Technologies shares the enthusiasm of the other panelists about the tremendous potential of IP-Enabled Services, and we are encouraged that this Committee has embarked on a careful review of the technologies and trends that are changing the way the world communicates.

The industry has come a long way since Congress passed the Telecom Act of 1996. The Act was developed in a voice-centric environment, where time, distance and geographic boundaries drove the market. Today, these factors have receded to the background. In an IP-enabled world, voice is merely one of many applications, along with video and data, which are fundamentally digital packet streams of information. IP-based technologies have dramatically changed the cost and reach paradigms and will soon enable the seamless delivery of blended voice, video and data services to any type of access device across any kind of network. These changes obviously have ramifications for the way these services are regulated at the state and federal levels.

As a result, there is a discontinuity between the legacy of the Act and where the industry and market are today. From a technological perspective, we have traveled much farther in the last ten years than anyone could have anticipated, and looking forward, we see this trend continuing. Many of the technologies that drive today's networks are fundamentally different than those that drove networks when the Act was developed. Therefore, it only stands to reason that the regulatory requirements must be updated as well.

If permitted to achieve their full potential, IP-Enabled Services can help

- drive both innovation and investment in the sector,
- create value for consumers and businesses,
- stimulate economic growth,
- drive efficiencies in areas like health care and education,
- and help the United States maintain a global technology leadership position.

For this to happen, we believe it is critical for Congress to create at the federal level a framework that recognizes the changes in technology and the market, and is designed to promote and enable the converged lifestyle services people are demanding. To do so, we need to remove the existing constraints within traditional legal and regulatory boundaries that impede the full development of these services.

Let me provide a brief glimpse into some of what Lucent is doing in the area of IP-Enabled Services. Then I'll discuss a few specific measures we believe Congress can take to help unlock their potential. In today's increasingly mobile world, our market research tells us that people want communications services that are simple, seamless and secure, as well as personal, portable and reliable. As my colleagues here today have also described, people want to check their investments, send photographs, download music, make dinner reservations and hold teleconferences using any end-user device—and they want to be able to access these broadband services at home, at work or anywhere in between. Lucent's Bell Labs—which is responsible for such world-changing innovations as the transistor, the laser, and the cellular technology so many of us can't live without today—has developed technologies and solutions that make it possible for these IP-Enabled Services to be deployed simply and cost-effectively. Many already are available today, and others will be coming to market shortly.

We are currently a major provider of open standards-based IP Multimedia Subsystems (or IMS) and of IP-enabled third-generation wireless technologies like CDMA-EVDO and UMTS to service providers around the world. We also provide the core backbone over which IP-Enabled Services travel in the optical and data domain, and we're leveraging these embedded networks and operations environments to offer IP-Enabled Services faster. Because these technologies combine broadband bit rates with mobility, we see them as the cornerstones of the IP revolution. We believe that IP-Enabled Services will become an engine of economic growth that will change the way we work and play as profoundly as the Internet itself has changed the way we access information.

This engine of growth is already at work. IP-Enabled Services are beginning to provide secure, personalized networks that are customized to the needs of end users, thus increasing productivity—especially in business environments. For example, Lucent's Active Phonebook application allows groups of colleagues to better manage their communications by tracking team members carrying a mobile phone and providing customized e-mail, text messages or phone alerts when a designated group arrives at—or departs from—a designated area. This means that whether you or your colleagues are on a 2G, 3G or home network, you can access your instant messages on a portable device, download slides for a critical presentation, find out who is available to have a real-time discussion about the presentation and set up that teleconference—all at the same time. It does this within an environment that also allows for privacy by enabling users to control whether they can be tracked and from how far. This same technology could be invaluable to teams of first responders, enabling them to see where each member of the team is, send plans or images and communicate with one another. It could help soldiers in the field share reconnaissance data in real time while planning their next maneuver. Or it could help a group of friends or family members who simply want to stay in touch more conveniently, and in different and fun ways.

It is also becoming increasingly clear that, enabled by IP, the distinction between wireless, wireline and cable offers will continue to blur over the next few years. Therefore, Lucent is breaking down the barriers between our own product lines by developing new products, services and software that support our "common IP platform approach" to convergence across our entire portfolio.

Obviously, I could spend hours explaining the latest technology platforms and their impact on business models, but I know my time is limited today. Therefore, I invite each of you to visit Bell Labs to see our demos first hand and to engage

in a more in-depth discussion of where we see technology going and what impact it will have on various parts of the economy.

My understanding is that this committee is interested in what today's technologies can do and how best to create an environment that enables consumers and businesses to realize the full benefits of these technologies. That brings me to back the need for change. Let me preface my recommendations by saying that any legislative action must promote investment and choice, must provide for the requirements of our critical national infrastructure needs, and must not hamper the industry's initiatives to align itself in a manner that best serves the market and its constituents. That being said, there are three key recommendations I would like to make.

First, given the fundamental differences between communications in the traditional and IP worlds and the complexities involved, I believe Congress needs to take a thoughtful approach to the development of an appropriate legislative environment for IP-Enabled Services. Fundamentally, this needs to happen at the federal level. Today's communications are all about convergence—converging networks, converging technologies, converging applications and converging devices. However, the current inconsistencies of legislative and regulatory requirements leave carriers and end users in a position where they at times have to piece together their communications solutions. If Congress were to help break down these barriers, it could serve to facilitate and accelerate the rollout of IP-Enabled Services.

Second, I would urge you to consider new means to promote and facilitate the deployment of broadband access platforms, both fixed and wireless, upon which IP-Enabled Services depend. In particular, I would recommend that Congress ensure that sufficient allocations of cleared licensed spectrum are available on a timely basis to service providers that are rolling out powerful new 3G networks throughout the country. It would also be useful to explore ways to expedite the provisioning of broadband access that enables the delivery of such services as video over broadband—or what many refer to as IPTV or Mobile TV.

Third, I would ask Congress to consider increased support for favorable R&D tax treatment and other mechanisms, such as increased government funding for advanced telecommunications research, to accelerate research into these new technologies. This will encourage the development of services and applications that will add value to our economy.

Your leadership in each of these areas will help all of us at this table to continue to develop ever more compelling solutions that will help the United States maintain a leadership position in the area of communications.

Let me close by saying that Lucent continues to look for ways to collaborate with the federal government in the area of advanced research in communications. This is an area where Bell Labs has a long history of success, and we would welcome new opportunities to work together.

We also look forward to working with this Committee on all of the important issues that surround the deployment of IP-Enabled Services and the broadband access services critical to their future success.

Thank you again, Mr. Chairman, for the opportunity to testify before the Committee.

Mr. UPTON. Thank you. Mr. Quigley.

STATEMENT OF MICHAEL QUIGLEY

Mr. QUIGLEY. Chairman Upton, Ranking Member Markey, members of the subcommittee, ladies and gentlemen. Good morning. Thanks for the opportunity to speak before the subcommittee this morning.

First, I would like to give you a little bit of background on Alcatel. We are a global company with operations in 130 countries around the world, 2004 revenues of just over \$16 billion U.S. dollars, worldwide employees of about 56,000 people. We view the North American market as vital to the future of Alcatel, and in fact, to the entire technology industry. And one of the reasons Alcatel has made investments of over \$16 billion in technology in North America. We have 9,000 people here, and in fact, we spend some 20 percent, a little over 20 percent of our North American

revenue, on R&D, which is a higher percentage than any other part of the world.

We have global G&D centers for IP routing and enterprise applications in California, and our global R&D center for fiber to the home technologies, and fiber to the node technologies, is in North Carolina, as well as our headquarters here in Dallas. Mr. Chairman, we see IP—

Chairman BARTON. Mr. Chairman, Mr. Chairman. I just want the committee to listen to this real Texas accent. I just—you all are always making fun of me, but that is the real McCoy right there.

Mr. QUIGLEY. Of course, an East—

Ms. RUSSO. By way of Australia.

Mr. QUIGLEY. East Texan accent. So we—Mr. Chairman, we do see, in Alcatel, IP technologies as the driver of a new generation of communication services. IP enables services providers and enterprises to offer a wide array of applications, including voice, video, and data, over a unified network. The unified network drives both increased productivity, and gives enterprises and consumers more choice.

Ongoing investments in IP technologies is, we see, driven by both demand and supply. On the demand side, we see what we call user-centric service. We have conducted primary research, as have others, that says users these days prefer to be able to get their communications from whatever type of terminal they like, on whatever network at whatever time suits them. It is a clear trend we are seeing with—from users. For example, a doctor who can log on into a phone or a PC in his local hospital, and have that network automatically recognize him, provide his email, his voicemail, and secure access to patient records, is going to have more time for patients. And perhaps even more importantly, he is unlikely to miss vital information. It is IP technology which will make those types of services, user-centric services, possible.

The other key enabler is the growing ubiquity of broadband. It—as it was commented before, it was not long ago that residential broadband was virtually nonexistent. Today, there are approximately 150 million broadband customers throughout the world, including 32 million here in the U.S. We in Alcatel, on a worldwide basis and in North America, are a leader in broadband access technologies. We have shipped, in fact, over 50 million digital subscriber lines to service providers on a worldwide basis.

So our view is the combination of widespread broadband supply and user-centric demand, while they are very productive technologies, they are going to be a real tall order for service providers and enterprises, and this is where IP technologies will come into play. IP enables us to provide all of these integrated services over a unified network with high levels of interactivity, security, and quality of service.

Chairman Upton, I know that you have a particular interest in education technology, and we share your appreciation for what technology can do both inside the school and outside, and for example, Alcatel is working with Verizon to complete a deployment of 27,000 IP phones in Clark County, Nevada, that school district. Clark County has adopted Voice over IP because it reduces telecom costs by combining voice and data networks, so they can spend

more resources on teaching and less on IT management. The IP system provides more features for the teachers and administrators, such as call blocking during school hours and increased reliability.

Another example is IPTV. In October of last year, Alcatel was selected by SBC as its primary network infrastructure and integrator for Project Lightspeed. You may recall that this is a project which is going to bring IP television with ultra-high-speed broadband to 18 million households by the end of 2007. In addition to multiple services with high quality over this single pipe into each home, is bring widespread benefits, distance learning, telecommuting, telemedicine, and others, as well, obviously, as IPTV.

But what IPTV will do for the consumer is to provide additional choice over the video services currently available from both cable and satellite providers. For example, IPTV customers will be able to select varying camera angles while watching sporting programs. The main point is that this service will be switched video rather than broadcast, which will be particularly important to those organizations wanting to offer niche video offerings, such as foreign or educational programming.

Alcatel believes that for IP technologies to flourish in the U.S., we need an environment that encourages service providers to invest in IP-based networks, that will also drive industry to invest in IP technologies. This requires a level playing field in which all players have an equal opportunity to rapidly deploy IP technologies without unreasonable constraints or disincentives. Equally crucial is the continuing focus on education. The U.S. has traditionally been the world leader in the development of IP technologies, in great part thanks to the superior quality of its engineering and science programs. Many countries, including China and India, are now graduating equally qualified engineers in very large numbers. Innovation is crucial to the—if the U.S. is to maintain its lead in this ever more competitive environment. The policies that this Congress sets with regard to IP technologies can help ensure that the right incentives are in place to enable the U.S. to continue to lead in IP innovation.

Mr. Chairman, I appreciate the opportunity to testify before the committee, and would be happy to answer any questions. Thank you.

[The prepared statement of Michael Quigley follows:]

PREPARED STATEMENT OF MICHAEL QUIGLEY, CHIEF EXECUTIVE OFFICER, ALCATEL
NORTH AMERICA

Chairman Upton, Ranking Member Markey, Members of the Subcommittee, ladies and gentlemen. Good morning. My name is Michael Quigley, I am the Chief Executive Officer of Alcatel North America and the President of Alcatel's global Fixed Communications Group.

Thank you for this opportunity to speak before the Subcommittee concerning the development of communications technologies using Internet Protocol. First, I would like to provide the Subcommittee with a little background concerning Alcatel and the equipment and services we offer to the marketplace. Alcatel is a global company with operations in 130 countries; 2004 revenues of 12.3 billion Euros; and worldwide employees totaling 56,000. The North American market is vital to the future of Alcatel and the entire technology industry. Alcatel has made over \$17 billion in technology investments in North America. We have 9,000 people here, and dedicate more than 20% of our North American revenue to research & development that we conduct in North America—a higher percentage than we reinvest worldwide. Our global R&D centers for IP routing and enterprise applications are based in Cali-

fornia, and our global R&D center for fiber to the home technologies is based in North Carolina. Alcatel's customers include traditional telephone companies, mobile carriers, private and public enterprises, transportation networks, and satellite operators.

Mr. Chairman, the world is at a threshold of a communications revolution, and Alcatel sees IP technologies as the driver for this new generation of communications services. IP enables service providers and enterprises to offer a wide array of applications, including voice, video, and data, over a unified network that does not discriminate based on any particular application. This drives both increased productivity for businesses and enhanced consumer choice and experience.

Ongoing investment in IP technologies is driven by both demand and supply. First is the demand for *what we call "user centric services."* We've conducted primary research, as have others, that show that end users prefer to have their communications services available to them ubiquitously, regardless of what device they are using, or what network they are accessing. For example, I prefer to have my same email available to me on my PC at home, my PC at work, and my cell phone. If I have to forward it between those three, I lose precious time. By the same token, a doctor who can log into any phone or PC at his local hospital, and have that network automatically recognize him, and provide his email, voicemail, and secure access to his patient's records is going to have more time for patients. Moreover, he can be sure he is not missing vital information that he might otherwise have had to check multiple devices or networks to get. Today, we each have services that are only available on a particular device or network. Tomorrow, we can securely move information more effectively, and attach it to a user's profile across multiple devices and networks. IP is the technology that makes these user centric services possible.

The second key enabler of this user centric world is the growing ubiquity of broadband. It was not long ago that residential broadband was nonexistent. Traditionally, the local access networks—that is the "last mile" to the customer—were a bottleneck of slow, dial-up speeds. An offering of integrated voice, data, and video to a customer would not have much appeal if the user had to turn off his computer to use the voice services or watch video that took hours to download. Today, there are approximately 150 million broadband customers throughout the world, including 32 million here in the U.S. Alcatel is the worldwide and North American leader in broadband access technologies, with over 50 million digital subscriber lines shipped to service providers.

This combination of widespread broadband supply and user-centric demand creates a tall order for service providers and enterprises alike, and they turn to technology leaders like Alcatel to help. This is where IP-based technologies come into play. IP enables us to provide all of these integrated services over a unified network with high levels of interactivity, security, and quality of service. Service providers gain the efficiency of a unified network that offers voice, data, and video to the customer, while satisfying the customer's demand to be at the center of their communications universe.

The importance of IP-based technologies to satisfy this demand is best made with examples. Chairman Upton, I know that you have a particular interest in education technology, and Alcatel shares your appreciation for what technology can bring to the classroom and the educational opportunities that can be delivered to those outside the classroom. Alcatel is working with Verizon to complete a deployment of 27,000 IP phones in the Clark County, Nevada, School District. Like many other large school districts, Clark County adopted VoIP because it reduces telecom costs by combining voice and data networks. The reduced network management overhead means a school can spend more of its resources on teaching, and less on IT management. Further, the IP Telephony system provides more features for the teachers and administrators, such as call blocking during school hours, and increased reliability so there is no single point of failure in the network. Indeed, one application we recently developed would allow a teacher in a classroom that has an emergency to immediately notify the rest of the school by simply pressing a few buttons.

Another example that illustrates the importance of IP: In October, Alcatel was selected by SBC as its primary network infrastructure and services supplier for Project Lightspeed, which will deliver integrated IP Television and other ultra-high-speed broadband services to 18 million households by year-end 2007. Alcatel will enable SBC to provide this suite of services by building fiber deeper into the SBC network—using shorter copper subloops in existing neighborhoods and building fiber all the way to customers' premises in new housing developments. Equally as important, Alcatel will enable SBC to deliver multiple services with high quality over a single pipe to each home by leveraging the IP technologies it has developed.

This new network will enable SBC to provide broadband Internet access that offers downstream and upstream speeds measured in megabits instead of kilobits. We

are all aware of the widespread benefits offered by high speed Internet access—distance learning, telecommuting, telemedicine, and others.

IPTV will offer consumers an additional choice to the video services currently available from cable or satellite providers. For example, IPTV customers may select varying camera angles while watching sports programming—focusing on any one angle or splitting the screen to watch several sporting events at once. Additionally, because this service will be switched video rather than broadcast video, the bandwidth demands on the local access network are no greater than the program the user is currently viewing. This will be a great benefit to organizations wanting to offer niche or unique offerings, such as foreign or educational programming.

Alcatel believes that for IP technologies to flourish in the US, we need an environment that encourages service providers to invest in IP-based networks and this will continue to drive the industry to invest in IP technology and standards development. This also requires a level playing field in which all players have an equal opportunity to rapidly deploy IP technologies without unreasonable constraints or disincentives.

Equally crucial is a continuing focus on education. The US has traditionally been the world leader in the development of IP technologies, in great part thanks to the superior quality of its engineering and science programs. Many countries including China and India are now graduating equally qualified engineers in huge numbers. Innovation is critical for the US if it is to maintain its lead in this ever more competitive environment. The policies that this Congress sets with regard to IP technologies can help ensure that the right incentives are in place to enable the US to continue to lead in IP innovation, and continue to be the choice of those who invest in IP technology development.

Mr. Chairman, I appreciate the opportunity for Alcatel to testify before the Committee, and I would be happy to answer any questions you may have. Thank you.

Mr. UPTON. Well, thank you all very much for your great testimony, and it—without a doubt, I think many of us, most of us, all of us, are on exactly the same page.

Sort of interesting, last night, I was at a dinner. And—a lot of friends, and the question came up, how are your kids? And I whipped out my wallet, and I showed a very nice picture of my daughter, who is in high school, and my son is a few years old, but my son is a seventh grader, and all of the sudden, the fellow next to me, Dr. Jacobs, whipped out that phone that you showed. Did you get them all back, by the way?

Mr. ENGEL. I still have mine.

Mr. UPTON. Yes. All right. Watch Mr. Engel. But he whipped out that phone, and with it, he showed a video of his son singing a little song, and talked about MapQuest, and all the different services that are available. I even liked the color of the light, blue, in terms of the services available. That is where we are today. Just think about where we are going to be tomorrow, and it is exciting to see all of that. And no question about it, and it makes no sense, at least in my mind, that we regulate any of these platforms differently. They all need to be the same. In fact, one of the terms that I have used is deregulatory parity, to allow them to advance without the regulations that would otherwise, perhaps, curtail their deployment, not only to businesses, but to families, and as—particularly as we look to compete with other companies and countries around the globe.

Does—no one disagrees with that, of the five. Is that right? No one would disagree with that. What I would like to ask each of you is what do you think would happen to the sales of these IP products down the road if, in fact, they were subjected to the same rules, the same telecommunications rules, that we had in the 1996 Act.

Mr. Zander?

Mr. ZANDER. Well, again, I think you hit it right on the head. I think we can't—we have never been able to, you know, stop the rate of technology, in the 30 years that I have been in the business, and we are undergoing as much change today as I have seen probably since the Internet got discussed 10 years ago, just tremendous disruptive technology that is going to bring broadband access to every man, woman, and child, probably on the planet, and the concern that I have in this concept of seamless mobility, is that we do, as you said, provide regulations that will inhibit the rate of change of technology and not provide these services, putting us at a competitive disadvantage, putting the consumer at a competitive disadvantage, and as we have seen in other parts of the world, the United States at a competitive disadvantage. So I urge us to understand that there aren't distinctions necessarily any more between wireline, wireless, cable, all of the technologies that were in the world of the net, or in the world of IP access, and it is going to be available on all devices to all consumers at any time. So we must understand the big paradigm shift here of the technology, the disruptive technology, and then from there, work to handle the various issues that were discussed here today.

Mr. UPTON. Dr. Jacobs.

Mr. JACOBS. Yes, I am obviously very focused on the wireless part of that, and I think the wireless part is very powerful. It has come a long way in a fairly short time, and without too great a regulatory constraint. But now, we are moving into a whole range of new services based on having broadband access to a device that we carry with us where we might be, that is kind of indispensable to all of us. And so there is a whole range of services there. Voice will be going over the Internet Protocol, hopefully that that doesn't get regulated and additional charges put on that. A range of other services, providing video clips, et cetera. The question is how might those be handled. The freedom to provide these services that people clearly want. They are paying for them already. Therefore, the market is working. Allowing that to continue to develop, I think, is a very important part of how we proceed ahead.

In addition, there is additional spectrum that is always required, and again, one of the aspects is making that spectrum available. I know one of the key aspects of that you have been looking at is the digital TV transition, making the UHF frequency channels available as the broadcasts move over to digital. And I think having a firm deadline there would be a help in supporting, providing additional spectrum to support these interactive services.

Mr. UPTON. Mr. Mattes.

Mr. MATTES. I believe that businesses are not deploying technology because they enjoy technology. They are deploying technology in order to gain a competitive edge. And consumers are not using technology for technology's sake. We are trying to balance—our work requirements are always on—work environment and our family lives. Now, the minute you put regulation on top of that, we take some of the creativity out of the system, because I am absolutely certain that the applications that will drive productivity or enhance our lifestyles, they are not all invented at this point in time. People will get extremely creative. The more we put stipula-

tions on them, the more we put them at a competitive disadvantage, as a company and as a country.

Mr. UPTON. Ms. Russo.

Ms. RUSSO. Yes. I would just add to what my—

Mr. UPTON. You have got to hit that button.

Ms. RUSSO. Can you hear me? I would just add, maybe, from a little bit different perspective. In order for companies to be willing to invest in the network technologies that will enable these services, they have to operate in an environment that makes that investment a good choice. At the same time, the services have to be adopted by the users. That requires an environment of choice, an environment of competition, an environment of cost effectiveness that would cause someone to adopt, to want to adopt those services, whether they are a consumer or whether they are a business.

So I think, as many of us have said, creating an environment that is designed to promote and advance the investments necessary to make these services available, the competitive environment that allows these services to be viewed to be valuable by consumers and businesses, I think is what is required to assure that we have an environment of promotion, as opposed to an environment where there is uncertainty, where there is lack of clarity, where there is overregulation that will, in fact, stall the investment decisions, and the adoption that will ultimately occur?

Mr. UPTON. Very good point. Mr. Quigley.

Mr. QUIGLEY. Jim, when I arrived in the U.S. a little more than 5 years ago now, the U.S. was absolutely one of the world leaders in rolling out DSL broadband technologies. What I saw, though, in the subsequent years, is regulatory uncertainty holding that rollout up, and we in fact, I think, as one of my colleagues remarks, slipped down the chain of countries that was deploying broadband. What we see now, more recently, with the outcomes from the broadband unbundling, are much more certainty, and once again, the industry really picking up, in the amount of equipment and new and innovative technologies that are willing to be deployed. So I think there is no doubt in our minds that regulatory uncertainty will hinder the deployment of IP technologies.

Mr. UPTON. Mr. Markey.

Mr. MARKEY. Thank you, Mr. Chairman. You represent the digital telecommunications arms merchants. You sell this technology to companies that are out there deploying in an effort to compete, and you sell to all comers. They want to buy your equipment to get out there and compete, you will be more than willing to sell to them. Could you tell us, and this is a yes or no—I have a second question which will ask, I will ask for longer answers, but this one just a yes or no. Could you tell us whether you support or oppose the ability, with appropriate nondiscriminatory protections, of municipal entities, and municipal utilities, to deploy broadband infrastructure in their communities? Yes or no. Mr. Zander?

Mr. ZANDER. I am going to go first. Can I go last?

Mr. MARKEY. I will let anyone down here who wants to go first. Anyone have a view on that?

Mr. QUIGLEY. Municipal utilities, yes. Yes, we would support—

Mr. MARKEY. You would support—

Mr. QUIGLEY. Municipalities, yes?

Mr. MARKEY. Okay. Thank you.

Mr. JACOBS. It is hard to make a yes or no answer. Because—

Mr. MARKEY. Oh, you got to say yes or no.

Mr. JACOBS. Right. Because there is an economic issue here, and I think that—with—

Mr. MARKEY. Yes.

Mr. JACOBS. [continuing] carriers providing wireless services at an almost all you can eat fixed monthly amount, that makes the competition for a local area—

Mr. MARKEY. No, but if they want to get in—if the municipality wants to get in.

Mr. JACOBS. If the service is being supported already, I don't believe there is a need for the municipality to become involved.

Mr. ZANDER. I will say yes.

Mr. MARKEY. You would say yes, they should be allowed in.

Mr. ZANDER. Yes.

Mr. QUIGLEY. I would perhaps just add one other point, if I could, Congressman Markey. The—in terms of supporting municipalities, providing that it is on an equal and—

Mr. MARKEY. Yes. Absolutely.

Mr. QUIGLEY. [continuing] equitable basis.

Mr. MARKEY. Absolutely.

Mr. QUIGLEY. In other words, not publicly funded, competitive—

Mr. MARKEY. That is right.

Mr. QUIGLEY. Somebody has to come in competitively.

Mr. MARKEY. Precisely. Yes. Mr. Mattes.

Mr. MATTES. I would go a definite maybe on that one. I think if there is a level playing field.

Mr. MARKEY. A level playing field. Assume that.

Mr. MATTES. There might be ways of doing it, but it has to be a level playing field—

Mr. MARKEY. Okay.

Mr. MATTES. [continuing] between the municipalities and the—

Mr. MARKEY. Okay. Assume that level playing field, and Ms. Russo?

Ms. RUSSO. Obviously, there are lots of complexities in this kind of question, including your request for a simple yes/no.

Mr. MARKEY. But assuming all things are equal, there is no discrimination.

Ms. RUSSO. Yes. Assuming everything is equal—

Mr. MARKEY. Yes.

Ms. RUSSO. [continuing] and there is no discrimination, it would be hard to argue you can't provide the service. It is how do you assure everything is equal—

Mr. MARKEY. Right. But—

Ms. RUSSO. [continuing] is really—

Mr. MARKEY. [continuing] if it could be done.

Ms. RUSSO. [continuing] yes, is really the question.

Mr. MARKEY. If it could be done, you would support it. Second question, one of the cornerstones of the Internet is that it is an open architecture network, availing entrepreneurs of opportunity to innovate and to experiment, and extending to consumers the ability to reach the services of their choice, and use the equipment of their

choice. Could each of you please comment on the importance of retaining an open architecture model for our IP broadband future, and the advisability of ensuring that the Internet remains a platform for innovation, in terms of stimulating economic growth and creating jobs? Mr. Zander.

Mr. ZANDER. Well, it is, you know, it is just essential. I think it is what has made this incredible, you know, growth and opportunity, and the whole mobility efforts of the last 10 years, and we as vendors and suppliers, as you mentioned, have an obligation to make sure that the Internet does remain open, that there are published interfaces, that we have the specifications. I mean, the real problem today, in talking to the average consumer, is the complexity we bring to them. And for seamless mobility to work, we need to increase mobility with less effort, and you will know the Internet, I think, really has arrived when it follows you, not when you have to follow it, and I urge all of us, as vendors, and all of you, to help us maintain an open set of interfaces and standards that allow us to build this Internet of the future.

Mr. MARKEY. Thank you. Dr. Jacobs, open architecture.

Mr. JACOBS. That is much easier one, yes.

Mr. MARKEY. Thank you. Mr. Mattes.

Mr. MATTES. Open architecture ensures both creativity as well as competition, and adherence to standards is the only way to go about it.

Mr. MARKEY. Okay. Thank you.

Ms. RUSSO. We support an open architecture, it—for a lot of reasons. It is radically different, by the way, than the architecture of networks of the past, which have been more proprietary. But in an open architectural environment, you can get lots of companies involved in helping to create the services that will enable a broader and richer set of options for consumers and businesses, and should spur economic growth and job development.

Mr. MARKEY. Okay. Thank you. Mr. Quigley.

Mr. QUIGLEY. Yes. Open architectures and general standards have been the cornerstone of being able to provide interoperability across states, across the world. So I think most of us in the industry would absolutely support open architectures, and also support the important area of standards development, such as address takes a lead here in North America.

Mr. MARKEY. Thank you. Thank you, Chairman.

Mr. UPTON. Mr. Barton.

Chairman BARTON. Thank you, Mr. Chairman, and you know I only tease people I like, so I am not—I think you have got a great accent. Don't hold that against me. Which country is No. 1 in the world in terms of broadband penetration?

Ms. RUSSO. Korea.

Mr. MATTES. No. 1 is Korea at this point in time.

Ms. RUSSO. Korea.

Mr. MATTES. No. 2 is Canada, and No. 3 is Denmark.

Chairman BARTON. Denmark.

Mr. MATTES. Followed by countries like Iceland.

Chairman BARTON. Does Argentina have more broadband penetration than the United States?

Mr. MATTES. No, sir.

Chairman BARTON. They don't? See, I thought they did. So why are we so far behind?

Mr. MATTES. That is a question with a lot of answers, but the one thing, if you take a look at those countries, what you will find is, with the exception of Canada, every single country ahead of the United States has a smaller geographic footprint than the United States, and that might be one part of the answer.

Chairman BARTON. So part of it is just our geography.

Mr. MATTES. And maybe the way we deal about it, and the regulation, and the regulatory—

Chairman BARTON. State regulation has no part of it?

Mr. MATTES. It sure does have a part of it.

Chairman BARTON. It has—it does have a part of it.

Mr. MATTES. Absolutely.

Chairman BARTON. So how many of you all think that whatever we do here, if we do anything at all, it ought to have Federal preemption? I saw 2 hands go up, 3, 2 hands went up twice.

Ms. RUSSO. They obviously feel strongly.

Chairman BARTON. I mean, isn't that an automatic, that if we are going to have a model that is forward-based and innovative, you have to preempt the State and local governments in terms of the rollout? I am not talking about access, in terms of geographically going in and putting in the broadband, and those—but just the regulatory model. I mean, how could we get to No. 1, if we don't do that? Does anybody think we should—we shouldn't—

Mr. QUIGLEY. Perhaps I can comment. If—a good example that Andy mentioned was Canada, which is up there, which is also very geographically dispersed. They were running a considerably higher broadband penetration than the U.S. was, and if you look at the difference there, the CITC really focused on facilities-based competition as they regulated broadband. So I think—my view is that facilities-based competition is important, as is preemption at the Federal level, to make sure that the people who are willing to invest don't have to deal with 51 different regulatory bodies as they try and roll out this new technology.

Chairman BARTON. See, I think it is a given that—yes, sir.

Mr. ZANDER. Let me—you know, I think certainly that is part of the answer. I think if you ask why we fell, you know, to number 13, whatever it is right now—in my travels, is—when I go to Korea or China, and I have just been over there, or even Japan or India, you tend to sit down with government official, and there seems to be mandate from the top. There seems to be a program. There seems to be a platform for broadband as well as technology investments, as well as the whole communications area, and there is a program to get this done, and it does involve the regulation. It does involve the Federal mandates, as you pointed out. I just think the U.S. has to really approach this whole idea of broadband and communications, along with education, along with technology investments, as a natural platform. And it concerns me to look, not only at the rollout of broadband, but all the things that go with it, as I mentioned. As I go to these countries, we are falling behind, I believe. And I am very anxious and excited to see what we are talking about here today. It is long overdue, and I think we have to understand the competitive advantage. It is just not about getting

TV to an individual on a phone. It is about competitive advantages for our businesses. It is about competitive advantages for everything we do every day, so this is very, very important, what we are talking about.

Chairman BARTON. Mr. Jacobs, you had something you wanted to say.

Mr. JACOBS. Yes, I think when you were referring to the broadband access, you are probably very focused on the wireline, and that of course has been going up, but there are other countries further ahead. There is also, of course—the world is changing very rapidly—a lot of that broadband access is now going wireless, and your statement about needing Federal rules to cover that, since wireless devices, mobile devices, in fact, can be taken across State lines and often are, I think it is important to have that Federal rules overruling. So I would certainly support that. But the situation is changing rapidly. I think any rules that one comes up with, you have to look ahead to that, at wireless, indeed, and wireless devices becoming very powerful. That, indeed, is going to be a major way in which everybody does access the Internet, and so the world is indeed changing.

Chairman BARTON. Yes, ma'am.

Ms. RUSSO. Yes, I would just punctuate what two of my colleagues have said. First of all, in countries where you see significant investment, there is a governmental priority and initiative and focus on getting that done, and the appropriate mechanisms put in place, depending on the country, to make that happen. So it is deemed to be a priority, and it has been executed that way. With respect to the question about State and Federal purview of responsibility, for all the reasons we talk about the need for change, I think it is very important that the role of State regulation and Federal regulation be examined as part of the work that is being done, because the dramatic changes that have occurred in the technologies, the presence of wireless broadband access in such a huge role, the fact that time, distance, and geography are far less relevant than they have been, I think requires that to be looked at as part of the work of the committee.

Chairman BARTON. Thank you. And thank you, Mr. Chairman.

Mr. UPTON. Mr. Engel.

Mr. ENGEL. Well, thank you very much, Mr. Chairman. Before I begin, I want it duly noted that I am wearing an Upton 2006 button.

Mr. UPTON. It is going to work—

Mr. ENGEL. And I want to know when the hearing is coming to New York, the next field hearing.

Mr. UPTON. I know when it is.

Mr. ENGEL. Okay. Thank you. And Mr. Zander.

Mr. UPTON. June.

Mr. ENGEL. Thank you. Mr.—June—Mr. Zander mentioned traveling all over Korea and China, and since you and I were traveling buddies over in Korea and China not long ago, it is very, very true when we see different governments making an effort, and making it a priority to get in line. Mr. Quigley, you used the words regulatory uncertainty, and I think those are the key words—and I think that—when we are talking about the deployment of IP tech-

nology. I believe that if you take a look at the Telecommunications Act, the first one was 1934, I believe, and we rewrote it in 1996. That is 62 years, and now it is 9 years since 1996, and we can see how things are rapidly changing, that 9 years later, we need to have a rewrite. I happen to believe that we should have a total rewrite of the telecommunications laws. I am wondering what some of your feelings are about a total rewrite, or perhaps a limited rewrite dealing with IP services. Does anybody feel strongly about it one way or another, about what we ought to be doing? Yes.

Mr. QUIGLEY. In response, Congressman, I think—probably if I am—I guess I wouldn't be too far off saying that my colleagues would likely agree with me which—whatever we see, we would like to see it happen relatively quickly, so that we do get the certainty that we need in this domain. If that means that a complete rewrite is going to take a long time, we would probably be less enthusiastic than if we could address the key areas of IP technologies more quickly.

Mr. JACOBS. Let me, perhaps, touch on one aspect, which is, again, has to do with wireless. There is the issue between licensed spectrum and unlicensed spectrum. There is a need for some regulations in order to allow networks to be planned, the investments to be made, to make sure that there is no interference. Those types of requirements, I think, are needed as one rewrites the rules here. One also has to look at, in a little bit more detail, at the kind of services, and there is a range of them, from very wide area coverage, and typically there, one needs to use licensed spectrum to prevent interference, down to local, home, office, campus, and personal, just connecting from a device to a display, a keyboard, whatever. The latter two, the personal area, the local area, don't need regulation. The signals typically don't go very far. It is a rather different situation. The wide area needs to be carefully examined, and I think the regulations and licensing is required there.

Mr. ZANDER. I think there are three things I will say. One is, sense of urgency. I think, as you said, this is long overdue to address these issues, and we have to bear that in mind, that this technology is moving very fast, and the user requirements are also going. Two, I would say that we need to focus on the regulation of IP-enabled services with a light touch. And three is to tear down these regulatory silos of the platforms, including cable, wireline, and wireless. So I think if we focus on those things and start there, I think we will make a lot of progress moving this along pretty quickly.

Mr. MATTES. Let me just give you a little feedback of what many of the service providers are pondering on right now. They are trying to define the business models on how they can provide good service to their customer, and of course, earn good money while they are doing that. And there are some fundamental decisions they all have to take at this point in time. I think the more we give them security, that once they do invest into their new business models that they can reap the benefits of the investment, the better it is for the industry, and the faster we can provide that security and guidance to them, the better. So you might want to—just according to how fast can you provide security for investment decisions.

Mr. ENGEL. You know, it is so obvious to me that we need regulatory parity over different systems of communications. You know, in these regulatorily uncertain times, you know, it quacks like a duck, it walks like a duck, it looks like a duck, but we can't call it a duck. It doesn't make much sense to me at all. I am wondering if I could just slip in one quick question, and that is as Congress is going to require VoIP to be compatible with 911, I would like to know, if anything, what your companies are doing to make your products compatible? Quickly.

Mr. JACOBS. Well, it is a much easier situation in some sense with the wireless phones, because they already have the capability of using the GPS to get a very accurate position location, and then sending that the same way that is currently being done on circuits, which being able to send out over the packet switch as well. So I think we will have—that problem has been worked, needs to continue to have attention paid to it, but I think that that will happen with the mobile devices.

Mr. ZANDER. The technology is there. We just have to go do it.

Ms. RUSSO. Yes. I mean, I would just add that there is a clear recognition on the part of the manufacturers that thing like CALEA, E911, are important elements of networks, regardless of whether they are IP-enabled, that are required to support emergency preparedness, emergency issues, and really, the security of the critical infrastructure. So we are building that into our product plans, both from a hardware and a software standpoint.

Mr. ENGEL. Thank you. Thank you, Mr. Chairman.

Mr. UPTON. Mr. Radanovich.

Mr. RADANOVICH. Thank you, Mr. Chairman. Can I get a sense from anybody who wants to answer this question, in order to kind of build the platform for the changes, I think, that we would like to do in any telecom legislation, would be what would be the benefit to consumers? And on that, I am wondering if you can—is it possible for you to quantify for us the savings to customers of having all the—this communication services and devices converged onto one platform? Can you build a case for how it will help American business or consumers in general?

Mr. MATTES. I think the case can be made, but to give you just a very tangible example, is if we check our pockets today, probably all of us carry 3, 4, 5 different devices for different networks and different environments with us, and I don't think we enjoy checking 5 voice mail box and 5 email boxes, and making sure we are always synced up. The minute that we converge, the interface between the circles that we are in, because we are in a family circle, we are in a company circle, we are in a friend circle, gets so much easier, and you can put real dollar savings to that, if you really want to run the models on that.

Ms. RUSSO. I would add from the consumer standpoint, there is the dimension of what services are made available to enhance their own personal productivity, their own efficiency, their own entertainment, their own education, whatever. So there is an aspect of this around more services, more useful services for consumers. In an environment where, if the consumer has choice, because there is investment going on in the industry for a broad array of services from many different places, then I think you could make a case

that it is good for the consumer, because it enhances, you know, we call them lifestyle services. Right. It enhances their lifestyle. It makes them more efficient. It makes them more productive, providing the portability, the personalization, the customization, that in essence brings the network, really takes the network to them as opposed to them going to the network. So that is the kind of thing that is possible with IP services, and that will happen if investment is incented, and the regulatory environment promotes that.

Mr. RADANOVICH. It is not really—well, it is an issue of dollars, but it is more expressed on convenience and efficiencies, and simplification of the communications, right?

Ms. RUSSO. Yes, but what comes with that, of course, is bundling. So what you are doing—what you are getting from multiple services today can be combined and converged or blended services, and so from a pricing standpoint, much as what we have seen happen in the industry, there is a pricing model that goes along with that that makes it worth what paid for kind of a model.

Mr. ZANDER. Just let us not affect—let us not also forget the enterprises and businesses, what mobile communications can do for companies like myself, I have 66,000 workers, and if you take a look at our workforces today, they are mobile, and to give the ability to have field service people, manufacturing people, office workers, the ability to have their mobile communications with them at all times, to be able to walk seamlessly through environments, whether it is in the office or out in the open, is a tremendous amount of productivity improvements that I can measure to the bottom line today. Also in public safety and our military and our defense, to be able to bring these kind of mobile services improves the ability, you know, improved efficiencies and capabilities in those areas. So this, as far as business and government and public safety, is a great productivity improvement, and as Pat talked about, for the consumer, is an efficiency and ability to access services for convenience for the consumers. So I can actually measure it in my own company as I roll out mobile devices and the cost savings I can see.

Mr. RADANOVICH. Mr. Zander, can you quickly, before my time is out, you had mentioned earlier about the three things that you like to see in reform legislation. Can you give those to me real quick? I missed them.

Mr. ZANDER. Well, the first thing I said was speed, sense of urgency. Being in tech all my life, I just—I look at the rate of technology changes, and I ask that we act with a sense of urgency, which I see here today. Second is to the regulation of IP services, do it with a light touch, and the third, I said, is tear down the regulatory silos of the platforms such as cable, wireline, and wireless. We have to think of this, seamless communications and seamless mobility.

Mr. RADANOVICH. Okay. All right. Thanks very much. Thank you, Mr. Chairman.

Mr. UPTON. Mr. Boucher.

Mr. BOUCHER. Thank you very much, Mr. Chairman, and I want to join with my colleagues in welcoming these distinguished witnesses, and thank each of you for your outstanding and very informative testimony this morning. I was personally pleased to see

the convergence among your views, that the time has arrived for us to legislate a new set of regulatory parameters with respect to IP applications. I think Mr. Stearns, in his opening remarks, may have described the legislation that he and I have put forward, that is designed to achieve that goal. Basically, it follows the outline that most of you have suggested we should pursue this morning. It would declare all Internet applications to be interstate and subject to exclusive Federal jurisdiction. It would then limit the Federal regulatory authority to very narrow areas, E911, disability access, CALEA, law enforcement access, universal service, and appropriate intercarrier compensation.

Third, it would declare that all IP services be neither telecommunications services nor information services, and would break us away from the silos into which all services over the last decade have had to be wedged, and then it would declare that all platforms would receive the same regulatory treatment. That is essentially what our legislation achieves. I have one question that is a very short one for you, and would hope that you could limit this just to a yes or no. Would you agree that our legislation, with regard to IP applications, should be broad in scope, and that it should cover all IP applications, including things such as multi-channel video, which I note that two of the leading telephone companies are now providing over IP, as opposed to simply being a very narrow, targeted statute that only addresses VoIP, and one legislative proposal we have had before us would just address VoIP. So could we get agreement from everyone that the statute should be broad, and should cover all of the advanced Internet applications?

Mr. ZANDER. Yes.

Mr. JACOBS. A very strong yes.

Mr. ZANDER. Yes.

Mr. QUIGLEY. Yes.

Mr. BOUCHER. All right. Any disagreement? No disagreement. I have another subject that I would like to address with you, and I was pleased to hear that Mr. Markey opened the conversation with respect to open architectures. And I was pleased to note your responses, many of which related to the need to have uniform standards and full interoperability. But I think there is another aspect of open architectures that deserves our consideration, and that is this. I strongly think that every platform provider should be required to offer nondiscriminatory treatment, and by that, I mean that someone who is offering a cable modem service or a DSL service or other broadband application should not be permitted in the law to discriminate in favor of his own product being offered across that service. So the cable modem provider should not be able to discriminate in favor of his multi-channel video package offered across the cable modem service to the disadvantage of an independent provider of multi-channel video. And a telephone company, by the same token, offering DSL, should not be able to discriminate in favor of its VoIP product, for example, to the disadvantage of some independent offeror of VoIP.

Can we get agreement that such a provision is appropriate and that this basic nondiscriminatory treatment concept should be a part of the law? Ms. Russo.

Ms. RUSSO. Let me—yeah, let me just say. I don't—this is a complex set of issues, so I would be more than happy to work with you on this, but I would certainly like a little bit more time to understand all of the ramifications before I just blanketly say, you know, yes, I agree.

Mr. BOUCHER. That is fair enough.

Ms. RUSSO. Okay.

Mr. BOUCHER. Would others like to take a more definitive plunge at this point?

Ms. RUSSO. Others willing to do that?

Mr. BOUCHER. Mr. Quigley.

Mr. QUIGLEY. I would absolutely support what Pat said. This is a very complex area. I think all of us, I certainly—I would like to take a little more time and give you a considered answer.

Mr. BOUCHER. Okay. Thank you. Anyone else?

Mr. JACOBS. Well, in some sense, you are talking about a level playing field and allowing competition to occur. I think the more competition, the better benefits for both consumers and businesses. So in that sense, yes. As one gets into the details of what exactly is being controlled or made equally available, then it takes some very careful wording on that. But for example, the equal access to different content over the different media I think is very important.

Mr. BOUCHER. I mean, I see this as really a pretty simple proposition. What we are basically saying through this kind of non-discriminatory treatment requirement is that someone that offers a broadband platform has got to let the customer of that broadband service go to any website he wants, and have total, unrestricted access to whatever that particular website might offer. And to allow anything less than that I think really runs the risk of broad interference with the functionality of the Internet. Now, phrased in that way, do I get a different answer? No? All right. Well, thank you all very much. This has been a helpful conversation. On reflection, if you would like to submit some additional comments answering that particular question, I would be very interested in reading your answers.

Thank you, Mr. Chairman.

Mr. UPTON. Thank you. Mr. Ferguson.

Mr. FERGUSON. Thank you, Mr. Chairman. Again, I want to welcome the panel, and appreciate your comments this morning, and your insights, as we look at a really huge task. And again, I wanted to talk to Pat Russo a little bit, not only because Lucent, of course, is headquartered in my district in New Jersey, but the storied Bell Labs facility that is so much a part of Lucent, so many of the technologies that we are talking about, and that we are dealing with the complexities of, as we look toward writing this legislation, really come from—have come out of Bell Labs, and it is something that we are not only very proud of in New Jersey, but something that I think is a huge benefit to people as we now see, literally around the world.

With these new technologies, of course, come great complexities, and they are, in some ways, fraught with peril. We have, because of the increased ability to share information and data, and services along with these technologies, come obviously potential problems, potential fraud, theft, security-related issues. And I wanted to ask

Ms. Russo if you would, perhaps, comment on—because Bell Labs and Lucent have really been at the forefront of so many of these technologies that we are now enjoying and are able to employ, if you could talk a little bit about what some kind of security risks or security issues that we deal with. As we deal with these great new technologies, they have to be, I would—I got to believe—coupled with similar advances in security technology. Can you talk a little bit about that, as it relates to your work in the company?

Ms. RUSSO. Yes. I think the observations and the comments that you make are absolutely right on. Bell Labs has a history in building security in, and reliability into networks traditionally, and it is an area of very high priority for us, from an advanced technology standpoint. In addition to the work going on, not only in Bell Labs, but in, I am sure, many other companies around security for these next generation networks, there is also a lot of work in the industry going on that I would just make the committee aware of. The National Security Telecommunications Advisory Committee, where I serve as vice chair, has taken a major task to look at security requirements associated with next generation networks. You should hear that as IP-enabled networks. There is a lot of very good work going on by a taskforce of the industry in that regard.

At the second—additionally, the National Reliability Council, NRIC, is another body that is adopting initiatives around security for IP networks. So there is a lot that is going on. There is a lot more to do, but I think all of us in the industry share the sense of urgency about what is different in these next generation networks, and what has to be cared for from a security standpoint. There is a lot of investment going into it, and there is a lot of industry work going on.

Mr. FERGUSON. Well, I appreciate that. And it is—I just want to reiterate my concern and interest in this particular issue. We are all excited about and thrilled and awed by the technologies that are available today. And frankly, that will continue to be developed and made available, need to be made more available to Americans and people around the world. And we are, I think, unanimous, I would imagine, in our desire to expand accessibility and availability of these technologies, of creating a marketplace where companies can compete and offer these services and these technologies to people. Because there is, you literally can't quantify the good that can be done.

Ms. RUSSO. Absolutely.

Mr. FERGUSON. To build the economy, to build quality of life for people. But as I say, we need to make sure that we always keep in mind the security of these technologies, because with more and more information and data and whatnot being, you know, traveling around and being able to be shared more easily, we need to make sure that bad actors aren't empowered by, perhaps, an oversight in some way of security issues. Did you want to add something to that? I am sorry.

Ms. RUSSO. No. Oh. Go ahead.

Mr. FERGUSON. Mr. Mattes.

Mr. MATTES. If you talk about security, you actually want to look at it from two ways. The one way is how to keep the bad guys out, that is, all the firewalls and everything that we are working on.

The other one, which will be equally as important, is let the good guys in. As we are in such a mobile environment, once I hook up to such a network, what am I allowed to do so? And as companies become more and more open ecosystems, with subcontractors—take the automotive industry, you don't even notice where the car seat manufacturer stops and the car manufacturer starts. Who is allowed to do what if you are part of an extranet, or a mobile workforce? And those are the two flip sides of security, and both will drive the deployment of such technology as we embrace better solutions.

Mr. FERGUSON. Well, I—just to close, I would look forward to continuing to work with all of you. We certainly appreciate your willingness to be here today, and to share your expertise with us, and we are going to need your continued expertise as we work on this bill.

Thank you, Mr. Chairman.

Mr. UPTON. Thank you, Mr. Wynn.

Mr. WYNN. Thank you, Mr. Chairman. I would like to thank all of the panel members for opening up, or giving us a vision of what the new world is going to look like. Let me ask just a couple of quick questions.

I believe, Ms. Russo, I heard you make a remark that we need to have equal treatment for the same services. I also believe, Mr. Mattes, that you were saying something along the same line. In view of that, do you believe we ought to consider a more functional approach to regulation, more along the European model, so that regardless of the industry, if you do this service, this is how you are regulated by this branch of the FCC, or this section of the FCC, as opposed to what we are doing now, which seems to focus more on what you call yourself? Ms. Russo, and then, Mr. Mattes.

Ms. RUSSO. Yes. My point was to suggest that in an environment where services are becoming increasingly IP-enabled, voice, for example, is an application that is a set of bitstreams that runs over the same network as data, text, et cetera. And it gets provided from—in many ways. So the point I was trying to make is that certainly, looking at what is the service, and consideration should be given for treating services the same, regardless of who is providing them, and if—and so, you know, it is—

Mr. WYNN. Is that kind of a yes?

Ms. RUSSO. Yes, conceptual. Yes.

Mr. WYNN. To functional regulation?

Ms. RUSSO. Yes.

Mr. WYNN. Okay. Mr. Mattes. Am I pronouncing your name right?

Mr. MATTES. Yes, sir. Absolutely. It should be more functional. The one thing I would like to add to it is if you compare different levels of regulation, what you might want to consider is going to the lowest level of regulation if you compare those functions, rather than the opposite.

Mr. WYNN. You have got to get that in. I—

Ms. RUSSO. Yes.

Mr. WYNN. I understand.

Ms. RUSSO. It is an important point.

Mr. WYNN. Okay. Ms. Russo, you said that we ought to probably look at eliminating some regulations. Could you give us an example, or a couple of examples, of things that you—regulations that currently exist that you think are impeding the development of these IP services?

Ms. RUSSO. Yes. I was suggesting that as the committee looks at the Act and the changes that are necessary with respect to the Act, thought should be given to are there areas where regulation exists today, where it will no longer be necessary as these technologies roll out.

Mr. WYNN. Any specifics at this point? Well, I will tell you what. Perhaps I can follow up, send you something, a question—

Ms. RUSSO. Yes.

Mr. WYNN. [continuing] in writing, and if you could provide us with that.

Ms. RUSSO. I would like to do that.

Mr. WYNN. That would be helpful. Let us see. Mr. Quigley, you were talking about facilities-based competition as one way to increase our broadband penetration. Can you talk about that a little bit more? How would we promote this facilities-based competition?

Mr. QUIGLEY. It is—Congressman, when I was mentioning facilities-based competition, it was an observation of what I have seen, for example, in Canada, which we supply a lot of technology to. And there, there was no reluctance on the part of our customers, the people who build, end up building networks, to invest, provided they realized they were competing with people who were also making investments, on an even basis. There is more trouble—we had more trouble in the U.S., where there was, frankly, people arbitraging investments that others were making. That is the type of area in which people shy away a little bit from making big investments. If you are not sure, you have got to, then, make those facilities available to others who are not making equivalent investments. And I think it is very important in the regulation that we try and make sure it is evenhanded. Everybody has to invest equally.

Mr. WYNN. Thank you. I agree with that. Dr. Jacobs, you were talking about the need for more spectrum, and you commented on licensed and unlicensed. Would you give me your position on the role of unlicensed spectrum?

Mr. JACOBS. Yes, I think unlicensed spectrum has been very valuable in providing for personal area and local area networks. That is, again, the ability to have hotspots within your home, within your campus, at certain areas where there might not otherwise be coverage. Those can be unlicensed because they don't cover much of an area, and therefore, the possibilities of interference are much more limited.

The wide area, that is, systems that cover very large areas and provide the services over very large areas, there, you have the opportunity for interference to come in, in fact, come and go, and therefore, be very difficult to react to that interference. And so there, I think, it is very important to have licensed spectrum.

Mr. WYNN. Can you give me some sort of geographical parameter for what you would consider to be an appropriate zone for unlicensed spectrum?

Mr. JACOBS. I don't think there is any very specific number, but something in the order of perhaps several hundred feet. The use—I can do it somewhat technically. The use of very high frequencies automatically means that the signals get weaker as they go out further, and so if you go to unlicensed in the 2 or 3 gigahertz and higher frequency bands, then you tend to not run into a problem. One difficulty with giving a specific radius is radio waves don't necessarily behave too well. You can't confine them. And so again, it is—the purpose is supporting just local or personal uses, and versus just trying to cover a very wide area with a service.

Mr. WYNN. Okay. Thank you very much. Thank you, Mr. Chairman.

Mr. UPTON. Thank you. Ms. Blackburn.

Ms. BLACKBURN. Thank you, Mr. Chairman, and I want to say thank you to each of you on the panel, for being here today. I have certainly enjoyed listening to your comments. And this past weekend, I had the opportunity to spend some time with my Screaming Eagles out of Fort Campbell, the Daring 101st, down at Fort Polk, Louisiana. They are getting ready to redeploy to Iraq, and had the opportunity to look at some of the things they are doing with some of the VoIP technology, and talk about some of the successes, talk about some of the problems. So I enjoyed hearing what you had to say about an open architecture and convergence in a single platform, because some of the problems we have in those protocols is data conversion, being able, where those—the generation in which we are right now with those protocols, being able to transfer some of that data. So I appreciate the work that you all are doing.

I have got a couple of different questions. One pertains to your bottom line, one is going to pertain to your structure. So let us talk to the bottom line first, and I tell you. I think it is very difficult to be working off of a piece of legislation, probably for you all 9 years old, the mindset, or the attitudes that went into building that are probably 10, 12 years old. And you are dealing with the technology that has a life cycle of about 2 years, and then you are on to something new. So we know that environment can be very difficult. And you all have talked a little bit today about what you are investing in R&D. We have talked some about regulation, taxation, the impact that that has on how you do your job, and the type of investments that you are able to make into your job. And Ms. Russo, you talked a little bit, touched on, just barely touched on tax incentives on R&D.

What I would like to hear from each of you is what percentage of your annual budget are you spending meeting the burden of regulation and taxation in the U.S., and what percentage of your budget—I think Mr. Quigley is the only one who stated it at 20 percent for them, but what percentage are you spending on R&D, and as we move forward into a different environment, or into the next generation where you are using an open architecture, or a converged platform, what type savings would you visualize the American consumer receiving? And if anyone would like to start. If you have that with you, great. If not, if you want to submit that to me later, that would be—that is fine, too. Anyone who would like to answer first, go ahead.

Mr. JACOBS. First of all, with the very rapidly changing industry, one needs to be investing in R&D. You need to continue to do that, even when the industry slows down a bit, because you know that over time, it is going to be growing. We have been continuing to increase our R&D. We are pretty much limited often by the availability of trained people, and so this issue of making sure our universities are producing more—K-12 is doing a better job, all of that becomes quite important. But R&D expenses are between 15 and 20 percent of revenues, probably now getting close to the 20 percent point.

With regard to the savings to consumers, I think we are going to converge devices. Just we do carry a device with us at all times, a telephone, but now, it does many other things, and because of the increased power, it is just going to handle most tasks that we are quite interested in having with us at all times. There, the question of making sure there is competition, that there is ability to buy services from different operators, will guarantee that the consumer and businesses do get a very good pricing for those services. So competition, maintaining competition, I think, is very critical.

Ms. BLACKBURN. Ms. Russo.

Ms. RUSSO. Yes.

Ms. BLACKBURN. Would you like to respond?

Ms. RUSSO. I will provide some answers, and then what I miss, we can forward to you. First of all, in terms of R&D, we are in the 16, 17 percent range of R&D as a percent of revenue, even through the downturn, the dramatic downturn in the industry, we reserved investment in pure research. As Dr. Jacobs noted, you have got to continue to invest in the technologies that are going to make a difference down the road, and we have done that.

With respect to percent of budget—percent of revenue associated with regulation, I would argue that, you know, we tend to be spending more associated with—not telecom-related regulation, but things like Sarbanes-Oxley, et cetera, and so obviously, we are making investments, as are all companies in that regard. The regulatory investment, or lack thereof, or effect, if you will, associated with us as a communications supplier, tends to be a relatively small percentage of folks who we have who have to stay on top of the regulation, interact here in Washington. Obviously, that is an investment that we make. The other side of the effect of regulation is what we have commented on, which is when there is lack of clarity, it really stalls investment. And the industry has obviously been affected by that over the last couple of years, and that has more of effect than actually spending on regulation in the kind of companies that we have.

Ms. BLACKBURN. Okay. Mr. Zander.

Mr. ZANDER. The question on R&D spending, we spend about \$3.5 to—or more billion dollars in R&D every year. About 11 percent of our budget. It is quite a sizable all around—seamless mobility in communications. We, too, have maintained that R&D spending levels throughout the last few years of the downturn, and continue to think that it is probably the most—single most important thing we focus on inside of Motorola, how we are deploying our R&D assets.

In terms of the consumer savings, I think there is the savings about the converged devices, but I always like to approach it from the productivity increases for both consumers and businesses of what we are providing. I think there is more of an upside to productivity than it is necessarily on cost savings. But—and that is somewhat, at times, hard to measure, but I think in corporations, we begin to see with mobile communications and mobile devices, the kind of dollars we can save, but more importantly, the productivity increases through our employees and our business processes.

Ms. BLACKBURN. Thank you. Mr. Quigley, go ahead.

Mr. QUIGLEY. Yes. If I could, perhaps, just add to what Pat has said, emphasize that point again, in terms of what is the cost of regulations to us. So we will certainly provide the information on the internal costs, but the point that Pat made, that the—it is very difficult to make a profit if you don't have a top line. And the top line is what is constrained if our customers aren't willing to invest, and that is why regulatory certainty, again, is so important to all of us in the industry.

Ms. BLACKBURN. Thank you. Mr. Mattes.

Mr. MATTES. Siemens spends about \$6 billion in R&D every year, but the one thing, it is not just the number that you are looking into. You also need to look into where you spend the R&D dollars. R&D is now also becoming a global industry, and I think we have got a second challenge to tackle here. It is not just about spending the money, but making certain that we have the innovation in a country like the United States, because if you just compare cost per engineer, you will find yourself in a very tough environment. So we need to foster an environment where we have creativity and innovation to make certain that we do have R&D spent in the Western world.

Ms. BLACKBURN. Thank you. I appreciate that. One question pertaining to structure. I am, like most folks, have read plenty of media reports that say several of the companies, some of you at the table even, are looking to merge or acquire one another during the coming year, and when we look at reauthorization of the Telecom Act, should we continue prohibitions on certain types of companies from merging, or should we end them? Any comment? Thank you. Thank you, Mr. Chairman.

Mr. UPTON. Time had expired, right? Mr. Inslee.

Mr. INSLEE. Thank you, Mr. Chairman. My name is Jay Inslee. I am up from the Seattle neck of the woods, and I just want to thank you and your industry for providing American cities' citizens to chew out their Congressmen in real time from virtually any place on the planet. It really is—we appreciate that, and it is put to good use. But I do—I am serious about that. I just want to say thanks a little bit about the incredible creativity of your industry. It is really amazing. It is stunning for us who learn about it, and I hope you will give some thanks to your creative geniuses that you are putting to work.

I want to ask you a question sort of dovetailing what Mr. Boucher was asking about regulatory aspects of exclusivity of certain technologies hooked up to certain other technologies. I was out at Microsoft the other day. I have got half their campus in my district, and I was talking to the people who developed the IPTV system

that is reaching some success with SBC now, and Verizon, which shows you investments take time sometime. It is working out finally. But one of their pleas were whatever you do, make sure that you don't stifle creativity. Make sure you don't create off-limits zones that would prevent anybody from really creating a new box or technology that, if had access to bits, can do some good stuff. So instinct is to make sure that we allow everybody access, of new technology, to get access to those bits one way or another, to do good things with those bits. On the other hand, there is an instinct to want to preserve an investment, and this other argument, that you ought to be able to control your own end of your wires, so to speak, and I am just trying to figure out a way to sort of, as a model of how to think of this, one way I have thought about it is sort of distinguishing transmission from manipulation, if you will, and sort of looking at it in those terms. Transmission ought to be freed access to either end, if you will, for new technologies, but manipulation, perhaps you could have exclusivity, if you will. Can you just suggest sort of a model, how we should sort of think about this? It is not the most intuitive thing. That is a free fire zone, for anyone who wants to tackle that.

Mr. JACOBS. Well, it is a difficult area, because, for example, in the case of wireless operators, they want to have some exclusive services that they can offer to attract users to their particular system. On the other hand, you don't want to have a walled garden where their users can't get out and access the Internet elsewhere. I think much of that gets handled by the competitive issues. If you are unhappy with what your current carrier is allowing you to do, there are other carriers. So having competition, I think then forces companies to support the things that consumers and companies do need.

So for example, number portability turned out, I think, to be a very good aspect in allowing both companies and individuals to move from one user to another. Aspects that support competition are important. There will, however, also be common services. I mentioned earlier that we are working with operators and content providers to support video, many channels of video and audio over one of the UHF TV channels, 55, to cell phones. That would be operating in conjunction with operators, where they would take some of the stream that was common, but then be able to offer very particular services themselves. I think it is important to be able to get the full content available over a common channel, though. And so it is always going to be a bit of a balancing act. Competition, I think, is the key to making sure that consumers can get what they need.

Mr. INSLEE. So in that scenario you just posed, is there a regulatory aspect of that to make sure that can occur?

Mr. JACOBS. There could be issues with being able to provide content to cell phones. That, I think, will turn out to be very positive, in the sense that just getting access for content providers to be able to provide many more consumers looking at their content in a variety of ways. I think that that will cause support from the industry. But it is quite possible that broadcast might say no, this is my territory, et cetera, et cetera. So regulations can come into this.

Mr. INSLEE. Anyone else want to take a crack?

Mr. MATTES. I think you want to differentiate between access, what you call transmission, and then content, on the access side, and then, the transmission side, you need open systems and open standards to provide that seamless communication and this ubiquitous approach to companies and end users. The minute you go into content, if you want to—you gave IPTV as an example, if you would want to download a video, apparently, the people that make the video want to make sure that it is downloaded to you and not you and all of the State of Washington. So there, you—the minute you get into content, you start having different models than when you talk about access and control.

Ms. RUSSO. Yes. I would offer—all the things we are talking about today have levels of complexity that are considerable. I would—rather than trying to respond with a model suggestion, I would rather get back to you with some thoughts about that after really spending some time thinking through it.

Mr. INSLEE. I very much appreciate that. I am a new member of this committee willing to be taught, so we are looking for good ideas in any form. Thank you very much.

Mr. UPTON. Thank you. Mr. Walden.

Mr. WALDEN. Thank you, Mr. Chairman. In Ms. Russo's statement, I believe you said the act was developed in a voice-centric environment, where time, distance, and geographic boundaries drove the market. Does anyone disagree with that statement? You are all on the same place. And then, I think you went on to say there is a discontinuity between the legacy of the Act, and where the industry and market are today. Does everybody agree with that as well? What happens in—I represent a very rural district, on the other—well, he is in Washington, but I am on the eastern side of Oregon, and I guess I am concerned about some of the issues relative to the Universal Service Fund, and if phone gets shifted over into IP, what happens to support that? What happens for 911 communication? I know others have asked that, and I would be curious to get more comments from you on those two topics, and then, the third is just this sort of the legacy companies, and how they are regulated. It strikes me that in telecom policy, we create a new set of regulations or not as each new technology emerges, and then, we wait 4 or 5, 6, 10 years, and we review all that. And meanwhile, you have got economic models and systems built on one set of rules, to develop or deliver, let us say, phone, and the next group is doing cable TV, but pretty soon, they are into phone, and you know, where we have the Internet, where it can do it all. Would you take the regulation off of everybody who wants to deliver what can be delivered over the Internet? Where do we regulate and how, I guess? And so Universal Service Fund, if each of you could address that, what you think, if any, is necessary. And then—so we can serve rural areas. And then, these other topics. Mr. Zander, could we just start with you, and give us your best?

Mr. ZANDER. I think, certainly any system that promotes universal telecommunications and broadband services would help to make our vision of seamless mobility a reality. So we certainly fully support that. I do think the—and we talked earlier about developing countries that we visit, and the growth of mobile communications is just that, to help those rural communities, that we can

bring these services much quicker than the conventional way of past, of putting in telephone poles and all of that infrastructure. And I think the E911, I think all of the other potential issues can be incorporated, or are being incorporated, actually, and you know, we have today GPS on these devices, and we have E911 in these devices, so that we can reach to rural areas much quicker. So I see the vision of seamless mobility to be inclusive overall. In fact, a faster adoption rate in getting many of your customers the kinds of services that are enjoyed by the inner cities, for example.

Mr. WALDEN. All right. Dr. Jacobs.

Mr. JACOBS. Yes. I think when one was talking just wired communications, then subsidy is some way of being able to help finance it in rural areas was critical, because the cost per subscriber was much higher.

Mr. WALDEN. Exactly.

Mr. JACOBS. With wireless, that equation has changed tremendously, as Mr. Zander points out. You are able to put up a tower and cover very broad areas. Again, I was just in India. They are building the towers to every one of the villages. Right now, doing without government subsidy, doing it with private companies, although they are talking about subsidies, then, for supporting educational services, et cetera. And so I think the needs are changing. The technology has allowed rural service to be provided with a whole variety of capabilities, the broadband as well as the voice capability. It is important, I think, therefore, to—rather than trying to provide taxes to pay for this service, to allow the services to spread and take advantage of the technology.

Mr. WALDEN. Yes, there is parts of my district where there is one customer for every 9 miles of wire. So that is an economic model that gets difficult to maintain in a wired environment. Mr. Mattes.

Mr. MATTES. Well, Siemens does support the Universal Services Program. However, we also believe that it probably needs some revisiting, and the focus should be more on how do you deploy next gen networks, whether they are wired or wireless, whatever is suitable for the respective area, at a much more rapid pace than we are doing today. Maybe one of the examples that you want to look at where this would be extremely beneficial for the end user, would be the whole digital hospital environment. We have that type of environment all through the Americas, and not just in metropolitan areas.

Ms. RUSSO. Yes, I would just echo, really, what my colleagues have said. I think the—I think it is important to revisit what was the original purpose of the Universal Fund? Is that still legitimate? I mean, certainly, there are legitimate requirements to cover rural areas, and—with availability and affordability. I think the point made about wireless technologies today not having been available when it was first created, create a whole different paradigm. We see that in countries like India, China, and many other areas where wired networks aren't being built. So I think there is a technology dimension to it. There is a revisiting of what problem are we trying to solve, and what possibilities exist with these next generation services, to really enhance productivity and efficiency in education, healthcare, in the rural areas. And so the point I would make is I think while the Act is being relooked, really folding this

in, in terms of clarity around what problem are we trying to solve, and how best can we solve it, because there are legitimate requirements, has to be a factor. I would agree with you.

Mr. QUIGLEY. I would just support what Pat has said. And Congressman Walden, we would be happy to provide an input on the Universal Service Fund. It is a very complex area, as we have seen, to a broadband world. On the other two questions asked, on E911, I think we all recognize the industry has to solve that problem working through the standards bodies. And on your third question, do we need some type of regulatory framework as we move forward into this new world, I think the first thing I would certainly recommend we see is confirming the orders that have taken place just recently from the FCC, to have them codified into any change to the Act. Once again, it comes back to making sure we are not making radical changes as we move forward. The industry has now got a base. It is moving forward. It is making investment. It is developing products and services. We would like that to continue, and I think certainly, there is a real need to have a—some Federal jurisdiction to make sure we do have preemption, so that we are not dealing with a vast array of different regulations as we go State by State, or district by district.

Mr. WALDEN. Then I guess my final question for each of you, how do we deal with consumer complaints in an unregulated environment? I see it in my own business, when we deal with providers of broadband and elsewhere, other services, and I hear this argument back here, the one you have made, and I am, as a businessperson, somewhat sympathetic to it, and yet, I don't see the FCC as having the capability to deal with the many consumer complaints that are, frankly, very legitimate, on bandwidth and capacity and connection and I mean, you all probably have never suffered it, but some of us have tried to do plug and play with multiple vendors, and it is always the other vendor not on the phone that is causing the problem. And it is hard to get a solution, and how do we address that?

Mr. QUIGLEY. If I could just comment on the point on the states. I think there is absolutely a key role for the states to play, the State regulators to play in that area of making sure quality is provided to consumers, consumer complaint areas, that there is no doubt, within the framework of an overall set of rules, set on a Federal level, there is absolutely a place for the states to play a role.

Mr. WALDEN. All right. Thank you. Anyone else want to take a crack before the gavel drops? Thank you.

Mr. UPTON. Mr. Bass.

Mr. BASS. Thank you, Mr. Chairman. Mr. Chairman, you and I had a chance, a couple of years ago, to tour a police precinct headquarters in Chicago, which Motorola was involved in a pilot project to provide real time communication between officers on the street, in vehicles, and it required a considerable amount of bandwidth in the upper 700 megahertz area. I was wondering whether or not you, Mr. Zander, could comment on Motorola's position relative to a hard date for DTV transfer, which obviously, I know what the answer to that is, and the other representatives here today, what your position is on that issue. In other words, I threw a softball.

Mr. ZANDER. Thanks. I needed one today. Well, you know how we feel, we think is vital that a certain date be established, as close as possible to the December 31, 2006. The spectrum recovered will be used for the next generation of public safety equipment and services providing for the safety and security of our citizens. And also will be available to—for commercial services. So we fully support that, and urge that we get close to that December 31 date, as soon as possible.

Mr. BASS. Anybody else want to comment? You don't have to, but—

Mr. JACOBS. I also support that very strongly, including the December 31, 2006 date, if we can get there. That spectrum is, indeed, very valuable. There are more and more services that one wishes to provide support, and having that available in a known time period, without having to go through very lengthy periods to clean the spectrum, that would be very helpful.

Mr. BASS. And does anybody else have any other—

Ms. RUSSO. No.

Mr. BASS. Anything else to add to that?

Ms. RUSSO. Support that.

Mr. BASS. Okay. Mr.—the record can show, it looks like the whole team here supports that hard date. Mr. Mattes, you made a reference to e-medicine. I was wondering if you could be a little bit more specific, and talk about the interaction of hospital services and the Internet, and how that might work in a real life situation.

Mr. MATTES. Well, there are two things that you can basically look at. The one is that a hospital is no longer confined to a physical building, but you can basically have outpatients being serviced at the same rate of expertise that you can have people in a traditional hospital.

The second thing, if you just imagine if a doctor is walking through a hospital, and has some form of a PDA with him in an IP environment, you would get the patient's records, all the information that you need about that individual, as well as all of your communication opportunities at the same time. Let us say something is happening to that individual, you would know automatically who in an emergency room or a specialist type of person, who is on duty, where they are, where are they located in the building, how long would it take them to get there, those type of services. And I believe it is going to propel the whole hospital environment into a much more cost effective, but at the same token, much more user friendly type of environment.

Mr. BASS. Is it going to take any kind of special legislative initiative to achieve that goal, or—

Mr. MATTES. It is actually already happening right now. There is hospitals out there that are doing this, at this point in time, and the market is driving it.

Mr. BASS. Ms. Russo, you want to—

Ms. RUSSO. Yes. I would just support that with the real service that we have been involved in supporting for visiting nurses, where through broadband wireless access, which enables the bandwidth, to download patient data from the home, images when appropriate, so to Andy's point, these are, you know, some of these services are

in place today as a result of the broadband technologies that are available.

Mr. BASS. Dr. Jacobs.

Mr. JACOBS. Yes. We talked about convergence, but one additional convergence does have to do with medical aspects. For example, the phone that we carry with us, very powerful computer, display, communications. There are now devices that plug in, for example, one of them has to do with a sensor that you can put a little drop of blood on. It senses the blood sugar, provides information, then, through the program that is downloaded to the phone about whether you need to take action, if there is an emergency, to send that back. Another service that we are supporting has to do with connecting the phone to a heart monitor, making sure that that information is then sent back. If they are doing the filtering, so you don't just send back lots of information.

Mr. BASS. I just want to make sure—

Mr. JACOBS. Responding to that.

Mr. BASS. Before my time expires, there are no telecom issues, legislative issues, that are directly associated with e-medicine, that you think need to be addressed. If not, that is fine. I am—all right.

Mr. MATTES. Actually, if you take a look at it, the United States probably has a competitive edge, if you compare to some of the legislation that you have in Europe with the hospital environments regulated.

Mr. BASS. Thank you. I yield back, Mr. Chairman.

Mr. UPTON. Thank you. Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman, and thanks to the panel for their patience. And I know Mr. Engel mentioned the 911 issue, and there is great challenges, and I just want to encourage us to keep focused on that, because it is going to be critical, and I—while I have a few—a little bit of time, I want to ask Dr. Jacobs a question on reverse 911 issues, homeland security concerns. There is great promise. I know that you can help us explain the media flow network, and I want to give you the opportunity to do that.

Mr. JACOBS. The—first of all, we were kind of pioneers in allowing cell phones to have GPS but at very low cost, so that the phone actually receives from the GPS satellites the location information, but because it is a cell phone that has a radio link, one has additional information about time, frequency, rough location, you can actually integrate that satellite signal longer, in particular, get position where before it was not possible. And so indeed, we therefore are able, I think, to provide very good services as the PSAPs become, now, equipped to handle this information, very good services to public safety, to first responders, et cetera. I think that is going to be a key use of this mobile communication capability.

Mr. SHIMKUS. For my colleagues who are new to the committee, and the premise of reverse 911 is when there is an emergency, whether that is at a refinery, or—and you can calculate downwind characteristics, you can—in theory, you can in essence call all the cell phones in the downwind direction of the cloud, and give them specific directions as to which way to move out of the harmful path, and those of us on the E911 Caucus are—I mean, I speak on this a lot. I am glad to see that we have the capability, and we are mov-

ing in that direction, because from all the security aspects, it is another way why a deregulated market that is trying to meet the needs of the consumers turns around new products and services quicker and faster, and I would concur with a lot of the comments that have been made, that we want less regulation, not more, if we want to continue in this path of being world innovators. And Mr. Chairman—

Mr. JACOBS. Right. On the regulation side, there is an issue there because of privacy, and we are all aware of the fact that it is important that you can control who knows where you are. When you dial 911, automatically, in a sense, you give them permission for that location to be transmitted. The problem with this reverse E911, being able to send out information to a group, is you would need their permission to receive certain types of emergency information, and let their locations be calculated, in order to do so properly. And so there may be some regulatory issue here having to do with the privacy aspects of that.

Mr. SHIMKUS. Or a Good Samaritan clause, to the extent that says you are going to be held harmless for doing that for public safety or individual safety concerns. And Mr. Chairman, I think that is a great thing to address, and I am glad you made those comments, because that is what we are here, to try to help reconcile the legislative concerns to make that possible. Thank you, Mr. Chairman. I yield back.

Mr. UPTON. Thank you. Mr. Pickering.

Mr. PICKERING. Thank you, Mr. Chairman. I thank you for holding this hearing and getting us started as we go on the path of reform. All right. Let me—Mr. Mattes, let me ask a question. An issue that was raised last week in the Rural Telecommunications Caucus, and that has come to my attention, is that in many of our rural areas, we have now wireless broadband networks, but it seems that there is an issue as to access, or being able to purchase from equipment manufacturers the digital devices, Blackberry like devices. And so my question to you, why is that, one? Or two, let us just say a company from Mississippi called you, independent wireless company, wanted to buy your device. What would you tell them?

Mr. MATTES. Honestly, I am not sure whether I understand the first part of the question.

Mr. PICKERING. The question is, from what I am hearing, independent wireless companies, not the large national carriers, but rural-based wireless companies, that are serving a lot of, for example, in Mississippi, one of these companies probably serves about 40 percent of the Mississippi subscribers, around 400,000 people. Now, they have advanced networks. So it is not an issue of deploying networks. But they cannot purchase the Blackberries or the devices to be able to then use the full range of services that come with the devices. So that creates a problem with consumer choice and competition. It is not an issue of networks. It is an issue of access to devices. What is the problem, and what is the solution?

Mr. MATTES. As an industry, I think the industry would be happy to serve just about anybody. The majority of the devices in this country are being sold through providers at this point in time. In order to get a specific answer, you need to look, really match the

type of network, the type of standard that you have, and the type of device that these companies are looking at, and whether that type of device is available on that type of network, and——

Mr. PICKERING. Okay. Let us say that it is compatible with Siemens. It is—their network is compatible with Siemens devices. If they called you, would you sell to them?

Mr. MATTES. Sure.

Mr. PICKERING. Anybody else?

Mr. JACOBS. You know, I think the problem——

Mr. PICKERING. You sell down that—I mean, is it a supply issue? Can you manufacture enough? Do you need to have a new manufacturing facility in Mississippi?

Mr. JACOBS. I think the problem that you are probably encountering is that as you manufacture these devices, you provide software that may be very specific to a particular carrier. That causes the manufacturer to say well, that is only a few sales, another one is many more sales, therefore, I will focus on the much larger carrier. And that reduces it. Technology is coming to the rescue there.

Mr. PICKERING. Now——

Mr. JACOBS. Technology is coming to the—I am sorry.

Mr. PICKERING. I will say that there is a group of independent wireless carriers that are forming a co-op, whether they can purchase in volume and in bulk. And again, I would hope that, because this is a real issue in states like mine, that you all would work with all companies to find a way to sell the devices, because not only do you need the networks, we need your devices.

Mr. JACOBS. Yes. Let me just add that the technology is coming to the rescue there, because you can manufacture essentially a basic device, and then download the software to it that particularizes it to a given carrier, to a given set of functions that that carrier wants to provide. If you can do that after you have done the manufacture and initial testing, the cost of doing that individualization is very low. That is where we are all going. We are going there very rapidly.

Mr. PICKERING. Thank you very much. Mr. Boucher is no longer, and so if you all feel free to say that you prefer my legislation to his, you can go ahead and do that. But let me just say something real quickly as we get into the larger subject of reform. I think that there is consensus on preemption across—that we need on wireless, and on IP, to preempt, it needs to be a Federal. There are issues of video entry that also need to be looked at, as to whether we should preempt, at the city and the franchising, and at the State level. But I think that those are probably critical issues that we can find consensus on.

The more difficult things Mr. Boucher got into, as far as access to networks. Now, the subcommittee chairman, Mr. Upton, said he wanted to get to deregulatory parity. I agree with him. The line of questioning of Mr. Boucher was actually increasing regulations and perpetuating regulations at a higher level on both Bell companies and cable companies. I think our objective should be deregulatory parity, but that does not mean regulatory parity. And let me just quickly, Mr. Chairman, if I could just have a minute.

On regulatory parity, it sounds good, but as—any of you are parents. I have five children. Now, I regulate all five of mine dif-

ferently. One is 15 and the other is 6. Depending upon their age and their maturity, I regulate them according to where they are. I teach and correct in different ways. Now, when they are 18, I hope to achieve deregulatory parity. I can say go forth and do well and do right, but don't call me, or don't ask me. Now, I don't know if that will be possible, but that is my hope. As we have gone from 1996 from monopoly to competitive policy, the history of regulation, whether it is in energy or transportation or in telecommunications, or in many other sectors, it is to treat dominant different than non-dominant, new entrants different and new technologies differently. And so we are now on a path of a transition to get to deregulatory parity. I would hope that we maintain that certain as we treat legacy networks differently, and then, as we can get into deregulatory parity, of new networks.

Would you all agree with—that is the correct path to take, to achieve?

Mr. MATTES. Absolutely.

Ms. RUSSO. Yes.

Mr. PICKERING. And my legislation does that a little bit better, doesn't it? Thank you very much.

Mr. UPTON. Mr. Boucher is on the way, I understand. Ms. Cubin. Ms. Cubin.

Ms. CUBIN. Thank you. I apologize. I had to step away for a few minutes, but I am really glad I made it back. And I understand that Mr. Walden and Mr. Mattes, touched on this, but if you wouldn't mind answering it for me. It seems like, from your testimony, that you support ubiquitous broadband, and I certainly agree with that, and I think most of us do, but could you expand on your comments regarding reforming universal service, and how it would help achieve ubiquity? I mean, are there any specific suggestions that you might have? I am from Wyoming, and I know people on this panel are so tired of hearing that Wyoming is the least populated State and it is almost 100,000 square miles, and so, you know, deployment of all of these services to rural America, and Wyoming in my heart, is just really very, very, very important in order for our country to move forward as a country, as a culture, and as a strong country.

Mr. MATTES. I have made the statement earlier that we do support the universal service, but the same token, we believe that the whole approval process might need some relooking. It needs to be more speedy. It needs to be more along the lines of how do I deploy next gen networks, and also, the question of how can I have the advanced infrastructure connectivity brought to those areas, and one of the examples that I used earlier, saying that a good case in point are digital hospitals, because they provide a level of support and service to the community that you otherwise would not have in those parts of the U.S. of A that you just described. The same holds true for schools, libraries—

Ms. CUBIN. Right.

Mr. MATTES. [continuing] what have you.

Ms. CUBIN. Right. I think it is very important that we do act on that. Dr. Jacobs, did you have something that you wanted to say?

Mr. JACOBS. Yes. Again, the technology is helping. I think the cost of providing service, even to the spread out population of Wyo-

ming, is coming down markedly. Wireless, clearly, you can get a lot of coverage from a cell tower. But we are going to a situation now where there is also abilities to—through the Internet, to provide minimal capabilities with the towers, so it is very low expense, at that point, low maintenance, go through a satellite, for example, if you are away from wirelines or fiber, and get back to all of the controlling circuitry elsewhere. And so again, the technology is moving in a direction that is going to make this problem much simpler, much less expensive, not the need for a high tax level.

Ms. CUBIN. That is really good news. Dr. Quigley, as a leader in broadband access technologies, you testified—the continuing rollout of DSL and other broadband technologies has affected the cost of hardware. I guess specifically what I want to ask is, what is going to happen on the cost of hardware?

Mr. QUIGLEY. We see in this industry hardware dropping, I guess as a general rule, at least 15 percent a year. In fact, recently, it has been dropping even further than that, due to competitive pressures. We don't expect that to let up. Just in terms of addressing the types of solutions also in the rural areas. As Dr. Jacobs has said, there is going to be a variety of technologies, either satellite, WIMAX technologies, particularly as we—if we open some of the spectrum at lower frequencies, we will be able to get further. So we are optimistic that we will be able to find technical solutions to rural connectivity issues, and—it will give you some heart—the place where I originally came from makes Wyoming look fairly populated. We have got a lot of—in fact, it was a problem I studied some time before, about how to really reach these rural communities that are a long way away from population centers, and I think we are all reasonably optimistic that over the next few years, we will start to see some technologies emerge that can help solve those problems cost-effectively.

Ms. CUBIN. Good. And all of you feel that that is the right thing to do, I take it. Good? Thank you. I see my time is just about out. Thank you, Mr. Chairman.

Mr. UPTON. Mr. Stearns.

Mr. STEARNS. Thank you, Mr. Chairman. I was able to watch a little of it on the TV back in my office, and I appreciate Congressman Boucher's support for the bill that he and I co-sponsored. I guess I would make a plug for it. We need a broad sweep to cover all IP-enabled services, so on whatever legislation we consider. Oftentimes, when you ask questions, you say to them, give us your expert opinion. I want to ask a question, what do you see, to get to seamless mobility, that you showed with that phone, and some of the things you have talked about, what could we as legislators do to enable this to happen? We are getting ready to rewrite the Telecom Act of 1996, and you know, I—obviously, you will say regulatory certainty would be one of them. But I mean, is there anything else that maybe has not been mentioned, that if you were sitting in my spot, that you think Congress should do? Maybe just start from my left. Mr. Zander.

If there is nothing other than regulatory certainty, we will just let it go, but I mean, is there some incentive that you would like to see in the tax code, or something like that, or the—obviously, the President talked about, by 2007, we want to have broadband avail-

able for all of our economy to make it more competitive. Obviously, that is one thing that we are hoping will happen. But, I mean, is there anything specific that, as Congresspeople, we should do?

Mr. ZANDER. I think that is a really good question. I mean, we covered some of the things today. I would prefer to get back to you, perhaps, with some more specifics, but you know, I am getting, you know, tearing down the silos, regulation of IP-enabled services, and making sure that we continue to have an environment where we can fund R&D, I think, is a necessity.

Mr. STEARNS. So make sure that the funding of R&D.

Mr. ZANDER. Absolutely. We are encouraged, as corporations, as we have in the past, that we have a very robust investment in this country in next generation research and development. I think it is—and again, I think there are other areas outside, maybe, this committee, in terms of education and funding technology initiatives, as we have in the past 30 years in this country. So I would like to see our labs. I would like to see our education. I would like to see R&D.

Mr. STEARNS. Probably see more scientists and engineers in our colleges.

Ms. RUSSO. Yes. Absolutely.

Mr. ZANDER. Yes. I mean, I think it is a real issue. I mean, probably maybe outside this—

Mr. STEARNS. We have all voted to help fund the industry by letting immigration—supporting immigration for those people who come, for example, from India, who has all the expertise. Dr. Jacobs, anything just quickly, and then I have got one more question, Mr. Chairman, and I will be done.

Mr. JACOBS. Yes. No, I would just reiterate the importance of the education initiatives, the visa initiatives. We are educating many students from other countries here. In the past, we have been able to relatively easily hire them to stay on, but with the lack of visas, and even now, although there has been some help for students with advanced degrees, it is still a very tight situation.

Mr. STEARNS. Because of the homeland security problem.

Mr. JACOBS. Partly that, and partly, this question of feeling that because they are foreign, they may be being paid less.

Mr. STEARNS. Yes.

Mr. JACOBS. And therefore, unfair competition, but that is not the case at all. The students coming out of our universities, the competition is fierce, because there are so few.

Mr. STEARNS. Mr. Mattes.

Mr. MATTES. Just two points. The one that the minimal regulation that you are going to put in place would be on a Federal level, and we won't have to go through 50 different State versions thereof. And the second issue is the awareness that technology is a competitive edge. I do find it honestly disturbing that countries like Iceland are way ahead of the United States when you look at broadband deployment, and they are using this as a competitive niche to position their economies, and we should raise the awareness that the investment will better the economy, and—

Mr. STEARNS. And Japan is doing the same thing.

Mr. MATTES. Yes.

Ms. RUSSO. Yes. I—

Mr. STEARNS. Ms. Russo.

Ms. RUSSO. This is really just punctuating what my colleagues have said, but really understanding the value chain that supports the industry, I think, is important. Everything from how do you get the technology developed, where is the talent coming from, how do we make sure we have it? How do we make sure we are incenting investment is important? And at the same time, oh, I just lost my thought. Hang on. I will—it will come back to me. But understanding the value chain—oh, and then, as part of the process, I am sure you all will invite the providers of the services in to articulate to you what will cause them to do it, to deploy technology faster.

Mr. STEARNS. Like we are doing today, having you come in—

Ms. RUSSO. Well, no, I mean, actually—I mean, we are happy to provide technology and systems and networks to the service providers, who are the companies that are actually investing in and deploying these services. So as part of the committee's work, I am assuming you will be asking the wireless, wireline converged companies, what is it that would cause you to invest more and deploy more faster?

Mr. STEARNS. Okay. Dr. Quigley.

Mr. QUIGLEY. I would just say we were all, I think, very pleased that President Bush did set the goal to make broadband available to every American by the end of 2007, and I would probably just amplify again, if I can, the words of my colleagues, that light regulation, with preemption of the key issues at the Federal level is very important, and also, the importance of education. Without those people coming through, very clever people coming through, the industry simply will stall.

Mr. STEARNS. Mr. Chairman, I would just ask one more question here for Mr. Quigley. How is the IPTV different from today's traditional cable television programming service?

Mr. QUIGLEY. Okay, I could give you a long answer, or a short one.

Mr. STEARNS. Just a short answer.

Mr. QUIGLEY. In the—real short one. It is about—it is a switched service, for a start, which means what you get normally today is a raft of channels, several hundred, which you can pick one out of. With IPTV, you have a link directly into every premises or home, which means the customer or the subscriber can select what channel they want. They get what they want when they want it, at the time they want it. And it is a fundamentally different experience than a broadcast TV. You can also do a lot of things, of picture-in-picture, of combining Internet services and video services at the same time. So you can be—vary camera angles, if there is different cameras on a sporting event. There is a raft of different services you can get. So it is a very different viewing experience.

Mr. STEARNS. Thank you for your courtesy, Mr. Chairman.

Mr. UPTON. Mr. Markey.

Mr. MARKEY. Thank you, Mr. Chairman. I just wanted to get to one key question here, and that is where the United States ranks in the deployment and subscription to broadband compared to other countries. Using the criteria that other countries, South Korea, subsidizes the subscription to broadband. So for example, in

the United States, if dialup is \$25 and broadband is \$50, you are on your own if you want to subscribe. So 25 percent of Americans now subscribe. In South Korea, they make sure that the price is \$25, so do any of you suggest that we should adopt the South Korean model, the Icelandic model, where the government subsidizes the subscription to broadband? Where does America rank among countries that don't subsidize the customer in deployment of broadband? Does anyone know that?

Anyway, I guess my point is that since most people in Iceland live in Reykjavik, one city, and South Korea, in Seoul, and most of these people are living in apartment buildings, and they also get a subsidy from the Federal Government, that adopting the South Korean or Icelandic model might not actually work here, if most of the members are willing to subsidize every customer in America for half of their bill out of the government treasury, and we are having a hard enough time getting a consensus on subsidizing senior citizens for their retirement, much less on people for broadband. Do you understand what I am saying, Mr. Mattes?

Mr. MATTES. Yes. I think, without going through every single country detail, I think it would be a fair assumption that about 50 percent of the countries that are ahead of us in broadband deployment are not subsidizing the services to their end users.

Mr. MARKEY. And what are the top two countries there, in your mind?

Mr. MATTES. As far as I know, that would be Denmark and Netherlands.

Mr. MARKEY. Denmark and Netherlands. And the Carterfone decision back in 1968 basically made it possible for companies to sell devices to the network and to consumers in the analog era, and basically broke down the Western Electric monopoly, which was basically one company had one supplier, and that was it, AT&T. Is there any reason to repeal that law, even though it is an analog era law, the Carterfone law? Is that still appropriate for the digital era, to keep the Carterfone regulations on the books, or is that obsolete, because we have moved to digital? That is, the sale of network and consumer equipment to all customers on a nondiscriminatory basis. Anyone want to speak to that?

Mr. UPTON. It sounds like this hearing is going to be adjourned.

Mr. MARKEY. Okay. I have got a—I actually, I think I am going to have a chance to go to Ash Wednesday services if we adjourn the hearing right now, and perhaps, Ms. Russo, you might want to come over to Mass with me. And you too, Mr. Quigley. Thank you all very much.

Mr. UPTON. I want to thank all of you for joining us for a considerable time today, and I note that we are going to have a vote on the House floor in literally seconds, and right after that, we start a full committee markup, so we appreciate your time, and we look forward to working with you in the next 2 years.

[Whereupon, at 12:15 p.m., the subcommittee was adjourned.]

[Additional material submitted for the record follows.]

RESPONSE FOR THE RECORD BY ANDY MATTES, PRESIDENT AND CEO, SIEMENS COMMUNICATIONS

Question 1: Should Congress mandate that voice IP technologies are 911 compliant?

Answer: Siemens recognizes that certain core public interest issues are implicated by all communications technologies and, therefore, that all communications technologies should play a part in advancing these interests. Communications technologies should, to the extent technically and operationally feasible, support the emergency response needs of public safety authorities.

Question 2: Is Siemens working on 911 solutions as part of your company's development of new IP-enabled voice products and services and if so will these solutions include location and call back capabilities? Other capabilities?

Answer: Siemens is voluntarily building into its VoIP product portfolio support for 911 services.

Today the SURPASS hiQ 8000 softswitch currently supports emergency calling (E911) by handing off calls via ISUP trunks or MF CAS (Channel Associated Signaling) trunks through a tandem connection to a Public Safety Answering Point (PSAP). The SURPASS hiQ 8000 will provide the following functions for E911:

- Receive and recognize E911 calls and route the calls to the E911 tandem over SS7 or MF CAS trunks.
- Provide the ANI of the calling party to the E911 tandem/PSAP via SS7 or MF.
- Disable subscriber features (such as call waiting) that could interfere with the handling of E911 calls.

Question 3: Are there any technical or policy barriers stopping you from offering 911 capable products rapidly?

Answer: Siemens recognizes the public benefits for supporting access to 911 emergency services regardless of the communications technology being used (e.g. TDM, wireless, VoIP, etc.) and is building such capabilities into its VoIP product portfolio.

From a technology perspective certain technical barriers do exist. The most significant challenge is in the area of supporting roaming subscribers in a residential environment, specifically as it relates to first determining and then providing the physical location of the subscriber and callback information to the emergency service organization. Siemens is currently investigating possible options for resolving this issue.

ALCATEL
April 1, 2005

Hon. FRED UPTON
Chairman
Subcommittee on Telecommunications and the Internet
House Commerce on Energy and Commerce
United States House of Representatives
Washington, DC 20515

DEAR MR. CHAIRMAN: Thank you for the opportunity to testify before the Subcommittee on Telecommunications and the Internet as part of its hearing to examine the state of the Internet Protocol industry from Alcatel's perspective as a communications equipment manufacturer and vendor. I am pleased to respond to questions that will become a part of the hearing record. My responses are as follows:

Question 1. Should Congress mandate that voice IP technologies are 911 compliant?

Response. Alcatel believes that Voice-over-Internet-Protocol ("VoIP") technology and other IP-enabled services have tremendous potential to fundamentally change the way our society communicates, and should be allowed to develop without unnecessary regulatory impediment. Alcatel maintains that the advancements in technology that have enabled high-quality IP voice service to become a reality will also provide the technical solutions needed to achieve certain social benefits, including 911 emergency access services. In comments filed with the Federal Communications Commission (FCC) in its *IP-Enabled Services* docket, Alcatel expressed its view that IP-enabled voice services should continue to meet 911 and E911 obligations.

Question 2. Are you working on 911 solutions as part of your company's development of these devices and services, and if so, will these solutions include location and call back capabilities? Other capabilities?

Response. Alcatel is currently offering several products that provide GPS location capabilities. For example, Alcatel offers GPS tracking capability for mobile networks that can be used to aid in the tracking of a caller in an emergency situation. We believe that 911 access over IP may be available in the near future but many service providers do not currently possess this capability in a manner that can be widely deployed. Alcatel remains interested in the development of similar solutions for carriers deploying IP-enabled voice services.

Question 3. Are there any technical or policy barriers stopping you from offering 911 capable products and services rapidly?

Response. By the very nature of the public Internet, determining the exact location of a user is a challenge. Users enter the Internet via IP addresses, which do not correlate with physical addresses. Moreover, many IP-enabled services offer “nomadic” features that provide the user with the capability to access and use services wherever they can find Internet access. This is an important distinction with the legacy circuit-switched network where location was determinable, commercially necessary for billing purposes, and legally necessary to determine jurisdiction.

Alcatel is a leader in the standards-making bodies throughout the world and can attest to the significant efforts to build location capabilities for public safety and law enforcement into Internet services. These processes are ongoing, and Alcatel is confident that industry can develop services and practices to address these 911 issues.

Mr. Chairman, thank you again for the opportunity to appear before your subcommittee.

Sincerely,

MICHAEL QUIGLEY

LUCENT CORPORATION

The Honorable FRED UPTON
Chairman
Subcommittee on Telecommunications and the Internet
United States House of Representatives
Washington, DC 20515

DEAR CHAIRMAN UPTON, thank you for your letter dated March 4, 2005. It was a pleasure to appear before your subcommittee and I am happy to provide you with responses to the questions that you have submitted. A copy will be submitted electronically as well.

We look forward to continuing to work with you.

Sincerely,

PATRICIA RUSSO, *Chairman and CEO*
Lucent Corporation

cc: The Honorable Edward Markey
 Enclosure

QUESTIONS FROM THE HONORABLE BART GORDON

Question: Should Congress mandate that VoIP technologies are 911 compliant?

Response: Lucent has over time been at the forefront of efforts to perfect E911 services for traditional PSTN and wireless networks. Lucent believes that industry has an obligation to ensure that people who use IP enabled services that emulate traditional telephone services can access 911 services. There can be no mistake about that. Considerable effort is being made by industry to ensure that VoIP users can access 911 services and Lucent supports and participates in these efforts. Lucent believes that such industry led initiatives should be given a chance to succeed before more formal regulation is considered. We must all be aware that adequate E911 services may require network infrastructure upgrades that are unique to the E911 capability and new ways of collaborating across networks and service providers that are unique to IP-enabled services. Industry may need financial incentives to deploy the needed upgrades and collaboration models in a timely fashion.

Question: Are you working on 911 solutions as part of your company's development of these devices and services, and if so will these solutions including location and call back technologies? Other capabilities?

Response: Yes we are. Lucent believes that both location and call back capabilities are required to provide E911 capabilities across IP-enabled networks that are comparable to today's E911 services. Carriers and operators are increasingly interested in addressing user demand for location-based services. Lucent is also involved in a number of groups under the Network Reliability and Interoperability Council (NRIC) that are working on just these issues. While the granularity of defining location for this type of service may currently not suffice for E911, we are looking at refining the capability for both commercial and security applications. The location requirement for E911 services will be more stringent than for commercial services.

By enabling emergency agencies with IP communications capabilities, these agencies can leverage IP enabled communications more effectively in emergency situations. In particular, through the use of the IP Multimedia Subsystem (IMS) service

architecture, emergency agencies can take advantage of new blended voice, video, and data services to enhance emergency communications.

Question: Are any technical or policy barriers stopping you from offering 911 capable products and services rapidly?

Response: There are both technology and policy barriers to next generation application of the 911 services that we know of today. E911 has traditionally been a fixed location, voice-oriented service. Increasingly user demand is for services that are not location-based, but user-based and this is frequently mobile in nature. What that means is that people used to have to go home, to an office or use a pay phone to make a call and all of those are fixed and known locations. Today people increasingly want to access a broad range of voice and multimedia services, across a broad range of devices that may not include our traditional definition of a telephone, regardless of their location. So this is not just a voice issue or telephone issue.

Technically, the challenge is to take what is today a one-dimensional service—which involves, in essence determining where the call originated—and integrate other technologies to address the highly variable components of IP-Enabled Services: end user devices that are often mobile and frequently incorporate technologies such as GPS, which do not work inside buildings and tunnels for instance and triangulation of cell sites which perhaps is not a totally reliable method of determining where a user is in the case of an emergency.

However, we believe these barriers can be overcome. One method we are looking at is the use of the IP Multimedia Subsystem, which provides a standards-based means of correlating a broad range of user and network data for service delivery, but which we believe could also be used to address E911 issues. The IMS could track users whereabouts using GPS feeds and cell site activity or other activity indicators and have that information available to report a users last-known location in the event of a 911 call. We believe we can make this information secure; however, privacy issues are raised with the collection and storage of this information.

Location capabilities place serious challenges on both networks and applications since IP networks do not inherently provide location information. Location information is required to identify the appropriate public services access point as well as to provide accurate geographical or address information for emergency responders. The ability to provide authenticated and accurate location information will likely require network infrastructure enhancements. Security is another key technical challenge for IP enabled emergency services. Emergency communications must have security mechanisms to ensure the accuracy and authenticity of the location, call back, and other relevant information. These new security procedures are presently being actively discussed in the industry.

Again, Lucent is actively involved in a number of groups under NRIC that are working on issues.

QUESTION FROM THE HONORABLE ALBERT R. WYNN

Question: You said in your testimony that Congress should consider removing certain telecommunications regulations. Where do you see an opportunity to do so and why?

Response: Next generation networks are fundamentally different than traditional telephone networks. In an IP-enabled world, voice is merely one of many applications, along with video and data, which are fundamentally digital packet streams of information. IP-based technologies have dramatically changed the cost and reach paradigms and with time will enable the seamless delivery of blended voice, video and data services to any type of access device across any kind of network. They have also transformed the ability of service providers, network operators, and others, to quickly introduce exciting new services in response to a variety of market factors, customer demand, and the evolution of technology. These changes obviously have ramifications for the way these services are regulated at the state and federal levels. We believe that the power of next generation networks, and really, convergence, will be best unleashed when service providers, operators and others can change their service offer without complicated regulation or a lengthy approval process or prior approvals. An example of a way that new service introduction could be streamlined is the removal of current barriers that limit a traditional service provider's ability to offer IP-enabled services without having those services subject to traditional video regulations.

MOTOROLA
March 31, 2005

The Honorable FRED UPTON
Chairman
Subcommittee on Telecommunications and the Internet
Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

DEAR MR. CHAIRMAN, thank you for inviting me to appear before your Subcommittee last month to testify about the seamless mobility of technology users along with their voice, video, and data communications as they go about living their lives or saving others—in the case of first responders. You chaired an outstanding hearing that kicked off the Telecom Reform that you and Members of the Commerce Committee will lead. I look forward to sharing in this critical initiative which will carry the Telecom Act beyond the Internet, leave the cell phone as we know it in the dust, and truly make it the universal remote control for life.

You have asked for further information on IP-enabled voice technologies and emergency communications, including whether Congress should mandate 911 compliance on VoIP technologies, what solutions Motorola might be developing in this space, and what barriers exist. Let me begin by sharing my view that ensuring that emergency communications are available to users of IP-enabled technologies is the right thing to do. In particular, Motorola prides itself on its heritage in public safety communications. We will continue to strive so that users of new technologies can get help when and where they need it.

To address your questions, I offer the example of what Motorola is working on with respect to 911 solutions as we develop new IP-enabled devices. Motorola has developed a mobile office or what we call an “enterprise” device that has dual network features—voice communications over cellular and voice over an IP-enabled WLAN workplace network. The dual network provides a seamless hand-off of active calls between the WLAN and the cellular networks. The device uses WLAN network IP access points within the workplace and uses the cellular network when outside the workplace.

Motorola has worked closely with our partners to support emergency communications on both the cellular and IP-enabled sides of this device. On the WLAN side, the 911 call feature allows authenticated and registered enterprise WLAN users to make emergency 911 calls from the enterprise WLAN / PBX network. The system provides the calling party number to the Public Safety Answering Point (PSAP) which is mapped by the enterprise administrator to the caller’s Emergency Location Information Number (ELIN) information specific to the facility location. The calling party number also functions as the callback number to allow the PSAP to re-establish the call back to the enterprise emergency response system, if necessary. When the PBX receives a 911 call from the device, the PBX maps the handset’s initial enterprise WLAN registration location to the publicly routable ELIN and sends the 911 call and calling party number to the PSAP. If a situation arises where the call drops while the caller is in the workplace WLAN network, the PSAP can make a call to the calling party number provided by the enterprise. The enterprise emergency response system and PBX would then re-establish the call to the originating caller in the enterprise WLAN network. If the caller moves out of the enterprise WLAN network, the call is seamlessly handed-off to a cellular carrier as any other non-emergency call. If a situation arises where the call drops after moving to the cellular network, the PSAP can make a call to the calling party number provided by the enterprise. The enterprise emergency response system and PBX would then forward the call to the originating caller, now on the cellular network. If a call is initiated when the caller is in the cellular network, the call is treated like any other 911 call on the carrier’s network.

As you know, these innovative technologies are complex and somewhat nascent. However, the vision for these technologies is robust, and we hope to learn from the experience we are gaining in deploying the enterprise solution with our customers and partners. Your continued oversight of this issue will keep developers of devices and services focused on its utmost importance while recognizing that some things will be harder technologically to do than others.

We applaud the Congress’ studied approach to addressing complicated technical questions such as this. We are moving to solve them in a way that will meet the expectations of the public, and we pledge to work with you to get it right. I hope the example of what we are doing in the enterprise space is of service to the Com-

mittee and demonstrates our commitment to this important public policy objective. We're getting it started.

Sincerely,

ED ZANDER
Chairman & CEO, Motorola

The Honorable FRED UPTON, *Chairman*
Committee on Energy and Commerce
Subcommittee on Telecommunications and the Internet
U.S. House of Representative
Washington, DC 20515-6115

DEAR CHAIRMAN UPTON: Thank you for the opportunity to testify at the Subcommittee's February 9th, 2005 hearing titled "How Internet Protocol-Enabled Services are Changing the Face of Communications: A View from Technology Companies." I am in receipt of questions submitted by Congressman Gordon related to the hearing that you requested I answer for the Committee's hearing record. I am pleased to provide this information. As these questions relate to wireless technologies supporting enhanced 911 position location, QUALCOMM is well qualified to speak on this subject.

Question #1: Should Congress mandate that voice IP technologies are 911 compliant?

Response: Not at this time. The Federal Communications Commission (FCC) has, through its rules, mandated enhanced E-911 for all wireless and wireline telephony. Our understanding is that the FCC is in the process of deciding whether to impose a similar E911 mandate with respect to VoIP services. If the FCC imposes such a mandate on VoIP, then Congressional action will not be necessary.

Question #2: Are you working on 911 solutions as part of your company's development of these new devices and services, and if so, will these solutions include location and call back capabilities? Other capabilities?

Response: Yes. QUALCOMM is in the process of developing chipsets for wireless phones for the next generation of our EV-DO technology, known as 1xEV-DO Rev. A, that will enable wireless operators to use VoIP for voice calls. Each of these chipsets will also incorporate QUALCOMM's Assisted GPS solution, which enables operators to offer the most reliable, precise, and accurate commercial E-911 position location capability in the world.

Question #3: Are there any technical or policy barriers stopping you from offering 911 capable products and services rapidly?

Response: No. QUALCOMM recently announced that over 100 million wireless phones containing our Assisted GPS technology have been sold worldwide. It is clear that we are well into the mass production and mass commercial delivery of these devices. Neither I nor my staff is aware of any policy barrier inhibiting our continued mass delivery of these devices in the United States.

We believe that the inclusion of GPS-based position location technology into wireless phones has transformed these phones into greatly improved safety tools, which enhance both the personal safety of individual citizens as well as our collective homeland security. Conversely, if mobile VoIP devices do not include this capability, citizens who use these devices to place emergency calls will not be locatable by public safety personnel. I have attached a recent story from Texas that reports on the tragic results for one family that tried to call for help on a VoIP phone and was not able to connect with their local 911 dispatch center.

We are therefore eager to help you define the best public policies to ensure the rapid dissemination of GPS equipped wireless devices to all Americans. I hope that you find this information helpful. If you have any additional questions please do not hesitate to contact me.

Sincerely,

IRWIN MARK JACOBS
Chairman and CEO QUALCOMM Incorporated

