

**STATEMENT OF  
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**BEFORE THE  
COMMITTEE ON ENERGY AND COMMERCE  
SUBCOMMITTEE ON TELECOMMUNICATIONS AND THE INTERNET  
U.S. HOUSE OF REPRESENTATIVES**

**“How Internet-Enabled Services are Changing the Face of Communications: A  
Look at the Voice Marketplace”  
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Mr. Chairman and members of the Committee, thank you very much for providing me with this opportunity to appear before you today. My name is John Melcher, and I serve as the Executive Director of the Greater Harris County 9-1-1 Emergency Network where we administer the 9-1-1 system serving approximately 4 million people in the Houston, Texas metropolitan area.

**The VoIP 9-1-1 Incident**

Before we get started I would like to introduce a Houston family, the John family, to the committee members. Sitting behind me is Pastor Peter John, his wife Sosamma, and their daughter, Joyce. This family is quite fortunate to be here today, Mr. Chairman, as just a month ago both Pastor and Mrs. John were shot during a home invasion in their southwest Houston home.

A quiet Thursday afternoon at the John residence in the Mission Bend subdivision was horrifically interrupted when the family confronted home invaders attempting to rob the family at gunpoint. Pastor John and his wife were shot during the

commission of the felony. As he bled from his leg wound, the father exhorted his daughter to call 9-1-1 to summon an ambulance for him and his injured wife. The daughter ran and grabbed the cordless phone, dialed 9-1-1, and received this recording: ***"Stop, you must dial 9-1-1 from another telephone. 9-1-1 is not available from this telephone line. No emergency personnel will be dispatched."***

Joyce, thinking the problem was with the cordless phone, tried another telephone instrument in the house and got the same recording. After the assailants fled, frantic and desperate, she ran to a neighbor and dialed 9-1-1. Fortunately, her neighbor's service had access to traditional 9-1-1 features and Public Safety Answering Point call takers who immediately arranged an ambulance dispatch for Joyce's wounded parents. Needless to say this was an extremely traumatic incident that was exacerbated by a lack of access to emergency 9-1-1 services.

This family's experience typifies the American consumer's relationship with new and innovative IP-enabled services and the dramatic impact these services have on public safety. Call it what you may, grace of God, good fortune, or Karma, the John family experience with Voice Over Internet Protocol (VoIP) broadband telephone service is a compelling yet harrowing story about the benefits of IP-enabled services while highlighting the need to formulate a forward plan for the future of emergency services in this country.

I am a bit of a raconteur. I call the anecdote I relate to you today **"IP-Enabled Services-VoIP. The Good, the Bad, and the Ugly."** This story brings home the benefits of VoIP that draw consumers and will continue to do so, exponentially. That is the good. The story I relate today to this committee will also describe the increasing

strain on an already stretched and aging 9-1-1 infrastructure. This I will call the bad. Finally, I lay out as fodder for future discussion the support you can give public safety for us to realize the benefits of IP-enabled services and enable PSAPs across the nation to deliver a more effective and efficient response for emergency calls that are delivered to PSAPs with enhanced information to the call taker. While this part of my story could be called the ugly, in reality it brings the storytelling full circle. This is because when 9-1-1 can fully realize the benefits of IP-enabled services that ordinary consumers are seeing today, then the ugly becomes the good for both Public Safety and the citizens of the United States.

### **The Good**

IP-enabled services VoIP services are dramatically changing the types of communications services offered to American consumers. The pace of technological innovation in the IP-enabled arena is unparalleled to any other time in modern communication industry. I have been involved in communications for over twenty-five years. Over 15 years have been in my role of a 9-1-1 system administrator. I would say that the revolution of IP-enabled services has a much greater impact on consumers than the divestiture of Bell System or the Telecommunications Act of 1996. Granted, both of the aforementioned watersheds in the annals of telecommunications history have helped usher in the IP revolution but the convergence of both voice and data in a unified architecture and protocol has a more direct impact on consumers.

These new VoIP services are lower in cost, offer more flexible features, and offer unlimited calling plans. These services are touted as superior substitutes to the regular circuit switched Plain Old Telephone Service lines (POTS) they are supplanting. The VoIP services are lower in cost for a myriad of reasons. First, VoIP services offered today do not carry the fee structure associated with regulated telecommunications services. Second, VoIP is unique in that the IP application, in this case VoIP, can be physically separated from the transmission medium, i.e. the copper twisted pair, fiber, or coaxial cable, that carries the IP packets to the consumer. Unlike traditional telephony, the IP-enabled service provider can choose to vend their services with or without the underlying transmission facility. This definitely can impact the price points associated with communications services. Lastly, some VoIP applications, both at the residential and enterprise levels, require fewer personnel to install and maintain and thereby can lead to reduced monthly recurring charges.

VoIP is also innovative in the flexibility it affords consumers. Traditional telephony necessitates that consumers contact their service provider to request the service provider activate features such as call forwarding, answering options, and personalized rings. New VoIP applications allow consumers to “design” their service. Follow me roaming, call screening, and personalized ringing can all be programmed by consumers via Internet access to their account. As more features of communications are pushed out to the end of the network and come under the direct control of the end user the services provided are more flexible and dynamic. While this empowers consumers in the communications market it also has an unintended consequence of making access to 9-1-1 services problematic. I shall discuss this in more detail shortly.

VoIP is the harbinger for the ultimate product for consumers in communications services: geographic number portability. VoIP combines low cost with flexibility by allowing a New York based talent firm to have Los Angeles area code numbers (flexibility) without the exorbitant costs associated with foreign exchange mileage and usage charges. The benefits for parents with children attending far away universities, elderly parents on limited incomes, and other similar consumer scenarios are easily envisioned.

The Johns opted for their Internet based VoIP because of the unlimited calling plan. VoIP services are generally marketed as a comparable substitute for traditional circuit switched local and long distance services. For families and small businesses that use long distance to keep in touch with family members or business contacts, this new technology is a very attractive enticement to supplant existing POTS services.

The future of IP-enabled services is even brighter as 3<sup>rd</sup> Generation(3G) wireless networks are deployed. Wireless broadband coupled with IP technology is poised to launch a new generation of IP devices that will allow mobile consumers a wider array of communication and information services. The future of communication—voice, data, text, video, etc.—is exciting and it is just around the corner.

Divestiture, competition, and deregulation of telecommunications have provided the required impetus of investment to bring a host of new and exciting communications services to consumers. This bodes well for the future public safety and emergency dispatch services. As the recently liberated Martha would say, “That is a good thing.”

## **The Bad**

It is no secret today's 9-1-1 infrastructure is rooted in an era where communications service consisted of fixed-location, POTS lines installed by a monopoly telecommunications provider. This monopoly provider was expected to provide cheap and reliable 9-1-1 systems as a "social obligation" associated with being given monopoly rights. It was a symbiotic relationship for both the telephone company and the local 9-1-1 administrators. The telephone company benefited because their subscribers had easy access to emergency services. The 9-1-1 administrators could offer reliable emergency services while assessing small 9-1-1 service fees on subscriber phone bills.

The communications landscape has changed dramatically since Texas' first enhanced 9-1-1 system was activated in Houston, Texas in January of 1986. Approximately 40% of our total 9-1-1 call volume is from wireless phones. The telecommunications providers in our area have mushroomed from 6 franchise telephone companies to over 200 competitive local exchange providers offering telecommunications as either pure resellers, facilities-based carriers using Unbundled Network Element (UNE) platforms, 3<sup>rd</sup> party facilities, their own facilities, or a combination of any of the aforementioned.

Our 9-1-1 system has changed little during this same period. We have pioneered competition in the 9-1-1 database management arena so as to have a neutral 3<sup>rd</sup> party assess the accuracy and timeliness of the Local Exchange Carrier (LEC) data being submitted into the 9-1-1 system. Our 9-1-1 network components are still provided to us by the incumbent LEC, SBC, in an uneasy but working relationship with Intrado, our designated 9-1-1 database management services provider. I say uneasy because the

splitting of 9-1-1 network management from 9-1-1 database management, two processes that are functionally “joined at the hip,” is unheard of outside of Texas. The ILEC providing 9-1-1 services generally provides both of these key 9-1-1 service components.

Given the consumer controlled aspect of new IP-enabled VoIP services, especially those VoIP services that are Internet based, today’s 9-1-1 infrastructure, while long on reliability, comes up short on its ability to accommodate these new technologies. Members of this committee, along with the FCC, have had a glimpse of what I am implying. Representative Shimkus, a strong and ardent supporter of E9-1-1 services, was instrumental in passing the recent ENHANCE 9-1-1 Act in the waning days of the last Congressional session. This legislation, when funded, will help facilitate the deployment of wireless 9-1-1 and in general improve the 9-1-1 infrastructure.

The lesson we learned with wireless was that the 9-1-1 system is extremely limited in its ability to handle mobile communication technologies. Consequently, the call routing logic was pushed back into the wireless carrier network. Wireless carriers use either a Mobile Positioning Center (MPC) or translation tables in the switch memory of the Mobile Switching Center (MSC) to maintain routing tables that associate cell tower with a PSAP for the routing of wireless calls. These tables are used to assign a pseudo Automatic Number Identification (p-ANI) that will correspond to a static record in the ILEC 9-1-1 system.

Some types of VoIP, especially applications relying on the Internet and existing broadband connections, share much in common with wireless 9-1-1. There is one distinct and major difference, however. Unlike wireless Phase II where the wireless service provider is responsible for accurately assessing the location of the user within FCC

defined requirements for location services, *the Internet based VoIP services location is determined entirely by the end user*. This precludes automatic submission of user location data to the 9-1-1 system.

This is problematic for both consumers and public safety. Consumers have a reasonable and realistic expectation that access to 9-1-1 services is available on any communications service that is being touted as a replacement for POTS services. Public safety educators have done a yeoman's job in educating the American public about the benefits of 9-1-1 service. Ask any child over the age of 4 who should they call if Mommy can't wake up and the majority of them will tell you 9-1-1. Hardly a week goes by without some televised action show that has a dramatic scene where someone yells, "Call 9-1-1." Furthermore, the public expects that access to 9-1-1 services is not only ubiquitous it is also automatic. That is, the consumer need do nothing more than request communications services. Providing location of service usage is an alien and foreign concept to many consumers.

PSAPs personnel, while trained to handle emergency calls irrespective of how they come into the PSAP with or without the attendant data, have come to rely on the public's knowledge of 9-1-1 to pattern operational practices to optimize their response to emergency incidents. VoIP's inability to access the 9-1-1 system elements and the delivery of emergency calls to local telephone lines compels PSAP personnel to reassess existing PSAP call-handling procedures, in ways currently unknown both to the PSAP and to the VoIP provider. PSAP personnel need to know a relatively uniform call processing function for VoIP calls so as to properly train call takers. VoIP providers need to appreciate the call taking and dispatch function in PSAPs so as to provide the

optimal information required by PSAPs for emergency calls placed by VoIP subscribers. This process takes time. In our business time equals money and may also equal lives.

This change of roles for the consumer as well as the PSAP personnel require 9-1-1 system administrators take on an extensive educational campaign to educate both the public and our PSAPs about the shortcomings of VoIP interfacing with the 9-1-1 system. This educational process may address immediate needs but may have the unintended consequence of diminishing the relevance of 9-1-1 in the public's eye. We are leery of any campaign that says "9-1-1 is the number for emergencies except if you use VoIP." Given the projected exponential growth of VoIP and other IP-enabled communications services coupled with the limited innovation in today's 9-1-1 services market, I can tell you this dilemma certainly represents the Bad in the IP-enabled Voice Market.

### **The Ugly**

I pose this question to the members of the committee, "Do you believe that ubiquitous access to 9-1-1 emergency services, irrespective of communication technology platform, is the only acceptable goal for 9-1-1 public policy?" If your answer to that question is "Yes" then you must accept as axiomatic the fact the existing 9-1-1 infrastructure must be completely overhauled so as to accept new and innovative technology platforms supporting IP-enabled services. The ramification of such a public policy position is a double edge sword. Imagining the benefits of a new IP based 9-1-1 system with enhanced data elements and bringing that reality to consumers is a goal that would fit quite nicely in any political platform. However, the reality of supporting two

households, the existing log cabin and building the manor house, can be politically unpalatable during times of severe budget constraints.

The idea of a new and improved 9-1-1 systems based on packet technologies have been touted by outgoing FCC Chairman Michael Powell. Commission Copps recently iterated some of the same benefits of an IP-based 9-1-1 system when he spoke to NENA last month in Washington D.C. The FCC and many VoIP Providers are visionary in seeing an enhanced 9-1-1 infrastructure that not only includes ANI and ALI but also patient specific information such as medical records or language preference. This is all quite doable with the convergence of voice and data using IP on a unified platform.

I need to note that a major catalyst that brought about the first generation of 9-1-1 services is no longer in existence. The absence of this catalyst can be directly attributable to the same factors that have ushered in this communication revolution: namely the divestiture of the Bell system and the Telecom Act of 1996. The first generation of 9-1-1 systems, basic, and the second generation represented by enhanced features were both brought about through AT&T. AT&T developed the basic 9-1-1 technology and upgraded the platform for the enhanced features of ANI, ALI, and Selective Routing. Many of the country's enhanced 9-1-1 systems were installed after divestiture but nevertheless they have their roots in the old AT&T monopoly structure.

There is no nationally prominent catalyst such as AT&T that can serve to design, test, and deploy a third generation 9-1-1 platform throughout the United States. It is also very important to understand the dual role of the ILEC in the roll out of the first and second generation of 9-1-1 platforms. These platforms were rolled out prior to the Telecom Act of 1996 and the introduction of competition to the local exchange market.

Then, it really didn't matter that the 9-1-1 service provider was also the only phone company in town. Now it does matter greatly. Remember that local regulators expected the ILEC to offer 9-1-1 at substantially reduced rates as return favor for enjoying monopoly presence in the local exchange market place. Therefore, 9-1-1 was never and is still not a profit center for the existing 9-1-1 service providers who for the most part are still the ILECs.

The competitive local exchange market also offers no incentive for the ILEC to upgrade the 9-1-1 infrastructure. Upgrades will only facilitate the interconnection of competing service providers. Currently the traditional interconnection to 9-1-1 system elements is under public utility commission approved interconnection agreements between certified local exchange carriers and incumbent local exchange carriers. Denying access of these 9-1-1 system elements to non-certified IP enabled providers serves only to create a natural barrier to competition for the ILEC. Simply put, why should the ILEC voluntarily allow competitors access to 9-1-1 systems and thereby further erode their existing customer base?

Lack of access to 9-1-1 system elements compels VoIP providers to seek other methods to deliver calls to PSAPs. These other methods likely do not get answered with the same priority or have the same information that is generally associated with traditional 9-1-1 call delivery. This has the effect of creating a caste system for emergency services.

Straddling the gap between generations can be a delicate balancing act for PSAPs, IP-enabled service providers, regulators, and legislators. There are costs associated with the support of two platforms for the duration of migration. These costs will be borne by

all stakeholders. The existing 9-1-1 system is rooted in a geographically localized, dedicated trunk, and circuit switch platform paradigm. The cost to replicate this model nationwide for many IP-enabled service providers is just not economically sustainable. Many of these entrepreneurial IP-enabled providers have very narrow profit margins. It is probably wiser to focus these limited assets on building a new generation 9-1-1 platform and attempt to keep the costs associated with current generation interconnection at a minimum. This requires a realistic assessment of performance expectations of VoIP providers in the current architecture while avoiding “functional fixedness” when looking at ways to interconnect to today’s 9-1-1 system elements. Functional fixedness is a term used in the practice of psychology which can best be described as follows:

***People are often very limited in the ways they think about objects, concepts, and people. When something is thought of only in terms of its functionality, then the person is demonstrating functional fixedness. This type of thinking is narrow and limited, often inhibiting the problem solving process.***

### **Next Steps**

The immediate need of 9-1-1 system administrators is to rip away the veils. Some VoIP providers wear the veil of “lack of 9-1-1 system element access” to cover their reluctance to spend money on 9-1-1 interconnection. Compelling the ILECs to open up access to 9-1-1 system elements irrespective of certification status will certainly go a long way in removing this veil. Also, ILECs need to be compelled to allow new and innovative ways of allowing interconnection while not compromising system integrity.

Some alternative examples of access would be implementing operational procedures to allow existing CLECs to serve as aggregators of emergency services instead of requiring each service provider to establish their own interconnection. This aggregation service is currently being offered by firms like Level 3 Communications but may require altering existing interconnection agreements.

Another solution is leveraging the Public Switched Telephone Network (PSTN) with proven technology. Greater Harris County 9-1-1 is using the PSTN to deliver emergency calls from telematics call centers to PSAPs via the existing 9-1-1 network, replete with ANI and ALI. I believe this same technology is being used for delivery of VoIP calls in Washington State and Rhode Island.

ILECs can also offer an aggregation service of their own by strategically placing IP gateways with existing 9-1-1 routers. All of these examples serve as viable alternatives to costly direct trunking. Local regulatory bodies could execute a national policy similar to local state public regulatory commissions executing the federal Telecommunications Act of 1996. This would make these alternatives available to new IP-enabled technologies needing to deliver 9-1-1 calls to PSAPs. Ripping away this veil of lack of access will squarely put the onus of making 9-1-1 services available a service provider decision.

Local regulatory bodies executing a national 9-1-1 policy can also assist 9-1-1 administrators in ripping away the “quality of service and network integrity veil” (ie, subterfuge or smoke screen) worn by the ILECs. As I mentioned earlier in my testimony there is currently nothing that would entice or compel the ILECs to open up access to 9-1-1 system elements that would facilitate the interconnection of competitors. Many

ILECs do not allow non-certified IP-enabled service providers traditional access to 9-1-1 system elements because they fear for the integrity of the 9-1-1 network. It appears Bell South does not want to entertain alternative interconnection methods such as the PSTN solution being used in Greater Harris County 9-1-1 for telematics merely because it isn't the traditional method of doing 9-1-1. Certification as a CLEC is no guarantee of sterling network integrity. The record books are full of examples of failed services by certificated local exchange carriers. Greater Harris County 9-1-1 had an incident where an end office was isolated from the 9-1-1 system because redundant circuits terminated in the same failed channel bank located in the LEC end office. Conversely, lack of certification does not automatically mean substandard network interconnection. In a competitive market place quality of service is a key product differentiator whether that service is provided by a certified CLEC or a non-certified IP-enabled service provider.

And functional fixedness should not drive the spending of resources to interconnect to the existing 9-1-1 system. If there is a proven and tested method that is cheaper than the traditional direct trunk architecture, then the ILECs providing 9-1-1 elements should be open to alternative interconnection methods. The veil of "network integrity" must be stripped away to obliterate the caste system that is being formed today.

The support for the third generation of IP-based 9-1-1 systems is more complex. Many stakeholders are simultaneously driving toward that destination via a variety of industry fora. The National Emergency Number Association, the Emergency Services Interconnection Forum, the Internet Engineering Task Force , and Network Reliability and Interoperability Council are four key players all currently looking at next generation

9-1-1 platforms. In summary I see the following as key ingredients for successful design and deployment of a 3<sup>rd</sup> generation nationwide 9-1-1 IP based platform:

- Regulation and legislation conducive to industry development and testing of a new IP-based platform
- Realization by regulators and legislators that 9-1-1 is a “second best” market (as described by economists Richard Lipsey and Kelvin Lancaster in 1956) rife with social obligations and requiring oversight instead of laissez-faire competition market management
- National catalyst to serve in the capacity AT&T did for 1<sup>st</sup> and 2<sup>nd</sup> generation platforms-perhaps the newly authorized joint program office?
- A business model that will assure industry participants of a reasonable rate of return on investment in a 3<sup>rd</sup> generation network
- Realization that there needs to be a viable business case in support of 9-1-1

### **Final Thoughts**

I have covered a lot of ground in a short period. So in closing please allow me to offer you what I see as the current state of affairs. I speak from over 25 years in public safety and 9-1-1 administration. We are truly at a crossroads for 9-1-1. IP-enabled services, in particular VoIP, present us with both an unprecedented challenge to 9-1-1 as well as an unprecedented opportunity for the advancement of emergency services. To put it a bit more philosophically, VoIP is the yin and yang of 9-1-1.

We can continue down the bumpy and twisted road we traveled with wireless 9-1-1 or we can learn from our past experiences. This means we accept the fact that the problem is not with new technology but with the existing 9-1-1 infrastructure. We can quickly alter our learned behaviors and paradigms to accommodate these new VoIP services to our existing infrastructure and rip out the roots a burgeoning caste system of access to 9-1-1. I enlist your support in helping both VoIP providers and 9-1-1 service providers understand this concept. 9-1-1 system administrators will work to educate our citizens about the 9-1-1 services available to them via their communications providers.

But this stop gap solution is short term. Unless we wish to face a similar dilemma with the next new mobile technology just beyond the horizon we must work to develop and deploy a new nationwide 9-1-1 infrastructure capable of interfacing to numerous communication platforms. This migration must occur within in the next 60 months or this country puts at risk the social objective of 9-1-1 anywhere, any time, for any device. This committee has the resources and influence to help us attain this ambitious goal and we in the Public Safety industry encourage your active support.

I thank you again for lending me your ears and giving me your time to discuss a matter I feel so passionately about. Your attention is most gratefully appreciated. Good day.