COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF TELECOMMUNICATIONS AND CABLE

Investigation by the Department on its Own Motion to Determine whether an Agreement entered into by Verizon New England, Inc., d/b/a Verizon Massachusetts is an Interconnection Agreement under 47 U.S.C. § 251 Requiring the Agreement to be filed with the Department for Approval in Accordance with 47 U.S.C. § 252	D.T.C. 13-6

REBUTTAL TESTIMONY OF
DAVID J. MALFARA, SR.
ON BEHALF OF
THE COMPETITIVE INTERVENORS

I. INTRODUCTION AND WITNESS QUALIFICATION

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION.

A. My name is David J. Malfara, Sr. My business address is 7712 Linkside Loop, Reunion, Florida 34747-6767. I am president/CEO of ETC Group, LLC, which is a business management and technology consulting firm.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of CTC Communications Corp. d/b/a EarthLink Business; Lightship Telecom LLC d/b/a EarthLink Business; Choice One Communications of Massachusetts, Inc. d/b/a EarthLink Business; Conversent Communications of Massachusetts, Inc. d/b/a EarthLink Business; EarthLink Business, LLC (formerly New Edge Network, Inc. d/b/a EarthLink Business); Cbeyond Communications, LLC; tw data services llc; Level 3 Communications, LLC; and PAETEC Communications, Inc. (collectively, "Competitive Intervenors").

Q. PLEASE BRIEFLY SUMMARIZE YOUR PROFESSIONAL BACKGROUND AND EXPERIENCE.

A. A full description of my qualifications and relevant experience is provided as Exhibit DJM-1 (attached). In brief summary, I am President and Chief Executive Officer of ETC Group, LLC, a business management and technology consulting company. For more than 35 years, I have been an active participant in the continuing evolution of the Telecommunications Industry. I have led companies that served as competitive communication services providers in local, long distance and broadband markets. I have negotiated dozens of interconnection agreements with incumbent local exchange carriers (ILECs), including Verizon. I have provided technical and business consultation to a wide variety of service provider organizations. I have held engineering and management positions in leading technology companies such as Honeywell Information Systems and GTE Telenet (the nation's first public packet-switched network service provider). I am a senior member of the Institute of

Electrical and Electronics Engineers ("IEEE"). I currently lecture at the Michigan State University Institute of Public Utilities' annual educational program for state public utility commissioners and their staffs, and have served as a guest lecturer at the University of Pittsburgh Graduate Telecommunications and Networking Program and at the Massachusetts School of Law. I served for several years as a director of COMPTEL, a national trade association for the competitive communications industry, and on its executive committee. Within the past ten years, I have provided expert testimony in a case before the Louisiana Public Service Commission relating to an interconnection agreement dispute between an ILEC and a competitive carrier, and in litigation before the United States District Courts for the Northern District of New York and the Eastern District of Tennessee.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony will show that a number of the assertions made in Verizon's direct testimony regarding technology are false or, at best, misleading. I will demonstrate that Verizon's suggestion that IP interconnection and VoIP traffic exchange pose more complex technical issues than the circuit-switched technologies used in the PSTN is inaccurate, in that it apparently fails to consider the advancements of TDM, SS7, LNP and a host of other complex advancements in the PSTN's historic and continuing evolution.

My testimony will show that Verizon's FiOS Digital Voice (FDV) service provides the same basic functionality as traditional TDM-based telephone service. I will also show that Verizon's representation that this functionality of FDV (*i.e.*, the ability to conduct "two-way, real-time voice communications") is somehow modified or altered by VoIP technology or the features packaged with FDV, so as to be something other than a telephone call, is also false. I will further demonstrate that, because the customer interface to FDV service is an analog RJ11 registered jack, no net protocol conversion occurs when a FDV customer establishes a telephone call with a subscriber of TDM-based telephone service. Moreover, even if such a conversion did occur, it would not change the fundamental nature of the telephone call because the net protocol conversion would simply maintain inter-operability between old and new technologies on the PSTN.

I will also show that the primary functionality of FDV (*i.e.*, two-way real-time voice communications) is not geographically "untethered" but, in fact, anchored to the subscriber's residence. I will explain that FDV is also incapable of acting as a nomadic VoIP service from some other location, for example, by using Internet access.

I will demonstrate that the two primary reasons that Verizon claims its FDV service is different from traditional telephone service – the functionality of its Account Manager and the behind-the-scenes interworking of evolving network technologies –

are nothing new to the PSTN and are like numerous other technological developments in the PSTN.

I will show that the Account Manager (the optional, graphical user interface of Verizon's FDV service) is a service wholly independent of the two-way real-time voice communications service that is the primary function of FDV. I will also show that the availability of these features does not make FDV any different than traditional TDM-based telephone service by discussing a virtually identical capability created by Z-Tel in 1999, packaged with voice communication services wholly comprising TDM technology.

Finally, my testimony will show that FDV exemplifies the routine interworking of old and new technologies for the purpose of improving network efficiency. Further, FDV does nothing to alter the actions or the perceptions of an end user who simply wants to pick up a telephone and place a call. FDV is a packaged service whose technologies are invisible to the customer and whose primary function looks identical to traditional TDM–based telephone service.

II. VERIZON'S CLAIM OF INCREASED TECHNOLOGICAL COMPLEXITY

Q. PLEASE REFER TO THE STATEMENT ON PAGE 5, LINES 3-5 OF VERIZON'S TESTIMONY REGARDING THE SUPPOSED TECHNOLOGICAL COMPLEXITY OF IP INTERCONNECTION AND VOIP TRAFFIC EXCHANGE. DOES THE TECHNOLOGY UNDERLYING

IP INTERCONNECTION AND VOICE OVER INTERNET PROTOCOL (VOIP) INCREASE THE TECHNOLOGICAL COMPLEXITY OF VOICE COMMUNICATION ON THE PSTN?

A. No. To the contrary, it simplifies it. The PSTN is already a complex, interactive system of hardware, software and methods of procedure. Verizon's representation that IP interconnection and VoIP technologies somehow make the exchange of voice traffic on the PSTN *more* complex from a technical perspective is unfounded. In fact, Verizon's own testimony describes several ways in which IP interconnection and VoIP technologies will *simplify* operations and *reduce* technical complexity (as well as costs).

Q. PLEASE GIVE SOME EXAMPLES OF HOW THE USE OF IP SIMPLIFIES THE TECHNICAL ASPECTS OF VOICE COMMUNICATION ON THE PSTN.

A. Verizon gives an example in its own testimony. Verizon acknowledges that "IP interconnection enables providers (including Verizon) to reduce the number of interconnection points they need."[1] This means that the operational and environmental requirements incurred at each eliminated interconnection point, including facilities, equipment, processes, personnel and footprint, are no longer necessary. The effect of this reduction is to greatly simplify not only the network operations, engineering and topology of service provider networks and their interconnection but also the *business/administrative* operations and processes of those

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[1] See Verizon Direct Testimony, page 13 at 13-15. I understand that at this stage of the proceeding the substantive terms of the contracts are not at issue; therefore, I express no view as to whether the number of points of interconnection under the Verizon/Comcast agreements is optimal.

service providers. This is true not only for Verizon, but for all other facilities-based providers, including competitive carriers, that have deployed IP technology in their networks. It is one of the overarching technical reasons that competitive carriers seek IP interconnection. As Verizon admits, IP interconnection also enables the elimination of the numerous "layers of switches that separate PSTN calls into local, tandem and interexchange segments."[2]

In addition to the advantages of IP interconnection, VoIP technologies themselves offer further opportunities for simplification of the PSTN. For example, while today's circuit-switched technology requires an entirely separate signaling network (the SS7 network) in order to establish, maintain and terminate telephone calls, VoIP signaling can be conducted over the same network used to carry the actual voice conversation. This provides a significant reduction in the complexities of call routing and disposition as well as redundancy/restoration designs, facilities, equipment and processes. IP interconnection and VoIP technologies, therefore do not represent a more complex technical or operating framework than that represented by the circuit-switched technologies used in the PSTN. On the contrary, IP interconnection and VoIP technologies provide the opportunity to simplify the framework, to the benefit of Verizon, competitive carriers, and all other facilities-based participants in the PSTN.

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[2] See Verizon Direct Testimony, page 10 at 9-11.

Q. ARE THE "MANY POTENTIAL ALTERNATIVES AND OPTIONS" TO WHICH VERIZON REFERS (PAGE 5, LINES 4-5) UNIQUE TO THE IMPLEMENTATION OF VOIP TECHNOLOGIES IN THE PSTN?

A. No; this has always been the case for the PSTN. For example, when SS7 networks were first deployed, it was never envisioned that they would make possible developments such as Local Number Portability (LNP). LNP enabled users to port their telephone number, not only to other fixed-line providers, but to cellular companies as well. This capability provided the *option* of choosing a competitive *alternative* to local exchange customers throughout the country.

Q. WHAT OTHER MAJOR TECHNOLOGICAL CHANGES HAVE BEEN SUCCESSFULLY INCORPORATED INTO THE PSTN?

A. The list of technological advancements deployed on the PSTN is long. To name just a few, these include such innovations as Stored Program Control switching in 1965, digital switching in 1977, SS7 in the 1980s, Synchronous Optical Networking (SONET), Advanced Intelligent Network (AIN) and Wave Division Multiplexing (WDM) – all introduced in the 1990s. Exhibit DJM-2 depicts the history of important innovations deployed in the PSTN. As is evident in the diagram, IP technologies are already properly included in that progression.

Q. WAS THE LEVEL OF COMPLEXITY OF THESE DEVELOPMENTS AT THE TIME THEY WERE INTRODUCED DIFFERENT FROM THE COMPLEXITY LEVEL OF VOIP TECHNOLOGIES TODAY?

A. No. At the time of their deployment, those developments were considered quite complex. The technical issues surrounding IP interconnection and VoIP traffic exchange are *different* than those posed by circuit-switched technologies but they are

not more complex. In many cases, they are simpler. Verizon has failed to identify a single *technical* issue that causes IP interconnection and VoIP traffic exchange "to raise the complexity bar" above that associated with circuit-switched technologies. There is, therefore, every reason to believe that these *different* technical issues will be resolved among industry participants as they have in the past.

Q. VERIZON STATES (ON PAGE 37, LINES 18-22) THAT "IF IP INTERCONNECTION FOR VOIP WERE HANDLED THROUGH THE SECTION 252 AGREEMENT PROCESS," THE RESULT WOULD BE "MORE THAN FIFTY DIFFERENT STATE PUBLIC UTILITY COMMISSIONS APPLYING THEIR OWN VIEWS" OF THE TECHNICAL DETAILS ASSOCIATED WITH IP INTERCONNECTION. PLEASE TELL US WHETHER YOU AGREE AND WHY.

A. I disagree. Carriers negotiating IP interconnection agreements should have little difficulty resolving the technical details comprising such interconnection. I have been involved in several such negotiations between competitive carriers and these issues have proven rudimentary and negotiations are concise. This is for several reasons.

For instance, competitive carriers have been exchanging voice traffic in IP on a large scale for, at least, the better part of a decade. These competitive carriers have been proven successful in working out the technical details of IP interconnection arrangements with each other. There is no reason to believe that competitive carriers could not do the same with ILECs, to the extent ILECs are willing participants in such negotiation. In fact, competitive carriers have already been successful in

establishing IP interconnection arrangements with the IXC affiliates of Verizon and other ILECs.

If carriers need to resolve a technical dispute during negotiations, they can develop a test plan and conduct private testing. This is often done when either carrier wishes to support a new feature or function or traffic type (*ex*. introduce a new CODEC or international traffic to a new country) over the POI.

In my experience negotiating interconnection agreements, carriers have been able to resolve the technical issues associated with TDM interconnection and the fact that those agreements were filed under § 252 or were the result of arbitration before a state commission has not resulted in the development of technical standards by "more than 50 different state public utility commissions." Instead, carriers followed industry technical standards for TDM interconnection arrangements and the state commissions accepted them. There is no reason to expect that the experience with IP interconnection agreements will be different.

Q. ARE THERE EFFORTS UNDERWAY TO DEVELOP INDUSTRY STANDARDS FOR THE EXCHANGE OF IP-BASED TRAFFIC?

A. Standards-setting bodies and industry working groups have successfully developed and are continuing to develop technical and operating standards for IP interconnection. The issues on which this work centers include the technical issues raised by Verizon on page 36 of its testimony, such as "*Interconnection,*" "*Codecs*

and Transcoding," and "*Service Quality and Disaster Recovery*." There is, for example, an American National Standard for carrier to carrier IP interconnection entitled: *IP Network-to-Network Interface (NNI) Standard for VoIP*.[3] This standard was developed by the ATIS Packet Technologies and Systems Committee (PTSC), of which Verizon is the current chair for "IP Interconnection".[4]

The "*Scope of Traffic*" issues raised by Verizon (p. 36, lines 14-17) present no particular technical concern either. The subject traffic is clearly identified as that consistent with VoIP technology (i.e. real-time, two-way voice communications in IP format); the geographic and jurisdictional nature of this traffic would pose no technical problems. This is demonstrated by the fact that many carriers are already exchanging multi-jurisdictional voice traffic in IP.

I see no reason that state commissions would depart from these industry technical standards and practices that have been developed and are being developed for IP interconnection in the event of an arbitration of an IP interconnection agreement.

Q. VERIZON GOES ON TO DESCRIBE OTHER DETAILS OF NEGOTIATION, INCLUDING THOSE "RELATED TO SIGNALING FOR CALL SETUP AND DELIVERY, CALL ROUTING, TRAFFIC FORECASTS, AND TESTING." DO ANY OF THOSE ISSUES POSE SPECIAL PROBLEMS IN AN IP ENVIRONMENT?

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[3] Available through the ATIS Document Center at https://www.atis.org/docstore/product.aspx?id=25486.

[4] See http://www.atis.org/0191/index.asp, "PTSC IPI Chair: Mark Desterdick, Verizon."

A. No. Again, IP interconnection is technically feasible. Further, because of the ability to eliminate "layers" of systems necessary in a circuit-switched environment, resolving technical issues is easier. For example, while circuit-switching may invoke discussions (for example) of using in-band, Multi-Frequency signaling, PRI (with or without NFAS), SS7 (in its many iterations) or something else (*ex*. cellular IS-41), IP technologies have standardized on Session Initiation Protocol (SIP) for all such signaling. Call routing, forecasting and testing are all very commonplace in interconnection negotiations regardless of technology, and IP technology poses no special problems in those negotiations. The negotiation points may be different than in the TDM interconnection context, but they are by no means more complex. The technical issues associated with IP interconnection and VoIP technologies are generally understood in the industry and are not greater in number or more complicated than those that have been addressed in TDM interconnection agreement negotiations.

III. A CALL IS A CALL (ADDITIONAL FEATURES OF FIOS DIGITAL VOICE)

Q. LET'S DISCUSS VERIZON'S DESCRIPTION OF ITS VOIP SERVICES IN ITS TESTIMONY. WHAT IS YOUR UNDERSTANDING OF VERIZON'S FIOS DIGITAL VOICE?

A. My understanding is that FiOS Digital Voice (FDV) is a "packaged" product comprised, primarily, of a "two-way, real-time voice communications"[5] service that

[5] See Verizon Direct Testimony, page 9 at 1-2

transmits voice traffic using VoIP technologies. "Packaged" is a term used here to describe the offering of two or more different services under a single product label.

Q. DO THE VERIZON AND COMCAST SERVICES AT ISSUE TRAVEL OVER THE PUBLIC INTERNET?

A. No. Importantly, while FDV uses IP technologies and protocols, FDV traffic is not carried over the public Internet (as I discuss below). The same is true of the Comcast VoIP service at issue in this proceeding as well as the VoIP service offerings of virtually any other facilities-based service provider, including CLECs.

Q. HOW AND WHY DO VERIZON, COMCAST, AND OTHER FACILITIES-BASED VOIP SERVICE PROVIDERS TRANSMIT VOIP CALLS?

A. All of these providers use private "managed" IP networks to carry this voice traffic as a means to ensure acceptable performance and security. For example, as Verizon states in its news release explaining how its FDV service works (emphasis added): "To understand the features and quality of FiOS Digital Voice, you first need to know that the service is not the same as the services you get with a little Internet adapter for your modem and phone, and it does not ever touch the public Internet." The subtitle of the news release itself – "Verizon's Private, Managed IP Network Links Customers' Homes to Softswitch..." – further assures customers of the service's isolation from the Internet. A true copy of Verizon's news release is Exhibit DJM-3.

Q. HOW DOES THE USE OF THESE MANAGED IP NETWORKS CHANGE THE CHARACTER OF CALLS MADE OR RECEIVED BY END USERS?

A. Not at all. Though provided over new network technology, this two-way voice communications service provides the same basic functionality as traditional TDM-based telephone service – the transmission of voice signals without any fundamental alteration of the voice signals, as sent and received by the customer. Like the telephone exchange service provided by traditional TDM-based service providers, it gives users the ability to make and receive local calls (*i.e.*, to communicate with each other within a defined area similar to a local exchange). And like the exchange access service provided by traditional TDM-based service providers, it allows the origination and termination of long-distance calls. From the perspective of a user making or receiving a call, FDV service is functionally indistinguishable from traditional TDM-based telephone service.

Q. ON PAGES 6-9, VERIZON DESCRIBES MANY FEATURES OF ITS FDV PRODUCT. DO THESE FEATURES SUGGEST THAT FDV IS A FUNDAMENTALLY NEW AND DIFFERENT MEANS OF VOICE COMMUNICATION AS COMPARED TO TRADITIONAL TDM-BASED VOICE SERVICE?

A. Absolutely not. Though Verizon explains, at length, through its testimony that this service also includes an "Account Manager," the Account Manager merely acts as a graphical user interface (GUI) that allows users to set up their own voice service features and that facilitates use of the voice communications service. (A "Graphical User Interface" or GUI is a type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators represented on a display screen.) More specifically, the Account Manager provides a user portal to

access other services and applications which, in part, are used to report on, configure or invoke the voice communications service. The Account Manager is not a component of, or integrated with the voice service itself, but is instead an adjunct to it. In fact, the voice communications service does not require the Account Manager in order to originate or to answer a call.

Therefore, the Account Manager feature, in its entirety, is nonessential to the "two-way, real-time voice communications" that comprises the principle function of FDV service. The same is true of many of the other features offered with FDV, including three-way calling, call forwarding, call scheduling, call waiting, speed dialing, Do Not Disturb, Simultaneous Ring, voicemail, and Voice Mail Screening. These features are not a necessary component of the basic voice communications service and they do not alter the fundamental nature of the voice communications service.

Q. PLEASE EXPLAIN WHY THE PACKAGE OF FEATURES OFFERED WITH FDV DOES NOT MODIFY OR ALTER THE UNDERLYING TWO-WAY REAL-TIME VOICE COMMUNICATION SERVICE.

A. The packaging or bundling of multiple services is popular in today's technology environment. So much so that what, in reality, are several distinct and independent services are often mistaken as components of a single service. In communications, this is facilitated by the GUI, which I described above. The FDV Account Manager provides an example of just such an interface. Verizon describes these features as an

integrated part of FDV,[6] but that is not correct. These features are not at all integrated or required for the "two-way, real-time voice communications" service that is its primary function.

Q. PLEASE EXPLAIN WHY THE "ACCOUNT MANAGER" FEATURES ARE NOT AT ALL INTEGRATED OR REQUIRED FOR REAL-TIME, TWO-WAY VOICE COMMUNICATIONS.

A. Users can place or receive telephone calls over the FDV service without ever accessing the Account Manager.

Q. ARE THE ACCOUNT MANAGER AND OTHER FEATURES THAT VERIZON DESCRIBES UNIQUE TO VOIP TECHNOLOGY OR SERVICES?

A. No. The Account Manager and other features offered with Verizon's FDV are not unique to VoIP technology or services. Features like those in Verizon's Account Manager have been available with TDM-based telephone service for years.

Q. PLEASE GIVE AN EXAMPLE.

A. When I was president of Z-Tel Network Services, Inc. in 1999, we created a two-way real-time voice communications service using the popular Unbundled Network Element Platform (UNE-P) available at that time, comprising the TDM network elements of Regional Bell Operating Companies, such as Verizon. We also created a GUI-based "Personal Communications Center" (PCC) which could be used to report

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[6] See Verizon Direct Testimony, page 6 at 12 – page 9 at 4

on, configure or invoke the voice communication service. Those services were packaged together as a product called a "Z-Line."

Q. PLEASE DESCRIBE Z-LINE AND ITS FEATURES.

A. Z-Tel's PCC was analogous in function to the Verizon Account Manager but was built entirely to support and interoperate with TDM-based voice communication services on the PSTN. The attached Exhibit DJM-4 describes Z-Line and its features. Significantly, virtually all of the functionality currently provided by Verizon's Account Manager was provided by Z-Tel's PCC in 1999. Z-Line features (among other things) voicemail with email notification, email attachment of the voice message file for playback on any computer, call scheduling, simultaneous ring, wireless notification, group messaging, call log viewing, GUI-based call origination (using TDM not VoIP) and remote configuration and activation/deactivation of services and features such as call blocking, call forwarding, scheduling of availability for the reception of calls, etc.. In other words, the functions and features of Z-Tel's 1999 PCC and Verizon's FDV Account Manager are virtually identical.

Q. ARE THERE OTHER FEATURES OF FDV THAT HAVE BEEN AVAILABLE WITH TDM-BASED TELEPHONE SERVICE IN THE PAST?

A. Yes.

Q. PLEASE EXPLAIN.

A. Many of the other features offered with FDV are features of or evolutionary improvements on features that have been offered with TDM-based voice service for

years. For instance, users of TDM-based voice service have long been able to "choose a telephone number from area codes and exchanges that do not on the PSTN serve [their] town." Service providers have offered such "foreign exchange" service since even well before local exchange competition. New technologies make this process considerably easier and less expensive but the appearance of the voice communications service being provided is exactly the same to the user. In another example, Verizon's Call Forwarding All Calls with Scheduling feature and Call Forwarding Selective with Scheduling are simply improvements or incremental upgrades to the call forwarding that has long been available with TDM-based voice service. And "accessing and playing back . . . voice mail messages" on "a computer or wireless device" is merely an advancement on voicemail service available with traditional TDM-based telephone service and was available with Z-Tel's service as early as 1999.

Q. DO EITHER Z-TEL'S PCC OR VERIZON'S ACCOUNT MANAGER MODIFY OR ALTER THE UNDERLYING TWO-WAY VOICE COMMUNICATION?

A. No. Neither Verizon's Account Manager nor Z-Tel's Personal Communications Center is capable of modifying or altering the two-way real-time voice communications service with which it is packaged because both the Verizon Account Manager and Z-Tel Communications Center are separate and operate independently from that service.

Q. IN ITS DIRECT TESTIMONY, VERIZON STATES (PAGE 7, LINES 14-16) THAT "ADDITIONAL [FDV] FUNCTIONS UNTETHER THE SERVICE FROM THE SINGLE GEOGRAPHIC LOCATION OF THE CUSTOMER'S SERVICE ADDRESS." DO YOU AGREE WITH VERIZON'S STATEMENT?

A. Absolutely not. I will explain. To begin, the user interface to Verizon's FDV service is not an IP interface and a FDV subscriber cannot use his or her own VoIP telephone (such as a digital phone or a SIP phone) to access the service. Verizon, in its news release attached as Exhibit DJM-3, says (emphasis added): "Right at the home, in the Optical Network Terminal, or ONT, that provides FiOS services in the home, the call is created *using a Session Initiation Protocol (SIP) process built into the ONT*. In IP talk, a 'session' is an activity using IP language and signals the IP network that a phone call is being made."

Rather, the FDV user interface is the same type of registered jack (RJ11) that traditional TDM-based telephone service subscribers have been using for years. In other words, the only way for an FDV subscriber to access the primary functionality of the service – *i.e.*, two-way real-time voice communications capability – is through the analog RJ11 interface to Verizon's Optical Network Terminal (ONT). And importantly, the ONT is permanently anchored to the customer's residence. So, the FDV service cannot be considered "untethered" from the customer's location. Because there is no IP user interface to FDV, there can be no nomadic VoIP capability (such as that found in Vonage's VoIP service) whereby the customer could, for example, take a device to different location and conduct two-way real-time voice communications through an Internet broadband connection. Unlike Vonage's VoIP

service and other nomadic VoIP services, the two-way voice communications service provided by Verizon's FDV is not geographically untethered, but rather is inextricably tied to the customer's location.

Verizon's carefully-worded testimony describing FDV, therefore, seems to leverage well-accepted traits of VoIP service, to which FDV service does not ascribe, in an apparent attempt to differentiate the service from Plain Old Telephone Service. The result is that many of Verizon's statements can be misleading, and can cause the reader to conclude that FDV is something it is not *(i.e.*, functionally different than the Plain Old Telephone Service provided using TDM circuit-switched technology, as perceived by the customer).

IV. TECHOLOGY INTERWORKING AND PROTOCOL CONVERSION

Q. PLEASE REFER TO PAGE 27 OF VERIZON'S TESTIMONY. THERE, VERIZON TALKS ABOUT CONVERTING ONE PROTOCOL TO ANOTHER. WHAT DOES THAT SUGGEST TO YOU?

A. It's not totally clear, but in a letter to the Department on November 26, 2013, Verizon stated that it was entitled to argue that a "net protocol conversion" rendered its FDV an information service. Though vague, I believe this is what Verizon is referring to on page 27.

Q. DOES THE PROVISION OF VERIZON'S FDV SERVICE INVOLVE WHAT IS KNOWN AS A "NET PROTOCOL CONVERSION"?

A. No. ***Begin Claimed Highly Sensitive Confidential*** [redacted] ***End Claimed Highly Sensitive Confidential***no net protocol conversion occurs. It is important to point out that when Verizon sends voice traffic from a FDV customer to a called party that uses TDM-based telephone service or *vice versa*, a net protocol conversion does not occur either. This is because, as discussed, Verizon FDV customers are precluded from using an IP interface to access the service. By contrast, when a subscriber to a VoIP service that uses an IP interface (*i.e.*, a digital or SIP phone) calls a party that uses TDM-based telephone service or *vice versa*, a net protocol conversion does occur.

Q. IS THAT SIGNIFICANT TO THE ISSUES IN THIS CASE?

A. No. A TDM-to-IP or IP-to-TDM protocol conversion is nothing new and does not alter the basic nature of the voice communications service that is being provided to the user (*i.e.*, the user does not perceive any change in the form or content of the voice message being transmitted). The protocol conversions occur merely to allow the incremental introduction of IP technology into the PSTN as carriers transition from TDM technology to IP. These TDM-to-IP or IP-to-TDM protocol conversions can also be thought of as internetworking conversions. That is, they occur solely within the carriers' network to facilitate the provision of the voice communications service being provided to the end user. The introduction of TDM itself required an

analog-to-digital protocol conversion in order to interconnect the analog channel-carrier systems of the old transmission facilities to the "new" (at the time) TDM facilities during the period of transition.

Q. HAVE "NET PROTOCOL CONVERSIONS" OCCURRED IN THE PAST WHEN NEW TECHNOLOGY WAS INTRODUCED INTO THE TELEPHONE SYSTEM?

A. Yes.

Q. PLEASE EXPLAIN WHAT OCCURED.

A. For example, during the transition from analog to digital technology in the 1980s, service providers needed to conduct net protocol conversions between callers using analog service and callers using digital service. Those net protocol conversions were needed simply to facilitate the introduction of digital technology into the PSTN, such as Integrated Services Digital Network (ISDN). The ISDN Primary Rate Interface (PRI) is a common interface used today to provide digital voice communications interconnections to the customer equipment (*ex.* PBXs) of commercial customers. ISDN also afforded residential subscribers access to digital technology by way of the Basic Rate Interface (BRI). BRI is also capable of providing a voice communications service interface to subscribers of the PSTN. Any of these digital services can be used to place or receive telephone calls to customers of analog voice communications service today, with the commensurate "net protocol conversion" necessarily performed by the PSTN.

Q. PLEASE GIVE OTHER EXAMPLES OF PROTOCOL CONVERSION IN VOICE CALLS.

A. Again, there is nothing unusual about voice calls undergoing net protocol conversions. Another example is that today, voice traffic among cell phones and between cell phones and wireline phones are often converted between various protocols (for example, GSM, CDMA, TDM and all-IP 4G). In fact, Verizon has announced that its wireless service is transitioning to a technology framework called Long Term Evolution (LTE) and that its wireless voice service will, in 2014, begin transitioning to Voice over LTE (VoLTE).[7] VoLTE provides support for voice communications using native IP technology. Therefore, in order for Verizon's VoLTE subscribers to reach analog or TDM-based digital subscribers, a net protocol conversion of IP-TDM will need to be accomplished. And that conversion will not change the fundamental nature of the voice service being provided.

Q. ARE THERE OTHER EXAMPLES OF WHAT YOU CONSIDER TO BE MISLEADING TECHNICAL REPRESENTATIONS IN VERIZON'S DIRECT TESTIMONY?

A. Yes. Another example of this type of misleading generalization is found in the statement (emphasis added):

> "As described more fully below, <u>VoIP converts a customer's voice into digital data packets</u> and routes the packets over IP networks, which allows

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[7] See *THOMSON REUTERS STREETEVENTS EDITED TRANSCRIPT VZ - Q3 2013 Verizon Earnings Conference Call*, page 11, available at http://www.verizon.com/investor/DocServlet?doc=3q_13_vz_transcripts.pdf

much more efficient transmission of voice calls than telephone calls carried over the Public Switched Telephone Network ("PSTN")."

Q. WHY DO YOU CONSIDER THIS STATEMENT MISLEADING?

A. It is a misrepresentation: Despite Verizon's insistence to the contrary, VoIP itself has nothing to do with transcoding a customer's voice into digital data packets. That is the function of a CODEC.

Q. WHAT IS A CODEC?

A. CODECs are used to digitally represent analog signals (such as voice) by sampling them (*i.e.*, taking a snapshot of them) at a specific rate of time.

Q. ARE CODECS A NEW DEVELOPMENT?

A. CODECs are far from new. In fact, they have been used in the PSTN for this purpose since the PSTN was transformed from analog technology to digital technology.[8] As far back as 1962 when AT&T Bell Labs introduced the T-carrier system that first supported the TDM facilities in use today on the PSTN. T-carrier ushered in the digital era, replacing the older "channel-carrier" systems that were used to carry multiple analog voice conversations by combining them on a single, physical transmission facility using *Frequency* Division Multiplexing (FDM). The TDM facilities that replaced the channel-carrier systems are digital facilities and require the use of CODECs in order to accept and transport voice communications.

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[8] See Exhibit DJM-2

Q. WHAT DOES VERIZON SAY ABOUT CODECS THAT YOU CONSIDER MISLEADING?

A. As well established as CODECs are, Verizon chooses to redefine them, stating in its direct testimony that (emphasis added) "Codecs are devices or software that encode or decode an audio signal to and from a digital data stream in IP format."[9] That statement is inaccurate, since the output of a CODEC is not a "digital data stream in IP format", but simply a quantized digital signal (1s and 0s) representing the customer's voice at a periodic sampling rate of time (usually 8000 times per second for the PSTN). A quantized digital signal is one in which many values are represented by a fixed number of bits. In the PSTN, G.711 is the CODEC normally used in which the quantization of sampled audio produces a value represented by 8 digital bits (*i.e.*, 1s or 0s). The output of a CODEC does not include anything that would identify it as comprising "IP format". In fact, it contains no IP address or anything else that would make it uniquely contained within the realm of IP technology, because it is not at all so confined. Further, IP is a networking technology. The output of a CODEC is not and, therefore, requires the assistance of a networking technology in order to be transmitted from one location to another. That choice is not limited to IP and could comprise any available digital transmission technology. Including but not limited to FDM, TDM, WDM, any radio access network (RAN) technology, or the protocols known as RTP (Real-time Transport

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[9] See Verizon Direct Testimony, page 25 at 12-13

Protocol) over UDP (User Datagram Protocol) which reside in the IP suite of protocols.

V. EFFICIENCIES OF IP TECHNOLOGY

Q. WHY DOES VERIZON USE IP TECHNOLOGY?

A. In a phrase: Verizon gains tremendous network efficiencies. IP simply provides a more efficient way to multiplex several voice conversations on a physical facility than does Time Division Multiplexing. This is directly analogous to the efficiencies gained earlier in the history of the PSTN when the newly introduced TDM functionality of T-carrier systems replaced the FDM functionality of channel-carrier systems.

Q. ARE THESE BENEFITS UNIQUE TO VERIZON'S DEPLOYMENT OF IP TECHNOLOGY?

A. No. The result of any service provider replacing TDM with IP as a network access and transport technology is an improvement in network efficiencies, a reduction in network complexity and a reduction in the complexity of business/administrative processes necessary to support the user service – in this case, voice communications. Virtually all competitive facilities-based providers have long-recognized these benefits and either built their networks using IP technologies or are rapidly converting them to IP for these very reasons. This manner of technology transition is nothing

new to the PSTN. As we have seen, the history of the PSTN is replete with examples of just such technical advancements in its evolution.

Q. YOU MENTIONED THAT IP PROVIDES A MORE EFFICIENT WAY TO MULTIPLEX THAN TDM. CAN YOU EXPLAIN?

A. The Oxford dictionary defines multiplex[ing] as "involving simultaneous transmission of several messages along a single channel of communication."[10] Through the use of its addressing structure, where every endpoint (called a host) is given its own IP address, and traffic to and from many hosts is transported concurrently over a "single channel of communication" (*i.e.* a single pathway on a single physical facility), IP technology epitomizes multiplexing.

Q. HOW DOES THE MULTIPLEXING FUNCTION OF IP DIFFER FROM TDM MULTIPLEXING?

A. Very little. Interestingly, the multiplexing function of IP technology is different from that of TDM only in the length of time it allocates the facility to the individual packets of each stream of user information it is transporting. In other words, IP is accurately described as a *time division multiplexing* technique where the length of time that 100% of the facility is given to each packet of user information is the length of time necessary to transmit it. In IP, the capacity of that physical facility can be shared among as many streams of user information as can be supported at the service level expected.

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[10] See definition available at http://www.oxforddictionaries.com/us/definition/american_english/multiplex

Conversely, in the familiar form of TDM (on the PSTN), each stream of user information is given access to 100% of the facility for the same (fixed) length of time. For a normally configured T-1 supporting voice transmission, that is approximately $1/24^{th}$ of a second. Hence, 24 streams of user information (calls) is the maximum number that can be handled by a T-1 so configured.

Q. WHAT OTHER EFFICIENCIES DOES IP TECHNOLOGY PROVIDE OVER TDM?

A. While TDM indeed provides efficiencies gained by using a single physical facility to transport multiple telephone calls (as well as other, unrelated services within segregated pathways), the technology, by itself, provides no means to convey other information, such as the ultimate origination and destination point of each digital segment of voice conversation being transmitted. With IP technology, that information can be added to the beginning of the voice conversation segments as a "header." The result is an IP packet. Using this practice (or protocol), facilities transporting IP packets can convey all manner of customer data that would need to be transmitted, say, between Boston and Washington, D.C., with each packet possibly identifying different final destinations, but with that part of the route in common. With advancements in optical fiber capacity that allow a single facility to carry ever-increasing traffic loads, Verizon (or any facilities-based carrier for that matter) is, thereby, able to take advantage of vast scale economies in its transport network. Further, VoIP traffic can be carried with other IP traffic, as well as traffic using

protocols other than IP, with each on individual, isolated pathways of the same physical facilities so the scale economy advantage extends to network equipment as well. Finally, because these technologies, themselves, make it possible for multiple streams of IP traffic to be isolated from each other while riding the same physical facilities, access networks as well as transport networks benefit.

Q. YOU MENTIONED THAT VOIP TRAFFIC CAN BE CARRIED WITH OTHER IP TRAFFIC. SIMILARLY, VERIZON STATES (ON PAGE 10, LINES 20-21) THAT IP NETWORKS CARRY VOICE AND NON-VOICE TRAFFIC. DOES THIS FACT CHANGE THE FUNDAMENTAL NATURE OF THE VOIP SERVICE BEING PROVIDED TO THE USER?

A. No. As explained above, even if VoIP traffic and IP data traffic (such as Internet traffic) are transmitted over the same physical facility, the VoIP service is fully isolated from the Internet service and neither is aware of the existence or presence of the other. Much like a single copper cable that binds hundreds of individual copper pairs, with each operating independently of the other as individual pathways and some operating as multiplexed facilities comprising multiple, discreet pathways (*e.g.*, a PRI), the logical communication pathways of modern physical facilities (such as optical fiber, etc.) are fully isolated from each other. While one isolated pathway may carry Internet traffic, another may carry broadcast television while still another may carry the IP traffic of Verizon's FDV service. As I stated earlier in my testimony, this isolation is well-publicized by Verizon in documents such as its news release explaining how FDV works.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

Exhibit DJM-1

DAVID J. MALFARA, SR.

PROFESSIONAL EXPERIENCE

ETC GROUP, LLC – REUNION, FL **2008 – PRESENT**

PRESIDENT/CEO

President and CEO of business management and technology consulting company leveraging significant experience in the management, operation and deployment of a wide range of business practices and emerging technologies to support the evolving business models of telecommunication and broadband service providers. Directs strategic business/business line creation, financial modeling, planning & design as well as development, adaptation and deployment of next-generation technologies, networks and organizational models for the company's carrier/service provider clients.

CONTINUING WORK AND NOTABLE ACCOMPLISHMENTS

- Currently engaged as engineering subject matter expert for certain U.S. service providers in developing suggested framework for inter-carrier interconnection of IP networks under Title II of the Telecom Act for telecommunications services so regulated.
- Currently engaged in national rollout of certificated service provider operations for multi-billion dollar global organization.
- Currently engaged in due diligence evaluations of several U.S. broadband service providers for possible acquisition, funded by leading U.S. private equity firm.
- Periodic guest lecturer at the University of Pittsburgh, Graduate Program for Telecommunications and Networking.
- Guest lecturer at the Michigan State University Institute of Public Utilities "Camp NARUC", which is an educational venue where state public utility commissioner and staff learn about business, technical and regulatory issues influencing the domestic market.
- Provided engineering subject matter expertise, assisting national service provider association in the development and submission of amicus brief for current U.S. Supreme Court case involving Incumbent Local Exchange Company (ILEC) obligations under the Telecom Act.
- Engaged as business and engineering subject matter expert, assisting national service provider association in the strategic development and presentation of opposition arguments to Incumbent Local Exchange Company (ILEC) copper loop retirement initiatives, within FCC proceedings, by outlining the technological advancements, and benefits of Ethernet First-mile Copper technologies with respect to ubiquitous broadband availability throughout the U.S.
- Developed business case and go-to-market plan for a Midwest U.S. service provider to deploy new, innovative business model using Public Computer Center and Sustainable Broadband Adoption strategies, including development and submission of applications, totaling ~ $15M, filed under those categories of the American Recovery And Reinvestment Act (ARRA), U.S. Department of Commerce NTIA BTOP Program to drive broadband subscribership launch and growth.
- Developed business case and go-to-market plan for a Southeast U.S. service provider to expand current

wireless broadband network in rural areas of the Southwest U.S. from 32,000 to 350,000 square miles including development and submission of three applications, totaling ~ $53M, filed under the ARRA U.S. Department of Agriculture RUS/BIP Stimulus Program Last-mile category.

- Developed Layer-2 architecture design and economic feasibility model for Puerto Rico Service Provider using Carrier Backbone Bridging technology, migrating from MPLS transport.
- Worked on behalf of a broadband service provider and the FCC's Omnibus Broadband Initiative team to find innovative ways to apply finer and more dynamic granularity to current RF spectrum rules for the 3.65 GHz, 5 GHz and TV "white spaces" bands for rural areas of the U.S.

REMI COMMUNICATIONS HOLDINGS, LLC – GREENSBURG, PA **2001 – 2008**

PRESIDENT/CEO/CTO

President, CEO, CTO and co-founder of certificated telecommunications service provider (carrier) offering broad-ranging, basic and advanced communication and IMS-based application services over its Carrier Ethernet, QoS-based network infrastructure, to commercial customers throughout the Northeast US. Led the firm's Professional Services team in designing/developing/deploying complex business models for technology-oriented clients.

NOTABLE ACCOMPLISHMENTS

- Led the efforts to deploy one of the first business models in the U.S utilizing carrier-class Ethernet in the First Mile (IEEE 802.3ah) metro networks to support commercial demand for private broadband networking.
- Designed/developed and deployed the business model and network, based upon emerging VPLS technology, to support the telecommunication needs of the company's large-scale enterprise customers who desired exclusive and proprietary control of their Layer-3 (IP) domain.
- Built and led project management and product certification for proof-of-concept level research lab exploring emerging technology products in provider network Layer-2 access/transport architectures as well as Voice over IP (VoIP) and IMS application platforms.
- Negotiated and led initiatives wherein company acted as "Beta" carrier-customer for several network equipment vendors in testing technologies comprising access, transport and application systems.
- Led the Professional Services team that was awarded a contract to completely re-design the municipal fiber network of the City of Philadelphia in order to accommodate emerging requirements for growth in both scale and scope. Successfully presented network design based on WDM at Layer-1 and PBB (802.1ah) Layer-2 transport.

Z-TEL NETWORK SERVICES, INC (ZNS) – TAMPA, FL **1998 – 2001**

PRESIDENT

Founding president of one of the nation's largest residential UNE-P (Unbundled Network Element – Platform) CLECs of the time at year-end 2000, achieving annualized revenue of nearly $300 Million with more than 340,000 subscribers. ZNS was the largest operating subsidiary of Z-Tel Technologies, Inc. (Nasdaq: ZTEL) which launched a successful Initial Public Offering in late 1999. In early 2000, ZTEL achieved a market capitalization in excess of $1.2 Billion.

NOTABLE ACCOMPLISHMENTS

- Created, deployed and managed a successful (and one of the largest scale) business model for a nation-wide Competitive Local Exchange Carrier operating under the newly enacted Telecommunications Act of 1996 (TA96).
- Built and led the executive team that built a 2400 employee work force from zero, including all network design and business operational support systems to handle a workflow of more than 22,000 telecommunications services orders per month.
- Negotiated and operated under one of the first Inter-connection Agreements (ICAs) with Regional Bell Operating Companies under TA96.
- Participated in many national public policy initiatives to promote a pro-competitive telecommunications regulatory environment in federal and state venues.

PENNSYLVANIA ALTERNATIVE COMMUNICATIONS, INC – GREENSBURG, PA 1983 – 1997

CHAIRMAN/CEO

(Pace Long Distance/Pace Network Services)

Chairman, CEO and founder of nationwide telecommunications service provider. Formed shortly after the Divestiture of AT&T, Pace Long Distance began as a regional long distance company in the Pittsburgh, Pennsylvania area and grew to a nationwide company serving residential and business customers throughout the U.S. prior to its sale to LCI International (now Qwest) in 1997. Pace Network Services began operations in 1994 as a provider of SS7 signaling services (ISUP & TCAP) to the inter-exchange carrier (IXC) market and grew to be the largest provider of SS7 STP services to that carrier community with more than 100 carrier-customers prior to its sale to ICG Telecom Group (now Level3) in 1997.

NOTABLE ACCOMPLISHMENTS

- Created one of the first post-divestiture, competitive long distance companies using the newly-introduced ENFIA and, later, Feature Group D access services of the LECs in order to achieve parity ("equal access") to AT&T in providing long distance telephone services.
- Launched Toll-free Portability services for commercial customers using the newly created SMS Database for toll-free long distance services as a "RespOrg" (certified Responsible Organization).
- Deployed Advanced Intelligent Network (AIN) services within the network using Digital Switch Corporation (now Alcatel) Intelligent Peripheral platform.
- Created and deployed nationwide, wholesale SS7 signaling network and business model
- Negotiated and closed the sale (with federal and state regulatory approvals) of the two nationwide telecommunication carriers (PLD & PNS) to publicly traded acquirers.

EDUCATION

University of Toledo/Bowling Green State University • Technical/Business Courses

More than 30 Business Management Courses (various)

More than 20 Technical Certifications in Telecommunications (various)

BOARDS & MEMBERSHIPS

TransWorld Networks Corporation

Member – Executive Advisory Board

YourTel America, Inc.

Former Member – Executive Advisory Board

The Institute of Electrical and Electronics Engineers

Senior Member – Orlando Section

Senior Member – IEEE Communications Society, IEEE Information Theory Society, IEEE Standards Association

Competitive Telecommunications Association

Professional Associate Member

Former Member – Board of Directors, Executive Committee

Former Chair – Technology Task Force

North American Numbering Council

Former (founding) Member – NPAC Local Number Portability Administration Selection Working Group

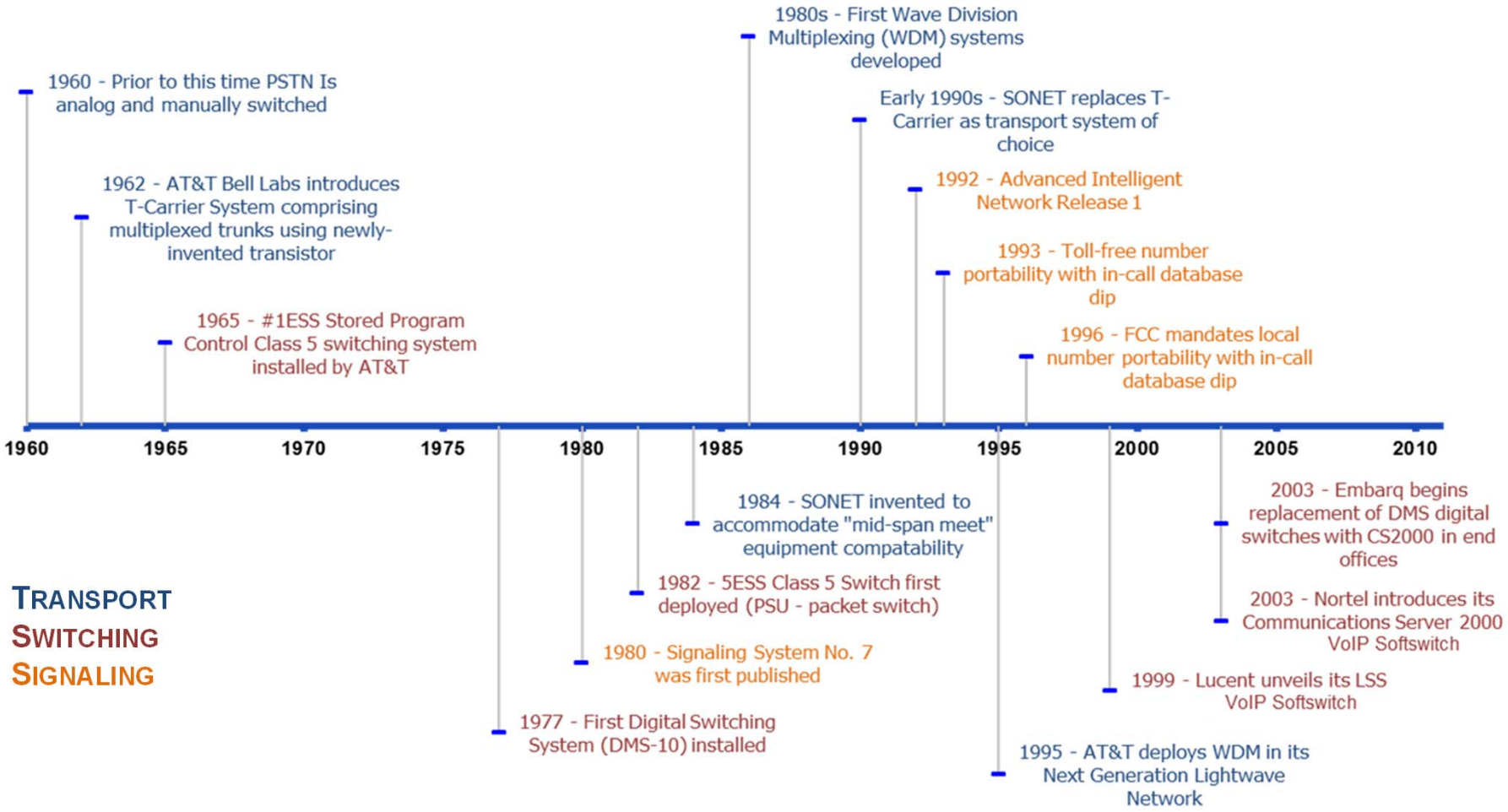
PRESENTATIONS & PUBLICATIONS

- "Broadband Investment in Rural Areas" (Aug, 2013 - Michigan State University, Institute of Public Utilities)
- "Enabling Architectures – Protocols and Frameworks for Today's Service Provider Networks" (Aug, 2013 - Michigan State University, Institute of Public Utilities)
- "The Transition to an All-IP Network: A Primer on the Architectural Components of IP Interconnection" (May, 2012 - National Regulatory Research Institute)
- "Keeping Up With Emerging Technologies: The Impact of New Trends on Your Business" (October, 2011 - COMPTEL)
- "Facilities-Based First-Mile Strategies – An Adaptive Approach To Customer Access" (June, 2011 - COMPTEL)
- "IP Multimedia Subsystem (IMS) – The Carrier-Grade Challenge To OTT Services" (May, 2011 - COMPTEL)
- "IP Interconnection For Managed VoIP – Interconnecting Next Generation Network Service Providers " (April, 2011 - COMPTEL)
- "Enterprise IP Telephony Architectures for the Service Provider Network" (March, 2011)
- "Enabling Architectures – Business/Technology Models For Today's Service Provider Networks" (January, 2011 - COMPTEL)
- "IP Interconnections" (September, 2010 - COMPTEL)
- "Emerging Technology: Generating Revenue With Innovative Products And Services" (October, 2009 - COMPTEL)
- "Best Choices for Evolving Enterprises" (October 2007 - ThinkerNet)
- "Next-Generation Communication Networks – Ensuring QoS and Security In A Converged World" (October, 2006 - COMPTEL)
- "The Alternate Access Universe – Options for the UNE Transition" (March, 2006 - COMPTEL)
- "Making Carrier IP Networks a Reality" (October 2003 - COMPTEL)
- "Signaling System & Database Interconnection – Gaining Access To The Logical Network" (February, 2003 - COMPTEL)

The above publications appear(ed) in various trade journals, association-based conference media, subscription-based websites and magazines. I have also co-authored several documents (Comments, Ex Parte filings, etc.) filed with state regulatory commissions and the Federal Communications Commission in multiple proceedings, with some including whitepapers I have authored.

Exhibit DJM-2

PSTN Historical Technological Evolution



SOURCE: ETC GROUP – INTERNAL RESEARCH

Exhibit DJM-3

News Center Home Page

FiOS Digital Voice: Here's How It Works

Verizon's Private, Managed IP Network Links Customers' Homes to Softswitch and Applications Server, Enabling Innovative Services

News Release ShareThis

BASKING RIDGE, N.J. – June 3, 2010 – To understand the features and quality of FiOS Digital Voice, you first need to know that the service is not the same as the services you get with a little Internet adapter for your modem and phone, and it does not ever touch the public Internet.

What it is instead is a versatile, reliable voice service from Verizon that completes the FiOS service picture and offers customers many new, innovative features.

FiOS Digital Voice uses an IP (Internet protocol)-based network of its own for calling and feature delivery, engaging the regular phone network only when a FiOS Digital Voice customer needs to call a user who's on the traditional network - or vice versa. Otherwise, it's a completely new system that leverages the features of IP-based call control and will be able to leverage the many features and innovations that will be devised in the future. IP is a data format used by the Internet but actually represents a universal format that allows integration between IP-enabled systems, hardware and software.

Today, when callers using a traditional phone network pick up the phone to make a call, they activate a dedicated circuit into the public phone system and then dial a number to give a computerized switching system instruction about whom to call. The switching system then uses a data link to set up and deliver the call over Verizon's or another carrier's circuit-switched network.

Before FiOS Digital Voice, a call made on a FiOS line was processed almost the same way. The only difference was that the link from the customer to the switching central office was carried over the FiOS fiber.

FiOS Digital Voice changes all that.

Right at the home, in the Optical Network Terminal, or ONT, that provides FiOS services in the home, the call is created using a Session Initiation Protocol (SIP) process built into the ONT. In IP talk, a "session" is an activity using IP language and signals the IP network that a phone call is being made.

The SIP signaling is made over Verizon's private IP-based network to new "softswitches," which provide the service and control to establish voice communications to other FiOS Digital Voice customers, or to traditional phone customers. These advanced softswitches also provide for all of the new features that can be applied to the call. (See list in main release).

"Verizon's long-haul network had already run on packet-switching technology," said Eric J. Bruno, vice president for Verizon consumer product management and development. "What FiOS Digital Voice does is push that functionality and design right to the home for better efficiency and to add new features to the design."

Beyond the calling-oriented functionality, there is future magic in IP telephony. Because it is IP-based, many other IP-based systems can be interconnected with it. For instance, a contact list on a computer can be synced to the phone line and specific features activated based on cross play between the ringing phone and the contact name and number.

Verizon Communications Inc. (NYSE, NASDAQ:VZ), headquartered in New York, is a global leader in delivering broadband and other wireless and wireline communications services to mass market, business, government and wholesale customers. Verizon Wireless operates America's most reliable wireless network, serving nearly 93 million customers nationwide. Verizon also provides converged communications, information and entertainment services over America's most advanced fiber-optic network, and delivers innovative, seamless business solutions to customers around the world. A Dow 30 company, Verizon employs a diverse workforce of more than 217,000 and last year generated consolidated revenues of more than $107 billion. For more information, visit www.verizon.com.

####

Media Contact:

Jim Smith, 908-559-3477
Cliff Lee, 518-396-1095

Exhibit DJM-4

Your Personal Communications Center

Z-Line

Your Z-Line Personal Communications Center provides an integrated communications package.

You get a personal communications center on the web to manage messages, place calls, update directories, and change configurations for your phone service…

and you can use the service seamlessly from any phone or the web….

Your Personal Communications Center

Z-Line

Your Z-Line Personal Communications Center includes the following Messaging services:

Voice Mail - *a voice inbox for receiving and storing your messages*

Notify Me - *a notification service that alerts you via email or pager when you receive a voice mail message*

* **Email -** *sending and receiving email through the myzline.com interface*

* **Fax -** *sending and receiving fax mail through the myzline.com interface*

* **Paging** - *direct member paging*

* *coming soon*

Your Personal Communications Center

Z-Line

Your Personal Communications Center

Z-Line

Your Z-Line Personal Communications Center includes the following Calling services:

Find Me - *a call connection feature that allows you to link your Z-Line to your existing phone numbers*

Web Dial - *initiates calls from the web (over the PSTN - Public Switched Telephone Network)*

* **Conference -** *bridging multiple parties onto a single call*

* **Call History -** *inbound and outbound call listing*

** coming soon*

Your Personal Communications Center

Z-Line

Your Z-Line Personal Communications Center includes the following Address Book services:

Contacts - *maintains your personal address book for adding, editing and deleting contacts*

Lists - *allows you to organize your contacts into messaging distribution lists*

Synchronize - *imports contacts from other applications (Outlook, etc.)*

General Directory - *searches for other Z-Line members*

Refer Others- *email engine for generating referral messages to build your community*

Your Personal Communications Center

Z-Line

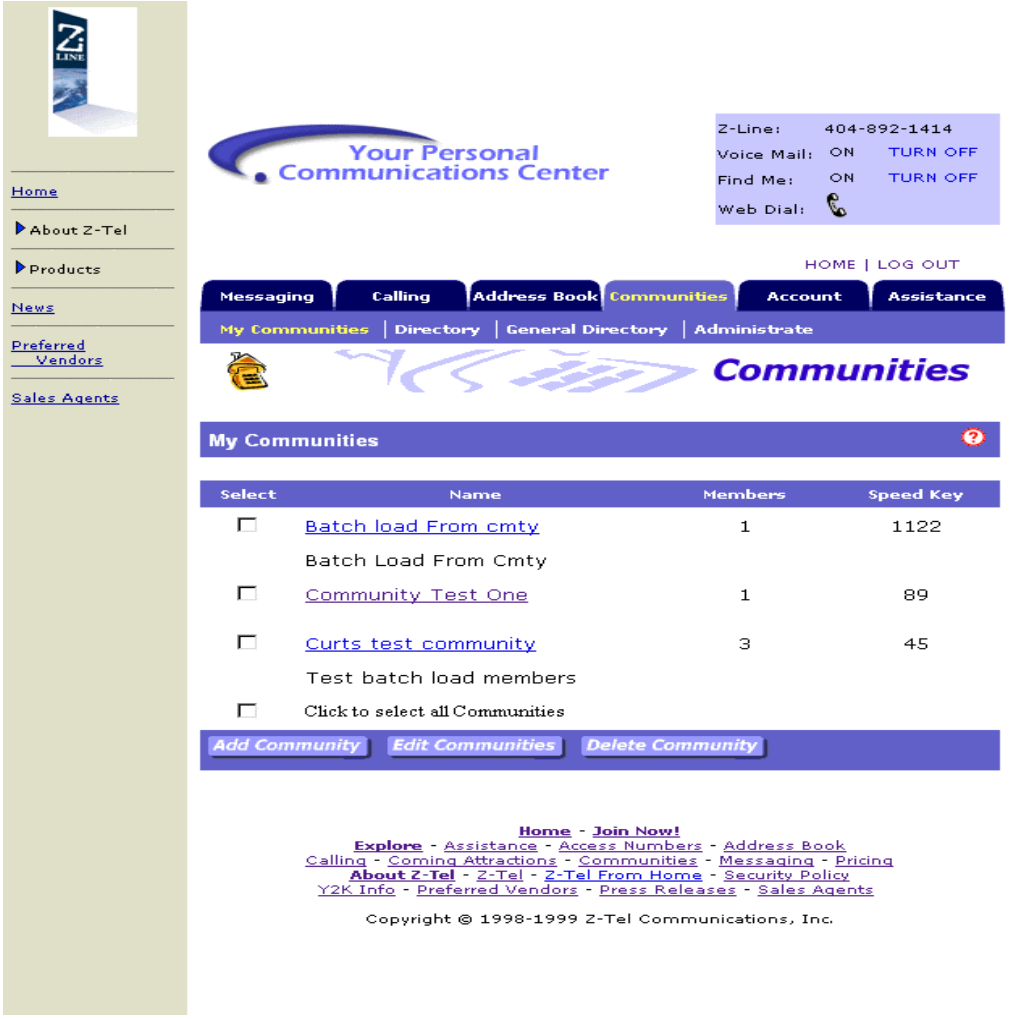
Your Z-Line Personal Communications Center includes the following Communities services:

My Communities - *create and build your own communities*

Directory - *searches for other Z-Line communities*

General Directory - *searches for other Z-Line members*

Administrate - *interface for maintaining communities*



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Your Personal Communications Center

Z-Line

Your Z-Line Personal Communications Center includes the following Account services:

My ID - *maintenance of security identification*

I'm @ - *ten most frequent numbers for calling and configuration*

Fast Access - *caller ID technology to authenticate telephone access*

Profile - *maintains address and billing information*

Statements - *on-line summary and detailed statement information*

* **Current Month** - *near real-time call detail*

** coming soon*

Your Personal Communications Center

Z-Line

Your Z-Line Personal Communications Center includes the following Assistance services:

User Guide - *help and instructions for using your Z-Line*

Contact Us - *email and Live Chat with a customer care associate*

Access Numbers - *listing of local and toll free Z-Line access numbers*