

STATE OF NEW HAMPSHIRE  
BEFORE THE  
PUBLIC UTILITIES COMMISSION

DT 09-044

New Hampshire Telephone Association  
Petition for an Investigation into the Regulatory Status of  
IP Enabled Voice Telecommunications Services

DIRECT TESTIMONY OF  
VALERIE WIMER  
ON BEHALF OF  
THE NEW HAMPSHIRE TELEPHONE ASSOCIATION

1 **I. INTRODUCTION**

2 **Q: PLEASE STATE YOUR NAME, OCCUPATION, AND PLACE OF BUSINESS.**

3 A: My name is Valerie Wimer. I am employed by John Staurulakis, Inc as Director  
4 New Business Development. JSI is a telecommunications consulting firm. My  
5 office is located at 7852 Walker Drive, Greenbelt, MD 20770. JSI has provided  
6 telecommunications consulting services to rural local exchange carriers since 1963.

7 **Q: PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE AND**  
8 **EDUCATIONAL BACKGROUND.**

9 A: I have been employed by John Staurulakis, Inc. (JSI) since 1997. As Director of New  
10 Business Development, I am responsible for helping rural companies offer new products  
11 and prepare for competition. In this position, I have also been involved in negotiating  
12 many interconnection agreements between CLECs and ILECs.

13  
14 Prior to my employment at JSI, I worked for Southern New England Telephone (SNET)  
15 for eighteen years. I started my career in outside plant engineering where I was  
16 responsible for the planning of the economic placement of facilities to meet customer  
17 growth. I held several manager positions in switching operations, procurement, and  
18 network planning prior to being promoted to Director of Transmission Engineering. In  
19 that position, I was responsible for transmission performance, equipment testing, and  
20 microwave engineering. After eighteen months in that position, I moved to the  
21 Marketing and Product Management Department to plan and implement emerging

1 technology-based products including ISDN, SS7, and small business Centrex products. I  
2 was responsible for quantifying customer demand, translating that information into a  
3 product definition, identifying the cost and price of the service, and implementing the  
4 service across all the operations departments. Following that period, I was Director of  
5 Network Architecture for two years. In this capacity, I was responsible for the planning  
6 and deployment of new switching, signaling, trunking, and outside plant network  
7 technologies in Connecticut. This included evaluating the distribution of tandem  
8 switches and the migration to host/remote switch architecture. After that, I was Director  
9 of Network Services for three years. In this capacity, I was responsible for the  
10 development and implementation of SNET's corporate policies governing local  
11 competition in Connecticut. I supervised wholesale marketing and the development of  
12 Section 252 interconnection agreements. I was the SNET technical and marketing  
13 witness for several dockets relating to the development of competition in Connecticut. I  
14 also managed a CLEC users group for SNET, which educated CLECs on local service  
15 operations and solicited input from the CLEC industry regarding operational  
16 requirements.

17  
18 I graduated with honors from Cornell University with a BS in engineering. I completed  
19 Executive Engineering Education at Stanford University, Continuing Engineering  
20 Courses at George Washington University, and SNET's Advanced Management  
21 Development Program.

1 **Q: HAVE YOU EVER TESTIFIED IN NEW HAMPSHIRE?**

2 A: Yes. I have testified in case DT 00-233, Investigation as to Whether Certain Calls  
3 are Local, and DT 08-013, Comcast Phone of New Hampshire, LLC Request for  
4 Authority to Provide Local Telecommunications Services

5 **Q: ON WHOSE BEHALF ARE YOU TESTIFYING?**

6 A: I am testifying on behalf of the members of the New Hampshire Telephone  
7 Association, excluding any affiliates or subsidiaries of FairPoint Communications,  
8 Inc. (collectively, the "RLEC Representatives").

9 **Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

10 A: My purpose in providing this testimony to the New Hampshire Public Utilities  
11 Commission ("Commission" or "PUC") is to establish (1) that the Comcast Digital  
12 Voice and Time Warner Cable ("TWC") Digital Phone services ("Cable VoIP")  
13 provide the same service that the RLEC's provide to end user customers; (2) that  
14 this service differs from the VoIP service that is provided by "over the top" Voice  
15 over Internet Protocol ("VoIP") providers such as Vonage; (3) that the networks of  
16 the RLECS, Comcast<sup>1</sup> and TWC<sup>2</sup> all perform the same basic functions and that,  
17 while the technologies used to accomplish these functions may differ slightly, the  
18 result is the same; (4) that the services provided by Comcast and TWC meet the  
19 definition of a telecommunications service under federal law and of a public utility  
20 under state law; and (5) that both the RLECs and Cable VoIP providers offer  
21 enhancements to their basic service but that these enhancements do not change the  
22 characteristics of the underlying basic service.

23

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<sup>1</sup> Unless a specific entity is referenced, "Comcast" refers to any and all affiliates of Comcast Corp. that are involved in the provision of the Comcast Digital Voice service.

<sup>2</sup> Unless a specific entity is referenced, "TWC" refers to any and all affiliates of Time Warner Cable, LLC that are involved in the provision of the Time Warner Cable Digital Phone service.

1 **II. THE RLECS' LOCAL EXCHANGE SERVICE IS THE SAME AS THE VOIP**  
2 **SERVICE PROVIDED BY COMCAST AND TWC FROM THE END USER**  
3 **PERSPECTIVE.**  
4  
5

6 **Q: WHAT SERVICE DOES THE END USER CUSTOMER PURCHASE?**

7 A: Comcast IP Phone, TWC Digital Phone and the RLECs all offer customers the ability to  
8 make calls and receive calls from any other telephone number. All the companies have  
9 rate plans that have unlimited local calling and a limited amount of toll calling for a flat  
10 rate.<sup>3</sup> In addition, Comcast, TWC, Granite State Telephone, Inc. and the TDS  
11 Companies<sup>4</sup> (the latter two being NHTA members) offer a bundle of voice service that  
12 allows customers to have unlimited local and long distance calling. All of the companies  
13 offer a list of several calling features such as call forwarding, call waiting, and call  
14 rejection.

15  
16 Comcast, TWC and Granite State have features that allow the customer to manage their  
17 calls dynamically with features such as "Follow Me" or "Find Me" service, receive voice  
18 mail messages on their email and manage their features, billing and other account  
19 information via their respective web portals.<sup>5</sup> TDS has a web portal that allows  
20 customers to order services and provides on-line billing services. Comcast, TWC and  
21 Granite States' web portals allow customers to receive message and call notifications on

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<sup>3</sup> See Comcast Frequently Asked Questions, attached as Exhibit VW 1-1, and TWC Digital Phone Calling Plans, attached as Exhibit VW 1-2.

<sup>4</sup> Hollis Telephone Company, Inc., Kearsarge Telephone Company, Merrimack County Telephone Company, and Wilton Telephone Company, Inc.

<sup>5</sup> See Comcast Response to Staff Data Request 1-38 ("Comcast Response"), TWC Digital Phone Response to Staff Data Request 1-38 ("TWC Response"), and Granite State website, [www.granitestatetelephone.com/telephone.php](http://www.granitestatetelephone.com/telephone.php). (Responses referenced in this testimony are contained in Exhibits VW 1-5 (for Comcast) and VW 1-6 (for TWC.))

1 devices other than the telephone and access their account information.

2  
3 **Q: PLEASE DESCRIBE AND COMPARE HOW AN END USER MAKES A CALL**  
4 **ON CABLE VOIP AND TRADITIONAL LOCAL EXCHANGE SERVICES.**

5 **A:** The end user experience in making and receiving calls is the same for Cable VoIP and  
6 regulated local exchange service. When customers make a call, they pick up a phone,  
7 hear a dial tone, and dial the number of the person they want to call. When the called  
8 party answers the phone, the two parties talk. The customers hear the same audio  
9 indicators such as a busy signal, call waiting tone, and other signals to communicate the  
10 call status with the caller. The end users take no additional or different actions in placing  
11 and receiving Cable VoIP calls than they do with regulated local exchange calls.

12  
13 **Q: IS MOVING THE LOCATION THAT THE CUSTOMER CAN MAKE AND**  
14 **RECEIVE CALLS A FEATURE OFFERED TO END USERS BY COMCAST OR**  
15 **TWC?**

16 **A:** No. Neither Comcast nor TWC list any type of mobile (or “nomadic”) capability on their  
17 web portals or residential service agreements. Additionally, both state that the customer  
18 may not move the eMTA (described below), which is not owned by the Customer.<sup>6</sup>

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<sup>6</sup> See Exhibit VW 1-3, Comcast Service Agreement for Residential Customers (found at [http://www.comcast.com/MediaLibrary/1/1/About/PhoneTermsOfService/PDF/DigitalVoice/SubscriberAgreement/UnifiedLegal\\_CT-NH-ME-MA-NY-VT\\_18.pdf](http://www.comcast.com/MediaLibrary/1/1/About/PhoneTermsOfService/PDF/DigitalVoice/SubscriberAgreement/UnifiedLegal_CT-NH-ME-MA-NY-VT_18.pdf)) (“Comcast Residential Agreement”) (“You will not use the Comcast Equipment at any time at an address other than the Premises without our prior written authorization.” See Exhibit VW 1-4, TWC residential service agreement (found at [http://help.twcable.com/html/twc\\_sub\\_agreement.html](http://help.twcable.com/html/twc_sub_agreement.html)) (“TWC Residential Agreement”) (“I will not, nor will I allow others to, open, alter, misuse, tamper with or remove the TWC Equipment as and where installed by TWC or use it contrary to this Agreement”).

1 **Q: DO CUSTOMERS PURCHASE SPECIALIZED CUSTOMER PREMISES**  
2 **EQUIPMENT (“CPE”) WHEN PURCHASING COMCAST OR TWC VOICE**  
3 **SERVICE?**

4 **A:** No. Customers use their own telephones. The eMTA that interfaces with the Comcast  
5 and TWC network is provide by Comcast<sup>7</sup> or TWC<sup>8</sup> without a separate charge.  
6 Customers do not have an option to purchase their own IP phones. IP phones, such as a  
7 SIP phone, do not operate with the TWC service.<sup>9</sup> Comcast does not eliminate the  
8 possible use of a SIP phone but does not provide a SIP interface in its technical  
9 specifications.<sup>10</sup> However, Comcast does not allow end users to purchase their own  
10 eMTA.<sup>11</sup>

11  
12 **Q: IS THERE A DIFFERENCE TO THE END USER WHEN PURCHASING**  
13 **SERVICE FROM OVER-THE-TOP VOIP PROVIDERS SUCH AS VONAGE?**

14 **A:** Yes. With Vonage, the customer is able to move their service from one location to  
15 another at any time. The customer only needs access to a broadband connection from any  
16 source such as cable modem service, DSL service, WiFi, Hot Spot or a corporate  
17 network. The customer must also purchase a terminal adapter to interface with the  
18 Vonage service, either from a third party or from Vonage, or rent the device from  
19 Vonage. The terminal adapter is not provided as part of the service.

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<sup>7</sup> Comcast Response 1-5

<sup>8</sup> TWC Response 1-5

<sup>9</sup> TWC Response 1-2.

<sup>10</sup> See Comcast TM402 Users Guide for specifications.

<sup>11</sup> Comcast Response 1-8.

1 **II. COMCAST, TWC AND THE RLEC VOICE NETWORKS PERFORM THE**  
2 **SAME FUNCTIONS**  
3  
4

5 **Q: PLEASE DESCRIBE IN GENERAL THE TECHNICAL FUNCTIONS THAT**  
6 **ARE REQUIRED TO COMPLETE CABLE VOIP CALLS AND RLEC**  
7 **REGULATED CALLS.**

8 **A:** A customer uses a telephone set that the customer owns to transmit voice and dialed  
9 telephone numbers to the network. The dialed telephone numbers are used to designate  
10 the called party and determine how to route the call.<sup>12</sup> The telephone set is connected via  
11 a “loop” over which the voice call is transmitted to a switching center. The switching  
12 center determines how to route the voice call based on software instructions acting on the  
13 dialed telephone number. The voice call is connected either to a customer on the same  
14 switch or to another switch that serves the telephone set associated with the dialed  
15 number. If the call is between switching centers, or what is known as an inter-switch  
16 call, the call will travel over a series of interoffice transport trunks and through one or  
17 more switches until it reaches the switch connecting to the loop of the terminating  
18 telephone set. The call is sent down the loop to the terminating customer’s telephone set  
19 and the telephone set rings. If the terminating customer answers the ring, the two  
20 customers can talk.

21  
22 This describes the basic functions that are required to complete the call. The exact  
23 manner in which the functions are performed varies with the particular technology used.

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<sup>12</sup> The switch uses the telephone number either directly or indirectly, e.g. in some cases the telephone number is translated into an IP address for routing.

1 Digital equipment performs functions differently than analog equipment. Packet  
2 switches perform functions differently than circuit switches.<sup>13</sup> Although the actual  
3 method of performing the functions differs, the overall network achieves the same result:  
4 voice calls are originated and terminated in real time across a distance.  
5

6 **Q: PLEASE DESCRIBE HOW THE CABLE VOIP NETWORK AND REGULATED**  
7 **RLEC NETWORK PERFORM THE VARIOUS CALLING FUNCTIONS.**

8 A: I will describe the networks using the five major functional pieces of the call, which are:  
9 customer premises equipment (“CPE”) which, in the majority of cases, is a telephone, the  
10 loop, switching, signaling and transport.  
11

12 **Q: PLEASE DESCRIBE THE CPE.**

13 A: CPE for residences are telephones and modems that customers can purchase from any  
14 retail outlet or from the service provider.<sup>14</sup> The vast majority of customer owned  
15 telephones use analog transmission. These analog phones are exactly the same for Cable  
16 VoIP and regulated RLEC service. The analog phone changes the audio voice into an  
17 electrical signal that can be transmitted though the network. It also transmits dialed  
18 telephone numbers via tones or pulses to the network. Businesses have a wider variety of  
19 CPE that is purchased by the customer: telephones, key systems, PBXs, routers and a

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<sup>13</sup> A circuit-based digital signal dedicates an entire channel to the call for the full duration of the call. A packet signal breaks the call into small pieces, or “packets,” and transmits the packets separately. Each packet in a call can take a different path to the end point and does not monopolize the path for the duration of the call. Because of these characteristics, packet switching usually requires fewer facilities.

<sup>14</sup> Many service providers sell analog or digital telephones. In addition, over-the-top providers such as Vonage sell IP CPE directly to customers. Once this equipment is sold, it is owned and maintained by the customer.

1 multitude of other devices that connect both voice and data devices to the network.

2 Business systems such as key and PBXs are typically digital or packet based. Newer  
3 business systems are often IP packet based, but may still interface with the network in a  
4 non-IP format.

5  
6 **Q: ARE THERE OTHER DEVICES LOCATED ON THE CUSTOMER PREMISES**  
7 **THAT ARE NOT OWNED OR SELECTED BY THE END USER?**

8 A: Yes. When implementing Fiber to the Home (FTTH), the RLECs provide a battery to  
9 maintain power to the Optical Network Unit (described below) during a commercial  
10 power failure. The battery is located within the premises but owned and maintained by  
11 the RLEC. The customer can not choose the battery type. In addition, some deregulated  
12 portions of telecommunications companies have provided equipment on the customer  
13 premises such as a frame relay assembler/disassemble (FRAD) that provides an enhanced  
14 service to the customer.

15  
16 Similarly, Cable VoIP providers have a device called an embedded Multimedia Terminal  
17 Adaptor (“eMTA”) that is located on the customer premises but is not owned, maintained  
18 or selected by the customer.<sup>15</sup> The eMTA connects to the customer owned analog  
19 telephone and changes the analog voice into IP packets for transmission on the network.<sup>16</sup>

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<sup>15</sup> TWC Response 1-5. (“TWCDP owns the eMTA and makes it available to the customer at no additional charge.”); Comcast Response 1-2. (“The eMTA is owned by Comcast’s cable affiliate.”)

<sup>16</sup> Comcast Response 1-5 . (“The eMTA reformats the analog voice signals created by the handset into the IP packets for routing on the CDV network”); TWC Response 1-5. (“[T]he eMTA is used to convert the customer’s

1 **Q: PLEASE DESCRIBE THE LOOP.**

2 A: The loop is the connection between the customer's location and the associated switching  
3 center. The Cable VoIP service is provided over a hybrid fiber-coax ("HFC") loop  
4 facility, while RLECs use copper wire (usually multiplexed on to a fiber feeder facility,  
5 e.g. a Digital Loop Carrier ("DLC")), or FTTH. All these technologies convert the  
6 various voice, data, and video signals from an electrical to optical format, and have the  
7 capability to combine or multiplex transmission from several services (e.g. voice, data,  
8 and video) together to be transmitted on an optical fiber facility.

9  
10 All three technologies use electronics in a centralized building. For the RLECs this will  
11 be at the central office ("CO") serving the customer's premises, while for Cable VoIP, it  
12 is typically at the head end location of the cable system.

13  
14 The HFC technology and DLC technology both connect via fiber from the switch to a  
15 location in the field that is closer to the customer. Equipment in the field changes the  
16 optical signal into an electrical signal. This equipment is called a "Node" in the HFC  
17 network and DLC equipment in the RLEC network. The DLC equipment has the  
18 additional capability to multiplex individual customer transmission together into a larger  
19 bandwidth trunk and can multiplex voice data and video into a single signal. The  
20 bandwidth of the facility leaving the DLC to the CO is traffic engineered to handle the  
21 capacity of the voice, data and video being transmitted. Many DLCs also convert analog

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voice communications from analog to IP format in order to then transmit those communications over Tiner Warner Cable's broadband network.")

1 or digital signals into an IP signal.

2  
3 In the direction of the end user, the HFC node and DLC each transfer the signals to either  
4 copper coax cable (in the case of the HFC) or a twisted-pair copper cable (in the case of  
5 the DLC). The cable carries the signals to the customer premises. One twisted copper  
6 pair will be dedicated to single customer and carry all the voice, data, and video for that  
7 customer from the DLC. The coax works differently. From the HFC node, the coax  
8 capacity is shared by all the customers served by that coax cable. (Note that there is no  
9 bandwidth on the coax cable that is specifically dedicated to any one customer.) In a  
10 coax network all the customers share the same bandwidth on the cable from the HFC  
11 node, whereas the DLC customers have a dedicated copper loop.

12  
13 In addition to DLC, some of the RLECs have installed FTTH, where an optical fiber  
14 cable is deployed between the switching location and the customer's premises.  
15 Electronics called an optical network unit (ONU) or an optical network terminal (ONT)  
16 are placed at the customer premises to change the optical digital signal to electrical. This  
17 device will also separate the various services of voice, data, and video delivered from the  
18 fiber into separate streams to be utilized by the customer's CPE, e.g. modem, TV, or  
19 phone. It also converts the signals from digital or IP to analog for the voice service, so  
20 that it will be compatible with the analog telephone. The ONT performs the same  
21 functions for voice as the Cable VoIP eMTA, except that it is usually located on the  
22 outside of the premises while the eMTA is located inside the premises.

1 **Q. PLEASE EXPLAIN THE SWITCHING IN THE CALL FLOW.**

2 A: As described above for loop plant, several technologies can be used for switching voice  
3 calls. Most telephone companies use digital electronic circuit switches and are migrating  
4 to IP-based, packet switching “soft switches.” For example, Granite State uses a soft  
5 switch for its regulated voice service. Comcast and TWC also have stated that their  
6 networks use soft switches.<sup>17</sup>

7  
8 Digital circuit switches, like those still used by Dunbarton, Dixville, the TDS Companies,  
9 and Bretton Woods, can interface with either an analog or a digital loop. (If the signal  
10 from the loop is analog, the switch will convert it to digital.)<sup>18</sup> Soft switches can  
11 interface to a digital loop (packet-based or not), but generally do not have analog  
12 interfaces. The soft switch then converts the signal into IP packets. (For some Cable  
13 VoIP providers, this conversion is performed in the “Media Gateway” component, which  
14 may be a separate piece of equipment or, as with Comcast, may be part of the soft  
15 switch.<sup>19</sup> The actual switching and signaling functions are in the “main” portion of the  
16 switch.)

17  
18 The soft switch or digital circuit switch then determines where the call needs to be routed  
19 to reach the called party. If the call is to another customer of the same carrier (an “on

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<sup>17</sup> Comcast Response 1-12, TWC Response 1- 12.

<sup>18</sup> If a loop connects to the switch through a DLC arrangement, the DLC performs the conversion.

<sup>19</sup> TWC Response 1-22. (“The Media Gateway Device is not part of the soft switch.”); Comcast Response 1-22.  
 (“The media gateway is a component of the soft switch . . . ”)

1 net” call) on the same switch, the carrier will complete the call without interfacing to any  
2 other carrier or switch. Calls that involve passing the call to a different carrier (“off net”  
3 calls) are handled differently.

4  
5 **Q: WHAT IS THE MOST COMMON WAY THAT CARRIERS HAND TRAFFIC**  
6 **BETWEEN TWO DIFFERENT VOICE NETWORKS?**

7 A: Calls between carriers require a common interface between the carriers. Circuit switched  
8 network interfaces are well defined, relatively simple, and reliable. These are currently  
9 the most common interface format between different carriers, since they have been  
10 proven to work well with little coordination between carriers. On the other hand, VoIP  
11 interfaces are more complex and not yet as well defined as circuit switched interfaces.  
12 Currently, they are not as easily implemented as circuit switched interfaces and require  
13 extensive testing between the carriers connecting their networks. For these reasons, there  
14 are cases in which two companies using VoIP technology will still convert to circuit-  
15 switched interfaces to ensure that the interface between the two carriers will work  
16 properly.

17  
18 **Q: PLEASE EXPLAIN TRANSPORT TECHNOLOGIES.**

19 A: The vast majority of interoffice transport is on optical fiber. Until the last few years, the  
20 optical standard was Synchronous Optical Network (“SONET”). As more voice traffic  
21 becomes packet based instead of circuit switched, and as data traffic increases, fiber  
22 networks have been migrating to Ethernet or IP standards. Many voice providers now

1 use Ethernet (IP) transport for their voice traffic.

2  
3 The public Internet can be used to provide interoffice transport for voice and data traffic.

4 However, when using the public Internet, the carrier has little, if any, control over the  
5 quality of the connection and may not be able to give voice traffic priority over data  
6 traffic. Thus, if there is traffic congestion, voice packets can be delayed and the voice  
7 quality can be degraded. Comcast and TWC both have stated that they have addressed  
8 this problem by giving their voice services dedicated bandwidth on their private  
9 networks, which do not use the public Internet.<sup>20</sup>

10  
11 **Q: PLEASE EXPLAIN SIGNALING.**

12 **A:** Signaling consists of the instructions that monitor the status of the call, alert the user of  
13 incoming calls, transmit routing information and change routing of the call using criteria  
14 both from the dialed digits and other information. Signaling includes tones to give status  
15 to the customer, like dial tone or ringing, passing of dialed digits through the network,  
16 and information from external sources, such as caller name to be added into the call.  
17 Until the 1980's the signaling traveled the same path as the telephone call and was  
18 referred to as "in-band signaling." In the 1980's, the Signaling System 7 ("SS7")  
19 network was implemented that allows the signaling to take a different path from that of  
20 the actual call. The SS7 network is referred to as out-of-band signaling. The SS7

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<sup>20</sup> Comcast Response 1-3. ("From the eMTA to the CMTS Comcast reserves dedicated bandwidth for its VoIP services. After passing through the CMTS, CDV/BCV traffic continues to be transmitted as a dedicated service."); TWC Response 1-11. ("Voice and Data packets use segregated bandwidth. Voice communications are not routed over the public Internet.")

1 signaling network is packet-based. It has the ability to verify whether the line is busy  
2 prior to setting up the connection to the called party. The SS7 network allows  
3 information from external third party databases to be added to the network. For example,  
4 the local number portability database, which tells the originating carrier which  
5 terminating carrier serves a customer with a ported number, is an SS7 database that  
6 returns a Location Routing Number (LRN) to the requesting switch. The call is then  
7 routed not to the original terminating telephone but to the LRN. Other SS7 databases  
8 enable customer-unique features such as calling name delivery, time-of-day routing, or  
9 routing of calls to different locations based on the originating location (e.g., an 800 call to  
10 Pizza Hut will route a call to the Pizza Hut location closest to where the call was  
11 originated), and other consumer-based services. Comcast, TWC and the RLECs all use  
12 SS7 signaling.

13  
14 VoIP routing has some of the same characteristics as SS7 signaling. VoIP routes based  
15 on the IP address associated with the equipment. When a customer places a call, the  
16 network looks up in a table to find the address of the equipment where the call should be  
17 directed. The IP addresses of the equipment are not known to the public and are only  
18 used internal to the network, just as the LRN address returned from the LNP database is  
19 not used by end users.

20  
21 When packets are used to transmit the voice call, signaling information is included in the  
22 “header” of each packet because each packet can take a different path to the destination.

1 The information in the header includes information such as the type of service,  
2 identification, source address, destination address, protocol, and packet life. This  
3 information maybe updated on each segment of the call. If a packet is lost or arrives too  
4 late, the system employs error correction to help improve the voice quality.

5  
6 **Q. DO VOICE CALLS STAY IN THE SAME FORMAT FROM THE BEGINNING**  
7 **OF THE CALL TO THE END OF THE CALL?**

8 A. No. Since the vast majority of calls are originated or terminated on analog phones and  
9 almost no networks are completely analog, there are some changes in the transmission  
10 format of the call between the calling and the called party. The call may change from  
11 analog to digital, from digital to IP packets, electrical to optical and back again several  
12 times as it is routed through the network. The routing information may also change.  
13 Instead of routing based on the actual dialed telephone numbers, a local routing number  
14 associated with a carrier's switch or equipment IP addresses may be used. The specific  
15 technology that serves any one portion of the network will determine if the call is circuit-  
16 based or IP packet-based. The exact protocols implemented depend not only on the  
17 carrier but also on the specific vendor equipment used.

18  
19 **Q: IS THE MOVEMENT TO VOIP A REVOLUTIONARY CHANGE OR AN**  
20 **EVOLUTION OF TECHNOLOGY?**

21 A: In my opinion, the migration to VoIP is an evolution in technology. Voice networks have  
22 migrated from analog to digital and now the voice network is migrating to IP

1 technologies. Small portions of the network have introduced IP voice. These segments  
2 are continuing to grow. As IP becomes a more mature technology for voice use, the  
3 circuit switched network will be slowly replaced until it is gone. This migration is  
4 similar to the migration of technology from an all analog network to a digital network.  
5

6 **III. CABLE VOIP SERVICE MEETS THE DEFINITION OF A TELECOM-**  
7 **MUNICATIONS SERVICE UNDER FEDERAL REGULATIONS AND A PUBLIC**  
8 **UTILITY UNDER STATE REGULATIONS**  
9

10 **Q: WHAT ARE THE REQUIREMENTS TO BE A TELECOMMUNICATIONS**  
11 **CARRIER UNDER FEDERAL RULES?**

12 A: As described in Mr. Meredith's testimony,<sup>21</sup> to meet the federal definition of  
13 telecommunications a carrier must offer transmission, between or among points specified  
14 by the user, of information of the user's choosing, without change in the form or content  
15 of the information as sent and received, for a fee, directly to the public, or to such classes  
16 of users as to be effectively available directly to the public, regardless of the facilities  
17 used.  
18

19 **Q: DOES CABLE VOIP SERVICE OFFER TRANSMISSION BETWEEN OR**  
20 **AMONG POINTS SPECIFIED BY THE USER?**

21 A: Yes. Comcast or TWC voice customers dial the number of the entity that they want to

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<sup>21</sup> Direct Testimony of Douglas Meredith ("Meredith Direct") 5:14-21.

1 reach.<sup>22</sup> The voice call is then routed through the network to reach the telephone number  
2 that the customer dialed. Although information other than the telephone number (LRN or  
3 IP address) may be used by the network to direct the call, ultimately the telephone  
4 number is the address used and known to the customer.<sup>23</sup>

5  
6 **Q: DOES CABLE VOIP SERVICE CONVEY INFORMATION OF THE**  
7 **CUSTOMERS CHOOSING?**

8 A: Yes. The customer is able to convey the voice between the calling and called party. The  
9 voice is understood on both ends of the call without modification. This is the basic  
10 service that is of issue in this proceeding. Other services may be added on top of this  
11 basic service, but does not change the nature of the basic service itself.<sup>24</sup>

12  
13 **Q: IS THERE A CHANGE IN FORM OR CONTENT OF THE INFORMATION**  
14 **SENT OR RECEIVED IN CABLE VOIP SERVICE?**

15 A: No. The content the customer is sending over the network is voice.<sup>25</sup> The voice is heard  
16 on both ends of the call. The form of the call at the originating and terminating ends of  
17 the call is also not changed. The call originates from an analog CPE device and is

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<sup>22</sup> TWC Response 1-13. (“A TWCDP cable VoIP Service customer using a conventional telephone initiates a call by dialing the telephone number of the called party.”); *see also* Comcast Response 1-13.

<sup>23</sup> Comcast Response 1-12 (i). (“the soft switch conducts an internal subscriber database inquiry and determines that the *telephone number* is assigned to another Comcast VoIP customer.”) (emphasis added) Comcast Response 1-12 (iii). (“The first is to the local number portability database (LNP) to determine whether the number has been ported and if so to which carrier.”)

<sup>24</sup> Meredith Direct Testimony at 7:18-21.

<sup>25</sup> Comcast Response 1-1. (“Comcast’s CDV and BDV services allow customers to communicate the voice content of their choosing to a person or entity that has been assigned and is using a telephone number.”) TWC Response 1-1. (“TWCDP’s Cable VoIP services provide customers with the ability to engaged in real-time, two-way voice communications with any other person or entity that is assigned a standard telephone number.”)

1 received at the called party location on an analog CPE device.<sup>26</sup> Therefore the form of  
2 the information at both ends of the call is the same analog format at the customer owned  
3 device.

4  
5 **Q: IS THERE ANY CHANGE IN FORM DURING THE TRANSMISSION OF THE**  
6 **CALL?**

7 A: Yes. As mentioned earlier, all networks change the analog format into a different type of  
8 signal in the middle of the call. The network may use digital, optical, or IP formats  
9 within the network but return the call to the same analog form as originated by the  
10 customer owned CPE. This end-to-end requirement was defined in the Frame Relay  
11 Order, which held that the “enhanced service definition applies only to end-to-end  
12 communication between or among subscribers. Thus communications between a  
13 subscriber and the network itself (e.g., for call setup, call routing, and call cessation) are  
14 not considered enhanced services”<sup>27</sup>

15  
16 **Q: ARE THERE CHANGES IN THE FORM OF THE CALL BETWEEN OR**  
17 **AMONG SUBSCRIBERS?**

18 A: No. The changes in the form of the call are internal to the networks carrying the call.  
19 When the call stays on-net in the Comcast or TWC network, Comcast or TWC change  
20 the form at the beginning of the call and change it back to the same format at the end of

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<sup>26</sup> In very few cases the CPE may be digital or SIP based.

<sup>27</sup> *Independent Data Communications Manufacturers Association, Inc. and AT&T Petition for Declaratory Ruling*, 10 FCC Rcd 13717 para. 11 (1995) (“*Frame Relay Order*”).

1 the call. Both Comcast and TWC have stated that this type of on-net call does not have  
2 any net change in form.<sup>28</sup>

3  
4 **Q. ARE THE COMCAST AND TWC VOICE SERVICES OFFERED TO THE**  
5 **PUBLIC?**

6 A: Yes. Both Comcast and TWC have websites that promote their voice service to  
7 residential and business customers.<sup>29</sup> Although their service is limited to certain  
8 geographic areas, all residential customers within those areas are offered service at a  
9 standard rate and under the same terms and conditions. There are some specific business  
10 voice offerings from both Comcast and TWC that are more customized but are still  
11 generally offered.

12  
13 **Q: DO COMCAST AND TWC CHARGE FOR THEIR VOICE SERVICE?**

14 A: Yes. There is a charge when a customer subscribes to the Cable VoIP service.

15  
16 **Q: IN YOUR OPINION DO THE COMCAST AND TWC SERVICE OFFERINGS**  
17 **CONSTITUTE A TELECOMMUNICATIONS SERVICE?**

18 A: Yes. The Comcast and TWC voice service offerings transmit voice calls to parties that  
19 the customers have chosen to call. The voice content is not changed or stored during the  
20 call. The calls begin and end generally on analog phones that are owned by the

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<sup>28</sup> Comcast Response 1-26. ("Calls that do not leave the Comcast's managed IP network do not experience net protocol conversion."); TWC Response 1-26. ("[A] call that remains on TWCDP's network end to end will not undergo a net protocol change.")

<sup>29</sup> See Exhibits VW 1-1 and VW 1-2.

1 subscriber, and so begin and end in the same format. The service is offered on a retail  
2 basis for a fee to the public.

3  
4 **Q: WHAT IS THE DEFINITION OF A PUBLIC UTILITY UNDER STATE**  
5 **REGULATIONS?**

6 A: As stated in Mr. Meredith's testimony a voice carrier qualifies as a public utility if it is  
7 owning, operating or managing any plant or equipment or any part of the same for the  
8 conveyance of telephone or telegraph messages.<sup>30</sup>

9  
10 **Q: WHICH COMCAST ENTITY IS CONSIDERED WHEN DETERMINING THE**  
11 **DEFINITION OF A PUBLIC UTILITY?**

12 A: Comcast has a complicated corporate structure. Comcast has revealed four entities:  
13 Comcast IP Phone, Comcast Phone, Comcast Business and Comcast Cable<sup>31</sup> that are  
14 involved with providing their voice service. Some of these entities physically own  
15 portions of the plant that the calls use; some entities market the service to end users.  
16 However, Comcast presents itself as a single company to the end user in its Agreement  
17 for Residential Services:

18 "Comcast Services will be provided to you ("you," "your," or  
19 "Customer") on the terms and conditions set forth in this  
20 Agreement for Residential Services (the "Agreement") by the  
21 operating company subsidiary of *Comcast Corporation that owns*  
22 *and/or operates the cable television system* in your area  
23 ("Comcast," "we," "us," or "our") and in any applicable Tariff(s)  
24 on file with the FCC, state utility commission or other comparable

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<sup>30</sup> RSA 362:2.

<sup>31</sup> Comcast Response 1-41.

1 state agency. For purposes of this Agreement, “affiliate” means  
2 any entity that controls, is controlled by or is under common  
3 control with Comcast Corporation. Services may include, but are  
4 not limited to, cable television service (“Video”), Comcast High-  
5 Speed Internet service (“HSI”), and *Comcast Digital Voice Service*  
6 (“CDV”) (each a “Service” and collectively the “Services”).<sup>32</sup>  
7

8 Based on Comcast’s statements to the end user it seems that the Comcast Cable affiliate  
9 is the entity that provides retail services, including Digital Voice Service, to the end user.  
10 That is the entity that is acting as a public utility.  
11

12 **Q: DOES COMCAST OWN FACILITIES?**

13 A: Yes. Comcast owns the eMTA, the HFC loop plant, the soft switch, and the managed IP  
14 network. (The Comcast cable affiliate specifically owns the eMTA and HFC loop  
15 plant.)<sup>33</sup>  
16

17 **Q: ARE SOME OF THESE FACILITIES IN NEW HAMPSHIRE?**

18 A: Yes. The eMTA is located at the New Hampshire customers’ premises, and the HFC  
19 plant is located in the area where Comcast holds a cable franchise.  
20

21 **Q: DO THE COMCAST OWNED FACILITIES CONVEY TELEPHONE**  
22 **MESSAGES?**

23 A: Yes. Mr. Meredith has explained that a telephone message is the same as a voice  
24 message. The Comcast plant is used to provide the Comcast Digital Voice service across

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<sup>32</sup> See Comcast Residential Services Agreement. (emphasis added).

<sup>33</sup> Comcast Response 1-5, 1-11.

1 the network. The soft switch is not located in New Hampshire. A switch located in  
2 Chelmsford, MA is used to route calls to and from New Hampshire.<sup>34</sup>

3  
4 **Q: WHICH TWC ENTITY IS CONSIDERED WHEN DETERMINING THE**  
5 **DEFINITION OF A PUBLIC UTILITY?**

6 A: TWC also has a complicated corporate structure. It has identified four affiliates: Time  
7 Warner Cable, LLC, Time Warner Communications, Time Warner Cable Information  
8 Services (New Hampshire), TWC Digital Phone LLC and one non-affiliate, CRC, that  
9 are involved in providing the TWC voice service. Some of these entities physically own  
10 portions of the plant that the calls use; some entities market the service to end users.  
11 However, TWC presents itself as a single company to the end user in its Agreement for  
12 Residential Services:

13 “set forth the terms and conditions that govern my receipt of Services from  
14 *Time Warner Cable*, which may include, among others, video, high-speed  
15 data and *voice* Services.”<sup>35</sup>  
16

17 Based on TW’s statements to the end user it seems that the Time Warner Cable is the  
18 entity that provides retail services including voice service to the end user. That is the  
19 entity that is acting as a public utility.  
20

21 **Q: DOES TWC OWN, OPERATE, OR MANAGE ANY FACILITIES?**

22 A: Yes. TWC owns the eMTA, the HFC loop plant, the media gateway, and the managed IP

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<sup>34</sup> Comcast Response 1- 22.

<sup>35</sup> See Exhibit VW 1-4. (emphasis added).

1 network. It also contracts with CRC to interconnect with other carriers. TWC effectively  
2 manages the relationship with CRC to insure the quality of its voice service. The Time  
3 Warner Cable operator in the specific area owns the HFC loop plant and some portion of  
4 the IP backbone network.<sup>36</sup>

5  
6 **Q: ARE SOME OF THESE FACILITIES IN NEW HAMPSHIRE?**

7 A: Yes. The eMTA is located at the New Hampshire customers' premises, and the HFC  
8 plant is located in the area where TWC holds a cable franchise.

9  
10 **Q: DO THE TWC OWNED FACILITIES CONVEY TELEPHONE MESSAGES?**

11 A: Yes. Mr. Meredith has explained that a telephone message is the same as a voice  
12 message. The TWC plant is used to transmit the voice messages across the network. The  
13 media gateway is not located in New Hampshire. A media gateway in Portland, ME is  
14 used to route calls to and from New Hampshire.<sup>37</sup> The CRC switch serving TWC  
15 customers in New Hampshire is also located in Maine.

16  
17 **Q: DO YOU BELIEVE THAT COMCAST AND TWC MEET THE DEFINITION OF**  
18 **A PUBLIC UTILITY IN NEW HAMPSHIRE?**

19 A: Yes. Comcast Cable and Time Warner Cable are the providers of retail voice service to  
20 end users, as both these entities own, operate, and maintain HFC plant in the state which  
21 is used to provide voice service to the retail end users. This in my opinion meets the

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<sup>36</sup> TWC Response 1-16

<sup>37</sup> TWC Response 1-22.

1 definition of a public utility.

2  
3 **IV. COMCAST AND TWC VOICE SERVICES ARE NOT INFORMATION**  
4 **SERVICES, BUT INFORMATION SERVICES ARE PROVIDED IN ADDITION**  
5 **TO THE TELECOMMUNICATIONS SERVICE.**  
6

7 **Q: IS THE VOICE SERVICE PROVIDED BY COMCAST AND TWC A**  
8 **TELECOMMUNICATIONS SERVICE?**

9 A: Yes. As described above and in Mr. Meredith's testimony, the voice services provided  
10 by Comcast and TWC are telecommunications services because the service allows  
11 customers to exchange real time voice of the customers choosing, for a fee, without any  
12 change in form or functions.

13  
14 **Q: DO ANY OF THE COMPANIES PROVIDE INFORMATION OR ENHANCED**  
15 **SERVICE IN ADDITION TO THE TELECOM-MUNICATIONS SERVICE?**

16 A: Yes. My understanding is that all the RLECs, Comcast and TWC offer enhanced  
17 services that store, retrieve and process information. These services complement the  
18 basic telecommunications service provided to the customer.

19  
20 **Q: WHAT INFORMATION OR ENHANCED SERVICES ARE OFFERED?**

21 A: Voice mail, follow-me service, voice mail on devices other than the telephone, and access  
22 to account and billing information are all enhanced services.

23

1 **Q: ARE THESE SERVICES PART OF THE CALL FLOW?**

2 A: Voice mail and display of voice mail or call information are often in the actual call flow.  
3 These services either store information or add information to the call. For example, voice  
4 mail is an enhanced service because it stores the message the customer left so it can be  
5 retrieved at a later time. This information is not information “of the customer’s  
6 choosing” and therefore the service is an enhanced service.

7  
8 **Q: CAN THE BASIC CABLE VOIP CALL BE COMPLETED WITHOUT THE USE**  
9 **OF THESE ENHANCED FEATURES?**

10 A: Yes. The completion of the call is not dependent on these features being available. The  
11 voice service is a stand-alone service.

12  
13 **Q: PLEASE DISCUSS THE OTHER ENHANCED SERVICES THAT ARE NOT IN**  
14 **THE CALL FLOW.**

15 A: The Find Me service, account information, and management of voice mails are services  
16 provided via the Comcast, TWC, TDS or Granite State web portals. The web portals  
17 provide customers an interface to the service provider’s records and systems. The  
18 information provided is not generated by the customer but is the service provider’s  
19 information about the customer (e.g. customers records). It provides a secure access  
20 method for customers to directly change and manage their communications services  
21 without having to talk with a service representative. In the case of these services  
22 functions, the customers access a web portal and then log on to see their specific

1 information. The customers are then allowed to view their billing information or change  
2 various characteristics of their service directly. The information accessed is not  
3 information that the customers generated so is not “information of the customer’s  
4 choosing.” The information is also stored. Therefore, all the services provided via the  
5 web portal are enhanced services.

6  
7 **Q: IS IT SIGNIFICANT THAT THESE ENHANCED WEB PORTAL SERVICES**  
8 **CAN BE ACCESSED FROM ANY BROADBAND CONNECTION AS**  
9 **DESCRIBED BY COMCAST?**

10 A: No. These web portal services are like any other website. They can be accessed via a  
11 dial up connection or a broadband connection. Since these services are not in the actual  
12 voice call flow, access to these services has no impact on the fact that the voice service  
13 provided by Comcast or TWC is a telecommunications service.

14  
15 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

16 A. Yes.