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VIA ECFS ***EX PARTE***

December 23, 2009

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: NBP Public Notice #17*, Health Care Delivery Elements of National Broadband Plan*, GN Dkt. Nos. 09-47, 09-51, 09-137; WC Dkt. No. 02-60

Dear Ms. Dortch:

tw telecom inc. ("tw telecom" or "TWTC"), through its undersigned counsel, hereby supplements the comments submitted by other parties in response to the Commission's National Broadband Plan ("NBP") Public Notice #17 regarding the broadband needs of health care providers.[1] As discussed herein, Ethernet services hold the greatest promise for delivering the bandwidth, scalability, and reliability needed for broad use of innovative health information technology ("health IT") applications. However, in order to ensure that health care providers can realize the benefits of Ethernet technology, and in turn, health IT applications, the FCC must establish the pre-conditions for competition in the Ethernet services market.

I. Ethernet Services Provide An Efficient And Effective Solution For The Connectivity Needs Of Health Care Providers Seeking To Adopt Bandwidth-Intensive Health IT Applications.

The comments filed in response to NBP Public Notice #17 make clear that access to affordable, reliable, high-bandwidth connectivity is a prerequisite to the widespread adoption of health IT applications.[2] Among these bandwidth-intensive applications are Picture Archiving

[1] *Comment Sought on Health Care Delivery Elements of National Broadband Plan*, NBP Public Notice #17, DA 09-2413 (rel. Nov. 12, 2009) ("NBP Public Notice #17").

[2] *See, e.g.*, Comments of Health Network Group Organized by Internet2, at 4 (filed Dec. 2, 2009) ("Affordable, high-speed broadband availability is essential to the development of sustainable health information exchange and telemedicine services."); Comments of Dell Inc., at 9 (filed

and Communications Systems ("PACS") and teleradiology.[3] PACS are information systems dedicated to the acquisition, transport, storage, viewing, and manipulation of medical images (e.g., x-rays, MRIs, and CT scans).[4] By replacing film with digital images, PACS provide physicians with faster access to diagnostic imaging information at the point of care and enable multiple clinicians to consult on images at the same time from different locations.[5] This can

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Dec. 4, 2009) (arguing that "without reliable, high-bandwidth connectivity," "neither healthcare professionals nor U.S. consumers will be able to adopt healthcare IT solutions that are so critical to achieving the goal of reforming our healthcare system to deliver better quality for a lower cost"); Comments of National Health IT Collaborative for the Underserved, at 1 (Dec. 4, 2009) ("As more and more health information moves to an electronic format, connectivity is becoming vital. As health care continues to evolve at an unprecedented pace, it would be difficult to overestimate bandwidth needs."). Unless otherwise indicated, all comments cited are in GN Dkt. No. 09-51.

[3] *See, e.g.*, "Delivering Business Class Ethernet - A Perspective On Level 3's Comprehensive Ethernet Services Portfolio," *Heavy Reading*, at 14 (Nov. 2007), www.level3.com/downloads/Business%20Class%20Ethernet.pdf ("*Delivering Business Class Ethernet*") ("Explosive growth in the transmission of high-resolution digital images . . . is placing greater bandwidth and service performance requirements on communications networks. Bandwidth hungry teleradiology - the sending of ex-rays, MRIs, and CT scans and consultative text - is the most common type of telemedicine application today, and its use continues to grow rapidly. . . . Participants need a reliable, high-bandwidth connection that permits them to synchronously manipulate high-resolution images . . . .").

[4] *See, e.g.*, Arjun Kalyanpur *et al*., "Inter-Organizational E-Commerce in Healthcare Services: The Case of Global Teleradiology," 5 J. OF ELEC. COMMERCE IN ORGS. 47, 51 (Apr. 2007/June 2007).

[5] *See, e.g.*, Press Release, Government of the Northwest Territories, Canada, "NWT Hospitals Go Filmless," at 1 (Mar. 16, 2009), http://www.exec.gov.nt.ca/currentnews/prDetails.asp?varPR_ID=1242 (explaining the benefits of moving to PACS technology, including "faster report turn-around times which results in faster diagnosis and decisions relating to treatment"; "flexible viewing for physicians and hospital staff (clinicians can consult on images at the same time from different locations)"; elimination of "the costs associated with 'hard copy' film, developing and storage"; and prevention of "lost or misplaced images resulting in unnecessary duplication of exams"); *see also* "UCLA computers replace traditional film, speed diagnoses," *Communications News* (Nov. 1992), http://findarticles.com/p/articles/mi_m0CMN/is_n11_v29/ai_12781516/ ("In clinical settings such as intensive care, UCLA physicians report that they have improved care by viewing images on computer display stations directly. By comparing new, digitized, on-line images with a patient's previous historical records, physicians speed diagnoses."); *see id.* (quoting Dr. H.K. Huang, professor of radiological sciences, UCLA) ("The advantages of filmless imaging are simple: we never lose images and retrieval time is fast and consistent. Once we digitize an X-ray or transmit CT scans into a digital-based system, physicians and nurses can access them over the network quickly and at any time.").

result in more timely and efficient delivery of care,[6] prevent redundant testing and reduce medical errors,[7] and reduce both patients' and providers' travel to and between health care facilities.[8] PACS also support teleradiology, the electronic transfer of radiological images from one location to another for purposes of remote interpretation or consultation.[9] This can provide patients with quick, easy access to specialists in distant locations.[10] Some health care providers

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[6] *See, e.g.*, Bruce I. Reiner & Eliot L. Siegel, "Technologists' Productivity When Using PACS: Comparison of Film-Based Versus Filmless Radiography," 179 AM. J. OF ROENTGENOLOGY 33, 33 (July 2002) ("Compared with conventional film-screen operation, filmless operation using computed radiography was associated with a significant decrease in technologist exam times in the performance of general radiographic examinations. This decrease in technologist examination times in a filmless environment offers the potential for increased productivity with resulting personnel savings and operational efficiency."); *see also* Robins Anderson, "PACS improving patient care," *American Society of Radiologic Technologists Scanner* (Jan. 2007), http://findarticles.com/p/articles/mi_6799/is_4_39/ai_n28405210/ ("Digital medical imaging can cut exam time down to half or less compared with film-screen imaging. And the almost instant transfer of the images means patients are on the exam table [for] less time.").

[7] *Cf.* Comments of State of New York, at 6 (filed Dec. 4, 2009) (explaining that heath care providers' lack of access to all of a patient's medical records at the point of care can result in redundant testing and medical errors).

[8] *Cf.* Comments of National Health IT Collaborative for the Underserved, at 2 (filed Dec. 4, 2009) (explaining that "telehealth" technologies in general can result in "[r]educed travel to and among medical offices, clinics, and hospitals"); Comments of American Telemedicine Association, at 1 (filed Dec. 3, 2009) (explaining that telemedicine in general "shortens patient and provider travel times").

[9] *See* Kalyanpur, *supra* note 4, at 47; *see also* Dr. Ronald S. Weinstein *et al*., "The innovative bundling of teleradiology, telepathology, and teleoncology services," 46 IBM SYS. J. 69, 70 (Jan.-Mar. 2007) ("Teleradiology uses information technology (IT) to store digital radiographie images and to transmit them for interpretation to the consulting site. . . . The popularity of Picture Archiving and Communications Systems (PACS) has revolutionized radiology. Films are no longer used in the majority of practices. Patients emerge from appointments with a CD instead of a film packet, and if the CD is misplaced, the original image data can be recovered from the system storage server. While the original image data are preserved, digital images can be manipulated by the reviewer to correct brightness and contrast. When questions arise, the images can be electronically transmitted for virtual review anywhere in the world where a DICOM (Digital Imaging and Communications in Medicine) reader exists. For patients, the digital procedure is quicker and less painful and exposes them to less radiation than its analog predecessor.").

[10] *See, e.g.*, Comments of Health IT Now Coalition, at 3 (filed Dec. 4, 2009) ("Broadband allows a patient to get an MRI and have it read and interpreted by an expert in a different hospital in a different state. This function brings the expert to the patient rather than the patient to the expert."); *see also* Kalyanpur, *supra* note 4, at 48 (stating that teleradiology "enables the delivery of subspecialty opinions to remote locations, where otherwise expertise is not available"); *see id.*

have determined that 100 Mbps of capacity is necessary to support PACS for the timely transfer of medical images[11] and health care providers' demand for bandwidth will likely increase as the resolution capabilities of imaging equipment improve.

As several commenters have explained in the record, however, many health care providers do not have sufficient broadband capacity to support PACS or teleradiology.[12] Similarly, tw telecom's own experience with the health care industry is that while PACS have become more affordable over time, health care providers seeking to use PACS often lack the bandwidth necessary to support PACS. For example, health care providers often lack the bandwidth necessary to transport the images and other patient data between multiple patient care sites. tw telecom has also found that as health care providers increasingly digitize medical images (and thereby increase the size of electronic medical records), they frequently lack

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at 50-51 ("Teleradiology enables the wider availability of subspecialty consultations wherein images of a specific body region/modality need to be referred to the radiologist with expertise in the interpretation of that type of study. Past studies indicate that opinions of subspecialty radiologists obtained through teleradiology have resulted in significant improvements in the quality of patient care.").

[11] *See, e.g.*, Comments of Rural Wisconsin Health Cooperative Information Technology Network, at 2 (filed Nov. 30, 2009) (explaining that due to the average number and size of radiology images, such as digital mammograms, CR images, CT images, and MRI images, [PACS] typically require "100 Mbps speeds" and "1000 Mbps for optimization"); Comments of UnitedHealth Group, at 4 (filed Dec. 4, 2009) (stating that bandwidth needs for high resolution imaging and image transfer . . . could range in upwards [of] 100 Mbps depending upon time sensitivity nature or requirement for the transmission of images"); *see also* Comments of Alcatel-Lucent, at 12 & n.3 (filed Dec. 4, 2009) ("In a study reported in 2006, a metropolitan area network required speeds between 155 Mbps to 622 Mbps to support radiology file transfers between nine hospitals/health centers in Canada.").

[12] *See, e.g.*, Comments of National Health IT Collaborative for the Underserved, at 3 (filed Dec. 4, 2009) (explaining that "in Japan, much of the nation is wired with superior high-speed fiber technology providing symmetric 100 Mbps bandwidth" that can be used to enable pathologists to make remote diagnoses or radiologists to conduct remote interpretations and/or consultations, but that "[u]nfortunately, most of America does not have access to broadband connections that are fast enough to enable [teleradiology] or other bandwidth-intensive telehealth applications already in widespread use in other countries"); Comments of UnitedHealth Group, at 4 (filed Dec. 4, 2009) (explaining that the bandwidth requirements of high resolution imaging and image transfer "place[] a significant burden on connectivity in rural areas where access [to] imaging systems is often much more restricted"); Comments of the Rural Wisconsin Health Cooperative Information Technology Network, at 3 (filed Nov. 30, 2009) ("[W]e've recently begun a process to select a shared PACS, which our current transmission speeds [i.e., 20 Mbps] will not support. When we implement PACS, we will need to either provision PACS servers at each of the participating hospital locations, or to raise our bandwidth levels to allow the effective sharing of server resources from the central datacenter.").

sufficient bandwidth to backup and transport this data to off-site storage and comply with federal requirements regarding data backup, business continuity, and disaster recovery.[13]

In order to close this connectivity gap, tw telecom has been delivering Ethernet services to hospitals and other health care providers for years. The inherent efficiencies of Ethernet networks make Ethernet an affordable and reliable solution to health care providers' bandwidth needs.[14] As tw telecom has explained, Ethernet services provide significantly more bandwidth at substantially lower costs than legacy broadband services (e.g., Frame Relay and ATM).[15] Ethernet services are also more flexible and scalable than legacy broadband services (i.e., service providers can increase capacity or change service features through simple remote adjustments rather than through the deployment of new electronics).[16] tw telecom has delivered these benefits to health care providers seeking to adopt PACS, teleradiology, electronic medical records, and other health IT applications in a variety of health care delivery settings. The following examples are representative.

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[13] For example, the Health Insurance Portability and Accountability Act ("HIPAA") requires covered health care providers to establish contingency plans for responding to emergencies (such as fire, vandalism, system failure, and natural disaster) that damage systems that contain electronic protected health information. *See* 45 C.F.R. § 164.308(a)(7)(i). As part of its contingency plan, a covered health care provider must implement a data backup plan, disaster recovery plan, and emergency mode operation plan. *See id.* § 164.308(a)(7)(ii)(A)-(C). *See also Delivering Business Class Ethernet* at 14 (explaining that the requirements of HIPAA regarding electronic medical records "have led many hospitals and other healthcare companies to seek high-bandwidth connectivity linking multiple sites to keep information management costs in check").

[14] *See also* Russell Shriver, "Spotlight on Ethernet," *xchange Magazine* (Dec. 4, 2008), http://www.xchangemag.com/articles/526/spotlight-on-ethernet.html ("Ethernet is a fantastic fit for the $2 trillion health care industry due to scalability of bandwidth, support of virtual colloaboration environments and bringing additional health care outlets on-net as requirements change and remote health care is sought after. The most vital uses of Ethernet within this sector are improving quality of care, meeting regulatory demands and creating overall efficiencies enabling applications such as electronic health care records; computerized physician order entry; [PACS] for imaging; and live video conferences for Telehealth as a means for distance learning. Despite the current economic climate, health care needs for Ethernet will continue to grow as health care outlets turn to Ethernet for cost efficiency, reliability, and scalability.").

[15] *See* Letter from Thomas Jones and Jonathan Lechter, Counsel for tw telecom inc., to Marlene H. Dortch, Secretary, FCC, GN Dkt. Nos. 09-47, 09-51, & 09-137, at 2 & n.2 (filed Dec. 22, 2009) ("*December 22nd Ex Parte Letter*").

[16] *See id.* at 2 & n.3; *see also Delivering Business Class Ethernet* at 4 ("[E]nterprises are embracing Ethernet first and foremost for the ease with which it allows them to cost-effectively scale with growing bandwidth requirements. Ethernet enables enterprises to reduce communications costs and increase business productivity because it offers significant performance-price advantages versus other network technologies like SONET and ATM.").

The Oregon Clinic

TWTC provided Ethernet connections of up to 500 Mbps to the Oregon Clinic's 12 locations in the Portland area, giving the Clinic "the ability to share medical records and images, such as x-rays and CAT scans, among [its] physicians, staff, and medical imaging providers securely and in real time."[17] The increased bandwidth enabled more efficient patient care than that delivered using the Clinic's legacy Frame Relay and T1 technology. As TWTC explained after the installation, "Prior to this infrastructure upgrade, The Oregon Clinic used CD-ROMs, delivered by courier, to transfer data from location to location, which often took several hours. Now the transfer of information is instantaneous, as The Oregon Clinic has a computer terminal in every exam room and a network designed to handle large files."[18] As a result, according to The Oregon Clinic's CIO, the Clinic can "deliver patient data to physician screens within seconds."[19]

In addition, TWTC's Ethernet service allowed the Clinic to deploy a real-time, data backup disaster recovery solution.[20] The Clinic is able to back up 17 terabytes of patient and enterprise data to its data center facility across a 500 Mbps Ethernet link.[21] The Clinic's CIO observed that TWTC's Ethernet circuits would reduce the Clinic's disaster "recovery time by 98 percent, from hours to minutes."[22]

Radiology Ltd.

TWTC provided 100 Mbps Ethernet connections to eight of Radiology Ltd.'s locations in the Tucson area in order support the transfer of PACS digital image data between patient sites and radiologists for interpretation.[23] These connections enable Radiology Ltd. to "transmit the

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[17] Press Release, Time Warner Telecom, "The Oregon Clinic Accelerates Network, Improves Patient Care with Time Warner Telecom's Metro Ethernet Service," at 1 (July 30, 2007), http://www.twtelecom.com/Documents/Announcements/News/2007/OregonClinic.pdf

[18] *Id.*

[19] Press Release, Time Warner Telecom, "The Oregon Clinic Extends Patient Care Services Across Metro Portland with Time Warner Telecom's Metro Ethernet Service," at 1 (May 22, 2008), http://www.twtelecom.com/Documents/Announcements/News/2008/TheOregonClinic.pdf.

[20] *See id.* at 1-2.

[21] *See id.* at 2.

[22] *Id.* at 1.

[23] *See generally* Press Release, Time Warner Telecom, "Time Warner Telecom Native LAN Speeds Sharing of Digital Patient Exams to Improve Patient Care at Radiology Ltd." (Feb. 23, 2004) ("*tw telecom 2004 Radiology Ltd. Press Release*") http://www.twtelecom.com/Documents/Announcements/News/2004/News2004_Radiology_Lim

results of readings to physicians within five minutes after they're completed."[24] According to Radiology Ltd.'s director of information technology, TWTC's Ethernet service provided the bandwidth necessary for teleradiology. He explained, "We've witnessed a growth in the size of the radiology images crossing our WAN and it's common for four 1 Gbps files to be in transit at any given time. On a monthly basis, we move about 5.3 million images to radiologists and physicians. So, in addition to high reliability, [TWTC] services deliver the bandwidth we need to meet patient health care requirements."[25] He added that, "[even though] new radiological imaging instruments create much larger imaging data sets," the scalability of TWTC's Ethernet service would enable Radiology Ltd. "to deploy cutting edge technology without fear of being limited by bandwidth considerations."[26]

ProHealth Care

TWTC used Ethernet to connect ProHealth Care's six sites in the Milwaukee area.[27] According to ProHealth Care's enterprise architect, TWTC's Ethernet service provided several benefits. First, the Ethernet service's high bandwidth and low latency allowed ProHealth Care to "move large data sets associated with [its] cardiology and radiology applications between sites."[28] Second, the higher bandwidth provided by TWTC's Ethernet connections enabled ProHealth Care to centralize its PACS imaging assets and realize "valuable" "cost savings."[29] Third, ProHealth Care was able to eliminate the costs of maintaining and administering ATM equipment.[30] Fourth, ProHealth Care was able to reduce administrative costs and increase efficiencies because its IT employees had more experience and familiarity with Ethernet than ATM.[31] Fifth, TWTC's Ethernet service provided scalability such that "[e]ven with the large

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ited.pdf ; Press Release, Time Warner Telecom, "Time Warner Telecom Delivers Additional Data Services To Tucson's Radiology Ltd." (July 29, 2005), ("*tw telecom 2005 Radiology Ltd. Press Release*") http://www.twtelecom.com/Documents/Announcements/News/2005/PR-Radiology_Ltd.pdf.

[24] *tw telecom 2004 Radiology Ltd. Press Release* at 2.

[25] *tw telecom 2005 Radiology Ltd. Press Release* at 2.

[26] *tw telecom 2004 Radiology Ltd. Press Release* at 2.

[27] *See* Press Release, Time Warner Telecom," Time Warner Telecom Delivers Metro Ethernet to ProHealth Care for Improved Patient Care," at 1 (May 9, 2005), http://www.twtelecom.com/Documents/Announcements/News/2005/ProHealth_Care_Press_Release.pdf.

[28] *Id.* at 2.

[29] *Id.* at 1.

[30] *See id.*

[31] *See id.*

data volumes patient exams generate, the Gig-E circuits still [gave ProHealth Care] about 50 percent headroom to grow into."[32]

Presbyterian Healthcare Services

TWTC provided Ethernet connectivity of between 100 Mbps and 300 Mbps to three Presbyterian Healthcare Services hospitals in Albuquerque.[33] Presbyterian deemed TWTC's Ethernet service to be a "prerequisite to the implementation of the hospital's planned [PACS]."[34] Installation of Ethernet service increased the hospitals' bandwidth at a lower cost, reduced equipment costs, and provided scalability.[35] According to its data communications operation manager, Presbyterian doubled its bandwidth for less than what it was paying its legacy provider and TWTC's Ethernet "solution can easily scale to 1 Gbps as [Presbyterian] grow[s], and at a very reasonable price."[36]

Saltzer Medical Group

TWTC provided Ethernet service to four Saltzer Medical Group facilities in the Boise, Idaho area in order to allow Saltzer to "quickly share large data archives, such as radiology images or scanned patient documents among treating physicians, in all of [its] locations."[37] Saltzer's CEO explained that TWTC's Ethernet solution would thus improve patient care by "greatly increas[ing] [Saltzer's] efficiency" and "giv[ing] patients greater flexibility to visit whichever location is convenient for them."[38] According to the health care provider's director of information services, another benefit of TWTC's Ethernet service is that "[TWTC] can quickly scale our bandwidth, but we won't need any additional configuration changes or additional costly equipment."[39]

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[32] *Id.* at 2.

[33] *See* Press Release, Time Warner Telecom, "Time Warner Telecom Ensures Clean Bill of Health for Presbyterian Healthcare Services Communications Network," at 1 (Mar. 2, 2004), http://www.twtelecom.com/Documents/Announcements/News/2004/News2004_Presbyterian_HC.pdf.

[34] *Id.* at 2.

[35] *See id.*

[36] *Id.*

[37] Press Release, Time Warner Telecom, "Time Warner Telecom Wins Metro Ethernet Contract for Saltzer Medical Group," at 1 (Feb. 24, 2004), http://www.twtelecom.com/Documents/Announcements/News/2004/News2004_Saltzer_Medical_Group.pdf.

[38] *Id.*

[39] *Id.* at 2.

II. The FCC Must Ensure That Health Care Providers Can Realize The Benefits Of Ethernet Services, And In Turn, Health IT Applications, By Establishing The Pre-Conditions For Competition In The Ethernet Market.

The purpose of NBP Public Notice #17 is to assess the extent to which it is appropriate for the Commission to recommend ways to enhance the availability of broadband services needed by health care providers. The discussion in NBP Public Notice #17 focuses on the role of subsidies.[40] Properly designed subsidies should certainly be part of the overall plan for promoting broadband to health care providers, but they should only be part of the plan. To begin with, the record in this proceeding indicates that subsidy programs have been difficult to administer and consequently, relatively ineffective.[41] While the Commission can improve the effectiveness of the existing subsidy regime, it will never be able to eliminate its inefficiencies entirely. Wherever possible, the Commission should rely on competition *in lieu of* subsidies to spur the deployment of broadband facilities needed by health care providers. Not only will competition yield more efficient outcomes, it will cause competitors to deploy affordable Ethernet connectivity to more locations, thereby diminishing the number of locations for which subsidies are necessary. This will make subsidy programs more narrowly targeted, less costly, and easier to administer.

Accordingly, given the unique suitability of Ethernet for health IT, any plan to spur the deployment of broadband for health care providers must include the promotion of competition in the provision of Ethernet. Unfortunately, as tw telecom explained in its *December 22nd Ex Parte Letter* in this proceeding, the FCC's current regulatory regime affirmatively undermines Ethernet competition.[42] This is because the FCC has left the incumbent LECs free to exploit their substantial and persisting market power over Ethernet loops at locations where it is not

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[40] *See* NBP Public Notice # 17 at 6-7 (asking questions regarding the Universal Service Rural Health Care Support Mechanism and the Rural Health Care Pilot Program).

[41] *See, e.g.,* Comments of Health Network Group Organized by Internet2, at 1 (filed Dec. 2, 2009) ("The administration of the [Rural Health Care Pilot Program] has led to near disastrous results with about two percent of the funding being disbursed after almost two and one half years of a three-year program."); Comments of the American Telemedicine Association, at 7 (filed June 8, 2009) ("Numerous problems have been raised in the implementation of the [Rural Health Care Pilot Program] largely due to the poor initial design including the initial review process, program rules and regulations."); Comments of the Michigan Public Health Institute, at 12 (filed June 8, 2009 ("The inadequate planning and design of the 'Pilot' Program, as described in this document, threaten to extend the record of difficulty executing the FCC's Rural Health Care mission. Further, the Pilot Program's planning and design has cost this project and many others around the country considerable time and (taxpayer) money. There are other successful government-financed activities in this area. If the FCC adopted some of their proven practices, many of the issues described herein could have been avoided.").

[42] *See December 22nd Ex Parte Letter* at 7-12.

possible for tw telecom (or likely any other competitor) to self-deploy loops.[43] In order to increase the level of competition in the Ethernet market, thereby increasing the availability of low-priced Ethernet services to health care providers, the Commission should therefore reestablish dominant carrier regulation of incumbent LECs' wholesale Ethernet service and rely on such regulation to ensure that incumbent LECs charge wholesale prices at levels that are materially below competitors' retail Ethernet prices.[44]

Respectfully submitted,

/s/ Thomas Jones
Thomas Jones
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Attorneys for tw telecom inc.

[43] *See id.*

[44] *See id.* at 12.