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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Enhancement of Broadband Access Through the Preservation of Public Television Translator Service and the Development of Digital Translators and Digital On-Channel Repeaters	)	RM Docket No. _____

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FEDERAL COMMUNICATIONS COMMISSION
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ASSOCIATION OF PUBLIC TELEVISION STATIONS, PUBLIC BROADCASTING SERVICE AND THE CORPORATION FOR PUBLIC BROADCASTING PETITION FOR RULEMAKING

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EXECUTIVE SUMMARY

The Association of Public Television Stations, the Public Broadcasting Service, and the Corporation for Public Broadcasting petition the Commission to immediately initiate a rulemaking to ensure the delivery of noncommercial educational and public safety services to all Americans by protecting the existing system of translators and facilitating the development of a fully digital, broadband-like infrastructure that includes not only full-power digital transmitters, but also digital translators and digital on-channel repeaters. DTV translators and DTV on-channel repeaters are a technically feasible and spectrum efficient means of delivering educational and public safety services to populations that live in either rural areas or areas that experience reception problems because of terrain or other factors. The Commission has the opportunity to ensure universal service to all Americans by adopting policies and rules to:

- facilitate the relocation of analog translators that provide a noncommercial service;
- facilitate the transition of existing or relocated analog noncommercial educational translators to digital operation;
- extend public television digital service through new on-channel repeaters or translators and protect these services from unreimbursed displacement or in some instances offer these services additional interference protection; and
- make additional technical modifications to its rules to support the licensing of translators and repeaters.

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ASSOCIATION OF PUBLIC TELEVISION STATIONS, PUBLIC BROADCASTING SERVICE AND THE CORPORATION FOR PUBLIC BROADCASTING PETITION FOR RULEMAKING

Pursuant to Rule 1.401 (47 C.F.R. §1.401), the Association of Public Television Stations ("APTS"),[1] the Public Broadcasting Service ("PBS")[2] and the Corporation for Public Broadcasting ("CPB")[3] (collectively "Public Television") hereby petition the Federal Communications Commission ("Commission") to immediately initiate a rulemaking to ensure the delivery of noncommercial educational and public safety services to all Americans by protecting the existing system of translators and facilitating the development of a fully digital,

[1] APTS is a nonprofit organization whose members comprise the licensees of nearly all of the nation's 356 noncommercial educational television stations. APTS represents public television stations in legislative and policy matters before the Commission, Congress, and the Executive Branch, and engages in planning and research activities on behalf of its members.

[2] PBS is a nonprofit membership organization that serves individual public television stations by distributing national programming and providing other program-related services to the nation's public television stations.

[3] CPB is a private, nonprofit corporation created and authorized by the Public Broadcasting Act of 1967 and financed primarily by federal appropriations to facilitate and promote a nationwide system of public broadcasting. *See* 47 U.S.C. § 390 *et seq.*

broadband-like infrastructure that includes not only full-power digital transmitters, but also digital translators and digital on-channel repeaters.

Public Television has a vision of how it can use digital technology to better the lives of all Americans. By using a fully-integrated system of full-power digital transmitters, low-power digital translators and digital on-channel repeaters,[4] public television envisions a world in which it will distribute noncommercial educational and public safety services to all Americans over a broadband-like digital broadcast infrastructure. This goal addresses the striking need for broadband services among the unserved and underserved, especially among rural Americans. Public Television can achieve this concept with federal policy support from the Commission. Although rural America depends on approximately 4,800 low-power translators to receive broadcast service,[5] translators have traditionally been considered a secondary service and subject to disruptive and repeated displacement. Translators have also not been authorized to operate in digital, which could leave millions of rural Americans without access to the educational promise of digital technology. Nor has there been any provision in the Commission's rules for the use of digital on-channel repeaters to serve these populations. It has been demonstrated that digital

[4] Translator stations are low power transmitters that pick up a television (or radio) signal and retransmit that signal to rural or remote areas. 47 C.F.R. § 74.731(a) ("Television broadcast translator stations and television broadcast booster stations provide a means whereby the signals of television broadcast stations may be retransmitted to areas in which direct reception of such television broadcast stations is unsatisfactory due to distance or intervening terrain barriers"). See also 47 C.F.R. § 74.701(a) (defining "television broadcast translator station" as "A station in the broadcast service operated for the purpose of retransmitting the programs and signals of a television broadcast station, without significantly altering any characteristic of the original signal other than its frequency and amplitude, for the purpose of providing television reception to the general public"). Translators typically either retransmit the input signal on a different output channel or modulate and amplify the video and audio feed for retransmission. 47 C.F.R. § 74.731(b). Television broadcast booster stations provide a means whereby the licensee of a television broadcast station may provide service to areas of low signal strength in any region within the primary station's Grade B contour. The booster station may not be located outside the predicted Grade B of its primary station nor may the predicted Grade B signal of the television booster station extend beyond the predicted Grade B contour of the primary station. See 47 C.F.R. §§ 74.701(i) and 74.731(j).

[5] "Broadcast Station Totals as of September 30, 2001," http://www.fcc.gov/mmb/#totals, (total of 4,762 UHF and VHF translators nationwide).

translators and digital on-channel repeaters are both technically feasible and spectrum-efficient. The Commission should take advantage of these technical advances and adopt rules that allow public television stations to bring needed educational and public safety services to all Americans.

The Commission should immediately initiate a rulemaking to ensure the delivery of noncommercial educational and public safety services to all Americans by protecting the existing system of low-power translators and by facilitating the development of a fully digital, broadband-like infrastructure that includes not only full-power digital transmitters, but also digital translators and digital on-channel repeaters.

I. There is a Gap in the Availability of "Broadband" Services among Rural Populations

The Commission, the Departments of Commerce and Agriculture, and others have reported that the deployment of advanced services in rural areas[6] lags far behind the deployment in more urbanized areas. For instance, the Commission found that while the nation-wide deployment of advanced telecommunications capability has been reasonable and timely in

[6] The term "rural" has also been subject to varying definitions, depending on the context. For instance, the U.S. Department of Commerce and U.S. Department of Agriculture have used the U.S. Census definition of the term when examining the deployment of advanced telecommunications services to rural areas. "Advanced Telecommunications In Rural America: The Challenge of Bringing Broadband Service to All Americans," U.S. Department of Commerce, National Telecommunications and Information Administration, and U.S. Department of Agriculture, Rural Utilities Service (April, 2000) ("NTIA/RUS Report"), p. 4. Thus, in this context, "rural" means "towns of fewer than 2,500 inhabitants as well as areas outside of towns, including farmland, ranchland, and wilderness." *Id.* (citing U.S. Census Bureau, Urban and Rural Definitions and Data at www.census.gov/population/censusdata/urdef.html). Because the Census definition can encompass both traditionally small and rural towns and outlying areas, as well as areas that are developing or urbanizing (e.g. new suburban developments), the Department of Commerce and Department of Agriculture have cautioned analysts on the use of the term and have focussed primarily on rural areas outside of towns and suburbs. *Id.* at p. 5. Indeed, the Department of Agriculture's Rural Utilities Service has recognized three levels of "rurality" for purposes of its distance learning and telemedicine program. An "exceptionally rural area" means any areas that is not included within the boundaries of any incorporated or unincorporated city, village or borough having a population "in excess of 5,000 inhabitants." A "rural area" means any such area with a population over 5,000 but not exceeding 10,000 inhabitants. A "mid-rural area" refers to an area having a population with a population over 10,000 and not exceeding 20,000 inhabitants. 7 C.F.R. § 1703.126(b)(2)(i).

general, certain groups of consumers may be particularly vulnerable to delayed deployment. These particularly vulnerable groups of consumers include among others, consumers living in sparsely populated areas, consumers living on tribal lands and/or in U.S. territories, elementary and secondary schools, and rural health care facilities.[7] In addition, the Departments of Commerce and Agriculture also reported in 2000 that the deployment of advanced telecommunications services in urban and rural areas was not proceeding at a comparable rate, with residents in rural areas generally being the last to receive service.[8]

The latest figures indicate that while 32 percent of Internet users in large metropolitan areas have access to broadband services, only eight percent have access in rural areas.[9] In addition, less than five percent of cities with fewer than 10,000 people have broadband enabled cable systems or Digital Subscriber Line (DSL) service.[10] Less than one percent of towns with populations under 1,000 have cable modem access and none have DSL.[11] This disparity affects

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[7] Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Third Notice of Inquiry, CC Docket No. 98-146, FCC 01-223, ¶¶ 1, 14 and no. 4 (rel. Aug. 10, 2001); and Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Third Report, CC Docket No. 98-146, FCC 02-33, ¶ 35 (rel. February 6, 2002) ("Third Broadband Report") ("Our data suggest that there is a great disparity in high-speed subscribership at different populations densities with high-speed services reported more often in high-density areas than in less dense areas"). See also Third Broadband Report, ¶ 109 ("[A] positive correlation persists between population density and the presence of high-speed subscribers"), ¶35 ("Nearly all the most densely populated zip codes (well over 90 percent) have one or more high-speed subscribers, but fewer than 40 percent of the most sparsely populated zip codes have high-speed subscribers"), and ¶ 110 ("[U]nique and challenging issues relating to the provision of advanced services on tribal lands remain").

[8] NTIA/RUS Report, p. 17.

[9] "Characteristics and Choices of Internet Users," Report to the Ranking Minority Member, Subcommittee on Telecommunications, committee on Energy and Commerce, House of Representatives, United States General Accounting Office, GAO-01-345, p. 19 (Feb. 2001).

[10] NTIA/RUS Report, pp. 18, 21.

[11] Id.

between 55-65 million Americans who live in rural areas,[12] including nearly a third of America's children.[13]

II. Public Television Can Provide Noncommercial Educational and Public Safety Services Over A Broadband-Like Digital Infrastructure to All Americans

As part of its statutory mission, public television is committed to deliver noncommercial educational telecommunications services to unserved and underserved constituencies, including those Americans living in rural and small markets.[14] Public television transmitters, including low-power noncommercial educational translator and developing on-channel repeater technology, have the potential to provide noncommercial educational and public safety services over a broadband-like digital infrastructure to all Americans. The inherent flexibility of broadcast technology can allow for the delivery of data at extraordinary speeds in conjunction with a multicast television experience. One-way data rates can approximate nearly 5 megabits per second, exceeding the 200 kilobits per second that the FCC and other agencies consider to be necessary for "advanced" or "broadband" telecommunications services.[15] This extraordinary data delivery mechanism, in conjunction with other technologies designed to provide a return

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[12] The Rural Policy Research Institute reported that in 1997, 54.3 million people lived in "non-metropolitan" areas, accounting for over 20.3 percent of the nation's population. See http://www.rupri.org. Other commentators have noted that the number of people living in rural areas has now reached nearly 65 million. Diwata Fonte, "Speed the Plow—and Broadband, Too," Businessweek Online (July 11, 2001), available at: http://www.businessweek.com/bwdaily/dnflash/jul2001/nf20010711_920.htm.

[13] The Rural Policy Research Institute reported that in 1996, 27.1 percent of America's children lived in rural (non-metropolitan) areas. See http://www.rupri.org.

[14] For instance, Congress has determined that "[I]t is necessary and appropriate for the Federal Government to complement, assist, and support a national policy that will most effectively make public telecommunications service available to all citizens of the United States. 47 U.S.C. §396(a)(7). Congress has further concluded that "[I]t is in the public interest for the Federal Government to ensure that all citizens of the United States have access to public telecommunications service through all appropriate available telecommunications distributions technologies." 47 U.S.C. §396(a)(9).

[15] NTIA/RUS Report, p. 6.

path capability, can facilitate the delivery of high-quality noncommercial educational and public safety services through a "broadband-like" pipe. To reach this potential, a fully-digitized public television system must include digital translators and digital on-channel repeaters, technology that has been proven to be both feasible and spectrum-efficient.

A. Public Television Transmitters, Including Translators, Can Overcome the Lack of Broadband Services in Rural Areas

With the transition to digital operations, public television can play a pivotal, spectrum-efficient and cost-effective role in providing educational broadband access for rural and other underserved areas and audiences. Public stations are committed to developing new and essential educational content and services and have dedicated a portion of their digital bandwidth to providing universal access for all Americans to formal educational services. Through the APTS Board of Trustees, public television stations have officially adopted a policy of committing 4.5 megabits per second on a daily average of public stations' DTV bitstream (one-quarter of their digital channel capacity on average) to formal educational services. This approximates the capacity of three T-1 lines downstream to every school in America and is worth $2.4 billion annually. This level of digital capacity will deliver data at rates 80 times faster than 56K dial-up modems and 15 times faster than digital subscriber line (DSL) connections and will play a vital role in helping schools achieve their educational goals.

A digitized public television system can make a significant contribution to the deployment of high-speed, broadband-like services to Americans in rural areas and other

underserved populations.[16] If fully converted, public television stations' transmitters and translators can provide digital video, audio, and data services over-the-air to 99 percent of American households at the rate of 19.4 megabits per second. In fact, a digitized public television system would have the ability to reach a far greater number of Americans than other current "last mile" services, such as cable modems and DSL connections. By illustration, attached are several maps that show, respectively, the potential coverage by public television

[16] The term "broadband" has been a loosely used term of art that has encompassed a variety of services delivered at a number of data-rates. See "Broadband: Bringing Home the Bits" Committee on Broadband Last Mile Technology, computer Science and Telecommunications Board, Division on Engineering and Physical Sciences, National Research Council (National Academy of Sciences: Washington, DC, 2002) p. 2-2, et seq., available at: http://www.nationalacademies.org/. For instance, Section 706 of the 1996 Telecommunications Act defines "advanced telecommunications capability" to means a "high-speed, switched , broadband telecommunications capability" in any media that "enables users to originate and receive high-quality voice, data, graphics and video telecommunications using any technology." Telecommunications Act of 1996, Title VII, §706(c), P.L. 104-104, 110 Stat. 153 (Feb. 8, 1996) (codified at 47 U.S.C.S. § 157, note). In 1999, the FCC concluded that "broadband" was to be defined as requiring both upload and download speeds in excess of 200 kilobits per second (kbps)." Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Report, 14 FCC Rcd 2398, 2406, FCC 99-5, ¶20 (rel. Feb. 2, 1999) ("First Broadband Report"). The Commission has noted that because DTV signals are neither two-way nor "switched," such signals do not constitute "broadband" services. First Broadband Report, 14 FCC Rcd 2398, 2406, ¶ 21 and n. 15. Nevertheless, the Commission recognized that if two separate one-way technologies capable of delivering data rates at 200 kbps or greater to the last mile were used in concert, the result would be a broadband service. Id. at 14 FCC Rcd 2398, 1406, ¶22. The Commission has also recognized that as technology evolves, the concept of "broadband" would also have to evolve. Id. at 14 FCC Rcd 2398, 2408, ¶25 (allowing for the possibility that the Commission could require two-way data rates of more than 200 kbps in the future). In 2000, the Commission retained its definition of "broadband" but clarified that because the term had become so "common and imprecise" as to include a broader range of services, it was necessary divide broadband services into two narrower sub-categories: "advanced services" and "high-speed services." Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Second Report, 15 FCC Rcd 20913, FCC 00-290, ¶11 (rel. Aug. 21, 2000) ("Second Broadband Report"). "Advanced services" refer to two-way data delivery services capable of data rates of 200 kbps or greater in both directions, while "high-speed services" refer to services that deliver 200 kbps in at least one direction. Id. In February of this year, the Commission retained this distinction for the reasons stated above. Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Third Report, CC Docket No. 98-146, FCC 02-33, ¶ 9 (rel. February 6, 2002). APTS has advocated that the definition of "broadband" not be so limited as to exclude asymmetrical "broadband-like" services that have a substantial download speed and a limited upload capacity. See Comments of the Association of Public Television Stations, Request for Comments on the Deployment of Broadband Networks and Advanced Telecommunications, National Telecommunications and Information Administration, Docket No. 011109273-1273-01 (December 14, 2001), and Comments of the Association of Public Television Stations, Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable And Timely Fashion, and Possible Steps To Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Federal Communications Commission, CC Docket No. 98-146 (September 24, 2001) (reproduced at Appendix D).

versus the potential DSL reach to the "last mile" in New Hampshire, Georgia, Kentucky, Iowa, Arkansas, Idaho and New Mexico (see Appendix A, "Public Television Coverage Maps (Based on NTSC Coverage)"). Thus, using a fully converted digital system, public television will be able to provide powerful and cost-effective nearly universal "last mile" services to meet the public's needs.

This bandwidth and reach will effectively use facilities that have been developed over the years to ensure the goals of universal services policies. For example, a teacher in a remote community may use dial up Internet access through a rural telephone company to access rich media web content delivered over-the-air by the teacher's local public television transmitter or translator. This material would be downloaded on-demand to a PC with a tuner card and a UHF antenna at data rates that may never be available through DSL or cable modems for many rural Americans. The following are some examples of current educational services that can be delivered on a near-universal services basis through local public television stations.

- The Wisconsin Educational Communications Board has used DTV technology to deliver educational data overnight to local schools with computers equipped with DTV tuner cards. In two Madison elementary schools, fourth-graders are now able to view video segments of downloaded material as many times as they wish and can explore additional resources such as graphics, written materials, and audio recordings. The enhanced resources include video segments, maps, photographs, historical documents, tours designed to help guide student learning, and audio segments of actual diaries. For teachers, there is an integrated teacher guide, teaching tips, and a list of related Wisconsin Model Academic Standards.

- Through its *New Jersey Workplace Literacy Program*, New Jersey Network has been helping to address adult literacy through a groundbreaking partnership with the New Jersey Department of Labor in which it uses a variety of technologies, including its digital television signal, to deliver work force training materials to welfare recipients, dislocated workers and other job seekers to designated sites in New Jersey.

- Through its program, "Producing Ohio: Creating Our Economy," WCET has created an interactive multimedia economics curriculum developed for fifth

and sixth grade students. Dynamic and entertaining cross-curricular lessons give students the knowledge and tools necessary to succeed on the Ohio Proficiency Tests.

- In conjunction with CPB and the National Council of Teachers of English, WGBH presented a series of nine works of American Literature that included teaching resources and a student section. These works are airing nationally on public television. The teaching resources included lesson plans, discussion questions, and projects as well as access to information about other literary works that are widely taught in U.S. schools.

- Through the Utah Education Network, a partnership with the Utah Department of Education, public television station KUED, Salt Lake City, helps to distribute curriculum materials to teachers in the state more effectively. Its web site, www.uen.org, is a comprehensive educational resource for grade school through adult learners featuring an online library service, access to lesson plans and teaching materials, ability for teachers to create their own Web page portal, a catalog of distance learning opportunities and other resources.

- Public television station KNME, Albuquerque, New Mexico, is partnering with regional colleges and universities to create high-end interactive teaching packets to help high school teachers in the Four Corners region (Utah, Colorado, New Mexico and Arizona) meet curriculum standards. The project currently supports more than 48,000 students, 86 percent of whom are Navajo, in 100 schools in 11 school districts.

- Idaho Public Television (IPTV) provides Instructional Television material for K-12 teachers and PBS Adult Learning Services telecourses, offered for credit by Idaho institutions. In addition, IPTV provides a portion of its system to the higher education institutions of Idaho to offer classes to students at other in-state institutions, as well as offering the PBS Ready-to-Learn, National Teacher Training Institute and GED programs.

Other examples of the potential for high-speed services are described at Appendix B of this document.

In addition, because of the universal coverage of public television transmitters and translators, reaching 99 percent of all American households, a fully digitized public television system could offer significant new public safety advantages. For example, on November 15,

2001, Kentucky Educational Television (KET), in partnership with the local branch of the National Oceanic and Atmospheric Administration (NOAA), debuted a new service to representatives from the state police, emergency management agency and weather service. KET commissioned the development of software that allows it to use its digital broadcast capacity to immediately send emergency storm alerts, weather information, criminal profiles and updates, and other time-sensitive materials instantaneously to computers around the state. Transmission of this data over the digital broadcast signal decreases alert time and information lags from minutes to seconds. Use of the digital broadcast infrastructure can also bypass the congestion of wireline and cellular networks that can plague communications in emergency situations, as was recently demonstrated on September 11, 2001. Generous funding from the Kentucky state legislature enables KET to complete its digital conversion of 16 transmitters by May of 2003, thereby ensuring this service is available to virtually all residents of the state. Public television's digital facilities can be used to provide this vital public safety service nation-wide.

B. DTV Translator and DTV On-Channel Repeater Technology Are Both Technically Feasible and Spectrum-Efficient

A great deal has been learned about digital translators and repeaters.[17] It has been demonstrated that digital translator and digital on-channel repeater technology is both technically feasible and spectrum-efficient. By creating rules that allow for the development of these technologies, the Commission can ensure the universal delivery of free, over-the-air DTV signals, especially to rural regions.

[17] See, e.g. Comments of the Merrill Weiss Group, MM Docket No. 00-39, p. 19 et. seq. (May 17, 2000).

1. Digital Translators and On-Channel Repeaters Are Technically Feasible

Digital Translators. A digital translator typically operates at low power and receives the signal of either the main transmitter or another translator on one channel and "translates" it into another channel for output to a local area unable to receive the main signal. A number of field trials have demonstrated that it is feasible to use low power television translators to deliver DTV signals to rural and other remote areas. For instance, using a two-year experimental license from the FCC, Kent Parsons, an engineer with the University of Utah's public television stations, has been able to confirm that digital translators can deliver studio-quality television signals to rural viewers with high reliability and reasonable cost. Using commercial station KSL-DT, an NBC affiliate operating on channel 38 in Salt Lake City, Utah, as the originating station, Parsons constructed a television translator 83 miles away (experimental call sign "K17FJ").[18] The resulting reception was excellent, despite mountainous and difficult terrain.[19] Mr. Parsons chose channel 17 as the output channel to test whether any interference would be caused to an analog station at channel 16 at that site. No interference problems were reported.[20] Mr. Parsons also experimented with translating this signal a second time from channel 17 to channel 32 at a location 67 miles away near Monroe, Utah. Again, DTV reception was excellent.[21]

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[18] See "DTV Goes to the Country: TV Engineer Successfully Tests 8-VSB Over Challenging Terrain," Broadcasting and Cable (April 9, 2001), available at: www.broadcastingandcable.com. See also "Multi-hop DTV Translators at Work in Utah," Broadcast Engineering (May 1, 2001), available at: www.broadcastengineering.com. In Parson's set-up, the main signal goes into a Zenith ATSC 8VSB "remodulator" translator that converts the signal to a standard 45 MHz IF frequency. It is then up-converted using a General Instruments frequency-agile up-converter. This feeds, on frequency, a Larcan MX100, which produces 30W of digital-television carrier power on channel 17, ultimately feeding a PR450 directional Paraflector antenna made by the Scala Division of Kathrein.

[19] Id.

[20] Id.

[21] Id.

Digital On-Channel Repeaters. A digital on-channel repeater ("DOCR") receives the signal of a main transmitter on one channel while distributing that signal on the same channel to a local area that is unable to receive the main signal.[22] For some time, work has been done on the feasibility and reliability of on-channel DTV repeater technology.[23] For instance, in 1998 the Advanced Television Technology Center ("ATTC") began to investigate the feasibility of using DOCR technology within the ATSC 8-VSB digital television system to extend the signal of a main station to remote and RF-challenged locations.[24] On September 4, 1998, ATTC performed a real-world test and analysis that confirmed that a properly engineered DOCR could work in conditions where the target audience was shielded from the main transmitter by terrain. ATTC selected a site in Charlestown, WV that was shielded from the Washington, DC area by a low ridge of mountains and successfully repeated the DTV signal of public television station WETA on the same channel to Charlestown by using DOCR technology.[25] ATTC achieved a nearly 100 percent success rate.[26] It concluded that DOCR technology could be used "in terrain isolated topology to extend reliable coverage into areas of marginal DTV service."[27] It also concluded that DOCR technology would be able to "improve coverage areas where low signal strength and

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[22] Petitioners prefer to use the more generic term, "on-channel repeater" rather than the term "booster." Current Commission rules use the term "booster" rather than on-channel repeater, See 47 C.F.R. § 74.701(e) and 74.701(i) and define "boosters" to mean technology that distributes the signal of a main station on the same channel by modifying the amplitude of the signal. On-channel repeaters, however, can be simple amplifiers, heterodyne converters and processors, or synchronous systems. The Commission should therefore use the term "on-channel repeater" to refer to this broader class of technologies.

[23] Comments of the Merrill Weiss Group, MM Docket No. 00-39, p. 21 (May 17, 2000), *citing* S.A. Lery, W.H. Paik, and R.M. Rast, "Extending HDTV Coverage using Low Power Repeaters—a Cellular Approach," IEEE Transactions on Broadcasting, Vol. 38, No. 3, pp. 145-150 (Sept. 1992).

[24] See Comments of the Advanced Television Technology Center, MM Docket No. 00-39, pp. 1-2, 4-9 (June 16, 2000).

[25] Id.

[26] Id.

[27] Id. at 8.

strong multipath exists by increasing the received signal strength well above the original primary-only signal."[28]

In addition, in a paper published in June of last year, Charles Rhodes demonstrated the feasibility of on-channel digital repeaters based on the successful field tests of Paul Burkeholder, Humboldt County TV District, Nevada, and Sam Zborowski, vice president and chief technical officer of ADC Wireless Group, in Pittsburgh.[29] Mr. Rhodes concluded that there were few problems with same-channel interference.[30] He also concluded that the problem of co-channel interference is much smaller with digital signals, as compared to analog signals.[31]

Recently, a variety of other pilot projects have been initiated as well. For instance, WPSX, licensed to the Pennsylvania State University, has received funding from the Department of Commerce and an FCC experimental license (issued in June, 2001) to test on-channel repeaters to reach populations living in the valleys of central Pennsylvania.[32] Although no tests have been conducted yet, it is anticipated that these repeaters will be initially fed by microwave signals originating from the main studio at University Park Campus of Penn State and will, in a series of on-channel hops service Pine Grove Mills, Altoona and Johnstown in a "single frequency network."

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[28] Id. at 8.

[29] Charles Rhodes, "Engineering and On-Channel Off-Air DTV Repeater," TV Technology (June 28, 2000).

[30] Id. ("[T]he equalizer simply filters out the weaker of the two signals provided there is at least a 5 dB difference in their power as delivered to the DTV receiver")

[31] Id. See also Khalil Salehian, Michele Guillet, Bernard Caron, and Andre Kennedy, "On-Channel Repeater for Digital Television Broadcasting Service," Communications Research Centre, Ottowa, Ontario, presented to the IEEE Broadcast Symposium (October, 2001, Washington, DC) (reporting on successful tests of on-channel repeaters using the 8-VSB standard).

[32] See Letter from H. John Morgan, Assistant Chief, Video Services Division, Mass Media Bureau, to The Pennsylvania State University (June 26, 2001), 1800E-1HJM, File No. BEXP-20010608ABD. See also The Pennsylvania State University's Comments, MM Docket No. 00-39 (May 17, 2000).

Further, WSKG, Binghamton, New York, has received a grant from the Corporation for Public Broadcasting to test the feasibility of implementing multiple low-power on-channel DTV repeaters to deliver its DTV signal to the many remote rural populations of up-state New York. WSKG is planning a test using its existing translator site at Corning, New York.

2. DTV Translator and On-Channel Repeater Technologies are Spectrum-Efficient

DTV translator and digital on-channel repeater technologies are especially spectrum-efficient and supplement the DTV Table of Allotments in ways that make the most of this limited national resource. First, both DTV translator and DOCR technologies use digital modulation, which is more spectrum-efficient and less prone to cause interference with adjacent channels and other services than analog technology. For example, protection ratios are more favorable with DTV signals than with NTSC signals, and DTV receivers are less sensitive to interference than NTSC receivers. In addition, DTV signals require less power than NTSC signals to reach the same service area. Secondly while DTV translators are spectrum-efficient, DOCR technology is even more spectrum-efficient because DOCR technology uses the same channel for both input and output.

In an age of increasing spectrum scarcity, it is important for the Commission to create policies that take advantage of spectrum-efficient technology to make the most of a limited national resource.[33] DTV translator and DOCR technology are an especially spectrum-efficient

[33] See Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission, Notice of Proposed Rulemaking, ET Docket 98-153, FCC 00-163, ¶ 1 (May 11, 2000) (initiating rulemaking regarding new ultra-wideband technology in order to permit scarce spectrum resources to be used more efficiently).

means of using the limited national resource of over-the-air spectrum to bring broadcast and broadband services to all Americans.

III. Commission Policy Changes Can Facilitate the Development of Digital Broadcast Services in Rural Areas

Through its system of full-power transmitters and through approximately 700 low-power translators, public television provides services to over 99 percent of the American public. Using a fully converted digital system, public television will be able to provide powerful and cost-effective nearly universal "last mile" services to meet the public's needs. Public television translator stations comprise key portions of the public television system. However, translators are threatened by a number of factors within the Commission's purview.

A. Television Translator Service is Threatened Under Current Commission Rules (a) Because Translators Are a Secondary Service and (b) Because Translators Did Not Receive Digital Allotments

Television translators are a secondary service. Thus, they must protect other stations, including both full-power and low-power Class A stations from interference.[34] Even if a translator station provides the only public television signal to a community, it must accommodate the needs of neighboring full-power stations and some low-power stations by seeking a replacement channel in increasingly congested spectrum or go off the air. In addition, the FCC has held that because a translator station operates as a secondary service it must vacate the

[34] See 47 C.F.R. § 74.703 et seq.

spectrum at channels 60-69 at the end of the DTV transition in its market.[35] Although the Commission has recently ruled that a translator may continue to operate at channels 52-59 even after the end of the DTV transition in its market, the Commission has made it clear that a translator continues to be secondary to other services and that it must not cause actual interference to either DTV stations or licensees for new services.[36] Consequentially, when new services are introduced at channels 60-69 and later at 52-59, translators must re-engineer into the DTV core of channel 2-51 under the constant threat of eviction. PBS estimates that more than one-third (35 percent) of public television translators operate on channels 52 and above and will therefore be subject to potential displacement and disruption.[37] Because millions of rural residents rely on this technology to receive television signals, the potential loss of current analog translator service would be devastating to these communities.

Moreover, television translators did not receive digital allotments. This means that as the public broadcasting system converts to digital operation, those Americans who rely on translator

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[35] Reallocation of Television Channels 60-69, the 746-806 MHz Band, ET Docket No. 97-157, Report and Order, ¶ 25(January 6, 1998) ("LPTV stations and TV translators currently operate on a secondary basis on channels 60-69"). *Id.* at ¶ 29 ("We will permit LPTV and TV translators to continue to operate on channels 60-69 until the end of the DTV transition period, as long as they do not cause harmful interference to primary services"). "[P]roviding protection from interference by new services to low-power TV is incompatible with the allocations for public safety and commercial services required under the Budget Act in that such action would preclude new licensees' access to the band in large areas of the United States. It would also effectively give low-power TV primary status, at least in the commercial portions of the 746-806 MHz band, an action we have declined to take previously." Reallocation of Television Channels 60-69, the 746-806 MHz Band, Memorandum Opinion and Order, FCC 98-261, ET Docket No. 97-157, ¶ 13 (rel. Oct. 9, 1998). See also http://www.fcc.gov/oet/faqs/dtv-tvtx.html.
("TV translators and LPTV stations operating on channels 60-69 will be secondary to existing analog stations, DTV stations, and stations of any other primary services operating on those channels. Low power stations will be allowed to continue broadcasting on these channels up to the end of the DTV transition as long as they do not cause harmful interference to primary services").

[36] Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), Report & Order, FCC 01-364, ¶¶24-30. (rel. January 18, 2002). The Commission also allowed translator licensees to negotiate interference agreements with new service providers. Id. at ¶ 27.

[37] About 25 percent of public television translators operate on channels 60-69. Comments of the Association of America's Public Television Stations and the Public Broadcasting Service, MM Docket No. 87-268 (Nov. 22, 1996), p. 16.

service will not be able to receive a digital signal from public television stations in their community. Millions of rural residents would therefore never see the benefits of digital broadcasting if the Commission does not act to authorize digital translator technology or its equivalent.

Recognizing the plight of these essential television translator services, the Commission has created some limited relief in its Sixth Report and Order in the Advanced Television proceeding.[38] For instance, the Commission allows a displaced translator station to apply on a first-come first-served basis for a suitable replacement channel in the same geographic area without being subject to competing applications and without having to wait for a filing window.[39] The Commission has also relaxed certain technical requirements pertaining to interference standards and taboo restrictions.[40]

However, the limited relief offered so far does not address the fundamental and underlying problem. Television translators are still a secondary service subject to repeated and disruptive displacement, and television translator stations are not currently authorized to broadcast in digital.

B. Without Intervention by the Commission, the Potential Loss of Service Could be Devastating to Rural Communities

If public television translators are not granted a greater degree of protection than current rules afford, and if public television translators are not authorized to upgrade to digital, rural

[38] See Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Sixth Report & Order, FCC 97-115, MM Docket No. 87-268, ¶ 141 et. seq. (April 21, 1997).

[39] Id. at ¶144.

[40] Id. at ¶145.

Americans will lose access to basic analog service and will also miss the opportunity to benefit from the exciting new noncommercial educational and public safety services that digital broadcast technology has to offer.

If translator service were to be disrupted, the result would be devastating to both rural communities and to the public broadcasting system as well. We believe that there may be approximately 700 public television translators nation-wide. A study conducted by the Corporation for Public Broadcasting in 1998 concluded that over 12 million Americans are served by public television translators.[41] Of these, over 2 million Americans receive no other public television service. Therefore, if these public television translators were lost, over 2 million Americans living in rural and small markets would lose access to all free, over-the-air public television services. This study establishes that the potential loss would affect not just a few scattered individuals in the aggregate, but entire communities, with smaller, more rural communities suffering the most. For instance, two communities of more than 100,000 each, nine communities of 50,000 – 999,999, and 49 communities of 10,000 – 49,999 people, would lose complete access to all local public television services.[42]

The threat to local service if translators are displaced is even more disturbing when one examines two typical cases: that of Utah and Idaho. A review of the FCC database reveals that of the approximately 700 public television translators in service nationwide, over 70 are located

[41] See Reply Comments of the Association of America's Public Television Stations, and the Public Broadcasting Service, Rural and Small Market Access to Local Television Broadcast Signals, Department of Commerce, National Telecommunications and Information Administration, Docket No. 000208032-0031-01 (May 15, 2000), citing Jerry Ostertag, *Analysis of Impact of Elimination of Translators*, Corporation for Public Broadcasting, September 18, 1998.

[42] It is likely that this estimate is a conservative number. The data does not allow us to determine the exact number of people, in otherwise served broadcast areas, who do not have access to public broadcast service because of terrain difficulties or other local conditions creating holes or shadow areas in transmission, and who rely exclusively and solely on a translator delivered public television signal. APTS, PBS and CPB are currently working together to compile the latest information on translator coverage to assess the potential loss of service.

in rural Utah, repeating the signals of KUED, KULC and KBYU to communities unable to receive these signals otherwise. A loss of translator service would be devastating to the rural populations of Utah and to the public broadcasting system in that state. Because a number of translators in Utah feed other translators in an integrated system, a break in the chain may be likely to affect more communities than the community of license for a single translator. A significant number of translators carrying KUED, for instance, feed one another in this "daisy chain" arrangement.[43] KUED has therefore estimated that because of the interconnection of translators, the loss of a single translator could multiply the loss of free, non-commercial service to Utah households several-fold.[44] The inevitable result is that without adequate protection of translators during and after the DTV transition, numerous rural and remote households in Utah will find themselves stripped of the valuable, free, over-the-air local services that public television stations provide.

The situation in Idaho is also difficult. Idaho Public Television reports that it operates five transmitters and 34 translators covering 80 percent of the state's population.[45] It has been estimated that 118,294 people, or nearly 10 percent of Idaho's population, receives its public television service solely through translators.[46] A graphic comparison of the population served through Idaho Public Television's transmitters versus its translators is provided at Appendix C of

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[43] See Reply Comments of the Association of America's Public Television Stations, and the Public Broadcasting Service, Rural and Small Market Access to Local Television Broadcast Signals, Department of Commerce, National Telecommunications and Information Administration, Docket No. 000208032-0031-01 (May 15, 2000), citing Declaration of Fred C. Esplin, Comments of the Association of America's Public Television Stations and the Public Broadcasting Service, Federal Communications Commission MM Docket No. 87-268 (Nov. 22, 1996).

[44] Id.

[45] Reply Comments of Idaho Public Television, Rural and Small Market Access to Local Television Signals, National Telecommunications and Information Agency, Docket No. 000208032-0032-01, (May 15, 2000), p. 1.

[46] Id. at pp. 5-6.

this document. If translator service is disrupted in that state, due to the factors outlined above, thousands of Idaho citizens will lose their only public television service.

Moreover, the loss of service will affect not only those viewers who access television signals over the air but numerous subscribers to rural cable systems nationwide. Although national figures are unavailable, numerous small cable systems in rural areas rely on the reception of television translator signals at their headends to provide service to their customers. If translator service were to be shut down, not only would rural Americans who rely on over-the-air reception be denied service, a significant number of rural cable subscribers would also lose service as well.[47]

IV. The Commission Should Adopt Policies and Rules to Facilitate the Delivery of Educational and Public Safety Broadband Services on a Spectrum Efficient, Universal Basis

The Commission has recognized the importance of translators, stating that they often provide "the only source of free, over-the-air broadcasting in rural areas."[48] Accordingly, the Commission has announced its intention to initiate a new proceeding examining the status of low-power television translators and whether such stations could qualify for "some kind of primary status."[49] The Commission has also signaled that it intends to initiate a proceeding

[47] For instance, it has been reported that in Utah. "Cable companies use the translators to provide the Salt Lake City television stations to rural viewers. Therefore, if a translator goes off the air, the cable company can't provide the station carried by the translator to its viewers." Bill McClure, "Free Rural Television May Soon Be A Thing of the Past," the Richfield Reaper (April 5, 2000), p. 1-A. "This system [of translators] not only fills the free airwaves, but also feeds local broadcasts to the cable systems, such as Peak Cablevision." Martin Renzhofer, "Rural Utah May Lose Free Television Feed," The Salt Lake Tribune (March 15, 2000),p. D1.

[48] Establishment of a Class A Television Service, Report & Order, FCC 00-115, MM Docket No. 00-10 (April 4, 2000), ¶35.

[49] Id.

concerning on-channel DTV boosters for service to areas that otherwise cannot be reached.[50] To promote the universal and "last-mile" deployment of noncommercial educational and public safety services over a broadband-like infrastructure, especially to rural areas, Public Television urges the Commission to initiate a comprehensive proceeding that addresses the range of issues outlined in this petition as soon as possible.

To facilitate the delivery of these services, the Commission should adopt the following policies. First, the Commission should facilitate the relocation of noncommercial educational analog television translators. Second, the Commission should facilitate the transition of existing or relocated noncommercial educational analog translators to digital operation. Third, the Commission should establish policies that extend public television digital service through new digital translators and on-channel repeaters. Fourth, Public Television requests that the Commission make a number of additional technical modifications to its rules to support the licensing and operation of translators and repeaters.

A. The Commission Should Facilitate the Relocation of Analog Translators that Provide a Noncommercial Educational Service

Because analog noncommercial educational television translators operate as a secondary service, they continue to face displacement by full-power stations and other services with priority. Translators also face displacement by new licensees at channels 52-69 and in most circumstances must seek replacement channels within the DTV core. As discussed above, this

[50] See Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television, Report and Order and Further Notice of Proposed Rule Making, 2001 FCC LEXIS 408, FCC 01-24, MM Docket No. 00-39, ¶ 63 (rel. January 19, 2001). See also Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television, Memorandum Opinion and Order on Reconsideration, FCC 01-330, MM Docket No 00-39, ¶ 68 (rel. November 15, 2001).

forced relocation will impose considerable costs on these licensees and may result in loss of service to millions of rural Americans.

The Commission should facilitate the relocation of analog translators to their communities by continuing to process displacement applications at any time and quickly. In addition to the displacement relief that the Commission already has in place,[51] Public Television proposes that the Commission should encourage all full-power DTV applicants to cooperate and work with existing analog translators to accommodate them if possible.[52] If displacement is necessary, a proposed full-power station should directly notify the existing translator licensee of its potential displacement. The full-power station should then be required to work with the incumbent translator licensee to find a new channel and should reimburse the translator licensee for any and all costs associated with relocation, consistent with the Commission's established reimbursement policies first articulated in its "Emerging Technologies" proceeding and successfully used in other contexts.[53]

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[51] The Commission has created some relief by allowing a displaced translator station to apply on a first-come first-served basis for a suitable replacement channel in the same area without being subject to competing applications and without having to wait for a filing window. See Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Sixth Report & Order, FCC 97-115, MM Docket No. 87-268, ¶ 141 (April 21, 1997). The Commission has also relaxed certain technical requirements pertaining to interference standards and taboo restrictions. Id. at ¶145.

[52] See Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Memorandum Opinion &Order on Reconsideration of the Sixth Report & Order, FCC 98-24, ¶ 107 (rel. Feb. 23, 1998).

[53] The Commission's Emerging Technologies policy provides for any necessary relocation of incumbent licensees by new technology licensees unable to share spectrum with incumbents. If an emerging technology provider needs an incumbent's frequency, the Commission encourages the parties to negotiate a voluntary relocation agreement. Should that fail, the emerging technology service provider could request involuntary relocation of the incumbent. However, in that case, the emerging technology service provider must guarantee payment of all relocation expenses, build the new facilities at the relocation frequencies, and demonstrate that the new facilities are comparable to the old as follows:

> (1) The emerging technology service provider must guarantee payment of all relocation costs. This includes all engineering, equipment, site and FCC fees, as well as any reasonable, additional costs that the relocated fixed licensee may incur as a result of operation in a different frequency or migration to other media.

B. The Commission Should Facilitate the Transition of Existing or Relocated Analog Noncommercial Educational Translators to Digital Operation

The Commission has yet to create general rules authorizing DTV operation by existing or relocated translator stations. However, recognizing the value of these stations and the importance of allowing such stations to broadcast in digital, the FCC has stated that it will consider requests by translator stations to operate a DTV service on replacement channels on a case-by-case basis under its displacement relief policy.[54] Nevertheless, this case-by-case approach does not adequately ensure a smooth transition for existing or relocated analog public television translators.

As discussed above, rules that facilitate the transition of translators to digital facilities will serve the public interest. Public Television has a vision of how it can use digital technology

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> (2) The emerging technology service provider must complete all activities necessary for implementing the new facilities, including engineering, frequency coordination and cost analysis of the complete relocation procedure. This also includes identifying and obtaining, on the incumbents' behalf, new frequencies or other facilities where applicable.
> (3) The emerging technology service provider must build the new system (or alternative) and test it for comparability to the existing system. The incumbent licensee would not be required to relocate until the comparable alternative facilities are available to it for a reasonable time to make adjustments and ensure a seamless handoff. If within one year after the new facilities are in operation, they are demonstrated by incumbent licensee to be not comparable to the former facilities, the emerging technology service provider must remedy any deficiencies or pay to relocate the incumbent licensee back to its former frequency.

In the Matter of Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, First Report and Order and Third Notice of Proposed Rulemaking, 7 FCC Rcd 6886, FCC 92-437, at ¶ 24 (Oct. 29, 1992). See also Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile Satellite Service, Second Report and Second Memorandum Opinion and Order, FCC 00-233, ¶ 108 (Rel. July 3, 3000) (using reimbursement principles for relocation of 2GHz microwave licensees). If a new channel is not available for use by a displaced translator station, the Commission may allow the translator to cease operations temporarily until a new channel can be found. Once a new channel is found, either during the transition to digital or after the transition is complete, the displaced translator should be allowed to apply for the available channel at any time and without having to wait for a filing window as if it were an existing service.

[54] See Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Sixth Report & Order, FCC 97-115, n. 263 (rel. April 21, 1997); and Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Memorandum Opinion &Order on Reconsideration of the Sixth Report & Order, FCC 98-24, ¶ 122 (rel. Feb. 23, 1998).

to better the lives of all Americans. By using a fully-integrated system of full-power digital transmitters, low-power digital translators and digital on-channel repeaters, public television envisions a world in which it will distribute noncommercial educational and public safety services to all Americans over a broadband-like digital broadcast infrastructure. Public television translators are an essential piece of the infrastructure that enables public television to reach 99 percent of Americans. In order to fulfill the educational and public safety promise of digital technology, public television stations need to upgrade not only their full-power transmitters but also their translators as well.

The lack of comprehensive digital translator rules is particularly problematic for state networks. In order to digitize their state networks, state public television licensees are seeking funding from their respective legislatures. But state legislators have expressed concern about providing financial assistance for digital upgrades if only a portion of the state public television system (i.e. that portion served by full-power transmitters) is authorized by the FCC to operate in digital. This potentially affects state funding not only for public television translators but also state funding for the state public television system as a whole. Thus, a licensee of a public television translator requires a clear set of FCC rules that provide for a rational migration from analog to digital as the foundation for planning and funding the transition of its translator service.

Public Television therefore proposes that the Commission should develop comprehensive rules to facilitate the transition of translators to digital. The Commission should (a) authorize translators to operate dual analog/digital channels where channel allotments are available and desired by the licensee, and (b) authorize translators to switch overnight from analog to digital operations where no channels are available or where the licensee is unable to construct dual channels. The Commission should provide such authorization through a "fast-track" licensing

procedure, using "check-list" applications that it has successfully developed in other circumstances.[55]

C. The Commission Should Establish Policies That Extend Public Television Digital Service Through New Digital On-Channel Repeaters or Translators and Should Protect Them from Un-reimbursed Displacement.

For the same reasons as above, the Commission should authorize the creation of new digital on-channel repeaters and new digital translators. These new technologies can provide valuable educational broadcast, public safety and data services to difficult-to-reach "blank spots" within a full-power transmitter's DTV service area. They can also extend this service beyond a full-power transmitter's DTV service area to reach more Americans not served by a full-power public television service. The Commission should authorize these new technologies based on the following principles.

Digital On-Channel Repeaters Within the DTV Service Area. First, the Commission should accept applications for new digital on-channel repeaters that improve the service of an existing full-power transmitter within the predicted DTV service area of that transmitter. These applications should be accepted at any time without waiting for filing windows and should be processed quickly, perhaps using the short form ("check-list") application process that the Commission has successfully employed for full-power DTV stations. This procedure for accepting applications would be appropriate because digital on-channel repeaters located within the predicted DTV contour are designed to bring service to areas that should receive the DTV signal of the main station but do not because of terrain or other factors. Such applications should

[55] In addition, Public Television has also argued that in order to ensure a successful DTV transition, the Commission should establish DTV receiver standards so that all consumers may be able to receive free, over-the-air DTV signals. See, *e.g.*, Comments of the Association of America's Public Television Stations and the Public Broadcasting Service, MM Docket No. 00-39 (May 17, 2000), pp. 15-16.

be viewed as if they were merely minor modifications to an existing main DTV transmitter and should not require an extensive an engineering analysis.

If a DTV on-channel repeater is authorized to operate within the predicted DTV service area of the main transmitter, the repeater should be provided the same interference protection granted to the main transmitter with which it is associated. A DTV repeater that repeats the signal of a main transmitter within the transmitter's DTV service area and on the same channel should not pose any interference problems to other services and is a particularly spectrum-efficient technology. The repeater would merely improve the service within an existing, and already-protected, service area that cannot, because of terrain or other geographic features, reliably receive a good digital signal from the main transmitter.

Digital Translators Within the DTV Service Area. The Commission should also accept applications for new digital translators that improve the service of an existing full-power transmitter within the predicted DTV service area of that transmitter. These applications should be accepted at any time on a first-come, first-served basis without waiting for filing windows. Because an engineering analysis may be required to ensure non-interference with other services, use of check-list application procedures would not be indicated. Nevertheless, because these services would be designed merely to fill in hard-to-reach areas within the predicted DTV service area of a main station, these applications should be processed quickly, as the likelihood of interference with other services is minimal.

If a DTV translator is authorized to operate within the predicted DTV service contour of the main transmitter, the translator should be granted some additional protections against un-reimbursed displacement. For instance, the licensee of a proposed full-power DTV service or other authorized service that will experience interference from the operation of the existing DTV

translator should notify the licensee of the DTV translator directly of the possibility of interference. The new entrant should then work with the existing DTV translator licensee to find engineering solutions can accommodate both services. If not, the new entrant should work closely with the existing DTV translator licensee to find a new channel and should reimburse the DTV translator licensee for any and all costs associated with relocation. As noted above, relocation and reimbursement principles should be consistent with the Commission's established policy in its Emerging Technologies proceeding and successfully used in other contexts.[56]

Beyond the DTV Service Area. The Commission should also accept and process applications for digital translators and digital on-channel repeaters that extend the service of an existing transmitter beyond the predicted DTV service area of the existing transmitter. To allow for quick and efficient application processing, the Commission should allow these applications to be filed at any time. The Commission should also approve these applications without allowing for competing applications if the applicant demonstrates that the need for a noncommercial educational translator would be greater than the need for any other LPTV or TV translator station. This showing would be accomplished if the applicant demonstrates that the noncommercial educational TV translator applicant would provide a first or second television NCE service to 10% of the population within the proposed NCE translator station's protected contour.[57]

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[56] See note 53 supra. Note, if a new channel is not available within the DTV core, Public Television suggests that digital translators be allowed to use channels 53 and above, subject to protections against un-reimbursed displacement.

[57] See Comments of Association of Public Television Stations, MM Docket No. 95-31, pp. 20-21 (May 15, 2002), referencing 47 C.F.R. § 73.202(a)(1) and Reexamination of the Comparative Standards for Noncommercial Educational Applicants, Report and Order, FCC 00-120, 15 FCC Rcd 7386, ¶ 114 (rel. April 21, 2000).

When the Commission established the core DTV channels as channels 2 through 51, it deleted all vacant, reserved, noncommercial analog allotments, replacing as many as feasible with reserved DTV allotments.[58] The Commission has stated that the balance of the reserved allotments would be restored after the reallocation of channels 60-69 at the end of the DTV transition.[59] Public Television suggests that providing public television applicants priority in situations where an applicant will provide the only digital noncommercial educational public television service to a community would be an appropriate and practical way of restoring the deleted, reserved noncommercial allotments into the digital table.[60] Certainly, ensuring and protecting universal digital public television service in this country would realize the goal of the Commission in 1952 when it reserved spectrum for non-commercial educational uses.[61]

DTV translators and repeaters that extend DTV service beyond the predicted service area of a main DTV station should be granted some additional protections against subsequent un-reimbursed displacement. If an out-of-contour DTV translator or repeater service replicates the coverage of an existing analog translator, any subsequent full-power or Class A low power station that would experience interference should notify the existing DTV translator or repeater licensee directly of the possibility of interference. The new entrant should then work with the existing DTV translator or repeater licensee to find engineering solutions that can accommodate

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[58] Advanced Television Systems and Their Impact on the Existing Television Broadcast Service, Sixth Report & Order, FCC 97-115, 12 FCC Rcd 14588, ¶ 112 (1997).

[59] Advanced Television Systems and Their Impact on the Existing Television Broadcast Service, Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order, FCC 98-24, 13 FCC Rcd 7418, ¶ 133 (1998).

[60] For competing noncommercial applications, the Commission should use the comparative criteria point system that it uses to resolve full-power NCE/NCE mutual exclusivities. See 47 C.F.R. § 73.7003.

[61] See Amendment of Section 3.606 of the Commission's Rules and Regulations; Amendment of the Commission's Rules, Regulations and Engineering Standards Concerning the Television Broadcast Service; Utilization of Frequencies in the Band 470 to 890 MCS for Television Broadcasting, Sixth Report and Order, 41 F.C.C. 148 (1952).

both services. If not, the new entrant should work closely with the DTV translator licensee to find a new channel and should reimburse the DTV translator licensee for any and all costs associated with relocation in accordance with the Commission's Emerging Technologies policies.[62] However, new low power or new translator stations must protect the existing digital public television translator from interference and must accept interference from the existing digital public television translator.

D. The Commission Should Make Additional Technical Modifications to its Rules to Support the Licensing and Operation of Translators and Repeaters

Public Television also requests that the Commission make a number of additional technical modifications to its rules to support the licensing and operation of translators and repeaters. In particular, the Commission should allow translators to use the Longley-Rice method of predicting signal coverage, should separate its low-power rules from its translator/repeater rules and should relax technical performance criteria.[63]

Use of Longley-Rice. The Commission should allow applicants for translators to routinely use the latest accepted propagation and signal coverage analysis methods – namely the Longely-Rice method – for determining interference to analog and digital full power, low power and other authorized television transmission facilities. Many translators are designed to provide coverage in areas that do not receive adequate signal due to terrain shielding even though such areas are within the predicted Grade B protected service contours or the predicted DTV service

[62] See note 53, supra.

[63] It should be noted that because digital transmissions are far more spectrum-efficient than analog transmissions, the taboo relationships for DTV are much less stringent than for NTSC and therefore allow for greater flexibility in digital operation.

area. The use of the Longley-Rice method will ensure protection for TV broadcast stations while providing more realistic signal level prediction for areas not reachable by a main station. Using Longley-Rice should also permit more realistic prediction of interference for adjacent channels as well as the "taboo" channels with respect to the protected station rather than standard mileage separations and the propagation charts at section 73.699 of the Commission's rules.

Because the use of Longley-Rice method often predicts spot locations with signal levels higher than the f(50,50) charts, the amount of interference predicted when using Longley-Rice should be based on percentage of audience affected by the proposed translator as is the case with DTV allocation techniques. Further, as is the case with DTV, the ability to receive stations outside the nominal Grade B protected service contour is not protected and thus would not be counted as interference.

The Commission should therefore amend section 74.705 of its rules and all subsections to allow applicants to use the Longley-Rice method (as described in section 74.703(a)) as an accepted method of signal coverage prediction for the relocation of translators, and for the authorization of new translators on a separate channel within the DTV service area or on any channel outside the DTV service area, rather than requiring waivers for its use. The Commission should also amend section 74.706(e) of its rules to allow use of the Longley-Rice method to determine interference protection to DTV stations as well as low power TV, TV translator and TV booster stations.

Separation of Low-Power and Translator/Repeater Rules. In addition, the Commission should conduct a thorough review of the translator and low power TV rules (Part 74, sub-part G) with the intent of separating rules for low power TV (including class A low-power TV) stations from the rules applicable to translators and repeaters. This streamlining will allow applicants for,

and operators of, translators and repeaters greater freedom and efficiency while maintaining interference criteria appropriate to the specific broadcast service. To this end, the Commission should request input from the public regarding rule changes to make application processing and technical and operational criteria more efficient.

Additional Issues. In addition, because translators and on-channel repeaters are frequently low-power and low-cost facilities, the Commission should not require such stations to meet the stringent and expensive technical performance criteria that are applied to full-power stations, except when difficult issues of interference are involved.

Conclusion

The Commission should immediately initiate a rulemaking to ensure the delivery of noncommercial educational and public safety service to all Americans by protecting the existing system of low-power translators and by facilitating the development of a fully digital, broadband-like infrastructure that includes not only full-power digital transmitters, but also digital translators and digital on-channel repeaters.

Respectfully submitted,

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