afford stations the opportunity to apply to maximize their service areas. In addition, the Commission issued a *Clarification Order* with respect to the interim rules established in the *Second DTV Periodic Report and Order*.[776] Those rules continue to be available for stations that wish to apply to use DTS technology during the pendency of the rulemaking proceeding.

223. ***Enhanced-VSB (E-VSB).*** Enhanced-VSB or E-VSB is an amendment to the ATSC A/53C standard for DTV. E-VSB provides an option to broadcasters to trade off data-rate for a lower carrier-to-noise threshold for a portion of their data stream. This portion can be more resistant to interference and low signal strength conditions. One potential application is for a "fallback audio" stream that could be heard even if the video picture is unavailable. Another could be a small video stream for mobile handheld devices or data transfer to mobile devices. The ATSC has published a number of related Candidate Standards that support the E-VSB System. CS/T3-608 and CS/T3-609 provide transport specifications, and CS/T3-606 provides enhancements to the ATSC PSIP Standard (A/65). Enhancements to AC-3 audio (E-AC-3) are contained in documents CS/T3-613 and CS/T3-614.[777]

224. ***Home Networking and Wi-Fi.*** Home networking allows consumers to connect multiple devices in the home (*e.g.*, set-top boxes, television sets, personal computers) with each other. Currently, the most common application for home networking is to connect multiple PCs to cable modems. Within the context of video competition, home networks may also be used to transmit video such as downloaded VOD movies. MoCA, the Multimedia over Coax Alliance, was formed to develop specifications for networking over existing in-home coaxial cables.[778] By allowing devices connected to the same set of coax cables to network at high speeds (over 100 Mbps), programming recorded by one PVR in the house can be accessed by any other set-top device in the house.[779] The Digital Living Network Alliance (DLNA), a consortium including Fujitsu, IBM, Intel, Microsoft, and other consumer electronics manufacturers,[780] also is seeking to standardize the interaction of various networked devices in the home to enable the seamless transfer and management of content among enabled devices.[781] In addition, Comcast, Time Warner, and Cox offer home networking using a wireless system based on CableLabs' CableHome.[782] Another example of home networking is TiVo Corporation's TiVo ToGo service, which permits consumers to view programming recorded on one TiVo device in the home on other TiVo devices, on home computers, and on portable media players.[783]

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[776] *Id.*

[777] Advanced Television Systems Committee, *ATSC Approves Enhancements to DTV Standard* (press release), July 20, 2004.

[778] Multimedia over Coax Alliance, at http://www.mocalliance.org/en/index.asp (visited Oct. 20, 2005). *See also Digital Entertainment without Compromise*, CABLENET, at http://www.cablenet.org/participants/demos/MoCA.pdf (visited Oct. 20, 2005).

[779] Multimedia over Coax Alliance, *MoCA Concludes Successful Field Trials for Home Networking of Digital* Entertainment Using Coax (press release), Apr. 4, 2005.

[780] DLNA Promoter Members are: Fujitsu, Hewlett Packard, Huawei, IBM, Intel, Kenwood, Lenovo, Microsoft, Motorola, NEC, Nokia, Panasonic, Philips, Pioneer, Samsung, Sharp, Sony, ST, Texas Instruments, Thomson, and Toshiba. For the complete list of member companies, *see* Digital Living Network Alliance, *DLNA Member Companies,* at http://www.dlna.org/about/roster/ (visited Nov. 7, 2005).

[781] Digital Living Network Alliance, at http://www.dlna.org/home (visited Nov. 7, 2005).

[782] CableLabs CableHome, at http://www.cablelabs.com/projects/cablehome/ (visited Oct. 20, 2005).

[783] TiVo, *TiVoToGo Transfers*, at http://www.tivo.com/4.9.19.asp (visited Oct. 20, 2005).

225. Cable operators also are forming alliances with wireless hotspot[784] providers to offer subscribers high-speed data access via Wi-Fi hotspots.[785] For example, Comcast offers its high-speed Internet subscribers owning Wi-Fi enabled laptops the T-Mobile subscription "HotSpot" service.[786] Cox has joined Qwest, Intel, and Arizona State officials to offer a Wi-Fi hotspot service known as Public Online Wireless Electronic Resource (POWER), which provides free wireless broadband service to members of the public in Arizona. Time Warner is deploying its own wireless network in large, heavily trafficked commercial establishments, and Charter is using a Wi-Fi wholesaler to deliver roaming coverage to its cable modem subscribers.[787] Cable operators believe the hotspot coverage will enable additional services and increase revenue streams.

226. ***WiMAX and Municipal Wi-Fi.*** WiMAX continues to develop as a wireless standard that is expected to become a last mile solution for cable operators, broadband providers, and others.[788] The technology, embodied in IEEE Standard 802.16, has the potential to reach rural customers outside the range of today's infrastructure and also can be used to provide entire metropolitan areas with high-speed data access. With speeds up to 75 Mbps and ranges up to 30 miles, WiMAX technology is a step in the transition to IP communication entirely without wires.[789] Among the potential applications for WiMAX is the delivery of high-quality video to handheld or portable devices. Development of WiMAX has continued, with the creation of a certification program in April 2005[790] and the opening of an official testing laboratory in July 2005.[791] While the primary proponent of WiMAX has been the Intel Corporation, Nokia also has begun significant investment in the technology.[792] Some analysts do not expect widespread availability of WiMAX before 2010.[793]

227. Closer on the horizon than WiMAX deployment is the provision of wireless broadband by various municipalities, often offered for free.[794] At least six major cities, including Philadelphia, San

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[784] A hotspot is a place where the public can access Wi-Fi service, either for free or for a fee. Hotspots are available at coffee shops, airport lounges, train stations, convention centers, hotels and many other public meeting areas. Corporations, campuses, and local governments also are implementing hotspots to provide wireless Internet access to their visitors and guests. Wi-Fi Alliance, *Glossary of Terms,* at http://www.wi-fi.com/OpenSection/glossary.asp?TID=2 (visited Jan. 14, 2005).

[785] Wi-Fi is an interoperability certification for wireless local area network (LAN) products based on the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard.

[786] Alan Breznick, *MSOs Seek Winning Wi-Fi Forumula,* CABLE DIGITAL NEWS, Apr. 1, 2005.

[787] *Id.*

[788] Intel Corporation, *WiMAX – Broadband Wireless Access Technology,* at http://www.intel.com/netcomms/technologies/WiMAX (visited Oct. 20, 2005).

[789] Intel Corp., *Broadband Wireless Access: IEEE 802.16 and WiMAX White Paper,* Aug. 2003, at http://www.intel.com/technology/magazine/standards/st08031.pdf (visited Dec. 8, 2005).

[790] WiMAX Forum, *WiMAX Forum Launches Certification Program, Expects First Equipment in Market by Year-end (*press release), Apr. 18, 2005.

[791] WiMAX Forum, *The WiMAX Forum Showcases Equipment and Breadth of Applications, Opens Test Lab* (press release), July 13, 2005.

[792] Simon Hendery, *WiMAX Not Up To Billing*, NEW ZEALAND HERALD, Oct. 18, 2005, at http://www.nzherald.co.nz/section/ story.cfm?c_id=5&objectid=10350750 (visited Oct. 20, 2005).

[793] Marsha Walton, *Is Wifi on Steroids the Next Big Thing?*, CNN, Oct. 17, 2005, at http://www.cnn.com/2005/TECH/10/17/wireless.WiMAX/index.html (visited Oct. 20, 2005).

[794] Michael Grebb, *Cities Unleash Free Wi-Fi*, WIRED NEWS, Oct. 19, 2005, at http://www.wired.com/news/technology/wireless_special/0,2914,68999,00.html (visited Oct. 20, 2005).

Francisco, Chicago, Denver, Miami Beach, and Portland, Oregon, have begun developing or announced plans to deploy municipal Wi-Fi networks, either free or at low cost to local residents.[795] In general, municipalities deploy Wi-Fi as a mesh network covering an entire, large area with wireless data access based on IEEE Standard 802.11.[796] Traditional public wireless access has followed the hotspot model already deployed.[797] Some municipalities, including Philadelphia, have partnered with an existing service provider, such as Earthlink, to offer this new network at wholesale rates to competitive ISPs.[798] In some cases incumbent providers and other competitors have sought and continue to seek local and national government prohibitions on publicly funded data networks.[799]

228. ***Next Generation Network Architecture.*** NGNA is an undertaking by Comcast, Cox, and Time Warner to advance cable operators' transition to all-digital networks without expensive rebuilds. While encompassing many aspects of cable service, including advanced video and audio compression technologies (codecs), such as MPEG-4 and Windows Media 9, a primary goal of NGNA has been the development in 2005 of an alternative software-based conditional access system which continues to support cable operators' existing security. Comcast and Motorola have begun development of a solution based on Motorola's MediaCipher technology.[800] The companies demonstrated this technology to the Commission at a Comcast-hosted event in July 2005.[801]

229. ***Advanced Compression.*** The use of advanced codecs in place of MPEG-2 can significantly decrease the amount of bandwidth required to transmit digital video. Although advanced compression technologies require significant investment in new hardware, MVPDs have embraced the reduction in bandwidth that advanced compression allows. Existing video delivery services are able to provide more programming and new entrants face decreased barriers to entry into the competitive video marketplace.[802] MVPDs have focused on two codecs – MPEG-4/H.264 (also known as AVC) and Microsoft's VC-1 (formerly Windows Media 9/VC-9). Both AVC and VC-1 are included in the HD-DVD and Blu-ray BD-ROM high-definition disc specifications along with MPEG-2, which provides at least one new pipe into the home for HD programming.[803] The ATSC has several candidate standards

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[795] *Id.*

[796] A mesh network is a network that provides a direct connection between each site and every other site. Through the use of intelligent internetworking devices, each transmission might be routed over an alternative path should the primary (direct) path between the two sites be either congested or in a state of failure. *See* Harry Newton, NEWTON'S TELECOM DICTIONARY (CMP Books, 17th ed., 2001), at 434.

[797] Jay Wrolstad, *Cities Take on Wi-Fi Challenge*, CIO TODAY, Oct. 5, 2005, at http://www.cio-today.com/news/Cities-Take-on-Wi-Fi-Challenge/story.xhtml?story_id=011000UKI4MH (visited Oct. 19, 2005).

[798] Leslie Cauley, *Debate Swirls over City Wi-Fi Networks*, USA TODAY, Oct. 4, 2005, at http://www.usatoday.com/tech/products/services/2005-10-04-wifi-networks_x.htm (visited Oct. 19, 2005).

[799] *Id.*

[800] Jeff Baumgartner, *Blowing It Up*, CED MAGAZINE, June 2005, at 38-46.

[801] Letter from Neal M. Goldberg, General Counsel, NCTA, to Marlene H. Dortch, Secretary, FCC, CS Docket 97-80, (Oct. 14, 2005).

[802] DBS providers DIRECTV and EchoStar are turning to MPEG-4 as a way to increase their video offerings within the limited bandwidth available through their existing satellites. New entrants, such as SBC, are using advanced codecs as a way to maximize the benefits of their initial investments by carrying the greatest number of channels in the minimum amount of bandwidth.

[803] At least one affordable HD-DVD player will be available by the end of the year. JVC, *JVC Unveils Affordable, High Definition DVD Player* (press release), June 8, 2005. Playstation 3 will have a Blu-ray player and is due out in early 2006. *See* Tony Smith, *Sony Unveils PS3,* THE REGISTER, May 17, 2005, at http://www.theregister.co.uk/2005/05/17/sony_unveils_ps3/ (visited Oct. 20, 2005).

under consideration that could include AVC and VC-1 for limited use in terrestrial digital broadcasting.[804] In January 2005, DIRECTV announced that it has begun to transition its operation to AVC, with the intent to provide local HD channels nationwide by 2007.[805]

230. ***Mobile Video.*** Several technologies have emerged to offer broadcast television to mobile telephones. Digital Video Broadcast-Handheld (DVB-H) and QUALCOMM's proprietary MediaFLO technology are the two most prominent mobile video platforms. Tower operator Crown Castle has deployed a single-frequency DVB-H test site in Pittsburgh, Pennsylvania using spectrum in the 1440-1790 MHz band.[806] The service will provide video at 24-30 frames per second. Crown Castle plans to launch commercially in select major markets, including New York, in 2006 and to deploy nationwide to the top 30 markets throughout 2007.[807] Verizon Wireless plans to use Crown Castle's network to send live television to its phones in the first quarter of 2006.[808] MediaFLO transmissions are expected to use 700 MHz TV channels.[809] On September 27, 2005, QUALCOMM announced the first live, over-the-air demonstration of the FLO (Forward Link Only) Technology delivered to a wireless handset.[810]

231. Mobile phone companies also are beginning to deliver video programming to cellular telephones and other portable devices via 3G data services. Verizon Wireless launched a 3G multimedia service called VCAST in February 2005. Transmitting at a maximum speed of 300 to 500 kbps, VCAST offers on-demand content, as well as 3D games to phones compatible with the next-generation network.[811] Sprint began streaming live Fox News on wireless phones in April 2005 through its Sprint TV service.[812] Satellite radio providers are also testing mobile video. In January 2005, On2 Networks announced that XM Satellite Radio will use On2 Networks' VP6.2 codec for streaming video to mobile receivers in vehicles.[813]

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[804] Currently, the ATSC Technology and Standards Group is considering the possibility of specifying one or two advanced video codecs for the E-VSB mode. CS/TSG-658 and CS/TSG-659, developed by the Specialist Group on Video and Audio Coding (TSG/S6), define the video system characteristics for VC-1 and AVC, respectively.

[805] Robert Heron, *DirecTV's HD Future is MPEG-4,* PC MAGAZINE, Jan. 6, 2005, at http://www.pcmag.com/article2/0,1759,1748991,00.asp (visited Oct. 20, 2005).

[806] Junko Yoshida, *Cell Phone Video Gets Real,* EE TIMES, Sept. 20, 2004.

[807] Texas Instruments, *Texas Instruments Brings Live Digital TV to Your Cell Phone* (press release), Oct. 21, 2004. *See also* Crown Castle, *Crown Castle Mobile Media Becomes Modeo: Showcases Live Mobile TV at International Consumer Electronics Show* (press release), Jan. 4, 2006.

[808] *Verizon Wireless Seen Offering TV via Crown Castle*, EWEEK.COM, Oct. 4, 2005, at http://www.eweek.com (visited Oct. 20, 2005).

[809] Doug Lung, *Broadcasting to Cell Phones*, TV TECHNOLOGY, Sept. 7, 2005, at http://www.tvtechnology.com (visited Sept. 7, 2005).

[810] QUALCOMM, *QUALCOMM Conducts First Live Demonstration of FLO Technology on a Wireless Handset* (press release), Sept. 27, 2005.

[811] Ed Oswald, *Verizon Wireless VCast Goes Live,* BETANEWS.COM, Feb. 1, 2005, at http://www.betanews.com/article/Verizon_Wireless_VCAST_Goes_Live/1107259065 (visited Dec. 12, 2005). *See also* NCTA Comments at 10-11.

[812] David Hayes, *Sprint Presents Live TV on Phone*, KANSAS CITY STAR, Apr. 19, 2005, at http://www.kansascity.com/mld/kansascity/business/technology/11428413.htm (visited Oct. 20, 2005). Viewers see the broadcast at just under 15 frames per second, the minimum required for humans to perceive continuous motion. *See also* NCTA Comments at 11.

[813] On2 Technologies, Inc., *XM Satellite Radio Selects On2 True Motion VP6* (press release), Jan. 5, 2005.

232. MobiTV launched live broadcast television service beginning in November 2003, although the initial service deployment frame rate was only one frame per second.[814] The first MobiTV service allowed consumers to access some 13 channels in real time.[815] MobiTV today is providing about 36 channels to 500,000 subscribers.[816] The service is available to customers of Sprint PCS, Cingular, and several regional carriers.[817] Other startups, such as GoTV, PacketVideo, and SmartVideo, are delivering video content to phones. Chip manufacturers continue to improve the speed and quality of mobile video.

233. Consumer electronics manufacturers are beginning to offer portable video players. Computer manufacturer Apple recently unveiled a new version of the iPod capable of carrying 75-150 hours of downloaded video.[818] Disney offers programming through the iTunes store that consumers can view on the iPod, including Pixar short films and hit television shows for $1.99 per download.[819] In March 2005, Sony released the Playstation Portable, a combination portable gaming device and media player that can display full-length movies from a Sony proprietary Universal Media Disc (UMD).[820] CinemaNow offers movie downloads that consumers can view on PCs and on several portable video players from a variety of manufacturers.[821] The Commission will monitor these nascent technologies as their services develop.

234. ***DOCSIS 3.0.*** CableLab's Data Over Cable Service Interface Specification or DOCSIS continues to be the dominant standard used to provide high-speed Internet service for cable operators. As the throughput to operators increases, their ability to deliver additional and more complex services, including video over IP, increases.[822] As noted in our *2004 Report*,[823] CableLabs will not pursue a new DOCSIS 2.x specification[824] and will instead use routine "Engineering Change Requests"[825] to add many

[814] Jefferson Graham, *With MobiTV, It's Television on the Go*, USA TODAY, Oct. 9, 2005 (*Graham Article*), at http://www.indystar.com/apps/pbcs.dll/article?AID=/20051009/BUSINESS/510090347/1003/BUSINESS (visited Dec 12, 2005).

[815] MobiTV, *Watch Live TV Content On Your Sprint Mobile Phone* (press release), Nov. 13, 2003.

[816] Jefferson Graham, *TV on Cellphones? Funny but Profitable*, USA TODAY, Sept. 27, 2005, at http://www.usatoday.com/tech/products/services/2005-09-27-mobitv_x.htm (visited Dec 12, 2005). *See also* MobiTV, *MobiTV Channel Lineup*, at http://www.mobitv.com/channels/index.html (visited Oct. 20, 2005).

[817] *Graham Article. See also* NCTA Comments at 11.

[818] Apple, *Apple Unveils the iPod; Fifth Generation iPod Now Play Music, Photos & Video* (press release), Oct. 12, 2005.

[819] *Apple's Wide-Ranging Video Visions,* IPMediaMonitor, Oct. 17, 2005, at http://www.ipmediamonitor.com/subscribers/index.htm?article_id=46&sid=1 (visited Oct. 20, 2005).

[820] Sony, *Most Anticipated Consumer Product Launch of 2005, PSP [Playstation Portable] Ushers in a New Era In Portable Entertainment* (press release), Mar. 24, 2005.

[821] MediaNow, *CinemaNow is First to Add Download-To-Own Video Option to Online Service* (press release), Jan. 15, 2004.

[822] "Throughput" is the actual amount of useful and non-redundant information which is transmitted or processed. *See* Harry Newton, NEWTON'S TELECOM DICTIONARY (CMP Books, 17th ed., 2001), at 697.

[823] *2004 Report*, 20 FCC Rcd 2859 ¶ 209.

[824] Alan Breznick, *CableLabs Drops DOCSIS 2.x Plans, Eyes DOCSIS 3.0 Spec*, CABLE DATACOM NEWS, Sept. 2004.

[825] An Engineering Change Request (ECR) is the first step in the procedure to change CableLabs specifications. CableLabs posts the proposed change to their website and sends the ECR to a subject area working group mail list for work on the proposed change. CableLabs then posts an Engineering Change Order (ECO) to their website with indication of an ECO Comment Deadline. The final step in the procedure to change specifications is called an Engineering Change Notice (ECN), in which the proposed change is officially considered to be part of the (continued....)

of the planned features to the existing DOCSIS 2.0 specification, saving other changes for a future DOCSIS 3.0 specification.[826] DOCSIS 3.0 will enable advanced services, such as Internet video, by supporting delivery of hundreds of Mbps to a single DOCSIS device.[827] CableLabs has selected "packet bonding" over "MPEG bonding"[828] for wideband[829] capabilities in the emerging DOCSIS 3.0 specification.[830] This is partly based on the fact that packet bonding gives operators a faster time to market because the technique can be deployed with existing technologies. Legacy cable modem termination systems (CMTSs), for example, can support packet bonding with a software revision. DOCSIS 3.0 enables channel bonding, a technique that will allow cable operators to offer speeds of 100 Mbps and greater, allowing them to better compete against new fiber-to-the-home (FTTH) technologies.[831] The next-generation of CMTSs under the emerging DOCSIS 3.0 specification may also set the technical groundwork for more IP video in the future.[832]

235. ***PacketCable.*** PacketCable, another CableLabs project, is the specification standard developed for delivering advanced real-time multimedia services over two-way cable plant.[833] PacketCable uses IP technology to enable a wide range of services, including IP telephony, multimedia

(Continued from previous page)
specification that it modifies. CableLabs, *Glossary*, at http://www.cablelabs.com/news/glossary.html#E (visited Sep. 17, 2004).

[826] Alan Breznick, *CableLabs Drops DOCSIS 2.x Plans, Eyes DOCSIS 3.0 Spec*, CABLE DATACOM NEWS, Sept. 1 2004, at http://www.cabledatacomnews.com/sep04/sep04-3.html (visited Oct. 20, 2005).

[827] Douglas Shapiro, *CableLabs Financial Analyst Day*, Banc of America Securities, May 20, 2004, at 3.

[828] Packet bonding virtually welds together the multiple channels by breaking down and spreading the MPEG data packets over two or more QAM channels. The cable modem, which already operates in terms of packets, then recombines the packets. Packet Bonding is easier to implement than MPEG bonding because it is compatible with current Cable Modem Termination Service (CMTS, located in the cable headend) architecture. *See* Alan Breznick and Michael Harris, *Packet Bonding Picked for DOCSIS 3.0*, CABLE DIGITAL NEWS, May 1, 2005, at http://www.cabledatacomnews.com/may05/may05-1.html (visited Nov. 17, 2005). MPEG bonding, another form of channel bonding, virtually fuses together multiple 6 MHz channels, thereby creating one larger bandwidth and higher speed channel. *See* Jeff Baumgartner, *Drilling for Bandwidth: A Pipeline Full of Options Can Help MSOs Keep Pace*, CED MAGAZINE, Mar. 1, 2005, at http://www.bigbandnet.com/news/inTheNews/2005/news_030105b.php (visited Nov. 17, 2005).

[829] The wideband protocol spreads the DOCSIS frames, consisting of the access control and payload increments associated with each IP data flow, "vertically" across the multiple QAMs so that each frame is delivered in a fraction of the time it would take to deliver it in standard DOCSIS single-channel mode. Because DOCSIS frames are transported in the larger framework of 188-byte MPEG transport frames, the actual breaking up of the flow into vertically stacked fragments is done at the MPEG transmission convergence layer, leaving intact the DOCSIS physical and media access control (MAC) layers. *See Cisco Unveils Gig-IP Path Uniquely Suited for Cable*, SCREENPLAYS, Sept. 1, 2005, at http://www.screenplays.bz/sp105k.html, (visited Nov. 17, 2005).

[830] Alan Breznick and Michael Harris, *Packet Bonding Picked for DOCSIS 3.0*, CABLE DIGITAL NEWS, May 1, 2005, at http://www.cabledatacomnews.com/may05/may05-1.html (visited Oct. 28, 2005).

[831] Jeff Baumgartner, *"Packet Bonding" to be Part of DOCSIS 3.0 and the Modular CMTS*, CED BROADBAND DIRECT, Apr. 18, 2005, at http://www.cedmagazine.com/article/CA6264575.html (visited Dec. 12, 2005).

[832] *See* High-Speed Service Report at Table 3; Alan Breznick and Michael Harris, *Cable Operators, Baby Bells See Big Drop in Data Gains for Q2, (but MSOs Regain Quarterly Market Share Edge as Telcos Fall Faster*, CABLE DIGITAL NEWS, Sept. 1, 2005, at http://www.cabledatacomnews.com/sep05/sep05-1.html (visited Dec. 12, 2005).

[833] CableLabs, *PacketCable Home*, at http://www.packetcable.com (visited Oct. 19, 2005). *See Availability of Advanced Telecommunications Capability in the United States, Fourth Report to Congress*, 19 FCC Rcd at 20554; Letters from Paul Glist, Cole, Raywid & Braverman, Counsel for CableLabs, to Marlene Dortch, Secretary, FCC, July 28, 2004 and July 29, 2004, at 7-8, 25, respectively.

conferencing, interactive gaming, and general multimedia applications.[834] As of September 2005, 35 PacketCable-embedded multimedia terminal adapter devices were certified by CableLabs.[835] In addition, 31 DOCSIS certified modems also contain PacketCable capabilities. PacketCable Multimedia is an evolution of PacketCable that expands the realm of applications supported. It provides opportunities for better bandwidth management and the deployment of a variety of IP-based services by enabling dynamic bandwidth requests, managing shared edge network resources and integrating noncable specific applications in the DOCSIS environment. PacketCable Multimedia also provides a general, all-purpose quality-of-service (QoS) framework for multimedia applications.[836] PacketCable Multimedia allows MSOs to use its quality-of-service feature to provide better, more consistent VoIP service, which is a critical part of the triple play (*i.e.*, video, voice, data) business model for cable operators, as competing VoIP services, such as Vonage, gain ground.[837]

V. FOREIGN MARKETS

236. In the *Notice*, the Commission invited comment on the status of competition in foreign markets for the delivery of video programming that would provide insights regarding the nature of competition in the United States and the relative efficiency of market structures and regulations within the United States. In last year's report, we reviewed several countries' experiences with the digital television transition; broadcast, cable and satellite competition; and developments in video over broadband, now more commonly referred to internationally as IPTV.[838] This year we focus on developments in IPTV.

237. The advent of IPTV is a response by both incumbent operators and new entrants to the growth of competition in the provision of broadband services.[839] Although the rates of growth vary worldwide, a number of countries have seen stagnant growth in the fixed line market, due in part to saturation, such as in Western Europe, and due in part to the ubiquity and density of mobile telephone service in Asia and Europe generally, which has led to substitution of mobile telephone service for fixed line service.[840] Incumbents have responded by upgrading their facilities to deliver more advanced services, such as broadband Internet. Similarly, competitive providers have taken advantage of regulatory initiatives in some markets that open up incumbent operators' facilities to competition and, in the European Union, allow cross border competition.[841] Overall, this has led to lower prices, more

[834] CableLabs, *PacketCable Home*, at http://www.packetcable.com (visited Oct. 19, 2005).

[835] CableLabs, *PacketCable Certified Products*, at http://www.cablemodem.com/downloads/Certified_Products.pdf (visited Oct. 20, 2005). An embedded multimedia terminal adapter (E-MTA) is a device used to enable voice services over a cable modem.

[836] Ellacoya Networks, *Ellacoya Multimedia Service Manager (MSM) PacketCable Multimedia-based Application*, at http://www.ellacoya.com/products/multimediaMgr.shtml (visited Dec 12, 2005).

[837] Kurt Dobbins, *The Advantages of PacketCable Multimedia Technology Beyond Voice*, SCTE CABLE-TEC EXPO 2005 PROCEEDINGS, June 14-17, 2005.

[838] *See 2004 Report*, 20 FCC Rcd at 2860-62 ¶¶ 213-17.

[839] Organization for Economic Co-Operation and Development, *OECD Communications Outlook 2005*, 2005, at 96-97, 124-28.

[840] *See, e.g.*, International Telecommunications Union, *Europe & CIS's Telecommunications/ICT Markets and Trends (ITU European Trends 2005)*, 2005, at 2, at http://www.itu.int/ITU-D/ict/statistics/at_glance/Europe_RPM_2005.pdf.

[841] For example, in Europe, Telecom Italia operates in France, Netherlands and Germany; BT Group has operations in Italy, Spain, Germany and other countries; and Deutsche Telekom has high-speed Internet operations in France, Spain, Austria, and Switzerland. *ITU European Trends 2005*, at 10.

competition, and increased use of broadband infrastructure to deliver a bundle of services that include voice, data, and video.[842]

238. In Europe, recent developments suggest a measured rollout of IPTV over DSL[843] by incumbents and new entrants.[844] In the United Kingdom, the unbundling of local telephone loop connections prompted several companies to introduce IPTV, in conjunction with telecommunications and Internet access services. As we reported last year, Homechoice has been providing service primarily to residential areas of London, and now passes 2.4 million homes.[845] It recently announced that, beginning in 2006, it will expand its network to 10 million homes passed.[846] Within its present footprint, Homechoice, which reports approximately 34,000 subscribers, is adding new pay-TV customers at a faster rate than either cable or satellite operators.[847] Approximately 55 percent of Homechoice's customers subscribe to all three of its services – video, telephony and Internet access service. The leading telecommunications carrier in the United Kingdom, BT, announced that it would enter the IPTV market in late summer 2006.[848] BT's service will be delivered at a minimum connection speed of 1.5 Mb, and will include a set-top box with an integrated digital over-the-air broadcast receiver and wireline broadband receiver, as well as a DVR capable of storing up to 80 hours of programming and capable of displaying HD content.[849] BT's service also will include VOD services characterized as "catch-up TV," in which programs from the previous seven days' broadcast schedule will be available on demand without the need to record; 30 digital over-the-air TV channels; communications services, including instant messaging, chat, and video telephony on TV; and interactive services.[850]

239. Italy's FastWeb, one of Europe's first IPTV providers, which launched in 2001, reported that it has approximately 644,000 subscribers as of September 2005.[851] FastWeb's network covers 85

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[842] For example, according to the ITU, competition to European incumbent operators is common, with approximately 85 percent of local markets, 73 percent of long distance markets, and 74 percent of international markets open to other operators. *ITU European Trends 2005*, at 1. *See e.g.*, Gerry Blackwell, *IPTV: The Big Picture*, ISP Planet, Apr. 15, 2005; Robert Clark, *Going for the Treble*, Telecom Asia, June 2005; Evan Ramstad, *Triple Play*, WALL STREET JOURNAL, Oct. 24, 2005; *IPTV Builds Momentum in Several Markets*, Point Topic.com, Feb. 22, 2005.

[843] Approximately 90 percent of broadband Internet connections in Europe rely on ADSL infrastructure. *ITU European Trends 2005*, at 10.

[844] By one estimate, one percent of Western European households subscribed to IPTV services in 2004. IDC, Inc., *European Telcos Become Entertainment Providers Through Launch of IPTV Services* (press release), Aug. 24, 2005. IDC projects that, by 2009, approximately six percent of Western European households will subscribe to IPTV services.

[845] *See 2004 Report*, 20 FCC Rcd at 2861 ¶ 216.

[846] *Video Networks to Roll-Out Homechoice Nationally*, IPTV NEWS, Nov. 3, 2005. Homechoice provides end-to-end customer service and installed its own network work equipment in 137 BT central office facilities.

[847] *Video Networks to Roll-Out Homechoice Nationally*, IPTV NEWS, Nov. 3, 2005.

[848] *BT IPTV Launch By Summer 2006*, THE REGISTER (UK), Sept. 28, 2005.

[849] *BT Select Philips as Set Top Box Provider for Broadband Services*, IPTV NEWS, Oct. 26, 2005. In the UK, Freeview is the principal over-the-air digital television service, allowing the reception of 30 digital broadcast channels, and accounts for 5.178 million of the UK's 15.7 million total digital television households. *See* Ofcom, *Digital Television Update – 2005 Q2*, Sept. 15, 2005.

[850] *BT Select Philips as Set Top Box Provider for Broadband Services*, IPTV NEWS, Oct. 26, 2005.

[851] FastWeb SpA, *FastWeb Files Q3 Prelims* (press release), Oct. 7, 2005. Last year, we reported that FastWeb had 151,000 customers as of June 2004. *See 2004 Report*, 20 FCC Rcd at 2861 ¶ 214. One factor contributing to the sharp increase in FastWeb subscribers was a promotion in which premium channels showing professional soccer games were given away for free with new subscriptions. Gerry Blackwell, *IPTV Grows in Europe*, ISP Planet, June (continued....)

cities and population centers in Italy, passing a total of 7.5 million homes.[852] FastWeb plans to extend its network to 30 million homes passed by the end of 2006. FastWeb is the only Italian operator offering a triple play service package of video, voice, and data service. For approximately $30 a month, FastWeb's basic package offers metered broadband service of 300 minutes of voice and Internet access, including Internet access of 10 Mbps download for subscribers with a fiber optic connection and 6 Mbps download for subscribers with a DSL connection; and a package of television programming that includes four national Italian broadcast channels, a collection of thematic and international channels (*e.g.*, CNN, Cartoon Network, Disney Channel); VOD; and a network-based DVR.[853] Beyond the included video programming, FastWeb offers a range of thematic programming tiers, such as Sports and Movies, and also offers programming on an a la carte basis.[854] Approximately 40 percent of FastWeb's subscribers choose to subscribe to a la carte channels and subscription packages.[855] In addition, FastWeb resells on an a la carte basis some of the programming of its principal video programming competitor, Sky Italia. In July 2005, Telecom Italia launched free trials of its IPTV over ADSL service in Rome, Milan, Bologna, and Palermo and was expected to introduce the service in 21 Italian cities by the end of 2005. The service will feature live TV, including exclusive Italian football matches, top Italian basketball, and VOD. Telecom Italia is using Microsoft TV IPTV Edition software.[856]

240. France has three national operators providing IPTV service. France Telecom's MaLigne TV, a DSL-based service, passes approximately 8.5 million homes and has approximately 142,000 subscribers as of September 2005.[857] France Telecom will extend this service to the carriers it owns in the United Kingdom, the Netherlands and Poland by mid-2006.[858] In addition, France Telecom is planning to introduce a set-top box, called "LiveBox," which will be capable of supporting a range of service offerings in addition to home networking.[859] Neuf Telecom launched its IPTV over DSL service in late 2004 and offers a triple play service for approximately $35 per month, featuring 46 channels and more than 150 additional channels that can be purchased a la carte or in bundles.[860] The third provider, Iliad,

(Continued from previous page)
30, 2005. FastWeb's network is a combination of fiber optic cable and DSL. FastWeb expanded its network following a 2001 Italian anti-trust decision that required Telecom Italia, the incumbent telephone company, to provide access to cable ducts and rights of way that it had built for a cable television network but subsequently abandoned. In addition, the Italian government has subsidized the purchase of the FastWeb set-top box as part of its effort to foster the development of interactive television in Italy. *Id.*

[852] FastWeb SpA, *FastWeb Files Q3 Prelims* (press release), Oct. 7, 2005.

[853] FastWeb SpA, *FastWeb's TV Options*, at http://www.fastweb.it/principale.php?PAGEST=4_family.php.

[854] For example, FastWeb offers Roma Channel, Milan Channel, and Inter Channel for $9.45 each per month; Disney Channel and Cartoon Network for approximately $4.75 each per month; and CNN and ESPN Classic Sport for approximately $2.40 each per month. FastWeb's VOD service is also available a la carte for approximately $9.45 per month. *See* FastWeb SpA, FastWeb's TV Options, at http://www.fastweb.it/rincipale.php?PAGEST=4_family.php. In addition, FastWeb charges a one time activation fee of approximately $112.

[855] Gerry Blackwell, *IPTV Grows in Europe*, ISP Planet, June 30, 2005.

[856] *Telecom Italia Readies "Superphone" and IPTV Launch*, CONVERGE NETWORK DIGEST, Oct. 27, 2005.

[857] France Telecom, *Revenues Up By 3.8% in the Third Quarter of 2005* (press release), Oct. 27, 2005.

[858] *France Telecom Outlines NExT – New Experience in Telecom Services*, CONVERGE NETWORK DIGEST, June 30, 2005.

[859] France Telecom, *France Telecom Launches NExT : A Three-Year Transformation Programme to Make France Telecom the Operator of Reference for New Telecom Services in Europe* (press release), June 29, 2005.

[860] *See* Neuf Telecom, at http://www.neuf.com/fr/index.html; Ray Le Maistre, *Neuf: Time is Right for IPTV*, Light Reading, Jan. 31, 2005, available at http://www.lightreading.com/document.asp?doc_id=66872.

markets its triple-play service through its "Free" broadband service provider. At a cost of approximately $35 per month, in addition to Internet access and telephone service, Free provides 80 free television channels and offers approximately 170 subscription video channels on an a la carte basis or in thematic packages, such as sports and music.[861] As of June 2005, Free had approximately 1.18 million subscribers to its triple-play package, 130,000 of whom choose to subscribe to a la carte video programming.[862]

241. Elsewhere in Europe, in June 2005, Finland's Alcom, the primary DSL provider for the Aland Islands, launched that country's first commercial IPTV over DSL service and now serves approximately 1,000 subscribers.[863] Alcom offers 26 channels for approximately $11 per month.[864] Broadband and telephone service are separate subscriptions and range in price from approximately $35-$64 per month, depending on the speed of service.[865] In May 2005, Russian company Sistema Multimedia launched its IPTV service Stream TV, which offers Internet access, VOD, and 80 Russian and international television channels, with a basic service package costing approximately $9.95 per month. The service, which is available to approximately 3.3 million Moscow homes, allows subscribers to add new video channels or packages on an a la carte basis.[866]

242. In Asia, a number of countries have seen the introduction of IPTV services by both incumbent operators and new entrants. One analyst argues that Asia is "fertile ground" for IPTV services given incumbent operators' extensive existing wireline networks, high population density of urban areas, leadership of Asian countries in broadband penetration growth, widespread deployment throughout Asia of ADSL networks supporting at least 6 Mbps to residential areas, and government policies encouraging aggressive broadband implementation through a combination of regulatory flexibility and financial incentives.[867] PCCW of Hong Kong launched its IPTV service Now Broadband TV (NOW) in 2003 and had over 441,000 subscribers as of June 2005.[868] The service is offered on a stand-alone basis or in combination with PCCW's Netvigator broadband Internet access service. NOW offers customers 15 free video channels and 57 subscription video channels, 22 of which are exclusive to the provider.[869] NOW allows its customers to subscribe to individual channels on a month-to-month, six-month, or 12-month basis, in addition to annually based subscriptions to packages of programming offered by other providers. At present the service does not support any DVR functionality, nor can any content be recorded by any other means.[870] In China, despite aggressive deployment of broadband infrastructure, the rollout of IPTV

[861] *See* Iliad Group, at http://www.iliad.fr/en/activities/internet.html. For example, Free's music pack, consisting of three MTV channels and two VH1 channels, costs approximately $2.30 per month.

[862] Iliad Group, *Leading Voice over IP and TV over ADSL Operator in Europe* (press release), Aug. 2, 2005.

[863] *Alcom Launches First IPTV Over DSL Service in Finland Using Paradyne's Broadband Access Solutions*, Business Wire, June 13, 2005.

[864] Alcom Datakommikation, Aland.tv – Digital TV Over Broadband, at http://www.alcom.aland.fi/index.php?page=produkter/aland_tv.php.

[865] *Id.*

[866] *Stream TV IPTV Service Launches in Russia*, Informitv, May 13, 2005; Sistema Multimedia, *Sistema Multimedia Launches Interactive Television* (press release), May 11, 2005.

[867] *See* Jeffrey Soong, *Why is Asia Leading the Global IPTV Revolution?*, CONVERGE NETWORK DIGEST, June 23, 2005.

[868] PCCW Limited, *PCCW Reports 2005 Interim Results* (press release), Aug. 18, 2005.

[869] Individual channels cost approximately $0.80 per month; movie channels, such as HBO, cost approximately $6 per month. Bundles of channels cost approximately $15 per month. Evan Ramstad, *Triple Play*, WALL STREET JOURNAL, Oct. 24, 2005.

[870] NOW employs three-layered content protection comprising network-based conditional access, digital copyright protection, and analog copyright protection, resulting in no instances of piracy, compared to the 15 percent piracy (continued....)

has been very slow and is limited to trials at the present time, as China's major telecommunications operators await the issuance of IPTV licenses by the State Administration of Film, Radio, and Television.[871] Four companies in Japan provide IPTV service, and a new service was expected to launch in South Korea before the end of 2005.[872]

VI. ADMINISTRATIVE MATTERS

243. This *2005 Report* is issued pursuant to authority contained in sections 4(i), 4(j), 403, and 628(g) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 154(j), 403, and 548(g).

244. It is ORDERED that the Office of Legislative Affairs shall send copies of the *2005 Report* to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

245. *Accessible Formats.* To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY). *Ex Parte Rules.* There are no *ex parte* or disclosure requirements applicable to this proceeding pursuant to 47 C.F.R. § 1.1204(b)(1).

246. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments on paragraphs 31-36 in MB Docket No. 05-255 on or before April 3, 2006, and reply comments on or before April 18, 2006. Comments may be filed using: (1) the Commission's Electronic Comment Filing System (ECFS), (2) the Federal Government's eRulemaking Portal, or (3) by filing paper copies. *See* Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

- *Electronic Filers*: Comments may be filed electronically using the Internet by accessing the ECFS: http://www.fcc.gov/cgb/ecfs/ or the Federal eRulemaking Portal: http://www.regulations.gov. Filers should follow the instructions provided on the website for submitting comments.

    - For ECFS filers, if multiple docket or rulemaking numbers appear in the caption of this proceeding, filers must transmit one electronic copy of the comments for each docket or rulemaking number referenced in the caption. In completing the transmittal screen, filers should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions, filers should send an e-mail to ecfs@fcc.gov, and include the following words in the body of the message, "get form." A sample form and directions will be sent in response.

(Continued from previous page)
rate of other pay TV operators in Hong Kong. This triple layer of digital content protection is credited with enabling PCCW to obtain exclusive programming rights from programmers concerned with the piracy of their programming on IP-based video networks. Jeffrey Soong, *Why is Asia Leading the Global IPTV Revolution?*, CONVERGE NETWORK DIGEST, June 23, 2005. PCCW is expected to introduce a network-based DVR functionality. Entone Technologies, *Entone Selected for World's Largest IPTV VOD Deployment* (press release), Oct. 3, 2005.

[871] Ray le Maistre, *China Mulls IPTV Licenses*, Light Reading, Jan. 13, 2005, available at http://www.lightreading.com/document.asp?doc_id=65985.

[872] *See* Evan Ramstad, *Triple Play*, WALL STREET JOURNAL, Oct. 24, 2005; Ginny Parker Woods, *In the Fast Lane*, WASHINGTON POST, Oct. 24, 2005.

- *Paper Filers*: Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

  Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

  - The Commission's contractor will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, NE., Suite 110, Washington, DC 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building.

  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

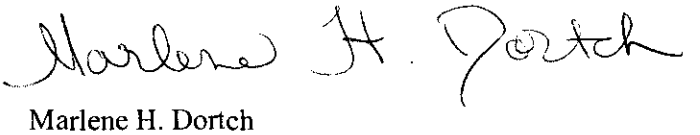
  - U.S. Postal Service first-class, Express, and Priority mail should be addressed to 445 12th Street, SW, Washington DC 20554.

- In addition, parties must serve the following with either an electronic copy via e-mail or a paper copy of each pleading: (1) the Commission's duplicating contractor, Best Copy and Printing, Inc., Portals II, 445 12th Street, S.W., Room CY-B402, Washington, D.C. 20554, telephone 1-800-378-3160, or via e-mail at www.bcpiweb.com; (2) Marcia Glauberman, Media Bureau, 445 12th Street, S.W., Room 2-C264, Marcia.Glauberman@fcc.gov; (3) Anne Levine, Media Bureau, 445 12th Street, S.W., Room 2-A864, Anne.Levine@fcc.gov; and (4) Timothy May, Media Bureau, 445 12th Street, S.W., Room 2-C315, Timothy.May@fcc.gov.

247. *People with Disabilities*: Contact the FCC to request materials in accessible formats (Braille, large print, electronic files, audio format, etc.) by e-mail at fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

248. The Media Bureau contacts for this proceeding are Anne Levine at (202) 418-7027, Anne.Levine@fcc.gov, and Timothy May at (202) 418-1463, or Timothy.May@fcc.gov.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

APPENDIX A

LIST OF COMMENTERS

Initial Comments

Alcatel
American Cable Association (ACA)
The America Channel (TAC)
Association of Public Television Stations (APTS)
BellSouth Corporation and BellSouth Entertainment, LLC (BellSouth)
Broadband Service Providers Association (BSPA)
CenturyTel, Inc.
Cincinnati Bell Inc.
City of Ontario, California
Comcast Corporation (Comcast)
Community Broadcasters Association (CBA)
Consumer Electronics Association (CEA)
Consumers for Cable Choice
DIRECTV, Inc.
EchoStar Satellite L.L.C. (EchoStar)
Media General, Inc.
National Association of Broadcasters (NAB)
National Cable & Telecommunications Association (NCTA)
National Rural Telecommunications Cooperative (NRTC)
National Telecommunications Cooperative Association (NTCA)
Network Domain, LLC
Qwest Communications International Inc. (Qwest)
RCN Telecom Services, Inc. (RCN)
SBC Communications, Inc. (SBC)
Telecommunications Industry Association (TIA)
United States Telecom Association (USTA)
Verizon Communications Inc. (Verizon)
The Walt Disney Company (Disney)
W.A.T.C.H. TV Company (W.A.T.C.H. TV)

Reply Comments

ABC, CBS and NBC Television Affiliate Associations (Affiliates Associations)
BellSouth Corporation and BellSouth Entertainment, LLC (BellSouth)
Comcast Corporation (Comcast)
Consumer Electronics Association (CEA)
DIRECTV, Inc.
EchoStar Satellite L.L.C. (EchoStar)
iN DEMAND L.L.C.
Joint Cable Commenters (Advance/Newhouse Communications, Cox Communications, Inc., and Insight Communications)
National Association of Broadcasters (NAB)

National Cable &Telecommunications Association (NCTA)
Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASCO)
Paxson Communications Corporation (Paxson)
Qwest Communications International Inc. (Qwest)
SBC Communications, Inc. (SBC)
Time Warner Cable Inc. (Time Warner)
The United States Telecom Association (USTA)
Verizon Communications Inc. (Verizon)

APPENDIX B
TABLE B-1
Assessment of Competing Technologies

Technology Used	June 01	June 02	June 03	June 04	June 05
(1) TV Households	102,184,810	105,444,330	106,641,910	108,410,160	109,590,170
Percent Change	1.37%	3.19%	1.14%	1.66%	1.09%
(2) MVPD Households[(i)]	86,062,074	87,562,641	88,312,191	92,295,766	94,226,357
Percent Change	3.72%	1.74%	0.86%	4.51%	2.09%
Percent of TV Households	84.22%	83.04%	84.18%	85.14%	85.98%
(3) Cable Subscribers	66,732,000	66,472,000	66,050,000	66,100,000	65,400,000
Percent Change	0.73%	-0.39%	-0.63%	0.08%	-1.06%
Percent of MVPD Total	77.54%	75.91%	73.58%	71.62%	69.41%
(4) MMDS Subscribers	700,000	490,000	200,000	200,000	100,000
Percent Change	0.0%	-30.00%	-59.18%	0.00%	-50.00%
Percent of MVPD Total	0.81%	0.56%	0.22%	0.22%	0.11%
(5) PCO Subscribers	1,500,000	1,600,000	1,200,000	1,100,000	1,000,000
Percent Change	0.0%	6.67%	-25.00%	-8.33%	-9.09%
Percent of MVPD Total	1.74%	1.83%	1.34%	1.19%	1.06%
(6) HSD Subscribers	1,000,074	700,641	502,191	335,766	206,358
Percent Change	-32.28%	-29.94%	-28.32%	-33.14%	-38.54%
Percent of MVPD Total	1.16%	0.80%	0.56%	0.36%	0.22%
(7) DBS Subscribers	16,070,000	18,240,000	20,360,000	23,160,000	26,120,000
Percent Change	23.74%	13.50%	11.62%	13.75%	12.78%
Percent of MVPD Total	18.67%	20.83%	22.68%	25.09%	27.72%
(8) OVS Subscribers[(ii)]	60,000	60,000			
Percent Change	0.00%	0.00%			
Percent of MVPD Total	0.07%	0.07%			
(9) BSP Subscribers[(iii)]			1,460,000	1,400,000	1,400,000
Percent Change			N/A	-4.11%	0.00%
Percent of MVPD Total			1.63%	1.52%	1.49%

Notes:

(i) The total number of MVPD households given on this table is the sum of the subscribers to each of the MVPD services listed. The actual total number of MVPD households is likely to be somewhat less than the given figure since some households subscribe to the services of more than one MVPD. *See 1994 Report,* 9 FCC Rcd at 7480. However, the number of households subscribing to more than one MVPD is expected to be low. Hence, the total can be seen as a reasonable estimate of the number of MVPD households.

(ii) Beginning in 2003, we combined OVS subscribers with BSP subscribers. We are no longer, therefore, reporting a separate number for OVS subscribers.

(iii) This number includes some, if not all, OVS subscribers, and may double count some cable subscribers from newer cable overbuild systems. We started reporting this number two years ago and thus we do not have subscribers for years prior to 2003.

Sources:

(1) Television households: All years, *Nielsen Media Research.*

(2) Total MVPD households: The sum of the total number of subscribers listed under each of the categories of the various technologies. See note (i) above.

(3) Cable subscribers: All years, Kagan Research, LLC, *Kagan's 10-Pay TV Subscriber History,* Broadband Cable Financial Databook 2005, July 2005, at 11.

(4) MMDS subscribers: 2001 from NCTA Comments for the *2001 Report* at 7; 2002 from NCTA Comments for the *2002 Report* at 12; 2003 from NCTA Comments for the *2003 Report* at 8; 2004 from NCTA Comments at 7, n.12; 2005 from NCTA, *Analysis of MVPDs: March 2005*, Cable Developments 2005 at 15.

(5) PCO (SMATV) subscribers: 2001 subscribers from NCTA Comments for the *2001 Report* at 9; 2002 subscribers from NCTA Comments for the *2002 Report* at 12; 2003 subscribers from NCTA Comments for the *2003 Report* at 8; 2004 subscribers from NCTA Comments at 7, n.12; 2005 from Kagan Media Research, Media Trends 2005, at 69.

(6) HSD subscribers: 2001 from SBCA Comments for the *2001 Report,* Table 1 at 4; 2002 from SkyReport.com at http://www.skyreport.com/dth_us.htm; 2003 from SBCA Comments for the *2003 Report* at 4; 2004 from *2004 Report*, 20 FCC Rcd at 2798 ¶ 64; 2005 from *C-Band Decline Continues*, Satellite Business News FAXUpdate, July 6, 2005.

(7) DBS subscribers: 2001 from SBCA Comments for the *2001 Report,* Table 1 at 4; 2002 from SkyReport.com at http://www.skyreport.com/dth_us.htm; 2003 from SBCA Comments for the *2003 Report* at 4; 2004 from *2004 Report*, 20 FCC Rcd at 2792 ¶ 54; 2005 from The DIRECTV Group, Inc., *SEC Quarterly Report Form 10-Q Pursuant to Section 13 or 15(d) of the Securities Act of 1934 for the Quarterly Period Ended June 30, 2005*, at 40, and EchoStar Communications Corp., *SEC Quarterly Report Form 10-Q Pursuant to Section 13 or 15(d) of the Securities Act of 1934 for the Quarterly Period Ended June 30, 2005*, at 25.

(8) BSP subscribers: 2003 subscribers from NCTA Comments for the *2003 Report* at 8; 2004 subscribers from BSPA Comments at 6 for the *2004 Report* and Commission estimates; 2005 subscribers from Commission estimates.

TABLE B-2

Number and Subscriber Size of Major Cable System Clusters (Cumulative Figures)

Range of Clustered Subscribers (thousands)	2001		2002		2003		2004	
	Clusters	Subscribers (millions)	Clusters	Subscribers (millions)	Clusters	Subscribers (millions)	Clusters	Subscribers (millions)
100-199	30	4.3	31	4.5	34	4.9	46	5.4
200-299	17	4.2	18	4.4	18	4.4	18	6.3
300-399	18	6.1	21	7.1	17	5.7	17	6.6
400-499	10	4.4	10	4.4	10	4.4	8	3.5
>500	32	33.3	29	31.0	29	34.3	29	29.7
Total	107	52.3	109	51.3	108	53.6	118	51.5

Sources:

2001 from Kagan World Media, *Major Cable TV Systems/Clusters*, Broadband Cable Financial Databook 2002 at 38; 2002 from Kagan World Media, *Major Cable TV Systems/Clusters*, Broadband Cable Financial Databook 2003, at 39; 2003 from Kagan Research, LLC, *Major Cable TV Systems/Clusters*, Broadband Cable Financial Databook 2004, at 39-40; and 2004 from Kagan Research, LLC, *Major Cable TV Systems/Clusters*, Broadband Cable Financial Databook 2005, at 39-40. Since last year, Kagan World Media's methodology for counting clusters has changed, leading to difficulties in directly comparing the numbers for 2004 with those for previous years, which causes year-to-year comparisons to be uninformative. In previous years, all of Comcast's subscribers in the Northeast and Mid-Atlantic were counted as part of one "supercluster." Beginning this year, those subscribers were broken out into separate clusters. This is probably a more accurate approach, but causes direct year-to-year comparisons to be uninformative.

TABLE B-3
2005 Concentration in the National Market for Purchase of Video Programming[1]

Rank	Company	Percent of Subscribers[2]
1	Comcast	22.99
2	DirecTV	15.72
3	EchoStar	12.27
4	Time Warner	11.69
Top 4		62.67
5	Cox	6.73
6	Charter	6.37
7	Adelphia	5.50
8	Cablevision	3.22
Top 8		84.50
9	Bright House	2.34
10	Mediacom	1.55
Top 10		88.39
Top 25		94.00
Top 50		95.73
	HHI	1201[3]

Notes:

(1) MSO subscriber totals as of June 2005, and reported in Top Cable System Operators as of March 2004, Kagan World Media, *Cable TV Investor,* July 29, 2004, at 16-17. There is no double counting of subscribers. If a cable operator is partially owned by more than one MSO, its subscribers are assigned to the largest MSO. Subscribers for DIRECTV and EchoStar are based on the company's SEC 10-Q filings.

(2) The total number of MVPD subscribers used to calculate the HHI is 94,226,357 from Table B-1.

(3) The HHI is calculated on the basis of market shares for the top 65 companies. Because all of the remaining MVPDs have very small shares of the market, an HHI calculation that included all cable system operators could only be slightly higher (no more than 2-3 points) than the given HHI.

TABLE B-4
Concentration in the National Market for the Purchase of Video Programming
2002-2005

Market Share	Percent of MVPD Subscribers			
	2002	2003	2004	2005
Top Share	14.75	22.69	23.37	22.99
Top 2	29.04	35.01	35.47	38.71
Top 3	41.03	46.63	47.34	50.99
Top 4	50.48	55.98	57.97	62.67
Top 10	84.44	81.95	84.72	88.39
Top 25	90.26	87.45	90.41	94.00
Top 50	92.05	89.29	92.32	95.73
HHI	884	1031	1097	1201

Sources:

Data for 2002 through 2004 were taken from *Reports, 2002-2004*. Data for 2005 are from Table B-3. Reported statistics for 2004 were based on March data since June data comparable to that used in previous years were unavailable. For 2005, June data were available, and were used.

APPENDIX C

TABLE C-1
National Video Programming Services
Affiliated with One or More Cable MSO

Programming Service	Launch Date	MSO Ownership (%)	Ownership by Other Media Entity (1)
Rainbow Media Group			
American Movie Classics (AMC)	Oct. 84	Cablevision (60)	
Fuse	Jul. 94	Cablevision (60)	
Independent Film Channel	Sep. 94	Cablevision (60)	
WE: Women's Entertainment	Jan. 97	Cablevision (60)	
Turner Broadcasting System Group			
Boomerang	Apr. 00	Time Warner (100)	
Cartoon Network	Oct. 92	Time Warner (100)	
CNN	Jun. 80	Time Warner (100)	
CNN En Español	Mar. 97	Time Warner (100)	
CNN Headline News	Jan. 82	Time Warner (100)	
CNN International	Jan. 95	Time Warner (100)	
TBS (Turner Broadcasting System)	Dec. 76	Time Warner (100)	
Turner Classic Movies (TCM)	Apr. 94	Time Warner (100)	
Turner Network Television (TNT)	Oct. 88	Time Warner (100)	
TNT HD		Time Warner (100)	
Court TV	Jul. 91	Time Warner (50)	Liberty Media
HBO Group			
Home Box Office (HBO)	Nov. 72	Time Warner (100)	
HBO 2	Oct. 98	Time Warner (100)	
HBO Comedy	May 99	Time Warner (100)	
HBO Family	Oct. 98	Time Warner (100)	
HBO Latino	Nov. 00	Time Warner (100)	
HBO Signature	Oct. 98	Time Warner (100)	
HBO Zone	May 99	Time Warner (100)	
HBO HD		Time Warner (100)	

Programming Service	Launch Date	MSO Ownership (%)	Ownership by Other Media Entity
Cinemax	Jun. 98	Time Warner (100)	
Cinemax HD		Time Warner (100)	
Action Max (Cinemax multiplex)	Aug. 80	Time Warner (100)	
@Max (Cinemax multiplex)	May 01	Time Warner (100)	
5StarMax (Cinemax multiplex)	May 02	Time Warner (100)	
MoreMAX (Cinemax multiplex)	Jun. 98	Time Warner (100)	
OuterMax (Cinemax multiplex)	May 01	Time Warner (100)	
Thriller Max (Cinemax multiplex)	Jun. 98	Time Warner (100)	
WMAX (Cinemax multiplex)	May 01	Time Warner (100)	
Comcast Corp. Networks			
E! Entertainment	Jun. 90	Comcast (60.5)	Disney
G4 VideogameTV (formerly G4 tech TV)	Jun. 02	Comcast (83.5)	EchoStar
Golf Channel	Jan. 95	Comcast (99.85)	
Outdoor Life Network (OLN)	Jul. 95	Comcast (100)	
Style	Oct. 98	Comcast (60.5)	Disney
TV One	Jan. 04	Comcast (32.8)	News Corp.
AZN Television	Jul. 90	Comcast (100)	
PBS Kids Sprout	Oct. 05	Comcast (40)	PBS
Discovery Communications, Inc.			
Discovery Channel	Jun. 85	Cox (25), Advance Newhouse (25)	Liberty Media
Discovery En Español	Oct. 98	Cox (25), Advance Newhouse (25)	Liberty Media
Discovery Health	Jul. 98	Cox (25), Advance Newhouse (25)	Liberty Media
Discovery HD Theatre	Jun. 02	Cox (25), Advance Newhouse (25)	Liberty Media
Discovery Home	Oct. 96	Cox (25), Advance Newhouse (25)	Liberty Media
Discovery Kids	Oct. 96	Cox (25), Advance Newhouse (25)	Liberty Media
Discovery Times	Oct. 96	Cox (12.5), Advance Newhouse (12.5)	Liberty Media New York Times
Animal Planet	Oct. 96	Cox (25), Advance Newhouse (25)	Liberty Media
BBC America	Mar. 98	Cox (25), Advance Newhouse (25)	Liberty Media
FiT TV	Jan. 04	Cox (25), Advance Newhouse (25)	Liberty Media

Programming Service	Launch Date	MSO Ownership (%)	Ownership by Other Media Entity
Military Channel	Jul. 98	Cox (25), Advance Newhouse (25)	Liberty Media
The Learning Channel (TLC)	Nov. 80	Cox (25), Advance Newhouse (25)	Liberty Media
Travel Channel	Feb. 87	Cox (25), Advance Newhouse (25)	Liberty Media
Science Channel	Oct. 96	Cox (25), Advance Newhouse (25)	Liberty Media
Joint Ventures and Other Vertically Integrated Networks			
iN DEMAND (60 multiplexed channels)	Nov. 85	Comcast (54.1), Time Warner (30.3), Cox (15.6)	
iN DEMAND HD1 (also called iNHD)	Sep. 03	Comcast (54.1), Time Warner (30.3), Cox (15.6)	
iN DEMAND HD2 (also called iNHD2)	Sep. 03	Comcast (54.1), Time Warner (30.3), Cox (15.6)	

(1) "Other" media entity is defined as a DBS operator, broadcast network, or broadcast television station licensee. Liberty Media's programming interests are listed because of Liberty's ownership interest in News Corp.

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Letter from Arthur H. Harding, counsel for Time Warner Inc., to Marlene H. Dortch, Secretary, FCC, MB Docket No. 05-192 (Oct. 21, 2005), at 1-5.

TABLE C-2

National Video Programming Services
Not Affiliated with a Cable MSO
(By Affiliation)

Programming Service	Launch Date	Ownership by "Other" Media Entity (1)
A&E (Arts & Entertainment)	Feb. 84	Disney, NBC-Universal, Hearst
ABC Family	Apr. 77	Disney
America's Store	Sep. 86	
American Life (formerly Goodlife Television Network)	Feb. 85	
Angel One		Dominion Video Satellite
Angel Two		Dominion Video Satellite
Anime Network	Dec. 02	
Auction Network		
Black Entertainment Television (BET)	Jan. 80	Viacom
BET Gospel	Jul. 02	Viacom
BET Hip Hop	Jul. 02	Viacom
BET on Jazz	Jan. 96	Viacom
Beauty & Fashion		
Biography Channel	Nov. 98	Disney, NBC-Universal, Hearst
Black Family Channel	Nov. 99	
Bloomberg Television	Jan. 95	
B Mania	Nov. 00	
Bravo	Dec. 80	NBC-Universal
Bridges TV	Nov. 04	
Buzztime Entertainment	1994	
BYUTV	Jan. 00	
Catalog TV		
Celtic Vision	1995	
Church Channel	Jan. 02	Trinity Broadcasting Network
Classic Arts Showcase	May 94	
Country Music Television (CMT)	Mar. 83	Viacom
CNBC	Jul. 89	NBC-Universal
CNBC World	Apr. 89	NBC-Universal
Comedy Central	Apr. 91	Viacom
C-SPAN	Mar. 79	(2)

Programming Service	Launch Date	Ownership by "Other" Media Entity
C-SPAN2	Jun. 86	(2)
C-SPAN3	Sep. 97	(2)
CSTV (College Sports Television)	Apr. 03	Viacom
Colours TV	Dec. 01	
Cornerstone Television	Apr. 79	
Current TV	Aug. 05	
Daystar Television Network	Dec. 98	Daystar Television Network
Deep Dish TV	Jan. 86	
Disney Channel	Apr. 83	Disney
DIY (Do-It-Yourself Network)	Dec. 94	EW Scripps
Encore	Apr. 91	Liberty Media
Encore HD	Mar. 04	Liberty Media
Encore Action	Sep. 94	Liberty Media
Encore Drama	1994	Liberty Media
Encore Love	Jul. 94	Liberty Media
Encore Mystery	Jul. 94	Liberty Media
Encore WAM!	Sep. 94	Liberty Media
Encore Westerns	Jul. 94	Liberty Media
Epic Sports	2005	
ESPN	Sep. 79	Disney, Hearst
ESPN Classic	May 95	Disney, Hearst
ESPN2	Oct. 93	Disney, Hearst
ESPN HD	Mar. 03	Disney, Hearst
ESPNews	Nov. 96	Disney, Hearst
ESPN2 HD		Disney, Hearst
ESPNU	Mar. 05	Disney, Hearst
Eternal Word Television Network (EWTN)	Aug. 81	
Faith Television Network	Jul. 02	
Familyland Television Network	Nov. 99	
Family Net	May 00	
Fine Living	Mar. 02	EW Scripps
Flix (a Showtime Network)	Aug. 92	Viacom
Food Network	Nov. 93	EW Scripps
Fox Movie Channel	Nov. 94	News Corp.