

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

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FEDERAL COMMUNICATIONS COMMISSION
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In the Matter of)
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Carriage of Transmissions of)
Digital Television Broadcast Stations)
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Amendments to Part 76)
of the Commission's Rules)
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_____)

CS Docket No. 98-120

REPLY COMMENTS OF
MICROSOFT CORPORATION

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SUMMARY

DTV will transform the consumer's television experience by enabling vast improvements in video and audio quality, as well as new types of programs and services made possible by the incorporation of data into the programming "bit stream." Cable carriage of broadcasters' DTV programming will be a critical component of the transformation. But before the Commission considers whether to mandate that cable operators carry that programming, a number of open technical issues concerning both the broadcast and cable carriage of DTV should be resolved. The submissions of a wide diversity of commenters demonstrate that work remains to be done to resolve these issues and that no currently available technical solution to the must-carry question has won broad support.

No satisfactory copy protection mechanism exists for DTV broadcasts and cable carriage, and without such a mechanism, copyright holders of motion pictures and prime time programming will be disinclined to license their content for DTV transmission of any sort. Adoption of must-carry rules in the absence of such a mechanism could create false consumer expectations regarding the performance of DTV – expectations that would go unmet in the near term. Moreover, consumers who purchase first-generation DTV equipment, deployed before technical problems are resolved, may find that their equipment has become obsolete when those problems are solved, and the resulting technology is incorporated in next-generation equipment. The Commission should be careful to ensure its rulemaking authority does not exacerbate this potential for consumer confusion.

Other technical issues include the lack of final, interoperable standards for the

transmission of Internet Protocol ("IP") over broadcast cable and the IEEE-1394 media. Such standards are needed to combine video and Internet data applications to create new programs and services that will allow DTV to reach its fullest potential. Consumers who expect to have access to new data-enriched DTV programs and services may be disappointed if such services and programs can not be delivered to them due to a lack of final standards for transmission of IP transported data.

In a similar vein, inter- and intra-industry cooperation is required to develop final standards for the cable carriage of PSIP data. Not only do parties disagree over the relative merits of leading standards, but compatibility problems exist between these standards and various transmission modes and types of consumer equipment.

Three primary solutions for cable carriage of broadcasters' DTV signals have been advanced: "pass-through," remodulation, and the Consumer Electronics Manufacturers Association's component video proposal. None of these solutions is without flaws or has widespread support among commenters. The Commission should not adopt a DTV must-carry Band-Aid when it is clear that each of the proposed Band-Aids is inadequate to meet consumers' needs. The most effective means of developing appropriate solutions to the open technical issues that surround DTV is to allow interested industries to continue with their voluntary efforts, with minimal involvement of the government. Many commenters have urged the Commission to rely on marketplace forces and voluntary industry efforts to resolve open technical issues.

As to other issues, numerous commenters have stated that Electronic Programming Guides ("EPGs") and similar services, by virtue of their importance to

consumers and their potential for revenue generation, will be a source of competitive advantage across various industries. The Commission should recognize the various industry groups' strong business interests in these services and their interest in crafting them to suit consumer demand. All providers of EPGs, navigational information, and similar services -- including broadcasters, cable operators, and third parties -- should in the first instance have a chance to compete and to respond to consumer demand without regulatory intervention. The most prudent course for the Commission to follow in this area for the immediate future would be to take a "hands-off" approach, and allow the market to determine how EPGs and similar services evolve; however, if the Commission adopts rules in this area, they should be as flexible as possible.

Finally, if the Commission adopts any DTV must-carry rules, it should not adopt any format-specific DTV signal quality requirements. There is little, if any, statutory support for such requirements, and the constitutionality of such requirements is questionable. In addition, such requirements should be unnecessary because the availability of alternative DTV delivery modes -- including DBS, over-the-air terrestrial broadcasting, Open Video Systems, and the Internet -- ought to create incentives to transmit DTV programming in whatever formats cable operators' subscribers prefer.

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**REPLY COMMENTS OF
MICROSOFT CORPORATION**

Microsoft Corporation ("Microsoft") respectfully replies to the comments filed in the above-captioned proceeding.

INTRODUCTION

If there is a single point of consensus among the commenters, it is that DTV will transform the consumer's television experience – by enabling both vast improvements in video and audio quality, and new types of programs and services derived from the incorporation of data into the programming "bit stream." On the other hand, there is a broad range of views on whether, to expedite this transformation, the Commission can or should mandate that cable operators carry broadcasters' DTV transmissions.

Cutting through the rhetoric, the initial comments of numerous parties, representing a variety of different industries and organizations, support Microsoft's view

that this issue is premature. We are at a point too early in the transition to DTV to determine whether must-carry rules from the analog world should be carried forward into the digital realm and, if so, what the nature of those rules ought to be.

The Commission and DTV pioneers such as PBS recognize the vast potential of new data-enhanced programs and services. In its comments, PBS identified a long list of potential educational, interactive and other data-related DTV services it might offer, including multimedia educational materials, interactive children's programming, distance learning services, improved services for the physically challenged, and delivery of Internet websites related to public television programming without the need for a personal computer ("PC") or Internet Service Provider.¹

PBS is one of the cutting-edge digital content creators working to make these possibilities a reality. One of its most notable recent achievements is a documentary about Frank Lloyd Wright produced by Ken Burns that aired in November 1998. To demonstrate the potential of DTV, PBS simultaneously transmitted companion data with the documentary to a test audience in six different cities.² Using this additional data, the test audience could view video footage and interviews that were not included in the primary documentary program. For example, viewers could take "virtual tours" of three of Wright's buildings, which provided viewers with 360-degree views of each room.³

¹ See Comments of The Association of America's Public Television Stations, *et al.*, in CS Dkt. No. 98-120 (filed October 13, 1998) ("PBS Comments") at 37-41.

² See *id.* at 38; see also <http://www.pbs.org/digitaltv/enhanceNS.html> and www.pbs.org/flw (featuring PBS's regular Frank Lloyd Wright site).

³ Consumers are already clamoring for these services. The interactive edition of *The Wall Street Journal* recently reported a "growing synergy" between the Internet and television among sports fans, one-third to one-half of whom log onto their computers while they are watching their favorite sports. As clumsy and awkward and inelegant as it is [using the television and the Internet together], it suggests the

The incorporation of data into DTV to create new services will not only benefit consumers, but will build new businesses for broadcasters, programmers, advertisers, cable operators, and software and hardware producers.⁴ Data services can be either advertiser-supported, fee-based, or some combination thereof, creating new revenue-generating opportunities for broadcasters, cable operators, and advertisers. Data-enhanced programs and services will create jobs in the consumer electronics, computer hardware, and software industries.

But we are just at the dawn of DTV, and the technical questions about how new programs and services will be defined and delivered abound. In light of the huge benefits digital technology will offer consumers and the current technical uncertainties, the Commission should adhere to the principle of "first, do no harm." Prescriptive rules during periods of rapid technical change threaten to stifle innovation and impede technological progress.⁵

demand is a little ahead of the technology's ability to deliver such convergence," says an analyst quoted by the *Journal*. DTV, however, has the ability to deliver this convergence, producing a new service that is greater than the sum of its parts. David Sweet. Split Screen: Sports Fans Call for Two Views of the Game, November 11, 1998 <http://interactive.wsj.c.../retrieve.cgi?id=SB910210701769632000.djm&template=printing.tmp>.

⁴ See Angela Hickman, "DTV Push Gains Momentum," December 1, 1998, <http://www.zdnet.com/pcmag/news/trends/981130.html> (stating that adding Internet to broadcasting will help broadcasters maintain their market share in the face of competition from the Internet). The Washington Post recently reported that the key attribute of DTV "is that it empowers a TV station to do more than shower 'Gilligan's Island' reruns on viewers; it enables a broadcaster to send out any kind of information -- music, text, video, you name it -- that can be encoded," which could lead broadcasters to transmit a variety of data services, including applications grounded in the Internet. Paul Farhi, "A Defining Moment for TV? -- As Digital Broadcast Era Begins, the Outlook is Far From Clear," The Washington Post (November 1, 1998) H1 ("Defining Moment") at H16.

⁵ See Comments of the Association for Maximum Service Television in CS Dkt. No. 98-120 (filed October 13, 1998) ("MSTV Comments") at 42 (DTV technology moves faster than the regulatory process and standards can quickly become obsolete). As Microsoft noted in its initial comments, if the Commission adopts any DTV must-carry rules, those rules should incorporate safeguards for the carriage of the data component of DTV programs and services.

DISCUSSION

I. SUBSTANTIAL EVIDENCE IN THE RECORD DEMONSTRATES THAT UNRESOLVED TECHNICAL ISSUES MAKE ADOPTION OF DIGITAL MUST-CARRY RULES INAPPROPRIATE AT THIS TIME.

In addition to Microsoft, parties representing a broad range of interests acknowledge that unresolved technical hurdles exist regarding cable carriage of broadcasters' DTV signals.⁶ In our view, it would be rash to attempt to create DTV must-carry rules without having some idea about how those technical hurdles will be overcome.

A. A Broad Spectrum of Commenters Recognizes the Importance of Robust Copy Protection to DTV's Success.

In addition to Microsoft, members of diverse industry sectors recognize that a satisfactory copy protection mechanism must be developed before consumers can receive high quality DTV programming via cable (or even via terrestrial broadcast), because copyright owners of high-value movies and other programs -- primarily those aired during prime time -- will not license their programming without such protection.⁷

⁶ See, e.g., Comments of Cablevision Systems, Inc. in CS Dkt. No. 98-120 (filed October 13, 1998) ("Cablevision Comments") at 2, 8-9 (the breadth of the NPRM suggests that consideration of must-carry is premature now because "so many fundamental pieces of data remain lacking"); Comments of Cable Telecommunications Association in CS Dkt. No. 98-120 (filed October 13, 1998) ("CTA Comments") at 2 (breadth of NPRM suggests that it should have been an Notice of Inquiry; DTV technology is not sufficiently advanced to make consideration of must-carry appropriate at this time); Comments of Telecommunications Inc. in CS Dkt. No. 98-120 (filed October 13, 1998) ("TCI Comments") at 14-15 (integration of broadcast and cable is a technically complex matter that would not be accelerated by regulation); Comments of the National Cable Television Association in CS Dkt. No. 98-120 (filed October 13, 1998) ("NCTA Comments") at 38-40; Comments of the Office of Communications of the United Church of Christ, Inc., *et al.*, in CS Dkt. No. 98-120 (filed October 13, 1998) ("UCC Comments") at 2-5, 18-19; Comments of GTE at 5 n.14 (technical hurdles make must carry premature).

⁷ See Comments of Sony Electronics, Inc. in CS Dkt. No. 98-120 (filed October 13, 1998) ("Sony Comments") at i, 5, 10 (copy protection is "a necessary prerequisite to development of the most exciting and attractive programming for consumers"); Comments of Zenith Electronics Corp. in CS Dkt. No. 98-120 (filed October 13, 1998) ("Zenith Comments") at 11 (a workable copy protection system will take "considerable time" and "may require new semiconductors and software and product redesign");

With DTV, copy protection assumes an importance without parallel in the analog world. In the absence of effective safeguards, digital technology permits repeated copying of a program without degradation in quality, which is a problem that never arose in the realm of NTSC television. Creators of high-value program content, recognizing this danger, have made the existence of "effective technological measures to prevent unauthorized access to and reproduction of premium programming, especially during the early stages of the distribution sequence," a prerequisite to releasing their programs for DTV broadcast or cable carriage.⁸ In other words, program creators will require encryption of the DTV signals as they are broadcast to include additional copy protection mechanisms at each stage of transmission, and DTV receivers and set-top boxes ("STBs") will have to appropriately handle copy-protected content.⁹

Some commenters have asserted that unresolved copy protection issues should not delay the adoption of must-carry requirements, notwithstanding the significant

Comments of the Motion Picture Association of America in CS Dkt. No. 98-120 (filed September 17, 1998) ("MPAA Comments") at 1-2 (content producers require copy protection before they will license high-value programs for DTV); Cablevision Comments at 8-9 (neither IEEE-1394 technology nor copy protection systems are ready for full-scale deployment); Comments of Philips Electronics North America Corporation in CS Dkt. No. 98-120 (filed October 13, 1998) ("Philips Comments") at 12-13 (reviewing the limitations of current IEEE-1394 technology as a copy protection mechanism, including its inability to handle encrypted signals); Comments of Adelphia Communications Corporation, *et al.*, in CS Dkt. No. 98-120 (filed October 13, 1998) ("Adelphia Comments") at 24-25 (the lack of IEEE-1394 interface on existing receivers will create problems in the form of an installed base incapable of receiving certain broadcast and cable services); Comments of BellSouth Corporation, *et al.*, in CS Dkt. No. 98-120 (filed October 13, 1998) ("BellSouth Comments") at 21 n.54 (because of technical hurdles, set-top boxes with IEEE-1394 technology will not even be widely available until "well after" the launch dates for DTV in the top thirty national television markets); MSTV Comments at 42 (IEEE-1394 copy protection scheme "far from perfect" and has several key weaknesses); Comments of Circuit City Stores, Inc. in CS Dkt. No. 98-120 (filed October 13, 1998) ("Circuit City Comments") at 9 (IEEE-1394 interface "does not appear to offer a complete solution").

⁸ MPAA Comments at 3.

⁹ See *id.* at 2 ("Digital set-top boxes, receivers and related equipment should be equipped to recognize and respond to content management information in pre-recorded media as well as terrestrial DTV, satellite, cable and other transmissions.").

shortcomings DTV will have in the absence of a satisfactory copy protection solution.¹⁰

The National Association of Broadcasters ("NAB"), for example, has argued that copy protection issues are not germane to carriage of broadcasters' DTV signals because copy protection rules do not generally affect broadcast services, which are delivered free.¹¹ But the mere fact that a program is broadcast free over the air does not make the program fair game for piracy. And in any event, the creators of high-value programming have already made it clear that they will not make their programs available for DTV broadcasts unless and until there is end-to-end copy protection.¹²

NAB has warned that deferral of a decision on must-carry until a workable copy protection standard is developed may further delay the roll-out of IEEE-1394-equipped DTV reception devices (such as advanced set-top boxes, cable-ready DTV sets, VCRs, PCs, and home networking devices).¹³ It is difficult to comprehend the public policy justification for pushing DTV technologies and products to market before technical issues that could be impacted by such a decision are resolved. Such a hurried approach could only result in government-sanctioned proliferation of DTV consumer equipment that risks obsolescence when technical problems are solved and improved technology is incorporated into the next generation of equipment.

¹⁰ See, e.g., Comments of the Consumer Electronics Manufacturers Association in CS Dkt. No. 98-120 (filed October 13, 1998) ("CEMA Comments") at 24-25; Comments of the National Association of Broadcasters in CS Dkt. No. 98-120 (filed October 13, 1998) ("NAB Comments"), Appendix G at 9-10; Sony Comments at 4.

¹¹ NAB Comments, Appendix G at 9-10.

¹² MPAA Comments at 5.

¹³ NAB Comments at 10. See *infra*, note 21, and accompanying text for a discussion of the IEEE-1394 interface.

The roll-out of DTV will depend largely on the industry's ability to offer popular, compelling programming, which will be available only if there is an effective copy protection standard for DTV broadcasts and cable carriage.¹⁴ The adoption of must-carry rules before a satisfactory copy protection mechanism is developed and incorporated in DTV consumer equipment could create the false expectation among consumers that the DTV programming choices available to them will be at least as diverse as those available with their NTSC sets.

Worse, the existence of must-carry rules could imply that the Commission had given its "stamp of approval" to currently available DTV consumer equipment which, in the absence of copy protection, might not meet consumers' expectations because it will be unable to deliver digitally the programming and movies consumers currently receive on their NTSC sets. The Commission should avoid any action, such as premature adoption of must-carry rules, that could threaten public acceptance of DTV.¹⁵ Because of the pivotal importance that copy protection plays in the ultimate success of DTV, the must-carry debate is premature and should be put on hold until the various industries that are working on the issue agree on suitable copy protection standards.

That said, there is broad consensus among commenters that the Commission need not become directly involved in resolving copy protection issues because ongoing

¹⁴ See MPAA Comments at 2 ("Without effective content management, the public interest in providing viewers with the maximum number of program choices cannot be achieved.")

¹⁵ Electronics manufacturer Thomson Consumer Electronics has cautioned the Commission against creating unrealistic consumer expectations by "thrust[ing] consumers -- and all other parties -- into a frantic and chaotic environment in which the search for the best solutions becomes lost or forgotten in the search for a solution." Comments of Thomson Consumer Electronics, Inc. in CS Dkt. No. 98-120 ("Thomson Comments") (filed October 13, 1998) at 18-19 (emphasis in original).

industry efforts should resolve those issues within a reasonable time.¹⁶ Commenters generally view the appropriate role of the Commission as limited to monitoring industry's voluntary efforts and urging industry to resolve the outstanding issues in a timely fashion. Microsoft concurs with this view, with the additional recommendation that the Commission should ensure that the process of resolving copy protection issues be open and that all interested industries have an equal opportunity to participate in that process.

B. Other Important Technical Issues Remain.

1. PSIP carriage standards are unresolved.

The lack of a standard for cable carriage of Program and System Information Protocol ("PSIP") data poses yet another obstacle to consideration of digital must-carry requirements.¹⁷ PSIP provides critical naming, channel numbering, and navigation information needed to aid consumers in identifying and locating available broadcast programs. The cable industry is considering alternative schemes, which will have compatibility problems in cases where a broadcast signal is passed through a cable plant. Again, as with so many other aspects of DTV, inter-industry standards for PSIP carriage have not yet been established.¹⁸ In addition to ongoing disagreement about

¹⁶ See Sony Comments at 10-11; Comments of Mitsubishi Electric America in CS Dkt. No. 98-120 (filed October 13, 1998) ("MEA Comments") at 6; BellSouth Comments at 23; MSTV Comments at 42; Comments of General Instrument Corporation in CS Dkt. No. 98-120 (filed October 13, 1998) ("GI Comments") at 5.

¹⁷ Technical information contained in these Reply Comments, unless otherwise specified, was provided by Tom McMahon, Director of Advanced Television Technology, Microsoft Corporation, and Patrick Griffis, DTV Strategist, Microsoft Corporation.

¹⁸ Compare GI Comments at 6-7 (arguing that the cable industry's voluntary standard, equivalent to the ATSC's A/56 standard, is adequate for cable carriage and criticizing the new ATSC A/65 standard as overly burdensome on cable operators) with Sony Comments at 9 (the A/65 standard must become the standard for cable carriage of PSIP data).

the merits of particular PSIP standards, technical compatibility questions, such as IEEE-1394's method of handling PSIP data, also require resolution.¹⁹

2. Carriage of data via Internet Protocol remains an important open issue.

Microsoft also wishes to underscore a point from its initial comments that other commenters overlooked regarding carriage of data. Specifically, standards for the transmission of Internet Protocol ("IP") based data by broadcast, cable or the IEEE-1394 interface are still evolving.²⁰ Such standards should be finalized for each transmission mode, and should be made interoperable across broadcast, cable, and IEEE-1394 transmission modes, before adoption of any must-carry rules. Although industry efforts to develop these standards are presently ongoing, satisfactory and timely completion of these efforts will require intra- and inter-industry cooperation. The development and cable carriage of DTV services that incorporate Internet applications will be impossible in the absence of standards for transmission of IP-transported data.

Interoperability between DTV programming and the Internet will greatly increase the range of DTV services available to consumers, and the Commission should encourage such interoperability. Indeed, the evolution of DTV is in such an early stage

¹⁹ See, e.g., MSTV Comments at 34 (it is unclear whether the IEEE-1394 interface can handle PSIP without remapping by the cable operator).

²⁰ Technically, multicast IP datagrams can be transmitted on bi-directional or uni-directional data links, so higher-level protocols built on IP could be used on a wide variety of broadcast networks and on cable network infrastructures. Standards for transmitting and receiving IP datagrams over virtually every variety of broadcast television network (both analog and digital) either exist today or are fast emerging from the appropriate bodies. For example, the IPVBI working group of the Internet Engineering Task Force (IETF) is in the process of publishing a specification for the transmission of IP datagrams in the vertical-blanking interval of analog television broadcasts worldwide. Similar technical efforts must occur regarding cable infrastructures in order to support interoperability between DTV programming and the Internet.

that it is impossible to determine which programs and services cable operators should be required to carry. For example, once standards for transmission of IP-transported data are developed, the issue may arise as to whether cable operators should be required to carry back viewers' upstream data, which will be associated with interactive programming and services such as home shopping and e-commerce. It would thus be premature to adopt must-carry rules before standards are more fully developed that will make it possible to envision the range of new programs and services that could potentially be subject to must-carry.

The Advanced Television Systems Committee's Data Broadcasting subgroup as well as its DASE (DTV Applications Software Environment) working group are addressing this issue, but both groups need more time to resolve it. Adoption of any must-carry rules before this issue is resolved could create false expectations for consumers about DTV's potential to handle data and interactive applications, and could compound consumers' concerns about technology obsolescence.

Although other commenters have not addressed the IP data issue, they have identified a variety of possible solutions for other unresolved technical issues. These commenters, however, hold disparate views regarding the optimal solutions. Further, the disparity of commenters' positions demonstrates that much work remains to be done to achieve consensus on the workable solutions.²¹

²¹ See, e.g., GTE Comments at 2, 3, 6; UCC Comments at 5; Cablevision Comments at 2, 8; Adelphia Comments at iii-iv, 22-25; TCI Comments at 4; Sony Comments at 3 (besides the IEEE-1394 interface, there is no "broad consensus on any other solution currently available"); NAB Comments at 45-48; Thomson Comments at 18-23; Comments of MediaOne Group, Inc. in CS Dkt. No. 98-120 (filed October 13, 1998) ("MediaOne Comments") at 9-16, 20.

II. EACH OF THE LEADING PROPOSED CARRIAGE OPTIONS HAS SIGNIFICANT SHORTCOMINGS.

Relatively few commenters have addressed the technical feasibility of specific carriage options, resulting in a somewhat limited record on this facet of the must-carry debate. Nevertheless, the comments that did discuss carriage options have confirmed Microsoft's assertion in its initial comments that each of the three primary carriage options -- pass-through, remodulation and CEMA's component proposal -- have implementation problems at this point.

There is relatively broad recognition among the commenters (that addressed the issue) that pass-through remains imperfect, for reasons including those Microsoft identified in its initial comments: pass-through is bandwidth-hungry; it can only be used by people who have DTV receivers, to the exclusion of certain devices such as digital VCRs; it cannot be easily integrated with the cable operator's Electronic Programming Guide ("EPG") or value-added services such as e-commerce, e-mail, video teleconferencing, and web access, which are rendered inside the STB; and it does not offer viewers a seamless viewing experience.²²

Although remodulation in the STB received some support from commenters, it remains unattractive because of outstanding interoperability questions -- especially the added costs of decoding and re-encoding the MPEG data stream to add local graphics at the set-top box and of including in STBs the processing power necessary to decode

²² See Comments of Microsoft Corporation in CS Dkt. No. 98-120 (filed October 13, 1998) ("Microsoft Comments") at 12-13; see also MediaOne Comments at 11-13; Thomson Comments at 20, n.27, 22-23; BellSouth Comments at 19-21, 23-24; NAB Comments at App. G, 1-4, 6-7; CEMA Comments at 21-22.

all DTV video formats.²³

To elaborate, consider an analogy to the channel 3/4 output of an analog VCR to a conventional NTSC receiver (which is set to a fixed channel -- 3 or 4). In this case, the VCR becomes the navigation device and the VCR remote control is used to determine what is seen on the TV display. In the digital equivalent of this scenario, the cable STB would have a channel 3 or 4 output which is 8 VSB modulated and fed into the input of the DTV receiver (which could be, similarly, set to channel 3 or 4).

As in the analog case, the cable STB becomes the controlling navigation device and the STB's remote control should be used to determine what program is seen on the DTV display. However, unlike in the analog case, the remodulated DTV digital signal is an MPEG transport stream that might contain -- in addition to a single video/audio program -- PSIP channel mapping information as well as additional, multiplexed programs. If more than one program is present in the remodulated signal, the consumer now would have to switch over to use the remote control for the DTV receiver to determine which "sub program" to view. However, if the channel mapping information in the PSIP is not intelligible to the DTV receiver, the DTV receiver could tune away from channel 3/4 to a different channel and lose the signal, causing consumer frustration. The alternative would be for the viewer to obtain channel mapping information from the analog input, which would require yet another change in

²³ The term "remodulation" has been used in two contexts in the must-carry debate. In one context, it refers to remodulation at the cable head-end. In this case, the 8 VSB DTV broadcast channel is received at the head-end, demodulated to its baseband MPEG transport stream and then remodulated via quadrature amplitude modulation (QAM) onto a cable channel. The second context refers to remodulation at the cable set-top for delivery to the DTV receiver interface. At the STB, the QAM signal is remodulated using 8 VSB modulation to produce a broadcast-like DTV signal for input to a DTV receiver. In the above discussion, we refer to the costs associated with remodulation at the STB.

the channel selection device.

Further, adding any kind of graphic overlay information (such as channel numbers or a program guide) to the remodulated signal would require the cable STB to fully decode the received MPEG signal to baseband video in order to be combined with the overlay graphics. The combined signal and graphics would then have to be MPEG re-encoded, followed by remodulation to 8 VSB. This approach would add tremendous complexity and cost to the cable STB.

Various commenters have pointed to the IEEE-1394 interface or the component video proposal of the Consumer Electronics Manufacturers Association ("CEMA") as potential solutions to carriage problems. There is a lack of consensus, however, particularly between broadcasters and receiver manufacturers regarding the relative merits of the IEEE-1394 interface and CEMA's component video proposal.²⁴ One of the main concerns regarding both of these interfaces lies in their lack of a copy protection mechanism.

In addition, the 1394 specification covers only the low-level aspects of the interface, not advanced 1394 features and functions such as those specified for 1394 by many consumer electronics manufacturers, including SONY, MEI, Phillips, and others. Until those advanced features and functions of the 1394 are universally specified, these devices are not guaranteed to interoperate for consumers. This would be a plug-and-play disaster and further dampen enthusiasm for DTV receivers.

CEMA's component video proposals address the STB-to-television connection

²⁴ See, e.g., NAB Comments at App. G, 8-9; MSTV Comments at 42; Philips Comments at 12-13; Sony Comments at i, 5, 10.

for analog NTSC broadcasts, digital standard definition, and digital high definition.²⁵ Broadcasters maintain that such an approach has inherent drawbacks, among them high-cost, expensive duplication of certain components and a limited ability to accept inputs from multiple devices.²⁶

The only conclusions that can reasonably be drawn on the basis of the record in this proceeding are that many crucial technical issues are unresolved, and workable solutions to those issues do not yet exist. While various short-term approaches to certain issues have been advanced, none of these approaches has won the broad support of commenters. In short, until the affected industries resolve these issues, it would be premature and, indeed, imprudent, for the Commission to adopt must-carry rules for DTV.

III. THE COMMISSION SHOULD CONTINUE TO FACILITATE INDUSTRY EFFORTS TO SOLVE TECHNICAL ISSUES, BUT ALLOW THE INTERESTED INDUSTRY GROUPS TO RESOLVE THOSE ISSUES THROUGH VOLUNTARY PROCESSES.

There is broad agreement among a wide diversity of commenters that industry groups are working diligently to resolve numerous technical issues surrounding the creation, broadcast, and cable carriage of DTV programming and services.²⁷ These

²⁵ See CEMA Comments at 23; NAB Comments at App. G, 8-9.

²⁶ NAB Comments at App. G, 8-9.

²⁷ *E.g.*, MediaOne Comments at i, 6-10, Sony Comments at i, 2, 10; GI Comments at 2, 8. Similarly, it appears that cable operators and broadcasters are successfully negotiating voluntary carriage arrangements, thereby diminishing, if not eliminating, the urgency of any must-carry requirement. See, *e.g.*, MediaOne Comments at 7-8 (MediaOne has completed DTV carriage agreements with approximately 90% of the broadcasters in its markets and plans to negotiate such arrangements with other broadcasters); "CBS, Time Warner in digital TV deal," CNET News.com (Dec. 8, 1998) (available at www.news.com) ("CBS/Time Warner") (CBS announces that Time Warner Cable will carry the DTV signals of all 14 stations CBS owns in those stations' markets).

groups include (to name a few) the Cable Consumer Electronics Advisory Group (formed by the National Cable Television Association ("NCTA") and CEMA), the OpenCable project, the Advanced Television Systems Committee ("ATSC"), the World Wide Web Consortium (W3C), the Society of Motion Picture and Television Engineers ("SMPTE"), and the Advanced Television Enhancement Forum ("ATVEF").

These and other groups represent both intra- and inter-industry efforts to address the numerous technical issues that still affect DTV. A broad range of commenters has echoed the view Microsoft expressed in its initial comments that technical issues surrounding DTV would be most effectively and expeditiously addressed through the efforts of groups such as those identified above, rather than through regulatory action.²⁸ FCC Chairman Kennard has also expressed a preference for industry-led resolution of technical issues rather than governmentally-imposed solutions. The Chairman has stated, "[T]here's a real danger that if we were to mandate a particular standard now, it would become obsolete very quickly."²⁹

The intense ongoing activity of industry groups to resolve the open technical issues surrounding DTV should be allowed to continue, free from regulatory restraints. The Commission should therefore refrain from adopting technical standards for DTV. Furthermore, it should not take any action that could interfere with industry efforts to resolve technical issues, or result in hurried, imperfect technological solutions and

²⁸ See *supra*, note 16; see also MediaOne Comments at 16-20; Thomson Comments at 23-24.

²⁹ Chairman Bill Kennard, *quoted in "Steady As She Goes: FCC Chairman Bill Kennard and the Cool Approach to DTV,"* published in *The Dawn of Digital Television* (joint publication of, and supplement to, *Broadcasting & Cable*, *TWICE*, and *Digital Television*) (November 16, 1998) S8 (hereinafter cited as "Kennard Interview") at S9.

inferior quality DTV services and consumer products. Such undesirable circumstances could result if the Commission adopts must-carry requirements prematurely or adopts rules that could give certain technologies any advantage over others.

Private industry is extremely effective at solving complex technical problems, particularly when prodded by the Commission. Such informal Commission oversight of voluntary industry efforts is far better suited to solving rapidly changing technological issues than are prolonged, paper-intensive rulemaking proceedings.³⁰ Chairman Kennard's leadership has wisely followed an industry-led, market-driven approach to solving technical issues, rather than an administratively imposed approach,³¹ a principle that Microsoft strongly supports and that experience has proven effective.

The Commission should follow just such a course in addressing the numerous issues surrounding the deployment and cable carriage of DTV; that is, it should facilitate industry efforts to find technical and operational solutions, rather than choosing the solutions itself. As the facilitator of industry problem-solving, the Commission should ensure that all interested industries are fairly represented in the process, that the process is open, and (if necessary) that milestones and guidelines are established to ensure that the process achieves solutions in a timely manner. The Commission should recognize, however, that it is impossible to set deadlines for reaching technological

³⁰ Chairman Kennard expressed this view in his remarks before the "Dawn of Digital Television" Summit Meeting. See Remarks of Chairman Kennard to the "Dawn of Digital Television" Summit Meeting (Nov. 16, 1998) (hereinafter cited as "Kennard Dawn of Digital Speech").

³¹ Kennard Interview, *supra*, note 29, at S8-S11; Remarks of Chairman Kennard before the International Radio and Television Society, New York, New York (Sept. 15, 1998) ("Beyond this limited role for government we must trust in the marketplace . . . [including] giving businesses the opportunity to fail too."); Kennard Dawn of Digital Speech, *supra*, note 30 ("it is very important that private industry take the lead in these DTV developments").

solutions, and it should make allowances if the reasonable efforts of industry groups fail to yield satisfactory solutions within expected time frames.

IV. THE COMMISSION SHOULD RELY ON THE MARKET IN THE FIRST INSTANCE TO DETERMINE WHICH EPG SERVICES WILL SUCCEED.

Numerous commenters have addressed the issue of EPGs and similar services, stressing that such services, by virtue of their importance to consumers and their potential for revenue generation, will be a source of competitive advantage across various industries. In its consideration of issues regarding carriage of EPGs and similar services, the Commission should recognize the various industry groups' strong business interests in these services and their interest in crafting them to suit consumers' interests. All providers of EPGs, navigational information, and similar services -- including broadcasters, cable operators, and third parties -- should in the first instance have a chance to compete and to respond to consumer demand without regulatory intervention. Eventually, the Commission may conclude that it should play the role of facilitator to monitor the market and ensure through informal processes that there is a fair playing field for competition to occur. The most prudent course for the Commission to follow in this area for the immediate future would be to take a "hands-off" approach, and allow the market to determine how EPGs and similar services evolve.

If, however, the Commission adopts any rules regarding carriage of EPGs, navigational information, and similar services, those rules should be flexible enough to permit all interested parties to create and introduce competing services, and to encourage the introduction of new, innovative services.

V. THE LEGAL BASIS FOR ADOPTION OF FORMAT-SPECIFIC DTV SIGNAL CARRIAGE REQUIREMENTS IS UNCLEAR AT BEST, AND MARKET FORCES ALONE SHOULD ENSURE THAT CABLE SUBSCRIBERS RECEIVE DTV PROGRAMS IN THE FORMATS THEY DEMAND.

A number of commenters have asked the Commission to require cable operators to carry broadcasters' DTV signals in the video formats in which broadcasters transmit those signals.³² As indicated in our initial comments, the adoption of format-specific carriage requirements is legally problematic and contrary to the interests of consumers and the affected industries. Therefore, even if the Commission adopts any carriage requirements for broadcasters' DTV signals, it should refrain from adopting format-specific signal quality requirements for carriage of such signals.

A. Commenters Have Failed to Identify a Sound Legal Basis for Requiring Cable Carriage of Broadcasters' DTV Signals in the Same Video Formats in which They Were Broadcast.

Advocates of a requirement that cable operators carry broadcasters' DTV signals in the same video formats in which they were broadcast have failed to identify a compelling legal basis for such a requirement because none exists. Under Section 614(b)(4)(B) of the Communications Act -- the source of the Commission's authority to adopt rules for cable carriage of broadcasters' DTV signals -- the Commission is authorized only to establish "any changes in the signal carriage requirements of cable television systems necessary to ensure cable carriage of such broadcast signals of local commercial television stations which have been changed to conform with such modified standards."³³ The Commission's authority under Section 614(b)(4)(B) is at most

³² *E.g.*, Philips Comments at 2, 7-10; Thomson Comments at 9-13; MSTV Comments at 30-32.

³³ 47 U.S.C. § 534(b)(4)(B).

unclear, if not circumscribed, by the statutory language.

The Commission may only adopt rules that are "necessary to ensure cable carriage" of broadcasters' DTV signals. Rules prescribing the precise video format of broadcasters' DTV programs carried by cable are unnecessary to ensure carriage of such programs, and therefore the Commission is arguably not authorized to adopt such rules. Nothing in the legislative history of Section 614(b)(4)(B) provides any tenable support for the proposition that Section 614(b)(4)(B) authorizes the Commission to adopt format-specific requirements for cable carriage of DTV broadcasts.

Assuming, *arguendo*, that the Commission can apply the legal standards for analog signal quality in Section 614(b)(4)(A)³⁴ to DTV signals. Under that provision, cable operators could be required only to:

- carry broadcasters' DTV signals "without material degradation,"³⁵ which the Commission should define narrowly, without specific reference to video formats;³⁶ and
- provide processing and carriage quality for such signals that is "no less than that provided . . . for carriage of any other type of signal" -- "to the extent technically feasible."³⁷

Under these standards, cable operators would fundamentally be prohibited from processing and carrying DTV signals originated by non-broadcasters -- including those the operators themselves originate -- in a higher quality than that in which they process

³⁴ 47 U.S.C. § 534(b)(4)(A).

³⁵ *Id.*

³⁶ Given the Commission's tenuous (if any) statutory authority to adopt DTV signal quality requirements, any requirements it adopts should be as flexible, unburdensome, and non-prescriptive as possible.

³⁷ 47 U.S.C. § 534(b)(4)(A).

and carry broadcasters' signals, to the extent technically feasible. Such equal treatment should quell any broadcasters' speculation that cable operators will favor their own DTV programming over that of broadcasters in terms of signal quality.³⁸

In addition to the statutory arguments against the adoption of DTV signal quality rules, the Supreme Court's decision in *Turner Broadcasting Sys. v. FCC*, __ U.S. __, 117 S.Ct. 1174 (1997) ("*Turner II*") provides independent grounds for refraining from adopting such rules. The Commission has recognized the need to "take into account the implications of the *Turner II* decision and the most current information with respect to must-carry and retransmission of DTV signals."³⁹

In the precursor case to *Turner II*,⁴⁰ the Supreme Court held that the must-carry rules (then limited to analog broadcasts) were content-neutral because they did not distinguish among speech based on content.⁴¹ As such, they were subject to intermediate, rather than heightened, scrutiny under the First

³⁸ Because neither Section 614(b)(4)(A) nor its legislative history provides any clear guidance for interpreting "material degradation" in the digital realm, the Commission should be extremely cautious in applying that standard to DTV signals. In the absence of unambiguous evidence of Congress's objectives and intent, the Commission should define "material degradation" as flexibly as possible. At least one broadcaster, Paxson Communications Corporation, has stated that the "material degradation" standard for DTV should be at least equivalent to the standard for analog signals, *i.e.*, that the quality of broadcasters' DTV signals is at least equal to that of cable operators' DTV signals. Comments of Paxson Communications Corporation in CS Dkt. No. 98-120 (filed October 13, 1998) at 29-30, 73.

³⁹ See *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, MM Docket No. 87-268, Memorandum Opinion and Order on Reconsideration of the Fifth Report and Order, FCC 98-23, 13 FCC Rcd 6860 (released February 23, 1998) ("Reconsideration of Fifth Report") at ¶ 86.

⁴⁰ *Turner Broadcasting Sys. v. FCC*, 512 U.S. 622 (1994).

⁴¹ 512 U.S. at 643.

Amendment to the Constitution.⁴²

Even assuming that signal quality requirements for DTV may be content-neutral, an argument could be made that highly specific, detailed and prescriptive requirements would not withstand intermediate scrutiny. First, it would be difficult to imagine "compelling" or "substantial" governmental interests to be furthered by such requirements, particularly if they are format-specific. Given the absence of clear language in Section 614(b)(4)(B) or its legislative history regarding signal quality rules for DTV, it is impossible to identify a "governmental interest" that would be furthered by format-specific requirements.

In addition, detailed DTV signal quality rules would be unlikely to satisfy the second prong of the intermediate scrutiny test, *i.e.*, that they not burden substantially more speech than is necessary to further the government interest for which they were intended. If format-specific carriage requirements result in the displacement of other parties' video or non-video services, such rules would arguably burden speech more than necessary to further the government interest (if one can be defined) behind such rules.

Thus, there are significant legal obstacles to the adoption of DTV signal quality requirements that are specific as to video format. In light of these obstacles, the Commission should not adopt format-specific requirements for carriage of DTV signals.

⁴² *Id.* at 662.

B. Cable Operators Will Carry DTV Signals in the Formats their Subscribers Demand.

Competition in the delivery of DTV programs and services will, by all accounts, continue to grow. Cable operators are cognizant of the competition they will face in the provision of high-quality DTV programs and services, and they ought to ensure that their subscribers are satisfied with the quality of all the DTV programs and services they carry -- including those originated by terrestrial broadcasters and carried on their systems.⁴³ "The last thing we want," an executive of Time Warner Cable said recently, "is to have people call saying they spent \$8,000 to \$10,000 on a HDTV set and they want to be hooked up, and for us not to be in a position to do it."⁴⁴ Decker Anstrom, president of NCTA, has confirmed the cable industry's commitment to its customers: "Our customers are going to want digital and high-definition television, and we'll deliver it. But . . . these things don't happen overnight."⁴⁵

Because consumers have increasing options -- including over-the-air reception, direct broadcast satellite ("DBS"),⁴⁶ Open Video Systems, and possibly the Internet⁴⁷ --

⁴³ See, e.g., BellSouth Comments at 24-28; TCI Comments at 12; Comments of Lifetime Entertainment Services in CS Dkt. No. 98-120 (filed October 13, 1998) at 17.

⁴⁴ "CBS/Time Warner," *supra*, note 27.

⁴⁵ Don West, "The Medium They Couldn't Kill: The Dawn of Digital Television," published in The Dawn of Digital Television (joint publication of, and supplement to, Broadcasting & Cable, TWICE, and Digital Television) (November 16, 1998) S2 (hereinafter cited as "West") at S13 (quoting Decker Anstrom).

⁴⁶ Cable companies, broadcasters, and industry observers have all recognized the competitive threat DBS poses to cable with respect to delivery of DTV programming and services. See "Cable TV Industry Looks Cautiously at High-Tech Future, Sees Much Work To Be Done," Telecommunications Reports (Dec. 7, 1998) (hereinafter cited as "Cable Conference") at 10; West, *supra*, note 45, at S25. DBS has technical advantages over both cable and over-the-air terrestrial broadcast media, and Chuck Sherman, of the NAB, has said that broadcasters "are anxious to do business with" DBS providers. West, *supra*, noted 45, at S25, S27. One manufacturer, Hitachi Home Electronics (America), Inc., has introduced HDTV sets capable of receiving DTV signals from DBS as well as over-the-air from terrestrial

for receiving video programming in different formats, consumers should be able to "vote with their feet" if they believe that their cable systems are delivering DTV signals that are inferior in quality to those available from other delivery channels.⁴⁸

The availability of alternative delivery vehicles should create competitive pressures on cable operators to deliver broadcasters' DTV signals in the formats their subscribers want.

CONCLUSION

Numerous technical issues should be resolved before the Commission adopts must-carry requirements for DTV. The adoption of such rules before technical problems are solved, it could help create false expectations in consumers that might not be met and might inhibit public acceptance of DTV. Voluntary industry efforts are addressing the open issues surrounding DTV broadcast and cable carriage, and they should be

broadcasters. See Press Release: "Hitachi's HDTV Coming to a City Near You: The Latest in Digital Technology at Retailers Across the U.S." (Dec. 14, 1998) (available at <http://biz.yahoo.com/>). Another manufacturer, Thomson Consumer Electronics, plans to produce DTV sets with similar capabilities. West, *supra*, at S25. The Commission has encouraged consumers to ask DBS providers whether they will deliver DTV programs and services, including HDTV programming. FCC Consumer Bulletin: "Digital Television Consumer Information" (released November 16, 1998) ("Consumer Bulletin").

⁴⁷ In a recent interview, FCC Chairman Bill Kennard acknowledged that consumers are not limited to cable for delivery of terrestrial broadcasters' DTV signals. Chairman Kennard stated, "[B]roadcasters do have an alternative delivery system to digital. It's an over-the-air technology. Cable is not their only gateway into America's homes." Kennard Interview, *supra*, note 29, at S11. The Chairman noted that DBS is an additional potential alternative for DTV delivery, which would "bring more competition to cable" and "be a good thing for consumers." In that regard, the Chairman voiced his support of local into local, and his hope that the Satellite Home Viewer Act would generate momentum for that objective. *Id.* In addition to over-the-air reception and delivery via DBS, it appears that DTV will soon be available over the Internet; America Online has announced that it will launch "AOL TV," a DTV service, early next year. See Kennard Dawn of Digital Speech, *supra*, note 29; Kevin Anderson, "Taking the Net from PC to TV," BBC News (Dec. 13, 1998) (available at <http://news.bbc.co.uk>).

⁴⁸ DTV receiver manufacturers, who are vociferous proponents of format-specific signal carriage requirements, have espoused a similar position with respect to the proposed adoption of mandatory receiver standards. According to those commenters, mandatory standards are unnecessary because manufacturers will naturally respond to consumer demand. *E.g.*, CEMA Comments at 25-26; Thomson Comments at 23-24; Philips Comments at 14-19.

permitted to complete their work with minimal government intervention.

If the Commission adopts some type of must-carry requirements, notwithstanding the inadvisability of doing so, it should not adopt DTV signal quality requirements that are specific as to video format. Such requirements would lack a firm legal foundation, and could be obviated by the operation of natural marketplace forces.

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Certificate of Service

I, Suzanne Takata certify that true and correct copies of the preceding Reply Comments of Microsoft Corporation in CS Docket CS 98-120 were served this 22nd day of December, 1998 via electronic mail to the following parties. Those parties marked with an (*) were served via hand delivery.

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