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Before the
FEDERAL COMMUNICATIONS COMMISSION
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In the Matter of)

Carriage of Transmissions of)
Digital Television Broadcast Stations)

Amendments to Part 76)
of the Commission's Rules)
_____)

CS Docket No. 98-120

**COMMENTS OF
MICROSOFT CORPORATION**

Marc Berejka
Federal Regulatory
Affairs Manager
Microsoft Corporation
21 Dupont Circle, Suite 510
Washington, D.C. 20036
(202) 293-0890

Kevin DiLallo
Justin Castillo
Levine, Blaszak, Block & Boothby, LLP
2001 L Street, NW.
Suite 900
Washington, D.C. 20036
(202) 857-2550

Counsel for
Microsoft Corporation

October 13, 1998

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SUMMARY

Digital Television ("DTV") will employ higher-quality video and audio and the power of computing and the Internet to enhance existing programming and create novel programs and services. Because of unresolved technical issues, however, adopting must-carry obligations now for DTV would be premature and impractical. Accordingly, for the time being the Commission should defer adoption of any digital must-carry requirements.

Several key facets of DTV technology require further development before consideration of digital must-carry requirements may be appropriate. For example, no end-to-end copy protection system currently exists. In the absence of acceptable copy protection and anti-piracy mechanisms, content producers will not allow their high-value motion pictures and programming to be carried on DTV. Another aspect of DTV technology that requires resolution is the carriage of data via Internet Protocol ("IP"). Imposing must-carry obligations before DTV technology supports IP transmission could hobble the development of DTV programming and services that integrate video, audio, and data components.

Adoption of digital must-carry rules at this time also would be premature because the existing solutions for cable carriage of DTV are technologically incomplete, inefficient, and costly. One option -- "pass-through" of the entire DTV broadcast signal over the cable system -- begs several important technical questions. Perhaps most significantly, use of the pass-through option would allow only owners of expensive DTV receivers to decode and display DTV signals. And those viewers would require an input selector switch, such as an

A/B switch, to change from their regular cable programming to the passed-through DTV programming. In addition, the pass-through approach would waste scarce bandwidth on cable operators' systems, and would not solve the copy protection or IP transmission problems noted above.

The second option, "remodulation," shares several of the pass-through option's shortcomings. But most problematically, adoption of the remodulation approach may significantly inflate the cost of set-top boxes, because those boxes will require the ability to decode and process digital video formats varying from 480i to 1080i. These increased costs could discourage consumer acceptance of DTV and delay the broadcasters' return of spectrum that could be used for other purposes.

Ongoing voluntary industry efforts will resolve the open technical issues surrounding cable carriage of DTV more expeditiously than any governmental regulation. The significant progress and inter-industry cooperation of groups such as the Advanced Television Enhancement Forum, which is developing DTV standards, suggest that must-carry regulations should be unnecessary, at least in the near-term. Natural marketplace forces will result in the fastest, widest deployment of DTV if unimpeded by regulation.

Moreover, it is entirely possible that, for at least the next two years, digital must-carry requirements will be unnecessary to ensure that cable subscribers have access to DTV. Commercial stations affiliated with the four networks operating in the top 30 television markets are likely to elect retransmission consent, rather than must-carry, to obtain cable carriage of their DTV

programming. DTV must-carry rules thus may not become relevant until May 1, 2002, when the remaining local stations are required to complete construction of their digital broadcasting facilities. By then, a great deal of innovation and cooperation will have occurred that will answer the questions whether digital must-carry rules are needed at all, and, if so, what they should entail.

If the Commission postpones consideration of must-carry, hardware prices will have an opportunity to fall. Copy protection issues and other technical problems will be resolved voluntarily. Industry groups will formulate enhanced programming specifications. The Commission will have time to develop the record about the nature of what DTV programming will be. And the cable industry, which has already committed itself voluntarily to carrying broadcasters' DTV signals, will have time to continue to work cooperatively with broadcasters and consumer electronics manufacturers to perfect digital carriage technologies.

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Microsoft Corporation submits these Comments in response to the Federal Communications Commission's *Notice of Proposed Rule Making* in the above-captioned proceeding (the "NPRM").¹

INTRODUCTION

Digital Television ("DTV") will be both evolutionary and revolutionary. DTV will enhance existing programming, such as movies and sports, by adding to them higher quality audio and video, a wide-screen format, and new, program-related information. In this respect, DTV represents the next logical step in the evolution of consumer products toward increasing multimedia capability. Just as television added pictures to radio to create a new experience, DTV is poised to add the power of computing and the Internet to television programming to

¹ FCC 98-153 (released July 10, 1998).

provide consumers with more enriching entertainment and informational opportunities. The transition to DTV will also enable "the creation of entire[ly] new products" and services.² Programmers, broadcasters, high-tech companies like Microsoft, and consumer electronics manufacturers are just now developing what will be the first phase of the DTV experience.

Over the course of this change, the U.S. television infrastructure will evolve from an analog to a digital base. The migration to digital will require changes in every aspect of television, from the equipment used to create and transmit programs to the devices consumers use to receive and view the digital signals. The move to DTV will require re-thinking nearly every step of the production, transmission, and viewing process. From a practical standpoint, the transition to DTV requires designing, standardizing, and implementing a completely new set of technologies that raise challenges never contemplated in the analog world.

Much has been written about the first-generation DTV receivers that will be sold this fall and that may range in price from \$5,000-\$10,000. Microsoft's vision for the roll-out of digital television is a broader one. Low-cost, advanced set-top boxes ("ASTBs") will also play a critical role in delivering the promise of DTV to *all* Americans. If history is any guide, the set-top box will be a key element in the transition to DTV. As television has evolved, it has been enhanced through the use of various set-top boxes that have provided new

² Remarks of FCC Chairman William E. Kennard before the International Radio and Television Society, New York, NY, September 15, 1998.

functionality. Cable television, satellite TV, and video games all developed and reached mass appeal through low-cost, high-volume set-top boxes costing \$200-300. The VCR is the most ubiquitous set-top box and is now widely available at prices below \$200.

The transition to DTV will proceed quickest by following the same path. Initially, the ASTB will enable consumers with existing analog NTSC³ sets to benefit from the new DTV signals by improving the picture quality on their NTSC sets and by delivering Internet access, video-on-demand, and interactive programming -- all at consumer-friendly prices. As DTV sets become more affordable, that same ASTB can be connected to a DTV set to deliver the full range of DTV's additional benefits.

The evolutionary and revolutionary nature of DTV makes it extremely difficult, if not impossible, for the Commission to appropriately address the complicated question of digital must-carry at this time. The Commission has correctly observed that digital must-carry depends on "the critical issues surrounding the interoperability" of DTV broadcast, cable systems and digital receivers.⁴ Although substantial progress has been made in setting standards and integrating technology, final resolution of the numerous issues surrounding

³ National Television Standards Committee.

⁴ NPRM at ¶ 2.

digital must-carry is not yet appropriate precisely because many of the critical aspects of interoperability remain open.⁵

Microsoft, as much as any entity, would like DTV to be deployed and accepted as rapidly and widely as possible. However, the broad array of open technical issues concerning the interoperability of various DTV elements makes the adoption of any digital must-carry requirements premature and impractical. Microsoft therefore urges the Commission not to adopt any must-carry requirements at this time.

DISCUSSION

I. DIGITAL TELEVISION TECHNOLOGY IS NOT SUFFICIENTLY MATURE TO PERMIT IMPOSITION OF MUST-CARRY OBLIGATIONS AT THIS TIME.

The must-carry rules for analog broadcasts require cable operators to deliver prescribed aspects of a certain number of local television broadcasts. In particular, cable operators must carry the basic components of the analog broadcast television signal⁶ in an integrated fashion.⁷

⁵ Technical information contained in these Comments has been provided by Tom McMahon, Director of Advanced Television Technology, Microsoft Corporation.

⁶ See 47 U.S.C. § 534(b)(3) (describing content that must be carried, including "the primary video, accompanying audio, and line 21 closed caption transmission . . . and, to the extent technically feasible, program-related material carried in the vertical blanking interval or on subcarriers. Retransmission of other material in the vertical blanking interval or other nonprogram-related material . . . shall be at the discretion of the cable operator").

⁷ See 47 U.S.C. §§ 534(b)(4) (requiring broadcast signals to be carried on cable "without material degradation"), 534(b)(6) (governing channel positioning of broadcast signals on the cable system).

Although the analog must-carry requirements for content and signal quality are subject to the technical limitations of cable systems,⁸ the technical issues associated with implementing cable carriage of analog television broadcasts have been relatively straightforward.⁹ The analog signal is relatively simple, and there is a one-to-one relationship between the broadcaster's signal and a single, unique program. Today's analog terrestrial broadcasts deliver individual programs, or a single unique "essence" comprised of video, audio and relatively limited data components that can be readily separated from each other.

Cable carriage of DTV signals, on the other hand, raises novel issues for which the analog must-carry regime provides very limited guidance. For example, the challenges of implementing must-carry regulations for DTV become much more complex, because there is no longer a one-to-one relationship between the broadcaster's 6MHz DTV allotment and single program. A broadcaster's digital signal can simultaneously include multiple programs, along with a wide range of data (both ancillary and non-ancillary). New forms of data are also required for the consumer to access and manage the viewing experience. Along with the change in the fundamental nature of the signal, new types of connectors and software technologies are required to insure a smooth and logical experience for consumers, as well as to provide copyright protection for program creators.

These technological differences mean that determining the "essence" of a program in the digital era -- and insuring that the program's essence gets to the

⁸ See 47 U.S.C. §§ 534(b)(3)(A), (b)(4)(A).

consumer -- are much more challenging problems than the Commission faced in adopting analog must-carry rules. Although the full scope of DTV services remains unexplored, what is clear is that DTV services will embrace far more than just audio, video and closed captioning.¹⁰ Not only will DTV challenge analog must-carry concepts because of technological differences in *what* can be carried, it will also raise new possibilities regarding *when* content can be carried. The fact that program-related data might not always be carried in real-time could have profound implications for how digital must-carry is conceptualized and structured.¹¹

⁹ NPRM at ¶18.

¹⁰ For a discussion of the future of DTV, see European Broadcasting Union and Society of Motion Picture and Television Engineers Task Force for Harmonized Standards for the Exchange of Program Material as Bitstreams, Final Report, 8, July 1998 <<http://www.smpte.org/engr/tfrpt2w6.pdf>> ("Task Force Report") (because of DTV, the television industry will "remak[e] itself" as a result of "(i) the proliferation of new delivery channels to consumers, (ii) the new capability of those channels to carry data of many types in addition to, or in place of, video and audio, and (iii) the need to fill those channels with content"). Further, "new business possibilities will open for those who can leverage the ability to transmit new forms of information through channels that formerly carried only television. . . . The transformation will be aided by [DTV's] confluence with the dramatic changes occurring in computer and networking technologies, leading to faster processing, larger memories, greater storage capacity and wider bandwidths -- all at lower capital and operating costs."

¹¹ See *id.* at 11-12:

The brave new world of television, based on the exchange of programme material as bitstreams, brings with it many new and changed considerations Future systems will not only provide new operational functions and features, they will also perform even traditional operations in a new and fundamentally different manner. . . . [F]uture systems . . . will be largely based upon the use of computing techniques and data networking [and will] make widespread use of servers, which will enable use of non-real-time

Beyond the conceptual and structural puzzles, there are a handful of technical questions that remain open and that make digital must-carry technically unfeasible at this point. Because of these technical issues, the seamless integration of NTSC broadcast television into cable systems that viewers enjoy and expect today is not yet possible for DTV. Microsoft urges the Commission to develop the record further on these important matters to insure that DTV is permitted to reach its fullest potential and that consumers are not misled into believing that they will receive a satisfying experience before the technology can make such an experience possible.

A. Copy Protection Issues Remain Unsolved.

The NPRM seeks comment on digital compatibility between and among transmission systems, set-top boxes, and receivers.¹² A more fundamental problem exists than lack of compatibility among components that must interoperate; it is the lack of copy protection standards for individual components that meet the demands of content producers.¹³ One of DTV's greatest assets is that it will enable consumers to enjoy theater-quality pictures and audio in their own homes. Without safeguards, however, digital technology would offer pirates an unprecedented opportunity to make copies that are every bit as good as the

¹² transfers that, in turn, will allow optimization of the trade-off between the speed of delivery and bandwidth utilized.
NPRM at ¶ 30.

¹³ Comments of the Motion Picture Association of America in CS Dkt. No. 98-120 (filed September 17, 1998) at 1-2.

original.¹⁴ The owners of these valuable assets understandably want their investments protected.¹⁵ Consumers might never see digital broadcasts of *Titanic* – whether over-the-air or via cable – until the motion picture industry is satisfied that sufficient end-to-end safeguards against copyright infringement and piracy exist.

Protecting high-value programming from piracy means encrypting the signal at every stage in the production and transmission processes. The system of necessary safeguards is complex, and the standards bodies involved (as indicated below) are a diverse group. First, the programming must be produced with a copy protection mechanism (Society of Motion Picture and Television Engineers); second, the programming must be encrypted by broadcasters for transmission over the air (Advanced Television Systems Committee); third, the programming must be encoded by the cable operator and then decoded again in the set-top box (Society of Cable Television Engineers); fourth, the signal must go through the cable operator's conditional access and pay-per-view stages; and fifth, the programming must be encrypted yet again (under a different system) to travel from the set-top box to the receiver (Copy Protection Technical Working Group and 5C Consortium). Throughout the entire origination, transmission, and delivery process the signal might include a digital watermark to aid in the prosecution of pirates. Until all of the interested standards bodies confer and coordinate copy protection at each stage of the process, the majority of non-

¹⁴ *Id.* at 6.

¹⁵ *Id.* at 5.

cable-produced programming, particularly the high-quality programming that consumers want most, will likely be unavailable on DTV, regardless of whether the Commission adopts must-carry rules.

The Commission should not give consumers false hope that must-carry rules, if adopted in the near term, would overcome these technical issues. Early adopters who buy sets before the copy protection standards are established may see their digital televisions "go black" when new, copy-protected DTV signals are broadcast because they will lack the ability to decode them.¹⁶ Also, the lack of standards will discourage content producers from releasing high-value programming such as major motion pictures. If the Commission were to adopt must-carry rules, it would risk giving consumers the false impression that these issues do not exist. To avoid this hazard, the Commission should develop the record further on this issue and refrain from adopting must-carry rules before such time as content producers' concerns are addressed and DTV viewers are assured of the ability to receive high-value programming.

B. No Standards Exist Yet to Support Internet Protocol Transmission.

Another crucial aspect of DTV that remains undefined is the carriage of data via Internet Protocol ("IP"). Although some versions of the IEEE-1394¹⁷ standard support IP for computer applications, there is still no version that will support IP in connection with cable carriage of DTV broadcasts. Without such a

¹⁶ *Id.* at 5-6.

¹⁷ IEEE-1394 is a standardized interface developed by the Institute of Electrical and Electronics Engineers, Inc.

standard, there is no way to assure content providers using IP that their programming-related data will reach viewers. Because video, audio, and data comprise the three essential aspects of DTV signals, carriage of the data component of the signal is essential to the future of DTV. Given the absence of standards for IP, adoption of DTV must-carry obligations would be premature. Microsoft urges the Commission to develop the record further on this point as well to insure that DTV technology provides a well-coordinated mechanism for integrating IP into DTV carriage standards.

C. Existing Must-Carry Solutions are Flawed.

Imposing must-carry requirements now also would be premature because the potential cable carriage options are flawed. One must-carry option raised in the NPRM is "pass-through."¹⁸ Pass-through entails taking the entire digital broadcast signal and passing it directly through the cable system and the cable set-top box and feeding it directly to the consumer's television. The second option, "remodulation," allows the cable operator to process the signal at the headend, with further processing of the signal in a set-top box. At this time, neither pass-through nor remodulation provides a satisfactory consumer experience at levels of quality and price that would justify imposition of digital must-carry.

1. Pass-Through

The appeal of pass-through is its apparent simplicity: the cable operator merely takes the signal and sends it straight through to the viewer. Thus, pass-

¹⁸ NPRM at ¶¶ 26-27.

through seems appealing because it does not seem to be a burden on cable operators, whose systems only need to serve as a conduit for the DTV signal.

While pass-through appears to offer something for everyone, in fact, it offers little to anyone. It expends large amounts of bandwidth and benefits only the few who could get the same DTV experience over the air via a new and expensive DTV receiver. The passed-through signal will be useless for everyone else, producing only "snow" on their analog television screens.

Moreover, pass-through begs many technical questions. The first hurdle concerns getting the signal from the cable headend to the set-top box without signal degradation. Television signals are modulated for delivery either over the air or over cable. The modulation technology used by broadcasters for over-the-air delivery (VSB) is different from the modulation used by cable providers in digital transmissions (QAM).

The next issue concerns what happens to the signal when it enters the set-top box. Assuming the broadcast signal is carried in its original ATSC-compliant form, there would be no separation of the signal into its various components. Accordingly, pass-through could cause cable operators to carry more than just a single program's video, audio, and program-related data.

Getting the signal from the set-top box to the receiver is the next challenge. The connector cable needed to deliver the signal to the receiver has not yet been fully defined, and there is no input jack on any of the DTV receivers coming out in the fall. The IEEE-1394 standard may represent a potential solution, but many technical issues, including protocols and encryption, have yet

to be resolved before it can be implemented. In addition, for the time being, the 1394 connector lacks sufficient bandwidth to pass through baseband 1080i signals by more than a factor of two.

Even if one assumes that pass-through technology could deliver the signal from the set-top box to the receiver, the consumer could not be assured a seamless DTV viewing experience at this point. To switch between the standard cable signals output by the ASTB and the passed-through signal, a consumer would have to switch the input source to the receiver. This is similar in nature to switching video sources on a receiver today between a video and RF or video and S-video source. The DTV switch could be as simple as a button on the remote or a mechanical switch; however, no standard or even proposal for this switching mechanism exists. As important, if the signal were to reach the receiver, there would be no way to separate the signal. Software that is as yet undefined would need to reside in the receiver to handle this separation and provide a user interface and navigation methodology for the consumer.

Spectrum efficiency is also a serious concern. Because the broadcaster's signal contains certain overhead data that is not used by the cable system (or potentially revenue-bearing and non-programmatic data that cannot be separated out) the signal uses more of the cable provider's bandwidth than necessary. As much as 25% of the bandwidth under the pass-through option would be wasted. Since bandwidth is a limited resource, inefficient use of this asset imposes costs on the cable operator and, ultimately the consumer, by restricting programming choices and increasing costs. Thus, pass-through would take a large slice of

spectrum for the benefit of a few DTV receiver owners, while providing no DTV experience for anyone else.

2. Remodulation

Under the "remodulation" option, the cable operator takes the signal and processes it before putting it on the cable system. The set-top box then processes the signal further before sending it into the receiver for viewing. Remodulation uses less bandwidth than pass-through, and it also permits integrating the DTV signal into the cable system. However, there are no standards available today that overcome copy protection and interconnection issues. As significant, because broadcasters will be transmitting in various formats, the advanced set-top box capable of handling remodulated signals, would have to be able to process formats from 480i up to 1080i. This requirement would compel use of additional memory and processing power, which would add hundreds of dollars to the cost of the set-top box, possibly delaying consumer acceptance of DTV. Given the historical role of the set-top box in the development of television, this could be a crucial drawback.

II. NATURAL MARKETPLACE FORCES, RATHER THAN REGULATION, WILL BE MOST EFFECTIVE AT DRIVING THE DEPLOYMENT AND CARRIAGE OF DTV.

Promulgating must-carry requirements in the face of this technological uncertainty is unwise. A recent report from a joint task force formed by the Society for Motion Picture and Television Engineers (SMPTE) and the European Broadcasting Union (EBU) emphasized the priorities for the transition to DTV:

"[E]nd-to-end interoperability as well as optimized technical quality must be considered as prerequisites to successful system implementation."¹⁹ The SMPTE/EBU Task Force also noted that refining the technology early helps to avoid deployment of "application[s] which would inherently limit the range of future potential uses of the technology" and incorporation of those applications into DTV.²⁰

If the Commission adopts must-carry requirements before the relevant technical issues are resolved, the early years of DTV could be jeopardized. As explained above, in the absence of adequate technological solutions to fundamental issues such as the integration of IP data and copy protection concerns, the full potential of DTV will not be achieved, at least in its early years. Consumers will be denied the often-repeated promise of a theater-like experience because content producers will not license their material for transmission in digital formats. New services combining data and digital video will be inaccessible due to a lack of transmission and reception standards.

Regulatory mandates, particularly if they are premature or overly specific, interfere with natural marketplace forces and can harm consumer interests, rather than ensuring that supply keeps pace with demand. In the related *Advanced Television Systems* proceeding²¹, consumer electronics manufacturers

¹⁹ Task Force Report, *supra*, note 10, at 8.

²⁰ Task Force Report, *supra*, note 10, at 115.

²¹ *Advanced Television Systems and their Impact on the Existing Broadcast Service*, MM Dkt. No. 87-268, Notice of Inquiry, 2 FCC Rcd 5125 (1987) (subsequent history omitted) ("*Advanced Television Systems*").

and broadcasters recognized this danger, and expressed their strong belief that the Commission should rely on marketplace forces, rather than regulation, to insure that consumers' demand for new DTV products and services are met. The Electronic Industries Association ("EIA") wrote:²²

[T]he Commission should continue to rely on the marketplace and should neither require the manufacture of, nor compel the purchase of, [Advanced Television ("ATV")] receivers that consumers do not want, do not need, or simply cannot afford. Nor should the Commission deny consumers the opportunity to purchase lower-priced NTSC equipment that meets their viewing needs. In the absence of any identifiable marketplace failure to satisfy consumer needs, there is no reason for the Commission to inject itself in the highly competitive consumer electronics industry. As in the past, the Commission should allow marketplace forces to determine the capabilities of ATV sets and the prices at which they will be sold.

Similarly, the National Association of Broadcasters ("NAB") has argued that marketplace forces would be more effective than a simulcasting requirement for ensuring optimum use of the digital spectrum to meet consumer demand:

Rather than interfering with marketplace dynamics at the sensitive early stages, the Commission should . . . let broadcasters do what they do best -- provide programming that attracts viewers. Such a marketplace approach will lead to the most rapid development of a vibrant market and result in a faster ATV transition and consequent faster recovery of NTSC spectrum.^[23]

²² EIA Reply Comments on *Advanced Television Systems*, *supra*, note 21, Fourth Further Notice of Proposed Rulemaking and Third Notice of Inquiry ("4th NPRM"), (filed January 22, 1996) at 12-13.

²³ NAB Comments on *Advanced Television Systems*, *supra*, note 21, 4th NPRM (filed November 20, 1995) at 5.

The Commission should recognize that unencumbered marketplace forces are the most effective mechanism for meeting consumer demand. Cable operators are in the best position to assess their subscribers' demand for DTV programming and services, and they have strong economic incentives to meet that demand; however, it may be economically inefficient to require cable operators to provide DTV programming and services far in advance of any appreciable demand for such programming and services. In short, the Commission should not adopt must-carry rules that could interfere with marketplace forces. It should not push cable subscribers to purchase or lease costly set-top boxes before technological solutions have been found to minimize consumers' costs or before the full range of DTV's potential benefits can be made available.

Premature implementation of regulatory requirements can delay the availability of features that distinguish DTV from analog NTSC, discourage consumer acceptance of the new medium, and unnecessarily protract the transition to DTV. Depressed market acceptance of DTV will, in turn, slow the rate at which prices for consumer DTV equipment will fall, and further postpone the day that the average American consumer will be able to afford DTV equipment and take advantage of the benefits DTV can offer.

Furthermore, prolongation of the transition to full digital broadcasting will frustrate Congress' intent that, as expeditiously as possible, television broadcasters return to the government one of the two channels presently

allocated to them for NTSC and DTV broadcasting.²⁴ The Commission has established December 31, 2006, as the deadline for broadcasters to return one of their channels,²⁵ but a 1997 amendment to Section 309 of the Communications Act²⁶ allows broadcasters to retain their analog licenses beyond the return deadline if they can demonstrate certain enumerated factors indicating low penetration of DTV in their markets.²⁷ Any regulations that ultimately result in slower DTV penetration may tie up scarce, valuable spectrum that could be used for other purposes, including generating substantial revenues for the public treasury. Such a result would be unreasonable, contrary to the public interest, and inconsistent with the Commission's obligation under the Communications Act to serve the public interest.

III. **THE COMMISSION SHOULD GIVE THE AFFECTED INDUSTRIES A SUFFICIENT OPPORTUNITY TO RESOLVE THE TECHNICAL AND BUSINESS ISSUES INVOLVED IN CABLE CARRIAGE OF DIGITAL SIGNALS.**

As the Commission has recognized on many occasions in the past,²⁸ voluntary industry efforts are best suited to the resolution of complex technical

²⁴ See 47 U.S.C. §§ 336(c), 336(f)(2), (3); *Advanced Television Systems, supra*, note 21, Fifth Report and Order, 12 FCC Rcd 12809, 12849-51 (1997).

²⁵ *Advanced Television Systems, supra*, note 21, Fifth Report and Order, 12 FCC Rcd at 12850.

²⁶ Balanced Budget Act of 1997, Pub. L. No. 105-33, 11 Stat. 251 (1997).

²⁷ 47 U.S.C. § 309(j)(14); see NPRM at ¶ 12.

²⁸ See, e.g., *Implementation of Section 304 of the Telecommunications Act of 1996 – Commercial Availability of Navigation Devices*, CS Dkt. No. 97-80, FCC 98-116, Report and Order (rel. June 24, 1998), 63 Fed. Reg. 38095 (July

issues such as those that must be tackled in connection with must-carry of DTV signals. In fast-moving industries such as the telecommunications and information services industries, government-mandated standards can stifle innovation and perpetuate obsolete technologies beyond their normal market life.²⁹ Furthermore, government-mandated standards are often not the product of technological and economic considerations that would otherwise drive sound business decisions in a free market. The private sector (and market forces) are better suited than government for establishing standards that meet consumer needs.³⁰

In cases such as this, where the technology is only just beginning to evolve, long-term benefits may be realized by allowing standards to evolve at their natural pace. New applications of fresh technology often emerge while the technology is still fluid and able to change in ways that may not have been

15, 1998) at ¶¶ 70, 72, 74, *petitions for recon. pending; Advanced Television Systems, supra*, note 21, Fourth Report and Order, 11 FCC Rcd 17771, 17772, 17790 (1996).

²⁹ Bruce M. Owen & Steven S. Wildman, *Video Economics*, (Harvard University Press: 1992) ("Owen & Wildman") at 261; Stanley M. Besen & Leland L. Johnson, *Compatibility Standards, Competition and Innovation in the Broadcasting Industry*, (Santa Monica, CA: The Rand Corporation, 1986) at 131; Dr. Jeffrey Krauss, "Implications of FCC Regulation of Telecommunications Technical Standards," *IEEE Communications Magazine* (Sept. 1982) at 28, 31.

³⁰ See Letter from Larry Irving, Administrator, NTIA, to Hon. Reed E. Hundt, Chairman, FCC, filed in *Advanced Television Systems, supra*, note 21 (August 9, 1996) ("The Administration also believes that the best solution for the many difficult questions that have arisen in this proceeding would be for the interested parties to reach a consensus on the disputed issues. . . . An industry-developed consensus on these difficult issues would be preferable to a government-imposed resolution or no resolution of these issues at all.").

envisioned when it was initially conceived. Indeed, it has been noted in a related context that

[t]he United States may . . . realize long-term benefits from delays in selecting its HDTV standards. . . . [T]he government may beneficially slow down the standards selection process in the early stages of the development of a new technology when the range of its applications and alternative approaches to developing the technology are not well understood.³¹

DTV itself demonstrates how technology can evolve and improve if technical standards and requirements are not imposed prematurely. DTV has its origins in efforts to develop analog high-definition television or “HDTV.” Fortunately for all -- particularly consumers -- before an analog HDTV standard was implemented and deployed in the marketplace, technology evolved, resulting in today's far more versatile DTV standard. That evolution might have been aborted if broadcasters and consumers had made significant investments in analog HDTV equipment before DTV was developed.

The Commission has previously refrained from mandating detailed industry technical requirements because such requirements could pose a risk of technological stagnation. For example, the Commission opted for market-driven, rather than government-imposed, solutions to technical issues in the *Broadband PCS* proceeding, the *Advanced Cellular* proceeding, and the *DBS* proceeding, in

³¹ Owen & Wildman, *supra*, note 29, at 283.

each of which the rapid deployment of new technology was a key Commission objective.³² In the *Broadband PCS* proceeding, the Commission stated that

PCS is in a nascent stage in its development and . . . imposition of a rigid technical framework could stifle the introduction of important new technology.^[33]

DTV is similarly in its infancy, where the benefits of allowing experimentation and innovation may be particularly great.³⁴ In considering the adoption of must-carry rules at this time, the Commission should assess whether such rules could undermine achievement of its objectives in the related *Advanced Television Systems* proceeding, namely, "to increase the availability of new products and services to consumers . . . , to encourage technological innovation and competition . . . , [a]nd to minimize regulation."³⁵ The risk of such a clash of objectives should not be discounted.

³² *Broadband PCS Proceeding, Amendment to the Commission's Rules to Establish New Personal Communications Services*, Gen. Docket No. 90-314, Second Report and Order, 8 FCC Rcd 7700 (1993) ("*Broadband PCS*"); *Advanced Cellular Proceeding, Amendment of Parts 2 and 22 of the Commission's Rules to Permit Liberalization of Technology and Auxiliary Service Offerings in the Domestic Public Cellular Radio Telecommunications Service*, Gen. Docket No. 87-390, Report and Order, 3 FCC Rcd 7033 (1988) ("*Advanced Cellular*"); *Amendment of Subpart C of Part 100 of the Commission's Rules and Regulations with Respect to Technical Standards for Direct Broadcast Satellite Service*, 60 R.R. 2d 1539 (1986), 1986 FCC LEXIS 2818, ¶¶ 4, 12. In each of these proceedings, the Commission adopted only minimal critically important standards, leaving resolution of numerous technical issues to industry.

³³ *Broadband PCS*, *supra*, note 32, 8 FCC Rcd at 7755.

³⁴ *Advanced Television Systems*, *supra*, note 21, MM Dkt. No. 87-268, Fifth Further Notice of Proposed Rule Making, FCC 96-207, 11 FCC Rcd 6235, 6248 (1996).

³⁵ *Advanced Television Systems* Fifth NPRM, *supra*, note 34, 11 FCC Rcd at 6236.