WRITTEN STATEMENT OF

PAUL LIAO
CHIEF TECHNOLOGY OFFICER, MATSUSHITA ELECTRIC CORP. OF AMERICA
PRESIDENT, PANASONIC TECHNOLOGIES, INC.

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
ROUNDTABLE ON DTV RECEIVER COMPATIBILITY WITH CABLE TV SERVICE
MAY 20, 1999

SUMMARY

The issues raised in this DTV compatibility roundtable are critical both to the ability of consumers to buy digital navigation devices (including cable-ready DTV sets) in a competitive retail market and to the success of the DTV transition. Panasonic is keenly interested in competing in the market for digital products. We want to be able to supply consumers with a full range of digital products with various functionalities at various prices. We want to be able to compete with other manufacturers on the basis of features and prices, not on whether or not our product will function with a particular cable system.

It is only the power of free market competition that can truly unleash the benefits of DTV for the American public. For competition to thrive, the consumer electronics and cable industries must agree to standards and implementation plans that result in "cable-ready" digital receivers and "digital television-ready" cable systems, as well as fully functional interfaces. In December 1998, we urged the Commission to take a stronger oversight role in the standards-setting process. While there has been good progress, for which we can all be proud, toward the establishment of what are known as the "OpenCable" specifications, we fear that this progress has not yet been sufficient to meet the aggressive timetable that we all want to satisfy. Therefore, we again urge the Commission to strengthen its oversight efforts.

There are a number of steps that we look toward as most important for ensuring a competitive market for navigation and other digital devices that can provide widespread consumer choice, and consumer confidence in new digital services:

- The CE and cable industries must agree to a cable-ready baseline standard in the next three months. If they do not agree, the FCC should start a proceeding to define the specifications for a digital cable-ready set. A digital cable-ready set is one that can be directly connected to a cable system without an intervening device.

- The CE and cable industries must agree to a standard that defines how cable systems will carry the electronic program guide datastream and how digital devices can access that datastream so as to display both cable and broadcast DTV services. In addition, the power of digital technology will so greatly expand the level of programming choice that no digital device can be competitive without open access to electronic program guide information. This standard should be part of the cable-ready baseline specification. In addition, navigation device manufacturers should have access to specific technical information, upon request, that is necessary to access and use the EPG datastream.

- The CE and cable industries should resolve promptly the outstanding technical issues that stand in the way of widespread implementation of the 1394 interface. We support the use of a 1394 interface to provide an efficient mechanism to transport signals from a digital cable set-top box to a digital television receiver. However, cable systems should not expect 1394 to be included in every digital device. Universal inclusion of 1394 would burden many consumers with unnecessary expense and could impair certain functionalities of digital TV sets and other devices.

- The CE and cable industries should select a copy protection technology that balances the legitimate interests of copyright owners with the interests of consumers in making legal copies. Panasonic believes the 5C specification strikes this balance.

- In addition to setting deadlines for the completion of the standards-setting process and the commencement of a proceeding if those deadlines are not met, the FCC should strengthen its oversight of, and participation in, the process. It should hold more public meetings like this one in which many (not just one or two) interested parties convene on the record to discuss the progress towards interoperability and any technical issues that require resolution.

- Because the technology of digital television is only in its infancy, it is difficult to anticipate all the interoperability issues that might arise. We can be sure more issues *will* arise. For example, there may be new requirements for open and interoperable operations, administration, and maintenance protocols that any competitive device will have to follow to connect to a cable network or to provide for software upgrades of cable services. Going forward, the FCC should require the CE and cable industries to establish the appropriate and ongoing open process to ensure that interoperability issues are properly and quickly addressed.

WRITTEN STATEMENT OF
PAUL LIAO
CHIEF TECHNOLOGY OFFICER, MATSUSHITA ELECTRIC CORP. OF AMERICA
PRESIDENT, PANASONIC TECHNOLOGIES, INC.

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
ROUNDTABLE ON DTV RECEIVER COMPATIBILITY WITH CABLE TV SERVICE
MAY 20, 1999

Good morning. My name is Paul Liao, and I am here on behalf of Matsushita Electric Corporation of America and Panasonic Technologies, Inc., makers of Panasonic brand consumer and professional electronic equipment ("Panasonic"). Thank you for inviting me to appear before you today to discuss the outstanding technical obstacles to the retail availability of cable-compatible digital television ("DTV") receivers, set-top boxes and other devices.

I would like to begin by commending the Commission and its staff for holding this Roundtable today. The technical issues we consider arise as the Commission faces the dual – and daunting – tasks of implementing the rollout of digital television and promoting the retail availability of set-top boxes and other navigation devices. In tackling these formidable tasks, the Commission is faced with entrenched industry structures that inherently resist pressures to become more competitive. The Commission has faced such challenges before, and has at its disposal a variety of tools to overcome this resistance. That process will be – indeed, has already proven to be – difficult and time-consuming, just as it was in the telephone industry where my background lies. But the end result will be worth the regulatory and industry investments. We must keep in mind that the consumer stands to benefit greatly from the Commission's efforts in this regard. At stake for the consumer are increased competition in the market for multichannel video programming services, greater choice among a diverse array of commercially available

products for accessing entertainment and other communications services, and lower prices. These are things that consumers – along with Congress, the Commission and Panasonic – want. If consumers are to get these things, the Commission must, as it is beginning to do by holding this Roundtable today, take a more pro-active, "industry-coaching" role in ensuring that technical and competitive challenges do not derail the process.

I. CONSUMERS SHOULD HAVE THE FREEDOM TO CHOOSE AMONG A RANGE OF PRODUCTS WITH A VARIETY OF FEATURES AND PRICE POINTS.

Panasonic has taken the industry lead in developing and delivering products to bring the digital and HDTV revolution into American homes, schools and businesses. Panasonic began selling its first HDTV digital-ready television set – the first such television product on the market – in August 1998.[1] A few months later Panasonic began selling its all-format DTV decoder (TU-DST50),[2] which decodes and outputs all 18 video formats of the ATSC Digital Television Standard and converts any of the DTV formats to NTSC for connection to existing NTSC sets. Paired with a range of Panasonic display options, such as the new digital-ready and HDTV-capable wide-screen projection TV (PT-56WXF90) or the digital-ready SuperFlat System TV (CT-32XF55), the DTV set-top decoder enables consumers to enjoy the best possible home theater experience.[3] Panasonic has developed compliant devices for providing DTV reception and display on computers, and the company is working on a variety of applications in the computer and interactive television fields. Panasonic is also working to design, manufacture

---

[1] *See* Panasonic Press Release, August 3, 1998, "Panasonic Ships First High-Definition Monitor/Projection TV."

[2] *See* Panasonic Press Release, October 22, 1998, "Panasonic Ships Industry's First Set-Top Digital TV Decoder."

[3] *See* Panasonic Press Release, [date], "Panasonic Leads in High Definition and Digital Television Products for the Home."

and sell digital cable set-top boxes to a variety of consumers. Thus, Panasonic's approach to DTV encompasses the full spectrum of DTV technologies for consumer televisions, cable set-top boxes and computers.

Panasonic believes that giving consumers the freedom to choose the features and functionality they want in their digital audio and video equipment is critical to market adoption of new products, the rapid nationwide transition to DTV, and the growth and viability of competitive new services made possible by DTV. Consumers must be able to choose among a variety of products with confidence that the equipment they purchase will work – with full functionality – with whatever programming source they choose.

In order to foster competition in both services and CPE, the Commission should coach the industry towards providing, as soon as possible, a range of "cable-ready" digital television receivers that can be used with "digital television-ready" cable systems. Cable-ready sets will enable consumers to connect *compatible* cable service directly to digital television receivers, eliminating the need for duplicative circuitry lodged in both the set-top box and the set, and thus reducing the cost and complexity of digital equipment needed in the home. In addition, cable-ready sets enable equipment manufacturers like Panasonic to offer consumers a wide array of features without the risk that a cable set-top device will override the features and render them useless -- a goal shared by Section 624A of the Communications Act, 47 U.S.C. § 544a. Thus, cable-ready sets provide the best long-term solution to the compatibility and competition problems associated with set-top boxes and other digital devices.

Cable operators and equipment manufacturers are currently engaged in ongoing efforts to reach agreement on the "baseline" standards for cable-ready DTV receivers. The "baseline" cable-ready elements represent the foundation upon which a variety of digital services

can be anchored. Just as nationwide basic telephony standards have allowed new services such as PC modems to connect to the internet, these "baseline" specifications will allow a variety of new digital video services while ensuring basic interoperability. They represent the floor of digital cable services available to consumers and not a ceiling limiting further innovation in response to market demands.

The Consumer Equipment Manufacturers' Association ("CEMA") has outlined eight elements that are essential to achieve digital cable-ready sets that will perform the same functions as cable-ready sets in the analog environment.[4] CEMA and the National Cable Television Association ("NCTA") agree that these elements are essential to cable-ready sets, but technical details concerning implementation of some of these elements remain unresolved. For example, emergency messaging standards are not yet complete and questions remain concerning the transmission of navigational information through in-band or out-of-band protocols. Although progress is being made, the pace is not as rapid as we would like.

Efforts are also under way to develop standards necessary for the production of receivers that handle subscription, pay-per-view, and one-way video-on-demand cable services. Cable industry representatives have called for inclusion of these advanced features, plus an IEEE-1394 connection, in the "baseline" cable-ready set specifications. Although Panasonic understands the cable industry's desire to have cable-ready sets that can process as many cable services as possible, we are equally committed to providing consumers with a variety of sets incorporating different features at a range of prices. Panasonic believes that there must be a *baseline* cable-ready receiver that will satisfy basic consumer needs and provide a foundation

[4] *See* Reply Comments of Panasonic/Matsushita Electric Corp. of America, CS Docket No. 98-120, at 20 n.35 (Dec. 22, 1998).

upon which manufacturers can compete with advanced features. Consumers will not be well-served if all cable-ready sets include expensive features that may never be used by a significant number of consumers. Thus, specifications for digital cable-ready sets should focus on a minimum set of features and functions necessary for interoperability with compatible cable systems.

Because of the importance of cable-ready sets to the implementation of digital television, the Commission should monitor and encourage industry efforts to develop the baseline cable-ready specifications. The Commission should then adopt such baseline specifications as a nationwide definition for both cable-ready televisions and compliant cable systems. The Commission should establish a deadline (perhaps August of this year) by which the cable and consumer equipment industries will be expected to reach agreement on the specifications for cable-ready DTV receivers. If no agreement has been reached by the deadline, the Commission should begin a proceeding to define the specifications for baseline digital cable-ready receivers. The Commission has the authority to undertake such a proceeding under: (a) its authority to implement advanced television services, 47 U.S.C. §§ 336, 614(b)(4)(B); (b) its authority to assure the retail availability of equipment, including television receivers, used to access services offered over multichannel video programming systems, *id.* § 549; (c) its authority to review and modify its existing, analog cable compatibility regulations "to reflect improvements and changes in cable systems, television receivers, video cassette recorders, and similar technology." *Id.* § 544a(d); and (d) its authority to "[s]tudy new uses for radio, . . . and generally encourage the larger and more effective use of radio in the public interest." *Id.* § 303(g).

The Commission's authority to specify a cable-ready baseline standard survives the Telecommunications Act of 1996 (the "Telecom Act"). The Telecom Act stated that the Commission can assure "compatibility among televisions, video cassette recorders, and cable systems . . . with narrow technical standards that mandate a minimum degree of common design and operation, leaving all features, functions, protocols, and other product and service options for selection through open competition in the market." *Id.* § 544a(a)(4). The Telecom Act also preserved the Commission's authority to assure the functionality of specified features, including those related to "advanced television picture generation and display." Therefore, the Commission should acknowledge that industry efforts to establish a "baseline" digital cable-ready specification are consistent with the goals of the Telecom Act and affirm that the Commission will, at some future date, adopt such specifications as a definition for what constitutes interoperability between digital cable-ready televisions and "digital-television ready" cable systems.

II. EQUIPMENT MANUFACTURERS MUST HAVE ACCESS TO THE INFORMATION NEEDED TO BUILD PRODUCTS WITH THE FUNCTIONALITY CONSUMERS DEMAND.

The kind of consumer choice that Panasonic envisions can flourish only if consumer equipment manufacturers have access to the technical information they need to develop and build cable-ready receivers, set-top boxes and other devices that will deliver the full range of cable programming and services to the consumer. For example, in order to build products that will display encrypted programming on the consumer's television set, manufacturers must have the necessary technical information to access the electronic program guide ("EPG") datastream in encrypted digital cable programs. The EPG datastream provides the program description, start time and end time that are displayed in an on-screen guide for the consumer's convenience. But the need for EPG information goes well beyond the display of

programming lists, to the very display of the programming itself. The EPG datastream includes the dynamic channel information that enables the television set or navigation device to locate the program on the system and display it on the set. This information is essential to program tuning in the "virtual channel" environment of a digital cable system. Thus, without the ability to access and decode this information, the set or device will display a blank screen when a consumer attempts to access encrypted digital programming.

The OpenCable standard currently under consideration does not include the information necessary to permit a navigation device to access the EPG datastream in digital cable programming. Information describing EPG datastreams is considered to be proprietary by cable head-end manufacturers. However, unless information concerning these datastreams is made available, no competing vendor can build a competitive navigation device that will satisfy the basic consumer expectation of displaying all of the programming for which the consumer has paid.

CE and cable industry representatives have been discussing non-proprietary ways of providing EPG datastreams, such as the ATSC "Program System and Information Protocol" (PSIP) standard A/65. This standard has been included in the SCTE standard (DVS-211) as the sixth of six "profiles," or ways of providing EPG data. However, since DVS-211 does not make profile six mandatory, CE manufacturers have no assurance that it will ever be implemented by head-end manufacturers so that cable systems can transmit EPG data in a non-proprietary format. Absent such assurances, CE makers and, ultimately, consumers, cannot confidently conclude that a "cable-ready" DTV receiver would actually work with a particular cable system. The Commission should set a deadline for the industries to implement non-proprietary EPG formats.

The navigation devices rules reflect the importance to interoperability of the open disclosure of necessary technical information. The rules provide that:

> Technical information concerning interface parameters that are needed to permit navigation devices to operate with multichannel video programming systems shall be provided by the system operator upon request in a timely manner.

47 C.F.R. § 76.1205. As manufacturers continue their efforts to develop competitive navigation equipment, disputes are sure to arise between system operators and equipment manufacturers concerning what technical information falls within the parameters of Section 76.1205. To prevent significant delays in the introduction of competitive devices, the Commission should be prepared to resolve such disputes in a timely manner. The Commission also must be willing to interpret the navigation devices broadly to the extent necessary to fulfill the underlying Congressional mandate. The Commission should encourage the provision of EPG datastream information by applying the technical disclosure provisions of the navigation devices rules so as to require cable systems to disclose the details of proprietary EPG data formats or to simulcast non-proprietary EPG datastreams that provide the same data in an open format.

One way for the Commission to conceptualize the "technical information concerning interface parameters" that will be subject to disclosure under the rules would be through the framework of the seven layers that form the Open Systems Interconnection ("OSI") model for communication between two points in a telecommunication network. The OSI model, which has been adopted by the International Organization of Standards, provides a common reference point for the development of detailed interfaces between end users in a networked environment. The layers of the model (application, presentation, session, transport, network, data link, and physical) make up the necessary elements for effective communication between end users. Technical information for all of the OSI layers is essential for CE manufacturers to develop

equipment that will communicate effectively, *i.e.* interact seamlessly, with a cable or other multichannel video programming system.[5] If a multichannel video programming distributor ("MVPD") refuses to disclose technical information that proves essential to permit an unaffiliated vendor to produce and sell devices that enable *full* interoperability with and access to the multichannel video services offered over the MVPD's system, the Commission must be willing to step in and compel prompt disclosure of the necessary information. Situations may arise in which essential technical information is not the intellectual property of the MVPD, but is provided on a contractual non-disclosure basis by a third party manufacturer. In many of these instances, it may be reasonable to require the MVPD to provide the same protocol or function in an alternative way using open, non-proprietary standards.

III. STANDARDS FOR INTEROPERABILITY MUST BE DEVELOPED THROUGH OPEN, TIMELY AND DEFINITIVE PROCESSES.

Consumer equipment that is compatible with multichannel video programming systems – and thus viable in the marketplace – is not possible without open and transparent standards to which equipment manufacturers can build.[6] In order to ensure that standards are fair and reflect consumers' interest in affordable, multi-function products, the standards must be developed through officially-recognized standards-setting bodies with open participation by all affected industries. In the "cable compatibility" context, the appropriate body to develop open standards is the Cable Consumer Electronics Advisory Group ("C3AG"). C3AG was formed at

[5] For example, information concerning the Operations, Administration and Maintenance ("OAM") functions performed at a cable head-end is a critical part of the "session layer," and this should be subject to disclosure under Section 76.1205.

[6] The Commission has recognized that "[s]tandards will be needed to ensure that compatibility is maintained as new digital technologies and services are introduced." First Report and Order, *Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992, Compatibility Between Cable Systems and Consumer Electronics Equipment*, ET Docket No. 93-7, 9 FCC Rcd 1981, 1982 (1994).

the Commission's urging by CEMA and NCTA to advise the Commission on technical compatibility problems between cable systems and consumer electronics equipment. C3AG's open processes, broad representation, and quasi-official standing under the Communications Act's "cable compatibility" mandate make it well-suited to take the lead in developing proposed compatibility standards. These proposed standards could then be submitted to the Electronic Industries Association ("EIA"), or other relevant, accredited standards-setting body, for prompt approval.

The Commission has thus far relied to a considerable extent on the OpenCable specifications process of Cable Television Laboratories, Inc. ("CableLabs"), a cable industry research and development organization, to resolve compatibility issues.[7] Panasonic applauds the cable industry for taking on some of the difficult compatibility problems and Panasonic participates in the OpenCable process as a vendor. But this is not a process that is truly open to all interested parties, and OpenCable is not a standards-setting body. Because full and open participation of all interested parties is lacking at the outset, OpenCable's preferred solutions to interoperability issues must subsequently be vetted by accredited standards bodies, which prolongs the standards-setting process.

The Commission should not countenance any further delay in the standards-setting process. The deadline for network broadcast stations in the ten largest television markets to begin DTV broadcasts has already passed, and the deadline for DTV broadcasting to begin in the next 20 markets is fast approaching. So is the deadline for the availability of separate security modules for navigation devices. Equipment manufacturers are working hard to develop

---

[7] *See, e.g.*, Report and Order, *Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices*, CS Docket No. 97-80, 13 FCC Rcd 14775, ¶¶ 75-81 (1998).

consumer-friendly digital receivers and other devices. However, absent agreement on what standards are needed and firm deadlines for setting them, it is difficult to predict when fully-functional products can be designed and manufactured for retail sale. Consumers should no longer suffer from the delay engendered by a stalled and insufficient standards-setting processes.

The Commission must set realistic but ambitious deadlines by which essential standards – such as standards for baseline cable-ready DTV receivers, EPG datastream information and Point of Deployment ("POD") modules – must be established. And the Commission must take a more pro-active role in coaching the standards-setting process. The Commission should assign to an identified group of high-level Commission staff responsibility for actively monitoring the standards-setting process and stepping in to facilitate resolution if the process becomes log-jammed; the Commissioners themselves should be available to mediate where their involvement is warranted.

The Commission should also hold open meetings such as this Roundtable on a more regular basis. Reliance on off-the-record meetings with individual companies or segments of the affected industries has not proven effective in keeping the Commission fully informed about all of the compatibility problems. Open meetings at which issues can be debated, assertions tested, and language used in the same way should provide the Commission with a clearer picture of how the standards-setting process is proceeding.

Finally, it is critical that the standards-setting processes lead to the establishment of *definitive* standards. It is not enough for the affected industries to develop a number of alternatives for each required standard. A diversity of standards creates confusion for consumers and drives up equipment costs by forcing manufacturers to build equipment that incorporates multiple standards. Therefore, as the Commission monitors industry standard-setting processes,

it must step in where necessary to urge the affected industries to narrow the field of acceptable standards for a particular purpose and settle on a single standard that will enable manufacturers to build affordable, fully-functional and nationally-portable equipment.

IV. THE COMMISSION SHOULD ENCOURAGE THE DEVELOPMENT OF ADEQUATE AND REASONABLE COPY PROTECTION STANDARDS.

Panasonic is committed to working with other consumer electronics manufacturers, representatives of the content industries, and other interested parties to ensure that copyrighted content, whether transmitted in analog or digital format, is adequately protected against unauthorized copying. Toward that end, Panasonic has invested enormous amounts of time and money in the development of technologies that will protect the integrity of copyrighted works without unduly burdening either equipment manufacturers or consumers. Panasonic's efforts include the following:

- Panasonic and Toshiba jointly developed the Content Scramble System and associated licenses. This encryption technology and licensing system was the breakthrough that allowed the highly successful launch of DVD products into the market and continues to protect "open DVD" discs from unauthorized copying.
- Panasonic has joined forces with four other companies in developing the "5C Digital Transmission Copy Protection" technology applicable to IEEE 1394 and similar bi-directional digital interfaces.
- Panasonic has joined with three other companies to develop technologies for DVD audio and related digital downloading of music.
- A Panasonic engineer has served for over two years as one of the three co-chairs of the multi-industry effort to solicit and analyze technologies for watermarking audio-video content for copy protection purposes.
- An attorney retained by Panasonic is a leader of numerous efforts, largely successful, to forge legal means to implement and enforce the newly-developed technical methods of copy protection.

At present, there is no DTV receiver on the market that contains an interface equipped with copy protection technology.[8] However, Panasonic is continuing to work actively on a variety of copy protection technologies and legal regimes that are, or could be, applicable to digital transmissions in various contexts, including over interfaces in today's and tomorrow's DTV sets. Panasonic will continue to work on these approaches in cooperation with our colleagues in the consumer electronics, content programming and delivery, and computer-related industries.[9] Moreover, although Panasonic believes that the vast majority of copy protection technologies will be implemented through private, voluntary licensing regimes, to the extent that certain copy protection technologies will require legal support, Panasonic is prepared to work with interested parties to develop and recommend appropriate, narrowly-tailored laws.[10]

Panasonic is equally committed to offering in its new products all the functions consumers have come to expect, as well as new features and enhanced performance capabilities. Thus, Panasonic believes that new digital recording devices, regardless of their copy protection features, must permit consumers to "time-shift" television programs. Panasonic's overarching goal is to balance consumers' right to use the products they purchase and engage in reasonable, "fair use" copying activities in their homes against the legitimate anti-piracy concerns of content

---

[8] This is because: (i) copy protection technologies were not available when the first generation of sets was being designed for release in fall 1998; (ii) some of the copy protection technologies now available require installed decryption capabilities or smart-card-type capabilities that were not incorporated into the first generation of sets; and (iii) the sets now on the market were designed fundamentally to receive the first generation of over-the-air DTV broadcasts, not premium channels from satellite or cable, where copy protection issues are of greatest concern.

[9] One example is Panasonic's ongoing participation in the "5C" group. If the Commission has questions about the development or deployment of the 5C copy protection standard, it should feel free to invite all of the 5C members to address those questions, perhaps at another of what we hope will become a regular series of public roundtables on DTV compatibility issues.

providers. For digital interfaces, Panasonic believes the 5C specification strikes this balance. For analog interfaces, Panasonic believes that appropriate copy protection technology can be developed that adequately protects copyrighted content.

V. CONCLUSION

Panasonic is eager to compete in the market for digital products – a market that will be truly competitive only if the CE and cable industries adhere to common standards that enable interoperability between "digital television-ready" cable systems and "cable-ready" digital receivers, as well as fully functional interfaces. The Commission should participate more actively in, and exercise more oversight over, the standards-setting and implementation processes to ensure that a competitive, consumer-friendly market for digital products develops. Specifically, the Commission should monitor and encourage industry efforts to develop baseline cable-ready specifications by a date certain. The Commission should then adopt such baseline specifications as a nationwide definition for both cable-ready televisions and compliant cable systems. The Commission should also set a deadline for the industries to implement non-proprietary EPG standards. In addition, the navigation device rules should be applied in such a way that cable systems and other MVPDs make disclosures about EPG datastreams and other technical information that are necessary to allow navigation devices to function with the MVPDs' systems.

(continued . . .)

[10] Panasonic's representatives were instrumental in working with various parties in drafting and recommending to Congress the "Macrovision" response provisions of the Digital Millennium Copyright Act.

National Association of NAB® BROADCASTERS

COMMENTS

OF

LYNN CLAUDY
SENIOR VICE PRESIDENT
SCIENCE & TECHNOLOGY
NATIONAL ASSOCIATION OF BROADCASTERS

FEDERAL COMMUNICATIONS COMMISSION ROUNDTABLE ON DTV RECEIVER COMPATIBILITY WITH CABLE TELEVISION SERVICE

MAY 20, 1999

The FCC is conducting, on May 20, 1999, a technical roundtable on DTV receiver compatibility with cable television service, with the National Association of Broadcasters as a participant representing the broadcasting industry. The discussion will be focussed on the development or lack thereof, of technical standards to achieve inter-operability between cable service and the new DTV receivers, which are currently being marketed. Sixty-seven percent of American viewers use cable television service to view the free, over-the-air television service, which has begun its (and the country's) transition to digital television.[1] As cable viewers represent the vast majority of the population, they must buy digital television receivers if the digital transition is to move along and ultimately succeed. Thus, inter-operability of DTV sets with cable and cable's new digital transmission is critical to the transition.

The National Association of Broadcasters files this written statement in advance of the technical roundtable as a summary of the positions we will espouse and more fully develop through the course of the roundtable discussion.

I. Why Is DTV/Cable Interoperability Important and What Should We Do About It?

The original chicken and egg problem of launching DTV service was often stated as: Why should broadcasters build DTV facilities when there are no receivers available and why should manufacturers build DTV receivers when there are no stations built? This conundrum was expected to be solved by the FCC's DTV station rollout schedule—station facilities were mandated to be built on a fixed schedule and receiver manufacturing was assumed to follow as a normal reaction by marketplace forces. Essentially, this is the scenario that is unfolding now. At the present time, at least 66 stations are on the air[2] and over 20 models of HDTV receivers[3] are available for sale at retail.

[1] As of November 1, 1999, there will be approximately 150 DTV stations on air, serving upwards of 60% of the population.
[2] NAB press release "Digital Television Update," May 3, 1999.
[3] CEMA DTV Guide, March 1999.

Now the television industry has a new chicken and egg problem, involving the willingness of ***consumers to buy*** the now available DTV sets and of ***programmers to supply content*** for the newly built DTV stations. With specific reference to HDTV, a recent article in the Chicago Tribune stated the problem succinctly:

> *But the promise of HDTV probably will remain a chicken-and-egg riddle. Consumers aren't likely to pay high prices for sets unless there's enough programming to justify the cost, and broadcasters won't go full-speed into high-def until there are enough sets out there to convince them it's a profitable format.*[4]

The availability and distribution of compelling HDTV content has been rising and may indeed be plentiful by the fall of 1999, when all ABC, CBS, Fox and NBC network affiliates in the top 30 markets are required to be on the air with their digital service. NBC began nightly broadcasts of the Tonight Show with Jay Leno in HDTV in late April,[5] ABC has been showing one or two movies per week in HDTV since November 1998,[6] the Fox network plans to transmit "Independence Day" as its first HDTV movie on May 23[7] and PBS has produced and distributed a number of major HDTV programs as well as demonstrating practical scenarios for multi-channel SDTV programs and data enhanced broadcasts.[8] Perhaps most important of all was CBS's announcement on May 8 that most of its primetime fall 1999 program schedule will be distributed to CBS affiliates in full HDTV format.[9] As well, local television stations that have activated their digital channel, in large and small markets, are investigating and experimenting with creative ways to acquire rich and attractive program content to fill up their digital pipeline.

---

[4] *Outlook Sharpens for HDTV*, CHI. TRIB., May 10, 1999, Business at 1.
[5] *Id.*
[6] *50% More Stations Than Expected Meet FCC's First Mandated DTV Deadline of May 1, 1999*, BUSINESS WIRE, April 30, 1999.
[7] Telephone interview by Joan Sutton, NAB with Peggy Binzel, Fox Television Network, Washington, DC (May 14, 1999).
[8] *PBS is changing the shape of television* (visited May 13, 1999) <http://www.pbs.org/digitaltv/program.html>.
[9] *Mitsubishi Electric Sets Pact With CBS Aimed at Lifting Sales of Digital TVs*, WALL ST. J., May 10, 1999, at B12.

In short, the broadcasting industry is doing its part to solve the new chicken and egg dilemma. **But consumers must have confidence that the DTV sets they are being asked to buy will work with cable, in order to move the transition along in a positive direction.** In the DTV cable must carry proceeding, NAB reiterated the point that the key to the DTV transition is selling DTV receivers and the *sine qua non* to selling DTV receivers is cable compatibility:

> *Of particular concern are possible technical impediments preventing or making difficult the reception of DTV by the two-thirds of U.S. television households that receive television solely through their cable systems. For the DTV transition to take hold and for the consumer to reap the substantial benefits of digital television, consumers must have the confidence that the DTV sets they are being urged to buy will work with cable, and with other devices, such as VCRs.* ***Absent such confidence, they will sit on the sidelines, waiting "for the kinks to be worked out."*** *The Christmas 1998 selling season likely will not be a great one for DTV purchases because the DTV sets on the store shelves will not be able to connect to or communicate with digital cable boxes. This situation cannot be allowed to go on for much longer, if the DTV transition is to be the success story that has been so long in the making.* [10]

To sum up in the simplest terms, the fact that DTV sets are not considered interoperable with cable is deterring DTV sales. It is not hard to find evidence that this is the popular view; indeed, it is freely admitted by the retail consumer electronics industry itself. Consider the following entry from the Frequently Asked Questions page at the website of Best Buy Inc., a major consumer electronics retail chain:

> ***So I can't get HDTV through my cable box?***
> *Not right now. While cable fully understands the need to provide high-quality digital sounds and pictures to its customers, they have not decided how much HDTV programming they'll be able to transmit. You can expect to see the first HDTV-capable cable boxes within the next year or so, however.* [11]

Another major consumer electronics retail chain, Circuit City, lists on its website that the lack of cable compatibility is one of the reasons that they believe the HDTV experience will take a long time to develop in terms of affordability and programming choices:

---

[10] Comments of National Association of Broadcasters, CS Docket 98-120, Oct. 13, 1998 at 46 (emphasis added).

[11] *Frequently Asked Questions About DTV* (visited May 13, 1999) <http://www.bestbuy.com/productinfo/hotproducts/hdtv/faqs.asp>.

> *65% of the country receives their TV signal via cable or satellite.* ***PRESENTLY, no HDTV sets are guaranteed to be cable compatible when the cable systems eventually offer HD programs.*** [12]

Even Consumers Union, in a generally positive Consumer Reports article about initial tests of several of the first DTV receivers, can't resist pointing out that current DTV receiver models don't work with cable:

> *If you're considering an HDTV set now, bear in mind that next year's sets may be a little cheaper and better. For example, they are likely to be designed to work well with digital-cable set-top boxes that carry HDTV, which are yet to hit the market.* [13]

Thus, the answer to the question "Why is cable interoperability important?" is simply that consumers *en masse* are not likely to buy DTV receivers that are not compatible with cable. Since the broadcast service's DTV transition cannot proceed unless DTV set penetration increases, the process and the DTV transition, absent cable-compatible products, will be at best sluggish, at worst stalled.

NAB urges that this issue be resolved immediately and in time for the 1999 Christmas buying season. We suggest that all DTV receivers introduced in November 1999 and beyond should incorporate an IEEE 1394 interface for compressed digital signals *and* an agreed upon standard analog component baseband input for high resolution signals. This minimal capability would materially reduce both the real and perceived stigma that DTV receivers "will not work with cable" and enhance the present and future value of DTV receivers to consumers, both necessary steps in providing some much needed momentum to the current sluggish takeup rate of DTV receivers which imperils the fledgling DTV transition.[14]

---

[12] *HDTV (High Definition Television)* (visited May 13, 1999) <http://www.circuitcity.com/tv2/products-tv-hdtv.htm> (emphasis in original).

[13] Television Test/Special Report: HDTV Arrives, CONSUMER REPORTS, Mar. 1999, at 13.

[14] CEMA's published numbers for DTV set sales can be mistakenly interpreted to be the number of DTV sets in the home. *See* CEMA press release "DTV Sales Remain Strong," Apr. 19, 1999 (Stating that 12,518 DTV sets were sold to dealers in the first quarter of 1999. CEMA previously reported that 13,176 DTV sets were sold to dealers in 1998). The CEMA sales figures are characterized as referring to sales of "HDTV" sets, defined by CEMA as those capable of scanning at 1080i and creating a 16:9 image (even on

II. It Is Critical That DTV Receivers Offered For Sale In 1999 Incorporate The IEEE 1394 Standard For Cable Compatibility.

At the end of October, 1998, CEMA and NCTA announced agreement on a cable interface[15] for DTV receivers and predicted that it might be deployed in 1999:

> *Having now completed the baseline specification for this digital interface, we believe that* ***some*** *consumer electronics manufacturers* ***may*** *produce 1394-enabled digital television receivers with content protection technology for retail distribution by November 1999.* [16]

Unfortunately, even the lukewarm optimism in this announcement misread the cold reality of manufacturers' product introduction plans with respect to cable interfaces. As was evident in the manufacturers' comments filed in the FCC's digital must carry proceeding, an industry consensus on the path to reliable cable interoperability did not emerge. NAB's reply comments in this proceeding took note of this failure:

> *[C]omments filed in this proceeding raise serious concerns that the consumer electronics industry does not agree on the critical importance of implementing a single guaranteed interoperable connection for all digital devices, particularly for the interface to digital cable systems.* [17]

NAB/MSTV's letter to Chairman Kennard of November 10, 1998 reinforced the importance of implementing cable compatibility:

> *The baseline digital interface standard to enable digital set-top boxes to communicate with and send DTV signals to DTV sets is not enough to guarantee that set makers and set-top box manufacturers will build this digital connection into their equipment. Some manufacturers don't want to incur the modest*

---

a 4:3 display). They do not necessarily include any DTV tuner/decoder. Mark Schubin, *Mark's Monday Memo, 03 May 1999*, (visited May 18, 1999) http://digitaltelevision.com/mondaymemo/mlist>. Thus, CEMA has not provided specific numbers for sales of DTV sets to consumers that can directly receive over-the-air digital DTV signals.

[15] There are some technical differences between the CEMA version of the IEEE 1394 standard and the cable industry's version, developed by SCTE. Specific conflicts between the SCTE and CEMA versions of the IEEE 1394 Standard that are significant in NAB's view and urgently need to be resolved are shown in the attached Appendix.

[16] Letter from Gary Shapiro, President, CEMA and Decker Anstrom, President, NCTA to William Kennard, Chairman, FCC (Oct. 30, 1998) (emphasis added).

[17] Reply Comments of NAB, CS Docket 98-120, Dec. 22, 1998 at 88-89.

expense of implementation, some have other "favorite" interfaces, and some are concerned that a standard for digital copyright protection is needed before the majority of manufacturers will incorporate any interface into equipment and before the majority of program producers will release their copyrighted programs for digital distribution. [18]

In hindsight, this reasoning as to why IEEE 1394 is not being widely implemented on current DTV receivers has turned out to be true, but the concerns of manufacturers remain largely baseless. **In fact, the cost to implement IEEE 1394 is relatively low and will continue to decline rapidly, IEEE 1394 has emerged as the digital interface of choice for consumer devices and a copy protection scheme for use on IEEE 1394 digital links is fully developed and ready for implementation.**

On the issue of expense of implementation, the cost of IEEE 1394 interfaces is declining rapidly because of its wide base of support, extensive deployment in the consumer and computer marketplace and consequent economies of scale in driving down silicon and connection costs. For example, the 1394 Trade Association, founded in 1995, consists of 170 companies and organizations from around the world dedicated to the proliferation of the 1394 serial bus. The 1394 Trade Association predicts that, based on orders for silicon, almost 8 million 1394-enabled PCs will be shipped in 1999, for use with mass storage, printers, cameras and other peripherals. Texas Instruments predicts that they alone will ship a total of 24 million 1394 chipsets in the year 2000, with most of the growth coming from demand among the PC manufacturers.[19] The 1394 Trade Association's 1394 Showcase website,[20] which highlights products and technologies that are on the market today, shows 46 consumer equipment models now supporting IEEE 1394, from video cameras to VCRs to audio equipment. Clearly, the cost of implementing 1394 will decline rapidly with this scale of implementation taking place.[21]

---

[18] Letter from Eddie Fritts, President and CEO, NAB and Margita White, President, MSTV to William Kennard, Chairman, FCC (Nov. 10, 1998).

[19] *1394 Trade Association Predicts Strong Growth for Multimedia Bus in 1999*, (visited May 14, 1999) <http://www.1394ta.com/About/Newsletter/index.htm#1394strong>.

[20] *See* <http:// www.1394Showcase.com> (visited May 13, 1999).

[21] Implementation of IEEE 1394 also requires a licensing fee, under the terms of a joint licensing group that has been formed to cover licensing the essential patents in the interface standard. The group has agreed to a licensing fee of $0.25 per system. *See Joint Licensing Program Further Increases Attractiveness of the IEEE 1394 Digital Interface* (visited May 18, 1999) <http://www.1394ta.com/Press/1999.05.12.htm>.

1394 has proved to be the interface of choice for a wide array of consumer product platforms, including the cable industry, which itself plans to deploy it. As far back as March 1998, the Open Cable process selected IEEE 1394 as the digital interface for HDTV signals to DTV receivers.[22] The two largest cable set top manufacturers, Scientific Atlanta and General Instrument Corporation, are counting on IEEE 1394 as being the method of digital interface with DTV receivers on products they plan to release as soon as this year:

> *By the end of 1999, high definition television sets and a new Explorer set-top model are expected to incorporate the IEEE 1394 "Firewire" standard that makes newer HDTVs directly compatible with cable.* [23]

General Instrument also supports 1394 as an option on its DCT 5000+ set top box for interfacing to a high definition television or other consumer devices. The DCT 5000+ is planned for field deployment beginning in the 3rd quarter of 1999.[24]

1394 is also the interface technology that many believe can be the baseline for interoperability with a plethora of digital devices in the home, such as digital VCRs, video disc players and DBS satellite terminals, just to name a few. As an example of a connection platform that goes beyond single device interconnectivity, IEEE 1394 is also the technical basis for the home networking standard called HAVi, supported by a growing group of cross-industry interests. The companies that currently participate in HAVi are Grundig, Hitachi, Matsushita, Philips, Sharp, Sony, Thomson and Toshiba. According to the HAVi website,[25] the first products can be expected in late 1999 or early 2000. Typical HAVi devices are digital audio and video products such as cable modems, set top boxes, digital TVs, internet TVs or intelligent storage devices for A/V content. In

---

[22] CableLabs® press release "CableLabs® Specifies High-Speed Link For OpenCable™ Digital Set-Top Boxes," March 17, 1998.

[23] *HBO's HDTV Signal Now Available in Time Warner's Tampa Cable System Using Scientific-Atlanta Equipment* (visited May 14, 1999) <http://www.sciatl.com/NewsRoom/NewsReleases/releases/990504-2.htm>.

[24] *See* <http://www.gi.com> (visited May 13, 1999) for DCT 5000+ specification sheet and DCT 5000+ press release, May 4, 1999.

[25] *See generally* <http://www.havi.com> (visited May 13, 1999).

his keynote address at the 1999 NAB convention, Sony President Howard Stringer explained the advantages of the 1394-based HAVi approach:

> *At Sony, we view the DTV set as the command center for a digital home network. Our homes will be as connected tomorrow as our offices are today. [...] This open architecture, called HAVi, for "Home Audio-Video Interoperability" architecture, will support a variety of chip sets, operating systems and software applications. In effect all the audio/video devices in the home will be interoperable. [...] HAVi will support the high speed digital network known as IEEE 1394... 1394 will link consumer electronics, computers and digital content.*[26]

With respect to copy protection, progress is unclear and there is no end in sight. While both cable interests and consumer electronics manufacturers claim to be working on the problem, there is no schedule in place to achieve consensus on a standard. Consequently there seems little likelihood that a standard will be completed in the near term, although the basic elements are in place for such a standard.

The cable industry has begun the standardization process for a copy protection method to be deployed on a IEEE 1394 link (SCTE Draft Standard DVS 194). However, when the copy protection scheme in DVS 194 (the so-called "5C" system) was balloted by the SCTE in November 1998, a significant number of "no" votes were cast. Under SCTE rules, "no" votes must be addressed and attempted to be resolved before the standard can be finalized. There has been no attempt by the SCTE to begin to respond to or resolve these "no" votes. Therefore, the SCTE IEEE 1394 Standard with copy protection retains its status as only a draft standard, and one with significant opposition at that.

The consumer electronics industry has reviewed a number of proposals for copy protection but has taken no action that would suggest consensus on a single solution will emerge in the near term. CEMA issued a Call For Information (CFI) in November 1998 and prepared a report on five copy protection systems submitted in response to the CFI in

[26]Howard Stringer, Digital or Die: Broadcasting in the 21st Century, Address at the NAB Convention (Apr. 19, 1999).

February 1999.[27] At the CEMA technical committee meetings the week of May 10, 1999 it was agreed that the five system contributors would have until June 30, 1999 to amend or update their proposals. CEMA will then compare the proposals against the list of attributes developed by CEMA and those developed by MPAA and present the comparison to the CEMA technical committee in August. There is no plan to develop *selection criteria* for a single system nor a target schedule to complete this activity. And even if CEMA completes a selection process, there is no guarantee that their selection will match that of the cable industry leading to the very real possibility that the ultimate result, after months or years of work, will be an irreconcilable standoff.

NAB believes that the introduction of cable-compatible DTV receivers in 1999 is absolutely necessary to develop consumer confidence that current DTV receivers have some future value with respect to receiving digital content over cable, *i.e.*, will work with digital cable and will not be obsoleted next year. The draft solution for copy protection being considered by the cable industry in the draft SCTE DVS 194 Standard ("5C") is clearly the most fully developed system and is the closest to implementation as well as standardization by an industry standards committee.[28] It also is reported to meet the appropriate qualification criteria established by the MPAA,[29] which represents the major body of affected copyright holders. Given these facts, further investigation into copy protection methods, which would certainly further delay the DTV rollout in this critical period, is of questionable value. In any case, development of a schedule for deployment of copy protection is a fundamental first step if the goal is ever to be achieved. To date, that simple step has not been taken.

Alternatively, if copy protection cannot be agreed upon in the very near term, NAB believes IEEE 1394 should be implemented on DTV sets as soon as possible anyway.

---

[27] *See* Interim Report of the CEMA R4.8 WG2, "Review of Information Submitted in Response to the CFI," Feb. 11, 1999.

[28] The "5C" copy protection scheme is administrated by the Digital Television Licensing Authority. Fees for use of 5C include an Annual Administration fee (between $10,000 and $18,000) and a Per Certificate Fee (between $.05 and $.07).

[29] MPAA List of Attributes of a Security Environment for Distribution of Protected High Value Content, attached to Memorandum from Jon A. Baumgarten to Shazia Azhar, Manager, CEMA Technology and Standards Department, May 5, 1999.

The intrinsic value to the DTV transition of introducing cable (and other device) interoperability in DTV sets in 1999 without copy protection far exceeds any practical risks associated with deploying some early 1394-enabled sets without copy protection implemented. As a target deadline, NAB suggests that DTV receivers intended for introduction in November 1999 and beyond incorporate IEEE 1394 capability.

III. All DTV Receivers Should Incorporate A High Resolution Component Baseband Video Input As Standardized By CEMA, as well as a 1394 interface.

While the IEEE 1394 Standard can serve well as the standard interface among and for multiple digital video devices, it may be unsuitable for some applications. For instance, some set top box makers may want to deliver high resolution "web-like" pages and other enhancements that require a high data rate signal that accompanies the DTV signal, which could exceed the resolution limits for the On Screen Display (OSD) capability of the CEMA and SCTE IEEE 1394 standards or exceed the overall 200 Mb/s data rate constraint set by the CEMA IEEE 1394 standard. For this reason, incorporating an analog high resolution component video input on all DTV receivers (as well as an IEEE 1394 port) is a logical solution. Component inputs cost very little to implement and in any case are present on almost all DTV receivers released to date.[30] CEMA has agreed on a single technical standard for high definition baseband component connections (EIA 770.3) and NAB believes that **EIA 770.3 should be universally implemented on DTV receivers.**

However, as NAB noted in comments submitted in the digital must carry proceeding, on the subject of baseband video as an interface between cable set top boxes and DTV receivers:

> *[T]his solution implies that the set-top box would have the ability to fully decode all broadcast video formats, including HDTV, increasing the cost of the set top box significantly from a set top box that has SDTV-decoding capability only. . . . Further, from the consumer cost point of view, this is a needlessly expensive solution since the HDTV-decoding capability is redundantly duplicated in both the set-box and the DTV receiver in the consumer's home. One way or another, the consumer ends up paying twice for the same capability of decoding high*

[30] Bill Wall, *Can You Support Today's HDTV Sets?*, COMM. TECH., May 1999, at 109. ("Out of 20-plus HDTV models now on the market, a recent survey found that only one lacks a component analog input.")

definition picture data and digital audio, which are silicon-intensive, and hence costly, operations.[31]

Also from NAB's comments in the digital must carry proceeding:

> *The IEEE 1394 standard has another advantage compared to the component video input with respect to connecting multiple inputs to the receiver. The IEEE 1394 standard is a "bus" standard and allows daisy chaining of many devices. With component inputs, the receiver would need to have as many component input connectors as there are devices to be connected to the DTV receiver. Clearly, with multiple devices such as a cable set-top box, VCR, satellite set-top box, DVD player and others all possible within a consumer media room setup, the advantages of a guaranteed IEEE-1394 connection compared to component inputs are obvious.*[32]

The above discussion also shows that, even if a "cable ready" DTV receiver is fully defined, the IEEE 1394 interface will be useful in providing "plug-and-play" connectivity for other digital devices, much to the delight of consumers. NAB urges that IEEE 1394 interfaces be present on <u>all</u> DTV receivers for this reason.

IV. Conclusion.

Implementing sufficient cable compatibility in DTV products is a critical priority for products that will be available in 1999 and beyond. To facilitate this goal, **all DTV receivers should incorporate three external signal interfaces:**

1. **an RF input for receiving over-the-air digital signals according to the FCC DTV standard;**
2. **a baseband compressed digital (EIA Standard 775) interface; and**
3. **a component baseband video input (EIA Standard 770.3).**

With immediate agreement on these basic interfaces, the receiver industry is urged to include this minimal set of interoperable interfaces in all products intended for introduction in November 1999 and beyond.

---

[31] Comments of National Association of Broadcasters, CS Docket 98-120, Oct. 13, 1998, App. G at 8.
[32] *Id.*

Appendix

Functional Differences Between The Cable And DTV Receiver IEEE 1394 Standards Must Be Resolved Immediately.

The IEEE 1394 Standard describes a digital serial signaling method. It defines the physical layer (the wire and connectors specifications) and two lower protocol layers (the link layer and the transaction layer). It also defines rules for managing connections of devices to use this signaling method. The CEMA and SCTE 1394 documents describe protocols and rules for devices to use on "top" of the IEEE 1394 Standard. The CEMA Standard is DTV **1394 Interface Specification (EIA 775).** The SCTE draft 1394 Standards are **Home Digital Network Interface Specification Proposal without Copy Protection (DVS195) and Home Digital Network Interface Specification Proposal with Copy Protection (DVS194).** *

There is at least one major difference between the baseline SCTE (DVS195) and CEMA (EIA 775) standards for IEEE 1394 that must be resolved. EIA 775 permits the placement of the entire MPEG transport stream from one demodulated (RF) channel onto the 1394 interface, with the responsibility for navigation among multiple program streams shifting to the receiver when more than one program is present. SCTE DVS194/5 requires that only one program stream be selected from the MPEG transport stream on a (RF) channel and requires the set-top box to delete all references to any other program streams (or optionally delete the content of all other program streams.)

NAB believes that placement of the entire transport stream must be permitted in both the cable and consumer electronics IEEE 1394 standard. There are several reasons for this. One reason is that some stations may have several related but "unlinked" programs that are broadcast at the same time, all of which make up the station's free program service. For example, a news program could have four local stories during its local news segment

that would be labeled as different programs (in the MPEG technical sense). Limiting the 1394 interface to selection of just one of these programs reduces the availability of choices for consumers as to how they can use and interact with these concurrent programs. Second, each broadcast channel will use the full 19.3 Mbps data rate from time to time for HDTV programming. The timing of such use will not always be known, so the cable system needs to provision its system to carry this data rate, and therefore there is no benefit in terms of reduced load on the cable system to propose discarding data at the interface between the set top box and DTV receiver. Further, broadcasters may use some of their data capacity for delivery of non-program related data services. In a cable system, this may require agreement between broadcasters and cable operators. But if the IEEE 1394 interface is implemented according to the current version of the SCTE standard, such a data service could never be delivered to consumers while also delivering a television program. This is short sighted, unnecessary and leads to a potentially significant lost revenue opportunity.

There are other differences of a more minor nature among these standards that also need to be resolved. One document should be given precedence in the event of apparent conflict to reduce the chance of implementers making design decisions that might lead to a failure for the interface to function adequately. NAB suggests that the requirements in EIA 775 should take precedence over DVS 194/195 in the event of conflict.

---

* It should be noted that although these SCTE draft Standards did pass in the Digital Video Subcommittee's balloting process, they have not been through the reconciliation process to resolve the outstanding "no" votes, have not been accepted by the SCTE Engineering Board and therefore are not final.

Statement of Edward Milbourn
Manager, Advanced Television Systems Planning
Thomson Consumer Electronics, Inc.

FCC Roundtable on
DTV Compatibility With Cable

May 20, 1999

Introduction and Summary

Thomson Consumer Electronics ("Thomson") appreciates this opportunity to address issues related to digital television ("DTV") compatibility with cable and other video distribution media.

We at Thomson are working to accelerate this nation's transition to digital television. We are in the initial stages of offering consumers affordable digital products that will permit consumers to access and enjoy the total array of new and exciting services that are enabled by digital broadcasting.

Thomson commends the Commission for its commitment to ensuring that the transition to digital television proceeds as rapidly and as smoothly as possible. We at Thomson share this commitment, and note that not only is this important to the affected industries, but most importantly, also for consumers. We share the Commission's vision that promoting the viability of broadcast digital television services helps "ensure robust competition in the video market that will bring more choices at less cost to American consumers."[1/]

[1/] *See, e.g., Advanced Television Systems and Their impact upon the Existing Television Broadcast Service,* Fifth Report and Order, MM Docket No. 87-268, 12 FCC Rcd 12809 at para. 5 (1997).

I would like to focus on three specific issues related to attaining the Commission's expressed goal of using signal distribution competition as a means of fostering more choices at less cost for America's consumers.

First, consumer access to all DTV services. Consumers must be assured of access to the full array of services and features enabled by the new digital sets and digital broadcasting regardless of the video distribution mechanism. In particular, this includes access to broadcasters' electronic program guides ("EPGs"). Consumers purchasing digital television receivers have a right to expect that all the functions of their new sets will work when receiving broadcast DTV signals without regard to whether the signals are delivered directly over-the-air, through cable, or by satellite or wireless cable. Digital broadcast signals must be delivered in their entirety, without material degradation, no matter how the consumer receives the signal if consumers are to realize all the benefits of digital broadcasting.

Second, copy protection. The affected industries are working on a copy protection system applicable to all DTV interfaces. Thomson is actively engaged in this process. As the Commission is aware, Thomson has repeatedly stated that the 1394 firewire must not be viewed as the ideal or even a satisfactory long-term solution for cable-DTV compatibility, particularly relative to "cable-ready" DTV receivers. The 1394 approach perpetuates the need for consumers to purchase and rely on set-top boxes, and may not be the most cost-effective means to provide an effective interface. These concerns aside, however, Thomson recognizes the need for adequate copy protection

for data carried over the 1394 interface because it will be used to connect multiple devices on a digital home network, including DVD players and digital VCRs.

Thomson is especially concerned that one proposed 1394 copy protection solution, the so-called "5C" system, is severely limited in its ability to provide true copy protection. Moreover, due to the nature of its device revocation and renewability characteristics, its use would run counter to consumers' best interests. So concerned is Thomson about the shortcomings of this particular system that, with our partner Zenith, we have devoted substantial resources to designing an alternative copy protection scheme. Our design, XCA ("Extended Conditional Access"), meets the needs of both content owners and consumers.

Third and finally, stable standards. The success of any consumer electronics product depends on specifically defined, stable standards. Therefore, the establishment and adoption of specific industry standards for cable-ready DTVs represents the best hope for achieving cable compatibility in a manner that best serves the needs of consumers. While Thomson is generally optimistic that progress is being made on these standards, the Commission's help is needed so that these more cost-effective digital receivers will be available to consumers as quickly as possible.

As reflected in our public filings, Thomson urges a transitional approach to cable compatibility that ensures cable customers have a viable means of receiving all available DTV signals and services. This could be achieved by cable operators providing an ATSC-compliant (i.e., 8-VSB) output of broadcasters' DTV signals for DTV receivers until alternative compatibility solutions are available to consumers. Work

should proceed expeditiously both on copy protection for all DTV interfaces and, most importantly for consumers, on standards for cable-ready DTV receivers. As solutions and products embodying sound copy protection systems and consumer friendly interfaces come to market, reliance on 8-VSB pass-through as a means of ensuring receipt of digital broadcast signals over cable systems can diminish.

Such a transitional approach has two important benefits. First, it ensures that cable consumers have access to digital broadcast signals at every stage of the transition, which is critical to accelerating the pace of the transition; and second, it provides the involved industries time to adopt not the fastest solution, but the best solution for all stakeholders, especially consumers. We must remember that consumers hold the ultimate key to a successful DTV transition.

Broadcasters' Digital Signals and Services, Including Electronic Program Guides, Should Be Accessible to All Consumers Regardless of Delivery Media

In addition to high resolution pictures and CD-quality sound, DTV offers consumers an array of new programming and features. However, to be readily accessible to consumers, these new features and programming must be organized and presented in a transparent and consumer friendly way. Electronic program guides organize and display information concerning video programs, including over-the-air broadcasts, cable, satellite, and wireless cable. Thomson has been a pioneer in the development and enhancement of EPGs for NTSC receivers and envisions EPGs as playing an even more critical role as we convert to digital. EPGs, which functionally are

similar to portals on the Internet, will be critical to navigating through a universe consisting of hundreds of video channels and potentially many audio channels and digital data options.

In the digital world, the EPG will be the singular most important value-added feature provided by the television receiver. In its most basic form, the EPG is critical to facilitating the customer's tuning experience. The EPG data, as well as critical data relative to closed captions and parental guide information, are transmitted in the transport stream of the broadcaster's digital signal as specified by the Advanced Television Systems Committee's ("ATSC") Program Service Information Protocol ("PSIP") practice.[1/] This PSIP data protocol will not work correctly if the transport stream carried by a broadcaster is altered in retransmission by a cable, satellite, or wireless cable provider. Alterations of the transport stream will also affect any value-added program guide provided by the manufacturer. Any such alterations would cause unnecessary expense and confusion for consumers already owning receivers designed to work with data broadcast consistent with the ATSC PSIP standard.

Therefore, it is critical that consumer access to broadcast PSIP and other broadcast user data be assured for the protection of consumers, the furtherance of innovation, and the development of a robustly competitive market for all navigational information services. Ensuring that consumers have unimpeded access to all digital data that broadcasters transmit and television receivers decode will further the

---

[2/] System Information for Broadcast and Cable, ATSC DOC. A/65 (adopted December 23, 1997).

Commission's articulated goal of ensuring competition in the video market to bring consumers more choices at less cost. Specifically, those who retransmit broadcast signals should not be permitted to alter or delete any of the broadcaster-transmitted navigational and program-related data transmitted with the signal. This requirement will not prevent multichannel video programming distributors, such as cable operators, from offering their own EPGs and allowing consumers to choose between competing EPGs. Consumers, however, should be able to choose based upon competitive criteria, such as features, performance and cost, rather than being denied that choice by a multichannel video programming distributor ("MVPD") which has stripped, substituted or altered PSIP and/or user data from the digital bit stream transmitted by the broadcaster.

Ensuring retransmission of such data would be consistent with Congressional and Commission policy objectives. For example, in Section 302 of the Telecommunications Act of 1996, Congress prohibited open video system operators from unreasonably discriminating against unaffiliated entities in the presentation of information to subscribers to enable them to select programming using navigational devices or on-screen guides or menus.[1/] These protections were adopted expressly to ensure that consumers have access to competing EPGs. Given that DTV eventually will be available to <u>every</u> American consumer, the concerns addressed by Congress in Section 302 are equally applicable to others who retransmit broadcast signals, and

---

[3/] *See* 47 U.S.C. § 573(b)(1)(E).

applying the same resolution will further consumer welfare in the transition to digital television.

In addition, in Section 624A of the Communications Act, enacted as part of the comprehensive Cable Act of 1992, Congress required the Commission to resolve incompatibilities between cable systems and TVs and VCRs. The statute notes that premium equipment features and functions often are disabled or inhibited by cable, and that this incompatibility could inhibit manufacture of TVs and VCRs with innovative features and functions. The purpose of requiring the Commission to assure compatibility between these devices and cable systems was to enable subscribers to enjoy the full benefit of both programming on cable systems and functions built into consumer electronics equipment. This statutory provision provides additional clear authority for the Commission to act on behalf of consumers by ensuring compatibility[1/].

Further, the Commission has found expressly that EPGs fall within the scope of Section 629 of the Communications Act, which requires the Commission to assure the commercial availability of navigation devices not affiliated with any multichannel video programming distributor.[1/] The Commission stated its commitment to "encourage the development of the market for the provision of EPGs as part of the broader goal of promoting consumer choice."[1/] The Commission's examination of the technical issues

---

[4/] *See* 47 U.S.C. § 544a, *see also* Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992, *Report and Order*, 9 FCC Rcd. 1981 (1994).

[5/] *In the Matter of Implementation of Section 304 of the Telecommunications Act of 1996 - Commercial Availability of Navigation Devices*, CS Docket No. 98-120, *Report and Order*, 13 FCC Rcd. 14775 at ¶ 116 (1998).

[6/] *Id.*

and progress toward ensuring compatibility between DTV receivers and other sources of video programming should include consideration of consumer access to the navigation functions of retransmitted broadcast signals.

DTV-Cable Compatibility Issues Should Be Resolved In a Manner That Best Serves the Needs of Consumers.

Thomson is committed to resolving compatibility issues in a manner that best serves consumers. DTV-cable interoperability is a top priority for Thomson. Through recognized standards-setting bodies and in cooperation with the cable industry, Thomson continues to work vigorously to *guarantee* that, at every stage of the transition, America's 70 million cable subscribers are no less capable of exploiting all of the functionality Thomson's feature-rich DTV products will put in their hands -- and choosing freely from among all available DTV services and features -- than those receiving DTV services off-air. Such a guarantee is *essential* to ensuring that consumers control how they will participate in the DTV revolution.

Transitional Phase

Until important DTV-cable compatibility issues are resolved, this guarantee to consumers can be realized if cable operators provide an ATSC-compliant (*i.e.,* 8-VSB) output of broadcasters' DTV signals. Thomson is encouraged by the announcements of two cable multiple system operators ("MSOs") that they plan to provide such an output (albeit on a limited basis) and believes that all cable systems should be required to provide an 8-VSB alternative until other approaches are available to consumers. Such a transitional approach to cable compatibility would ensure, both in the short- and

long-term, that every consumer would have access to available DTV signals in their intended quality and entirety, including access to all the receiver-based features which consumer electronics manufacturers such as Thomson are building into their digital receivers.

Thomson has concerns about the desirability, particularly from the consumer's perspective, of limiting a "solution" to DTV-cable compatibility to something, such as the 1394 firewire, that *by its very nature* entails the additional purchase and use of a set-top box. Without question, cable-ready DTV receivers will provide consumers a superior means of compatibility -- technically, practically and financially. However, until work on cable standards is complete and manufacturers such as Thomson can offer cable-ready receivers to consumers, the 1394 interface is perhaps one possible "bridge" to ensuring that America's 70 million cable households can participate in and help drive the DTV revolution.

Copy Protection

As the Commission is aware, work on the 1394 interface is largely complete except for agreement on a copy protection system. Thomson fully appreciates the importance of copy protection, particularly from the perspective of content providers who understandably insist that their work be protected from illegal duplication. Any copy protection system also must be consistent with the best interests of law-abiding consumers, especially in the event that secrets are "hacked."

There are multiple approaches to designing encryption-based copy protection systems. The approach employed by the 5C system protects content by continuously

descrambling and rescrambling it at each link. This approach requires the use of algorithms and secrets stored in chips, which manufacturers would be required to place in every device in a digital home network (such as the cable and satellite decoders, VCRs, DVD players, PCS and DTV receivers). If the content is to be stored at its final destination, another copy protection system needs to be specified. For any given link, the source device and the sink device authenticate each other and establish a shared key for scrambling and descrambling. Under this approach, third-party "device revocation" may be employed to disable consumer devices reported to be in violation of the copy protection system.

Thomson believes that the 5C system fails to satisfy the twin imperatives of protecting content providers *and* consumers:

- First, 5C admittedly does not include the technical solution to prevent multiple generations of copies of digital data (it is able to protect data only in transmission, not in storage);
- Second, 5C relies on embedded security chips which, once successfully compromised, can be renewed only by recalling and retrofitting *every device*; and
- Third, and perhaps most problematic for consumers, 5C's "device revocation" would disable a consumer's DTV receiver, VCR, or other device upon receipt of data thought to be violative of the copy protection scheme.

The unprecedented deactivation of the personal property of consumers -- and the angry consumer backlash that likely would follow the disabling of home consumer devices - makes the 5C approach highly questionable.

Acting on these concerns, Thomson, together with Zenith, devoted substantial resources to developing an alternative global copy protection system: XCA. The XCA copy protection system:

- Protects content in both transmission *and* storage (thus defeating attempts to create multiple generations of copies);
- Employs the more practical and consumer-friendly "smart-card"-based approach to security, thus preventing the need for a consumer to haul his or her DTV device back to the retailer should the system be compromised (or "hacked");
- Eliminates the undesirable "device revocation" scheme that would disable home consumer devices without warning or explanation;
- Protects both one <u>and</u> two-way digital interfaces (including the RF interface and the 1394 firewire); and
- Will be licensed on a fair and non-discriminatory basis.

Under the XCA approach, content is scrambled only at the source (broadcast/cable/satellite head end), and is descrambled only by display devices. The descrambling function is enabled by an authorized replaceable security device, such as a smartcard attached to the device. This method, which has been used successfully in the RCA brand digital satellite receiver equipment for direct broadcast satellite ("DBS") services, ensures that content remains encrypted during its entire life cycle and that consumer-friendly protective measures can be taken should the encryption be compromised.

The XCA method is a reliable, simple, and consumer-friendly approach. XCA does not involve any management of secrets by the manufacturers, nor the drastic

changes in traditional manufacturing processes and practices that would be required by embedded secrets and a device revocation system.

These elements of the XCA copy protection system address the concerns of the cable, the consumer electronics, motion picture and computer industries, and protect the interests of consumers. The viability of the XCA system recently was demonstrated with the first hardware implementation of the XCA "smart-card" at the April, 1999 Convention of the National Association of Broadcasters ("NAB").

Cable Transmission Standards Are Necessary for Cable-Compatible Digital Television Receivers

The statutory cable compatibility provisions, Section 624A of the Communications Act,[7] led the Commission to ask the Consumer Electronics Manufacturers Association ("CEMA") and National Cable Television Association ("NCTA") to form an advisory group to consider compatibility issues. The Cable Consumer Electronics Advisory group ("C3AG") was formed for this purpose and has before it issues related to a digital cable ready standard.

CEMA and NCTA are reporting to you today on their efforts to reach agreement on digital cable standards. Such standards are necessary to permit manufacturers to design and distribute cable-ready digital television receivers. As I have noted above, the 1394 firewire and copy protection scheme is necessary for some purposes but for the consumer is an expensive and poor substitute for a fully-compatible digital television set.

---

[7] See discussion of Section 624A, *supra*, pp. 6-7.

For consumers, availability of cable-ready digital receivers would represent the most cost-effective and consumer-friendly approach to DTV-cable compatibility. Chairman Kennard framed the issue clearly last November in his speech before the Digital Television Summit Meeting in Washington, D.C. :

> I am aware, however, that agreement on the so-called IEEE 1394 standard is only part of the solution to DTV compatibility. . . . [P]rogress on defining interoperability standards for digital cable ready sets must be made, so that consumers have the choice not to have a separate set-top box.[8/]

Thomson believes that although negotiations for DTV cable compatibility standards have been unnecessarily drawn out in the past, progress now appears to be being made. The negotiations are showing promise and should be encouraged and continued on an accelerated basis. Thomson hopes that remaining issues will be resolved as soon as possible this year so that manufacturers can get to work designing, building, and distributing to consumers cable-ready as well as over-the-air and DBS-ready digital receivers.

[8/] Remarks of William E. Kennard, Chairman, Federal Communications Commission to the "Dawn of Digital Television" Summit Meeting; Washington, D.C., Nov. 16, 1998 (as prepared for delivery).

Conclusion

Thomson believes that on the whole, the beginning months of the transition to digital broadcasting have been positive. While there remains much work to be done, members of the affected industries are hard at work looking for consensus and solutions. The major changes occurring in the cable industry resulting from acquisitions create a unique opportunity to inject new resources, talent and perspective into the challenging technical and policy issues remaining to be resolved. Thomson is hopeful that issues such as broadcast signal delivery, program content protection, and cable transmission standards, will be resolved in a manner that best accommodates the needs and desires of American consumers and the industries that serve them.

Federal Communications Commission
Roundtable on DTV Receiver Compatibility with Cable Television Service

Comments of Sony Electronics Inc.

May 20, 1999

Sony Electronics Inc. ("Sony" or "Sony Electronics"), headquartered in Park Ridge, NJ is a leading U.S. employer and a manufacturer of professional, informational technology and consumer electronic equipment, including digital television receivers. As such, Sony appreciates the opportunity to support the Federal Communications Commission ("the Commission") effort to expeditiously bring digital television to American consumers. As noted in our October comments and December 1998 reply comments in CS Docket No 98-120, Sony believes widespread carriage of DTV signals and its availability on and compatibility with a variety of display devices will convince the American viewing public to invest in this new, exciting technology.

Sony agrees with the Commission view that market forces and consumer demand will resolve most of the remaining issues surrounding the transition to digital television. Roundtable meetings, like that proposed in the Commission's April 21 Public Notice, and collaboration among the broadcasting, cable, programming, and electronic equipment industries, are essential to ensuring compliance with the Commission's timetable. The technical innovation that results from such collaboration benefits the public interest by making available to American viewers improved television-delivered services and by providing the basis for a broad range of potential new technologies that will touch and impact upon every element of our society. As a leader in new technologies and a DTV advocate, Sony participates in a number of these collaborative ventures, including OpenCable and the Copy Protection Technical Working Group.

IEEE 1394 (i.LINK) Interface solution for Cable Set-top Devices and DTV Receivers

In its April 21 Public Notice, the FCC identifies interface technology as one of the technical issues on which it seeks a progress report. As a leader and licensee, Sony strongly endorses IEEE 1394 (i.LINK) and its use in home networks that include computers and consumer electronics devices. The effort surrounding deployment of IEEE 1394 demonstrates an unprecedented collaboration and is consistent with the Commission's timely deployment of DTV. There are many other efforts designed to create mutually compatible means of moving the process forward, always consistent with the interests of the public – whose acceptance of the offerings of DTV will become the ultimate arbiter of our success. Notable among these efforts are the work of the Consumer Electronics Manufacturers Association (CEMA), the Advanced Television Systems Committee (ATSC), the OpenCable initiative from CableLabs, the Society of Cable Television Engineers (SCTE), the inter-industry Copy Protection Technical Working Group (CPTWG) and the related Digital Transmission Content Protection (DTCP) effort. Sony is an active member in each of these initiatives.

The IEEE 1394 digital interface is a result of a multi-industry collaboration to establish a common interface for high-speed digital communications. Sony believes that this interface, with content protection, will satisfactorily resolve most interface/connection issues concerning the digital set-top-box. Moreover, by enabling DTV receivers, digital cable boxes, home computers and digital audio devices to be digitally linked, the IEEE 1394 interface, with content protection, will allow the development and introduction of new digital services beyond DTV itself.

Before the advent of digital audio and video equipment, the content (or data) and the control information had to be passed between devices separately. That is, the content in analog form, the control digitally, leading to the "spaghetti" behind many consumer's entertainment systems. With digital AV equipment, both the content and control can be communicated over a single digital interface. That digital interface has to be of a high speed given the bandwidth required by digital video, especially high definition.

IEEE 1394 is desirable as the interface among digital AV equipment for a number of reasons:

- High speed: With speeds up to 400Mbps (and higher planned), IEEE 1394 is capable of handling multiple digital video streams simultaneously.
- Bi-directional communications: With no distinction between input and output, IEEE 1394 allows sharing of digital video between devices like a digital TV and digital VCR that can have the data moving in either direction. The bi-directional capability also enables seamless control of devices and the handshaking necessary for secure communications.
- Plug and Play simplicity: Any consumer-oriented interface must be simple. IEEE 1394 is simple in that the products can be connected in any order and up to 63 devices can be connected to the network at the same time.

Sony believes that the IEEE 1394 digital interface will resolve digital set-top-box connection/interface issues to the satisfaction of all parties. We endorse the IEEE 1394 interface, with content protection, as the long-term solution to interoperability between set-top boxes and consumer DTV receivers. We do not believe that there is a broad consensus on any other interface solution currently available that includes content protection, but should one come to market, its use should not be precluded by government regulation. Instead, consumers should be allowed to choose the best product.

Sony has been an active participant in the CableLabs OpenCable process, and has been pleased to see the speed with which that organization has tackled the difficult problems surrounding the development of a standardized infrastructure for digital cable. We also supported an effort organized by CEMA focussed on developing a digital interface between digital cable set-top devices and digital television receivers. The results are standards such as EIA-775 and SCTE DVS-194 that define the use of as an interface between digital televisions and digital cable set-top boxes.

The significant differences between the two standards are two-fold. First, DVS-194 specifies a content protection scheme (Digital Transmission Content Protection (DTCP)) whereas EIA-775 does not. As will be discussed below, Sony believes that a content protection method is required for the successful implementation of a digital interface. EIA-775 acknowledges the need by saying content protection parameters "are expected to be established"[1]; DVS-194 requires it from the outset.

The second difference between the two specifications is that DVS-194 requires an analog input for handling complex user interfaces. EIA-775 supports the switching between analog and digital inputs with the analog interface optional.

Sony endorses the use of IEEE 1394 with DTCP as the interface between digital cable set-top devices and digital television receivers. Sony has already announced the components and chipsets that make commercialization possible, and intends to launch products incorporating these devices in the 2000 model year.

Content Protection and Digital Transmission Content Protection Solution

The April 21 Commission's Public Notice requests an update on DTV copy protection solutions. Sony believes that content protection for digitally transmitted content will be critical to the development of DTV and related technologies. The importance of content protection has a direct bearing on the availability of attractive, exciting high-definition programs. Program producers will be understandably reluctant to release recent hit films in digital high definition unless they have reasonable assurance that their content will not be subject to unauthorized copying or duplication.

The content creators are not the only stakeholders in the digital age. Any content protection system must reconcile the needs of the content providers with the performance, transparency and simplicity that consumers expect and deserve. Copy control solutions must not degrade the spectacular quality that digital television can deliver. In general, consumers should never be aware of the operation of content protection unless they attempt to

[1] From the forward to EIA-775, DTV 1394 Interface Specification "Users of this standard should also note that, at some future point, copy protection parameters, methods and/or standards are expected to be established with which copy-protected content traversing the DTV 1394 interface will be required to comply."

make an unauthorized copy. Finally, content protection must not add significant cost to either home equipment, digital packaged media or digital services.

In order to ensure the protection of the program content, the motion picture, information technology, and CE industries have spent years developing technical methods of protecting digital content in the Content Protection Technical Working Group (CPTWG). One of the principal technical projects of the CPTWG has been focused on protecting digital content across the bus between products in the home. The CPTWG established the Digital Transmission Discussion Group (DTDG) for this activity. The "5C" Digital Transmission Content Protection (DTCP) technology was proposed to the DTDG by Hitachi, Intel, Matsushita, Sony and Toshiba. Last year a licensing authority was set up by the "5C" companies to administer "5C" Digital Transmission Content Protection technology, in a manner that assures consistent implementation, and meets content owners' requirements. More information about the 5C technology, including technical information and licensing terms and conditions and other policies are available from the Digital Transmission Licensing Administrator, which maintains a web site at http://www.dtcp.com. To quote the DTLA:

> To allow for protected transmission of copy-protected material between digital devices like PC's, DVD Players, and Digital TV's, five companies – Hitachi, Intel, Matsushita (MEI), Sony and Toshiba have prepared the Digital Transmission Content Protection (DTCP) specification.
>
> The DTCP specification defines a cryptographic protocol for protecting audio/video entertainment content from illegal copying, intercepting and tampering as it traverses high performance digital buses, such as the IEEE 1394 standard. Only legitimate entertainment content delivered to a source device via another approved content protection system (such as the DVD Content Scrambling System) will be protected by this content protection system.
>
> The DTCP specification relies on strong cryptographic technologies to provide flexible and robust content protection across digital buses. These cryptographic techniques have evolved over the past 20 years to serve critical military, governmental and commercial applications.
>
> These techniques have been thoroughly evaluated by hackers and by legitimate cryptographic experts and have proven their ability to withstand attack. The cryptographic stability of the system is derived from the proven strength of the underlying technologies, rather than merely how well a certain algorithm can be kept secret.

The DTCP solution meets the needs of the content owners as well as those of the consumer. For the MPAA, the DTCP solution contains copy control information, two-way communication for authentication and is a renewable system. For consumers, the DCTP system does not degrade the signal quality, is low in cost (can be integrated into an IEEE 1394 interface chip), and is transparent.

Sony and other manufacturers have announced IEEE 1394 interface chips with the DTCP content protection built-in. These parts are available to manufacturers for product development. Sony is developing products utilizing these chips.

Sony believes the DTCP content protection system is a solution ready to be implemented in the marketplace. The DTLA has already issued many licenses to manufacturers. The DTCP system is the only digital content protection technology developed:

- With cross CE / IT participation
- In conjunction with the content owners
- With both licensing and technology information available
- With technology ready for implementation
- With export approval both for the technical specification and completed products

The initial application of the DTCP content protection system is to IEEE 1394. However, the system has been designed to be easily expanded to other buses. Efforts are well under way to map to the DTCP protocol to the Universal Serial Bus interface; a draft proposal has already been submitted to the USB Developers Forum.

DTCP technology can also be integrated into broader copy protection architectures; various proposals to do so have been presented to the CPTWG.

The DTCP solution does not attempt to dictate a universal standard for everything from cable headends to satellite services and packaged media formats. DTCP does not disenfranchise existing conditional encryption, such as the Content Scramble System (CSS) used in connection with DVD-Video discs, or other conditional access schemes used in connection with transmissions to the home

Digital Cable Ready Receivers and Other Equipment

The April 21st Public Notice requests an update on compatibility solutions for digital cable ready receivers and other equipment. The consumer electronics and cable industries (led by CEMA and NCTA respectively) have been working together to establish the compatibility standards to allow a consumer electronic receiver to directly connect to a cable service. Sony has been an active participant in these efforts and fully supports the initiative. Eight key standards covering all of the elements have been identified. All of the requirements have not been finalized, but Sony remains committed to the processes in place to arrive at solutions.

A critical element to digital cable ready receivers is the separable security module and the corresponding interface on the receiver necessary to support cable subscription services. Sony supports the Commission's ruling on "Navigation Devices" (CS Docket 97-80, FCC 98-116) as amended and the time frames established for a conclusion on this subject. Sony believes that the security module and interface are necessary to allow consumers to receive the maximum benefit from the features and capabilities being introduced in the advanced digital television sets.

The presence of a high-speed digital network in the home audio-video environment enables the creation of more cost efficient devices. The expensive HD-capable MPEG decoder in the television does not have to be replicated in other devices with a network interface present.

Cable-ready devices have the same content protection needs as articulated above for the digital cable set-top devices if they have a home A/V network connection. Sony believes the unique services and additional benefits of a home network will lead most products to have some capabilities for inter-connection. Any network will require a secure means for exchanging content among devices. As a system designed for bus operations, the DTCP solution is well suited for this application.

While CEMA, NCTA and industry members are aggressively working towards the compatibility solutions for digital cable ready receivers, there is still work to be done. The final specification of the cable separable security module (Point of Deployment module or POD) and "program and system information" standards must be finalized in order to establish a productization timeline.

Summary

The carriage of digital television programming by cable systems is essential to the swift establishment and acceptance of DTV in the United States. In order to speed the transition from analog to digital television, therefore, Sony applauds the Commission's efforts to encourage and promote a collaborative environment that ensures cable carriage of terrestrial digital programming.

Unprecedented inter-industry coordination is quickly producing solutions to both short- and long-term interoperability between cable and consumer television receivers. These include the interface standards activities of CEMA, OpenCable and SCTE, particularly on the IEEE 1394 digital interface, as well as other inter-industry activities (such as the CPTWG) to support the development of content protection solutions – an essential prerequisite to the availability of high-value programming.

An indicator of progress from these inter-industry efforts is the development of the critical standards for digital cable systems and digital consumer electronic devices. Sony Electronics Inc. is taking an active position in the following standards activities:

Under the auspices of the Society of Cable Telecommunications Engineers:

- DVS 131 Draft Point-of-Development (POD) Proposal on Open Cable (approved)
- DVS-194 Home Digital Network Interface Specification Proposal with Copy Protection (approved)
- DVS-195 Home Digital Network Interface Specification Proposal without Copy Protection (approved)
- DVS-208 Emergency Alert Message for Cable (proposed)
- DVS-211 Service Information for Digital Television (proposed)
- DVS-213 Copy Protection for POD Module Interface (proposed)

Under the auspices of the Consumer Electronic Manufacturer Association/Electronics Industry Alliance:

- EIA-775 Title: DTV 1394 Interface Specification (approved)
- EIA-770.3 Title: High Definition TV Analog Component Video Interface (approved)

The schedule on which these solutions are finalized is largely dictated by the technical obstacles to be overcome and would therefore not be materially aided by government regulation. To the contrary, Sony believes that government rules are not currently necessary and might well complicate those efforts. Sony believes it is best for companies to work together through multi-industry groups to arrive at solutions, rather than promoting proprietary technologies, which frequently slow development of standards.

May 17, 1999

Mr. Alan Stillwell
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Dear Mr. Stillwell:

As requested, on behalf of the cable industry participants in the FCC's May 20 Roundtable Meeting (CableLabs, AT&T, Time Warner, and General Instrument) the National Cable Television Association is providing the following consolidated response to questions posed for the roundtable meeting.

The cable industry understands the need to resolve the compatibility issues to be addressed at the FCC roundtable. As you know, the relevant industries are working together to jointly address these technological issues, and we want to assure you that we will make every effort to continue our collaboration to facilitate the introduction of digital television to consumers as promptly as possible. We expect this collaboration to ultimately benefit the most important player in the equation – the consumer.

The cable industry supports the OpenCable™ digital platform, a CableLabs-managed initiative, aimed at developing key interface specifications to foster interoperability among advanced digital devices such as set-top boxes and digital television receivers. The OpenCable™ process is open to anyone who wants to join and sign a non-disclosure agreement -- currently over 300 companies are participating.

OpenCable™ is, in effect, a multi-industry program, and its representatives have participated in numerous joint-industry meetings and initiatives.

The OpenCable™ effort has made significant progress, including the development of a baseband serial interface based on IEEE-1394 with copy protection to promote compatibility between set-top boxes and digital television receivers. In addition, specifications have been developed for a Digital Security Module Interface and work is on-going to develop the Digital Security Module ("POD" module).

Set-Top Devices

The necessity for finding a way to deliver high-resolution digital video cable services to digital television (DTV) receivers has arisen at the same time that there has been a general movement toward interconnecting multiple audio/visual (A/V) devices on a common bus or network. The IEEE-1394 high performance serial bus has emerged as the preferred tool to accomplish this goal.

The SCTE standard DVS-194 provides a complete interface for DTV interconnection including the "5C" Digital Transmission Content Protection (DTCP) technology. This SCTE standard incorporates the EIA-775 standard, as the two organizations worked together to develop compatible standards. However, the EIA standard does not provide for copy protection. The SCTE standard will permit higher quality on-screen display graphics and meets the initial requirements for basic functionality and fidelity with respect to current practices in the cable industry. We believe that copy protection and extended graphics serve to support most consumers' video viewing requirements.

Copy Protection

In response to Motion Picture Association of America's (MPAA) concerns that copyrighted material sent over any digital interface be protected, the SCTE standard DVS-194 incorporates the 5C DTCP technology. It is important that this copy protection technology be agreed upon and implemented as quickly as possible. We are encouraging other industries and companies to embrace this interface for calendar year 2000 deployment.

Although the copy protection debate has been complex, we believe several manufacturers and at least one cable MSO have entered into agreements with the DTLA (Digital Transmission Licensing Authority) for use of the 5C DTCP technology. The cable industry expects to deploy 1394-enabled set-top boxes utilizing 5C copy protection during calendar year 2000.

Digital Cable Ready Receivers

The OpenCable™ effort is a multi-industry process incorporating standards from CEMA (EIA), SCTE (DVS), IEEE and ITU. It provides the interface specifications for DTVs using separate set-top devices and for cable ready DTVs. At the same time, the cable and consumer electronics industries are working together to complete standards that will promote the compatibility between DTVs and digital cable services.

Specifically, the cable industry is addressing requirements that will allow integrated DTV receivers to connect directly with digital cable systems. We believe that this effort represents a significant step toward enabling consumers to enjoy the full capabilities of their cable systems while their DTV receivers deliver the highest resolution picture.

Toward this end, our industries are jointly examining certain requirements that should be present at the interface between a cable system and an integrated DTV receiver in order to facilitate basic compatibility. These requirements include modulation/demodulation capability, compression and display formats, and appropriate signal levels. To support subscription services, our industries have derived specifications for the separable security module and the corresponding interface on the receiver.

There is still work to do and our industries are moving ahead to address and resolve outstanding technical issues.

Conclusion

The cable industry is making significant progress with other industries to jointly address compatibility issues. Our goal is to make the transition to digital television in its many forms as smooth as possible for the American consumer. The cable industry looks forward to participating in the upcoming May 20 FCC roundtable meeting.

Sincerely,

William A. Check, Ph.D.
Vice President, Science & Technology

FCC Roundtable on
DTV Technical Issues

Statement of
Alan McCollough
President and COO
Circuit City Stores, Inc.
May 20, 1999

On behalf of Circuit City Stores, I very much appreciate being invited to participate in this roundtable discussion. Circuit City is the nation's leading retailer of consumer electronics and appliances. We have a clear and vital interest in the transition to digital television, which will most certainly have a significant impact on our business. It has also been clear, from the very first live demonstration last year, that this is a transition of significant interest to our customers. We are the leading retailer of home satellite television systems and, in the deregulated era that approaches we look forward to being the leading retailer of fully functional cable Navigation Devices.

Today I want to make two main points:

1. The main thing lacking in the transition to DTV is digital content. This problem is fundamental to all other transition problems; a solution will help drive solutions to other problems.

2. The clear intent of the Telecommunications Act of 1996 to ensure the competitive availability of devices over which consumers can receive any services of Multichannel Video Program Distributors will be frustrated if the capability of devices available at retail is substandard in any respect compared with those offered through the MSOs.

<u>Digital Content</u>
<u>Is The Key</u>

Free, local, over the air terrestrial broadcasting remains the key to television. Were this not the case, the Congress would not have allocated scarce and expensive spectrum to this service. Nor would the Commission have gone to such lengths to assure that broadcasters put up new antennas and transmission towers.

The DTV receivers now in our stores were designed primarily as television broadcast receivers. But so far, consumers would be justified in asking, "Where's the beef?" Most digital broadcasts are simply upconversions of analog NTSC programs. Except for the Tonight Show, there

is almost no current programming to watch that was produced in a DTV format, let alone in HDTV. We were disappointed that the NAB Convention came and went without any significant programming announcements. We are pleased to see, however, that a consumer electronics manufacturer has now stepped forward to underwrite the conversion of film to true HDTV content at one major network.

Compelling broadcast content, alone, would be sufficient to interest consumers in buying DTV and HDTV receivers. Of course we need wired interfaces, but the broadcast interface is here now. It took a national effort, and a unique commitment to localism, to achieve it. Broadcast remains the vital core around which wired solutions will evolve. Lengthy debate over various content protection methods is only meaningful if there is something to protect. It would be disappointing if broadcast does not retain its place as a major provider of content to homes, and a framework around which other services can build.

Cable Navigation Devices Offered
At Retail Must Not Be Substandard
Compared To Those Offered Through MSOs

The question as to whether or not the OpenCable specification will be sufficiently developed for consumer electronics manufacturers to produce navigation devices for distribution by July of 2000 is best left for the manufacturers to answer. It should be remembered by all, however, that there is a lot more to this question than whether the Cable MSOs will, by that date, supply "POD" modules to support competitive devices. It must also be possible to design a device, sufficiently far in advance of the July 2000 date, that will work successfully, efficiently, and reliably with the MSO system on which it is used.

Unfortunately, if one asks the right questions, one learns from CableLabs that the OpenCable specification, as currently developed, is far from supporting devices that will be truly competitive. The news with respect to support, in competitive devices, of the services that everyone is most excited about - interactive, value-added, choice-enhancing - is far from good. Nor have such services been maintained in the basic OpenCable specification. To a significant extent, the on-schedule "success" achieved thus far results from a lowering of sights rather than from attaining original objectives.

It is imperative, to unleash a competitive market and comply with the 1996 law, that devices offered in the open marketplace be every bit as capable as those offered directly to customers by Cable MSOs. It is difficult to imagine how anyone could believe that the Cable industry is supporting competitive availability if their systems can reliably support only substandard navigation devices.

For our customers to receive the benefits of competition, there must be no performance gap between MSO devices and competitive devices. Otherwise, the result will be the very redundancy and operability problems that the law and the Commission have sought to eliminate. The "digital engine" of a DTV receiver already contains most of the circuitry it would need to function as a Cable or a DBS set-top-box. This additional functionality can be added to DTV sets at very low cost. Such combinations also provide – in light of the interface problems, also discussed today, that will take a while to solve – the only sure way to bring wired and satellite DTV and HDTV content to consumers. This is also by far the most user-friendly solution for most customers.

Both Thomson and Hitachi have already made provisions to offer this type of product in the satellite world. It seems clear that, IF manufacturers can provide fully capable Cable navigation features, they will offer them as POD-enabled features in these products as well, at minimal additional cost to consumers. But, if the most OpenCable will support will be only a minimal subset, the customer wanting the full MSO feature set will have to put up with the additional cost and complexity of adding a redundant cable box, leased from their MSO, anyway.

The technical issues that need to be resolved, quickly, in order to avoid such an outcome – and provide for true competitive availability of functional, user friendly product – involve software, not hardware, interfaces. The other connection and compatibility problems posed for discussion today, though important, are secondary. If the software issues were solved, consumers would be able to buy television receivers that receive any and all services offered by cable systems, without regard to hardware compatibility problems.

Once there is competition in building and selling the host devices, the full forces of the marketplace will be unleashed in driving down prices and improving products and features. As to such products, we can avoid redundancy and box-to-box interface and copy protection issues. Only the cable drop, and a security module, will be necessary to receive any broadcast, basic cable, premium, or interactive service offered over any system.

* * *

We believe that the Commission is right to be interested in and concerned about these aspects of the transition to DTV and HDTV. We look forward to participating in this roundtable discussion.

May 18, 1999

MOTION PICTURE ASSOCIATION OF AMERICA

RECOMMENDED LIST OF ATTRIBUTES OF A SECURITY ENVIRONMENT FOR DISTRIBUTION OF PROTECTED HIGH VALUE CONTENT*

"Approved" means acceptable to owners of legally protected high value content exercising their individual discretion, for the purpose of protecting lawful rights.

All content referenced below is assumed to be legally protected, high value content.

1. The following is applicable to all linked transport, display, and recording devices.
2. The same principles apply to CE and IT devices.
3. Digital bit streams are never "in the clear" (i.e., are always encrypted).
4. Bidirectional digital output is allowed only with Approved digital technology protection (e.g., CMPS [Canal+] and/or 5C, if Approved).
5. Unidirectional digital output is allowed only with Approved digital technology protection (e.g., CMPS, if Approved)
6. Standard definition analog output (NTSC and PAL: 480I, 480P, and 576I lines) must be protected by an Approved Analog Protection System (APS) (e.g., Macrovision) and marked by CGMS-A.
7. All high definition analog output (above 480P, e.g, 720 or 1080 lines) must be protected by an Approved analog protection technique. (E.g., a video scrambling technique, yet to be determined and approved. A future system based on watermark and requiring response under legislation may also be suitable.)
8. All video inputs (digital and analog) must look for and respond to an Approved watermark standard.
9. Licensed devices with recorder function must respond to copy protection flags (CGMS-A, Macrovision, and Watermarks).
10. When only one copy ("copy once") is allowed, such copy must be recorded using an Approved copy protection technology in a manner that does not allow access to the content by non-participating devices and that does not allow further copying.
11. Content providers should be granted express third-party beneficiary rights to enforce licenses.

12. Specific devices should accommodate Approved revocation and renewability mechanisms. Content providers shall have the right to invoke revocation/renewal.

* The MPAA is publishing this list to reflect the views of its individual member companies. All decisions as to whether particular technologies are acceptable, whether to invoke any particular level or form of copy protection, and other matters are for unilateral, independent determination by individual member companies.

Statement of Victor Tawil, Senior Vice President
The Association for Maximum Service Television, Inc.

May 20 FCC Roundtable on DTV Compatibility With Cable and Other Video Distribution Services

B. The Existing Standard-Setting Process Is Not Working Well Enough.

1. The FCC is relying too heavily on the OpenCable process.

The Commission is relying on CableLabs' OpenCable process to accomplish a number of important and related goals. In the navigation devices *Report & Order*, the FCC expressly relies on that process to produce a conditional access interface (the "POD specification") that will enable the retail availability of navigation devices.[10] The FCC seems tacitly to be relying on the OpenCable process to ensure easy access to DTV broadcast signals through cable as well, particularly in light of its inaction on the *DTV Cable Carriage/Compatibility* proceeding.

In our view, the Commission has relied too heavily on this process; there are simply too many goals and interests at play and too little oversight to guarantee that the public interest in compatibility and retail availability is honored. The Commission itself must be more active in seeing to it: (a) that the necessary standardization (*e.g.*, in the areas of cable transmission, cable navigation protocols, and interfaces between cable systems and digital devices) takes place; (b) that the standards agreed to preserve the public's stake in DTV (that is, that they foster easy access to undegraded DTV signals); and (c) that the cable and device manufacturing industries actually implement the standards in a way that protects legacy devices that are compliant with the standards and ensures the retail availability of new generation of devices at reasonable prices.

2. The standards-setting process is too confused and too slow.

There is an inordinate amount of confusion surrounding the standards-setting process. The Commission, in the *Navigation Dev*ices proceeding, set a deadline for the cable and

manufacturing industries to arrive at certain standards.[11] But today, almost one year after the FCC promulgated those rules, the public knows very little about how we are going to get from here to there. The standards-setting process is moving too slowly and the companies involved are changing their minds too often about what functionalities they expect or will build. There is not enough commonality in the industry players' approaches. And, as discussed further below, neither broadcasters nor the public has a voice in the process nearly commensurate with their interests in the outcome.

Currently, there are four major separate organizations working on defining and /or setting digital compatibility standards. These are: ATSC, CEMA, SCTE and CableLabs. All are working in parallel on their own pace; some have defined different versions of the same things. For example, both CEMA and CableLabs have a version of the 1394 interface. ATSC, CableLabs, CEMA and SCTE are all involved with the development of conditional access standards. Defining slightly different versions of an interface standard or other technology is tantamount to defining no standard at all. There is a need to have a common standardization process to insure harmonization of these standards. The Commission simply must be more involved.

Set-Top Boxes. The interface issue is only one among several other important digital standards issues (*e.g.*, cable transmission and navigation) that must be settled. Since the interface

---

[10] Report and Order, *In re Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices*, CS Docket No. 97-80 (June 24, 1998) ("*Report & Order*"). These rules are codified at 47 C.F.R. § 76.1200, *et seq.*

[11] *See* Report & Order, ¶ 80.

standard agreement is the one the Commission has pursued most publicly,[12] one would expect there to be a fair amount of certainty at this point about interface implementation. There is no such certainty, not even six months after the cable and equipment manufacturing industries told the Commission that they had agreed to a 1394 interface standard.[13] A review of the December 1998 reply comments filed in the *DTV Cable Carriage/Compatibility* docket and subsequent *ex parte* presentations shows how far the various manufacturers and MSOs are from a consensus on implementation of the 1394 interface. Some companies (*e.g.*, General Instrument) oppose use of the 1394 interface. Some companies support it only as a short-term solution to the interoperability problems (*e.g.*, Philips and Thomson), while other companies view it as a long-term solution (*e.g.*, Mitsubishi). Some support use of the 5C Digital Transmission Copy Protection with 1394 (*e.g.*, Hitachi, Intel, Matsushita, Sony and Toshiba). Other companies advocate use of XCA digital copy protection method (*e.g.*, Zenith, Philips, Thomson). It is simply not at all clear where and when the 1394 interface will be used.

Even if there were agreement to use the 1394 physical layer in all DTV receivers starting in 1999, there is some disagreement about the upper layers. Thus, although individual manufacturers may tell you today that they are building equipment with standardized interfaces, each manufacturer and cable company may mean something different by that.

---

[12] *See, e.g.*, Letter from Chairman Kennard to Decker Anstrom, NCTA and Gary Shapiro, CEMA (Aug. 13, 1998) (recognizing difficulties of transporting DTV signals from cable set-top boxes to DTV sets and urging the completion of a standard on the IEEE 1394 interface standard in digital television sets).

[13] *See* "Inter-Industry Consensus Reached on IEEE-1394 Digital Interface Specification," National Cable Telecommunications Association Press Release (Nov. 2, 1998) (reporting on NCTA and CEMA letter of October 20, 1998 to Chairman Kennard).

As a result of this uncertainty, while more than 120 television stations broadcast DTV signals this fall, consumers interested in buying DTV receivers will for the second year have no assurance that the devices they buy at fairly high prices will have a long useful life or will work productively with their cable service even in the near future. For the benefit of consumers and the DTV transition, the Commission should step in to encourage the inclusion of all three standard interfaces—the 1394, RF interface and a component baseband video input—on all DTV receivers. Had the Commission taken this action last year, many of the interoperability problems would have been resolved by this production cycle.

Some say that a digital interface like 1394 cannot be uniformly implemented until there is agreement on copy protection. This approach effectively holds free, over-the-air DTV hostage to premium programming and the seemingly endless battle over copy protection methods. It means that the cable, movie and equipment manufacturing industries—not the aggressive DTV rollout—will control the pace of DTV receiver purchases and ultimately the transition to DTV. Last fall, there were two proposals on the table regarding copy protection (5-C and XCA). Today, SCTE's standard process is effectively stalled with a contentious yet unresolved draft standard based on 5-C, CEMA is considering five copy protection technologies,[14] and the Motion Picture Association of America refuses to get involved in the standardized action process beyond a statement of general principles about copy protection. The problem of settling on a particular system seems to be getting worse not better. This can only mean more delay and confusion.

---

[14] The five proposals are Digital Transmission Copy Protection ("DTCP" or "5-C") (Hitachi, Intel, Matsushita, Sony and Toshiba), Extended Conditional Access ("XCA") (Thomson and Zenith), MRJ Technology Solutions, NDS Technologies Israel, Ltd., Open Copy Protection Solution ("OCPS") (Philips).

Cable-Ready Sets. The NCTA/CEMA process has been no more adept at standardizing consumer-friendly cable-ready sets than it has digital interfaces. Broadcasters and equipment manufacturers have long-advocated cable-ready sets as the best solution to digital interoperability problems. Nearly a year ago, the Joint Engineering Committee of CEMA and NCTA ("JEC") listed the eight essential elements necessary to ensure compatibility between basic cable services and digital receivers.[15] The standards-setting process had been completed, or was near completion, for each of these elements and the cable industry had only to agree to use the standards that it had been instrumental in establishing. Today, the cable industry still has not come to a consensus on such basic questions as digital formats and navigation technologies. Without this consensus, cable-ready sets will not be produced. Instead of settling these basic questions, the equipment manufacturers and cable industry are arguing about what it means to be cable-ready and how many functionalities cable-ready DTV sets should include (*e.g.*, should they include 1394).

Lacking expeditious industry consensus on standardization, the Commission should define the narrow technical standards that ensure a minimum degree of common design and operation between cable systems and DTV receivers. It should specify the technical requirements with which a television receiver must comply in order to be sold as "cable ready."[16]

---

[15] *See* Letter from George Hanover, CEMA, to Andrew Scott, NCTA (June 26, 1998) (enclosing CEMA's cable-ready proposal). *See also* Letter from Garry Shapiro, CEMA, to Chairman Kennard (Sept. 10, 1998) (enclosing the cable-ready proposal, urging harmonization of the OpenCable™ initiative and CEMA open standard-setting efforts, and noting that CEMA had received no response from the NCTA to CEMA's cable-ready proposal, "even though this proposed specification was the result of joint meetings between the cable and the consumer electronics industries and identified the key issues (such as PSIP, receiver performance, cable system signal, etc.) that must be addressed as digital cable systems come on line.").

[16] The Commission has express authority to set these specifications under 47 U.S.C. § 544a.

Specifically, it should specify those standards that must be agreed to so that cable-ready sets receive and display all DTV broadcast programming (including data-rich programming) and in-the-clear cable programming, and have upgradable connections for premium cable programming.

3. The standards-setting process is not complete.

The goals of interoperability and the retail availability of navigation devices will not be achieved without much swifter action on a number of standards that go beyond the interface issue. For example, navigation standards, and an implementation plan agreed to by equipment manufacturers and the cable industry, are necessary for the production of both set-top boxes and cable-ready sets. At the most basic level, digital devices must be able to decode the program guide transmitted through the cable system. While over-the-air DTV programming will use the standardized in-band PSIP,[17] cable prefers out-of-band system information and other technologies.[18] At this point, there is no standard for locating the out-of-band system information on cable, and no agreement on how to harmonize the two standards in the receiver. Perhaps even more importantly, for encrypted programming, there is no standard for locating electronic program guide ("EPG") data.

The Commission should require *common* navigation standards and the disclosure of technical information that enables consumers to locate cable and broadcast (digital and analog)

---

[17] ATSC Standard A/65 Program and System Information Protocol for Terrestrial Broadcast and Cable ("PSIP").

[18] The cable system will usually carry its own version of system information "out-of-band" in a separate channel. This decision by the cable industry to use out-of-band system information and other out-of-band data is controversial because it allows the cable system, rather than the individual program provider or the consumer, to control navigation and other data services. In the case of the component video output, the PSIP data would be useless to DTV receivers since it is not part of the video signal that is put

programming easily and transparently. Specifically, the Commission should require the cable and equipment manufacturing industries to agree on standards for accessing out-of-band system information and the EPG data stream. In addition, the Commission should require cable operators to disclose, under the navigation devices rules, enough technical information about how their EPGs work to enable broadcasters and equipment manufacturers to deploy EPGs, set-top boxes, cable-ready receivers and other navigation devices that work with the cable system.

4. The OpenCable process is not open.

Broadcasters and consumers have the same interests with respect to the functionality of digital devices: transparency, ease of use, affordability, and maximum compatibility over the whole range of cable services and digital equipment products. Unfortunately, the OpenCable process does not include broadcasters in a meaningful way. The FCC needs to be much more hands-on in identifying shortfalls in the current standard-setting process and stepping in to protect the consumer's interests. Such FCC action might take the form of more open meetings of this sort, deadlines for standards to be set that incorporate time for public comment to the FCC, and the timely conclusion of the cable compatibility rulemaking proceeding. As discussed below, it is critical that the FCC consider and resolve some of these issues in the *DTV Cable Carriage/Compatibility* docket, which is the only forum that provides for meaningful public and broadcaster comment.

---

out as component video.

C. The Commission Should Quickly Complete Its *DTV Cable Carriage/Compatibility* Rulemaking.

The standards-setting issues discussed above are central to the concerns raised in the *DTV Cable Carriage/Compatibility* rulemaking. The Commission has authority to address these issues not only under Section 624A (authorizing the FCC to mandate compatibility among television sets, video recorders and cable systems) and Section 629 (requiring the retail availability of navigation devices) of the Communications Act, but also under Sections 614 and 615 (requiring cable carriage of television broadcast signals in a particular manner).

In its October 1998 comments in the DTV *Cable Carriage/Compatibility* proceeding, MSTV asked the Commission to establish principles (and deadlines to achieve these principles) for the transmission of digital signals to ensure that the digital service provider, not the distributor, can reach the home in a way that maximizes consumer choice and ease of use.[19] Specifically, we recommended the following principles:

1. Cable operators should include the listing or display of programming information of all broadcast and other non-affiliated video services in a non-discriminatory fashion on the cable systems' navigational devices, guides or menus and should not interfere with a broadcaster's or other non-affiliated video service's ability to use part of its channel capacity to provide a program guide or menu to the cable systems' subscribers.[20]

2. To implement (1) above and to preserve other features of the DTV signal that serve the public interest, cable operators should carry without substantive alteration: the PSIP

---

[19] *See* Comments of the Association of Maximum Service Television, Inc. in the *DTV Cable Carriage/Compatibility* proceeding (Oct. 13, 1998) at pp. 30-37, 40-44.

[20] The Commission recognized the importance of EPGs in "promoting consumer choice" and competition in the video marketplace. *Navigation Devices Report & Order*, ¶116. It also recognized that rules may be needed to promote fair competition between cable-provided and independent EPGs in the *DTV Cable Carriage/Compatibility Notice* at ¶ 82. A non-discrimination requirement already exists with respect to Open Video Systems (video provided by local telephone companies). *See* 47 C.F.R. § 76.1512. *See also* Telecommunications Act of 1996, H.R. Rep. No. 204, 104th Cong., 2d Sess., at 97-98 (1995). A similar requirement will apply to DBS carriers if the Satellite Copyright, Competition and Consumer Protection Act of 1999 (H.R. 1599) becomes law.

information that is part of the DTV signal or other data that provides channel navigation, program guide information, and/or V-chip information. Cable operators should also carry without alteration the closed captioning information.

3. Cable operators should ensure that the information required to be carried under (2) above can be accessed and used by any digital television receiver that has the capability to access and use such information in the over-the-air environment.[21]

4. Cable operators should carry DTV signals without material degradation. Specifically, cable operators should transmit the entire qualified video bitstream of the DTV signal through the cable facility (defined to include those set-top boxes the cable system deploys) in way that DTV receivers capable of receiving and displaying the DTV signal can do so with as high a resolution as they could if they received the signals over the air.[22]

III. CONCLUSION

Now, seven months after we submitted initial comments in the *DTV Cable/Compatibility* proceeding, there has been fairly limited progress. We again urge Commission action. It may not be enough at this point merely to set forth principles as the DTV receiver production schedules advance. Instead, MSTV urges the Commission to specify the areas in which standards must be agreed to and implemented in order to satisfy the goals of the Communications Act. We recommend that:

---

[21] Technically, it should not be difficult for a cable system to comply with these first three principles. To the extent that broadcasters use their DTV channel capacity to transmit program information (*e.g.*, PSIP), a cable operator would have to transmit the signal in its 8 VSB format for early generation sets built to receive that signal, arrive at a satisfactory QAM to 8 VSB conversion standard, or arrive at a satisfactory interface or baseband video output standard which preserved the in-band program guides that broadcasters are transmitting. In all cases, to the extent that cable operators are transmitting their own program information, guides or navigation devices, they would have to ensure that the DTV information was seamlessly integrated into the guide or navigation device.

[22] To comply with the non-degradation principle, a cable system must either pass through a DTV signal untouched or ensure that set-top box or headend processing does not interfere with the ability of DTV sets to receive all the bits of the DTV signals such sets are capable of receiving (this will most likely involve arriving at satisfactory interface standards with the manufacturing industry).

- The Commission should set a short deadline (90 days) for the completion by CEMA and SCTE of all the outstanding standards issues relating to set-top boxes and cable-ready DTV receivers. If there is not *full* agreement on the standards by that date, the FCC should either initiate a fast-track proceeding or use the *DTV Cable Carriage/Compatibility* proceeding to set the narrow technical standards necessary to ensure compatibility.
- For 1999 and 2000 DTV receivers, at a minimum, the Commission should require the implementation of three interfaces in a universal receiver (*i.e.* the 1394, RF interface and component baseband).

Federal Communications Commission
Roundtable on DTV Receiver Compatibility

Statement of
Ruth Rodgers
Executive Director
Home Recording Rights Coalition
May 20, 1999

The Home Recording Rights Coalition was founded in October 1981, after a U.S. Court of Appeals, on the basis of copyright law, ruled that it was illegal to sell home video "Betamax" recorders to consumers. Although this ruling was overturned by the U.S. Supreme Court in 1984, in almost every year there has been some initiative, based on copyright concerns, to restrict the ability of consumers to buy and use otherwise lawful devices.

As the Commission holds this Roundtable, consumers face a new and more serious threat: an inability to *view* programs, acquired legally through lawful devices. Once again, consumers are at risk not because of what they have done, but out of concern over what they *might* do.

HRRC participated in OET's docket (ET Docket 93-7) on cable compatibility because it recognized the potential for consumer freedoms to be limited by arbitrary restrictions on product design and interoperability. HRRC submits this written statement, in response to OET's April 21, 1999 Public Notice, out of concern over the prospect of one-sided and restrictive impositions on DTV interfaces that, again, would impose burdensome and unnecessary restrictions on consumer freedoms.

Home Recording Should Not
Be Confused With Commercial Piracy

Copyright-based concerns over consumers' ability to acquire home recorders have been overstated from the start. In large measure, this has been due to confusion, generated intentionally and otherwise, of home recording with commercial piracy. The vast majority of consumers are not pirates, and their practices do not have remotely similar consequences.

Pirates seek to go into business in competition with authorized program distributors, without making any attempt to acquire the rights to do so. They make their copies in large batches, using equipment comparable to that used by the authorized distributor. Consumers who acquire pirated goods (wittingly or unwittingly) need to have only a playback device to play them. So piracy has nothing to do with home recording, or home recorders.

Yet, based on legitimate concerns over such unauthorized commercial distribution, consumers are asked to buy less capable home recorders for their private,

noncommercial use. This imbalance was not justified when the Betamax case was brought, and it is not justified now, in the age of the Internet. As in the case of home VCRs, unauthorized commercial Internet distribution will occur whether or not consumers have access to home recorders

Consumers soon will be able to exchange stored files over broadband networks. Content providers worry that, collectively, such exchanges could be significant. But, as we discuss below, the potential for consumers to gain new private, noncommercial activities should not cause them to lose existing freedoms.

Consumers' Reasonable and Customary Recording Practices Have Expanded Rather Than Contracted Markets For Programs

Home video now provides Hollywood's single largest revenue stream. It is said to be the largest single factor considered when a studio decides whether or not to make a movie. Yet, when VCRs were first introduced, a lawsuit was filed to ban them. Then, when home video rental – the primary component in this revenue stream – was introduced, the industry tried to change the law to make movie rental illegal. The industry has repented these efforts. But some remain concerned that the *next* product, the *next* format, and the *next* novel means of distribution will be all bad. Finally, the downside will outweigh the upside. So, again, new devices are targeted. This time, however, the bullseye covers DTV receivers, as well as digital video recorders.

The studios' concern over home recording leads to unrealistic extrapolations of consumer practices. They are tempted to react as the scientists did to Godzilla in the first movie – to kill, rather than study. (Necessary in that movie, but not in this one.) Actual consumer recording practices are varied and complex, and differ according to medium. They have never, ever, been as bad as projected, and have been shown to play key roles in promoting film distribution.

Consumers tend to "timeshift" video programming, while they "place shift" music. They seldom watch a movie repeatedly, or even more than once in a while, whereas they often listen to a song intensely and repeatedly. Distributors of audiovisual content have coexisted very successfully with consumer recorders and home video rental, and have turned each to their advantage. After theatrical display, motion pictures go through successive "release windows" of broader distribution and commercial privity. The first – home video – recoups more money than the theatrical box office. The next consumer window – pay-per-view and video-on-demand – provides a direct link to the consumer, who chooses to pay for the right to receive a specific performance at a specific time. The next consumer release windows involve programming services for which the consumer pays "up front" – for a particular channel, or for a particular block of channels. By the time the work is distributed over cable or satellite channels that have been sold to consumers on a block basis, or is terrestrially broadcast, the earlier and more specific markets generally have been exploited.

Technical Restraints On Consumer Devices Have Been Developed Subject To A Basic "Encoding Rule"

Compromise That Recognizes Customary Consumer Practices and Expectations

The actual nature of consumer practices, and the existence of stages in which the commercial potential of films have been recouped, allow for moderate rather than drastic approaches to home recording. For the past decade, the HRRC has judged any proposal for an officially recognized restraint on the use of new technology according to three questions:

- Does it spur, rather than hinder, technological development?
- Do consumers get their fair share from the improvement in technology (or is it all applied to restraining or charging more for consumer practices)?
- Will the result be greater legal certainty in the marketplace (rather than litigation and attendant uncertainty)?

Beginning in 1993, the HRRC joined in negotiations with representatives of the motion picture industry with the goal of drafting a balanced "Digital Video Recording Act" (DVRA) that would address content owner concerns over new formats and interfaces -- but would also recognize and preserve the reasonable and customary practices of consumers. In this process, it was recognized that users of consumer electronics would be subject to the development of technologies providing for "security" against both unauthorized program access as well as home copying. In exchange, motion picture studios would be bound by "encoding rules" that would preserve consumers' reasonable and customary practices.

In the digital world, the technical restrictions have come to fruition, but the motion picture industry's commitment to accepting reasonable "encoding rules" diminishes with each passing day. Efforts to enact the DVRA were set back in 1996, when representatives of the Information Technology industry objected to some of its technical and legislative underpinnings. But the immediate result was for IT companies to join in more sophisticated work on technical measures, involving encryption, through monthly open meetings of the Copy Protection Technical Working Group (CPTWG).

In the strictly analog world, the "encoding rules" developed for the DVRA did find expression in Section 1201(k) of the Digital Millennium Copyright Act of 1998 (DMCA). Section 1201(k) applies only to certain analog VCRs (primarily VHS format) and imposes a duty to respond to widely used "Macrovision" anti-copy encoding. The "encoding rules," as to when defined technology can be applied so as to prevent consumer copying, are derived directly from the 1993 formulation that has been the basis for all cooperative work since:

- *No copy* encoding can be applied to packaged home video, pay-per-view, and video-on-demand programs.
- *No copy* encoding can be applied to *consumer copies* of pay-cable channels (but not so as to prevent the first generation consumer copy).

- Encoding may *not* be applied so as to interfere with home recording of other subscription program services, including basic cable, or of any programming originating as a free terrestrial broadcast.

These rules are sensible in terms both of content owner expectations and accustomed consumer practices. Consumers are not accustomed to copying packaged home video products, as they generally have only one playback/recording device at any viewing location. Nor have they paid in advance for *a la carte* services such as pay-per-view and video-on-demand. Moreover, since by definition such programs are being made available at the consumer's convenience, time-shifting expectations are reduced. Conversely, these programs generally are offered early in the "window" cycle, in which program owners are concerned with receiving revenue from all potential customers who are willing to pay separately, according to viewing occasion. They believe that protection during this stage will allow them to maximize revenue before moving to less specific distribution to consumers.

While Technology Has Become More Potentially Burdensome To Consumers, The Commitment To Encoding Rules Has Eroded Severely

HRRC believes that these "encoding rules," which served as the basis for the widely praised multi-industry negotiations and developments of technology since 1993, strike a reasonable balance between commercial interests in controlling distribution and consumer interests in fair use and convenience. But, as the technological restrictions available to content owners – developed on a cooperative basis -- become more potent, their recognition of the encoding rule bargain, on which they were based, grows more faint.

Encryption technologies control access to viewing, as well as copying. Where encryption is used as a means to assure compliance with copy control technology, devices deemed "insecure" or non-compliant thus are at risk of losing the signal for purposes of *viewing*, as well as copy protection. Hence, the Commission is right to be concerned over whether content owners will refuse to support interfaces that they deem "insecure" for home recording purposes. In such case, consumers stand to lose not only accustomed recording practices, but *also the ability to view certain programs if their devices happen to use the "wrong" interface.*[1] This would violate the sound principle that new technology ought to work for, not against, the consumer.

Encoding Excesses By Program Providers Could Block Viewing By Some DTV Owners Of Channels For Which They Have Paid

[1] Where digital encryption technologies are employed, the program is put in a virtual "package" that can be opened only by devices that are "compliant" with copy protection technologies. It is the potential application of a corollary to this approach that is of concern to interface compatibility of DTV devices: *if compliance of devices potentially receiving a program over an interface cannot be assured, the program might not sent over the interface.*

If all signals to DTV receivers could be routed over interfaces as to which compliance would be assured, then encoding rules would affect only copying, and not access to programs for viewing. However, in the present transitional period, it is already too late to "secure" all interfaces. Of the DTV receivers presently on the market, *none* has a digital interface that is even potentially compliant with any pending proposal for signal encryption. (Nor has there been universal endorsement of a single encryption method or architecture for such purpose.) Focusing just on the products available today, industry estimates are that more than 100,000 units will be sold by the end of the year.

The DTV receivers available now have digital "8VSB" inputs, designed to receive non-encrypted broadcast signals, plus component-video analog inputs similar to the "RGB" interface between PCs and their monitors. (Most displays, including solid state panels, are analog devices.) If the DTV receiver is sold in two boxes, as a "set-top box" plus a "display," it may be that the *only* input into the display capable of carrying a high-resolution signal is the component analog input. These 8VSB and component analog interfaces are considered "non-secure" by content providers. While "watermark" technology is under development to mark their status for home recording purposes, in the absence of legislation mandating compliance by future generations of recording devices, there is no guarantee that all such recorders, fitted with an 8VSB or component analog interface, will search for and respond appropriately to the "watermark" information.

Potential reluctance of content owners to allow programs to be sent over "non-secure" interfaces would pose a problem for consumers, manufacturers, and retailers under any circumstances. It seems unfair that consumers, having purchased DTV products and services in good faith, would not be able to view *any* – indeed, the most expensive – DTV programs because of concerns that they *might* be copied on future generations of recorders that have been neither announced nor marketed. To the extent that a change in "encoding rules" causes copy protection to be demanded for more programs, the potential "interface blackout" will be all the more severe.[2]

Consumers Should Receive The Benefit Of All Doubt; Access To Viewing Of Cable, Satellite and Broadcast Services Should Not Be Blocked Over DTV Interface Concerns

HRRC believes that public policy[3] ought not to embrace or countenance the blackout of interface access for signals delivered to the public over cable and satellite systems, where this is done solely for copy protection concerns. As we discuss above, any justification for doing so on grounds of piracy, through potential commercial redistribution, is misdirected. Any concerns based on private, noncommercial home

[2] Over time, consumers acquiring DTVs with "compliant" interfaces would be able to receive such channels, but unless and until there is any solution as to component analog interfaces, consumers with "legacy" DTVs would not.
[3] While Commission jurisdiction over consumer electronics design and home recording issues is limited, it does have continuing oversight over issues pertaining to implementation of OpenCable, under CS Docket 97-80; has responsibilities as to compatibility issues represented by ET Docket 93-7; and has raised compatibility questions in CS Docket 98-120. In any event, the Commission performs a service by holding this public forum.

recording are addressed to projected mating of devices and interfaces that may not, in fact, receive commercial acceptance, and are aimed at consumer practices that have never proved harmful.

HRRC believes that encoding rules as expressed in DMCA Section 1201(k) – which represent the foundation on which the multi-industry technological restraints have been erected -- should be respected. They reflect a balance of content owners' concern and consumers' reasonable and customary practices. HRRC is willing to discuss, with other interested parties, how this reasonable balance can be maintained.

Finally, HRRC believes that there is clear potential for solutions, including appropriate and narrow legislation, that would "secure" interfaces that are presently considered non-secure. HRRC has a decade-long record of constructive cooperation in pursuit of such solutions.

In summary, HRRC believes that in this transitional period, consumers ought to be given the benefit of the doubt. They have provided magnificent support for all concerned industries. The pending problems, recognized by all in good faith, should not be solved at their expense.