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December 22, 1998

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Magalie Roman Salas, Esq.
Secretary
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The Portals
445 Twelfth Street, S.W.
Room TW - B204
Washington, D.C., 20554.

re: Reply Comments of Sony Electronics Inc.

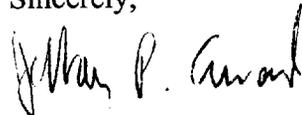
In the Matter of Carriage of the Transmissions of Digital Television
Broadcast Stations / Amendment of Part 76 of the Commission's Rules
CS Docket No. 98-120

Dear Ms. Salas:

Please find enclosed for filing an original and nine copies of the reply comments of Sony Electronics Inc. in the above-captioned proceeding. Also enclosed is an additional copy for our records, which I would appreciate your stamping and returning to our courier.

Thank you for your assistance.

Sincerely,



Jeffrey P. Cunard

Enclosures

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Before the
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In the Matter of)
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of Digital Television Broadcast Stations)
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Amendments to Part 76)
of the Commission's Rules)

CS Docket No. 98-120

REPLY COMMENTS OF SONY ELECTRONICS INC.

Jason Farrow

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December 22, 1998

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Summary

Sony Electronics Inc. (“Sony”) is a leading U.S. manufacturer of consumer electronic equipment, including television receivers. Sony fully supports the efforts of the Federal Communications Commission to bring the benefits of digital television to American consumers and industry. These reply comments respond to and clarify issues addressed by other parties in response to the Notice of Proposed Rulemaking

To the extent that other comments raise concerns regarding the suitability of IEEE 1394 (i.LINK) for DTV implementations, and the availability of content protection technology for DTV implementations, Sony replies as follows:

First, such concerns should be examined in light of the inevitable future integration of DTV with home networks. DTV content delivered to the home, whether by cable or other media, must be capable of transmission throughout the entirety of such networks. To be acceptable, any long-term technical and copy protection-related approaches must recognize this reality in order to encourage content owners to make high value content available for the digital environment.

Second, effective solutions to address any such concerns are currently available. IEEE 1394 (i.LINK) has both the capacity to handle initial DTV applications and the expandability to make it an attractive long-term choice. The Digital Transmission Content Protection technology developed by the “5C” companies (5C DTCP) is a mature solution to content protection concerns that was developed with inter-industry input, has found inter-industry widespread support and is available on fair and reasonable terms.

Given the strong technological foundation that has been laid for DTV implementation, no further rulemaking by the Commission technical and content protection issues are needed or advisable.

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

In the Matter of)	
)	
Carriage of the Transmissions of Digital Television Broadcast Stations)	CS Docket No. 98-120
)	
Amendments to Part 76 of the Commission's Rules)	

REPLY COMMENTS OF SONY ELECTRONICS INC.

Sony Electronics Inc. ("Sony") hereby submits its Reply Comments in response to the Notice of Proposed Rulemaking ("NPRM") in the above-captioned proceeding. Sony shares the Commission's view of the importance of cable transmission of DTV signals for rapid deployment of DTV in the U.S market. Sony is concerned, however, that some comments filed in this proceeding fail to examine DTV within the larger context of future digital technology for the home. Specifically, Sony wishes to address comments filed by certain other parties with respect to the suitability of IEEE 1394 (i.LINK) as both an immediately available and long-term interface solution for DTV and comments questioning the availability of the copy protection necessary in order to promote content availability for DTV. Sony Electronics, headquartered in Park Ridge, NJ, is a leader in digital technology with 26,000 employees in North America. The company is currently selling a 34 inch direct view high definition television set and are co-developer of other digital technologies, including the Compact Disc and DVD technologies.

I. INTRODUCTION

As Sony Electronics stated in its initial Comments, we appreciate that the Commission's efforts to promote DTV have recognized that market forces and private efforts continue to generate solutions to DTV issues. We share the Commission's views that challenges to the successful proliferation of DTV should be met primarily by private industry in a competitive and fair environment. Sony recognizes the tremendous potential benefit for the consumer and for industry that DTV represents. Sony also understands the Commission's concerns that unresolved technical and policy issues may have delayed or threatened the success of DTV. As a leader in digital technology Sony Electronics has committed significant engineering and business resources to developing solutions to DTV related concerns. We also appreciate the role of the Commission and Chairman Kennard in prompting private industry action. These efforts, as reported in the joint letter of November 1, 1998 from CEMA and NCTA to Chairman Kennard, have helped produce an IEEE 1394 (i.LINK) specification ready for the cable transmission of DTV signals. CEMA and NCTA further state their belief that manufacturers may produce "1394-enabled digital television receivers with content protection technology" by late 1999 due to the availability of the 5C Digital Transmission Content Protection (5CDTCP). Sony will continue to work together with other stakeholders to resolve outstanding and future issues, but we share the CEMA and NCTA view that the major standardization and copy protection issues for the delivery of DTV via IEEE 1394 (i.LINK) from the set top box have been resolved, and the infrastructure for new economic opportunity is in place.

II. THE ROLE OF ADVANCED HOME NETWORKS IN CARRYING DTV TRANSMISSIONS

In conjunction with the standardization of IEEE 1394 (i.LINK) for DTV transmission, other significant developments have recently taken place. As a leader in making advanced technology available to consumers, Sony stresses that DTV is a fundamental advancement that will both enable and promote a wide range of advanced consumer-oriented technology. Sony is concerned that some comments made to the Commission focus too narrowly on the link between the broadcaster or cable provider and the DTV receiver. While this link may be the primary concern of the Commission, a comprehensive DTV strategy must recognize that digital content delivered by DTV transmissions will travel beyond the cable operator and DTV receiver link. The growth of networking, already pervasive in business, has reached the home. As more digital technology becomes available for home use, consumers will demand the advantages of interoperability offered by digital A/V home networks. While Sony endorses the Commission's actions in the development of DTV and is enthusiastic about the resulting prospects for truly digital cable ready DTV receivers, DTV transmissions brought into the home via cable or other means, will interact within a larger network of PCs, home servers, digital audio/video systems, and new forms of digital content delivery.

To realize the potential of sharing of digital information, Sony recognizes that content must be protected from unauthorized transmission and copying by. DTV transmissions within the home must have the capability to coexist with new interactive cable, satellite, and Internet services, and with new recording formats and other new security technologies. Industry leaders realize that DTV should exist within a symbiotic and synergistic relationship with other digital

A/V home network nodes. Even short-term DTV transmission solutions must have the flexibility to cope with such dynamic growth.

A. Private Industry Has Created a Foundation for New Products and Businesses in DTV Transmission and Home Networks

Other companies share Sony's vision of integrating DTV with other cutting edge consumer electronic and computer technology, creating new economic opportunities. As the CEMA/NCTA letter to the Commission states, private industry has established a strong technological foundation for the future of DTV. The IEEE 1394 Trade Association, CEMA R4.8 WG1, ATSC, OpenCable, SCTE and the CPTWG have all participated in the open multi-industry processes that have developed and refined the IEEE 1394 standard that will form that backbone of such DTV and home networking. On March 18, 1998, eight CE companies, including Sony (with Grundig, Hitachi, Matsushita, Philips, Sharp, Thomson, and Toshiba), announced Home Audio/Video interoperability ("HAVi") open specifications for a home AV networking protocol that allows 2-way interconnectivity among AV devices from different manufacturers.¹ The HAVi group has made DTV an integral part of its home networking plans, and has chosen IEEE 1394 (i.LINK) as the common interface for delivering DTV and other signals throughout the home. Already a number of companies are implementing IEEE 1394 (i.LINK) in their products. Some PC manufacturers, including Sony, now include an IEEE 1394 port. Because camcorders do not handle copyrighted content, Sony and most other manufacturers of digital camcorders, include an IEEE 1394 interface. Recently, OpenCable has

¹ HAVi participants all share an interest in establishing a rational standard to ensure that interoperability of CE devices in the digital realm reflects the interoperability that consumers now enjoy with their digital devices. HAVi will also provide for advanced "plug and play" when consumer devices interconnect. For more information see www.havi.com.

developed a draft of its HDNI specification for connecting cable to home networks. The HDNI draft specification also utilizes IEEE 1394 and proposes 5C DTCP for copy protection. Private industry has succeeded in laying the technical groundwork, such as IEEE 1394 standards, for businesses to create new products and services based on digital technology.

B. The IEEE 1394 (i.LINK) Interface Satisfies the Needs of the Home Network, including DTV

Although the inclusion of IEEE 1394 (i.LINK) in the OpenCable HDNI and HAVi specifications demonstrate that many proponents of home networking and DTV have recognized the capability of that interface, some parties criticized IEEE 1394 (i.LINK) in their initial comments. Sony strongly disagrees with these statements, which ignore the relationship between DTV and other devices. Sony stands firmly behind the emerging multi-industry consensus on IEEE 1394 (i.LINK) as ideal for both DTV transmission and wider uses.

First, the IEEE 1394 (i.LINK) interface has more than sufficient bandwidth to make it an attractive choice for initial DTV applications, and that IEEE 1394 (i.LINK) has the capability to make it an ideal long-term choice as well. Microsoft agrees that the IEEE 1394 standard represents a potential solution for the future, but claims that “technical issues must be resolved before it can be implemented.” Specifically, Microsoft asserts that the 1394 connector “lacks sufficient bandwidth to pass through baseband 1080i signals by more than a factor of two.”²

This assertion concerning the bandwidth of IEEE 1394 is misleading, however, because baseband HD bitstreams are used only in HD production studios and not in homes. Baseband is useful for studio applications such as the raw, uncompressed output of an HD studio camera, but

² Comments of Microsoft Corporation at 11.

it is not utilized for transmission and delivery. Simply, baseband is not used in the home, while the currently defined bandwidths of 100, 200, or 400 Mbps of IEEE 1394 more than meet the demands of immediate DTV applications. Initial IEEE 1394 (i.LINK) applications are intended to utilize a transmission speed of 200 Mbps, giving it the capacity to handle multiple, simultaneous ATSC-compliant MPEG HD signals of 19.39 Mbps.

While uncompressed HD bitstreams, such the output of a studio high definition camera, are transmitted at approximately 1Gbps and use HD-SDI interfaces, these are professional applications that use bandwidth far in excess of what will be utilized in home consumer devices. Currently, no digital interface developed for consumer use is capable of delivering over 1Gbs. Data compression, not interface technology, solves this issue. Nevertheless, work is ongoing to define speeds for IEEE 1394 in excess of 1 Gbps, which will give IEEE 1394 bandwidth to handle even uncompressed data in future applications.

Not only does IEEE 1394 represent a long-term solution, Sony is also confident that IEEE 1394 (i.LINK) is mature enough to fully addresses the immediate needs of the DTV industry. Currently, no viable alternative offers IEEE's bandwidth combined with bi-directional capabilities to provide for home networking, copy protection protocols, and future expandability. Also, the availability of 5C DTCP answers Microsoft's contention that encryption still needs to be defined before IEEE 1394 (i.LINK) is ready for use in DTV. This issue is addressed below.

As stated above, industry continues to improve IEEE 1394 (i.LINK) technology. Notwithstanding comments on the limitations of physical length of transmissions via IEEE 1394 (i.LINK),³ Sony believes that IEEE 1394 (i.LINK) unquestionably meets the immediate needs for home DTV transmissions and networking within one room. Work is currently underway to

³ Comments of Zenith at 11, footnote 7.

define IEEE 1394 Long, which was demonstrated at Comdex in November 1998. IEEE 1394 Long will provide a reliable bi-directional digital link with the physical length to create a high-speed network within the entire home. Companies such as the HAVi group members are committed to make that potential a reality. IEEE 1394 is expected to provide further capabilities, such as Internet Protocol, to further expand possible businesses in the digital age.

For these reasons, numerous companies in the CE, IT, and cable industries have announced their intention to support IEEE 1394 (i.LINK), and it has clearly emerged as the most widely accepted interface for home network implementations, including DTV.

III. CONTENT AVAILABILITY FOR DTV

Technical advances in areas such as digital transmission truly have the capability of revolutionizing the consumer electronics market, but Sony shares the FCC concern that such technical advances will mean nothing unless the consumer finds value in DTV programming. Sony applauds the FCC for its leadership in promoting the launch of new and exciting content now available, including live sports programming from Madison Square Garden, the television series Chicago Hope, and the PBS special on Frank Lloyd Wright. Each of these broadcasts proves that developers can and will find value in this new broadcast medium.

In order to secure other programming for digital media, Sony has worked closely with the content owner community to resolve copy protection concerns. For over three years Sony has participated in the CPTWG with dozens of other leading electronics, computer, and motion picture companies in order ensure advances in advance digital technology do not post a threat to the content business. Sony and other companies have committed tremendous resources to developing a rational policy and technology framework for a digital environment.

In addition to satisfying content owner concerns, copy protection technology also must meet the needs of manufacturers, who need to consider cost, processing burden, and interoperability. Additionally, copy protection must be transparent to the consumer, and in no way interfere with legitimate use of the digitally delivered content. Copy protection must also not unnecessarily restrict the ability of service providers to secure their services through conditional access and security systems. A system that meets the concerns of the consumer, the content owners, the manufacturers, and the service providers will remove the final hurdles to the deployment of DTV, adding value by making more content available.

IV. THE 5C DTCP PROTOCOL FOR IEEE 1394 (i.LINK) CREATES A SECURE DTV AND HOME NETWORK ENVIRONMENT

In order to meet the copy protection concerns of content owners, manufacturers, and consumers mentioned above, Sony has developed, with Hitachi, Intel, Matsushita, and Toshiba, the 5C DTCP protocol for IEEE 1394 (i.LINK).⁴ Many companies have recognized the potential of 5C DTCP, and plan to take advantage of the business opportunities offered by a secure digital transmission method. Some comments ignore the development of 5C DTCP, and claim that IEEE 1394 is somehow deficient or “severely limited” because it does not provide for content protection.⁵ A few parties have suggested that the “lack” of copy protection makes deployment of IEEE 1394 premature and that further discussion (with inherent delay) is needed.⁶ Additionally delay, however, would clearly be a mistake. While some copy protection technologies, such as watermarking and content encryption for particular forms of storage media,

⁴ 5C DTCP White Paper attached to comments of Hitachi, Ltd., Intel Corporation, Matsushita Electric Industrial Co., Ltd., Sony Corporation and Toshiba Corporation.

⁵ Thomson Comments at 4, 10 & 29; Circuit City at 9.

⁶ Thomson Comments at 10; Philips at 12 & 13; Microsoft at 11.

are still being developed and standardized, a secure digital bus, the key security link for enabling digital DTV transmission and home networks, has already been developed.

It must be emphasized that the IEEE 1394 (i.LINK) interface standard itself is not intended to provide copy protection. Comments that imply that IEEE 1394 (i.LINK) is deficient because its protocols do not provide copy protection are, therefore, misleading, because IEEE 1394 standards were intended to support copy protection protocols, not define them. Instead, IEEE 1394 (i.LINK) is designed to be combined with an effective content protection protocol, such as 5C DTCP. Any digital interface will require content protection. IEEE 1394 works with the most mature copy protection technology available.

A. 5C DTCP Was Developed According to an Inter-Industry Process

While IEEE 1394 itself does not provide content protection, the currently available 5CDTCP technology fully meets the requirements developed by the inter-industry Digital Transmission Discussion Group (DTDG), a subgroup of the CPTWG. The DTDG process allowed for open participation from major representatives of the CE, IT, and movie industries. Hitachi, Intel, Matsushita, Sony, and Toshiba developed the 5C DTCP to meet the requirements of robustness, low cost, and ease of implementation agreed upon in the open DTDG process. Despite claims made in this proceeding that no consensus on copy protection exists, the 5C DTCP solution has successfully garnered wide multi-industry support that will soon lead to 5C DTCP enabled products from multiple manufacturers and suppliers.⁷

Importantly, the development of 5C DTCP technology began over two years ago during this DTDG process, and the 5C DTCP is currently available as a complete specification. Other

⁷ Comments of Thomson at 4.

copy protection “solutions” are still proposals in the conceptual phase. Proponents of these alternatives have not yet fully addressed concerns regarding availability, licensing terms, inter-industry support, and technical concerns such as robustness, expandability, cost, and interoperability. By contrast, 5C DTCP is mature and ready for implementation. The specification has been available for evaluation under a reasonable NDA for months, and the 5C companies have already established a Digital Transmission Licensing Administrator (DTLA), which oversees licensing of 5C DTCP. The DTLA has a low cost and flexible licensing scheme, allowing adopters to choose for themselves between a license structure of \$14,000/year, plus \$0.06/key, or \$18,000/year, plus \$0.05/key. A key generation facility, operated by Intel, will be fully operational by the end of 1998. Over 60 companies have received the non-highly confidential portions of the specifications, and two vendors, Sony and Matsushita, have already announced that IEEE 1394 chips that implement 5CDTCP will be available in Spring of 1999.

Importantly, the 5C companies have stated that they have developed the 5C DTCP in order to enable digital technologies and businesses to move forward, a goal also expressed by the Commission. 5C companies have therefore committed to making the 5C DTCP available at a very reasonable cost. 5C DTCP was developed through an open process, and the 5C companies intend to continue to work with licensees in a cooperative fashion. The availability of the specification and cryptographic keys means that soon multiple vendors will be able to make 5C DTCP solutions readily available for implementers.

Significantly, Sony and other developers of the 5C DTCP have endeavored to meet the concerns of the creative community. The Motion Picture Association of America (“MPAA”) has participated in the CPTWG with the 5C companies and others since its inception over three years. The MPAA also participated in the DTDG Call for Proposal process and the subsequent

evaluation process. 5C DTCP technology addresses all of the MPAA major technical concerns regarding digital transmission. The MPAA has stated it does not intend to designate any single copy protection solution, but MPAA members have publicly expressed support for 5C DTCP, stating that 5C DTCP provides an effective and acceptable technical means of copy protection.

It is important to note that while 5C DTCP enabled IEEE 1394 chips will soon be available from multiple vendors to implementers, no one has yet introduced a viable copy protection solution for HD analog or VSB interfaces. Content owners have repeatedly stated they will only approve a HD transmission bus that includes "authentication," a means of confirming that content is only transmitted to compliant devices. While 5CDTCP meets this requirement, VSB, HD analog, and other one-way interfaces are currently incapable of performing authentication, making them unattractive as long term solutions for transmission of high-value content. 5C DTCP, on the other hand, has the technical capability and the inter-industry support that will bring copy protection to DTV as early as next year. Further discussion and delay on this issue promises no foreseeable benefit, and threatens the short-term and long-term prospects of DTV.

B. THE IEEE 1394 (i.LINK) INTERFACE WITH 5C DPTCP IS A READILY AVAILABLE AND VIABLE LONG-TERM SOLUTION FOR DTV COPY PROTECTION CONCERNS

As we noted in our initial comments, and as reiterate above, Sony expects that the demand for digital home entertainment devices will extend considerably beyond the DTV receiver. The Thomson comments' narrow focus on the DTV receiver ignore the expected future consumer demand that digital VCRs, digital audio devices, and other types of digital audio-visual equipment be interconnected with their DTV receivers. Thus, unless manufacturers intend to

make the DTV receiver a separate, standalone device incapable of connecting with digital VCRs and home A/V networks, an approach that Sony considers shortsighted, DTV receivers will still require digital interfaces with content protection, such as IEEE 1394 (i.LINK). Interestingly, Thomson is one of the co-developers of the HAVi specification, which supports just such a connection between DTV and home networks.

Sony believes that any HD interface must incorporate content protection if it is to have any meaningful long-term application. At the present time, only digital interfaces that incorporate content protection provide such a solution. There is currently no copy protection method that would be applicable to analog interfaces, such as RGB and Y, Pb, Pr, which are endorsed by Circuit City.⁸ Moreover, although Circuit City asserts that the IEEE 1394 (i.LINK) interface requires placement of the MPEG decoder in the display⁹ – even when the manufacturer would otherwise choose to put all electronics in a navigation box – the RGB and Y, Pb, PR interfaces suffer from the same problem. The lack of available content protection for these interfaces may limit their use for high-value content, such as pay-per-view and video on demand services, and as a consequence, precludes placement of the HD decoder in a “navigation box.” Finally, these analog interfaces are not appropriate for the connection of other digital A/V devices – a role that Sony believes is critical for the long-term viability of any interface.¹⁰

Although Y, Pb, Pr does not incorporate content protection, and thus, is not a viable long-term solution, Sony provides a Y, Pb, Pr interface on its first HD set as an interim solution, in accordance with the recommendation of CableLabs. Although the Thomson comments criticize the “failure” of IEEE 1394 to address such “legacy” DTV receivers, no approach that adequately

⁸ Circuit City comments at 9.

⁹ Since digital interfaces such as IEEE 1394 (i.LINK) carry the compressed MPEG bitstream, the decoder must be in the display in order to ensure a secure system.

¹⁰ For this reason, Sony disagrees with General Instruments’ assertion that Y, Pr, Pb is “a more robust interface than

addresses content protection, whether IEEE 1394, VSB, or any other digital interface, will be applicable to such receivers.¹¹

However, during the interim period between such first generation DTV receivers and the introduction of “cable ready” DTV receivers after the year 2000 (when the Commission’s Navigation Device rules go into effect), IEEE 1394 will serve a critical role by permitting consumers to utilize digital cable boxes in conjunction with DTV receivers. In the absence of a digital interface, such as IEEE 1394, with copy protection, the rapid deployment and acceptance by consumers of DTV technology might well be slowed significantly during this critical period. And, as we noted above, IEEE 1394 will continue to play a critical role in the interconnection of digital AV devices in the home, even after the introduction of “cable ready” DTV receivers.

CONCLUSION

Notwithstanding some claims to the contrary, the ongoing efforts of ATSC, Open Cable, CEMA, the CPTWG, and individual companies have established a solid infrastructure of standards and technology for companies to develop exciting new economic opportunities in DTV. Currently available technology for digital interfaces can address long-term concerns of bandwidth, copy protection, and future expandability. The IEEE 1394 (i.LINK) interface, with copy protection, forms a robust and flexible foundation on which to build DTV businesses. It is a complete solution that is available now, and it offers the room to grow and will soon offer higher speed, and protocols that offer even more flexibility and capability. The efforts of private industry are continuing to meet the needs of DTV. No further federal rulemaking is required.

1394.” General Instrument Comments at 4.

¹¹ Thomson comments at 29. See also Philips comments at 12 & 13.

The groundwork has been laid, and more solutions are forthcoming, so, despite the assertions of others, Sony today remains optimistic about the opportunities for DTV.

Respectfully submitted,

SONY ELECTRONICS INC.

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