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

In the Matter of	)	
	)	
Intel Corporation	)	
Request for Waiver of the IEEE-1394	)	CSR-8229-Z
Output Requirement	)	
	)	
Implementation of Section 304 of the	)	
Telecommunications Act of 1996;	)	CS Docket No. 97-80
Commercial Availability of Navigation Devices	)	

TEXAS INSTRUMENTS OPPOSITION TO INTEL'S WAIVER REQUEST

Texas Instruments Incorporated ("Texas Instruments") opposes the request by Intel Corporation ("Intel") for a waiver of the Commission's IEEE-1394 interface requirement. IEEE-1394 ports are inexpensive and IEEE-1394's true peer-to-peer network capability benefits consumers by allowing peripherals to use smaller, cheaper CPU/processor devices. Granting Intel's request will undercut the Commission's use of equipment standards to address consumer harm, and give an unfair advantage to Intel over other manufacturers that have invested in IEEE-1394 in order to satisfy the Commission's rules. Intel's waiver request also fails to meet the high threshold for a grant of a waiver, because Intel has not shown that a waiver is necessary, or shown hardship or special circumstances. Finally, Intel's waiver request is so broad that grant of the waiver will lead to the unraveling of the IEEE-1394 standard. If Intel believes that the IEEE-1394 standard should be replaced, it should petition for a rulemaking rather than seeking a waiver so broad that it will effectively rescind the Commission's IEEE-1394 standard. That would allow for open dialogue and a complete record, so that consumers are protected.

IEEE-1394 is a low-cost networking solution that is widely deployed in the consumer and personal computer markets. To date more than 1 billion IEEE-1394 ports have been shipped

worldwide (with more than 25 million set-top boxes shipped with IEEE-1394 ports). The IEEE-1394 network interface was designed for, and is ideal for, video streaming. IEEE-1394 operates at 400 Mbps (four times faster than present Ethernet speeds), requires much less CPU overhead, makes more efficient use of network bandwidth, and is commercially available at a price of less than $1.00. The low-cost 400 Mbps version of IEEE-1394 supports five or more simultaneous HD-quality video streams on the same network with very low CPU utilization, significantly outperforming the low-cost version of Ethernet.[1]

Intel contends that integration of the IEEE-1394 protocol into its CE3100 and CE4100 products is not commercially viable and therefore a cost burden on consumers. This is simply untrue. The marketplace has shown that IEEE-1394 is easily integrated into a wide range of consumer products, from TVs to Blu-Ray recorders to high-definition set-top boxes. Grant of the waiver would unfairly distort the competitive landscape, disadvantaging those consumer electronics manufacturers that have invested to integrate the IEEE-1394 port into their products at low cost in order to comply with FCC requirements while advantaging manufacturers (like Intel) that have not made that investment. Manufacturers are currently shipping HD set-top boxes enabled with the IEEE-1394 port, so there is no evidence that the Commission's IEEE-1394 requirement has placed an undue cost burden on the consumer.

The Intel waiver request uses the terms IP (or Internet Protocol) and Ethernet almost interchangeably. For clarification, both IEEE-1394 and Ethernet are network standards in which data can be transmitted. IP is a type of data packet, formatted in a specific manner. Ethernet

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[1] Although the newer version of the Ethernet standard (1000 Mbps Ethernet, or Gigabit Ethernet) is faster than the 400 Mbps version of IEEE-1394, Gigabit Ethernet is also more expensive. In addition, newer versions of the IEEE-1394 protocol provide 800 Mbps at commercially available prices of less than $2.50, with next-generation versions that will operate at 1600 and 3200 Mbps.

networks only transfer IP packets, whereas IEEE-1394 can transfer IP packets, bulk data, or true isochronous data. This flexibility in the types of information which IEEE-1394 can transfer is another advantage that enables lower-cost customer solutions. The isochronous capability of IEEE-1394 is able to guarantee a specific amount of bandwidth for transmitting each video stream on the network. Not only does this guarantee quality of service but the isochronous capability allows IEEE-1394 to achieve the same performance as an Ethernet network with smaller memory buffers and less CPU processing.

While Intel observes that consumers are not making full use of the IEEE-1394 interface in set-top boxes, that situation is not because of IEEE-1394's cost or capability. The IEEE-1394 bus is designed to provide a two-way interface, yet cable multiple system operators ("MSOs"), who write the specifications for set-top boxes, currently use software to only enable content to move in one direction – out of the set-top box. The software on the set-top box disables the capability of the IEEE-1394 port from sending content into the set-top box, which limits how the port interacts with the set-top box. These limitations on the IEEE-1394 port are not due to its capability or that of the set-top box hardware, but rather to the MSO software disabling the inherent capability of the port. This effectively prevents anyone other than the cable MSOs from providing interactive two-way services on the IEEE-1394 interface. An Ethernet solution would not correct this problem and presumably would be subject to the same limits imposed by the MSOs. Instead of granting Intel's waiver request and fragmenting the market, the Commission should, for the same reasons it is considering network neutrality, require cable MSOs to provide full bi-directional software support for their set-top boxes via the IEEE-1394 port. That would lead to many new innovative services and a richer consumer experience.

I. IEEE-1394 FUNCTIONALITY BENEFITS CONSUMERS .

Intel argues that adding IEEE-1394 capabilities to its system-on-a-chip processors for the set-top box market will be too expensive. But this ignores the declining cost of IEEE-1394 that has resulted from the Commission's requirement that cable operators provide HDMI/DVI and IEEE-1394. Some customers of Texas Instruments add IEEE-1394 capabilities to their HD set-top box for less than $1.00 per set-top box. In other implementations, additional capabilities and encryption have been offloaded from the CPU/SOC chipsets into the IEEE-1394 interface at costs of less than $3.00 per set-top box – while enabling the set-top box CPU/SOC chip to use slower, cheaper CPU subsystems because of the offloaded functionality. The cost of IEEE-1394 continues to decline because of competition and innovation due to the Commission's requirement for HDMI/DVI and IEEE-1394. Granting of a waiver to some manufacturers is likely to fragment the market and reduce innovation and competition, ultimately harming the consumer and increasing costs.

In addition, the cost to the consumer is not solely in the set-top box, but also in the peripheral devices which connect to the set-top box. IEEE-1394's true peer-to-peer network capability enables smaller, cheaper CPU/processor devices when moving data between devices. Indeed, IEEE-1394 can totally eliminate the need for a CPU/processor in some peripheral devices in certain implementations. For Ethernet, both the set-top box and the peripheral device require expensive CPU/processor devices. Also, IEEE-1394 topology enables a daisy-chaining architecture, which allows multiple peripheral devices to connect into the network by simply connecting Device A to Device B, Device B to Device C, Device C to Device D, and so on. Ethernet topology uses a separate router/splitter to connect multiple devices. In the case of three or more devices connected into the topology, a separate Ethernet router/splitter would need to be

added, or integrated into the set-top box, adding cost and complexity to the Ethernet network solution.

II. GRANT OF THE WAIVER WILL UNDERCUT THE COMMISSION'S ABILITY TO USE EQUIPMENT STANDARDS TO ADDRESS CONSUMER HARM.

The Commission should not reward one manufacturer for not investing in technology that complies with a standard adopted by the Commission through notice and comment rulemaking, while other manufacturers have sought to comply with the Commission's requirements. That sets a precedent that would allow manufacturers in the future to request a waiver of other requirements established by the Commission simply because it is inconvenient to their product development plan. Manufacturers that make solutions that are competitive to Intel's CE3100/CE4100 products also use system-on-a-chip architecture (similar to the technology developed by Intel), but those manufacturers have not sought the Commission's indulgence to avoid providing HDMI/DVI and IEEE-1394 functionality. These competitors have instead chosen to meet their legal obligations, either by integrating HDMI/DVI and IEEE-1394 functionality into their system-on-a-chip architecture, or by using low-cost external integrated circuits as a companion to the system-on-a-chip.

The Commission adopted its HDMI/DVI and IEEE-1394 output standard as a means of providing cable subscribers with the opportunity to use customer premises equipment purchased from retail outlets, rather than the cable operator. The Commission sought a competitive market for the design, manufacture, and retail sale of navigation devices. To achieve that goal, the Commission recognized that technical standards addressing transmission and support were

needed. That is why the Commission adopted the HDMI/DVI and IEEE-1394 output standard.[2] In fact, if one company is allowed to bypass that standard via a waiver– rather than providing Ethernet as a complementary network interface device – then it will create an unlevel playing field and discourage investment in cost-effective technology to satisfy the Commission's standards.

III. INTEL'S REQUEST FAILS TO MEET THE HIGH THRESHOLD FOR GRANT OF A WAIVER.

The waiver request fails to meet the high burden required to obtain a waiver of the HDMI/DVI and IEEE-1394 output standard set forth in Section 76.640(b)(4) of the Commission's rules.[3] Intel observes that Section 629(c) of the Communications Act imposes a statutory restriction on granting waivers of Section 76.640(b)(4). In order to grant a waiver, the Commission must find that a "waiver is *necessary* to assist the development or introduction of a new or improved multichannel video programming or other service offered over multichannel video programming systems, technology, or products."[4]

The waiver request does not meet this standard. The market has been providing low-cost solutions to meet the Commission's HDMI/DVI and IEEE-1394 requirements. The IEEE-1394 solution is technically superior, provides more bandwidth for HD channels, provides lower CPU

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2 *See Implementation of Section 304 of the Telecommunications Act of 1996; Commercial Availability of Navigation Devices; Compatibility Between Cable Systems and Consumer Electronics Equipment*, Second Report and Order, 18 FCC Rcd. 20885 (2003).

3 47 C.F.R. § 76.640(b)(4).

4 47 U.S.C. § 549(c) (emphasis added); *see* Intel's Waiver Request at 10-11. There is some question about the applicability of Section 629(c) of the Communications Act to Section 76.640(b)(4) of the Commission's rules. Section 629(c) addresses the standard for granting a waiver to allow a "new or improved multichannel video programming or other service." Intel does not and cannot assert that Ethernet is a service (because it is a product) and does not and cannot assert that Ethernet is something new or improved.

utilization, and achieves this at the same, or lower, cost as would be possible with Ethernet. It is clearly not *necessary* for the waiver to be granted in order for there to be development or introduction of new or improved multichannel video programming or other services.

In addition, the waiver request has failed to meet the customary requirements for the Commission to waive its rules and regulations. Intel has not cleared the "high hurdle" facing waiver applicants. Intel has not shown any hardship or any special circumstances that justify a waiver.[5] Rather, Intel has simply stated that it would be cheaper to build a set-top box without an IEEE-1394 port.

IV. GRANTING INTEL'S WAIVER REQUEST WILL EFFECTIVELY RESCIND A DULY PROMULGATED COMMISSION RULE WITHOUT SOLVING THE PROBLEM OF CABLE CONTROL OVER CONTENT.

Even if the Commission were to weigh replacing the HDMI/DVI and IEEE-1394 port with Ethernet, the process of selecting a suitable replacement should not come through grant of a waiver. Instead, if the Commission deems that the proper course is to explore transitioning from the HDMI/DVI and IEEE-1394 port to alternate protocols, this process should be done through notice and comment rulemaking to ensure that all voices are heard, and that the rights of viewers are protected. Intel's request, however, is permanent and sweepingly broad and, if granted, would ultimately allow any set-top box that includes an IP-compatible port to omit an IEEE-1394 port, and opens the door to removing the HDMI/DVI port as well. If the waiver request is granted, it would most likely have the practical effect of rescinding a Commission rule duly promulgated through notice and comment rulemaking.

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[5] *See Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153, 1158 (D.C. Cir. 1969), *cert. denied*, 409 U.S. 1027 (1972).

Intel's request appears to be asking for a waiver for more than just set-top boxes using system-on-a-chip architecture, or even the broader universe of set-top boxes containing an Ethernet port. Rather, the request appears to be asking for a waiver of the IEEE-1394 output requirement whenever an IP-compatible port is included in the set-top box, whether that port is Ethernet, wireless IP, or some other technology.[6] If granted, the waiver will entirely swallow the rule. As the Commission has previously observed, a waiver request is an inappropriate means of changing or rescinding a regulation duly adopted through notice and comment rulemaking.[7]

Even if a waiver were limited to set-top boxes that incorporate Intel's system-on-a-chip CE3100/CE4100 processors, the grant of this waiver would likely have the practical effect of ending the HDMI/DVI and IEEE-1394 output requirements. That is because any other consumer electronics manufacturer that has failed to invest in HDMI/DVI and IEEE-1394 integration could also obtain a waiver from the Commission of Section 76.640(b)(4) by making a copycat waiver request.[8] Moreover, other consumer electronics manufacturers might not even need to seek a

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[6] *See* Intel's Waiver Request at 1 n.3.

[7] *See, e.g.*, *Threshold Fair Distribution Analysis of 26 Groups of Mutually Exclusive Applications for Permits to Construct New or Modified Noncommercial Educational FM Stations Filed in October 2007 Window*, Memorandum Opinion & Order, 23 FCC Rcd. 17983, 17986-17987 (Media Bur. 2008) (denying waiver request where applicant failed to show unique circumstances and concluding that the "proposal would be better considered in the context of notice and comment rulemaking procedures"); *Rechannelization of the 17.7-19.7 GHz Frequency Band for Fixed Microwave Services under Part 101 of the Commission's Rules*, Notice of Proposed Rulemaking, 19 FCC Rcd. 7260, 7267 (2004) (denying waiver request where applicant failed to show unique circumstances and observing that the "proper mechanism" for a rule change "is through a notice and comment rulemaking proceeding and not through a decision to grant a blanket waiver"); *Schlumberger Technology Corp.*, Order, 14 FCC Rcd. 2988, 2990 (Wireless Bur. 1999) (concluding that "accommodation of . . . industry trends regarding use and needs . . is a matter more appropriately handled in the context of a rule making proceeding rather than by a waiver").

[8] Indeed, TiVo parrots some of Intel's arguments in its recent request for a waiver of the IEEE-1394 requirements. *See* TiVo Inc. Petition for Clarification or Waiver of 47 C.F.R. § 76.640(b)(4), CS Docket No. 97-80 (filed Nov. 6, 2009).

waiver. To the extent that Section 76.1207 of the Commission's rules is applicable to waivers of Section 76.640(b)(4), then a waiver granted to one company "shall be effective for all service providers and products in the category in which the waiver is granted."[9] For this reason, if Intel wants to eliminate the IEEE-1394 standard, Intel should petition for a rulemaking (as it is free to do) to examine the requirements of Section 76.640(b)(4) in particular and the ability of consumers to use other consumer electronics – like PVRs – with set-top boxes.

The Intel waiver request suggests that grant of a waiver will resolve the issue of a lack of interactive capabilities for consumer electronics used with set-top boxes supplied by cable operators. This is fallacious. Ethernet is just an interface technology, like IEEE-1394. Many set-top boxes already support an Ethernet port, but, for example, do not offer consumers Internet access through that port. That is because the cable MSOs have not enabled software on their set-top boxes that would enable rich, interactive services over any interface port, whether that port is IEEE-1394 or an Ethernet interface. The reason why this has not happened is not that consumers do not desire an open platform, but because an open platform would begin to erode the control cable MSOs retain by providing a closed programming platform for content.

Conclusion

The best thing for consumers would be an open set-top box platform. The intent of the FCC has been to standardize interfaces around HDMI/DVI and IEEE-1394, to allow networking with customer premises equipment purchased at retail so that viewers could control the content of their viewing experience. Today, the hardware capability is in place – in set-top boxes in so many American homes – so the Commission should consider requiring the cable MSOs to

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[9] 47 C.F.R. § 76.1207.

software-enable the capabilities of these ports. This would truly open the set-top box to rich, interactive services, and spur competition and benefit the viewer.

For the foregoing reasons, Intel's request for a waiver of Section 76.640(b)(4) of the Commission's rules should be denied.

Respectfully submitted,

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