

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Implementation of Section 304 of the Telecommunications Act of 1996)	CS Docket No. 97-80
)	
Commercial Availability of Navigation Devices)	
)	
Compatibility Between Cable Systems and Consumer Electronics Equipment)	PP Docket No. 00-67
)	

COMMENTS OF TIVO INC.

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SUMMARY

TiVo commends the Commission for recognizing the urgent need for it to intervene in order to develop a solution for bidirectional compatibility between cable systems and CE equipment. After four years of industry negotiations without success, and eleven years since the enactment of Section 629, it is time for the Commission to act to ensure that consumers see the benefit of competition in the market for navigation devices, as intended by Congress when it passed Section 629.

In adopting a two-way compatibility solution, the Commission should ensure that CE manufacturers are able to build two-way devices that use their own distinct user interface to display cable programming. TiVo has distinguished itself and developed a loyal customer following in large part because of its innovative navigation devices, with their distinctive and easy-to-use user interface and other features not offered by cable-provided boxes. In order to fulfill Congress' goal of consumer choice and competition in the navigation devices market, the Commission should ensure that consumers have meaningful choices not just with respect to whether they can buy or lease set-top boxes, but also with respect to the design, features, usability, convenience, and functionality of such boxes.

The Commission should also ensure that the two-way compatibility standard achieves the goals identified by CEA in its proposal, including safeguarding consumer choice and competition, protecting consumer investment

in competitive devices, establishing fair and open technical standards, requiring a level playing field by establishing true common reliance, and removing barriers to innovation.

Unfortunately, a solution based on the current OCAP regime will not serve the competition and consumer choice goals of Section 629. While OCAP may have theoretical appeal, the reality is that while OCAP may be appropriate for leased boxes, it is simply not practical or technically sufficient for competitive set-top boxes. Because they allow cable operators to dictate device design and curtail the freedom of CE manufacturers to design innovative competitive boxes, OCAP and the associated CableLabs license agreements currently are inconsistent with the goals of Section 629 and are insufficient to bring about the true benefits of two-way compatibility and competition in the navigation devices market.

In order for consumers to realize the benefits of two-way compatibility sooner rather than later, TiVo proposes herein an interim solution that reflects a compromise that would assure that all parties' interests are adequately met in today's market. TiVo proposes that competitive CE manufacturers should be permitted to build non-OCAP bidirectional boxes that receive all programming channels offered by MSOs provided on a per channel basis and include a presentation engine that allows individual MSOs to run their proprietary bidirectional applications — such as VOD and PPV — remotely on their servers.

This solution is both quick – it can be deployed by February 2009 transition date
– and fair.

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COMMENTS OF TIVO INC.

TiVo Inc. ("TiVo")¹ hereby submits these comments in response to the *Third Further Notice of Proposed Rulemaking* in the above-captioned proceeding.²

TiVo commends the Commission for recognizing the need for it to immediately intervene in order to develop a solution for bidirectional compatibility between

¹ TiVo offers a personalized television service that allows viewers to take advantage of the convenience of digital technology to customize their viewing experiences using advanced searching and storing mechanisms and a consumer-friendly user interface. Last year, TiVo announced the launch of its TiVo Series3 HD DVR, the world's first THX®-certified digital video recorder. More recently, TiVo released its TiVo HD DVR, bringing competitive HD DVRs to the market at an affordable price. The TiVo Series3 HD DVR and the TiVo HD DVR support up to two CableCARD decoders along with over-the-air ATSC reception and can output standard definition signals to analog televisions and standard definition or high definition to digital televisions. These products act as two independent single stream Unidirectional Digital Cable Products ("UDCP") CableCARD hosts within one set-top box, enabling dual-tuner functionality. They can also be configured to operate as a single CableCARD device using a single stream CableCARD or, in the case of the TiVo HD DVR, a multi-stream CableCARD that provides dual streams. For more information, see www.tivo.com.

² *Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices*, Third Further Notice of Proposed Rulemaking, CS Docket No. 97-80, FCC 07-120 (rel. June 29, 2007) ("*Two-Way FNPRM*").

cable systems and CE equipment. After four years of fruitless negotiations and with the deadline for the digital television transition fast approaching, it is time for the Commission to step in and act to ensure that consumers see the benefit of competition in the market for navigation devices as intended by Congress when it passed Section 629 eleven years ago.

In adopting a two-way compatibility solution, the Commission should ensure that CE manufacturers are able to build two-way devices that use their own distinct user interface to display cable programming. TiVo has distinguished itself and developed a loyal customer following in large part because of its innovative boxes with their distinctive and easy-to-use user interface and other features not offered by cable-provided boxes. In order to fulfill Congress' goal of consumer choice and competition in the navigation devices market, the Commission should ensure that consumers have meaningful choices not just with respect to whether they can buy or lease set-top boxes, but also with respect to the design, features, usability, convenience, and functionality of such boxes. The Commission should also ensure that the two-way compatibility standard achieves the goals identified by CEA in its proposal,³ including safeguarding consumer choice and competition, protecting consumer investment in competitive devices, establishing fair and open technical standards, requiring a level playing field by establishing true common reliance, and removing barriers to innovation.

³ *Two-Way FNPRM* at para. 8, App. B.

Unfortunately, a solution based on the current OCAP regime will not serve the competition and consumer choice goals of Section 629. While OCAP may have theoretical appeal, the reality is that while OCAP may be appropriate for leased boxes, it is simply not practical or technically sufficient for competitive set-top boxes. The technical provisions of OCAP and the additional terms that are in effect via CableLabs licensing agreements operate to let cable operators dictate the design of competitive devices. Because it curtails the freedom of CE manufacturers to design innovative competitive boxes, OCAP currently is inconsistent with the goals of Section 629 and is insufficient to bring to bear the true benefits of two-way compatibility and competition in the navigation devices market.

I. THE COMMISSION IS RIGHT TO FOCUS ON ENSURING BIDIRECTIONAL COMPATIBILITY OF CABLE SYSTEMS AND CE EQUIPMENT

TiVo commends the Commission for recognizing the need for immediate action to find a solution for bidirectional compatibility of cable television systems and consumer electronics equipment. As digital cable television displaces analog cable television and over-the-air NTSC in more and more households and as two-way features such as enhanced EPGs, VOD, and PPV proliferate, common reliance on a bidirectional compatibility solution is needed to ensure that the Commission furthers Congress' goal of ensuring competition in the navigation devices market. Moreover, as the Commission recognizes, enabling common

reliance on a two-way compatibility solution will boost the sales of digital television equipment and spur the digital transition.⁴ As the Commission correctly notes, there have been four years of fruitless industry negotiations regarding a bi-directional solution.⁵ Now, with less than 18 months left before the February 17, 2009 deadline for the digital transition, it is time for the Commission to step in.

TiVo's experience so far suggests that a bidirectional compatibility solution will lead to robust competition in CableCARD-compliant CE equipment. Despite numerous obstacles to adoption for consumers, including lack of access to cable PPV and VOD offerings, TiVo has found that consumers have in fact shown significant interest in acquiring innovative one-way devices. As TiVo and others have informed the Commission,⁶ real world implementation of the Commission's CableCARD requirements has faced numerous problems, including technical problems with the CableCARDs themselves⁷ and foot-

⁴ *Id.* at para. 7.

⁵ *Id.* at para. 5

⁶ See, e.g., Opposition of TiVo Inc. to NCTA Request for Waiver, CS Docket No. 97-80, CSR-7056-Z, at 5 n.7 (filed Nov. 30, 2006); Letter from David B. Yoffie, Professor, Harvard Business School, to Chairman Kevin J. Martin, FCC, CS Docket No. 97-80 (Apr. 11, 2007) (describing problems with obtaining a CableCARD from cable operator); Letter from Arthur Goldschmidt to Chairman Kevin J. Martin, FCC, CS Docket No. 97-80 (Dec. 28, 2006) (same); Letter from Terry L. Thrush, Sr. to Chairman Kevin J. Martin, FCC, CS Docket No. 97-80 (June 22, 2007) (describing problems with activation of CableCARDs by cable operator).

⁷ Stephen H. Wildstrom, *TiVo, Minus the Tangle*, Business Week, July 26, 2007, available at http://www.businessweek.com/technology/content/jul2007/tc20070725_324484.htm (hereinafter "*Wildstrom, Minus the Tangle*") ("In theory, cable subscribers now should be able to buy a box at a retail store, obtain a small device (or two, in the case of the TiVo) called a Cablecard from the cable company, plug it all in, and be up and running. The

dragging by the cable industry, reflected by inadequate information for consumers, inconsistent and inaccurate billing practices, uninformed customer service representatives, supposed supply shortages, “negative marketing,” implementation of switched digital services,⁸ and strong marketing by cable operators of their own leased DVRs.

Despite these obstacles, TiVo has managed to significantly increase the number of CableCARDs in circulation with a Series3 Dual Tuner HD DVR released last year with a retail price of \$799 – referred to by a noted technology reviewer as the “Lexus of video recorders.”⁹ TiVo is now introducing its TiVo HD Dual Tuner DVR boxes with a retail price of \$299, and this new box can be

reality is something else: It took [cable company] installers two trips to my house – a total of about four hours' work – and extensive consultations with TiVo technicians to get the unit running properly. This isn't going to cut it. Cable operators and their research arm, CableLabs, must make plug-and-play a reality or the cost will be ruinous. Once the TiVo was working, it was a delight.”); Rob Pegoraro, *Getting CableCarded* (Aug. 15, 2007), at

http://blog.washingtonpost.com/fasterforward/2007/08/getting_cablecarded.html (“[The cable company] installer showed up late – 2 hours and 40 minutes past the service window – and with two defective CableCARDs, identifiable as such by the ‘BAD’ stickers on each.”)

⁸ Cable operators are increasingly using “switched digital” technology for adding new programming channels. Since switched digital is a bidirectional technology, those channels cannot be received by consumers using unidirectional CableCARD devices. See Ex Parte filing by Consumer Electronics Association et al., CS Docket No. 97-80, at 4 n.8 (filed Nov. 7, 2006) (“CEA Proposal”) (describing the switched digital issue); <http://www.tivocommunity.com/tivo-vb/showthread.php?t=357703> (general discussion of switched digital); <http://www.tivocommunity.com/tivo-vb/showthread.php?t=362981> (switched digital launch in Fairfax County, Virginia). To its credit, the cable industry has recognized that unidirectional CableCARD customers should be able to receive these channels, and engineers from the cable industry and TiVo are working together to create a solution that will enable unidirectional CableCARD devices to receive switched digital channels. See Letter from Neal M. Goldberg, NCTA, to Marlene H. Dortch, Secretary, FCC, CS Docket No. 97-80, at 3 (June 5, 2007).

⁹ David Pogue, *Costly, Sure, but It's Nirvana for TiVo Fans*, September 21, 2006, New York Times, Sep. 21, 2006, at C1 (hereinafter “Pogue, *Nirvana for TiVo Fans*”).

expected to further increase the use of CableCARDs in retail devices.

Importantly, both the TiVo Series3 HD DVR and TiVo HD DVR boxes come with features that the cable operators have not made available to consumers, including online scheduling, integration of broadband content, advanced search capabilities, the “recently deleted” folder, overtime scheduler, smart padding, overshoot correction, audio podcasts, movie and television downloads from Amazon.com, broadband video from the New York Times, CNET and The Onion, home movie sharing, and TiVo KidZone parental controls, not to mention the award-winning TiVo user interface and ease of use.¹⁰ TiVo’s innovation and price competition, as well as its acceptance by consumers, validates the Congressional competitive policy and the Commission’s confidence in the advantages of competition in the navigation devices market.

While TiVo’s experience suggests that there is strong consumer demand for two-way compatible CableCARD devices, the Commission is right to note that barriers exist that have kept the market for competitive devices from

¹⁰ Numerous commentators have favorably compared TiVo DVRs to cable company provided navigation devices. See, e.g., Pogue, *Nirvana for TiVo Fans* (“And yet most people considering a digital video recorder (DVR) these days don’t get TiVo’s. They rent generic boxes from cable companies. Now, *these boxes are to TiVo as an oxcart is to a Maserati*; their creators, it’s painfully clear, do not share TiVo Inc.’s obsession with polish and elegant simplicity”) (emphasis added); Wildstrom, *Minus the Tangle* (“It’s a source of endless astonishment to me that in the eight years since the first TiVo box hit the market, the cable companies and the two makers of most of their set-top boxes, Motorola (MOT) and Cisco’s (CSCO) Scientific Atlanta, have never come close to matching TiVo’s ease of use. *TiVo still runs rings around the cable carriers’ best boxes with its speedy response to remote-control clicks, its well-organized and easy-to-search program guide, and its really fast fast-forward*”) (emphasis added); Andy Ihnatko, *Competitors Prove TiVo At Tops of Its Game*, Chicago Sun-Times, Aug. 16, 2007.

reaching its true potential.¹¹ The failure of one-way devices to make large inroads into the market is largely a self-fulfilling prophecy, because CE manufacturers have been prevented from making fully-competitive set-top boxes. Meanwhile, the cable industry markets digital cable by touting the ability of leased set-top boxes to receive all cable programming services (including VOD) and denigrates competitive set-top boxes by pointing out to consumers that those devices cannot receive switched digital, interactive program guides, and VOD – and may not be able to receive premium channels, high definition channels, or even basic and digital cable channels.¹²

¹¹ *Two-Way FNPRM* at para. 5 (“It is apparent that consumers have not shown significant interest in one-way devices, which cannot access features such as EPGs, VOD, PPV, and other ITV capabilities provided by cable operators.”); *id.* at para. 7 (“We believe that the lack of two-way functionality on digital cable ready devices is deterring consumers from purchasing digital televisions, which are an essential part of an effective digital transition.”). See also Pogue, *Nirvana for TiVo Fans* (“But today’s CableCard is a one-way device. It can’t send signals back to the cable company, which means that you can’t order pay-per-view movies. If you consider that a sacrifice, skip the new TiVo – or else keep a cable box on hand for pay-per-view use, connected to a different TV input”). Requiring consumers to make a choice between popular cable services and a competitor’s navigation device (or keep a cable company provided box on hand) cripples the market for competitive navigation devices and is certainly not what Congress intended when it passed Section 629.

¹² See Time Warner Cable of Central Texas, *CableCARD FAQs*, at http://www.timewarnercable.com/centraltx/Products/Cable/CableCard_SA.html (last visited August 23, 2007) (highlighting that the *only* services that a consumer using a unidirectional CableCARD can be guaranteed to receive is “crystal-clear picture and sound”).

II. COMMON RELIANCE ON A SINGLE BIDIRECTIONAL COMPATIBILITY STANDARD IS NEEDED TO FULFILL THE CONGRESSIONAL GOAL OF PROMOTING COMPETITION IN THE MARKET FOR NAVIGATION DEVICES

Common reliance on a single bidirectional compatibility standard serves the Congressional intent of promoting competition in the marketplace for navigation devices. As the Commission noted when it adopted the rule, such an integration ban would further the goal of Section 629 of the Communications Act by “facilitat[ing] the development and commercial availability of navigation devices by permitting a larger measure of portability among them, increasing the market base and facilitating volume production and hence lower costs.”¹³ The Commission noted that integration of security and non-security functions “is an obstacle to the functioning of a fully competitive market for navigation devices by impeding consumers from switching to devices that become available through retail outlets”¹⁴ and that requiring the separation of security would “allow[] manufacturers to provide a diverse array of equipment.”¹⁵

In enacting Section 629, Congress stressed the importance of such competition in the navigation devices market, saying that “[c]ompetition in the manufacturing and distribution of consumer devices has always led to

¹³ *Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices, Report and Order, CS Docket No. 97-80, FCC 98-116, para. 49 (rel. June 24, 1998) (“First Report and Order”).*

¹⁴ *First Report and Order, para. 69.*

¹⁵ *First Report and Order, para. 61.*

innovation, lower prices and higher quality.”¹⁶ When the Commission later decided to maintain the integration ban, it noted that common reliance would “help ensure that as the navigation devices market continues to mature, consumers will be able to experience the benefits of choice in the navigation devices market.”¹⁷

The principle of requiring compatibility standards to enable competition in the market for communications equipment – leading in turn to consumer benefits in the form of greater innovation, lower prices, and higher quality – is one of the most settled and successful principles in telecommunications policy. The principle dates back to the seminal *Carterfone* decision,¹⁸ and demonstrates that the public interest is best served when consumers have a wide array of equipment choices and are not limited to equipment supplied by a bottleneck network operator. Outside of the cable arena, this principle was followed in the wireline telephone market, the enhanced services market in the Commission’s

¹⁶ H.R. Rep. No. 104-204, at 112 (1995).

¹⁷ *Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices*, Second Report and Order, CS Docket No. 97-80, FCC 05-76, para. 30 (rel. Mar. 17, 2005) (“*Second Report and Order*”).

¹⁸ *Use of the Carterfone Device in Message Toll Telephone Service*, 13 FCC 2d 420, 424-25 (1968).

Second Computer Inquiry proceeding,¹⁹ and, most recently, in the wireless arena in the Commission's recent *700 MHz Auction Order*.²⁰

In the recent *700 MHz Auction Order*, the Commission adopted service rules that require the winner of the 700 MHz C Block license to provide open platforms for devices and applications. In doing so, the Commission's goal was to "encourage additional innovation and consumer choice . . . by removing some of the barriers that developers and handset/device manufacturers face in bringing new products to market."²¹ The Commission also noted that by "fostering greater balance between device manufacturers and . . . service providers," its goal was to "spur the development of innovative products and services."²² The Commission's goal in the cable set-top box arena is much the same – *i.e.*, establish an open standard for true two-way compatibility, which would foster greater balance between CE equipment manufacturers and cable operators and promote the development of independent innovative digital cable ready devices.

¹⁹ *Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry)*, Final Decision, 77 FCC 2d 384; *modified on recon.*, 84 FCC 2d 50 (1980); *further modified* 88 FCC 2d 512 (1981), *aff'd sub nom.*, *Computer and Communications Industry Ass'n v. FCC*, 693 F.2d 198 (D.C. Cir. 1982), cert. denied, 461 U.S. 938 (1983), *aff'd on second further recon.*, FCC 84-190 (rel. May 4, 1984).

²⁰ *Service Rules for the 698-746, 747-762, and 777-792 MHz Bands*, WT Docket No. 06-150, at ¶¶ 189-230 (rel. Aug. 10, 2007) ("*700 MHz Auction Order*").

²¹ *700 MHz Auction Order* at ¶ 201.

²² *700 MHz Auction Order* at ¶ 201.

III. THE BIDIRECTIONAL COMPATIBILITY SOLUTION MUST ENSURE TRUE COMPETITION FOR SET-TOP BOXES BY SAFEGUARDING CONSUMER CHOICE AND ENSURING THAT CE MANUFACTURERS HAVE THE FREEDOM TO DESIGN INNOVATIVE DEVICES

A. CE Manufacturers Must Be Able To Build and Sell Devices Using Their Own Desired User Interface

As the Commission adopts a two-way compatibility requirement in this proceeding, it must make absolutely clear that CE manufacturers are permitted to build bidirectional cable devices that use the CE manufacturer's own user interface to display cable programming signals. A standard that ensures such freedom for CE manufacturers with respect to user interfaces would ensure that consumers see the benefit of competitive devices with respect to their functionality and not simply their brand and price. Moreover, without the freedom to design their own user interface, companies like TiVo that have established brand loyalty in large measure because of a superior user interface would be unlikely to build a navigation device with a user interface that did not meet its high standards of usability or did not do justice to its brand image.²³

The cable industry promotes the view that all features of navigation devices are part of the cable service to which a consumer subscribes, and,

²³ The user interface is a key product differentiator for TiVo. *See, e.g.,* Andy Ihnatko, *Competitors Prove TiVo At Tops of Its Game*, Chicago Sun-Times, Aug. 16, 2007 ("A TiVo is about as easy to operate as an iPod. Way before cell phones got a hang of the concept, the TiVo proved that you could have a slick, simple and highly modern graphical user interface based solely on four directional arrow keys and an "OK" button."); Pogue, *Nirvana for TiVo Fans*. TiVo employs talented designers and user experience experts, and expends significant resources during product development on its user interface.

therefore, all devices must present interactive cable services exactly as they would be presented by a leased cable set-top box that is controlled and designed by the cable operator.²⁴ However, such an assumption is inconsistent with how consumers view products and services they purchase, particularly when they buy competitive devices. Consumers expect greater differentiation in features and more flexibility from, as well as greater user control over, devices that they own compared to equipment that they lease from the cable operator. Such consumer expectations are even more likely as consumers pay several hundred dollars for their own competitive navigation devices which, like TiVo's boxes, add value over the leased set-top boxes offered by cable operators.

Congress's goal as expressed in Section 629 was to enable competition in the market for navigation devices, providing consumers with meaningful choices not simply in whether they can buy set-top boxes versus lease them, but also with respect to the design, features, usability, convenience, and integration of functions of such boxes. Permitting cable operators to expand their control over cable service to the point where they dictate how all menus for cable programming are displayed would effectively deprive consumers of choices in competitive navigation and home network devices that are made available in the retail market. Cable operators should not be permitted to exercise control over the design of competitive products in the guise of controlling cable service; such

²⁴ See, e.g., Verizon's Petition for Waiver of the Set-Top Box Integration Ban, 47 C.F.R. § 76.1204(a)(1), CS Docket No. 97-80, CSR-7042-Z, at 31-32 (filed July 10, 2006) ("Verizon Waiver Petition").

control is unjustified and would stifle the innovation that Section 629 sought to foster. In the *Carterfone* analogy, the consumer is intended to have a full range of choice over all features and aspects of the hardware he or she purchases, limited only by the requirement that it cause no technical harm to the network. The same standard applies in cable.²⁵

In short, manufacturers of competitive navigation devices *must* be able to run their own user interface on their devices. If CE manufacturers are limited to building devices that have exactly the same look and feel as the boxes that consumers can lease from their cable provider, then TiVo would likely not produce bidirectional navigation devices as it does not believe that it could build a compelling product that consumers would buy in sufficient numbers. Moreover, providing a non-TiVo user interface would damage TiVo's brand equity. There is little room for innovation in navigation devices if cable operators are permitted to extend their network "service" to the user interface.

B. The Bidirectional Compatibility Solution Must Provide CE Manufacturers With Sufficient Incentives to Innovate and Must Protect Consumer Investment in Competitive Devices

TiVo welcomes the Commission's decision to act to further the adoption of a solution for bidirectional compatibility of cable television systems and consumer electronics equipment. Such a solution must have the following attributes:

²⁵ See 47 C.F.R. § 76.1201.

1. Set-top Boxes Must be Able to Run the Device Maker's User Interface

As discussed above, the bidirectional compatibility standard adopted by the Commission must enable CE manufacturers to design devices using their own user interface. Such flexibility is critical to fostering competition in the navigation devices market and will enable consumer choice with respect to device design and features in addition to price and brand.

2. The Bidirectional Compatibility Solution Must Protect Consumer Investment

The bidirectional compatibility standard must protect consumer investment in the devices that they purchase by ensuring that such devices are able to function as designed by the manufacturer. The standard must not permit cable operators to limit the functionality of devices for any reason except to prevent signal theft or for other legitimate security reasons (*i.e.*, the *Carterfone* standard of preventing technical harm to their network). The standard must also prevent competitive consumer devices from becoming inoperable or obsolete prematurely.²⁶

3. All Set-top Boxes Must Have Access to a Single, Nationally Interoperable Security Interface

Any downloadable conditional access standard *must* be nationally portable and relied upon by both cable operators and competitive set-top box manufacturers. Simply put, common reliance means that *all* cable operators and

²⁶ CEA Proposal at 3.

all set-top box manufacturers rely on the *same* conditional access security system. Fragmenting the standard by permitting separate MSO-specific standards would require consumers to scrap their navigation devices when they change cable systems and destroy common reliance and national portability. Moreover, such a downloadable security interface must be licensed under reasonable and non-discriminatory terms and conditions that are publicly disclosed. Further, downloadable security must be limited to hardware and software truly necessary for conditional access support, and must not require CE manufacturers to implement extraneous, unrelated technologies such as OCAP. For example, the DCAS proposal offered by NCTA ties the implementation of DCAS to OCAP. Yet, OCAP has nothing to do with implementing an effective downloadable security system.²⁷ Finally, in order to ensure that competitive device manufacturers are able to design products using such an interface, they should be able to seek device certification through a defined compliance certification process administered through a government agency or a standards body that is representative of the entire CE and MVPD industries and not simply the cable industry.²⁸

On this issue, TiVo strongly supports the comments of the Consumer Electronics Association (“CEA”), filed on July 5, 2007, in this proceeding in which

²⁷ See Verizon Waiver Petition at 31.

²⁸ After initial certification, manufacturers should be permitted to self-certify that their devices comply with the applicable standard. The same certification process should apply to the entire two-way compatibility standard, not simply the security aspect of set-top box devices.

it addressed the issue of common reliance, downloadable conditional access systems, and the need for a single industry-wide solution.²⁹ As CEA explains, the Commission must not permit individual cable operators to develop their own separable security solutions, as such an outcome would prevent competitive device manufacturers from building devices that consumers could use with a variety of cable providers, in effect defeating the Commission's decade-long effort to implement Section 629. TiVo believes that a bidirectional solution that lacks a nationally portable and interoperable security interface cannot succeed in the retail marketplace.

4. The Compatibility Solution Must Have the Remaining Attributes Discussed by CEA

The bidirectional compatibility standard should satisfy all the consumer-oriented principles discussed by CEA in its proposal.³⁰ In addition to protecting consumer investment, as discussed above, the bidirectional compatibility regime must safeguard consumer choice and competition by: (1) giving consumers and CE manufacturers the freedom to engage in all lawful and nonharmful activities with respect to content viewed and stored on their devices; (2) establishing fair and open technical standards; (3) ensuring a level playing field by requiring common reliance by cable operators and CE manufacturers; and (4) removing

²⁹ Comments of CEA on Six Requests for Waiver of 47 C.F.R. § 76.1204(a)(1), CS Docket No. 97-80 (filed July 5, 2007).

³⁰ CEA Proposal at 3-4; *see also* CEA Appendix to Joint Proposal to FCC, CS Docket No. 97-80, at 2-3 (Nov. 30, 2005).

barriers to innovation that currently exist, for example, via certification requirements.

C. The Commission Must Remain Involved In the Adoption of Bidirectional Compatibility Standards

The Commission must remain involved in the process of adopting a bidirectional compatibility standard and should not delegate decision-making to CableLabs or any other organization controlled by a stakeholder. As the Commission has recognized, the industry-only efforts have not been effective in developing two-way compatibility between cable systems and CE devices despite having been ongoing for over four years.³¹ Moreover, given the upcoming hard deadline for the digital transition, the Commission should not risk further delay by disengaging from the process at this critical time. The Commission is best positioned, and has the clearest responsibility, to take into account the interests of both competitive device manufacturers and cable operators (and other MSOs) and to keep the process moving on schedule.

IV. A SOLUTION BASED ON THE CURRENT OCAP REGIME WILL NOT SERVE THE CONGRESSIONAL GOAL OF COMPETITION IN THE NAVIGATION DEVICES MARKET

A. The Problem with OCAP

While aspects of the OpenCable Application Platform (“OCAP”) concept may have theoretical appeal, the Commission must divorce the theory of OCAP

³¹ *Two-Way FNPRM* at para. 5 (describing the “disappointing” progress of industry-led negotiations toward an agreement on bidirectional compatibility).

from the reality. Although it is true that the Java programming language, which is the basis of OCAP, makes it technically possible for “software developers to write applications and programs that would run on any OCAP-enabled device,”³² the additional requirements that CableLabs has introduced into OCAP via the Cable Host Interface Licensing Agreement (“CHILA”) and the OCAP Implementers License Agreement (“O-ILA”) (collectively referred to hereinafter as the “OCAP licensing requirements”) make it impractical and insufficient for use by competitive retail navigation devices.

OCAP may be an appropriate standard for leased boxes, but that does not make it practical or even technically sufficient for the competitive retail devices envisioned by Section 629. The fact that operators themselves have taken several years to roll out OCAP on devices and networks they fully own and control should give some indication of the complexity of OCAP and that it is not practical for retail devices.³³ Indeed, this practical complexity is a significant reason why no OCAP-based boxes are sold at retail today.

³² *Id.* at para. 6.

³³ Even if TiVo could build an OCAP-based retail box, testing and certifying that box would be extraordinarily difficult. One only has to look at the CableCARD situation today. Even though CableLabs “certifies” CableCARDs and host devices, they often do not interoperate properly in the field. This is due in part to the fact that the CableCARD specification is not sufficiently complete to ensure thorough testing. In addition, because they are not vendors to CE companies, the CableCARD vendors are often not responsive to requests to fix bugs in the cards. These problems persist despite UDCP being a relatively simple technology with a performance component against which CE manufacturers at least can test their products. Unlike UDCP, the OCAP is complex and the specification lacks a performance component. Consequently, there is no mechanism for a CE company to build a retail device that can be tested to ensure it will perform adequately in the field.

Moreover, even if OCAP were practical for TV sets, it would not enable consumer choice with respect to set-top devices that lie in between a TV monitor and the cable pipe because OCAP was not designed or developed to support multifunction devices with non-cable related features. Indeed, the OCAP licensing requirements, at present, prevents or, at least, interferes with the range of functions that competitive set-top boxes could otherwise offer to consumers.

The OCAP specifications allow the MSO, and not the CE manufacturer, to control the user interface and functionality of the set-top boxes used with their systems.³⁴ The Monitor Application ensures that only programs authorized by the MSO will run on an OCAP-enabled device. Thus, any program that tries to use the two-way capabilities built into OCAP or downloaded onto the middleware by the manufacturer, must first be authorized by the MSO before it will run on a set-top box. This would be analogous to a consumer buying a new computer with Internet-enabled software applications such as Skype, Google Earth and eBay, only to find that these applications will not run unless the consumer's ISP has "authorized" the programs since they use the ISP's network – and if the ISP authorized the programs, the ISP may replace the user interfaces for these programs with a version which the ISP prefers.

³⁴ See Verizon Waiver Petition at 31-32; CEA Appendix to Joint Proposal to FCC, CS Docket No. 97-80, at 2-3 (Nov. 30, 2005); OpenCable Application Platform Specifications, OCAP Profile 1.1, OC-SP-OCAP1.1-I01-061229, at Section 10.2.2.4 (issued December 29, 2006).

As it is currently defined, the OCAP licensing requirements lock out any program or innovation by a device manufacturer unless the manufacturer has a separate agreement with every MSO. For example, TiVo could not write an application for displaying VOD in a TiVo user interface because there are no VOD application protocol interfaces (“APIs”) in OCAP. Under the current OCAP specification and licensing language, cable applications can control product resources and disable applications that are part of a competitive set-top box or that were installed by the owner on such a device. Thus, even if CableLabs created APIs for VOD and TiVo created a VOD application, an individual MSO could refuse to allow the application to run on a box sold to a consumer by TiVo.

While OCAP is designed as a platform upon which interfaces can be built to access services provided by cable operators, it is not a complete or sufficient solution for device manufacturers building boxes that access those services. The present OCAP specification intentionally omits critical technical elements needed for the design of competitive set-top boxes with two-way functionality. For example:

- OCAP does not provide a way to access the program guide that the consumer has paid for as part of his or her cable service and is currently provided to all leased digital set-top boxes.
- As currently defined in OCAP, the cable operator will be able to download the missing components of OCAP to allow only the cable operator’s user interface to access the program guide service.

- The same is true for PPV, VOD, switched digital, Video Mosaic, and other interactive and non-interactive cable services – OCAP allows cable operators to control the presentation of these services, but does not allow CE manufacturers to access or control the presentation of these same services.
- The MSO is able to download its own applications that contain these missing pieces, written in OCAP, but these missing pieces are NOT available to any other application running on a competitive set-top device.
- OCAP takes control over customers’ devices by requiring that the devices use proprietary applications to access services like VOD. This limits a device manufacturer’s ability to present its customers with a unified and logical graphical user interface. OCAP thus enables the cable operator to control the look and feel of a set-top device. This limits a manufacturer’s ability to innovate and differentiate its products and thereby limits choice in the marketplace.

In effect, it is as if the OCAP specification allowed TiVo to build a car chassis but only the cable operator can supply the engine – the performance of the vehicle is completely controlled by the cable operator and TiVo cannot differentiate its product from that of other set-top box manufacturers. Under such circumstances, TiVo simply lacks the ability to innovate and build competitive products as envisioned by Section 629.

B. The Current OCAP Proposal Does Not Comply With Section 629

Section 629 was designed to:

assure the commercial availability, to consumers of multichannel video programming and other services offered over multichannel video programming systems, of converter boxes, interactive communications equipment, and other equipment used by consumers to access multichannel video programming and other

services offered over multichannel video programming systems³⁵

Congress recognized that MVPDs have “a valid interest, which the Commission should continue to protect, in system or signal security and in preventing theft of service.”³⁶ Congress thus required that “[t]he Commission shall not prescribe regulations . . . which would jeopardize security of multichannel video programming and other services offered over multichannel video programming systems, or impede the legal rights of a provider of such services to prevent theft of service.”³⁷ In enacting its regulations implementing the Congressional mandate and giving effect to the *Carterfone* “do no harm” standard, the Commission required cable operators not to prevent “the connection or use of navigation devices to or with” its system “except in those circumstances where electronic or physical harm would be caused by the attachment or operation of such devices or such devices may be used to assist or are intended or designed to assist in the unauthorized receipt of service.”³⁸

However, the cable industry, through OCAP and CHILA licensing requirements, has gone far beyond the intent of this requirement by effectively redefining the phrase “harm to service.” Though this phrase was intended to protect the physical cable system and prevent theft of service, the cable industry

³⁵ 47 U.S.C. § 549(a).

³⁶ H.R. Rep. No. 104-204, at 112 (1995).

³⁷ 47 U.S.C. § 549(b)..

³⁸ 47 C.F.R. § 76.1201.

has attempted to extend its meaning.³⁹ OCAP is currently designed to protect the operator's monopoly on presenting and controlling services under the guise of preventing "harm to service." Cable operators' control of the user interface, as mandated technically in the OCAP specification via the monitor application, and legally via the CHILA and O-ILA licenses, goes beyond protection of the physical network or preventing theft of service. The restrictions OCAP places on design are in place only to protect the cable operator's ability to control the total user experience when the device is no longer one leased by them, and severely restrict the ability of the CE manufacturer to provide unique value to the consumer by innovating in user interfaces or how cable programming is offered to consumers.

In addition to OCAP's technical provisions, the CHILA license – which is the only available license for developing a bidirectional navigation device – places fundamental restraints on features, functionality, and innovation that far exceed the ordinary meaning of "harm to network" or "theft of service." Section 629's objective of competition and innovation in the navigation devices market cannot be achieved under CHILA's "take-it-or-leave-it" licensing terms for fundamental technology necessary to build bidirectional cable devices.

In their current form, OCAP and CHILA license requirements simply are not sufficient to meet the requirements of Section 629, since they do not permit *competitive* devices to access any enhanced cable services, including bidirectional

³⁹ As described above, the licenses offered by CableLabs impose potential constraints on competitive features and functions that go well beyond protection against harm to the network or theft of cable services.

services. Of course, OCAP and CHILA could be modified to correct these deficiencies. By illustration and not limitation, for example, OCAP presently defines open APIs for access to basic broadcast channels, but does not include open APIs for capabilities such as interactive services. As CableLabs has done with DVR and home networking capabilities, OCAP can be extended to include open APIs for these additional capabilities. Similarly, CableLabs can be directed to publish open APIs for the missing components of OCAP – two way services such as VOD, PPV, SDV and EPG.

However, given that such changes to OCAP are not likely to happen voluntarily or in the immediate future (if ever) and given the urgency of the hard deadline for the digital transition and the need to spur the development of competitive digital cable ready navigation devices, TiVo proposes the interim solution set out below.

V. TIVO PROPOSES AN INTERIM TWO-WAY SOLUTION THAT WILL BRING TO CONSUMERS THE BENEFITS OF COMPETITION WITHOUT FURTHER DELAY

Given the choice between the current OCAP regime proposed by NCTA and CEA's November 7th proposal, TiVo has to support the CEA proposal since, as explained above, the current OCAP regime simply does not allow TiVo to build a competitive bidirectional product. As explained above, the current OCAP regime is no choice at all since the technical provisions of OCAP and the additional terms that are in effect via CableLabs licensing agreements prevent

TiVo from dictating the design and functionality of its product. Although the purity of its offering may suffer to some extent, however, TiVo believes that some concessions may be necessary for consumers to realize the benefits of competition as promised by Section 629 in the near term, which in turn will promote the sale of digital cable ready devices and the DTV transition. TiVo thus proposes an interim solution below that reflects a compromise that would assure that all parties' interests are adequately met in today's market.

TiVo has created an efficient network-based client-server protocol using open standards for hosted applications. This protocol, which TiVo calls the Home Media Engine ("HME") protocol, supports efficient rendering of modern multimedia user interfaces on remote devices, reporting remote control and other events back to a server running an application.⁴⁰ The HME protocol is efficient, agile, thin and scalable. While HME was designed for graphics-rich multimedia applications served over unmanaged IP networks, the protocol will operate over any suitable network transport interface, such as bi-directional CableCARD. Applications can be quickly modified, upgraded and tested on the server without changing the code on the client (*i.e.*, set-top box). Client requirements are minimal, simply displaying text, pictures, audio, video and graphical elements as dictated by the server application. Perhaps most

⁴⁰ An early reference implementation of the TiVo HME protocol was released as open source in 2005, and can be found at <http://tivohme.sourceforge.net>. TiVo has been evolving and enhancing the protocol and its supporting toolsets internally since that time, using it to deploy an increasing number of production applications.

importantly, TiVo already uses HME servers today to support millions of HME clients.⁴¹

TiVo believes that competitive CE manufacturers should be permitted to build non-OCAP bidirectional boxes that receive all programming channels offered by MSOs provided on a per channel basis and include a presentation engine such as HME that allows individual MSOs to run their proprietary bidirectional applications – such as VOD and PPV – remotely on their servers. Such two-way applications could be invoked on the competitive box through its native user interface.⁴² In this way, each MSO could control the presentation of their bidirectional applications without having to redesign the cable architecture and without needing the competitive set-top box manufacturer to do any development work. Under this proposal, cable operators can use OCAP for their leased boxes if they so desire; however, CE manufacturers' devices can but need not run OCAP. This solution is both quick and fair – it can be deployed by February 2009 transition date; it addresses the cable industry's concern about controlling the presentation of their proprietary bidirectional applications such as VOD and PPV; and it lets MSOs run their own applications without

⁴¹ TiVo uses HME technology today for, among other things, its Swivel search feature, Fandango, Live 365, Podcaster, Yahoo! Photos, and Yahoo! Weather applications, as well as to present the TiVo user interface on Comcast's leased DVR set-top boxes in the soon-to-be released Comcast-TiVo DVR service.

⁴² In order to keep their product(s) competitive, the competitive set-top supplier should have every incentive to ensure that entry to server-based services is easy and works well. Similarly, MSOs should have every incentive to ensure that the applications work well, as they derive revenue from these services and they are clearly elements of the cable service.

interfering with CE manufacturers ability to design competitive navigation devices. Such a solution would ensure that consumers finally are able to benefit from competition and innovation in the market for navigation devices as intended by Section 629. Were the Commission to favor this proposal, TiVo would promptly work with appropriate standards bodies to evolve HME into a suitable industry standard for creating such applications.

This proposed solution is “interim” because it would not result in retail boxes that support all interactive operator services. A fully-functional bidirectional retail set-top box would either require substantial modifications to OCAP and its licensing regime, or implementation of the CEA proposal. While TiVo wishes to create such a fully-functional bidirectional box in the future, we recognize that neither of these approaches would yield a retail device that could be deployed by Christmas 2009, much less the February 2009 transition date.

VI. THE ADOPTION OF A BIDIRECTIONAL COMPATIBILITY STANDARD SHOULD NOT BE DELAYED IN ORDER TO FIND A SOLUTION FOR NON-TRADITIONAL “CABLE OPERATORS” OR OTHER MVPDS

The Commission asks whether “all MVPDs – including DBS and wireline video providers – should be subject to any rules that [the Commission] adopt[s] to promote bidirectional compatibility between cable television systems and consumer electronics equipment.”⁴³ TiVo welcomes the adoption of bidirectional compatibility standards for all MVPDs, as such standards would enable CE

⁴³ *Two-Way FNPRM* at para. 13.

equipment to be easily designed to work with all MVPD platforms, further enabling economies of scale and promoting competition in the device market. However, any such cross-platform effort should not be used as an excuse for slowing down bidirectional compatibility standards for cable systems, which have been discussed for a decade. In addition, while a universal compatibility standard is certainly desirable, differing architectures of cable, satellite and IP-based networks may necessitate different bidirectional compatibility standards for each of these MVPDs such that TiVo could build a cable box, a satellite box and an IP-based network box. While TiVo would certainly prefer to build one box that works across all MVPD platforms, it simply may not be realistic. In any event, separate timetables for satellite and IP-based MVPDs would seem most practical as such network operators have not had as much time to prepare for such standards as have cable operators.

* * *

TiVo applauds the Commission for recognizing the need to take action to develop a solution for bidirectional compatibility between cable systems and CE equipment. TiVo looks forward to working with the Commission and other interested parties in achieving such a solution and finally bringing to consumers the benefits of competition in the set-top box market as envisioned by Congress when it enacted Section 629.

Respectfully submitted,

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