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

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
)
Implementation of Section 304 of the)
Telecommunications Act of 1996)
)
Commercial Availability of)
Navigation Devices)

CS Docket No. 97-80

COMMENTS OF VIACOM INC.

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EXECUTIVE SUMMARY

Rules adopted by the Commission in this proceeding should ensure that digital navigation devices which are commercially available at retail be universal in the sense that they are: (i) portable from locale to locale; (ii) standardized so that different modes of multichannel programming distribution (e.g., cable, DBS, MMDS, over-the-air digital multiplexed broadcast signals) can all be processed through a single device, thereby facilitating consumer choice in selecting, from time-to-time, different preferred providers of programming; and (iii) be secure from signal piracy.

In order to be secure from signal piracy, the device must have a separated security system that is not commercially available at retail but whose distribution and inventory is controlled by the MVPD whose signal is secured by the device. Consequently, the current universe of deployed analog devices, which have their security mechanisms embedded in the device itself, must not be made commercially available. Only the next generations of digital devices could meet these standards, and it is those devices which are to be subject to any commercial availability mandate.

The Commission must particularly act quickly in setting the rules for commercial availability of new devices which will shortly be deployed for receipt of digital terrestrial broadcast signals (be they SDTV multicast or HDTV or some combination thereof). The Commission has mandated an aggressive rollout of DTV, and it can be expected that, at least for a number of years, viewers will utilize a set-top converter device to process DTV signals so that they need not purchase more expensive DTV monitors. These set-top devices must be capable of processing all possible formats which broadcasters may use for their DTV transmissions. No single broadcaster or MVPD can be afforded an opportunity (by virtue of a failure in the Commission's rules to address the matter) to position itself as a gatekeeper by virtue of its wide-spread early deployment of a DTV set-top box containing proprietary technology that would be

capable of locking out the digital signals of other, later-to-market competitive broadcasters or MVPDs. Open architecture DTV set-top boxes capable of processing all available DTV signals and unable to lock out any particular DTV signal must be mandated so that a gatekeeper scenario does not arise in the context of DTV.

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To the Commission:

Comments of Viacom Inc.

Viacom Inc. ("Viacom") respectfully submits these Comments in response to the *Notice of Proposed Rule Making*, FCC 97-53 (released February 20, 1997) ("*Notice*"), in the above-captioned proceeding.

I. Introduction

By this *Notice*, the Commission solicits comment on proposals to implement Section 629 of the Communications Act,¹ which directs the Commission to adopt regulations to assure the "commercial availability" of set-top boxes and other customer premises equipment from manufacturers, retailers and other vendors not affiliated with

¹ 47 U.S.C. §549.

any multichannel video programming distributor ("MVPD"). Section 629 of the Act was added to the Communications Act as part of the Telecommunications Act of 1996 ("1996 Act").²

Through its cable networks, UPN television network and syndicated programming, Viacom is a program supplier, and through its owned and operated broadcast television stations, Viacom is a program distributor. Specifically, Viacom wholly owns several basic cable television networks, including MTV: Music Television, M2: Music Television, VH1, Nickelodeon/Nick at Nite, and Nick at Nite's TV Land, and the premium channels Showtime, the Movie Channel and Flix. Viacom also owns SET Pay Per View, a distributor of sports and other event programs. Additionally, Viacom co-owns basic cable networks, including USA Network, Comedy Central, Sci-Fi Channel, and All News Channel, and premium cable network Sundance Channel. Through its Paramount Pictures subsidiary and through its majority ownership of Spelling Entertainment Group, Viacom also produces network programs and produces and distributes syndicated television programs and engages in the distribution of off-network product. Viacom is also the 50%-owner of UPN, a nascent broadcast television network. In addition, subsidiaries of Viacom hold licenses of eleven television stations.

Viacom has long been vitally interested in the widespread commercial availability of navigation devices that could otherwise serve as gateways to Viacom programming. Indeed, Viacom has utilized every opportunity to propound its belief that the Commission must promote universal and multi-choice features of digital navigation devices so as to help preclude the MVPD providers of such devices from becoming de facto gatekeepers of what American consumers may view. And in this proceeding, in

² Pub. L. 104, 110 Stat. 56 (1996).

which the competitive availability of navigation devices is an issue squarely before the Commission, Viacom continues to urge the Commission to adopt measures that advance the principles of universality of digital set-top boxes, which, Viacom asserts, is consistent with the statutory directives of Section 629.

Acknowledging the realities of the existing marketplace and the vast number of deployed analog set-top devices, Viacom advocates that the Commission adopt rules that *going forward* in the digital era promote the general universality of digital navigation devices so that, for example, a single device could access cable, DBS, MMDS, terrestrial digital TV and other distribution modes of programming. However, in light of the impending roll out of terrestrial digital television ("DTV"), the Commission must act now to ensure that when DTV set-top boxes, in particular, are deployed, there is no opportunity for DTV gate keepers to establish themselves by virtue of their pre-emptive distribution of DTV set-top boxes containing proprietary technologies. These first-in boxes could be used to impede the distribution of competitors' multiplexed DTV signals and thereby generally thwart the development of DTV. Rules are necessary to guard against this possibility and will require standardization of certain portions of the navigation devices, with the concomitant separation of proprietary security systems from those standard elements. Because the proprietary security system of each MVPD (including digital broadcasters) will be separated from the standardized, non-proprietary elements of the navigation device, the universal features of the set-top box, as advocated by Viacom, will not jeopardize the security of any MVPD's system.

In short, Viacom advocates in this proceeding the following:

(1) That the Commission adopt rules, consistent with Section 629, which promote the universality of digital navigation devices used in connection with MVPD services, including terrestrial digital television; and

(2) That in all events, when adopting any rules governing set-top boxes, the Commission ensure that signal security not be compromised and require that any navigation device sold on the open market contain a standard interface so that security mechanisms which will only be provided by MVPDs to their authorized subscribers can work with the set-top box which is otherwise commercially available. This means that analog decoders currently deployed in the marketplace should not be made available for retail distribution.

II. Section 629 Of The Act Requires A Revolution In the Design of Today's Set-Top Boxes Such That Commercially Available Digital Boxes Are Produced Pursuant To Universal Standards.

A. The Proprietary, Uni-Choice Analog Set-Top Boxes Of Today

The various MVPD services to which viewers subscribe, or will subscribe, such as cable television, direct broadcast satellite ("DBS")/direct-to-home ("DTH"), multichannel and local multipoint distribution service ("MMDS" and "LMDS"), all generally use converter, or set-top, boxes to enable a TV monitor to display the channels delivered to their subscribers, as well as to protect their services from signal theft and illegal reception. Additionally, for a substantial period of time, in the very near future, consumers who wish to view content delivered digitally via free, over-the-air television, but who are unwilling to invest in the purchase of a new TV receiver equipped to receive and display digital signals, will need to acquire set-top boxes for their analog TV receivers in order to convert the digital signal for analog display.

Analog set-top boxes are designed by a handful of manufacturers³ according to the specifications of MVPDs. Thus, set-top boxes are generally produced to be compatible with only the systems of the particular specifications-requesting MVPDs. The license rights to the design of the boxes are held by the manufacturers, sometimes in tandem with the MVPDs.

Because set-top boxes today are manufactured with signal processing components that can receive only the signal of a particular MVPD, the set-top box of each programming distributor is different. Even the set-top boxes among classes of MVPDs may differ. For example, a set-top box provided by a cable system for its tiered - and premium-channel subscribers in Washington, DC may not be usable by the tiered - and premium-channel subscribers of the same MSO in New York City. As a further example, in the event subscribers to Echostar's DBS system decide today to subscribe instead to DirecTV, a competing DBS system, those subscribers would be unable to use their already-purchased Echostar receiver/set-top box in connection with the DirecTV service.

In short, set-top boxes for use with tiered and premium cable services are not available at the retail level. A subscriber to such cable channels can obtain a set-top box from only one source: that subscriber's cable system. On the other hand, while set-top boxes for use with the DBS services are generally available now only through a retailer, the boxes are compatible exclusively with the system of a specific DBS provider.

Through the continued exclusive distribution of set-top boxes or the continued retail availability of only uni-purpose, proprietary boxes, MVPDs can use the

³The principal manufacturers are: General Instrument Corp., Scientific-Atlanta, Inc. and Zenith Electronics Corp.

equipment to create anticompetitive, technological roadblocks by thwarting consumer choice in programming distributors and, ultimately, choice in programming.

B. The Ideal Universal, Multi-Choice Digital Set-Top Boxes Of Tomorrow

Ideally, upon adoption of Commission regulations implementing Section 629 of the Act, consumers should be able to visit their local consumer electronics store and purchase a universal, multi-choice digital set-top box. With one such multi-choice set-top box in their homes, consumers could freely choose to subscribe to any MVPD's system, could freely elect to disconnect that system and switch to another, and could even freely subscribe to more than one MVPD service. Moreover, with such a box, consumers could even move to another state or region of the country and use the same box to access MVPD services in the new locale.

And because no entity will control, through proprietary hardware or software, access to the consumer's multi-choice box, no one MVPD will be able to serve as the gatekeeper for programming that consumers can and cannot access. Thus, not only will individual consumers benefit from the multi-choice and portability features of the commercially available boxes, but the public interest as a whole will be served by an unobstructed gateway to numerous and diverse programming voices.

The commercially available set-top box envisioned by Viacom is similar to the double-sectioned model proposed in the *Notice*.⁴ The box must contain two basic hardware modules accessible to the software of each and every MVPD. (See Appendix A for a diagram of the two-module box.) One module will have hardware that

⁴ *Notice* at ¶34.

accommodates all MVPDs' software relating to non-security functions of the box, such as the tuner, remote control circuitry and other non-access control features.

In the digital world, this software presents to the viewer an Electronic Program Guide ("EPG") --the navigation tool with which the consumer selects programming. With an EPG, a viewer in the digital world can efficiently sort through large numbers of channels, the number of which would otherwise be inefficient to "surf" through. While the EPG functions as an electronic television viewing guide, the EPG can be formatted by the MVPD to do more than simply list programs. For example, the MVPD can brand the pages within the EPG, display channel brands and map the purchasing of pay-per-view options and other services. Viacom proposes that the display of the EPG information to the consumer remain proprietary, but that the software and hardware connection to, or "interface" for, this EPG software be standardized. In this way, the proprietary EPG software of all MVPDs can be used with the universal box.

The second module will have hardware that accommodates all MVPDs' proprietary security software, called the "conditional access system." Viacom advocates, as discussed in further detail below, a smart-card-based conditional access system that requires the insertion of a credit-card-like card into this second module of the set-top box (which may or may not be detachable). Unlike the box itself, the card (and/or the module) would not be sold at retail and its distribution would be controlled and inventoried by each MVPD for its own customers. The smart card, carrying the proprietary encryption of the MVPD, would interface with the otherwise commercially available set-top box, which contains a common scrambling algorithm. Indeed, Viacom urges the Commission to require a common scrambling algorithm. It is unquestionably feasible to make such an algorithm part of either the actual set-top box or of a detachable security module into which the smart-card is inserted. In fact, the SECA

conditional access system operated by Canal Plus uses a common algorithm in its box, while the Irdeto conditional access system operated by Shinawatra in Thailand, Galaxy in Australia, Telepiu in Italy, Multichoice in South Africa and Gulf DTH (which is 25%-Viacom owned) in the Middle East use a common algorithm in a detachable security module.

If a separated module is to be used, then to connect this security device with the box's hardware requires a standardized connection. This connection, called the "decoder interface connector," which has already been sanctioned by the Commission in its 1994 cable equipment compatibility rule making proceeding,⁵ will enable all MVPDs to utilize the conditional access system with their proprietary smart cards.

The dual-module box will be universal, such that it can be used by the subscriber to any MVPD service. In addition to being universal in nature, however, the set-top box of tomorrow should accommodate more than one MVPD simultaneously so that a consumer need not purchase multiple boxes upon the subscription to more than one MVPD. Thus, set-top boxes should have multiple (perhaps three or four) sets of dual modules (or "plugs" for separated security modules) to insure that the boxes are, indeed, multi-choice.

Finally, it should be pointed out that it is possible today for MVPDs to download completely new software into the proprietary areas of standardized set-top boxes of every subscriber without stepping foot into their homes. What the MVPD can do, in essence, is re-program the proprietary EPG. Through this capability, an MVPD could circumvent any Commission rules prohibiting the proprietary nature of set-top

⁵ That earlier proceeding was *Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992, First Report and Order* in ET Docket No. 93-7, 75 RR 2d 152, ¶41 (1994).

boxes by re-programming an open architecture box to be a "closed" navigation device, that is, one which discriminatorily shuts out certain programmers, highlights one group of services or facilitates the selection of one group while making selection of another group considerably more difficult. The effects of the MVPD re-programming, therefore, would be anticompetitive. Thus, Commission rules relating to universal set-top boxes should mandate that under no circumstances shall any MVPD download over-the-air or through the cable and into any box software which interferes with the box's ability to operate with the EPG or conditional access system of any other MVPD.

C. How The Universal, Multi-Choice Digital Boxes Comport With Section 629

1. Overview

Section 629 of the Act, added to the Communications Act as part of the 1996 Act, directs the Commission to

adopt regulations 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 . . . from manufacturers, retailers, and other vendors not affiliated with any multichannel video programming distributor.⁶

Such regulations under the statute, however, shall not prohibit any MVPD from also offering navigation devices to consumers, so long as the MVPD's charges to consumers for such devices "are separately stated and not subsidized by charges for any such service."⁷ Further, in implementing the statute, Section 629 provides that the Commission may not prescribe rules which would "jeopardize" the security of

⁶ Section 629(a) of the Act, 47 U.S.C. §549(a).

⁷ *Id.*

multichannel video programming and other services offered over MVPD systems or "impede" the legal rights of a provider of such services to prevent theft of service.⁸

The express statutory language and the legislative history of Section 629 indicate that Congress intended that consumers enjoy the freedom to purchase from a commercial source universal navigation devices. Specifically, Congress expressly stated in the Conference Report accompanying the 1996 Act that "[o]ne purpose" of Section 629 is to "help ensure that consumers are not forced to purchase or lease *a specific, proprietary converter box, interactive device or other equipment* from the cable system or network operator."⁹ And Congress directed the Commission to adopt commercial availability regulations "in consultation with appropriate industry standard-setting organizations,"¹⁰ which, according to the Conference Report, include IEEE, Digital Audio Video Council ("DAVIC"), MPEG and ANSI.¹¹ In light of these Congressional directives, Viacom maintains that it is not sufficient that an MVPD merely sell its own, proprietary set-top boxes to commercial outlets at wholesale prices so that those outlets, in turn, can sell the MVPD-provided boxes to consumers. Instead, universal, multi-choice set-top boxes, whose standards are set in consultation with the industry's standard-setting organizations, must be available for retail purchase by consumers.

Reinforcing Viacom's conclusion that Congress contemplated the ultimate universality of set-top boxes is the sunset provision of Section 629 of the Act. That section directs that Commission regulations implemented pursuant to Section 629 shall cease to apply when, among other things, the Commission determines that "the market

⁸ See Section 629(b) of the Act, 47 U.S.C. §549(b).

⁹ H. Rept. 104-458, 104th Congress, 2d Sess. 181 (1996)(Emphasis added.).

¹⁰ Section 629(a) of the Act, 47 U.S.C. §549(a).

¹¹ H. Rept. 104-458, 104th Congress, 2d Sess. 181 (1996).

for the multichannel video programming distributors is fully competitive. . . ."¹² The inclusion of this express ultimate objective in a statute governing the commercial availability of navigation devices demonstrates that Congress viewed the retail sale of such equipment as an essential means of promoting competition among MVPDs. Viacom maintains that only equipment which permits an MVPD subscriber to switch to or add the service of a competing MVPD will promote competition among MVPDs. To that end, therefore, Viacom respectfully urges the Commission to adopt rules --in consultation with standard-setting organizations-- that assure the ultimate commercial availability of universal, multi-choice set-top boxes.

2. "Commercial Availability"

Viacom submits that in order to assure "commercial *availability*" of set-top boxes and other navigation devices, such equipment must have commercial *appeal* to consumers. In other words, consumers will be unmotivated to invest in their own set-top box if, when they visit their local consumer electronics store, they find that one \$400 model will let them receive only a particular cable system's offerings, and that they must buy a second \$400 model to receive one DBS system's offerings, a third \$400 model to receive another DBS system's offerings, a fourth \$400 model to receive the one local digital broadcast television station's offerings and a fifth \$400 model to receive another local digital broadcast television station's offerings. To appeal to consumers, a commercially available box must be produced pursuant to universal standards and must be "multi-choice," allowing the consumer to use one box with one or many MVPD services.

¹² Section 629(e) of the Act, 47 U.S.C. §549(e). The statute also directs that the Commission determine that two other requirements have been satisfied: (1) that the market for converter boxes, and interactive communications equipment, used in conjunction with that service be fully competitive; and (2) that elimination of the regulations would promote competition and the public interest.

It is also imperative under universality principles that equipment which consumers acquire at the retail level should possess technological features that might not otherwise be available in the equipment furnished to subscribers by the MVPD, such as multiple ports for accommodating more than one MVPD service and multiple slots for accommodating more than one MVPD's smart card security system. The box with commercial appeal, therefore, must be universal: One box will fit all.

3. "[I]n Consultation With Appropriate Industry Standard-Setting Organizations."

The commercial appeal of commercially available digital boxes must be that the boxes are universal and "multi-choice." Universality requires that a baseline of components of the box be standardized. And standardization, in turn, means that the industry must be mandated to use a particular standard or that the industry voluntarily agree to the use of one. Viacom urges the Commission to adopt rules that prohibit, going forward, the production of any digital navigation device intended for retail sale that is not universal and multi-choice. That way, the Commission would not be compelled to adopt standards, but could allow the industry to do so on its own in order to abide by the new Commission prohibition. The technical parameters of a multi-choice box would be agreed upon by industry-wide committees, which would determine the standards to be used in producing components common to all digital decoder boxes sold in the United States.

4. MVPD Provision of Set-Top Boxes.

While the universal features of digital set-top boxes may add marginal costs to the price of boxes, the consumer's investment in this multi-choice equipment will yield a new-found freedom of selection of MVPD services without the wasted expense of

making monthly payments toward leasing a specific, proprietary, uni-function box from each MVPD. However, in the event the consumer wishes to avoid extra costs inherent in purchasing a digital multi-choice set-top box, the consumer may opt to lease or purchase from the MVPD a proprietary, uni-purpose box, if, as permitted under Section 629(a), the MVPD elects to continue providing its own boxes. While the statute requires that when MVPDs do furnish boxes, they must separately state and may not subsidize the charges for those boxes, Viacom suggests that such notice is not sufficient to alert the consumer to set-top box choices. Therefore, Viacom suggests that the Commission also require that the MVPD educate the consumer so that informed leasing and buying choices are made. In any MVPD literature describing the availability through the MVPD of navigation devices, the limits of such equipment --such as the lack of universality and of portability-- must be adequately detailed in terms easy to comprehend. At the same time, such MVPD literature must inform the consumer of the option of purchasing compatible equipment in area retail outlets.

III. The Commission Must Mandate That All Commercially Available Digital Navigation Devices Include the Smart-Card Conditional Access System.

A. Background.

As the owner of advertising-supported basic and premium networks, as well as a major distributor of pay-per-view events, Viacom is vitally concerned about signal piracy. The theft of signals costs the cable industry an estimated \$5.1 billion in unrealized revenue each year, an amount totaling almost 20% of gross industry revenue in 1995.¹³ The National Cable Television Association ("NCTA") has projected from a 1995 survey of cable signal theft that there were five million illegal premium-channel

¹³ "Cable Piracy Facts. . .," National Cable Television Association (NCTA), March 1997.

users in that year alone. This loss does not even account for unauthorized reception of PPV programming.¹⁴ Indeed, it has been estimated that approximately one-third of the viewers of last fall's pay-per-view airing of the Tyson-Holyfield fight were illegal viewers, constituting an estimated \$30 million to \$40 million in lost revenues.¹⁵

However, while the security needs of MVPDs and their programming suppliers cannot be ignored, Viacom believes that the issue of signal piracy should not be exploited as the rationale for the continued exclusivity by MVPDs in the distribution of set-top boxes to consumers. The analog set-top boxes of today are built such that the security systems are buried within the box. Accordingly, the only way to control piracy of today's analog set-top boxes is to control access to the boxes themselves. That is why the most recent report of set-top box theft on a grand scale focused on theft from manufacturers.¹⁶ (See Appendix B for *The Wall Street Journal* report concerning set-top box theft.) The digital set-top boxes of tomorrow, as proposed by the Commission in the *Notice* and as envisioned by Viacom, will have no compromisable security system contained within the boxes that are sold commercially. The boxes will house only non-security items and module interfaces. However, the security system (the smart cards and/or a separated security module) will not be commercially available. Indeed, the security element of the conditional access system should and must be maintained under the strict control of the MVPD so that its distribution can be carefully controlled, monitored and tagged, thereby limiting its availability on the open market where it could be more easily stolen, cloned and replicated.

¹⁴ *Id.*

¹⁵ See Mitchell, Kim, "Piracy Plagues the PPV Arena," *Cable World*, April 7, 1997, p.58.

¹⁶ Robichaux, Mark, "Crossed Wires: Cable Pirates Sought Plunder But Blundered Into a Major FBI Sting," *The Wall Street Journal*, May 12, 1997, p.A1.

B. Decoder Interface Connector/Scope of Commission Authority.

Viacom strongly supports the Commission's proposed solution to meeting the twin goals of promoting commercial availability of set-top boxes and insuring signal security: by isolating the security portions of the box from the operational and functional components of the box, which include the tuner, the remote control circuitry, the power supply, and any other non-access control features.¹⁷ As noted in the *Notice*¹⁸ and as discussed in Section B, above, the separate security system module of the box will require the use of a standardized connection between the MVPD smart card and the box's hardware. This connection, the "decoder interface connector", was endorsed by the Commission in its 1994 cable equipment compatibility rule making proceeding.¹⁹

In the *Notice* in this proceeding, the Commission queries the applicability to Section 629 of the three amendments to Section 624A of the Act, which were also added as part of the 1996 Act and which restrict the Commission's standard-setting authority. Viacom argues that those amendments are not applicable to the Commission's implementation of Section 629: section 624A governs the narrow issue of compatibility between cable systems and consumer electronics equipment, such as TV receivers, videocassette recorders ("VCRs") and similar devices. Congress enacted Section 624A in response to consumer complaints that new and recent models of TV receivers and VCRs often contain premium features and functions that are disabled or inhibited because of cable scrambling and by the use of cable devices, such as

¹⁷ See *Notice* at ¶34.

¹⁸ See *Notice* at ¶36.

¹⁹ See note 5, *supra*.

converters and remote control units, needed to receive cable programming.²⁰ It does not apply to the issues of set-top box availability and the security issues relating thereto.

Indeed, as noted by the Commission in the *Notice* to this proceeding relating to Section 629, which relates to the broader issue of commercial availability of navigation devices used in connection with not only cable services but all MVPD services, the House Report specifically stated that the amendments to Section 624A are "not intended to restrict the Commission's authority to promote the competitive availability of converter boxes, interactive communications devices, and other customer premises equipment as required by [Section 629]."²¹ Thus, the Commission should not view the amendments to Section 624A as limiting the Commission's requiring standardization in connection with the proceeding now before it.

Notwithstanding the non-applicability of those amendments, if Commission rules prohibit, going forward, the production of any digital set-top box that is not universal and multi-choice, the Commission will not be placed in the position of establishing standards. Rather, the industry should be directed to agree to universal standards without any government intervention other than the mandate to do so.

C. Smart-Card Conditional Access System.

The set-top box security system that would best further the objective of commercial availability and universal standards is one that is capable of supporting multiple MVPD encryption systems. This is not to say that Viacom supports a single national security standard. Rather, Viacom supports the types of security systems

²⁰ See Section 624A(a)(1), 47 U.S.C. §544a(a)(1).

²¹ H.R. Rep. No. 104-204, 104th Cong., 1st Sess. 111 (1995).

proffered by The Titan Corporation, Mitsubishi Electronics America, Inc. and Circuit City Stores, Inc. in their separate comments filed in the Commission's 1994 cable compatibility proceeding, that is, a national replaceable security interface standard that will accommodate the use of so-called "smart cards."²²

The smart-card-based conditional access system functions as follows: Subscription MVPD programming is first scrambled using a scrambling algorithm in conjunction with a randomly generated control word (or "key"). There are literally billions of possible unique control words available. A new control word is generated every few seconds (typically every 2-10 seconds) in order to make it more difficult for unauthorized parties to "guess" the control word. The control word is encrypted by the conditional access system and transmitted alongside the scrambled programming to the set-top box. The encrypted control words are routed by the set-top box to the smart card which contains the same conditional access system that was used to encrypt the control word in the first place. The smart card decrypts the control word and routes it to the descrambler to enable the original programming to be recovered.

Embedded in each of the smart cards, which are credit-card-like pieces of plastic, is the algorithm. When inserted into a conditional access port, the smart card will, if authorized, de-encrypt to obtain the control word and de-scramble the television signal into a watchable program. In the event of a security breach, the MVPD need only replace the smart card with one carrying a different and more secure algorithm. (See Appendix C for a diagram of a typical set-top encryption system envisioned by Viacom.) And because the smart card contains all of the security elements, it is less

²² See Comments of The Titan Corporation in ET Docket No. 93-7, filed on February 16, 1994, at 6-9; Comments of Mitsubishi Electronics America, Inc. in ET Docket No. 93-7, filed on January 25, 1994, at 9-13; Comments of Circuit City Stores, Inc. in ET Docket No. 93-7, filed on January 25, 1994, at 8-12.

costly to replace the smart cards of each subscriber (approximately \$10) rather than to replace the proprietary set-top boxes of each (approximately \$100). Thus, MVPDs are more apt to thwart hackers early on merely by replacing relatively inexpensive smart cards.

Consistent with Section 629(b) of the Act, Commission adoption of a multi-purpose set-top box employing the smart-card conditional access system would neither "jeopardize" the security of an MVPD programming supplier nor "impede the legal rights" of such programmer to prevent theft of service.²³ There is no incremental increase in risk to the security of the smart-card conditional access system by mandating access to a standard security interface to the other elements of a set-top box for competing MVPDs. The MVPD will continue to be the sole party responsible for the security of the system and the sole party with possession of the encryption keys.

IV. The Advent Of Terrestrial DTV Presents The Commission With A Window Of Opportunity For Establishing Universal, Multi-Choice DTV Set-Top Boxes.

A. Background.

Digital television presents a clean slate on which the Commission may immediately craft standards for fully universal, multi-choice set-top boxes without severely upsetting the status quo. Not only has digital service not yet been launched, but consumer electronics manufacturers have not yet begun to mass produce digital TV receivers or digital converters for analog television sets. However, the window of opportunity for devising digital set-top box standards is narrow in that the Commission

²³ Section 629(b), 47 U.S.C. §549(b).

recently adopted an ambitious mandatory roll-out of the service nationwide. Thus, it is imperative that in the Report and Order emanating from this proceeding that the Commission seize this moment to establish a standard DTV set-top box that benefits consumers and promotes competition among MVPDs, including that newest of MVPDs, digital television.

Last month, the Commission took the final step toward implementing a regulatory framework for the launch of terrestrial digital television: it assigned a digital channel of 6 MHz to each of the 1600 broadcast television stations, established rules for the DTV service, and set a schedule for the launch of the DTV service.²⁴ Under the DTV rules, a television licensee may use its 6 MHz of spectrum to broadcast one high definition TV ("HDTV") program or multiple standard definition TV ("SDTV") programs or some combination thereof. Thus, in the digital era, broadcast television stations, which currently transmit only one stream of analog programming will have the potential to transmit a single program with extremely high quality video and sound during prime-time and to transmit several lesser quality streams of digital programming simultaneously at other times of the day. Broadcasters will suddenly be transformed into multi-channel, over-the-air MVPDs. In establishing DTV rules, the Commission required that broadcasters provide programming on at least one free digital channel, but expressly contemplated that broadcasters could utilize their assigned spectrum for subscription services. The Commission even noted that several broadcasters within a market could pool their channels to create a larger, multi-channel competitor to other MVPDs.²⁵

²⁴ See *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service* in MM Docket No. 87-268, FCC 97-116 (released April 21, 1997) ("*Fifth Report and Order*"); *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service* in MM Docket No. 87-268, FCC 97-115 (released April 21, 1997) ("*Sixth Report and Order*").

²⁵ See *Fifth Report and Order* at ¶60.

As to the roll-out of digital television, the Commission set an aggressive timetable for the nation's 1600 full-power broadcast television stations.²⁶ By November 1998, less than 18 months from now, all television stations located in the top ten television markets and affiliated with the ABC, CBS, NBC and Fox networks must deliver a digital signal over their communities of license. By May 1999, less than two years from now, all such affiliates located in the top 30 markets must deliver such a signal. And, by May 2000, in five years, all other television stations must transmit a digital signal. The conversion to digital must be complete by 2006, according to the Commission, when the analog service is terminated and the analog channel must be returned to the government.

Further complicating the transition to digital is how viewers will actually receive the digital television programming -- in whatever format broadcasters elect to transmit. For at least a decade --that is for several years after the termination of analog television service in 2006-- it is unlikely that Americans will be willing to invest in new, expensive DTV receivers --with initial per-set price estimates ranging between \$2,500 and \$5,000²⁷-- until prices are reduced. Instead, in order to continue receiving broadcast television programming after the termination of analog service, viewers can purchase -- for a much lesser amount -- a converter box (or digital decoder) that converts the digital television signal for display on existing analog receivers.

While the Commission mandated an ambitious roll-out of digital television with strict deadlines to be extended due only to circumstances beyond the broadcaster's control, the Commission left each broadcaster with the choice of transmission format. Consequently, each of the 1,600 television stations must initially determine which

²⁶ See *id.* at ¶76.

²⁷ See Hearn, Ted, "Stations Ponder HDTV as 1st Move," *Multichannel News*, April 14, 1997, p. 6.

transmission format it will pursue: The new digital-broadcast spectrum tier to deliver HDTV, with better than 1,000 lines of resolution? Or to remain with a 525-line format and deliver a lesser quality SDTV signal? The latter choice --the SDTV format-- represents a lower-cost route which relies on production equipment that is readily available today and does not require additional investment in, or replacement of, studio equipment. Electing HDTV, on the other hand, means launching a service in a standard which lacks worldwide market support. Indeed, no party has yet commenced mass producing digital encoders for DTV, although C-Cube Microsystems expects to announce plans for an HDTV encoder sometime this year.²⁸ However, C-Cube is waiting for broadcasters to determine which of several proposed DTV formats they will pursue.²⁹

B. DTV Set-Top Boxes.

The Commission should be concerned that absent regulation of the DTV converter box, the first party or parties to the market with a widely deployed DTV box could thereby insure that its technology becomes the *de facto* standard and would then be empowered to dictate terms to all DTV broadcasters. That is because late-comers would be forced to adapt to what is already accepted and established in the market. By preventing DTV broadcasters and even other MVPDs from entering and competing in the digital video market, a first-in party could become an effective "gatekeeper" for American viewers, determining what programming they can and cannot access from the set-top box.

²⁸ See Dawson Fred, "Broadcasters Question Digital TV Timetable," *Multichannel News*, April 14, 1997, p. 41-42.

²⁹ See *id.*