

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

In the Matter of

Digital Broadcast Content Protection

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MB Docket No. 02-230

**REPLY COMMENTS OF THE MOTION PICTURE ASSOCIATION OF AMERICA,
INC., METRO-GOLDWYN-MAYER STUDIOS INC., PARAMOUNT PICTURES
CORPORATION, SONY PICTURES ENTERTAINMENT INC., TWENTIETH
CENTURY FOX FILM CORPORATION, UNIVERSAL CITY STUDIOS LLLP, AND
THE WALT DISNEY COMPANY**

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The Motion Picture Association of America, Inc. (“MPAA”), Metro-Goldwyn-Mayer Studios Inc., Paramount Pictures Corporation, Sony Pictures Entertainment Inc., Twentieth Century Fox Film Corporation, Universal City Studios LLLP, and The Walt Disney Company hereby submit these Reply Comments in response to the Commission’s Further Notice of Proposed Rulemaking.¹

INTRODUCTION AND SUMMARY

As the MPAA *et al.* stated in their initial comments in this FNPRM, the Commission should adopt the three marketplace criteria and the “at least as effective” test as set forth in the Joint Proposal of the MPAA, 5C Companies, and Computer Industry Group to the Broadcast Protection Discussion Group. *See* Final Report of the Co-Chairs of the Broadcast Protection Discussion Subgroup to the Copy Protection Technical Working Group, June 3, 2002, Tab F-2. Those criteria offer the most fair and efficient means of authorizing secure technologies for use

¹ *See* Report and Order and Further Notice of Proposed Rulemaking, *Digital Broadcast Content Protection*, MB Docket No. 02-230, FCC 03-273 (rel. Nov. 4, 2003) (“Broadcast Flag Order”).

with DTV products. If the Commission nevertheless wishes to explore “functional criteria,” it should consider a model developed by the MPAA attached hereto as Appendix B.

No matter what criteria the Commission adopts, it must provide for an adequate opportunity for content providers to challenge proposed technologies. This means, at a minimum, that technology proponents must be required to submit detailed explanations of how their technology will prevent the unauthorized redistribution of Marked and Unscreened Content. While a “Personal Digital Network Environment” need not be defined at this time, the Commission must approve only those technologies to Table A that constrain protected content to a “Local Environment,” which is the set of compliant, authorized devices within a tightly defined geographic area around a Covered Product. Anything less would allow the widespread unauthorized redistribution of digital broadcast content and undermine the system of localism that is one of the Commission’s most important policy goals. Finally, no matter what criteria are ultimately adopted, the Commission need only engage in a review of certain security and intellectual property-related license terms. The Commission should not engage in a detailed review of every term of every license, because the market will select against unappealing terms, and for the Commission to do so may tend to stifle innovation in content protection technologies.

The Commission should also adopt the withdrawal standard and procedures contained in the Joint Proposal. In case of a serious compromise of a technology, there must be some means for removing a technology from Table A, so that future devices will no longer be sold with that output or recording method. The standard and procedures contained in the Joint Proposal represent a workable solution that requires consideration of the harms to content owners, device manufacturers, and consumers resulting from the compromise and proposed withdrawal. Nearly all of the comments agreed in broad outline with this proposal.

Finally, the Commission should require encryption of the digital basic tier. Doing so would help pave the way for future modulation schemes used by cable operators, and would help protect cable-originated programs, not just retransmitted broadcasts, against unauthorized redistribution.

I. The Commission Should Adopt the Criteria Contained in the Joint Proposal

A. The Marketplace Criteria and the “At Least as Effective” Test Provide a Fair, Objective and Rapid Means of Authorizing Technologies for Use With DTV Products

The comments filed in response to the Commission’s original NPRM as well as those filed in response to the FNPRM illustrate that the three marketplace criteria and the “at least as effective” test are the optimal means of authorizing technologies for use with DTV equipment.

In summary, they are:

- 3 Major Studios and/or Major Television Broadcast Groups use or approve the technology; *or*
- 10 Major Device Manufacturers (including software vendors) use or approve the technology; *or*
- the technology and its relevant licensing terms include appropriate output and recording controls and that technology is permitted to be used under a license for another “marketplace” approved technology; *or*
- the technology is “at least as effective” as a technology approved under one of the three criteria listed above (the “Marketplace Criteria”).

Further details, definitions, and procedures are spelled out in Appendix A.

The marketplace criteria offer a means of authorizing technologies already in use or approved for use in the protection of content that is certain to be faster and more flexible than any alternative procedure that has been proposed. The “at least as effective” test – which we anticipate will utilize reasonably contemporaneous benchmark technologies – allows the

Commission to admit other technologies using its own judgment as to whether those technologies are as effective in preventing the unauthorized redistribution of Marked and Unscreened Content. Together, these criteria provide a reliable, objective, and fair means of authorization. *See* Comments of the MPAA *et al.* (“MPAA *et al.*”) at 2-3; *see also* Comments of the MPAA *et al.*, in CS Docket No. 97-80, PP Docket No. 00-67 (the “Plug & Play” proceeding) at 3-4 (filed Feb. 13, 2004) (hereafter “MPAA Plug & Play SFNPRM Comments”). The Commission should adopt the criteria contained in the Joint Proposal to the Broadcast Protection Discussion Group (“BPDG”) and submitted as Section X.21(c) of Appendix A to our initial comments to this FNPRM as the permanent means of authorizing digital output and recording technologies. *See* MPAA *et al.* at 2-3; *see also* Comments of DirecTV, Inc. (“DirecTV”) at 12 (supporting marketplace determinations); Comments of the Digital Transmission Licensing Authority LLC (“DTLA”) at 4-5. For convenience that Appendix is included as Appendix A to this filing.

Use of the “at least as effective test” should be limited to the benchmark technologies that were considered and formed the basis of the Joint Proposal by multiple representatives of the BPDG. Thus, it should extend only to those benchmark technologies that are approved under the “marketplace” criteria, and not to technologies that secure approval under the Commission’s interim procedures, or any other criteria that may emerge.

A number of comments opposed granting a single industry a “gatekeeping” function over content protection technologies. *See* Comments of the Center for Democracy and Technology (“CDT”) at 7; Comments of the Consumer Electronics Association (“CEA”) at 6; Comments of Philips Electronics North America Corp. (“Philips”) at 7; Comments of Public Knowledge and Consumers Union (“PK/CU”) at 14; Comments of Verizon (“Verizon”) at 2, 7. This

fundamentally misconceives our proposal. No one in the Broadcast Flag proceeding has ever proposed granting “gatekeeping” powers to a single industry. As DTLA has noted, the Joint Proposal allows content providers to play at most a “gate-opening” – not a gatekeeping – role. *See* DTLA at 17. Under the three marketplace criteria, a *technology provider* that had entered into an agreement with content providers *or* hardware or software vendors would be able to secure fast and easy authorization. Furthermore, the “at least as effective” test allows a neutral decisionmaker – the Commission – to determine if a technology not adopted in the marketplace is nevertheless sufficiently effective to be approved, thus eliminating any possibility of “gatekeeping.”²

B. If the Commission Wishes to Explore Additional “Functional Requirements,” It Should Consider a Model Developed by MPAA

In its FNPRM, the Commission (at Paragraph 62) sought comment on “objective” and “functional” criteria. As we have shown, the marketplace criteria of the BPDG Joint Proposal are the most objective and capable of wholly impartial administration and measurement. *See* MPAA *et al.* at 2-3; MPAA Plug & Play SFNPRM Comments at 3-4. The added “at least as effective as” criterion is an equally objective measurement of functional characteristics. Thus,

² Genesis Microchip proposes that only a “ANSI-accredited standards-setting organization or open standards group with ANSI-equivalent policies” should grant such technology authorizations, and such authorizations should be reviewed by an advisory committee. Comments of Genesis Microchip, Inc. (“Genesis”) at 6-7; *see also* PK/CU at 14 (standards bodies should be consulted). However, as an administrative agency capable of performing technical analyses, the Commission is fully qualified to perform this function, and neither a standards-setting body nor an advisory committee is necessary. *See* Comments of the IT Coalition (“IT”) at 13-14; Comments of the National Cable & Telecommunications Association (“NCTA”) at 4; Comments of Time Warner Inc. (“TW”) at 13. The authorization of a technology under the Joint Proposal criteria does not set a standard, but merely places a technology on a list with numerous other technologies to choose from. Notably, several other comments make similar recommendations for a criterion that places decisionmaking power in the Commission’s hands. The Center for Democracy and Technology, for example, proposes that the Commission in effect judge proposed technologies according to whether “the technology effectively frustrate[s] an ordinary user from indiscriminate redistribution of protected content to the public over the Internet or through similar means.” CDT at 5. The “at least as effective” test is far superior to these other proposals in that it provides the Commission with a set of concrete benchmarks against which to measure technologies – they must be as effective in preventing unauthorized redistribution, by whatever method, as those technologies that have already been authorized pursuant to the marketplace criteria.

our proposal discussed in Section I.A above carries forward the Commission’s interest in both objectivity and functionality.

In contrast, other parties have urged the Commission to reject market criteria in favor of “functional criteria” that are so abstract as to be of no practical benefit. These inadequate proposals demonstrate the difficulty of specifying functional criteria for Table A technologies and reinforce the need for adoption of market-based criteria, such as those proposed by the MPAA. Even if the Commission were to consider functional criteria, however, the Commission should reject the proposals so far advanced, which would unacceptably compromise the integrity of Table A and of the Broadcast Flag as a whole. Although the MPAA believes that any set of functional criteria carries too great a risk that Table A will be populated with insecure protection technologies – a risk that an (appropriately) high withdrawal standard will necessarily exacerbate – the MPAA feels constrained to respond to the various proposals by delineating criteria that would at least mitigate that risk. The characteristics of this set of criteria are that:

- It provides detailed descriptions of specific functionalities and characteristics that technology vendors should consider, and that the Commission can review. It thus fulfills – far more than the minimal if any guidance offered to the Commission and vendors by others’ “functional” proposals – the expressed desire of many commentators for direction and certainty.
- It relies upon encryption-based techniques. We are not aware of any non-encryption based technology – and none has been proposed³ – that will enable redistribution protection to be effectively and efficiently perpetuated to downstream (“sink”) devices without enmeshing the Commission in regulation beyond the very limited sphere of demodulators and peripheral TSP products (“Covered Products”) to govern the behavior of every device that is capable of receiving digital outputs from a Covered Product. Moreover, the unencrypted passage of Marked or Unscreened Content must inevitably

³ Philips proposed in its comments that the criteria permit the submission of a non-encryption solution – a watermark – as a Broadcast Flag protection technology. See Philips at 8-10; see also DTLA at 4. As the MPAA has noted before, however, the Philips proposal has several serious problems for which, to date, no one has proposed a solution. Most critically, the Philips proposal would require watermark detectors be installed, not just in demodulation devices, but in every device that could possibly receive and record, output, or display the content. Thus, the regulatory reach of such a proposal would vastly exceed the scope of the Joint Proposal.

expose that content to unauthorized interception and consequent uncontrolled redistribution, as any downstream product may simply ignore contrary directions.

- It incorporates a level of robustness that mirrors that of the Joint Proposal. Two comments proposed robustness rules for technologies that mirror, instead, those adopted by the Commission for Covered Demodulator Products. *See* DTLA at 9; IT at 11. The standard for robustness of technologies is particularly important to the success of the entire Broadcast Flag scheme, and thus it is especially critical that the Commission adopt an adequate level of robustness for content protection technologies to be certified under this regulation. For the reasons explained in the Petition for Reconsideration and Clarification of the MPAA in MB Docket No. 02-230 (at 2-21), the robustness rules adopted by the Commission for Covered Products are not adequate. Moreover, the content protection technologies used to pass digital content *from* regulated demodulators are likely to be a key point of attack among numerous and widely distributed downstream devices. As Philips noted in its comments, a content protection technology must be sufficiently robust to make it “difficult for the expert to distribute any attack on a component in a form that is implementable by an average user.” Philips at 15. As noted in our initial comments, our Petition for Reconsideration, and again below, the result of a compromise of a technology may be much more severe than the compromise of a single device. If the Commission adopts functional criteria, therefore, it must provide for a level of robustness that will ensure the integrity of the entire system.
- It requires that approved technologies incorporate “localization.” This is discussed further below; but it should be noted here that our model requires that outputs be effectively localized in their “normal course” of operation. *See also* DTLA at 8. Thus, this model does not impose any impracticable burden, even under contemporary limitations of technology.
- It requires that authorized technologies incorporate an effective mechanism for revoking the identifying keys of downstream technologies. (As discussed in our initial comments at 9, revocation is an important but limited tool in dealing with unfortunately inevitable hacking attempts and related intrusions, and is a more desirable alternative, when useful, than the actual “withdrawal” of technologies from Table A because it preserves the full past and future functionalities of unaffected devices.) Consistent with private sector licensing arrangements, we have limited the mandatory revocation feature to specified cases of compromise – lost, stolen, misdirected, and unlawfully cloned or disclosed keys or identity certificates. *Accord*, DTLA at 12; Matsushita at 4. Hence, revocation is not required for other cases or causes of compromise, or for non-compliance with downstream licenses generally. However, revocation may be insufficient to remedy broad-based compromises affecting myriad devices. In order to (a) limit recourse to “withdrawal” from Table A while (b) not causing the migration of attractive content to alternative distribution channels, we have also required that “system renewability and upgradeability” be provided for software and upgradeable firmware implementations of Table A technologies; but it is not required for other implementations where it would be unduly burdensome.

The three market-based criteria contained in the Joint Proposal are critical to ensuring a fast-track process for Table A approval. Absent those criteria, the authorization process may become mired in procedural and substantive challenges, leading to a stagnant, underpopulated Table A, to the detriment of consumers as well as content providers. As indicated above, the functional criteria proposed by others lack the specificity necessary to guide technology developers or Commission determinations as to whether particular technical requirements have been met, or to insure any amount of security for authorized technologies. The flaws in the proposal by Hewlett-Packard and Microsoft cited in the FNPRM, *see* Broadcast Flag Order ¶ 62 n.141, were analyzed in detail in our initial comments on this FNPRM. *See* MPAA *et al.* at 4-6. The functional criteria proposed by others, such as DTLA and the IT Coalition, share many of the flaws of the HP-Microsoft proposal, including the absence of any limitation on the geographic reach of the redistribution of Marked and Unscreened Content. *See* DTLA at 8-12; IT at 11-13; Philips at 13-22. The comments of Philips, for example, state that a technology must “prevent the unauthorized, indiscriminate redistribution of broadcast content,” and define requirements for cryptographic elements, *see* Philips at 15-16, but the criteria Philips proposes contain no provisions requiring technical limitations on the reach of redistributed content, and propose no means of measuring the security of the non-encryption-based systems Philips would allow.

C. The Commission Must Provide for an Adequate Opportunity to Challenge Proposed Technologies

No matter what criteria they proposed, most comments agreed with the Joint Proposal that there must be an opportunity for content providers to object to a proposed technology. *See* MPAA *et al.* at App. A § X.21(c)(6); *see also* Comments of ATI Technologies, Inc. (“ATI Technologies”) at 2; CDT at 7-8; DTLA at App. A; IT at 9; NCTA at 3; TW at 14. Most of

those who commented agreed, at least implicitly, that the Commission itself should act as a neutral arbiter of whether a non-marketplace criterion is met. However, a few comments propose that technology providers be allowed to fully “self-certify” compliance with the regulation, apparently without opportunity for regulatory objection, contest, or verification. *See* Comments of the Home Recording Rights Coalition (“HRRC”) at 6; Philips at 10-11; Verizon at 9.⁴ That is, some of the comments endorse a procedure whereby millions of noncompliant devices could be allowed to flood the marketplace with no vetting process whatsoever before content providers could have an opportunity to object. In such a situation, the regulation would quickly become toothless, the Commission will be burdened by enforcement requests and proceedings, and consumers will be forced to pay the price when inadequate technologies are withdrawn. None of these results should be allowed to occur; the Commission’s regulation must provide for a thorough review of proposed technologies before they are authorized.

Furthermore, no matter what criteria are ultimately adopted by the Commission, whether it is the criteria contained in the Joint Proposal or other criteria, the Commission must ensure that content providers have a meaningful opportunity to review whether the criteria are in fact met by a proposed technology and to object to technologies that fail to meet those criteria. Several comments mistook and reversed the appropriate burden of producing evidence: they proposed a high threshold for a prima facie case against a proposed technology, without requiring any detailed showing by the technology provider as to how its technology will prevent the unauthorized redistribution of Marked and Unscreened Content. *See, e.g.*, CDT at 7-8; IT at 10. The ability to object, however, will be rendered useless unless there is a corresponding obligation

⁴ While several comments state that they are in favor of “self-certification,” some of those also express support for an objection process under which a technology could be reviewed by the Commission prior to authorization. *See* IT at 10 (calling for “full self-certification,” but with “an opportunity for non-frivolous objections”).

on the part of technology providers to demonstrate precisely how their technology meets the criteria. The Joint Proposal and our submission, for example, requires such a detailed showing in Section X.20(c) of Appendix A.

D. The Scope of Prohibited Redistribution Should Focus on the Local Environment

The MPAA *et al.* have recommended against adopting a definition of “Personal Digital Network Environment” at this time, given the fact that many of the affected business models are in a state of flux, and defining such a term could impact not only existing and emerging means of distribution, but also the copyrights of content owners. Most comments agreed that it is premature at this time to define a PDNE. *See* CDT at 9; IT at 3, 8; Comments of Matsushita Electric Corp. of America (“Matsushita”) at 3; Philips at 31; PK/CU at 11-13; TW at 11-12; Verizon at 3-5.

Nevertheless, with or without a “PDNE,” the scope of redistribution permitted by a Table A technology must be defined as limited to the “Local Environment,” either as the result of direct application of the relevant criteria (such as our proposed Marketplace Criteria, which will self-define the issue of scope), or otherwise. Localization is currently the only reliable means to limit the unauthorized redistribution of content. Localization simply means that the technology “affirmatively and reasonably constrains unauthorized distribution beyond the [device’s] local environment,” including by the use of “controls to limit distance from a Covered Product,” or “limits on the scope of the network addressable by such Covered Products,” in addition to “affinity-based controls used to approximate association of such set of devices with an individual or household.” MPAA *et al.* at 7-8; Appendix B at § X.A; *see also* DTLA at 8 (proposing similar scope).

Several comments proposed an extremely broad and vaguely worded “scope” that would not place any reasonable constraints on the unauthorized redistribution of content. *See* CDT at 2; IT, HRRC, Philips at 16-17; *but see* Sports Leagues at 6. Indeed, some comments proposed defining only a safe harbor of permitted redistribution – a concept that would be impossible for a “protection technology” to enforce, or to reconcile with copyright law – rather than sharply delineate the outer limits of what the technology will allow. *See* CDT at 6; CEA at 6; HRRC at 4; Philips at 17-18. Thus, proposals such as the IT Coalition’s to define the scope of redistribution as “inhibiting indiscriminate redistribution over the Internet,” IT at 3, do nothing to achieve the Commission’s goal of “forestall[ing] any potential harm to the viability of over-the-air television.” Broadcast Flag Order ¶ 4.

Going beyond merely proposing a vague scope, the IT Coalition has affirmatively opposed the concept of localization in its comments. The IT Coalition argues instead that “location control” is simply “an attempt to protect current broadcaster business models rather than address the problem before the Commission.” IT at 7. However, it is not simply broadcaster business models that are at stake, but also the Commission’s longstanding and fundamental policy of the promotion of local broadcasting.⁵ Free over-the-air television is made available by a system of local affiliates and television stations that depends on local advertising targeted at a local viewing audience drawn in not only by network first-run programming, but

⁵ *See In the Matter of General Motors Corp. & Hughes Elecs. Corp., Transferors, and The News Corp. Ltd., Transferee*, M.B. Docket No. 03-124, FCC 03-330 ¶ 210 (Jan. 14, 2004) (localism one of “our most important Communications Act goals and policies”); *In the Matter of 2002 Biennial Regulatory Review*, 18 FCC Rcd 13620 at ¶ 73 (rel. July 2, 2003). Indeed, last summer the Commission announced the launch of a “Localism in Broadcasting” Initiative to “enhance localism among radio and television broadcasters.” *FCC Chairman Powell Launches “Localism in Broadcasting” Initiative*, FCC Press Release (Aug. 20, 2003). The Commission’s policy of localism has been affirmed and reaffirmed by Congress, *see* 47 U.S.C. § 534(a) (requiring carriage of “local commercial television stations” by cable operators); H.R. Rep. No. 104-104 at 221 (1996), and by the courts, *see United States v. Southwestern Cable Co.*, 392 U.S. 157, 175 (1968) (Commission acted properly to prevent public deprivation of “the various benefits of a system of local broadcasting stations”); *NBC v. United States*, 319 U.S. 190, 203 (1943) (“Local program service is a vital part of community life.”).

also by syndicated shows as well as local news programming. The key to the generation of revenue by local affiliates and television stations is that their programs are available to their local viewing audience only at certain times and on certain days. *See* Joint Comments of the MPAA *et al.*, MB Docket No. 02-230, at 9-10 (filed Dec. 6, 2002). This system of local broadcasting has been in place, and has been a fundamental goal of the Commission, for decades. Localization helps to ensure that the locally broadcast content is not undermined by distant signals or by permanently available archives of syndicated programs.

Instead of localization, the IT Coalition proposes allowing Table A technologies to redistribute content almost anywhere. “Given the increasing ubiquity of portable digital devices and secure communications across networks, no reason exists to limit consumers’ use and enjoyment of DTV to a given location, or other artificially defined ‘environment,’ as long as indiscriminate redistribution is inhibited. . . . Location is irrelevant as long as the consumer is located within a wide, almost continent-sized, region.” IT at 7. The IT Coalition’s broad scope will not achieve the goal set by the Commission here. Localization thus must be a key component of any content protection technology proposed for digital terrestrial broadcast television content. While the IT Coalition no doubt has its own business models to protect, its suggestion to allow essentially unhindered redistribution cannot be accepted in this proceeding.

E. The Commission Should Not Undertake a Detailed Review of Licensing Terms That Do Not Impact the Security of Marked or Unscreened Content

Other comments proposed that the Commission perform detailed reviews of the licenses of technologies proposed for Table A. *See* AAI at 5; Philips at 22. Such detailed reviews are not only unnecessary, they may interfere with innovative product designs in content protection technologies. In the marketplace, device manufacturers, technology providers, content providers, and ultimately consumers will all negotiate at arm’s length to arrive at the optimal

licensing conditions. The marketplace criteria contained in the Joint Proposal will allow such negotiations to proceed unhindered and thus obviate the need for any overarching license review.

Nevertheless, even under the “at least as effective” test, some review of the licensing terms of a proposed protection technology is necessary. For example, a proposed technology must require that adequate security be given by the downstream device to Marked and Unscreened Content to be effective. *See* MPAA *et al.* Att. A § X.21(c)(1)(C); *see also* TW at 14. Under the Joint Proposal, the license for a technology proposed under the “at least as effective” test must also contain provisions for enforcement of the license and for “Change Management,” which is defined as “a process by which content owners are provided a specified right or ability to meaningfully object to particular amendments to content protection agreements.” MPAA *et al.* at Att. A §§ X.21(c)(1)(C), X.27. There is no need, however, to require that all change management provisions be drafted in exactly the same way – for example, similar to those contained in the DFAST license – so long as they provide content owners with an ability to meaningfully object. The Commission should also require that, as the American Antitrust Institute proposed, “all putative licensors of governmentally approved technology should, as a threshold matter, be required to identify any and all patents, copyrights, or trade secrets they deem necessary to the technology being licensed.” Comments of the American Antitrust Institute (“AAI”) at 6. The MPAA *et al.* have similarly proposed, as a criterion for Table A, that “in the event that use or triggering of the [proposed] technology imposes any obligations upon content owners or broadcasters, such technology may only be added to Table A if . . . such obligations have been fully disclosed on the record of the application.” MPAA *et al.* Att. A § X.21(c)(9).

Some licensing terms, however, are better left unregulated, so as not to constrain innovation in designing content protection technologies. For example, technologies should not be required to approve the use of all other authorized technologies in downstream products. *See* AAI at 10-12; Philips at 24; PK/CU at 14-15. It may be the case that a technology provider may want to construct and sell a completely closed and proprietary system, using only its own output and recording technologies. *See* DTLA at 16. The Commission should not ban any such attempt from the marketplace. Similarly, given that there will be a plethora of technologies for device manufacturers and consumers to choose from, the Commission does not need to engage in detailed policing of royalty rates and other licensing terms to ensure that they are reasonable and non-discriminatory. *See* PK/CU at 14. If the Commission establishes a procedure for conducting such a review, it can be sure that every competitor of every technology provider will challenge and appeal any determination with respect to the reasonableness of the provider's licensing terms, meaning that there will be no quick authorizations onto Table A. The Commission should also not require the independent management of licenses by a neutral third party. *See* AAI at 15. Again, there will be numerous technologies proposed for Table A. To the extent that a technology's license is not to manufacturers' or consumers' liking, they will be free not to install that technology or purchase a product with that technology included. The free operation of the market will be able to determine which licensing provisions are optimal far more easily and accurately than the Commission, deciding *ex ante*. *See* DTLA at 16.

II. The Commission Should Not Create an Exemption for “Professional Equipment”

Harmonic has filed a comment proposing an amendment to the regulations adopted in the Commission's November 4, 2003 Report & Order. Harmonic's amendment would add definitions for “Professional Equipment” and “Professional User” in place of the written

commitments provided for in Section 73.9002(d)(2), and exempt such “Professional Equipment” from the scope of the regulation. Harmonic’s request should not be granted for two reasons.

First, although filed as a comment to the Commission’s FNPRM, the filing is in fact not responsive to any of the Commission’s requests for comments. Rather, as a proposal to amend the existing regulations adopted November 4, Harmonic’s filing is instead a late-filed petition for reconsideration, which should have been submitted by January 2.

Even if considered timely, Harmonic’s petition should be rejected. With increasingly sophisticated equipment becoming available to consumers every year, including a thriving “prosumer” market, the line between professional equipment and consumer equipment would be extremely difficult to define, resulting either in noncompliant equipment becoming available to the general public or bona fide professionals having difficulty obtaining noncompliant equipment. During the Broadcast Protection Discussion Group, representatives from several different industries attempted to create a definition of “professional equipment” that would duly limit the exception to the regulation, but were unable to do so. The only professionals with a legitimate need for non-compliant equipment are those already identified in Section 73.9002(d)(2), and the written commitment provisions clearly identify those professionals and clearly set out the obligations with respect to them.

Harmonic has failed to identify a sufficient reason why it or others will not be able to comply with the written commitments provision. Although Harmonic states that “we believe these filing requirements would be burdensome,” in fact the written commitments required by Section 73.9002(d) are *de minimis*. The written commitments are merely an agreement to abide by the regulation, with only certain essential information being required. The burden of filing a

written commitment will therefore be virtually non-existent, and certainly does not justify the blurring of the line between consumer and prosumer devices as described above.

III. The Commission Should Adopt the Standard and Procedures for Withdrawal Contained in the Joint Proposal

As we noted in our initial comments, some confusion has arisen in this proceeding between removal of a technology's authorization, or "withdrawal," and revocation of an individual device's authorization to decrypt content. Withdrawal concerns a global compromise of a technology, whereas revocation deals with a compromise of a single device.⁶

Most of the comments are in agreement that a withdrawal provision must be available for those cases where a technology has been seriously compromised and attempts to mitigate that compromise have failed. *See* CEA at 9; DTLA at 19-20; Comments of the Electronic Frontier Foundation ("EFF") at 10; IT at 17; Matsushita at 3; Philips at 31-32. Many of the comments also agreed that the Commission should weigh the harms against content providers, technology and device manufacturers, and consumers, and decide on that basis whether withdrawal is necessary. *See, e.g.*, DTLA at 19-20; IT at 17-18; Matsushita at 3.⁷ In such a situation, the only alternative to withdrawal would be to allow the continued legal manufacture of products with compromised protection technologies, a result that would ensure the rapid demise of the entire system by causing the very migration of content to non-broadcast distribution channels that the Commission seeks to avoid. Surprisingly, a few comments proposed just that. For example, the

⁶ There is a third type of removal provided for in the criteria contained in the Joint Proposal: "disqualification" of a listed technology as a benchmark for purposes of the "at least as effective" criterion for Table A. *See* MPAA *et al.* App. A § X.23(a). A disqualified technology is not removed from Table A and may continue to be employed in Covered Products.

⁷ ATI Technologies argues that content owners and the Commission itself should be barred from having any input in withdrawal decisions because they do not manufacture technologies or devices. *See* ATI at 2-3. By the same token, however, manufacturers do not produce the content that would be at risk from a compromised

Consumer Electronics Retailers Coalition opposes any Commission action that would diminish the “functionality or usefulness” of products or interfaces. Comments of the Consumer Electronics Retailers Coalition (“CERC”) at 3; *see also* HRRC at 5. ATI Technologies proposes that a product should not be forced to be withdrawn from the marketplace until its natural obsolescence. *See* ATI Technologies at 3. This, however, is an empty proposal, as the very fact of a substantial compromise will ensure a perpetual market for the illicit use of that technology – the compromise will itself become a formally or tacitly marketed feature of the product – unless and until it is withdrawn. The MPAA *et al.* support a reasonable grace period for the cessation of use of a compromised technology, but that grace period should not be allowed to be indefinite. *See also* CEA at 9.

Device revocation, on the other hand, should be considered by the Commission as one of the security-related licensing terms of a content protection technology. As is the case with existing protection technologies now, *see* Philips at 20-21, device revocation will be performed pursuant to the terms of the license, rather than by Commission direction. Again, as with other license terms, the market is fully capable of determining the optimal licensing terms for device revocation, and no need has been demonstrated in any of the comments for Commission supervision of this matter.

IV. The Commission Should Require Encryption of the Digital Basic Tier

The MPAA *et al.* have proposed that the Commission require cable operators to encrypt the digital basic tier, including retransmitted digital broadcast content. Several comments, however, oppose encryption of the digital basic tier, primarily on one of three grounds: first, that

technology. Rather than debate whose ox would be more gored by a partisan decision, it seems self-evident that a neutral decision-maker such as the Commission should govern the withdrawal process.

the NCTA's proffered justification for it was inadequate; second, that it would interfere with cable-compatible devices; and third, that such encryption is not necessary to convey the Flag to cable set-top boxes.

First, it is important to note that the reasons the MPAA *et al.* support encryption of the digital basic tier are not necessarily the same as those offered by the NCTA and others. In our opinion, encrypting the digital basic tier would serve two beneficial functions: it would provide a higher level of security to all of the content on the digital basic tier, whether a retransmission of a digital TV broadcast or not, the same as is now offered by satellite operators; and it would permit cable operators to use new forms of modulation beyond the currently mandated 8-VSB, 16-VSB, 64-QAM, or 256-QAM forms without petitioning the Commission for a waiver or amendment of the regulations, *see* TW at 16. None of the initial comments to the FNPRM dispute these two claims.⁸ It is not clear, however, that a cable operator's conditional access system could be used to move protected content around a home network, since at least in a Plug & Play device it normally would be decrypted by the CableCARD, passed over the interface using DFAST, and then re-encrypted for output or recording only by the receiving product. *See* Opposition of the MPAA to the Petition for Reconsideration or Clarification Filed by the NCTA in M.B. Docket No. 02-230 at 8-9 (filed Mar. 10, 2004); MPAA *et al.* at 12-13; CEA at 2-3; CERC at 2; HRRC at 3; Matsushita at 1-2; *but see* NCTA at 4.

The other objections to encryption of the digital basic tier all miss their mark. For example, some comments argued that encryption of the digital basic tier would strand consumer devices such as PVRs and television sets that cannot decrypt the conditional access method used.

⁸ Although the CEA and EFF question the need for the protection of retransmitted broadcasts, CEA at 3; EFF at 8-9, neither disputes the fact that encrypting such retransmissions would make them more secure. Given that the CEA's and EFF's remaining criticisms of encryption are wide of the mark, as explained above, no reason exists to justify forfeiting the greater security.

See CEA at 3; EFF at 7; HRRC at 3. However, these comments overlook the fact that, aside from digital cable set-top boxes provided by cable operators, very few consumer digital TV receivers exist in the marketplace that have in-the-clear QAM tuners.⁹ And as those products are all high-end models, it is likely that their owners subscribe to premium services that would require use of CableCARD-equipped a set-top box that could connect to these legacy TVs.

Second, some of the commenters objected that encryption of the digital basic tier would allow cable operators to use encryption as a proxy for the presence of the Flag. If so, these comments argued, then encryption of the entire digital basic tier would mean that even unmarked, but encrypted, programming would be protected from redistribution. See DTLA at 3; EFF at 8. These comments misconstrue the intent of the Commission's regulations, however. Section 76.1909(b) specifically requires any retransmitter that encrypted the retransmitted signal to:

upon demodulation of the 8-VSB, 16-VSB, 64-QAM or 256-QAM signal, inspect either the EIT or PMT for the Broadcast Flag, and if the Broadcast Flag is present:

- (1) securely and robustly convey that information to the consumer product used to decrypt the distributor's signal information, and
- (2) require that such consumer product, following such decryption, protect the content of such signal as if it were a Covered Demodulator Product receiving Marked Content.

The Commission should clarify that the intent of Section 76.1909(b) is that both the presence *and absence* of the Broadcast Flag must be accurately conveyed to the receiving device. Thus, a cable operator who used encryption for all programming would need to use another mechanism,

⁹ We are not aware of any sales of digital recorders with in-the-clear QAM tuners in the marketplace. While there may be a small number of digital TV receiver products sold into the market with in-the-clear QAM tuners, see EFF at 7, most manufacturers of digital cable-compatible products have introduced CableCARD capability in their latest products.

such as CCI signaling across the CableCARD-Host interface, to signal the presence or absence of the Broadcast Flag.

V. The Broadcast Flag Must Apply to Software Demodulators

In their initial comments, the MPAA *et al.* noted, contrary to the claims of some, that the Broadcast Flag regulation would not interfere with the construction of open-source software demodulators, and would not be more oppressive than any of the numerous regulations that now apply to open-source software DTV devices. *Compare* MPAA *et al.* at 13-18 *with* EFF at 3-6; PK/CU at 6-11. Exempting all demodulators with a software component from the regulation would cause grave harm to the effectiveness of the regulation. MPAA *et al.* at 14; *see also* Matsushita at 2.

None of the other comments filed raise significant challenges to the points made in our initial comments. The EFF argues, wanly, that software is not a “component,” and that therefore demodulators made from software do not fit the Commission’s definition of “Demodulator.” The EFF offers, as its sole support for this claim, the fact that the Commission did not adopt the language of the Joint Proposal that added to the definition of “Demodulators” an explanatory phrase: “e.g., a demodulation chip or demodulation software.” *See* EFF at 2 & n.4; Joint Comments of the MPAA *et al.*, MB Docket No. 02-230, at App. B § X.1 (filed Dec. 6, 2002). However, if the EFF’s explanation were correct, the Commission would have eliminated not only software, but also demodulation chips from the definition of “components,” a result that is plainly absurd. Furthermore, the plain meaning of “component” belies the EFF’s claim: a “component” is “a constituent part; ingredient.” Webster’s Ninth New Collegiate Dictionary 270 (1984). Software is clearly a “constituent part” of a software demodulator.

Public Knowledge and Consumers Union similarly claim that software demodulation products are almost by definition “robust” because “the average person does not program or engage in circumvention or alteration of software, be it open-source or proprietary.” PK/CU at 10. This statement illustrates perfectly the difficulties with the definition of robustness the Commission has adopted in the Broadcast Flag regulation, which the MPAA has petitioned the Commission to reconsider. *See* Petition for Reconsideration and Clarification of the MPAA, MB Docket No. 02-230, at 2-21 (filed Jan. 2, 2004). Regardless of the outcome of that petition, however, the Commission cannot adopt a robustness standard as low as that proposed by Public Knowledge and Consumers Union. Most consumers do not remove the covers on their CE devices and computers either. Thus, under the interpretation of “robustness” propounded by Public Knowledge and Consumers Union, all demodulation products everywhere would be by definition robust. Such an interpretation strips the concept of “robustness” of any meaning.

Public Knowledge and Consumers Union also claim that software-defined radios should be exempted from the Broadcast Flag regulation because the “software components” will be unable to meet any compliance requirements. This argument ignores the fact that it is not a “component” that must be compliant with the regulation; it is a “Covered Demodulator Product” – which may include a Demodulator – or a Peripheral TSP Product. Thus, in the case of a Covered Demodulator Product, it is the combined package of software and hardware components that must meet the Compliance Rules of the regulation. The two groups betray a further lack of understanding of the regulation when they assert that “a compliant device is one that senses whether other, connecting devices are playing by the rules.” PK/CU at 8. Compliant products do no such thing; they merely ensure that Marked and Unscreened Content is routed only to certain outputs and recorded only by certain recording methods. They are not required to

communicate with connected devices. Public Knowledge and Consumers Union offer no explanation as to why a demodulation product with both hardware and software components could not achieve these goals as well as any other product.

Public Knowledge and Consumers Union also assert that application of the regulation to demodulators with software components could place the Commission “in the position of regulating every programmer, every personal computer, and every antenna, because the combination of these elements might lead to a noncompliant demodulator.” PK/CU at 9. Again, this statement is without any basis in fact. Under the regulation, the Commission is in the position of regulating only those combinations of elements that constitute a Covered Demodulator Product or a Peripheral TSP Product; if it is not one of those two things, the Commission does not have to regulate it.

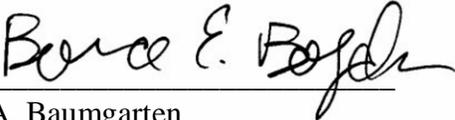
CONCLUSION

For the reasons stated above, the Commission should adopt the criteria contained in the Joint Proposal, including the withdrawal standard and procedure, and should require the encryption of the digital basic tier. The Commission should not exempt demodulators with software components from the regulation, nor create a broad exemption for “professional equipment,” either of which would create a vast loophole that would undermine the regulation’s effectiveness.

* * *

Respectfully submitted,

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APPENDIX A

Revised Proposal for Table A Criteria¹

X.20 Application for Table A Authorization.

(a) Written application required.

[Anticipates regulations similar to 47 C.F.R. § 2.911.]

(b) Submission of Table A application or information to the Commission.

[Anticipates regulations similar to 47 C.F.R. § 2.913.]

(c) Information to be included in application. An application for Table A authorization shall include:

- (1) a demonstration that any one or more of the criteria specified in Section X.21(c)(1) is met;
- (2) any Associated Obligations applicable to the technology;
- (3) the technology's licensing terms and conditions concerning output and recording controls, including licensing terms and conditions claimed to establish compliance with Sections _____;
- (4) a statement whether the applicant is the licensor of the technology. If the applicant is not the licensor of the technology, the application shall:
 - (A) state that, prior to the filing of the application, the applicant has provided or is providing notice of the filing of the application, together with a copy of the application, to the person or company identified in the application as the licensor; and
 - (B) list the identity and business address of the licensor and, if applicable, the name of any individual employed by or representing such licensor to whom such notice has been provided;
- (5) for the criteria set forth in X.21(c)(1)(A):
 - (A) the identity of the companies that applicant avers have used or approved a technology as defined in Section X.25;

¹ As used herein "Table A" means a listing of digital output and recording technologies authorized for use under the Commission's Broadcast Flag regulations. The numbering of sections follows the February 18, 2003 submission of MPAA *et al.* in response to the initial NPRM in this docket.

(B) evidence of use or approval under Section X.25; and

(C) a detailed description of the technology's recording and/or output controls, as applicable, and how such controls prevent unauthorized redistribution of Marked Content and Unscreened Content (including redistribution over the Internet);

(6) for the criteria set forth in X.21(c)(1)(B):

(A) the identity of the companies that applicant avers have used or approved a technology as defined in Section X.25;

(B) evidence of use or approval under Section X.25;

(C) the identity of the companies that applicant avers have licensed the technology;

(D) evidence that the technology has been licensed; and

(E) a detailed description of the technology's recording and/or output controls, as applicable, and how such controls prevent unauthorized redistribution of Marked Content and Unscreened Content (including redistribution over the Internet);

(7) for the criterion set forth in X.21(c)(1)(C):

(A) evidence that the applicant's technology is at least as effective as a technology currently on Table A,

(B) evidence that the technology is in legitimate use in a Major Commercial Market in connection with the output or recording of a commercially significant amount of New Release Content, if applicable; and

(C) a detailed description of the technology's recording and/or output controls, as applicable, and how such controls prevent unauthorized redistribution of Marked Content and Unscreened Content (including redistribution over the Internet); and

(8) for the criterion set forth in Section X.21(c)(1)(D):

(A) the licensing terms expressly naming the technology as being permitted to be used for the output or recording of audiovisual content; and

(B) a detailed description of the technology's recording and/or output controls, as applicable, and how such controls prevent unauthorized redistribution of Marked Content and Unscreened Content (including redistribution over the Internet);

(d) Requests for Identification in Support of Applications.

(1) At least 60 days prior to making an application under this section, any prospective or actual applicant may file a request, on a form prescribed by the Commission, for information concerning whether one or more named Major Studios or Major Television Broadcast Groups have “used” or “approved”, as “use” and “approval” are defined in Section X.25, the technology proposed to be used by the applicant.

(2) The Commission shall promptly inform each company named in such a request that it has been so named, and request confirmation as to whether it has used or approved the technology, as defined in this subpart. All responses shall be signed as provided in Section X.20(a)__. In light of the interest of Major Studios and Major Television Broadcast Groups in the use of the Broadcast Flag, a failure to respond to the Commission’s inquiry within 60 days shall be deemed to be an admission of use or approval of the technology as defined in this subpart.

X.21 Process for Deciding Application.

(a) Notification of pending application.

(1) Applications claiming satisfaction of X.21(c)(1)(A), (B), or (D): Major Studios and Major Television Broadcast Groups shall be notified by the Commission in a timely manner of receipt of an application for Table A authorization. Specific notice of an application under this Section shall be provided to the companies listed pursuant to Section X.20(c)(5)(A). Any company named in an application, as well as any other interested party, shall have 60 days to comment on the facts alleged in the application.

(2) Applications claiming satisfaction of X.21(c)(1)(C): At the initiation of the licensor of the technology or of another company, the Commission shall issue a notice to Major Studios and Major Television Broadcast Groups providing 60 days for comment on the request to include such technology on Table A.

(b) Consideration of application. The Commission shall have the duty and responsibility to process applications for Table A authorizations under this subpart.

(c) Grant of application.

(1) The Commission shall grant an application for Table A authorization if it finds from an examination of the application and supporting data, as well as of relevant comments received thereon within the time periods specified herein, and other matter which it may officially notice, that the application sets forth information sufficient to demonstrate that the technology satisfies at least one of the following criteria:

(A) 3 Major Studios and/or Major Television Broadcast Groups (of which at least 2 must be Major Studios) use or approve the technology.

(B) 10 Major Device Manufacturers (including software vendors) have licensed the technology and 2 Major Studios use or approve the technology.

(C) The technology is at least as effective at protecting Unscreened Content and Marked Content against unauthorized redistribution (including unauthorized Internet redistribution) as is any one of the technologies currently listed on Table A (other than technologies determined to be “significantly compromised” pursuant to Sec. X.23(a)(1)). A determination of whether a technology is “at least as effective” requires consideration of the effectiveness of both the technology and any applicable licensing terms and conditions relating to security (including such technology’s compliance and robustness rules necessary to comply with the provisions set forth herein), enforcement, and Change Management.

(x) In connection with such determination, evidence that the technology is in legitimate use in a Major Commercial Market in connection with the output or recording of a commercially significant amount of New Release Content shall weigh in favor of a determination that such technology is “at least as effective” as a technology then on Table A, provided that if such technology has not been so used in connection with a commercially significant amount of New Release Content, such fact shall not be weighed against a finding that such technology meets such “at least as effective” standard.

(y) By way of example and not limitation, a technology shall not be deemed to be in use “in connection with the output or recording of a commercially significant amount of New Release Content” if:

(a) such use is solely for internal testing or other evaluation of such technology (including but not limited to testing or evaluation in the form of limited-duration “beta testing”);

(b) the company or companies that use such technology demonstrate their intent to use such technology solely outside the United States; or

(c) such use relates solely to the non-commercial distribution of audiovisual content, such as distribution solely to professional devices or for internal distribution within a company (including its Affiliates).

(D) The technology (together with its licensing terms and conditions concerning output and recording controls and Associated Obligations) includes output and recording controls that protect against unauthorized redistribution of audiovisual content (including unauthorized Internet redistribution) and

such technology was expressly named as being permitted to be used for the output or recording (as applicable) of audiovisual content (except where such permission does not extend to use in connection with New Release Content) under the license applicable to a technology listed on Table A (whether such license itself expressly names the technology or references another means by which such technology may be expressly named), either (a) at the time such listed technology was listed on Table A, or (b) at a later date, provided that a Change Management process applied to such subsequent naming of such technology and such subsequent naming complied with such Change Management process.

(2) An entity that is counted to satisfy one of the criteria specified in paragraph (1) cannot be counted more than once in satisfying that criterion.

(3) For purposes of satisfying subparagraph (1)(A) or (B), if an entity is counted as a Major Device Manufacturer, Major Studio, or Major Television Broadcast Group (each, an “Industry Category”), no Affiliate of such counted entity may be counted in the same or any other Industry Category, except that

(A) if an entity is counted as a Major Device Manufacturer, 1 Affiliate of such counted entity may be counted as either a Major Studio or Major Television Broadcast Group; and

(B) if an entity is counted as a Major Studio or Major Television Broadcast Group, 1 Affiliate of such counted entity may be counted as a Major Device Manufacturer.

(4) A failure to satisfy any of the criteria specified in paragraph (1) shall not preclude an applicant from filing a subsequent application for such technology, or the subsequent addition of the technology to Table A, pursuant to that or any other criterion.

(5) In the event that the licensor of such technology is not the initiator of the request and objects within the applicable notice period to the inclusion of such technology on Table A, then such technology shall not be included on Table A.

(6) In the event that 3 Major Studios and/or Major Television Broadcast Groups object, during the 60-day public notice period, to the inclusion of such technology on Table A on the basis that such technology does not satisfy Section X.21(c)(1)(C), the matter shall be resolved through an expedited review (not to exceed an additional 45 days) to determine whether or not that criterion is satisfied. In the event that there are fewer than 3 Major Studios and/or Major Television Broadcast Groups that so object within the specified period of time (and the licensor of the technology does not object) or if the result of the expedited process is a determination that the technology satisfies Section X.21(c)(1)(C), then the technology will be included on Table A. If the licensor of the technology objects, at any time prior to the conclusion of such process, to the inclusion of its technology

on Table A, then the technology will not be included on Table A. For purposes of this paragraph, if any Major Studio or Major Television Broadcast Group is counted as objecting to the inclusion of such technology on Table A, no Affiliate of such counted entity may also be counted as so objecting.

(7) Grants will be made in writing showing the effective date of the grant and any special condition(s) attaching to the grant. If no objections are received, or in the case of X.21(c)(1)(C) fewer than 3 objections from Major Studios and Major Television Broadcast Groups are received, during the 60-day public notice period relevant time periods for comment or objection specified herein, a grant shall be deemed effective as of the expiration of such period. If any objections (in the case of Sections X.21(c)(1)(A), (B) and (D)) or 3 objections (in the case of Section X.21(c)(1)(C)) are received from Major Studios or Major Television Broadcast Groups during such period, a grant shall be deemed effective as of the date the Commission resolves such objections in favor of the applicant.

(8) No technology shall be admitted to Table A, nor shall any technology authorization be deemed effective, until the application has been granted.

(9) Notwithstanding any other provision of these regulations, because content owners and broadcasters do not have privity with the manufacturers of devices in which the technology will be implemented, in the event that use or triggering of the technology imposes any obligations upon content owners or broadcasters, such technology may only be added to Table A if (a) such obligations have been fully disclosed on the record of the application; (b) that technology may be turned off, bypassed, or otherwise not used and triggered at the content owner's and broadcaster's election, (c) and content owners and broadcasters are provided with facile means of such election.

(d) Dismissal of application.

(1) An application which is not in accordance with the provisions of this subpart may be dismissed.

(2) Any application, upon written request signed by the applicant or his attorney, may be dismissed prior to a determination granting or denying the authorization requested.

(3) If an applicant is requested by the Commission to file additional documents or information and fails to submit the requested material within 60 days, the application may be dismissed.

(e) Denial of application. In the event that the required number of objections are received from Major Studios or Major Television Broadcast Groups during the relevant time periods specified herein and the Commission is unable to make the findings specified in Section X.21(c)(1), it will deny the application. Notification to the applicant will include a statement of the reasons for the denial.

(f) Petition for reconsideration; application for review.

[Anticipates regulation similar to 47 C.F.R. § 2.923.]

X.22 Continuing Obligations of Grantee

[Anticipates regulations similar to 47 C.F.R. §§ 2.929, 2.931, 2.932, 2.936, and 2.938.]

X.23 Disqualification as Benchmark and Withdrawal of Table A Authorization.

(a) Disqualification as benchmark.

(1) A Major Studio or Major Television Broadcast Group may request pursuant to Sec. 1.41 that the Commission disqualify a technology listed on Table A for use as a benchmark in the evaluation conducted under Sec. X.21(c)(1)(C) and X.23(b)(2), on grounds that the technology has been significantly compromised in relation to its ability to protect Unscreened Content and Marked Content from unauthorized redistribution (including unauthorized Internet redistribution). The grantee, and any other interested persons, shall be given 60 days to respond to such a request. The Commission shall disqualify the listed technology as a benchmark if it finds that the technology has been so significantly compromised. Disqualification under this Section X.23(a) does not remove such technology from Table A; such removal may only occur voluntarily, by order of the Commission for exigent circumstances, or pursuant to Section X.23(b).

(2) A grantee or any potential or actual licensee of a listed technology that has been disqualified pursuant to paragraph (1) may request pursuant to Sec. 1.41 that the Commission reinstate such technology for use as a benchmark pursuant to Secs. X.21(c)(1)(C) and X.23(b)(2). The request shall state what actions the grantee has taken to ameliorate the compromised aspects of its technology such that its technology is at least as effective as another technology currently listed on Table A. The party or parties initiating the request pursuant to paragraph (1), and any other person, shall be given 30 days to respond to or comment on such a request. The Commission shall reinstate the listed technology for purposes of Secs. X.21(c)(1)(C) and X.23(b)(2) if it finds that the technology protects Unscreened Content and Marked Content from unauthorized redistribution (including unauthorized Internet redistribution).

(b) Withdrawal of Table A authorization.

(1) The Commission may withdraw any Table A authorization:

(A) for material false statements or representations made either in the application or in materials or response submitted in connection therewith by the applicant, the licensor (if the applicant is not the licensor), the applicant's or licensor's Affiliates, or by any party where the applicant or licensor knows the statement or representation to be false at the time of submission, or in records required to be kept by Sec. X.22__.

(B) if it is determined that changes have been made to the technology other than those authorized pursuant to a process of Change Management or otherwise expressly authorized by the Commission.²

(2) A Major Studio or Major Television Broadcast Group may request pursuant to Sec. 1.41 of this chapter that the Commission withdraw the authorization granted to a technology listed on Table A on grounds that the technology has been substantially compromised in relation to its ability to protect Unscreened Content and Marked Content from unauthorized redistribution (including unauthorized Internet redistribution). The grantee, and any other interested persons, shall be given 60 days to respond to such a request. The response may state what actions the grantee has taken to ameliorate the compromised aspects of its technology such that its technology is at least as effective as another technology currently listed on Table A that is not then disqualified for use as a benchmark under Section X.23(a). The Commission shall withdraw the authorization granted to the listed technology if it is determined that the technology has been substantially compromised in relation to its ability to protect Unscreened Content and Marked Content from unauthorized redistribution (including unauthorized Internet redistribution).

(3) In making a determination under paragraph (2), the Commission shall consider the protection of Unscreened Content and Marked Content from unauthorized redistribution (including from unauthorized Internet redistribution), and the impact on content owners, consumers and manufacturers resulting from the continued use of such compromised technology and from any withdrawal of such technology from Table A.

[Anticipates additional regulations providing for a suitable grace period after revocation.]

X.24 Availability of information relating to grants.

(a) Grants of Table A authorization will be publicly announced in a timely manner by the Commission.

(b) Information relating to Table A authorizations, including any materials submitted by the applicant in connection with an authorization application, shall be available in accordance with Secs. 0.441 through 0.470 of this chapter.

X.25 Market Acceptance.

(a) For purposes of a determination pursuant to Sections X.21(c)(1)(A) and (B) (and for no other purpose, e.g., not for purposes of patent law), a company shall be deemed to have “used” or “approved” a technology (a “Proposed Table A Technology”) only if:

(1) such technology (together with its licensing terms and conditions concerning output and recording controls and Associated Obligations) includes output and

² The foregoing subparagraphs are based on 47 C.F.R. § 2.939(a).

recording controls that protect against unauthorized redistribution of audiovisual content (including unauthorized Internet redistribution); and

(2) at least one of the following conditions is true:

(A) such company or, where such company is a Major Studio, any of its Qualified Affiliates, has signed an agreement with the licensor of such Proposed Table A Technology that expressly authorizes (including, for avoidance of doubt, via license grant, non-assertion covenant or other authorization) the company or any of the company's Qualified Affiliates (either immediately or upon a specified future date or circumstance) to use or cause the use of such Proposed Table A Technology in a Major Commercial Market, in connection with the output or recording (as applicable) of audiovisual content (except where such authorization does not extend to use in connection with the company's New Release Content), provided that the use of such Proposed Table A Technology was expressly provided for in such agreement at the time the company enters into such agreement (whether such agreement then permits the use of the Proposed Table A Technology or then specifies a future date or circumstance upon which such use of such Proposed Table A Technology shall be permitted), and provided further that such "use" or "approval" shall not be deemed to exist prior to the effective date of any right to use such Proposed Table A Technology under such agreement;

(B) such company or, where such company is a Major Studio, any of its Qualified Affiliates, has entered into a content license or similar content-related agreement that, upon signature (and not pursuant to a Change Management procedure), expressly identifies, either directly, or indirectly by description or reference, such Proposed Table A Technology (i.e., by expressly naming such technology in such content license or content-related agreement or, indirectly, by expressly naming such technology in a specification, standard or license that is directly or indirectly linked by explicit reference through one or more instruments to such content license or content-related agreement) as being permitted to be used for the output or recording (as applicable) of the company's audiovisual content (except where permission does not extend to use in connection with the company's New Release Content);

(C) such company or, where such company is a Major Studio, any of its Qualified Affiliates, has signed an agreement with the licensor of another technology for which the applicable license specifically permits the use (either immediately or upon a specified future date or circumstance) of the Proposed Table A Technology in a Major Commercial Market in connection with the output or recording of audiovisual content (except where such permission does not extend to use in connection with the company's New Release Content), provided that the use of such Proposed Table A Technology was expressly provided for in such agreement at the time the company enters into such agreement (whether such agreement then permits the use of the Proposed Table A Technology or then specifies a future date or circumstance upon which such

use of such Proposed Table A Technology shall be permitted) and provided further that such “use” or “approval” shall not be deemed to exist prior to the effective date of any right to use such Proposed Table A Technology under such agreement;

(D) such company has issued an unambiguous public statement endorsing the Proposed Table A Technology for the output or recording (as applicable) of the company’s audiovisual content (except where such endorsement does not extend to use in connection with the company’s New Release Content) or the inclusion of the Proposed Table A Technology on Table A; or

(E) a General Counsel or equivalent legal representative of such company has approved in writing the inclusion of the Proposed Table A Technology on Table A.

(b) By way of example and not limitation, a company shall not be deemed to have “used” or “approved” a technology if: (A) its use or approval relates solely to internal testing or other evaluation of such technology (including but not limited to testing or evaluation in the form of limited-duration “beta testing”); (B) notwithstanding any contractual right to use such technology for New Release Content, the company demonstrates that it uses and intends to use such technology under such contract solely in connection with content other than New Release Content; (C) the company demonstrates its intention to use or approve the use of the technology solely outside the United States; or (D) its use or approval relates solely to the non-commercial distribution of audiovisual content, such as distribution solely to professional devices or for internal distribution within the company (including its Affiliates).

X.26 Authorization for Use With Unscreened Content. In order to be authorized for use with Unscreened Content, an Authorized Digital Output Protection Technology or Authorized Recording Method must, in addition to meeting other applicable criteria, further either:

(a) protect Unscreened Content in a manner that prohibits its digital recording (other than temporary storage solely for the purpose of enabling immediate or delayed display) unless and until the EIT or PMT for content contained in a stream that has not been altered following demodulation is inspected for the Broadcast Flag, in which case:

(1) if the Broadcast Flag is determined to be present, the content shall thenceforth be treated in the same manner as if it had been passed from a Covered Demodulator Product protected by such Authorized Digital Output Protection Technology (pursuant to 73,9004(a)(3) or 73,9006(b)), or recorded using such Authorized Recording Method (pursuant to 73,9004(b)(2)), as Marked Content; and

(2) if the Broadcast Flag is determined not to be present, no protections are thenceforth required to apply; or

(b) protect Unscreened Content so that such content may be accessed in usable form by another product only if such other product protects such content in accordance with the Compliance and Robustness Requirements applicable to Unscreened Content, as if it were a Covered Demodulator Product.

X.27 Definitions.

“Affiliate” means, with respect to any entity, any corporation, partnership or other entity that, directly or indirectly, owns, is owned by, or is under common ownership with, such first entity, for so long as such ownership exists. For purposes of the foregoing, “own,” “owned” or “ownership” shall mean holding ownership of, or the right to vote, more than fifty percent (50%) of the voting stock or ownership interest entitled to elect a board of directors or a comparable managing authority.

“Associated Obligations” means any obligations set out on, or proposed to be set out on, Table A for a given Authorized Digital Output Protection Technology or Authorized Recording Method, which pertain to the use of such technology by a Covered Demodulator Product to protect Unscreened Content or Marked Content pursuant to X.3(a)(3), X.4(a)(3) or X.6(b).

“Change Management,” for purposes of these criteria, means a process by which content owners are provided a specified right or ability to meaningfully object to particular amendments to content protection agreements.

“Major Television Broadcast Group,” for purposes of these criteria, means the 4 largest broadcast networks and the 5 largest television station groups that are not affiliated with Major Studios.

“Major Device Manufacturer,” for purposes of these criteria, means any member of CEA, ITI, BSA or CCIA, the total gross revenues of which from device manufacturing and software publishing exceed US\$_____ per year.

“Major Studio,” for purposes of these criteria, means, during the course of any year, any member of the MPAA or any other company that has generated U.S. box office revenues from theatrical releases of feature films in the immediately prior year that are at least as great as the MPAA member company with the lowest U.S. box office revenues from theatrical releases of feature films for that same year.

“Major Commercial Markets,” for purposes of these criteria, means the United States, any country within the European Community, Canada, Japan and Australia.

“New Release Content,” for purposes of these criteria, means, with respect to the application of any Proposed Table A Technology to audiovisual content, audiovisual content owned or acquired by license (with the right to determine distribution methods) by a Major Studio and first commercially released during the 24-month period preceding such application of such technology to such audiovisual content.

“Qualified Affiliate” means, with respect to a Major Studio, (a) an entity that directly or indirectly owns and controls such Major Studio or (b) an Affiliate of a Major Studio authorized to distribute the preponderance of the New Release Content owned or licensed by such Major Studio for one or more of the major content distribution channels (i.e., theatrical, home entertainment, pay-per-view, video-on-demand, pay television, basic cable or broadcast television). For purposes of the foregoing, “own” shall mean holding ownership of, or the right to vote, more than fifty percent (50%) of the voting stock or ownership interest entitled to elect a board of directors or a comparable managing authority.

APPENDIX B

March 15, 2004

[Section X] Functional Criterion for Table A.¹

(a) **Standard.** A technology may be added to Table A upon a determination pursuant to [insert appropriate procedural regulation] that the technology – together with associated terms and conditions affecting security (including output and recording control, enforcement, and Change Management) that must be implemented as a strict condition of using the technology in devices – provides Affirmative and Reasonable Constraints on the digital redistribution of Marked and Unscreened Content through the digital outputs and connections of a Covered Product beyond the Local Environment of such Covered Product. For these purposes, “digital redistribution” does not include the physical movement of portable media or devices on which such content has been recorded. Thus, the technology need not impose any restrictions on such physical movement, so long as recording and playback are compliant with this subpart.

(b) **Definitions.**

(1) “Affirmative Constraints” means constraints that include each of the requirements of subsection (c) below and that effectively prevent digital redistribution beyond the Local Environment.

(2) “Local Environment” is the set of compliant, authorized devices within a tightly defined geographic area around a product. Mechanisms to define the Local Environment consist of: A) controls to limit distance from such product, B) limits on the scope of the network addressable by such product, and C) affinity-based controls used to approximate association of such set of devices with an individual or household. For example, the Local Environment of a product in a home consists of the set of authorized devices within or in the immediate vicinity (e.g., the yard, garage, or driveway) of that home but does not include products or devices located in a neighbor’s home or operated by passers-by. Devices in an individual’s car, RV, or boat are considered to be in the Local Environment of a product that is in an individual’s home when the devices are in the immediate vicinity of that individual’s home.

(3) “Reasonable Constraints” means constraints that in the normal course of operation prevent digital redistribution beyond the Local Environment.

¹ This model would also add appropriate procedural and other extensions to various of the provisions submitted by the MPAA *et al.* in connection with its proposal for Marketplace Criteria in Appendix A of our initial Comments to this FNPRM. Most importantly, Sections X.20(c) (information to be included in applications), X.21(c) (conditions of grant of application), X.21(c)(1)(D) (output and recording controls in license), X.21(c)(8) (intellectual property disclosure and obligations), and X.23(b) (withdrawal of authorization) would be adjusted accordingly.

(c) Mandatory Characteristics. To be considered for Table A under this criterion, a technology (and its associated terms and conditions) may be implemented – subject to the terms of applicable agreements – in hardware or software or both and must include in each case each of the following characteristics. Compliance with this section is a threshold requirement and does not determine that a technology must or should be added to Table A.

(1) the technology must effectively encrypt the content using cryptographic ciphers and cryptosystems of appropriate strength, key length, and in a manner such that:

(A) all cryptographic algorithms (including but not limited to symmetric and asymmetric ciphers, one-way cryptographic hashes, and cryptographic random number generators) shall have undergone public peer review and achieved widespread, published acceptance within the cryptographic scientific community to be strong algorithms;

(B) all cryptographic algorithms shall be such that detailed knowledge of the algorithms, the implementation of the algorithms, or both shall not, in and of itself, be sufficient information to allow the development or production of circumvention devices;

(C) all cryptographic algorithms, cryptosystems, keys and secrets shall be of sufficient strength, bit length, and implementation structure to render cryptanalysis to be computationally infeasible and prevent a system breach or compromise of content within the reasonably foreseeable future taking into account anticipated increases in processor speed/computational power, the possibility of distributed attacks, and future cryptanalysis techniques;

(2) the technology must utilize an authentication method such that any device participating in the exchange of Unscreened Content or Marked Content must:

(A) determine the authenticity of target sink device(s) on a regular and frequent basis prior to transmitting the content, including but not limited to confirming such sink device's existence in the Local Environment of the sending device. "Authenticity" means that the sink device demonstrates secure credentials showing it is authorized to implement the technology.

(B) securely manage the communication and distribution of any cryptographic keys and any secrets for decrypting the content using specific means to restrict such communication and distribution to within the Local Environment of the sending device;

(C) use specific means to limit exchanges of content beyond the Local Environment of the sending device, such as, but not limited to, Round Trip Time (RTT) limits; provided that use of any particular means may be found to be insufficient to meet this Mandatory Characteristic due to known or likely techniques for capturing and transmitting content beyond the Local Environment; and

(D) use specific affinity-based mechanisms, such as, but not limited to, password protection, user registration and/or cryptographic domain binding, in order to approximate association of a set of devices within a Local Environment with an individual or household and constrain content exchanges to those devices;

(3) decryption of such authenticated, encrypted transmission must be licensed, and such licenses must impose as terms and conditions the Compliance Rules of Subpart M and robustness requirements that comply with the Robustness Rules of [Section Y] on the sink device; provide content owners with an opportunity to meaningfully object to amendments to the license; and assure that such terms and conditions are imposed on all subsequent receiving devices;

(4) the technology must be implemented in Covered Demodulator Products and Peripheral TSP Products in hardware and software in a robust manner that complies with the Robustness Rules provided in Section [Y] below;

(5) the technology must incorporate an effective mechanism for revoking any lost, stolen, intercepted or otherwise misdirected cryptographic key or keys associated with a particular device; and any key or keys that are associated with a particular device and that have been made public or disclosed in violation of a license agreement, or cloned without authorization of the entity generating and licensing the keys. (“Key” includes any associated device identity or certificate or the like.)

(6) if the technology is implemented in software or upgradeable firmware, it must support a secure mechanism for system renewability and upgradeability in order to restore the content protection capabilities of the technology in the case of a successful system attack.

(d) Other Considerations.

(1) In making a determination of whether a proposed technology together with its terms and conditions does provide Affirmative and Reasonable Constraints on the ability of Covered Products to digitally redistribute Marked Content and Unscreened Content through the digital outputs and connections of Covered Products beyond the Local Environment of the sending device, in addition to the Mandatory Characteristics set forth above, the following shall also be considered:

(A) the capabilities of the technology to constrain digital redistribution addressing both present and foreseeable threats that may be envisioned at the time of such determination; hence, the addition of any technology to Table A under this criterion or the existence of any Technology on Table A under any other criterion is not a significant factor in assessing a newly proposed technology, although the failure of a proposed technology to implement characteristics of prior Table A technologies can be a significant factor militating against addition of the new technology to Table A;

(B) the geographic reach of possible dispersal of a signal at usable strength (i) absent the intervention of typical barriers such as walls within and surrounding a home, and (ii) in the face of such barriers;

(C) geographic limits, if any, imposed by need for, possible use of, or absence of physical carriers, such as wires and cable, and relevance of proximity features such as distance and sight lines, provided that any need for, use and relevance of such physical carriers or proximity features may be found to be of little or no weight in the face of encapsulation, tunneling, or other techniques for capturing and transmitting content beyond the Local Environment of a Covered Product; and

(D) the extent to which the proposed technology prevents or deters access to encrypted content by unauthorized devices including non-targeted sinks on the same network (i.e., “snooping”).

(2) For the purpose of this criterion, the mere implementation of device counting, unaccompanied by substantial other characteristics in addition to those required by subsection (c), is not an Affirmative or Reasonable Constraint.

[Section Y] Robustness Requirements.

(a) In General. These robustness rules apply to the construction and implementation of Table A Technologies in Covered Products and Downstream Products and the behavior of such products with regard to the handling of Unscreened Content, Marked Content, and Downstream Content. For the purpose of these rules: (i) “Covered Products” include Covered Demodulator Products and Peripheral TSP Products; (ii) a “Downstream Product” is a product other than a Covered Product that receives content from a Table A Technology or from a technology that is approved for output or recording Downstream Content, including Downstream Content from a prior Downstream Product or from a succession of products that are linked by transmission from an initial Covered Product; (iii) “Downstream Compliance Requirements” are requirements of initial and subsequent Downstream Products that replicate the conditions of Subpart M under licenses for Table A Technologies as required under Section [X](c)(3) of the Functional Criteria; and (iv) “Downstream Content” is content that originated as Unscreened or Marked Content in a Covered Product and that is received by an initial or subsequent Downstream Product. Without limitation, Demodulator and Downstream Compliance Requirements include features and conditions pertaining to implementation of the Table A technology, such as encryption and decryption functions, and to related requirements such as avoidance of unprotected and non-authorized outputs and of unprotected or unauthorized protection of recordings in Covered and Downstream Products. Unless the sense of a provision is to the contrary, references to “Table A Technology” shall include any technology that is approved for recording Downstream Content in, or for output of Downstream Content from, a Downstream Product.

(1) Table A technologies shall be implemented in Covered and Downstream Products in a manner clearly designed to effectively frustrate attempts to modify such technologies to defeat the Demodulator Compliance Requirements and Downstream Compliance Requirements.

(2) Table A technologies and Covered and Downstream Products shall not include:

(A) switches, buttons, jumpers or software equivalents thereof,

(B) exposed traces, pins, or vias (i.e., only buried traces, hidden pins and hidden vias are allowed), or

(C) functions (including service menus and remote-control functions),

in each case by which the Demodulator or Downstream Compliance Requirements can be defeated, or by which compressed unencrypted Marked Content, compressed unencrypted Unscreened Content, or compressed unencrypted Downstream Content can be exposed to output, interception, retransmission, or copying, in each case other than as permitted under Subpart M or similar Downstream Compliance Requirements.

(3) Table A technologies shall be implemented in Covered and Downstream Products in a manner that is clearly designed to effectively frustrate attempts to discover or reveal any secret keys or secret algorithms used to meet the requirements of the Demodulator or Downstream Compliance Requirements.

(b) Data Paths. Within a Covered and Downstream Product, features including but not limited to implementations of Table A technologies shall not allow Unscreened Content, Marked Content, or Downstream Content to be present on any User Accessible Bus in unencrypted, compressed form.

(1) Uncompressed Content. During a petition opportunity that the Commission may designate, an interested person may petition the Commission to initiate a Notice of Inquiry to determine whether it is technically feasible and commercially reasonable to require that Unscreened Content, Marked Content or Downstream Content when transmitted over any User Accessible Bus in uncompressed digital form be made reasonably secure from unauthorized interception by using means that meet the standards set forth in Section [Y](d). Such petition shall include evidence that such an inquiry is warranted in light of generally available technologies and existing commercial circumstances. Should the Commission, based on such evidence and on consultation with affected industries, proceed with such Notice of Inquiry and thereby determine that requiring such protection at such level is technically feasible and commercially reasonable, the Commission may, pursuant to a Notice of Proposed Rulemaking, revise this Section to so require. The Commission will consider in its analysis: the general availability of relevant technologies, cost of implementation, effectiveness of any solutions, availability of alternative solutions, intellectual property licensing issues, consistency with requirements of other content protection systems, likely ability of manufacturers to satisfy the Robustness Requirements, and normal design cycles for such products. The Commission will exercise its discretion to limit the frequency of such Notices of Proposed Rulemaking. The procedures of this subparagraph shall apply as well to other provisions of these Robustness Rules that are currently limited to compressed content.

(c) Methods of Making Functions in Table A Technologies Robust. Table A technologies and other features in Covered and Downstream Products shall be manufactured using at least the following techniques in a manner that is clearly designed to effectively frustrate attempts to defeat the content protection requirements set forth below.

(1) Distributed Functions. Where compressed Unscreened Content, compressed Marked Content, or compressed Downstream Content is delivered from one portion or implementation of the Table A technology or a Covered or Downstream Product to another portion or implementation of such Table A technology or such product, whether among integrated circuits, software modules, a combination thereof, or otherwise, such portions shall be designed and manufactured in a manner associated and otherwise integrated with each other such that such Unscreened Content, Marked Content, or Downstream Content as the case may be, in any usable form flowing between such portions of such Table A technology or products shall be reasonably secure from being intercepted or copied except as permitted under the Demodulator and Downstream Compliance Requirements.

(2) Software. Without limiting the requirements of Sections [Y](a) and (b), portions of a Table A technology or Downstream or Covered Product that implement in Software the content protection requirements set forth in the Demodulator or Downstream Compliance Requirements shall:

(A) Comply with Section [Y](a)(3) by a reasonable method including but not limited to: encryption, execution of a portion of the implementation in ring zero or supervisor mode (i.e. in kernel mode), and/or embodiment in a secure physical implementation; and, in addition, using techniques of obfuscation clearly designed to effectively disguise and hamper attempts to discover the approaches used.

(B) Be designed so as to perform or ensure checking of the integrity of its component parts such that unauthorized modifications will be expected to result in a failure of the implementation to provide access to unencrypted Unscreened Content, unencrypted Marked Content, or unencrypted Downstream Content. For purposes of this Section [](c)(2)(B), a “modification” includes any change in, or disturbance or invasion of, features or characteristics, or interruption of processing, relevant to Sections [Y](a) and (b). This Section [Y](c)(2)(B) requires at a minimum the use of signed code or more robust means of “tagging” operating throughout the code. For purposes of this Section [](c)(2), “signed code” means a method of achieving trusted distribution of Software by using public key cryptography, keyed hash, or other means at least as effective, to form a digital signature over Software such that its authenticity and integrity can be verified.

(3) Hardware. Without limiting the requirements of Sections [Y](a) and (b), the portions of a Table A technology or Downstream or Covered Product that implement in Hardware the content protection requirements set forth in the Demodulator or Downstream Compliance Requirements shall:

(A) Comply with Section [Y](a)(3) by any reasonable method including but not limited to (i) embedding any secret keys or secret cryptographic algorithms used to meet the content protection requirements set forth in the Demodulator Downstream Compliance Requirements in silicon circuitry or firmware that cannot reasonably be read or (ii) employing the techniques described above for Software.

(B) Be designed such that attempts to remove, replace, or reprogram Hardware elements in a way that would compromise the security afforded by the requirements set forth in the Demodulator and Downstream Compliance Requirements would pose a serious risk of rendering the Table A technology or Covered or Downstream Product unable to receive, transmit, record, or play back Unscreened Content, Marked Content, and Downstream Content. By way of example, a component that is soldered rather than socketed, or affixed with epoxy, may be appropriate for this means.

(4) Hybrid. The interfaces between Hardware and Software portions of a Table A technologies and Covered and Downstream Products y shall be designed so that the Hardware portions comply with the level of protection that would be provided by a pure Hardware implementation, and the Software portions comply with the level of protection that would be provided by a pure Software implementation.

(d) Level of Protection. The content protection requirements set forth in the Demodulator and Downstream Compliance Requirements and the requirements set forth in Sections [Y](a)(3) and [Y](b) shall be implemented in a reasonable method so that they:

(1) Cannot be defeated or circumvented merely by using general-purpose tools or equipment that are widely available at a reasonable price, such as screwdrivers, jumpers, clips and soldering irons, or using specialized electronic tools or specialized software tools that are widely available at a reasonable price, such as EEPROM readers and writers, debuggers or decompilers, other than Circumvention Devices; and

(2) Can only with difficulty be defeated or circumvented using professional tools or equipment, such as logic analyzers, chip disassembly systems, or in-circuit emulators or any other tools, equipment, methods, or techniques not described in Section [Y](e)(1), such as would be used primarily by persons of professional skill and training, but not including professional tools or equipment that are made available only on the basis of a non-disclosure agreement or Circumvention Devices.

(e) Advance of Technology. Although an implementation of a Table A technology or other features of a Covered or Downstream Product when designed and first shipped may meet the above standards, subsequent circumstances may arise which, had they existed at the time of design would have caused such products to fail to comply with this Section [Y] (“New Circumstances”). If a manufacturer implementing a Table A technology has actual notice or actual knowledge of New Circumstances that relate to the manufacturer’s specific implementation of a Table A technology or other features of a Covered Demodulator Product (hereinafter referred to as “Notice”), then within 18 months after Notice such manufacturer shall cease distribution of such Covered Product or Downstream Product and shall only distribute Covered Products and Downstream Products that are compliant with this Section [Y] in view of the then-current circumstances.