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

In the Matter of	)	
Digital Broadcast Copy Protection	)	MB Docket No. 02-230
	)	
	)	

REPLY COMMENTS OF THE ELECTRONIC FRONTIER FOUNDATION

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The Electronic Frontier Foundation (EFF) submits the following reply comments in connection with the Commission's *Notice of Proposed Rule-Making (In re Digital Broadcast Copy Protection)*, FCC Docket No. 02-230 (issued Aug. 9, 2002) (the "NPRM").

I. Introduction

In its initial comments,[1] EFF expressed its view that a technology mandate to support the broadcast flag for digital television (DTV) is both unnecessary and unwise. In a joint comment submitted in this docket,[2] however, a group of entertainment industry entities has set forth a detailed prescription for just such a technology mandate ("MPAA Proposal"), largely based on recommendations contained in the *Final Report of the Co-Chairs of the Broadcast Protection Discussion Group of the Copy Protection Technical Working Group ("BPDG Final Report")*.[3]

Having participated extensively in the Broadcast Protection Discussion Group ("BPDG"), EFF is intimately familiar with the MPAA Proposal, having attended all of the meetings of the BPDG. It is our view that the technology mandate proposed therein is unnecessary, ineffective, and unwise.

EFF agrees with the Consumer Electronics Association that

> [R]egulatory agencies, like courts, should issue only such mandates as are narrowly tailored and to not hinder technological innovation. Further, they should only be applied against a substantial, demonstrable threat. Governmental interference should not occur at all unless clearly necessary to foster availability of content, **not just in theory, but in fact**.[4]

Facts, however, are in notably short supply in the comments submitted by those who support the MPAA Proposal or broadcast flag mandates like it.

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[1] Comments of the Electronic Frontier Foundation (submitted Dec. 6, 2002) ("EFF Comment"). All references to party comments herein are in FCC Docket No. 02-230, unless otherwise noted.
[2] Joint Comments of the Motion Picture Ass'n of America, Inc., *et al*. (submitted Dec. 6, 2002) ("MPAA Comments").
[3] The *BPDG Final Report* is available from EFF's "Consensus at Lawyerpoint" weblog: http://bpdg.blogs.eff.org.
[4] Comments of the Consumer Electronics Ass'n (submitted Dec. 6, 2002), p. 5 (emphasis added).

Proponents of DTV content protection based on the broadcast flag have failed to produce any empirical evidence regarding:

- The actual scope of Internet redistribution of DTV content today or in the near-future;
- The extent to which such redistribution actually threatens the commercial prospects of DTV content producers and terrestrial broadcasters; or
- The effectiveness of the MPAA Proposal to meaningfully reduce the incidence of Internet redistribution.

The MPAA Proposal will also:

- Harm consumers;
- Impair innovation and competition in the DTV market; and
- Violate the First Amendment rights of open source software programmers.

In light of these considerations, it is EFF's view that the Commission should reject at this time not only the MPAA Proposal, but any regulatory technology mandates premised on the broadcast flag.

II. Proponents of a broadcast flag mandate have failed to demonstrate its necessity.

In advocating for a broadcast flag mandate, its proponents argue that (1) DTV is uniquely vulnerable to "Internet piracy" and (2) this threat will result in high-quality content being withheld from terrestrial DTV broadcasters.

Proponents of a broadcast flag mandate indulge in considerable hyperbole regarding the "threat" posed to DTV by "Internet piracy," but have failed to come forward with *any* evidence demonstrating that Internet redistribution of DTV content poses a problem today or that it will in the near future. Moreover, what evidence *has* been submitted in this docket makes it plain that high-quality content has *not* been withheld from DTV broadcast as a result of fears regarding Internet piracy.

A. Internet redistribution of DTV content is not a realistic threat today, nor will it be in the foreseeable future.

Supporters of the MPAA Proposal have failed to document *a single instance* of a DTV broadcast being shared over the Internet. This notwithstanding:

- the fact that high-quality films (including blockbusters like *Men in Black* and *Saving Private Ryan*) and primetime network programming (including top-rated shows like *ER* and *Law & Order*) are being broadcast today without any content protection in place;[5]
- the fact that DTV tuner cards for PCs[6] can be purchased for as little as $299 that will save DTV programming to hard drives without any copy protection whatsoever; and
- the fact that millions of American households have broadband Internet connectivity, and tens of millions of consumers are using peer-to-peer (P2P) file-sharing products like Kazaa.

This is not to say that unauthorized Internet redistribution of video content is not occurring—just that *none of it is coming from DTV broadcasts*. The vast majority of the video content being redistributed via the Internet is captured from analog NTSC broadcasts or cable transmissions, extracted from DVDs, or recorded by camcorders in theaters. The MPAA Proposal, of course, will do nothing to curtail the continued availability of content from these other sources.

Full-resolution DTV broadcasts are not being redistributed over the Internet because the resulting files are far too large. A single two-hour movie broadcast in 1080i would occupy over 17 *gigabytes* of hard drive space.[7] As discussed in EFF's initial comment, transmitting such a file over a typical consumer broadband connection would take, under ideal circumstances, over 40 hours.[8] This makes DTV broadcasts, among the consumer video formats available today, uniquely *unattractive* candidates for Internet redistribution. Moreover, these files cannot be reduced in size without sacrificing resolution (and once "down-rezzed," the

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[5] For more examples of the high-value DTV content being broadcast today, in the absence of any broadcast flag technology mandate, see BSA Digital Television Compendium (submitted Dec. 2, 2002).

[6] The MyHD DTV tuner card retails today for $299, is capable of receiving 480p, 720p, and 1080i ATSC broadcasts, and saves the resulting programs to a hard drive in unencrypted form. For more information regarding this card, see <http://www.digitalconnection.com/Products/Video/myhd.asp>.

[7] Content broadcast at 1080i, when demodulated and stored on a computer in its MPEG format (already highly compressed), fills 8.7 gigabytes per hour. *See* MyHD HDTV PC Decoder Card FAQ, <http://www.digitalconnection.com/Support/cn_myhd_1.asp>.

[8] EFF Comment, p. 4.

files are no better than those readily available from non-DTV sources).[9]

These facts render implausible the parade of Internet horribles marshaled by proponents of the MPAA Proposal. The MPAA Comments declare that, in the absence of a broadcast flag mandate, a consumer will be able blithely to redistribute DTV recordings "via peer-to-peer file trafficking," or "easily e-mail the file as an attachment," or "simply place the recorded file on a personal webpage."[10]

Each of these hypothetical examples is implausible; some are laughable.[11] In an attempt to substantiate the claims contained in the MPAA Comments, MIT graduate student Raffi Krikorian ran a number of real-world tests, documented in reply comments that he has submitted in this docket.[12] Using a DTV recording of the 2003 Super Bowl, Mr. Krikorian discovered that it was *impossible* for him to send a copy of the game to another person over the Internet using his home broadband connection. Even using his MIT Internet access—a level of broadband connectivity that home Internet users are *never* likely to achieve—he found that it would take a minimum of *2 days* to send a copy over the Internet to a person equipped with a home broadband connection.

"Any recipient of digital broadcast television, not just the professional pirate or amateur hacker, would have it within his or her power to illegally redistribute digital broadcast television content almost at will, everywhere on Earth," declaim the MPAA Comments.[13] Apparently not.

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[9] Programming captured from DTV broadcasts could be made smaller by sacrificing resolution (colloquially called "down-rezzing"). The resulting files would be no better than those that could be obtained from analog NTSC broadcasts or cable transmissions, or video extracted from DVDs. In other words, so long as the content in question is available on DVD or being broadcast in analog NTSC anywhere in the world, those intent on unauthorized Internet redistribution will not need DTV broadcast sources, so will not be affected by any broadcast flag mandate.

[10] MPAA Comments, p. 7.

[11] Sending DTV content via email? 17 gigabyte email attachments? Is there a single mailserver on the public Internet that would accept and successfully deliver such a thing? Given the outlandishness of the idea, EFF suggests that the burden is on the MPAA to prove that such a thing is possible.

[12] Reply Comments of Raffi Krikorian (submitted Feb. 18, 2003), available at http://www.bitwaste.com/bpdg/comments.pdf.

[13] MPAA Comments, p. 7.

This evidence similarly undermines the hypothetical Internet scenarios submitted in a joint comment filed by the major national sports leagues in this docket.[14] The National Sports Leagues Comments imagine a "displaced" Green Bay Packers fan in San Diego receiving a recording of a Packers game "virtually in real time from his brother in Green Bay," thereby getting for free that which he would otherwise have to pay.[15] The experiments of Mr. Krikorian suggest that, assuming the "brother in Green Bay" is a professor at a major research university with the use of an ultra-high bandwidth web server, the "displaced fan" in San Diego might, with luck and a good quality broadband connection, get the game in two to three days.

In other words, the brother in Green Bay would have accomplished this feat more cheaply, more quickly, and more reliably via the U.S. Postal Service's "Second Day Air". Yet the National Sports Leagues presumably do not believe that the Commission should assert jurisdiction over all parcels traveling in the mails.

The National Sports Leagues Comments also suggest that consumers might make and distribute "highlights" reels, undermining programs such as "Inside the NFL."[16] This assumes, first, that professional sports programming cannot compete against amateur producers, an unsubstantiated claim that should be viewed with healthy skepticism. Second, it assumes that the amateur producer will have access to ultra-high bandwidth servers with capacity far in excess of home broadband. Third, it assumes that sports fans will be willing to wait days, perhaps as much as a week, while their broadband Internet connections are tied up downloading the DTV highlights reel. All the while, the professionally-produced, multi-million dollar network highlights

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[14] Comments of the Nat'l Football League, Office of the Commissioner of Baseball, Nat'l Basketball Ass'n, Nat'l Hockey League, Women's Nat'l Basketball Ass'n, Nat'l Collegiate Athletic Ass'n, PGA Tour, Inc., and Ladies Professional Golf Ass'n (submitted Dec. 6, 2002) ("National Sports Leagues Comments"), pp. 7-8.

[15] *Id.*

[16] *Id.* As an initial matter, no court has ever held that the making and noncommercial sharing of such "home-brew" highlight reels constitutes copyright infringement, as opposed to fair use. In order to prevail over a fair use defense, the copyright owners would have to demonstrate that these amateur, noncommercial "highlights" reels substantially impact the market for their copyrighted works. The lack of relevant evidence contained in the National Sports Leagues Comments bodes poorly for their copyright case.

shows, such as "Inside the NFL," provide a same-day, free, high-quality alternative.

Some supporters of the MPAA Proposal suggest that, even if DTV signals are too large to redistribute today, consumer broadband capacity will rapidly expand to overcome the larger file sizes.[17] None, however, supply any empirical evidence to support this rosy view of the consumer broadband marketplace. Although rapid improvements have characterized both the market for semiconductors (famously captured in "Moore's Law") and data storage, consumer broadband capacity has not shown similar improvements. The capacity of consumer broadband connections appears to be constrained by limitations inherent in the "last mile" infrastructure.[18] In fact, in the wake of the collapse of several consumer broadband providers like Northpoint and Covad, consumers today are paying more money for less capacity. Market penetration of consumer broadband service, moreover, continues to lag.

B. There is no evidence that content is being withheld from DTV today.

There is no credible evidence to support the notion that high-value content is, today, being withheld by content owners on the basis of fears regarding Internet redistribution. In addition to EFF, a number of those who contributed comments in this docket have pointed out that high-quality content, including prime-time network programming and Hollywood blockbusters, is already available on DTV broadcast.[19]

C. There is no evidence that content will be withheld from DTV tomorrow.

Notwithstanding the paucity of concrete evidence regarding the severity of the threat posed by Internet redistribution, Viacom has suggested that its family of companies may begin withholding content from DTV in the future, unless the broadcast flag mandate is implemented.[20] That is their right in a market economy—no one

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[17] See National Sports Leagues Comments, p. 7.

[18] In the words of one telecommunications industry wag, bemoaning the expense involved in deploying fiber-optic infrastructure to the home, "There is no Moore's Law for back-hoes."

[19] *See* EFF Comments, pp. 6-7; BSA Digital Television Compendium (submitted Dec. 2, 2002); Comments of the IT Coalition (submitted Dec. 6, 2002), p. 11.

[20] Comments of Viacom (submitted Dec. 6, 2002), p. 12. Other commenting parties suggest that they fear that other content

has suggested a mandate that would force CBS to continue making *The Young and the Restless* available via DTV broadcast on CBS affiliates. Although many fans would doubtless be disappointed, CBS is free to withhold its content from DTV broadcasters (although its network affiliates would continue to be subject to the Commission's regulations concerning the DTV transition).

Viacom's ultimatum is rather puzzling, however. Viacom admits that it has not withheld its programming from DTV thus far.[21] However, it concludes that "DTV sales and broadband subscriptions have reached the 'tipping point' at which it can no longer afford to expose its content to piracy."[22] If Viacom's concern is "piracy" facilitated by the slow spread of consumer broadband, then it should withhold its content from *analog broadcast*. To the extent Viacom broadcast content is being redistributed via the Internet today, it is being captured from insecure *analog NTSC* broadcasts and cable transmissions. As discussed above, the size of DTV files provides considerably more security from Internet redistribution than that provided by the analog NTSC broadcast medium.

The internal incoherence of Viacom's ultimatum underscores a larger point. If "Internet piracy" were the threat for DTV content that proponents of the MPAA Proposal make it out to be, one would expect that content owners should be petrified to continue analog NTSC broadcasts of their high-value content. Nevertheless, the MPAA-member companies continue to supply high-value content to analog broadcasters, and have made no threats to withdraw prime-time features like *The West Wing* from analog broadcast.

In any event, Viacom's threat should not necessarily cause alarm to those interested in spurring competition in the DTV content market. Should some incumbent producers and distributors of broadcast content decide voluntarily to leave the DTV market, there are good reasons to think that the marketplace will be quick to adjust and that the public may in fact benefit. The technologies associated with producing DTV content are rapidly falling in price, opening DTV to new, smaller producers.[23] New HD content

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producers may take similar actions in the absence of a broadcast flag mandate. *See* Comments of National Broadcasting Company, Inc. (submitted Dec. 6, 2002), p. 2.

[21] *Id.* at p. 9.

[22] *Id.*

[23] JVC recently introduced a 720p-capable HDTV camera for $3,500. *See* http://www.audiorevolution.com/news/0203/11.jvc.shtml. This

producers, such as Mark Cuban's HDNet, are aggressively creating DTV content, all of which can be licensed to terrestrial broadcasters hungry for content to broadcast in their DTV spectrum allocations. There is no reason to think that a vacuum in the marketplace would not quickly be filled by new content producers.

History also teaches that the threats of entertainment companies (or a cartel comprised of several of them) to withhold content in the face of new technologies should be viewed with considerable skepticism. At the dawn of the color television age, for example, major motion picture studios declared that they would never license color programming for broadcast, fearing that broadcasts would Napsterize their box office business. Ironically, it was Disney who broke ranks first, producing *The Wonderful World of Color*, which ultimately became one of television's most successful shows.[24] Once Disney defected, the cartel's coordinated refusal to deal arrangement quickly collapsed.

The very same thing occurred upon the introduction of the VCR in the mid-1970s. The major motion picture studios again declared that they would never sell their movies on pre-recorded video cassettes. This time, it was Fox that defected first, realizing that the VCR presented a lucrative opportunity to exploit its library of film properties.[25] Once again, the cartel came crashing down.

There is every reason to believe that any coordinated withholding of content from DTV by today's major motion picture studios, if it were to occur, would similarly fail, as entrepreneurs like Mark Cuban rush in to fill the vacuum and begin to collect substantial revenues from DTV broadcasters.

D. No promise of content if mandate given

Finally, it is worth noting that not a single proponent of the MPAA Proposal has made any commitment to making any additional content available for DTV broadcast should a broadcast

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year's Sundance Film Festival included 537 features shot with HD digital cameras, up from 440 features the year before. *See* Rick Lyman, "Doubt Meets Determination on the Road to Sundance," N.Y. TIMES (Jan. 16, 2003) http://www.nytimes.com/2003/01/16/movies/16FEST.html.

[24] *See* The Museum of Broadcast Communications, "Walt Disney Programs," http://www.museum.tv/archives/etv/W/htmlW/waltdisneyp/waltdisneyp.htm.

[25] James Lardner, FAST FORWARD: HOLLYWOOD, THE JAPANESE, AND THE VCR WARS (1987), p. 171-73.

flag mandate be enacted. Content producers would remain free to take their properties to other outlets, including conditional access systems, premium channels, and direct-to-DVD releases.

III. The MPAA Proposal will not effectively curb Internet redistribution.

Even if there were evidence to suggest that unauthorized Internet redistribution of DTV broadcasts posed a realistic threat to DTV content producers, the MPAA Proposal (or, for that matter, any broadcast flag regime) would be hopelessly ineffective as a solution to the problem.

A. The MPAA Proposal: More sieve than solution.

As noted by a number of commenting parties,[26] the broadcast flag regime envisioned in the MPAA Proposal is woefully inadequate as a solution for unauthorized Internet redistribution. Even some of its staunchest supporters have been forced to admit that, by itself, the MPAA Proposal will not curb unauthorized Internet redistribution of video content.[27] This shortcoming is rooted in the fundamental technical characteristics of the broadcast flag regime; no retrofit can rescue it.

The rise of the Internet as a global, distributed communications medium has fundamentally changed the challenge facing those who build "content protection" systems. In years past, content protection vendors could rely on reasonably robust technologies to function as "speed bumps"—systems that, while presumably still vulnerable to sophisticated attacks, serve a useful purpose by effectively limiting the capabilities of the unsophisticated user.

As computer security experts have come to realize in recent years, however, the "speed bump" approach has been rendered

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[26] *See* (all in FCC Docket No. 02-230), e.g., Comments of Public Knowledge and Consumers Union (submitted Dec. 6, 2002), pp. 15-17; Comments of Verizon (submitted Dec. 6, 2002), pp. 3-5; Comments of Veridian Corp. (submitted Oct. 30, 2002), pp. 5-6; Comments of Motorola (submitted Dec. 6, 2002), pp. 4-5; Comments of the Computer & Communications Industry Ass'n (submitted Dec. 6, 2002), pp. 11-12.

[27] *See* National Sports Leagues Comments, p. 13; Comments of Andy Setos, President of Engineering, Fox Entertainment Group, at the "Battle over the Broadcast Flag: The IP Wars and the HDTV Transition," CATO Institute Policy Forum (Feb. 5, 2003) (available at http://www.cato.org/events/030205pf.html) ("Alone, it doesn't ring any bells, because there are so many work-arounds."), at time index 49:10.

obsolete by the availability of multiple avenues for unauthorized redistribution over the Internet (most notably via distributed P2P file sharing networks). This insight was recently documented in a research paper published by a team of senior Microsoft security engineers, entitled *The Darknet and the Future of Content Distribution.*[28] So long as one sophisticated user can defeat the security in question, and so long as the resulting "cracked" content can be accessed by any subsequent recipient (this is known in computer security circles as a "break-once, break-everywhere" security model), the content will find its way onto the Internet and will be available to unsophisticated users without any "speed bump" at all.

The lesson is simple: in a post-P2P world, where a "break-once, break-everywhere" security regime is concerned, all it takes is one "leak" to render the security entirely ineffective.

The broadcast flag is just such a "break-once, break-everywhere" system. Because it is premised on broadcasting content "in-the-clear" using widely-understood ATSC modulation techniques, *any* broadcast flag approach to protecting DTV content is doomed to "leak."

The MPAA Proposal, however, not only leaks, it leaks like a sieve. In addition to the fundamental weakness detailed above, its weaknesses include:

- **The Analog Hole**: By its own terms, the MPAA Proposal leaves analog outputs on DTV receivers entirely unregulated, including high-quality "component" outputs capable of outputting HD content at full resolution.[29] As discussed at length in EFF's earlier comments, these outputs can be redigitized using A/D converters and off-the-shelf PCs.[30] After this one-time conversion, the

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[28] Peter Biddle, Paul England, Marcus Peinado, and Bryan Willman, *The Darknet and the Future of Content Distribution,* presented at the 2002 ACM Workshop on Digital Rights Management (Nov. 18, 2002) (paper available at http://crypto.stanford.edu/DRM2002/darknet5.doc). This paper represents the views of the authors, all of whom are senior Microsoft security engineers involved with the "Palladium" trusted computing project. The paper does not necessarily represent the views of the Microsoft Corporation.

[29] *See* MPAA Comments, Attachment B, Section X.3(a), p. 8; *id.* at Section X.4(a), p. 10.

[30] *See* EFF Comments, p. 11. While A/D converters able to capture the full resolution of HD component analog outputs remain relatively expensive, these products are likely to fall in price

broadcast flag mandate would pose no further obstacle to Internet redistribution. (The limits of consumer broadband capacity, detailed above, would continue to apply, restricting the Internet redistribution of such content.)

- **The Legacy Receivers Hole**: Every DTV receiver manufactured prior to the effective date of any broadcast flag mandate will continue to receive DTV broadcasts, blithely ignoring the broadcast flag and any associated technology mandate. Each one will therefore constitute a "leak"—so long as the content remains "in-the-clear," no broadcast flag mandate will be able to address this weakness.[31]
- **The Software Receivers Hole**: Demodulation of ATSC broadcasts is possible today using consumer-grade PCs, off-the-shelf components, and free software such as that being developed by the GNU Radio project.[32] "Software defined radio" (SDR) technologies will make it possible for individuals with little more than "hobbyist" skills to turn their PCs into "noncompliant" DTV receivers. As the experience with DeCSS and other DVD decryption software illustrates, attempts to ban SDR software are likely to raise First Amendment concerns, and are almost certain to fail as a practical matter.[33] Proponents of the

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quickly. In fact, it can be imagined that PC manufacturers might be tempted to build a high-bandwidth A/D converter onto every PC motherboard (a perfectly lawful innovation) in order to sidestep the MPAA Proposal altogether.

[31] DTV tuner cards designed to turn consumer-grade Windows PCs into DTV receiving devices can be had today for as little as $299 retail. *See* MyHD card, [URL]. By the time a broadcast flag mandate enters into effect, this cost will almost certainly have fallen considerably.

[32] GNU Radio software, running on commodity PC hardware, is already able to receive and demodulate ATSC digital broadcasts. *See* http://www.gnu.org/software/gnuradio/images/hdtv-samples.html (sample screen shots from *Law & Order*). *See also* Eric Blossom, "GNU Radio: A Free Software Defined Radio," presentation to the Copy Protection Technical Working Group, February 27, 2002, available at http://www.cptwg.org/Assets/Presentations/gnuradio-27-feb-2002-cptwg.ppt. The current GNU Radio source code, in C++, is available from the GNU Radio homepage. *See* "GNU Radio – The GNU Software Defined Radio," http://www.gnu.org/software/gnuradio/gnuradio.html.

[33] DeCSS is a software program that permits PC-users to decrypt

MPAA Proposal have entirely failed to address the enforcement challenges inherent in attempting to plug this "leak."

- **The Cable Hole**: To the extent terrestrial DTV broadcasts remain unencrypted when retransmitted as part of a cable systems "basic tier" channels, these QAM-modulated cable channels will constitute a "leak" in the MPAA Proposal's broadcast flag regime.[34] In response to this problem, the MPAA Proposal urges that the Commission regulate the ATSC QAM demodulators used in cable systems, as well as the VSB demodulators used in broadcast DTV receivers. What this ignores, however, is that ATSC QAM demodulation is much simpler than the 8/VSB modulation used by DTV broadcasters. Consequently, it will be trivial for hobbyists to assemble "noncompliant" QAM demodulators.[35] This will enable hobbyists with little

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and extract content from commercial DVDs that are encrypted with the Content Scrambling System ("CSS"). When the software first was distributed, motion picture companies launched several lawsuits to halt its distribution. Although they ultimately obtained injunctions in these actions, DeCSS code continues to be available from hundreds of sources both in the U.S. and abroad. *See* Declaration of Prof. David S. Touretzky in Support of Motion for Summary Judgment, DVD Copy Control Ass'n v. McLaughlin, No. CV-78680 (Ca. Sup. Ct. filed Nov. 28, 2001) (available at http://www.eff.org/IP/Video/DVDCCA_case/20011128_touretzky_decl.html) (noting that DeCSS is available from hundreds of websites). Moreover, in the course of ruling on the matter, courts have expressly recognized that efforts to ban the publication of software can raise serious First Amendment concerns. *See Universal City Studios v. Corley,* 273 F.3d 429 (2d Cir. 2001).

[34] Terrestrial broadcast systems use a modulation standard known as 8/VSB. Cable systems, in contrast, use a more straightforward modulation standard known as QAM. Although cable service operators have been slow to begin retransmitting DTV broadcasts over their cable systems, it appears that recent industry agreements are poised to break the logjam. *See* "Memorandum of Understanding Among Cable MSOs and Consumer Electronics Mfrs." (filed Dec. 12, 2002) (available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-3A2.pdf). Assuming that DTV broadcasts will be retransmitted as part of the "basic tier" of cable programming, DTV content will be available unencrypted and QAM modulated.

[35] From an engineering point of view, demodulation of QAM signals is much simpler than demodulation of 8/VSB signals.

expertise to receive ATSC broadcasts from their basic tier cable service, eluding any mandate altogether and creating serious enforcement challenges for the Commission.

- **The 480p DVI Hole**: The MPAA Proposal would permit compliant devices to include unprotected digital DVI outputs, so long as such outputs limited their resolution to no more than 480p.[36] Although inferior to true HDTV signals (720p or 1080i), digital outputs at 480p equal DVDs for quality and are likely to constitute another significant "leak" in the broadcast flag regime. This weakness of the MPAA Proposal is particularly glaring for broadcasters, like Fox, that continue to broadcast large portions of their DTV line-up at resolutions of 480p—for them, the MPAA Proposal offers *no security at all*, as compliant devices would be entitled to output Fox's 480p content to digital DVI outputs without restriction.[37]

B. The DVD Story: An instructive failure for content protection.

Several commenting parties emphasize the market success of the DVD format in urging the Commission to support a broadcast flag approach for DTV.[38] Although the DVD has proven to be staggeringly popular with American consumers, the DVD

Implementing QAM modulation and demodulation is (unlike VSB) routinely assigned as a student project in electrical engineering curricula. Electrical engineering textbooks treat QAM in great detail and include practical QAM-implementation exercises. Indeed, the popular commercial software package MATLAB, the market leader in simulation and mathematics for engineers, includes a software QAM modulator and demodulator in its "Communications Toolbox" library. The MPAA Proposal would appear to make the continued distribution of these common teaching tools unlawful.

[36] *See* MPAA Comments, Attachment B, Sections X.3(a)(7), X.4(a)(6), pp. 9-10 (permitting unprotected digital output to DVI outputs if limited to 480p resolution).

[37] Currently, direct recording from DVI outputs is made difficult by the high-bandwidth of these outputs. Nevertheless, these outputs offer a "perfect" digital DVD-quality version of the original DTV broadcast content. Progress in high-bandwidth digital capture technology, moreover, is likely to progress at a pace far greater than increases in home broadband Internet capacities.

[38] *See, e.g.,* Comments of the CBS Television Affiliates Ass'n (submitted Dec. 6, 2002), p.2; Comments of the IT Coalition (submitted Dec. 6, 2002), p. 18, n.46.

experience actually underscores the hopeless ineffectiveness of a "break-once, break-everywhere" security system like the broadcast flag in a networked world.

Prior to the introduction of the DVD format, major motion picture studios offered many of the same arguments that they offer today with respect to the broadcast flag—according to them, the introduction of a new digital video format raised unique risks of unauthorized duplication and redistribution, risks that caused them to withhold high-quality content in the absence of some technical protection measures. In response to this argument (and without resort to federal technology mandates), an encryption-based content protection system known as the Content Scrambling System ("CSS") was developed and integrated into what ultimately became the DVD format.[39] Notably, CSS offers considerably more robust security than a broadcast flag regime ever can, relying as it does on encryption rather than a simple "flag" embedded in "in-the-clear" content.

So what can we learn from the DVD experience?

One thing stands out: Hollywood was wrong about content protection.

CSS was defeated by hobbyists almost immediately, most famously by a group that included a Norwegian teenager named Jon Johansen.[40] Despite legal efforts to ban the distribution of DVD decryption tools, those tools continue to be widely available to (and in considerable demand by) consumers both from retail and Internet sources.[41] Their use requires no special technical knowledge or equipment.

Once decrypted, a DVD movie can be played on any PC, which is to say that CSS is a "break-once, break-everywhere" protection system. As a result, DVD content is widely available today from unauthorized sources, including P2P networks. The

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[39] *See* Comments of the IT Coalition, p. 18, n.46 (reviewing history of CSS protection on DVDs).

[40] For additional background on the Johansen case, *see* http://www.eff.org/IP/Video/DeCSS_prosecutions/Johansen_DeCSS_case/.

[41] One popular DVD copying tool, 321 Studios' DVD Copy X (retail price $80), was recently favorably reviewed in the Feb. 2003 edition of *PC World* magazine and featured in a recent J&R Music World advertisement in the pages of the national edition of the *New York Times*. Software capable of copying DVDs can also easily be obtained from the Internet from distributors located in the U.S. and offshore.

only meaningful constraint on this activity arises *not* from the content protection offered by CSS or the licensing obligations imposed by the CSS licensing entities, but rather from the limitations imposed by the limited bandwidth available to the American broadband subscriber. These limitations mean that the quality of content extracted from DVDs is much reduced from its native 480p resolution. Even with a dramatic reduction in resolution, a typical movie takes many hours to download from unauthorized Internet sources.

In short, the DVD experience illustrates the failure of the "speed bump" model of content protection in a networked environment. The failure of a broadcast flag approach to protecting DTV content is all the more certain, in light of the fact that the broadcast flag is a much less effective form of security than that provided by CSS.

The most striking thing about the DVD experience, however, is that Hollywood's fears proved to be unfounded. Yes, today virtually every major Hollywood feature film, as well as many television programs, are being redistributed without authorization via the Internet. Nevertheless, DVD sales continue to grow at a remarkable pace. In other words, it turns out that content protection was not necessary to prop up the market for DVDs. Hollywood's fears were unfounded.

But the imposition of CSS on the DVD format has left a distinct legacy—not in slowing Internet redistribution, but in inconvenience to consumers and impediments to innovation. While CSS presents no "speed bump" to those intent on downloading content from the Internet, it does function as a "speed bump" for consumers who would like to exercise their fair use rights. For example, CSS today interferes with the consumer's ability to make back-up copies of DVDs that they have purchased to protect them from theft or damage. CSS actually creates perverse incentives for law-abiding consumers, driving them to either (1) seek out potentially unlawful decryption tools; or (2) use unauthorized P2P channels in order to obtain copies of content they have already purchased.

More pernicious, however, is the continuing toll imposed on innovation by CSS today, long after its content protection function has ceased. The burdens of having to sign and abide by the restrictions of the DVD-CCA and DVD Forum licensing requirements continue to prevent innovators from providing law-abiding consumers with new products. For example, the strictures of the DVD-CCA licensing regime have slowed the introduction of digital video outputs on DVD players. Such digital video outputs on DVD players promise higher-quality displays in a variety of

home theater applications. In the meantime, high-end HDTV innovators have been forced to engage in a variety of quasi-legal maneuvers in order to deliver high-quality HD home theater installations.[42] Similarly, innovators eager to deliver in-home "media entertainment servers" are stymied because they cannot give consumers tools to copy the DVD's they own into a digital "video jukebox" system.[43]

The brief description of the DVD licensing regime included in the Comments of the IT Coalition makes the problem plain. "Because the governance structure provides for consensus among the industries, no one industry can force a specification or rule change on the other industries."[44] While this may foster "consensus," it also throws a blanket on the embers of innovation. DVD innovators who need adjustments to existing DVD standards must first convince their "industry" (i.e., their competitors) of the wisdom of a new DVD product category, then must convince two other "industries" (which may include further competitors), and only then will be allowed to ship their product. It is bad enough when industry groups impose market restraints of this kind via voluntary agreement. The MPAA Proposal, however, calls on regulators to step in to stifle free competition in the DTV market.

Innovation thrives in the absence of stricture. Conditioning the introduction of new products on inter-industry "consensus" between incumbent industry players inevitably exacts a toll on innovation, a toll that is ultimately paid by consumers in the form of fewer products and higher prices. For that reason, forcing DTV innovators into the limited number of output and recording technology options contained on "Table A" (or into burdensome regulatory proceedings in order to certify alternative technologies) will necessarily retard marketplace innovation in DTV technologies.

C. "Encrypt at source" will not necessarily be any more effective than the broadcast flag.

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[42] Jerry Del Colliano, "Will High-End DVD Players With Digital Video Outputs Force The Adoption of a Standard?", AudioRevolution (posted Oct. 11, 2002) (available at: http://www.audiorevolution.com/news/1002/11.digitalconnection.shtml).

[43] Email communication with Marc Canter, founder of Broadband Mechanics, a venture-funded, privately held Delaware corporation, in connection with the Community Maker product, which includes a software-based home media jukebox.

[44] Comments of the IT Coalition (submitted Dec. 6, 2002), p. 18, n.46.

Several commenting parties suggest that an approach that encrypts DTV broadcast signals as the source would be superior to a broadcast flag approach.[45] EFF takes no position on the merits of an "encrypt at the source" approach, as no party has presented for evaluation an alternative regulatory proposal based upon it. It is not apparent whether such an approach would require a federal technology mandate, whether such a mandate would be within the Commission's jurisdiction, or what impact any resulting regulatory regime would have on DTV consumers and innovators.

It is worth noting, however, that any "encrypt at the source" approach would suffer from many of the same fundamental security weaknesses as a broadcast flag regime to the extent it embraced a "break-once, break-everywhere" architecture. In particular, so long as DTV content can be redigitized through the "analog hole," no content protection approach is likely to meaningfully slow unauthorized Internet redistribution. In light of this fundamental weakness, any imposition by a "encrypt a the source" regime on consumer welfare or marketplace innovation should be evaluated carefully.

D. In light of its ineffectiveness as a content protection measure, any consideration of a broadcast flag mandate is premature.

Even the most ardent proponents of the MPAA Proposal admit that, for the reasons noted above, it is inadequate to the task of slowing unauthorized Internet redistribution.[46] They freely admit that additional government regulatory initiatives will be necessary before any broadcast flag regime can be effective. Unfortunately, the proponents of the MPAA Proposal have not explained with any detail what additional incursions of federal regulators into the DTV marketplace will be necessary to address the broadcast flag's manifold inadequacies. Representatives of the motion picture industry have spoken in general terms about the need for a solution to the "analog hole," but no concrete proposals have been presented for evaluation.[47] They have also urged a

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[45] *See, e.g.,* Comments of Motorola (submitted Dec. 6, 2002), pp. 4-5; Comments of Public Knowledge and Consumers Union (submitted Dec. 6, 2002), pp. 11-13; Comments of Veridian Corp. (submitted Oct. 30, 2002), pp. 7-8.

[46] *See, supra,* n. 27.

[47] *See* Motion Picture Ass'n of America, "Content Protection Status Report," submitted to the Committee on the Judiciary, United States Senate, April 25, 2002 (available at http://judiciary.senate.gov/special/content_protection.pdf). A multi-industry "discussion group" has been formed to discuss

regulatory fix for the "problem" of P2P file-sharing, but have presented little in the way of specifics.[48]

Any evaluation of the broadcast flag should proceed from a full understanding of the costs and benefits of the *entire* regulatory regime necessary to make it effective. Every content protection system that depends upon a federal technology mandate interferes in the marketplace for lawful technologies, imposing costs on consumers, innovators, and marketplace competition. Until those who support the MPAA Proposal are able to detail what other regulatory initiatives are necessary to make the broadcast flag effective, it is premature for the Commission to consider imposing a regulatory mandate on DTV technologies.

E. Alternatives to the Broadcast Flag: Voluntary measures by content owners offer more protection than any broadcast flag regime.

Voluntary measures by broadcasters to increase the resolution of DTV broadcasts will, without any federal interference in the technology market, offer considerably more protection to DTV content than the MPAA Proposal.

As discussed above, the chief limitation on the unauthorized Internet redistribution of DTV content arises from limitations on the capacity of consumer broadband connections. As discussed above, it appears that these limitations are not likely to change dramatically in the near-term. However, even if consumer broadband bandwidth were to increase, content owners could obtain additional protection for their DTV broadcast content by requiring that broadcasters transmit in higher resolution formats, such as 720p or 1080i. The Fox network, for example, currently broadcasts its DTV content in 480p resolution. This level of resolution today appears to offer adequate protection from Internet redistribution, as demonstrated by the nonexistence of full-resolution 480p DVD content on popular P2P file-sharing networks. If consumer broadband capacities were to increase in the future, Fox could begin broadcasting at higher resolutions, making it more difficult to redistribute the full-resolution content via the Internet.

The benefits of this approach are manifest. First, this approach would provide more meaningful security vis-à-vis Internet redistribution than the MPAA Proposal, which suffers

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possible solutions for the "analog hole," but is still far from any consensus recommendations. *See* EFF, *Cruelty to Analog* weblog (available at http://analog.blogs.eff.org).

[48] *Id.*

from numerous "holes," as discussed above. Second, this increase in protection could be accomplished through purely voluntary cooperation between content producers and broadcasters, requiring no federal interference in the DTV technology marketplace. Third, such a solution would create a meaningful "speed bump" for Internet redistribution without imposing any burdens on legitimate consumer in-home activities, including time shifting and sharing content within existing home networks. Finally, such an approach would have the ancillary benefit of improving the quality of DTV broadcasts, giving consumers a greater perceived incentive to upgrade their equipment and embrace the DTV transition.

F. Alternatives to the Broadcast Flag: Changes to copyright law.

Put simply, the issue of unauthorized Internet redistribution identified by proponents of the broadcast flag has implications far beyond the DTV context. It is a copyright problem. It requires a copyright solution, rather than medium-specific technology mandates.

In the long run, the challenge posed to incumbent copyright industries by new technologies will have to be addressed not by a patchwork of incomplete regulations on technology, but by changes in copyright law. While such changes are beyond the jurisdiction of the Commission, it is important to note that the rejection of the MPAA Proposal by the Commission does not leave the copyright dimensions of the DTV transition without a steward—the congressional committees with oversight over copyright law are already considering a number of legislative approaches that attempt to address unauthorized Internet redistribution of copyrighted works (including those broadcast on DTV) squarely.

EFF believes that copyright law reform promises a more fruitful path than DTV-specific technology mandates. In particular, EFF believes that consideration of possible compulsory licensing solutions may present a superior approach to the broadcast flag. There is ample precedent for such an approach in the cable context, where the Commission labored for many years with an ineffective and unwieldy set of regulatory mandates relating to redistribution of broadcast signals via cable systems.[49] In the end, Congress

[49] *See* Botein, *The New Copyright Act and Cable Television—A Signal of Change*, 24 BULL. COPYRIGHT SOC'Y USA, pp. 5-10 (1976); FCC, Cable Television Report and Order, 37 Fed. Reg. 3252-77 (1972).

stepped forward with a compulsory licensing solution to the copyright concerns of broadcasters.[50]

EFF believes that, should empirical evidence establish that Internet redistribution poses a substantial threat to the DTV transition, Congress should begin evaluating potential compulsory licensing solutions for the Internet context as possible alternatives to technology mandates that burden legitimate consumer activity and marketplace innovation.

G. The MPAA Proposal will not "level the playing field" with conditional access systems.

Some proponents of the MPAA Proposal urge the Commission to promulgate a broadcast flag mandate in order to "level the playing field" with conditional access systems, such as cable and DBS satellite systems.[51] In their view, unless DTV broadcasters can offer content producers the same level of content protection as their conditional access competitors, those producers will shun terrestrial broadcast in favor of conditional access systems. This will inexorably lead to the demise of free, over-the-air broadcast television, or so goes the argument.

This argument cannot withstand scrutiny. As the Commission is well aware, privately-owned conditional access systems and over-the-air broadcasters occupy entirely distinct "playing fields." While they may compete for content and viewers, there is far more separating them than merely the degree of content protection offered by the digital outputs on devices.

The lack of "levelness" in the "playing field" between terrestrial broadcasters and conditional access operators begins with the fact that broadcasters receive their conduit (i.e., the spectrum) for free from the public for 8 year terms subject to numerous regulatory requirements enforced by the Commission. Where content producers are concerned, the "levelness" is also compromised by the fact that terrestrial broadcasters must comply with content restrictions enforced by the Commission. HBO can

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[50] *See* 17 U.S.C. § 111.

[51] *See* comments of Fritz Attaway, Executive Vice-President, Motion Picture Ass'n of America, at the "Battle over the Broadcast Flag: The IP Wars and the HDTV Transition," CATO Institute Policy Forum (Feb. 5, 2003) (available at http://www.cato.org/events/030205pf.html) ("The analog hole is an issue that applies across the board, but right now we are just talking about the broadcast flag and it will level the playing field. It will put broadcasters in the same position as cable and satellite are today."), at time index 47:30.

deliver *The Sopranos*, NBC cannot. A broadcast flag mandate will do nothing to change that reality. Moreover, conditional access operators generally enjoy contractual privity with their subscribers and frequently own the "set-top boxes" that regulate access to their signals, giving them considerably more control over subscribers than broadcasters can ever hope to achieve over the public.

Marketplace realities also make it clear that the playing field is "unlevel" in myriad ways that will not be addressed by the MPAA Proposal. Content producers already treat premium channels (e.g., pay-per-view, HBO, Showtime) as a distinct market from broadcast television. There is no evidence suggesting that a broadcast flag mandate will change this marketplace arrangement. At the same time, terrestrial broadcast networks continue enjoy their own marketplace advantages, including nationwide reach and consumer recognition. It is not likely that the producers of *The West Wing* will find it worth their while to abandon NBC for Lifetime, solely because a broadcast flag mandate is not imposed on DTV devices by the Commission.

Finally, to the extent that vulnerability to unauthorized Internet redistribution does constitute a relevant factor considered by content producers when licensing their content, the playing field is already effectively level, as the content protection measures announced in the recently-filed Cable MSO-Consumer Electronics Industry Memorandum of Understanding[52] suffer from the many of the same vulnerabilities as the broadcast flag (most notably, the analog hole), and thus will likely prove little better than no protection at all.

Accordingly, content producers choosing between broadcast and conditional access outlets for their high-quality content offerings are not likely to be influenced by the presence or absence of an ineffective broadcast flag regime in the broadcast channel. The proponents of the MPAA Proposal have offered no evidence to suggest that "leveling the playing field" with respect to content protection for digital outputs will have any marginal impact on the market behavior of content producers, in light of the many more important distinctions between terrestrial broadcast and conditional access systems.

IV. The MPAA Proposal Harms Consumers.

The Commission specifically asked for comments regarding the impact that a broadcast flag mandate would have on consumers.[53] In responding to this question, proponents of the

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[52] *See, supra,* n.34.

[53] NPRM, at ¶ 9, p.3.

MPAA Proposal have failed to identify a single benefit that the mandate would bestow on consumers (other than the self-serving suggestion that content providers will refrain from withholding high-quality content). Rather than identifying any distinct consumer benefit, proponents of the MPAA Proposal are left arguing that consumers, even if not helped, will at least not be harmed.

Nothing could be further from the truth. Consumers will suffer in two distinct ways. First, they will be denied the benefits that would otherwise flow from an open innovative, competitive marketplace for DTV devices. Second, they will suffer because their legitimate, fair use activities will be curtailed.

A. The MPAA Proposal denies consumers the benefits of "convergence" between the general purpose computing and DTV marketplaces.

In recent years, companies from the computing industry have made inroads into audio/video markets previously the domain of the consumer electronics industry. This "convergence" promises substantial benefits to consumers in the form of increased competition, new innovation, and reduced prices for home entertainment equipment. The Commission, for its part, has specifically acknowledged these benefits as one important motivating force behind the DTV transition.[54]

These benefits are already taking hold in the DTV marketplace. For example, innovations in the area of digital, single-lens video projectors first deployed in corporate conference rooms are now arriving in the home theater marketplace. Epson, for example, has recently repurposed its line of video projectors, originally aimed at the corporate presentation market, for sale into the home theater market.[55] The fact that many of these projectors and their components can be sold into both the consumer and corporate IT marketplaces has meant lower costs, more competition, and more rapid innovation for consumers.

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[54] *See* Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, Fourth Report and Order, MM Docket No. 87-268, 11 FCC Rcd 17,771, 17,789 (1996).

[55] Epson recently added the PowerLite TW-100 to its product line, the first of its single-lens LCD projectors aimed at the home theater market. Epson has been producing projectors for the corporate presentation market since 1995. *See* Epson Press Release, available at http://www.projectorcentral.com/news_story.cfm?news_id=407.

Another example is the rise of the personal computer as the heart of a consumer home theater system. Given the rapid pace of innovation, the robust competition, and the constantly falling prices the characterize the PC market, consumers may find that "HTPCs" (home theater PCs) offer the most inexpensive options for entry into the world of DTV. Today, for example, the addition of a $299 MyHD PCI HD-tuner card to add to an existing PC presents a cheaper road to DTV than the purchase of a stand-alone DTV receiver.[56]

The MPAA Proposal threats to derail "convergence" in the DTV arena by enforcing a separation between the DTV and the general purpose PC markets. Vendors interested in producing wares for DTV will be forced to either add support for the output and recording technologies listed on "Table A," or persuade an arbitral body that their own content protection technologies offer "equivalent" protections.[57] Given the international and highly competitive nature of the general purpose computing marketplace, it is unlikely that vendors in that marketplace will subject all of their products to these strictures.

Accordingly, two distinct markets will likely develop: a market for DTV-capable devices and a market for general purpose PC devices. This artificial distinction will interfere with marketplace competition and increase product costs to vendors who will have to produce distinct devices for the two markets. Should this occur, the loser will be the American consumer, who will end up paying more money for less-capable devices.[58]

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[56] *See, supra,* n.6 (information regarding MyHD HD-tuner card).

[57] Under the MPAA Proposal, every manufacturer of covered ATSC VSB and QAM demodulators would be required to either use "Table A" technologies, or to file an application to have its own protection technology approved by the Commission. *See* MPAA Comments, Attachment C, pp. 2-3. The latter option imposes considerable administrative and legal expense, the delay associated with a "notice and comment" period, and no certainty regarding approval.

[58] The other possibility, of course, is that the entire general purpose computer market adopts "Table A" technologies on all of their multi-media capable products. This outcome would effectively transform the MPAA Proposal into a general mandate on all digital media technologies. EFF submits that the submissions in support of the MPAA Proposal are far too scant to support such a wide-ranging technology mandate.

In addition, under the MPAA Proposal, the American consumer will be unable to use her existing investment in computer-related technologies to smooth the DTV transition.

For example, by year-end 2003, over nine million American households will have home networks.[59] All of them would have to be replaced in order to interoperate with DTV devices should the MPAA Proposal be adopted. The marketplace for home broadband networking today is robust and competitive, with a variety of technologies (e.g., Wi-Fi, Powerline, and Ethernet) vying in the marketplace. None of the output options proposed for inclusion on "Table A" support any of these existing home network technologies. Consumers interested in having their home network interoperate with DTV would be forced to purchase entirely new networking equipment, assuming "Table A" technologies were eventually extended to include home networking technologies.[60]

B. The MPAA Proposal would undermine legitimate fair use activities.

EFF in its initial comments identified a number of lawful activities that are available to DTV viewers today that would be curtailed by the MPAA Proposal.[61] For example, under the MPAA Proposal, scholars, teachers and researchers would be prevented from incorporating excepts of broadcast programs into works of scholarship and impeded in their efforts to stitch together excerpts for in-class use. Relatives would be unable to email snippets of broadcast programming to one another. And most importantly, consumers would be barred from using any technologies other than those that incorporated "Table A" technologies, even if another technology were cheaper, faster, more flexible, or otherwise better suited to the lawful application in question.

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[59] *See* Parks Associates, "Broadband Access @ Home III" (summarized at http://www.smarthomeforum.com/start/show_news.asp?NID=95).

[60] DTCP ("5C") is designed to operate over IEEE 1394 (aka Firewire) networks. This networking standard, however, has not been widely adopted in the American home networking marketplace.

[61] *See* EFF Comments, pp. 13-15. The MPAA Proposal may also have unintended consequences for other exceptions contained in the Copyright Act, including exceptions for nonprofit archives, distance learning, and others. *See* Comments of the American Library Ass'n, American Ass'n of Law Libraries, Ass'n of Research Libraries, Medical Library Ass'n, and Special Libraries Ass'n (submitted Dec. 6, 2002), pp. 14-16.

Moreover, as discussed in our earlier comments, a broadcast flag mandate cannot hope to accurately predict which as-yet-undeveloped uses might be held to be fair uses if tested in court. Fair use is an evolving doctrine, and Congress has left its evolution in the hands of courts. However, if the tools available to DTV viewers are artificially constrained by a broadcast flag mandate, these future fair uses may never have a day in court.[62]

Rather than addressing these fair use concerns, the supporters of the broadcast flag emphasize that the MPAA Proposal would continue to permit in-home copying on devices that include whatever output and recording technologies make their way onto "Table A." For fair use purposes, however, the fact that "compliant" devices may be able to emulate the functions of the VCR (an analog technology nearing its 30th birthday), is simply insufficient.

To say that tomorrow's DTV devices will have all the same buttons as today's analog VCRs is not the same as saying that the fair use rights of the American viewing public have been preserved.

The proponents of the MPAA Proposal suggest that new fair uses will be enabled just as soon as security technologies are developed that meet their unstated requirements (of course, so long as entry onto "Table A" is premised on "market adoption" rather than objective functional criteria, it is impossible to say when a security technology might be "good enough").

In other words, jam yesterday, jam tomorrow, no jam today. This replaces the American tradition of fair use—which permits researchers, teachers and the viewing public to make uses first, ask permission later—with a regime wherein every use is technologically blocked until some as-yet-uninvented security technology is developed and adopted onto "Table A."

C. What about technologies removed from Table A?

The MPAA Proposal incorporates provisions designed to permit the "removal" of output and recording technologies from "Table A."[63] What will happen to consumers who already own

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[62] To take one example drawn from the National Sports Leagues Comments, if the MPAA Proposal were adopted, it might prevent courts from ever reaching the question of whether the Internet distribution of home-made sports "highlights" reels might qualify as a fair use.

[63] *See* MPAA Comments, Attachment C, p. 2 (proposing that the Commission create a process for removal of technologies from Table A).

devices that incorporate these "black sheep" technologies? Will future compliant devices no longer interoperate with them? Will existing devices be somehow "updated" so as to refuse to interoperate with these legacy "black sheep" devices?

These questions are not addressed in the MPAA Proposal. EFF is concerned that innocent consumers, who committed no infraction other than having purchased a technology that happened to be later compromised by future generations of hackers, will be punished by artificially-induced obsolescence of their DTV investment.

However, if their "compromised" devices are not somehow prevented from interoperating with other "compliant" devices, they will present yet another "hole" that undermines the effectiveness of the already sieve-like MPAA Proposal. This dilemma is unavoidable in any approach that depends on a series of technology mandates, rather than attention to copyright law.

V. The MPAA Proposal is anti-competitive, anti-innovation and threatens the constitutional rights of software developers.

In addition to harm to consumers, the MPAA Proposal will impose burdensome costs on innovation, competition, and the First Amendment rights of computer programmers.

A. There is no basis for the regulation of modulators.

The breadth of the MPAA Proposal's mandate on ATSC demodulators is troubling enough, reaching as it does not only all DTV tuners but also all "downstream" devices, including video recorders, DTV-capable computers, and all DTV-capable display devices.

The MPAA Proposal, however, includes not only a set of regulations on ATSC *demodulators* but also a parallel set of regulations on ATSC *modulators*, which would bring almost all uses of ATSC within the scope of the broadcast flag mandate.[64] The regulation of modulators received virtually no attention in the public meetings of the BPDG, and has received virtually no attention in the initial comments in this docket.

Despite the lack of detailed discussion of this issue, it is significant in its own right. A broad regulation of modulators creates its own set of costs, largely distinct from the costs of the corresponding regulation on demodulators. The MPAA Proposal

[64] *See* MPAA Comments, Attachment B, Section X.13 – X.15, pp. 15-19.

makes no attempt to justify this regulation of modulator technology.

Others, however, have contributed hypotheses regarding the rationale behind the modulator regulation proposal. It appears that it may be intended to address a hypothetical threat known colloquially as the "content laundry." Supporters of the MPAA Proposal appear to believe that "content that previously had been marked 'copy never' or 'copy one generation,' such as DVD or Pay Per View content, could be modulated using such [modulation] products," then presumably fed to an otherwise compliant demodulator.[65] Of course, in order to do so, a consumer would first need to defeat the copy controls applied to the DVD or PPV content; the modulation products themselves will not perform this crucial step.

In other words, a viewer who defeats the controls applied to some other content—not a DTV broadcast, but perhaps a DVD—could choose to supply the decrypted and uncontrolled content thus obtained to a "consumer modulator" that disguises this content as a terrestrial television broadcast. But why? A viewer who defeats the content protection measures on DVD or PPV content has a wide variety of options for recording and playback. The use of the "consumer modulator" device is only one of many, and it appears needlessly cumbersome.

Others have suggested that this scenario is only plausible if the scofflaw were attempting to evade an as-yet-undeveloped watermarking mandate.[66] In any event, until this proposed technology mandate, apparently unrelated to the issue of broadcast DTV, is further justified, EFF joins the IT Coalition in urging the Commission to reject it as both premature and inadequately supported in the record.

B. "Table A" poses serious risks of anti-competitive harm to the market for DTV technologies.

In our initial comments, EFF emphasized the potential anti-competitive effects that would accompany any broadcast flag mandate. Others also made similar points.[67] Not only does the MPAA Proposal suffer from the flaws detailed previously, but the "Table A" procedures included in it introduce several additional anti-competitive consequences for the DTV marketplace.

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[65] Comments of DTLA, p. 8.
[66] *See* Comments of the IT Coalition, pp. 29-30.
[67] *See* Comments of Public Knowledge and Consumers Union, pp. 20-21.

The MPAA Proposal would effectively require that the entire DTV device industry conform their technology offerings to the output and recording technologies that appear "Table A."[68] Unlike other technology standards, the broadcast flag standards would be mandatory, rather than voluntary. This makes the selection of "Table A" technologies, and the obligations imposed by the private licensing agreements relating to "Table A" technologies, a potential breeding ground for anti-competitive collusion by incumbent DTV industry players intent on slowing innovation and market entry by new competitors.

Of particular concern are "submarine" obligations incorporated into the private licensing agreements that companies must sign in order to have access to the "Table A" technologies. To the extent entrée into the DTV marketplace depends upon access to "Table A" technologies, those who control the "Table A" technologies will have the power to act as gatekeepers over competition in the market.

The MPAA Proposal imposes no meaningful limits on what kinds of "submarine" obligations can be buried in the private licensing agreements that govern access to "Table A" technologies. Both the entertainment and technology industries have incentives to include terms in these agreements that go beyond simply implementing broadcast flag protections. For example, entertainment interests can leverage the broadcast flag mandate by imposing additional, unrelated obligations in the license agreements for "Table A" technologies. For example, the existing license for "5C" DTCP apparently includes an obligation on licensees to implement future watermarking protections, once such a system has emerged from future inter-industry negotiations.

Accordingly, were DTCP to make its way onto "Table A," the broadcast flag mandate would effectively expand to include a *watermark mandate* for any who elect to embrace DTCP. In essence, the private licensing regimes surrounding the "Table A" technologies will effectively delegate to private entities the power

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[68] The MPAA Proposal also envisions an "expedited" procedure whereby technologies "at least as effective" as those already adopted can be used. *See* MPAA Comments, Attachment C, pp. 2-3. The cumbersome nature of this procedure, as well as the uncertainties that would accompany any arbitration, make it unlikely that a technology company would opt for this course. It is difficult to imagine any technology company making a substantial investment in developing and bringing to market new DTV products in the face of uncertainty regarding whether the technology would survive "notice and comment" review.

to impose new technology mandates on competitors without further oversight by the Commission or legislators. This presents anti-competitive, collusive opportunities for both the technology and entertainment industries.[69]

C. The MPAA Proposal threatens the First Amendment rights of computer programmers.

The MPAA Proposal suffers from constitutional infirmities insofar as it would ban the distribution of "noncompliant" computer software capable of demodulating ATSC signals.

As discussed in our earlier submission, such software already exists, as demonstrated by the GNU Radio project.[70] GNU Radio is free/open source software, which means that its authors give away the source code for the software, encouraging others to modify and improve upon it. As a result, GNU Radio cannot satisfy the "Compliance and Robustness" requirements of the MPAA Proposal, which require that all ATSC demodulators be implemented in "tamper-resistant" forms that prevent end-user modification.[71] Because free/open source software is, by definition, human-readable and intended for end-user modification and improvement, it cannot be "tamper-resistant."

Accordingly, were the MPAA Proposal adopted by the Commission, it would appear to ban the further publication of GNU Radio source code as a "non-compliant" ATSC demodulation device. Computer code, however, has repeatedly be recognized by courts as entitled to First Amendment protections when published for expressive purposes.[72] A ban on the publication of "tamper-friendly" ATSC demodulators implemented in software would therefore raise serious constitutional concerns.

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[69] In this respect, the IT Coalition's call for a "Table A" criteria based upon objective, functional requirements, coupled with a self-certification procedure for new technologies, is a distinct improvement over the MPAA Proposal.

[70] *See, supra,* n.32.

[71] *See* MPAA Comments, Attachment B, Section X.11, p. 15 (robustness requirements for all covered demodulation products).

[72] *See, e.g., Universal City Studios v. Corley,* 273 F.3d 429, 446-49 (2d Cir. 2001); *Bernstein v. U.S. Dept. of Justice,* 176 F.3d 1132, 1141 (9th Cir.), *reh'g in banc granted and opinion withdrawn,* 192 F.3d 1308 (9th Cir. 1999); *U.S. v. Elcom Ltd.,* 203 F.Supp.2d 1111, 1126-27 (N.D. Cal. 2002); *Bernstein v. U.S. Dept. of State,* 922 F. Supp. 1426, 1434-36 (N.D. Cal. 1996).

VI. The weaknesses of the MPAA Proposal stem from the flawed process that lead to its creation.

Many of the weaknesses in the MPAA Proposal stem from the deeply flawed nature of the BPDG process. The Commission has been urged by several BPDG participants to afford great deference to the "conclusions" or "recommendations" of the BPDG.[73] EFF representatives attended every BPDG meeting. Based on our experience, we urge the Commission to show no deference to the results of this flawed inter-industry effort that yielded no "consensus" recommendation.

First, and most importantly, the BPDG never addressed the fundamental questions raised by the Commission in this docket: whether a broadcast flag mandate is necessary, whether it would provide effective protection from Internet redistribution, and whether its benefits were outweighed by its costs. At no time was any empirical evidence presented to the group on any of these fundamental questions. Instead, the BPDG proceeded from the *assumption* that a broadcast flag mandate was necessary and the best alternative for protecting content. Alternate views, such as the merits of "encrypt at the source" approaches or suggestions that the broadcast flag be scrapped altogether, were given short shrift and ruled "out of scope."

In other words, the BPDG only considered *how* the broadcast flag should implemented, not *whether* it should be.

Moreover, the BPDG followed no formal rules or deliberative process and operated under considerable time pressure. It was dramatically different in these regards from a formal consensus-oriented technical standards body.[74]

The BPDG was not broadly representative. The lack of a formal process (and the appointment of co-chairs only from among MPAA-member studios, CE manufacturers, and computer hardware manufacturers) meant that a variety of constituencies had no effective representation, including:

- manufacturers of PVRs, including TiVo and ReplayTV;
- manufacturers of ATSC interfaces, such as DTV-tuner cards for PCs;
- manufacturers of ATSC semiconductor products;

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[73] *See* Comments of Digital Transmission Licensing Administrator, LLC, p.6; Comments of Viacom, pp. 8-9.

[74] *See, e.g.,* Comments of Verizon, p. 9 (noting important differences between BPDG deliberations and consensus-based standards process).

- computer software developers;
- independent film-makers;
- consumer advocates; or
- ordinary television viewers.

This lack of representation meant that the recommendations from which the MPAA Proposal was drawn necessarily reflected the economic and strategic interests of one or two dozen of the BPDG's largest participants, typically large incumbent companies in their respective fields. Because the BPDG process failed to adequately address the concerns of consumers or consumer advocates or the views of prospective new market entrants, the Commission should view with skepticism any claim that the BPDG's work product should be viewed as a "consensus" on which to base policy-making.

Even among those who were represented, the BPDG deliberations did not result in anything resembling a "consensus." The final conclusions of the BPDG were expressly rejected by a substantial number of BPDG members, including Philips, EFF, CDT, Public Knowledge, and Consumers Union, to name a few.[75] In addition, many participants expressed no view on the final recommendations presented. Nothing in the BPDG rules suggests that their silence should be construed as endorsement.

Despite repeated objections by EFF, the BPDG further limited participation by excluding the press, thereby limiting public awareness of the broadcast flag debate. In accordance with CPTWG policy, BPDG routinely and actively excluded from all participation interested members of the press, including reporters from the *Los Angeles Times, Bloomberg News* and *National Journal's Technology Daily*. Members of the press joining teleconference calls were asked by BPDG co-chairs to leave upon identifying themselves.

BPDG issued no press release, announcement, or call for participation. It did not maintain a web site. During the entire span of its deliberations, the only public web site devoted to BPDG's activities was operated by EFF. BPDG's existence was announced directly by CPTWG only to existing CPTWG members and attendees. In-person BPDG meetings were held only in Los Angeles and required a per-meeting payment of $100 per attendee. This effectively placed direct BPDG participation out of reach of

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[75] The complete Final Report of the BPDG, including the many appended dissenting views of BPDG participants, is available at http://www.eff.org/IP/Video/HDTV/bpdg-report/.

many individuals, consumer groups and smaller technology companies. Indeed, EFF urged several small technology firms with NTSC or ATSC products, such as PVR products, to attend; typically, these firms responded that they could not afford to participate.

For these reasons, any suggestion that the MPAA Proposal reflects the "consensus" of the BPDG participants, or that the BPDG was a neutral, representative, standards-setting body should be viewed with skepticism by the Commission.

VII. Conclusion

For the reasons detailed above, as well as for the reasons set out in its December 6, 2002 comments in this docket, EFF urges the Commission not to adopt any technology mandate premised on the broadcast flag.

/s/

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