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

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| In the Matter of: | ) | |
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| Implementation of Section 304 of the | ) | |
| Telecommunications Act of 1996 | ) | CS Docket No. 97-80 |
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| Commercial Availability of Navigation Devices | ) | |
| | ) | |
| Compatibility Between Cable Systems and | ) | PP Docket No. 00-67 |
| Consumer Electronics Equipment | ) | |
| | ) | |
| Digital Broadcast Content Protection | ) | MB Docket 02-230 |

**COMMENTS OF**
**MACROVISION CORPORATION TO**
**FURTHER NOTICE OF PROPOSED RULEMAKINGS**

Macrovision Corporation ("Macrovision") would like to provide the following comments on the FCC's Second Further Notice of Proposed Rulemaking on "Plug and Play" equipment (Compatibility Between Cable Systems and Consumer Electronic Equipment, dated September 10, 2003) and Further Notice of Proposed Rulemaking on the "Broadcast Flag" ("Digital Broadcast Content Protection, dated November 4, 2003).

For more than 20 years, Macrovision has built businesses around balancing the consumers' desire to make reasonable use of proprietary media content and pay-per-view/video-on-demand transmissions, and the content owners' right to protect their copyrights.

To that end, Macrovision has developed a wide range of content protection solutions, including copy protection, digital rights management, electronic licensing, watermarking, analog rights conveyance and Internet anti-piracy technologies and products.

We have licensed our content protection solutions to hundreds of companies worldwide, including the major motion picture studios, record labels, consumer electronics manufacturers, semiconductor and graphics card vendors, PC manufacturers, and cable and satellite system operators. Our analog copy protection ("ACP") solution is the *de facto* industry standard for protection against unauthorized copying of packaged media and pay-per-view and video-on-demand content and is currently deployed in more than 111 million set top boxes, 287 million DVD players, 100 million personal computers, and 5 million standalone DVD recorders. Our copy protection and rights management technologies have protected more than 4 billion VHS tapes, 2.7 billion digital versatile discs (DVDs), and 2 billion music tracks distributed worldwide.

We also own more than 87 U.S. patents and 74 U.S. patent applications in the areas of copy protection, digital rights management, electronic licensing, watermarking, analog rights conveyance and Internet anti-piracy technologies, including a number considered essential for solutions discussed as part of the two rulemakings.

Additional information regarding Macrovision and our technologies is available on our website at http://www.macrovision.com.

Macrovision has been involved with the broadcast content protection policy issues since November 2001, having participated in all the meetings of the Broadcast Protection Discussion Group (BPDG) and submitted comments in response to the Commission's earlier Notice of Proposed Rulemaking on the Broadcast Flag.[1] In addition, Macrovision was active in the Copy Protection Technical Working Group's (CPTWG) Analog Re-conversion Discussion Group (ARDG) during 2003, and has been an active participant in CPTWG and its sub-groups since 1996.

## *Approval Process for Content Protection Technologies*

Macrovision commends the commission for recognizing the need for "an open, objective approval process [for proposed content protection technologies]" in both the Plug and Play and Broadcast Flag rulemakings. We strongly support the establishment of a 'level playing field' that (1) allows vibrant competition among content protection solution vendors, (2) promotes a successful transition to digital television, and (3) ensures consumer choice in terms of navigation systems, home entertainment, and home networking equipment.

However, we are very concerned that an overly prescriptive process will stifle innovation, be dominated by certain large companies, and ultimately disadvantage both the consumer and content owners. Consequently, we urge the Commission to implement a flexible approval process under the aegis of Cable Labs, but with public disclosure by the licensor and public oversight by the Commission or an advisory committee.

## The Commission should establish a unified regulatory regime for the adoption of standards in both the Broadcast Flag and Plug and Play proceedings.

Because multiple products cutting across multiple industries will be affected by the digital television-related standards, Macrovision strongly supports a unified approach for selecting content protection standards – i.e., a single approval process with two sets of approval criteria to reflect the different policy goals of the two rules. As several commenters have noted,[2] this will streamline approval of content protection technologies

[1] See, generally, Comments of Digimarc Corporation and Macrovision Corporation, MB Docket No. 02-230 (December 5, 2002).

[2] See Comments of the American Antitrust Institute, MB Docket No. 02-230 (February 13, 2004) at 7; Comments of Genesis Microchip, MB Docket No. 02-230 (February 13, 2004) at 8.

for technology developers, such as Macrovision and other small, innovative companies, to simplify the selection of content protection technologies by equipment manufacturers, and provide a more straightforward mechanism for the Commission to resolve the conflicts that inevitably will arise during implementation of the two rules. In the absence of such a unified approach, content protection vendors will need to pursue two disparate approval processes for technologies and manufacturers will likely be subject to conflicting or redundant standards – resulting in unnecessary costs to consumers.

## The Commission should delegate the responsibility for evaluating content protection technologies to Cable Labs while overseeing the overall quality and results.

Content protection technologies are evolving rapidly – along with the increasingly complex home entertainment environment. The Commission simply does not have the resources or the technical expertise to evaluate and approve new content protection technologies beyond the interim period. Consequently, we recommend that the Commission (1) establish overarching program goals and clear, objective baseline technical and non-technical criteria (such as "robustness") for approving potential content protection technologies[3], (2) delegate the responsibility for evaluating technologies using these criteria for both the Plug and Play and Broadcast Flag rules to Cable Labs, (3) establish an advisory committee to oversee the evaluation process, measure results, and recommend ways to resolve complaints and conflicts and revise approval criteria over time, and, in so doing, (4) give the marketplace the opportunity to determine which technologies succeed or fail. Alternately, the Commission could oversee Cable Labs' activities directly; however, an advisory committee would provide opportunity for multi-industry involvement and oversight and potentially defuse some of the concerns expressed by other commenters over Cable Labs' role in these rulemakings. In either case, we strongly urge the Commission to require licensors to publicly disclose applications to bring greater transparency to the market for content protection technologies.

## The Commission's rules should explicitly permit approval of multiple content protection technologies, including non-encryption-based alternatives

As display quality, storage availability and network connectivity continue to increase, consumers' expectations about their use and enjoyment of digital content will shift. Consequently, Macrovision is heartened by the Commission's stated expectation that it will approve "many different content protection and recording technologies, including but not limited to digital rights management, software-based, and non-encryption alternatives."

Having evaluated many of the major content protection solutions, we recognize the substantial limitations of existing technologies and strongly agree with this approach. The Commission should encourage the rapid approval of any technology that can provide effective protection against unauthorized redistribution of digital terrestrial broadcast

[3] See, generally, the sections that follow.

content (in the case of the Broadcast Flag rule) and against unauthorized interception, retransmission or copying (in the case of the Plug and Play rule).

As others have commented,[4] we agree that the Commission should not limit the type of technologies that may be certified through this process, so long as such technologies provide effective protection against unauthorized usage in a manner consistent with the spirit of the two rules. Predetermining the nature of effective technologies or otherwise limiting in any artificial way the types of technologies that might be used will stifle competition and innovation.

For example, several systems that use a watermark to identify copyrighted content, coupled with a network-based detector and enforcement mechanism (e.g., an Internet service that crawls the Web and peer-to-peer networks looking for unauthorized content) are already available.[5] These types of systems offer the benefits of a high-level of protection against unauthorized, indiscriminant redistribution while providing flexibility for the consumer without the inherent limitations of link encryption or digital rights management technologies. When coupled with "speed bump" technologies in the consumer environment, they are likely to most cost-effectively provide the balance that the Commission seeks.

Encryption shouldn't be viewed as a panacea. Although it may serve certain applications well, in many other instances its restrictive nature may frustrate consumers' use of content while requiring a sizeable deployment cost for content owners and manufacturers.

## The Commission's rules should give equal consideration to analog interfaces

As others have noted, for the foreseeable future, any PDNE (however defined) in the average consumer's home is likely to be comprised of a mixture of legacy and new equipment. As a result, "plug and play interoperability" will remain a significant challenge, particularly if the Commission achieves its stated goal of approving a number of digital content protection technologies. The Commission need not look further than the sizeable challenges posed to the consumer in setting up a home theater system today without content protection or in getting different remote controls to work on different consumer devices.[6]

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[4] See Comments of the Digital Transmission Licensing Administrator (DTLA), MB Docket No. 02-230 (February 13, 2004) at 7-8; Comments of Philips Electronics North America Corporation ("Philips"), MB Docket No. 02-230 (February 13, 2004) at 8-9.

[5] See, e.g., Digimarc Corporation's, "Corbis Case Study" of infringement control and licensing compliance for commercial images (http://www.digimarc.com/docs/Corbis_CaseS.pdf). Several other companies currently offer systems that provide for automated interdiction of illegally distributed content, including video and audio.

[6] See, e.g., http://www.eetimes.com/printableArticle?doc_id=OEG20040122S0022

In order to smooth the introduction of these new regulations, the Commission must continue to allow consumers to make use of standard-definition and high-definition analog interfaces – not only in support of legacy devices, but as a "fall back position" when one device cannot interoperate with another device within their home network. CPTWG's Analog Reconversion Discussion Group[7] recently concluded work on a study of various forms of control over analog interfaces and found that certain of these technologies can effectively signal redistribution and copy control to downstream devices.[8]

The Commission should explicitly allow consumers the flexibility to store, copy and move, within a PDNE, broadcast or other content transferred over an analog interface, as long as the overarching goals of preventing indiscriminate redistribution or unauthorized interception, retransmission or copying are maintained. Under no circumstances should the Commission prevent, or allow approved digital content protection technologies to prevent, the movement of analog content around the PDNE.

## *Criteria for Approval of Content Protection Technologies*

### The Commission should establish criteria for the approval of both digital and analog content protection technologies.

As several commenters[9] have noted, the Commission's proposed regulations leave key outputs entirely unregulated. Regulating one type of output while leaving another entirely unregulated risks establishing significant market demand for the unregulated output. Moreover, it ignores the fact that consumers are already taking advantage of analog interfaces for unauthorized copying and sharing of high-value PPV/VOD content. According to recent primary research of active PPV/VOD programming households, more than 30% of users currently record purchased content. Approximately 20% of those users that record content share it with others.[10]

With the advent of new consumer equipment that makes it easier to share privately recorded programs, we expect that participation of households in sharing events will broaden dramatically. As a result, Macrovision supports creating a level playing field between digital and analog interfaces and believes that this risk of illicit redistribution, interception, retransmission or copying can be mitigated through carefully constructed and narrow rules governing content protection of analog video. We encourage the Commission to establish objective criteria for the approval of content protection and

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[7] See http://www.cptwg.org/Assets/Presentations/ARDG/ARDG%20Home.htm

[8] Specifically, the group was charged with "addressing security issues arising from the conversion of protected, copyrighted commercial audiovisual content from digital to analog format and reconversion to digital format"

[9] See Comments of the Electronic Frontier Foundation, MB Docket No. 02-230 (February 13, 2004) at 4-5, among others.

[10] "Recording and Sharing Programming in Cable and Satellite Households" primary research conducted by Macrovision Corporation/Alexander and Associates, March 2004.

rights conveyance technologies for analog interfaces for both the Broadcast Flag and Plug and Play rulemakings.

## The Commission should establish an appropriate framework for approving technologies, including baseline non-technical criteria, to provide market transparency – and then let market forces decide the winners.

We strongly agree with comments by Philips[11] that the Commission's technical criteria in both rules must be sufficiently flexible to permit the approval of non-encryption technologies. The specific criteria proposed by the IT Coalition[12] are heavily biased towards link encryption and digital rights management architectures and in our opinion will fail to serve consumers.

***The Commission Should Adopt a Small Set of Objective Criteria for Approving Technologies, Based on the Notion of "Indiscriminate Redistribution to the Public" in the case of the Broadcast Flag and "Unauthorized Interception, Retransmission or Copying" in the case of the Plug and Play rulemaking***

Several commenters have proposed specific criteria for approving technologies, but few agree on exactly what those criteria should be. While we strongly agree with the spirit in which these criteria have been offered, we urge the Commission not to enshrine particular modes of protection (e.g., encryption). Instead, we agree with the approach suggested by others[13] that the Commission take a relatively narrow approach to requirements for approving technologies, adopting overarching goals and a small number of targeted criteria and revisiting them over time. Specifically, we suggest that the approval of Authorized Technologies hinge on the following simple requirements:

> Broadcast Flag: Does the Protection Technology effectively frustrate an ordinary user from indiscriminate redistribution of protected content to the public over the Internet or through similar means?
>
> Plug and Play: Does the Protection Technology effectively frustrate an ordinary user from unauthorized interception, retransmission, recording or copying of Commercial Audiovisual Content in a manner consistent with Encoding Rules?

The Commission should establish guidance for Cable Labs to interpret these key functional requirements. Specifically:

> *Protection Technology: means a method approved pursuant to the procedures in §xx.xxxx and may include digital, analog, or recording protection technologies.*

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[11] Philips at 13-16.

[12] See, generally, Comments of the IT Coalition MB Docket No. 02-230 (February 13, 2004).

[13] See Comments of the Center for Democracy and Technology, MB Docket No. 02-230 (February 13, 2004) at 2, 4-6.

*For clarification, protection technologies need not be limited to link or file encryption, digital rights management, watermarking, or analog- or media-based copy protection or rights conveyance approaches.*

*Redistribution: The Protection Technology must be capable in the ordinary course of its operation of reasonably restricting the unauthorized redistribution outside of the home and personal digital network of Unscreened Content or Marked Content. For clarification, the Protection Technology shall not impose any restrictions with respect to the distribution or playback of physical copies of Unmarked Content, but shall limit recording and distribution of physical copies of Unscreened Marked Content.*

*Interception, Retransmission or Copying: The Protection Technology must be capable in the ordinary course of its operation of reasonably restricting the unauthorized interception, retransmission, redistribution, recording, copying or playback of Commercial Audiovisual Content in a manner consistent with the content encoding rules specified by the Content Owner or MVPD.*

By "effectively", we generally mean robustness. "Robustness" reflects the resistance of the implementation of the technology to efforts to defeat the protection measures by ordinary users (i.e., with average technical knowledge) as deployed in the marketplace. By "in the marketplace", we mean considering user limitations, practical form factors, and marketplace effects that often provide for a wide variation in the actual deployed robustness versus the technologies' theoretical effectiveness. This is an important distinction, because non-technical criteria, such as licensing and certification programs, enforcement/litigation against circumvention devices, etc., often result in greater field effectiveness (e.g., by reducing the ability of an expert to distribute an attack on or a circumvention device for a component in a form that is implementable by an average user). Thus, the Commission must strike a careful balance between theoretical security considerations and practical implementation factors in defining effectiveness or robustness.

In our view, the "Robustness" criteria for demodulator products proposed in §73.9007 represents an unreasonably high hurdle for most content protection solutions. In practice, the need for specialized technical knowledge in combination with specialized electronic or software tools (e.g., EEPROM readers and writers, oscilloscopes, video enhancement equipment, debuggers or decompilers, specialized applications/drivers in combination with selected drives) represents a far higher bar to the ordinary user than acquiring purpose-built software (often free and widely available on the Internet) made to bypass digital content protection technologies using a general-purpose computer.

While we agree with some of DTLA's suggestions regarding the definition of redistribution, we strongly disagree with the proposal to exempt distribution (i.e., recording) and playback of physical copies of Unscreened and Marked content from

protection.[14] This is tantamount to creating a "burning hole" by which ordinary users could easily circumvent the content protection simply by writing a file to physical media and re-reading it back into their system without protection.

We believe that these criteria will make the Commission's approval process as lightweight and narrowly focused as possible. By developing minimally burdensome and narrowly defined approval criteria, the marketplace will develop a range of rights protection options for consumers. However, we also believe that the Commission should oversee this process and revise the approval criteria over time to meet the changing demands of the marketplace.

***The Commission Should Not Adopt Any Criteria That are Specific to One Type of Content Security Architecture***

We agree with many of the comments by DTLA and Philips[15] that most of the technical criteria proposed by representatives of the IT industry are unnecessarily restrictive, unrelated to security considerations relevant to redistribution control or flawed in ways that render them unsuited to criteria for a broad range of products and technologies.

For example, certain technologies, such as authentication, are suited only to encryption-based systems; therefore, the absence of such functionality in systems with alternative architectures should not disqualify non-encryption-based systems.

While Macrovision recognizes that certain content protection technologies rely on encryption and key authentication as essential elements of security, the Commission should not preclude other, equally protective methods. DTLA proposed specific language that is far too biased towards encryption-based approaches.[16] Instead, the Commission should place greater emphasis on the proposed Ordinary User Standard as described in the preceding section. Other issues, such as vulnerability of cryptographic elements, inclusion of rights (or specific rights languages, such as XrML, renewability and upgradeability, interoperability, performance, and ease or cost of implementation, implementation in software or hardware, avoiding consumer confusion, etc.) are inappropriate to the consideration of a generalized approval process and we agree with comments by Philips and DTLA in these areas.[17]

[14] DTLA at 8.
[15] DTLA, generally, at 13-16; Philips, generally, at 13-17.
[16] DTLA at 8-9, 12.
[17] DTLA, generally, at 13-16; Philips, generally, at 13-17.

***The Commission Should Not Restrict the Use of Proprietary Technologies***

Macrovision supports the Commission's approach in the interim procedures that provide for the certification of both proprietary and interoperable content protection technologies. There is no reason to disapprove an otherwise effective technology that a company wishes to market only in its own products. The Commission's interest should extend only to the level of protection offered by the technology, not the marketing strategy employed by the owner; the marketplace can decide whether such products will succeed. Macrovision disagrees with the proposal by some to certify only technologies that may be licensed to others; though, clearly proprietary technologies that are initially approved as 'proprietary' and subsequently licensed as 'interoperable' at a later date to small numbers of licensees under less-than-non-discriminatory terms are problematic to the extent that they introduce distortions in an otherwise competitive marketplace.

In particular, we concur with the DTLA comments that "Effective technologies should be permitted to be applied even to closed systems that work only with a particular type or brand of product."

**The Commission Should Not Dictate Licensing Terms Beyond Reasonable and Non-Discriminatory**

As several commenters have noted,[18] it is inappropriate for the Commission to dictate specific licensing terms for content protection technologies, beyond the request that approved technologies be offered on reasonable and non-discriminatory terms. This is anathema to the Commission's stated goal of creating a vibrant competitive marketplace. Instead, the Commission should foster transparency in the marketplace to allow it to evolve more efficiently. Macrovision therefore opposes the suggestion by Philips that the Commission should adopt specific criteria that dictate the terms of technology licenses.

We do believe that the Commission should establish guidelines for acceptable 'non-discriminatory' licensing practices and factor these criteria into their evaluation of interim solutions. Specifically, a number of licensors of content protection technology currently limit, through explicit restrictions built into their commercial licenses, the downstream technologies that can interoperate with their systems. This "chaining of licenses" provides commercial advantage to selected partners with complementary technologies and potentially excludes others. In an established, vibrant open market for content protection solutions – with transparent licensing requirements – an equipment manufacturer can choose to take on the obligations of these license chains or choose a competitive technology. However, no such competition exists during the Interim period and the Commission could potentially be playing 'kingmaker' for both primary and downstream solutions by approving certain interim digital content protection solutions.

***The Commission Should Require Licensors to Disclose Publicly Licensed Necessary Patent Claims and Patent Licensing Policies***

[18] DTLA at 16.

Since the approval process for content protection technologies proposed for both rules does not involve an open standards-setting process, the Commission should require licensors seeking approval of their technologies to disclose publicly their patent policy (including which necessary patents claims are included in their licenses, if any, indemnification offered, litigation history, etc.) This would potentially help to address the concerns raised by others[19] regarding technologies developed by closed industry groups – concerns that we share both as licensor and licensee of intellectual property for content protection technologies. While this will not guarantee that approved content protection technologies are free and clear of patent claims by third parties, it would improve the transparency in the market by making it clear what patents are being offered with each approved technology – allowing equipment manufacturers to better evaluate, before deploying a technology, the intellectual property supporting it and the potential risks posed by third party claims.

[19] Genesis at 3.

## *Conclusion*

We urge the Commission to make changes to the approval process as proposed herein:

- Establish a unified regulatory regime for the adoption of standards in both the Broadcast Flag and Plug and Play proceedings.
- Delegate the responsibility for evaluating content protection technologies to Cable Labs while overseeing the overall quality and results.
- Permit approval of multiple content protection technologies, including non-encryption-based alternatives
- Give equal consideration to analog interfaces
- Establish criteria for the approval of both digital and analog content protection technologies
- Establish an appropriate framework for approving technologies, including baseline non-technical criteria, to provide market transparency.

Respectfully submitted,

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