method to fall within the confines of the earlier approval.[292]

67. DTLA, 4C and DCP each dispute Philips' claims.[293] DTLA asserts that DTCP's encryption and authentication works the same over every interface protocol with an equal level of robustness.[294] As a practical matter, DTLA indicates that it would be technically infeasible to differentiate Marked Content from similarly encoded content once it enters the DTCP encryption system and it would therefore be impossible to control the ability of that Marked Content to only pass through certain approved interfaces.[295] DTLA interprets PHILA as providing a blanket approval to DTCP for all current and future transports to which it may be mapped.[296] 4C states that CPRM's extensibility to multiple recordable media formats is one of its most important features and consumers should not be denied the right to use these new formats.[297] Where CPRM's essential attributes remain as they are in the certification before the Commission, 4C believes there is no reason to expect that content will not be protected at the same level and therefore no need exists for the Commission to conduct a reiterative proceeding.[298] DCP maintains that a metered approach to approvals would not be a good policy position for the Commission to take and suggests that Philips' support for this approach reflects its own interest in the licensing of HDMI as a transport for use with HDCP.[299]

68. Although we agree with 4C that where a content protection technology or recording method's essential attributes remain unchanged by its mapping to a new transport content is likely to be protected at the same level, we ultimately conclude that our review and approval of these technologies must be based on a transport-by-transport or media-by-media basis. As demonstrated by the mapping of DTCP to IP, significant legal and technical changes can result from this process.[300] We are therefore reluctant to issue a blanket approval for all existing and future transports or media to which these thirteen technologies may be mapped. At the same time, we do not wish to inhibit innovation or prevent consumers from benefiting from technological advances. We will therefore consider a proposal by a technology proponent for the addition of new a transport or media as a material change and an amendment to their existing certification. We will process any such amendments on an expedited basis following public notice and comment.[301] When evaluating these amendments, we will not reconsider any issues in the underlying certification that have already been addressed in this *Order*, unless they are directly impacted or modified by the mapping to the new transport or media. We believe that this approach will streamline the amendment process where any changes are *pro forma* in nature, but will allow for a full review of the merits where more substantive modifications occur. In the case of DTCP, we are not persuaded that this transport-by-transport approach will present any significant technical

[292] Philips Opposition to DTLA at 36-37; Philips Opposition to 4C at 33; Philips Opposition to DCP at 20-21.

[293] DTLA Reply at 56; 4C Reply at 19; DCP Reply at 17-18.

[294] DTLA Reply at 56.

[295] *Id.*

[296] *Id.*

[297] 4C Reply at 19.

[298] *Id.*

[299] DCP Reply at 17-18.

[300] *See* Philips Opposition to DTLA at 29-30; DTLA Reply at 50-54 (discussing the various legal and technical changes resulting from the mapping of DTCP to Internet Protocol, including a decrease in the number of authorized sink devices from 62 to 34, a switch in cipher from M6 to AES, and the addition of discussions on localization requirements).

[301] Technology proponents may certify any amendments pursuant to our procedures for subsequent certifications. *See* 47 C.F.R. § 73.9008(c).

difficulties given that it has been emulated in the DFAST and the Content Scramble System ("CSS") licenses and certain implementations of DTCP, such as over IP, have not yet been deployed in the marketplace.[302]

B. SCOPE OF REDISTRIBUTION CONTROL

1. Localization

69. In adopting a redistribution control system for digital broadcast television, the Commission articulated the express goal of the *Broadcast Flag Order* as:

> [P]revent[ing] the indiscriminate redistribution of [digital broadcast television] content over the Internet or through similar means. This goal will not (1) interfere with or preclude consumers from copying broadcast programming and using or redistributing it within the home or similar personal environment as consistent with copyright law, or (2) foreclose use of the Internet to send digital broadcast content where it can be adequately protected from indiscriminate redistribution.[303]

The Commission then sought further comment on the appropriate scope of redistribution that should be prevented and whether it was useful to define a personal digital network environment ("PDNE") within which consumers could freely redistribute digital broadcast television content.[304]

70. Although MPAA and other parties have filed comments responding to the *Further Notice of Proposed Rulemaking* on the appropriate scope of redistribution,[305] MPAA has also raised this issue in oppositions and responses it has filed with respect to certain certifications where the redistribution of content is not otherwise constrained through the inherent limitations of physical connectors or media.[306] Specifically, MPAA advocates the adoption of "localization" constraints by DTLA, Microsoft, RealNetworks, Thomson, and TiVo that would effectively restrict the scope of content redistribution to a tightly defined physical space in and around the home.[307] MPAA clarifies that it is not opposed to the concept of remote access in principle, but that a number of technological, policy, privacy and legal questions must be addressed before it can be implemented.[308]

71. The technology proponents have answered MPAA's request for localization constraints in different ways. DTLA currently requires adopters implementing DTCP over IP to limit TTL to a value

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[302] Letter from Jonathan Rubin, American Antitrust Institute, to Marlene Dortch, Secretary, FCC at Attachment A (May 28, 2004) ("*AAI Ex Parte*").

[303] *Broadcast Flag Order*, 18 FCC Rcd at 23555.

[304] *Id.* at 23578.

[305] *See e.g.*, MPAA Comments, MB Docket 02-230 (filed Feb. 13, 2004); MPAA Reply Comments, MB Docket 02-230 (filed Mar. 15, 2004).

[306] *See* MPAA Opposition to Thomson at 3-6; MPAA Opposition to TiVo at 4-6; MPAA Opposition to RealNetworks at 3-7; MPAA Opposition to Microsoft at 3-6; and MPAA Response to DTLA at 3.

[307] *See* MPAA Opposition to Thomson at 3-6; MPAA Opposition to TiVo at 4-6; MPAA Opposition to RealNetworks at 3-7; MPAA Opposition to Microsoft at 3-6. In the case of DTCP, MPAA recognizes that DTLA has established a localization work plan to identify proximity requirements for DTCP over IP and asks that this work plan be included in DTCP's certification. MPAA Response to DTLA at 3.

[308] *See* MPAA Opposition to Thomson at 3-6; MPAA Opposition to TiVo at 4-6; MPAA Opposition to RealNetworks at 3-7; MPAA Opposition to Microsoft at 3-6; MPAA Response to DTLA at 3; Letter from Bruce Boyden, Proskauer Rose LLP, to Marlene Dortch, FCC at Attachment (July 16, 2004).

of 3.[309] Pursuant to its recently completed localization work plan for DTCP over IP, DTLA has also committed to institute a RTT limit of 7 milliseconds or less in order to constrain the redistribution of content within an area approximating the home.[310] Microsoft specifies that it will adopt these same TTL and RTT limits in an effort to keep Marked Content proximate to the original device where it is encrypted by WMDRM.[311] RealNetworks has made a similar commitment with respect to Helix.[312] Thomson provides a more qualified response – Thomson will tentatively adopt a RTT limit of 7 milliseconds and a TTL limit of 3 for its SmartRight technology, but allows that these controls can later be relaxed should content owners agree or the Commission's rules so permit.[313] Unlike DTLA, Microsoft, RealNetworks, and Thomson, TiVo declines to adopt any proximity controls for its TiVoGuard technology and argues that such controls fall outside the scope of this proceeding.[314]

72. Although we will address the scope of redistribution issue in a broader context as part of our resolution of the *Further Notice of Proposed Rulemaking*, we are not inclined as part of our review of these certifications to impose proximity controls as an additional obligation where other reasonable constraints sufficiently limit the redistribution of content. The Commission's stated goal in the *Broadcast Flag Order* is clear – to prevent the indiscriminate redistribution of digital broadcast television content over the Internet or through similar means. Our goal was not to prevent "unauthorized" redistribution as advanced by MPAA.[315] Rather, we explicitly provided that the scope of the *Broadcast Flag Order* "does not reach existing copyright law."[316] We conclude that SmartRight and TiVoGuard each meet the Commission's stated goal of preventing indiscriminate redistribution through different combinations of device limits, interactive device authentication, and affinity-based mechanisms. With respect to TiVoGuard, we note in particular that under the terms of TiVo's subscriber agreement, copyrighted content may only be used for personal, non-commercial purposes.[317] The limit of 10 devices uniquely associated with a single secure viewing group additionally prevents content from being indiscriminately redistributed in a "daisy chain" fashion.[318] In the case of SmartRight, the smart card-based PPN structure and associated cap of 10 display devices performs a similar limiting function.[319] It is our hope that both TiVoGuard and SmartRight will not only provide a reasonable level of redistribution control for digital broadcast content, but will also facilitate new and innovative consumer uses, such as remote access to content. We recognize that MPAA and the National Football League ("NFL") have expressed concerns regarding the impact of remote access on local and regional broadcast television markets.[320] Given the

[309] *See* DTCP Volume 1, Supplement E, Mapping DTCP to IP (Information Version) at 18, *filed in* Letter from Seth Greenstein, McDermott, Will & Emery, to Marlene Dortch, FCC (May 5, 2004).

[310] DTLA Reply at 3; *DTLA 6/1/04 Ex Parte* at Attachment; *DTLA 7/20/04 Ex Parte* at 2; *DTLA 7/22/04 Ex Parte* at 1-2.

[311] Microsoft Reply at 5; *Microsoft 5/18/04 Ex Parte* at 9, 11.

[312] *RealNetworks 7/1/04 Ex Parte* at 2.

[313] Thomson Reply at 7-8; *Thomson 6/23/04 Ex Parte* at 2.

[314] TiVo Reply at 21-24.

[315] *See e.g.*, MPAA Opposition to TiVo at 3 (asserting that "TiVoGuard fails to sufficiently protect against unauthorized redistribution of Marked and Unscreened Content because it does not include any distance-based limitations on transmissions of the content").

[316] *Broadcast Flag Order,* 18 FCC Rcd at 23555.

[317] *TiVo 7/28/04 Ex Parte* at Attachment.

[318] TiVoGuard Certification at 25; *TiVo 7/21/04 Ex Parte* at Attachment.

[319] Thomson Reply at 9, n.17.

technical limits and affinity-based parameters of SmartRight and TiVo's TiVoToGo implementation, we believe that these concerns are speculative and irrelevant to our stated goal of preventing indiscriminate redistribution.[321]

73. In contrast, WMDRM and Helix lack the affinity-based linkage and interactive device authentication present in SmartRight and TiVoGuard.[322] We recognize, however, that both Microsoft and RealNetworks have committed to implement a combination of TTL and RTT limits to restrict the scope of redistribution. We conclude that this combination, as implemented by Microsoft and RealNetworks in conjunction with their WMDRM and Helix technologies, represents an adequate limiting mechanism. We emphasize that this determination is predicated on the specific parameters outlined by Microsoft and RealNetworks in their certifications and subsequent filings in these proceedings. We believe that determinations of whether proximity controls are necessary or desirable must be made on a case-by-case basis, taking into account the nature of the underlying content protection technology, whether it utilizes any other limits on the scope of redistribution, and the manner in which it would implement proximity controls.

74. In the case of DTCP over IP, we conclude that the combination of existing TTL and proposed RTT limits will adequately restrict the scope of redistribution.[323] Our approval of DTCP over IP is conditioned, however, on DTLA submitting to the Commission final revisions to its mapping specification for DTCP over IP reflecting its proposed RTT requirements.[324] Although adopters will not be required to implement these revisions until 18 months after the DTCP over IP specification becomes final, we clarify that only implementations of DTCP over IP using a combination of TTL and RTT limits are authorized for use with Marked Content.[325] We also specify that our approval of localization constraints for DTCP is limited to its IP implementation and does not extend to other transports to which DTCP has been mapped. Should DTLA determine that, pursuant to its ongoing localization work plan for other protocols, proximity controls are desired for non-IP transports, it must submit any such proposal to

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[320] *See e.g.*, MPAA Opposition to TiVo at 5-6; Letter from Frank Hawkins, NFL, to Rick Chessen, FCC at 1-2 (June 24, 2004) (speculating that without "any constraints on the timing of redistribution ... [TiVoToGo and Helix] users presumably would be able to redistribute games *as* they are broadcast," thereby upsetting the NFL's regional television plan).

[321] *See* Letter from James Burger, Dow, Lohnes & Albertson, to Rick Chessen, FCC at 1-3 (June 30, 2004) (indicating that "TiVo remote access does not permit real-time retransmission of a three-hour football game or anything remotely analogous").

[322] Microsoft and RealNetworks also utilize device limits as part of their systems. Microsoft's network streaming device implementation of WMDRM imposes a 10 device limit, while its connected storage device implementation restricts the transfer of content over IP to a "limited number" of devices. Microsoft Reply at 5-6; *Microsoft 5/18/04 Ex Parte* at 9, 11; *Microsoft 7/13/04 Ex Parte* at 2; *Microsoft 7/15/04 Ex Parte* at Attachment. No such limit is used in Microsoft's connected storage device implementation where the devices are directly connected via USB. *Id.* RealNetworks limits the number of Trusted Clients associated with a specific Trusted Recorder during any six month period to 10. *RealNetworks 7/1/04 Ex Parte* at 3.

[323] DTLA also imposes a 34 sink device limit for DTCP over IP. DTCP Certification at 10.

[324] *See DTLA 7/20/04 Ex Parte* at 2; *DTLA 7/22/04 Ex Parte* at 1.

[325] *See DTCP Adopter Agreement* at § 3.3. We do not believe that TTL alone is an adequate tool to restrict the scope of redistribution given its susceptibility to circumvention. Absent some associated form of proximity control, TTL can be circumvented through the use of a Virtual Private Network to encapsulate IP packets so that the TTL field is not decremented in transmission. *See* Letter from James Burger, Dow, Lohnes & Alberston, PLLC, to Susan Mort, FCC at Attachment at 6-7 (June 22, 2004), *accord* Letter from Bruce Boyden, Proskauer Rose, LLP, to Marlene Dortch, FCC at Attachment at 9 (July 16, 2004) ("TiVo merely states the obvious when it argues that TTL alone is not difficult to circumvent").

the Commission for evaluation as a material change to its certification.[326]

2. Copy Restrictions

75. As reflected above, our interest in maintaining the proper balance between protecting digital broadcast content and promoting its use and enjoyment by consumers remains paramount. We continue to believe that, as stated in the *Broadcast Flag Order*, a redistribution control content protection system for digital broadcast television will not interfere with or preclude consumers from copying, using or redistributing digital broadcast television content as consistent with copyright law.[327] We recognize, however, that certain of the above-referenced content protection technologies and recording methods are unable to effectuate redistribution control through means other than copy restraints. For example, the D-VHS format encodes all content at the time of recording as "copy restricted" in CGMS, which would effectively limit broadcast content to one generation of copies.[328] Likewise, since HDCP is used to protect uncompressed video that generally cannot be copied by today's consumer equipment due to data stream size, HDCP was not designed to express different content protection states, such as redistribution control, and its adopter agreement was crafted with an explicit prohibition on copying.[329]

76. We must again acknowledge that the majority of these thirteen content protection technologies and recording methods were developed prior to adoption of the *Broadcast Flag Order*. As such, they carry with them certain legacy attributes that, while less than ideal from a broadcast flag perspective, may have been appropriate or necessary at the time and in the context that they were developed. The specific uses for which D-VHS and HDCP were developed – namely, the recording of HD digital content and the transport of uncompressed digital video content to a display – represent in their own right important pro-consumer elements of the digital transition. We are thus disinclined to prohibit D-VHS and HDCP for broadcast flag purposes, particularly where other output protection technologies and recording methods exist that permit copying and promote the use and enjoyment of digital broadcast television content by consumers. We are encouraged that a recent modification to the D-VHS copy protection requirements permits manufacturers to create D-VHS products that output protected digital broadcast content with "copy one generation" DTCP encoding, allowing a consumer to link two D-VHS devices and make additional protected copies.[330] We approve the D-VHS certification on the condition that JVC requires its adopters to implement this modification to ensure that consumers enjoy the maximum flexibility of its D-VHS technology.

77. We wish to clarify, however, that our approval of D-VHS and HDCP should not be interpreted as precedent supporting the future adoption of technologies that impose copy restrictions on digital broadcast television content. By the same token, it is not our intent to hinder competitors to D-VHS and HDCP from entering this market. We will therefore not consider the existence of copy restrictions to *per se* prevent an output protection technology or recording method's approval for broadcast flag purposes, particularly where the technology was developed prior to the adoption of the *Broadcast Flag Order*. Rather, we will consider such restrictions as a factor weighing strongly against the technology's approval as a part of our consideration of the functional criteria contained in Section

[326] *See DTLA 7/20/04 Ex Parte* at 1-2; 47 C.F.R. § 73.9008(c).

[327] *Broadcast Flag Order*, 18 FCC Rcd at 23555.

[328] D-VHS Certification at 11. JVC indicates that a format cognizant D-VHS device could permit the making of subsequent generations or copies for flag-marked or EPN encoded content. *Id.*; *see also* JVC Reply at 6-9.

[329] HDCP Certification at 5; *DCP 6/25/04 Ex Parte* at 1-3.

[330] The D-VHS copy protection requirements now enable format non-cognizant devices to read embedded CCI and the EPN indicator and convert it to "copy one generation" when outputting to DTCP. *JVC 6/24/2004 Ex Parte* at 2.

73.9008 of the Commission's rules.[331]

C. TECHNICAL MATTERS

78. As outlined above, the technology proponents have submitted detailed technical information with their certifications describing the level of security they afford content, how they maintain an appropriate scope of redistribution, their use of authentication, their capacity for revocation, renewal and upgrade, and whether they permit interoperability. Few questions were raised regarding these technical elements; we address any relevant legal and policy issues related to them below.[332] With the sole exception of DTCP over Bluetooth, we are satisfied that, as of the date of this *Order*, each of the output protection technologies and recording methods is technically sufficient in each of these areas to adequately protect digital broadcast television content from indiscriminate redistribution.[333] We recognize nonetheless that technology is ever-evolving, as are the potential threats to security. To the extent that an output protection technology or recording method becomes outmoded or so severely compromised that revocation, renewal or upgrade are insufficient to address the breach, we will consider petitions seeking revocation of our approval pursuant to Section 73.9008(e) of the Commission's rules.[334]

D. LICENSE TERMS

79. Under the Commission's interim process for reviewing output protection technologies and recording methods, we indicated that if a particular technology were to be offered publicly, the technology proponent must submit to the Commission a copy of its licensing terms and fees, in addition to evidence demonstrating that the technology will be licensed on a reasonable, non-discriminatory basis.[335] We further specified that, as part of our application of functional criteria to particular technologies, we would "consider a technology's licensing terms, including its compliance and robustness rules, change provisions, approval procedures for downstream transmission and recording methods, and any relevant license fees."[336] Of the thirteen above-referenced technologies, all except TiVoGuard and the software implementations of MagicGate will be publicly offered.[337]

80. In their oppositions and responses to the twelve licensed technologies, MPAA, Philips, Hewlett Packard, American Antitrust Institute ("AAI") and Genesis Microchip each seek the modification

[331] 47 C.F.R. § 73.9008.

[332] MPAA argued that RealNetworks and Microsoft provided insufficient information regarding their DRM technologies in their certifications. MPAA Opposition to RealNetworks at 2-3, 9; MPAA Opposition to Microsoft at 6. We are satisfied that both parties have supplemented their certifications with adequate information on the technical merits of WMDRM and Helix.

[333] We cannot reach a specific conclusion on the appropriateness of DTCP over Bluetooth in this context since the mapping protocol for this implementation relies upon information contained in the Bluetooth technical specification which has not been submitted by DTLA for Commission review. *See DTLA 6/24/04 Ex Parte* at Attachment. We are therefore unable to approve DTCP over Bluetooth at this time. DTLA may file an amendment to its certification with additional information regarding the Bluetooth technology and we will reevaluate the merits of DTCP over Bluetooth as if it were a new transport. Amendments may be certified pursuant to the procedures outlined in Section 73.9008(c) of the Commission's rules. *See* 47 C.F.R. § 73.9008(c).

[334] 47 C.F.R. § 73.9008(e).

[335] *Broadcast Flag Order*, 18 FCC Rcd at 23575.

[336] *Id.* at 23576.

[337] TiVo does not now and does not intend to offer TiVoGuard as a separate, free-standing digital output protection or recording technology. TiVoGuard Certification at 34. Similarly, Sony intends to keep its software implementations proprietary for its own use and that of its affiliates. MagicGate Memory Stick PRO Software Certification at 2; MagicGate Hi-MD Software Certification at 2.

of certain license terms. We discuss the specifics of their proposals below.[338] As a general proposition, however, we are reluctant to intervene in private industry negotiations. We are nonetheless cognizant of the fact that, by virtue of our adoption of a content protection system for digital broadcast television, we have a responsibility to ensure that our goals are met in a competitively neutral manner that serves the public interest. We believe that we can best accomplish this task through an oversight role in which we largely defer to the private licensing mechanisms established by the technology proponents and their adopters, except in cases of material changes, but provide aggrieved parties with a forum for recourse should these private licensing mechanisms fail. In our discussion of the proposed license modifications below, we articulate certain expectations and presumptions that will inform our oversight role in hopes of providing the technology proponents and their adopters with guidance that will avert potential disputes before they arise.

1. Approval of Downstream Technologies and Interoperability

81. Philips' oppositions to DTCP and CPRM express concern that the assertion of control by DTLA and 4C over the approval of downstream output and recording technologies is unreasonable and anticompetitive.[339] In particular, Philips maintains that these approval mechanisms empower DTLA and 4C to quash competition in so far as they can be used to prohibit DTCP and CPRM-compliant playback devices from using a competing technology to make copies.[340] Philips also anticipates delays in the adoption of new technologies as the result of having to seek what it views as redundant approvals from the Commission and certain technology proponents.[341] AAI raises similar concerns in noting that private contractual arrangements which preserve control over interoperability undermine competition.[342] AAI criticizes the downstream approval mechanisms employed by DTLA and 4C as perpetuating their market power, discouraging entry of non-interoperable products using competitive technologies, and locking consumers into a chain of related products.[343] Philips and AAI dispute any potential technical incompatibility issues and advocate a more open approach where any Commission-approved technology would be permitted downstream.[344]

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[338] Certain issues raised by MPAA have been resolved through clarifications and commitments made by the certifying entities and therefore do not require Commission action. These issues include: (1) the inapplicability of intellectual property claims and other obligations to non-adopter content providers, broadcasters, and consumers who indirectly trigger approved output protection technologies and recording methods when they embed the flag in content or utilize flag-compliant equipment; and (2) that the founders of specific output protection technologies and recording methods will abide by the same compliance and robustness rules applicable to third party licensees. *See* MPAA Response to Sony at 4-6; MPAA Opposition to Thomson at 11-12; MPAA Opposition to Philips and Hewlett Packard at 5, 8; MPAA Response to DCP at 4-5; MPAA Response to 4C at 3-5; MPAA Opposition to TiVo at 10-11; MPAA Response to DTLA at 5-6; MPAA Opposition to RealNetworks at 11-12; MPAA Opposition to Microsoft at 13-14; MPAA Response to JVC at 3-5; *see also* Sony Reply at 4-6; Thomson Reply at 15; Philips and Hewlett Packard Reply at 7-8, 14-15; DCP Reply at 6; 4C Reply at 7-8; TiVo Reply at 17; DTLA Reply at 5-6; RealNetworks Reply at 11-12; Microsoft Reply at 20-22, 29.

[339] Philips Opposition to DTLA at 21-28; Philips Opposition to 4C at 21-25.

[340] Philips Opposition to DTLA at 22-23, 26-27; Philips Opposition to 4C at 22-23.

[341] Philips Opposition to DTLA at 23-24; Philips Opposition to 4C at 23-24.

[342] AAI Opposition to DTLA at 5; AAI Opposition to 4C at 5; AAI Opposition to DCP at 5.

[343] AAI Opposition to DTLA at 10; AAI Opposition to 4C at 9-10.

[344] Philips proposes that either: (1) DTCP and CPRM's compliance rules be modified to provide that EPN encoded content may be output over, or recorded by, any Commission-approved technology, or (2) that any Commission-approved technologies are deemed approved by DTLA and 4C for use with EPN content. Philips Opposition to DTLA at 24, 27-28; Philips Opposition to 4C at 24-25; AAI Opposition to DTLA at 10; AAI Opposition to 4C at 10.

82. In response, DTLA advocates that the Commission reject any such "automatic" approval requirement out of a concern that DTCP's value would diminish unless DTLA had the ability to ensure effective protection downstream.[345] DTLA suggests that it may be technically infeasible for all output protection technologies and recording methods to interoperate and that unforeseen technical and legal consequences could result from mandated interoperability.[346] From a procedural perspective, DTLA contends that it has worked assiduously with technology proponents and approved every technology that it has reviewed thus far.[347] 4C similarly represents that it has responded promptly to requests for approval of outputs and recording methods, as well as to requests for adapting CPRM to various forms of recordable media.[348]

83. Interoperability is an important pro-competitive element in the consumer electronics and information technology marketplaces that benefits consumers by affording them flexibility to choose among devices made by different manufacturers. We therefore concur with Philips and AAI that interoperability can be a powerful counterbalance where a competitor, or a group of competitors, exercises a significant degree of control in this area. DTCP is in a unique position as one of the two publicly-offered output protection technologies that have been submitted under this interim process, particularly since it is the only such technology that is designed for use with compressed video content and permits copying.[349] DTCP is therefore likely to become the primary output protection technology used in the near term to securely send compressed content between devices. As a result, we must scrutinize any license terms that could constrain competition, such as the downstream approval mechanism questioned by Philips and AAI. We are nonetheless mindful of the technical and practical concerns raised by DTLA relating to interoperability. In order for any two technologies to interoperate, some degree of coordination and harmonization will be needed. We conclude that the license mechanisms used by DTLA and 4C to approve downstream technologies can be useful as forums to facilitate this coordination. Should the proponent of a downstream technology have complaints regarding the implementation of this process, we will consider them pursuant to our general procedures.[350] In approaching any such requests, we will start with the presumption that if an output protection technology or recording method has been approved by the Commission, it should be permitted as a downstream technology where feasible. The upstream technology administrator shall bear the burden of demonstrating in writing, and with specificity, why interoperability is infeasible, whether due to technical incompatibilities, prohibitive costs, or other good cause. We believe that through this oversight role we can minimize any competitive concerns while still affording industry flexibility in determining where

[345] DTLA Reply at 47-50.

[346] *Id.* at 48-49. Examples of these unforeseen consequences include: (1) the fact that certain technologies, like HDCP, are not intended to hand off content downstream; (2) some technologies may not be interoperable at all if a downstream technology requires certain information to be transmitted in the first data stream in order to carry forward any rules or obligations; (3) some technology owners may wish to create closed systems that are not publicly licensed; (4) most technologies require some amount of effort to create interoperability "hooks" between systems, which are issues that should be discussed in the marketplace; and (5) interoperability can present encoding rule issues. *Id.* at 49-50.

[347] *Id.* at 47. DTLA acknowledges that Philips has submitted its Vidi technology for approval as a downstream recording method and that the review process is underway. *Id.* at 48, n.66. DTLA states that Vidi will be treated fairly and thoroughly in due course under this process, as would any other request for approval. *Id.*

[348] 4C Reply at 17. 4C indicates that it is prepared to undertake a prompt review of Vidi and that, if the Commission approves Vidi, and since MPAA has expressed its basic support for the technology, 4C sees no reason why Vidi would not be promptly approved based on currently available information. *Id.* at 17-18.

[349] DTCP and HDCP are also the only content protection technologies that have been approved to date by CableLabs for use with unidirectional digital cable products. *See DFAST Technology License Agreement for Unidirectional Digital Cable Products* at § 2.4 <www.cablelabs.com/udcp/downloads/DFAST_Tech_License.pdf>.

[350] 47 C.F.R. § 1.41.

interoperability can most reasonably be accomplished. We strongly encourage the technology proponents to strive for interoperability wherever possible to ensure that consumers have the widest degree of flexibility when purchasing flag-compliant DTV equipment.

2. Licensing of Intellectual Property

84. As described above, DTCP, HDCP, CPRM, and MagicGate each utilize a necessary claims and reciprocal non-assert approach to licensing intellectual property.[351] Under this approach, the technology proponent agrees not to assert any of its intellectual property claims against adopters if such claims are necessary to manufacture or implement the technology.[352] Adopters in turn must agree not to assert an infringement claim with respect to its own intellectual property against the technology proponent. A number of parties raised concerns regarding aspects of the necessary claims and reciprocal non-assert approach to intellectual property licensing.

85. Genesis Microchip, Inc. ("Genesis") filed an opposition in response to Sony's MagicGate certifications urging that the Commission require the disclosure of any existing or pending patents held by Sony that are necessary to implement the MagicGate technology.[353] In the alternative, Genesis suggests that such patents be disclosed to any prospective adopter upon request.[354] Genesis is concerned that it cannot know whether it holds any patents necessary to implement MagicGate unless it knows the scope of Sony patents that are involved. Thus, Genesis could potentially manufacture a product and later be found liable for patent infringement.

86. Philips opposes the DTCP, HDCP and CPRM necessary claims and reciprocal non-assert provisions on the grounds that they cause barriers to entry that require adopters to forfeit their intellectual property in direct contravention of the Commission's reasonable and nondiscriminatory patent licensing policy.[355] Philips asks the Commission to "recognize the inherent anticompetitive tendency and discriminatory effect of a licensing agreement that requires a licensee to surrender its intellectual property rights against the licensor and against other users of a technology" and which "reduces the incentive to develop innovative new technologies."[356] In response to the CPRM certification, Phillips states that it believes it holds patent rights essential for implementing that technology.[357] Similar concerns are reflected in the comments of Hewlett-Packard regarding the DTCP adopter agreement arguing that the non-assert provision places a potentially large portion of Hewlett-Packard's intellectual property rights in jeopardy.[358] Philips and Hewlett-Packard both advocate an alternative arrangement that permits adopters

[351] *See supra*, ¶¶ 10, 16, 27, 38.

[352] The applicable intellectual property can include, *inter alia*, patents, copyrights, and know-how. *See e.g.*, *Hi-MD Device Hardware Adopter Agreement* at Art. II.

[353] Genesis Opposition to Sony at 2-5. Genesis raised similar arguments in comments filed in the *Digital Broadcast Content Protection* (MB Docket No. 02-230) and *Implementation of Section 304 of the Telecommunications Act of 1996: Commercial Availability of Navigation Devices and Compatibility Between Cable Systems and Consumer Electronics Equipment* (CS Docket No. 97-80 and PP Docket No. 00-67) proceedings. Petitions for reconsideration in those proceedings are pending.

[354] Genesis Opposition to Sony at 2.

[355] Philips Opposition to DTLA at 6-21; Philips Opposition to DCP at 5-17; Philips Opposition to 4C at 6-21.

[356] Philips Opposition to DTLA at 15, 18; Philips Opposition to DCP at 12, 15; Philips Opposition to 4C at 15, 18.

[357] Philips Opposition to 4C at 12.

[358] Comments of Hewlett-Packard to DTLA at 3-4.

to license any conflicting patents on a reasonable and non-discriminatory basis.[359]

87. AAI[360] urges that the Commission treat the DTCP and CPRM adopter agreements as patent pools and undertake an analysis similar to that used by the Department of Justice in its Business Review Procedure.[361] For purposes of such a review, AAI urges that a patent disclosure requirement be imposed so that a determination can be made as to whether only complementary and essential patents are implicated.[362] AAI also encourages the Commission to evaluate license provisions that AAI regards as competitively harmful, including overly broad reciprocal non-assert provisions that inhibit innovation.[363] Since reciprocal non-assert provisions can provide adopters with disincentive to develop innovations that substitute for necessary claims, AAI believes that "a reciprocal [licensing] obligation that ensures reasonable and non-discriminatory compensation for innovations is self-evidently more pro-competitive."[364]

88. Sony, DTLA, DCP, and 4C rebut these concerns by explaining the rationale underlying their use of a necessary claims and reciprocal non-assert approach.[365] Sony notes that Genesis does not suggest that the necessary claims approach adopted in the MagicGate device hardware agreements is unlawful or fails to satisfy the Commission's interim approval procedures.[366] Sony contends that since content protection is not a feature for which consumers are typically willing to pay, this necessary claims approach allows Sony to offer MagicGate on a cost recovery basis below commercial royalty rates.[367] If Genesis' suggestion were adopted and Sony was required to disclose the specific patent claims covered by the MagicGate specification, Sony indicates that it would be forced to pass on to adopters, and indirectly consumers, the cost of reviewing its patent portfolio.[368] Moreover, Sony argues that it is unclear how the disclosure of intellectual property would even address Genesis' underlying business concern since: (1) the scope of necessary claims would not be fixed until any pending patents were finally issued, and (2) some patents may have both a necessary claims component, as well as some portion that is not required to implement the technology, making the scope of necessary claims difficult to discern.[369]

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[359] Philips Opposition to DTLA at 5, 21; Philips Opposition to DCP at 4-5, 17; Philips Opposition to 4C at 5, 20-21; Comments of Hewlett-Packard to DTLA at 9.

[360] AAI describes itself as "an independent research, education, and advocacy organization that supports a leading role for competition, as enforced by our antitrust laws, within the national and international economy." AAI Opposition to DCP at 1-2; AAI Opposition to 4C at 2; AAI Opposition to DTLA at 2. Philips and Hewlett-Packard are among AAI's contributors. *See AAI Ex Parte* at Attachment.

[361] AAI Opposition to 4C at 4; AAI Opposition to DTLA at 4.

[362] AAI Opposition to 4C at 4; AAI Opposition to DTLA at 4. Under the Department of Justice guidelines, patent pools involving competing patents are more of a concern than those involving complementary patents. U.S. Department of Justice and Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* at 28-29 (Apr. 6, 1995).

[363] AAI Opposition to DCP at 7; AAI Opposition to 4C at 8-9; AAI Opposition to DTLA at 9. AAI considers such provisions to "favor imitators over innovators." *See* Comments of AAI, MB 02-230 at 2 (filed Feb. 13, 2004).

[364] AAI Opposition to DCP at 6-7; AAI Opposition to 4C at 8-9; AAI Opposition to DTLA at 9.

[365] DTLA Reply at 28-39; DCP Reply at 13-17; 4C Reply at 10-17; Sony Reply at 8-10.

[366] Sony Reply at 7. Sony notes that Genesis' comments are inapplicable to the MagicGate software certifications, which are not publicly licensed. *Id.* at 8.

[367] *Id.* at 8-9.

[368] *Id.* at 9.

[369] *Id.* at 10.

89. In the case of the DTCP adopter agreement, DTLA points out that its terms were also designed to keep the technology's cost low.[370] DTCP was first offered in 1998 to protect a wide range of video content and has since been licensed to more than 75 adopters.[371] DTLA contends that the adopter agreement is pro-competitive in effect and comports with the Commission's traditional meaning in requiring reasonable and non-discriminatory licensing – low cost and equal access.[372] In addition, DTLA maintains that the adopter agreement in no way limits or deters licensees from exploiting their own intellectual property to develop competitive technologies.[373] DTLA suggests that it would be manifestly unfair at this time to change such a fundamental license provision upon which parties have relied since DTCP's inception.[374] Even under a hybrid approach where adopters owning necessary claims were allowed to charge reasonable royalty rates for their patents, DTLA asserts that the 5C Companies would need to start charging commercial royalty rates for their intellectual property.[375]

90. When adopting mandatory technical standards, the Commission's historical focus has been to conduct a sufficient evaluation of the underlying patent rights to prevent any monopoly rights granted under the patent process from being unnecessarily extended through standardization. In other words, the Commission attempts to ensure that no mandatory standard should be so dependent on specific patent rights that the cost of that technology to the public would be adversely affected.[376] The *Broadcast Flag Order* and related Commission rules do not contemplate the adoption of a single federal standard for protecting Marked Content from indiscriminate redistribution. However, a similar concern arises to the extent that the Commission must approve output protection technologies and recording methods for use in this context and that, at least at the beginning of the process, the competitive alternatives may be limited. It is for this reason that Section 73.9008(a)(4) of the Commission's rules require technology proponents to submit their licensing terms for review to ensure that the marketplace and consumers are protected from the imposition of unnecessary costs or anticompetitive constraints.[377]

91. As to the issue of direct costs, our concern that a particular technology will become a *de facto* standard associated with an unreasonable licensing fee has been adequately addressed by the number and variety of technologies we are approving and the prevalence of fee structures based on license administration cost recovery.[378] With respect to the potential for certain license terms to serve as ancillary restraints on competition and technical innovation, the record in this proceeding does not support the Commission's adoption of one approach to intellectual property licensing over another. We agree that particular licensing terms, especially when coupled with market power, could be used in an anticompetitive manner. At this time, we find no evidence has been presented that the necessary claims and reciprocal non-assert approach to intellectual property licensing is *per se* discriminatory, that Sony, DTLA, DCP or 4C has actually engaged in anticompetitive or discriminatory conduct, or that the RAND approach advocated by Philips and Hewlett Packard is inherently preferable in all circumstances. Both approaches are currently used in the marketplace. In reaching this decision, we remain concerned about

[370] DTCP Certification at 17-18 n.8; DTLA Reply at 11-12, 19.

[371] DTCP Certification at 13, 18.

[372] DTLA Reply at 10-20.

[373] *Id.* at 12.

[374] *Id.* at 36-37.

[375] *Id.* at 37.

[376] *See e.g.*, Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, 6 FCC Rcd 7024, 7034 (1991) (adopting ATSC digital television broadcast standard).

[377] 47 C.F.R. § 73.9008(a)(4).

[378] With respect to D-VHS, there is no evidence on the record that its availability and terms, including pricing, have been unreasonable or discriminatory.

the potential for anticompetitive or discriminatory conduct in this nascent market. As some commenters point out, a particular licensing structure for an approved technology could result in competitors facing difficult choices regarding the protection of their intellectual property and their ability to build devices incorporating that technology which, ultimately, could affect innovation in the market. We believe, however, that our continued oversight, especially concerning the approval of downstream technologies and change management processes in the MagicGate, DTCP, HDCP and CPRM licenses, should effectively curb any potential anticompetitive or discriminatory conduct. In approving the foregoing technologies, the Commission takes no position on the application of the federal antitrust laws to the technology proponents' licensing terms. The Commission reserves the right to reconsider its approvals should a federal court determine that a technology proponent, through its licensing terms or otherwise, violates the federal antitrust laws, or upon a request by the Department of Justice or the Federal Trade Commission on the grounds that a technology proponent's licensing terms raise substantial concerns under the federal antitrust laws. In addition, once flag-compliant devices are introduced in the marketplace, interested parties should: (1) bring concerns to the Commission for appropriate action, (2) bring competitive or antitrust concerns to the attention of the relevant antitrust authorities, or (3) seek private enforcement action in court. At that time, the Commission may revisit the licensing terms of approved technologies.

3. Content Provider Third Party Beneficiary and Enforcement Rights

92. In its oppositions to TiVoGuard, WMDRM and Helix, MPAA seeks its own form of oversight through mandatory third party beneficiary and enforcement rights against manufacturers of downstream devices.[379] MPAA argues that such rights are critical to enforcement of the flag compliance and robustness requirements downstream.[380] TiVo challenges MPAA's request as beyond the Commission's authority and practically unnecessary since TiVo has committed itself and contractually required its downstream device manufacturers to adhere to the Commission's flag compliance and robustness rules.[381] In the event that TiVo or its manufacturers failed to meet these requirements, TiVo suggests that MPAA's members could file a complaint with the Commission or enforce their copyrights privately.[382] RealNetworks and Microsoft take a similar stance.[383] Microsoft additionally cites its commercial relationships with content owners as providing strong incentive to respond to their concerns about security and enforcement, but points to the multi-purpose nature of WMDRM technology and the cross-industry impact of decisions affecting it as reasons why a more formal content owner role is

[379] MPAA Opposition to TiVo at 9; MPAA Opposition to Microsoft at 10; MPAA Opposition to RealNetworks at 10-11. Although MPAA initially questioned the enforcement licensing structure for SmartRight, Thomson's subsequent provision of a content participation agreement in addition to the third party beneficiary rights already contained in the SmartRight adopter agreement have alleviated MPAA's concerns. *See* MPAA Opposition to Thomson at 9-10; Thomson Reply at 11-12, 14; *Thomson 5/28/04 Ex Parte* at 3. MPAA also challenges the inclusion of a € 100 million ($122.8 million) annual revenue threshold for third party beneficiary status to seek injunctive relief under Vidi's adopter agreement. MPAA Opposition to Philips and Hewlett Packard at 7-8. Philips counters that such a threshold is intended to ensure the bona fides of content participants and points to similar requirements in the change management provisions of DTCP's content participant agreement. Philips and Hewlett Packard Reply at 13-14, n.23; *see also* DTCP Certification at Exhibit 3, §§ 1, 3.7(f), 3.8, 3.9(d). Given the presence of similar threshold provisions in other license agreements, we are not inclined to intervene in the negotiation of this specific license term.

[380] MPAA Opposition to TiVo at 9; MPAA Opposition to Microsoft at 10; MPAA Opposition to RealNetworks at 10-11.

[381] TiVo Reply at 12-17.

[382] *Id.* at 15-16.

[383] RealNetworks Reply at 11; Microsoft Reply at 22-27.

impracticable.[384]

93. Although most of the technology proponents have accorded content owners with third party beneficiary and enforcement rights against manufacturers of downstream devices, we are not persuaded that such contractual arrangements should be uniformly mandated. As illustrated by WMDRM, the multi-use nature of certain technologies makes it impracticable for some technology proponents to grant content owners formal enforcement rights which could have significant cross-sector implications. Our expectation is that the commercial relationships between content owners and technology proponents will serve as strong incentive to address potential compliance issues. In addition, we concur with TiVo, Microsoft and RealNetworks that content owners have other enforcement mechanisms available to them, including the ability to appeal to the Commission. Should a technology proponent fail to adequately meet the Commission's flag compliance and robustness rules, whether through their own direct implementation or through contractual relationships with downstream device manufacturers, a content owner may petition the Commission seeking revocation of the technology's approval for use under this order, or other appropriate relief.[385]

4. Change Management

94. Given the dynamic nature of technology today, change management over technical and legal matters is a critical and necessary element both in the administration of the above-referenced output protection technologies and recording methods, as well as the Commission's oversight of this certification process. Opponents have raised concerns regarding change management in two contexts. First, MPAA challenges the change management procedures relevant to Vidi, TiVo, Helix and WMDRM as providing an insufficient role for content owners to object to technical and legal changes.[386] In the absence of a strong content owner role in change management, MPAA advocates that the Commission retain jurisdiction over all changes and should approve any changes before they are implemented.[387]

95. In response, Philips, Hewlett Packard, TiVo, RealNetworks and Microsoft primarily focus on technical changes that may be needed to maintain the security of their technologies. Philips and Hewlett Packard agree that the Commission should retain jurisdiction over all technical changes, except where they are in the nature of bug fixes or the correction of minor errors or omissions.[388] To address content owner concerns, Philips and Hewlett Packard are willing to add a proviso that any such clarifications or corrections shall not have a material and adverse effect on the overall security of Vidi and

[384] Microsoft Reply at 22-26.

[385] 47 C.F.R. §§ 73.9008(e), 76.7; *see also* 47 C.F.R. § 1.41.

[386] MPAA Opposition to Philips and Hewlett Packard at 5-7; MPAA Opposition to TiVo at 10; MPAA Opposition to RealNetworks at 9-10; MPAA Opposition to Microsoft at 11. Just as it had initially challenged the enforcement provisions of the SmartRight adopter agreement, MPAA at first questioned its change management terms, but later acquiesced to new procedures added in the SmartRight content participation agreement. *See* MPAA Opposition to Thomson at 9-10; Thomson Reply at 11-12, 14; *Thomson 5/28/04 Ex Parte* at 3. MPAA also disputes the inclusion of a time limit on arbitration procedures in the Vidi adopter agreement applicable to change management disputes. MPAA Opposition to Philips and Hewlett Packard at 6. Philips counters that the time limit affects a limited scope of permitted changes and will still afford content providers a full and fair opportunity to resolve conflicts since arbitration is only a last resort after all other dispute resolution mechanisms have been exhausted. Philips and Hewlett Packard Reply at 12-13. Given the existence of detailed dispute resolution provisions in the Vidi license, we again defer to the parties to negotiate their specific terms.

[387] MPAA Opposition to Philips and Hewlett Packard at 5-7; MPAA Opposition to TiVo at 10.

[388] Philips and Hewlett Packard Reply at 8. Philips and Hewlett Packard also indicate that the permissible changes relating to broadcast content are very limited under the Vidi license. *Id.* at 9, 11.

that content participants can object to any materially adverse changes.[389] TiVo and RealNetworks emphasize that change management is not required by the Commission's rules.[390] TiVo elaborates that MPAA's request for a formal private role in change management is unnecessary and unreasonable since technology companies have incentive to appropriately handle security changes.[391] TiVo pledges to notify the Commission of any security changes and suggests that if it fails to maintain the security of its system, MPAA can file a complaint with the Commission.[392] Microsoft echoes TiVo in its belief that its commercial relationships provide the business incentives that drive changes to the WMDRM system.[393] Microsoft offers that its Security Advisory Board can serve as a vehicle that allows content owners to provide input on developments affecting the security of WMDRM.[394]

96. The second context in which change management issues are raised relates to the HDCP, CPRM and DTCP licenses. AAI and Philips argue that the change management terms contained in these licenses are overly broad and lack adopter participation.[395] AAI and Philips particularly object to the change management procedures applicable to the HDCP, CPRM and DTCP compliance rules, suggesting that they provide DCP, 4C and DTLA with a competitive advantage through lead time in product design.[396] Philips asserts that the compliance rules applicable to EPN content in the CPRM and DTCP licenses should be those the Commission has adopted in the *Broadcast Flag Order* and any necessary changes should be subject to the process of amending the Commission's rules.[397] With respect to the HDCP compliance rules, Philips proposes that change management be accomplished through an open process with adopter notice and input prior to Commission approval.[398] AAI agrees that any changes other than minor corrections or modifications should necessitate Commission review.[399]

97. DCP responds by saying that there are significant limitations on its practical ability to make changes and assures that it will not knowingly make changes that would render HDCP inconsistent with the Commission's flag compliance and robustness rules.[400] DCP further suggests that, to the extent a technology proponent makes changes that materially affect the technology's compliance with the

[389] Philips and Hewlett Packard Reply at 12.

[390] TiVo Reply at 8; RealNetworks Reply at 10-11.

[391] TiVo Reply at 4-6, 8, 10-11.

[392] *Id.* at 5-6, 8-9.

[393] Microsoft Reply at 24.

[394] *Id.* at 24-25.

[395] AAI Opposition to HDCP at 7; AAI Opposition to CPRM at 9; AAI Opposition to DTCP at 9; Philips Opposition to HDCP at 17-20; Philips Opposition to CPRM at 25-31; Philips Opposition to DTCP at 28-33. In particular, Philips advances that the scope of permissible changes under the DTCP license has been broadly construed by DTLA to include: (1) adding EPN to the encoding rules, (2) limiting personal video recorder ("PVR") copying to 90 minutes, (3) limiting first generation copies to two per format, (4) limiting the number of authorized sink devices from 62 to 34, (5) changing the cipher from M6 to AES, and (5) adding discussions on localization. Philips Opposition to DTCP at 29-30.

[396] *See* AAI Opposition to CPRM at 9; AAI Opposition to DTCP at 9; Philips Opposition to HDCP at 17-20; Philips Opposition to CPRM at 25-31; Philips Opposition to DTCP at 28-33; *see also* Hewlett Packard Comments to DTCP at 5.

[397] Philips Opposition to CPRM at 31; Philips Opposition to DTCP at 33.

[398] Philips Opposition to HDCP at 5, 20. As part of its review and approval of any proposed change, Philips advocates that the Commission take in to account its impact on adopters, the public, and content owners. *Id.*

[399] AAI Opposition to HDCP at 7; AAI Opposition to CPRM at 9; AAI Opposition to DTCP at 9.

[400] DCP Reply at 16-18.

Commission's rules, that technology's approval could be revoked by the Commission.[401] DTLA asserts that not all changes to the DTCP licenses or specifications may be relevant to broadcast protection, and should be of no concern to the Commission.[402] DTLA further submits that permissible changes to the specification must be narrow in scope and that most changes that have occurred derive from porting DTCP to new protocols, something which has only benefited adopters.[403] DTLA also rejects the notion of Commission oversight, whether through advance approval or re-evaluation of changes already made pursuant to change management.[404]

98. As specified with respect to the scope of our approval herein, we are not inclined to grant blanket approvals under which a technology proponent could subsequently make material and substantial changes to their technology or license terms. To do so would undercut the validity of this certification process. At the same time, we do not wish to inhibit innovation or involve the Commission in unnecessary bureaucratic oversight. We will therefore defer to the change management procedures already set in place by the technology proponents for non-material, routine changes to both the technical specifications as well as any applicable license agreements. Included among the changes that we will consider non-material are: (1) bug or minor security fixes; (2) minor errors or omissions; (3) corrections; and (4) routine changes in license fees. To the extent that any party – including content owners, adopters, or others – feel that the change management procedures have been inappropriately invoked or applied, they may file a complaint with the Commission.[405] Where a technology proponent has not established formal change management procedures, it is our expectation that they will consult with content owners and adopters and provide advance notice of any non-material changes as is practicable.

99. Any technical or legal changes that are material and substantial in nature, irrespective of whether a particular technology has formal change management procedures in place, must be submitted to the Commission for approval. Material changes shall include, but are not limited to: (1) mapping to a new transport or media; (2) changes in the encoding or treatment of digital broadcast television content; (3) changes that may have a material and adverse effect on the integrity or security of the technology; (4) changes in the cryptographic method used, except where the algorithm is unchanged and only the key length is expanded; (5) changes in the scope of redistribution; and (6) any fundamental change in the nature of the technology.[406] We will treat any proposed material change as an amendment to the

[401] *Id.* at 17.

[402] DTLA Reply at 54.

[403] *Id.* at 46-47. DTLA counters Philips' characterization of changes that have been made under the DTCP license: (1) adding EPN to the encoding rules benefits consumers by allowing them to copy content; (2) the 90 minute PVR provision for "copy never" content is irrelevant to the instant proceeding, but benefits consumers by guaranteeing a floor to preserve PVR functionality; (3) the limit of 2 copies per format is misleading as a single source can send content simultaneously to 34 sink devices, allowing consumers to make 68 first generation copies in multiple formats of copy once content; (4) the 34 sink device limit was necessary to port DTCP to IP to prevent public networking while preserving the ability to have home and personal networks, but this number can be expanded; (5) the change of cipher is for DTCP-IP and only applies for those adopters that voluntarily decide to implement to DTCP-IP; and (6) adopters have received advance notice that proposed changes for localization may be imposed to reinforce existing obligations, so long as the changes are commercially and technically reasonable so as not to impose material costs on adopters. *Id.* at 50-54.

[404] *Id.* at 6, 54, n.70.

[405] *See* 47 C.F.R. § 1.41.

[406] For example, we will consider the planned merger of WMDRM with Windows Information Rights Management content protection system into one digital rights management system to represent a fundamental change in the nature of WMDRM that merits treatment as a material change. Microsoft Reply at 24, n.22. We will also consider any changes in future releases of WMDRM that materially alter the features, functionality, or compliance and robustness

(continued....)

technology proponent's existing certification and will process such amendments on an expedited basis following public notice and comment.[407] When evaluating these amendments, we will not reconsider any issues in the underlying certification that have already been addressed in this *Order*, unless they are directly impacted or modified by the proposed material change. We believe that this oversight role strikes an appropriate balance that will assure the integrity of this certification process while at the same time preserving flexibility for technology proponents in routine management matters and providing content owners and adopters with adequate participation in change management.

5. Revocation and Renewal

100. Revocation and renewal are the primary means by which content protection technologies and recording methods maintain their level of protection in the face of ongoing security challenges. Although several technology proponents indicate that they achieve renewal through revocation,[408] we consider the two processes to be distinct and wish to clarify their meanings. Revocation involves the process of disabling a key so that it can be no longer used for decryption. Depending on the system architecture of a particular technology, revocation can therefore be applied to specific applications or content, individual devices, or a class of devices. Renewal in its true sense refers to the ability of a content protection technology to change its cryptography without hardware or software upgrades.

101. With this distinction in mind, we turn to comments filed by MPAA with respect to the revocation and renewal procedures utilized by TiVo and Microsoft.[409] MPAA questions these procedures in so far as content owners are not given a formal role in initiating revocation or renewal.[410] MPAA specifies that TiVo may have little practical incentive to identify, investigate and take action where revocation and renewal are merited.[411] TiVo counters that a formal private role for content owners is unnecessary and unreasonable since TiVo's business model depends on the security of its system.[412]

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requirements applicable to the protection of digital broadcast content described in Microsoft's certification and subsequent filings in this proceeding to merit treatment as a material change. *See Microsoft 7/13/04 Ex Parte* at 1.

[407] Technology proponents may certify any amendments pursuant to our procedures for subsequent certifications. *See* 47 C.F.R. § 73.9008(c).

[408] *See e.g.*, Vidi Certification at 9; HDCP Certification at 8; CPRM Certification at 9-10 (for products with unique device keys); DTCP Certification at 8-9.

[409] MPAA also raised several issues relating to revocation that were subsequently addressed in reply comments. In its oppositions to SmartRight and Helix, MPAA initially argued that neither Thomson nor RealNetworks had provided adequate information describing their revocation and renewal processes. MPAA Opposition to Thomson at 8-9; MPAA Opposition to RealNetworks at 8. In their replies, Thomson and RealNetworks supplied additional detail. Thomson Reply at 12-13; RealNetworks Reply at 8-10. Thomson also accorded content participant agreement signatories with a formal role in revocation and renewal procedures. Thomson Reply at 12-13. In its response to Sony's MagicGate technologies, MPAA sought clarification that all 300 MB HiMD recorder devices and software are subject to revocation. MPAA Response to Sony at 5. Sony confirmed in its reply that all MagicGate HiMD products, both hardware and software, must be capable of the same revocation process as its 1 GB media. Sony Reply at 5.

[410] MPAA Opposition to TiVo at 8; MPAA Opposition to Microsoft at 9. MPAA also seeks clarification on Microsoft's delivery of revocation and renewal information, particularly with respect to hardware implementations. MPAA Opposition to Microsoft at 9. Microsoft elaborates that the delivery of revocation information is handled through as many mechanisms as possible, while renewal information is propagated through WMDRM-protected content in Internet and physical media. Microsoft Reply at 15-18. Microsoft pledges to seek out additional delivery mechanisms. *Id.* at 17-18.

[411] MPAA Opposition to TiVo at 8.

[412] TiVo Reply at 4, 6-7.

TiVo welcomes information from content owners and others about potential security compromises, but feels that adding an additional layer of private contractual negotiations would be time consuming and add little to reinforce content protection.[413] In a similar vein, Microsoft stresses that content owners generally have the ability to provide input on revocation matters through its Security Advisory Board and that certain *pro forma* responses to security breaches have been negotiated with specific content owners.[414] Given the multi-purpose nature of its WMDRM technology and the cross-sector impact of revocation and renewal decisions affecting it, Microsoft submits that there must be limits on the scope of decision-making authority afforded to content owners.[415] We are persuaded that TiVo and Microsoft have sufficient business incentive to properly implement revocation and renewal where warranted, but nonetheless encourage their continued collaboration with content owners on such matters. To the extent that TiVo or Microsoft fails to address revocation and renewal concerns, content owners may petition the Commission under our general procedures or take private enforcement action.[416]

102. MPAA's oppositions and responses with respect to each technology also contain global comments regarding the potential use of the ATSC transport stream to transmit revocation and renewal data.[417] MPAA perceives a need for a standardized means of delivering this data in the ATSC transport stream and queries the technology proponents on how such information would be received, processed and conveyed.[418] Sony reiterates that revocation information is exchanged and propagated among its MagicGate hardware and software products through media, rendering unnecessary the delivery of revocation information through other means.[419] TiVo likewise asserts that its system, which automatically revokes devices that do not communicate with TiVo's central server, adequately addresses any revocation concerns.[420] Other technology proponents, such as Thomson, Philips, Hewlett Packard, DCP, 4C, RealNetworks, Microsoft and JVC, express a willingness to work with content owners and other stakeholders to develop a standardized means of delivering revocation and renewal information through the ATSC transport stream.[421]

103. Our analysis of the above-referenced output protection technologies and recording methods reflects that each currently has in place appropriate mechanisms to disseminate revocation and renewal information. To the extent that industry wishes to explore new avenues for the delivery of such information, we encourage them to do so and to consult with all affected parties and we will monitor their progress. We must nonetheless express significant concerns regarding the potential use of the public airwaves to transmit data that could limit the functionality of consumer devices or possibly turn them off.

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[413] *Id.* at 7, 10-11.

[414] Microsoft Reply at 24-25.

[415] *Id.* at 25-26.

[416] *See* 47 C.F.R. § 1.41.

[417] MPAA Response to Sony at 6; MPAA Opposition to Thomson at 9; MPAA Response to Philips and HP at 8; MPAA Response to DCP at 5; MPAA Response to 4C at 5; MPAA Opposition to TiVo at 8-9; MPAA Response to DTLA at 6; MPAA Opposition to RealNetworks at 9; MPAA Opposition to Microsoft at 10; MPAA Response to JVC at 5-6.

[418] MPAA Response to Sony at 6; MPAA Opposition to Thomson at 9; MPAA Response to Philips and HP at 8; MPAA Response to DCP at 5; MPAA Response to 4C at 5; MPAA Opposition to TiVo at 8-9; MPAA Response to DTLA at 6; MPAA Opposition to RealNetworks at 9; MPAA Opposition to Microsoft at 10; MPAA Response to JVC at 5-6.

[419] Sony Reply at 6.

[420] TiVo Reply at 7-8.

[421] Thomson Reply at 13-14; Philips and Hewlett Packard Reply at 15-16; DCP Reply at 7; 4C Reply at 9; RealNetworks Reply at 9; Microsoft Reply at 17-18; JVC Reply at 6.

Indeed, we have similar concerns about the potential use of the ATSC transport stream to transmit any content protection information beyond that which was specifically approved in the *Broadcast Flag Order*.[422] Industry should advise and consult with the Commission before it implements any new uses of the ATSC transport stream to deliver content protection information.

6. Compliance and Robustness

104. Apart from the change management issues discussed above, compliance and robustness matters have been raised in two limited contexts. MPAA questions TiVo and Microsoft regarding the compliance and robustness rules applicable to downstream devices incorporating TiVoGuard and WMDRM.[423] Since TiVoGuard will not be publicly licensed, MPAA seeks assurance from TiVo that any downstream devices will abide by the Commission's flag compliance and robustness rules.[424] TiVo affirms that it will adhere to the Commission's flag compliance and robustness rules with respect to any downstream device it manufactures, sells or distributes and will contractually obligate downstream product manufacturers to do the same.[425] In the case of Microsoft, MPAA challenges the adequacy of its compliance and robustness rules and the means by which they will be applied downstream.[426] Microsoft explains that since it does not currently license WMDRM for third party implementations, it has no need to formalize and publish its internal robustness requirements.[427] Given its future plans to license such implementations, however, Microsoft states that it has developed a set of applicable compliance and robustness rules for its network streaming and USB connected storage device implementations, and is in the process of developing similar compliance rules governing the transfer of content over IP among connected storage devices.[428] We conclude that both TiVo and Microsoft have instituted sufficient compliance and robustness requirements for downstream devices incorporating the TiVoGuard and WMDRM technologies, but condition our approval of the WMDRM implementation permitting the transfer of content over IP on Microsoft submitting to the Commission the final compliance rules applicable to this implementation.

7. Associated Obligations

105. A final area touched upon in several of MPAA's oppositions and responses involves upstream controls over downstream HDCP functions.[429] In order for HDCP to function properly, certain actions need to be taken by a Covered Demodulator Product prior to delivering content to the HDCP

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[422] In the *Broadcast Flag Order*, we specified that "to the extent broadcasters wish to use the ATSC flag to protect unencrypted DTV broadcasts, they may do so provided they do not transmit the optional additional bits provided for in ATSC A/65B." *Broadcast Flag Order*, 18 FCC Rcd at 23569.

[423] MPAA also seeks clarification from Sony that the same robustness requirements applicable to hardware implementations of its MagicGate technology will similarly govern its software implementations. MPAA Response to Sony at 5. In its reply, Sony confirms that Section 12.1 of its content participant agreement for MagicGate requires its software and hardware implementations to abide by the same robustness rules. Sony Reply at 4-5.

[424] MPAA Opposition to TiVo at 7.

[425] TiVo Reply at 3-4.

[426] MPAA Opposition to Microsoft at 7-8.

[427] Microsoft Reply at 19-22.

[428] *Microsoft 5/18/04 Ex Parte* at 1-2; *Microsoft 6/25/04 Ex Parte* at Attachments; *Microsoft 7/28/04 Ex Parte* at n.3. In addition, Microsoft has formalized a set of compliance rules that will govern Microsoft's implementation of WMDRM in Windows, which will not be licensed for third party implementation. *Microsoft 5/18/04 Ex Parte* at 1-2.

[429] MPAA Response to Sony at 3-4; MPAA Opposition to Thomson at 7-8; MPAA Response to Philips and HP at 3-4; MPAA Response to DCP at 3-4; MPAA Response to DTLA at 4-5; MPAA Response to JVC at 5-6.

output.[430] DCP describes these "associated obligations" as ensuring that an HDCP source function is fully engaged, with its encryption active, before delivering protected content to the output.[431] The associated obligations outlined by DCP also require Covered Demodulator Products to deliver and process any SRMs that might be included in content for revocation purposes.[432] MPAA seeks to impose these associated obligations through the adopter agreements applicable to output protection technologies or recording methods.[433] For example, if Sony authorized HDCP as a protected downstream output, MPAA would have the MagicGate device hardware adopter agreements require compliant Covered Demodulator Products to assert upstream control of the flow of content being sent to an HDCP function.[434]

106. Sony responds by suggesting that any associated obligations are more appropriate as part of the Commission's rules than as part of the MagicGate license, but acknowledges that a similar obligation is already contained in its compliance rules.[435] In contrast, Thomson, Philips, and Hewlett-Packard believe that the best resolution is for DCP to change the HDCP specification or compliance rules.[436] DCP objects, noting that these associated obligations "are 'upstream' from the HDCP output, and thus, not covered by the HDCP license obligations."[437] DCP joins DTLA and JVC in advocating that the Commission require Covered Demodulator Products to comply as a condition of HDCP's approval under this certification process.[438] DTLA asks that similar associated obligations relating to DTCP be adopted to ensure SRMs are delivered and processed, and to set the appropriate data fields to signal EPN encoding.[439]

107. In establishing our compliance rules for Unscreened and Marked Content, we recognized that additional technical requirements specific to a particular Authorized Digital Output Protection Technology might be needed to ensure that when Covered Demodulator Products send content to outputs protected with such technology, they function correctly.[440] It is for this reason that we expressly provided that Unscreened and Marked Content could be sent "to a digital output protected by an Authorized Digital Output Protection Technology, *in accordance with any applicable obligations established as a part of its approval pursuant to [Section] 73.9008*."[441] It is incumbent on manufacturers of Covered Demodulator Products using HDCP or DTCP-protected outputs to ensure that these output protection technologies function correctly. As a condition of our approval of HDCP, we therefore expect that manufacturers of Covered Demodulator Products will verify that the HDCP source function is fully engaged and able to deliver protected content, meaning that HDCP encryption is operational on such output. For DTCP, we expect that Covered Demodulator Product manufacturers will appropriately set the needed data fields to

[430] *DCP 6/25/04 Ex Parte* at 3.

[431] HDCP Certification at 15; DCP Reply at 5-6.

[432] HDCP Certification at 15; DCP Reply at 5-6.

[433] MPAA Response to Sony at 3-4; MPAA Opposition to Thomson at 7-8; MPAA Response to Philips and HP at 3-4; MPAA Response to DTLA at 4-5; MPAA Response to JVC at 5-6.

[434] MPAA Response to Sony at 3-4.

[435] Sony Reply at 2-4.

[436] Thomson Reply at 10-11; Philips and HP Reply at 5-6.

[437] *DCP 6/25/04 Ex Parte* at 3.

[438] HDCP Certification at 15; DCP Reply at 5-6; DTLA Reply at 5; JVC Reply at 4.

[439] DTLA Reply at 4-5.

[440] 47 C.F.R. §§ 73.9003(a)(3), 73.9004(a)(3).

[441] *Id.* (emphasis added).

indicate EPN encoding.[442] We are not persuaded, however, that obligations relating to SRMs delivered in content are needed at this time, given the lack of a standard for delivering revocation information in the ATSC transmission stream.[443] To the extent that such a standard is developed, and we determine that the delivery of revocation data in this manner is an appropriate use of the public airwaves, we may revisit this issue at that time. Since a number of alternative mechanisms exist to deliver and propagate revocation information, we do not believe that the ability of technology proponents to revoke compromised devices or components will be disadvantaged in the interim.

IV. ORDERING CLAUSES

108. **IT IS ORDERED** that pursuant to the authority contained in Sections 1, 2, 4(i) and (j), 303, 307, 309(j), 336, 337, 396(k), 403, 601, 614(b) and 624a of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i) and (j), 303, 307, 309(j), 336, 337, 396(k), 403, 521, 534(b) and 544a, the above-captioned digital output protection technologies and recording methods **ARE APPROVED** pursuant to Section 73.9008 of the Commission's Rules, to the extent described herein.

FEDERAL COMMUNICATIONS COMMISSION

Marlene Dortch
Secretary

[442] Manufacturers should set the following fields of the DTCP Descriptor to the indicated binary values: APS: 00 (copy-free), DTCP_CCI: 00 (copy-free), EPN: 0 (EPN-asserted), Image_Constraint_Token: 1 (not constrained), Retention_State: 000 (forever). Capitalized terms have the same meaning as set forth in the DTCP specification and adopter agreement.

[443] *See supra*, ¶¶ 102-103.

STATEMENT OF
COMMISSIONER KEVIN J. MARTIN
APPROVING IN PART AND CONCURRING IN PART

Re: Digital Output Protection Technology and Recording Method Certifications, Order (August 4, 2004)

I support this Order's approval of over a dozen technologies for use in digital television equipment to give effect to the "broadcast flag."

I write separately to express my concern with two issues. First, I fear that the "non-assert" clause in the DTCP adopter agreement could hinder competition and suppress innovation. We acknowledge in the Order that DTCP is the only publicly-offered output protection technology we approve that permits copying, and is "therefore likely to become the primary" standard for the foreseeable future. As a result, anyone who wants to build products for this market must sign the DTCP license. Yet, the license requires that companies give up any intellectual property rights they have in the DTCP technology before signing. Therefore a party may have to choose between the lesser of two evils: either don't participate in the relevant product market, or compete, but give up your intellectual property rights. I am concerned this result may be anti-competitive, may discourage future investment in intellectual property, and may generally be counter to good public policy.

Second, I am concerned that Tivo's technology does not include sufficient constraints. All of the other technologies requesting approval from us have adopted proximity controls or similar mechanisms to limit content redistribution outside the home at this time. I ultimately want to enable a person's digital networking environment to extend beyond the home. I fear, however, that we may be acting prematurely in concluding that Tivo's affinity controls are sufficient to protect against widespread redistribution. I therefore would have conditioned approval of Tivo's technology on adoption of proximity controls at this time, and continued to study whether its device limits and affinity controls provide adequate protection.