

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

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

COMMENTS OF PUBLIC KNOWLEDGE AND CONSUMERS UNION

Mike Godwin
Nathan Mitchler
Public Knowledge
1875 Connecticut Avenue, NW
Suite 650
Washington, DC 20009
(202) 518-0020

Christopher Murray
Consumers Union
1666 Connecticut Avenue, NW
Suite 300
Washington, DC 20009
(202) 462-6262

February 13, 2004

*Counsel for Public Knowledge and
Consumers Union*

TABLE OF CONTENTS

I. SUMMARY AND INTRODUCTION.....	1
II. THE COMMISSION HAS SOUGHT TO KEEP ITS RULEMAKING IN THIS ARENA NARROW.	4
III. THE COMMISSION SHOULD FORBEAR FROM IMPOSING ROBUSTNESS OR COMPLIANCE REQUIREMENTS ON SOFTWARE-DEFINED RADIO.	6
IV. THE COMMISSION SHOULD AVOID DEFINING A PERSONAL-DIGITAL-NETWORK-ENVIRONMENT (PDNE) STANDARD.	11
V. THE COMMISSION, OR A NEUTRAL THIRD PARTY, SHOULD APPROVE CONTENT-PROTECTION TECHNOLOGIES ON THE BASIS OF OBJECTIVE, NEUTRAL CRITERIA, WHICH MUST INCLUDE INTEROPERABILITY, AND THE TECHNOLOGIES MUST BE FREELY AVAILABLE OR LICENSED ON A RAND BASIS.....	13
VI. REVOCATION OF “COMPROMISED” CONTENT-PROTECTION TECHNOLOGIES SHOULD BE IMPLEMENTED ONLY WHEN THERE IS SUBSTANTIAL PROOF THAT THE COMPROMISE IS RESULTING IN SIGNIFICANT HARM, AND SHOULD BE IMPLEMENTED ONLY ON A GOING-FORWARD BASIS.	15
VII. BECAUSE THE BROADCAST-FLAG AND PLUG-AND-PLAY PROCEEDINGS RAISE DIFFERENT POLICY CONSIDERATIONS, THE COMMISSION SHOULD AVOID COMBINING THESE TWO FUNDAMENTALLY DISTINCT PROCEEDINGS.	17
VIII. CONCLUSION.....	17

television content is either effective or necessary, we nevertheless approve of the Commission's effort to keep the focus of its rulemaking narrow. Our comments in response to this *FNPRM* are grounded in our belief that the Commission must stay true to its commitment to keep the broadcast-flag-related rules narrow, and that to broaden these rules will undermine the limited-regulation, pro-competition, pro-innovation policies the Commission has sought to pursue in this and other proceedings.

The Consumer Groups believe that the Commission can meet its commitment to keep the broadcast-flag rules narrow in several ways. ***First***, it should forbear from imposing robustness or compliance requirements on software defined radio. Such requirements would be particularly ill-fitting for software defined radio – imposing compliance requirements would require the software to “sense” whether content is being routed into secure hardware channels – something software cannot do by itself. Moreover, it is not clear whether such systems can be made robust, since all software, whether proprietary or open-source, is inherently modifiable.

Subjecting software-defined radio to the broadcast-flag scheme presents intractable enforcement problems. Because the software and hardware components of software-defined radio are inexpensive, modifiable, widely duplicable and universally available, applying the broadcast flag scheme to software defined radio would leave the Commission in a position of regulating every programmer, personal computer, and antenna because the combination of these elements might result in a non-compliant device. Equally as important, however, subjecting software-defined radio to broadcast-

flag regulation would hinder innovation in an area where the Commission has sought to promote it. As the Commission has recognized, software defined radio will play a significant role in the development of cognitive radio, which is critical to the Commission's goal of increasing more effective and efficient use of spectrum.

Second, the Commission should avoid defining a personal-digital-network-environment (PDNE) standard. Creating such a standard would be inconsistent with the Commission's attempts to narrowly tailor its broadcast-flag regulation, because such a standard is necessarily broad – including everything users do with television and every kind of future product that may enable consumer uses of TV content. The notion of what a personal network may be expands constantly: where once the focus was on the confines of particular locations, portable and handheld digital video devices raise the question of whether the “personal network” is even capable of definition.

Third, the Commission, or a neutral third party, should approve content-protection technologies on the basis of objective, neutral criteria. Ideally, these standards should be developed in consultation with existing standards bodies, and the resulting protection technologies should either be freely available for manufacturers to use or should be licensable on a reasonable and non-discriminatory basis. Perhaps the most important functional criterion of any content-protection system must be interoperability with other such systems. Incompatibility is certain to cause confusion in the marketplace, which would inevitably lead to a slowing of the DTV transition.

Fourth, the Commission should revoke “compromised” protection technologies only when there is substantial proof that the compromise is resulting in significant economic harm. Such revocation should occur only on a going-forward basis, preventing the use of the technology in new devices without rendering nonfunctional existing devices in the field.

In addition, the Commission should not combine the broadcast flag and plug and play proceedings. Because broadcasters use public airwaves, the Commission’s stewardship over broadcast television is a unique responsibility – entailing considerations about promoting diversity and quality of content not applicable to the world of cable and satellite. For these reasons, the content protection technologies for each may have different parameters.

II. THE COMMISSION HAS SOUGHT TO KEEP ITS RULEMAKING IN THIS ARENA NARROW.

In its broadcast-flag *Report and Order*, the Commission took a number of steps to limit the scope of the proposed broadcast flag regulations. First, the Commission deferred deciding on a long-term approval mechanism for content protection and recording technologies² in order to consider the lasting impact of its regulations on new technologies and to ensure that the scope of the regulations does not exceed the limited goals of this order – to prevent “indiscriminate redistribution”³ and further the digital-television (DTV) transition.

² In the Matter of Digital Broadcast Content Protection, MB Docket 02-230, *Report and Order and Further Notice of Proposed Rulemaking*, FCC 03-273, ¶ 4 (Nov. 3, 2003) [hereinafter *Broadcast Flag FNPRM*].

³ *Id.* ¶ 10.

Second, the *Report and Order* states that the goals of this rulemaking are emphatically **not** to prevent viewers from copying digital broadcast television or redistributing it within the home or their “personal environment.”⁴ Furthermore, redistribution controls “will not ... foreclose use of the Internet to send digital broadcast content where it can be adequately protected from indiscriminate redistribution.”⁵ The Commission clearly recognized the importance of focusing on a narrow goal with regard to protecting television content and clearly recognized the role the Internet may play as information technology and television broadcasting advance, resulting in new features and uses for broadcast-television content.

Third, the Commission stated that it was seeking in its *Report and Order* **not to tread on the territory staked out by copyright law**.⁶ “[W]e wish to reemphasize that our action herein in no way limits or prevents consumers from making copies of digital broadcast television content,” the Commission stated, adding that “the scope of our decision does not reach existing copyright law.”⁷

Fourth, the Commission has attempted to set a realistic, implementable level of protection for DTV content, rather than aiming for any kind of absolute level of protection. The Commission’s approach has **not** been to insist on a level of content protection that amounts to an impenetrable wall, which would lead to serious unintended

⁴ *Id.* ¶ 10.

⁵ *Id.*

⁶ The Consumer Groups believe that the imposition of content-protection technologies, either as a Commission mandate or as a function of private licensing agreements, necessarily has an impact on existing copyright law. To the extent that the Commission has started down the road of approving content-protection technologies, therefore, it has inextricably entangled itself in copyright policy, despite its statements to the contrary. We understand, of course, that the Commission has **endeavored** to avoid any effect on copyright law with its rulemaking in the digital-television arena. Those efforts, even though we regard them as necessarily doomed to failure because of the inherent connection between copyright law and technological restrictions on copying content, inform our comments here.

⁷ *Id.* at ¶ 9. *See also id.*

consequences; rather the protection scheme has been crafted to serve as a “speed bump” to prevent ordinary, non-expert users from circumventing measures aimed at preventing indiscriminate redistribution. This too demonstrates the Commission’s effort to tailor its broadcast-flag regulation narrowly – the “impenetrable wall” approach to the protection of DTV content would require a far broader regulatory scheme. Furthermore, the Commission has expressly acknowledged that limited circumvention of a protection scheme by relatively sophisticated user level does not necessarily invalidate the use of that protection scheme so long as it is generally effective at preventing wider scale copying and redistribution.⁸

As the Commission notes, the choice of any content protection system must be based on a consideration of the balance between the level of protection the system achieves and the costs and burdens of implementation.⁹ It follows from the Commission’s declared policies in this area that any further regulation regarding the broadcast-flag regulatory scheme be narrow and focused rather than broad and far-ranging in its sweep.

III. THE COMMISSION SHOULD FORBEAR FROM IMPOSING ROBUSTNESS OR COMPLIANCE REQUIREMENTS ON SOFTWARE-DEFINED RADIO.

The Commission has generally given much attention to “cognitive radio” technologies, which “adapt their behavior based on external factors”¹⁰ and states that it

⁸ *Id.* at ¶ 20. The Commission cites the effectiveness of CSS copy protection for DVDs despite the fact that CSS has been circumvented and tools to decrypt DVDs are widely available.

⁹ *See id.* ¶ 21.

¹⁰ In the Matter of Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies and Authorization and Use of Software Defined Radios, ET Docket No. 03-
The Consumer Groups Comments on Broadcast Flag FNPRM, Page 6

recognizes “the importance of new cognitive radio technologies, which are likely to become more prevalent over the next few years and which hold tremendous promise in helping to facilitate more effective and efficient access to spectrum.”¹¹ The Commission has also sought “to ensure that our rules and policies do not inadvertently hinder development and deployment of such technologies, but instead enable a full realization of their potential benefits.”¹²

As we have seen, the Commission has recognized that software-defined radio will play a significant role in the development of cognitive radio.¹³ This role is attributable in large part to the fact that developing software is generally a less expensive, more adaptable enterprise than developing new technological hardware. The latter may take months or years to be modified, adapted and distributed in a new product cycle; software, however, has the potential to be developed, distributed and modified much faster. While not all software-defined radio is necessarily developed by the open-source-software community,¹⁴ a large part of it is,¹⁵ and as a consequence the economic cost of developing software-defined-radio applications, both in terms of using existing computer code, and in terms of programming manpower, are further reduced.

108, ET Docket No. 00-47(terminated), *Notice of Proposed Rulemaking and Order*, FCC No. 03-322, ¶ 8 (December 30, 2003) [hereinafter *Cognitive Radio NPRM*].

¹¹ *Id.* ¶ 7.

¹² *Id.*

¹³ See *Cognitive Radio NPRM*; *supra* Section III.

¹⁴ Because software is inherently modifiable, even software-defined radio projects based on proprietary software tools and source code will pose significant problems when it comes to imposing robustness requirements.

¹⁵ *E.g.*, Eric Blossom’s GNU Radio project, which has successfully demodulated HDTV broadcast signals in software, is an open-source software project. See GNU Radio, at <http://www.gnu.org/software/gnuradio/gnuradio.html>.

Imposing *compliance* requirements¹⁶ on software-defined radio adds an additional development burden on software developers working in this field, not only because it requires additional code to make software-based demodulators search for and respect the broadcast flag, but also because it requires the demodulator software somehow to determine – to “sense” – whether content is being routed into secure hardware channels. This is not something software can do by itself – it must be intimately connected to its own hardware in order to ensure that other hardware to which it’s connected is secure. *To put the matter bluntly, software by itself has no “eyes” – it can only control the “eyes” (that is, sensors) that are given to it by hardware.* For this reason, the software component of software-defined radio will inherently be unable to meet, by itself, any compliance requirements; compliance is contingent on the presence of sensor devices that are instantiated in hardware, since a compliant device is one that senses whether other, connecting devices are playing by the rules.

Of course, one may reasonably conclude that software by itself lies outside the scope of the broadcast-flag regulation, just as general-purpose hardware (such as general-purpose computers) lie outside that regulation; software by itself cannot be a demodulator (or for that matter a downstream device). It is only the *combination* of demodulation software and general-purpose hardware that might conceivably meet compliance requirements, or that might be required to under the current scheme.

¹⁶ *Broadcast Flag FNPRM*, Appendix B, § 73.9003 Compliance Requirements for Covered Demodulator Products: Unscreened Content; § 73.9004 Compliance Requirements for Covered Demodulator Products: Marked Content.

The fact that hardware and software that are themselves not within the scope of the regulation may be combined into demodulators thus raises important enforcement considerations, should the Commission attempt to enforce compliance requirements in the arena of software-defined radio demodulation. Specifically, the software and hardware components of software-defined radio are inexpensive, tremendously modifiable, widely duplicable (in the case of software), and universally available. As a result, an interpretation of the broadcast-flag regulation to include software-defined radio (or, in the alternative, a failure to exempt software-defined radio from the broadcast-flag regulation) raises enforcement problems that may be intractable. The Commission could find itself in the position of regulating every programmer, every personal computer, and every antenna, because the combination of these elements might lead to a noncompliant demodulator. Furthermore, since the Commission is seeking both to promote cognitive radio and to prevent cognitive-radio development from being hindered by regulation,¹⁷ a finding by the Commission that software-defined radio necessarily lies outside the scope of the broadcast-flag regulatory scheme would be consistent with the Commission's pro-innovation policies as stated in the cognitive-radio proceeding.

Even if software-defined radio demodulators are deemed to fall under the broadcast-flag regulation, and even if software-defined radio demodulators easily could be made compliant, it may not clear whether such compliant systems also can be made

¹⁷ See *Cognitive Radio FNPRM*.

robust.¹⁸ The argument against robustness can be stated as follows: since all software, whether open-source or proprietary, is inherently modifiable, a software-defined radio demodulator that is otherwise compliant in terms of its handling of flagged content cannot be robust since it may be tampered with. The Consumer Groups take the converse view, however, given that the Commission has set a robustness threshold that centers on whether an ordinary person – as distinct from an expert – can circumvent the content protection mechanisms in complaint software-defined radio demodulators. The average person does not program or engage in circumvention or alteration of software, be it open-source or proprietary. For this reason, we conclude that any software-defined radio demodulator that might be compliant is, almost by definition, “robust” as the Commission has defined that term.¹⁹

Apart from the issue of whether the software-defined radio can meet the parameters laid out by the Commission in its current broadcast-flag ruling, there remains the troubling question of whether the Commission should attempt to regulate the writing of the software that would be a component of software-defined radio. Most courts that have considered the question of whether software qualified as First Amendment-protected speech have concluded that it does.²⁰

In sum, then, the Consumer Groups believe that the Commission must tread lightly when it considers the extent to which software-defined radio can and should be

¹⁸ “The content protection requirements set forth in the Demodulator Compliance Requirements shall be implemented in a reasonable method so that they cannot be defeated or circumvented merely by an ordinary user using generally-available tools or equipment.” *Broadcast Flag FNPRM*, Appendix B, § 73.9007 Robustness Requirements for Covered Demodulator Products.

¹⁹ *See id.*

²⁰ *See e.g., Bernstein v. U.S. Dep't of State*, 922 F.Supp. 1426, 1436 (N.D. Cal. 1996).

regulated under the broadcast-flag regime. Attempts to shoehorn software-defined radio into a scheme that is designed primarily for hardware-based dedicated digital-television equipment may undermine the development of cognitive radio and suppress innovation generally. Furthermore, such regulation necessarily must be broad to reach the components of software-defined radio, and may pose significant enforcement and First Amendment problems.

IV. THE COMMISSION SHOULD AVOID DEFINING A PERSONAL-DIGITAL-NETWORK-ENVIRONMENT (PDNE) STANDARD.

Creating a PDNE (personal digital network environment) standard will be inconsistent with the Commission's attempts to narrowly tailor its regulation in this area, because such a standard is necessarily broad and will define not only every thing users do with television but also every kind of future product that may enable consumer uses of TV content. The Commission sought to forbear from imposing such broad regulation by focusing on the particular perceived problem of "indiscriminate redistribution" over networks like the Internet. The Commission should not "back into" broad regulation by defining every other kind of consumer use of content.

The narrow goal, as stated in the broadcast flag *Report and Order* – the prevention of "indiscriminate redistribution" – does not dictate the need to define a PDNE. Indeed, doing so will necessarily undermine the Commission's efforts to tailor the broadcast-flag regulation as narrowly as possible to meet that specific goal.

Worse, the attempt to define a PDNE will tread on the prerogatives of Congress in defining copyright law and associated doctrines such as fair use. Attempting to define a

PDNE that encompasses all reasonable current personal use, as well as all future personal uses, is a massive, if not impossible, undertaking. Furthermore, defining a PDNE will freeze current conceptions of personal use into place without creating any opportunity to adapt to new technologies and the reasonable uses that these technologies create.

For instance, imagine if the Commission had defined the scope of a personal network when the personal video cassette recorder (VCR) was in its early stages of consumer adoption. Not impossibly, such an environment might have included the rooms in one's home, and it might have limited use in other's homes or at a second home. As it happens, technology leapt ahead of what was widely imagined at the beginning of the VCR era; VCRs are now commonly found in automobiles and offices - two areas unlikely to have fit within any "personal network" imagined at the introduction of the this consumer technology. Furthermore, VCRs triggered the creation of a highly profitable aftermarket in rental and sale of repackaged movies and television shows.

Digital technologies make predictive defining of this nature even more difficult. Even the example of the positive impact of the VCR is trivial in comparison to the possibilities digital media and digital files enable. The notion of what the "personal network" might be, even for recorded television, has expanded even during the course of this proceeding; where once the focus was on the confines of particular locations, such as one's home or one's relatives' homes, the increasing penetration of portable, and even handheld digital video devices capable of displaying movies and recorded television

content²¹ raise the question of whether the “personal network” should, or even could, be defined at all. Is it the user’s home? The office? Is it someone watching a movie on an airplane, or listening to a digitally recorded song on the subway? Is it the air or wires in between these places where a personal and legitimate content transfer might occur? Is there any place (or device) that, in theory, could not fall under the definition of a “personal digital network environment”? This seems to be the ultimate in regulation. The Consumer Groups believe that is important to allow the personal network to remain undefined, so as to allow for the growth and development of innovative products and functions that may in turn drive more people to adoption of digital television.

V. THE COMMISSION, OR A NEUTRAL THIRD PARTY, SHOULD APPROVE CONTENT-PROTECTION TECHNOLOGIES ON THE BASIS OF OBJECTIVE, NEUTRAL CRITERIA, WHICH MUST INCLUDE INTEROPERABILITY, AND THE TECHNOLOGIES MUST BE FREELY AVAILABLE OR LICENSED ON A RAND BASIS.

Throughout both the plug-and-play proceedings and the broadcast-flag proceedings, the Commission has been alert to the possibility that any rule that favors a single technology or grants a first-mover advantage to any technology may have an unintended anticompetitive effect. For this reason, the Commission has stated in its broadcast-flag *Report and Order* its intention to promote the development of “many

²¹ See e.g., Archos AV300 Series, available at http://www.archos.com/products/av300_series.html?sid=j22k2jyyby3kkksb3c2ocs; Creative Labs Zen Portable Media Center, *Creative Wins Second Consecutive "Best Of CES" Award At Consumer Electronics Show*, available at <http://www.creative.com/ces/award.asp>; TiVo To Go, *New TiVo Service Release Ushers in Era of "TiVo To Go" Portable, Mobile TiVo Experience*, TiVo Press Release, Jan. 8, 2004 available at www.tivo.com/5.3.1.1.asp?article=196.

different” content-protection technologies.²² The *Report and Order* states the Commission’s hope “that proponents will certify many different technologies for approval, including but not limited to digital rights management, software-based, and non-encryption alternatives.”²³

The Consumer Groups believe that standards for content-protection technologies approved in the broadcast-flag context as well as in the plug-and-play context should be objective and neutral. We believe such standards must be administered by third parties rather than by the content owners, whose interests in maximizing revenue from content may be at odds with the public-interest considerations associated with the Commission’s stewardship over television broadcasting. Ideally, these standards should be developed in consultation with existing standards bodies, which may also play a role in testing and approval. The protection technologies either should be freely available for manufacturers to use or should be licensable on a reasonable and nondiscriminatory (RAND) basis. The Consumer Groups believe that the Commission has a special role under the broadcast-flag regime to ensure that these licensing approaches are used.

The Consumer Groups further note that a major functional criterion of any competing content-protection system must be interoperability with other content-protection systems. As the transition to digital television progresses, consumers will continue to purchase new equipment that they reasonably expect will interoperate with their existing investment in digital television. Incompatibility among content-protection systems is certain to cause confusion in the marketplace as consumers attempt to

²² *Broadcast Flag FNPRM* ¶ 55.

²³ *Id.*

integrate new components, devices, and functionalities into their existing digital-television entertainment systems. Since the Commission has committed itself to mandating content protection technologies in the broadcast-flag proceeding, the Consumer Groups believe the Commission has taken on the burden of ensuring that this mandate does not frustrate consumers who are continuing down the road to digital television. The best way to ensure this outcome is to insist that whatever content-protection technologies are implemented are compatible – to the extent possible, and to the extent consistent with the revocation framework discussed below – with existing and future content-protection technologies.

The Consumer Groups further believe that the Commission must supervise the licenses of these content-protection technologies to ensure that the licensing terms do not themselves prohibit or limit interoperability with competing technologies.

VI. REVOCATION OF “COMPROMISED” CONTENT-PROTECTION TECHNOLOGIES SHOULD BE IMPLEMENTED ONLY WHEN THERE IS SUBSTANTIAL PROOF THAT THE COMPROMISE IS RESULTING IN SIGNIFICANT HARM, AND SHOULD BE IMPLEMENTED ONLY ON A GOING-FORWARD BASIS.

The Commission correctly recognizes that content-protection technologies that appear to be secure today may be breached or circumvented tomorrow.²⁴ Nevertheless, not every instance of a “compromised” protection technology necessitates the abandonment of that technology. The lesson of DVD content protection measures is instructive; CSS (the “Content Scramble System” used on many commercial DVDs) was

²⁴ See *Broadcast Flag FNPRM*, at ¶ 65.

broken years ago by a computer programmer in Norway, yet CSS has not been abandoned by content producers, and DVD sales have continued to climb. Clearly, despite the flaws uncovered in the Content Scramble System and the development of ways of circumventing that system, the compromise of CSS has led to no significant economic harm; if it had done so, content makers would have abandoned this system altogether rather than continue to use it on newly issued DVDs.

Should a content-protection system be determined by the Commission to have been compromised in a way that does lead to significant economic harm, the Consumer Groups argue that the revocation of a content-protection system or technology occur only on a going-forward basis – that is, that the revocation simply prevent the use of this technology in new devices without “breaking” or rendering nonfunctional existing devices in the field.

VII. BECAUSE THE BROADCAST-FLAG AND PLUG-AND-PLAY PROCEEDINGS RAISE DIFFERENT POLICY CONSIDERATIONS, THE COMMISSION SHOULD AVOID COMBINING THESE TWO FUNDAMENTALLY DISTINCT PROCEEDINGS.

The broadcast-flag proceeding and related technological inquiries should not be united with the plug-and-play proceeding because the Commission's stewardship over broadcast television is a unique responsibility – unlike cable and satellite TV, which viewers pay for, broadcast television is delivered free for viewers who have no contractual relationship with the service providers, via a medium that is owned by the public. Because the stewardship of this medium – the airwaves – as a public resource entails considerations about promoting diversity and quality of content that standard-setting in the cable and satellite world does not, the content-protection technologies may have different parameters (*e.g.*, allowing for more flexible home uses) than those for cable and satellite services.

VIII. CONCLUSION

In adopting its broadcast-flag rules, the Commission labored to ensure that those rules were narrow, pro-competitive and pro-innovation. At this point in the proceeding, it must ensure that the rules do not expand in a way that invalidates or undercuts that labor. The Commission will prevent such regulatory expansion if it 1) forbears from regulating software defined radio, 2) refuses to define the “personal digital network,” 3) approves content protection technologies on the basis of objective, neutral criteria including interoperability and availability on a reasonable, non-discriminatory basis and 4) permits

revocation of “compromised” content-protection technologies only upon a showing that the compromise results in significant economic harm.

Respectfully Submitted,

Mike Godwin
Nathan Mitchler
Public Knowledge
1875 Connecticut Avenue, NW
Washington, DC 20009
(202) 518-0020

Christopher Murray
Consumers Union
1666 Connecticut Avenue, NW
(202) 462-6262
Washington, DC 20009

*Counsel for Public Knowledge and
Consumers Union*

February 13, 2004