

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th St., SW
Washington DC 20554

October 28, 2003

Subject: Digital Broadcast Copy Protection, MB Docket No. 02-230

Dear Chairman Powell:

I. The Broadcast Flag Mandate, as Applied to Software, Runs Afoul of the First Amendment.

For the reasons set forth in our Reply Comments¹ in this docket, the Electronic Frontier Foundation (“EFF”) continues to believe that the broadcast flag mandate proposed by the Motion Picture Association of America (“MPAA Proposal”) currently pending before the Commission is unnecessary, ineffective and unwise.

Assuming that the Commission nevertheless intends to move forward with a broadcast flag mandate, EFF again² urges the Commission to avoid any technology mandate that would have the effect of banning the publication of computer source code simply because that code has the functional capability of demodulating free, over-the-air ATSC digital television broadcasts.

II. Software Defined Radios are Critical Technologies and SDR Research should not be Stifled by a Broadcast Flag Mandate.

As the Commission has repeatedly recognized in the spectrum policy context, recent advances in intelligent, self-configuring radios offer enormous promise in the years ahead. One of the foundational (and still developing) technologies in this field are “software defined radios” (“SDRs”), where software running on general purpose computing devices perform all the modulation and demodulation necessary to send and receive radio signals.

These SDR technologies already exist and already have the ability to demodulate free, over-the-air ATSC broadcasts, as demonstrated by the GNU Radio project.³ GNU

¹ See Reply Comments of the Electronic Frontier Foundation, filed February 18, 2003, available at <http://www.eff.org/IP/Video/HDTV/20030218_reply_comments.pdf>.

² See *id* at pp. 29-30.

³ See <<http://www.gnu.org/software/gnuradio/gnuradio.html>>; see also Sam Williams, *Radio Free Software*, SALON, Dec. 18, 2002, <http://www.salon.com/tech/feature/2002/12/18/gnu_radio/>.

Radio is free/open source software, which means that its authors give away the source code for the software, encouraging others to modify and improve upon it. The software has already successfully been used to demodulate free, over-the-air ATSC broadcasts.⁴ As a general-purpose SDR implementation, GNU Radio is also able to demodulate FM radio broadcasts as well as other signals transmitted over a variety of frequencies.

As these SDR technologies mature, researchers can be expected to examine, discuss, and improve upon the software developed by GNU Radio and similar projects. This on-going research will require the publication of software code for testing, research and evaluation purposes.

III. The Broadcast Flag Mandate will Make Publication of SDR Software Illegal, in Violation of the First Amendment.

The First Amendment difficulty arises from the MPAA Proposal's effort to reach both hardware- and software-based ATSC demodulators. The MPAA Proposal insists on a broad ban on the distribution of "noncompliant" computer software capable of demodulating ATSC signals.

Unfortunately, in order to be "compliant" within the MPAA Proposal, ATSC demodulators must be implemented so as to satisfy "Compliance and Robustness" requirements, which in turn require that such demodulators be implemented in "tamper-resistant" forms that prevent end-user modification.⁵ In other words, in order to be "compliant," any software capable of demodulating ATSC broadcasts must be shipped with "the hood welded shut." Of course, this effectively makes it unlawful to publish any SDR software in a form that permits researchers, hobbyists, engineers and other technologists to understand its workings, comment upon them, and make modifications. This is, of course, the essence of research.

GNU Radio is just one example of software whose publication would be banned by the MPAA Proposal. GNU Radio is free/open source software, which means that its authors make available the source code for the software, encouraging others to modify and improve upon it. As a result, GNU Radio cannot satisfy the "Compliance and Robustness" requirements of the MPAA Proposal. Because free/open source software is, by definition, human-readable and intended for end-user modification and improvement, it cannot be made "tamper-resistant." The same is true of any software published in order to foster further research, comment, modification and improvement.

The publication of SDR software like GNU Radio is clearly entitled to First Amendment protections when published for expressive purposes, whether such publication is inspired by scientific research or a hobbyist's curiosity.⁶ A flat ban on the

⁴ See < <http://www.gnu.org/software/gnuradio/images/hdtv-samples.html>> (showcasing DTV images captured by GNU Radio software).

⁵ See MPAA Comments, Attachment B, Section X.11, p. 15 (robustness requirements for all covered demodulation products).

⁶ See, e.g., *Universal City Studios v. Corley*, 273 F.3d 429, 446-49 (2d Cir. 2001); *Bernstein v. U.S. Dept. of Justice*, 176 F.3d 1132, 1141 (9th Cir.), *reh'g in banc granted and opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999); *U.S. v. Elcom Ltd.*, 203

publication of “tamper-friendly” ATSC demodulators implemented in software would therefore raise serious constitutional concerns.

IV. Expanding the Commission’s Jurisdiction to Include Pure Software Products is Unprecedented and Unwise.

We are unaware of any other context where the Commission has taken on the role of regulating the publication of pure software code that is subject to First Amendment protection. This, however, is exactly that the MPAA Proposal suggests; the scope of the proposed Broadcast Flag mandate is such that it includes *all* technologies capable of demodulating ATSC broadcast signals, including SDR demodulators implemented purely in software.

As the Commission’s own Technical Advisory Council II has recognized,⁷ any effort to ban software code is likely to encounter serious enforcement difficulties. For example, publication of SDR software code on off-shore websites would undermine the effectiveness of any Commission ban here in the United States. At the same time, SDR engineers located in the United States would be inhibited in their research efforts as contrasted with their overseas competitors.

V. The Commission Should Narrow the Scope of Any Broadcast Flag Mandate to Exclude Software-Based Demodulators.

There has been absolutely no evidence introduced into this docket that demonstrates that free, over-the-air ATSC broadcasts are a source of Internet piracy today. At most, proponents of the MPAA Proposal point to a hypothetical threat some years in the future. This hypothetical threat, moreover, is premised on assumptions regarding vast improvements in residential broadband capacity.

On this record, an infringement on the First Amendment rights of SDR programmers, researchers, hobbyists and engineers cannot be justified. If and when the MPAA can point to an existing threat of widespread unauthorized Internet redistribution of free, over-the-air ATSC broadcast content, then the Commission can properly consider whether or not carefully tailored regulation of SDR software is warranted. Until such time, the First Amendment counsels against a broad ban on publication of SDR software simply because such software is capable of demodulating ATSC broadcasts (along with other radio frequency transmissions).

Accordingly, we urge the Commission to make it clear that any Broadcast Flag mandate be limited solely to hardware-based demodulators, excluding pure software-

F.Supp.2d 1111, 1126-27 (N.D. Cal. 2002); *Bernstein v. U.S. Dept. of State*, 922 F. Supp. 1426, 1434-36 (N.D. Cal. 1996).

⁷ See Report: Seventh Meeting of FCC Technical Advisory Council II, issued Jan. 24, 2003, Section 6.1, available at < http://www.fcc.gov/oet/tac/TAC_II_Report_7.zip> (“Then, with the world-wide availability of software that can even be modified if needed, any radio transmitter or receiver can be emulated. Bans on receiver types will be circumventable with ease. Mandates such as the proposed ATSC broadcast flag will be hard to enforce (and may even fail in the presence of a single web-connected noncompliant receiver”).

based demodulators running on general purpose computer hardware. This could easily be accomplished by clarifying the definition of “Demodulation Function” to exclude implementations accomplished entirely in software running on general purpose computing hardware.

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