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November 28, 2003

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

RE: Reply Comments on the Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2590 MHz Bands.

Docket Number 03-66

Dear Ms. Dortch,

Attached and following, please find Reply Comments of the Electronic Frontier Foundation and co-signers.

Please do not hesitate to contact me should you have any questions or concerns regarding the filing, at the below stated number.

Thank you for your courtesy and assistance.

Very truly yours,

Cory Doctorow
Outreach Coordinator
Electronic Frontier Foundation
415.436.9333 x106

Enclosure

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

REPLY COMMENTS OF:	:	
Electronic Frontier Foundation	:	
Common Assets Defense Fund	:	
Bay Area Research Wireless Network	:	
NYCWireless.net	:	
The Supernova Group	:	
David Isenberg	:	
	:	
In the Matter of: Amendment of Parts 1, 21, 73, 74	:	
and 101 of the Commission's Rules to Facilitate the	:	
Provision of Fixed and Mobile Broadband Access,	:	Docket No. 03-66
Educational and Other Advanced Services in the	:	
2150-2162 and 2500-2690 MHz Bands	:	
	:	
November 28, 2003	:	
	:	
TO: Federal Communications Commission	:	

1.0 Abstract

The Electronic Frontier Foundation (EFF), the Common Assets Defense Fund, the Bay Area Research Wireless Network, NYCWireless.net, the Supernova Group and David Isenberg hereby submit comments in response to the Commission's April 2, 2003, *Notice of Proposed Rulemaking* (NPRM) requesting comment on changes to the rules governing licensing of the Instructional Television Fixed Service (ITFS), the Multipoint Distribution Service (MDS) and the Multichannel Multipoint Distribution Service (MMDS). EFF and co-signers applaud the Commission's release of the NPRM in this proceeding, and urges the Commission to allow unlicensed technologies to operate in the ITFS spectrum. In addition to encouraging innovation and allowing for increased use of this spectrum, We would like to direct the Commission's attention to yet another rationale, namely, the degree to which allowing unlicensed underlay operations in the 2150-2162 and 2500-2690 MHz bands serves the First Amendment of the U.S. Constitution.

2.1 About Common Assets Defense Fund

Common Assets Defense Fund is a non-profit organization dedicated to taking action on behalf of the commons. Through targeted communications and coalition building, Common Assets is working in three major areas; protecting public water, reclaiming the airwaves, and promoting new job growth through energy investments.

2.2 About the Bay Area Research Wireless Network

The Bay Area Research Wireless Network (www.barwn.org) is a multi county deployment of Part 15 high speed data radios. The network is used for experimentation in technical, political and social issues of an open access, bi-directional network. BARWN is particularly interested in developing technical solutions for wireless deployment in third-world or economical depressed areas in order to support voice, emergency services and education.

2.3 About NYCWireless.net

NYCwireless serves as an advocacy group for wireless community networks providing free, public wireless Internet service to mobile users in public spaces throughout the New York City metro area. These public spaces include parks, coffee shops, and building lobbies. NYCwireless also works with public and nonprofit organizations to bring broadband wireless Internet to under-served communities.

2.4 About the Supernova Group

The Supernova Group is an independent technology analysis and consulting firm, based in the Philadelphia area. It advises businesses and investors on the strategic implications of emerging technological trends, and organizes an annual conference on the decentralization of software, communications, and media. Its founder, Kevin Werbach, previously served as Counsel for New Technology Policy at the Federal Communications Commission, and as Editor of Release 1.0: Esther Dyson's Monthly Report.

2.5 About David Isenberg

David S. Isenberg is the founder of isen.com, LLC, an independent telecommunications analysis firm in Cos Co, Connecticut.

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3.0 Introduction

It is our belief that the free speech right guaranteed in the First Amendment of the U.S. Constitution is best served through flexibility in spectrum allocations that permit innovative uses. Spectrum models should allow for a variety of speakers and speech. We agree with Chairman Powell's sentiment that this proposal has the potential to provide bandwidth for constant innovation.

The concerns raised in initial comments regarding unlicensed underlay come primarily from risk-averse, entrenched incumbents, not from nimble, entrepreneurial companies, nor from those public-spirited organizations that are ever at the forefront of flexible spectrum uses. We believe that the concerns over the technical feasibility of unlicensed underlay are unjustified. The Commission has made the right commitment by proposing to allow unlicensed underlay as it strives for public good and upholds the Constitution.

4.0 Unlicensed spectrum use permits more speech

The First Amendment calls on government to eschew regulation of speakers and the means of speech[1]. The restriction of access to spectrum—which, as an effective medium of expressive communication, is a proxy for speech—is only lawful to the extent that is necessary to prevent harmful interference beyond the ability of well-designed radio devices to overcome its effects. Emerging and established technologies are shifting the definition of "well-designed radio" and creating models for spectrum use at much higher information densities and with much less formal coordination. The Commission's increasing commitment to flexible spectrum use acknowledges this new technical reality; and to the extent that the Commission acts on this commitment, it serves not only the public interest but also the Constitution.

The successful and unprecedented cooperative use of the ISM spectrum in the 2.4 GHz band demonstrates the degree to which command-and-control models are unnecessary for communications free from fatally harmful interference. As EFF wrote in its comments in the UHF[2] and SPTF[3] dockets, we believe in setting aside yesterday's speech-restricting command-and-control regimes in favor of underlays, overlays and other frequency-agile uses of the spectrum.

Initial commenters in this docket express skepticism about the feasibility of underlay, noting that there are no underlay successes in the field to date[4]. This lack of successes should not come as a surprise, given that there is likewise no regulatory model that encourages the growth of such systems. It is precisely through the creations of easements such as underlays that the Commission can encourage the growth of such devices. The underlay objections are cut from the same cloth as the dismissal of the ISM allocation as certain to create a "junk band."[5] The ISM allocation created market pressure for devices that could peacefully coexist in the same band; an underlay for the 2150-2162 and 2500-2690 MHz bands will foster the development of underlay-aware technologies that allow for simultaneous, shared, *and* unregulated speech.

5.0 Geographic awareness is possible

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[1] For an extended discussion of the First Amendment issues relating to unused or underused spectrum, see Stuart Minor Benjamin, The Logic of Scarcity: Idle Spectrum as a First Amendment Violation, 52 Duke L. J. 1 (2002) at 19-20 which asserts that 2500-2690 MHz band is a "notable example" of underused spectrum.

[2] Docket 02-380, see http://www.eff.org/Infra/Wireless_cellular_radio/20030417_eff_fcc_spectrum_letter.pdf.

[3] Ibid.

[4] *See* Comments of Earthlink, Ericsson, IPWireless, and Lucent, In the Matter of the Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2590 MHz Bands, WT Docket 03-66 (September 8, 2003).

[5] "You can't predict beforehand how much commons spectrum will be worth—before WiFi came along, 2.4GHz was called the 'junk-band,' yet, in a dismal tech economy, it's exploded, become more valuable that it would have been for exclusive use." Remarks of Kevin Werbach, Former Counsel for New Technology Policy at the FCC, at the Stanford University "Spectrum Policy: Property or Commons" conference, March 1, 2003. As reported at http://boingboing.net/2003_03_01_archive.html#90394010

Earthlink, in its initial comments[6], argues that GPS and other location-determining technologies ("location technologies") are insufficiently robust to form the basis for spectrum allocation. Earthlink asserts that a licensed user of a band in which underlay users employ location technologies (to determine which frequencies their devices may transmit in) will find themselves continually interfered with due to the unreliability of this technology. This uncertainty will make potential license-holders unwilling to bid on spectrum that is underlaid, and will make spectrum owners unwilling to invest in infrastructure that will be compromised by underlay uses.

Co-commenters counter by noting that location technologies, while still admittedly nascent, are *already* the basis for important policy initiatives, notably E911[7]. What's more, location technologies represent one of the few well-capitalized[8] technology sectors in today's dismal economy. Indeed, the industry-leading O'Reilly Emerging Technology Conference has selected location as one of the themes for its 2004 conference[9], and will feature learned technical presentations with such titles as "35 Ways to Find Your Location."

It is therefore a mistake to assert that the novelty of location technologies translates into unreliability or lack of interest. As E911, the UHF proposal[10] and this proceeding create the regulatory demand for location-awareness and the infrastructure to support it, location technologies will play an increased role in many areas of technology.

5.1 Enforcement is Possible

Ericsson asserts[11] that an unlicensed underlay should not be allowed since it will be technically unfeasible for the Commission to enforce compliance in unlicensed devices. By contrast, co-commenters have the utmost faith in the Commission's ability to manage the regulation of unlicensed devices.

The Commission will increasingly have to come to grips with frequency-agile, unlicensed devices in the hands of the American public: co-commenters are confident that unlicensed RF-emitters built atop free software-based software-defined radios (SDRs), such as those running the

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[6] *See* Comments of Earthlink, In the Matter of the Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2590 MHz Bands, WT Docket 03-66 (September 8, 2003).

[7] *See* http://www.fcc.gov/911/enhanced/

[8] *See* http://www.isp-planet.com/research/2002/vc_trends_021112.html

[9] *See* http://conferences.oreilly.com/etech/

[10] Docket 03-280, see http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6513404215

[11] *See* Comments of Ericsson, Inc., In the Matter of the Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2590 MHz Bands, WT Docket 03-66 (September 8, 2003).

GNU Radio[12] software, will see increased use by the public, due to the flexibility and utility of user-modifiable SDRs. Already, GNU Radio has been demonstrated to decode ATSC transport streams[13], FM radio[14], and other RF applications of great consumer interest.

If enforcement difficulty due to frequency-agility is to be used as the basis for forming spectrum policy, the Commission is going to find itself repeatedly rejecting worthy, innovation-fostering, First-Amendment-compliant dockets.

5.2 Underlays are possible

Earthlink asserts that potential lessees will not want to acquire spectrum prone to inference due to unlicensed underlay devices. However, there is ample evidence that commercial entities are willing and able to operate in interference-prone spectrum. All spectrum is prone to some interference, and wireless applications operators and the hardware vendors who serve them have a long an honorable history of improving the reliability and robustness of devices from televisions to cellular phones.

More dramatically, wireless ISPs (wISPs) have sprung up all around the world -- in airports[15], in rural communities[16], in urban centers[17], even on the slopes of Tibetan mountainsides[18] -- operating brisk commercial enterprises in a band whose rules specify that all users must accept *all interference* within the Part 15 rules[19].

Commercial entities have no expectation of governmentally guaranteed certainty in their business-operations. The lack of certainty is at the very heart of free enterprise: the freedom to succeed and the freedom to fail are flipsides of the same coin. As the Commission instructed Sprint, "spectrum is not, and has never been, exclusive to Sprint or to any other licensee or user."[20] If Earthlink is unwilling to step in and fill the niches afforded by increased flexibility in spectrum regulation, EFF is confident that other businesses will fill the void they leave behind. For example, Sky Dayton, a successful risk-taker (ironically, he founded Earthlink), has recently

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[12] *See* http://www.gnu.org/software/gnuradio/

[13] *See* http://www.gnu.org/software/gnuradio/hdtv-samples.html

[14] *See* http://www.gnu.org/software/gnuradio/screenshots.html

[15] *See* http://www.wirelessairport.org/about.htm

[16] *See* http://www.wcai.com/rural/index.htm

[17] *See* http://www.nycwireless.net/

[18] *Siemens to use Openwave Platform to Deliver Mobile Internet to the People's Republic of China*, Press Release by China Mobile Communications Corporation, January 22, 2001. *See* http://www.openwave.com/us/news_room/press_releases/2001/20010122_cmcc_0122.htm

[19] 47 C.F.R § 15.5 (2002)

[20] *See* Ultra-Wideband Order, *supra* note 118, at. ¶271.

raised millions in successive rounds of venture capital for a new business called Boingo[21], bent on providing network services in the (far less certain) ISM band, despite the inherent insecurity of operating under rules that specify that his customers must accept all interference from devices ranging from microwave ovens to baby-monitors.

5.3 Unlicensed underlay is needed

In its comments, Stanford states that there does not appear to be any demonstrated need for spectrum in the 2500-2690 MHz band for unlicensed usage, and such usage does not appear at this time to advance an instructional service[22]. This is a bewildering assertion, given the explosive growth of devices operating in other unlicensed environments[23]. Clearly, the American public is positively *clamoring* for devices that communicate using unmetered, unlicensed spectrum. The creation of new free-play zones in which the public may make use of the spectrum that the Commission allocates in its interest is the appropriate response to that demand.

Stanford's subsequent assertion that the Commission's recent proposal for an allocation of 225 MHz in the 5 GHz band will obviate the need for an unlicensed underlay in the band under discussion here is likewise unfounded. Firstly, the answer to, "How much spectrum should the Commission allocate for flexible use before it has served the First Amendment?[24]" *must* be "As much as possible." On a less theoretical note, co-commenters respectfully remind the Commission and Stanford that RF energy transmitted at 2GHz has different propagation characteristics and different technical demands than RF energy transmitted at 5GHz -- for example, a software-defined radio that is designed to communicate in the 2.4GHz ISM band will be easier to modify to communicate at 2.5GHz than to communicate at 5GHz.

6.0 Conclusion

The Commission must be sensitive to its overweening obligation to regulate speech and speakers as lightly as possible, and realize that flexible spectrum use is the best mechanism to date for allowing the most speech from the most speakers. The SPTF has set the Commission on the right course, and we urge the commission to heed its recommendations, as this proposal is consistent with the public interest and with the Constitutional objective of free speech as outlined in the First Amendment. We advocate that the Commission explore new and previously untried avenues to facilitate innovation and free speech. Finally, we urge the Commission to bring

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21 *See* http://www.boingo.com

22 *See* Joint Comments of Stanford University and Northeastern University, In the Matter of the Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2590 MHz Bands, WT Docket 03-66 (September 8, 2003).

23 Gartner Dataquest estimates the number of [802.11] chipsets produced will quintuple by 2006, reaching over 45 million.

24 For an extended discussion of the First Amendment issues relating to unused or underused spectrum, see Stuart Minor Benjamin, The Logic of Scarcity: Idle Spectrum as a First Amendment Violation, 52 Duke L. J. 1 (2002) at 19-20 which asserts that 2500-2690 MHz band is a "notable example" of underused spectrum.

forward more proposals like this one, which will further reduce the scarcity of spectrum and the need to regulate speech.

Respectfully submitted,

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November 28, 2003