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January 27, 2003

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

RE: Comments, Spectrum Policy Task Force Request for Comment
ET Docket Number 02-135

Dear Ms. Dortch,

Attached and following, please find Comments of the Electronic Frontier Foundation.
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
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Electronic Frontier Foundation
415.436.9333 x106

Enclosure

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of: :
: :
FCC Spectrum Policy Task Force : ET Docket No.: 02-135
Report and Recommendations : :
: :
January 15, 2003 :

TO: Federal Communications Commission
Spectrum Policy Task Force

Spectrum Task Force Comments Outline

1.0 Summary:

The Electronic Frontier Foundation applauds the Commission’s willingness to explore new regulatory paradigms in respect of our national spectrum. This resource is a crucial piece of the ongoing democratization of communication, and the Commission’s foremost duty today is to ensure that future innovations that will reduce spectrum scarcity are not foreclosed by today’s policy decisions, and to set policies that reward spectrum-users for robust, cooperative techniques that increase network throughput over all dimensions of time, frequency, shape and space.

2.0 About the Electronic Frontier Foundation:

The Electronic Frontier Foundation (EFF) is a non-profit, member-supported charitable foundation that works to uphold civil liberties interests in law, policy and standards. Based in San Francisco, EFF has a 13 year history of helping to shape the American technological realm such that it is embedded in a sociopolitical system that reflects the civil liberties that are enjoyed in the physical America.

3.0 Introduction:

The report of the Spectrum Policy Task Force (SPTF) is a broad-minded, ground-up reconsideration of spectrum allocation and spectrum scarcity. In the report, the SPTF comments on the efforts of “Cognitive Radio” engineers and theorists to use new classes of devices—such as software-defined radios and ultra-wideband radios—to reinvent spectrum use as a cooperative venture. Such cooperation, enabled by interoperability, open standards, and a regulatory framework that encourages cooperation among terminals and their operators, holds out the promise of a world where spectrum scarcity is replaced by spectrum plenty.

An America of plentiful spectrum is an America that provides an open platform for innovators to build upon. It is an America where self-provisioning network devices put the power to grow, maintain and use networks into the hands of end-users.

This is a fine vision of America, and one that would support this country's competitive health for decades to come. Therefore, it is incumbent upon the Commission to define the contours of spectrum policy such that it:

- i. Does not forestall innovative future technologies that will reduce spectrum scarcity
- ii. Encourages and rewards these innovative technologies

It is for this reason that EFF strongly endorses policies such as overlay, receiver standards, and commons-based approaches to spectrum allocation. This is also why EFF has serious reservations regarding ownership-based models, which may discourage competition.

3.1 Summary:

- i. Spectrum allocation should encourage cooperative approaches which reduce spectrum scarcity
- ii. Spectrum allocation should not forestall these approaches
- iii. Overlay, receiver standards and commons-based approaches serve the public interest
- iv. Ownership-based approaches may forestall innovation

4.0 Ownership models should not be allowed to impede innovation

4.1 Permanent ownership slices up the commons

Ownership models may impede innovations that arise from commons-based approaches. While it is unclear whether cooperative radio approaches will end spectrum scarcity, there is no question that such models will sharply decrease scarcity, and that spectrum plenty will grow as a function of progress in general information technology, such as improved techniques and faster processors. Permanent allocation of bands to private interests, with concomitant guarantees of exclusive or near-exclusive use of those bands, means that techniques and technology improve, these fenced-off areas that cut the commons into disjoint ribbons will account for ever-greater losses in opportunity for the general public to transmit and receive information. Moreover, markets in propertized spectrum can *never* internalize the value of innovations that depend on commons-based approaches, as they, by their nature, premise value on the right to exclude.

4.2 Temporary ownership encourages cooperation and nimbleness

EFF agrees with the SPTF's conclusion that one size does not fit all. There are and will be models of valuable spectrum use that serve the public interest that require some assurance of exclusivity to some band. However, these models do not require permanent allocation to thrive. If exclusive allocations were time-limited to a relatively brief period and subject to receiver standards that required that the system accept a relatively high (but not insurmountable) amount of interference from overlay and easement users, exclusive licensees would be provided with a powerful incentive to design their systems to be software-upgradeable (so that de-allocation or re-allocation at the end of the exclusivity period would not render the system obsolete) and to peacefully co-exist with innovative, low-power approaches that increase spectral efficiency.

4.3 Permanent ownership is often worth more than is paid

As technology advances, spectrum plenty increases. As spectrum grows more plentiful, the applications for spectrum grow more varied and the value of the spectrum in which new applications function grows. In other words, the sole certainty about the future of spectrum is that spectrum's value will increase. Even if fevered bidding in a spectrum auction drives the price of some slice of spectrum to bankruptcy-inducing levels for the successful bidders, the winners of such auctions are always getting a bargain at the public's expense. It is impossible to calculate the value of spectrum. While auctioning off permanent property rights in spectrum may provide a one-time enrichment of the General Treasury, these sums are dwarfed by the potential economic activity that is lost by foreclosing commons-like usage of that band.

4.4 Permanent allocations foreclose innovations

The space of all possible uses and techniques for spectrum is much larger than the space of all uses and techniques in practice today. The pace of innovation is such that future applications may render current approaches obsolete. A permanent grant of spectrum to a private party forecloses on radical, as-yet-unimagined approaches that would render the current allocations schemes nonsensical. By assigning only temporary allocations that can be reconsidered in light of new developments, the Commission will future-proof its policies.

4.5 Summary

- i. Permanent allocations may increase scarcity in the long run
- ii. If exclusivity is required, temporary grants create incentives for cooperation and efficiency
- iii. Temporary allocations are future-proof

5.0 Commons-based approaches work

The limited experiment in commons-based allocation that yielded the 802.11 family of IEEE standards and Bluetooth personal-area-networking is an unquestioned success. Innovative companies such as Motorola, Alvarion, WaveRider, and Redline Communications have made good use of unlicensed spectrum to generate still more economic activity outside of the realm of standards-defined applications, while peacefully co-existing with them. Ad-hoc, low-powered, unlicensed wireless networking applications have proven themselves a fertile ground for innovation. Individuals, companies, and community groups have made use of the spectrum to provide emergency and disaster relief, to extend Internet service to rural areas, to build successful commercial enterprises and to sell billions of dollars' worth of equipment. Indeed, many observers cite the explosive growth of unlicensed wireless applications as the sole bright spot in an otherwise grim information technology sector.

5.1 More commons, more better

The SPTF's report offers many possible policy initiatives for extending the commons-based approach to allocation, including overlay, easements, receiver standards, and the raw allocation of contiguous bands to unlicensed use. EFF heartily endorses all of these proposals and urges the Commission to adopt policy that acts on them.

5.2 Receiver standards encourage cooperation

The Commission's first guiding principle in setting policy should be to do no harm to spectrum plenty. By treading cautiously in respect of ownership-like allocations the Commission can attain this. The Commission's second principle, however, should be to create incentives for technologies that improve cooperation and reduce scarcity. One such policy initiative is the specification of receivers that must accept high, but not insurmountable, levels of interference from easement and overlay users. Such a policy would create a competitive pressure among technologists to design equipment that "plays nice with others," allowing for low-powered conversations within its coverage region. The reverse scenario, in which all other users are required to stifle themselves when a licensed user wishes to talk or listen, is an invitation to engineering laziness. Policy to date has focused on developing a more controlled "voice;" it is time for the Commission to demand that spectrum users also develop a better, more selective "ear."

5.3 Summary

- i. The commons-allocation approach that yielded 802.11* and other unlicensed uses is a signal success and a model for the future
- ii. Policies that follow this model include overlay, unlicensed-use allocations, easements and receiver standards
- iii. Specifying robust receivers aligns spectrum-users' interests with scarcity-reducing cooperation

6.0 Conclusions

The SPTF's report is, on the whole, laudable and progressive. As the Commission continues to investigate and pursue spectrum-allocation reform, EFF asks that it continue to uphold the public interest by setting policies that align the interests of all spectrum users with techniques and technologies that reduce scarcity by increasing cooperation.

Respectfully submitted,

Cory Doctorow
for the Electronic Frontier Foundation