Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Promoting More Efficient Use of Spectrum Through	)	ET Docket No. 10-237
Dynamic Spectrum Use Technologies	)	

COMMENTS OF THE SAMUELSON-GLUSHKO TECHNOLOGY LAW AND POLICY CLINIC AT THE UNIVERSITY OF COLORADO

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EXECUTIVE SUMMARY

The Dynamic Spectrum NOI is another important step by the Commission towards more efficient and technologically flexible management of the nation's finite spectrum resource. More intensive spectrum usage is a logical and desirable consequence of the FCC's commitment to maximizing spectrum's value. Notably, prescient spectrum management in a dynamic and flexible environment should emphasize the critical role of effective enforcement in enriching the value of spectrum. Accordingly, we commend the FCC for recognizing the importance of enforcement in the NOI under ¶56, *Harmful Interference, Spectrum Rights, and Receiver Standards*.

This comment explains why it is essential that interference disputes be resolved in a timely, predictable, and fair manner. In particular, the FCC should carefully examine how to evolve the Commission's enforcement and dispute resolution roles. Much recent attention has been devoted to the delineation of property-like rights in spectrum and to the encouragement of new technologies and services. Far less attention, however, is paid to considering what type of enforcement regime is appropriate for a resource no longer managed in a command and control manner. Notably, where disputes arise, effective enforcement promotes private bargaining and swift, efficient resolution. Accordingly, the Commission should consider the role of effective enforcement in the Dynamic Spectrum NOI docket and, more broadly, the Commission should make a wider inquiry into FCC processes associated with enforcement and dispute resolution an integral part of its future spectrum management practices.

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The promotion of innovative uses of spectrum through dynamic spectrum technologies is an important piece of the FCC's overall campaign to encourage more efficient and robust uses of spectrum. The Samuelson-Glushko Technology Law and Policy Clinic at the University of Colorado respectfully submits these comments regarding spectrum enforcement and dispute resolution as they relate to the Dynamic Spectrum NOI. The Commission has led a revolutionary rethinking of spectrum management over the last few decades, pursuing policies that facilitate efficient use as well as market-based management of spectrum.[1] In particular, the Commission's market-based policies help to promote the free flow of spectrum to its highest valued use.

Greater flexibility in spectrum management, including expanded opportunities for dynamic access, will encourage new technologies, promote innovation, and generate more intensive uses of spectrum. Expanded access to, and heavier use of, the spectral resource is a desirable consequence of the FCC's commitment to efficiency-creating and market-based approaches. Yet greater flexibility and enhanced access will increase the number of interference disputes among various spectrum users.

[1] *See generally*, FCC, *Spectrum Policy Task Force Report*, ET Docket No. 02-135 (2002); *see e.g.*, FCC, *Secondary Markets Report and Order and FNPRM*, FCC 03-113 (2003).

The Commission should ensure that its enforcement and adjudication regimes are optimally structured to resolve the interference disputes of today and tomorrow. In the Dynamic Spectrum NOI, it is certainly important that the FCC consider usage rights, license terms, and new technologies. This is, however, not enough. The Commission must also ensure that interference disputes will be resolved in a timely, predictable, and fair manner.

In three parts, these Comments detail why a focus upon effective enforcement is warranted. First, we examine relevant economic theory that explains why efficient resolution mechanisms are a crucial backstop in a more flexible spectrum management system. Second, we analyze the existing resolution and enforcement regime. In particular, we identify why an evolution in enforcement is important in the context of flexible management systems marked by more frequent interactions and potential disputes between license holders. Third, we explain how a review of spectrum interference resolution systems is consistent with larger trends in spectrum management reform. Therefore, we respectfully request that the Commission should consider the role of effective enforcement in the Dynamic Spectrum NOI docket and, more broadly, the Commission should make a wider inquiry into FCC processes associated with enforcement and dispute resolution as part of its future spectrum management practices.

I. ECONOMIC THEORY UNDERSCORES THE IMPORTANCE OF EFFICIENT ENFORCEMENT AND RESOLUTION MECHANISMS

A well-structured enforcement regime is an essential component of an efficient market with new entrants. As Ronald Coase famously explained, efficient bargaining requires the explicit presence of a well-defined property right *and* a mechanism to enforce the right.[2]

[2] Roland Coase, *The Federal Communications Commission*, 2 Journal of Law and Economics 1, 14 (Oct. 1959) ("A private-enterprise system cannot function properly unless property rights are created in resources, and, when this is done, someone wishing to use a resource has to pay the owner to obtain it. Chaos disappears; and so does the government except that a *legal system to define property rights and to arbitrate disputes* is, of course, necessary.") (emphasis added).

Understandably, much recent attention has been devoted to the delineation of property rights in spectrum. However, far less attention is paid to ensuring that the FCC's enforcement mechanism is appropriate for a spectrum market. This omission is notable because not only does inadequate enforcement undermine the rule of law, forcing parties to resort to self-help, it also frustrates private bargaining and negotiation, ultimately decreasing the value of spectrum as a whole.

This modern trend towards efficiency-focused and market-based approaches is a welcome policy development that improves upon the ad-hoc and overly prescriptive world of command-and-control regulation.[3] By encouraging new entry, however, these policies also increase the intensity of spectral use, which foreseeably leads to more interference disputes among the innovative users and novel operations.[4] In most respects, this is just a natural consequence of better utilizing the available spectral resources.[5] Thus, the FCC should neither regard increasing interference as harmful to the spectrum market *per se*, nor should it attempt to

[3] FCC, *National Broadband Plan* 78 (2010), http://www.broadband.gov/download-plan; *see also* F.A. Hayek, *The Use of Knowledge in Society*, Am. Econ. Rev. XXXV, No. 4. (Sept., 1945) ("[t]he reason for [the failure of centralized decision-making] is that the 'data' from which the economic calculus starts are never for the whole society 'given' to a single mind which could work out the implications and can never be so given.").

[4] Edward Wyatt, *F.C.C. Likely to Open New Airwaves to Wireless*, N.Y. Times, Sept. 12, 2010, http://www.nytimes.com/2010/09/13/technology/13wifi.html ("[I]ssues of interference and other conflicts inevitably will arise and will be have to be addressed by the commission…"). *See also* Ellen P. Goodman, *Spectrum Rights in the Telecosm to Come* 41 San Diego L. Rev. 269, 301–02 (2004) ("Flexible use will change the meaning of existing service categories like satellite radio or television broadcasting. To the extent that any given service category can be used for multiple consumer applications, such as data or video, then the characteristics of interservice and intraservice interference will be different than they are today. Depending on the degree of flexibility permitted within a set of spectrum usage rights, the meaningful distinction between interference scenarios will come to lie not in the definition of service, but in the system architectures and technologies at issue in the interference conflict. Thus, "intraservice" interference cases will arise between operators using a similar architecture, such as low-power satellite transmissions, whatever the end-user service that is provided. "Interservice" disputes will arise between operators using distinct system architectures, such as low-power satellite and high-power broadcast transmissions, again regardless of the associated consumer applications. As we have seen, because of the predictive modeling that goes into the setting of initial spectrum entitlements, the migration to flexible use is likely to exacerbate interservice interference in particular as new and different technologies share spectrum.").

[5] *See* Anna Schulz, *Creating a Legal Framework for Transboundary Water Governance in the Zambezi and Incomati River Basins* 19 Geo. Int'l L. Rev. 117, 125 (2007) ("Initially, natural resources may seem unlimited, but as the number of individual members multiply, conflicts over increasingly scarce resources become inevitable. It is thus necessary to establish a system of rules (law) to resolve these conflicting rights.").

forestall all possible interference conflicts before they arise.[6] But it is imperative to recognize that the unleashing of competitive forces is not, by itself, sufficient to ensure a well functioning spectrum market.[7] Rather, a successful market in spectrum necessitates the careful interplay of governmental design and private actors.[8] An effective enforcement regime is one of the most critical components.[9]

Two reasons explain why an effective enforcement mechanism is equally critical to a well-functioning spectrum market. First, in the absence of enforcement, there is nothing to stop a more powerful party from simply resorting to self-help (abrogating the property rights altogether).[10] Second, without enforcement, there is limited external authority to impose a

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[6] *See* Stephen J. Eagle, *Private Property, Development, and Freedom: On Taking Your Own Advice* 59 SMU L. Rev. 345, 359–60 (2006) ("Many commentators assert that private enterprises work well only after a society has established the institutions that interact with the market to form an efficient private sector. This is the role meant for government involvement during the early stages. A set of new rules should be established to inspire confidence in would be private investors. Of primary importance is the establishment of a legal infrastructure for the private sector…In addition, all these measures are of little practical value, unless the laws are supported by courts and trained professionals, who can settle disputes and enforce the laws.").

[7] *Cf., e.g.*, Jim Chen, *The Echoes of Forgotten Footfalls: Telecommunications Mergers at the Dawn of the Digital Millennium* 43 Hous. L. Rev. 1311, 1313 (2007) ("[t]he Telecommunications Act of 1996 promised to promote competition and reduce regulation, secure lower prices and higher quality services and encourage the rapid deployment of new telecommunications technologies. One decade later, many observers have argued that the Act in practice fell far short of the expectation that legislative reform would open all telecommunications markets to competition.") (internal quotation marks and citations omitted); Richard D. Cudahy, *Whither Deregulation: A Look at the Portents* 58 N.Y.U. Ann. Surv. Am. L. 155, 186 (2001) ("Enron failed apparently because of its hubris—its apparent belief that it could make its own way in the energy world, freed of deference to traditional rules and unshackled from regulatory constraint. Its demise may send a message that competitive innovation is not the only value—that freedom from regulation can loose the demons of human nature as well as unbind its creative potentials.").

[8] Ellen Byers, *Corporations, Contracts, and the Misguiding Contradictions of Conservatism*, 34 Seton Hall L. Rev. 921, 956 ("[g]iven these contemporary and historical lessons, [free market proponents] recklessly abandon their belief in pragmatism when they invoke a romanticized vision of 'free market America.' The assumption that the laissez-faire system can somehow 'heal' itself of its defects without any meaningful form of regulation is misguided and unfaithful to history. Despite its appealing frontier connotations, the concept of a 'free market' separate from government is simply a myth. As Dean Joseph Tomain observes, markets simply do not exist without governments: 'Governments create, protect, and enable transactions of property in markets.' ").

[9] *See* Jim Rossi, *Beyond Goldwasser: Ex Post Judicial Enforcement in Deregulated Markets* 2003 Mich. St. DCL L. Rev. 717, 717–18 (2003) ("Increasingly, regulatory agencies are adopting ex ante rules to set market access terms and conditions for network industries. A major challenge for regulatory law is striking an effective balance between ex ante and ex post regulatory mechanisms. I argue that ex post enforcement has an important role to play in deregulated markets and should not be ignored where a regulatory agency is not actively applying ex ante rule to guide market conduct.").

[10] *See* Maurice Stucke, *Does the Rule of Reason Violate the Rule of Law?*, 22 Loy. Consumer L.R. 28, 29 (2009) ("[T]he rule of law is a pre-condition for an efficient market economy.").

solution on parties if negotiations break down or if a party refuses to abide by the terms of a previous agreement.[11] As Yoram Barzel explains:

> [t]he courts participate in rights delineation in two ways. The first is indirect: When the parties choose to settle their disputes without resorting to the courts, their actions are influenced by their perceptions of how the courts would have acted in their dispute. The second is direct: The disputes are actually settled by the courts.[12]

In short, effective enforcement is the glue that holds the market's incentive structure in place.[13]

Moreover, three additional considerations also underscore the importance of an effective enforcement regime in an efficient market. *One*, enforcement ensures that the benefits conferred by rights correspond to the price paid to obtain the rights.[14] Harold Demsetz explains that in an ineffective property right regime, a good can be produced in insufficient quantities because the price paid for these goods does not reflect the entire benefit of the good for the general society.[15] *Two*, efficient enforcement keeps transaction costs low.[16] As Owen Lippert notes, "[a]t the core

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[11] *See* Craig Pirrong, *A Theory of Financial Exchange Organization* 43 J. Law & Econ 437, 463 (2000) ("Even given these distributive effects, members clearly have an incentive to choose rules that maximize joint surplus by negotiating Coasean bargains. There are myriad obstacles to the implementation of such bargains, however. Reneging is an ever-present possibility, especially if bargains require asynchronous performance or if the different parties to the bargain realize their benefits at different times. Reputation and formal contracting may mitigate these hazards but are unlikely to eliminate them altogether. The potential complexity of wealth-increasing bargains can also impede their implementation. The difficulties of complete contracting in a dynamic and complex environment are well known. Third-party enforcement of contracts is also costly, especially given the specialized and arcane features of financial markets. Information asymmetries may also bedevil the completion of Coasean bargains. Well-crafted governance structures that reduce enforcement and negotiation costs can mitigate impediments to deals that enhance member wealth.").

[12] Yoram Barzel, *Economic Analysis of Property Rights* 98 (Cambridge University Press 2nd. ed. 1997).

[13] *See* Brian JM Quinn & Anh, T.T. Vu, *Farmers, Middlemen, and the New Rule of Law Movement* 30 B.C. Third. World. L.J. 273, 280–81 (2010) ("[E]fficient markets and economic growth…require the rule of law and formal legal structures, in particular the protection of property rights and the efficient enforcement of contracts.").

[14] Harold Demsetz, *The Exchange and Enforcement of Property Rights* 7 J. Law & Econ. 11, 17 (1965) ("The value of what is being traded depends crucially on the rights of action over the physical commodity and on how economically these rights are enforced. The enforcement of the accompanying property rights has an important impact on the ability of prices to measure benefits.").

[15] *Id.*

[16] Owen Lippert, *One Trip to the Dentist is Enough: Reasons to Strengthen Intellectual Property Rights Through the Free Trade Area of the Americas* 9 Fordham Intell. Prop. Media & Ent. L. J. 241, 263 (1998) ("[O]ne of Coase's fundamental insight is this: the sustained economic success of a country does not depend on any initial or subsequent endowment of capital and technology, but rather on its ability to maintain institutions of formal and informal rules that keep low the costs of measuring the valuable attributes of what is being exchanged and the costs of protecting rights and policing and enforcing agreements.") (internal quotation marks omitted).

of reducing transaction costs is a stable, clear and enforced system of property rights."[17] And *three*, enforcement encourages vigorous investment into the market and ensures that goods and resources flow to their highest valued use.[18] In short, when effective enforcement is lacking, it degrades the overall value of spectrum because the market mechanism cannot efficiently facilitate the free flow of spectrum to its highest valued use,[19] and in turn, parties become less willing to pay to acquire spectral rights because of the uncertainty that results from inefficiency.[20]

For example, consider how the absence of effective enforcement would affect new services that commence operations in response to the National Broadband Plan. These new services—even with careful licensing and *ex ante* technical review—will often drastically and unpredictably alter the ambient spectral environment, causing the new services to function poorly and degrade the quality of the existing services. When this happens, the ideal solution is for the affected parties to negotiate a satisfactory outcome amongst themselves.[21]

But, as emphasized above, these negotiations will take place most efficiently in parallel to an alternative outcome where the parties suppose an enforcement regime would reach a

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[17] *Id.*

[18] J. Gregory Sidak & Daniel F. Spulber, *Deregulatory Takings and Breach of the Regulatory Contract* 71 N.Y.U. L. Rev. 851, 935 (1996) ("Without protection of property there would be a reduction in incentives to invest, because there would be an increased risk that others would appropriate the returns to the investment. The classic example is the farmer planting crops in anticipation of reaping the harvest. Those who confiscate property or the productive returns created by the investment of resources are free riding on the efforts of others. Free riders create economic inefficiencies because they do not take account of the full costs associated with their behavior.").

[19] *See* Michael Trebilcock & Paul-Erik Veel, *Property Rights and Development: The Contingent Case for Formalization* 30 U. Pa. J. Int'l Law 397, 399–400 (2008) ("[I]t has become conventional wisdom amongst most economists that, whatever else the state does, it should provide effective institutions and processes to protect private property rights and enforce contracts, which are regarded as pre-requisites to efficient and dynamic market economies. In the words of two prominent law and economics scholars in a forthcoming book, Law and the Poverty of Nations, 'inadequate institutions to enforce property and contract law is the most pervasive and fundamental defect in the legal framework of poor countries.' On this view, law plays a critical role in promoting economic development and should be accorded the highest developmental priority.").

[20] *Id.*

[21] *See* David B. Spence & Paula Murray, *The Law, Economics, and Politics of Federal Preemption Jurisprudence: A Quantitative Analysis* 87 Cal L.R. 1125,1204 n.303 (1999) ("[T]he Coasean view advocates private negotiated solutions to externality problems.").

timely, predictable, and fair result if the parties do not. Otherwise, the least-adversely effected party has little incentive to negotiate (preferring the maintain the status quo at no cost to itself). As Einer Elhauge explains:

> Coasean bargaining and the so-called 'private ordering' actually depend on the…definition and enforcement of contract and property rights. Without…legal enforcement, such contract and property rights would be meaningless, and Coasean bargaining and the resultant 'private ordering' would be impossible.[22]

Moreover, not only does this poor enforcement frustrate negotiations between private parties themselves, but in turn, it degrades the value of spectrum overall because outside parties—in light of these difficulties they observe—become less inclined to invest in spectral resources.

II. EXISTING ENFORCEMENT PROCEDURES REFLECT PAST SPECTRUM MANAGEMENT PRACTICES

The migration to flexible use and market-based apportionment of spectrum represents a salutary development within the regulatory landscape. But, as Section I explains, a commitment to these policies alone is insufficient to assure a robust, well-functioning spectrum market. Thus, it is also incumbent on the FCC to ensure that the necessary structural components of an efficient market (*viz.*, appropriate rights definition *and* an enforcement mechanism) are in place if the spectrum market is to function effectively. Accordingly, the time is ripe for the Commission to consider matters of effective enforcement in existing open dockets and to issue an NOI to solicit public comment about the adequacy of the enforcement procedures it uses to resolve spectrum interference conflicts.

The FCC's current enforcement regime has yet to adapt and become well-equipped to resolve interference conflicts between private parties that arise in the flexible use and market-

[22] *See* Einer R. Elhauge, *Does Interest Group Theory Justify More Intrusive Judicial Review?* 101 Yale L.J. 31, 97 (1991).

based contexts. Enforcement mechanisms[23] currently available to the FCC (*viz.*, basic policing through the Enforcement Bureau and rulemaking) remain largely tailored to the needs of command-and-control regulation. That is, existing procedures focus almost entirely on the rights afforded one party through a license issued and regulated by the FCC.[24] As the Commission transitions to flexible and market-based approaches, the importance of the vertical relationship between the FCC and the license-holder becomes secondary. Instead, horizontal private ordering between the parties themselves becomes the primary focus.[25] Accordingly, the Commission's enforcement proceedings must evolve to better reflect the reality of inter-licensee conflicts, often involving circumstances where multiple parties are operating within their granted licenses, rather than focusing on permissions afforded an individual party from the FCC. At present, when disputes arise between private parties, the available options - rulemaking and basic policing – often do not provide efficient mechanisms to reach timely, predictable, and fair solutions. Instead, as the next two subsections explain, rulemaking is generally too protracted to efficiently

[23] *See* Practicing Law Institute, *FCC Enforcement Bureau Website Documents* 1294 PLI/Corp 11, 16 (2002) ("The Federal Communications Commission is the primary organization responsible for enforcement of the provisions of the Communications Act and the FCC's implementing rules. The FCC has the authority to investigate possible rule violations and to take enforcement action, if warranted. The FCC, itself, does not have the authority to take criminal action against those who violate the Communications Act…The FCC's enforcement authority is governed by the Communications Act of 1934. The Act provides the Commission with a variety of tools to investigate violations and to ensure compliance with the Act and the Commission's rules.").

[24] *Cf.* Pablo T. Spiller & Carlo Cardilli, *Towards a Property Rights Approach to Communications Spectrum* 16 Yale J. Reg. 53, 59 (1999) ("[S]pectrum, such as the original 800 megahertz (MHz) cellular bands, [is] left with a hybrid legacy of vague property rights and continuing command-and-control regulation.").

[25] *See* Patrick S. Ryan, *Application of the Public-Trust Doctrine and Principles of Natural Resource Management to Electromagnetic Spectrum* 10 Mich. Telecomm. & Tech. L. Rev. 285, 288 (2004) ("At present the FCC employs a command and control philosophy to manage the electromagnetic spectrum. This means that the FCC centrally controls the spectrum, that neither individuals nor companies may broadcast on it without first getting the FCC's permission in the form of a license, and that they must later go back to the FCC for permission to make any changes in the way they use the license."); Abbot B. Lipsky, Jr., Note, *Reconciling Red Lion and Tornillo: A Consistent Theory of Media Regulation* 28 Stan. L. Rev. 563, 583 (1976) ("This regulatory strategy [private property rights] would remove the government from direct determination of the particular individuals who are allowed to broadcast, leaving this decision to market forces, and would avoid the need for specific behavioral commands and sanctions now necessary to secure compliance by broadcasters with the various obligations imposed by the public interest standard. Primary responsibility for allocation decisions would be given to private parties.") (internal citations omitted).

adjudicate conflicts between parties and basic policing is too limited in scope to resolve the full array of issues that can arise in a dispute between private parties.

A. Rulemaking. Rulemaking[26] is a thorough process, but it is typically too slow to efficiently resolve interference conflicts between private parties in a commercially practicable timeframe.[27] The fundamental problem is that, rather than treating interference disputes as adjudicatory matters to be resolved by courts, the FCC approaches private conflicts as licensing issues to be resolved in the context of its licensing authority.[28]

However, rather than treating this as an *ex post* problem of private ordering to be resolved by an adjudicatory process, the FCC's current rules contemplate reopening the licensing process as the primary means of redressing this interference dispute. Therefore, a more nuanced interpretation must consider the extent to which inefficiencies are introduced into the dispute resolution process because the negotiations occur in the shadows of a licensing process rather than an adjudicatory one.

B. Enforcement Bureau. The other enforcement option available to private parties is

[26] Herein, the term "rulemaking" is used broadly to connote the wide array of rulemaking and adjudicatory powers afforded the FCC under the Administrative Procedure Act (APA). *See generally* William S. Jordan, III, *Ossification Revisited: Does Arbitrary and Capricious Review Significantly Interfere with Agency Ability to Achieve Regulatory Goals Through Informal Rulemaking?* 94 Nw. U. L. Rev. 393, 394 n.3 (2000) ("The APA distinguishes between rulemakings, which require public notice and produce agency rules that have the force and effect of law, and adjudications, which do not require notice and produce agency decision that are analogous to court decisions, affecting only the parties to the particular proceeding. The APA also distinguishes between "informal" proceedings and proceedings that are required by statute to be 'formal,' though the APA does not actually use these terms. Statutes are rarely found to require formal rulemaking.") (internal citations omitted).

[27] Goodman, *supra* at 338–39 ("The FCC has its own standard of liability for spectral interference. Interference is of regulatory concern only when it amounts to 'harmful interference,' defined as '[i]nterference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service.'…These decisions are premised on judgments about harmful interference and about which party should bear responsibility for causing and abating such interference…Although these disputes are generally articulated in the context of a rulemaking proceeding rather than in a complaint process, the FCC acts like a court in determining how much service disruption constitutes harmful interference on a case-by-case basis.") (internal citations omitted).

[28] Note that the FCC has the authority to structure dispute resolutions in a manner akin to common law courts, but that it has to this point eschewed this strategy. *See e.g.*, 5 U.S.C. § 554 (formal adjudications); 5 U.S.C. § 555 (informal adjudications).

the basic policing offered through the Enforcement Bureau (EB).[29] However, although the EB is effective at resolving interference disputes quickly where a user is operating in clear violation of FCC rules, such as a pirate broadcaster, it is not designed to handle wide-ranging interference conflicts between commercial enterprises. The basic problem is that the EB is only equipped to investigate the existence of interference, while the issues at stake in private disputes often involve far more than the mere existence of interference, extending into the various business' operations as a whole.

In contrast, an adversarial, court-like setting merits consideration. Such an approach would allow private parties to more-thoroughly present their concerns and to develop the full range of facts necessary to examine the entire scope of an interference dispute—ensuring that the incentive structure necessary to facilitate bargaining properly envelopes all of the rights implicated in a dispute.

III. EFFECTIVE ENFORCEMENT REFORM ALIGNS WITH CURRENT TRENDS FOR SPECTRUM MANAGEMENT REFORM

Consideration of effective enforcement regimes is well aligned with current trends in spectrum management. Additionally, such a focus tracks well with Congressional and other efforts for spectrum management reform designed to enhance efficiency and promote innovation.

The National Broadband Plan aims to repurpose 500 MHz of "beachfront" spectrum between 225 MHz and 3.7 GHz for wireless broadband use in the next ten years.[30] This ambitious goal highlights the importance of creating new and efficient uses of spectrum. The reallocation of this spectrum will invariably create more crowding within the bands allotted. As

[29] Practicing Law Institute, *FCC Enforcement Bureau Website Documents* 1294 PLI/Corp 11, 16 (2002) ("The FCC's Enforcement Bureau is primarily responsible for enforcement of most of the provisions of the Communications Act as well as enforcement of the Commission's rules, orders and authorizations.").
[30] *See supra* note 3.

seen above, this crowding will require effective enforcement regimes to resolve issues of spectrum interference.

Furthermore, the current debate over the use of TV white spaces also illustrates the need for careful consideration of effective enforcement systems. As mentioned in the Dynamic Spectrum NOI, the 2008 white space rules seek more intensive use of formerly under-utilized bands. The use of TV white spaces is just one of many proposals to spur more effective and intensive use of spectrum through the application of new technologies.

In addition, Congress has two notable efforts currently under consideration with consequences for current spectrum management practices. The Reforming Airwaves by Developing Incentives and Opportunistic Sharing Act ("RADIOS"), sponsored by Senators Kerry and Snowe, and the Wireless Innovation and Spectrum Enhancement Act ("WISE"), sponsored by Senator Hutchinson, each call for a more intensive use of spectrum. Both proposals also include an inventory of existing spectrum to further study the overall spectrum ecosystem.

IV. CONCLUSION

For these reasons, the Commission should consider the increased number of enforcement proceedings and adjudications of disputes that will arise with more efficient uses of spectrum. Overall, the Commission should consider adequate spectrum interference resolution as a crucial dimension of effective spectrum management practices.

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