Before the
Federal Communications Commission
Washington, DC 20554

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

To: The Commission

COMMENTS OF THE
TELECOMMUNICATIONS INDUSTRY ASSOCIATION

I. INTRODUCTION AND SUMMARY

The Telecommunications Industry Association (TIA) hereby submits comments to the Federal Communications Commission (Commission) in the above-captioned proceeding.[1] TIA commends the Commission for investigating ways to introduce greater innovation and efficiency into the nation's use of radio spectrum.

TIA represents the global information and communications technology (ICT) industry through standards development, advocacy, tradeshows, business opportunities, market intelligence and world-wide environmental regulatory analysis. For over 80 years, TIA has enhanced the business environment for broadband, mobile wireless, information technology, networks, cable, satellite, and unified communications. TIA is accredited by the American National Standards Institute (ANSI).

[1] *Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies*, ET Docket No. 10-237, Notice of Inquiry (rel. Nov. 30, 2010).

As the Commission evaluates policies that may encourage the use of dynamic spectrum sharing technologies, TIA believes that regulatory focus is needed on meeting the spectrum demands of the industry in the designated timeframe, and should not be reliant upon as-yet unproven technical capabilities for near-term solutions whether DSA or other technologies and techniques.

If sharing policies associated with dynamic spectrum access (DSA) are adopted, TIA urges that the Commission avoid a "one-size-fits-all" policy approach that does not take into account the unique services provided in various spectrum bands as well as the characteristics of different frequency bands. Commercial adoption of such sharing models will be subject to a variety of economic, technological, operational and regulatory realities. At the same time, there are still many uncertainties concerning regulatory and business aspects of such new models. Therefore, TIA supports a broad, multi-factor analysis for any sharing arrangements, especially those supporting emergency and real-time services, so that sharing arrangements tailored to the services and frequency bands are adopted.

II. THE COMMISSION SHOULD MAINTAIN INTERFERENCE PROTECTION FOR PRIMARY LICENSEES

TIA strongly urges the Commission to continue adopting policies and rules that maintain the principle of protecting services in primary licensees' allocations.[2] Providing this fundamental

[2] For example, the Commission has adopted rules allowing for shared use between TDMA and CDMA MSS operators in the 1618.25-1621.35 MHz and 2483.5-2500 MHz bands, encouraging these operators to "explore economic solutions for coordination such as compensating one licensee for not using a portion of spectrum in a particular geographic zone where the requesting licensee's operations require additional capacity." *See Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6 /2.4 GHz Bands*, IB Docket No. 02-364, *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3*

protection is consistent with the statutory requirement that the Commission's spectrum management policies, among other effects, encourage new technologies and services, ensure efficient use of spectrum, and protect primary licensees from harmful interference.[3] The Commission has, in other matters seeking to develop more efficient spectrum use, noted its overarching concerns with the protection of primary licensee use of spectrum.[4] In addition, as far back as 2002, the FCC's Spectrum Policy Task Force's Interference Protection Working Group stated:

> Interference protection is central to effective spectrum management. Electromagnetic interference plays a pivotal role in the design and operation of telecommunications equipment and systems, and related costs…Interference protection is fundamentally related to spectrum rights and obligations. It also affects the efficiency of spectrum use. Regulatory interference protection standards that are too lax could prove detrimental to existing or planned services. Conversely, standards that are overly protective could prevent or impede the introduction of new services and technologies…Interference protection has always been a core responsibility of the Commission.[5]

The Commission's ongoing protection of primary licensees in the context of this proceeding and others involving future spectrum sharing technologies will ensure the ability to provide reliable,

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GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, FCC 04-134 (rel. Jul. 16, 2004) at ¶ 54.

[3] 47 U.S.C. § 303(f)-(g).

[4] *See Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees*, WT Docket No. 10-153, *Request for Interpretation of Section 101.141(a)(3) of the Commission's Rules Filed by Alcatel-Lucent, Inc., et al.*, WT Docket No. 09-106, *Petition for Declaratory Ruling Filed by Wireless Strategies, Inc.: Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules Filed by Fixed Wireless Communications Coalition*, WT Docket No. 07-121, Notice of Proposed Rulemaking and Notice of Inquiry (rel. Aug. 5, 2010) at ¶ 6.

[5] Federal Communications Commission, *Spectrum Policy Task Force Report* (2002).

continuous service to customers and add value to the protected licenses.[6] This, in turn, will encourage investment in infrastructure, service, devices, and applications by offering heightened certainty from a regulatory perspective.

III. THE COMMISSION SHOULD ESTABLISH CLEAR REGULATORY CONDITIONS

As the Commission considers rules to encourage dynamic spectrum access technologies, it must make band-by-band assessments of spectrum with regard to suitability for dynamic spectrum sharing. Specifically, there may be particular scenarios where some sharing practices may greatly enhance the ability to use spectrum and may provide efficient ways of repurposing spectrum for specific uses. In other instances, this may not be the case. For example, spectrum used for wide area, broadband networks, including satellites, is best served using licensed and globally harmonized spectrum. For CMRS service providers, the fact remains that network reliability, coverage, and capacity are critical to a licensee's ability to provide services to customers. This competitive pressure drives wireless companies to invest billions of dollars each year to expand their service territories, improve the quality of their service, increase the capacity of their networks, and bring innovative services to consumers across the country.

Further, the band-by-band analysis approach is consistent with the recommendations in National Broadband Plan.[7] This approach reflects the fact that evolving licensed spectrum sharing

[6] Goodman, Ellen P., *Spectrum Equity*. Journal of Telecommunications and High Technology, Vol. 4, No. 101, 2005 at 195, *available at* http://ssrn.com/abstract=849568 (noting that, while the value of interference entitlements are difficult to determine, providing a licensee with interference protection increases the value of the licensee's license).

[7] *Connecting America: The National Broadband Plan*, Federal Communications Commission, March 2010 *at* 29 (recommending that "tools to influence competition… are best applied on a fact-driven, case-by-case basis.").

technologies properly focus on conditions specific to services in a particular band or particular set of bands and the services those bands support. Successful licensed spectrum sharing models require deliberate technology research and development that is tailored to a specific band and its authorized uses, and that require technical characteristics of new proposed uses to be specified and therefore will be introduced over time.

For example, since 2006, the use of dynamic frequency selection (DFS) has enabled sharing in overlapping frequencies between 5 GHz Wireless local area networks (LANs) and U.S. Government radar uses. However, reports of related interference continue to date,[8] and further development of this band-specific and system-specific sharing mechanism continues.[9] Aside from noting the resulting uncertainty to manufacturers attempting to market devices for use in these bands as well as resources expended by industry and the government to resolve this situation, TIA submits that this example illustrates that sharing arrangements can be successful but will need to consider both the band characteristics and band use requirements. Therefore, a "one-size-fits-all" approach can create regulatory and operational uncertainty and drain government resources, impeding progress on the development and adoption of innovative spectrum sharing technologies.

[8] *See* FCC Memorandum, Elimination of Interference to Terminal Doppler Weather Radar (TDWR) (July 27, 2010). *See also* Briggs, Mark, *Dynamic Frequency Selection (DFS) and the 5GHz Unlicensed Band*, June 2010, *available at* http://www.elliottlabs.com/documents/dynamic_frequency_selection_combined.pdf.

[9] *See* Presentation of the National Telecommunications and Information Administration (NTIA), *5 GHz DFS Technology Development and Deployment: Challenges Met and Lessons Learned*, DSO Emerging Spectrum Technology Workshop (Sept. 13-14, 2010), available at http://estworkshop.com/MYDOX/Frank%20Sanders%20-%20DFS%20and%20Radar%20Interference.pdf.

TIA suggests that some uses and services are unlikely candidates for spectrum sharing. For example, the cellular industry has excelled in the efficient utilization of spectrum, and has reached a point where utilizations in time, frequency, space and code domains are managed to an extent that would be very difficult to match with a system where unbridled sharing was allowed, even if aided by the use of sensing, database methods or other techniques. Specifically, spectrum dedicated for wide area mobile broadband network use must remain free from sharing requirements.[10] Additionally, the 25 MHz block near the 1.2 GHz used for the GPS L2 signal, as well as frequencies that are NATO-harmonized for international communication, have recently been identified as not conducive to sharing.[11] Sharing rules imposing low power, duty cycles, strict out of band emission (OOBE) limits, limits to spectrum access during specific times, and limits to using specific frequencies and/or at specific locations may impede on critical uses demanded from each sharing licensee to such a degree that shared use becomes unfeasible. Further, some satellite bands may have difficulty dynamically sharing spectrum with terrestrial uses due to earth stations' operating as receive-only sites. Industry and the ITU[12] are currently evaluating methods (e.g. database access) to facilitate sharing between Fixed Service Satellite (FSS) and International Mobile Telecommunications (IMT) systems in these bands.

[10] *See* Middleton, Gareth, et al, *Inter-Operator Spectrum Sharing in a Broadband Cellular Network* (Aug. 2006), *available at* http://www.ece.rice.edu/~gbmidd/papers/ISSSTA06.pdf (noting that, even with a packet-based cellular sharing framework, the operating point is rarely achieved in wide area broadband networks).

[11] Lenard, Thomas M., et al, *Increasing Spectrum for Broadband: What Are The Options?* (rev. February 2010) *at* 21, *available at* http://web-docs.stern.nyu.edu/old_web/economics/docs/workingpapers/2010/Lenard,%20White,%20Riso_Increasing%20Spectrum%20for%20Broadband.pdf.

[12] *See* Document 5D/TEMP/445-E, Preliminary draft new Recommendation ITU-R M.[IMT.MITIGATION], 9th Meeting of Working Party 5D, Chongqing, China, 19. Oct. 2010.

Additionally, the operation of mobile broadband networks are increasingly dynamic due to the mobility of users, inevitably increasing occurrences of signal degradation from both naturally occurring (atmospheric) and man-made (leaking of electric power sources, building penetration), and interference sources. By utilizing sound technical analyses, industry participants, the FCC, and, where federal use is involved, the NTIA, are in the best position to identify whether a given band and its service is suitable for spectrum sharing models, and TIA further encourages the use of tailored, band-specific evaluations that will make certain the correct degree and type of sharing characteristics to be used in respective bands. Nonetheless, TIA encourages research and development efforts to mature spectrum sharing technologies that may in the future enable further maximization of use of spectrum.

IV. THE COMMISSION SHOULD ADDRESS THE NEEDS OF THE INDUSTRY WHEN DEVELOPING SHARING TECHNOLOGY POLICIES

TIA strongly urges the Commission to develop policies on existing or new sharing technologies based upon avoiding interference and ensuring technological and operational feasibility. Beyond these threshold factors, the Commission should also apply a set of criteria to ensure that spectrum sharing will serve the public and can support the services demanded by the consumer. For instance, standards such as LTE are able to support data rates of over 300 Mbs/cell in the wide area and 1 Gb/s indoors in controlled simulation tests. Sufficient quantities of licensed spectrum are needed in order to address demand for high data rate coverage, Quality of Service (QoS), and capacity. It is not correct to assume that shared usage will necessarily increase spectrum efficiency above services like cellular where the demands for capacity and services have pushed the state of the technological to significant degrees of efficiencies. High data rates

need a wide bandwidth; 4G networks will need 100 MHz of spectrum, preferably contiguous, to achieve peak capability. Therefore, policymakers should not divorce the operational, effective, and economic case from an evaluation of technical capabilities; the existence of a sharing technology should not, by itself, justify regulatory action, but should be one of multiple factors for each specific service and band.

It is clear that the cycle of innovation and investment in the cellular industry has depended on a pricing model for spectrum. The progressive granting of even larger parcels of spectrum as systems and technologies evolve to handle the complexities of supporting larger bandwidths and higher data rates has worked to the benefit of consumers. There is great motivation within the cellular industry to continue to deliver the full potential of the technologies under development.

Moreover, DSA, currently under development by the Department of Defense (DOD) and industry, is one new sharing technology with potential to enhance spectrum management and should be employed to encourage increased spectrum efficiency.[13] DSA may enable use of a given frequency at a given geography and a period of time when not otherwise used by an authorized or licensed user. While this technology is under continual development, its use – as noted by the NTIA's Commerce Spectrum Management Advisory Committee (CSMAC) Interference and Dynamic Spectrum Access Subcommittee's recent Final Report – should be evaluated on a case-by-case basis as it may create unique challenges to mitigating interference to different system architectures and will need to be examined as they become available. Thus, DSA should be adequately researched and developed before it can be considered as a means to

[13] *See Interference and Dynamic Spectrum Access Subcommittee Final Report*, CSMAC at 7 (Nov. 8, 2010) (2010 CSMAC Interference and DSA Report).

avoid interference and occurrences of sensing "false alarms" that may cause a device to cease functioning. Further, the overall DSA system architecture and how it will interact with the communications ecosystem as a whole must be assessed.[14]

Meanwhile, the value of shared access for wide area coverage is dependent on the extent to emergency and real-time services can be supported. This in turn is dependent on the ability of a service provider to exert ownership of the spectrum within certain defined constraints such as traffic loading or geographical or timing limitations, with implicit guarantees of quality. The constraints imposed by the sharing environment will determine whether real-time services can be supported or is the spectrum only suitable for best-effort services.

VI. CONCLUSION

Creating a successful sharing environment is determined by consideration of many factors, including the economic model, whether spectrum can be used nationwide, whether limitations are in significant markets, whether the considered spectrum is valuable enough to warrant innovation, is adjacent to or complements existing bands/services, is contiguous in large blocks, and is suitable for mobility. Best-effort services can only be considered a complement to licensed spectrum and will not be able to support Commission mandates and real-time services as envisioned by the National Broadband Plan. The future maturity of a sharing technology should not, by itself, justify adoption of that technology. Multiple factors need to be considered, including impact on licensed users to continue to provide services to its customers.

[14] *See Id.* at 8 ("Sound spectrum policy requires a realistic assessment of the interference avoidance mechanisms of DSA techniques, through additional testing and evaluation, including NTIA's ongoing Test-Bed initiative.").

Therefore, there is an urgent need to allow for comprehensive and unprejudiced studies on different approaches of accessing and utilizing spectrum while keeping in mind the need to satisfy mass-market demands for value based mobile broadband services. In particular, attention is drawn to keep decisions about sharing spectrum separate from those pertaining to meeting the needs of the commercial mobile broadband to insure adequate and timely resources are made available.

For the foregoing reasons, TIA urges the Commission to adopt policies consistent with the recommendations above.

Respectfully submitted,

TELECOMMUNICATIONS INDUSTRY ASSOCIATION

By: */s/ Danielle Coffey*

Danielle Coffey
Vice President, Government Affairs

Patrick Sullivan
Director, Technical and Government Affairs

TELECOMMUNICATIONS INDUSTRY ASSOCIATION
10 G Street N.E.
Suite 550
Washington, D.C. 20002
(202) 346-3240

February 28, 2011