Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
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Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies	)	ET Docket No. 10-237
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REPLY COMMENTS OF CTIA - THE WIRELESS ASSOCIATION®

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March 28, 2011

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SUMMARY

CTIA—The Wireless Association® ("CTIA") submits the following reply comments in response to the record compiled in the above-captioned proceeding. As explained in these reply comments, the demand for wireless services is fast outstripping available capacity. CTIA supports the goal of enabling efficient use of our nation's spectrum resources and details the many spectrum efficient technologies that mobile wireless providers are deploying. At the same time, efficiency gains alone will not meet the increasing demand for mobile services and there can be no dispute that substantially more spectrum is needed to maintain and build upon the wireless industry's record of investment, innovation, and ever-expanding services to consumers. CTIA once again commends the Commission and the Administration for their continued commitment to repurpose 500 MHz for wireless broadband services over the next 10 years.

The record demonstrates that mobile wireless providers are efficiently and intensively using their spectrum to deliver state-of-the-art mobile services. Wireless providers have been able to achieve this high level of spectrum efficiency in part through the use of dynamic spectrum access technologies within their own networks. In addition, wireless providers have focused on spectrum re-use to help achieve efficiency gains through the deployment of smaller and smaller cells where market demands warrant.

Industry and public interest advocates largely agree that mobile wireless spectrum is inappropriate for forced sharing through third-party dynamic spectrum access. The record demonstrates that mobile wireless spectrum is densely used and highly congested. Thus, any autonomous or involuntary dynamic spectrum access would raise the substantial risk of harmful interference and jeopardize the quality and efficiency of mobile services. The record also demonstrates that current spectrum sensing technologies are inadequate to protect mobile services from harmful interference. The challenge of sensing mobile use stems in part from the multitude of signal types, the low power transmissions and increasingly low signal to noise ratio in mobile wireless networks. Moreover, involuntary third-party dynamic spectrum access in licensed mobile wireless spectrum would be unlawful.

Finally, CTIA reiterates that, before extending any widespread dynamic spectrum access policy, the Commission must develop and implement a rigorous enforcement regime to protect against harmful interference. However, the record fails to offer any such meaningful enforcement regime. Once devices are authorized and deployed, there is no effective way to remove these devices, even if operating unlawfully and causing harmful interference. The risk of harmful interference is especially acute with policy radios where field configurable operating parameters have the real potential to be modified in a manner that allows these devices to operate outside of acceptable limits.

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CTIA—The Wireless Association® ("CTIA") hereby submits these reply comments in response to the record compiled in the above-captioned proceeding. The record demonstrates that mobile wireless providers are efficiently and intensively using their spectrum to deliver state-of-the-art mobile services, relying in part on dynamic sharing technologies within their own networks. Commenters largely agree that mobile wireless spectrum is inappropriate for forced sharing with third-party, autonomous operations. More broadly, as the Commission considers any widespread dynamic spectrum access policy, it must set forth a rigorous enforcement regime.

I. INTRODUCTION

Innovation is the hallmark of the wireless industry, and in the past year the industry has delivered further 3G deployment and the dramatic emergence of 4G networks, the introduction of tablets and other cutting edge devices, and a multitude of exciting and inventive new applications, from mobile health to location-based technologies, and much, much more. As Chairman Genachowski recently noted:

> Everywhere you look, mobile is becoming a staple of the workplace, increasing productivity and contributing to our economy – from managing crops on a farm to managing inventory at Best Buy. Thanks to Skype, Facebook, Twitter and many others, mobile has become an incredible platform for connecting friends and families, kids on one end of the country to grandparents on the other.[1]

As Chairman Genachowski's remarks reflect, and as the ever-increasing mobile wireless subscribership and usage trends confirm, any suggestion that the business model for today's mobile industry is "anti-consumer" is pure folly.[2]

Studies demonstrate that the demand for wireless service is fast outstripping available capacity. The FCC issued a report in October 2010 examining the projected growth in wireless traffic demand, relying on work conducted by three respected industry sources, Cisco Systems, Coda Research, and the Yankee Group. Based on an averaging of the three reports, the research projected significant growth in mobile data traffic from 2009 levels – by a factor of five by 2011, more than 20 times by 2013, and reaching 35 times 2009 levels by 2014.[3] Notably, "in all three forecasts, the trend remains upward in 2014, implying continued growth beyond the forecast period."[4]

With all this growth, the demand for spectrum resources is skyrocketing. CTIA thus supports the inquiry's goal of "enabl[ing] more efficient utilization of our nation's precious

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[1] Prepared Remarks of Chairman Julius Genachowski, *The Clock is Ticking*, at 5 (Mar. 16, 2011).

[2] Comments of the Public Interest Spectrum Coalition at 2 ("PISC Comments"). PISC includes the following organizations: Benton Foundation, Free Press, Media Access Project, New America Foundation, and Public Knowledge. *Id.* at 1 n.1.

[3] FCC Staff Technical Paper, *Mobile Broadband: The Benefits of Additional Spectrum*, at 9 (Oct. 2010).

[4] *Id.*

spectrum resource."[5] The record demonstrates that mobile wireless providers are making efficient and intensive use of their licensed spectrum, and already incorporate dynamic sharing technologies in their networks.

CTIA takes this opportunity once again to commend the Commission and the Administration for their continued commitment to repurpose 500 MHz of spectrum for wireless broadband services over the next 10 years. Even with billions of dollars invested in next-generation technologies, including the use of femtocells, picocells, and Distributed Antenna System ("DAS"), that increase the efficient use of spectrum, there can be no dispute that substantially more spectrum is needed to maintain and build upon the wireless industry's record of investment, innovation, and ever-expanding service to the American people.

CTIA encourages the marketplace, and the Commission, to continue to explore innovative wireless technologies, including dynamic sharing, but cautions that any consideration of dynamic spectrum access by third-party or autonomous end-user devices must be band-by-band and should not involve spectrum used for commercial mobile wireless services.

II. THE RECORD DEMONSTRATES THAT MOBILE WIRELESS PROVIDERS, THROUGH EXCLUSIVE-USE LICENSES, ARE EFFICIENTLY USING THEIR SPECTRUM TO DELIVER STATE-OF-THE-ART MOBILE BROADBAND SERVICES.

Mobile wireless providers are the most intensive users of spectrum, and are constantly increasing that efficiency through continued investment in new technologies, including dynamic spectrum access technologies, that allow mobile networks to carry an ever-increasing amount of voice and data traffic.[6] Today, mobile providers employ a range of sophisticated sharing

[5] *Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies*, Notice of Inquiry, 25 FCC Rcd 16632, 16632 ¶ 1 (2010) ("*NOI*").

[6] *See, e.g.*, Comments of T-Mobile USA, Inc. at 2 ("T-Mobile Comments") ("T-Mobile efficiently and effectively utilizes its current spectrum . . . to offer customers 4G service using

techniques, including modulation and coding methods that change dynamically to enable the highest possible data transfer rates. With the deployment of 4G, carriers are also incorporating dynamic spectrum access technologies to help further increase the efficiency of their networks. For instance, LTE "uses sensing technologies in conjunction with advanced scheduler algorithms to optimize spectrum use."[7] LTE also incorporates "adaptive modulation that adjusts and optimizes spectrum usage according to the RF environment, dynamic power controls that adjust and optimize power levels a thousand times per second, advanced spectrum management techniques, [and] MIMO antenna systems that use multiple polarities and diversity transmit and receive algorithms such as spatial-multiplexing . . . ."[8]

Claims to the contrary are simply unfounded.[9] As an initial matter, mobile wireless providers are continuing to increase spectrum re-use by deploying smaller cells in areas where mobile services are most heavily used. For example, mobile wireless providers are regularly using Outdoor Distributed Antenna System ("ODAS") to improve coverage and capacity by

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HSPA+ technology . . . ."); Comments of AT&T Inc. at 9 ("AT&T Comments") ("AT&T already employs cognitive radio techniques in its network that allow wireless base stations to sense and schedule traffic and thus achieve better efficiency."); Comments of Verizon Wireless at 8 ("Verizon Wireless Comments") ("The advanced technologies wireless carriers are deploying today often use dynamic spectrum access technologies and ensure CMRS networks operate at the optimum level of spectrum efficiency and utilization."); Comments of Ericsson at 3 ("Ericsson Comments") ("[T]he cellular industry has excelled in the efficient utilization of spectrum and has utilized time, frequency, space and code domains to an extent that would be very difficult for a system of unbridled sharing to match . . . .").

[7] Verizon Wireless Comments at 8.

[8] *Id.* *See also* AT&T Comments at 9 ("AT&T continues to work with standards bodies, such as the Third Generation Partnership Program ("3GPP"), to improve and extend the uses for [cognitive radio] techniques."); T-Mobile Comments at 2 ("T-Mobile is investigating HSPA+ enhancement features including high speed download packet access by means of carrier aggregation and uplink transmit diversity.").

[9] *See* PISC Comments at 8.

dividing a macrocell into several lower-power spatially separated smaller cells.[10] Typically, ODAS utilizes a utility pole for each antenna site, rather than a traditional tower.[11] It is worth noting that using utility poles also generally provides ready access to backhaul through fiber already deployed on the utility poles (or at least an ability to install fiber relatively affordably).[12] By using an increased number of smaller cell sites, a carrier can further increase the re-use of its spectrum to help meet the growing demand for mobile services.[13]

In addition, mobile wireless providers have utilized even smaller cells to re-use spectrum and supplement coverage where a macrocell may not readily reach, including femtocells (*i.e.*, personal cell sites for home and/or office) and picocells (*i.e.*, small cell sites controlled and installed by the mobile wireless provider in public spaces where mobile services are heavily used such as malls, casinos, and airports).[14] The record also reflects emerging spectrum-efficient technologies such as heterogeneous networks ("Hetnets"). As explained by Qualcomm, Hetnets

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[10] *See, e.g.*, Kevin Fitchard, *LTE Deployments Driving New Distributed Antenna Deployments*, CONNECTED PLANET, Mar. 15, 2010, http://connectedplanetonline.com/3g4g/news/LTE-driving-distributed-antennas-0315/ (discussing carriers' increased use of ODAS with LTE deployments); Lynnette Luna, *AT&T Looking to Small-Cell Architecture to Cope with Data Influx*, FIERCEBROADBANDWIRELESS, Mar. 10, 2011, http://www.fiercebroadbandwireless.com/story/att-looking-small-cell-architecture-cope-data-influx/2011-03-10 ("AT&T is proposing to build some 80 new small-antenna tower sites on top of utility poles across downtown Palo Alto, Calif., in a bid to bolster voice and data capacity in areas that experience heavy data traffic.").

[11] *See, e.g.*, Dr. Charles L. Jackson, *Observations on Pole Access for Wireless Carriers*, at 1 (Mar. 17, 2011), *attached to Ex Parte* Letter from Brian M. Josef, Assistant Vice President, Regulatory Affairs, CTIA to Marlene H. Dortch, Secretary, FCC, WC Docket No. 07-245 (Mar. 17, 2010); Fitchard, *supra* note 10.

[12] *See* Jackson, *supra* note 11, at 2.

[13] *See id.* at 2, 4; Fitchard, *supra* note 10; Luna, *supra* note 10.

[14] *See* Verizon Wireless Comments at 18 ("Licensees and other businesses in coordination with licensees are deploying picocells, femtocells, and distributed antenna systems that allow CMRS licensees to utilize fully spectrum that otherwise lacks adequate coverage and capacity.").

will use adaptive interference management and interference cancellation to enable the overlap and integration of macro-, pico-, and femto-cells, allowing even greater frequency re-use and increased network capacity.[15] These examples demonstrate that carriers are finding innovative ways to intensify the re-use of their spectrum where market demands warrant such an approach. Indeed, Kris Rinne, Senior Vice President, Architecture and Planning of AT&T Mobility, recently explained that "[t]he LTE Advanced standards work includes many of the things required for heterogeneous networks. We see exciting opportunities to enhance coverage and capacity through small cells."[16]

Wireless providers are also utilizing a diversity of approaches to move the increased traffic off of densely used mobile wireless spectrum and onto the network. In some instances, use of smaller cell sites such as utility poles offer ready access to a fiber network.[17] In other instances, CMRS carriers have deployed Wi-Fi hotspots in areas of heavy use to help offload mobile data traffic from their cellular networks.[18] Femtocells also help offload traffic from the carrier's network because these microcells typically use the subscriber's broadband connection to deliver traffic to the core network, rather than the wireless provider's network.[19] In addition,

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[15] Comments of Qualcomm Incorporated at 12 ("Qualcomm Comments").

[16] *See* Lynnette Luna, *AT&T's Rinne: HSPA+ to set LTE apart from competitors*, FIERCEBROADBANDWIRELESS, Mar. 23, 2011, http://www.fiercewireless.com/ctialive/story/att-cto-talks-hspa-advantage-when-it-rolls-out-lte/2011-03-23#ixzz1HvaodC00.

[17] *See, e.g.*, Jackson, *supra* note 11.

[18] *See* PISC Comments at 10-11. *See also* T-Mobile, About T-Mobile HotSpot, http://hotspot.t-mobile.com/services_about.htm (last visited Mar. 16, 2011) (discussing T-Mobile Wi-Fi hotspots).

[19] Peter Rysavy, *Femtocells Suit Up For Work*, INFORMATIONWEEK (Feb. 2, 2009).

new technologies are being developed to help carriers optimize their subscribers' use of public and private Wi-Fi networks.[20]

These are just a few examples of how mobile wireless providers are finding innovative ways to make efficient use of spectrum. At the same time, the FCC has correctly recognized that multiple approaches will be required to meet the demand for mobile broadband services, and that additional spectrum is an essential piece of that equation. Indeed, none of these techniques by themselves will obviate the need for additional spectrum. As the FCC OBI concluded in assessing the impact of carriers' migration from 3G to 4G, "[e]ven accounting [for this increased efficiency], however, it is clear that additional spectrum will be needed to meet mobile demand."[21]

Further, any claims of hoarding or "warehousing" spectrum, or proposals for a "use it or share it" model, are meritless.[22] As Chairman Genachowski recently made clear, "[i]t is not hoarding if a company paid millions or billions of dollars for spectrum at auction and is complying with the FCC's build-out rules."[23] Licensees have market incentives to recoup the investment made in acquiring spectrum, either through build-out and the provision of service or

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[20] *See* Lynnette Luna, *WeFi Introduces Carrier Wi-Fi Offloading Solution for Third-Party Wi-Fi Networks*, FIERCEBROADBANDWIRELESS, Mar. 10, 2011, http://www.fiercebroadbandwireless.com/story/wefi-introduces-carrier-wi-fi-offloading-solution-third-party-wi-fi-network/2011-03-10. More generally, many smartphones today are Wi-Fi-enabled, allowing end-users to easily connect to any available Wi-Fi network as an alternative for data transmissions and to offload data traffic from the cellular network. *See, e.g.*, Bonnie Cha, *Making Connections: Smartphones With Wi-Fi*, CNET.COM, July 24, 2009, http://reviews.cnet.com/4321-6452_7-6610195.html.

[21] FCC Staff Technical Paper, *Mobile Broadband: The Benefits of Additional Spectrum*, at 15 (Oct. 2010).

[22] *See, e.g.*, PISC Comments at 5, 22-23.

[23] Prepared Remarks of Chairman Julius Genachowski, *The Clock is Ticking*, at 8 (Mar. 16, 2011).

secondary market access to the licensed spectrum, and efforts to seize access through forced sharing of such licensed spectrum only serves to create market uncertainty.

III. INDUSTRY AND PUBLIC INTEREST ADVOCATES LARGELY AGREE THAT MOBILE WIRELESS SPECTRUM IS INAPPROPRIATE FOR FORCED SHARING THROUGH THIRD-PARTY DYNAMIC SPECTRUM ACCESS.

A. Mobile Wireless Spectrum Is Densely Used And Congested.

Mobile wireless providers are only able to achieve the spectrum efficiency discussed above by densely re-using their spectrum and effectively managing congestion. Moreover, due to the highly mobile nature of the services provided, there are an increased number of variables to consider and a heightened susceptibility to harmful interference that make mobile wireless bands inappropriate for dynamic spectrum access.

Multiple parties recognize this reality. For instance, Microsoft explains that "because [CMRS] providers intensively use their spectrum, mandated access by smart radios would not be appropriate in spectrum bands licensed for their exclusive use."[24] PISC acknowledges that "frequency bands that are intensively and efficiently in use – such as the bands used for CMRS – are the least suitable candidates for spectrum band sharing" in built-out markets.[25] In addition, the IEEE Radio Regulatory Technical Advisory Group makes clear that the interest of most of its members "is not in exclusively licensed spectrum, rather it is in shared use spectrum [such as the TV white spaces spectrum], for which a robust geolocation database . . . is a reliable solution."[26] In addition, as Ericsson notes, even in less-populated rural areas where the mobile wireless

[24] Comments of Microsoft Corp. at 2 ("Microsoft Comments").

[25] PISC Comments at 28. *See also id.* ("There are many hundreds of MHz of high-quality spectrum in other bands, far more lightly used and better suited to opportunistic access, than are the PCS and other bands used by the commercial wireless industry.").

[26] Comments of IEEE 802.18 at 6 ("IEEE 802.18 Comments").

spectrum may be less densely used, exclusive use spectrum is still required to provide service throughout the larger cells typical of these areas.[27]

Ultimately, exclusive-use licenses enable carriers to manage access to their spectrum, ensuring the necessary quality of service for real-time and emergency services.[28] For instance, the Commission should recognize that shared systems cannot reliably support mandated services, including E911, priority service for public safety, CALEA, and telecommunications relay service.[29] Without an exclusive-use licensee providing central management, real-time services (emergency or otherwise) would compete for spectrum resources with third-party opportunistic devices, potentially undermining a carrier's ability to provide the quality of service required for these real-time services.[30] To that end, CTIA does not support the suggestion that the 2.5 GHz band would be appropriate for involuntary dynamic sharing.[31] Any such forced sharing within this licensed band would create a significant risk of interference to licensed services and inhibit further investment in mobile wireless broadband.[32]

[27] Ericsson Comments at 6-7.

[28] *Id.* at 5.

[29] AT&T Comments at 13; Ericsson Comments at 16.

[30] Ericsson Comments at 6; Comments of V-Comm at 17, *attached to* Verizon Wireless Comments ("V-Comm Attachment").

[31] Microsoft Comments at 9.

[32] Although CMRS centric, these comments generally apply to any exclusive-use band utilized for mobile wireless services, including for instance the 2.5 GHz band.

B. Current Spectrum Sensing Technologies Are Inadequate To Protect Mobile Services From Harmful Interference.

Today's sensing technologies cannot reliably detect mobile wireless spectrum use. As Motorola Solutions noted:

> Prototype [white space devices] had difficulty reliably sensing the presence of TV band incumbents, whose transmitters are fixed in nature, and typically very high power and high site. Reliable sensing of much lower-power handheld and portable two way radio transmitters will be orders of magnitude more difficult than detecting high power fixed transmitters.[33]

For starters, the challenge in sensing mobile use is due in part to the multitude of signal types operating in CMRS bands, including CDMA, EVDO Rev. 0, EVDO Rev. A, GSM, TDMA, SMR/IDEN, EDGE, UMTS, HSDPA, HSUPA, HSPA+, LTE, and WiMAX.[34] The complexity in sensing operations in commercial wireless bands will only increase as mobile providers continually adopt and integrate new technologies, which will include potentially very different signal types than are used today.

In addition, with each new generation of technology, mobile networks operate at lower power and a lower signal to noise ratio, making spectrum sensing that much more difficult.[35] As mobile networks use lower power and a lower signal to noise ratio, network operations become even more sensitive to interference.[36] Finally, geolocation databases will not provide adequate protection due to the dynamic, highly mobile and ubiquitous nature of these services.[37]

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[33] Comments of Motorola Solutions, Inc. at 4 ("Motorola Comments").

[34] V-Comm Attachment at 9. As noted above, these comments generally apply to any exclusive-use band utilized for mobile wireless services, including for instance the 2.5 GHz band.

[35] *See, e.g., id.* at 10; AT&T Comments at 12.

[36] *See, e.g.*, V-Comm Attachment at 11; T-Mobile Comments at 6 ("[M]odern CMRS systems using frequency reuse are 'interference limited' and any increase to the noise floor from any unwanted signals would cause degradation of service to customers."); AT&T Comments at 10

The Commission must also recognize that the analysis of harmful interference is not static. Even if third-party opportunistic devices would not interfere with current CMRS operations, such devices may potentially interfere with the next generation of mobile wireless technologies that licensees will deploy – from handheld consumer devices to mHealth devices and beyond. Moreover, if third-party opportunistic devices absorb any new efficiency gains by CMRS providers, any incentive to make the investments necessary to develop these new technologies is diminished, if not fully eliminated.[38]

Although some assert that the Commission should reexamine the interference temperature as a technique to manage interference,[39] the Commission appropriately terminated the interference temperature proceeding in 2007. At that time, the Commission noted that "[c]ommenting parties generally argued that the interference temperature approach is not a workable concept and would result in increased interference in the frequency bands where it would be used."[40] Nothing in the record suggests otherwise.

C. Mandatory Third-Party Dynamic Spectrum Access to Mobile Wireless Licensed Spectrum Would be Unlawful.

The Commission should also dismiss the claim that "[u]nused spectrum capacity on any band, in any location, remains public property" to which the Commission may grant access "at

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("Although new air interfaces like LTE often provide increased spectral efficiency, they are also often more sensitive to interference or degradation than legacy systems.").

[37] Verizon Wireless Comments at 12; AT&T Comments at 12.

[38] *See* AT&T Comments at 9-10.

[39] Comments of Google, Inc. at 12 ("Google Comments").

[40] *Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands*, Order, 22 FCC Rcd 8938, 8938 ¶ 2 (2007).

any time."[41] This statement is entirely too broad. In fact, the Commission issues licenses for many blocks of spectrum on an exclusive basis within a specified geographic area, including all of the bands used for the provision of commercial mobile wireless services. CMRS licensed spectrum rights include the "right to be protected from interference."[42] As noted above, such third-party devices may potentially interfere with current operations or with next generation technologies that licensees will deploy. In addition, as the Commission has acknowledged, such "'exclusive use' spectrum rights" include the authority to "lease some or all of the spectrum usage rights associated with their licenses to third party spectrum lessees."[43] Forced sharing would violate these rights.

Such a dramatic change would constitute a radical repudiation of the auction contract.[44] The D.C. Circuit has observed that the FCC cannot "radically change the terms of an auction after the fact."[45] As AT&T notes, the government may affect an auctioned license through regulatory changes, but "there is a line the government cannot cross" without materially changing the terms of the auction contract after the fact, and exposing the government to

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[41] PISC Comments at 27. PISC cites no legal authority for this extraordinary claim, relying instead on Eli Noam's theory that "spectrum access is traffic control." *Id.* (quoting Eli Noam, *Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism: Taking the Next Step to Open Spectrum Access*, 41 J. OF L. & ECON. 765-90 (1998)).

[42] Verizon Wireless Comments at 16 (quoting Spectrum Policy Statement, 15 FCC Rcd 24178, 24186 (2000)).

[43] *Fixed & Mobile Services in the Mobile Satellite Service Band*, Notice of Proposed Rulemaking and Notice of Inquiry, 25 FCC Rcd 9481, 9489 (2010).

[44] Alternatively, such a change may constitute secondarily retroactive rulemaking, which will be set aside if arbitrary and capricious, either as to the substance of the rule or its retroactive application. *See Celtronix Telemetry, Inc. v. FCC*, 272 F.3d 585, 589 (D.C. Cir. 2001); *U.S. Airwaves* v. *FCC*, 232 F.3d 227, 233 (D.C. Cir. 2000).

[45] *U.S. Airwaves Inc.* v. *FCC*, 232 F.3d at 235.

liability.[46] Further, the Commission's grant of a public right of dynamic access to spectrum that was previously licensed on an exclusive-use basis, obtained by a private party relying on investment expectations based on the nature of the license, would, at a minimum, raise an issue as to whether there is a prohibited taking of property rights without due compensation.

IV. THE COMMISSION MUST ADVANCE A RIGOROUS ENFORCEMENT REGIME BEFORE EXTENDING A WIDESPREAD DYNAMIC SPECTRUM ACCESS POLICY.

Proponents of dynamic spectrum access suggest they are prepared to move ahead. However, the record fails to offer a meaningful enforcement regime to protect against harmful interference. Even those proponents that recognize licensees' legitimate interference concerns provide no mechanism to address such concerns.[47]

The Commission has often struggled to provide licensees with any meaningful enforcement mechanism to address harmful interference.[48] From radar detectors to signal boosters, exclusive-use licensees have waged an uphill battle to remedy even well-documented incidents of harmful interference.[49] Implementing a forced sharing dynamic spectrum access

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[46] AT&T Comments at 16; *see also Winstar* v. *United States*, 518 U.S. 839 (1996); *In re NextWave Pers. Commc'ns*, 200 F.3d 43, 60-62 (2d Cir. 1999).

[47] *See, e.g.*, Comments of Public Knowledge at 7-8 ("Public Knowledge Comments").

[48] *See, e.g., Review of Part 15 and other Parts of the Commission's Rules*, First Report and Order, 17 FCC Rcd 14063, 14068-69 ¶ 15 (2002) (requiring new radar detectors to comply with the revised emission requirements but failing to address devices already sold that would continue to cause interference for several years thereafter); Letter from Brian M. Josef, CTIA to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-4, at 3-4 (June 3, 2010) (explaining that the harmful interference issues caused by unauthorized signal boosters is time-consuming and resource-intensive to resolve).

[49] *See, e.g.*, Comments of the Satellite Industry Association at 15-16 ("SIA Comments") (discussing the satellite industry's struggle with harmful interference caused by certain radar detectors); *Wireless Telecommunications Bureau Seeks Comment On Petitions Regarding The Use Of Signal Boosters And Other Signal Amplification Techniques Used With Wireless Services*, WT Docket No. 10-4, Public Notice, 25 FCC Rcd 68, 68 (WTB 2010) (recognizing the

policy that would allow potentially mobile, intermittently transmitting, and possibly unlicensed devices would only exacerbate the challenges faced by mobile wireless licensees in addressing incidents of harmful interference.[50]

A licensee's ability to reclaim exclusive use of its spectrum could be nearly impossible, as a practical matter, if and when harmful interference occurs.[51] As evident with interfering radar detectors, once devices are authorized and deployed, there is no effective way to remove these devices completely, even if operating unlawfully and causing harmful interference.[52] Even if the Commission later reverses such a policy, any harmful interference caused to existing and future mobile services could continue for the service life of the autonomous dynamic spectrum access devices.

Policy radios create a unique and particularly noteworthy risk of substantial harmful interference. With field configurable operating parameters, these devices are susceptible to end-users potentially modifying the operating parameters in a manner that allows the device to operate outside of the acceptable operating limits, creating a significant risk of harmful interference to critical communications services.[53] Although potential controls would be put in place to prevent such tampering, it is worth noting that "virtually every attempt to lock down

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harmful interference that unauthorized signal boosters can cause to network operations and communication services); Letter from Brian M. Josef, CTIA to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-4, at 3-4 (June 3, 2010).

[50] *See* SIA Comments at 12 (raising similar concerns in the context of satellite bands).

[51] Ericsson Comments at 8.

[52] Verizon Wireless Comments at 12-13; SIA Comments at 11-12 (discussing the harmful interference caused by certain radar detectors to Very Small Aperture Terminals ("VSATs") and the difficulty dealing with devices already sold).

[53] *See* AT&T Comments at 20.

consumer devices has eventually been circumvented."[54] Moreover, many of these well-documented circumventions, from Blu Ray discs to iPhones, have been published on the Internet, enabling the public at large to exploit these weaknesses.

V. CONCLUSION

For the foregoing reasons, the Commission should refrain from implementing an involuntary dynamic spectrum access policy that applies to mobile wireless spectrum bands and ensure that any dynamic spectrum initiative is backed by a strong enforcement regime.

Respectfully submitted,

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[54] *Id.* at 20-21 (citing the circumvention of DVD and Blu Ray Disc protections, the "jail break" of mobile phones, and the modification of video game consoles and e-readers).