BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION

In the Matter of	)	
	)	
Unlicensed Operation in the TV Broadcast Bands	)	ET Docket No. 04-186
	)	
	)	ET Docket No. 02-380
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	
	)	

COMMENTS OF

NEW AMERICA FOUNDATION,
AUSTIN WIRELESS CITY PROJECT, CONSUMERS UNION, SEATTLE WIRELESS, CONSUMER FEDERATION OF AMERICA, EDUCAUSE, TRIBAL DIGITAL VILLAGE, FREE PRESS, CENTER FOR DIGITAL DEMOCRACY, CENTER FOR NEIGHBORHOOD TECHNOLOGY, CHAMPAIGN-URBANA COMMUNITY WIRELESS NETWORK, COMMON ASSETS, COMMON CAUSE, METRIX COMMUNICATION LLC, NEWBURYOPEN.NET, NYCWIRELESS, OFFICE OF COMMUNICATION OF THE UNITED CHURCH OF CHRIST INC., PERSONAL TELCO, PROMETHEUS RADIO PROJECT, PUBLIC KNOWLEDGE, BENTON FOUNDATION, WIRELESS TECH RADIO

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November 30, 2004

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COMMENTORS

Commentors in this proceeding include commercial providers of wireless internet services using unlicensed spectrum access; non-profit organizations using or promoting the use of unlicensed spectrum to improve education, increase broadband internet access and narrow the digital divide; and users of licensed and unlicensed wireless services.

The **Austin Wireless City Project** is an initiative of Austin Wireless to improve the availability and quality of public free WiFi in Austin. Austin Wireless, Inc. is a non-profit organization founded to educate, advise, enable, and assist operators of public spaces in providing free wireless hotspots to all residents of Austin and surrounding areas. www.austinwirelesscity.org

The mission of the **Benton Foundation** is to articulate a public interest vision for the digital age and to demonstrate the value of communications for solving social problems. Current priorities include: promoting a vision and policy alternatives for the digital age in which the benefit to the public is paramount; raising awareness among funders and nonprofits on their stake in critical policy issues; enabling communities and nonprofits to produce diverse and locally responsive media content. www.benton.org

The **Center for Digital Democracy** is a nonprofit public interest organization committed to preserving the openness and diversity of the Internet in the broadband era, and to realizing the full potential of digital communications through the development and encouragement of noncommercial, public interest content and services. www.democraticmedia.org

The **Center for Neighborhood Technology** (CNT) is a 25-year-old non-profit in Chicago that works on sustainable and livable urban environments. CNT is addressing the digital divide by building community wireless networks (CWN) in two Chicago inner-city neighborhoods, a Chicagoland suburb, and a downstate Illinois rural former coal mining town, connecting low- and moderate-income families in those communities to broadband Internet and local network resources. The CWNs utilize the unlicensed spectrum resources in the 2.4 GHz and 5-5.8 GHz bands and open source mesh networking software to deliver reliable, low-cost, high-speed networking. www.cnt.org

The **Champaign-Urbana Community Wireless Network**, a project of the Urbana-Champaign Independent Media Center Foundation, has deployed an extensive mesh network using Part 15 spectrum in the Champaign-Urbana metro area. The three-part mission is to (a) connect more people to Internet and broadband services; (b) develop open-source hardware and software for use by wireless projects world-wide; and, (c) build and support community-owned, not-for-profit broadband networks in cities and towns around the globe. www.cuwireless.net

Common Assets is a non-profit organization based in San Francisco. The organization brings

local, regional and national movements together to activate the American public to defend the commons from misuse, privatization and destruction. Common Assets was founded to reassert the public's ownership of the commons by preventing giveaways of our common assets to private interests. www.commonassets.org

Common Cause is a non-partisan non-profit dedicated to holding power accountable and encouraging citizen participation in democracy. Common Cause has nearly 300,000 members and supporters throughout the country, and state organizations in 38 states. www.commoncause.org

The **Consumer Federation of America** is the nation's largest consumer advocacy group, composed of two hundred and eighty state and local affiliates representing consumer, senior, citizen, low-income, labor, farm, public power and cooperative organizations, with more than 50 million individual members. www.consumerfed.org

Consumers Union, publisher of Consumer Reports, is an independent, nonprofit testing and information organization serving only consumers. We are a comprehensive source for unbiased advice about products and services, personal finance, health and nutrition, and other consumer concerns. www.consumersunion.org

EDUCAUSE is a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology. Membership is open to institutions of higher education, corporations serving the higher education information technology market, and other related associations and organizations. EDUCAUSE programs include professional development activities, print and electronic publications, strategic policy initiatives, research, awards for leadership and exemplary practices, and a wealth of online information services. The current membership comprises nearly 1,900 colleges, universities, and education organizations, including more than 180 corporations, and more than 13,000 active member representatives. EDUCAUSE has offices in Boulder, Colorado, and Washington, D.C. www.educause.edu

Free Press is a national nonpartisan organization working to increase informed public participation in crucial media policy debates, and to generate policies that will produce a more competitive and public interest-oriented media system with a strong nonprofit and noncommercial sector. www.freepress.net

Metrix Communication LLC is a Seattle-based company that supplies wireless network builders and developers with affordable, high quality equipment. Founded by experienced community wireless network developers, the company philosophy is to offer wireless equipment that works the way developers want it to work. Metrix equipment is rugged, reliable, powerful, expandable, and based on open standards. http://metrix.net/metrix/

The **New America Foundation** is a nonpartisan, non-profit public policy institute based in Washington, DC, which, through its Spectrum Policy Program, studies and advocates reforms to improve our nation's management of publicly-owned assets, particularly the electromagnetic spectrum. www.newamerica.net

NewburyOpen.net provides high-speed connectivity to 15 locations in Boston's Back Bay district and is the largest free wireless network in the city. The organization has been involved in promoting public WiFi networks financed with corporate sponsorship throughout New England and is also a founding partner of BostonWAG.org, the Boston Wireless Advocacy Group. www.newburyopen.net

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

The **Office of Communication of the United Church of Christ, Inc.** is a non-profit corporation advocating for the public interest in media, and in particular for those historically excluded from the media, especially women and people of color. The United Church of Christ has 1.4 million members and nearly 6,000 congregations. It has congregations in every state and in Puerto Rico. www.ucc.org/ocinc/

Personal Telco is a non-profit, community wireless network in Portland, Oregon. An all volunteer group, Personal Telco has over 100 active nodes in Portland and plans to expand throughout the entire city. Personal Telco's mission is to promote and build public wireless networks through community support and education. www.personaltelco.net

Prometheus Radio Project is a Philadelphia-based unincorporated collective of radio activists committed to expanding opportunities for the public to build, operate and hear low power FM radio stations. www.prometheusradio.org

Public Knowledge is a public interest advocacy organization dedicated to fortifying and defending a vibrant information commons. This Washington, DC based group works with a wide spectrum of stakeholders to promote the core conviction that some fundamental democratic principles and cultural values—openness, access, and the capacity to create and compete—must be given new embodiment in the digital age. www.publicknowledge.org

Seattle Wireless is a not-for-profit effort to develop a wireless broadband community network in Seattle. The organization uses inexpensive wireless technology to maximize community participation. www.seattlewireless.net

Tribal Digital Village (TDV) connects and serves more than 7,600 Native Americans living on reservations in isolated and scattered rural communities stretching from the California-Mexico border into Riverside County – an area that encompasses 150 miles and takes 4 ½ hours to visit by car. Nearly 30 percent of the tribal community's population lives below the poverty line, and 50 percent are unemployed. Tribal Digital Village's work, enabled by a grant from Hewlett-Packard, connects the 18 American Indian reservations in southern California to a high-speed, wireless Internet backbone and uses the Internet to build communities of interest among tribal members in ways that resemble family and community networks. www.sctdv.net

Wireless Tech Radio is the weekly LIVE wireless technology talk show streamed to industry participants worldwide. Delivering insightful and thoughtful coverage of the wireless industry, technologies, markets and business opportunities, Wireless Tech Radio speaks to anyone looking to expand their knowledge or gain new insight. Through interviews with top executives, WISP operators, industry analysts and technology innovators, Wireless Tech Radio offers comprehensive technology, applications, service, and industry coverage. A key tenet of our strategy is to ensure that every show provides valuable, insightful, and educational information that respects and values the time our listeners spend with us. And the industry reception has been spectacular. www.WirelessTechRadio.com

INTRODUCTION

This proceeding potentially opens a new era of wireless innovation for the benefit of the American people. Over the last five years, Part 15 technologies have evolved from primarily consumer devices, such as baby monitors and garage door openers, to become a critical element of our national information infrastructure. Even within the Commission's narrow constraints, volunteers and commercial innovators have developed "last mile" solutions that bring broadband internet access to inner city neighborhoods, rural communities, and every market in between. With every passing day, new devices daily become available to improve people's lives. Hospitals deploy integrated networks using unlicensed spectrum. Municipalities build public safety nets that provide police in pursuit of a suspect with detailed criminal records and provide firefighters with floor plans before they enter a blazing building.[1] Citizens everywhere continue to enjoy the convenience of connecting to the internet nearly everywhere, as wifi becomes standard in laptops and hand-held devices.

This proceeding can facilitate the growth of these technologies by permitting them to exploit the unique physical characteristics of spectrum in the broadcast bands. Although the *NPRM* emphasizes the delivery of broadband to rural America, this is but one of the many potential uses of unlicensed broadcast spectrum. The lower power requirements for signals, and the ability of signals in these bands to penetrate natural obstacles like wet leaves, will usher in the next stage of cheap devices capable of complex networking tasks. *See generally* Bill Lehr, "The Economic Case for Dedicated Unlicensed Below 3 GHz," New America Foundation (2004).

It is therefore critically important that the Commission "get it right the first time." While

[1] *See, e.g.*, Deborah Radcliff, "SMPD Blue: San Mateo Cops Create Wireless Web To Snare More Criminals," October 27, 2003.

the Commission should address valid concerns about interference, it must recognize that an overly cautious approach will stifle wireless technology for decades to come. The *NPRM*, while taking the first bold step of opening the broadcast bands, stumbles by moving too timidly. The Commission proposes unneeded exclusions and interference management measures so restrictive that they threaten to make deployment virtually impossible and prohibitively expensive. NAF, *et al.* therefore propose several necessary changes, beginning with a return to the Commission's traditional balancing of interference risk with potential public benefit rather than a determination to shield incumbents from all possible worst case scenarios.

SUMMARY

For more than two years, in three different proceedings and a host of Commission sponsored workshops, the Commission has received reams of evidence on the public interest value of permitting direct access to the public to broadcast band spectrum via the Part 15 rules. While incumbents have railed against the Commission, promising dire consequences for the future of free over-the-air television and for the digital transition, these claims lack merit. As far back as 1989, the Commission recognized that it could permit low power transmitters to operate in the broadcast bands. *In re Revisions of Part 15*, 4 FCCRcd 3493, 3501 (1989) (*1989 Part 15 R&O*). Notably, the Commission explicitly found:

> ***We are satisfied that our proposed general emission limits are adequate to prevent harmful interference to TV receivers from Part 15 transmitters operating in the television broadcast bands.*** Of great concern, however, is the more intensive use of these bands that may occur with the introduction of various forms of High Definition Television (HDTV)....For this reason, ***at the present time,*** we are not allowing intentional radiators operated under the general limits to

> have their fundamental emissions located in the frequency bands allocated to television broadcast stations.

Id. (Emphasis added)

Nothing has changed in the last fifteen years to contradict the conclusion that Part 15 devices can operate in the broadcast bands without causing harmful interference. To the contrary, technologies for interference avoidance have become increasingly powerful, sophisticated, and cheap to implement. Although broadcasters may argue that permitting operation of Part 15 devices in these bands will hinder the digital transition, these claims have no more validity than they did in 1989. Access to this spectrum for Part 15 devices promises to return so much to the public in the form of broadband access and advanced telecommunications services, that it would be irrational for the Commission to ignore its previous findings by continuing to deny public access to broadcast spectrum.

Too much caution. The FCC proceeds with an abundance of caution in the *NPRM*. Indeed, it proceeds too cautiously, proposing unwarranted strictures that inhibit the ability of parties such as Commentors to provide desperately needed broadband services to rural and poor urban communities. Notably, the total exclusion of operation in "occupied" bands, ¶14, the Commission's proposal for a professional installer certification for fixed nodes, ¶40, the requirement that mobile devices include identification beacons, ¶22, and an insistence on layering multiple mitigation strategies appear inconsistent in light of the Commission's previous findings that generic Part 15 protections would adequately protect viewers from interference.

The *NPRM* also proceeds too cautiously in its proposed methodology for protecting expanded rights of Low Power Television (LPTV) broadcasters and translators. The Commission offers no explanation for why it proposes complete exclusion to protect these

services. When combined with the Commission's decision to award an additional companion channel for digital transition of LPTV and translators, *see* MB Docket No. 03-185, *In re Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules Digital Low Power Television* (rel. Sept. 30, 2004) ("*Digital LPTV Order*"), the proposed complete exclusion would effectively nullify any real possibility of Part 15 access to broadcast band spectrum and thus deny to all Americans the enormous benefits of unlicensed access in the broadcast bands.

NAF, *et al.* agree with the Commission's findings in 03-185 that LPTV provides much needed diversity in a media environment dominated by large group owners divorced from their local communities, and that LPTV and translators provide free over the air television in isolated areas. *Id.* at ¶1. But the Commission has created a false dichotomy between LPTV and Part 15 by proposing to treat these new channels as "occupied" and thus unusable. The Commission should reconsider this proposal and permit both the digital transition of LPTV ***and*** direct citizen access to the broadcast bands under Part 15.

No Windfalls to Broadcastersters. The Commission's most puzzling proposal, and perhaps most detrimental to the deployment of Part 15 devices in the broadcast bands, is the proposition that broadcasters could receive compensation for declaring white space "open." *NPRM* at ¶21. This proposal violates basic principles of the Communications Act and of the First Amendment. While it may make sense to allow broadcasters to operate "pilot beacons" that indicate the strength of their actual signal so as to avoid a "hidden node" problem, *id.* at n.34, this must be done, if done at all, at the broadcaster's expense.

Faulty premises. The Commission's over-cautious approach appears to proceed from several false premises. ***First,*** the Commission has unaccountably switched its focus from the receiving public to licensees. Traditionally, the Commission has focused on protecting the

public -- the statutory beneficiary of the television licensing scheme – by examining both the existing state of deployment and audience expectations.[2] By contrast, the Commission here speaks not of protecting viewers or receivers, but of protecting licensees. *See* Appendix B Proposed Rule 15.244(g) (requiring intentional radiators to "protect TV stations from harmful interference").

While this may at first seem a matter of semantics, this confusion on the part of the Commission leads to a faulty public interest analysis. By placing the licensee at the center of the public interest analysis, the Commission has abandoned its traditional approach of balancing overall risk to the public with the potential public benefits. *Cf. 1989 Part 15 R&O*, 4 FCCRcd at 3519 (rules reflect "trade offs between beneficial low power spectrum use and possible interference to authorized radio services"). Instead, the Commission wrongly proposes to move forward only if proponents of direct citizen access can satisfy the nigh-impossible evidentiary burden that no possibility of interference exists under whatever worst case scenario incumbents can conceive.

Second, the Commission compounds this error by attempting to customize the rules for existing technologies. For example, in discussing the potential uses for unlicensed spectrum, the *NPRM* makes no mention of mesh networks, *NPRM* at ¶18, and the proposed rules reflect this lack of vision. In practice, mesh networks – either as stand alone networks or in combination with "hub and spoke" networks – are being deployed in ever greater numbers. What technological innovations will the Commission foreclose by crafting rules based on the state of technology in May 2004? Mitigation techniques and restrictions customized to today's uses

[2] *See, e.g., Creation of a Low Power Radio Service*, 15 FCCRcd 2205, 2232-46 (2000) (focusing interference analysis on receivers and rejecting idea that radio licensees can define the quality of service they wish to provide).

vitiate the flexibility that has made the innovation under Part 15 possible.

Instead of requiring specific mitigation techniques and technologies, the Commission should describe what functionalities it will require from devices to avoid interference. Proper application of the Part 15 process will ensure that these devices create no harmful interference, but will retain flexibility and affordability.

Part I reviews the relevant statutory and constitutional factors the Commission must weigh in its public interest analysis. Implementation of the *NPRM*, as modified in the manner suggested in these comments, will broadly serve the goals of the Communications Act and the First Amendment. By contrast, failure to permit direct citizen access to spectrum where technology permits such access raises grave First Amendment concerns.

Part II addresses the questions raised in the *NPRM* regarding which services require protection through the blunt instrument of exclusion, and which do not. An analysis submitted as Appendix A demonstrates that, despite the overabundance of exclusions proposed in the *NPRM*, some space exists for unlicensed devices even in crowded urban markets. The Commission can better serve the public interest, however, by limiting exclusion from "occupied" channels only where necessary to protect health and safety or to protect full power stations and existing LPTV and translator services.

Commentors support the FCC's proposal regarding exclusion of Channel 37 to protect medical devices. While this complete exclusion is overly conservative, the potential harm to the public of even modest interference to life-saving medical equipment weighs heavily in favor of exclusion at this time. Similarly, the importance of public safety operations justifies exclusion of unlicensed operation in PLMRS and CMRS in those markets where channel 14-20 are used for these services. Commentors note, however, that these conclusions should be re-examined on a

regular basis as the technologies mature. Indeed, in the future, public safety and medical telemetry services may find it advantageous to permit unlicensed operation in these channels when broadband networks in the broadcast bands are widely deployed.

Commentors, however, urge the Commission to reconsider the tentative decision to exclude operation on Channels 2-4. At the very least, the Commission should permit low power mobile devices to operate on these bands. These devices are the property of the same homeowner using consumer devices such as VCRs. Since the focus of this proceeding properly belongs on users, it follows that the Commission should allow users to decide whether they prefer low power mobile devices despite the possible risk of interference.

Commentors fully support the FCC's tentative conclusion that wireless microphones are unlikely to experience significant interference. To the extent the Commission considers further mitigation necessary, Commentors suggest that the Commission create an exemption to the Over The Air Receiver Device (OTARD) rule and permit owners of facilities where wireless microphones are used to prohibit operation of devices using broadcast band frequencies.

In **Part III**, Commentors urge the Commission to reconsider the *NRPM*'s tentative decision to prohibit operation of Part 15 devices in bands occupied by expanded digital service of LPTV broadcasters and translators. The Commission should allow operation in these bands on a co-equal basis with the expanded LPTV and translator services. In the alternative, the Commission should permit operation of Part 15 devices in bands occupied by these new services subject to the standard limitations of Part 15 underlays, *i.e.*, that the Part 15 device must accept any interference, and must not cause any interference.

In **Part IV**, Commentors discuss appropriate principles for mitigation of interference risk. Commentors address the flaws in the Commission's approach in the *NPRM*, and

recommend a return to the Commission's traditional user-centric analysis. Commentors also urge the Commission to maintain the decentralization and flexibility that have made Part 15 so successful. In this framework, Commentors propose that a number of mitigation techniques address legitimate interference concerns. In particular, the Commission should be wary of proposals from incumbents designed to expand the rights of incumbents at the cost of the public.

PART I: THE COMMISSION MUST TAKE A BROAD VIEW OF THE PUBLIC INTEREST AND THE INTERESTS OF THE FIRST AMENDMENT.

Although the *NPRM* generally focuses on whether the proposed rule changes will foster deployment of broadband, opening the broadcast bands to Part 15 will also produce a torrent of benefits consistent with the Communications Act as a whole. Furthermore, as discussed below, the interests of the First Amendment require the Commission to place a high value on allowing citizens to communicate directly, rather than through a licensed intermediary.

A. The *NPRM* Furthers the Goals of The Communications Act.

The Commission has repeatedly found that expanding the Part 15 rules furthers the goals of encouraging "new technologies and services to the public." *See, e.g., Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Range* 12 FCCRcd 1576, 1580-85 (1997) (finding that expanding unlicensed access furthered interest of developing new technologies, new services, new competitors, deployment of advanced telecommunications capabilities to all Americans – with an emphasis on rural and educational uses – and helped fulfill the Commission's obligations under Section 257 to promote entry by small businesses and to enhance diversity of information sources); *In re Section 257 Proceeding to Identify and Eliminate Market Entry Barriers for Small Businesses*, 12 FCC Rcd 16802, 16913-14 (1997). *See also* Ken Carter, *et al.*, "Unlicensed and Unshackled: A Joint OET-OSP White Paper on Unlicensed Devices and Their Regulatory Issues," FCC Office of Strategic Planning Working Paper #39, Washington, DC: FCC, May 2003.

The paucity of service and the lack of ownership opportunities for minority communities further highlights the importance of unlicensed access. Generally, providers of broadband and other advanced telecommunications services traditionally focus their attention on the wealthiest

markets. *See* Leonard M. Banes, "Deregulatory Injustice and Electronic Redlining: The Color of Access to Telecommunications," 56 Admin. L. Rev. 263 (2004). Furthermore, although the Communications Act directs the Commission to use auctions to promote "economic opportunity and competition ... by avoiding excessive concentration of licenses and by distributing licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women," 47 U.S.C. §309(j)(3)(C), ownership of telecommunications facilities remains excessively concentrated in the hands of a few, large corporations. Eli Noam, "The Effect of Deregulation on Market Concentration: an Analysis of the Telecom Act of 1996 and the Industry Meltdown." Working Paper. Columbia Business School, Columbia Institute for Tele-Information (2002). Despite the Commissions consistent efforts to develop bidding criteria that will promote minority and small business ownership, spectrum auctions continue to fail in these goals. *See* Leonard M. Banes & C. Anthony Bush, "The Other Digital Divide: Disparity In the Auction of Wireless Telecommunications," 52 Cath. U. L. Rev. 351 (2003).

By contrast, unlicensed access creates immediate opportunity for deployment in any community by any entity. The Commission has in the past observed how unlicensed access removes regulatory barriers to minority and small business ownership of telecommunications facilities. *See Section 257 Report To Congress*, 19 FCC Rcd 3034, 3077 (2004); *Section 257 Report to Congress*, 15 FCC Rcd 15376, 15432 (2002). Nor will communities economically unattractive to incumbents need to wait for broadcast licensees or other incumbents to provide critical services. Rather, these communities will be able to deploy needed systems themselves.

Commentors will not dwell at length on the benefits expanded unlicensed access has brought to rural America, inner city and minority communities, and Americans of every walk of

life. The Commission and individual commissioners have recognized these benefits in numerous studies, reports, notices, orders, and speeches.[3] Others, such as the New America Foundation, have likewise extensively documented the benefits of unlicensed access.[4]

In weighing whether to expand unlicensed access into the broadcast bands, the Commission must give these goals of the Communications Act great weight. Unlicensed access will generally facilitate deployment of advanced telecommunications services faster than the Commission's current policy of relying on phone and cable incumbents. Furthermore, it will facilitate speedy deployment in those communities that traditionally must wait the longest for licensed services to deploy. Accordingly, the public interest weighs heavily in favor of permitting unlicensed access in the broadcast bands.

B. The *NPRM* Would Provide a "Deregulatory" Means to Further The Goals of Section 706 of the 1996 Telecommunications Act.

The Commission has acknowledged the growing role of unlicensed spectrum access in the deployment of broadband access to all Americans pursuant to the mandate of Section 706 of the Telecommunications Act of 1996. *Unlicensed Operation in the 3650-3700 MHz Band*, 19 FCCRcd 7545, 7546-47 (2004) (*3650-3700 NPRM*). In considering the value of unlicensed access to the Commission's Section 706 mandate, the Commission should consider that unlicensed access is an inherently "deregulatory" means of promoting broadband deployment. It

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[3]*See, e.g.*, UNLICENSED AND UNSHACKLED, *supra*; *The Harvest*: *Remarks of Commissioner Abernathy at the Wireless Communications Association International Annual Conference* (June 2, 2004); *Remarks of Commissioner Jonathon S. Adelstein, WISP Forum, South Dakota School of Mines and Technology*, May 25, 2004.

[4]*See, e.g.*, Matt Barranca, "Unlicensed Wireless Broadband Profiles: Community, Municipal and Commercial Success Stories," NEW AMERICA FOUNDATION (2004); William Lehr, "Dedicated Lower Frequency Unlicensed Spectrum: The Economic Case for Dedicated Unlicensed Spectrum Below 3 Ghz," NEW AMERICA FOUNDATION (2004).

frees all citizens to access spectrum with readily available consumer devices, rather than restricting the ability of citizens to access the public airwaves. In addition, there is no limit (other than that imposed by the economics of the marketplace) to the number of competitors using unlicensed spectrum access. This places greater emphasis on market mechanisms than does licensing, which creates an artificial scarcity that is aggravated, not alleviated, by allowing licensees to treat government-licensed monopolies as private property.

Accordingly, to the extent the Commission believes that the Telecommunications Act of 1996 encourages the Commission to facilitate deployment of broadband through "deregulatory" means and to rely on market competition, unlicensed access provides a far more potent avenue than any other strategy employed by the Commission to date. If the Commission is serious about deregulation as a means of promoting competition, rather than as a means of preserving incumbent dominance, the Commission should adopt the *NPRM*.

C. First Amendment Considerations Weigh Heavily In Favor of Adopting the *NPRM*.

"The 'public interest' standard necessarily invites reference to First Amendment principles...and, in particular, to the First Amendment goal of achieving 'the widest possible dissemination of information from diverse and antagonistic sources.'" *FCC v. National Citizens Committee for Broadcasting*, 436 U.S. 775, 795 (1978) (citations omitted). Indeed, the FCC has a fundamental responsibility to protect the public's "collective right to have the medium function consistently with the ends and purposes of the First Amendment." *Red Lion Broadcasting Co., Inc. v. FCC*, 395 U.S. 367, 390 (1969).

Nowhere does this principle apply with greater force than in the broadcast bands. Broadcasters receive their spectrum for free, on condition that they provide service to their local

community. *Office of Communication of the United Church of Christ v. FCC*, 359 F.2d 994, 1003 (D.C. Cir. 1966). No broadcaster has anything in the nature of a property interest in its spectrum. 47 USC §§301, 304, 309(h); *UCC*. To the contrary, where the Commission finds that a licensee has failed to serve the public interest, the Commission must deny renewal of the license and award it to another steward. 47 USC §309(e).

Given the tremendous imbalance at the moment between the modest amount of spectrum allocated for unlicensed access by all citizens in contrast with the vast amounts of spectrum assigned to exclusive licensees, and given the physical qualities that make this spectrum so inherently valuable for public access, the "reference to First Amendment principles," *NCCB supra*, weighs heavily in favor of opening new spectrum to unlicensed access. As the Supreme Court has observed "the Government could surely have decreed that each frequency should be shared among all or some of those who wish to use it." *Red Lion*, 367 U.S. at 390-91. While technological limitations of the past generally required exclusively licensing in the hands of a few, this by no means makes exclusive licensing to the exclusion of all others the preferred regime under the First Amendment.

Permitting broader direct access to spectrum by the public serves the First Amendment both by creating more opportunities for people to speak and, concomitantly, more sources for people to hear. As technology continues to advance, and the need for exclusivity diminishes, it serves the interests of the First Amendment to permit as many citizens as possible to access spectrum as freely as possible. *See* Stuart Minor Benjamin, "The Logic of Scarcity: Idle Spectrum As First Amendment Violation," 52 Duke L.J. 1 (2002); Stuart Buck, "Replacing Spectrum Auctions With Spectrum Commons," 2002 Stanford Technology L. Rev. 2 (2002).

As a general rule, discretionary licenses on the right to communicate are repugnant to the

First Amendment. *See Generally Watchtower Bible & Tract Society of New York, Inc. v. Village of Stratton*, 536 U.S. 150, 161-64 (2002). Only because unregulated use of the electromagnetic spectrum by ***everyone*** would make impossible the effective use of the spectrum by ***anyone*** has the Supreme Court permitted the Federal Government to license spectrum. *National Broadcasting Co v. United States*, 319 U.S. 190 (1943); *Federal Radio Commission v. Nelson Bros.*, 289 U.S. 266 (1933); *In re Nextwave Personal Communications, Inc.*, 200 F.3d 43 (2nd Cir. 1999).

But this does not give the government complete *carte blanche* in managing spectrum. *NBC*, 319 U.S. at 217. To the contrary, the FCC must manage spectrum so as to promote the goals of the First Amendment. *Red Lion*, 395 U.S. at 389-393. In light of the general antipathy of the First Amendment to discretionary licenses as a precondition of speech, the First Amendment imposes on the Commission a responsibility to consider whether direct access by citizens is technologically feasible. *Accord FCC v. League of Women's Voters of California*, 468 U.S. 364, 376 n. 11 (1984).

As the Supreme Court has found, the First Amendment prohibits the government from granting exclusive rights in communications media unless the physical characteristics of the medium require exclusivity as a precondition of productive use. In *City of Los Angeles v. Preferred Communications*, 476 U.S. 488 (1986), Preferred Communications did not take part in an auction for an exclusive cable franchise. Nevertheless, it applied for a franchise in competition with the winner of the auction. The City of Los Angeles denied the application. The district court upheld the power of the city to award an exclusive license, but the Ninth Circuit Court of Appeals reversed on First Amendment grounds. *Id.* at 492-93.

The Supreme Court remanded for further fact finding on the question of whether any

physical limitations required the city to limit the number of franchises. The Supreme Court explicitly held that the desire of the city to maximize revenue or maximize economic efficiency did not permit limiting the ability of citizens to speak through the new medium any more than the city could limit the number of newspapers in the name of economic efficiency. *Id.* at 494-95. Where the laws of physics no longer require exclusivity, exclusivity cannot be justified on economic or efficiency grounds alone.

Commentors do not argue here that technology has advanced to the point where the spectrum may accommodate all who wish to use it, and that therefore the days of exclusive licensing have passed. *Cf. League of Women Voters supra* (observing that technological advances might someday render exclusive licensing obsolete). Indeed, many applications, such as public safety, will continue to demand exclusivity for the foreseeable future. The ability of technology to provide unlicensed access to all citizens under some conditions does not render the underlying basis of *FRC v. Nelson Bros.* or *NBC* obsolete.

Rather, Commentors observe that the Commission in the *NPRM* has tentatively concluded that all citizens may access the electromagnetic spectrum freely without creating the harmful interference that justifies exclusive licensing. If the Commission nevertheless decided to limit the right to speak through spectrum in this band to a handful of privileged licensees, for no better reason than to maximize revenue to the government or maximize economic efficiency, that decision would violate the First Amendment principles set forth in *Preferred Communications.*

Looking beyond the letter of the law, the goals of the First Amendment and the general repugnance of the First Amendment for licensing as a precondition of speech create a high public interest in fostering greater direct access by citizens to the electromagnetic spectrum. In

weighing where the public interest lies, the Commission should seek to maximize opportunities for unlicensed access as best serving the goals of the First Amendment. It should therefore reject the demands of incumbents to move in an artificially cramped and restricted manner.

Finally, the Commission must consider that nothing in this proceeding requires the Commission to make a choice between the public interest value of free over the air television and public access to spectrum. Television licensees will still hold their licenses, and will still have an obligation to provide their local communities with "suitable access to social, political, esthetic, moral, and other ideas and experiences." *Red Lion*, 395 U.S. at 390. By opening the television broadcast bands to unlicensed access, the Commission will maintain the existing benefits of broadcast television and the conversion to digital while promoting the goals fo the Communications Act and the First Amendment.

PART II: THE COMMISSION SHOULD MAKE THE GREATEST AMOUNT OF SPECTRUM AVAILABLE, CONSISTENT WITH PUBLIC SAFETY.

In its approach to expanding Part 15 to broadcast spectrum, the Commission should seek to maximize the spectrum available for use. As described in Part I *supra*, such an approach best serves the public interest and furthers the interests of the First Amendment.

Commentors attach an analysis of six DMAs prepared by the New America Foundation. These profile a broad cross-section of environments: dense urban environments (Los Angeles, CA and Washington, DC); moderate density (Burlington, VT); moderate density border area (El Paso, TX); and small rural environments (Helena, MT and Juneau, AK).

As these charts make clear, even the densest urban environments will yield valuable opportunities for unlicensed access without interference to television reception. Even subject to

all exclusions set forth in the *NPRM*,[5] the City of Los Angeles contains blocks of contiguous usable channels from Channel 23-27, 39-40, and 44-51.

While even this limited access promises to bring significant benefits in urban and rural areas, the Commission can do far more. Current technology is sufficiently robust and proven to allow the Commission to take significant steps to expand the availability of broadcast spectrum without jeopardizing health and safety. Specifically, the Commission should reconsider its tentative conclusion to exclude Channels 2-4 and Channels 52-69 from access. The Commission should also reconsider its tentative conclusion to prohibit operation in border areas. NAF, *et al.* support the Commission's tentative conclusion that wireless microphones and broadcast auxiliary services do not require any special interference protection. Finally, NAF, *et al.* urge the Commission to explicitly incorporate review of the limitations on Part 15 devices in the broadcast bands as part of its Trienniel Review under Section 257(c).

A. Appropriate, Limited Exclusions for Public Health and Safety

While the Commission should move aggressively to bring the advantages of unlicensed spectrum access to the public, the Commission must also proceed prudently. In particular, where public safety is concerned, the Commission does well to wait until unlicensed broadcast band technologies have more fully matured. Accordingly, Commentors agree with the Commission's conclusion to prohibit operation on Channel 37 and on Channels 14-20 in those markets where PLMRS uses these bands. *NPRM* at ¶33.

Commentors stress, however, that this limitation should be regularly reviewed. Both hospitals and public safety entities increasingly rely on Part 15 devices and data networks using unlicensed spectrum. *See* Barranca, *supra* n.3. The Commission itself has recently acknowledged the benefits of allowing licensed public safety entities to use the technology

[5]This analysis does not reflect potential changes based on the Commission's decision in MB Docket No. 03-185 (rel. Sept. 30, 2004).

developed in unlicensed environments, and to create networks that utilize both licensed and unlicensed services. *In re 4.9 GHz Band Transferred From Federal Government Use*, WT Docket No. 00-32 (rel. Nov. 12, 2004) at ¶10. Commentors fully anticipate that, within a few years time, expansion of unlicensed access to these channels will prove both technologically simple and broadly beneficial. Accordingly, as discussed in Part II.F, Commentors urge the Commission to incorporate review of these exclusions in its Trienniel Review under Section 257.

B. The Commission Should Reconsider Exclusions From Channels 2-4.

The Commission's exclusion from Channels 2-4, however, do not derive from health and safety concerns. Rather, the Commission proposes to exclude entirely operation in channels 2-4 to protect the output channels of TV interface devices. *NPRM* ¶34. This needlessly excludes a significant swath of spectrum from valuable public access.

As an initial matter, TV interface devices come equipped with coaxial cables with shielding from television broadcasts. As a consequence, these devices do not need total exclusion for protection from interference.

More importantly, these devices reside under the control of the television viewer. Residents using these devices know when they are watching television and when they are not. They can make rational decisions as to what consumer devices they prefer to operate when. Indeed, the FCC has mandated that equipment manufacturers provide helpful information to users on how to correct potential interference problems. 47 CFR §15.105. In doing so, the Commission clearly recognizes that citizens can make rational value judgments as to whether to tolerate a risk of interference in exchange for the benefits of unlicensed devices. *See also NPRM* at n.50 (acknowledging that homeowner is in best position to judge value of Part 15 device that creates modest interference with own television). The Commission should continue to assume that users remain capable of making the same judgments here.

C. The Commission Should Reconsider Complete Exclusion of Channels 52-69.

As the Commission itself recognizes, a good deal of the spectrum in Channels 52-69 remains unassigned and ready for immediate use. *NPRM* at ¶34. Nevertheless, the Commission proposes to prohibit any operation in these bands "to avoid potential sharing difficulties between new uses and unlicensed operations." *Id.*

This puts the analysis exactly backward, particularly with regard to those channels as yet unassigned. The return date of the analog spectrum remains uncertain. Debate rages as to whether to require a firm date five years from now, or whether to continue to provide loopholes that will facilitate further delay. *See, e.g.,* John Eggerton, Broadcasters Push DTV Decision Delay, Broadcasting and Cable, Nov. 22, 2004.

The Commission should not repeat the mistake it made in 1989 when the Commission first adopted the existing Part 15 rules. Although the Commission found operation of Part 15 devices compatible with television reception, the Commission prohibited operation of Part 15 devices in television broadcast spectrum to protect the conversion to analog high definition television. *1989 R&O* 4 FCC at 3501. Conversion to analog high definition never occurred, and the public was therefore needlessly deprived of devices using this valuable spectrum.

If the Commission postpones operation of unlicensed devices in Channels 52-69 until completion of the analog return and final resolution of other potential uses, it will deprive Americans of valuable spectrum services that could become available almost immediately. Such delay, in the name of nothing more than administrative efficiency, can hardly serve the public interest.

The Commission should take note that Congress has displayed no preference for traditionally "licensed" services over "unlicensed" services. To the contrary, where Congress

has directly addressed the matter, it has required new licensed services to protect incumbent unlicensed services. Balanced Budget Act of 1997, Pub. L. 105-33, Section 3002(c)(1)(C)(v). Since Congress has shown no preference for new "licensed" services, the Commission should not do so either. To the contrary, the Commission should move expeditiously to promote deployment of advanced telecommunication services to all Americans by making Channels 52-69 available for unlicensed use.

D. The Commission Should Reconsider Its Proposal to Exclude Use In Border Areas.

The Commission should reconsider its proposal to exclude use in border areas analogous to its exclusion of VHF, UHF, and LPTV stations. *NPRM* at ¶46. This requirement would both impose substantial and unnecessary burdens on users and increase the cost of equipment.

The Commission has proposed power levels for Part 15 devices that are a bare fraction of what it permits to the licensed services that use the same bands. A zone of exclusion based on the characteristics of high power stations therefore makes no sense. At the very least, the limited range of low power mobile devices makes such an exclusion an absurdity.

By contrast, imposition of this condition has real costs to would be users. One of the most successful noncommercial networks, the Tribal Digital Village (TDV), operates in part in the proposed exclusion zone. This network provides broadband connectivity to a federation of 18 Native American tribes in southern California, using a combination hub-and-spoke and mesh network architectures to bring broadband in a way that empowers the Native American community. TDV provides more than connection with the internet at large. TDV provides a wide area intranet that serves the tribes and restores and reenforces cultural bonds that the forced resettlement of these related tribes on separate reservations artificially severed. *See generally*

OET Docket No. 04-151, *Comments of Tribal Digital Village*, filed August 29, 2004. TDV would benefit enormously from the ability to deploy Part 15 devices using the broadcast bands throughout its entire network. The Commission should not arbitrarily deny TDV this capacity by mechanically imposing border exclusions without evidence that such exclusion is necessary.

Numerous cities also exist in the border areas, where users would benefit from use of both high power fixed and low power mobile devices. These Finally, the cost of creating devices that will comply with this additional condition represents a marginal, but real, increase in the cost of manufacture.

The Commission cites no comments which raised this concern. Nor does it provide any engineering analysis to support a conclusion that operation of either high power or low power devices would create interference across the border. It simply asserts that exclusion is necessary pending negotiated agreement with Canada and Mexico. Without further support, this conclusion is wholly arbitrary.

Finally, it is noteworthy that the Commission has never required any Part 15 device to include a mechanism to cease operation in foreign countries, despite the fact that use of such devices may well be illegal under local law. Nor does the Commission require that Part 15 devices operating in the 900 MHz or 2.4 GHz bands cease operation close to border areas. The Commission offers no reason to alter its traditional approach here.

E. The Commission Should Affirm Its Tentative Conclusion on Wireless Microphones and Broadcast Auxiliary Services.

Commentors concur with the Commission's tentative conclusion regarding wireless microphones. *NPRM* at ¶38. Commentors have more difficulty discerning the Commission's tentative conclusions concerning broadcast auxiliary services, since the Commission does not

address them directly.[6] However, since the Commission has not proposed any specific remediation measures designed to protect auxiliary services, Commentors assume that the Commission has determined that no additional means are necessary.

In support of the Commission's conclusion, NAF, *et al.* observe that wireless microphones and other broadcast auxiliary services represent a subclass of unlicensed device. Had the Commission's reformation of the Part 15 rules in 1989 not excluded access to the broadcast bands on the incorrect assumption such exclusion would facilitate the transition to analog high definition TV, these devices would have simply been absorbed into the Part 15 framework.

As the Commission moves toward a more simplified, market-based, and ultimately more efficient spectral management policy, the problems of such limited "command and control" carve outs become more readily apparent. Nor has history supported the idea that these devices will remain only in the hands of broadcasters. To the contrary, wireless microphones can be found in consumer electronic stores around the country. Despite this widespread use, licensees continue to provide service to viewers. This should call into question the predictions of incumbents that widespread, uncontrolled use of low power devices in the broadcast bands must inevitably degrade the television broadcast service.

Even if the comments received raise concern with the Commission's analysis that the risk of interference is minimal, *see, e.g.*, Comments of Michael J. Marcus (filed Sept. 2, 2004), the Commission should also consider the significant public interest benefits of simplifying its spectral management and encouraging the broad economic and social benefits of Part 15 as independent grounds for concluding that these devices require no special remediation beyond the

[6]Par. 16 of the *NPRM* solicits comments on such services, but the body of the *NPRM* does not mention them.

already overly conservative protections the Commission has already proposed.

The Commission should also consider that if interference becomes a genuine issue for these devices as the number of Part 15 devices grows, the market will respond either with improved technology for licensed auxiliary services or by simply substituting improved Part 15 devices that perform the same functions as the Part 74 devices. Rather than burden the public in an effort to preserve the older technology like some fossil fly in regulatory amber, the Commission should adopt rules that facilitate innovation.

Finally, if the Commission decides it must impose yet another layer of protection for an incumbent, the Commission can create an exception to the Over The Air Receiver Device (OTARD) rules that would allow the owners of facilities that use wireless microphones and other auxiliary services, such as sports arenas and Hollywood studios, to ban the use of devices operating in broadcast band frequencies.

Recently, the Office of Engineering and Technology issued a declaratory ruling applying the OTARD rules to receives designed to receive unlicensed spectrum. *Commission Staff Clarifies FCC's Role Regarding Radio Interference Matters and Its Rules Governing Customer Antennas and Other Unlicensed Equipment*, 19 FCCRcd 1130, 1131 (2004). Given the concern expressed by some manufacturers of wireless microphones that, despite the Commission's engineering analysis, interference is still possible, the Commission may wish to make a narrow exception to the OTARD rules in this case. By allowing landlords to prohibit devices operating in the broadcast bands, any vestige of legitimate concern regarding possible interference can be addressed.

NAF, *et al.* stress that this exception should be limited only to those permitted under the rules to use the Part 74 devices. The Commission should not create a loophole that would allow

landlords generally to prohibit Part 15 devices, thus defeating the purpose of the OTARD rules. Since unauthorized parties using the Part 74 devices violate the Commission's rules, they deserve no protection for their unauthorized use of the service.

Again, NAF, *et al.* do not recommend such an exception to the OTARD rules in the first instance. Rather, Commentors suggest that such an exception would provide more than adequate protection in the event the Commission considers it necessary.

F. The Commission Should Conduct A Periodic Review To Further Open Broadcast Spectrum to Part 15.

Because the proposals in the *NPRM* are so inherently conservative, the Commission will want to revisit them in a systemic fashion as Part 15 technologies prove themselves in the field. A regular review will serve the public far better than requiring *ad hoc* petitions for rulemaking to permit greater access as the technology continues to mature.

The Commission should therefore put all parties on notice that it will regularly review operation in the broadcast bands and seek opportunities to further deregulate unlicensed use by removing unnecessary restrictions. In this way, the Commission can fulfill its obligations under the Communications Act to remove barriers to infrastructure development, 47 USC §257, encourage deployment of advanced telecommunications, 47 USC §§157 & nt, 303(g), enhance the opportunities for diversity of ownership and diversity of views, 47 USC §257(b), and fulfill its obligation under the First Amendment to facilitate direct communication among citizens via the electromagnetic spectrum.

The Commission should logically include this review in its Triennial Review conducted pursuant to Section 257(c). As discussed in Part I *supra*, the Commission has consistently recognized that increasing opportunities for unlicensed access directly fulfills the goals of

Section 257 to "remove market entry barriers for entrepreneurs and other small businesses in the provision and ownership of telecommunications services and information services." 47 U.S.C. §257(a). The three year cycle will also allow a suitable lead time for the development of new technologies, while occurring with sufficient frequency to keep the rules from growing stale.

Finally, by explicitly incorporating review of the rules governing access to the broadcast bands into a regular, statutorily mandated review, no licensee can claim surprise or a lack of due process in the event the Commission decides to expand unlicensed access further. Licensees will have certainty that review will take place, and will plan accordingly.

PART III: THE COMMISSION MUST PROPERLY ACCOMMODATE BOTH THE EXPANSION OF UNLICENSED SERVICES AND THE LPTV DIGITAL TRANSITION.

The Commission proposes to designate as "occupied," and thus unavailable for use, spectrum allocated to low power television stations and translators for expanded digital services. *NPRM* ¶16. Given the enormous amounts of spectrum this would foreclose as a consequence of the Commission's recent action, *In re Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules Digital Low Power Television* (rel. Sept. 30, 2004) ("*Digital LPTV Order*"),[7] the Commission must reconsider this tentative decision. Unless the Commission reconsiders, its decision in the *Digital LPTV Order* will vitiate its efforts here to bring the benefits of unlicensed access to all Americans.

A. Total Exclusion From "Occupied" Channels Is Generally Too Conservative, And Creates Particular Difficulties In Light of the Digital LPTV Order.

As a general matter, the Commission has taken a far too cautious approach in protecting

[7]Commentors stress that they do not here challenge the Commission's decision in 03-185. Rather, Commentors urge the Commission to reconsider the conclusion in this proceeding to protect future expanded services by declaring the relevant channels "occupied" and therefore unavailable for use regardless of whether any activity is actually occurring in the band.

television reception through the blunt instrument of declaring all assigned television channels off limits. The Commission received numerous comments detailing mitigation strategies far less draconian than the total exclusion proposed in the *NPRM*. Nor does the record support the Commission's apparent tentative conclusion that an underlay operating pursuant to standard Part 15 certification, *i.e.*, even without additional features to mitigate interference, would cause harmful interference to television viewers. To the contrary, the FCC explicitly found more than fifteen years ago that operation of Part 15 devices was completely compatible with television reception. *1989 R&O*, 4 FCCRcd at 3501.

Nevertheless, NAF, *et al.* have not sought to dissuade the Commission from prohibiting underlays in "occupied" channels in recognition of the political difficulties such an approach would cause. Commentors well recall how the Commission's LPFM initiative was thwarted not by genuine technical concerns, but by the operation of the broadcasting lobby. Indeed, despite the fact that the statutorily-mandated independent study demonstrated that objections based on claims of interference were spurious, *see Comment Sought on Mitre Corp. Technical Report*, 18 FCCRcd 14445 (2003), LPFM remains sadly stunted pending further Congressional action.

In the case of future digital LPTV and digital translators, however, the Commission's refusal to permit underlays would render deployment in the broadcast band effectively impossible. In its *Digital LPTV Order*, the Commission stated that it would "allow permittees and licensees of LPTV, translators, and Class A stations to seek a companion channel for their digital operations." *Digital LPTV Order* at ¶141. The Commission further stated that it would seek to minimize the number of applications for companion channels in the 52-69 Channel bands and would prohibit use of Channel 37, ¶59, and PLMRS bands. ¶76. In short, the Commission will seek to maximize the number of companion channels in the bands allocated for unlicensed

use. The Commission further compounds the problem of availability by promising to open future windows "for new digital LPTV and TV translator stations without eligibility restrictions." *Id.* at ¶155.

As if these conditions did not make it difficult enough for equipment manufacturers to find "unoccupied" spectrum, the Commission provides no clear date on which it will open a filing window and select companion channels. Rather, the Commission will wait until at least after full service broadcasters complete their elections. *Id.* at ¶159.

This uncertainty will render it effectively impossible for equipment manufacturers to develop new technology in accordance with the requirements of the *NPRM*. The *NPRM* requires maintenance of a database of all licensed operators within the relevant frequencies. But no database can possibly predict what channels the Commission will assign to digital LPTV and translator companion channels. Nor can manufacturers assess whether enough spectrum will remain available nationally to make construction of equipment using broadcast spectrum worthwhile until the selection process is resolved.

Notably, the *Digital LPTV Order* makes no effort to address the impact of its decisions on this proceeding. To the contrary, mention of this proceeding is wholly absent. It therefore falls to the Commission in this proceeding to address these concerns.

B. The Commission Must Permit Operation of Part 15 Devices In Bands Designated For Expanded Digital LPTV and Digital Translator Service.

If the Commission wishes to permit any operation within the broadcast bands, it must permit operation in bands designated for expanded LPTV and translator services. Such an approach makes good engineering sense and also serves the public interest.

As a first step, the Commission must recognize that it is not an "either/or" choice

between Part 15 devices and digital LPTV. To the contrary, by permitting operation of Part 15 devices on channels designated for digital expansion, the Commission will facilitate ***both*** the public interest benefits of expanding the Part 15 regime and the public interest benefits of digital LPTV and translators.

As an initial matter, the Commission must begin its analysis in the proper place: protecting ***viewers*** from harmful interference, rather than protecting licensees from the risk of any possibility of interference. In this context, the Commission must consider that while exposure to diverse programming and maintenance of over the air rural programming has tremendous public interest value, as the Commission observed in the *Digital LPTV Order*, other interests are at play here as well. As discussed extensively in Part I, opening these bands to unlicensed access will serve the interests of the Communications Act and the interests of the First Amendment.

To reflect this balance, the Commission should employ the interference analysis it utilized in its LPFM proceeding. *Creation of a Low Power Radio Service*, 15 FCCRcd 2205, 2230-46 (2000). There, as here, the Commission balanced the value of further sharing the spectrum against the potential risk of interference to the existing service. *Id.* The Commission found that the proper measure of interference was the well established user expectation, not the high-fidelity service that incumbents might wish to provide in an ideal world. *Id.* *Accord In Re Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range, Memorandum Opinion and Order and Second Report and Order*, 17 FCCRcd 9614, 9628 (2002).

Accordingly, even if operation of Part 15 devices might cause some interference to some

users in some cases, this possibility would not justify complete exclusion. Indeed, the record here does not include any finding of even minimal risk to future digital LPTV operations. The Commission has conducted no analysis indicating that exclusion is necessary or desirable. To the contrary, as described above, the Commission has found operation of unlicensed devices compatible with operation of broadcast television. *1989 R&O*, 4 FCCRcd at 3501. Where the policy of total exclusion will make it practically impossible to deploy devices in the broadcast band, the Commission must at least attempt to support this exclusion with some record evidence.

In Part IV, *infra*, Commentors provide examples of basic principles for interference management. Employment of the techniques listed will make underlay operation in the broadcast bands safe. In particular, the Commission's lack of faith in "smart radios" capable of adjusting to their environment remains unjustified. Permitting operation of Part 15 devices in the channels allocated to expanded digital LPTV and translator services provides a perfect "testbed" for technologies that could ultimately provide underlay operations throughout the entire broadcast band.

Commentors also note that the LPTV digital transition has not even begun. There is a strong public interest value in allowing immediate deployment of unlicensed wireless services, particularly in rural areas. In these areas in particular, the Commission should allow citizens to chose for themselves the nature of the service they wish to receive. In these uncrowded areas, there is virtually no danger that a neighbor's low-power omni-direction antenna will cause interference, even in a worst case scenario. Nor will point-to-point links for high powered devices in rural areas cause interference with television reception. Radio waves do not collide with each other in the air. Rather, interference occurs when undesired signals arrive at a television receiver in sufficient strength to drown out the desired signal. The Commission can

address this without requiring the complete exclusion proposed in the *NPRM*.

Commentors make two final observations. First, the as the *NPRM* itself observes, future digital television technology that evolves in an environment of unlicensed access will be engineered to take advantage of this access. *NPRM* ¶23. This weighs in favor of creating a testbed for unlicensed underlays in a digital environment. Since election of companion channels and subsequent construction of digital transmitters cannot even begin until after full power stations make their elections, digital LPTV stations remain some years away from deployment. This will allow time for manufacturers to develop the technologies foreseen in the *NPRM*, with the knowledge that a market exists for such products.

Second, there is no reason why the Commission should favor a new secondary service over expansion of Part 15 "unlicensed service." Traditionally, the Commission has maintained a hierarchy of (primary) licensed–>(secondary) licensed –>licensed by rule–> "unlicensed." *See Intelligent Transportation Devices NPRM*, 17 FCCRcd 23136, 23167-68 (2002) (describing hierarchy). But nothing in the Communications Act requires this. To the contrary, where Congress has directly spoken, it has chosen to protected Part 15 devices against interference from the intrusion of new licensed services. Balanced Budget Act of 1997, Pub. L. 105-33, Section 3002(c)(1)(C)(v) (prohibiting creation of new licensed services in "bands allocated or authorized for unlicensed use pursuant to part 15" if such services "would interfere with operation of end-user products permitted under such regulation").

While the Commission and others routinely speak of Part 15 as "unlicensed spectrum," and therefore somehow different from "licensed" spectrum, this is clearly not the case. Section 301 of the Communications Act requires that all intrastate and interstate use of electromagnetic frequency take place pursuant to a "license" issued by the Commission. 47 USC §301. The term

"license," however, has broad meaning. While it can certainly refer to a site license detailing the power levels and services of the licensee, this hardly constitutes the only model available to the Commission. To the contrary, the statute explicitly provides the Commission broad discretion in creating licensing regimes. *See, e.g.,* 47 USC §§ 303(b); 307(b); 309(j)(6)(F).

Past Commission practice further supports the Commission's discretion to create a system of equipment certification that satisfies Section 301. In *In re Allocation of Spectrum for Radiodetermination Satellite Service*, 104 FCC.2nd 650 (1986), the Commission assigned a Section 301 license to an equipment manufacturer, with blanket permission pursuant to the license to manufacture transceivers. *Id.* at 666-67. In doing so, the Commission explicitly found that it acted pursuant to its Section 301authority, and that such blanket authority was consistent with actions taken in other proceedings. *Id.* and n.56. Indeed, the the name of the *1987 Part 15 NPRM*, 2 FCCRcd 6135 (1987), and *1989 Part 15 R&O*, 4 FCCRcd 3493 (1989), "Revision of Part 15 of the Rules Regarding the Operation of Radio Frequency Devices Without an Individual License," reflects the Commission's understanding at the time that Part 15 constitutes an appropriate exercise of its Section 301 licensing authority.

Finally, in the related area of licensing under Title II the Commission has granted a blanket authorization in lieu of a specific certificate of public convenience. In the 1980s, Section 214 of the Act required that all telecom providers obtain a certificate of public convenience and necessity before constructing or extending any line. In several proceedings over time, the Commission found that it could satisfy this licensing requirement by issuing blanket authority for particular classes of carriers to extend or construct lines, despite the fact that Congress had made no such explicit distinction. *See In the Matter of Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, First Report and*

Order, 85 F.C.C.2d 1 (1980); *In the Matter of Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, Fifth Report and Order*, 98 F.C.C.2d 1191 (1984). Similarly, nothing prevents the Commission from satisfying its Section 301 licensing requirement by issuing blanket authority to all devices that comply with the Part 15 rules.

Recently, the Commission has intimated that its authority for Part 15 flows from Section 302, rather than directly from Section 301.[8] *In re Amendment to Allow Part 15 in the 24.05-24.25 Ghz Band*, 18 FCCRcd 15944, 15948-49 (2003). The Commission did not consider in that proceeding what, if any, difference it would make if Section 302 in fact constituted a separate source of authority from Section 301. Even if Section 302 constituted a wholly separate source of authority from Section 301, nothing in the Communications Act indicates that Section 301 licenses must hold primary status over Section 302 "certifications." To the contrary, the Communications Act consistently treats "licensed services" and services otherwise authorized by the Commission as deserving equal protection. *See, e.g.*, 47 USC § 303(m)(1)(E) (permitting Commission to suspend or revoke license of operator that "willfully or maliciously interfered with ***any other radio communications or signals***) (emphasis added); § 333 (prohibiting malicious interference with any licensed or otherwise authorized operator).

In short, whether Part 15 devices are licensed under Section 301 or authorized under Section 302, nothing prohibits the Commission from providing Part 15 devices co-equal status with more traditional kinds of licensed services. This is especially true here, where the Commission has announced after issuance of this *NPRM* its intention to expand the rights of LPTV and translator licensees as a general exercise of its own authority rather than pursuant to

[8]In both the *1987 Part 15 NPRM* and the *1989 Part 15 Order*, the Commission cited both Section 301 and Section 302 as relvant sources of authority without elaboration.

some specific statutory dictate. *Digital LPTV Order* at ¶¶11-19. The Commission has not yet issued a single license for a companion digital frequency, and will not do so until after the rules for this proceeding are well settled. Accordingly, the Commission can and should require any LPTV or translator applicant to take its new, free license explicitly contingent on operation of Part 15 devices within the spectrum.

The Commission, of course, need not go so far as to grant Part 15 devices co-equal status. The Commission can retain its traditional scheme here. But, in doing so, it should proceed mindful of its full authority. Accordingly, when considering what mitigation measures may be necessary, the Commission should not act with the overabundance of caution that has marked its treatment of existing analog licenses and full power digital stations.

PART IV: THE COMMISSION SHOULD CONSIDER A BROAD VARIETY OF POSSIBLE INTERFERENCE MITIGATION TECHNIQUES.

A. The Commission Should Properly Balance the Dangers of Interference With The Benefits of Expanding Unlicensed, Rather Than Strive to Protect Incumbents Against Worst-Case Scenarios.

The purpose of FCC interference mitigation regulations should be"to maximize total utility in each band rather than to minimize interference to any individual spectrum user." R. Paul Margie, "Can You Hear Me Now? Getting Better Reception From The FCC's Spectrum Policy,"2004 Stan. Tech. L. Rev. 5, 6 (2004). The goal should not be to provide 100% protection against the risk of interference, a goal the Commission itself has recognized as not merely impossible, but contrary to the public interest as an unwarranted restraint on innovation and the introduction of new services. *See In Re Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range, Memorandum Opinion and Order and Second Report and Order*, 17 FCCRcd 9614, 9628 (2002) (*MVDDS 2nd R&O*) (interference must

be "harmful" to existing licensed service to raise cognizable claim that interference risk outweighs public interest benefits). The Commission has long recognized that complete protection from the risk of any interference is as unrealistic as creating a speed limit low enough to avoid all automobile accidents. Had this been the requirement to deploy automobiles, the United States would have remained a horse and buggy economy rather than a world leader in the auto industry. Similarly, if any potential increase in interference risk prohibited creation of a new service or extension of Part 15, no new innovation could take place in wireless technologies.

The Commission would do well to recall the principles it set forth when it created the current Part 15 rules. *In re Revision of Part 15 of the Rules Regarding the Operation of Radio Frequency Devices Without Individual License, First Report & Order*, 4 FCCRcd 3493 (*1989 Part 15 R&O*). Throughout the proceeding, the Commission explained that the public interest demanded a balance between the risk of interference to licensed services and the tremendous potential to the public in expanded unlicensed access. In doing so, the Commission faced virtually the same arguments raised by incumbents over the last two years and rejected them, relying on its technical expertise and real world experience in administering other unlicensed services rather than the worst case scenarios of licensees. *Id.* at 3494-95. The Commission concluded with words it would do well to recall today.

> The actions being taken in this Report and Order represent the Commission's best judgments as to the trade-offs between beneficial low power spectrum use and possible interference to the authorized radio services. We recognize that certain increased risks of interference to authorized devices may result from altering our regulations.….On balance, we believe that the public interest benefits of the rule changes being adopted outweigh the potential for increased interference.

Id. at 3519.

Similarly, when the Commission proposed to create the Unlicensed National Information Infrastructure (UNII) Band, it explicitly rejected calls from incumbents to guarantee protection

against worst case scenarios. *Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Range*, 12 FCCRcd 1576, 1580-85 (1997) (*UNII R&O*). The Commission rejected arguments that the Commission should require further testing of deployment via temporary licensing or otherwise delay service to the public. *Id.* Rather, balancing the risk of harmful interference with the clear public benefit of expanding direct citizen access to spectrum, the Commission chose to extend the traditional Part 15 regime to the band.

History has borne out the Commission's judgment in both cases. By acting to optimize the risk of interference, rather than seeking to protect incumbents from any risk at all cost, the Commission unleashed a virtual torrent of public interest benefits at no cost. By contrast, when the Commission has acted too cautiously, it has both denied the public the benefit of new services and while failing to secure new benefits from incumbents. In 1989, the Commission declined to extend the Part 15 Rules to the television broadcast spectrum even though the Commission was "satisfied that our proposed limits are adequate to prevent harmful interference" because "more intensive use of these bands may occur with the introduction of various forms of High Definition Television (HDTV)." *1989 Part 15 R&O*, 4 FCC Rcd at 3501.

B. Incumbents Hold Licenses of Limited Rights

In evaluating the claims made by broadcasters and other licensees, the Commission must recall that licensees posses narrowly tailored rights for limited times, dependent upon continued service to the public interest. 47 USC §307. Accordingly, the Commission should view with a jaundiced eye the claims of broadcasters that its actions constitute a Fifth Amendment taking or an unwarranted transfer of rights.

While the Communications Act is rarely a model of clarity, it is utterly unambiguous on

this issue: no licensee has anything in the nature of a property interest in a license. 47 U.S.C. §§301. *FCC v. Sanders Bros. Radio Station*, 309 U.S. 470, 475 (1940). Licensees must explicitly waive any claim based on prior use "against the regulatory power of the United States." §304. Licensees have no rights beyond those explicitly detailed on the face of the license and a guarantee of protection from ***harmful*** interference. 47 U.S.C. §309(h)(1); *MVDDS 2nd R&O*, 17 FCCRcd at 9628 ("[i]n the absence of harmful interference to DBS, no cognizable interest of DBS licensees will be undermined"). The Commission may unilaterally alter the terms of a license or class of licenses if it finds that doing so would serve the public interest and it protects the due process rights of the licensee. 47 U.S.C. §303(f); §316. This includes the power to require licensees to share access to their spectrum. *Red Lion*, 395 U.S. at 390-91.

Even within the scope of use under a license, the Act imposes limitations on licensees. A licensee may not use more than the minimum power "necessary to carry out the communication desired." 47 U.S.C. §324. Nor can a licensee deliberately act to interfere with any secondary or unlicensed access user, despite its primary status. 47 U.S.C. §333. Indeed, the Commission may revoke the license of an operator who "has willfully or maliciously interfered with any other radio communications or signals." 47 U.S.C. §303(m)(1)(E).

Examples of the Commission's power to alter the terms of a spectrum license demonstrate the breadth of power the Commission has to regulate in the public interest. In the past, the Commission has exercised its power to require broadcasters to divest newspapers in the same market area, even though the cross-ownership ban was not in effect at the time of the acquisition of the newspaper or broadcast license. *National Citizens Committee For Better Broadcasting v. FCC*, 436 U.S. 775, 814 (1978). The Commission has ordered the involuntary relocation of licensees, pursuant to compensation schemes determined by the Commission. *In re*

Redesignation of the 17.7-19.7 GHz Frequency Band, 15 FCC Rcd 13430 (2000), *affrm'd sub nom Teledesic L.L.C. v. FCC*, 275 F.3d 75 (D.C. Cir. 2001). The Commission has retroactively extended repayment schedules to the detriment of losing bidders, *U.S. Airwaves, Inc. v. FCC*, 232 F.3d 227 (D.C. Cir. 2000), and determined that it would use auctions to distribute available DBS channels despite previously informing licensees that it would distribute the excess capacity among the existing licensee pool. *DirecTV, Inc. v. FCC*, 110 F.3d 816 (D.C. Cir. 1997). In all these cases, the courts have upheld far more drastic restructuring of settled licensee expectations than that affected by the *NPRM*.

In the highly technical matter of determining what interference mitigation scheme to adopt, the Commission's power to act is at its zenith. *See, e.g., Teledesic LLC v. FCC*, 275 F.3d 75, 84 (2001). The Commission can, indeed must, make its decision on technical excellence rather than on the basis of perceived rights of licensees.

Similarly, licensees have no entitlement to compensation for any loss of "rights." The suggestion in the *NPRM* that it will permit broadcasters to charge for access, *NPRM* at ¶21, should be rejected as contrary to well settled policy and law. Broadcasters lose no right for which they must be compensated, nor do they provide any service by "permitting" access to unoccupied channels. Indeed, given that the Commission proposes to prohibit access to "occupied" channels, it is impossible to discern how the Commission has arrived at the patently false conclusion that broadcasters should receive "compensation" for public access.

C. The Commission Must Adequately Consider the Privacy Concerns of Users.

Although locator beacons serve a reasonable purpose in high power, stationary installations, their value in low power mobile devices is questionable. The need to find an individual low power transmitter will rarely arise, given the small area in the broadcast radius of

such devices.

On the other hand, requiring identification beacons in mobile devices creates a very real privacy concern if the Commission requires such beacons to transmit personal contact information. Users taking advantage of the new spectrum should not have to carry what will amount to a personal tracking device that, in addition to allowing anyone to track where they go, tells potential thieves where they live and potential spammers or scammers how to contact them.

If the Commission requires identification beacons in low power devices, it must recall that the intended users of such devices will be average citizens with significant privacy concerns, not network providers or others who would expect to make their contact information public. The Commission should therefore hesitate before requiring identity beacons in low power devices. If the Commission does require such beacons, it must not require personal contact information. At the least, the Commission should permit individuals to protect such information in the same way they protect other customer information when subscribing to telephone or cable services.

Many of the commentors here raised similar concerns where the Commission proposed an identification beacons requirement in ET Docket No. 04-151. *See Comments of NYC Wireless, et al.*, ET Docket No. 04-151, at 11-13 (filed July 28, 2004). NAF, *et al.* incorporate the more detailed discussion of the problems of identification beacons in mobile devices by reference here. A copy of the relevant filing is attached as Appendix B.

D. The Commission Should Consider Affordability and Ease of Use.

If the Commission seeks excessive protection against harmful interference, it will be forced to pile on interference mitigation technologies and make unlicensed devices prohibitively expensive. With mass produced consumer devices, even a difference of a few cents can have a large impact on sales. The Commission must therefore proceed with great caution in adding

interference mitigation features to unlicensed devices, doing so only where it finds genuine need.

Manufacturers and software producers such as Intel, Microsoft and Texas Instruments have stated that, given relatively unrestrictive rules, they can produce virtually costless wireless sensors and transmitters. Such a world would have hundreds of wireless devices in each home making valuable contributions to health, safety, energy efficiency, and education. In addition, Commentors such as CUWIN continue to innovate in the unlicensed wireless space in developing cheap networking devices that serve some of the poorest communities in the nation.

An increase in cost of even a few dollars can render the widespread deployment of these devices prohibitively expensive. Worse, the added cost produces a vicious circle. Because fewer people will buy the devices, manufacturers make fewer devices, reducing economies of scale and driving the price up even higher. This would render it practically impossible for organizations like CUWIN, and the communities they serve, to benefit from the new technologies.

Consider the Commission's recent decision to allow off-shelf unlicensed hardware for use in the licensed 4.9 GHz public safety band. *In re 4.9 GHz Band Transferred from Federal Government Use*, WT Docket No. 00-32 (rel. Nov. 12, 2004). As the Commission observed, cost matters, and expensive equipment can deter purchase and deployment of beneficial new technologies. *Id.* at ¶¶10, 13.

The Commission therefore must remain mindful that adding unnecessary precautions to satisfy the worst case scenarios of incumbents carries a real cost to society at large. It will do the public little good to create rules of access, but to make the mechanisms so unaffordable that the cost excludes the public from the benefits.

E. The Commission Should Avoid Mandating Any Specific Standard or Technology.

The Commission should specify the functions, not the specific technologies, of interference mitigation, because technology changes too fast for the Commission to specify. For example, satellite geolation (GPS) is the preferred geolocation system today. But there are many other types of potential geolocation systems that should not be precluded. For this reason, rather than mandating GPS as proposed in the *NPRM*, *see* Appendix B Proposed Rule 15.244(e)(1), the Commission should simply require that all devices have sufficient "geographic intelligence" to determine their location within a radius of 10 meters.

This is but one example of how mandating a specific technology or mitigation technique can have the unintended consequence of inhibiting, rather than promoting, the innovation and deployment the Commission seeks. The success of the Part 15 regime has flowed from two factors: its simplicity and the refusal of the Commission to dictate specific technologies or standards for devices. The Commission's Part 15 rules require that devices comply with the requirements and limitations set forth in the rules. ***How*** devices comply is irrelevant. If an applicant for Part 15 certification can demonstrate to the satisfaction of the Office of Engineering and Technology that a device complies with the rules, it receives a certification.

At all costs, the FCC should avoid setting specific standards and reject the suggestion in the *NPRM* that the FCC should mandate or otherwise involve itself in voluntary standards for the band. *NPRM* at ¶47. Voluntary standards have evolved throughout the Part 15 regime without any assistance by the Commission. There is no reason to assume this will not continue to be the case.

Worse, requiring an official FCC standards process will give broadcasters and other incumbents *de facto* veto power over new standards and, by extension, the evolution of Part 15

services in the band. Furthermore, the cost of participation will drive out all but well funded participants. As anyone who has participated in an FCC industry standards proceeding knows full well, FCC supervised standard making is slow, inefficient and expensive. This is not because of any deficiency on the part of the FCC. This is simply the nature of a process in which participants have incentives to promote their own proprietary products and technologies regardless of the technical merit of their products or those of their rivals.

Unlike television receivers, set top boxes, or other technologies where it is imperative for the industry to have a single standard, the object here is not uniformity to promote interoperability. The Commission wants to protect television reception and other licensed services. NAF, *et al.* therefore urge the Commission to give interested parties the greatest flexibility to develop innovative solutions rather than to mandate a single solution and create an open process that would leave new entrants at the mercy of incumbent licensees determined to find fault.

Finally, NAF, *et al.* note that the Commission and others favoring spectrum reform of any stripe consistently disparage previous "command and control" regimes, favoring instead regulations that promote flexibility. [CITE] Part 15 has provided a wealth of evidence for such a flexible approach. It would be irrational for the Commission to impose what amount to restrictive command and control requirements in the very heart, as it were, of spectrum flexibility.

F. The Commission Can Adequately Protect Licensed Services Through Its Existing Powers.

In the Notice of Inquiry leading to this *NPRM*, and in other proceedings, licensees have expressed concern that the Commission's certification regime is inadequate to protect them if

subsequent problems emerge. The Commission should address this concern explicitly by making clear it will cancel its certification of devices and may order recalls of devices if necessary.

In the past, the Commission has found that its certification regime and ability to act to remediate actual interference provides adequate protection for licensees. *In Re Amendment of Part 15 To Allow Certification of Equipment in the 24.05-24.25 GHz Range*, 16 FCC Rcd. 22,337, 22,341 (2001). A statement by the Commission that it may cancel Part 15 certification for devices that create widespread interference problems, and may even order recalls of devices already deployed, should resolve genuine concerns of harmful interference after certification. By contrast, to prohibit deployment of Part 15 devices in the broadcast bands because such devices might create harmful interference and cannot be easily recalled is unreasonable and irrational.

G. The Commission Should Eschew Centralized Interference Mitigation Techniques That Create Gatekeepers of Access And Favor Decentralized Mitigation Techniques.

Requiring unlicensed spectrum users to frequently seek information and permission from centralized authorities concentrates power over speech and commerce into too few hands. Imagine if every time somebody wanted to speak she would have to consult a Washington, DC database to confirm that there were no nearby speakers with whom she might interfere. The skepticism of gatekeepers for acoustic speech or print media should apply to management of the electromagnetic spectrum. Particularly, in the case of low power transmitters that cover a fraction of a square mile, common sense derived from the acoustic spectrum should apply in this realm.

Accordingly, the Commission should reject any proposal that centralizes control of access in the hands of a few. Unfortunately, the *NPRM* proposes two such strategies: that

broadcasters will transmit a "control signal" that governs when a device may access broadcast band spectrum, and that a high-power device must be installed by a "certified professional." Both of these proposals, if adopted, would dramatically impede the deployment and adoption of unlicensed technology in the broadcast bands.

By contrast, numerous decentralized technologies exist that would more than adequately protect reception of licensed services. NAF, *et al.* list only a few such techniques to demonstrate the viability of decentralized interference mitigation. The Commission should favor adoption of such techniques over centralized techniques that place power to control access to spectrum in the hands of a few.

1. The Commission Must Not Require Use of A "Centralized Database" That Broadcasters Would Control.

The *NPRM* proposes to require that, in addition to any other interference mitigation, portable devices receive a "control signal" before they can operate. ¶21. The *NPRM* appears to give exclusive rights to transmit this "control signal" to broadcasters, and to allow broadcasters to receive unspecified "compensation" for this service. *Id.* The *NPRM* requires similar controls in non-mobile devices not installed by an expert. *Id.* at ¶26. This proposal serves no useful purpose, and provides broadcasters with a "veto" over access by simply refusing to broadcast the control signal or imposing high fees.

As an initial matter, NAF, *et al.* observe that the Commission already requires broadcasters to submit all relevant information necessary for creating such a database. *See* 47 CFR §73.1690. Broadcasters have maximum power and geographic position of their antennas set by regulation and by their site licenses. 47 USC §309(h); 47 CFR §73.1690(a). Broadcasters making any significant changes must request permission from the Commission before making

the changes. 47 CFR §73.1690(b). Even so called "minor amendments" require notification within 10 days. 47 CFR §73.1690(c).

It is therefore with some puzzlement that NAF, *et al.* read that the Commission considers compilation and maintenance of the proposed database an arduous task. If the Commission must have a database, the Commission should compile the database ***itself*** and administer it.

Such an approach has numerous advantages over third party compilation and administration. The Commission is a "trusted third party" that will administer access to any database neutrally. By contrast, private parties – particularly if the Commission grants a monopoly on transmission to a particular class of private party – may have reason to deny access or manipulate the data. All licensees are already under an obligation to provide all information necessary for construction of the database to the Commission, and the Commission will ultimately receive all complaints regarding interference. The Commission can update the database in real time as it receives the information, providing all parties maximum protection.

Whoever compiles the database, however, the Commission should not grant a monopoly on access. Certainly the Commission should not grant a monopoly to broadcasters, the incumbents with the greatest incentive to preclude access. The *NPRM* as proposed gives broadcasters as a class a perfect veto over unlicensed access, even after Part 15 devices meet Commission approval. Given the tremendous concentration in media markets as a consequence of the Commission's lax ownership rules, only a few licensees in any market can decide to prohibit operation of Part 15 devices.

The Commission compounds this error by proposing to allow broadcasters to charge an unspecified price for access. Such an approach confers an unwarranted windfall on broadcasters. The Commission provides no reason why broadcasters should enjoy this monopoly right in favor

of any other third party. There is no logical reason why any "control signal" must come from a broadcaster using broadcast frequencies. Consider, for example, a third party provider that makes such information available through a website. A user could access the Internet via some other means (such as wireline, 2.4 GHz unlicensed, or licensed spectrum) and retrieve the necessary information.

If the Commission decides to require some sort fo command and control information, it must either set a fair price or allow competition to drive the price down. As written, the *NPRM* proposes allowing broadcasters to levy an unrestrained tax on citizens accessing broadcast spectrum. Such an "access tax" would limit deployment and marginalize what should be a ubiquitous technology.

The Commission must appreciate how such an additional cost would hinder deployment of noncommercial systems such as community wireless networks (CWNs) or shut out wireless internet service providers (WISPs) and municipal systems with little starting capital. CWNs in particular are vulnerable to an ongoing subscriber cost of the sort proposed in the *NPRM*. CWNs rely primarily on volunteers, providing access to the poorest urban and rural communities through volunteer labor and donated or cast-off equipment. As described by one handbook for community networking:

> The desire to end this separation of "those in the know" from "those who want to know" is helping to bring people away from their computer screens and back into their local neighborhoods. In the last year, hundreds of independent local groups have formed with a very similar underlying principle: get people connected for the lowest possible cost...Wherever possible, ingeniously simple and inexpensive (yet powerful) designs are being drawn up and given away. Thousands of people are working not for a profit motive, but for the benefit of the planet.

Rob Flickenger, BUILDING WIRELESS COMMUNITY NETWORKS, 2nd Ed. O'Reilly (2003) at 7.

These volunteer projects simply cannot afford to pay a regular fee to broadcasters to

obtain access to the public spectrum that should be theirs as of right. Yet it is precisely these communities – low income urban communities, minority communities, and rural communities – that the Communications Act most emphatically directs the Commission to serve.

Accordingly, the Commission should reject the proposal in the *NPRM* mandating a "control signal" as a precondition of operation, particularly one under the control of incumbent licensees.

2. The Commission Should Not Adopt A "Professional Installer" Certification.

NAF, *et al.* vigorously oppose the creation of any "professional installer" certification requirement, even as only one of several mitigation options. Requirements for professional certification, when endorsed by regulation, have a historic tendency to migrate from "optional" to "mandatory." The very fact that the Commission will endorse a "professional installer" certification will have an impact on unlicensed deployment, as an increasing number of public sector and private sector actors will assume that if such a certification exists, and is endorsed by the Commission, then it should be required rather than voluntary.

In addition, the Commission proposes no reason why "professional installer" certification is necessary to perform the function the Commission demands- use of a relatively simple tool to determine what channels are occupied. *See* Appendix B Proposed Rule 15.244(e)(2). Under the proposed rule, the professional installer must "configure the device to operate only on unused channels" after consulting the Commission's proposed database and using "computational software." There is no reason why a manufacturer cannot make a simple handheld device that will allow any individual to perform these acts regardless of any "certification." Indeed, it is trivially easy to download the relevant software into a commercially available personal digital

assistant.

Requirement of professional certification thus serves no purpose. On the other hand, a professional certification requirement would impose a very real and significant limitation on the ability of noncommercial community networks to deploy high power systems. New commercial entrants would also face a significant start up cost and disadvantage. Adoption of such a requirement would therefore undermine the very benefits the Commission intends to foster.

In addition to the cost imposed on users, certification systems have numerous problems. First, as the *NPRM* observes, no one has agreed on what criteria would constitute a "professional installer." *NPRM* ¶26. Even if the Commission can develop suitable criteria for 2004, these requirements will quickly become dated and useless.

NAF, *et al.* also express concern that allowing a private organization to administer the certification, as the *NPRM* suggests, invites that private organization to impose ever increasing requirements as a means of screening out potential competitors. If the Commission does require some kind of certification, the Commission must ensure that the certification imposes minimal burdens on those seeking to use high power systems. The Commission should administer the certification itself, to prevent any private organization from creating artificial barriers to entry.

Many of the commentors here raised similar concerns where the Commission proposed a mandatory certification requirement in ET Docket No. 04-151. *See Comments of NYC Wireless, et al.*, ET Docket No. 04-151, at 3-11 (filed July 28, 2004). NAF, *et al.* incorporate the more detailed discussion of the problems of professional certification present by reference here. A copy of the relevant filing is attached as Appendix B.

3. A Host of Decentralized Mechanisms Exist That More Than Adequately Address Legitimate Interference Concerns.

The Commission has taken the first critical step away from command and control or reliance on licensed intermediaries by approving the first software defined radio. *See* Public Notice "FCC Approves First Software Defined Radio," November 19, 2004. With this act, the Commission recognizes that use of the public airwaves has entered a new technological phase, one in which devices can avoid interference by responding to their environment rather than through the heavy hand of regulation.

Commentors do not propose the list of mitigation strategies given here as definitive. Rather, NAF, *et al.* suggest here technologies that already exist that employ more beneficial strategies than those proposed in the *NPRM*. NAF, *et al.* divide these strategies into three classes. ***Intelligent sensing devices*** use embedded sensors and software to detect the presence of activity on a channel and avoid the channel during operation of licensed transmitters. ***Receiver sensing devices*** sense the presence of a receiver seeking to receive broadcast transmissions. ***Permissive pilot beacons*** require licensees to establish their own beacons that warn devices that a channel is occupied. This is the opposite of the proposal of the Commission here, but is similar to that proposed by the Commission in the 3650-3700 MHz *NPRM*. *Unlicensed Operation in the 3650-3700 MHz Band*, 19 FCCRcd 7545, 7567-68 (2004).

Intelligent sensing devices. The Commission is well aware of the capacity of devices to sense their environment and adjust both power levels and frequency use dynamically. This technology is a mature technology, used in all 802.11b devices and other devices that use "listen before talk" protocols. This device maximizes efficiency of spectrum, because it allows total devices to use available spectrum without fear of interference.

Despite the maturity of this technology, the Commission declines to rely on this approach

here, in part for fear of the "hidden node" problem. *NPRM* ¶21 & n.34. As an initial matter, the fact that it is possible to construct a "hidden node" scenario that in some cases may raise a risk of interference should not, by itself, require complete exclusion from the "occupied" channel. As discussed at length above, the Commission should balance the potential for interference in some limited cases with the value of cheap public access to useful spectrum.

Nevertheless, the simplest form of dynamic sensing and adjustment can be improved in a variety of ways without requiring additional features. The location of licensed transmitters and their power is a matter of public record. The mechanics for computing signal strength based on these factors is well understood. A device could easily sense what channels it is receiving and match them against the database of possible signal strengths. While this would not provide a level of accuracy equivalent to GPS, it would provide enough information to allow a device to "know" it's location in a general way (e.g., by DMA) and avoid "occupied" channels. The device could further identify its location through the simple expediency of asking the user for a zip code before transmitting. Such a system would be cheaper and easier to implement than the centralized systems proposed by the Commission, and would have the advantage of moving control from a few "gatekeepers" to the network edge.

Receiver sensing devices. The proper focus of protection is upon the television viewer. Accordingly, devices do not need to protect an entire DMA. They need only protect receivers within the range of the Part 15 device.

Televisions and other broadcast devices emit signals when receiving broadcasts. For example, MobilTrak creates a device that can determine what radio station a car radio is tuned to from a distance of several hundred feet.[9] Equipment manufacturers can build in sensing capacity

[9]More information on MobilTrak is available at http://www.mobiltrak.com. *See also*, Dina El Boghdady, "Advertisers Tune Into New Radio Gauge," Washington Post E1 (October 25, 2004);

to determine if a television receiver is active nearby. If a receiver is not active, the device could freely transmit without fear of interfering with a viewer.

NAF, *et al.* recognize that such an approach raises privacy concerns. The technology already exists in unregulated form, however, so the danger to privacy already exists regardless of the use of such sensing devices under Part 15. More importantly, the Commission can impose further protections to ensure that the device does not report television viewing habits to the end user. Indeed, what frequency the device selects, based on the presence or absence of an active receiver, need not be transparent to the end user at all for the device to work.

Permissive pilot beacons. In the *3650-3700 MHz NPRM*, the Commission proposed that licensees could mount pilot beacons on licensed transmitters to inform Part 15 devices that a frequency is in use. *3650-3700 MHz NPRM*, 19 FCCRcd at 7567-68. Pilot beacons of this sort solve the hidden node problem by concentrating needed information into a stronger, more compact signal. *Id.* Thus, the Part 15 device will never be in a place where its reception of the pilot beacon is sufficiently attenuated so that the Part 15 device mistakenly believes the frequency band empty, but close enough to a local receiver capable of receiving broadcast programming that it will cause interference.

This scheme differs in critical respects from the mandatory control signal in the *NPRM*. It gives licensees the incentive to move quickly to install and activate beacons, rather than allowing licensees to veto entry by refusing to act. It does not allow licensees to turn an interference mitigation measure into a financial windfall and a means of excluding potential competitors. Nor does it create a need for a database that the Commission apparently considers expensive and difficult to maintain. As an added benefit, even if only some licensees employ

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Bob Brewin, "Radio 'Sniffers' Likened to Fed E-Surveilance," Computer World, May 31, 2000 (available at http://archives.cnn.com/2000/TECH/computing/05/31/radio.sniffers.idg/).

beacons, this would allow properly equipped devices to determine their location and the presence of other licensees – provided the licensee beacon contains some identifying information, such as its call letters.

These proposals only begin to outline possible mitigation strategies. As even this brief list makes clear, however, the real problem of interference mitigation does not require the complex, command and control solutions that the Commission proposes in the *NPRM*. Rather than mandate remedies that create bottlenecks and potentially make the cost of deployment prohibitive, the Commission should focus on decentralized mitigation techniques.

CONCLUSION

Over 15 years ago, the Commission recognized that unlicensed devices could share the broadcast bands with licensed services. The Commission failed to act, however, in the belief that to do so might interfere with the transition to high definition television. As a consequence, the public has been denied access to a vital spectrum resource while receiving none of the promised benefits from licensees. Every advance in technology in the last fifteen years has made it ever easier to share access to spectrum between broadcast television and Part 15 devices. The Commission should learn from this history, not doom the public to repeat it.

In the last 15 years, the cost of the Commission's misjudgment has grown astronomically. The Commission can be forgiven its failure to appreciate the public interest value of unlicensed access to broadcast spectrum in 1989, and acting in an abundance of caution to foster a transition in television that never came. Today, such a failure of nerve is inexcusable. The Commission has received volumes of highly persuasive evidence from hundreds of interested parties – citizens, CWNS, equipment manufacturers, WISPs, and others – regarding the value of access to the broadcast spectrum. Billions of dollars hang on the Commission's

decision to allow access to broadcast spectrum under conditions that facilitate innovation and deployment.

Ultimately, more important than these billions of dollars in potential investment and sales, is the public interest. The Commission's duty to facilitate direct access to the broadcast bands by citizens is clear under the First Amendment and the Communications Act. As the Commission reviews the comments submitted by competing industry players, the Commission must recall the words of the Supreme Court, "it is the right of the public ... which is crucial here. That right may not be constitutionally abridged by either Congress of the FCC." *Red Lion*, 395 U.S. at 390.

Respectfully submitted,

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APPENDIX A: SPECTRUM USE OF SERVICES IN THE TV BAND (See Attached)

1. Glossary
2. Six Case Studies—Detailed Information
3. Six Case Studies—Summary Information

APPENDIX B: NAF, *ET AL.* COMMENTS IN THE MATTER OF UNLICENSED OPERATION IN THE BAND 3650-3700 MHZ, ET DOCKET 04-151
(See Attached)

APPENDIX A: SPECTRUM USE OF SERVICES IN THE TV BAND

1. Glossary
2. Six Case Studies—Detailed Information
3. Six Case Studies—Summary Information

Glossary of Services in the TV Band

Class A Television Stations: Class A television stations were created to protect qualified LPTV stations from high power TV stations. They have quasi-primary status: unlike high power stations, they cannot force other TV stations to accept interference from them; they are only protected from being displaced by other stations. LPTV licensees were eligible for Class A licenses within a specific window in 2000, if within the previous 90 days of the order, they 1) broadcast for a minimum of 18 hours per day; 2) broadcast an average of at least 3 hours per week of programming produced within the market area served by the station; 3) were in compliance with the Commission's requirements for LPTV stations; and 4) from the date of application for Class A license, the station was in compliance with the Commission's operating rules for full-power television stations. (See 47 CFR Part 73)

Low Power Television (LPTV): LPTV stations broadcast signals at a low power, on a "secondary" basis to full-power stations; that is, their signals must not cause interference to the reception of existing or future high power stations, and they must accept all interference from high power stations. Unlike TV translator stations, LPTV stations may originate programming. Indeed, the FCC created low power TV to encourage community broadcasting with locally originated programming.[1] (See 47 CFR Part 73)

Low Power Auxiliary Stations (LPAS): Along with wireless microphones, wireless assist video devices make up a class of devices called Low Power Auxiliary Stations, which have secondary status in the broadcast bands:

- ***Wireless Microphones***: LPAS are most commonly used as wireless microphones by motion picture, television, or cable producers under Subpart H of Part 74 of the Code of Federal Regulations. The rules have also been extended to the National Football League. This type of wireless microphone is generally used to assist production and transmits over distances of approximately 300 meters. Licensees must submit to the FCC the purpose and place of use. They are limited to 250 mW in UHF and 50 mW in VHF with an occupied bandwidth of 200 kHz.

- ***Wireless Assist Video Devices (WAVDs):*** WAVDs operate in bands 180-210 MHz and 470-698 MHz.[2] Video assist devices produce low resolution images that can be used by members of a production crew to make decisions with respect to content, lighting, and image framing. Often, these video assist devices are connected via cable, but wireless decreases costs and increases efficiency for users. They are limited to 250mW but can transmit across 6 MHz.

Medical Telemetry: Wireless medical telemetry is used to monitor patient physiological parameters (e.g., cardiac signals) over a short distance using a transmitter worn by the patient and a central monitoring station. These devices have the advantage of allowing patient

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[1] See Federal Communications Commission, "LPTV Fact Sheet," http://www.fcc.gov/mb/video/files/LPTVFactSheet.html

[2] See 47 CFR Ch. I (10–1–03 Edition), section 74.870(c).

movement without tethering the patient to a bedside monitor with a hard-wired connection.[3] Until the establishment of Wireless Medical Telemetry Services (WMTS), medical telemetry operated only in the 608-614 MHz band, as an unlicensed secondary user, sharing the band with 12 radio astronomy stations that do not cause significant interference.[4] After WMTS, medical telemetry users have primary or co-primary status in 1395-1400 MHz and 1429-1432 MHz in addition to 608-614 MHz.

Private Land Mobile Radio Services (PLMRS): PLMR systems are used by companies, local governments, and other organizations to meet a wide range of communication requirements, including coordination of people and materials, important safety and security needs, and quick response in times of emergency. Public safety agencies, utilities, railroads, manufacturers, and a wide variety of other businesses use these radio systems every day. The services included in PLMRS are Public Safety, Industrial/Business, Private Land Mobile Paging, and Radiolocation.[5] PLMR services include sport radios, public safety radios (police, fire, EMS, etc.) as well as business/industrial radios (delivery, transportation, taxis, truckers, railroads, utilities, fast-food service, etc.).[6] (See 47 CFR Part 90)

TV Booster Stations: Booster stations are licensed only to full-power television stations for providing signal coverage over terrain-shadowed parts of the service area. These stations broadcast on the same frequency as their parent station. (See 47 CFR Part 73)

TV Translator Stations: TV translator stations rebroadcast the programs of high-power television stations by altering their frequency and amplitude to overcome transmission over long distances or intervening terrain. TV translator stations cannot originate more than 30 seconds of programming per hour, and are not limited to operation within the contour of the station that they rebroadcast. Most of the 4,700 TV translator stations are in the western mountainous states.[7] (See 47 CFR Part 73)

Unlicensed Wireless Microphones: Used by small users such as schools, sports teams, theatre groups, churches and hospitals, wireless microphones allow wireless communications using low power FM signals within a small space, usually 300 meters. Wireless microphones have secondary status on their bands of spectrum, which include 49-108 MHz, 169-216 MHz, 450-806 MHz, and 900-952 MHz. These microphones were originally only allowed on certain frequencies, until a series of FCC orders in the late 1980s expanded their use across the broadcast band, allowing microphones to operate on frequencies between TV channels.

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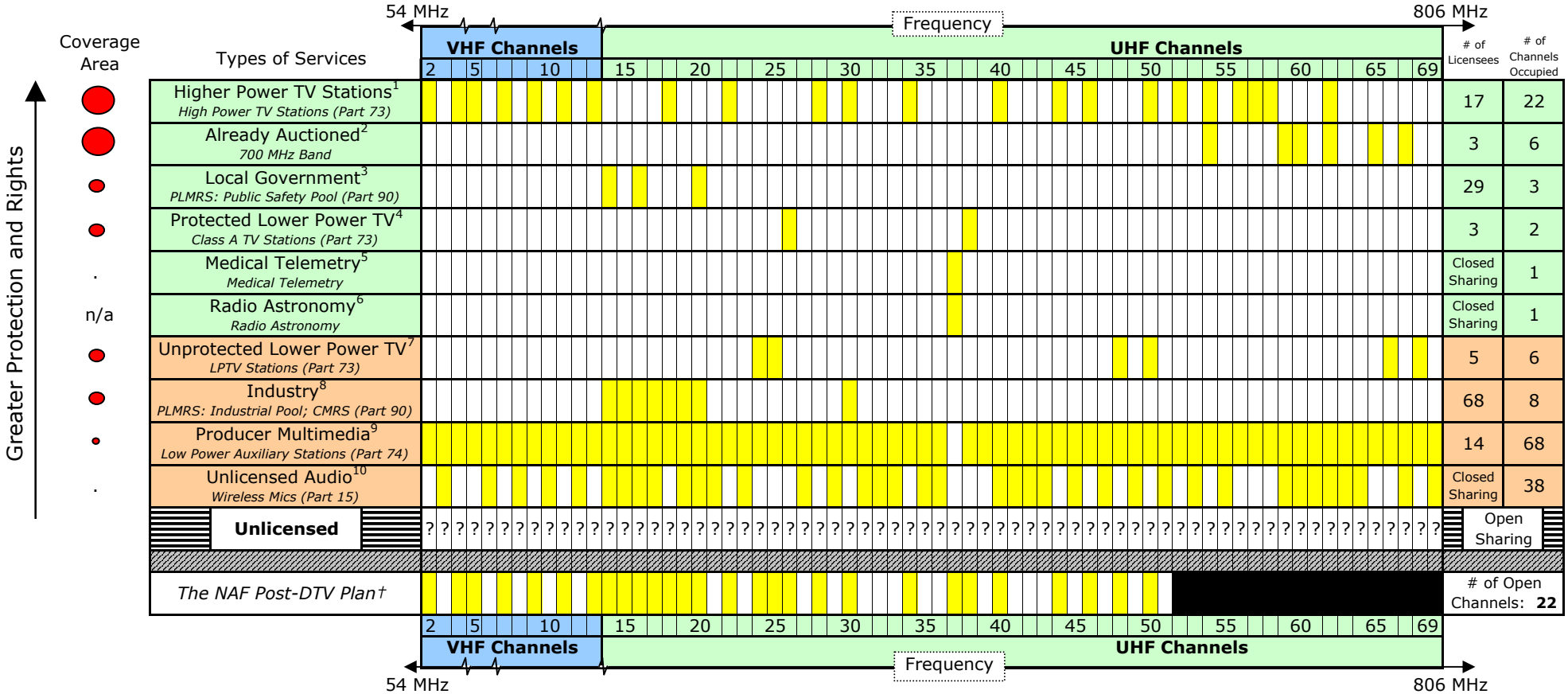
[3] See Food and Drug Administration, "What is Wireless Medical Telemetry?" http://www.fda.gov/cdrh/emc/wmt-about.html#1
[4] See Federal Communications Commission, "Wireless Medical Telemetry," http://wireless.fcc.gov/services/personal/medtelemetry/
[5] See Federal Communications Commission, "PLMRS," http://wireless.fcc.gov/services/plmrs/
[6] See Federal Communications Commission, "Wireless Medical Telemetry," http://wireless.fcc.gov/services/personal/medtelemetry/
[7] See NPRM in FCC 03-198, Para 6, 10; http://www.fcc.gov/mb/video/files/LPTVFactSheet.html

SIX CASE STUDIES – DETAILED INFORMATION

Broadcast Band Assignments and Allocations: *Los Angeles, CA**

Los Angeles DMA:
Rank #2
TV Households: 5,402,260
Market Type: Top Ten Urban



Notes: Examples of Licensees in Each Category

(Bold indicates multiple service rights for the same company in the same market)

1. Higher Power TV Stations: **CBS, NBC, ABC, Fox,** Univision Communications, Los Angeles Unified School District, Community TV of Southern California
2. Already Auctioned (Note: 1 MHz guardband of channels 60 and 65 auctioned, 2 MHz guardband of channels 62 and 67 auctioned): Nextel, Access Spectrum
3. Local Government: Cities of El Monte, La Mirada, Hawthorne; Los Angeles County; State of California
4. Protected Lower Power TV: **Venture Technologies Group,** KPAL Television, Inc.
5. Medical Telemetry: Shared
6. Radio Astronomy: 17 Observatories Nationwide
7. Unprotected Lower Power TV: **Venture Technologies Group,** Friendly Broadcasting Co.
8. Industry: Boeing, Northrop Grumman, Pacific Bell, **ABC**
9. Producer Multimedia: **CBS, NBC, Fox, ABC**, Gient Communications, Radford Studio Center,
10. Unlicensed Audio: Shared

Note: There are also approximately 4,700 translator stations, largely in western states

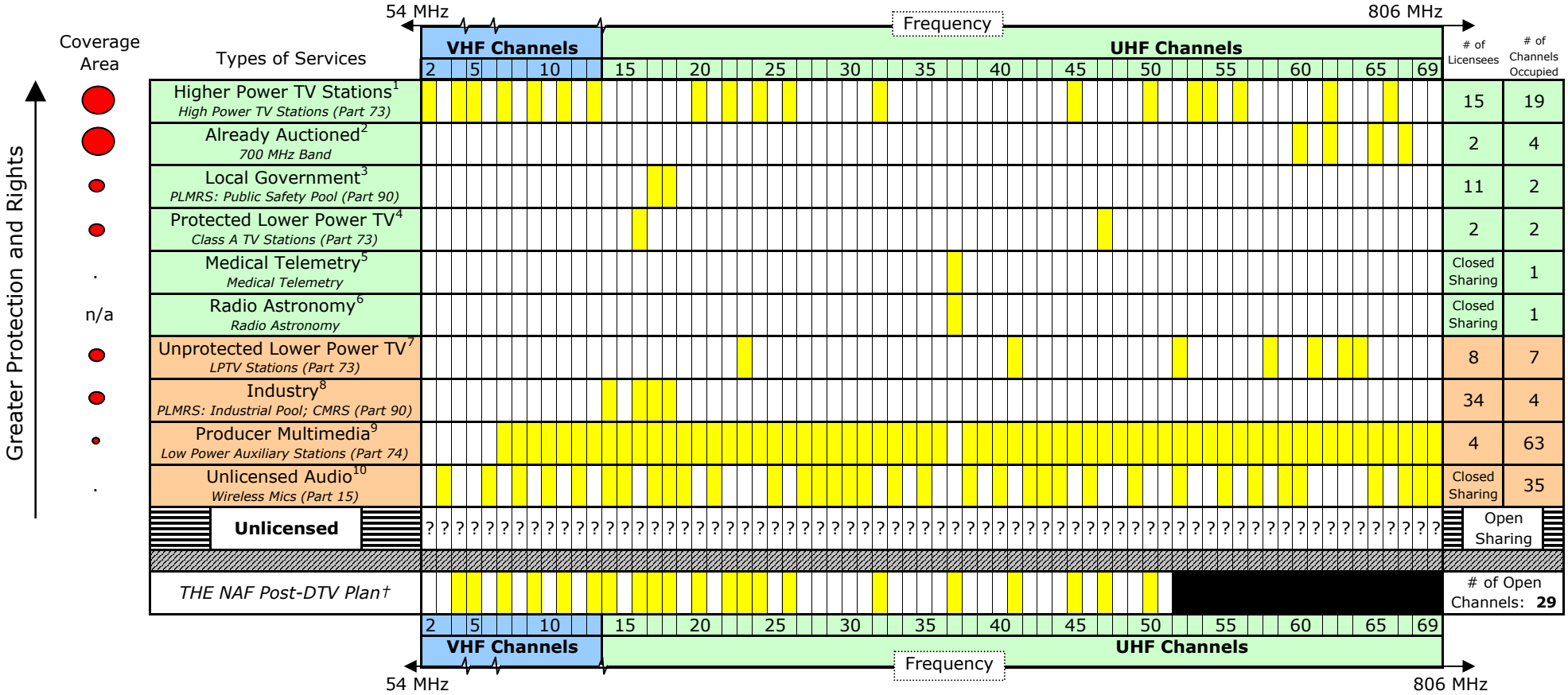
* Methodology: TV station assignments were compiled using the Center for Public Integrity's Media Tracker Database; Wireless Bureau licenses (700 MHz Band Licenses, PLMRS, and Auxiliary Stations) were accessed from the FCC's Universal Licensing System, in a 1 KM Radius around Los Angeles. (Coordinates: 340308N, 1181434W); Medical Telemetry and Radio Astronomy spectrum allocations are based on 47 CFR reservations; Part 15 Wireless Mic assignments are based on Shure's recommendation to use channels where TV stations do not operate. NAF's post-DTV plan is based on protecting all incumbents except LPAS, Wireless Mics, and grandfathered medical telemetry equipment.

† Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

G Grandfathered users operating on a secondary basis

Broadcast Band Assignments and Allocations: *Washington, D.C.**

Washington, D.C. DMA:
Rank #8
TV Households: 2,224,070
Market Type: Top Ten Urban



Notes: Examples of Licensees in Each Category

(**Bold** indicates multiple service rights for the same company in the same market)

1. Higher Power TV Stations: NBC, ABC, Fox, CBS, UPN, Howard University Greater Washington Educational Telecom Assn., WBDC Broadcasting, Inc.
2. Already Auctioned (Note: 1 MHz guardband of channels 60 and 65 auctioned, 2 MHz guardband of channels 62 and 67 auctioned): Nextel, Dominion 700
3. Public Safety: Cities of Mount Rainer, Takoma Park, Fairfax; Counties of Montgomery, Prince George, Anne Arundale; Bladensburg Fire Dept.
4. Protected Lower Power TV: Entravision Communications, Towson University
5. Medical Telemetry: Shared
6. Radio Astronomy: 17 Observatories Nationwide
7. Unprotected Lower Power TV: Asia Vision, ONDA Capital, Inc.
8. Industry: Northrop Grumman, Skytel, Intelsat
9. Producer Multimedia: ABC, WDBJ Television, Inc.
10. Unlicensed Audio: Shared

Note: There are also approximately 4,700 translator stations, largely in western states

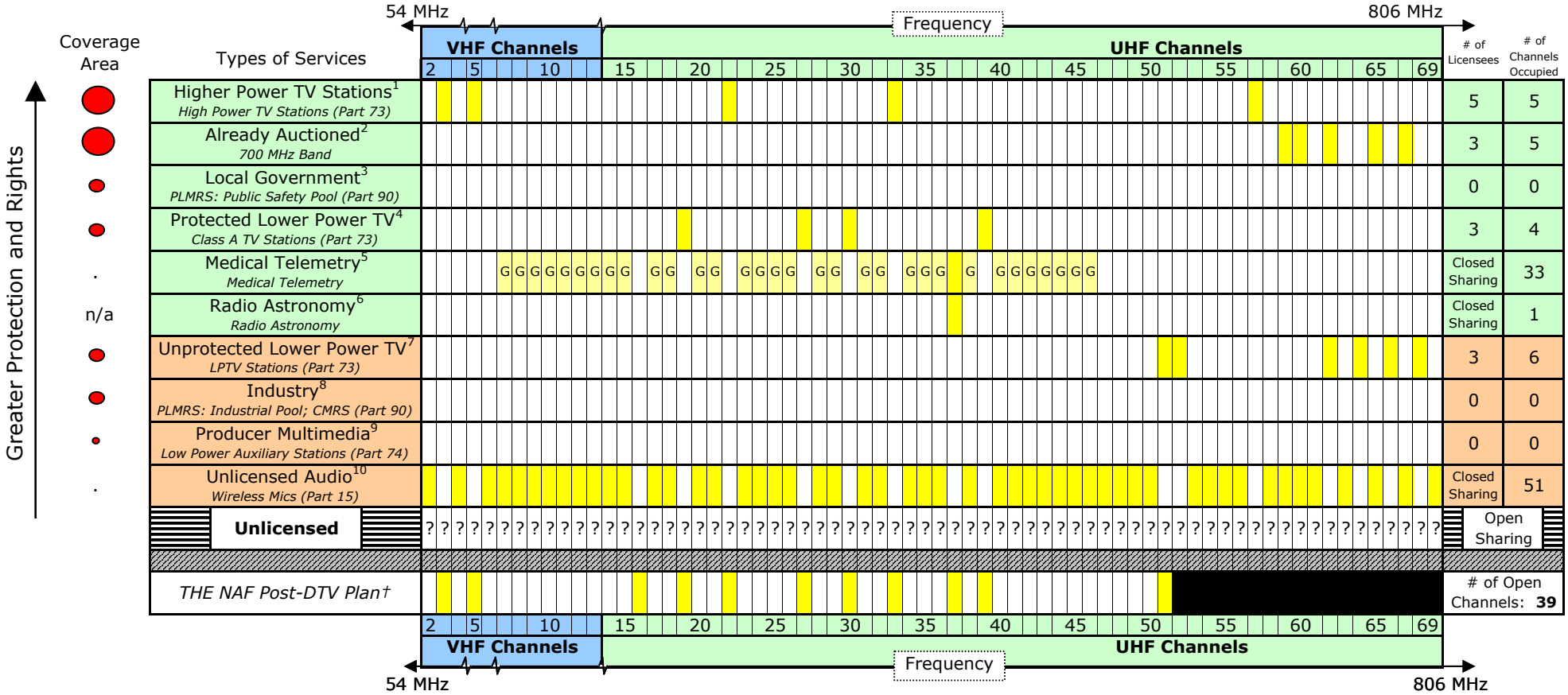
* Methodology: TV station assignments were compiled using the Center for Public Integrity's Media Tracker Database; Wireless Bureau licenses (700 MHz Band Licenses, PLMRS / CMRS, and Auxiliary Stations) were accessed from the FCC's Universal Licensing System, in a 1 KM Radius around Washington, D.C. (Coordinates: 385320N, 0770002W); Medical Telemetry and Radio Astronomy spectrum allocations are based on 47 CFR reservations; Part 15 Wireless Mic assignments are based on Shure's recommendation to use channels where TV stations do not operate. NAF's post-DTV plan is based on protecting all incumbents except LPAS, Wireless Mics, and grandfathered medical telemetry equipment.

† Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

G Grandfathered users operating on a secondary basis

Broadcast Band Assignments and Allocations: *Burlington, VT**

Burlington-Plattsburgh DMA:
Rank #89
TV Households: 323,070
Market Type: Medium Urban



Notes: Examples of Licensees in Each Category

(**Bold** indicates multiple service rights for the same company in the same market)

1. Higher Power TV Stations: Mansfield TV, Hearst, Corp., Straightline Communications
2. Already Auctioned (Note: 1 MHz guardband of channels 60 and 65 auctioned, 2 MHz guardband of channels 62 and 67 auctioned): Nextel Communications, Pegasus Guard Band, Vermont Telephone Company
3. Local Government: None
4. Protected Lower Power TV: **NYN, LLC**, Plattsburgh Partners
5. Medical Telemetry: Shared
6. Radio Astronomy: 17 Observatories Nationwide
7. Unprotected Lower Power TV: Vermont Wireless Cooperative, **NYN, LLC**
8. Industry: None
9. Producer Multimedia: None
10. Unlicensed Audio: Shared

Note: There are also approximately 4,700 translator stations, largely in western states

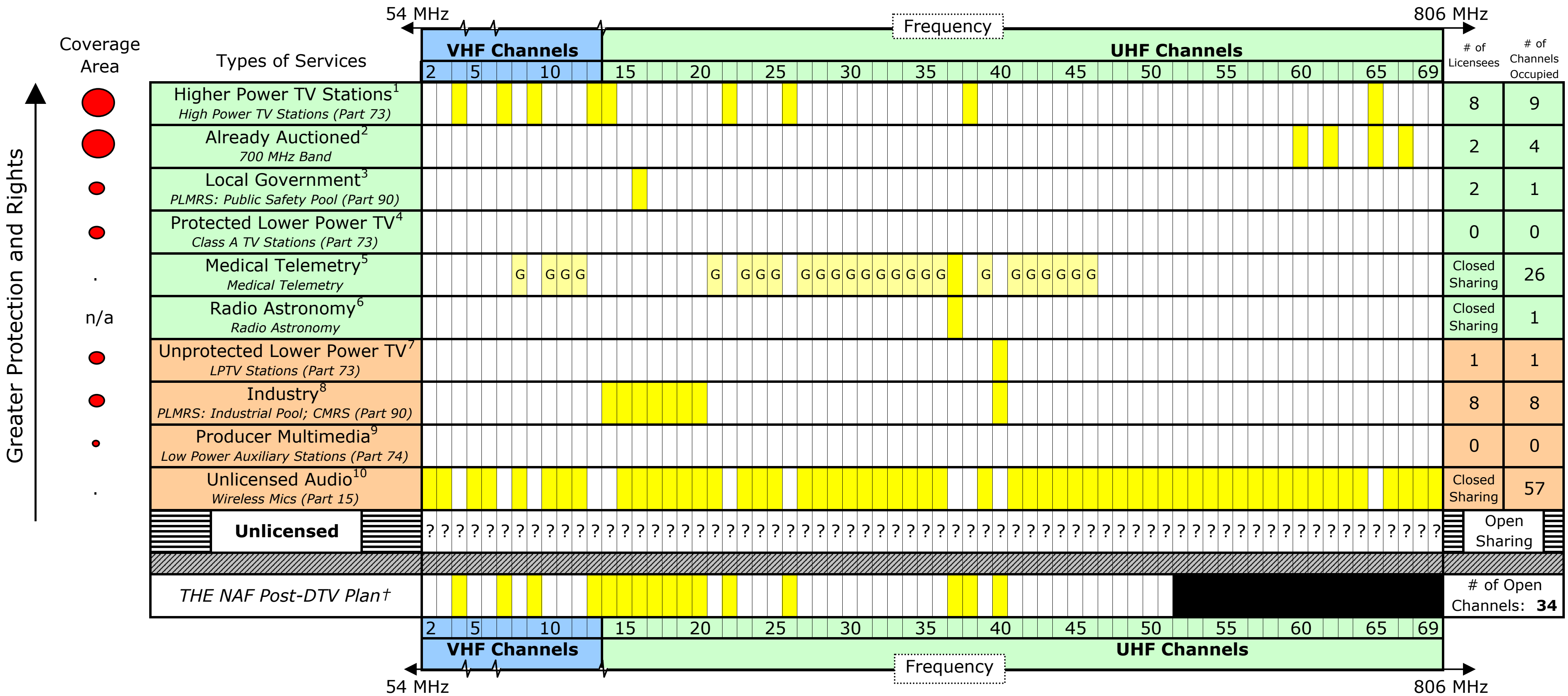
* Methodology: TV station assignments were compiled using the Center for Public Integrity's Media Tracker Database; Wireless Bureau licenses (700 MHz Band Licenses, PLMRS, and Auxiliary Stations) were accessed from the FCC's Universal Licensing System, in a 1 KM Radius around Burlington. (Coordinates: 442833N, 0731245W); Medical Telemetry and Radio Astronomy spectrum allocations are based on 47 CFR reservations; Part 15 Wireless Mic assignments are based on Shure's recommendation to use channels where TV stations do not operate. NAF's post-DTV plan is based on protecting all incumbents except LPAS, Wireless Mics, and grandfathered medical telemetry equipment.

† Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

G Grandfathered users operating on a secondary basis

Broadcast Band Assignments and Allocations: *El Paso, TX**

El Paso DMA:
Rank #100
TV Households: 283,870
Market Type: Medium Urban, Border Area



<u>Notes: Examples of Licensees in Each Category</u>

(**Bold** indicates multiple service rights for the same company in the same market)

1. Higher Power TV Stations: Pappas Telecasting, Cox Enterprises, Entravision Communications
2. Already Auctioned (Note: 1 MHz guardband of channels 60 and 65 auctioned, 2 MHz guardband of channels 62 and 67 auctioned): Access Spectrum, PTPMS II Communications
3. Local Government: Cities of Red Oak and Waxahachie
4. Protected Lower Power TV: None
5. Medical Telemetry: Shared
6. Radio Astronomy: 17 Observatories Nationwide
7. Unprotected Lower Power TV: Broadcast Group, Ltd.
8. Industry: Nextel, Victoria Communications, Aeowave Technologies
9. Producer Multimedia: None
10. Unlicensed Audio: Shared

Note: There are also approximately 4,700 translator stations, largely in western states

* Methodology: TV station assignments were compiled using the Center for Public Integrity's Media Tracker Database; Wireless Bureau licenses (700 MHz Band Licenses, PLMRS, and Auxiliary Stations) were accessed from the FCC's Universal Licensing System, in a 1 KM Radius around El Paso (Coordinates: 314521N, 1062911W); Medical Telemetry and Radio Astronomy spectrum allocations are based on 47 CFR reservations; Part 15 Wireless Mic assignments are based on Shure's recommendation to use channels where TV stations do not operate. NAF's post-DTV plan is based on protecting all incumbents except LPAS, Wireless Mics, and grandfathered medical telemetry equipment.

† Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

G Grandfathered users operating on a secondary basis

Broadcast Band Assignments and Allocations: *Juneau, AK**

Juneau DMA:
Rank #206
TV Households: 24,840
Market Type: Small Rural

54 MHz — Frequency — 806 MHz

VHF Channels: 2, 5, 10 | UHF Channels: 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 69

Greater Protection and Rights

Coverage Area	Types of Services	# of Licensees	# of Channels Occupied
	Higher Power TV Stations[1] *High Power TV Stations (Part 73)*	2	2
	Already Auctioned[2] *700 MHz Band*	2	4
	Local Government[3] *PLMRS: Public Safety Pool (Part 90)*	0	0
	Protected Lower Power TV[4] *Class A TV Stations (Part 73)*	0	0
.	Medical Telemetry[5] *Medical Telemetry*	Closed Sharing	38
n/a	Radio Astronomy[6] *Radio Astronomy*	Closed Sharing	1
	Unprotected Lower Power TV[7] *LPTV Stations (Part 73)*	2	3
	Industry[8] *PLMRS: Industrial Pool; CMRS (Part 90)*	0	0
	Producer Multimedia[9] *Low Power Auxiliary Stations (Part 74)*	0	0
.	Unlicensed Audio[10] *Wireless Mics (Part 15)*	Closed Sharing	62
	Unlicensed	Open Sharing	
	THE NAF Post-DTV Plan†	# of Open Channels: **44**	

54 MHz — Frequency — 806 MHz

Notes: Examples of Licensees in Each Category

(**Bold** indicates multiple service rights for the same company in the same market)

1. Higher Power TV Stations: Capital Community Broadcasting, Smith Broadcasting
2. Already Auctioned (Note: 1 MHz guardband of channels 60 and 65 auctioned, 2 MHz guardband of channels 62 and 67 auctioned): Pegasus Guard Band, Harbor Guardband
3. Local Government: None
4. Protected Lower Power TV: None
5. Medical Telemetry: Shared
6. Radio Astronomy: 17 Observatories Nationwide
7. Unprotected Lower Power TV: State of Alaska, Dan Etulain
8. Industry: None
9. Producer Multimedia: None
10. Unlicensed Audio: Shared

Note: There are also approximately 4,700 translator stations, largely in western states

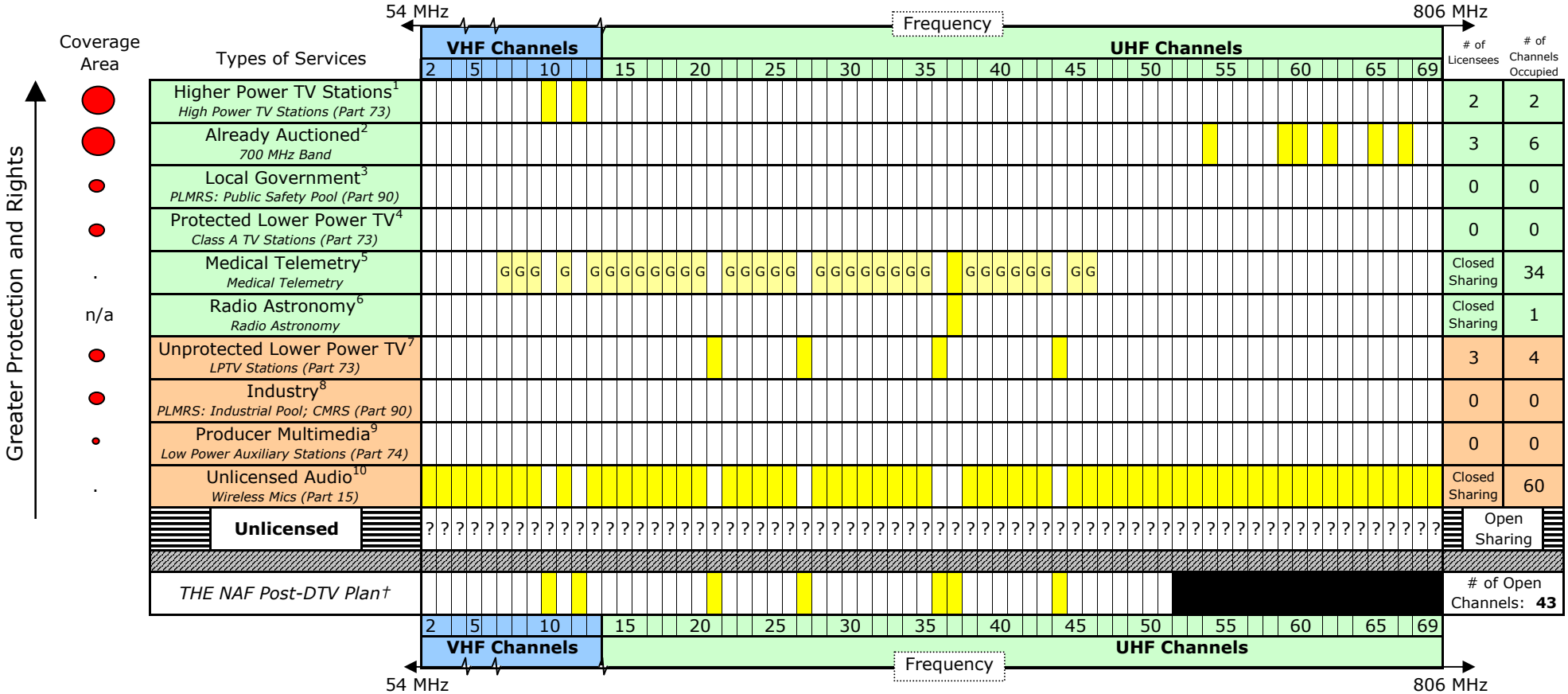
* Methodology: TV station assignments were compiled using the Center for Public Integrity's Media Tracker Database; Wireless Bureau licenses (700 MHz Band Licenses, PLMRS, and Auxiliary Stations) were accessed from the FCC's Universal Licensing System, in a 1 KM Radius around Juneau. (Coordinates: 581807N, 1342511 W); Medical Telemetry and Radio Astronomy spectrum allocations are based on 47 CFR reservations; Part 15 Wireless Mic assignments are based on Shure's recommendation to use channels where TV stations do not operate. NAF's post-DTV plan is based on protecting all incumbents except LPAS, Wireless Mics, and grandfathered medical telemetry equipment.

† Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

G Grandfathered users operating on a secondary basis

Broadcast Band Assignments and Allocations: *Helena, MT**

Helena DMA:
Rank #207
TV Households: 24,910
Market Type: Small Rural



Notes: Examples of Licensees in Each Category

(**Bold** indicates multiple service rights for the same company in the same market)

1. Higher Power TV Stations: Rocky Mountain Broadcasting Co., Sunbelt Communications
2. Already Auctioned ((Note: 1 MHz guardband of channels 60 and 65 auctioned, 2 MHz guardband of channels 62 and 67 auctioned): Nextel Communications, Pegasus Guard Band, Ronan Telephone Company
3. Local Government: None
4. Protected Lower Power TV: None
5. Medical Telemetry: Shared
6. Radio Astronomy: 17 Observatories Nationwide
7. Unprotected Lower Power TV: Wireless Access, LLC, KFBB Corp.
8. Industry: None
9. Producer Multimedia: None
10. Unlicensed Audio: Shared

Note: There are also approximately 4,700 translator stations, largely in western states

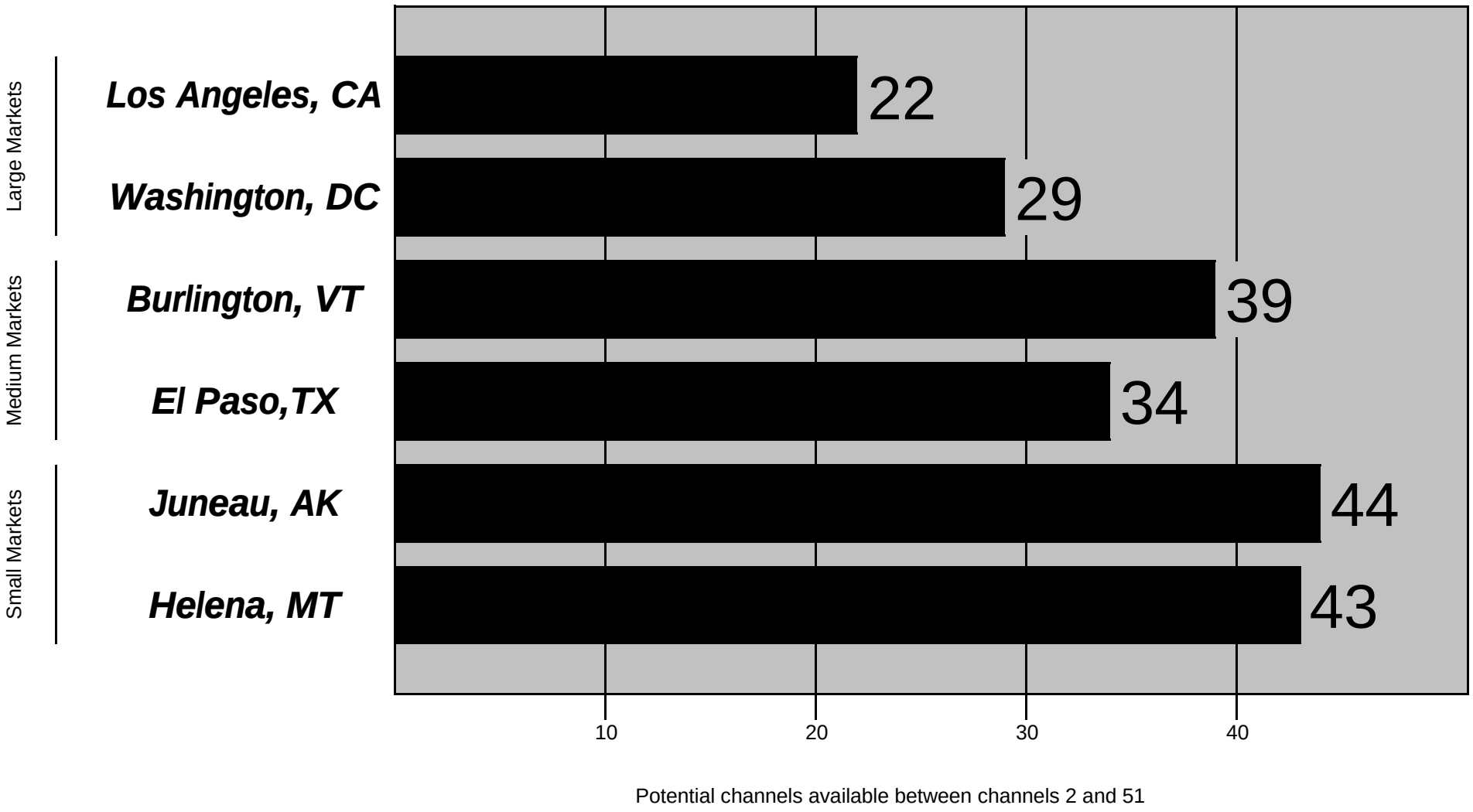
* Methodology: TV station assignments were compiled using the Center for Public Integrity's Media Tracker Database; Wireless Bureau licenses (700 MHz Band Licenses, PLMRS, and Auxiliary Stations) were accessed from the FCC's Universal Licensing System, in a 1 KM Radius around Helena. (Coordinates: 463534N, 1120207W); Medical Telemetry and Radio Astronomy spectrum allocations are based on 47 CFR reservations; Part 15 Wireless Mic assignments are based on Shure's recommendation to use channels where TV stations do not operate. NAF's post-DTV plan is based on protecting all incumbents except LPAS, Wireless Mics, and grandfathered medical telemetry equipment.

† Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

G Grandfathered users operating on a secondary basis

SIX CASE STUDIES -- SUMMARY INFORMATION

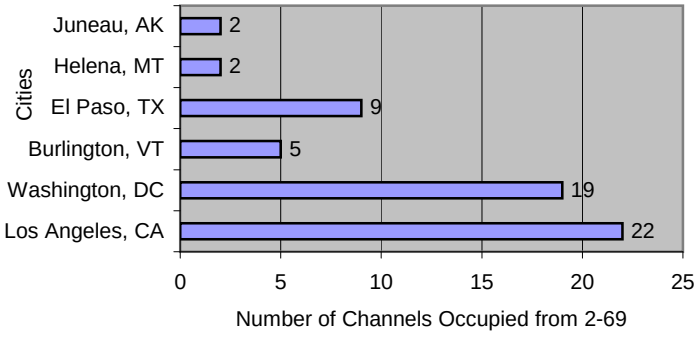
Potential Channels Available for Unlicensed Access*



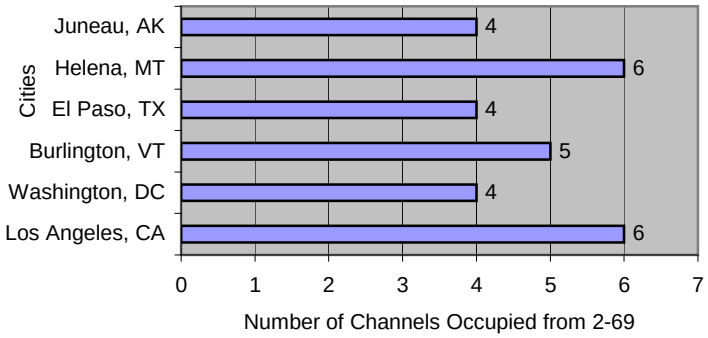
* Includes unassigned channels that could be opened for unlicensed sharing with more advanced technologies and different policies than envisioned in this NPRM.

Summary of Usage in 6 Case Studies by Service Type

High Power TV Channels

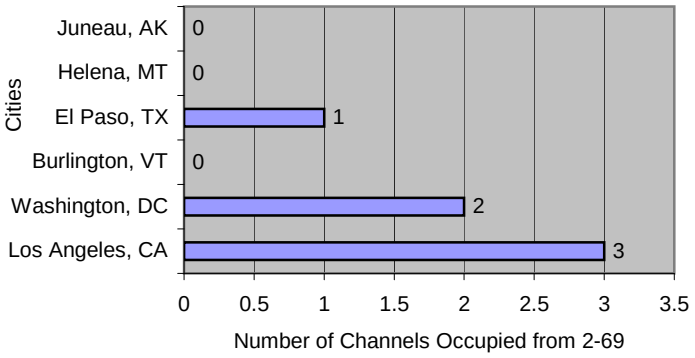


Already Auctioned



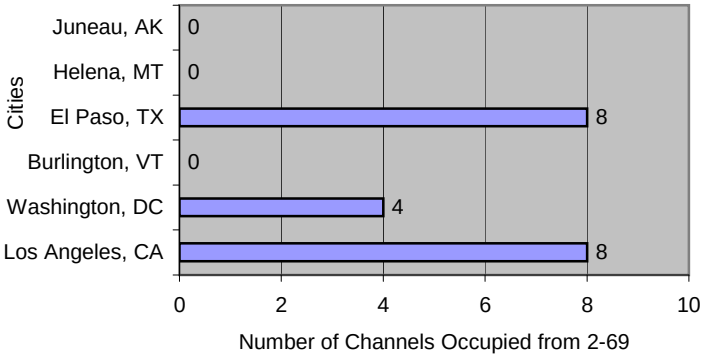
Local Government

(Private Land Mobile Radio Services: Public Safety Pool)



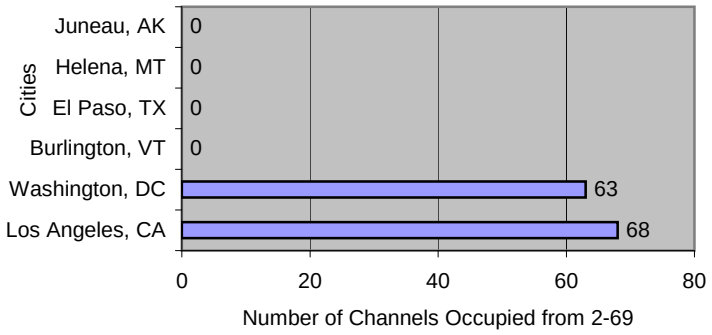
Industry

(Private Land Mobile Radio Services: Industrial Pool)



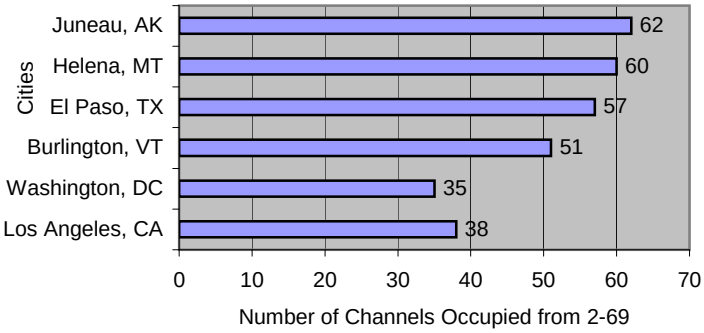
Producer Multimedia

(Low Power Auxiliary Stations)



Unlicensed Audio

(Wireless Mics)



APPENDIX B: NAF*, ET AL.* COMMENTS IN THE MATTER OF UNLICENSED OPERATION IN THE BAND 3650-3700 MHZ, ET DOCKET 04-151

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
	)	
Unlicensed Operation in the Band 3650-3700 MHz	)	ET Docket No. 04-151
	)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band	)	ET Docket No. 98-237

To: The Commission

COMMENTS OF
NYCWIRELESS, NEW AMERICA FOUNDATION,
FREE PRESS, PROMETHEUS RADIO PROJECT,
CENTER FOR DIGITAL DEMOCRACY, MEDIA ALLIANCE,
THE DANDIN GROUP, CONSUMER FEDERATION OF AMERICA,
PUBLIC KNOWLEDGE, THE ELECTRONIC PRIVACY INFORMATION CENTER,
AND
THE CHAMPAIGN-URBANA COMMUNITY WIRELESS PROJECT

Harold Feld
MEDIA ACCESS PROJECT
1625 K Street, NW, Suite 1000
Washington, DC 20006
(202) 232-4300
Counsel for Commentors

July 28, 2004

SUMMARY

Commentors applaud the Commission for proposing to open the 3650-3700 MHz band to unlicensed operation under the Part 15 rules. Commentors agree with the Commission's tentative conclusion that opening this band to unlicensed access will provide far greater benefits to the public than creation of another licensed service in the band. In addition to the First Amendment benefits that accrue whenever the Commission increases the ability of citizens to communicate with each other directly rather than through licensed intermediaries, the Commission has chronicled on numerous occasions how unlicensed spectrum access has fulfilled the goals of the Communications Act to foster innovation and new technology, [Section 7 & 303(g)], creates new opportunities for small businesses and entrepreneurs to deploy new spectrum services, [Section 257], and fosters deployment of advanced telecommunications services to all Americans [Section 1, 1996 Act Section 706].

Nevertheless, Commenters wish to express their concern with regard to certain aspects of the Commission's proposal.

1. The Commission Should Not Adopt A "Professional Installer" Certification.

Commentors vigorously oppose the creation of any "professional installer" certification requirement. Such a requirement would impose a very real and significant limitation on the ability of noncommercial community networks to deploy high-power systems. New commercial entrants would also face a significant start up cost and disadvantage. Adoption of such a requirement would therefore undermine the very benefits the Commission intends to foster.

In addition to the cost imposed on users, certification systems have numerous problems. First, as the NPRM observes, no one has agreed on what criteria would constitute a "professional installer." *NPRM* ¶41. Even if the Commission can develop suitable criteria for 2004, these requirements will quickly become dated and useless. Furthermore, allowing a private organization to administer the

certification, as the NPRM suggests, invites the private organization to impose ever increasing requirements as a means of screening out potential competitors.

The Commission has already proposed adequate safeguards against interference by high-power systems in the form of mandatory dynamic frequency and power modulation (DFPM) and identification beacons. Mandatory DFPM should render it impossible for a system to interfere with a licensee absent deliberate manipulation, something no certification requirement can address. Furthermore, in the event interference actually occurs, identification beacons (for high-power systems) will allow licensees to quickly identify any source of interference and require an abatement. The Commission therefore does not need to impose a certification requirement.

If the Commission does require some kind of certification, the Commission must ensure that the certification imposes minimal burdens on those seeking to use high power systems. The Commission should administer the certification itself, to prevent any private organization from creating artificial barriers to entry.

2. The Commission Should Not Require Locator Beacons In Mobile Devices.

Although locator beacons serve a reasonable purpose in high power, stationary installations, they serve no purpose in low power mobile devices. Low power devices with DFPM or geographic awareness pose no threat to the licensees.

By contrast, requiring personal beacons in mobile devices creates a very real privacy concern and invites all sorts of identity theft. Users taking advantage of the new spectrum should not have to carry what will amount to a personal tracking device that, in addition to allowing anyone to track where they go, tells potential thieves where they live and potential spammers or scammers how to contact them.

3. The Commission Must Consider the First Amendment Value of Unlicensed Access and Avoid Conferring Windfalls To Licensees.

To ensure a complete record, the Commission requests comment on whether a new licensed service or increasing flexibility to existing licensees would serve the public interest better than opening the band to unlicensed access as proposed in the *NPRM*. Opening the band to unlicensed without creating a new, licensed service would better serve the purposes of the First Amendment and of the Communications Act than creating a new, licensed service. Creating a new licensed service would also impose administrative costs on the Commission, delay deployment of new technologies in the relevant bands, and impede efficient use of spectrum.

4. The Commission Should Conduct A Regular Review of Activity In The Band to Determine Whether It Can Increase Power and Availability of Unlicensed In The Band.

As deployment takes place in the band, the Commission may well find that it can increase the power levels available to fixed or unfixed unlicensed devices operating in the band. In addition, protections such as beacons may prove unnecessary. The Commission should therefore put licensees on notice that it will regularly review activity in the band to determine whether to increase power or make other changes that would facilitate broader use of unlicensed spectrum technologies. For efficiency, the Commission could explicitly incorporate this review into its existing Triennial Review under Section 257.

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NATURE OF COMMENTORS

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

New America Foundation is a nonpartisan, non-profit public policy institute based in Washington, D.C., which, through its Spectrum Policy Program, studies and advocates reforms to improve our nation's management of publicly-owned assets, particularly the electromagnetic spectrum. http://www.newamerica.net.

Prometheus Radio Project is a Philadelphia-based unincorporated collective of radio activists committed to expanding opportunities for the public to build, operate and hear low power FM radio stations. http://www.prometheusradio.org

Free Press is a national nonpartisan organization working to increase informed public participation in crucial media policy debates, and to generate policies that will produce a more competitive and public interest-oriented media system with a strong nonprofit and noncommercial sector. http://www.freepress.net/

The Center for Digital Democracy is a nonprofit public interest organization committed to preserving the openness and diversity of the Internet in the broadband era, and to realizing the full potential of digital communications through the development and encouragement of noncommercial, public interest content and services. http://www.democraticmedia.org/

Media Alliance is a twenty-eight year old media advocacy and resource center in San Francisco working on behalf of media professionals, community-based organizations and under-represented communities for greater accountability, ethics and diversity in our media system. http://www.media-alliance.org/

The Dandin Group is a for-profit enterprise providing high speed Internet access to remote locations using advanced wideband wireless technologies. Its goal is to develop and deploy products and services that provide high quality Internet access for people in remote, underserved locations. http://www.dandin.com

Consumer Federation of America is the nation's largest consumer advocacy group, composed of two hundred and eighty state and local affiliates representing consumer, senior, citizen, low-income, labor, farm, public power and cooperative organizations, with more than fifty million individual members. http://www.consumerfed.org

Public Knowledge is a public interest advocacy organization dedicated to fortifying and defending a vibrant information commons. PK works with a wide spectrum of stakeholders to promote the core conviction that some fundamental democratic principles and cultural values – openness, access, and the capacity to create and compete – must be given new embodiment in the digital age. http://www.publicknowledge.org

The Electronic Privacy Information Center (EPIC) is a public interest research center in Washington, D.C. Established in 1994 to focus public attention on emerging civil liberties issues and to protect privacy and free speech, the staff of EPIC have been involved in many of the cutting edge privacy issues addressed by the FCC, including Caller ID, the TCPA, CALEA, CPNI, location privacy, and the adoption of the Do Not Call regulations.

The Champaign-Urbana Community Wireless Project, a project of the Urbana-Champaign Independent Media Center Foundation, has deployed an extensive mesh network using Part 15 spectrum in the Champaign-Urbana metro area. The three-part mission is to (a) connect more people to Internet and broadband services; (b) develop open-source hardware and software for use by wireless projects world-wide; and, (c) build and support community-owned, not-for-profit broadband networks in cities and towns around the globe. http://www.cuwireless.net

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
	)	
Unlicensed Operation in the Band 3650-3700 MHz	)	ET Docket No. 04-151
	)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band	)	ET Docket No. 98-237

To: The Commission

ARGUMENT

The above captioned rulemaking represents the Commission's latest positive step in broadening the access of the American people to unlicensed spectrum. As the Commission has noted, this directly serves the goals promoting broadband deployment to all Americans pursuant to Section 706 of the Telecommunications Act of 1996. *NPRM* ¶2. As demonstrated in numerous prior dockets, commercial WISPs, noncommercial community networks, municipalities, school systems, public safety officials, and countless others have used unlicensed wireless networks to bring affordable broadband to communities ignored by wireline or licensed wireless providers.[1]

The NPRM, however, proposes several departures from the Commission's highly successful Part 15 regime. It falls into the trap of customizing unlicensed access in this band along the lines of today's technology. As a consequence, the *NPRM* envisions a model wherein commercial rural WISPs use high power devices to provide Internet access to roving laptops.

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[1]*See, e.g.*, Matt Barranaca, "Unlicensed Wireless Broadband Profiles: Community, Municipal and Commercial Success Stories," New America Foundation (2004).

The Commission ignores the very real burdens and restrictions the proposed rules would impose on noncommercial deployment, municipal systems, and isolated commercial start up. The *NPRM* compromises the flexibility and ease of deployment that has made unlicensed spectrum access such a success story by proposing a certification requirement, and requiring i.d. beacons for mobile devices. The first imposes unnecessary burdens on those least able to meet them. The second asks citizens to consent to broadcast their personal contact information and realtime location in exchange for access to bandwidth.

While noncommercial and commercial deployment share many similar issues and concerns, noncommercial applications are particularly cost sensitive. They are also more likely to be run by volunteers who may or may not have broad technical backgrounds. As described by one handbook for community networking:

> The desire to end this separation of "those in the know" from "those who want to know" is helping to bring people away from their computer screens and back into their local neighborhoods. In the last year, hundreds of independent local groups have formed with a very similar underlying principle: get people connected for the lowest possible cost...Wherever possible, ingeniously simple and inexpensive (yet powerful) designs are being drawn up and given away. Thousands of people are working not for a profit motive, but for the benefit of the planet.

Rob Flickenger, BUILDING WIRELESS COMMUNITY NETWORKS, 2nd Ed. O'Reilly (2003) at 7.

The Commission's proposal to require "professional installer" certification jeopardizes this emerging community. It imposes new costs and new burdens on this army of volunteers and those they train.

Nor will only noncommercial users suffer. A new certification requirement will also make it that much harder for the private entrepreneur or municipality in an area that does not have access to broadband to simply buy equipment, learn the technology, and deploy.

The *NPRM* proposes sufficient other safeguards to protect incumbent licensed services. The Commission should not distort the open and empowering character of Part 15 which has enabled communities to deploy their own broadband. To do so would deny the benefits of the rules changes to those communities which need them most, and would set a dangerous precedent for excluding these communities from future innovations in unlicensed access.

I. THE COMMISSION SHOULD NOT CREATE A 'PROFESSIONAL INSTALLER' CERTIFICATION AS A CONDITION OF USING HIGHER POWER FIXED DEVICES.

The NPRM states: "to ensure that fixed unlicensed devices are established and operated in a manner that will avoid causing interference to FSS earth stations, we propose to require that such devices be installed by a professional." *NPRM* ¶41. The Commission should not adopt this proposal, which breaks with 25 years of successful precedent in Part 15 devices. The NPRM already proposes adequate safeguards to protect the relatively few incumbents potentially effected. At the same time, the proposed certification imposes significant new costs that will significantly impede deployment of high power devices.

A. The Cost of Certification Will Significantly Impede Deployment By Noncommercial Users, Isolated Entrepreneurs, and Municipalities.

The noncommercial community relies heavily on volunteers who devote personal time to maintaining community networks. Typically, these volunteers train more volunteers – including non-English speakers – who then handle the day-to-day administration of the network. Because Part 15 equipment use is unregulated, these communities have the capacity to create networks that meet their own needs, and can deploy broadband in areas that remain unserviced by traditional telephone, cable and licensed wireless providers.

Requiring "professional certification" as a precondition of installing and operating a high power stationary system imposes a very real, and in some cases insurmountable, burden to noncommercial users. Financially, paying for and maintaining a certification creates an initial hurdle to volunteering. Even a fee of $50 can represent a significant investment for volunteers in some communities.

But beyond financial barriers is a very real psychological barrier. It is one thing for someone to volunteer to help build a network and learn the necessary skills to connect their community. Ask them to study and take a test first, with no guarantee that they will pass on the first try, and the number of volunteers quickly diminishes. This hurdle increases in the case of volunteers from linguistic minority communities or communities with a strong distrust of government. These communities stand to experience the greatest benefit from the expanding the existing unlicensed regime with its concomitant improved broadband access. The Commission should not undermine this effort with an unnecessary certification requirement.

Within the community networking movement, volunteers try to create a "learning by doing" ethic. Installation of customer premise equipment is often taught to new volunteers by experienced volunteers. Emphasis is placed on treating each network as a unique combination of equipment, geography, and community need. Certification would create a psychological barrier between those certified and those uncertified, making this transmission of knowledge and preservation of a community ethic based on deployment even harder.

These barriers will also act to limit isolated municipalities and cash-strapped entrepreneurs from deploying new services. The imposition of any new requirement, particularly one that may

require significant study and expense as a condition of even taking the exam, will discourage communities or individuals from investing in unlicensed technologies as a broadband solution.

At the same time, the Commission does not appear to appreciate the cost of administering a certification system or the cost of certification to users. *NPRM* ¶42 ("[w]e believe it will be straightforward for professional installers to obtain the information necessary to meet their responsibilities" and referencing only the geographic location of every licensee). As part of its public interest evaluation, the Commission should carefully consider the cost of maintaining a certification system. Even if the Commission delegates responsibility for certification to a private organization, how will the Commission ensure that certification requirements remain current? That they are not applied in an anticompetitive fashion? That certification in fact serves a useful purpose?

NYCWireless, *et al*. respectfully suggest that the Commission should consider these cost issues carefully. One advantage of relying exclusively on device certification has been ease of administration. Before the Commission adds to the burdens of users or to the Commission's own administrative burdens (which it will pass through to those seeking certification in the form of fees) by imposing a user certification requirement, the Commission would do well to question whether the potential protection against interference is worth it, particularly in light of the other measures proposed by the Commission.

B. The *NPRM* Already Proposes Adequate Safeguards.

NYCWireless, *et al*. note that the Commission has two outstanding *NPRMs* that bear directly on the question of relevant safeguards. The Cognitive Radio proceeding, Docket No. 03-108, and the Interference Temperature proceeding, Docket No. 03-237, have proposed appropriate general

safeguards for sharing spectrum with licensed services. These proceedings may render the need for any additional safeguards in the 3650-3700 MHz band unnecessary.

Even without adoption of either the Cognitive Radio *NPRM* or the Interference Temperature *NPRM*, the Commission proposes sufficient safeguards here to protect incumbent licensees. For 25 years, the FCC has successfully relied upon technical certification of devices as the primary means of protecting incumbent licensees. Certification of devices ensures that devices will not interfere with neighboring licensed services unless a user deliberately tampers with the device. As a consequence, the Commission receives very few complaints from licensees that improper use or improper deployment of systems causes interference. Certification of users has proven largely unnecessary to prevent accidental interference.

By contrast, deliberate alterations of systems by users may cause interference, but requiring certification of users will not address deliberate modifications. Users with sufficient technical expertise to hack equipment will most likely have sufficient knowledge to pass certification examinations.

The *NPRM* proposes several safeguards that make accidental interference by fixed, high power systems almost impossible. First, the Commission will require mandatory dynamic frequency and power modulation (DFPM). *NPRM* ¶38. A properly certified ***system*** will therefore automatically sense the presence of an active licensee and adjust its power and frequency to avoid any interference without certification of the ***installer*** or ***user.***

Indeed, the *NPRM* suggests that the only data an installer will need is the location of licensees in the band. *NPRM* ¶42. This information can be stored on the device itself, and incorporated into the DFPM system.

The Commission has also proposed that high power fixed systems have identity beacons that would allow any licensee or user of an unlicensed system to locate the party responsible for the interfering system and resolve the interference issue. *NPRM* ¶60-62. Any licensee experiencing interference as a consequence of an unlicensed system can immediately find the responsible party and require abatement of any interference. The Commission has observed before that the ability of licensees to require Part 15 device operators to cease operation provides very significant protection. *In Re Amendment of Part 15 To Allow Certification of Equipment in the 24.05-24.25 GHz Range*, 16 FCC Rcd. 22,337, 22,341 (2001) ("Furthermore, all Part 15 devices operate under the condition that transmission must cease if the Part 15 device causes harmful interference. This operating condition is an adequate measure to ensure that authorized services will not receive interference from unlicensed devices"). As an additional benefit, Commentors anticipate that identity beacons will reduce the already minimal number of operators who deliberately alter systems, since the knowledge that any interference can be tracked to the source will discourage such practices.[2]

If licensees continue to express concern, the Commission can require equipment to recognize a signal from an FSS licensee that the frequency is in use and that the unlicensed user must modify its power use accordingly. *NPRM* ¶71-74. To the extent the Commission has concerns that this imposes unfair additional cost on licensees, *id.* at ¶74, the Commission should recall that FSS licensees receive free access to public airwaves. The minor cost of preserving this free public access can be born by the licensee, particularly where the licensee seeks to limit public access to a public

[2]Although Commentors oppose identity beacons for low power mobile devices because they constitute both a security risk and a privacy concern, *see* Part II *infra*, these concerns do not apply to fixed, high power devices. Furthermore, identity beacons for high power devices will assist unlicensed operators in coordinating with each other to avoid interference voluntarily.

resource. Licensee beacons would promote even more efficient spectrum sharing, and thus further the goals of the Communications Act and the benefit to the public.

If the Commission still has doubts about the equity of imposing even minimal costs on licensees, however, it can require unlicensed devices to recognize such beacons while making use of the beacons by licensees voluntary. In this way, only those licensees that feel they need the additional protection will pay for them, although the cost of the system will be borne by all unlicensed devices.

Commentors suggest that "licensee beacons" could transmit the location of the FSS Licensee, the frequency used, and the power the licensee will use. The beacon would stop transmitting when the licensee stopped transmitting. Unlicensed units would adjust their power and frequency in real time. The Commission should make clear, however, that use of beacons by licensees to deliberately disrupt operation of unlicensed systems rather than for legitimate purposes constitutes a violation of 47 U.S.C. §333.

Again, Commentors stress that certification of DFPM technology makes a system of "licensee beacons" redundant. But if the Commission feels it must, out of an abundance of caution, make further protections available to licensees, the added cost of licensee beacons is justified for both licensees and unlicensed operators.

Finally, the Commission can further buttress protection for licensees by requiring high power systems to have geographic awareness. *NPRM* ¶¶64-66.[3] Geographic awareness is a very blunt tool, since it would require reduced power levels or prohibit use of frequency bands for general public

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[3] The *NPRM* makes reference to GPS, a specific type of technology. Commentors urge the Commission not to adopt any specific technology. Commentors use the term "geographic awareness" to mean that the device "knows" its location and position relative to all licensees.

access even when such access would engender no risk of harmful interference. Commentors therefore urge the Commission to rely on DFPM and identification beacons alone. However, even the burden and expense of geographic awareness is preferable to a user certification requirement, which would impose a uniform burden on all users no matter where located.

In short, the proposal to burden noncommercial, municipal, and small start ups wishing to deploy the proposed high power systems with a professional certification requirement has no justification. The Commission has proposed more than adequate means to protect licensees. Breaking with 25 years of tradition and adding a certification requirement for unlicensed ***users***, rather than simply certifying devices themselves, adds nothing but expense.

C. The Commission Must Not Delegate Certification to Private Organizations

The Commission asks, if it adopts a certification requirement, whether to delegate certification to private organizations such as the National Association of Radio Telecommunications Engineers (NARTE) or Part-15.org. *NPRM* ¶41. NYCWireless, *et al.* oppose this proposal.

Certification requirements administered by private organizations have a history of manipulation by incumbents to limit potential competition. For example, that the State of Maryland requires would-be plumbers, electricians or HVAC engineers to take a lengthy exam before receiving even an application to apply for a license. In addition to the cost of studying and preparing for the exams, would be professionals must also work thousands of hours in lower-paid "apprenticeship" positions under a licensed professional. The exam requirements and apprenticeship requirements are set by organizations of incumbent plumbers, electricians and HVAC engineers.[4] Similar requirements

[4]Source: http://www.contractors-license.org/md/Maryland.html#md1

apply to such diverse professions as pharmacy and pharmacy technicians,[5] accountants,[6] and, of course, lawyers.[7]

There is no reason to suppose that professional wireless organizations will prove less susceptible than other professional organizations to the temptation to make certification requirements more expensive and more difficult over time. If the Commission does chose to create a certification requirement, it should not delegate certification to any private organization. To the contrary, the Commission must maintain control over the certification process to ensure that certification remain competitively neutral and imposes the least cost in terms of time and money.

Commentors stress that they do not question the integrity or professional character of NARTE, Part-15.org, or any other professional organization the Commission may propose. The concerns expressed here relate not to any particular organization; they stem from a recognition of the history of certification requirements and the natural temptation in ***any*** industry organization to impose ever more stringent licensing requirements for the ostensible purpose of protecting the public. If professions as diverse as electricians, plumbers, pharmacists, and accountants can fall prey to such temptations, the Commission cannot rely on wireless technicians to be the one exception.

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[5]Examination and 1560 internship hours. *See* The Maryland Board of Pharmacy website at: http://www.dhmh.state.md.us/pharmacyboard/forms/examsummary.htm.

[6]150 Semester hours of education and passage of multi-day professional examination. *See* Maryland State Division of Occupational and Professional Licensing website at: http://www.dllr.state.md.us/license/cpa/cpaapply.htm

[7]Attendance at ABA accredited law school, pass two day examination, requirements available from the State of Maryland Supreme Court at http://www.courts.state.md.us/ble/baradmissionrules.pdf.

In conclusion, the proposed professional installer certification requirement provides no additional protection to licensees or other users, imposes significant costs on users that may deprive the public of the vast public interest benefits of opening the band to unlicensed access, will increase the Commission's administrative burden, and – if delegated to a private organization – opens the door to anticompetitive behavior by incumbents. The Commission should therefore abandon this proposal.

II. THE COMMISSION SHOULD NOT REQUIRE PERSONAL BEACONS IN LOW POWER MOBILE DEVICES.

The Commission proposes to require all unlicensed devices, both fixed and mobile, "to broadcast identification information at regular intervals. At a minimum, the transmitted data should consist of contact information of the owner/operator of the device." *NPRM* ¶¶60-61. NYCWireless, *et al.* oppose applying this requirement to mobile devices.[8] This requirement will transform laptops and consumer devices into a personal RFID tag, will broadcast personal contact information to those who have the capacity to abuse it, and may create security issues for network operators.

At the same time, it is difficult to see how requiring mobile devices to broadcast such information will serve the public interest. A single lap top cannot possibly interfere with an FSS Earth Station given the restrictions on mandatory power levels and the intelligence built into each device. FSS Earth Stations do not have hidden node issues or other problems that might cause a user to inadvertently wander across the path of one and disable it.

To the extent licensees have expressed significant concern from mobile devices, it derives from whether a sufficient population of mobile devices could raise the ambient RF temperature to a level that would cause interference. *NPRM* at ¶17 (recounting comments of licensees). This is not

[8]As discussed above in Part I.B *supra*, NYCWireless, *et al* support this requirement for fixed high power devices.

a problem addressable by broadcasting identification information. Indeed, by the time the population of mobile devices could reach this level, constant broadcast of identification information would be part of the problem.[9]

By contrast, users have a very legitimate reason not to want their contact information broadcast to the world at regular intervals. This requirement will make every laptop or other consumer device using 3650-3700 MHz band a personal RFID tag accessible to anyone who wishes to follow a user. Worse, an identity thief could sit in any open, public area and capture the name and address of the owner of a potentially valuable laptop. While not as dangerous, but certainly annoying from a user perspective, third parties could use the contact information required by the Commission to send users unwanted solicitations.

Furthermore, the Commission may open a significant security hole, depending on how it requires networks to operate. On the Internet, a common attack is a "denial of service" (DoS) attack. This exploits the requirement built into the network that a server will identify itself if asked. The DoS attacker "pings" the server repeatedly, preventing it from answering real queries.[10] The Commission should take great care that it does not require equipment to embed a similar weakness.

Finally, the Commission should consider the marginal cost of requiring an identification beacon. While the cost is relatively small for a fixed, high power device, it becomes much more

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[9]NYCWireless, *et al.* observe that the *NPRM* adequately addressed this concern, based on input already received. Because FSS Earth Stations are large installations that point up, and receive information from satellites orbiting well above the background radiation, FSS Earth Stations are unlikely to experience any interference either from random mobile devices or from an increase in ambient noise. In any event, DFPM and other mitigation measures will prevent any rise in the interference temperature to levels that would create a significant risk of interference.

[10]*See* "CERT Advisory CA -1997 IP Denial of Service Attacks," available at http://www.cert.org/advisories/CA-1997-28.html

significant for a low power mobile device. Given the truly minimal value to licensees of identifying mobile devices, the Commission should not require mobile devices to broadcast identification information.

III. OPENING THE BAND TO UNLICENSED SHARING RATHER THAN EXCLUSIVE LICENSING WOULD FURTHER THE GOALS OF THE COMMUNICATIONS ACT AND THE FIRST AMENDMENT.

In the interest of ensuring that the Commission considers "all possible approaches for achieving [the] goals of maximizing efficient use fo the 3650 MHz band and the provision of new and advanced services," the Commission solicits comment on whether it should designate the band for licensed, rather than unlicensed, use. NYCWireless, *et al.* urge the Commission to reject any additional licensing regimes and to adopt the *NPRM* with the modifications suggested above.

It is important to note that the Commission is not asked here to make a choice or value judgment between exclusive licensing and shared access regimes generally. Both will continue to exist quite comfortably, and even complementary to one another, after adoption of the *NPRM*. Rather, the Commission must address the very narrow question of what best serves the public interest for this particular band. At the same time, however, the Commission must consider broader policy implications as part of its consideration of what serves the public interest in this particular band.

A. The 3650-3700 MHz Band Provides A Unique Opportunity For The Commission To Test The Potential of High Power Unlicensed Devices.

The vast majority of available spectrum is allocated to licensed services. Only a fraction of the available spectrum represents opportunities for relatively high powered unlicensed use. To date, the Commission has not found a band suitable for the power levels proposed in the *NPRM*. While recent actions have created the opportunity for higher power transmission in the existing 2.4 GHz

band, *see In re Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval*, ET Docket No. 03-201 (released July 12, 2004) (authorizing EIRP of 8 watts for certain antenna types), the Commission has never proposed to allow an opportunity to further explore the potential of unlicensed access as a broadband solution with higher power level. Nor, given the resistance to the Interference Temperature and Cognitive Radio proceedings, does it seem likely that the Commission will find as promising a band in the future.

Furthermore, as the Commission has observed, the 3650-3700 MHz band is significantly underutilized. Huge tracts of space throughout the country have no licensed activity to protect. Nor is the band populated with a plethora of unlicensed devices. By contrast, even the existing underlay bands with sufficient power for networking are crowded either with numerous other devices (such as in the 2.4 GHz band) or with government users that impose significant limitations for purposes of sharing (such as the new bands above 5 GHz). This band therefore provides a rare opportunity to explore the potential of Part 15 devices in a relatively "clean" environment.

The Commission has sound reason to explore the potential of unlicensed access at higher power levels. Unlicensed access has been an consistent driver of technological development, economic growth, and valuable social services.[11] The Commission has compiled an extensive record from WISPs and others demonstrating that a wide variety of operators and equipment manufacturers

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[11]*See*, *e.g.*, Kenneth R Carter, Ahmed Lahjouji, & Neal McNiel, UNLICENSED AND UNSHACKLED: A JOINT OSP-OET WHITE PAPER ON UNLICENSED DEVICES AND THEIR REGULATORY ISSUES, OSP Working Paper #39 (2003); Matt Barranca, UNLICENSED BROADBAND PROFILES: COMMUNITY, MUNICIPAL, AND COMMERCIAL SUCCESS STORIES, New America Foundation (2004); William Lehr, THE ECONOMIC CASE FOR DEDICATED UNLICENSED SPECTRUM BELOW 3 GHZ, New America Foundation (2004); James H. Johnson & J.H. Snider, BREAKING THE CHAINS: UNLICENSED AS A LAST MILE BROADBAND SOLUTION, New America Foundation (2003).

stand ready to utilize the band as soon as the Commission liberalizes the access rules. Opening the band to unlicensed access therefore promises to provide the public with new networks and technologies swiftly.

In contrast, the marginal value of adding a new licensed service is minimal. The Commission has recently expanded the opportunities for exclusive licensing through numerous spectrum auctions and its *Secondary Markets* proceedings. While an additional licensed service would perhaps be better than no new service in the band at all, since it generally serves the public interest to increase the availability of spectrum to the public, a new licensed service would not allow the Commission to experiment with new types of spectrum management that "generally encourage the larger, more effective use of radio in the public interest." 47 U.S.C. §303(g).

B. History Demonstrates That Deployment of Unlicensed Wireless Networks Will Happen Faster and In More Diverse Communities Than Deployment of A New Licensed Service.

Furthermore, creation of a new licensed service will significantly delay deployment of much needed broadband services. Creation of a licensed service requires creating new service rules, setting an auction date, holding the auction, and awaiting licensees to conduct a build out and build new consumer equipment capable of receiving the licensed frequencies. This process would take years.

Furthermore, licensees offering broadband or other new, advanced telecommunications services traditionally focus their attention on the wealthiest markets. *See* Leonard M. Banes, "Deregulatory Injustice and Electronic Redlining: The Color of Access to Telecommunications," 56 Admin. L. Rev. 263 (2004). Furthermore, although the Communications Act directs the Commission to use auctions to promote "economic opportunity and competition ... by avoiding excessive concentration of licenses and by distributing licenses among a wide variety of applicants, including

small businesses, rural telephone companies, and businesses owned by members of minority groups and women," 47 U.S.C. §309(j)(3)(C), ownership of telecommunications facilities remains excessively concentrated in the hands of a few, large corporations. Eli Noam, "The Effect of Deregulation on Market Concentration: an Analysis of the Telecom Act of 1996 and the Industry Meltdown." Working Paper. Columbia Business School, Columbia Institute for Tele-Information (2002). Despite the Commissions consistent efforts to develop bidding criteria that will promote minority and small business ownership, spectrum auctions continue to fail in these goals. *See* Leonard M. Banes & C. Anthony Bush, "The Other Digital Divide: Disparity In the Auction of Wireless Telecommunications," 52 Cath. U. L. Rev. 351 (2003).

By contrast, unlicensed access creates immediate opportunity for deployment in any community by any entity. The Commission has in the past observed how unlicensed access assists removes regulatory barriers to minority and small business ownership. *See Section 257 Report To Congress*, 19 FCC Rcd 3034, 3077 (2004); *Section 257 Report to Congress*, 15 FCC Rcd 15376, 15432 (2002). Nor will communities economically unattractive to incumbents need to wait for deployment by others. These communities will be able to do what so many other communities are already doing, deploy systems themselves.

Commenters will not weary the Commission with further recitation of the benefits expanded unlicensed access has brought to rural America, inner city and minority communities, and Americans of every walk of life. The Commission and individual commissioners have recognized these benefits

in numerous studies, reports, notices, orders, and speeches.[12] Others, such as the New America Foundation, have likewise extensively documented the benefits of unlicensed access.[13]

In weighing between creating a new licensed service or increasing opportunities for unlicensed access, the Commission must consider this deployment history. Unlicensed access will generally facilitate deployment of advanced telecommunications services faster than creation of a new licensed service from scratch in this band. Furthermore, it will facilitate speedy deployment in those communities that traditionally must wait the longest for licensed services to deploy. Accordingly, the public interest demands that the Commission adopt *NPRM* rather than create a new licensed service.

C. Opening the Band to Unlicensed Access Would Better Further The Goals of the Communications Act.

By contrast, creating further opportunities for unlicensed access on a dynamic basis where technologically feasible furthers the goals of the Communications Act. The Commission has recognized the benefits of unlicensed access to small businesses in furtherance of the goals of Section 257. *See Section 257 Report To Congress*, 19 FCC Rcd 3034, 3077 (2004); *Section 257 Report to Congress*, 15 FCC Rcd 15376, 15432 (2002); *Amendment of the Commission's Rules to Provide For Operation of Unlicensed NII Devices in the 5 GHz Range*, 12 FCC Rcd 1576, 1585 (1997) (authorizing new unlicensed services "will further the Commission's mandate, in Section 257(b) of the Communications Act, to promote vigorous competition and technological advancement"). The Commission has likewise acknowledged the growing role of unlicensed spectrum access in the

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[12]*See, e.g.*, UNLICENSED AND UNSHACKLED, *supra* n. 11; *The Harvest*: *Remarks of Commissioner Abernathy at the Wireless Communications Association International Annual Conference* (June 2, 2004); *Remarks of Commissioner Jonathon S. Adelstein, WISP Forum, South Dakota School of Mines and Technology*, May 25, 2004.

[13]*See* sources cited *supra* n. 7.

deployment of broadband access to all Americans pursuant to the mandate of Section 706 of the Telecommunications Act of 1996. *Unlicensed Operation in the 3650-3700 MHz Band* ¶2 (released April 23, 2004).

In considering the value of unlicensed access to the Commission's Section 706 mandate, the Commission should consider that unlicensed access is an inherently deregulatory scheme. It frees all citizens to access spectrum with readily available consumer devices, rather than restricting the ability of citizens to access the public airwaves. By contrast, creation of a new licensed regi8me is an inherently regulatory step. It requires the Commission to develop a host of new rules and regulations with the sole purpose of restricting general access to spectrum. Licensee conduct, even if given total flexibility, cannot hope to enjoy the same deregulatory freedom as operators using unlicensed services.

Furthermore, the policy of geographic licensing limits the number of possible competitors in any geographic market. The Commission has traditionally limited the number of licensees in a geographic area to a mere handful at best. The prohibitive cost of licenses at auction and the high price of equipment acts to limit competition further. By contrast, there is no limit (other than that imposed by the economics of the marketplace) to the number of competitors using unlicensed spectrum access.

Accordingly, to the extent the Commission believes that the Telecommunications Act of 1996 requires the Commission to facilitate deployment through deregulatory means and open competition, unlicensed access provides a far more potent avenue than licensing. If the Commission is serious about deregulation as a means of promoting competition, rather than as a means of preserving

incumbent dominance, the Commission should adopt the *NPRM* rather than constrain competition in the 3650-3700 MHz band through the creation of a licensed service.

D. First Amendment Considerations Weigh Heavily In Favor of Adopting the *NPRM*.

As part of its public interest analysis, the Commission is not free to simply weigh the economic possibilities inherent in licensed and unlicensed. To the contrary, "the 'public interest' standard necessarily invites reference to First Amendment principles...and, in particular, to the First Amendment goal of achieving "the widest possible dissemination of information from diverse and antagonistic sources." *FCC v. National Citizens Committee for Broadcasting*, 436 U.S. 775, 795 (1978) (citations omitted). Indeed, the FCC has a fundamental responsibility to protect the public's "collective right to have the medium function consistently with the ends and purposes of the First Amendment." *Red Lion Broadcasting Co., Inc. v. FCC*, 395 U.S. 367, 390 (1969). Given the tremendous imbalance at the moment between spectrum allocated for unlicensed access by all citizens and spectrum assigned to exclusive licensees, the "reference to First Amendment principles" weighs heavily in favor of opening new spectrum to unlicensed access rather than creating yet another licensed service.

As an initial matter, permitting broader direct access to spectrum by the public serves the First Amendment both by creating more opportunities for people to speak and, concomitantly, more sources for people to hear. As technology continues to advance, and the need for exclusivity diminishes, it serves the interests of the First Amendment to permit as many citizens as possible to access spectrum as freely as possible. *See* Stuart Minor Benjamin, "The Logic of Scarcity: Idle

Spectrum As First Amendment Violation," 52 Duke L.J. 1 (2002); Stuart Buck, "Replacing Spectrum Auctions With Spectrum Commons," 2002 Stanford Technology L. Rev. 2 (2002).

More generally, discretionary licenses on the right to communication are repugnant to the First Amendment. *See Generally Watchtower Bible & Tract Society of New York, Inc. v. Village of Stratton*, 536 U.S. 150, 161-64 (2002). Only because unregulated use of the electromagnetic spectrum by ***everyone*** would make impossible the effective use of the spectrum by ***anyone*** has the Supreme Court permitted the Federal Government to license spectrum. *National Broadcasting Co v. United States*, 319 U.S. 190 (1943); *Federal Radio Commission v. Nelson Bros.*, 289 U.S. 266 (1933); *In re Nextwave Personal Communications, Inc.*, 200 F.3d 43 (2nd Cir. 1999).

But this does not give the government complete *carte blanche* in managing spectrum. *NBC*, 319 U.S. at 217. To the contrary, the FCC must manage spectrum so as to promote the goals of the First Amendment. *Red Lion*, 395 U.S. at 389-393. In light of the general antipathy of the First Amendment to discretionary licenses as a precondition of speech, the First Amendment imposes on the Commission a responsibility to consider whether direct access by citizens is technologically feasible. *Accord FCC v. League of Women's Voters of California*, 468 U.S. 364, 376 n. 11 (1984).

As the Supreme Court has found, the First Amendment prohibits the government from granting exclusive rights in communication unless the physical characteristics of the medium require exclusivity as a precondition for productive use. *City of Los Angeles v. Preferred Communications*, 476 U.S. 488 (1986). There, Preferred Communication did not take part in an auction for an exclusive franchise. Nevertheless, it applied for a franchise in competition with the winner of the auction. The City of Los Angeles denied the application. The district court upheld the power of the

city to award an exclusive license, but the Ninth Circuit Court of Appeals reversed on First Amendment grounds. *Id.* at 492-93.

The Supreme Court remanded for further fact finding on the question of whether any physical limitations required the city to limit the number of franchises. The Supreme Court explicitly held that the desire of the city to maximize revenue or maximize economic efficiency did not permit limiting the ability of citizens to speak through the new medium any more than the city could limit the number of newspapers in the name of economic efficiency. *Id.* at 494-95. Where the laws of physics no longer require exclusivity, exclusivity cannot be justified on economic or efficiency grounds alone.

Commentors do not argue here that technology has advanced to the point where the spectrum may accommodate all who wish to use it, and that therefore the days of exclusive licensing have passed. *Cf. League of Women Voters supra* (observing that technological advances might someday render exclusive licensing obsolete). Indeed, many applications, such as public safety, will continue to demand exclusivity for the foreseeable future. The ability of technology to provide unlicensed access to all citizens under some conditions does not render the underlying basis of *FRC v. Nelson Bros.* or *NBC* obsolete.

Rather, Commentors observe that the Commission in the *NPRM* has found that, in the 3650-3700 MHz band, it is possible for all citizens to access the electromagnetic spectrum freely without creating the harmful interference that justifies exclusive licensing. If the Commission nevertheless decided limit the right to speak through spectrum in this band to a single entity, for no better reason than to maximize revenue to the government or maximize economic efficiency, that decision would violate the First Amendment principles set forth in *Preferred Communication.*

IV. THE COMMISSION SHOULD CONDUCT A PERIODIC REVIEW OF THE 3650-3700 MHZ BAND TO DETERMINE IF IT CAN ALLOW HIGHER POWER OR OTHERWISE REMOVE BARRIERS TO UNLICENSED ACCESS.

Commentors anticipate that the Commission may well impose more conservative limitations on operation of unlicensed services in the band than will ultimately prove necessary. Furthermore, as technology continues to advance, the Commission may well decide that adjustments to facilitate further unlicensed access are warranted.

The Commission should therefore put all parties on notice that it will regularly review operation in the 3650-3700 MHz band and seek opportunities to further deregulate unlicensed use by removing unnecessary restrictions. In this way, the Commission can fulfill its obligations under the Communications Act and under the First Amendment to remove barriers to infrastructure development, encourage deployment of advanced telecommunications, enhance the opportunities for diversity of ownership and diversity of views, and facilitate direct communication among citizens via the electromagnetic spectrum.

The Commission should logically include this review in its Triennial Review conducted pursuant to Section 257(c). As discussed above, the Commission has consistently recognized that increasing opportunities for unlicensed access directly fulfills the goals of Section 257 to "remove market entry barriers for entrepreneurs and other small businesses in the provision and ownership of telecommunications services and information services." 47 U.S.C. §257(a). The three year cycle will also allow a suitable lead time for the development of new technologies, while occurring with sufficient frequency to keep the rules from growing stale. Furthermore, a regular review will serve the public far better than requiring *ad hoc* petitions for rulemaking.

CONCLUSION

Although the *NPRM* has two significant flaws that the Commission should remedy before adoption, the *NPRM* represents a positive step forward by the Commission in its stewardship of public spectrum. Adoption of the *NPRM*, after elimination of the proposal for professional installer certification and after elimination of the requirement of personal identification beacons in mobile devices, will serve the goals of the Communications Act and of the First Amendment.

Respectfully submitted,

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July 28, 2004