Before the
Federal Communications Commission
Washington, D.C. 20554

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

JOINT COMMENTS OF
THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC.,
THE NATIONAL ASSOCIATION OF BROADCASTERS,
AND THE ASSOCIATION OF PUBLIC TELEVISION STATIONS

Dated: April 17, 2003

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SUMMARY

For nearly two decades now, broadcasters and the Commission have been dedicated to the goal of transitioning the nation's broadcast system to digital technology. With over 800 stations on the air in digital and dozens of different DTV set models available in stores, the transition is now entering a critical phase where its success increasingly depends on the willingness of consumers to adopt the technology that is now available in markets that cover 97.4% of television households. At this fragile and fluid stage, Commission policy should be to protect the fledgling digital service and explore ways to encourage consumers to adopt it. Now is *not* the time to consider introducing new, untested and largely uncontrollable devices into theoretically "unused" portions of the broadcast band (to the extent that any such "unused" spectrum can be found where there is demand for unlicensed devices that is not met with current spectrum). Allowing unlicensed devices into the broadcast band at this time would pose serious risks to the integrity of over-the-air broadcasting in general and to the success of the digital transition in particular while offering few benefits to the proponents of unlicensed devices. In this trade-off, the American consumer would be the loser.

The Commission has no experience with allowing unlicensed devices to operate in spectrum that is occupied as densely, continuously and ubiquitously as the TV broadcast spectrum. These devices are unlikely to have sufficient technological capability to consistently avoid interference with broadcast uses; nor can broadcasters assure that television receivers will be equipped to avoid or minimize interference. Although both analog and digital television sets would be affected by the resulting interference, DTV sets would be particularly vulnerable because interference to them would cause a complete loss of service (rather than just a snowy picture as in the analog environment). By undermining consumer confidence in the new digital

service at a critical juncture, this interference could derail the transition just as it is finally beginning to take off.

Weighed against this substantial risk are the few and conjectural benefits to be derived from allowing unlicensed devices to operate in "unused" broadcast spectrum. During the transition there is virtually no broadcast spectrum available for unlicensed use in the urban markets where there may be demand for unlicensed devices. In the rural areas where broadcast spectrum may be available, spectrum resources for unlicensed devices already are plentiful. Thus, a proposal allowing unlicensed devices to operate in "unused" broadcast spectrum would simultaneously be a solution without a problem (in rural areas) and *not* a solution to the problem that exists (in urban markets).

Also to be weighed on the scales is the strong risk that permitting unlicensed uses in the broadcast spectrum now would preclude far more productive uses of the spectrum after the digital transition has been completed. The complexities and harms of sharing spectrum with unlicensed uses at this time are great, the potential rewards are both speculative and slight, and the risk of blighting far more beneficial uses of the spectrum in the future is unacceptable.

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The Association for Maximum Service Television, Inc. (MSTV), the National Association of Broadcasters (NAB) and the Association of Public Television Stations (APTS)[1] share the Commission's desire to encourage high-value, innovative and efficient uses of spectrum resources. However, the possibility raised in this proceeding of allowing unlicensed devices to operate in "unused" portions of the television broadcast spectrum is premature and threatens to derail the Commission's and broadcasters' ambitious endeavor to promote spectrum efficiency in the broadcast band by converting the service to digital transmission. Allowing unlicensed devices into the broadcast band at this time ultimately would also undermine future efforts by the Commission to optimize the use of broadcast spectrum for new services.

Use of the television broadcast spectrum by unlicensed devices is not viable at this time. The TV broadcast band is being used intensively for the complex transition to digital

[1] MSTV is a non-profit trade association of local broadcast television stations committed to achieving and maintaining the highest technical quality for the local broadcast system. NAB is a non-profit, incorporated association of radio and television stations and networks that serves and represents the American broadcast industry. APTS is a nonprofit organization whose members comprise the licensees of nearly all of the nation's 357 CPB-qualified noncommercial educational television stations. APTS represents public television stations in legislative and policy matters before the Commission, Congress, and the Executive Branch and engages in planning and research activities on behalf of its members.

television, which is replete with significant logistical and technical challenges. Not enough is known about how the spectrum will be occupied during and after the DTV transition -- or how unlicensed devices would interact with the new technology -- to determine with any confidence that the two services can share spectrum without causing undue interference to each other. Moreover, the open architecture of the broadcast system and the economics and structure of unlicensed operation would significantly complicate efforts to resolve the interference issues that would arise between broadcast services and unlicensed devices. Taking into account (1) the unique, incalculable value of over-the-air broadcast television, (2) the uncertainties and fluidity of the TV broadcast band at least during the digital transition, and (3) the challenges for unlicensed devices attempting to operate in a crowded, dynamic broadcast band, it is clear that the costs and risks of introducing unlicensed devices into the broadcast band at this time strongly outweigh the limited benefits.

I. UNLICENSED USE OF THE TELEVISION BROADCAST BAND POSES SERIOUS RISKS TO THE INTEGRITY OF OVER-THE-AIR BROADCASTING.

The *Notice of Inquiry* seeks comment on the feasibility of permitting unlicensed devices to operate in broadcast spectrum at "locations and times when spectrum is not being used."[2] This type of "overlay" service contemplates the use of devices that would interfere with (or receive interference from) the licensed service if they operated in occupied spectrum.[3] That

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[2] *Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Notice of Inquiry, ET Docket No. 02-380, 17 FCC Rcd 25,632, 25,632 (2002) (*Unlicensed Devices NOI*).

[3] The Commission's Spectrum Policy Task Force Report distinguishes between "underlay" services and "overlay" services. Underlay services are those in which the secondary service would operate in the same spectrum as the primary service but below a certain "interference temperature," thereby -- in theory -- not causing interference to the primary service. FCC Spectrum Policy Task Force Report, ET Docket No. 02-135, at 30 (Nov. 2002) (*SPTF Report*). ("[T]o the extent that the interference temperature in a given band is not reached, other users (*e.g.*, unlicensed devices) could operate in the same band -- with the interference temperature

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is, neither broadcasters nor unlicensed users would be subject to the type of stringent technical limitations that would allow the licensed and unlicensed uses to occupy the same spectrum without causing interference to each other. Accordingly, the successful operation of "overlay" unlicensed devices in broadcast spectrum hinges on (1) the availability of spectrum that truly is and will remain "unused," (2) the ability of unlicensed devices effectively to limit their operations to any such "unused" spectrum, and (3) enforcement mechanisms in the event interference predictions, equipment certification procedures, or operator practices do not prevent harmful interference. The potential for disruption of the licensed service would be significant, and not easily remedied, where unlicensed devices erroneously transmitted in occupied channels.

A. Unlicensed Devices Are Unlikely To Include The Technology Necessary To Avoid Interference With Broadcast Operations.

Leaving aside for now the question of whether there is sufficient "unused" broadcast spectrum to afford much opportunity for beneficial unlicensed uses, at the outset there are serious questions about the ability of unlicensed devices to confine their operations to "unused" spectrum. Technologies allowing unlicensed devices to detect spectrum availability and, if necessary, to change frequencies in order to avoid interference are still in development and certainly have not been subject to the rigorous testing needed to determine whether they are effective in preventing interference in real-world settings -- especially a setting as complex and subject to change as the TV broadcast band as it transitions to DTV.[4]

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serving as the maximum cap on the potential RF energy they could introduce into the band."); *id.* at 40. In contrast, the Task Force envisioned "overlay" services as those that would operate in "white spaces" or geographic areas in which there is no primary user. *Id.* at 48.

[4] *See* Motorola, *A White Paper on the Exploitation of "Spectrum Holes" to Enhance Spectrum Efficiency*, ET Docket No. 02-135, at 4-6 (Oct. 28, 2002) (noting the significant problems faced
(continued...)

To the extent such technologies are or may soon be available, the cost and complexity of these and other solutions designed to minimize the likelihood of interference between broadcasting and unlicensed devices render it economically impracticable to include such solutions in the kind of mass market devices that have flourished in unlicensed spectrum. According to the attached study by Stuart Lipoff, an electrical engineer and internationally-recognized authority in new-economy-related businesses and technology in the consumer electronics industry and related manufacturing and service industries,[5] adopting a "listen before talk" spectrum etiquette for unlicensed devices in the broadcast band, while still fraught with significant technical challenges, offers the most promising approach to control interference to licensed operations.[6] However, it is estimated that implementing this spectrum etiquette[7] would at the outset price unlicensed devices at approximately 2.25 times the price of a comparable device without this technology.[8] This increased cost of unlicensed devices in the broadcast spectrum is likely to either (1) cause equipment manufacturers to concentrate their investments and efforts in other unlicensed bands,[9] or (2) cause equipment manufacturers to "cut corners" to

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by devices trying to identify "spectrum holes"); Comments of Motorola, Inc., ET Docket No. 02-135, at 27 (Jan. 27, 2003) (same); Comments of AT&T Wireless Services, Inc., ET Docket No. 02-135, at 10-11 (Jan. 27, 2003) (describing problems with measuring interference environments, including the "hidden transmitter" problem).

[5] *See* Stuart J. Lipoff, *Exploring the Feasibility of Sharing TV Band Spectrum with Unlicensed RF Devices*, Appendix (April 2003) (*Lipoff Report*), attached hereto as Attachment A.

[6] *Lipoff Report* § 6.1.

[7] Adopting an approach that uses a "listen before talk" spectrum etiquette would involve adding spectrum scanning and analyzing circuitry to unlicensed devices. *Lipoff Report* § 4.

[8] *Lipoff Report* § 6.2.

[9] Given the mass market nature of most unlicensed devices, consumers will have little incentive to buy the more expensive devices that operate in the broadcast spectrum.

reduce the cost of devices by including substandard technology that does not effectively prevent interference to the public's broadcast services.

Because the Commission is considering authorizing unlicensed devices to operate at power levels above those currently allowed for Part 15 devices,[10] there are even more uncertainties about the ability of those devices to prevent or avoid interference with broadcast uses. Little is known about the real-world operation of unlicensed devices at power levels above those authorized in Part 15, and it is difficult to predict the risks of -- and to develop the technology to avoid -- interference between such higher-powered unlicensed devices and broadcast uses operating in the same or nearby spectrum. Accordingly, there can be no guarantee that real-world unlicensed devices developed for use in the TV broadcast spectrum would be equipped with the necessary technology both to avoid interference from and to prevent interference to broadcast uses.[11]

B. The Characteristics Of Broadcasting And Unlicensed Operations Would Impede The Effective Resolution Of Interference Issues Arising Between The Services.

The broadcast service is uniquely vulnerable to the interference that could arise with the introduction of unlicensed devices into the broadcast band. The broadcast system is characterized by open architecture in which broadcasters do not control the design or manufacture of the receivers of their transmissions. Therefore, broadcasters cannot control the

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[10] *Unlicensed Devices NOI*, 17 FCC Rcd at 25,638-39.

[11] Such technology not only would have to detect which broadcast channels are vacant, but would also need to determine if any otherwise vacant broadcast channels were being used by low power auxiliary stations such as wireless microphones and wireless assist video devices. *See Unlicensed Devices NOI*, 17 FCC Rcd at 25,638. ("Low power auxiliary stations such as wireless microphones and wireless assist video devices on TV channels do not have defined protected contours, but unlicensed devices are not permitted to cause interference to them.").

extent to which receivers include technology that protects against interference from unlicensed devices.[12] Unlike wireless carriers and public safety users, for example, broadcasters cannot optimize spectrum use by replacing receivers, and must instead rely on the "lowest common denominator" of all TV sets in the market.[13] Moreover, because broadcasters exercise no control over receivers, they would not be in a position to address any implementation problems that might arise from the operation of unlicensed devices in the TV broadcast band. That is, where an unlicensed device interfered with a consumer's TV service, even if the consumer could identify the source of the interference, the broadcaster would not be able to modify the receiver or otherwise address the interference problem, even though it would be the broadcast service that would be disrupted.

Interference that might be caused by unlicensed operations in broadcast spectrum would be further exacerbated by the fact that unlicensed devices are essentially uncontrollable once in the hands of consumers.[14] Although the Commission's rules theoretically prohibit

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[12] FCC Spectrum Policy Task Force, Report of the Spectrum Rights and Responsibilities Working Group at 43 (Nov. 15, 2002); *see also* Comments of MSTV and NAB, Docket No. 02-135, at 15 (Jan. 27, 2003).

[13] At present, the TV sets in the market include at least 267 million analog sets (whose performance characteristics are, for the most part, not regulated and not known by the Commission) and evolving generations of digital sets. Consumers have paid for those sets, which were manufactured pursuant to design specifications that did not contemplate shielding the sets from unlicensed devices, and should not be forced to replace them to avoid interference from secondary users.

[14] *SPTF Report*, at 58 ("[O]nce unlicensed devices begin to operate . . ., it may be difficult legally or politically to shut down their operations even if they begin to cause interference or otherwise limit the licensed user's flexibility."); Comments of AT&T Wireless Services, Inc., ET Docket No. 02-135, at 12 (Jan. 27, 2003) (noting that potentially interfering unlicensed devices are itinerant and unidentifiable); *Review of Part 15 and Other Parts of the Commission's Rules*, First Report and Order, ET Docket No. 01-278, 17 FCC Rcd 14,063, 14,067 (2002) (describing interference caused by unlicensed radar detectors to VSATs in the 11.7-12.2 GHz band, and noting that the radar detectors could not easily be identified or, even if identified, controlled).

unlicensed devices from interfering with licensed services,[15] this rule cannot be enforced once the devices are abroad in the land. Because they are not licensed, unlicensed devices that cause interference do not appear in any database and cannot easily be detected and made to cease operation.[16] In addition, even though the Commission's rules state clearly that unlicensed devices shall not acquire any vested rights in continued use of spectrum bands,[17] it is difficult in practice for the Commission to make unlicensed devices cease operation and vacate particular spectrum once consumers have invested in such devices.[18]

Thus, there is a significant risk that the contemplated introduction of unlicensed devices into the TV broadcast band would result in at least sporadic, harmful interference between unlicensed devices and licensed broadcast services. Due to the unique open architecture of the broadcast system and the unaccountability of unlicensed devices, it would be extremely difficult to remedy and resolve such interference issues to the satisfaction of the affected consumers.

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[15] 47 C.F.R. § 15.5(b).

[16] The Commission recognized this difficulty in this proceeding when it asked how it could enforce its rules. *Unlicensed Devices NOI*, 17 FCC Rcd at 25,640. This is an extremely important and critical question -- without effective means for enforcing rules designed to ensure that unlicensed devices do not interfere with authorized users of the broadcast bands, neither broadcasters nor the Commission would be able to resolve any interference problems that might arise.

[17] 47 C.F.R. § 15.5(a).

[18] *See, e.g.*, *Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, ET Docket No. 99-255, 15 FCC Rcd 11,206, 11,225 (2000) ("Despite the fact that medical telemetry has no legal protection from interference in [the broadcast] bands, the fact remains that the Commission has had to take steps to protect medical telemetry from interference . . . . The steps the Commission has taken, such as . . . the requirement for DTV stations to notify nearby health care facilities, affect other parties.").

II. UNLICENSED OPERATION IN THE TELEVISION BAND WOULD BE ESPECIALLY PROBLEMATIC DURING THE TRANSITION TO DIGITAL TELEVISION.

As described above, the challenges posed by any attempt to introduce unlicensed devices into the broadcast band would be formidable in any event. But those challenges -- and their adverse effects -- would be even more daunting in light of the immense technological challenges broadcasters and the Commission are already tackling in the digital television transition.

A. The Television Band Will Be In A Crowded, Fluid And Fragile State During The Digital Transition.

It is widely recognized that the process of assigning all full-power broadcasters an additional channel to launch a digital station taxed broadcast spectrum resources to the brink and resulted in significant spectrum crowding and loss and degradation of service, particularly in heavily-populated urban areas.[19] Even relatively small markets now have upwards of a dozen stations operating in the broadcast spectrum. These dual transmission arrangements leave few, if any, channels available for unlicensed operation during the transition. Available channels are limited primarily to rural or other areas where spectrum resources already are plentiful.[20]

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[19] *See, e.g.*, *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, MM Docket No. 87-268, Sixth Report and Order, 12 FCC Rcd 14,588 (1997); Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order, 13 FCC Rcd 7418 (1998).

[20] The Lipoff study determined that unlicensed devices could cause interference to licensed TV service (both analog and digital) well within the station's Grade B service contour. The study determined that this interference potential would exist from devices operating on the same channel and the first adjacent channel of the affected TV station. *See Lipoff Report* § 3.4. Based on the interference protection criteria identified in the Lipoff study, MSTV conducted a channel availability analysis (considering full power NTSC and DTV stations but not including operating Class A or low power stations) to determine the number of "unused" channels available for unlicensed operation within a 60-mile radius of the top ten TV markets in the United States. The analysis found that no "unused" channels were available within a 60-mile radius of New York,

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Moreover, because many broadcasters now are, quite appropriately, operating with less than optimized or even replicating facilities, a substantial number of them may encounter DTV-to-analog, analog-to-DTV and/or DTV-to-DTV interference problems when they migrate to full facilities; these problems will, in turn, lead to site moves and other facility modifications. This ongoing volatility of broadcast facility changes and spectrum occupancy patterns -- which will intensify as the transition picks up speed and existing licensees begin to move to their final digital channels -- makes it risky and unreliable to interweave unlicensed devices in the current analog/digital environment.

The fluidity and complexity experienced during the transition will be multiplied many-fold towards the close of the transition. There are 17 stations with two out-of-core channels that must find a new DTV channel not currently allotted to them and there are 176 stations with out-of-core DTV channels that presumably will move to their analog allotments at the close of the transition. In addition, by statute, the FCC must allot 175 DTV channels in the core Channel 2-51 spectrum for new stations. There are Class A stations, low power stations, translators and boosters (with many more to be put on the air in the meantime)[21] that may have to move to new channels when the transition is completed. In its Biennial Review proceeding the Commission is wrestling with channel selection issues and use-it-or-lose-it

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Boston, Philadelphia, Washington, DC, Dallas, Los Angeles and San Francisco. One channel was available in Detroit, three in Atlanta and six in Chicago. The analysis also determined that it would be extremely difficult, if not impossible, to find any "unused" channels along the entire Boston-Washington corridor.

[21] In its *Biennial Review* proceeding, the Commission has expressed an intention to move toward greater use of boosters to transmit DTV. *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 03-15, FCC 03-8, ¶¶ 99-106 (rel. Jan. 27, 2003).

replication/maximization options. But it may not realize that even for stations with two in-core channels and stations with in-core DTV channels, the channel choices of other stations in the same or adjacent markets may have such adverse interference consequences that they and the public would be better served by operating on a third channel. But the option of choosing a third channel to avoid such an outcome could be foreclosed if unlicensed devices were allowed to occupy otherwise "unused" spectrum.

In short, the repacking process at the end of the transition will be more complicated, more uncertain and more disruptive than the process of creating the interim DTV allotment table in the first place. Consumers have a lot at stake because many could be disenfranchised of their over-the-air television service -- a disenfranchisement that would be particularly acute in the digital environment where interference results in total destruction of service, not mere degradation. Therefore, it would be wholly imprudent to permit unlicensed users to encumber currently "unused" television channels before these issues are resolved and broadcasters have settled into their final, post-transition channels.

Moreover, the various scenarios that could flow from these problems demonstrate why authorizing unlicensed devices in television broadcast spectrum at this time would be contrary to the public interest. First, if wireless devices were permanently ensconced on these channels, they could preclude the use of these channels for existing television stations, with the result being potential loss of service to millions of viewers. Second, any procedure for relocating unlicensed devices from previously "unused" channels to accommodate later broadcast use would be unreliable, costly and disruptive. Third, if the Commission adopted a conservative approach to permitting unlicensed uses of broadcast spectrum in order to protect against the harms entailed by the above two scenarios, there would be so little spectrum available for

unlicensed devices that it would be pointless to proceed. Any scheme considered by the Commission could run afoul of all three problems.

B. Unlicensed Devices Could Cause Significant Disruption To DTV Service.

As noted above, unlicensed devices that were unable to navigate the changing broadcast environment and erroneously operated in occupied broadcast spectrum would cause significant disruption to all broadcast service. However, the potential for disruption of digital service would be even greater given the dynamic state of the spectrum and the difficulty that unlicensed device manufacturers would have in attempting to engineer around a still-developing technology.[22]

One source of service disruption would be localized interference. Where the broadcast signal at a particular television set is weak (which can happen throughout a station's viewing area due to terrain, man-made structures, foliage, distance from the transmitter, indoor geography and other factors), even a low-powered device could cause interference to the reception of high-powered broadcasting services.[23] Interference could also occur where the presence of multiple unlicensed devices contributed to aggregate levels of RF energy high enough to overpower the broadcast signal at a particular television set.[24] Although there is as yet little experience with this sort of phenomenon, the Commission is aware of cumulative

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[22] *See Lipoff Report* §§ 4, 6.1, 6.3.

[23] Congress has expressed its disapproval for regulatory changes that would permit such service degradation. *See* Auction Reform Act of 2002, Pub. Law No. 107-195, 116 Stat. 716. Anticipating efforts to clear channels 52-69 for new services (by permitting broadcasters occupying those channels to use in-core digital allotments for analog transmission), Congress forbade waivers of spacing or interference rules that would result in "*any* degradation in or loss of service, or an increased level of interference, to *any* television household except as the Commission's rules would otherwise expressly permit." *Id.* § 6(a) (emphasis added).

[24] *See Lipoff Report* § 3.3.

interference in other contexts and should also make an effort to understand the aggregate effect of the RF "ecosystem" on licensed services as it considers measures that could contribute to the proliferation of unlicensed devices.

Although interference effects would be felt in both analog and digital receivers, the disruption of the viewing experience would be more significant in the DTV context, where interference would result in a complete loss of picture (rather than a snowy picture as in the analog environment). Where this "cliff effect" caused a viewer suffering interference from an unlicensed device to lose even just a few moments of a sporting event, movie or other program, the viewing experience would be spoiled and the viewer inclined to seek programming from another medium.

The broadcast service could also be burdened even where unlicensed devices suffer interference from the broadcast signal. Although unlicensed devices would be secondary and legally required to accept interference, as a practical matter consumers would hold the broadcaster responsible for interference to these devices, particularly where the interference was from a newly-fired-up broadcasting station (such as a station's newly enhanced DTV signal) to an already-purchased unlicensed device. The burdens created by such a *de facto* allocation of responsibility can be substantial, as when a local broadcaster felt it had to replace 2,000 garage door openers disabled by the broadcaster's new DTV signal.

C. Disruption Of DTV Service By Unlicensed Devices Could Derail The Digital Transition.

The adverse effect of service disruptions on the DTV transition would be substantial. As described in the attached report by Strategic Policy Research, a "critical mass" of consumers must adopt DTV in order for the "bandwagon to get rolling" to the point that DTV

penetrates the market rapidly and produces substantial consumer benefits.[25] Government policy plays an important role in helping or hurting the effort to reach this "critical mass." If government policies have the effect of "potentially disabl[ing] the new service -- perhaps even only on a sporadic basis -- this will inhibit the new service's ability to achieve critical mass, spontaneous feedback and service takeoff."[26] That is, if unlicensed devices operating in the broadcast band caused "sporadic reception failures . . . with the result that, at the margin, fewer viewers choose to view digital television over-the-air[, t]hat would potentially produce a variety of *adverse* (as opposed to positive) feedback effects" that ultimately could derail the digital transition.[27]

Given the complexities of the DTV transition and the likelihood that allowing unlicensed devices into the band at this time could undermine the progress of the transition, the Commission should not use the television broadcast band to launch an experiment on the use of unlicensed devices in occupied bands.

III. AT LEAST DURING THE DTV TRANSITION, THE COSTS OF INTRODUCING UNLICENSED DEVICES INTO THE TELEVISION BROADCAST BAND OUTWEIGH THE LIMITED BENEFITS.

It becomes even more clear that the Commission should delay considering any proposal to allow unlicensed operations in the broadcast band until after the DTV transition when the risks and costs of this course are weighed against the very limited and speculative benefits to users of unlicensed devices. To determine which bands are appropriate for

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[25] John Haring and Jeffrey Rohlfs, Strategic Policy Research, *Permitting Unlicensed Devices on Broadcast Spectrum During the DTV Transition: Substantial Costs and Risks, Largely Speculative Benefits*, at 14-15 (April 2003) (*SPR Report*), attached hereto as Attachment B.

[26] *SPR Report*, at 14.

[27] *SPR Report*, at 14-15 (emphasis in original).

transitioning to "flexible" spectrum use, the Commission's Spectrum Policy Task Force recommended performing a cost-benefit analysis.[28] It is not always appropriate to apply this approach to decisions involving broadcast spectrum because the value of broadcasting is not fully captured by a simple economic analysis.[29] In fact, the non-quantifiable importance of certain spectrum-based services like broadcasting was the primary reason the Spectrum Policy Task Force concluded that there should be no "one-size-fits-all" approach to spectrum management.[30] Nonetheless, a cost-benefit analysis (so long as it recognizes the unique value of broadcasting) here demonstrates that the significant costs of allowing unlicensed devices into the broadcast spectrum in the near term would far exceed the limited benefits that would accrue.

Unlicensed technologies such as Wi-Fi have achieved success in spectrum bands dedicated to unlicensed and/or intermittent uses.[31] The success of unlicensed devices in spectrum bands occupied by licensed users such as (and especially) broadcasters is much more uncertain, particularly given the ongoing, complicated transition to DTV. Acknowledging the

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[28] *SPTF Report*, at 46 ("In determining whether and how to transition legacy command-and-control bands to more flexible rights models, the Commission should focus first on initiating transition in those bands where additional flexibility will provide the greatest benefits at the last cost."). While the Task Force uses the term "command-and-control" to refer to the regulatory model applicable to broadcasting, MSTV and NAB have previously noted their opposition to this pejorative term. Reply Comments of MSTV and NAB, ET Docket No. 02-135, at 3 (Feb. 28, 2003). MSTV and NAB noted that the term "managed spectrum model" more appropriately describes the regulatory model under which broadcasters have served the American public while introducing innovative new technologies over time, such as color, UHF, stereo, second-language audio, translators and LPTVs, V-chip, closed captioning, and now DTV.

[29] *See, e.g.*, Reply Comments of MSTV and NAB, ET Docket No. 02-135, at 3-4 (Feb. 28, 2003); Comments of MSTV and NAB, ET Docket No. 02-135, at 1-2 (July 8, 2002); SPR Report at 3-5.

[30] *SPTF Report*, at 36.

[31] While the bands in which unlicensed operations have been most successful -- the 902-928 MHz, 2.4 GHz and 5.7 GHz bands -- are also allocated to other uses such as radiolocation and industrial, scientific, and medical ("ISM") devices, none of the primary users of these bands approach broadcasting's importance or its intensity and ubiquity of spectrum use.

uncertainties of the DTV transition, the Commission's Spectrum Policy Task Force recommended against any immediate regulatory changes for the broadcast band.[32] Although it could eventually prove feasible for TV broadcasting and unlicensed devices to share spectrum, now is not the time to even evaluate the question. The costs of allowing unlicensed devices into the broadcast band at this time far outweigh any potential benefits.

A. There Is Very Little "Unused" Spectrum In The Broadcast Band.

The *Notice of Inquiry* contemplates permitting unlicensed devices to operate in "unused" portions of the broadcast band. However, as described in Part II above, the broadcast band is extremely crowded as it undergoes the transition to DTV, leaving little or no "unused" spectrum in many markets, particularly where additional spectrum for unlicensed operations is most in demand. This crowding will intensify toward the end of the transition. As described above, television stations will have to be squeezed into channels 2-51.[33] These channels must accommodate all full service TV stations as well as Class A stations, other low power TV stations, TV translator stations and TV booster stations.

Moreover, the broadcast band is also already crowded with other devices, including wireless microphones, wireless assist video devices, remote control devices, and medical telemetry equipment.[34] Wireless assist video devices (WAVDS) were also recently

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[32] *SPTF Report*, at 46-47 ("In the case of broadcasting, evolution toward greater flexibility is governed for the time being by the statutorily-mandated DTV transition process, making additional regulatory changes impractical at least until that process is complete."); FCC Spectrum Policy Task Force, Report of the Spectrum Rights and Responsibilities Working Group, at 48-49 (Nov. 15, 2002) (noting that regulatory changes in the broadcast spectrum may not be "necessary, appropriate, or practical").

[33] *Unlicensed Devices NOI*, 17 FCC Rcd at 25,636.

[34] *Id.* at 25,636, 25,638.

authorized to operate in the broadcast band,[35] and the extent to which they will be deployed is still uncertain. In 1997, medical telemetry devices were allowed to operate on a wider range of broadcast channels at increased field strengths.[36] The Commission later decided, acknowledging the excessive crowding in the band, to stop allowing new medical telemetry devices in the broadcast band.[37] However, medical telemetry devices already operating in the band were allowed to continue. Those and other devices, while secondary to broadcasting, would need to be protected from interference from unlicensed uses.[38] Most of these other devices already operating in the broadcast band do not operate at fixed locations and do not have defined protection contours, making it even harder to identify any "unused" broadcast spectrum available for new unlicensed operations.

The limited spectrum resources that might be available in the broadcast band will not satisfy the proponents of unlicensed operations, who are seeking an additional *dedicated* allocation for unlicensed use.[39] A dedicated allocation for unlicensed use would do far more

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[35] *Revisions to Broadcast Auxiliary Service Rules in Part 74 and Conforming Technical Rules for Broadcast Auxiliary Service, Cable Television Relay Service and Fixed Services in Parts 74, 78 and 101 of the Commission's Rules*, Report and Order, ET Docket No. 01-75, 17 FCC Rcd 22,979, 23,032-40 (2002).

[36] *Amendment of Part 15 of the Commission's Rules to Permit Operation of Biomedical Telemetry Devices on VHF TV Channels 7-13 and on UHF TV Channels 14-46*, ET Docket No. 95-177, 12 FCC Rcd 17,828 (1997).

[37] *Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, ET Docket No. 99-255, 15 FCC Rcd 11,206, 11,225 (2000) (acknowledging the need to transition wireless medical telemetry devices away from the broadcast band because of increasingly intensive use of the broadcast band during the DTV transition and because of documented interference between DTV transmitters and medical telemetry devices).

[38] *See Unlicensed Devices NOI*, 17 FCC Rcd at 25,638 ("Low power auxiliary stations such as wireless microphones and wireless assist video devices on TV channels do not have defined protected contours, but unlicensed devices are not permitted to cause interference to them.").

[39] *See, e.g.*, Microsoft Comments, ET Docket No. 02-135, at 7-9 (Jan. 27, 2003) ("[T]he full potential of unlicensed wireless networks will not be realized through opportunistic use and

(continued...)

than a broadcast overlay to address the demands for unlicensed applications such as Wi-Fi.[40] First, a dedicated allocation would allow manufacturers to design and build inexpensive equipment for a particular frequency band, rather than the expensive, complicated technology that would be required of devices operating in the congested, dynamic broadcast band.[41] More fundamentally, an overlay allocation in the broadcast band is unlikely to provide *any* spectrum in the urban markets where unlicensed devices are in demand and existing allocations are most heavily used. To the extent that there are any "white spaces" available for unlicensed use in the broadcast spectrum, they are in rural areas where spectrum resources generally are more plentiful

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(continued...)
underlay alone."); Consumer Electronics Association Comments, ET Docket No. 02-135, at 3-6 (Jan. 27, 2003) ("[A]dditional spectrum is needed beyond the bands addressed in [this NOI]."); Wi-Fi Alliance Comments, ET Docket No. 02-135, at 2-3 (Jan. 27, 2003) (calling on Commission to designate additional bands for unlicensed spectrum). MSTV and NAB note that at present, Congress is considering legislation that would allocate on a dedicated basis significant amounts of spectrum to unlicensed or "commons" use. *See* Jumpstart Broadband Act, S. 159, 108th Cong. (2003); Spectrum Commons and Digital Dividends Act of 2003, H.R. 1396, 108th Cong. (2003). In addition, the Commission is reportedly considering commencing a proceeding to allocate 255 MHz of spectrum in the 5 GHz band for unlicensed operations. *Communications Daily*, Mar. 19, 2003, at 8 (summarizing Mar. 14 letter from Chairman Powell to Sen. Allen (R-Va.)).

[40] For example, manufacturers and other investors failed to invest in unlicensed personal communications service (UPCS) devices in the 1910-1920 MHz band because of the presence of microwave incumbents that had not yet relocated and the strict spectrum etiquette and monitoring required by the rules to prevent interference. *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, Third Notice of Proposed Rulemaking, ET Docket No. 00-258, FCC 03-16, ¶¶ 43, 46 (rel. Feb. 10, 2003). This lack of investment ultimately resulted in the reallocation of the 10 MHz in question. *Id.* ¶ 46. The rules requiring spectrum monitoring were found to be burdensome even though there were no primary users in the band who were to be protected from interference. The example of UPCS in the 1910-1920 MHz band, in contrast to the success of unlicensed devices in the 2.4 GHz and 5.7 GHz bands, illustrates the point that unlicensed operations are most likely to be successful in dedicated bands where interference is less of a concern and equipment manufacturers have sufficient incentives to invest in developing devices that operate on the spectrum in question.

[41] *See Lipoff Report* § 5.

and the need for additional spectrum to accommodate unlicensed devices is small or nonexistent. Where unlicensed devices need spectrum, *i.e.*, in the urban markets, the broadcast band has nothing to offer. Thus, the policy the Commission is considering, allowing unlicensed operations in "unused" broadcast spectrum, is simultaneously a solution without a problem (in rural areas) and *not* a solution for the problem that does exist (in urban areas).

B. Any Disruption Of Highly Valuable TV Broadcast Service Imposes Significant Costs On The Public.

As the Strategic Policy Research study explains, and the Spectrum Policy Task Force and the Commission generally have acknowledged, television broadcasting offers a unique, essential public service whose value cannot effectively be quantified in a true economic sense.[42] Broadcasters offer the only free, universally-distributed, locally-oriented news and information service available to the public.[43] Even in households that subscribe to a pay multichannel video service, other TV sets in the home rely on over-the-air broadcasting; in fact, thirty percent of all TV sets in use today are not connected to a multichannel video programming system.[44] And half the viewing on cable-equipped sets is of over-the-air broadcast channels.

The value of the public's local broadcast service is even greater at a time when the nation's homeland security is at risk. Homeland Security Secretary Tom Ridge has stated that "obviously television and radio" are the "first choice" for disseminating information to the

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[42] *SPR Report*, at 3-6; *SPTF Report*, at 44 (noting the many public services offered by broadcasters that justify the continued use of the "command and control" regulatory model for broadcasting).

[43] Although many Internet sources do not charge to access their sites, the sites are accessible only to those who have paid for an Internet connection.

[44] *See Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, Second Report and Order and Second Memorandum Opinion and Order, MM Docket No. 00-39, 17 FCC Rcd 15,978, 15,993 (2002).

public during a terrorist attack.[45] The Department of Homeland Security recommends that a battery-operated radio or television be included in each home's emergency supplies.[46]

Finally, the availability of free over-the-air broadcasting also exerts competitive pressure on cable and other subscription multichannel video programming services. The advent of "value added" DTV services, including HDTV and multicasting, could strengthen the ability of broadcast TV to compete in the video marketplace.[47] In the absence of competition from over-the-air television, consumers would pay more for subscription television services.[48]

Because of the high value consumers place on broadcast service throughout the country, even relatively small, sporadic service disruptions would impose significant costs on the public.[49] At this time and throughout the digital transition, these costs will vastly outweigh the limited benefits of allowing unlicensed operations in broadcast spectrum.

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[45] PBS Online News Hour, *Newsmaker: Tom Ridge,* Feb. 19, 2003, *available at* <http://www.pbs.org/newshour/bb/terrorism/jan-june03/ridge_2-19.html> ("JIM LEHRER: [S]ome people have mentioned that how is the ordinary American to find out about a terrorist attack ...? Is there some kind of system being worked on for that? TOM RIDGE: Precisely. There are multiple ways that we can communicate the plan; but there are also multiple sets of circumstances under which some of them wouldn't work. And so obviously television and radio is our first choice. ... [I]f the electricity is off, hopefully a battery-powered radio might help.")

[46] *See Make a Kit, at* http://www.ready.gov/supply_checklists.html (last visited Apr. 17, 2003).

[47] *See, e.g., Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Ninth Annual Report, MM Docket No. 02-145, 17 FCC Rcd 26,901, 26,941-42 (2002); *SPR Report*, at 15.

[48] *See SPR Report*, at 5 n.9.

[49] *SPR Report*, at 11-12.

C. The Costs of Allowing Unlicensed Operations In TV Broadcast Spectrum Substantially Outweigh Any Putative Benefits.

More spectrum may be needed for unlicensed use and there may be advantages to the "commons" approach of spectrum management.[50] However, opening the TV broadcast spectrum to unlicensed devices at this time is not likely (1) to make available meaningful spectrum resources for unlicensed devices or (2) to lead to optimal use of the broadcast spectrum.

In addition to the potential disruption of broadcast services generally and of the DTV transition specifically described in Parts I and II, another cost must be balanced against the limited benefits of allowing unlicensed operation in broadcast spectrum: that is, the effect on future opportunities to optimize the value of broadcast spectrum. As noted, the broadcast spectrum is already crowded with both high-power broadcast and lower-powered, intermittent auxiliary uses. Further populating the band with unlicensed devices threatens to preclude future consideration of alternative, more efficient and more valuable uses of the broadcast spectrum at the conclusion of the DTV transition. Once unlicensed devices are introduced into the broadcast spectrum, they would become, for all practical purposes, uncontrollable and unmovable. The effect of allowing these new, uncontrollable occupants into the broadcast spectrum would be to impair the Commission's freedom to take a fresh and more informed look at maximizing the value and efficient use of broadcast spectrum at the end of the DTV transition. Users of unlicensed devices would likely either oppose, or substantially increase the transaction costs of, clearing and reallocating broadcast spectrum used by unlicensed devices. Thus, allowing unlicensed devices into the TV broadcast spectrum at this time ultimately would undermine the

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[50] *SPTF Report*, at 36.

Commission's efforts to optimize the value of broadcast spectrum over both the short and long term.

CONCLUSION

Particularly in light of investments broadcasters and the public have made and are making in transitioning to digital television and the opportunities digital technology offers to increase the value of broadcast services (which opportunities are unlikely to be fully exploited until after the DTV transition is complete), the Commission should continue to protect the integrity of over-the-air television until the DTV transition is completed. While offering only limited, problematic opportunities for wireless proponents, the contemplated unlicensed use of broadcast spectrum would impose significant burdens that ultimately would undermine the Commission's goal of optimizing the value of scarce spectrum resources. At this time, therefore, the game is not worth the candle.

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