



Written Statement of

**Robert W. Hubbard**  
**President & CEO, Hubbard Television Group**  
**Vice President, Hubbard Broadcasting, Inc.**

*On behalf of*

**The Association for Maximum Service Television, Inc.**

**Before the Committee on Commerce, Science, and  
Transportation of the U.S. Senate**

**March 14, 2006**

## SUMMARY

With five decades of experience, MSTV knows how complex management of the broadcast spectrum can be, particularly during the ongoing transition to digital television. It is thus concerned by proposals to prematurely allow unlicensed devices into allegedly “vacant” broadcast channels at a time when the FCC and the world’s leading industry standards body, IEEE 802.22, are still determining whether, and if so, how, new wireless services could enter the band without degrading the public’s access to free, over-the-air television services. Proposals that would force the FCC to introduce unlicensed devices into the broadcast spectrum in as little as *six months* would short change the scientific discovery process, short circuit the IEEE’s important work and would wrongly prejudice complicated engineering questions.

MSTV is particularly concerned given the lack of any means to prevent or even remedy interference from unlicensed devices to reception of over-the-air broadcasts or other licensed services, including wireless microphones that are used in the production of emergency news coverage, sporting events, and political conventions. For example, there is no demonstrated technology that can reliably prevent an unlicensed device from transmitting on a television channel already in use. Indeed, much vaunted “spectrum sensing” technology has never been built, tested or proven to work in the broadcast band. Moreover, reproducible laboratory studies show that harmful emissions from unlicensed devices – even when the devices operate on “vacant” channels – would cause harmful interference to licensed services.

Once unlicensed devices are in the field, broadcasters and the FCC would have no reliable means of protecting the public’s television service from harmful interference. Too often, instances of interference will go unreported because consumers will not realize that an unlicensed device (or devices) has caused the interference. Even when interference is reported and linked to unlicensed devices, the FCC would not typically be able to find and shut down the interfering devices. Attempts to use traditional means to remedy harmful interference from unlicensed devices (*i.e.*, finding the offending transmitter and ordering it to cease operation) would sap both FCC and broadcaster resources, especially as the number of devices out in the field proliferates.

Even if out-of-band emissions could be controlled and the unlicensed devices could avoid transmitting on occupied channels, a fundamental problem would remain: with an *unlimited* number of unlicensed devices allowed to crowd the broadcast spectrum, the quality of broadcast and other licensed communications over that spectrum will necessarily decline. As many respected economists have recognized, this trend towards a “tragedy of the commons” would be irreversible and continually escalating.

It is also noteworthy that little white space spectrum currently exists in congested urban as well as many less populated markets. Even in rural markets where white space may be available, there is potential for interference to rural viewers, who often must use amplified antennas that would be particularly sensitive to emissions from unlicensed devices. The unlicensed devices proposal also threatens to conflict with the pending digital transition for low-power and TV translator stations, which is also a priority for rural viewers.

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Mr. Chairman and Members of the Committee, thank you for the opportunity to appear before you today to discuss policies affecting the public's spectrum resource and the important services delivered over that spectrum. My name is Robert Hubbard, and I am the President of the Hubbard Television Group, Vice President of Hubbard Broadcasting and serve as a member of the Board of Directors of the Association for Maximum Service Television, Inc. ("MSTV").

The issues surrounding spectrum management are important for this nation. Spectrum is a vital national resource, and must be managed wisely. Today there is considerable debate among economists and legal scholars regarding the best approach to spectrum management. Proponents of an unlicensed approach assert that it will lower the cost to new entrants while preventing interference to licensed services. Leading economists and legal scholars, however, have also voiced strong opposition to an unlicensed model. They believe that such an approach eliminates market discipline for entry, leading to overuse and increased interference among users. Whatever the merits or problems associated with an unlicensed approach, unique issues arise when the government attempts to employ two different regulatory regimes (*i.e.*, licensed and unlicensed) in the same band. Recent proposals would do just that, for the first time attempting to interleave an unlicensed model with licensed broadcast and other services. From an engineering and scientific perspective, the government should approach these unprecedented proposals with extreme caution.

MSTV has over five decades of practical, real world experience in spectrum management. Since 1956, we have worked to maintain and enhance the technical integrity of the American public's free, over-the-air television service as that service grew from less than 100 stations to over 1600 full-power broadcast stations. We also provided the FCC with the engineering expertise that made it possible to "squeeze in" during the transition channels for DTV service within the current 408 MHz allocation for television broadcasting. MSTV has also assisted policymakers in introducing other licensed services, including public safety communications and sophisticated Part 74 equipment essential to provide live news and sports coverage. And most recently, it helped design the process by which television broadcasters will complete the transition to digital transition ("DTV"), using the efficiency of digital technology to enable migration from the current band (channels 2 through 69) to the final condensed "in-core" band (channels 2 through 51). As a result, the television broadcast service will occupy only 294 MHz of spectrum as of 2009, in comparison to the more than 700 MHz of spectrum already available to unlicensed devices at or below the 5 GHz band.

The peaceful coexistence of so many licensed services in the same spectrum band has not happened by accident; it has required careful planning that takes into account the unique architecture of broadcast television service and the interference characteristics of the different services. Based on its knowledge of the difficulties in coordinating licensed services in the same band, MSTV is deeply concerned by proposals to allow an unlimited number of *unlicensed* devices into allegedly "vacant" channels within the spectrum reserved for the public's free, over-the-air television service. Studies and field tests conducted by well-respected scientists and engineers show that the introduction of unlicensed devices into the television broadcast spectrum threatens to create significant interference to the public's television service. As a result, the

unlicensed devices proposal would unfairly burden the over 21 million households that rely exclusively on free, over-the-air television services – a group which disproportionately includes minority, lower income, and elderly persons. In fact, these proposals threaten to create interference to approximately 73 million existing television sets that rely on an antenna to receive over-the-air television service. We are especially concerned about the interference to new digital television receivers and the government-subsidized digital-to-analog converter box program. Finally, by interfering with licensed production equipment in the broadcast bands, it would undermine coverage of emergency news, sports, political, and other events of importance to local communities. Licensed public safety services using broadcast spectrum in many major markets would also suffer.

When asked about these concerns, the relatively small but vocal group of unlicensed device advocates tells policymakers: “trust us.” MSTV respectfully submits that the public’s spectrum resource should be managed based on facts and engineering science, not on unsubstantiated promises. This Committee should take note of the world’s leading industry standards body, IEEE 802.22, which is currently determining whether, and if so, how, new wireless services can safely be authorized to operate in the broadcast spectrum. Proposals that would force the FCC to introduce unlicensed devices into the broadcast spectrum in as little as *six months* would short change the scientific discovery process, short circuit the IEEE’s important work and would wrongly prejudice complicated engineering questions. Once millions of unlicensed devices are placed into the marketplace and allowed to populate the spectrum, they cannot be removed. MSTV accordingly believes it would be unwise to place unlicensed devices into the broadcast spectrum before it is even known whether those devices can safely coexist with the important licensed services which are delivered to the public over that spectrum.

**I. CONGRESS SHOULD PROTECT CONSUMERS BY PRESERVING THE TECHNICAL INTEGRITY OF THE FREE, OVER-THE-AIR TELEVISION SERVICE.**

All too often, public policy debates regarding spectrum management deal with abstract concepts like “interference” and “spectrum efficiency.” The impact of these proposals, however, is very real. At stake are the television sets that exist in every living room, bedroom and kitchen across America. Most television receivers have not been engineered to protect against interference from unknown, unlicensed devices operating on adjacent channels in the television band; rather, they were designed to accommodate licensed services that operate in conformity with the FCC’s channel allocation plan. For the American consumer, interference from unlicensed devices is not an abstract concept. In real terms it means that the DTV set one family just purchased will not work when their neighbor turns on an unlicensed wireless device. It means that a new government-subsidized converter box will not work well when it is connected to another family’s analog set.

Parties urging for the introduction of unlicensed devices into the television broadcast spectrum have argued that Congress should not be concerned with the significant interference potential of such devices because Americans can turn to pay television services for programming. These erroneous claims overlook the continued importance of over-the-air television viewing to the American consumer.

Approximately 21 million households<sup>1</sup> with an aggregate 45 million sets rely *solely* on free, over-the-air television.<sup>2</sup> Those viewers rely exclusively on over-the-air television

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<sup>1</sup> *Estimated Cost of Supporting Set-Top Boxes to Help Advance the DTV Transition: Testimony Before the Subcommittee on Telecommunications and the Internet, Committee on Energy and Commerce, U.S. House of Representatives*, Statement of Mark L. Goldstein, Director, Physical (continued...)

for local news, sports, weather, and entertainment. In times of emergency, their lives may be saved when local television stations disseminate critical information from government officials to members of a community, including to viewers receiving that information via portable television sets commonly used during emergencies.<sup>3</sup> For example, when it became evident that Hurricane Katrina was headed towards the Gulf Coast, local television stations began wall-to-wall hurricane coverage, alerting the local community about the impending dangers and urging residents, including those in New Orleans, to evacuate.<sup>4</sup> Once the hurricane made its devastating landfall, local broadcasters remained a key link between government officials – including the governors of Louisiana, Mississippi, and Alabama – and the public by working cooperatively and creatively to maintain an on-air presence and thereby keep both local residents and the country informed of the severe crisis that followed the hurricane.<sup>5</sup>

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Infrastructure Issues, GAO, 7-8 (Feb. 17, 2005) (GAO Study). *See also* Comments of NAB and MSTV, MB Docket No. 04-210, *passim*, Attachment A (NAB/MSTV OTA Comments).

<sup>2</sup> NAB/MSTV OTA Comments at 2.

<sup>3</sup> Because they are typically battery powered, these sets are crucial when natural or manmade disasters leave viewers without access to power. As one report recently noted, “[I]n states in the hurricane belt ... small, battery powered TVs have become must-have items to have during power outages.” *Satellite Business News* 2, July 11, 2005.

<sup>4</sup> A video documenting these efforts of local television broadcasters in the Gulf Region may be viewed online at <http://www.mstv.org/honoring.html> (“*Gulf Region Video*”).

<sup>5</sup> For example, after the New Orleans levees broke, WWL-TV maintained an on-air presence by relocating news operations to a broadcast facility at Louisiana State University, and later to noncommercial station WLPB in Baton Rouge. Similarly, after floodwaters overtook New Orleans station WDSU’s facilities, nineteen of the station’s employees relocated to Hearst-Argyle sister station WAPT in Jackson, Mississippi. WDSU’s signal was then sent from Jackson to a backup TV transmitter in New Orleans, as WDSU’s primary transmitter was under water. *See, e.g.,* Craig Johnson, *Hurricane Katrina Tests Broadcasters: Gulf Coast Area Stations Improvise in Order to Stay on the Air*, *TV Technology*, Sept. 21, 2005, at [http://www.tvtechnology.com/features/news/n\\_hurricane\\_katrina.shtml](http://www.tvtechnology.com/features/news/n_hurricane_katrina.shtml) (last visited Jan. 23, 2006).

When access to a free, over-the-air signal is curtailed by over-the-air interference in favor of a pay service, some viewers experience that loss greater than others. For example, in some markets the number of homes not connected to cable or satellite services may reach as high as 40 percent. Variations may also occur along cultural lines. Univision has reported that nationwide, 33 percent of Hispanic households receive their programming solely over the air.<sup>6</sup> Over-the-air viewers should not be deprived access to these critical local services merely because they do not, or cannot, subscribe to a pay television service.

Cable and satellite subscribers are also affected by loss of free, over-the-air television service. As the General Accounting Office (GAO) has reported, over ten million households that subscribe to cable have *at least* one television set that is not connected to cable.<sup>7</sup> Added to the sets in homes solely relying on over-the-air service, there are an estimated 73 million television sets not connected to a pay television service in the U.S.<sup>8</sup>

Protecting the spectral integrity of the broadcast service is particularly important as the country enters a critical stage in the transition to digital television. Congress, the Executive Branch, and the FCC have all made clear that bringing the digital transition to a successful conclusion is of utmost priority and that it should not be obstructed by lower-priority goals. Years of hard work by broadcasters, government officials, consumer electronics manufacturers, and others have seen considerable progress, with nearly all 1600 television

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<sup>6</sup> Comments of Univision Communications, Inc., in MB docket No. 04-210 at 8, August 11, 2004.

<sup>7</sup> GAO Study at 8.

<sup>8</sup> NAB/MSTV OTA Comments at 5.

stations in the nation's 208 television markets now broadcasting a digital signal.<sup>9</sup> With the transmission side of the equation – broadcast facilities – virtually complete, the critical factor is to create incentives for American consumers to turn off their analog television receivers and switch to receiving signals in a digital format by the February 17, 2009 “hard date” on which analog broadcasts are to cease. But if unlicensed devices degrade consumers’ ability to receive DTV signals, adoption of digital sets will slow, undermining the DTV transition.

Concerns about the digital transition also extend to the development of an inexpensive digital-to-analog converter box that will ensure continued local broadcast service for consumers’ with analog sets. (As was widely reported last year, MSTV and NAB have entered into an agreement with LG Electronics and Thomson Inc. to develop a high-quality but low-cost prototype of such a box.) In recognition of such a box’s importance to concluding the digital transition, Congress has allocated \$1.5 billion to subsidize consumers’ purchase of converter boxes. Like any receiving device, these boxes must use antennas to receive local television signals, and therefore will be susceptible to interference, as well the analog sets to which the boxes are connected. And to meet Congressional expectations that these boxes remain low cost, there is little room to include additional filters or tuner selectivity. Even if additional funds were available, absent knowledge of the types of unlicensed services that will be operating in the band, it is difficult, if not impossible to include design changes to the box to further immunize the box from future interference.

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<sup>9</sup> *Mass Media Notes*, Communications Daily, Feb. 26, 2004 (quoting an NAB spokesperson as reporting 1,155 local stations on air in digital). That number has presumably risen in the nine months that have passed since NAB’s report.

In light of the importance of maintaining the public's access to free, over-the-air television services both during and after the digital transition, Congress should not use the broadcast spectrum as a testbed for risky experiments in new spectrum management methods. Any proposal to introduce new untested and unlicensed wireless technologies into the broadcast spectrum must contain meaningful mechanisms to avoid interference. As discussed below, no such mechanism exists today.

## **II. UNLICENSED DEVICES WOULD INTERFERE WITH CONSUMER RECEPTION OF OVER-THE-AIR BROADCASTS AND OTHER LICENSED SERVICES IN THE BAND.**

### **A. Existing Technology Would Not Prevent Unlicensed Device Operation on Occupied TV Channels.**

A key, but faulty, assumption of the proposal to allow unlicensed devices to proliferate through the broadcast spectrum is that technology exists by which an unlicensed device can reliably detect when a television channel is "vacant." In fact, there is no demonstrated technology that can reliably prevent an unlicensed device from transmitting on a television channel already in use. Thus, in many circumstances, unlicensed devices would operate on channels that are already occupied by local television or other licensed services, including wireless microphones that are used in the production of emergency news coverage, sporting events, and political conventions.

Most proponents of the unlicensed devices proposal rely on "spectrum sensing" methods as the only *potentially* reliable method for protecting the public's television service from unlicensed device interference. A device using this exploratory technology would "sense" the presence of a television signal and would then, allegedly, select a channel not in use. Yet

these “spectrum sensing” technologies are wholly unproven in the broadcast context, especially in light of the uniquely open and diverse architecture of television sets.

As Motorola cautioned in public statements to the FCC concerning the unlicensed devices proposal, “It would be premature to rely on spectrum sensing until these mechanisms are shown to be reliable via comprehensive study and real-world testing.”<sup>10</sup> Policymakers should not base real-world policy decisions on unproven promises of technology to come.

For example, efforts to develop spectrum sensing technology in the 5 GHz unlicensed band took several years of development and testing, even though in that band the task of “sensing” licensed users is far less complex than it would be in the television broadcast band. There, unlicensed devices are to be allowed to operate alongside licensed military radar through use of dynamic frequency selection (“DFS”). Development of DFS should have been relatively simple, given that a single user, the federal government, controlled both the transmission and receiving equipment for the licensed service. Indeed, prior to the FCC’s decision to adopt the new rules allowing unlicensed device operation in the 5 GHz band, the National Telecommunications and Information Administration (“NTIA”) had submitted detailed procedures by which these unlicensed devices would be tested to determine if they could reliably detect military radar.<sup>11</sup> Yet only last month, after three years of analysis and field testing, did the NTIA, Department of Defense, and the FCC reach agreement on criteria allowing sale of unlicensed devices operating alongside the military radar.

The significant efforts undertaken to permit the use of DFS in the 5 GHz band would pale in comparison to the task that would be needed to create reliable spectrum sensing

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<sup>10</sup> Comments of Motorola, ET Docket Nos. 04-186 and 02-380, at 8 (filed Nov. 30, 2004).

<sup>11</sup> See Comments of NTIA, ET Docket No. 03-122, at App. B (filed Oct. 1, 2003).

solutions in the television broadcast spectrum. For example, unlike military radar in the 5 GHz band, there are literally thousands of variants among the receiving equipment (*i.e.*, TV sets and Part 74 devices) at issue in the broadcast spectrum; this is a reflection of the unique open architecture of television receivers. Without reliable and consistent information about the receiving equipment, there can be no way of knowing whether an unlicensed device can detect a channel where its operation will not interfere with nearby viewers' television sets or Part 74 devices. Furthermore, in the broadcast spectrum there are full-power broadcasts, low power broadcasts, and licensed broadcast auxiliary stations (which are essential to the delivery of on-the-spot news coverage during weather disasters, public safety emergencies, political conventions, and sporting events). A spectrum sensing method would have to reliably sense *all* of these services.

Perhaps most importantly, as even Intel has recognized, in its opposition to the use of spectrum sensing spectrum for higher power unlicensed operations in the 3650 to 3700 MHz band, sensing “works well for short range, low power applications like Wi-Fi where control resides in one entity or operator-to-operator voluntary cooperation is feasible.”<sup>12</sup> The broadcast spectrum, however, exists below 1 GHz, where propagation characteristics allow transmissions – and interference – to travel over very long distances, passing through thousands of independent locations. Indeed, proponents of the unlicensed devices proposal have made clear that they would use the broadcast spectrum to deploy very *long*-range applications.<sup>13</sup>

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<sup>12</sup> Petition for Reconsideration of Intel Corp., ET Docket No. 04-151 (filed June 10, 2005).

<sup>13</sup> *See, e.g.*, Comments of Microsoft Corp., ET Docket Nos. 02-380 and 04-186, at 6 (filed Nov. 30, 2004) (alleging that “some [unlicensed] WISP signals could travel over 31 kilometers” using the television broadcast spectrum).

**B. Field Tests Show that Even an Unlicensed Device Operating on a Genuinely “Vacant” TV Channel Would Interfere with Viewers’ Access to Local Television Services.**

Even if technology were to develop that would allow unlicensed devices to properly detect when a given television channel is “vacant,” significant problems would remain. In consultation with one of the most respected broadcast laboratories in North America, Communications Research Centre Canada (“CRC”), MSTV has developed and conducted a reproducible laboratory study to measure the effects on a television receiver of an unlicensed device operating on a genuinely “vacant” TV channel.<sup>14</sup> This study shows that harmful emissions from unlicensed devices – even when the devices operate on “vacant” channels – would seriously harm the public’s access to free, over-the-air television services and would prevent the use of licensed wireless production equipment critical to the coverage of local news, sports, and other events.

Indeed, unlicensed devices operating in the broadcast spectrum at the FCC’s allowed power levels for out-of-band emissions (*i.e.*, energy that an unlicensed device radiates outside of its operating channel) could prevent a viewer from watching over-the-air television even when the device is as far as *78 feet* from a digital TV set, or *450 feet* from an analog set, despite the presence of multiple walls between the device and the TV set (as would occur in multiunit dwellings). Comments filed with the FCC by parties such as Motorola and the Consumer Electronics Association have seconded these concerns about out-of-band emissions

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<sup>14</sup> See Appendix A

from unlicensed devices.<sup>15</sup> It is noteworthy that IEEE 802.22 agrees with these concerns regarding out of band interference.

To ensure the reliability and credibility of the study, CRC and MSTV have extensively documented the methodology used and results obtained, and have submitted that documentation to the FCC.<sup>16</sup> MSTV subsequently produced a video, entitled “Your Neighbor’s Static,” which recreated the CRC/MSTV study in a real-world environment just outside Washington, D.C. Using an actual townhouse and actual DTV and analog receivers, this video showed the harmful effect of an unlicensed device operating on a “vacant” television channel on reception of over-the-air broadcasts.<sup>17</sup>

The CRC/MSTV field study remains the only real-world test of the effects of unlicensed devices out-of band emissions on licensed television services. The unsubstantiated promises of unlicensed device advocates cannot substitute for hard, scientific data, and this data is clear: the placement of unlicensed devices into the public’s broadcast spectrum would significantly harm the public’s local television service.

### **III. ONCE INTERFERENCE OCCURS, THERE IS NO ENFORCEMENT MECHANISM TO STOP IT.**

Compounding the serious flaws described above, once unlicensed devices are in the field, broadcasters and the FCC would have no reliable means of protecting the public’s television service from harmful interference. Although as a legal matter the FCC’s Part 15 rules

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<sup>15</sup> See Comments of Motorola, ET Docket Nos. 04-186 and 02-380, at 12 (filed Nov. 30, 2004); Comments of CEA, ET Docket Nos. 04-186 and 02-380, at 9 (filed Nov. 30, 2004).

<sup>16</sup> See Comments of MSTV and NAB, ET Docket Nos. 02-380 and 04-186, Ex. A (filed Nov. 30, 2004).

<sup>17</sup> See Appendix B for a technical description of the demonstration.

would privilege the licensed broadcast uses over the unlicensed transmissions in an interference dispute, as a practical matter this precedence would be of little value.

Rarely will broadcasters, the FCC, or the public even be aware of harmful interference from unlicensed devices, because most cases of interference from unlicensed devices will go unreported. If unable to receive a station's signal, viewers may simply assume that the interference is caused by a problem with the broadcaster's transmission or their sets. They are more likely to change the channel, or return a new DTV set to the store, than they are to call the broadcaster. It may thus take years before anything approaching the full impact of interfering unlicensed devices on the public's access to free, over-the-air television would come to light.

Even when interference is reported and linked to unlicensed devices, the FCC would not typically be able to find and shut down the interfering devices.<sup>18</sup> Just as spectrum sensing technology cannot reliably *prevent* interference, it should not be relied upon to *police* it.<sup>19</sup> Attempts to use traditional means to remedy harmful interference from unlicensed devices (*i.e.*, finding the offending transmitter and ordering it to cease operation) would sap both FCC and broadcaster resources, especially as the number of devices out in the field proliferates. As

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<sup>18</sup> See, e.g., *High-Tech Companies Defend FCC's Part 15 Regulatory Scheme*, FCC Report, June 14, 2002 (citing experience of amateur radio systems, which share spectrum with Wi-Fi devices, that the obligation of unlicensed devices to cease operation if they cause harmful interference to licensed operations "is an allusion.").

<sup>19</sup> 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."); *Review of Part 15 and Other Parts of the Commission's Rules*, 17 FCC Rcd 14063, 14067 (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).

Sprint has told the FCC, “once interfering unlicensed devices are in the market, it will ... potentially be virtually impossible for the [FCC] to recall these devices.”<sup>20</sup>

#### **IV. THE AGGREGATION OF UNLICENSED DEVICES IN THE BROADCAST SPECTRUM COULD ULTIMATELY LEAVE THE SPECTRUM UNUSABLE FOR ALL PARTIES.**

Even if out-of-band emissions could be controlled and the unlicensed devices could avoid transmitting on occupied channels, a fundamental problem would remain: with an *unlimited* number of unlicensed devices allowed to crowd the broadcast spectrum, the quality of broadcast and other licensed communications over that spectrum will necessarily decline. Although the addition of one or two unlicensed devices in a given region may not have an appreciable effect, the addition of hundreds of thousands or millions certainly will. This trend would be irreversible and continually escalating. Maintaining a low noise floor is critical if Congress is to uphold its longstanding commitment to a robust, universal, and free over-the-air television service.

As William J. Baumol, a professor of economics at New York University, has explained in an influential 2005 paper, the “policy of unlimited entry” that is the hallmark of an unlicensed device regime “is likely to have the same detrimental effects upon spectrum usage that it has on usage of shared resources elsewhere.”<sup>21</sup> Over time, a “tragedy of the commons” results in which the resource (*e.g.*, spectrum) is shared among so many users as to make it of little value for anyone. As Dr. Baumol notes, “interference is inevitable under a spectrum regime in which the market is not constrained by any restrictions that limit entry: in deciding whether or

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<sup>20</sup> Sprint Reply Comments, ET Docket No. 02-380, at 2 (filed May 22, 2003).

<sup>21</sup> William J. Baumol, *Toward an Evolutionary Regime for Spectrum Governance: Licensing or Unrestricted Entry?*, AEI-Brookings Joint Center for Regulatory Studies, 10 (April 2005).

not to enter, each entrant takes into account only the consequences of this decision upon himself, and disregards the effects upon others.”<sup>22</sup> The result is “overcrowding and overuse.”<sup>23</sup>

Experience in the unlicensed 2.4 GHz band is instructive. There, cordless phones have “reap[ed] devastating effects on 802.11b WLANs” because the technologies used are not compatible for minimization of interference.<sup>24</sup>

Even if future technology is able to accommodate some number of additional users within a given swatch of spectrum, demand will surely keep pace and the quality of communications in the spectrum will degrade.<sup>25</sup> As the economist Thomas Hazlett has noted, the history of unlicensed device entry is a “chase up the dial: the 900 MHz ISM band became congested, leading the FCC to open up the 2.4 GHz unlicensed band, which became crowded in major markets, leading the FCC to open up 300 MHz for the U-NII 5 GHz band.”<sup>26</sup> And once the decision is made to turn a band over to an infinite quantity of unlicensed devices, the spectrum cannot be recaptured for future productive use. The television broadcast spectrum should not be allowed to go the way of other spectrum that has suffered a tragedy of the commons.

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<sup>22</sup> *Id.* at 11.

<sup>23</sup> *Id.*

<sup>24</sup> *Interference from Cordless Phones*, Wi-Fi Planet, April 15, 2003, available at <http://www.wi-fiplanet.com/tutorials/article.php/2191241> (last visited Nov. 21, 2004).

<sup>25</sup> Baumol at 11.

<sup>26</sup> *Id.*, quoting Thomas W. Hazlett, *The Wireless Craze, the Unlimited Bandwidth Myth, the Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's 'Big Joke': An Essay on Airwave Allocation Policy*, 14 *Harvard J. L. & Tech.* 335, 429 (2001).

**V. SPECTRUM IS NOT READILY AVAILABLE IN CONGESTED URBAN AND MANY OTHER MARKETS.**

Driving the unlicensed devices proposal is another mistaken assumption, reflected in a paper issued by the New America Foundation (“NAF”) and Free Press last year: that large swaths of television broadcast spectrum are “vacant” and thus available for use by unlicensed devices. In fact, studies demonstrate that there is little or no white space available in congested urban and even many less populated markets.<sup>27</sup> The benefits cited by promoters of the unlicensed devices proposal – “free[ing] up un-used capacity for innovative new wireless applications” – would thus fail to materialize in many areas throughout the country.<sup>28</sup>

What has caused unlicensed device advocates like NAF/Free Press to so overestimate the amount of “white space” available? Most notably, they ignore the minimal interference guidelines for determining a “vacant” channel, as proposed by the FCC in its unlicensed devices proposal in 2004 and recommended by IEEE. Once the FCC’s more appropriate interference methodology is applied, most of the “white space” diminishes significantly, especially in urban and suburban areas. For example, as MSTV noted in filings before the FCC, there are very few white spaces available from Boston to Washington, DC during the digital transition. Even after the DTV transition, spectrum may be tight, because the television band will be reduced by nearly one-third. For example, in Dallas-Ft. Worth, where NAF/Free Press claims 120 MHz of television spectrum to be “vacant,” only 6 MHz is actually available.

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<sup>27</sup> The attached Appendix C includes a study by the respected engineering firm of Meintel, Sgrignoli & Wallace concerning the scarce amount of “white space” available in many markets.

<sup>28</sup> See Comments of Wireless Unleashed, ET Docket No. 04-186, at 1 (filed Nov. 30, 2004).

Even in rural markets where some white space may be available, there is potential for interference with the existing television broadcast service. Because of their distance from transmitting towers, many rural viewers receive very weak signals. To correct this weak signal condition, rural viewers often use amplified antennas. As a result, their receiving equipment is more susceptible to interference than typical antennas. This is one reason why the National Translator Association has expressed concern about allowing unlicensed devices in rural areas.

The unlicensed devices proposal also threatens to conflict with another priority for rural viewers: the digital transition for low-power and TV translator stations, which is unlikely to be complete when full-power analog broadcasts cease in 2009. Currently, 2,100 licensed LPTV and 4,700 licensed television translator stations are eligible to “flash cut” to digital operations, and in May the FCC will open a filing window by which these stations can seek a companion digital channel. Before taking any action that may disrupt that complex transition, Congress should take notice that the rural areas into which Intel and other parties suggest unlicensed devices would be deployed depend heavily upon low power television services. As FCC Commissioner Adelstein has stated: “[t]housands of translators and low power stations across our country fill a vital need as the primary source of over-the-air television for people in Rural America. As I’ve seen firsthand, often these stations are the only station in an area providing local news, weather, public affairs and emergency programming.”<sup>29</sup> Those same viewers would be deprived of digital low power television services if unlicensed devices

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<sup>29</sup> *Amendment of Parts 73 and 74 of the Commission’s Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend the Rules for Digital Class A Television Stations*, 19 FCC Rcd 19331 (2004), Separate Statement of Commissioner Jonathan S. Adelstein, Approving in Part and Concurring in Part.

are prematurely introduced into the broadcast spectrum before the digital low power transition is complete.

Moreover, the broadcast industry is currently faced with a crisis over the availability of spectrum to provide live remote coverage of news and sporting events. As MSTV has noted on previous occasions, broadcasters depend heavily on wireless microphones and cameras to provide live coverage of major events.<sup>30</sup> Under carefully controlled and coordinated conditions, these wireless devices currently use the “vacant channels” in the UHF band to operate. However, these channels are used heavily, making it difficult in major markets to find sufficient spectrum for the proper operation of wireless microphones. As a result, broadcasters are already experiencing significant obstacles to covering events of local and national importance. The unlicensed devices proposal would put wireless microphones in conflict with unlicensed devices for scarce spectrum. Thus, operation of unlicensed devices in the broadcast band would seriously undermine local stations’ ability to use existing wireless production devices and provide remote coverage of important events, including local emergencies such as weather disasters.

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On behalf of MSTV, I again wish to thank the Committee for the opportunity to discuss important matters of spectrum reform and their relationship to the public’s free, over-the-air television service. As demonstrated by the progress in the DTV transition, which will free up 108 MHz of spectrum for new wireless and critical public safety communications, local

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<sup>30</sup> See, e.g., Letter from David L. Donovan, President, MSTV, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 02-380 (filed June 23, 2003) (attaching transcript of video demonstrating concerns with the availability of spectrum for wireless microphones).

broadcasters are committed to efficient utilization of the public's spectrum resource. Spectrum efficiency, however, requires careful attention to the interference potential of services sharing the same spectrum band. To simply open the floodgates to unlicensed devices without resolution of the significant technical concerns described above would harm the public's interest in interference-free communications and the continued access to free, over-the-air television services. MSTV accordingly urges that any significant changes in use of the broadcast spectrum be made only *after* the FCC and respected organizations like IEEE 802.22 have designed and tested appropriate interference standards.