

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

Dated: May 16, 2003

**TABLE OF CONTENTS**

	<u>Page</u>
I. INTRODUCTION AND SUMMARY .....	1
II. COMMENTERS AGREE THAT TELEVISION BROADCASTING IS A HIGH-VALUE USE THAT MUST BE PROTECTED FROM INTERFERENCE AND DISRUPTION FROM UNLICENSED DEVICES. ....	2
III. THE RECORD REVEALS NO CONSENSUS ON THE PROSPECTS FOR REAL-WORLD AVAILABILITY OF UNLICENSED DEVICES CAPABLE OF AVOIDING INTERFERENCE WITH EXISTING LICENSED USES IN THE TELEVISION BROADCAST BAND.....	3
A. The Intel Study Is Seriously Flawed.....	4
B. The Record Demonstrates That The Technology Is Not Ready To Support Unlicensed Operation In TV Broadcast Spectrum.....	7
IV. MERELY CONSIDERING ALLOWING UNLICENSED OPERATIONS IN THE TELEVISION BROADCAST SPECTRUM DURING THE DTV TRANSITION POSES SERIOUS RISKS AND THREATENS TO DERAIL THE TRANSITION.....	9
V. THE COMMISSION SHOULD WAIT UNTIL AFTER THE DTV TRANSITION IS COMPLETE BEFORE UNDERTAKING ANY FURTHER PROCEEDINGS EXPLORING SPECTRUM SHARING BETWEEN BROADCASTING AND UNLICENSED USES.....	10

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

The Association for Maximum Service Television, Inc. (MSTV), the National Association of Broadcasters (NAB) and the Association of Public Television Stations (APTS)<sup>1</sup> submit these reply comments to urge the Commission not to take any further steps toward allowing unlicensed operations in television broadcast spectrum until after the completion of the transition to digital television.

**I. INTRODUCTION AND SUMMARY**

MSTV/NAB/APTS have demonstrated, and the comments bear out, that the current state of development of unlicensed technology does not permit responsible implementation of unlicensed devices in broadcast spectrum at any time during the DTV transition. We have also shown that the complexities and uncertainties of the ongoing digital transition call for allowing that process to run its full course before the additional complexities

---

<sup>1</sup> 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.

and risks of allowing unlicensed operations in the spectrum are added to the mix. Finally, the comments filed herein and recent developments at the Commission demonstrate that other, less controversial spectrum is available for unlicensed use at this time.<sup>2</sup> Accordingly, any further action at this time to consider allowing unlicensed operations in TV broadcast spectrum would be both pointless and potentially harmful to the DTV transition.

**II. COMMENTERS AGREE THAT TELEVISION BROADCASTING IS A HIGH-VALUE USE THAT MUST BE PROTECTED FROM INTERFERENCE AND DISRUPTION FROM UNLICENSED DEVICES.**

A number of commenters, including some entities that support allowing unlicensed devices to operate in broadcast spectrum, acknowledge the high value that consumers place on television broadcast service. For example, the Consumer Electronics Association (CEA) insists that protecting broadcast services from interference must be the Commission's priority: "Millions of consumers rely on over-the-air broadcast television programming for news and emergency information in addition to entertainment."<sup>3</sup> Commenters agree that unlicensed

---

<sup>2</sup> See *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Notice of Inquiry, 17 FCC Rcd 25,632, 25,640-43 (2002) (*Unlicensed Devices NOI*) (exploring the potential for unlicensed operations in the 3650-3700 MHz band); News Release, *FCC Proposes Additional Spectrum for Unlicensed Use* (rel. May 15, 2003) (proposing allocating 255 MHz of spectrum in the 5 GHz band for unlicensed use); see also Comments of Shure Inc., at 5 (Shure Comments) (supporting allocation for unlicensed operations in the 3650-3700 MHz band); Comments of Intersil Corp. and Symbol Technologies, at 5-7 (Intersil/Symbol Comments) (same); Comments of the Land Mobile Communications Council, at 11 (LMCC Comments) (same); Comments of American Petroleum Institute, at 6 (same); Comments of Cingular Wireless, at 10 (same, assuming such allocation is statutory); Comments of Ericsson Inc., at 3 (favoring allocation for unlicensed devices in the 5 GHz band).

<sup>3</sup> Comments of the Consumer Electronics Association, at 4 (CEA Comments); see also Comments of Sinclair Broadcast Group, at 5-6 (Sinclair Comments) ("Over-the-air broadcasting provides vital services to the public, including crucial local programming and public safety services, such as emergency broadcasts. The ease of reception of over-the-air television is crucial in times of emergency even for those consumers who rely primarily on cable and satellite."); Shure Comments, at 3 (quoting the Spectrum Policy Task Force Report as observing  
(continued...)

devices should only be allowed to operate in broadcast spectrum *if* there is sufficient assurance that broadcast uses will be adequately protected from interference.<sup>4</sup>

**III. THE RECORD REVEALS NO CONSENSUS ON THE PROSPECTS FOR REAL-WORLD AVAILABILITY OF UNLICENSED DEVICES CAPABLE OF AVOIDING INTERFERENCE WITH EXISTING LICENSED USES IN THE TELEVISION BROADCAST BAND.**

Although the parties generally agree that broadcast uses must be protected from interference from unlicensed devices, there is no consensus that the devices available or under development today will be capable of guaranteeing such protection. Intel Corp. and other proponents of unlicensed devices assert that technology is available today that will allow these devices to share spectrum with broadcast uses without causing interference.<sup>5</sup> But just as many commenters, including equipment manufacturers, acknowledge that interference-avoidance technology either is not yet available or is unproven in real-world operation.<sup>6</sup> For example, CEA describes the unique characteristics of the TV broadcast band, including its dense, high-power use and open architecture, and concludes that “[t]echnologies and devices capable of sharing of the broadcast TV bands are yet to be defined, documented and tested.”<sup>7</sup> Similarly, Intersil Corp.

---

(continued...)

that broadcast services provide “‘universal’ news, information, and entertainment to the general public.”).

<sup>4</sup> See, e.g., CEA Comments, at 4-7; Comments of RadioShack Corp., at 3 (RadioShack Comments); Comments of Motorola, Inc., at 3 (Motorola Comments); Shure Comments, at 5; Intersil/Symbol Comments, at 8-9.

<sup>5</sup> Comments of Intel Corp., at 6-7 (Intel Comments); Comments of IEEE 802.18, at 7 (IEEE 802.18 Comments); RadioShack Comments, at 5; Comments of Shared Spectrum Co. at 3-11; Comments of the Software Defined Radio Forum at 5-6 (SDR Comments).

<sup>6</sup> CEA Comments, at 4, 6; Comments of the Association for Maximum Service Television, Inc., the National Association of Broadcasters, and the Association of Public Television Stations, at 4-6 & n.4 (MSTV/NAB/APTS Comments); Comments of Cox Broadcasting, Inc., at 8 (Cox Comments); LMCC Comments, at 8; Shure Comments, at 10.

<sup>7</sup> CEA Comments, at 5-6.

and Symbol Technologies, manufacturers of unlicensed devices, acknowledge that the ability of unlicensed devices to avoid interference to TV reception remains only theoretical at this point, and would require “careful testing” to develop “fail-safe” interference avoidance technology.<sup>8</sup> “With rules prohibiting actual interference from unlicensed devices virtually impossible to enforce, the error cost of locking-in some flawed design [before such ‘fail-safe’ technology has been developed] is high.”<sup>9</sup>

**A. The Intel Study Is Seriously Flawed.**

The most detailed assertions about the viability of unlicensed operations in broadcast spectrum are contained in two studies submitted with the comments of Intel Corporation.<sup>10</sup> Taken together, the self-described “preliminary technical analyses” contained therein conclude that significant adjacent channel vacant TV spectrum is available even in large metropolitan markets, and that unlicensed devices can operate in these adjacent channels without causing undue interference in broadcast uses.

The Intel studies are seriously deficient and should be given no weight in this proceeding. The studies’ findings are based on inaccurate and incomplete information, misapplication of the FCC technical rules, and flawed analyses that seriously overstate the availability of spectrum in the San Francisco Bay area and understate the likelihood of interference from unlicensed devices. Moreover, the studies fail to provide support for the contentions made in Intel’s comments. For example, Intel’s comments assert that unlicensed

---

<sup>8</sup> Intersil/Symbol Comments, at 8-9.

<sup>9</sup> See Cox Comments, at 7.

<sup>10</sup> See Intel Comments, App. A (“Spectrum Sharing of Vacant TV Channels”) and App. B (“Results of the Laboratory Evaluation of the Impact of Narrow and Wide Band Signals Adjacent to TV channels,” prepared by Communication Research Centre Canada).

devices that would operate in broadcast spectrum would have characteristics similar to the LAN devices and other narrowband devices in the ISM band and could be compatible with digital television while enjoying the same kind of flexibility of use as devices operating in the ISM band (*i.e.*, operating within a few feet from a television receiver). Yet Intel's own analysis (App. A, at 20) shows that a separation in the range of 50 meters (approximately 150 feet) is required to prevent interference to a TV receive antenna from an unlicensed device. This kind of protection distance is hardly consistent with the flexibility of use envisioned for unlicensed devices or the real-world characteristics of urban environments.

The Intel studies use inappropriate and erroneous assumptions and a biased analysis to reach their pre-ordained conclusion that unlicensed devices could operate *within the service area of an adjacent channel analog or digital station* without causing interference to its service. Three particularly egregious errors stand out:

- *First*, the Intel studies inappropriately apply technical criteria developed for interservice sharing in the upper 700 MHz band to support unlicensed operation on adjacent channels within a television station's service area.<sup>11</sup> Part 27.60 of the Commission's Rules was developed to deal with interservice sharing between broadcasting and land mobile service. These rules were intended to define the protection afforded to television service from land mobile operations *outside the service contour* and were specifically developed to allow land mobile users to calculate additional protection to the television service where a broadcaster's service area is less than the hypothetical 55 miles (88.5 km).<sup>12</sup> They were not intended to apply to operations inside a broadcaster's service area. Operation

---

<sup>11</sup> See 47 C.F.R. § 27.60 (2002) (TV/DTV Interference Protection Criteria); *see also Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, First Report and Order, WT Docket No. 99-168, 15 FCC Rcd 476, 531-32 (2000); *The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010*, First Report and Order, WT Docket No. 96-86, 14 FCC Rcd 152, 217-27 (1998) (*Public Safety Spectrum Order*).

<sup>12</sup> *Public Safety Spectrum Order*, 14 FCC Rcd at 217-27.

inside a television station service area requires very different assumptions and technical criteria.<sup>13</sup>

- *Second*, the studies' conclusion that 19 vacant channels are available for unlicensed use in the San Francisco Bay area is based on erroneous and incomplete information regarding the current allotment of television channels in the San Francisco area. Specifically, Annex A to Appendix A identifies a total 21 channels (2 VHF and 19 UHF channels) as vacant and/or not associated with TV operations in the Bay area.<sup>14</sup> But 12 of the 19 channels identified in fact are allotted to television service in the Bay area,<sup>15</sup> three are assigned to non-broadcast operations,<sup>16</sup> and the remaining three channels, while not assigned immediately within the San Francisco Bay area, are assigned to TV operations in adjacent markets close enough to affect or be affected by the operation of unlicensed devices on the same channel.<sup>17</sup>
- *Third*, the studies fail to consider important technical factors that affect TV reception. Specifically, the studies fail to take into account (a) the effect of operating multiple unlicensed devices within the interference range of a TV receiver and (b) the large spread in the interference rejection statistics of the current population of NTSC and DTV receivers. With respect to the former, it is expected that unlicensed devices, intended for a variety of commercial and personal uses, will be widely available in the marketplace. Proliferation and use of these devices could eventually reach the current penetration of cordless telephones or home computers.<sup>18</sup> These penetration levels could have the unintended consequence of raising the RF noise floor level (*i.e.*, the noise

---

<sup>13</sup> See MSTV/NAB/APTS Comments, Att. A (Stuart J. Lipoff, *Exploring the Feasibility of Sharing TV Band Spectrum with Unlicensed RF Devices* (Apr. 17, 2003) (*Lipoff Study*)).

<sup>14</sup> Annex A claims the following channels are vacant in the San Francisco Bay Area: VHF channels 8 and 13 and UHF channels 16, 17, 22, 23, 25, 35, 37, 41, 42, 43, 46, 51, 52, 56, 58, 60, 62, 63 and 64. While there are 21 vacant channels identified in Annex A, Intel presumably referred only to the 19 UHF channels in its comments.

<sup>15</sup> TV channels 22 & 23 are assigned to KRCB in Cotati, TV channel 41 is assigned KKPX in San Jose, TV Channel 42 is assigned to KTNC in Concord, TV Channel 43 is assigned to KCSM in San Mateo, TV channel 51 is assigned to KDTV in San Francisco, TV 52 is assigned to KICU in San Jose, TV channel 56 is assigned to KTVU in Oakland, TV channel 60 is assigned to KCFM in San Mateo, TV channels 62 & 64 are assigned to KFTL in Stockton, and TV channel 63 is assigned to KTNC in Concord.

<sup>16</sup> TV channels 16 and 17 are assigned to land mobile operation in the San Francisco area. Channel 37 is assigned to Radio Astronomy.

<sup>17</sup> TV channel 25 is assigned to KOZR in Stockton, TV channel 35 is assigned to KOVR in Sacramento, TV channel 58 is assigned to KQCA in Stockton.

<sup>18</sup> MSTV/NAB/APTS Comments, *Lipoff Study*, at 7-10.

temperature) and ultimately affecting television reception. To properly consider the effect of multiple interferers on television reception, the Intel studies would need to apply an additional 18 dB to protect television receivers.<sup>19</sup> With respect to the latter, the laboratory results submitted in Appendix B itself show large variations in the interference rejection between the two receivers tested. For example, Tables 4.2.4 and 4.3.2 show as much as a 15 dB difference between the two receivers for the same impairment. Moreover, the data in Table 4.2.4 is at least 11 dB higher than the value used in Appendix A to calculate interference to TV reception for the upper adjacent case. Failing to account for both of these factors results in seriously under-estimating the potential for interference to TV reception.

**B. The Record Demonstrates That The Technology Is Not Ready To Support Unlicensed Operation In TV Broadcast Spectrum.**

In addition to the foregoing discussion of the significant weaknesses in the Intel studies, the comments highlight a number of problems with the wireless proponents' claims about the current availability of devices capable of avoiding interference with broadcast services. For example, while some unlicensed device manufacturers assert that devices employing "listen-before-talk" and frequency-hopping technologies would be capable of detecting and avoiding broadcast transmissions,<sup>20</sup> other commenters note that the technology is evolving and unproven<sup>21</sup> or technically inadequate.<sup>22</sup> Similarly, while some wireless proponents support the use of Global Positioning System (GPS)-based location sensing combined with a lookup table identifying available broadcast frequencies,<sup>23</sup> other commenters reject the idea on the grounds that GPS

---

<sup>19</sup> *See id.*

<sup>20</sup> *See, e.g.,* SDR Comments, at 5-6; Shared Spectrum Comments, at 1; RadioShack Comments, at 5.

<sup>21</sup> *See* LMCC Comments, at 5 (citing TIA Comments on FCC's Spectrum Policy Task Force Report); Cox Comments, at 8.

<sup>22</sup> Motorola Comments, at 4 (arguing that problems created by "hidden terminals" and "shadowing" of unlicensed devices render an unlicensed device "unable to detect use of its transmitting frequency throughout the entire zone that is affected by its transmissions").

<sup>23</sup> *See, e.g.,* RadioShack Comments, at 5.

signals are often not receivable indoors,<sup>24</sup> GPS technology is expensive,<sup>25</sup> and the use of a static table of broadcast licenses would not adequately reflect changes in broadcast spectrum use over time.<sup>26</sup>

These competing perspectives in the comments demonstrate that current technology simply does not provide adequate assurance that broadcast uses will be protected from interference from unlicensed devices. As noted in our initial comments, the potential for interference between unlicensed devices and broadcast uses is particularly acute in low signal strength environments.<sup>27</sup> For example, TV viewers residing at the outer edges of a station's contour or those relying on indoor reception throughout a station's market may be especially susceptible to interference from unlicensed devices. Indeed, with respect to indoor reception, there is simply no predictable means to measure interference in homes. Interference from unlicensed devices would vary depending on the number of devices in the home, the size of the room and the quality of the home's construction.

It may be that the technologies in development today can be refined over time to more consistently and reliably avoid interference to licensed uses, but at this time they are too theoretical and untested. And, as described more fully below, now is not the time to authorize, experiment with or even explore untested new uses in the broadcast spectrum. The Commission should wait until the DTV transition has progressed to its close and wireless technology has

---

<sup>24</sup> See IEEE 802.18 Comments, at 7 (“indoor usage would typically result in the inability to receive the GPS signals necessary to make an ‘operate/do not operate’ decision”); Shure Comments, at 13.

<sup>25</sup> See IEEE 802.18 Comments, at 7; Shure Comments, at 13.

<sup>26</sup> See, e.g., Intersil/Symbol Comments, at 9; Shure Comments, at 13-14.

<sup>27</sup> MSTV/NAB/APTS Comments, at 11.

more fully evolved in other spectrum before attempting to determine if unlicensed operations are workable in the TV broadcast band.

**IV. MERELY CONSIDERING ALLOWING UNLICENSED OPERATIONS IN THE TELEVISION BROADCAST SPECTRUM DURING THE DTV TRANSITION POSES SERIOUS RISKS AND THREATENS TO DERAIL THE TRANSITION.**

As described in our initial comments and those of other broadcasters and equipment manufacturers, the broadcast spectrum is in too fragile and fluid a state during the DTV transition to risk introducing the added complexity of allowing unlicensed operations in the spectrum.<sup>28</sup> The DTV transition is at a critical juncture. Consumers will embrace the transition and begin to purchase DTV sets in large numbers only if they are confident that the lingering technical issues have been resolved and their DTV sets will operate as expected. Any further steps at this time affecting the TV band are premature and could cause that consumer confidence to falter in at least two ways:

- *First*, if efforts to address issues raised in an unlicensed devices NPRM draw resources away from and delay resolution of the DTV technical issues, press reports could continue to warn consumers of possible technical problems with new DTVs;
- *Second*, press reports directly discussing the possible introduction of unlicensed devices into the broadcast band (and the technical problems that could ensue) could likewise prompt consumers to put off purchasing DTV sets.

Further delay and complexities in the DTV transition at this time would undermine Congress's and the Commission's important goals of improving the broadcast system and increasing spectrum efficiency.

---

<sup>28</sup> See, e.g., Cox Comments, at 4-5; Sinclair Comments, at 5-6; See also Comments of MSTV and NAB, MB Docket No. 03-15, at 3-7 (Apr. 21, 2003).

**V. THE COMMISSION SHOULD WAIT UNTIL AFTER THE DTV TRANSITION IS COMPLETE BEFORE UNDERTAKING ANY FURTHER PROCEEDINGS EXPLORING SPECTRUM SHARING BETWEEN BROADCASTING AND UNLICENSED USES.**

Ensuring a successful transition to DTV must be the Commission's priority now. More and more DTV stations are coming online, and broadcasters are feeling the strain of sustaining two simultaneous transmission operations. Broadcasters are encountering unanticipated interference problems (with both existing analog and new digital stations) as they bring their DTV stations online and learn more about the real-world propagation characteristics of DTV signals.<sup>29</sup> Broadcasters and equipment manufacturers should not be distracted from their efforts to resolve these and other issues arising in connection with the DTV transition to address the myriad of technical and policy questions that would be raised by further FCC proceedings to determine whether and how unlicensed devices could be accommodated in broadcast spectrum. Doing so could prolong resolution of the DTV technical issues and burden and stall the DTV transition.

Indeed, there is no point in even attempting to determine the feasibility of allowing unlicensed operations in TV broadcast spectrum until the end of the transition. As described in our initial comments, too little is known about what – and how – spectrum will be occupied after the transition to be able to answer even the preliminary questions raised in the *Unlicensed Devices NOI*. And we have shown that the complexities of the DTV transition call for that dynamic, complex and uncertain process to have run its full course before the further complexities and risks of unlicensed operations in the spectrum are added to the mix.

---

<sup>29</sup> Indeed, the unanticipated interference problems that are arising as DTV stations come online demonstrates why it is not sufficient to rely on theoretical assertions, as opposed to real-world experience, about the ability of unlicensed devices to avoid interference to broadcast uses.

If the Commission determines that unlicensed devices are still in need of additional spectrum at the end of the DTV transition, that will be the appropriate time for the Commission to consider whether it would be feasible to allow such devices to operate in broadcast spectrum. In the meantime, the Commission should allow the DTV transition to proceed without introducing the added complexity of further proceedings examining the possibility of allowing unlicensed devices in the TV broadcast band.

Respectfully submitted,

NATIONAL ASSOCIATION  
OF BROADCASTERS

/s/ Jack N. Goodman  
Henry L. Baumann  
Jack N. Goodman  
Ann West Bobeck  
1771 N Street NW  
Washington, D.C. 20036  
(202) 429-5430 (tel.)  
(202) 775-3526 (fax)

Lynn Claudy  
Senior Vice President,  
Science and Technology  
Kelly Williams  
Senior Director of Engineering and  
Technology Policy  
NATIONAL ASSOCIATION  
OF BROADCASTERS  
1771 N Street NW  
Washington, D.C. 20036  
(202) 429-5346 (tel.)  
(202) 775-4981 (fax)

ASSOCIATION FOR MAXIMUM  
SERVICE TELEVISION, INC.

/s/ Mary Newcomer Williams  
Jonathan D. Blake  
Mary Newcomer Williams  
COVINGTON & BURLING  
1201 Pennsylvania Avenue NW  
Washington, D.C. 20004  
202-662-6000 (tel.)  
202-662-6291 (fax)

*Its Attorneys*

/s/ David Donovan  
David Donovan  
President  
Victor Tawil  
Senior Vice President  
ASSOCIATION FOR MAXIMUM  
SERVICE TELEVISION, INC.  
1776 Massachusetts Avenue NW  
Washington, D.C. 20036  
202-861-0344 (tel.)  
202-861-0342 (fax)

ASSOCIATION OF PUBLIC  
TELEVISION STATIONS

/s/ Lonna M. Thompson  
Lonna M. Thompson  
Associate Vice President  
Strategic Initiatives & Corporate Counsel  
Andrew D. Cotlar  
Senior Staff Attorney  
666 Eleventh Street, NW, Suite 1100  
Washington, D.C. 20001  
202-654-4200 (tel.)  
202-654-4236 (fax)

Dated: May 16, 2003