

**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)

**REPLY COMMENTS OF THE
CONSUMER ELECTRONICS ASSOCIATION**

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The Consumer Electronics Association (“CEA”) respectfully submits these reply comments to the Notice of Inquiry in the above-captioned proceeding (“NOI”). In this proceeding the Commission addresses the feasibility of authorizing unlicensed devices to operate on a non-interference basis in the TV broadcast and 3 GHz bands.¹ CEA’s Comments focused on the necessity to continue to protect reception of current and future broadcast stations while permitting unlicensed devices with internal interference mitigation technology to operate on channels 2-51 in the digital TV broadcast spectrum strictly on a non-interference basis.

The Comments submitted in this proceeding establish that there is substantial unused spectrum capacity within the TV broadcast band and that there are opportunities to harness existing and new technologies to permit deployment of unlicensed devices using this spectrum while fully protecting the continued reception of all existing and future broadcast signals. The Commission should proceed deliberately to formulate and propose in a Notice of Proposed Rulemaking (NPRM) concrete technical rules and a real-world technical evaluation to authorize

¹ *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket No. 02-380, Notice of Inquiry, 17 FCC Rcd 25632 (2002) (“NOI”).

deployment of unlicensed devices in the TV broadcast spectrum that comply with equipment authorization requirements designed to prevent interference to current and any new or changed broadcast operations authorized in this spectrum.

UNLICENSED DEVICES MUST PROTECT BROADCAST TV RECEPTION

In our Comments we agreed with the Commission staff's conclusion in its Spectrum Report that providing additional spectrum for new and innovative unlicensed Part 15 devices should be a high priority and that sharing in the TV bands is feasible.² But we emphasized that unlicensed devices in these bands must use technical means to protect against interference with broadcast TV reception. We urged the Commission to encourage the development and demonstration of interference avoidance technology that will protect the broadcast TV service from interference. Furthermore, we stressed the need for broadcasters and TV manufacturers to play a preeminent role in developing standards and protocols that may be necessary to support unlicensed operation in the TV bands.

Several entities, including the Alaska Broadcasters, *et al.*, argue that concepts such as "interference temperature" and spectrum underlay of signals are not far enough long in development to justify their use in sharing the TV broadcast spectrum.³ We agree. In this proceeding, as MSTV, *et al.* note, the FCC requested comment on unoccupied spectrum in dimensions of geography and time, not interference temperature and receiver immunity.⁴ In its NOI the Commission addresses "allowing unlicensed devices to operate in TV broadcast

² See the Commission Staff's *Spectrum Policy Task Force Report*, ET Docket No. 02-135, November, 2002 ("Staff Report").

³ Joint Comments of Alaska Broadcasters Assoc., Arkansas Broadcasters Assoc., Communications Corporation of America, Guenter Marksteiner, Mississippi Assoc. of Broadcasters, New Mexico Broadcasters Assoc. and Pappas Telecasting Companies (April 17, 2003) ("Alaska Broadcasters *et al.*").

⁴ See Joint Comments of the Association for Maximum Service Television, Inc., the National Association of Broadcasters, and the Association of Public Television Stations at 2, fn. 3 (April 17, 2003) ("MSTV *et al.*").

spectrum *at locations and times when spectrum is not being used.*⁵ The concepts of interference temperature and receiver immunity address simultaneous co-channel uses that would rely upon an established desired-to-undesired signal strength difference to permit co-existence. The Staff Report upon which this NOI draws distinguishes the “underlay” concept, which may rely upon an “interference temperature” or other relative spectrum immunity metric, from “opportunistic” or dynamic use of existing bands through techniques that locate unused “white space” by geographic area or time of use *or* use techniques such as “listen-before-talk” to monitor spectrum dynamically and prevent co-channel transmissions if the frequency is occupied. The underlay concept requires much more work before it can be considered ready to be applied in the broadcast bands. Protection of broadcast signals must rely upon demonstrated sound technical methods and certainty, not experimentation and chance.

We do not agree, however, that there are no methods that would permit unlicensed devices to utilize vacant broadcast spectrum without creating interference. Technologies to determine whether spectrum is vacant are available and deployed today in other services, and properly configured for the TV broadcast environment, should be fully capable of protecting reception of broadcast signals. For example, in January the Commission, the U.S. Department of Defense, and the National Telecommunications and Information Administration (“NTIA”) reached agreement with industry on the means for mobile unlicensed U-NII devices to share spectrum with sensitive radar systems, both fixed or mobile, that operate to protect our national security. It is difficult to envision a more sensitive operation than protecting radar operations in the post-911 environment and a higher bar to ensuring against harmful interference. Yet those charged with protecting our national security concluded that the technology that unlicensed devices will incorporate – a listen-before-transmit technology called “Dynamic Frequency

⁵ See NOI at ¶ 1.

Selection” (“DFS”) – will provide virtually complete protection.⁶ Similar technology, adjusted to specifications designed to detect broadcast rather than radar signals, could be implemented to permit widespread deployment of unlicensed data devices without danger of interfering with broadcast signals reception.⁷

We emphasize that protection must be extended to all existing analog and digital broadcast operations by commercial and educational stations, Class A stations, Low Power TV stations (LPTV), satellite stations, and translators and boosters based upon the technical characteristics of existing television receivers used by consumers. In our comments we also suggested that broadcasters themselves might use the untapped capacity of the TV broadcast band to provide a return path through which they could provide interactivity to their viewers.⁸

The record in this and the Commission’s Spectrum Policy proceeding (ET Docket No. 02-135) demonstrates that existing technology, such as DFS, provides a basis that can be relied upon to authorize use of television channels by unlicensed devices without creating interference to current or future broadcast operations. GPS is another technology that has promise for the purpose of avoiding fixed television stations in particular. The technical implementation details, such as the specific protection method to be used and its threshold levels, do have to be studied

⁶ See NTIA press release dated January 31, 2003, “Agreement Reached Regarding U.S. Position on 5 GHz Wireless Access Devices”. (The NTIA, FCC, NASA and Department of Defense (DoD), working with industry, agreed to modify required Dynamic Frequency Selection (a listen-before-transmit mechanism) detection threshold characteristics. All parties agreed that unlicensed devices meeting the requirements would not interfere with radar, earth exploration satellite systems, and other mobile operations conducted in the same spectrum as the unlicensed devices.

⁷ See, e.g., Comments of IEEE 802.18 (undated) and Comments of the Wi-Fi Alliance (April 17, 2003).

⁸ We also proposed to exclude TV channels 2, 3 & 4 in order to protect the inputs to home consumer devices that are expected to operate in close proximity in the home to unlicensed devices; and channel 37, which is used for radio astronomy and some medical devices. Most commenters agreed with these exclusions and we continue to believe that these channels should not be used for unlicensed devices at this time.

and determined under real-world circumstances. Encouraging such study and use would be of substantial economic and commercial benefit to the American public. As stated in our Comments, broadcasters and TV manufacturers should have a preeminent role in developing standards and protocols that may be necessary to avoid any chance of harmful interference to broadcast reception. CEA is ready to contribute to any such effort to develop and test devices using interference mitigation techniques to ensure that such protection will completely protect broadcast viewers.

Finally, Sinclair Broadcasting in its Comments appears to advocate that the Commission not allow unlicensed devices to share the broadcast spectrum until it adopts performance standards for television sets. “Until such performance standards are adopted and implemented, however, Sinclair urges the Commission to defer any further consideration of new shared uses of TV broadcast spectrum.”¹⁰ This would either put in jeopardy all existing receivers used by viewers today or delay any use of unlicensed devices in this spectrum for several generations. Neither is necessary. We urge the Commission to adopt rules permitting unlicensed devices in this spectrum in a manner that will protect ALL television receivers, including those manufactured in 1950 and those manufactured in 2003. As discussed above and by other commenters in the record, the technologies exist to permit at least limited sharing with broadcasting in a manner that will not affect television reception no matter what kind of receiver is being used.

SUBSTANTIAL UNUSED CAPACITY EXISTS WITHIN THE TV CHANNELS

A number of commenters suggest that unlicensed devices cannot be authorized until after the conclusion of the digital television transition because stations will be changing channels until

¹⁰ Comments of Sinclair Broadcast Group, Inc. at 9-10 (April 17, 2003).

then.¹¹ Others argue that there is no unused spectrum available within the TV band, or at least not in urban areas.¹² Both assertions are demonstrably wrong.

To be successful, interference-avoiding technology that is built into unlicensed devices must be capable of dynamically adjusting to new stations, channel switches, etc. The broadcast spectrum has never been closed to change, and it is not realistic to believe that it will become so when the digital transition is complete. Stations make changes such as commencing operations, going dark, changing channels, moving to new antenna sites, etc., as a matter course, and will continue to do so. An interference-avoidance technology suitable for unlicensed devices in the TV band must be able to account for such changes automatically. A dynamic listen-before-transmit technology, for example, will avoid interference even to a station that has just commenced broadcasting. A GPS-based technology can be updated regularly to take changes into account. Arguing that unused spectrum within the TV bands should continue to remain fallow until all station changes cease is asking for permanent delay and the continued wasting of this valuable spectrum capacity.

Finally, some broadcasters argue that there is little or no unused spectrum capacity available in major cities.¹³ However, the station spacing necessary to protect broadcast signals from interfering with other broadcast signals is well known, and the design creates multiple islands of unused spectrum. Intel in its Comments submits technical documentation of the substantial spectrum capacity that exists and the feasibility of it being used for unlicensed devices on a non-interference basis. Even in one of the most crowded television markets, San Francisco, Intel found that there are 19 vacant TV channels -- a total of 114 megahertz -- that

¹¹ See Comments of Cox Broadcasting, Inc. at 4 (April 17, 2003); Joint Comments of MSTV *et al.*, *supra* note 5 at 8.

¹² *Id.* at 15.

¹³ *Supra* note 11.

could be put to productive use notwithstanding that during the digital transition every broadcaster is occupying two channels (one analog and one digital).¹⁴ There may be no channel capable of supporting another full-power broadcaster in the San Francisco area, but that is exactly the point of this proceeding: lower-power unlicensed devices that employ effective interference-avoidance techniques can utilize the smaller patches of vacant spectrum for productive communications services that will greatly benefit the public.

CONCLUSION

The record in this proceeding demonstrates that ample amounts of spectrum capacity are available. Devices that use modern interference-avoidance techniques can allow this spectrum to be put to productive use without causing any loss to broadcast viewers. This conclusion is consistent with that of the FCC staff in its Staff Report. We urge the Commission to take the next step and issue draft technical rules that will permit intensive use of this valuable natural resource while at the same time fully protecting all broadcast and other operations within the spectrum, both those that exist today and those that may be authorized in the future.

Respectfully Submitted,

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¹⁴ Comments of Intel Corporation (April 7, 2003).