

**Before the
Federal Communications Commission
Washington, DC 20554**

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

**REPLY COMMENTS OF THE
CONSUMER ELECTRONICS ASSOCIATION**

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The Consumer Electronics Association (“CEA”)¹ respectfully submits these Reply Comments addressing proposals made in the Commission’s Notice of Proposed Rulemaking (“*Notice*”) in the above captioned proceeding².

I. Introduction

The Consumer Electronics Association is the principal U.S. trade association of the consumer electronics and information technology industries, including manufacturers of television receivers, monitors, and associated equipment such as set-top boxes, personal video recorders (PVRs), video cassette recorders (VCRs) and DVD players that bring the video marketplace into consumers’ homes. Our members also design and

¹ Our members design, manufacture, distribute and sell a wide range of consumer products in addition to digital and analog television receivers, monitors, and associated devices such as video cassette recorders, direct broadcast satellite radio (DARS) and television (DBS) equipment, broadcast AM and FM radios, and unlicensed devices such as cordless phones, baby monitors, and wireless headsets. CEA’s more than 2,000 companies include all of this country’s major consumer electronics manufacturers and retailers.

² Unlicensed Operations in the TV Broadcast Band, ET Docket No. 04-186, Notice of Proposed Rulemaking (“*Notice*”), Released May 25, 2004.

manufacture a broad array of devices that utilize broadband, including Wi-Fi and other similar technologies.

In our comments³, we expressed our support of the Commission's intent in this proceeding to allow unlicensed device operation in vacant TV broadcast bands while ensuring that television broadcast viewers are fully protected from interference. Allocating this spectrum for unlicensed use would advance the deployment of many new and innovative products and services. However, when changing rules to allow for secondary unlicensed use, the probability and consequence of interference with current users must be fully examined and remedied where harmful interference is present.

The level of participation and range of comments is impressive. It reflects the complexity of introducing new devices in a band that has decades of legacy development and nearly 300 million receivers in place. The most impressive aspect of the record developed to date is the lack of parties that are fundamentally against the concept of introducing unlicensed devices in TV bands. To the extent that comments express opposition or caution, they are on how to most effectively introduce these devices without causing harmful interference to the large population of receivers.

CEA shares this affirmative view of the proceeding and recommends that the Commission proceed in developing its rules in conjunction with continued industry activity and input. Specifically, CEA recommends that the Commission focus on introducing rules for Fixed Access service first, continue to evaluate the potential solutions to problems noted with the Personal/Portable category, and allow the industry

³ Comments of Consumer Electronics Association, ET Docket No. 04-186 (Filed November 30, 2004) ("CEA Comments")

to work in parallel with the Commission to gather data and work through the highly technical issues surrounding this proceeding.

II. Introduction of Fixed Access Devices is Broadly Supported

As stated by CEA and many other parties in comments to this *Notice*⁴, the introduction of Fixed Access devices has both the largest benefit to the public and the smallest downside risk. Providing new means of broadband access to rural and underserved Americans is the perfect end to the means allowed by unlicensed operation in TV bands. The better propagation characteristics of these frequencies and relatively higher availability of vacant channels make Fixed Access the most appropriate category for the Commission's immediate focus. Giving priority to the implementation of Fixed Access devices is also directly supportive of the Commission's and the Administration's efforts to increase deployment of wireless broadband Internet.

III. Introduction of Personal/Portable Should be on a Limited Basis; More Testing Required

Among CEA members there is no clear consensus that Personal/Portable devices can currently be introduced without undue risk to existing devices and services. There are simply too many unresolved issues, such as Direct Pickup, to open the floodgate based on just paper analyses and good intention. CEA has been a strong supporter of unlicensed wireless devices long before Wi-Fi entered the popular vernacular. CEA generally advocates minimal rules for these devices and notes that some restrictions have been necessary to gain access to new spectrum in the first place. For example, rules require the use of Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC) to protect Federal Government use in the 5.25-5.35 GHz and 5.47-5.725 GHz

⁴ *Id.* at 4

bands. However, the introduction of unlicensed devices in TV bands is not the same as reuse of Industrial, Scientific, and Medical (ISM) bands where unlicensed devices were introduced into an environment with relatively few licensed devices by comparison. In ISM bands, the probability of being in very close proximity to a licensed device is relatively small. The opposite is true in this case. Virtually anywhere one of these Personal/Portable devices is likely to be used there will be a television receiver in close proximity. The notion that a larger population of licensed service receivers might require more stringent restrictions to protect the service seems not to be fully appreciated by some commenters. These restrictions can be reduced over time, but should be conservative at the outset.

CEA recommends that the Personal/Portable category be introduced on a limited basis. CEA maintains its position that this category be limited to a transmission power of 20 mW (EIRP) with a 0 dBi antenna gain, and then only after critical issues of control signal integrity and the benefits of spectrum sensing have been addressed. The appropriate course of action then is to allow the introduction of Personal/Portable devices under controls that allows learning and industry observation. This can be done for example by experimental license.

IV. Allow Industries to Continue Working on Effective and Proven Solutions

Since this proceeding began, affected industries have and continue to gather under a number of venues to address the challenging technical issues introduced by this proceeding. CEA has worked through its members to undertake field-testing and is considering coordinating further research on spectrum sensing. Additionally, IEEE 802.22 has formed to create a standard for Wireless Regional Area Networking using

unlicensed devices in TV bands. Broadcasters, wireless device manufacturers, television manufacturers, silicon designers, and RF experts are all present within IEEE 802.22. The discussions and course of work are vibrant and productive. If anything, the user community in the form of Wireless Internet Service Providers is underrepresented. CEA urges these groups to get involved with the committee, as the scope of work is directly addressed to these users.

CEA is also committed to facilitate data collection and evaluation of technologies that will allow Personal/Portable devices to be introduced with minimal risk. CEA completed its first level of data collection and is currently evaluating that data, some of which is provided with these reply comments as an Appendix. The next effort suggested by CEA is to advance the understanding of spectrum sensing by coordinating the development of a prototype device with such capability.

There is a long history of industry and the Commission working together to implement new and innovative uses of broadcast spectrum and to increase the efficiency of spectrum use. The introduction of wireless microphones, Low Power TV (LPTV), and translators all demonstrate creative efficiency gains in broadcast spectrum utilization. The biggest gain of all has been the switch from analog transmission to digital transmission. In each of these cases, it took time and cooperation for each affected party to learn about the others' usage and potential interference mechanisms. This discovery is now taking place under the auspices of IEEE 802.22 and CEA. The industry is working on the complex issues and concerns raised by commenters in the proceeding. The Commission should allow affected industries to continue this work without preemption before significant questions have been addressed and answered

V. Concerns about Direct Pickup Remain Unresolved

CEA finds nothing in the record indicating that the critical issue of direct pickup was considered in the *Notice*, nor has any solution other than reduced transmission power been provided. For the 100 mW transmit power in the proposed Personable/Portable category, the theoretical (free space) field strengths at 3 meters and 10 meters respectively are, 1150 mV/m and 343 mV/m, and CEA measured the average field strengths to be 1104 mV/m and 395 mV/m. These levels exceed the Commission's own rules for DPU protection that were worked out through years of discussion and testing by the cable and TV manufacturing industries. The DPU problem turns the interference analysis from a probability of interfering with the less than 20% of TV viewers relying on over the air broadcast to the probability of interfering with the more than 80% of TV viewers that receive cable or broadcast television.

VI. Protection of Grade B Versus Protection of Receivable Signals

The Commission proposes a regime in which television reception is protected to its Grade B contour and nothing more. The result is that consumers who are watching television from stations outside the Grade B contour may have that reception interrupted by an unlicensed device with no recourse. For the most part, viewers are completely unaware that there is such a thing as a Grade B contour or that they are receiving their broadcast signal in a way that merits less interference protection. Although we understand the impetus to set a calculable limit upon which the unlicensed devices can rely for determining available channels, CEA finds merit in the comments of the National Cable and Telecommunications Association (NCTA) and National Translators

Association that a significant number of consumers validly rely on reception outside of Grade B contours.⁵

VII. Source and Certainty of Control Signal

There is nothing in the record thus far that adequately addresses concerns over the insufficient rules governing the source of control signals and the means by which they are expected to be constrained to the geographic area for which they are valid. The *Notice* seems to be relying solely on a baseline assumption that unlicensed devices will not cause harmful interference. CEA lauds this approach as applied to unlicensed device operation in sparsely populated bands where the probability of harmful interference is low but finds it inadequate in this proceeding. The concerns about control signals that CEA raised in its comments remain unanswered⁶. The complete lack of any experience or industry consensus in using a control signal approach reinforces CEA's suggestion to introduce Personal/Portable devices cautiously.

VIII. Outcome of Field-Testing and Data

CEA has completed collecting field data in accordance with its test plan previously submitted under this proceeding⁷. The field strength data is included as an appendix. Spectrum plots are more voluminous and less easily distributed. CEA will make these available to the Commission and others by request.

a. Field Strength and Building Attenuation: The intent of these field strength measurements was to collect data on the relative field strength measured with an outdoor

⁵ Comments of the National Cable and Telecommunications Associations and Comments of the National Translators Association, ET Docket No. 04-186 (Filed November 30, 2004)

⁶ CEA Comments at 3

⁷ CEA *Ex Parte Presentation*, ET Docket Nos. 04-186, 02-380 (October 14, 2004)

antenna at 30 feet above ground, an outdoor antenna at six feet above ground, and an indoor antenna at six feet above ground. The data contributes to two areas of understanding for the industry. The first is to gain an understanding of the characteristics of signal attenuation from outside the house to inside the house at equal antenna height (building attenuation.) The second is to gain a similar understanding of the relationship between signals received by an outdoor antenna at 30 feet and an indoor antenna at six feet, for it is this differential that a spectrum sensing device must overcome to avoid interference with receivable TV channels. The data provided in Appendix A was collected by Wallace and Associates for CEA. Data was collected from 10 single-family homes in the Washington, DC area. At each home, field strength was recorded at one location with an antenna height of 30 feet and on four sides of the house at an antenna height of six feet. The latter four outside measurements were made at a distance of six feet from the house. Inside measurements were made at corresponding locations at a distance of six feet from the outside wall.

One can see the building attenuation in going from outside at six feet to inside at six feet for channels 39 and 40 by examining the data summary sheet of Appendix A at columns 'O' and 'U', respectively. For channel 39, the average attenuation is 11.4 dB, and the standard deviation is 14.5 dB. For channel 40, the average attenuation is 10.5 dB, and the standard deviation is 12.6 dB.

The difference in field strength from outdoor at 30 feet to indoor at six feet for channels 39 and 40 can be found in the data summary sheet at columns 'R' and 'X', respectively. For channel 39, the average difference is 14.9 dB, and the standard

deviation is 11.4 dB. For channel 40, the average difference is 15.7 dB, and the standard deviation is 10.8 dB.

CEA members are still in the process of rigorously analyzing this data, however, a few comments can be made on the limited sample population. Attenuation from inside the house to outside the house at six feet is roughly 11 dB. More significant in terms of probability of interference computation is the fact that the standard deviation is larger than the average attenuation. Similar results hold true for the field strength difference between 30 feet outdoors and six feet indoors. The average is just over 15 dB, and the standard deviation is roughly 11 dB.

b. Spectral Plots: Wallace and Associates recorded spectral plots using 1 kHz resolution bandwidth with an antenna at six feet indoors to simulate the signals that an unlicensed device would receive when trying to use cognitive radio techniques to determine vacant channels. These captures will be made available to the industry for post-processing to advance the state of the art in spectrum sensing.

IX. Conclusion

CEA supports the intent to allow for unlicensed use in the vacant TV broadcast bands. However, we must ensure that such uses do not interfere with consumer enjoyment of the broadcast signal. This is vitally important as we move from analog to digital. For the DTV transition to be successful, we must ensure a positive and successful customer experience.

On this basis, we support allowing unlicensed use for Fixed Access devices. For Personal/Portable devices, we urge that greater caution be taken by introducing products at a lower power limit after the conclusion of field-testing. Additionally, we suggest

developing a prototype that can be carried to homes and used to capture data for spectrum sensing. We look forward to continue working with the Commission and other interested parties on this proceeding and welcome comments on our field-testing results.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'M. Petricone', written in a cursive style.

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