

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C.**

*In the Matter of*

Facilitating the Provision of Spectrum-Based  
Services to Rural Areas and Promoting  
Opportunities for Rural Telephone Companies  
To Provide Spectrum-Based Services

WT Docket No. 02-381

**COMMENTS OF MICROSOFT CORPORATION**

A company is using unlicensed wireless technology attached to the side of grain silos to deliver moderately priced, high-speed Internet access in 150 rural communities in the Midwest. One farmer uses this service to download real-time commodity prices. Another “pulls up images of soil maps and overlays them with readings from his most recent harvest to determine what made one acre’s yield more abundant than another’s.”<sup>1</sup>

On the Big Island of Hawaii, consumers have installed a series of Wi-Fi base stations and directional antennas to provide high-speed Internet access:

Now people all over the island are tapping into [the] wireless links, surfing the Web at speeds as much as 100 times greater than standard modems permit. High school teachers use the network to leapfrog a plodding state effort to wire schools. Wildlife regulators use it to track poachers.<sup>2</sup>

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<sup>1</sup> Fara Warner, *Fast Farmers: Prarie iNet is Hooking Up America’s Heartland*, Fast Company, Apr. 2001, at 54.

<sup>2</sup> Erick Schonfeld, *The Island of the Wireless Guerrillas*, Business 2.0, Apr. 2002, available at <http://www.business2.com/articles/mag/0,1640,38492,FF.html>.

In Ellaville, Georgia (population, 2,000), a company is providing Internet access with an unlicensed network that cost around \$200,000.<sup>3</sup> Another entrepreneur has built a Wi-Fi network in Flatonia, Texas (population, 1,377) for about \$10,000.<sup>4</sup>

There can now be little doubt that devices operating in “unlicensed” bands<sup>5</sup> are able – at least in some circumstances – to bring broadband connectivity to rural areas. This is because many of the advantages of unlicensed devices are especially compelling in rural areas. Unlicensed devices are both inexpensive and easier to deploy, which is particularly important in areas with fewer customers. Moreover, while licensed network operators often find it difficult to obtain capital for deployment in rural areas with low population density, the customer-driven economics of unlicensed devices allows for incremental growth fed by new demand and marginal supply – a model that works regardless of population density.<sup>6</sup>

While unlicensed devices have already been deployed in some rural areas, their current use does not begin to tap their potential. To reach this potential, unlicensed rural broadband will require regulatory tending from the Commission. Just as Commission decisions have been critical to the success of unlicensed devices thus far, Commission decisions in the coming months will largely determine how quickly, and how completely, unlicensed devices can bring broadband Internet access to rural America.

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<sup>3</sup> See Gerry Blackwell, *Small Cities Serve Their Own*, ISP-Planet, June 25, 2002, available at [http://www.isp-planet.com/fixed\\_wireless/business/2002/municipal.html](http://www.isp-planet.com/fixed_wireless/business/2002/municipal.html).

<sup>4</sup> See Kirk Ladendorf, *High Speed Comes to the Hinterland*, Austin American-Statesman, May 20, 2002, available at <http://www.austin360.com/aas/business/052002/0520flatonia.html>.

<sup>5</sup> As a legal matter, the use of these bands is licensed by rule rather than by individual license – the use of the bands is not really “unlicensed.”

<sup>6</sup> See also Comments of Microsoft Corporation in ET Dkt No. 02-135 at 3 (filed Jan. 27, 2003) (“Microsoft SPTF Comments”) (“[B]ecause unlicensed bands are open to anyone who buys a compliant device and turns it on, a significant proportion of the capital invested in the creation of unlicensed networks may come from individuals and businesses, not from network operators. This means that there is no need to rely on the hope that “if you build it, they will come.”).

A great challenge in providing *any* wireless service to rural areas is that signals transmitted to a residence from a backhaul point of presence must travel over longer distances – usually a great deal longer – than such signals in urban areas. For unlicensed applications, directional antennas help, and mesh networks may eventually help. Even with these technologies, however, many areas lie outside the easy reach of current unlicensed devices’ transmission ranges. Microsoft therefore urges the Commission to help maximize the reach of unlicensed networks by: *(1) making a primary spectrum allocation in the lower bands for unlicensed services; and (2) allowing unlicensed devices to use increased power in rural (and other low-interference) areas.*<sup>7</sup>

***Primary Allocation for Unlicensed Services in Lower Bands.*** The Commission’s Spectrum Policy Task Force agrees with many observers (including Microsoft) that primary spectrum allocations will be required for unlicensed uses.<sup>8</sup> It suggests, however, that new unlicensed spectrum should generally be found above 50 GHz, while “in the lower portion of the radio spectrum, particularly bands below 5 GHz, the Commission should focus primarily, though not exclusively, on using the exclusive use model.”<sup>9</sup>

To truly benefit rural America, the Commission must be bolder in its spectrum allocation decisions. Only lower bands readily permit long-range and through-the-wall

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<sup>7</sup> See *Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services*, Notice of Inquiry, WT Dkt. No. 02-381 at ¶ 29 (rel. Dec. 20, 2002) (“*Notice*”) (requesting comment “regarding actions the Commission can take to encourage or facilitate the use of unlicensed spectrum [in rural communities]”).

<sup>8</sup> See *Spectrum Policy Task Force Report*, ET Dkt. No. 02-135 at 37, 54 (rel. Nov. 2002) (“*SPTF Report*”) (recommending that the Commission “expand[] the use of both the exclusive use and commons models throughout the radio spectrum” and stating that “it appears that additional spectrum is needed for unlicensed devices”).

<sup>9</sup> See *SPTF Report* at 38. The Task Force does state, however, that “[t]his does not mean . . . that only higher band spectrum should be subject to a commons approach.” *Id.* at 40.

propagation; therefore, many rural applications are only possible in lower bands. Any decision to limit new unlicensed allocations to upper bands would thus limit the ability of future unlicensed networks to reach many Americans. A far better approach would be to make new primary allocations of unlicensed spectrum in both upper *and* lower bands.<sup>10</sup>

***Power Flexibility in Rural Areas.*** The *Notice* asks whether unlicensed devices should be permitted to use higher output power levels in rural communities, where “the interference potential of unlicensed devices may be low or negligible . . . .”<sup>11</sup> Microsoft agrees with the Spectrum Policy Task Force that power limits for unlicensed devices need not be the same everywhere. There is no reason why higher-power unlicensed operations should not be allowed in rural areas, both for primary and for “opportunistic” or “underlay” uses. Such flexibility would bring instant benefits to rural America – giving unlicensed networks greater geographic reach, and, in turn, making such networks available to more Americans.

Indeed, one of the key insights both of the *Notice* and of the Spectrum Policy Task Force Report is that power limits can be tied *directly* to the interference environment, allowing higher-power unlicensed use everywhere interference potential is low (not only in rural geographic areas). This, of course, would give unlicensed broadband networks expanded reach in other underserved areas where the spectrum is not being used robustly. In any case, the concept of non-uniform power levels – whether defined by geography or interference environment – is a good one that is likely to bring real benefit to rural Americans.

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<sup>10</sup> Microsoft’s view is that, for rural applications, the lower the spectrum allocation the better. To be truly useful for rural applications, any new unlicensed allocation should be below 2.4 GHz.

<sup>11</sup> *Notice* at ¶ 29.

**CONCLUSION**

Unlicensed devices are bringing broadband access to some rural areas already. With the Commission's continued regulatory stewardship, these successes can be replicated in many more areas. By finding new lower-band spectrum and allowing greater power flexibility in rural areas, the Commission would take great strides towards making unlicensed broadband's potential a reality for *every* American.

Respectfully submitted,

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