

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

In the Matter of

Revision of Parts 2 and 15 of the Commission's
Rules to Permit Unlicensed National
Information Infrastructure (U-NII) Devices in
the 5 GHz Band

ET Docket No. 03-122
RM - 10371

COMMENTS OF MICROSOFT CORPORATION

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Because of the U.S. Government's preparation for and accomplishments at the World Radio Conference ("WRC-03") earlier this summer, the task at hand – to translate the outcome of WRC-03 into an acceptable domestic regime – is comparatively simple.

Before WRC-03, parties with often-divergent views about spectrum usage – including the Department of Defense ("DOD"), the National Aeronautical and Space Agency ("NASA"), and the wireless and high technology industries – found common ground in their understanding of the value of the 5 GHz band for both military and civilian uses, and the need to protect sensitive governmental operations from potential interference. They also found that they agreed on the technical solutions that would be required to allow civilian and military users to share the 5 GHz band.

The U.S. government ultimately used these agreements to craft its own position and to advocate successfully a global allocation for wireless local area networks in the 5 GHz band. Microsoft, a developer of software, applications, and Internet technologies, wholeheartedly supported the U.S. government position.

The Notice of Proposed Rulemaking (“NPRM”) now before the Commission reflects that position.¹ The proposals it contains – to make an additional 255 MHz of spectrum available for unlicensed National Information Infrastructure (“U-NII”) devices, to upgrade the status of government operations in the affected bands, and to impose technical restrictions to further protect those operations – will implement the successful outcome of WRC-03. Microsoft generally supports the proposed amendments to the Commission’s rules and urges the Commission to act expeditiously.

I. UNLICENSED WIRELESS LOCAL AREA NETWORKS UNIQUELY EXTEND THE REACH AND UTILITY OF BROADBAND SERVICES

Microsoft believes that robust, ubiquitous, and reasonably priced broadband service is essential to fuel the development of new applications and services that improve productivity, enrich lives, and benefit every sector of society and the economy. It also believes that wireless technologies – including technologies operating in the unlicensed bands – will be critical to bringing broadband to those who do not yet have it, and to increasing its utility to those who do.

As recounted in the Spectrum Policy Task Force Report and other recent reports, the Commission knows the unique promise of unlicensed wireless networking.² Of

¹ See *Revision of Parts 2 and 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, 18 FCC Rcd. 11581 (rel. June 4, 2003) (“NPRM”).

² See, Spectrum Policy Task Force, *Report*, ET Docket No. 02-135, at 54 (rel. Nov. 15, 2002) (“SPTF Report”) (“[T]he growing popularity of computer networking has stimulated a heightened interest in unlicensed technology and one of the fastest growing applications of unlicensed devices is for WLANs.”). See also Kenneth R. Carter, Ahmed Lahjouji, and Neal McNeil, *Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues*, OSP Working Paper Series No. 39 (May 2003) (“OSP Working Paper No. 39”).

course actions speak even louder than words: last month the Commission unveiled a Wi-Fi network to provide free wireless Internet access to visitors at its headquarters office.³

Wireless networks have the potential to provide the elusive third broadband pipe to urban America, bringing needed competition. And they may be able to deliver a *first* broadband pipe to Americans not in the urban core. Indeed, small towns and cities, wanting to attract and retain businesses, have emerged as a new type of broadband provider (the municipal wireless Internet service provider, or “municipal WISP”), leading one analyst to conclude “it may one day be as common for small cities and towns across America to offer broadband Internet access services as it is today for municipalities to provide electricity and water.”⁴

In addition to providing standard connectivity – whether linking devices in a residential or business network, or providing last-mile connectivity – wireless networks operating in the unlicensed bands can offer *different kinds* of connectivity: portable, mobile, temporary, and low-cost.

- The low cost of establishing an access point, and the true interoperability and open standards of Wi-Fi devices, have spawned a new type of Internet access: community-based access. Community hot spots are provided in public spaces by grass-roots organizations, not commercial or governmental entities. Wireless Week predicts that community hotspots will grow from 266 in 2002, to more than 5,000 in 2003 and more than 20,000 in 2004.⁵

³ See *FCC Goes WiFi*, News Release, Aug. 4, 2003 (quoting FCC chairman Michael K. Powell as saying, “We’re embracing the power of Wi-Fi and the freedom and convenience of wireless Internet access it gives to consumers”).

⁴ Gerry Blackwell, *The Municipal WISP, Part II*, ISP-Planet, July 2, 2002, at http://isp-planet.com/fixed_wireless/business/2002/municipal_wisp_part_2.html (quoting the City Administrator of Buffalo, Minnesota – which is only 26 miles from Minneapolis – as saying, “Even cities that are not that far from major centers are getting left out of the internet revolution”).

⁵ See *Where Art Thou Wi-Fi?*, Wireless Week, July 15, 2003, at <http://www.wirelessweek.com/index.asp?layout=article&articleid=CA310941&spacedesc=Departments&stt=001> (citing Gartner Dataquest).

- The low cost of Wi-Fi devices has also made them ideal for providing ready-made broadband infrastructure to underserved groups. For example, One Economy Corporation partners with corporations and charitable organizations to provide broadband access to low-income users to further scholastic, health and other educational opportunities. Similarly, near San Diego, a grant from H-P is being used to connect 18 remote Native American reservations via Wi-Fi Networks.⁶
- Because of their ease of use, unlicensed devices are also being used in creative ways in rural areas. The remote Alaskan village of Coffman Cove has created high-speed Internet connectivity using Wi-Fi networks linked to satellite backhaul.⁷
- There are both public (free) and commercial access points in airports, convention centers, hotels, libraries, museums, restaurants and gas stations. A single commercial mobile radio service provider has more than 1,200 “hot spots” in Starbucks coffee houses alone.⁸ With over 28,000 Wi-Fi public access points nationwide,⁹ it is tempting to think of this as an old story. Yet this growth has occurred in less than three years,¹⁰ and with estimates of 200,000 hot spots by 2008, it shows no signs of abating.¹¹
- Portable connectivity is being matched by true mobile connectivity. The Washington State Department of Transportation is introducing a FAN, or “floating area network,” to provide mobile WiFi connections to its 15,000 daily ferry commuters.¹² And IEEE is developing a new Wi-Fi standard (802.20) that can provide a connection on a train traveling 120 mph.¹³

⁶ See, e.g., Lynette Kuna, *Tribal Gathering*, Telephony Online, June 3, 2002, at http://currentissue.telephonyonline.com/ar/telecom_tribal_gathering.

⁷ See Gerry Blackwell, *Broadband Comes to Coffman Cove*, ISP-Planet, May 27, 2003, at www.isp-planet.com/fixed_wireless/business/2003/coffman_cove.html.

⁸ See Yarden Arar, *Starbucks Expands Wireless Internet Offering*, PC World, Aug. 21, 2002, at www.pcworld.com/news/article/0%2Caid%2C104237%2C00.asp.

⁹ See Ed Sutherland, *What Is the Future For Hotspots?*, Wi-Fi Planet, July 15, 2003, at <http://www.80211-planet.com/news/article.php/2235511>; Mark Berniker, *Wi-Fi Hot Spot Market Picking Up*, July 10, 2003, at <http://www.80211-planet.com/news/article.php/2233721>.

¹⁰ In 2000, subscriber revenue from access to hot spots was a mere \$1.1 million. See *WLAN Hotspots to Grow Fast: Report*, Wi-Fi Planet, Oct. 25, 2001, at <http://www.80211-planet.com/news/article.php/910631>.

¹¹ See Mark Berniker, *Wi-Fi Hot Spot Market Picking Up*, Wi-Fi Planet, July 10, 2003, at <http://www.80211-planet.com/news/article.php/2233721>.

¹² *Washington Commuter Ferries Get Wi-Fi Go Ahead*, Wi-Fi Planet, Aug. 20, 2003, at <http://www.wi-fiplanet.com/news/article.php/3066491>.

¹³ See OSP Working Paper No. 39 at 32.

- Wi-Fi enables temporary broadband connections that other technologies cannot easily provide. When the Anaheim Angels reached the World Series in 2002, the media center at Edison International Field had only two DSL connections to serve the impending media deluge.¹⁴ With little lead-time, the Angels hired an “event bandwidth service provider” to provision a temporary high-speed wireless link from a nearby 5.8 GHz POP.¹⁵

All of these developments have already occurred. We do not presume to know all the uses to which Wi-Fi and similar technology will be put. But we do know that these technologies will be increasingly critical to the nation’s broadband infrastructure.

II. THE COMMISSION’S PROPOSAL TO MAKE THE 5.47-5.725 BAND AVAILABLE TO PART 15 U-NII DEVICES WILL PROVIDE CRITICALLY NEEDED SPECTRUM

To date, the Commission’s actions have fostered an unlicensed revolution that is only beginning to show its promise. With 865 products certified by the Wi-Fi Alliance in 2-1/2 years, sales of Wi-Fi equipment are expected to reach \$1.3 billion in 2003.¹⁶ And as the price of Wi-Fi chipsets has fallen by three-quarters (from an average of \$43 in 2001 to \$10 in 2002), wireless enabled laptops are claiming a majority of laptop sales.

Notably, the Commission itself laid the groundwork for the innovation, growth and public benefits described above by authorizing innovative unlicensed technology, beginning with spread spectrum in the 1980s, and continuing with the establishment of the U-NII bands at 5.15-5.35 GHz and 5.725-5.825 GHz in the 1990s. Yet it is unlikely that wireless broadband networks will continue to grow without access to additional

¹⁴ See Gerry Blackwell, *The Big Event (Bandwidth)*, Wi-Fi Planet, Dec. 5, 2002, at www.80211planet.com/columns/article.php/1552931.

¹⁵ Temporary links serve other business exigencies as well: the same firm provided a 4 mbps Internet link for a design firm so that its employees could stand on line for premiere tickets to a Star Wars films. See *id.*

¹⁶ See <http://wi-fi.org/OpenSection/index.asp>; *The Latest WLAN Forecasts: More Growth*, Wi-Fi Planet, Aug. 22, 2003, at <http://www.wi-fiplanet.com/news/article.php/30667711>; OSP Working Paper No. 39 at 32.

spectrum. The NPRM correctly recognizes this and proposes to extend the reach of the U-NII band by adding the 255 MHz at 5.47-5.725 GHz.

The need for this spectrum is well established in the record. Last year, the Unlicensed Devices and Experimental Licenses Working Group of the Commission's Spectrum Policy Task Force reported that "the need for 'more unlicensed spectrum' was the most common theme among comments, workshops, and other discussions with interested parties."¹⁷ The full Task Force likewise acknowledged that the success of Wi-Fi has contributed to a "surging demand" for computer and data networking through wireless local area networks¹⁸ and concluded that "the Commission should consider designating additional bands for unlicensed use to better optimize spectrum access."¹⁹

With the addition of 255 MHz to the existing 5 GHz U-NII bands, the Commission will provide vitally important capacity, and the security necessary, for innovators to further the reach and potential of unlicensed broadband networks.²⁰ Moreover, prompt action to implement the international allocation is an appropriate, and indeed necessary, conclusion to the United States' leadership at WRC-03. It will confirm the United States' commitment to the public interest in facilitating the development of wireless LANs, and to harmonization of the 5 GHz spectrum for this use. It will further serve as an example for other administrations that will also be implementing the WRC-03 allocation.

¹⁷ *Report of the Unlicensed Devices and Experimental License Working Group*, ET Docket No. 02-135 at 11 (rel. Nov. 15, 2002).

¹⁸ *See SPTF Report* at 12-13.

¹⁹ *Id.* at 54.

²⁰ As explained in other proceedings pending before the Commission, Microsoft believes that access to spectrum in the lower bands, whether as a primary allocation or as an underlay, is also critical.

III. LIMITED TECHNICAL REGULATION AS PROPOSED IS SUFFICIENT TO PROTECT EXISTING SERVICES

In conjunction with the expansion of the U-NII band, the NPRM proposes two actions to accommodate existing services and to protect them from potential interference. First, it proposes several changes to the Table of Frequency Allocations: (1) to upgrade the status of the Federal Government Radiolocation service to primary in the 5.46-5.65 GHz band; (2) to upgrade the status of the non-Federal Government radiolocation service to primary in the 5.47-5.65 GHz band; and (3) to add primary allocations for the Federal Government, and secondary allocations for the non-Federal Government, for the Space Research Service (active) in the 5.35-5.57 GHz band and the Earth Exploration-Satellite Service (active) in the 5.46-5.57 GHz band. Microsoft supports these changes.

The NPRM proposes two additional technical requirements for devices operating in the new U-NII sub-band: dynamic frequency selection (“DFS”) and transmit power control (“TPC”). Inclusion of these requirements was part of the agreement that formed the United States’ proposals on the 5 GHz band at WRC-03, and Microsoft supports their inclusion in Part 15. DFS and TPC are important techniques that will allow robust sharing of the 5 GHz band.

The NPRM also proposes to require the use of DFS in the existing 5.25-5.35 GHz sub-band, as well as in the new 5.47-5.725 sub-band. DFS enables the unlicensed device to monitor the use of the spectrum before it even begins transmission. If the device detects that a radar is present, it will either move to an unoccupied channel or enter sleep mode. Because DFS will be a new requirement in the existing 5.25-5.35 sub-band, Microsoft encourages the Commission to provide an appropriate transition period before the new rule will take effect in that portion of the band. Because unlicensed devices have

been operating in this band without evidence of harmful interference, there is no exigency requiring an abrupt and disruptive transition. Microsoft encourages the Commission to be flexible, permitting manufacturers the time they need to develop and have certified devices incorporating the new technology without suffering adverse financial consequences.

Microsoft agrees that the Commission should adopt a clear testing procedure for establishing compliance with the DFS and TPC requirements. In particular, because of the worldwide allocation of the band, and the European decision to require DFS and TPC for HiperLANs using the 802.11 standard, the Commission should encourage the development of a uniform, internationally accepted test procedure that will protect other users of the band without undue burdens being placed on manufacturers.

Finally, Microsoft supports the Commission's proposal to limit power in the new 5.47-5.725 sub-band to 1-watt EIRP, rather than to apply the 4-watt limitation applicable to the 5.725-5.825 sub-band. While Microsoft agrees that the 1-watt limitation is appropriate in this instance, it believes the Commission is mistaken when it hypothesizes that the "100 MHz of spectrum that is already available at 5.725-5.825 GHz will remain sufficient for higher power operations."²¹ This conclusion seems at best premature and, given the need for higher power in many rural areas, Microsoft thinks it will likely prove incorrect.²² For now, the Commission should only decide the appropriate power limitation for the 5.47-5.725 sub-band.

²¹ *NPRM* at ¶ 18.

²² *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, 17 FCC Rcd 25554, 25569 at ¶ 29 (rel. Dec. 20, 2002).

CONCLUSION

By promptly completing this rulemaking, the Commission will hit a home run. By making this additional spectrum at 5 GHz accessible to wireless local area networks, the Commission will take an essential step toward its envisioned future in which “ubiquitous broadband deployment will bring valuable new services to consumers, stimulate economic activity, improve national productivity, and advance economic opportunity for the American public.” And, by doing so with only the minimal amount of regulation necessary to protect critical operations, the Commission will continue its leadership in the international sphere of spectrum policy.

Respectfully submitted,

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