



## **Regulatory Treatment of 802.11b Services Updated October 2002**

Within the radio spectrum, there are certain bands devoted to industrial, scientific, and medical (ISM) purposes. This spectrum has been used for a variety of applications, ranging from microwave ovens to industrial welding to medical procedures.

Recently, communications applications have been developed for one of these ISM bands, specifically for 2.4 GHz signals. The Institute of Electrical and Electronics Engineers (IEEE) Standards Association has developed an international standard, 802.11b, under which 2.4 GHz signals can be used for wireless local area networks (LANs). A major industry is developing, providing communications services, applications and equipment for this spectrum. Wireless LANs based on the 802.11b standard can be indoors (linking computers within an office) or outdoors. The outdoor applications allow ISPs to use this spectrum to provide Internet access to customers without utilizing the local loop of the telephone network – especially helpful in circumstances where the landline telephone infrastructure is deficient.<sup>1</sup>

There has been some controversy over the extent to which the ISM uses of the 2.4GHz band and the 802.11b uses might interfere with each other. However, in many situations 802.11b devices are not affected by the ISM uses. If interference or another radio problem is experienced, it may be easy to fix by relocating the device or its antenna, among other solutions.

In a number of countries, unlicensed communications devices share several of the ISM bands, including 2.4 GHz, with the result that communications opportunities are expanded. A country that does not permit use of the ISM bands by products compliant with international standards is contradicting an emerging international norm, foreclosing the development of an important market, and limiting the expansion of its communications infrastructure.

### **Regulatory Posture of ISM and 802.11b**

#### **-- ITU and IEEE**

The fact that there is an IEEE international standard, 802.11b, for 2.4 GHz data transmission indicates that there is international support for use of the ISM band for LANs. The International Telecommunications Union (ITU) has, to our knowledge, no policy or rule specifically addressing unlicensed ISPs or the use of the ISM band for 802.11b or related

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<sup>1</sup> Other industry standards for the 2.4 GHz spectrum include “Bluetooth” and Home RF. As the U.S. Federal Communication Commission has found, these standards “promise to greatly expand the number and variety of devices that operate in the 2.4 GHz band.”

wireless applications. No ITU policy is needed to permit unlicensed devices. Whether or not unlicensed communications devices -- such as IEEE 802.11b devices -- are permitted to share the ISM band(s) in any given country is a decision of local regulators and not an ITU decision.

### -- **US perspective**

In the U.S., 2.4 GHz is one of several bands of radio spectrum that are not licensed for radio services. However, that does not mean that the band cannot be used for private or commercial services – rather, it means that it **can** be used by anyone so long as the use does not interfere with uses on the licensed bands. It also means that 802.11b devices and other devices operating in the band for communications purposes enjoy no interference protection from competing uses and are not subject to any guarantee of quality of service.

U.S. public policy does not insulate license holders from competition by other unlicensed technologies. A license holder cannot complain that the value of its license is being diminished by those using unlicensed devices for provision of commercial services.

The fact that the ISM band is unlicensed does not mean that it is unregulated, however. The FCC imposes and enforces technical standards to ensure that equipment operating in these unlicensed bands does not interfere with operations on adjacent licensed bands.

Thus, in its regulatory treatment of the ISM and other unlicensed bands, U.S. policy supports innovation. These policies have led to the introduction of a wide variety of consumer devices, including improved cordless telephones and computer local area networks that operate on the 2.4 GHz band.

The FCC, in its commitment to allowing the broadest feasible use of unlicensed bands, adjusts its rules periodically in response to technology advances and other developments. The Commission's rules governing spread spectrum technology of the kind used in 802.11b applications were first adopted in 1985. Since then, the Commission has updated its rules several times to accommodate technological developments that promote new and innovative uses of the bands. Most recently, in May 2002, the FCC amended its rules governing the use of unlicensed spectrum to permit the use of additional types of digital transmission technologies on the unlicensed bands. It also eliminated technical regulations for spread spectrum systems that it concluded were no longer necessary.<sup>2</sup>

### -- **Nigeria**

According to the International Table of Frequency Allocations, the 2400-2500 MHz spectrum is designated for ISM use in ITU Region 2 including Nigeria.

According to the web site of the Nigerian Communications Commission (NCC): "The Commission does not permit the use of unlicensed spectrum for the provision of commercial

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<sup>2</sup> See Second Report and Order in the Matter of Amendment of Part 15 of the Commission's Rules regarding Spread Spectrum Devices, ET Docket No. 99-231.

services. Apart from having competitive advantage over those who had paid for spectrum, the unlicensed providers would not be in a position to guarantee acceptable levels of service and the protection of the rights of consumers. The Commission accepts that the use of unlicensed bands may be made for self provision, or for industrial, scientific and medical research applications."

The NCC seems to base its policy on the belief that unlicensed providers will have an advantage over providers who paid for licenses. However, this is an interpretation of the concept of a license not shared by all countries. In many countries, a license protects its holder against interference, but not against competition from new technologies. Unlicensed devices may be limited to low power levels to ensure they do not interfere with licensed users, but in the 2.4 GHz band, this does not justify a total ban on commercial uses.

In terms of quality of service, as the NCC correctly observes, unlicensed devices enjoy no interference protection and no guarantee of quality service. In an open marketplace, any quality of service drawbacks associated with unlicensed devices will be taken into account by consumers. The NCC's argument that unlicensed providers can't protect consumers is questionable, but in any case, if the customer receives poor service from the ISP, the customer has the option of terminating the service and selecting an alternate provider. Moreover, few ISPs -- whether wired or wireless -- guarantee quality of service; the varying conditions of the Internet make that rather impossible.

Nigeria's policy towards the regulation of the ISM band reflects national political and policy choices rather than current international norms. Regardless of the basis for the policy decision, the effects of this policy could negatively impact any ISP or other entity that seeks to provide service within Nigeria with 802.11b devices.

#### -- **Bulgaria**

In Bulgaria, the 2.4 GHz band is free for unlicensed usage, and in fact some ISPs are using it for high-speed Internet access. It can cover up to 35 km (20 miles) at 2 Mbps. Equipment costs about \$400 per point of presence, and the LAN is built around it. The standard used is 802.11b.

#### -- **India**

Until recently, those wishing to use wireless technologies, including 802.11b applications, in the 2.4GHz band were required to apply for and obtain a license from the Wireless Planning Committee ("WPC"), within the Ministry of IT & Communications.

Recently, however, India has eliminated the licensing requirement for the indoor use of wireless Internet and other local area network applications in the 2.4GHz band, under the 802.11b standard. Many expect that this new policy also will be extended to permit unlicensed outdoor uses of the technology. This new policy should facilitate increased innovation in the use of Bluetooth and other wireless technology in India.

## Conclusion

Some countries have sought to limit communications use of 2.4 GHz and other ISM bands. However, the international standards body IEEE has developed a standard for communications use of 2.4 GHz, and various countries have allowed use of the ISM band by ISPs, recognizing that it provides an important opportunity to expand use of the Internet, supporting overall development objectives.

802.11b devices are already a successful and dramatically growing business worldwide, including wireless LANs within private offices as well as for commercial ISP use.

Countries that seek to facilitate innovation in this spectrum will be well served by reviewing their regulations periodically, removing unnecessary regulatory restrictions and otherwise finding ways to facilitate increased public use of the ISM band.

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