Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Comments on draft IEEE P802.16a/D2-2002 Annex B.2**
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Source(s)	Durga P. Satapathy Sprint 9300 Metcalf Avenue MS: KSOPKB0802 Voice: (913) 534-2428 Fax: (913) 534-2526 d.p.satapathy@ieee.org
Re:	**IEEE P802.16a/D2-2002**
Abstract	Proposed additions to Annex B.2 on unlicensed spectrum
Purpose	Addition of relevant information
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Proposed comments for **IEEE P802.16a/D2-2002**

1) B.2.1, page 219: Replace lines 5-6 by

Outside the scope of the WirelessMAN standard, three methods are identified: antenna directivity, antenna polarization and multi-band operation.

2) Section B.2.1.2, pg 219. Add following suggested text:

In unlicensed bands, an individual device can maximize its throughput by transmitting at the maximum allowed power. For devices belonging to a WirelessHUMAN system that share a given unlicensed band, such behavior would also maximize system throughput when the devices are far apart. When devices are near, transmitting at maximum power leads to suboptimal system performance. The use of transmit power control in accordance with a spectrum etiquette can improve performance. The etiquette proposed in [1] shows how system throughput can be optimized for devices that reduce transmit power when received power exceeds a threshold. While such etiquettes are designed to deal with unknown sources of interference, it is conceivable that such methods would be more effective in dealing with interference from only WirelessHUMAN devices, as the system would have information about the number of such devices and their transmit powers. From a practical standpoint, such etiquettes could be observed by all devices that belong to a single WirelessHUMAN system or to a set of WirelessHUMAN systems that are configured to co-operate.

3) New sub-section of B.2.1: Multi-band operation

Another way to deal with interference in unlicensed bands is to utilize systems that operate in both licensed and unlicensed bands. The resources of licensed bands and unlicensed bands could be combined using a variety of methods and protocols. One example is to design for guaranteed services with the capacity available from licensed bands, and the unlicensed bands could be used to add capacity on a as-available basis. Other systems could primarily operate in unlicensed bands, and use available licensed spectrum as a safe haven when needed. This technique does not mitigate interference in unlicensed bands, but it does offer a potential solution to the problem of offering service guarantees utilizing unlicensed spectrum. The commonalties between WirelessHUMAN and WirelessMAN systems (e.g. common MAC framework) reduce the design complexity of such integrated systems. Software Defined Radio (SDR) technology, which holds the promise of allowing radio equipment to seamlessly operate in different modes over multiple frequency bands, has matured to the point that cost-effective deployment in current wireless platforms is conceivable [2]. The Software Defined Radio Forum [3] represents about 100 companies worldwide that are promoting SDR technology for advanced wireless systems. The Enhanced Software Radio Forum (ESRF) [4] is another technical forum that aims to develop an intelligent infrastructure with SDR functions for enhanced next generation radio technologies. There are numerous SDR research projects and industry initiatives that have developed worldwide in the last decade [5].
References

[1] D. P. Satapathy and J. M. Peha, "A Novel Co-existence Strategy for Unlicensed Variable Power Devices," Proceedings of IEEE International Conference on Communications (ICC), Helsinki, Finland, June 2001. Available online at http://contrib.andrew.cmu.edu/~dsaq/varpwr.pdf

[2] David C. Chauncey and Durga P. Satapathy, Using Software Defined Radio Technology To Improve The Performance Of An ITFS/MMDS System , WCA 8 th Annual Technical Symposium, Jan 2002.
[3] The Software Defined Radio Forum, http://www.sdrforum.org
[4] Enhanced Soft Radio Forum, http://www.delson.org/esrf/index.htm
[5] Software Radio Resource, http://www-sop.inria.fr/rodeo/turletti/SoftwareRadio.html