Opportunistic Primary-Secondary Spectrum Sharing with a Rotating Radar

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Abstract:

This paper considers opportunistic primary-secondary spectrum sharing when the primary is a rotating radar. A secondary device is allowed to transmit when its resulting interference will not exceed the radar's tolerable level, perhaps because the radar's directional antenna is currently pointing elsewhere, in contrast to current approaches that prohibit secondary transmissions if radar signals are detected at any time. We consider the case where a secondary system provides point-to-multipoint communications utilizing OFDMA technology in non-contiguous cells, as might occur with a broadband hotspot service, or a cellular system that uses spectrum shared with radar to supple ment its dedicated spectrum. We show that even at a fairly small distance to a radar, extensive secondary transmissions are possible, although with some interruptions as the radar rotates. By evaluating quality of service, we find that spectrum shared with radar could be used efficiently for applications such as non-interactive video on demand, peer-to-peer file sharing, large file transfers, automatic meter reading, and web browsing, but not for applications such as real-time transfers of small files and VoIP.