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FOR IMMEDIATE RELEASE
February 29, 2008

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FCC'S OFFICE OF STRATEGIC PLANNING AND POLICY ANALYSIS RELEASES THREE STUDIES ON SPECTRUM DESIGNATED TO UNLICENSED OPERATIONS

Two Studies Identify New, Efficient Class of Spectrum Congestion Etiquette;
Third Study Demonstrates Feasibility of Using a Market-based Mechanism to Determine Whether Spectrum Should be Designated to Unlicensed Operations

The Office of Strategic Planning and Policy Analysis (OSP) today released three working papers on two important spectrum management issues:

Working Paper #41, "Enhancing Spectrum's Value Via Market-informed Congestion Etiquettes" and Working Paper #42, "Modeling the Efficiency of Spectrum Designated to License Use and Unlicensed Operations," examine ways in which spectrum designated to licensed and unlicensed use can be more efficiently used.

Working Paper #43, "A Market-based Approach to Establishing Licensing Rules: Licensed Versus Unlicensed Use of Spectrum," examines the feasibility of employing a market mechanism to determine whether spectrum should be designated to either licensed or unlicensed use.

Drs. Mark Bykowsky (OSP), William Sharkey (WCB), and Mark Olson (George Mason University) co-authored all three papers, while Kenneth Carter (WIK) co-authored Working Paper #41.

OSP periodically issues working papers on emerging issues in communications in order to stimulate debate. These papers represent the individual views of their authors and do not necessarily reflect the views of the FCC, any FCC Commissioner, or other staff members.

Combining economic theory and experimental analysis, Working Paper #41 (and its more theoretical companion Working Paper #42) evaluates the ability of different wireless spectrum congestion etiquettes to promote the efficient use of wireless spectrum in the presence of licensed and unlicensed operations. Under the examined environment, theory predicts that society leaves half of the value it can receive from spectrum "on the table."

One new approach utilizes various types of user information to address the inefficient use problem. Assuming a close similarity between the naturally occurring environment and the experimental one, analysis reveals that the average efficiency of the existing etiquette employed in most unlicensed equipment is 42%. In comparison, experimental analysis reveals that the average efficiency of one market-informed etiquette - the Informed Greedy Algorithm - is 70%. This and other results form the factual basis for generating an entirely new type of spectrum allocation wherein a given band of spectrum is treated as a common pool resource in the absence of excessive spectrum congestion, but is treated as an excludable private good in the presence of such congestion.

Working Paper #43 addresses the issue of how best to identify the most desirable allocation rules for spectrum. This OSP paper focuses on issues associated with licensed use and unlicensed operations. Spectrum designated to unlicensed use is made freely available for uses that comply with appropriate technical standards. Spectrum allocated to licensed use is typically assigned to license owners through an auction. Moreover, winners of the auction are granted the right to exclude non-payers from using their spectrum. The allocation between licensed and unlicensed use, however, is based on the FCC's judgment, which in turn relies on information provided by interested parties seeking to use the spectrum.

One method of reducing the incentive that parties have to exaggerate the value they place on a given licensing regime involves creating a market for such rules. The study examines the feasibility of using a "clock auction" to determine, based on bids submitted by market participants for the corresponding licensing rules, the efficient allocation of a given amount of spectrum between licensed and unlicensed spectrum use. This study finds that market forces, in the form of a clock auction, can be used to determine the efficient assignment of license rules (i.e., those associated with licensed use and unlicensed operations) to spectrum.

The full text of each working paper is available at http://www.fcc.gov/osp/workingp.html. OSP contact: Mark Bykowsky, 202-418-1695.

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