

Smart Antenna Considerations for Wireless Communication Systems

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Smart antenna systems have been introduced as a means to improve spectral efficiency since the development and deployment of the first cellular networks in the 1980's. Over the past two decades, much of the adaptive and switched beam antenna technology to implement smart antennas in several different applications has been widely researched and in many cases developed into products. However, even with deployment of second generation cellular systems, the technology has not been embraced as a standard form of wireless access by the cellular and PCS industry. The purpose of this paper is to outline what the smart antenna technologist should consider from the point of view of an operator who wishes to deploy wireless services, including those that go beyond typical mobile cellular/PCS. The paper will focus on several key issues surrounding the smart antenna development which include: (1) technology trends and hardware development in the antenna and smart antenna industries, (2) network operators, (3) equipment manufacturers, (4) applications and opportunities for smart antennas, and (5) what standards can do for the industry. Each of these areas will be discussed in detail to provide the industry with a perspective of what would encourage wireless service provider's to embrace the smart antenna concept. By developing a better understanding of what is needed to make this promising technology more common in wireless systems, we hope that a new generation of spectrally efficient wireless communication systems will be developed and standardized into the infrastructure equipment.