

High Speed Internet Access - Anywhere, Anytime...



Meet Ender Ayanoglu, Technical Leader in the Wireless Access Business Unit of Cisco Systems, Inc., the worldwide leader in networking for the Internet. Ayanoglu's primary responsibility with Cisco is Broadband Fixed Wireless Access. "Fixed wireless services offer business users and consumers another option beyond landline local access, an alternative that promises higher-speed services and faster deployment," comments Ayanoglu.

Ayanoglu represents Cisco as Chair of the Broadband Wireless Internet Forum (BWIF), a program of the Institute of Electrical and Electronic Engineers Industry Standards and Technology Organization (IEEE-ISTO). BWIF is a consortium of more than 40 industry-leading companies. "BWIF member companies are diverse, ranging from end-to-end network equipment vendors, silicon providers, radio frequency system suppliers, customer premises equipment manufacturers, system integrators - key professionals who have a vested interest in the development of this superior technology," explains Ayanoglu.

Over the past two years, Ayanoglu has been instrumental in building Cisco's family of Broadband Wireless Solutions, including both Multipoint Broadband Wireless Systems and Point-to-Point Broadband Wireless Systems. "Our products are already in operation," states Ayanoglu. "They're available and shipping." These products support multiple microwave frequency bands in both licensed (2.5 GHz) and unlicensed (5.7 GHz) bands. These products conform to Vector Orthogonal Frequency Division Multiplexing (VOFDM) and Data-over-Cable Service Interface Specification (DOCSIS) standards.

VOFDM information is transmitted on not one, but multiple carriers at the same time. By providing redundancy in the form of coding across multiple carriers, the resulting transmission system becomes robust against selective fading and interference over the frequency band of transmission. "Orthogonal" means data transmitted on different carriers can overlap in frequency so that the system is spectrally efficient. It also implies simpler implementation. The "Vector" portion of the standard provides spatial diversity and increases system performance.

VOFDM operates in both Line-of-Sight (LOS) and Non-LOS environments, while single carrier technology is restricted to LOS. VOFDM technology was developed by Cisco and made available to the members of BWIF. "BWIF's membership is open to anyone and we welcome any company that has an interest in developing the product," comments Ayanoglu.

The VOFDM standard is expected to be accessible to the public in the near future. DOCSIS is currently available as an International Telecommunications Union standard (ITU-T J.112) [link]. DOCSIS is chosen as the Multiple Access Control (MAC) layer for BWIF specifications. "The most recent DOCSIS, Version 1.1, can support Qualities-of-Service (QoS) guarantees," explains Ayanoglu. "Supporting QoS is a requirement for providing advanced services such as Voice over Internet Protocol (VoIP) or Internet telephony. Due to the VOFDM and DOCSIS, we are able to provide Non-LOS service together with QoS guarantees."

With fixed wireless, business and residential users will be able to receive Internet service even if cable Internet or Digital Subscriber Line (DSL) is not available in their location, which comprises a large proportion of users. "For a service provider, fixed wireless has the unique ability to initiate service right after base station deployment," comments Ayanoglu. "This provides a much faster time to market broadband Internet service than upgrading the cable or the telephone plant."

Prior to joining Cisco, Ender Ayanoglu received his PhD from Stanford University in Electrical Engineering. He spent 13 years working with Bell Laboratories, first as part of AT&T and then with Lucent Technologies.

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