

Broadband USA Applications Database

Applicant Name: XW

Project Title: Xtendwave Technology Solution for Backhaul Network Congestion

Project Type: Sustainable Broadband Adoption

Executive Summary

XW, LLC dba Xtendwave is a provider of technology solutions and products enabling significantly increased bandwidth utilization for copper and other media, resulting in enhanced performance of digital communications equipment, and cost-effective, high performance carrier service on the nation's telecom infrastructure. Xtendwave's patented technology, Adaptive Filter Bank Modulation (AFBMTM), enables data rate performance improvements of up to 6X or more compared to existing standards for telecom backhaul transmission. AFBM enables this increase without expensive fiber construction.

A. PROBLEM STATEMENT With the explosion of integrated voice and data over the last 10 years, and with ubiquitous rural broadband destined to be a reality in the U.S., a huge challenge has been created for the network provider: . These 'middle mile' networks are the critical link in providing high speed access to unserved and underserved communities, since the speed at which a community can receive service is dependent in large part on the speed and capacity of the middle mile network. In fact, the sustainable adoption of broadband being dependent upon the middle mile network has been recognized by the NTIA and RUS as a high funding priority. To quote the NTIA NOFA of January 22, 2010: 'In Round 1 of the BTOP awards, over \$119 million went to middle projects, wherein projects that built higher-capacity fiber optics networks to carry more data to rural critical needs facilities received 'a substantial portion' of the total funding.' Quoting further, 'Recognizing the significant importance of middle mile infrastructure to improving broadband capabilities for consumers residing in unserved and underserved areas of the nation, NTIA has awarded a significant proportion of the funds to middle mile projects''

Xtendwave's patented technology solution, AFBM, is a network innovation that would increase the throughput of existing copper backhaul networks in rural areas by up to 6 times, at significantly improved financials over and above the options available today.

B. OVERALL APPROACH-INNOVATION

Xtendwave's proposal requests funds to design and produce components for the upgrade of copper backhaul networks in support of broadband ubiquity. The funding would accelerate the company's ability to deliver a commercial solution providing upgrades at financially responsible costs versus new fiber optic construction This will allow AFBM to provide a sound investment for Sustainable Broadband Adoption by providing a cost effective alternative method for middle mile connectivity using existing copper infrastructure. Xtendwave is prepared to deliver a breakthrough product that will help usher in the era of inexpensive, ubiquitous broadband service over existing copper infrastructure. Our approach allows existing networks to meet the needs of carriers in a cost-effective manner. Fiber optic economics do not work everywhere, and our component solution offers a timely, cost-effective alternative. Xtendwave will provide a chipset solution for use in Ethernet-over-Copper routing equipment, providing an increase in capacity of 6 times or more versus T1 lines, and 2 times or more versus SHDSL-based

equipment, providing carriers a very quick return on investment and the ability to provide underserved broadband communities a competitively priced service.

C. POPULATION SERVED
Xtendwave's AFBM Technology will enable improved broadband access nationwide by alleviating backhaul congestion to unserved and underserved communities for both wireline and wireless broadband access. This improvement to backhaul capacity over copper enables sustainable adoption in communities where the cost of backhaul upgrade makes the cost of providing broadband cost ineffective. AFBM enabled network equipment would, in effect, serve the entirety of the nation's telecommunications networks, in that the technology can be cost-effectively deployed easily and anywhere copper networks currently exist.

D. QUALIFICATIONS TO DEMONSTRATE ABILITY TO ACHIEVE INTENDED RESULTS
Xtendwave's management and technology team is in place, and has accrued sufficient private investment funding to carry out initial development and proof-of-concept. The team has over 80 years of relevant senior management experience. Additionally, Xtendwave has ongoing university collaboration with Southern Methodist University and The University of Texas at Dallas. Xtendwave has four issued patents covering AFBM technology and has additional applications pending. Xtendwave has received third-party validation of its hardware and is partnering with service providers and equipment providers in the telecom industry to bring Xtendwave's solution to market to provide access backhaul for unserved and underserved households.

Management Team: Morton Aaronson, Chairman and Chief Executive Officer ' 25 years senior management - telecom, technology, energy, start-ups, private, public companies ' VP of Market Management, MCI Business Markets ' President, COO KN Energy. President and CEO of en.able, LLC, ' President, CEO Aerie Networks, ' CEO Ricochet Networks
Dennis I. Robbins, Ph.D., Chief Operating Officer ' 32 years experience - semiconductor and technology ' Former VP of Texas Instruments, - manufacturing operations for analog/mixed signal components, 10 worldwide factories ' Co-founded startups - biomedical field and other ' NSF SBIR panelist for 6 yrs
Ian Dix, Chief Marketing Officer ' 20 years experience in telecom, top marketing executive for both multinational and early phase companies ' CMO ' Safenet, Cincinnati Bell ' EVP of Marketing for Qwest ' SVP of Marketing for LCI ' VP of Marketing for XLConnect - achieved large IPO, later sold to Xerox.
Oren Eliezer, Ph.D., Chief Technology Officer ' Over 20 years experience in digital communication systems and chips ' Co-founder Butterfly Communications, acquired by TI in 1999 ' 30 journal/conference papers, 15 invited seminars and talks, 29 patents and patents-pending
Board of Advisors: Prof. Naofal Al-Dhahir, University of Texas at Dallas ' EE Dept, broadband communication systems, signal processing ' Expert in DSL ' Stanford - student of J. Cioffi ' 'Father of DSL' Prof. Dinesh Rajan, Southern Methodist University ' EE Dept, Southern Methodist University ' Signal processing and digital communications Prof. Paras Balsara, University of Texas at Dallas ' EE Dept ' VLSI, efficient digital architectures Pradeep Shah, Ph.D. ' CEO Texas MicroPower ' Former Texas Instrument Fellow ' Developed several generations of Texas Instrument's VLSI CMOS technologies Mike McCarty ' Managing Director, CRT Investment Banking LLC ' Former Managing Director at Gleacher Partners for eight years ' Former Global Head of Telecom and Technology - SG Warburg
Patents: 1. 7,394,844 Code division multiple access employing orthogonal filter banks 2. 7,362,816 Inversion of channel distortion by adaptive wavelet lifting 3. 7,333,665 Optimal filter-bank wavelet modulation 4. 7,327,845 Transmission of encrypted messages between a transmitter and a receiver utilizing a one-time cryptographic pad
Additional patent applications and internal patent disclosures pending.

Technology Validation: Xtendwave has received a National Science Foundation Phase 1 SBIR award based on Xtendwave's AFBM technology. The award period is Jan 1, 2010 thru June

30, 2010. Notice of the award was received in November, 2009. A copy of the application is available upon request. Xtendwave's FPGA hardware has been tested and evaluated by 3rd parties, using both physical media and wireline simulators. Testing/evaluation was performed by Tekvizion Labs an independent testing and verification lab, most recently in February, 2010. In addition, the technology has been reviewed by Alcatel-Lucent, Frontier Networks, Centurylink, and others and endorsements for Xtendwave's approach have been received. Also, Xtendwave's technology approach has been corroborated via collaborative work with researchers at Southern Methodist University (co-participant on Xtendwave's SBIR award), and The University of Texas at Dallas (ongoing collaboration).

E. JOBS SAVED OR CREATED Xtendwave is a private-equity funded US company, with primary engineering operations in Dallas, Texas. This project will result in creation of approximately 100 technology jobs by 2015, and will result indirectly in potentially thousands of jobs will be created in the telecom service and equipment provider industries, as well as in the semiconductor industry, related to engineering, operations, sales, service and support of AFBM enabled products.

F. OVERALL PROPOSED PROJECT COST The estimated cost to deliver initial production quantities of AFBM XB ASIC chips enabled with Xtendwave's technology is \$10.6M, including 30% matching by Xtendwave.