Introducing xMax

By Daniel Carpini, Marketing Director, xG Technology, Inc.

One of the most pressing issues in the wireless communications industry is the management of finite radio frequency (RF) spectrum that is experiencing heavy demand due to the exploding consumption of mobile services. In the first half of 2010, the average US mobile user was consuming approximately 230 MB/mo in wireless data – an increase of 50% over the prior period. This trend is expected to accelerate, with a predicted annual growth rate of 55% over the next five years (ABI Research).

Recently, the FCC released a report which concluded that while mobile data traffic is expected to be 35 times higher in 2014 than it was in 2009, the network capacity available to deliver it will grow far slower – leading to a what is being referred to a "looming spectrum crisis." The solution to this problem will require finding new sources of spectrum, which the government has already started doing.

Two examples of this were the announced plans to release an additional 500 MHz for wireless broadband services by 2020, and the FCC’s decision to open unused TV white spaces spectrum to mobile devices.

However, licensed spectrum systems alone can’t fill the capacity gap fast enough. A recent white paper published by the Farpoint Group pointed out that there is an alternative, and one with a long history of advantages and benefits: unlicensed spectrum, which is freely owned by the public. While there is agreement there are significant amounts of unused/underused spectrum available, until recently technology has not been sophisticated enough to identify and effectively use it. That’s where cognitive radio technology – which is at the heart of xG Technology’s xMax system – comes in.

Considered the next frontier of wireless radio communications, cognitive radio refers to RF transceiver technology that has been designed with a high degree of intelligence and self-optimizing capabilities, in order to make informed decisions based on past usage and current conditions. The xMax cognitive radio system is able to identify radio frequencies that are not being used, and to quickly tune to those frequencies to transmit and/or receive signals.

It does this by implementing the best form of communication for the required conditions. The system has the built-in ability to select the frequency band, the type of modulation, power levels and other transmission parameters best suited to the requirements of the given location and RF environment. xMax also has the ability to instantly find other spectrum if interference is detected on the frequencies being used.

Some of the key xMax technology features include mobile device-driven handoff

and channel selection with required sensing and other intelligence at the edge of the network, an end-to-end IP architecture with full interoperability with third-party SIP-based VoIP networks, and rapid sensing and radio agility in both the frequency and time domains. From a product point of view, the xMax network solution includes a complete ecosystem of base stations, mobile switching centers, wireless handsets and network management tools.

These features make xMax a compelling solution in a wide variety of wireless sectors, including telecom providers, utilities, and emergency management. Another example is the military market, where xMax can function as a cost-effective on-base communications system for operations and training support, as well as a tactical cellular solution that can deliver voice, data and video services equivalent to commercial cellular service on the battlefield. xG Technology is currently collaborating with the US Army on such a project.

With its power to recognize pockets of available airwaves within unlicensed spectrum xMax cognitive radio networks have the potential to unleash the commercial value of such spectrum in ways not possible with traditional radio technology. This would help free up significant wireless bandwidth and substantially improve overall spectrum utilization – a major FCC policy goal.

Editor’s Note: This is the first of a three part series. Look for the second post next month.

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