



# The CDMA2000 Roadmap Offers Many Paths Forward for Operators

3G CDMA network enhancements are satisfying the growing demand for broadband connectivity

**W**ireless services are transforming industries, businesses and the lives of people. They are becoming the engine for economic development in countries across the globe. An estimated 4.2 billion people depend on mobile services in their professional and personal lives today.<sup>1</sup>

At the core of this revolution is 3G CDMA. Technologies such as UMTS, HSPA+, CDMA2000® and EV-DO are enabling instant access to people, information, corporate resources, multimedia, productivity tools, and other vital communication services that are creating substantial social and economic wealth. They have improved the lives of millions of people, bridging the “digital divide,” particularly in developing countries where teledensity and Internet penetration are low. Nearly 2 billion people use 3G CDMA services today.

Ever since its commercialization in 2000, CDMA2000 technology has been at the forefront of wireless innovation, setting higher standards in voice efficiency and data transmission. CDMA2000’s evolution path allows operators to seamlessly and economically address the ever-increasing demand for voice and broadband data services through forward and backward compatible upgrades. The long-term evolution path of CDMA2000 supports interoperability with and migration to LTE, so both technologies can coexist and operate seamlessly with each other. Some CDMA2000 operators are augmenting their networks with LTE through system overlays, when and where it makes business sense.

Nearly 650 million people in over 120 countries rely on CDMA2000 technologies for voice and broadband services. While 320 operators use CDMA2000 1X for voice, basic data and M2M connectivity services, 85 percent of them have upgraded to EV-DO data-optimized systems to support

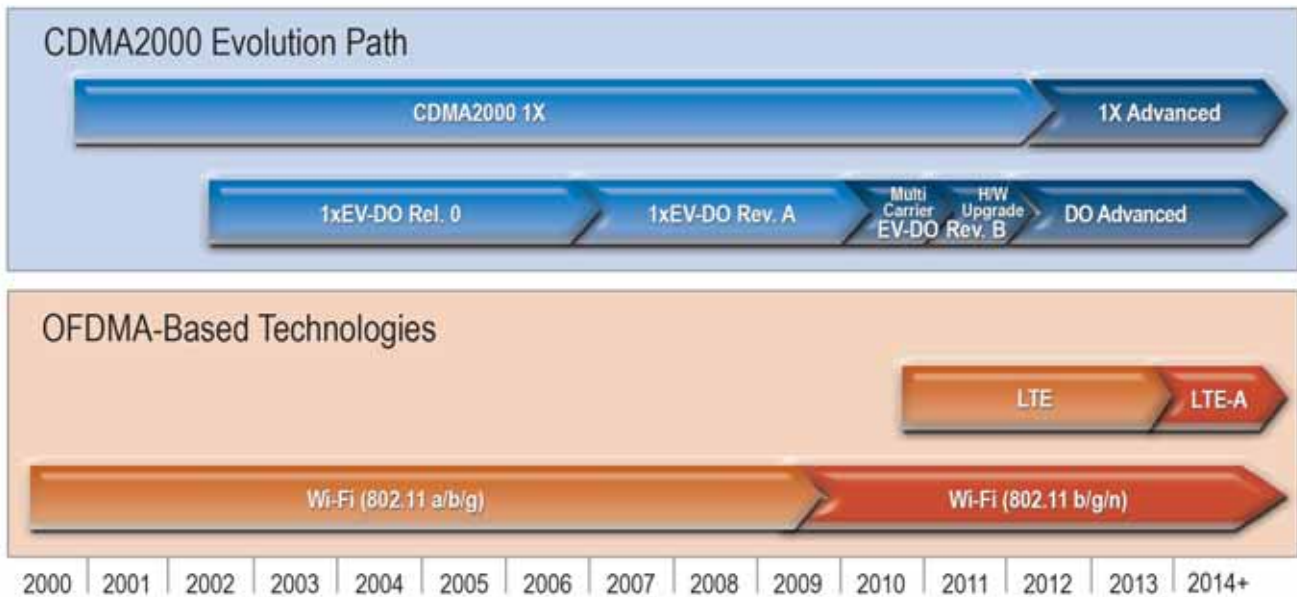
broadband data services.<sup>2</sup> Nearly a quarter billion people around the world use EV-DO-enabled devices today and with the explosive demand for smartphones and tablets, this number is growing exponentially.

## CDMA2000 Offers a Long-Term Evolutionary Path

One of the unique attributes of a CDMA2000 network, is that there are actually two closely intertwined networks in place – one network supporting voice, SMS and basic data services (CDMA2000 1X) and the other network supporting high-speed data traffic (EV-DO). This design has important implications for an operator, who can optimize its network for data traffic without impacting the quality of its voice services and vice versa.

Another advantage of CDMA2000 is that its evolutionary roadmap provides operators with an assortment of options to deliver considerably higher volumes and data traffic capacity over their existing network. In most cases, they can achieve this with backward compatible software enhancements that minimize the need for new hardware and abide by existing standards.

CDMA2000 1X is one of the most spectrally efficient 3G technologies for delivering voice. Over the years, several enhancements have been incorporated to boost its capacity and performance. The latest of them is 1X Advanced, which is being deployed by a number of CDMA2000 operators worldwide. It includes a collection of techniques that can increase voice capacity by up to a factor of four over legacy 1X networks, or trade off this capacity improvement to increase network coverage by up to 70 percent. 1X Advanced also has meaningful implications for data traffic and M2M services. With 1X Advanced supporting data rates of up to 307 kbps – double that of CDMA2000 1X – an operator can offer more



- ▶ bandwidth-intensive applications, including M2M services. Also, CDMA2000 1X (Revision F) optimizes the connection setup and delivery of M2M services by significantly reducing signaling and data transmission network loads, which increases network connection capacity and modem battery life. All of these capacity and performance gains free up spectrum for more EV-DO mobile broadband data services.

The EV-DO standard has also evolved significantly to support the increasing demand for broadband data services. The majority of CDMA2000 operators today use EV-DO Rev. A networks to deliver average broadband data speeds between 600 kbps to 1.4 Mbps, with latencies below 100 ms. A number of operators have deployed next-generation EV-DO Rev. B, which is an evolutionary software or hardware upgrade from Rev. A. The software upgrade aggregates multiple 1.25 MHz EV-DO Rev. A channels and enables data traffic to flow more efficiently across a larger bandwidth. This technique can combine up to three Rev. A channels, increasing the downlink and uplink peak data rates to 9.3 Mbps and 5.4 Mbps respectively within 5 MHz of spectrum, or it can double network capacity. Further performance improvements are possible through a hardware upgrade. By implementing a new channel card and/or radio module, EV-DO Rev. B further increases the peak data rate in the downlink to 14.7 Mbps in a 5 MHz channel and increases the capacity of the uplink by up to 65 percent through techniques such as interference cancellation.

CDMA2000 operators can further boost their broadband network capacity and performance by implementing DO Advanced. These performance gains are realized through a combination of smart network techniques, such as network load balancing, adaptive frequency reuse, distributed network scheduling and single carrier multilink. These techniques can be deployed via a software upgrade across existing EV-DO Rev. A and Rev. B networks, without requiring new spectrum, channel cards or devices. Instead of adding capacity across an entire network, DO Advanced allows operators to dynamically allocate existing network capacity where and when it is needed.

With the wide selection of CDMA2000 devices (over 3,250 have been introduced to the market, including ultra-low cost

devices), CDMA2000 operators across the globe, both in highly developed and developing countries, are able to address the particular needs of their markets and their business objectives.

CDMA2000 operators also offer a large selection of services, including: high-speed mobile broadband Internet access, high-definition video streaming, mobile commerce, entertainment, high-definition voice communications, social networking, enterprise productivity solutions, rich communication services, remote monitoring services and public safety. And, they are at the forefront in delivering M2M applications, supporting remote healthcare services, people and assets monitoring, payment systems and smart grid meter reading across various industries.

#### CDMA2000 and LTE will Coexist and Evolve to Meet the Demand for Data

The CDMA2000 roadmap gives operators the options and flexibility to meet the exploding demand for data traffic well into the future, without compromising the reliability and quality of delivering voice communications. With a combination of software and/or hardware upgrades, they can boost the performance and capacity of their systems quickly and cost-effectively, by adding or combining carriers (Rev. B) or migrating to 1X Advanced and DO Advanced. These options are especially viable in markets, where there is limited spectrum and capital resources to meet the growing demand for both voice and data services.

CDMA2000 also supports seamless interoperability with Wi-Fi and LTE. In densely-populated markets, where large bandwidths of spectrum (e.g., more than 15 MHz) are readily available, operators can deploy LTE to augment their network capacity in high-demand areas while continuing to evolve their IP-based CDMA2000 networks. Prominent operators, such as KDDI, Sprint and Verizon Wireless, intend to operate both LTE and CDMA2000 networks and offer multimode/multiband devices which support both technologies to deliver domestic and global roaming services into the next decade.

**For more information visit:**

[www.cdg.org](http://www.cdg.org)

<sup>1</sup> Ericsson, June 2012,

<sup>2</sup> CDG, June 2012