

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
Amendment of Part 2 of the Commission's Rules to	)	ET Docket No. 00-258
Allocate Spectrum Below 3 GHz for Mobile and	)	
Fixed Services to Support the Introduction of New	)	
Advanced Wireless Services, including Third	)	
Generation Wireless Systems	)	
	)	
Petition for Rulemaking of the Cellular	)	RM-9920
Telecommunications Industry Association	)	
Concerning Implementation of WRC-2000:	)	
Review of Spectrum and Regulatory	)	
Requirements for IMT-2000	)	
	)	
Amendment of the U.S. Table of Frequency	)	RM-9911
Allocations to Designate the 2500-2520/2670-	)	
2690 MHz Frequency Bands for the Mobile-	)	
Satellite Service	)	

**COMMENTS OF THE CDMA DEVELOPMENT GROUP, INC. (CDG)**

The CDMA Development Group ("CDG") hereby submits these comments in response to the Commission's Notice of Proposed Rule Making and Order, ET Docket No. 00-258, released January 5, 2001 (the *NPRM*). The CDG supports the Commission's efforts in initiating a proceeding to address the difficult issues of identifying spectrum for IMT-2000 or third generation wireless systems. It is critical that the FCC take on this issue at this time due to domestic and international pressures to give an indication of what spectrum policies the United States will be pursuing for IMT-2000.

## **Background**

The CDG is a non-profit international trade association of over 100 companies, including the world's leading manufacturers and operators of digital cellular and personal communications services (PCS) systems based on Code Division Multiple Access (CDMA) technology. The CDG's mission is to lead the rapid evolution and deployment of CDMA-based systems, based on open standards and encompassing all core architectures, to meet the needs of markets around the world in an emerging, information-intensive environment. By working together, CDG members help ensure interoperability among CDMA systems, while expediting the availability of CDMA technology to consumers.

CDMA is the newest of the digital wireless interfaces and now, after six years of commercial deployment, reaches over 71 million subscribers. From 1999 to 2000, the number of subscribers increased by over 70 percent. CDMA technologies are licensed to over 75 leading communications manufacturers worldwide. CDMA technology has been adopted by both the U.S. and European standards-setting bodies as an enabling access technology for International Telecommunication Union's (ITU's) IMT-2000.

The first commercial third-generation networks in the world, which have been implemented by Korea's SK Telecom and KT Freetel, are cdma2000 systems. Beyond the networks already operating in Korea, additional cdma2000 systems are expected to begin operations this year in the United States, Canada, Australia, New Zealand, Brazil,

Argentina and Japan. These systems include or will include the following key capabilities and services:

- offering over 144 Kbps data rates;
- providing nearly twice the channel capacity of **cdmaOne™** system and six times the channel capacity as non-CDMA second generation systems, creating more room for data traffic and additional voice subscribers;
- doubling the battery life of existing handsets through improved management of power resources;
- providing mobile access to streaming video, videoconferencing, video mail, and MP3 file transfers;
- advancing delivery of text data services such as m-commerce, location information, education, mobile banking and real-time stock status and trading at anytime and anywhere; and
- offering advanced packet data technology for enhanced network efficiency.

### **Technological Capabilities**

In the *NPRM*, the Commission seeks comment on a number of matters related to the availability of current technology, implementation of technologies that can provide

advanced wireless services, and the appropriate steps that the Commission should take in bringing about these advanced wireless services.<sup>1</sup>

CDMA technology makes highly efficient use of available radio spectrum by using spread spectrum transmission techniques. A CDMA network places both voice and data communications into encoded data strings or packet data that are then spread across a range of frequencies for transmission utilizing a code unique to each user. All CDMA packets are fully protected against noise on the radio link with error correction and error detection applied to all information bits in each packet. The packets can be reassembled and sent to a circuit switch, or the data packets can be maintained and sent to a packet switch or standard IP router. Because of limited packet data throughput achievable through other technologies and ease of upgrading a CDMA network, manufacturers and operators are increasingly pursuing CDMA's spectrally efficient solutions for the implementation of next generation systems.

In the United States, the Telecommunications Industry Association, in conjunction with the Third Generation Partnership Project 2 (3GPP2), developed a third generation CDMA standard referred to as the Multi-Carrier (MC) mode (also known as cdma2000) and the European Telecommunication Standards Institute (ETSI) proposed another CDMA-based standard referred to as the Direct Spread (DS) mode (also known as W-CDMA). The cdma2000 standard includes both a 1X version, employing the standard

---

<sup>1</sup> See Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET-Docket No. 00-258, *Notice of Proposed Rule Making*, FCC 00-455, January 5, 2001 (*NPRM*) at paras. 20, 22-23.

1.25 MHz radio carrier bandwidth and a 3X version designed for a 5 MHz bandwidth that is like the DS mode.<sup>2</sup>

As noted earlier, the first commercial third generation systems, cdma2000 1X systems, are already operating in the Republic of Korea. In the United States, operators Qwest Wireless, Sprint PCS and Verizon Wireless began field testing cdma2000 last year. These operators are expected to deploy commercial cdma2000 systems in the second half of 2001.

The CDMA industry has continued to innovate on the cdma2000 standard. 3GPP2 recently completed the first phase of the cdma2000 1xEV standard. cdma2000 1xEV provides wireless mobile access to the Internet by supporting peak data rates up to 2.4 Mbps (in phase 1) in a standard 1.25 MHz frequency channel. This technology is optimized for the Internet and incorporates a flexible architecture based on standard Internet protocols. cdma2000 1xEV can overlay on an existing network, be integrated into a current CDMA system, or operate as a stand-alone system.

With regard to the ability for first generation and second generation service providers to use its existing spectrum to provide advanced services, CDMA technology provides an option for these operators. The cdma2000 standard was developed with a philosophy of spectrum independence, and can be used in current bands (e.g., PCS, cellular, NMT) as well as IMT bands. cdma2000 1X, with its 1.25 MHz bandwidth, can

---

<sup>2</sup> Various names for the cdma2000 standard have resulted from the naming conventions of different standards organizations or phases in the standards process. These names are used interchangeably. To clarify, IMT-CDMA Multi Carrier 1X/3X is the ITU standards name; MC-1X and MC-3X are the abbreviations of the ITU standards names; cdma2000 phase 1 (1X) is also known as 1XRTT and phase 2

be used to upgrade any existing cellular system without denying services to customers and 1X will nearly double capacity of **cdmaOne** voice networks. W-CDMA, with its 5 MHz bandwidth, will in most cases require the licensing of new spectrum.

With regard to what appropriate steps should be taken, the Commission should be commended for its flexible regulatory policies regarding cellular and PCS that have allowed operators to upgrade their existing networks to meet consumer's demands. The Commission's flexible use policies will likely result in the United States becoming one of the first countries to introduce third generation services to certain segments of the market. This approach is in stark contrast to many other countries that place strict service criteria on a particular band of radio spectrum. An example is Europe's decision to assign particular mobile bands of radio spectrum to specific technologies, thus particular spectrum bands are reserved for second-generation mobile systems (i.e., GSM) and other bands for third generation wireless systems. In the United States, second-generation systems for cellular and PCS systems can upgrade their systems to third generation wireless systems without coming back to the regulator for approval or to pay additional fees. The operator can upgrade its system as the market demands because of the FCC's flexible regulatory approach. The Commission should continue to follow the approach that allows consumers to benefit from technology upgrades without requiring burdensome and lengthy regulatory processes to introduce advanced services.

---

(3X) is known as 3XRTT; and TIA's designation is IS-2000. High data rate cdma2000 technology is referred to as cdma2000 1xEV and TIA's designation is IS-856.

As the Commission examines new technologies for meeting demand for new data services in its decision making process, it must have a clear understanding of the current available technology, what capabilities technologies will offer in the immediate future, and what capabilities are far from being available in the marketplace. The Commission must filter “hype” from reality.

### **Migration Capabilities of CDMA Technology**

The Commission seeks comment on current trends in technology and migration paths to advanced wireless systems, as well as the cost impacts and other financial impacts that these technologies and migration paths will have on manufacturers, system operators, and consumers.<sup>3</sup> The Commission also asks what migration paths to advanced wireless services are being considered and how the type of technology currently used by a system provider influences its transition plans.<sup>4</sup> CDMA technology offers a unique and convincing evolutionary migration path from **cdmaOne** (second generation wireless) to cdma2000 (the third generation standard). When **cdmaOne** was originally being developed, scalability and a clear migration path to protect operators' investments were "must-haves." Therefore, a **cdmaOne** operator is assured of a graceful evolution path that is not available to other second generation digital technologies. The flexible migration of **cdmaOne** provides a series of upgrades leading to third generation

---

<sup>3</sup> *NPRM* at para. 18.

<sup>4</sup> *NPRM* at para. 23.

cdma2000, allowing each operator to upgrade when its individual market requirements dictate.

The evolution of the air interface, capability of the core network (ANSI-41), and spectrum flexibility assure that **cdmaOne** operators with immediate needs for third generation services can deploy them but allows other operators to wait until the market demand exists. The packet data design, which was included in the IS-95 standard from the very beginning, makes the **cdmaOne** base stations and CDMA handsets packet-data capable today. Thus, CDMA systems do not face the expensive packet data implementation that other technologies face. Additionally, systems are backward compatible and are planned to preserve operators' investments every step of the way. CDMA requires no expensive 2.5 generation interim networks that must be replaced by new third generation systems. Moreover, new cdma2000 1X handsets enable seamless roaming from network to network and between second generation and third generation systems.

One CDG member carrier envisions that it will be able to deploy the technology ubiquitously by simply plugging in new third generation channel cards to its existing base stations and adding software enhancements to base station controllers and base transceiver stations. This U.S. carrier expects that its costs to upgrade its national **cdmaOne** network to cdma2000 1X will be a comparatively low \$700-800 million

dollars.<sup>5</sup> Due to the added voice capacity -- double the second generation capacity of **cdmaOne** network, as well as higher data rate services, the investment is expected to be recouped quickly because of greater consumer usage and extended business applications. This is far lower than the costs for deploying entirely new third generation networks. Mobilcom of Germany expects to be able to reach 50 percent of the German population with investments of 1.6 billion euros (US \$1.405 billion).<sup>6</sup> Considering the difference in size of a national network that covers the United States and one that reaches half the population of Germany, this is a striking difference.

Because of the evolutionary path of **cdmaOne** systems to cdma2000, operators will be able to upgrade to third generation in their current bands. The CDG recognizes that sizeable investments have already been made in PCS and cellular spectrum bands and believes that in-band evolution to third generation with CDMA technology brings benefits to all operators including greater economies of scale, reduced complexity, reduced time to deployment, and simplified roaming.

Operators deploying CDMA technologies will be able to deploy cdma2000 in existing bands, as well as new bands, which will allow operators to save potentially billions of dollars on new spectrum until their customer base outgrows the spectrum available. Some of the proposed third generation technologies need completely new spectrum because there is no evolutionary path for their current second generation systems. This is simply not the case for cdma2000 systems, which can also be deployed

---

<sup>5</sup> Wireless Review, January 2001.

<sup>6</sup> "Hutchinson and MobilCom Predict Lower 3G Roll-Out Costs," Reuters, December 13, 2000.

in current bands or in newly identified bands. The advantage of CDMA technology is that it provides operators with maximum flexibility in deploying services. In the *NPRM*,<sup>7</sup> the Commission notes that a CDMA system could upgrade their technology to IS-95B technology. In fact, many CDMA operators are skipping the IS-95B stage and are deploying third generation cdma2000 technology in order to achieve the data rates above 144 Kbps with 1X and reaching 380 Kbps in the future.

In addition to being able to operate in all bands, cdma2000 can be implemented by both TDMA and GSM carriers. CDMA and TDMA share the ANSI-41 standard for their network backbone. Any wireless operator using ANSI-41 as its network standard can deploy a cdma2000 system. This is an extremely viable option for TDMA carriers who are operating under licensing frameworks that do not mandate specific technology choices. For example, after initially deploying TDMA digital technology in November 1993, Bell Mobility of Canada decided to deploy CDMA technology rather than continuing to incrementally improve its TDMA system.<sup>8</sup> Bell Mobility is continuing to deploy **cdmaOne** and has completed 1X field trials to deliver voice and data speeds of up to 144 Kbps in Ontario and will begin commercial deployment of third generation capabilities in late 2001.

For GSM operators, the story is equally compelling. When the ITU completed the IMT-2000 CDMA standards, they included the capability to deploy cdma2000 on the

---

<sup>7</sup> *NPRM* at para. 16.

<sup>8</sup>“The Move to CDMA: Bell Mobility’s Technology Decision” by Brian O’Shaughnessy, Vice President, Technology Development, Bell Mobility. [www.cdg.org/features/guestcol/oshughnessy.html](http://www.cdg.org/features/guestcol/oshughnessy.html)

GSM MAP core network. Provided the regulatory framework exists, GSM operators can also enjoy the benefits of cdma2000.

### **Standards**

The IMT-2000 radio interface standards provide a solid basis for deployment advanced wireless services. It is important, however, to ensure that these standards can evolve to meet the changing demands of the marketplace. The cdma2000 1xEV standard mentioned previously, for example, is an enhancement to cdma2000 being undertaken as part of the ITU process.

It is important that the industry standards process be responsive and flexible to meeting changes in the industry. cdma2000 1xEV is designed to operate in the same 1.25 MHz channel as cdma2000 1X.

### **Global Roaming and Spectrum Bands**

International roaming is an important capability of wireless systems. Subscribers are roaming on **cdmaOne** systems in the Asia-Pacific region, as well as between North America and the Asia-Pacific region. It is expected that similar agreements will be established within the Americas in the very near future.

Global roaming within the U.S. cellular and PCS frequency bands, which were included in the bands identified by the ITU for IMT-2000, will be difficult to achieve because the use of these particular bands differs across various regions. Many countries in the Americas will allow cellular and PCS operations in the 800 MHz and 1850-1990

MHz bands to upgrade their systems to third generation in those bands as market needs arise (e.g., Argentina, Canada, Chile, Mexico, and Peru). It is important to ensure that these allocations continue. Consumers in these countries will enjoy regional roaming in their current bands for third generation services as operators around the region, including the United States, overlay the advanced systems on their cellular and PCS networks.

In addition, many countries in the Americas are considering using the 1710-1850 MHz band for additional frequencies for IMT-2000, although some countries are considering pairing portions of that band with the 2110-2200 MHz band. Although this would enable a "global" downlink in the 2110-2200 MHz band, the problem that arises is that the integrity of the European DCS-1800 band, and any in-band pairing associated with that band, would be lost. Much of the decision of whether pairing that follows the European DCS-1800 band plan is chosen for the United States depends on the availability of the U.S. Government parts of the band (1755-1850 MHz).

Thus, to facilitate global roaming and gain economies of scale, it is critical that spectrum decisions in the United States be aligned as much as possible with national decisions that will result from WRC-2000. To this end, the CDG urges the Commission to identify the maximum amount of spectrum that is harmonized within our region and throughout the world.

## **CONCLUSION**

The CDG believes that the next few years will bring exciting new developments in the deployment of third generation technologies, particular those based on CDMA technology. The spectrally efficient CDMA technologies will maximize the services that can be provided within the spectrum that is designated for third generation wireless systems. However, due to the tremendous growth of the demand for wireless services, the CDG supports the FCC's efforts to identify new spectrum for third generation wireless services. To maximize roaming and economies of scale, the CDG, therefore encourages harmonization of IMT-2000 band plans to the extent possible.

Respectfully submitted,

**CDMA DEVELOPMENT GROUP, INC.**

Perry M. LaForge

Executive Director

575 Anton Boulevard, Suite 560

Costa Mesa, California 92626

Date: \_\_\_\_\_