Seeking Evolution of Networks to Satisfy Customers

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"Anytime, anywhere, with anyone" . . . I was taught this phrase as keywords summarizing the target qualities of mobile communication systems by my superiors and senior co-workers about 20 years ago when I joined NTT. Soon after I entered the company, 2.4-kbps circuit-switched data communication service using the PDC standard began. At that time, the service was called "non-telephone communication," indicating the fact that voice calls directly between customers made up almost all mobile communication. "With anyone" was expressed vividly by that trend then. How the times have changed. Afterwards, 28.8-kbps packet communication service appeared in the form of the PDC-P protocol in 1997, and services utilizing data communication in mobile environments grew. The standards then proceeded to W-CDMA and HSPA and LTE. We began PREMIUM 4G™*1 in March this year as an LTE Advanced service, ushering in the era of speeds greater than 225 Mbps.

With the realization of high-speed data communication, services dealing with high-volume contents, such as high-resolution video distribution and cloud services, have grown. At the same time, real-time message communication services are also expanding. Furthermore, as represented by the VoLTE service, launched last year, and the flat-rate system for voice calls, one can sense that even the conception of service for voice communication, the original point of mobile communication, is coming under review. So that customers can use such evolving and diversifying services with convenience and peace of mind, what is critical is not just improving data communication's speed and capacity. Also important is ensuring the basic quality of mobile communication systems with criteria such as "connection" and "without interruption," especially for message and voice communication. Our mission as mobile communication system developers is to respond to these demands by incessantly advancing the sophistication of networks.

We are now in the era of LTE. Together with the advent of this standard, high-speed technologies such as MIMO and carrier aggregation and various interference-reduction technologies have been developed as devices have evolved. Mobile communication networks have dramatically progressed. Technologies have also advanced to allow customers to securely use mobile phones. Examples include traffic control technologies so that more customers can communicate even during extremely crowded conditions, such as during a disaster and in an event space. However, even as such new technologies are being created, it is also effective to create new value by making ingenious use of current technologies and combining multiple technologies to improve the efficiency of network performance. An example is NTT DOCOMO's proposal of advanced C-RAN for the deployment of LTE-Advanced, which it then developed. This system combines two technologies – carrier aggregation and heterogeneous networks – to provide high-speed and high-quality network services. NTT DOCOMO is able to pioneer this system precisely because it intimately understands communication systems from its experience in network operations and standardization activities. We wish to continue to leverage this know-how and thoroughly exploit such existing knowledge going forward.

We have strengthened networks to meet the proliferation of services and terminals such as i-mode and smartphones. These technologies have brought about major changes to mobile communication traffic. In the coming Internet of Things (IoT) era, communication traffic different in character from those of today's mobile communication networks will be produced by the arrival of terminals with even more diverse forms of communication. To flexibly adapt to these changes and demonstrate high performance, we must respond with a fine balance of "developing new technologies" and "taking advantage of existing technologies." We also wish to maximize our utilization of the wireless spectrum, a limited resource, and continue to build robust yet flexible networks so that our customers can conveniently use mobile systems "anytime and anywhere."

*1 **PREMIUM 4G™:** A trademark of NTT DOCOMO.