EV-DO Rev. B

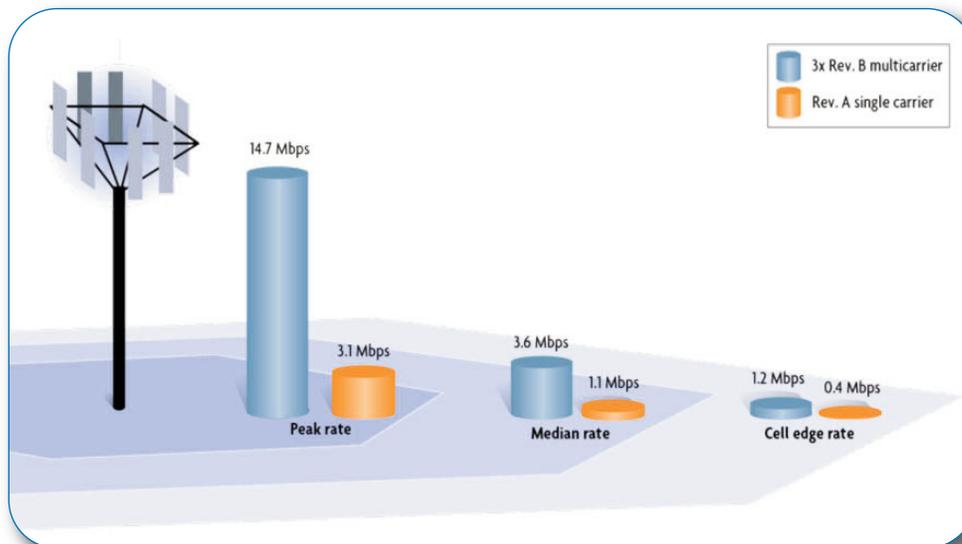## World's first multicarrier broadband technology

EV-DO Rev. B is an evolutionary software or hardware upgrade from EV-DO Rev. A. It more than triples the data rate for all users or doubles the network capacity (for bursty applications) over that offered by an EV-DO Rev. A network in 5 MHz of bandwidth.

By aggregating multiple 1.25 MHz Rev. A channels, via a software upgrade, EV-DO Rev. B enables data traffic to flow more efficiently across a larger bandwidth. This improves data throughputs and latencies in both the downlink and uplink. It also increases system capacity through significant trunking and frequency diversity gains.

> ### EV-DO Rev. B Benefits
>
> - Broadband data speeds
> - Increased network capacity (bursty apps)
> - More efficient use of existing resources
> - Improved end user experience
> - Lower latency
> - Improved cell edge performance
> - Cost-effective software upgrade
> - Backwards compatibility

Software Upgrade: The quickest and most affordable way to enable these performance enhancements is through a multicarrier software upgrade. By upgrading existing channel cards and Radio Network Controllers (RNC), an operator's Rev. A hardware investment is protected. No changes are required to any Packet Data Service Nodes (PDSNs), Home Agents (HAs), or other core network elements.
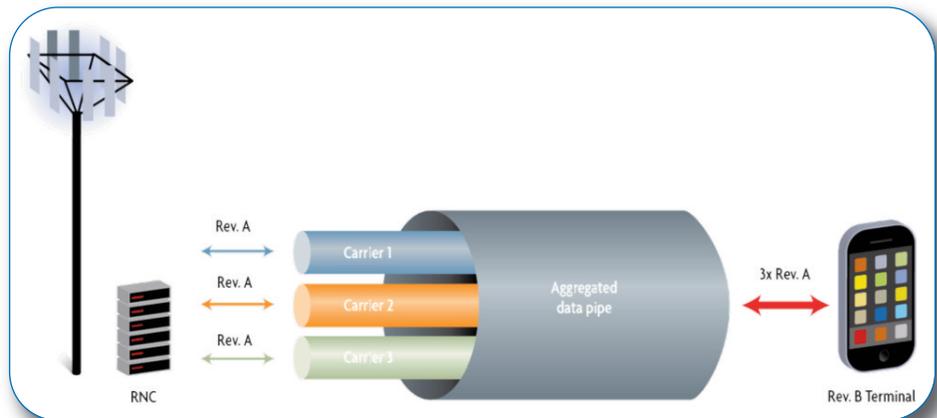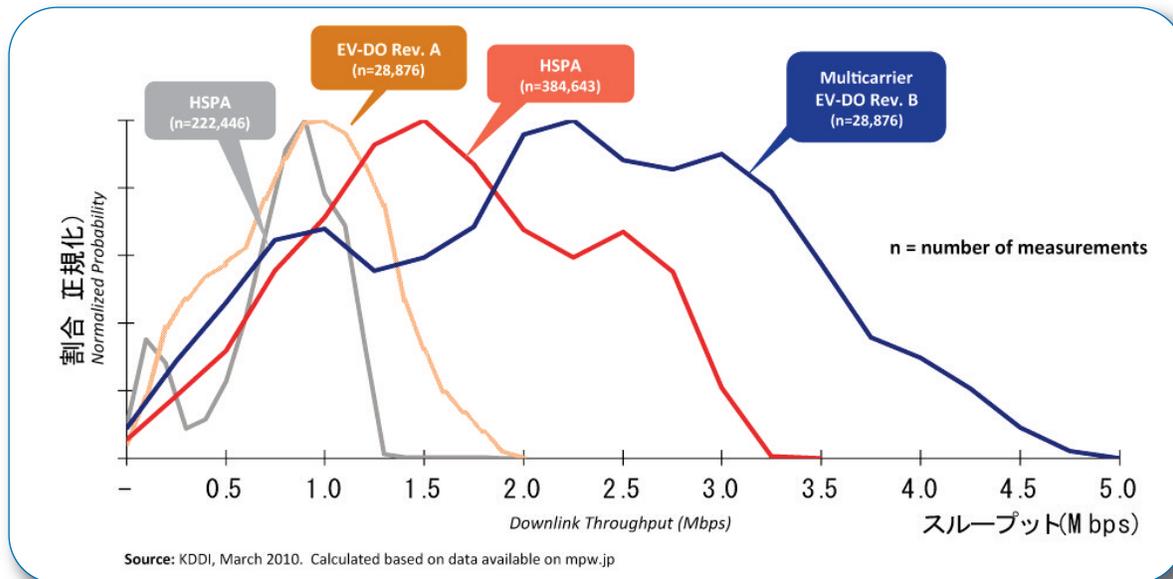
The software upgrade enables peak data rates of up to 9.3 Mbps and 5.4 Mbps in the forward and reverse link, respectively. Its user experience and average sector

throughput of 1.2 Mbps per MHz is equivalent to that of HSPA+ (Rel. 7) which advertises a much higher peak data rate of 21 Mbps. Improvements in the user experience are both perceivable and quantifiable in terms of connection times, file download times, quality of video streaming and voice over IP (VoIP) latency**.**

Hardware Upgrade: 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 more processing power and interference cancellation.

Voice network performance is defined by the number of blocked or dropped calls. Data network performance is defined by a uniform user experience across the entire cell coverage area, most importantly at the cell edge.

EV-DO Rev. A (n=28,876)

HSPA (n=222,446)

HSPA (n=384,643)

Multicarrier EV-DO Rev. B (n=28,876)

n = number of measurements

割合 正規化) / Normalized Probability

Downlink Throughput (Mbps)

スループット(M bps)

Source: KDDI, March 2010. Calculated based on data available on mpw.jp

Delivering a more responsive service all the way to the cell edge enables EV-DO Rev. B to provide a more consistent user experience across the entire network, especially inside of buildings. EV-DO Rev. B's cell edge performance is equivalent to that of LTE within the same amount of bandwidth and number of antennas.

Key benefits and features of Multicarrier EV-DO and Rev. B include:

- **Broadband Data Speeds:** The Multicarrier EV-DO software upgrade delivers a peak data rate of **9.3 Mbps** in the downlink and **5.4 Mbps** in the uplink, and with a Rev. B hardware upgrade, the peak data rate in the downlink increases to **14.7 Mbps**. The average downlink sector throughput is **1.2 Mbps** in 5 MHz of bandwidth.

- **Higher Network Efficiency:** Another benefit of the increased bandwidth and multicarrier operations is greater network trunking efficiencies which lead to high aggregate data and increased network capacity.

- **Very Low Average Latency:** EV-DO Rev. B's very low latency makes it ideal for delay-sensitive applications.

- **Doubling of Network Capacity:** EV-DO Rev. B more than doubles network capacity for bursty applications (e.g., web browsing).

- **Quality of Service (QoS):** Like EV-DO Rev. A, EV-DO Rev. B supports the prioritization and delivery of individual packets based on the type of application or user profile. These mechanisms ensure a consistent, high-quality user experience across the full range of applications, from delay-sensitive VoIP services to high-bandwidth video.

- **All-IP:** Like EV-DO Rev. A, IP-based EV-DO Rev. B networks provide operators with service flexibility and higher bandwidth efficiencies, which translate into greater control of service enablement and a significant cost savings.

- **Advanced Services:** EV-DO Rev. B can support bandwidth-intensive applications and delay-sensitive applications such as VoIP, video conferencing, concurrent voice and multimedia services, and 3D multiplayer online gaming. EV-DO Rev. B can also incorporate enhanced OFDM-based multicasting capabilities to enable the delivery of rich multimedia content.

- **Backwards Compatibility:** EV-DO Rev. B networks support existing Rel. 0 and Rev. A applications and devices and EV-DO Rev. B handsets will operate on all Rel. 0 and Rev. A networks. Rev. B is fully compatible with CDMA2000 1X and LTE networks.

Since EV-DO Rev. B is fully backwards compatible with EV-DO Rel. 0 and Rev. A, users will see an improvement in the performance of their legacy EV-DO devices as the more efficient EV-DO Rev. B devices are connected to the network.