DSL is now the world’s favorite broadband technology for surfing the Internet, uploading photos and videos onto popular Web 2.0 sites and, more and more, for watching TV. According to Point Topic, in December 2006 two thirds of the world’s 281 million broadband users were connected via DSL. And by 2009, according to the Stanford Group, there will be 258 million DSL users. Cable modems, satellite connections, and optical fibers are less widespread.

In the meantime, many experts believe that most connections to the Internet will soon be made via mobile terminals instead of stationary computers. After all, the number of cellular phone connections worldwide exceeded three billion in August 2007 according to the European Information Technology Observatory market research institute (EITO). Furthermore, EITO forecasts that this number will hit four billion by 2010, with another billion to come by 2015. This figure not only includes SIM cards for cell phones and smart phones, but also data cards for notebooks. Most of the growth is occurring in Asia (especially in China and India) and in Latin America. In India, six million new cell phone subscribers sign up every month.

Cellular radio networks still have enormous potential in terms of data rates. Third generation (3G) networks, currently with 114 million UMTS users worldwide, are now being upgraded from 384 kilobits per second (kb/s) to higher data speeds. According to the GSM Association (GSMA), the international industry association of more than 700 cellular radio operators, 155 UMTS networks are now “on air” in 68 countries worldwide. High Speed Packet Access (HSPA) has already been switched on by 110 of these networks in 57 countries, and another 52 network operators are planning to start using the technology soon. HSPA boosts transmission capacity from its current 7.2 megabits per second (Mb/s) downlink (DL) and 1.46 Mb/s uplink (UL) to up to 14.4 Mb/s (DL) and 5.72 Mb/s (UL) over a range of upgrade steps. According to estimates, HSPA is set to become the leading UMTS technology, with around a billion users worldwide by 2012.

Chip manufacturers and suppliers of network technology both expect more powerful UMTS networks to offer even higher bandwidths starting in 2009. In combination with special transmission methods such as OFDM (orthogonal frequency division multiplexing) and multi-antenna systems, they expect to see 42 Mb/s (DL) and 11 Mb/s (UL). Fourth generation cellular radio networks, whose standardization is about to begin, are expected to offer 100 Mb/s and more, starting in 2011.

Networks are also being launched with wireless WiMAX (worldwide interoperability for microwave access) technology. Analysts from Credit Suisse First Boston estimate that mobile WiMAX will usher in data rates of 2 Mb/s to 70 Mb/s, while experts from Arthur D. Little expect peak rates of 16.8 Mb/s.

Around the world, terminal manufacturers are reacting to the coexistence of different mobile broadband technologies and offering cell phones, smart phones, hand-helds, and notebooks with multiple technologies on board. Frost & Sullivan’s market researchers are highlighting in particular cell phones capable of phoning via both cellular networks and, at lower cost, WLAN connections. Experts from Strategy Analytics forecast that around 15 million notebooks with integrated 3G modems will be delivered in 2009. Competition comes from Intel’s WiMAX chipsets, which are also being used in notebooks.

The industry also sees great advantages in high bandwidths, for example in the use of industrial Ethernet in factories. The market for industrial Ethernet equipment is growing by more than 51 percent per year, according to a 2005 study from the ARC Advisory Group. This suggests that the number of industrial Ethernet units will grow from its current 3.1 million to 6.6 million in 2009. Industrial Wireless Lan (IWLAN) is also making progress. According to the ARC Advisory Group, the market for wireless industrial equipment will grow from $453 million in 2007 to $1 billion in 2010.

Nikola Wohllaib

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**Demand for Ethernet connections**

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**CAGR** 51.4%

**Sales of hardware, software, services, millions of US$**

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**CAGR** 26%

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**Demand for wireless technologies in industry**

**Sales of hardware, software, services, millions of US$**

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**CAGR** 26%

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**DSL dominates fixed-line broadband connections worldwide**

- **DSL**
- **Cable**
- **FTTx**

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**CAGR** 11.1%

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**Demand for wireless technologies in industry**

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