

5 G WIRELESS SYSTEMS

In telecommunications, **5G** is technology standard for broadband cellular networks, which cellular phone companies began deploying worldwide in 2019, and is the planned successor to the 4G networks which provide connectivity to most current cellphones. 5G networks are predicted to have more than 1.7 billion subscribers worldwide by 2025, according to the GSM Association. Like its predecessors, 5G networks are cellular networks, in which the service area is divided into small geographical areas called *cells*. All 5G wireless devices in a cell are connected to the Internet and telephone network by radio waves through a local antenna in the cell. The main advantage of the new networks is that they will have greater bandwidth, giving higher download speeds, eventually up to 10 gigabits per second (Gbit/s). Due to the increased bandwidth, it is expected the networks will increasingly be used as general internet service providers for laptops and desktop computers, competing with existing ISPs such as cable internet, and also will make possible new applications in internet-of-things and machine-to-machine areas. 4G cellphones are not able to use the new networks, which require 5G-enabled wireless devices.

Performance

Speed

5G speeds will range from ~50 Mbps to over 1 Gbps. The fastest 5G speeds would be in the mmWave bands and can reach 4 Gb/s with carrier aggregation and MIMO.

Latency

In 5G, the "air latency" is of the order of 8–12 milliseconds. The latency to the server must be added to the "air latency" for most comparisons.

Error Rate

5G uses adaptive modulation and coding scheme (MCS) to keep the bit error rate extremely low..

Range

The range of 5G depends on many factors. A key factor is the frequency being used. mmWave signals tend to have a range of only a couple of hundred meters whilst low band signals generally have a range of a couple of kilometer

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