

Looking Beyond 5G

Even as 5G wireless moves into the mainstream, technologists are already looking ahead to the next generation—6G, expected to come on stream in the 2030s. Here's a look at some of the use cases and data-driven needs for wireless technology that will push the expansion to 6G communications. (For more on one technical option for getting to a 6G world—accessing the terahertz band—see the feature article on p. 36.)

6G: Extreme high-speed & high-capacity communications

Extreme high data rate & capacity

Peak data rate of **>100 Gbps** exploiting new spectrum bands at **>100x** capacity

Extreme coverage

Blanket global Gbps coverage, expanded to **10,000 m** in the sky and extended coverage at sea

Extreme low latency

End-to-end consistent low latency of **<1 ms**

Extreme low energy & cost

Affordable **mmW/THz** networks and devices free from battery charging

Extreme high reliability

Guaranteed quality of service with **~99.99999%** reliability—secure, private, safe and resilient



Extreme massive connectivity

Massive connected devices (**10 M/km²**) with sensing capabilities and high-precision positioning (**cm-order**)

A 6G worldview

Solving social problems

Access for all people, goods and information anywhere in an ultra-real experience, will eliminate social and cultural disparities between rural and urban areas and promote local development

Expanded communication environment

Every place on the ground, sky, and sea will become a communications area, and users will no longer need to be aware of communication settings or service area

Cyber-physical fusion

Cyberspace will support human thought and action in real time through wearable and mounted devices, and all things will be linked, including cars, machinery, tools, cameras and sensors

Communication between humans and things

Innovative services for entertainment, gaming and watching sports will be ultra-real and rich and provided without time and place restrictions