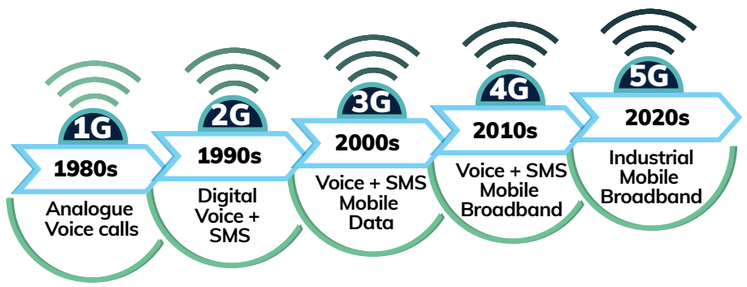
Australian Government
Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Bureau of Communications, Arts and Regional Research

# Fact Sheet: 5G mobile technology

## Why is 5G different?

**Fifth** generation (5G) mobile networks and technology are being deployed globally. Opportunities for 5G already exist in Australia for both consumers and business. Further use cases will emerge as 5G coverage expands.

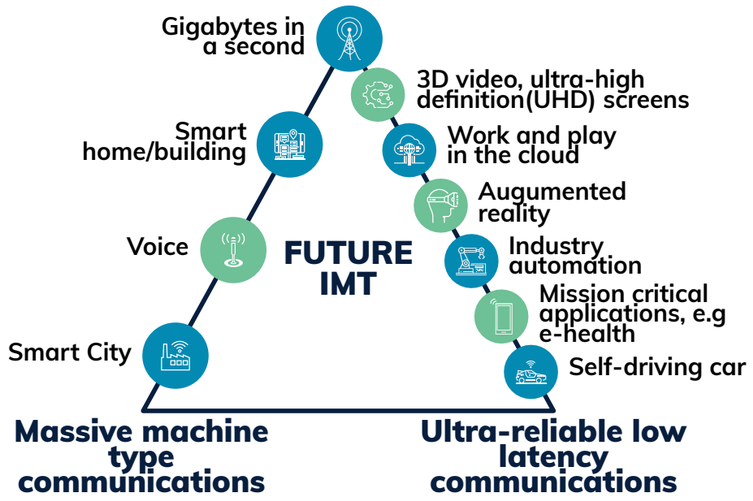



### 5G has three standout features over past Gs:

- **Enhanced mobile broadband** – capable of delivering 'fibre-like' speeds (up to 20 gigabits per second) under certain configurations.
- **Massive machine type communications** – connects millions of sensors and devices to support smart cities, agriculture and factories.
- **Ultra-reliable low latency communications** – enables real-time (1 millisecond latency) communication for autonomous vehicles, robotics control and telehealth applications.

## Use cases: the '5G triangle'

By combining these three features, 5G will enable innovations in industry automation, augmented and virtual reality, and e-health over the coming decade.




**Tip:** Latency is the time delay between communications over a network. The lower the latency, the quicker the response time after an event occurs. Low latency is essential for applications where instant feedback is vital, such as autonomous vehicles and telesurgery.

## Thinking smart: what can we do with 5G?

### Smart cities and homes

5G supports high-density networks of sensors to support surveillance, smart infrastructure and transport, smart lighting and safety enhancements.

### Smart farming

5G environmental sensors/actuators combine with artificial intelligence image recognition to create fully-connected smart indoor farms to grow quality crops year-round.

### Smart national grids

5G exceeds terrestrial non-mobile internet of things technology capability to operate smart power grids requiring real-time access to large volumes of sensor data over a vast area.

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# Emerging 5G use cases

## Supply chains

### Smart factories and warehouses

**5G** supports real time reactions/ controls for operating machines and robots via large numbers of sensors. Useful for the automated operation of factories and parcel sorting centres.

### Freight, logistics and distribution

**Productivity** increase through real-time goods tracking with internet of things tags and new technologies such as remotely operated vehicles, delivery 'robots', and UAVs [unmanned aerial vehicles].

**Tip:** Jitter is small intermittent delays during data transfers that can disrupt smooth communications.

## Transport

### Road and transport network management

**Real-time** data from connected vehicles and sensors can help improve safety, reduce congestion, and assist network management.

### Mobility as a service and public transport

**Improvements** to traveller convenience through seamless connectivity between transport modes and provision of timely information.

5G capabilities can enable new applications requiring end-to-end security, ultra reliability and time critical data traffic.

The low latency of 5G will create new opportunities for the health sector including virtual diagnostics and potentially robot assisted surgery.

## Health

### Telesurgery

**Telesurgery** needs to overcome the latency caused by physical distance to be safely deployed. Deploying 5G as a private network in rural/regional hospitals can bring health data closer to patients and make equipment safer by cutting the wires.

**Estimated requirements for 5G health applications:**

| Applications | Scenarios | Latency (ms) | Jitter (ms) |
|---|---|---|---|
| **Telepresence** and robotic telesurgery | Telesurgery | 5 | 2 |
| | Wireless robots | 1 | 1 |
| **Remote** pervasive monitoring | In hospital | 250 | 25 |
| | At home | 250 | 25 |
| **Healthcare** in rural areas | | 20 | 10 |

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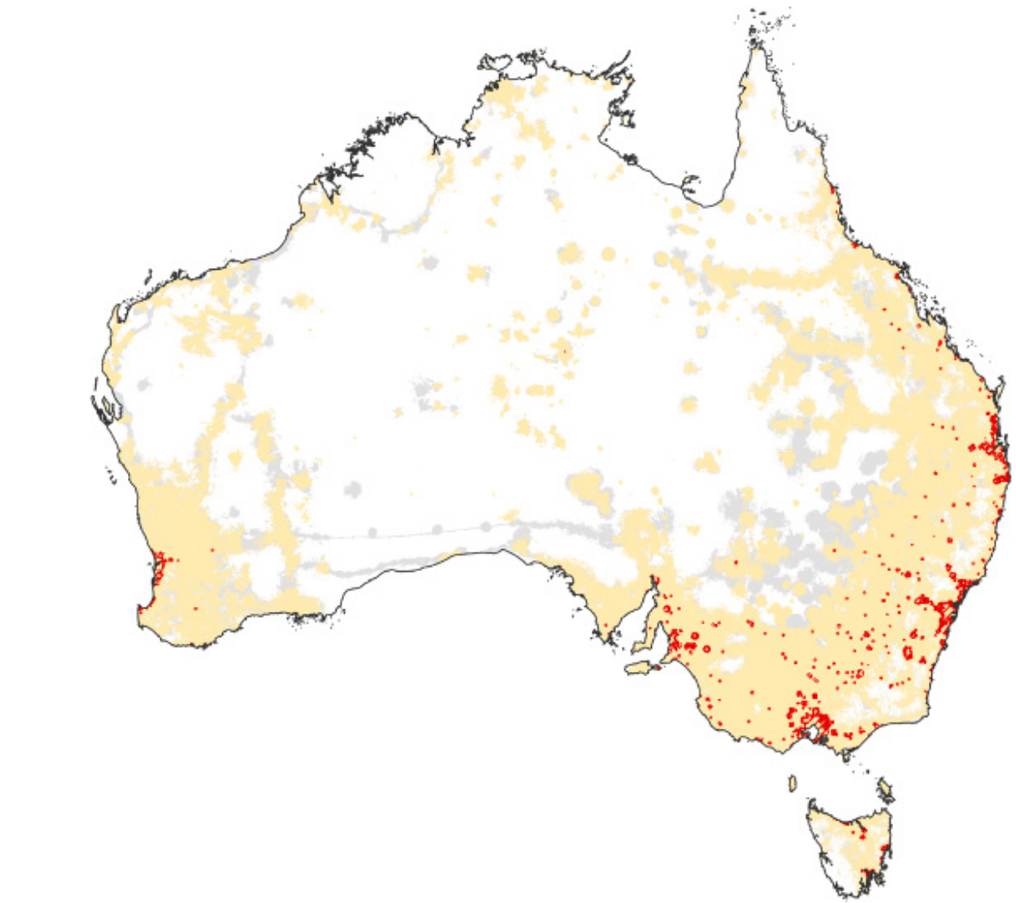
# As coverage expands, watch this space...




Source: ACCC Mobile Infrastructure Report – data release, October 2021

**Networks:** 5G public networks continue to be rolled out and require more widespread coverage to enable new uses.

**Spectrum:** 5G requires a mix of spectrum bands to achieve both wide coverage (lower band) and capacity (higher band mmWave). Australian mobile network operators currently have a balanced mix of spectrum assets for 5G.

**Tip:** Spectrum is the radio frequencies that wireless signals travel over.

**Regulation:** regulatory settings for new technologies like autonomous vehicles, artificial intelligence and drones are being developed to ensure safe operation.

**Edge computing:** more data centres in regional locations will assist network rollouts and improve latency and capacity for remote applications.

**Software and devices:** new technologies are being developed and refined for use with 5G networks.

**5G from space:** new standards aim to support greater integration of terrestrial 5G networks and low-earth orbit (LEO) satellite networks.

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