

Research and Insights

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Communication tower infrastructure: Explaining the 'Gs' that are changing communications

After years of cable broadband, is 5G set to change everything in the communications market? How are the opportunities in 5G benefitting infrastructure, and communications towers? In this note, Ausbil Global Infrastructure answers the fundamental questions about 5G, and how wireless technology is taking over cable in communications.

Q: What is 5G?

A: 5G is the 5th generation of global wireless technology used for mobile and internet services. To state the obvious, the 'G' in 5G stands for generation. 5G is the next stage in the evolution of communication technology that follows the previous 'Gs' from 1 to 4. Over time, the 'Gs' have progressed across data speed and volume, to be able to support an increasing array of functions and data loads that grow with the increasing demand network effect in communications. Table 1 summarises the 'Gs' so far.

Table 1: Meet the 'OGs'

Understanding the 'Gs' of Communications

	1G	2G	3G	4G	5G
Launched Technology	1980s	1991	2001	2009	2020
Download Speeds (bit/s)	Analogue	Digital	Digital	Digital	Up to 100Mbps
Supports this capacity	NA	>14.4kbps	>144kbps	Up to 100Mbps	Targets up to 10Gbps
Voice	Yes	Yes	Yes	Yes	Yes
SMS/MMS		Yes	Yes	Yes	Yes
Mobile internet			Yes	Yes	Yes
Video calls			Yes	Yes	Yes
Mobile broadband internet				Yes	Yes
HD TV				Yes	Yes
Cloud computing				Yes	Yes
Internet of Things (IoT)					Yes

Bits explained

8 bits = 1 byte

Kilobit per second: kbps, kbit/s, kb/s

8 kbs = 1 kilobyte per second

Megabit per second: Mbps, Mbit/s, Mb/s

Gigabit per second: Gbps, Gbit/s, Gb/s

Source: Ausbil

In simplified terms, like earlier generations of communications technology, 5G adopts radio wave technology rather than using physical conduits, so it is invisible and not something you can touch or feel. Mobile networks typically operate within frequencies from around several hundred megahertz up to 40 gigahertz. Other uses for this part of the radio wave spectrum include TV broadcasting, GPS, Wi-Fi, Bluetooth and cordless phones.

5G builds on advancements in radio wave spectrum usage, and the freeing up of spectrum as services such as analogue TV broadcasting are switched off, in a virtuous recycling of the spectrum. However, there is a visible aspect to 5G, the tangible tower and cell networks that power the transmission of information that makes the whole system work; this is the area of interest and opportunity for Essential Infrastructure investing (more on this later).



Tim Humphreys
Head of Global Listed Infrastructure

Phone: +61 2 9259 0281
Email: tim.humphreys@ausbil.com.au



Jonathan Reyes
Co-Head of Global Listed Infrastructure

Phone: +61 2 9259 0286
Email: jon.reyes@ausbil.com.au



Natasha Thomas
Portfolio Manager - Energy and Communications

Phone: +61 2 9259 0283
Email: natasha.thomas@ausbil.com.au



Paul Johnston
Portfolio Manager - Utilities

Phone: +61 2 9259 0284
Email: paul.johnston@ausbil.com.au

Q. As a user, what can I expect from 5G?

A: According to the marketers, 5G promises a lot, and in the context of a slow moving leviathan like the NBN, the market is willing to hear promises of faster speeds and easier connections. So what can we expect from 5G enhanced network capabilities? 5G is expected to offer a range of enhancements to communications that include:

- lower latency (at between 5-10 times lower than 4G), supporting more real-time applications;
- faster speeds (10-100 times better than 4G, and faster than cable broadband), supporting better performance for applications like high resolution video;
- higher density (some 300 times that of 4G), making the internet-of-things (IoT) achievable;
- more capacity (more than 3 times the capacity per unit of spectrum than 4G), so networks can support a much heavier content load; and
- it will consume less energy, supporting more efficient networks and devices.

Enabling the IoT with wireless 5G technology that can provide the necessary low latency and data capacity is the start of true enablement across a range of emerging technologies that will change how we live, such as increased energy efficiency, home security, fitness and well-being, smart cities, internet-connected cars and autonomous driving, environmental sensors, even remote surgeries.

5G and the IoT is expected to contribute to emissions reduction largely through the more intelligent and efficient usage of electricity, gas and other fuels as devices are more connected. For example, your oven or air conditioning, connected to your mobile phone or devices, can switch on or off at certain energy price points, and to match actual periods of need. Increased digitisation is one of the key drivers of a more energy efficient, lower-carbon environment. Mobile network enabled technologies form an important part of the decarbonisation solution as they facilitate rapid emissions reductions while improving quality of life and supporting economic growth.

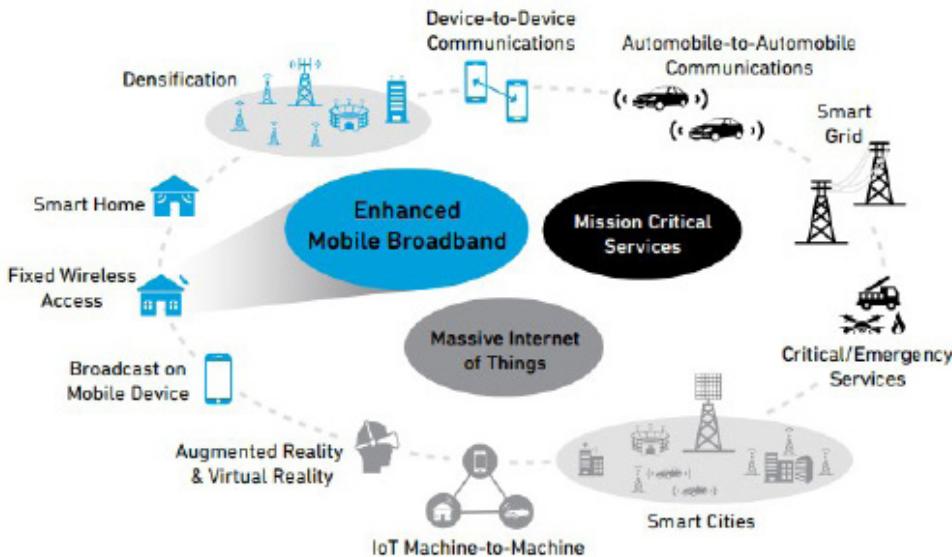
For the many performance reasons outlined, and in the context of universal disappointment at the NBN, 5G awareness and the intention to upgrade among consumers is rising rapidly. By 2025, 5G is projected to capture some 20% of global connections, with strong adoption expected across the developed Asia, North America and Europe markets.

Q. How does 5G achieve wireless coverage?

A: Simply put, as 5G networks are wireless they take a honeycomb approach to building a grid of coverage. Each cell of the honeycomb has, at its centre, a mobile phone tower loaded with 5G equipment. This equipment sends out and receives data across all the devices within its area. Each cell slightly overlaps to ensure that a user has continuous connection as they move from one cell to another. This ultimately allows the mobile network to seamlessly cover broad geographical areas, as illustrated in Figure 1.

5G uses higher frequencies than 4G. As a result, 5G waves are able to carry more data, but the trade-off is that they are not able to travel as far (a few hundred meters on present technology), compared to 4G frequencies which can carry data several kilometres. This means that a 5G network requires up to 10 times more towers, base stations and macro-cells to provide 'blanket' wireless coverage for users to the same reach as 4G.

Figure 1: Building a blanket exposure with 5G for a new world of functionality



The launch of 4G capacity already required the addition of more towers and small cells to create a coverage blanket. In many cases, existing tower infrastructure will be able to support the new locations required by 5G. As the rollout of the 5G network takes place, Mobile Network Operators (MNOs) will likely race to be the first to launch their service. This will provide the tower companies (and their shareholders) with an extra leg of growth as the new 5G networks are deployed. Tower companies, utilities and communications companies are investing in this network, and are aligned in the shift to a more compelling wireless internet.

Source: Qorvo

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Q. Why is 5G good for tower companies?

A: Historically the MNOs owned and managed their own tower network. They would not allow competitors to attach equipment to their towers as higher coverage of a country was seen as a competitive advantage. This competitive environment became obsolete once all the MNOs had universal coverage. At this point, their tower portfolios became an asset on their balance sheet that was generating virtually no return. This was when the independent infrastructure model started. MNOs could sell their tower portfolios to independent tower companies, crystallise their value and in return the acquirer could allow other MNOs to attach their equipment to the newly independent towers.

This is now the prevailing model of tower ownership around the world, but whilst the US is well advanced, Europe has just begun over the last couple of years, and Australia is behind the curve (though the largest carrier, Telstra, will soon split out its infrastructure assets, which are likely to include towers, cables and wires).

The economics of a mobile tower increase significantly as they move from one tenant to two or three. MNOs' typically sign multi-year rental contracts that rise each year by inflation (or in the case of the US, a fixed amount of ~3%). If a second MNO wants to attach their antenna onto a tower, then that tower has almost doubled its revenue at very little extra cost.

With the move from 4G to 5G, the MNOs need more tower locations for their antennae in order to enable a complete network coverage that uses more data intensive waves that can only travel shorter distances. The necessary increase in demand for more antennae to be attached to more towers is therefore a very positive revenue and profit driver for mobile tower companies.

There are some interesting listed examples of tower companies in the essential infrastructure universe. US listed American Tower (AMT: NYSE) predominantly offers traditional macro cell towers across the Americas, Africa and Europe that provide a blanket of coverage, while another US listed company Crown Castle (CCI: NYSE), in addition to macro cell towers, owns and develops a network of small cells that enable additional network densification by offloading traffic and bolstering capacity in the areas of the network where data demand is the greatest. In Europe, Cellnex (BME: CLNX) has emerged as Europe's leading independent operator of wireless telecommunications infrastructure, consolidating assets from MNOs who are divesting towers in order to raise capital. All of these assets offer a compelling opportunity in this space that benefits large operators who can mobilise and fund large rollouts of targeted cell networks to generate lines of cash revenue and capital appreciation.

Q: How is Ausbil positioning in the 5G space?

A: Ausbil's essential infrastructure team have held positions in communication towers for some time, providing a network-effect of leverage to the growing use of mobile handsets, smartphones, and now the ramp-up in 5G and the enablement of the IoT. Companies like American Tower, Cellnex and SBA Communications are examples of infrastructure plays in this area, and exhibit infrastructure-like characteristics, including relatively high entry barriers, even though they are classified as Real Estate by GICS.

Ausbil does not invest in any communications tower companies that are still embedded within an MNO, we prefer to invest in pure-play tower companies. However, there is likely to be growing opportunities as network operators spin-off infrastructure companies. Utilities and private owners that bring tower infrastructure to the listed market could also be an opportunity where Ausbil can look for new exposures in this space. As it builds scale, the steady and rising demand for this technology offers a long time horizon for rising returns. Perhaps more excitingly is that established players on the 'G-path' can leverage the towers, technology and network footprints to steadily roll into higher 'G's as wireless technology continues to improve, expand, decrease latency, and support greater data loads. 6G anyone?

For further information please contact:



Mark Knight
Head of Distribution
02 9259 0226
0438 307 841
mark.knight@ausbil.com.au

Ausbil Investment Management Limited
ACN 076 316 473
AFSL 229722
Level 27
225 George Street
Sydney NSW 2000
GPO Box 2525
Sydney NSW 2001
Phone 61 2 9259 0200
Fax 61 2 9259 0222

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