

What is Broadband Wireless Access?

Broadband Wireless Access (often abbreviated to BWA) refers to technology that delivers broadband speeds (ie. greater than 1.5Mbps or 1.5 million bits per second) over the air. BWA generally refers to services delivered from radio base station towers, rather than services delivered via satellite (which is the subject of a separate fact sheet). BWA encompasses both:

- mobile broadband – broadband services that can be mobile, such as 3G; and
- fixed wireless broadband – broadband services that are delivered to fixed sites.

NBN Co is proposing to build a fixed wireless broadband network to service households and businesses that will not be supplied with a fibre or satellite service.

Broadband Wireless Technologies

Much like broadcast TV and radio, Broadband Wireless Access uses radio frequencies to transmit information. Just like TV & radio, the strength of the received signal is reduced with distance from the transmitting tower, and is improved with the use of antennas (especially if the antenna is external to the building). To improve reception inside buildings for portable devices such as mobile phones, mobile broadband networks deploy large numbers of base station towers so that the towers are located close to the receiver. Fixed wireless broadband networks, however, generally use external antennas to improve reception and to deliver the broadband service further away from the tower (allowing fewer towers to be deployed)¹.

Spectrum

As mentioned above, BWA uses radio frequencies to transmit information. The amount of information able to be transmitted is dependent in part by the amount of radio frequency (often called spectrum) that is allocated to the base station. As an example, each television network is allocated a space of 7 MHz (7 million cycles per second) of spectrum to broadcast their group of digital stations (eg. picture and sound for ABC1, ABC HD, ABC2, ABC3). Most broadband wireless networks are allocated several or tens of MHz for broadband purposes.

BWA requires more spectrum than a television channel because television is a broadcast medium. The same broadcast signal is sent to all receivers, and so only needs to be sent once from the transmitter. In contrast,

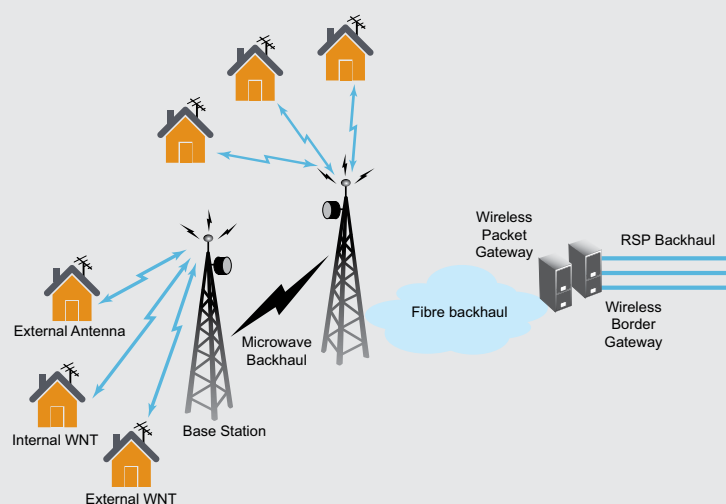
BWA sends and receives unique information from each receiver, so each piece of information uses its own portion of spectrum. In order to deliver high speed broadband to a large number of receivers simultaneously, more spectrum is needed.

Finally, spectrum that is at a lower frequency has better transmission characteristics than spectrum at higher frequencies². This permits the signal to travel over greater distances with less interference from intervening objects.

BWA vs Optical Fibre

The Optical Fibre fact sheet described the features of optical fibre, including fibre permitting almost boundless speeds. Even in PON topologies where a portion of the fibre is shared, speeds of greater than 100Mbps dedicated to each premises is possible. In contrast, BWA is bound by the available spectrum that limits the total amount of information that can be transmitted to premises within the radio cell. All premises within the cell share this total capacity. As a consequence, the total capacity of a fibre network will most likely exceed that of a wireless network (with typical spectrum allocations), however peak speeds (available for short bursts) may often be quite similar.

Wireless Serving Area – Indicative Access Infrastructure



¹ Mobile broadband networks also make use of external antennas to improve reception/coverage distance.

² ACMA, Five Year Spectrum Outlook 2009-2013, March 2009, p.18.