Antennas and Aerials

Description

Improving your connection with antennas and aerials

Experiencing an unstable internet or mobile connection is frustrating, especially if it only works in certain (and often inconvenient) locations. Whether for TV reception, radio signals, or internet access, a reliable antenna or aerial could be your solution to staying connected, no matter how far off the grid you live. Read on to find out more about the range of antennas and aerials available.

Read Boosting Your Connection

Using antennas to optimise your mobile phone reception

Firstly, an aerial refers to any structure used to transmit or receive signals. An antenna refers explicitly to the component that receives or transmits signals. On this page, we use the terms antennas and aerials interchangeably.

Now, once you have confirmed you are accessing the best provider and service for your needs (visit this page to learn more), you can use a combination of passive and active antennas (mobile repeaters) to improve your mobile phone coverage. Keep reading to learn the difference.

01. Passive Antennas

A passive antenna is usually mounted on a tall pole on a suitable roof, with cables running down into the house. These cables then connect to either a mobile broadband modem or your mobile, through the use of a mobile phone cradle. This can turn a small amount of reception into one to two bars of service â?? enough for calls, texting, and internet access through your mobile. Examples of passive antennas include Yagi and MIMO antennas.

02. Active antennas or â??mobile repeatersâ??

An active antenna or mobile repeater is a passive antenna connected to an amplifier (either internally or externally). This amplifier is made of components called transistors, which help make signals stronger.
Active antennas are usually known as Cel-fi or smart antennas and are licensed by ACMA (Australian Communications and Media Authority) to operate on the various telco networks. They also require power to work. You should check your antenna is compatible with the network you are accessing.

Learn more here

How it works: Basically, the cables from the passive antenna attach to an active antenna inside your home or building, which then broadcasts the enhanced signal throughout your property. All your mobile devices on the broadcasted network will show full reception. Youâ??ll be able to call, text, and use the internet as usual.

*Using an illegal booster can carry a large fine as they can interfere with the mobile network. Currently, only Cel-Fi branded models are approved for use within Australia.

Common questions about antennas

01. How do I know if an antenna will work for me?

A desktop site survey can assist you with determining if there is mobile reception in your area, and what equipment might be needed to get connected.

We can do a free connectivity report to determine if an antenna will help in your particular situation.

Companies such as the two mentioned below, or a local antenna expert, can also conduct a desk check for a fee (as prices do change, check their website for current costs):

- Telco Antennas
- OnWireless

Their report will advise on likely signal levels, the sort of mobile services available, the best antenna and extension device for your location and where to point your antenna.These businesses can then put you in touch with a specialist in your area who understands the requirements for your state.

02. Where do I get antenna equipment and advice?

The following companies can provide equipment and advice, and even installation in some cases:

- Telco Antennas â?? Advice, equipment and installation
- OnWireless â?? Advice, equipment and installation
- Powertec Technologies â?? Equipment provider
- NB Tec â?? Equipment provider â?? offers a licensed solution that is a modem/antenna and booster in one that can connect to Telstra, Optus or Vodafone mobile networks.

03. What is 4G MIMO and why might I need it?

MIMO (Multiple Input Multiple Output) is a radio frequency technique that can double a 4G carrierâ??s bandwidth. When you install a MIMO antenna, it could potentially double the download speed at your location. For example, the Wi-Fi routers in your home use MIMO to speed up local Wi-Fi transmissions. You would only use this type of antenna to improve 4G mobile broadband data use, not for improving mobile phone calls.

- See Telco Antennas for further details on MIMO.
- Still need more info? Check out Telco Antennas Frequently Asked Questions

04. What indicates a good signal?

Your device measures signal strength in dBm (decibels per milliwatt), while 4G/5G signal strength is in RSRP (Reference Signal Received Power). Typically, 4G RSRP levels show about -20 dBm lower than your previous 3G RSSI (Received Signal Strength Indicator) levels.

For example, 100dBm (RSSI) would equate to around -120dbm (RSRP). RSRP provides a more accurate signal strength as it focuses solely on the usable signal, excluding noise and network interference.

So, even though 4G RSRP readings might appear lower, it does not mean your signal is weaker.

A general guide to signal strength capability:

-50dBm to -90dBm	-91dBm to -105dBm	-106dBm to -112dBm	-113dBm to -125dBm	-126dBm to -136dBm	-136dBm to -140dBm
Strong signal (stronger signals are possible)	Good signal	Fair signal	Reliable data possible	Unreliable data	Unreliable data

Fast data	Fast data	Useful and reliable data speeds may be attained	Performance may be slower, increased latency	Performance will drop dramatically	Disconnection

05. How do I choose an antenna?

There are a few things to consider when choosing and installing your antenna. Unless you are a technical expert, it is best to get assistance from an expert in this process, as some of the below steps can be complicated.

A. Selecting your antenna

1. You need an antenna that works with your service providerâ??s network. The chosen antenna must have appropriate directional gain for the terrain youâ??re using it in. For example, high-gain antennas work best in flat areas with fewer obstacles to the signal path, like in the outback. Medium gain antennas reduce obstruction from buildings, trees or mountains.
   In contrast, unity gain antennas donâ??t change the received strength and are less obstructed by buildings, terrain or bushland, so they typically get used in rugged and hilly countries. You can learn more about directional gain here.
2. Where there are several competing towers, an omni-directional antenna might be suitable.
3. For some locations, a good internal antenna placed in a suitable location by a window may be all that is required.

B. Choosing your antenna location

1. While time-consuming, it is worth testing your signal in several locations with the antenna to find the right spot.
2. Outside signals can be detected with your mobile phone, but this can require complex processes depending on your mobile type.
   For example, you can easily access this information on an Android device. However, iPhones require you to enter a code.
3. You can use the signal bars on your device to indicate signal strength. However, viewing your signal through dBm (decibel milliwatts) is a better indicator.
   The signal level will display a negative value in dBm. The lower the negative value, the stronger the signal, e.g.,- 81dBm is stronger (better) than -89dBm.
4. Ensure that the mobile phone and modem you are using are from the same network or service provider.

C. Choosing a suitable mast/pole for your antenna

Your TV antenna may be suitable, but if it is not in the best location for the signal, you may need to consider installing a separate pole/mast. Consulting an expert at this time may be required.

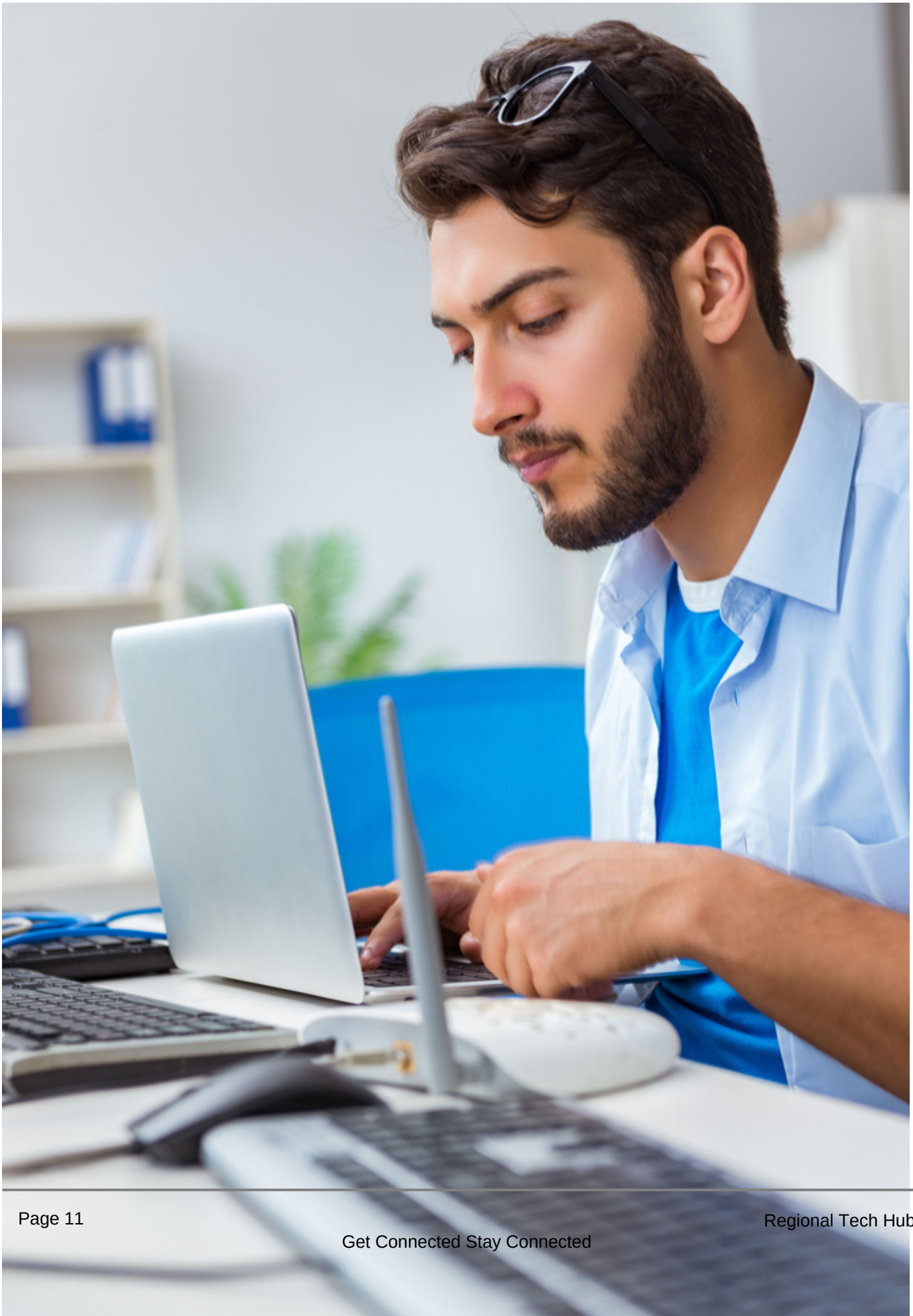
D. Positioning a directional antenna

1. Your desktop signal survey will have located the towers which service you.
2. Use Google Earth or similar to determine the direction of these towers from your location.
3. Point your antenna accurately by using local landmarks that indicate the direction of the required tower. You can also use a compass to identify directions identified from Google, or there are apps that can assist such as Aus Phone Towers.
    - Aus Phone Towers (3G,4G,5G) â?? Apps on Google Play
    - Aus Phone Towers (3G,4G,5G) on the App Store (apple.com)

E. Protecting your antenna

1. A gas arrestor may assist in lightning protection of your equipment.
2. Install a gas arrestor and grounding (as required).
3. Seek professional advice for optimal installation of these devices. Contact your equipment provider.

F. Final checks



Once the installation is complete, re-check the signal level and fine tune the antenna direction by using your indoor modem, hotspot mobile phone or Cel-Fi repeater signal level screen. This will also check that your coaxial connections are solid and correct.

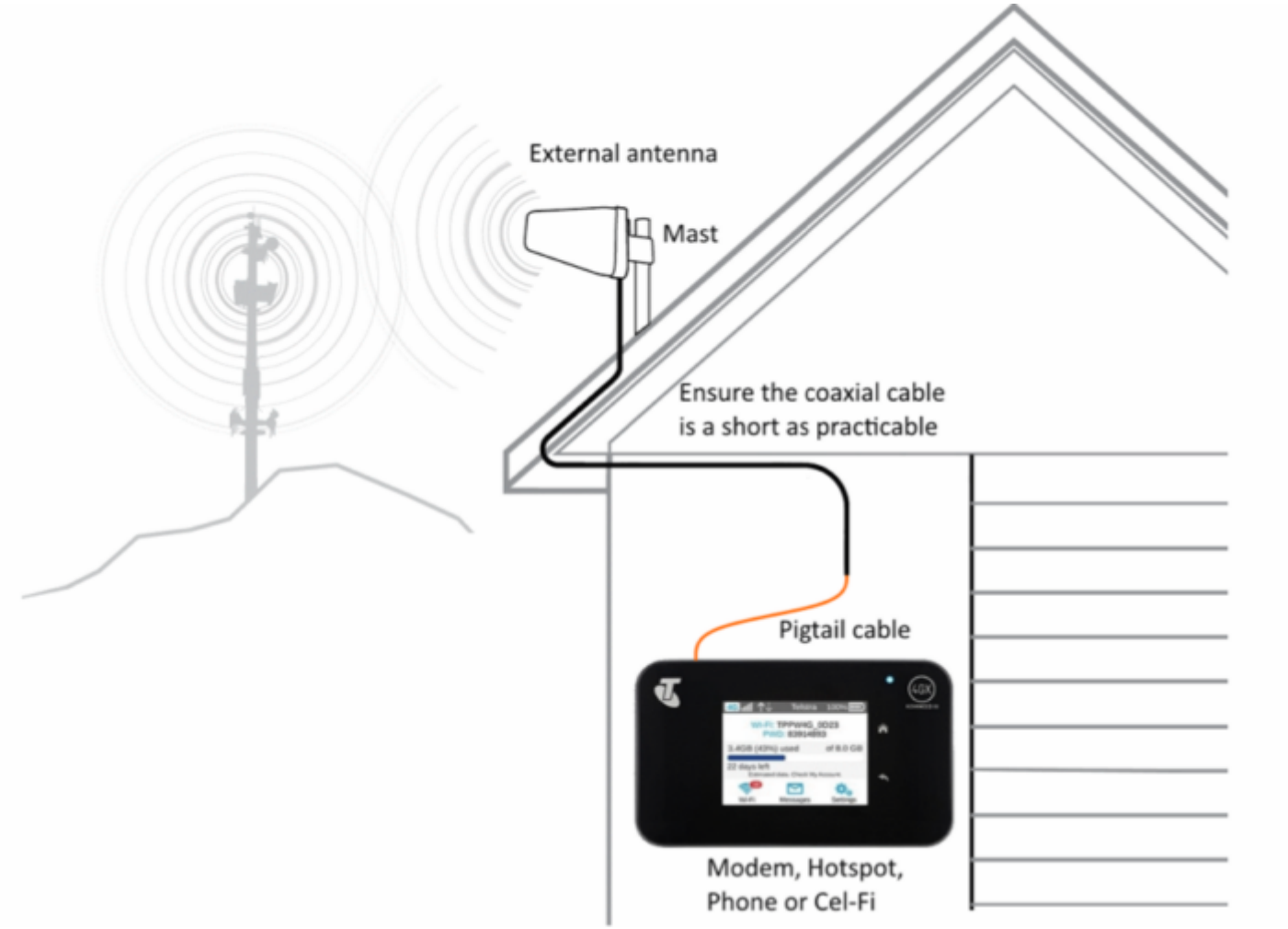
Coaxial connectors and long cable runs cause signal loss. Good quality connectors and well planned cable runs minimise this.

1. Use N-type connectors where possible; for example, in the antenna to cable connector.
2. Ensure all external connections are waterproofed with self-amalgamating butyl rubber tape.
3. Ensure the coaxial cable run from antenna to equipment is as short as possible and is the best lowest-loss cable you can afford. It is no good installing a great antenna only to lose precious signal and potential performance by using poor quality, high loss coaxial cable or having an extremely long cable run.

G. Locate the phone, modem or Cel-Fi device as close as possible to the antenna.

H. Choose the correct pigtail to interface your coaxial cable to your modem, hotspot, phone or Cel-Fi repeater.

1. The pigtail is a short flexible piece of coaxial cable which adapts the antenna cable connection to your specific device.
2. If a MIMO antenna is used, youâ??ll need to install two cable runs.



A typical external antenna setup

For more detailed information on antennas, please visit

Telco Antennas

We make sure our values are reflected in our work

Free And Independent Advice

The Regional Tech Hub is funded by the Australian Government, ensuring the advice we provide to you is free. We also remain independent, so the options and information we put forward are all assessed equally.

Regional Support

We believe all Australians, no matter where they live, should be able to access affordable and reliable internet and voice services. Our team are all regionally-based and understand the challenges regional, rural, and remote residents face.

Keeping it Easy

Regional Tech Hub understands the jargon used around connectivity options and issues can be frustrating and confusing. You can relax knowing our resources and advice are accurate, straightforward and practical.

Clear Processes

We offer various contact options and service levels to suit your needs, ensuring you stay informed and on board throughout every step of your connectivity journey. We strive to make every interaction clear, easy and stress-free.

Couldnâ??t find what you were after? Give us a call!

Chat to us on our hotline with one of our team members and letâ??s get the conversation started. If we donâ??t answer, weâ??ll get back to you in no time at all.

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