

Our wireless internet services.

This document is intended to be a non-technical guide to understanding wireless internet and its limitations and how to get the best from it.

Wireless internet services are becoming increasingly popular due to being able to provide a broadband service in rural areas where landlines are simply too long. This does not mean fibre type speeds or stable connection, but it can be better than alternatives.

Speed checking.

Speed testing is most accurate when done on a computer connected by a network cable to your router. Please make sure there are no other devices connected to your internet by switching them all off (for example Xbox, Amazon Alexa, Google dot, Internet enabled TV, Security cameras, Remote backup devices etc.). Also make sure the computer you are doing the speed test on is not using the internet for anything else (website running in the background, playing video or music, downloading torrents etc). Speed results for a wireless internet based broadband service will vary dramatically and ultimately only measure the speed between your device and the speed testing server.

We always tell our clients that wireless internet speeds can vary dramatically from one test to another. There are several broadband speed testing websites, and it is possible that each of them will return different speeds even if you do one after another! We have 5 speed testers on headoffice.it and they will frequently show different speeds!

Unless otherwise stated, a speed testing website will NOT measure the speed between your computer and a specific internet service (your work or school website, a video conferencing website, a particular gaming website etc.). All web hosting websites will have limits of their own and may appear slow due to prevailing demand (such as a popular football match or wedding). You may also find that videos hosted on one streaming platform play well but videos hosted elsewhere of the same quality will not play as well.

Video conferencing can also catch an end user out. Teams needs about 1.5Mb and Zoom needs about 3mb for a basic quality for a single user. If more users join the meeting, they will put a proportional demand on the bandwidth and eventually the reasonable maximum number of clients has exceeded what the wireless internet can support. Also, your upload needs to be able to excel the minimum speed.

Another problem here is where one member of the video conference has a very slow service and consequently the quality of their service appears to be poor. This is not necessarily your bandwidth limit being reached but theirs. It is a bit like using your mobile phone to contact someone on their mobile phone and they are in a poor signal

area – the voice is garbled giving you the impression it is your phone which is in a poor signal area.

What we are responsible for.

We deliver/dispatch and install a wireless internet router and set it in the most optimal position for best signal. We advise you on performance expectations, system limitations and best practices.

We will always attempt to get the best results without resorting to installing unnecessary equipment. We carry the installation out in steps, starting with the least cost solution and stopping at a point where we believe adding more equipment will not improve the service. This can mean mounting an external omnidirectional or high gain directional antenna or external high gain router.

External Routers will have a network cable fed into a Wireless Access Point or network hub in your premises for distribution.

All our wireless internet internal Routers will have their own internal antennas, but we may fit small antennas to improve signal strength if necessary. We may also connect an external antenna to the internal router for better signal strength. We find this works well in attic spaces.

Too big an antenna could bring in too strong a signal and overwhelm the router causing the speed to decrease. Also, low cost or mis tuned antennas can bring in extra frequencies (Noise) also causing speed losses and unstable connection. When we carry out an installation, we check the signal strength within the router (not the lights) and we also check the Signal to Noise ratio (S/N) ratio. If it is too high, we need to install a more finely tuned antenna.

What we are not responsible for.

It is possible to have a 10Mb broad band speed and connect to a video feed which requires 4 Mb and for the quality to be poor. There are several reasons for this so please check all of them listed below.

When you scan for available wireless networks, the devices which appear in the list are referred to a Wireless Access Points or WAP's for short. Most modern broadband routers will have a built in WAP for convenience.

Issues affecting the speed of a wireless internet broadband service.

1, Range from the mast.

Obviously, the further the wireless internet receiver is from the mast the lower the signal strength. However, if the router has 1 third (or more) of its signal strength indicators constantly illuminated, then signal strength is not the limiting factor.

2, Location of the router.

The router needs to be positioned at the site of the premises facing the mast for the strongest and most reliable signal. This can easily be checked by trial and error. If your router has an external static antenna, then it is the antenna which needs to be facing the mast. If we fit this then it will be correct. Also, there should be nothing between your external antenna and the mast and line of sight is preferable but not essential.

3, Internal obstructions. (This is for the Internet not the Wi-Fi).

If your antenna is in your attic, you may find that rain and snow affect speed. This is because it forms an additional barrier between the antenna and the mast.

Modern well insulated houses may have triple glazing or Argon gas filled windows. All excellent for insulation but will have a detrimental effect on wireless internet signal strength.

4, Interference.

External electrical wires, sheds, trees and so on will deflect a wireless internet signal. Any metal object within a few meters of the router can affect both the wireless internet signal from the mast to it and the Wi-Fi signal from it to your device. radiators, fridges plumbing and even reinforced concrete structures can affect your signals.

Interference can also be caused by electrical cables, fluorescent tubes, Tube TV's, Welders, anything with a motor or generator in it and so on. We have also found that some wireless devices such as wireless speakers, overpopulated wireless areas and mis configured Wi-Fi devices can cause problems.

5, Intermittent internet connection.

An intermittent connection is whereby the mobile internet signal from the mast to the router drops randomly. While the Router stays powered on. This may be caused by some sort of external electrical interference, a mast fault, or a faulty router. If this happens, I may replace your router to eliminate it as a cause of the problem. You can test this by viewing a video stream online and a good one to use is on the hedoffice.it website. The link is 'HD video test' under 'Speed Testers' on the left.

Things you can check to improve your broadband service within your premises.

1, Wi-Fi signal strength.

Distance from the WAP is the main problem here. If you are connecting your device to the WAP by Wi-Fi, you will need to ensure you have a good signal quality on your wireless device. We have had complaints like this in the past and have found the client

to be several rooms away from the router with 1 or 2 bars on their wireless device. Make sure the wireless device you are using is well within range of the Wi-Fi router.

2, Repeaters.

Repeaters are not signal boosters; they simply pick up an existing wireless signal and retransmit it. If you are using any sort of repeater, please do check its manual and make sure it is set up properly. We charge for a callout if we discover this type of problem.

3, Clean computer.

A computer running excessive software and or malware could be slow at the best of times and sometimes we discover this is the problem manifesting itself as a slow internet. Make sure your wireless Windows PC/Laptop has no viruses, bugs, malware, or any unnecessary programs which may intimidate its performance. We can do this for you by remote access or in our workshop and we charge normal callout and / or time fees for this.

4, Multiple Wireless Access Points (WAP's).

If you have more than one WAP, make sure you are connected to the one with the best signal. Sometimes your device will lock on to a WAP which is barely in range. Also, if you move your wireless device, it may stay locked onto the first WAP and it may not automatically lock onto the WAP with the best signal. We recommend using mesh networking to reduce the chances of this problem.

5, External interference.

Make sure that there are no wireless or other electrical devices which could interfere with your Wi-Fi signal. Devices known to interfere include, electric motors/generators, transformers, wireless speakers, fluorescent or neon lights, switch gear and so on.

6, Multiple users.

A wireless internet service speed will vary much more than a fixed line broadband and if there are multiple users at the client end, there will be much more apparent random speed fluctuations.

7 Applications.

There are some applications such as video streaming (YouTube, Netflix) and video conferencing which may work well with a wireless internet service for some time then for no apparent reason the quality of the video lowers. The apparent speed fluctuation can be for any of the reasons above. Please ensure that as far as possible, they are eliminated before contacting support.

We have also found that some sources of video content (religious services, educational conferencing, amateur bloggers) are unable to upload at sufficient speed giving the client the impression that it is the client's download speed is insufficient.

File synchronising applications such as OneDrive, Dropbox or other file synchronising service running on a system using your internet service, you may find that they can take up a significant amount of your bandwidth. We have also found that some clients are using the service for remote backup which will also demand a high a high bandwidth.

Remote viewing security cameras also puts a high demand on an internet service, which can impact on performance even though the client may not be remote viewing.

It is entirely possible that even with the applications listed above, running, your internet speed is satisfactory if you have sufficient speed to handle them all plus any other applications, you will not notice a speed problem.

What we find is that clients add more users, additional programs, and services on their devices until the wireless internet service cannot reliably support them all.

Wi-Fi is NOT internet.

Wi-Fi is the connection your wireless enabled device (mobile phone, Tablet, Laptop) makes to the Wireless Access Point (WAP) in your premises.

If, for any reason, your Wi-Fi connected device is not getting a strong enough Wi-Fi signal, then even a high broadband speed will seem slow. Using a Wi-Fi connected device to measure the speed of the internet is a guideline only and you may well be checking the speed of your internal Wi-Fi connection and not your internet speed at all!

The speed at your wireless device will be just under the speed of either the Wi-Fi or your internet speed – which ever is lowest. That is why it is important to have a good Wi-Fi signal strength before you use it to test your internet speed.

Additional notes on other technologies.

ADSL uses copper cable from the local exchange to your premises and has an acceptable range of about 8km. Speeds can go up to about 24Mb depending on how long the telephone cables are between you and the exchange. In areas where the FTTC cabinet is more than 2Km away, ADSL is preferred.

FTTC (Fibre To the Cabinet) can reach speeds of up to 80Mb and has a range of about 2Km. After which, ADSL may outperform it. This technology uses Fibre cables to the 'Cabinet / Green box' and copper from there to your premises. Fibre is a lossless (nearly) technology so speed to the cabinet can be very high. The speed decreases much more quickly than ADSL, the further you are away from the Cabinet. Hence the short range.

FOTP (Fibre To The Premises) uses Fibre cable to connect the Exchange directly to your premises and can have speeds up to 1GB. Technical college's, Hospitals and large corporations can get this service. We can also provide it to your home if your area has been cabled by Openreach with this technology.

A CAT 4 router has a max download speed of 150Mb whereas a CAT 6 router has a max speed of 300Mb. This is not why we prefer CAT 6 routers as in reality, your speed will never be much over 100Mb on a good day. We prefer CAT 6 routers as they can use signals from more than one mast at a time (bonding, where available) improving performance.

Every day is a new school day, and I would be grateful for your feed back or any new information you could add to this document which may be helpful to others.