

RTL8852BE Wi-Fi Speed Guide

- DISCLAIMER: I'm not an expert; this is a compilation of research on this topic based on my system and needs. Some steps may be duplicates (not necessarily a bad thing), missing, or different from what has solved others' problems.
- If you think there's a better way to do something, or you know something that's not included here, please edit the line in question [include your info for credit]. (Google will notify me of an editing suggestion.)
- I STRONGLY ADVISE that you create a restore point before doing any of this.
- Some settings are system-level, or otherwise not directly related to networking or Wi-Fi.
- Many details are hardware-specific (i.e. desktop vs laptop), especially those related to power savings.
- In this guide, always run Powershell or CMD as an administrator.
- There are apps to help with some of this (e.g. speedguide.net TCP Optimizer), but I didn't use them.
- Other guides include changes which are terrible ideas for most users. Those are not included.
- This guide is not a guarantee. There are so many factors, it would take a whole page just to list them.

THE BASICS

1. Make sure your system is connected to a 5Ghz Wi-Fi network.
 - a. Go to *Settings -> Network & internet -> Wi-Fi -> your network ->* scroll down until you see *Network band (channel)*. It should say *5 GHz*.
2. If possible, check all network cables (modem, router, etc.) for any damage or loose connections.
3. Check cables and other hardware for their stated speed limits. Your connection speed is only as good as the slowest link.
4. Position your Wi-Fi source as best as possible to minimize interference (avoid walls, furniture, etc.). This is especially important if any walls contain plumbing – which greatly impedes Wi-Fi signals.
5. Make sure your system is fully updated.
 - a. Go to *Settings -> Windows Update -> Check for updates* [if you're running Windows 11 -> *Advanced options*] -> *Optional updates* -> install pretty much anything here (except things like Windows preview updates). Improvements can come from unexpected updates (e.g. chipset).
 - b. Go to the motherboard or laptop manufacturer's website and make sure you have the most recent drivers, UEFI/BIOS, chipset, etc for your machine.
 - c. At this point, Windows Update will sometimes say that new, more recent/updated/better updates are available for your system. Release date is not always an indication of the best driver. (In my system, the most recent manufacturer's driver for this card is dated July 16, 2024. In other places there are drivers nearly a year newer.)
6. In *Settings -> Privacy & security*:
 - a. *General -> turn everything off*
 - b. *Inking & typing personalization -> Custom inking and typing dictionary -> turn off*
 - c. *Diagnostics & feedback -> turn everything off/required only*
 - d. There are many more settings there, but those are the basics to minimize network usage (and increase privacy). The rest are pretty much optional; the more you turn off, the less your PC uses. CAUTION: certain ones are required for apps to work (e.g. camera app, video calls, etc require the camera); instead of turning them off completely, limit which apps can use them, etc.

7. Use the antivirus/antimalware app of your choice (even Windows Security) to run scans and ensure that your system is clean. Among other issues, viruses and malware can steal your bandwidth.
8. Close any programs/end any processes that Uninstall unused programs. They use system resources – including bandwidth. It can't hurt to use something like [Revo Uninstaller Portable](#) (or the installed version) to do so as cleanly as possible.
9. Disable Startup apps. Any apps that don't need to run automatically should have startup disabled. Most can be found in Task Manager.
 - a. *Task Manager -> Startup apps -> sort by Status -> Enabled -> Right click -> Disable* each app that doesn't need to run automatically Restart the PC when you finish.
 - b. If an app is running on startup, but not in that list, then: *Win+r -> shell:startup* (for the local user; to do so for the entire system, *shell:common startup*). Then find or create a shortcut to the app in question, and place that shortcut in the Startup folder. Then open *Task Manager -> Startup apps*, and you should see that app in the list; disable it.
 - c. There are apps which may ignore these settings. To disable them, you may need to open those apps and search the settings for the startup option, as well as options to *close to system tray*, and others.
10. Disable Background apps.
 - a. In Windows 10, go to *Settings -> Privacy -> Background Apps -> Turn Off*.
 - b. In Windows 11, (without diving into Microsoft's claims) you need to go do this for every app individually: *Settings -> Apps -> Installed apps -> three dots -> Advanced options -> Background apps permissions -> Let this app run in background -> Never*. Alternatively, you can use a third-party app such as [Chris Titus's Windows Utility](#) to do this (once the utility is open, you can disable background apps and close in four clicks).
11. Run these checks in Powershell:
 - a. *sfc /scannow*. Run this command repeatedly until the result is, "Windows Resource Protection did not find any integrity violations." (If it shows this the first time, then continue.)
 - b. *DISM*
 - i. *DISM /Online /Cleanup-Image /CheckHealth*
 - ii. *DISM /Online /Cleanup-Image /ScanHealth*
 - iii. *DISM /Online /Cleanup-Image /RestoreHealth*
 - c. Run *sfc /scannow* again.
12. Restart your PC.

WI-FI CARD SETTINGS

Device Manager -> Network adapters -> Realtek 8852BE...

1. *Driver -> Update Driver -> Search automatically for drivers -> Search for updated drivers on Windows Update -> Check for updates* [if you're running Windows 11 -> *Advanced options*] -> *Optional updates -> install pretty much anything here* (except things like Windows preview updates).
2. *Advanced*
 - a. *2.4G Wireless Mode*
 - i. If your setup is DEFINITELY within range of a strong 5Ghz network, then:
Value: Disabled
 - ii. If you can't confirm your setup is in range of a strong 5Ghz network:
 1. Wi-Fi 5: *802.11b/g/n*
 2. Wi-Fi 6: *802.11b/g/n/ax*
 - d. *5G Wireless Mode* – if your network is:

- i. Wi-Fi 5: *IEEE 802.11a/n/ac*
 - ii. Wi-Fi 6: *IEEE 802.11a/n/ac/ax*
 - e. *802.11d* -> *Disabled* (From my understanding, 802.11d isn't relevant in the USA, but double check based on your location before making any changes.)
 - f. *Preamble Mode* -> *Value: Short & Long*
 - g. Preferred Band -> *Value: 3. 5G first***
 - h. Roaming Aggressiveness** – this depends on your setup; you may only find the right settings through trial-and-error. Here are some examples I've seen:
 - i.** My PC is a desktop, connected to a standalone router, so I set it to *Value: 1. Disable.*
 - ii.** If you have a desktop and a mesh system or Wi-Fi extender, you may want to set it to *2. Lowest.*
 - iii.** If you have a laptop, you may want to set it to *3. Medium-Low.*
 - i. *Wake on Magic Packet* -> *Value: Disabled* (unless you specifically have it set to utilize that feature).
 - j. *Wake on Pattern Match* -> *Value: Disabled* (unless you specifically have it set to utilize that feature).
 - k. *Anything with the word "Offload" in it* -> *Value: Disabled.*
3. **Power Management:** If you *desperately* want to minimize power usage at all costs, then *Allow the computer to turn off this device to save power* -> *Checked*.
 According to Microsoft, this only "controls how the network card is handled when the computer enters sleep", and "Windows never turns off the network card due to inactivity", but every guide I've found which discusses this setting says to uncheck it to maximize Wi-Fi performance.

MTU (packet size)

1. Ping a site (I used Google): Powershell -> *ping google.com -f -l 1472*
 - a. If the result is "*Packets: Sent = 4, Received = 0, Lost = 4 (100% loss)*" then reduce the value by 10, run the command, and repeat until the result is "*Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)*".
 - b. If the result is "0% loss", increase the value by 10, run the command, and repeat until the result is "100% loss".
 - c. Now that it's mostly narrowed down, reduce the value by 1, repeat the command, and repeat until the result is "0% loss". (In my case, the highest value was "*ping google.com -f -l 1472*".) The final number + 28 is your total MTU size (in my case, 1472 + 28 = 1500)
2. Two options, depending on your system. (If your router doesn't allow you to change this setting, then skip to '4'.)
 - a. Find your default gateway: Powershell -> *ipconfig*, scroll through the results until you find the *default gateway* (e.g. 192.168.1.1). Go to your browser, type the address to access your router, and search for the MTU setting (it may take a while to find it).
 - b. Some routers allow you to change this setting in an app.
3. Enter the total MTU size in its field.
4. If your router does not support changing the MTU, then go to Powershell -> *netsh interface ipv4 set subinterface "Wi-Fi" mtu=1500 store=persistent* (again, in my case it's 1500). Verify with *netsh interface ipv4 show subinterfaces*, and check that the MTU value is correct.

WI-FI CHANNELS

Wi-Fi slowdowns can be caused by congestion from other devices on the network, or from nearby networks.

Many routers mitigate this by allowing you to change the Wi-Fi channel. “Channel” does not mean the 2.4Ghz vs 5Ghz **band**; within each band, there are multiple channels. Overlapping channels will cause interference.

2.4Ghz band Wi-Fi has a maximum of 3 non-overlapping channels; 5Ghz Wi-Fi has many more than that.

Log in to the router, or use the router’s app, find the “channel” settings, and change the Wi-Fi channel.

NOTE: you may need to use a Wi-Fi analyzer app (or device) to determine the optimal channel to use; some router apps include this function, but they’re not always reliable.

DELIVERY OPTIMIZATION

1. Go to *Settings -> Windows Update -> Advanced options -> Delivery Optimization*.
2. Turn off “*Allow downloads from other devices*”. (If you’re okay with sharing with other computers on your own network, then keep it on, and set “*Allow downloads from -> Devices on my local network*”.)
3. Download options has two choices: *absolute bandwidth limit*, and *percentage of measured bandwidth*. Depending on how extreme you want to be with this, you can set an absolute limit.
4. Upload options allows you to set a percentage of bandwidth, as well as a data limit. (If you turned off Delivery Optimization, then this is irrelevant.)

POWERSHELL COMMANDS

A handful of Powershell commands to go through here.

1. Flush DNS – run the following commands, in order:

- a. *ipconfig /flushdns*
- b. *ipconfig /registerdns*
- c. *ipconfig /release*
- d. *ipconfig /renew*
- e. *netsh winsock reset*

Restart your PC

2. *netsh interface tcp show global*. The most relevant results seem to be:

- a. *Receive-Side Scaling State enabled*. If not, run *netsh interface tcp set global rss=enabled*
- b. *Receive Window Auto-Tuning Level normal*. If not, run *netsh interface tcp set global autotuninglevel=normal*
- c. *netsh int tcp set heuristics disabled*

Restart your PC

CHANGE YOUR DNS

There are endless DNS options, including Cloudflare, Google, and many more. Some people use Cloudflare as the main, Google as the backup, or vice-versa. There are utilities that can be used to determine the fastest DNS for you (however exactly that works). The one that showed up the most was [DNS Benchmark](#) – from the same people as [SpinRite](#). You have a few choices how to change the DNS:

1. On your router – THIS WILL CHANGE THE DNS FOR YOUR WHOLE NETWORK: log in to your router, or use its app, find DNS settings, and change the preferred and backup DNS.
2. If you don’t want – or are unable – to change the DNS for the whole network, do it for your PC.

- a. These settings will change the DNS for the network card you're using:
 - i. Go to *Settings -> Network & internet -> Advanced Network Settings -> your network -> More adapter options -> Edit*.
 - ii. Click *Internet Protocol Version 4 (TCP/IPv4) -> Properties -> General -> Use the following DNS server addresses*. Insert your preferred and alternate DNS server choices. Click OK.
 - iii. Back in *Wi-Fi Properties*, scroll down, find *Internet Protocol Version 6 (TCP/IPv6)*, and repeat the process for IPV6, making sure to use the IPV6 DNS addresses.
- b. The same process can be done for each network connection on this PC (this is the method I used because it offers an easy way to use encrypted DNS):
 Go to *Settings -> Network & internet -> Wi-Fi -> your network -> DNS server assignment -> Edit -> Manual -> IPv4 On -> enter preferred DNS -> [optional DNS over HTTPS -> On (automatic template)]*. Repeat for Alternate DNS, and optionally IPv6 and IPv6 Alternate DNS. Click *Save*.

POWER PLAN

Some people see performance increases by changing the power plan and editing/confirming some settings.

1. *Start -> type Power Plan -> Choose a power plan -> Show additional plans -> select High Performance*. Usually High Performance is available, but IF it isn't there, try these:
 - a. *Powershell -> powercfg -restoredefaultschemes*. Close then reopen Power options, and it should appear.
 - b. If it still doesn't appear: *Powershell -> powercfg /s SCHEME_MIN*. Close then reopen Power options, and it should appear.
 - c. If it still doesn't appear, then you can manually add it in Powershell:
 - i. High performance: *powercfg -duplicatescheme 8c5e7fda-e8bf-4a96-9a85-a6e23a8c635c*
 - ii. Balanced: *powercfg -duplicatescheme 381b4222-f694-41f0-9685-ff5bb260df2e*
 - iii. Power Saver: *powercfg -duplicatescheme a1841308-3541-4fab-bc81-f71556f20b4a*
 - iv. Ultimate Performance: *powercfg -duplicatescheme e9a42b02-d5df-448d-aa00-03f14749eb61*
 - d. Choose either *High Performance* or *Ultimate*.
2. After choosing a plan:
 - a. click *Change plan settings -> Change advanced power settings -> Hard disk -> Turn off hard disk after -> Setting (Minutes) -> you can set it to 0, but a few may be better (mine is set to 1, I saw another guide set it to 5)*.
 - b. *Wireless Adapter Settings -> Power Saving Mode -> Setting -> Maximum Performance*.
 - c. *PCI Express -> Link State Power Management -> Setting -> Off*.
 - d. (Optional) *Processor power management -> Minimum processor state -> Setting (%) -> 100*. (This setting has mixed results, and it may not be a good idea to tell the processor to run 100% all the time.)