

## Tech Note: What's the best 5G modem to use with ACCESS and LiveShot?

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This question is coming up more and more often as carriers are advertising their expanded 5G coverage. We've got the answer below, but first, a little about what 5G can do for you (and what it can't).

### What is 5G?

5G is a term that encompasses a lot of different technology. In many cases, the range and mobility issues, along with lack of symmetric upload speed, give 5G only equal or slightly worse performance than existing 4G services. In fact, some 5G service use 4G tech for their upload channel, which is (of course) the direction audio codecs care about most. But if you're investing in a modem for your codecs, and want to future-proof your investment, a 5G modem may be the right choice.



*ACCESS NX pictured with an Inseego M2100 5G modem*

5G is delivered in three different modes, and not all carriers offer all of these modes. Each mode utilizes a different set of radio frequencies, and for this reason performance differs dramatically. Generally speaking, lower radio bands have greater range. But the inverse is generally true for data rates—higher bands tend to have more capacity and throughput. Audio codecs really only use a fraction of a typical 4G channel, so the only bandwidth concerns usually are congestion-based. Even video codecs might not fill an entire 4G upload channel, but with congestion bandwidth can often be a concern.

Here's the different modes for 5G described:

**Low-Band 5G** - These services mostly use the same spectrum as existing 3G/4G services, usually below 2.6GHz. Services below 1GHz offer the best range of all, but often have the most congestion, especially if sharing with legacy users. Although low-band 5G offers modulation schemes that can provide more download capacity, upload is usually capped at legacy 4G speeds. Coincidentally with 5G deployment, extra low band capacity in the reused UHF TV (600MHz) band is coming on line, and offers a relatively uncongested option for the time being.

**Mid-band 5G** - These services use the radio spectrum between 2.5-6GHz. These bands have shorter range than low-band but higher capacity. Mid-band deployments are mostly in urban environments so far, since the limited range serves more customers in denser populations. A lot of deployment is focused on the C-band at the upper end of 3GHz, as it offers a good combination of range and bandwidth.

**High-band 5G** - Also called mmWave 5G, these services exist in the spectrum above 6GHz. These bands have relatively short range and are primarily being deployed to serve home Internet customers (with outdoor antennae). It's also being deployed in some sports venues as it has the potential to offer the most bandwidth of any band to line-of-sight users. As of this writing, only a few high-end phones support mmWave operation.



*Netgear modem pictured with LiveShot*

## 5G Hotspots

As of fall of 2021, a hotspot is the best option for connecting your codecs to 5G networks. There are several reasons:

1. Different carriers have deployed 5G on different bands, and “universal” modems aren’t really available
2. All these modes and bands often require an antenna array, which is more suited to a larger, external form factor (as opposed to attached USB modems)

It's not usually necessary or desirable to connect to a 5G Hotspot wirelessly (although that is possible with Comrex Wifi adapters). Some 5G Hotspots provide Ethernet ports, or can be tethered via USB. See special notes below regarding USB tethering.

In the US, the best performance will be had with a hotspot designed specifically for a carrier's select bands. This is usually easiest to obtain from the carrier themselves. Outside the US, unlocked universal hotspots may be a better choice.

## Here are our preferred models for Fall 2021:

### Inside the US

Verizon - Inseego M2100

*Covers all 4G LTE bands, low and mid band Verizon 5G offerings, as well as mmWave bands n260 and n261.*

AT&T - Netgear Nighthawk M5 MR5100 (AT&T Version)

*Covers all 4G LTE bands, low and mid AT&T bands, as well as mmWave band n260.*

T-Mobile - Inseego M2000 (T-Mobile Version) or Netgear Nighthawk MR5200 (unlocked)

*Covers all 4G LTE bands, low and mid T-Mobile bands (T-Mobile has little mmWave deployment at this time)*

### Outside the US

With not much mmWave deployment outside the US, we recommend the Netgear Nighthawk MR5200 (unlocked version) which covers the majority of global 4g and low and mid 5G bands.

*Note on USB tethering:* While it's possible to connect to these Hotspots with Wifi, best performance will usually be achieved with a wired connection. By using USB tethering mode, you can simultaneously use the data connection and charge the Hotspot's battery, removing the worry about powering the Hotspot from an adapter.

As of ACCESS/BRIC-Link firmware 4.5p11, and Liveshot firmware 1.4.1p5, our codecs will show the hotspots mentioned above in their device list when attached by USB.

### More notes:

1. The hotspots will appear in the list as an additional Ethernet port.
2. We recommend turning off the Wifi functionality of the hotspot if not using it.
3. All configuration of the hotspot is done via the interface on the hotspot itself, either via the display or attaching it to a computer and using a browser.
4. When configured correctly to use USB tethering, the Ethernet port that appears will extract a DHCP local IP address from the hotspot.

## Have questions or need support?

Call us at +1 978 784-1776 or email [techies@comrex.com](mailto:techies@comrex.com).