Wi-Fi vs Cellular Data transmission

### SDMAY21-01 Secure testing headset

# Benchmarks

## Wi-Fi

|  |  |  |
| --- | --- | --- |
| State | Average Speed | Broadband Coverage |
| [New Jersey](https://broadbandnow.com/New-Jersey) | 52.0 Mbps | 99% |
| [Connecticut](https://broadbandnow.com/Connecticut) | 41.8 Mbps | 99% |
| [Rhode Island](https://broadbandnow.com/Rhode-Island) | 46.7 Mbps | 98.2% |
| [New York](https://broadbandnow.com/New-York) | 45.2 Mbps | 97.8% |
| [Massachusetts](https://broadbandnow.com/Massachusetts) | 43.5 Mbps | 97.6% |
| [Delaware](https://broadbandnow.com/Delaware) | 44.9 Mbps | 97.5% |
| [Hawaii](https://broadbandnow.com/Hawaii) | 22.5 Mbps | 96% |
| [Maryland](https://broadbandnow.com/Maryland) | 51.3 Mbps | 96.7% |
| [California](https://broadbandnow.com/California) | 29.0 Mbps | 94.5% |
| [Florida](https://broadbandnow.com/Florida) | 41.2 Mbps | 94.9% |
| [Utah](https://broadbandnow.com/Utah) | 37.2 Mbps | 94.9% |
| [Pennsylvania](https://broadbandnow.com/Pennsylvania) | 41.4 Mbps | 94.7% |
| [New Hampshire](https://broadbandnow.com/New-Hampshire) | 37.4 Mbps | 94.3% |
| [Washington](https://broadbandnow.com/Washington) | 41.0 Mbps | 94.2% |
| [North Carolina](https://broadbandnow.com/North-Carolina) | 42.4 Mbps | 93.1% |
| [Ohio](https://broadbandnow.com/Ohio) | 32.1 Mbps | 91.9% |
| [Illinois](https://broadbandnow.com/Illinois) | 40.4 Mbps | 92.3% |
| [North Dakota](https://broadbandnow.com/North-Dakota) | 28.6 Mbps | 92.2% |
| [Nevada](https://broadbandnow.com/Nevada) | 34.3 Mbps | 91.8% |
| [Georgia](https://broadbandnow.com/Georgia) | 39.1 Mbps | 90.6% |
| [Maine](https://broadbandnow.com/Maine) | 21.2 Mbps | 89.7% |
| [Virginia](https://broadbandnow.com/Virginia) | 48.7 Mbps | 89.9% |
| [Colorado](https://broadbandnow.com/Colorado) | 40.9 Mbps | 90.4% |
| [Tennessee](https://broadbandnow.com/Tennessee) | 36.6 Mbps | 89.9% |
| [Oregon](https://broadbandnow.com/Oregon) | 39.1 Mbps | 89.7% |
| [Michigan](https://broadbandnow.com/Michigan) | 28.7 Mbps | 88.3% |
| [Minnesota](https://broadbandnow.com/Minnesota) | 36.8 Mbps | 88.1% |
| [South Carolina](https://broadbandnow.com/South-Carolina) | 39.3 Mbps | 88.2% |
| [Arizona](https://broadbandnow.com/Arizona) | 33.9 Mbps | 86.7% |
| [Texas](https://broadbandnow.com/Texas) | 46.9 Mbps | 86.9% |
| [Vermont](https://broadbandnow.com/Vermont) | 22.4 Mbps | 86.1% |
| [Wisconsin](https://broadbandnow.com/Wisconsin) | 37.4 Mbps | 85.3% |
| [South Dakota](https://broadbandnow.com/South-Dakota) | 26.8 Mbps | 85.3% |
| [Indiana](https://broadbandnow.com/Indiana) | 36.7 Mbps | 85.7% |
| [Kentucky](https://broadbandnow.com/Kentucky) | 30.5 Mbps | 85.3% |
| [Louisiana](https://broadbandnow.com/Louisiana) | 35.1 Mbps | 84.6% |
| [Idaho](https://broadbandnow.com/Idaho) | 25.6 Mbps | 82% |
| [Iowa](https://broadbandnow.com/Iowa) | 24.7 Mbps | 83.7% |
| [Nebraska](https://broadbandnow.com/Nebraska) | 27.1 Mbps | 82.4% |
| [Kansas](https://broadbandnow.com/Kansas) | 39.9 Mbps | 81.9% |
| [Alabama](https://broadbandnow.com/Alabama) | 33.7 Mbps | 81.2% |
| [Missouri](https://broadbandnow.com/Missouri) | 38.5 Mbps | 80.1% |
| [New Mexico](https://broadbandnow.com/New-Mexico) | 30.0 Mbps | 80.3% |
| [Alaska](https://broadbandnow.com/Alaska) | 27.9 Mbps | 78.2% |
| [West Virginia](https://broadbandnow.com/West-Virginia) | 29.9 Mbps | 75.2% |
| [Wyoming](https://broadbandnow.com/Wyoming) | 26.8 Mbps | 74.5% |
| [Oklahoma](https://broadbandnow.com/Oklahoma) | 40.2 Mbps | 73.3% |
| [Arkansas](https://broadbandnow.com/Arkansas) | 25.0 Mbps | 76.7% |
| [Mississippi](https://broadbandnow.com/Mississippi) | 25.2 Mbps | 70.2% |
| [Montana](https://broadbandnow.com/Montana) | 20.3 Mbps | 69.2% |

<https://broadbandnow.com/report/us-states-internet-coverage-speed-2018/>

|  |  |
| --- | --- |
| Country | Average download speed |
| Luxembourg | 375.78 |
| Japan | 102.34 |
| Iceland | 90.36 |
| South Korea | 86.98 |
| Switzerland | 79.58 |
| Sweden | 73.81 |
| Netherlands | 67.54 |
| Denmark | 61.49 |
| Spain | 57.86 |
| United States | 55.07 |

<https://broadbandnow.com/report/us-states-internet-coverage-speed-2018/>

## Cell Data

3G is being decommissioned. 2G is being kept as a low power backup

<https://en.wikipedia.org/wiki/3G#Decline_and_decommissions>

All speeds in Megabits per second

* 2G
  + GPRS: Icon shows G, maximum speeds of 0.1 Mbps, average speeds of less than 0.1 Mbps
  + Edge: Icon shows E, maximum speeds of 0.3 Mbps, average speeds of 0.1 Mbps
* 3G
  + 3G: Icon shows 3G, maximum speeds of 0.3 Mbps, average speeds of 0.1 Mbps
  + HSPA: Icon shows H, maximum speeds of 7.2 Mbps, average speeds of 1.5 Mbps
  + HSPA+: Icon shows H+, maximum speeds of 21 Mbps, average speeds of 4 Mbps
  + DC-HSPA+: Icons shows H+, maximum speeds of 42 Mbps, average speeds of 8 Mbps
* 4G
  + LTE Category 4: Icon shows 4G, maximum speeds of 150 Mbps, average speeds of between 12 and 15 Mbps
  + LTE-Advanced Category 6: Icon shows 4G+, maximum speeds of 300 Mbps, average speeds of between 24 and 30 Mbps
  + LTE-Advanced Category 9: Icon shows 4G+, maximum speeds of 450 Mbps, average speeds around 60 Mbps
* With 2G tech, latency is around 0.5 seconds
* With 3G tech, latency is around 0.1 seconds
* With 4G tech, latency is around 0.05 seconds

<https://www.tigermobiles.com/faq/mobile-download-speed-guide/#:~:text=3G%3A%20Icon%20shows%203G%2C%20maximum,average%20speeds%20of%201.5%20Mbps>

# Hardware

## Wi-Fi

* raspberry pi
  + Wi-Fi dongle
    - ~$10
  + Upgrading to a board with Wi-Fi
    - $5-10
    - This upgrade is only possible on the zero or the 3
    - The 4s come with onboard standard

## Cellular

* raspberry pi
  + Nova Global cellular modem
    - $69 for the device
    - The first sim is free
  + NimbeLink
    - 3G or 4G only
    - Major carriers
    - $78 hat/converter
    - $120 modem