Measuring Broadband New Zealand

Report 21, September 2024

The Measuring Broadband New Zealand programme measures the quality of New Zealand's fixed line, fixed wireless, and satellite internet. The aim of the programme is to independently measure and report on the actual in-home broadband performance so consumers can assess different providers, plans, and technologies to help them choose the best broadband for their homes. It will also encourage providers to improve and compete on their performance.

Please refer to page 31 for speed test results. The report also includes summary tables at the back that show the results for easy reference.

This report provides an overview of the findings from data collected between 1st July and 31st July 2024.

Contents

Overview

This report presents the key indicators of consumer internet performance in New Zealand from testing during July 2024.

Highlights include:

1. **Introduction of online game store test results, which measure the time taken to download a game from three popular online gaming stores.**
2. **Results for deprioritized LEO Satellite are included for the first time across all quality of service and quality of experience metrics.**
3. **Upload results by RSP are included in comparison charts for the first time.**
4. **The previous report comparison section now includes peak and 24/7 results.**
5. **Continuing to report download and upload speed results of two of Spark's 4G Fixed Wireless plans, and Spark's 5G Fixed Wireless plan using embedded technology.**

This report draws on testing from a wide range of providers, and a full list of RSPs included in this MBNZ report can be found in Table 2. There are a range of other RSPs to choose from who are not currently included in the testing, and we encourage Kiwis to shop around. Previous reports released by the MBNZ programme can be found here[1].

The MBNZ programme has a code of conduct to ensure that the parties involved act in good faith and in accordance with principles relating to data validation, 'gaming' of results, and appropriate public usage of the MBNZ results. A list of the signatories is included in the code, including the Commission and SamKnows. All tested RSPs complied with the current code of conduct, including validation of the data used in this report. You can see the code of conduct on our website here.[2]

[1] https://comcom.govt.nz/regulated-industries/telecommunications/monitoring-the-telecommunications-market/monitoring-new-zealands-broadband/Reports-from-Measuring-Broadband-New-Zealand
[2] https://comcom.govt.nz/__data/assets/pdf_file/0026/334871/Measuring-Broadband-NZ-Code-of-Conduct-October-2023.pdf

Executive Summary

Application Performance

1. Over 99% of Fibre 300, Fibre Max and HFC households were able to support 4 simultaneous UHD Netflix Streams. 86% of LEO Satellite households were able to support 4 simultaneous streams on the standard plan, and 65% on the deprioritized plan.

2. Online game store results are included for the first time in this report, measuring the time taken to download Hogwarts Legacy from three popular online game stores across plans. Fibre Max and HFC Max both achieved average download speeds to the three game stores capable of downloading a 79.5GB game in under 16 mins while Fibre 300 took just under 40 minutes. LEO Satellite plans averaged around 1 hour, while Fibre 50 and VDSL averaged between 3 to 4 hours. ADSL plans had the worst performance, averaging over 19 hours.

3. Latency to most social media platforms and video conferencing services remained fairly consistent compared to the previous report, with Snapchat seeing a small increase in latency for users receiving images.

Benchmarking

1. All plans saw stable download, upload and latency results compared to the previous reporting month.

Broadband Plan Comparison

This report includes broadband plans across a range of technologies and areas. The report shows performance comparison split across areas where Fibre broadband is available (urban areas), and where Fibre is not an option (rural areas). This comparison refines and expands our previous urban and rural view to better allow consumers to see how different technologies such as 4G Fixed Wireless perform in different areas. Areas with access to Fibre plans (Specified Fibre Areas) are the locations where Chorus will eventually be able to stop providing copper-based internet services (ADSL & VDSL plans), because Fibre is available. These are typically in more urban areas of New Zealand. More information on the withdrawal of copper-based internet services is available on the Commerce Commission website here[1].

ADSL - Remains suitable for traditional services like web browsing, email, and basic video streaming, particularly when there is only one person using the connection. Due to physical limitations, the highest-performing ADSL lines will never achieve download speeds higher than ~25 Mbps. The distance from house to exchange has a big effect on attainable speeds, with many ADSL lines averaging under 8 Mbps download. The higher latency, more frequent dropouts, and lower upload speeds make ADSL less suitable for video calls and multi-user households.

VDSL - There is a range in performance, some lines will achieve similar download/upload speeds to ADSL, whereas a small proportion of lines will achieve speeds comparable with Fibre 100, and certainly with lower speed Fibre plans. Lower speed lines will be less suitable for applications that use a lot of data, such as video conferencing and Ultra High Definition (UHD) streaming, whereas higher speed lines will generally support more data-heavy applications.

Fibre 50 - Supports latency-sensitive applications such as online gaming. Fibre 50 will also support applications such as UHD streaming and video conferencing. Fibre 50 may be unsuitable for data-heavy households with multiple simultaneous users.

Fibre 300 - Supports latency-sensitive applications such as online gaming. Fibre 300 will also support data-heavy applications such as UHD streaming with multiple simultaneous users or video conferences with a large number of participants. Fibre 300 will cover most users' requirements.

Fibre Max - Higher download and upload speeds than Fibre 300. The idle latency to internet applications, such as online games, through a Fibre Max line is the same as through any other Fibre

[1] https://comcom.govt.nz/regulated-industries/telecommunications/regulated-services/consumer-protections-for-copper-withdrawal

plan. Latency under load is lower for Fibre Max plans than for Fibre 300. Performance can vary depending on RSP, and Fibre 300 will support most modern internet applications and multi-user households. Fibre Max might be needed in cases where there is a genuine need for more bandwidth (e.g. frequently uploading or downloading large files) or when using extremely latency sensitive applications on a busy connection.

HFC (Cable) - Available in some areas (Wellington, Upper & Lower Hutt, the Kapiti Coast, and parts of Christchurch). HFC is also referred to as Cable and DOCSIS. One New Zealand is the only provider operating an HFC network in New Zealand. HFC lines achieve similar download performance to Fibre Max, however latency can be higher due to the difference between Cable and Fibre technologies.

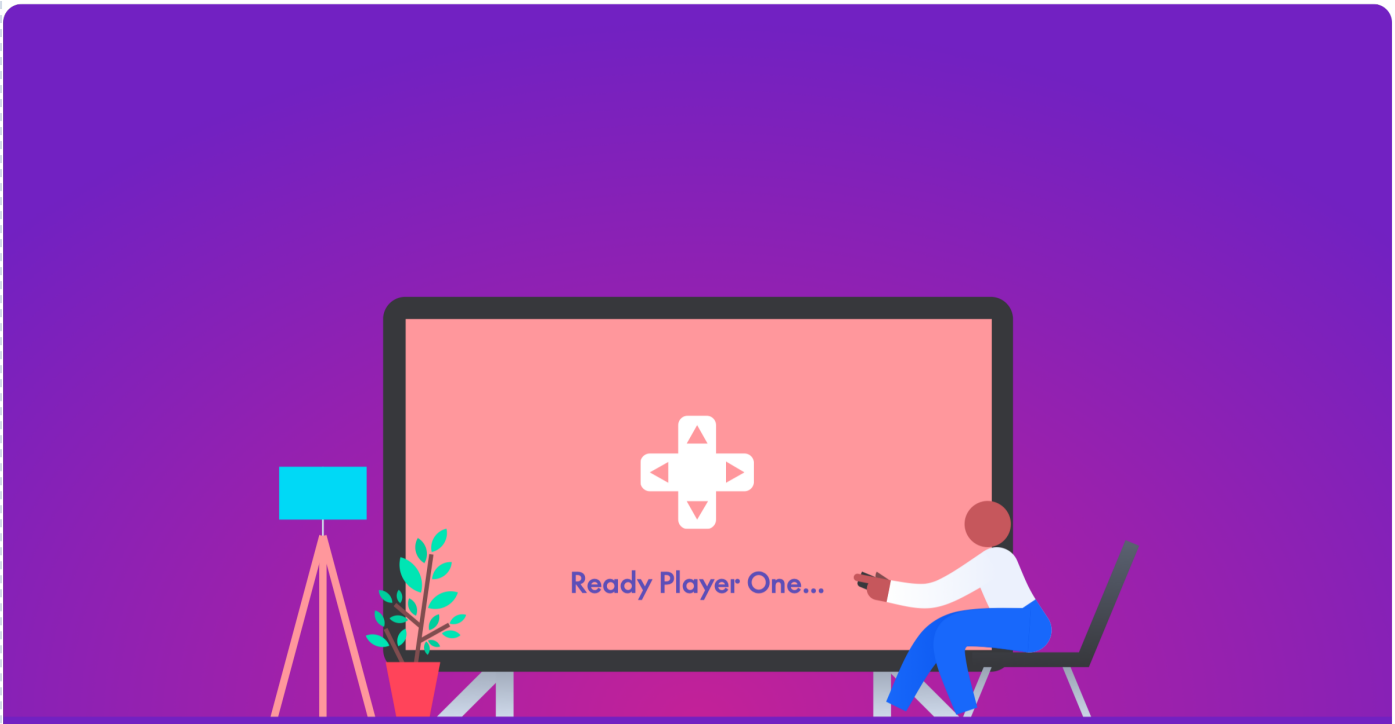
4G Fixed Wireless - Can offer higher download speeds than ADSL, and on average similar speeds to VDSL. Users will experience higher latencies due to the cellular technology underlying these plans. 4G Fixed Wireless has the highest latency of all technologies, and also delivers lower download/upload speeds and more frequent dropouts than Fibre. Speeds also can be more variable depending on the time of day, and other environmental factors. This range of performance factors means 4G Fixed Wireless should not necessarily be preferred to Fibre on performance grounds, however in some areas 4G Fixed Wireless is the only option for consumers, and even in areas where Fibre is available there are other reasons consumers might choose this option (ease of installation for example).

5G Fixed Wireless - Expected to support data-heavy applications, such as UHD streaming with multiple simultaneous users. Being a Fixed Wireless technology, users will likely experience higher latencies due to the nature of cellular technology. Speeds also can be more variable depending on the time of day, and other environmental factors. The 5G Fixed Wireless results presented in this report are specific to Spark. As each RSP has different fixed wireless infrastructure, these results should not be directly compared between RSPs.

LEO Satellite - Available in both rural and urban areas and is transmitted wirelessly using a satellite and ground based satellite dish. Typically higher download speeds than a Fibre 100 plan, but this can vary with location. While speeds can be expected to handle most applications, including video conferencing and streaming, it is not as consistent as fixed line broadband due to factors such as congestion and bad weather. Starlink is currently the only LEO Satellite provider included in the MBNZ report. Starlink also offer a deprioritized service, which means that traffic is deprioritized over

their standard service during peak hours. Results for both the standard and deprioritized plans are included in MBNZ.

Other Broadband Plans - There are other plans available that are not currently reported on by MBNZ. Fibre 30, 100 and 200 plans should be broadly consistent with results measured for Fibre 50, 300 and Fibre Max for latency and reliability metrics. The main differences for these lower speed Fibre plans would be lower download and upload speeds, meaning it would take longer to download and upload larger files, and they would be able to support fewer users at the same time when using video streaming services. For WISP Fixed Wireless plans it is not possible to give any firm advice around their suitability for different applications at this stage due to the variety of implementations and low sample size.



Application Performance

In this section we report on the performance of a number of common applications that consumers in New Zealand use on a regular basis.

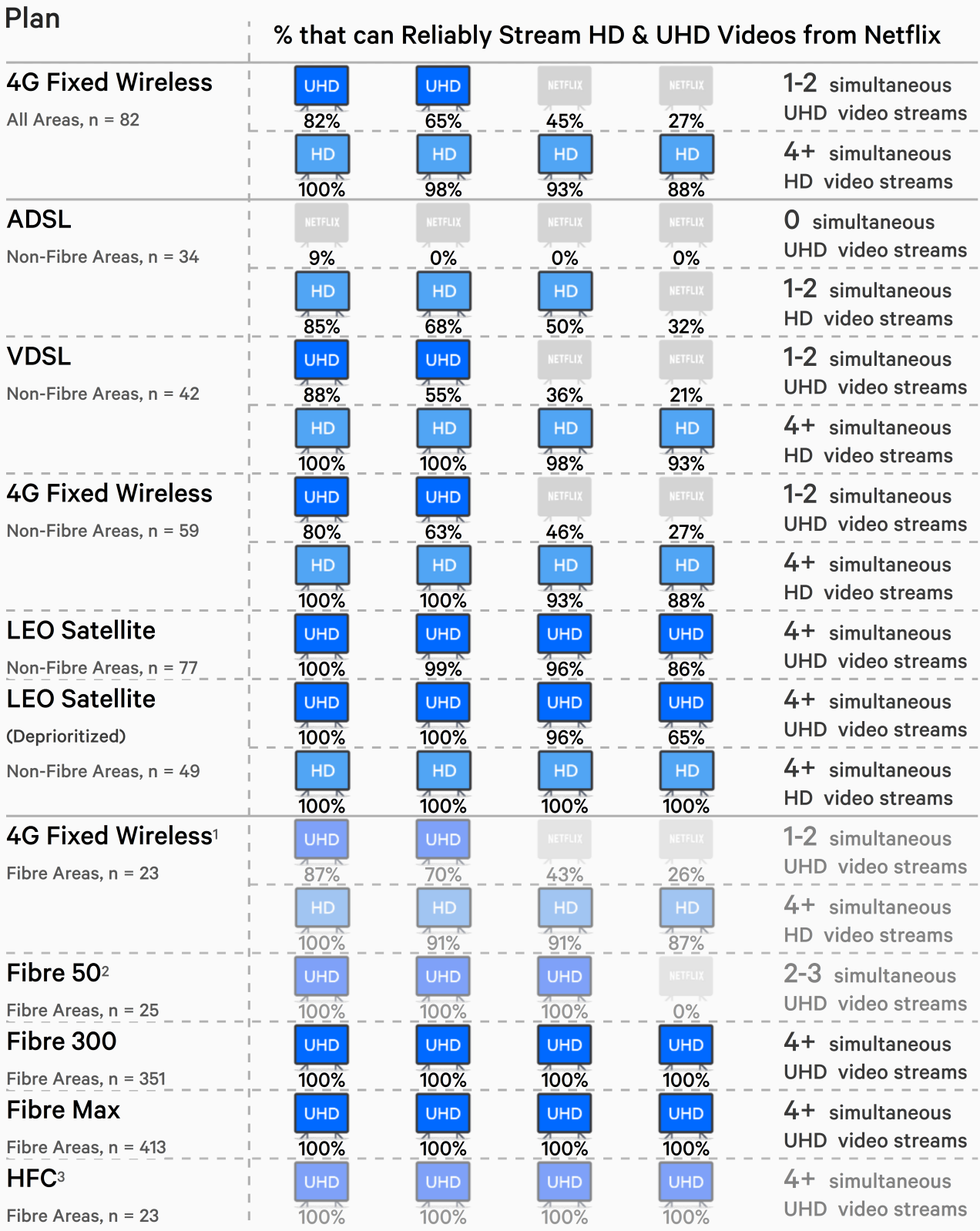
Some results in this section are shown with error bars representing the 95% confidence interval for each plan. The transparent bars show plans with a sample size lower than we would typically include within reporting. These plans have larger error bars due to the smaller sample size and care should be taken when comparing these plans against others. We recommend consumers factor in the error bars when comparing plan averages, especially those with smaller sample sizes.

Netflix

Video streaming is a good example of an application where the quality of a user's experience is more affected by bandwidth (capacity) than by latency (lag). The Netflix measurement streams real video from the live Netflix service [1]. Traffic for this service is often delivered from within broadband provider's network to improve performance. The transparent screens show plans with a sample size lower than we would typically include within reporting.

[1] This test runs on an idle connection, results may be affected with simultaneous usage. Results are also collected across all hours of the day, and peak hour performance may vary. HD is measured at 3 Mbps, and UHD at 15 Mbps in accordance with Netflix guidelines.

Figure 1:



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[1] Results for 4G Fixed Wireless are based on a sample size of 23 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fixed Wireless being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.
[2] Results for Fibre 50 are based on a sample size of 25 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fibre 50 being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.
[3] Results for HFC are based on a sample size of 23 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

Key Observations

- 86% of LEO Satellite plans were able to stream 4 simultaneous UHD Netflix streams, an increase compared to the previous 78%.
- 65% of deprioritized LEO Satellite plans were able to stream 4 simultaneous UHD Netflix streams.
- 82% of households on Fixed Wireless across all areas of New Zealand were able to support a single UHD stream, and 88% of households could support at least 4 simultaneous HD streams.
- In non-Fibre areas, 80% of 4G Fixed Wireless households were able to support a single UHD stream, and 88% of households could support at least 4 simultaneous HD streams.
- In Fibre areas, 87% of 4G Fixed Wireless households were able to support a single UHD stream, and 87% of households could support at least 4 simultaneous HD streams.
- 100% of households on Fibre 50 were able to stream 3 simultaneous UHD Netflix streams. No households on Fibre 50 achieved download speeds high enough to support 4 simultaneous UHD streams.
- 100% of households on Fibre 300, Fibre Max or HFC plans had an average download speed able to support 4 simultaneous UHD Netflix streams.
- 88% of households on VDSL plans in non-Fibre areas were able to support a single UHD stream, and 93% could support 4 simultaneous HD streams. For ADSL households in non-Fibre areas, only 9% were able to support a single UHD stream, while 50% could support 3 simultaneous HD streams.

Game Stores

Modern console games are delivered from online stores such as Steam, Xbox Live and PlayStation Network. These games can be tens or even hundreds of gigabytes so achieving high throughput from these stores is important to gamers. The game store measurement downloads a portion of a real game from three different game stores[1]. Results will depend on the content distribution networks (CDNs) that host the games, and can vary depending on your RSP and where the CDNs are located.

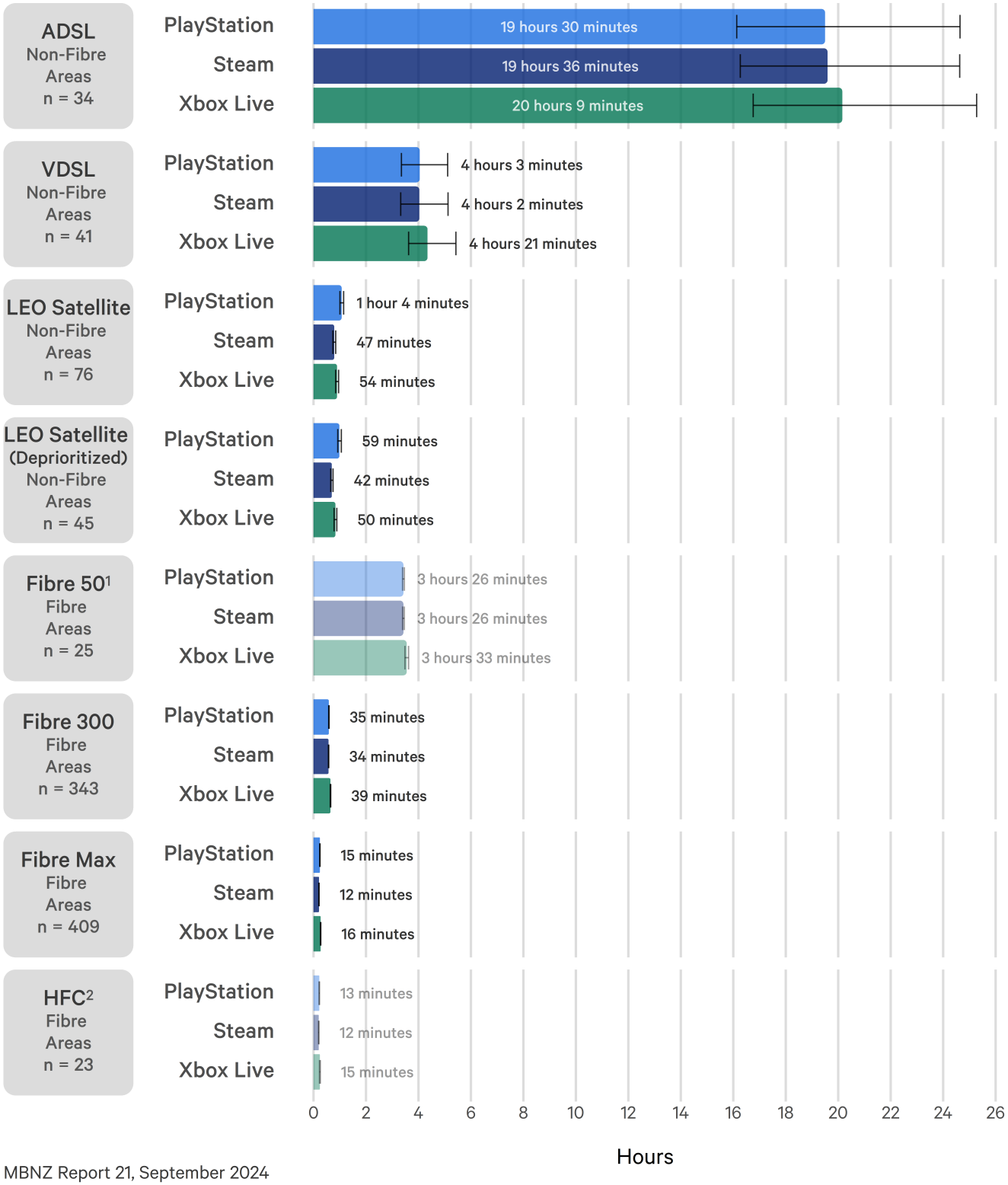
[1] This test runs on an idle connection, results may be affected with simultaneous usage. Results are also collected across all hours of the day, and peak hour performance may vary.

Figure 2: Average Time Taken to Download Hogwarts Legacy by Plan.

Average time taken to download a file of 79.5 GB.

Average of household average download speed, lower is better.

The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 34).



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[3]Results for HFC are based on a sample size of 23 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

Key Observations

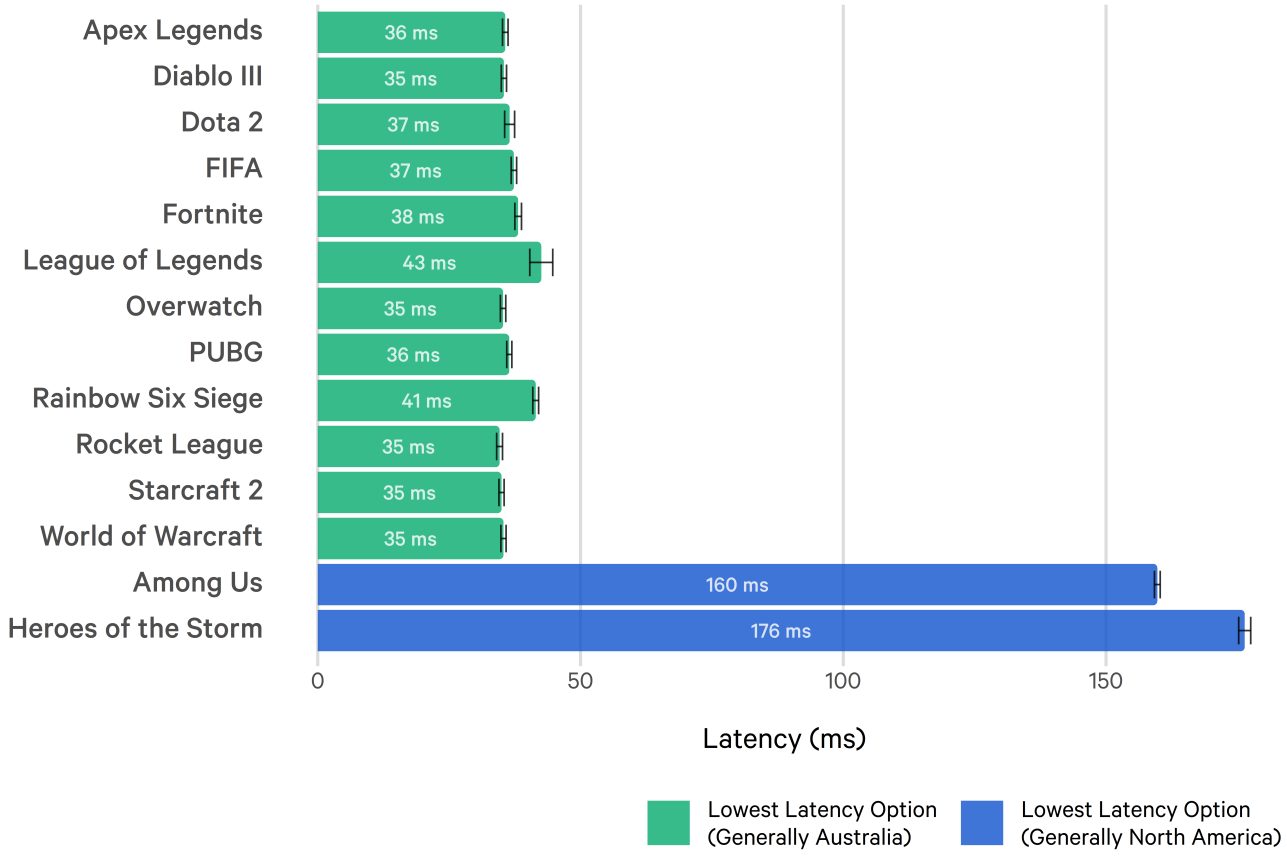
- The average time taken to download Hogwarts Legacy was around 20 hours for ADSL plans across all game store providers. For VDSL and Fibre 50 this average was between 3 to 4 hours.
- LEO Satellite plans had average download speeds capable of downloading Hogwarts Legacy in around an hour.
- Fibre 300 had average download speeds capable of downloading Hogwarts Legacy in 40 minutes or less across all tested game store providers. For Fibre Max and HFC Max, the download time was 16 minutes or less.
- Results for 4G Fixed Wireless are not included due to the data usage volumes used to run the test.

Online Gaming

Online gaming applications require low latency between users' machines and the central host server. If it takes a long time to pass messages between the users' device and the server where the game is hosted, then disruptive stuttering or lag will result. This is usually when latency increases beyond 50 or 100ms – some game servers will simply refuse to admit players who have triple-figure latency because this will ruin the game for everyone else.

Figure 3: The Latency to Various Online Gaming Servers.

Average of household average latency to gaming servers, lower is better.
Fibre Plans Only. Lower latency means that lag is less likely.



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Key Observations

- Among Us and Heroes of the Storm both tested to servers in North America. These games show average latencies much higher than the remaining games which tested to servers located in Australia.
- The impact of latency on consumers also depends on the type of game being played. For example, high latency would be noticed more by consumers playing first person shooter games than turn based strategy games, and could have a negative impact on game play experience if it was too high.
- The latency results above are shown for Fibre plans only. Results for latency split by individual plans can be seen in the figure below, and results for all RSPs can be seen in Table 6.
- Results for Valorant and Hearthstone have been removed from this report as we make updates to the tests.

Figure 4: The Latency to Various Online Gaming Servers by Plan.

Fibre Areas only. Average of household average latency to gaming servers, lower is better
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 23).
Lower latency means that lag is less likely.

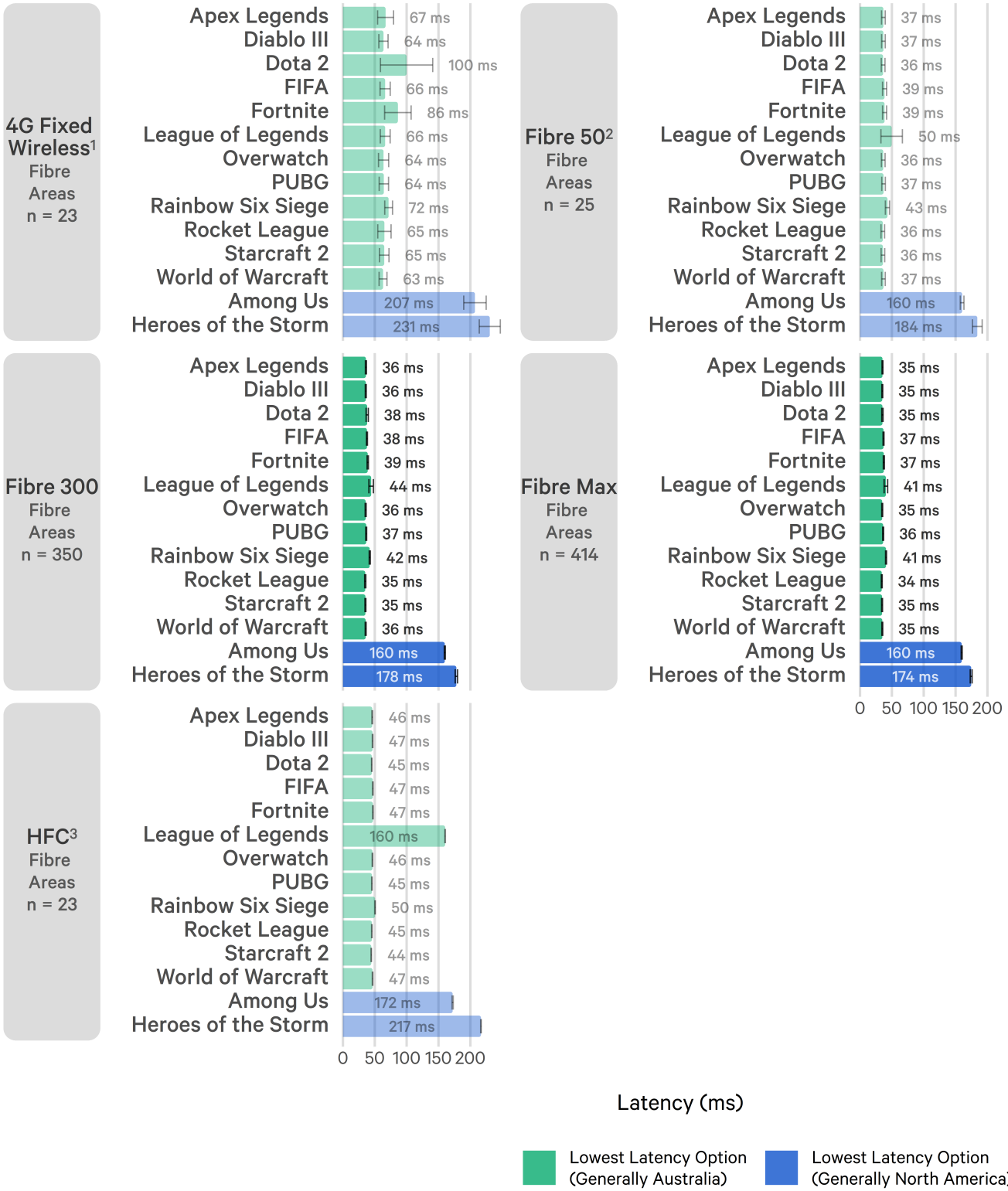

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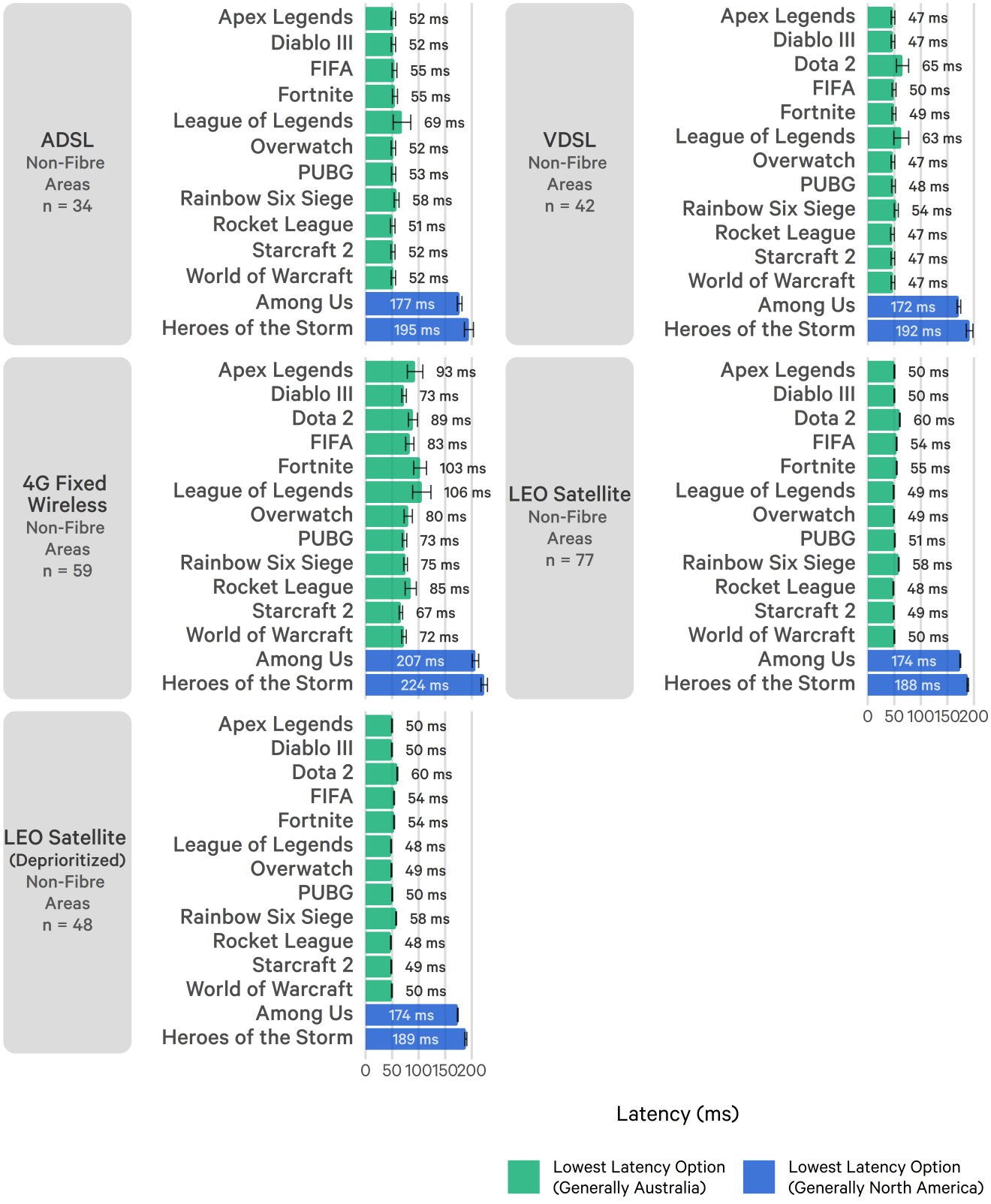
Figure 5: The Latency to Various Online Gaming Servers by Plan.

Non-Fibre Areas only. Average of household average latency to gaming servers, lower is better
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 34).
Lower latency means that lag is less likely.



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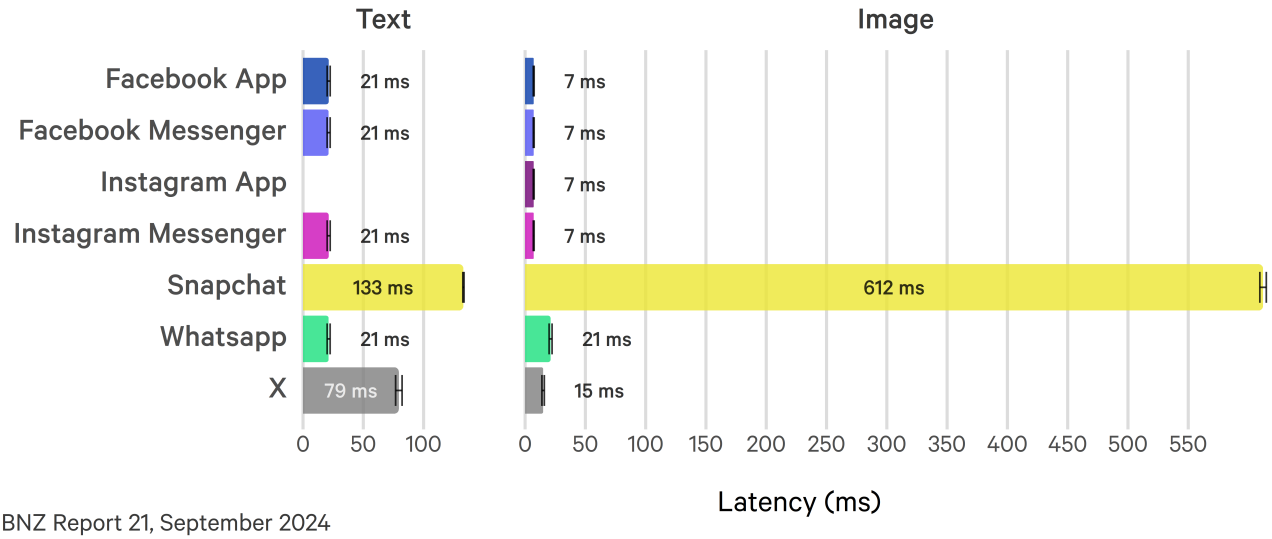
Social Media

Social media applications generally involve fetching a large number of relatively small pieces of information (single images, short pieces of text, and so on). Applications such as Facebook serve different types of content from different servers - for example, an image will come from one server while its caption will come from a different server. Due to this, latency to the server will be a large factor of how responsive social media applications will be, however there are other factors that can also influence performance.

Figure 6: The Latency to Servers of Different Social Media Platforms.

Average of household average latency to content servers, lower is better.
Fibre plans only.



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Key Observations

- Latency values for Whatsapp decreased for both text and image compared to the previous report. Average latency also decreased for Text downlink across Facebook and Instagram.
- Snapchat image latencies increased again compared to the previous report and remain higher than all other social media platforms tested for both Image and Text downlink. Consumers may notice a several second delay when using Snapchat, to download an image for example, compared to other social media platforms due to Snapchat's hosting location. This is outside the control of RSPs.
- Latency results are shown for Fibre plans only. Results for social media split by individual plans can be seen in the figure below, and results for all RSPs can be seen in Table 5.

Figure 7: The Latency to Servers of Different Social Media Platforms by Plan.

Fibre Areas only. Average of household average latency to content servers, lower is better.
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 23).

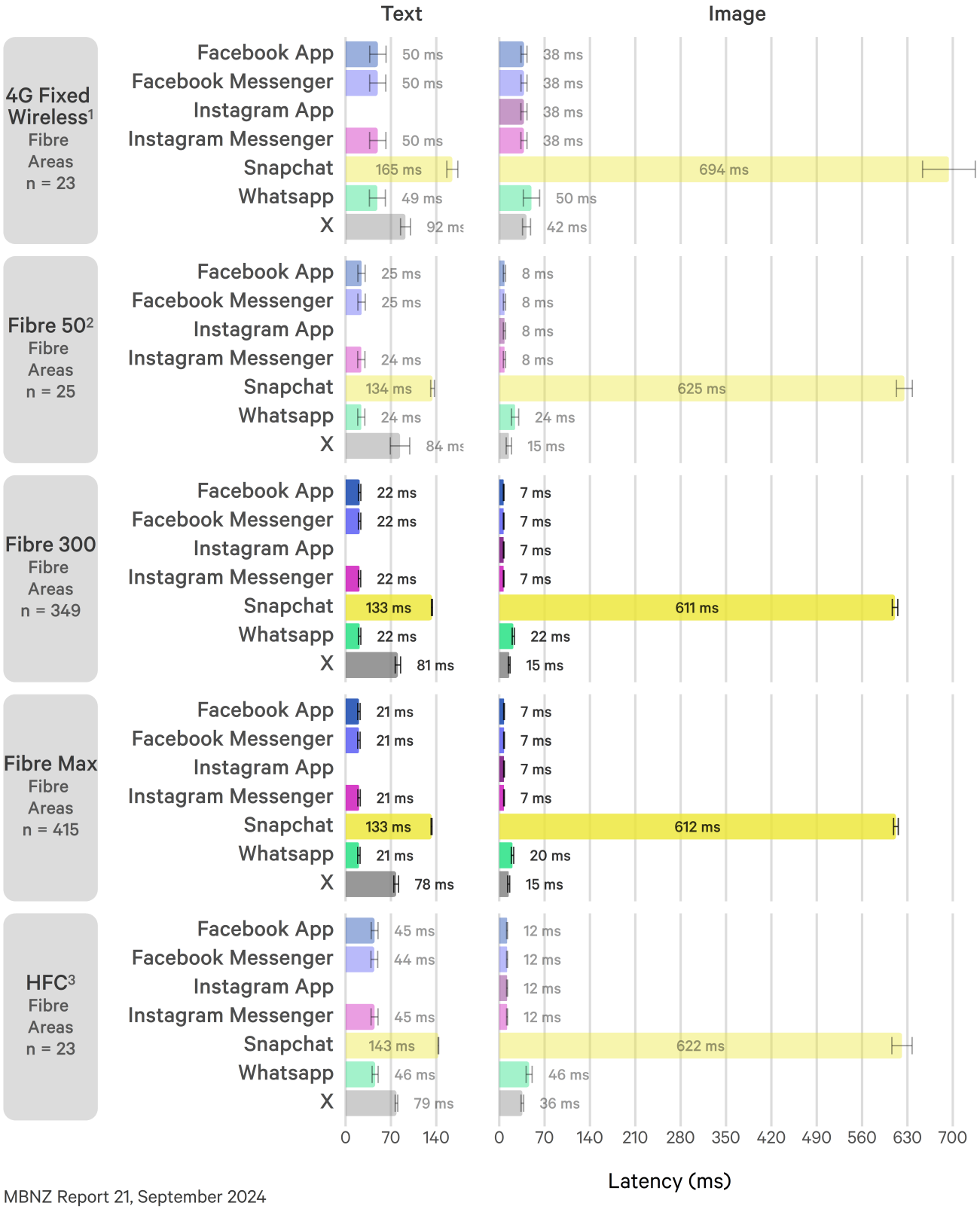

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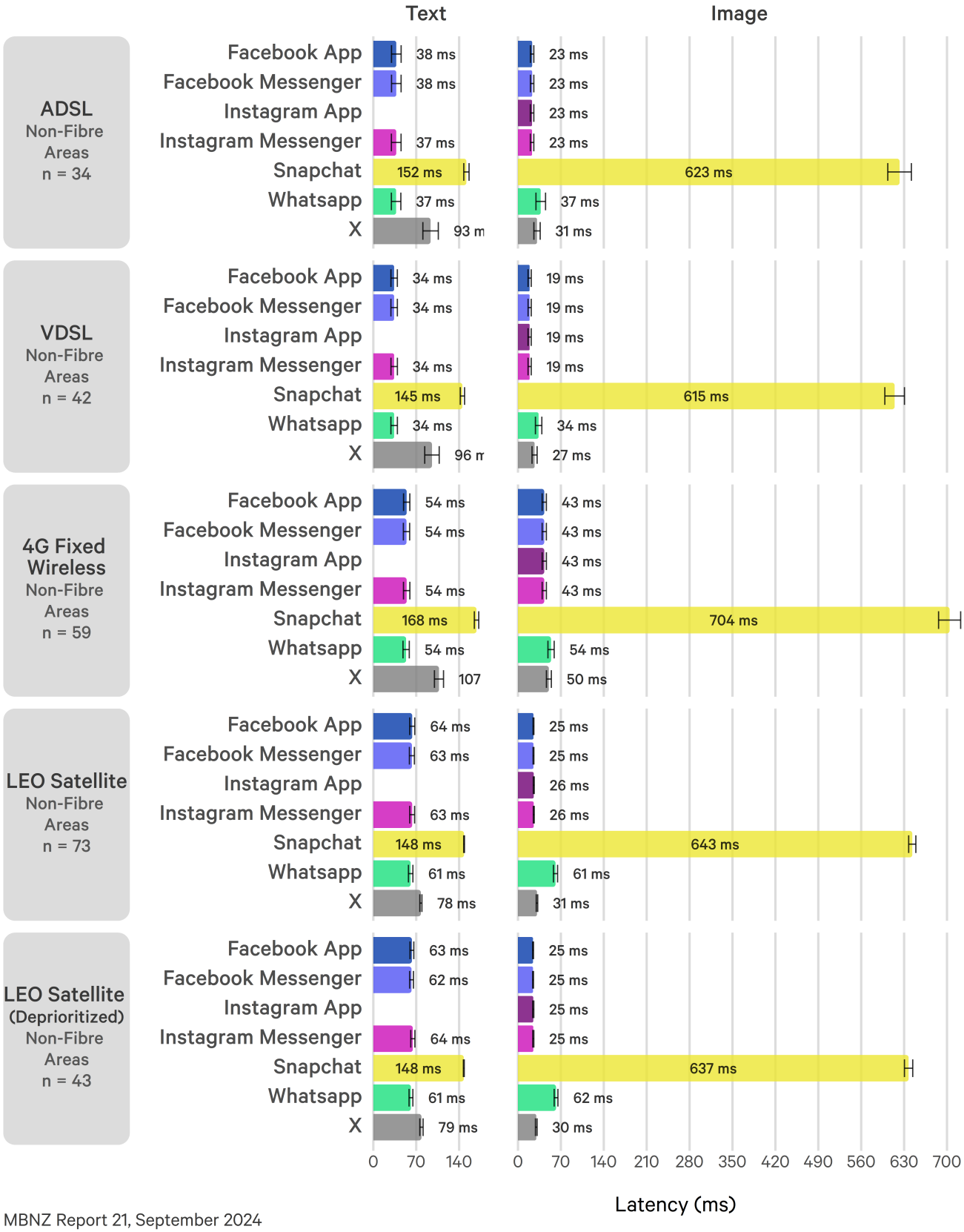
Figure 8: The Latency to Servers of Different Social Media Platforms by Plan.

Non-Fibre areas only. Average of household average latency to content servers, lower is better.
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 34).



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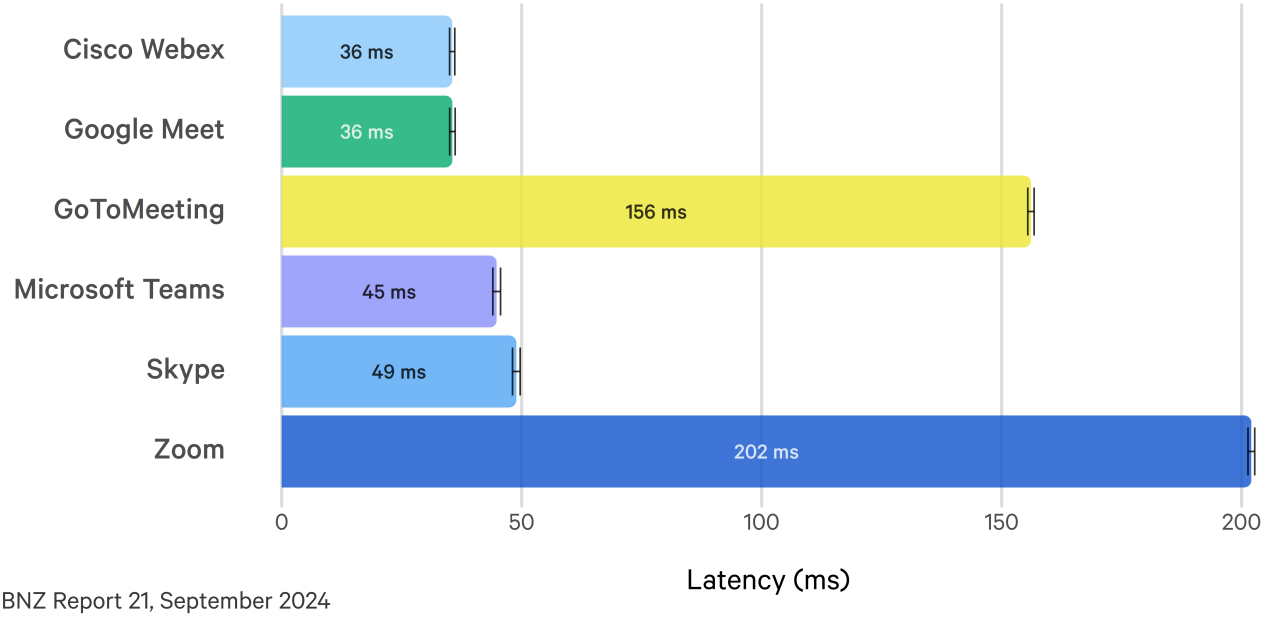
Video Conferencing

Latency is not the only factor impacting on the quality of a video call. Packet loss and jitter can result in stuttering and dropouts, and these are not captured in the round-trip times measured here. Application specific attributes such as audio/video encoding and proprietary communication protocols can lead to different performance characteristics for different services.

Figure 9: The Latency to Servers of Different Video Conferencing Services.

Results are using free accounts only.
Average of household average latency, lower is better. Fibre plans only.



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Key Observations

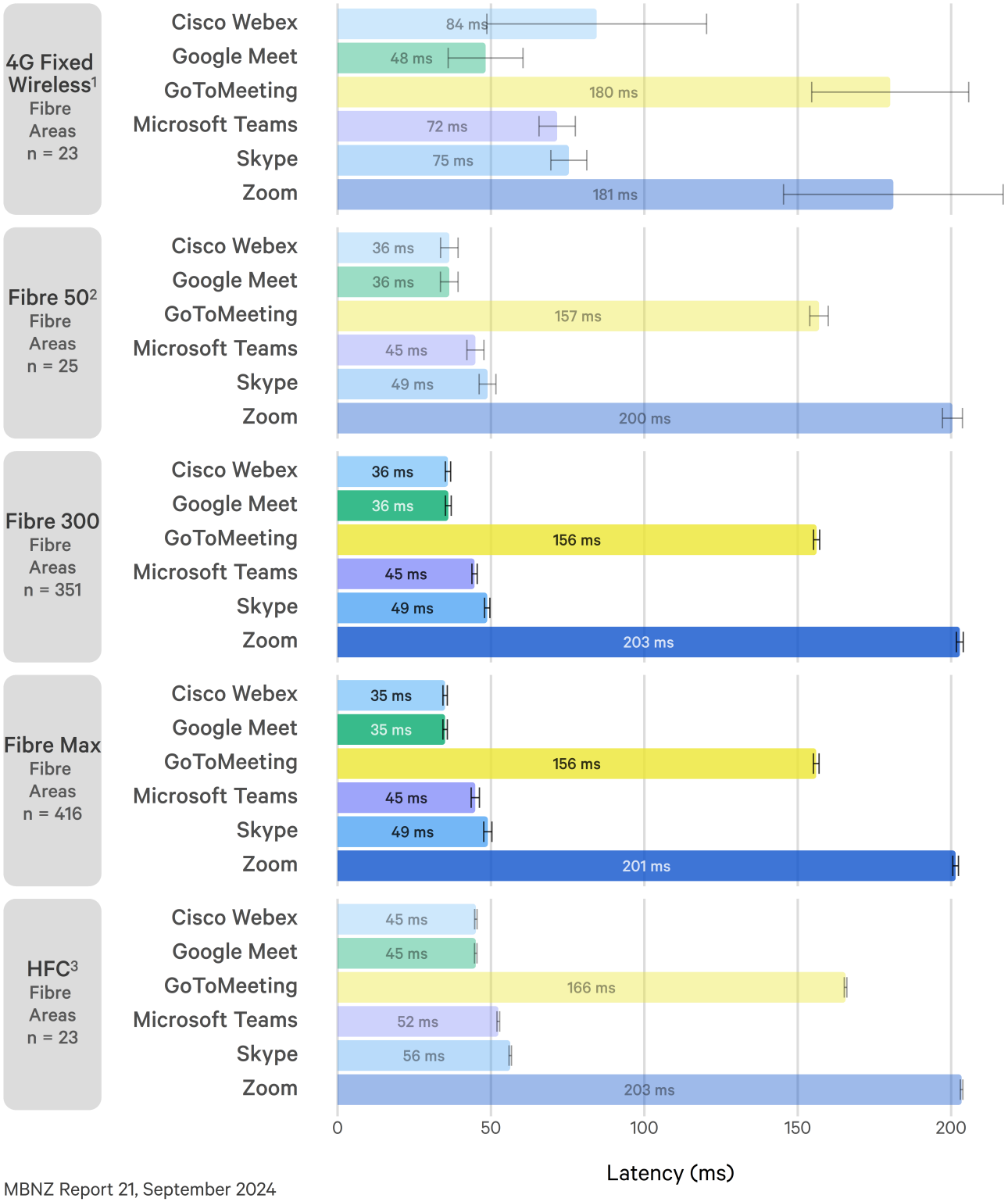
- Latency values for all video conferencing services remained consistent for Fibre plans compared to the previous report.
- Video conferencing services that use international servers usually see similar performance, however as the traffic is travelling further and subject to international routing, this could account for small differences in consumer experience like users talking over one another more frequently when using these unpaid services.
- The latency results above are shown for Fibre plans only. Results for all video conferencing split by individual plans can be seen in the figure below, and results for all RSPs can be seen in Table 7.

Figure 10: The Latency to Servers of Different Video Conferencing Services by Plan.

Fibre Areas only. Results are using free accounts only.

Average of household average latency, lower is better.

The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 23).



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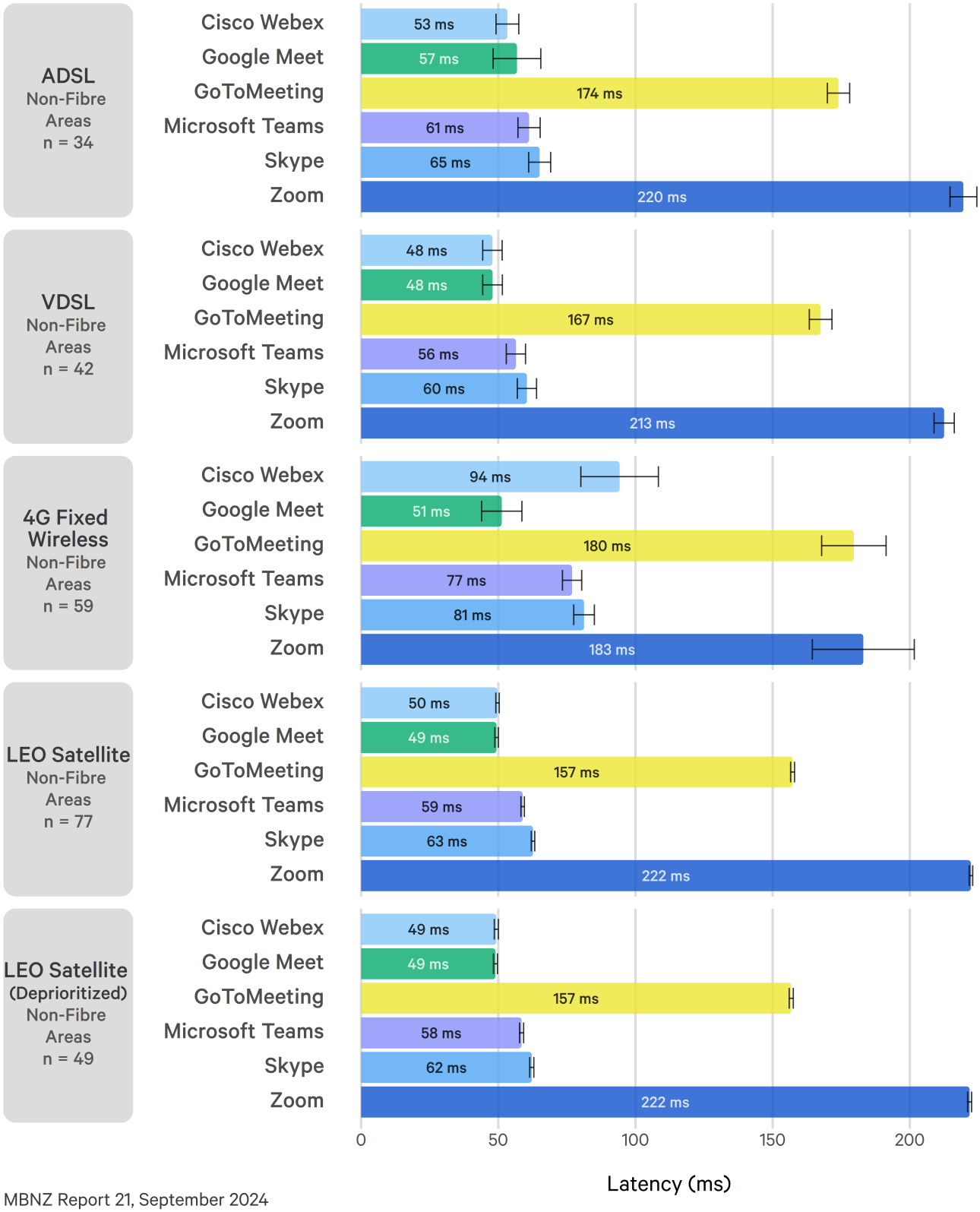
[3]Results for HFC are based on a sample size of 23 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

Figure 11: The Latency to Servers of Different Video Conferencing Services by Plan.

Fibre Areas only. Results are using free accounts only.

Average of household average latency, lower is better.

The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 34).



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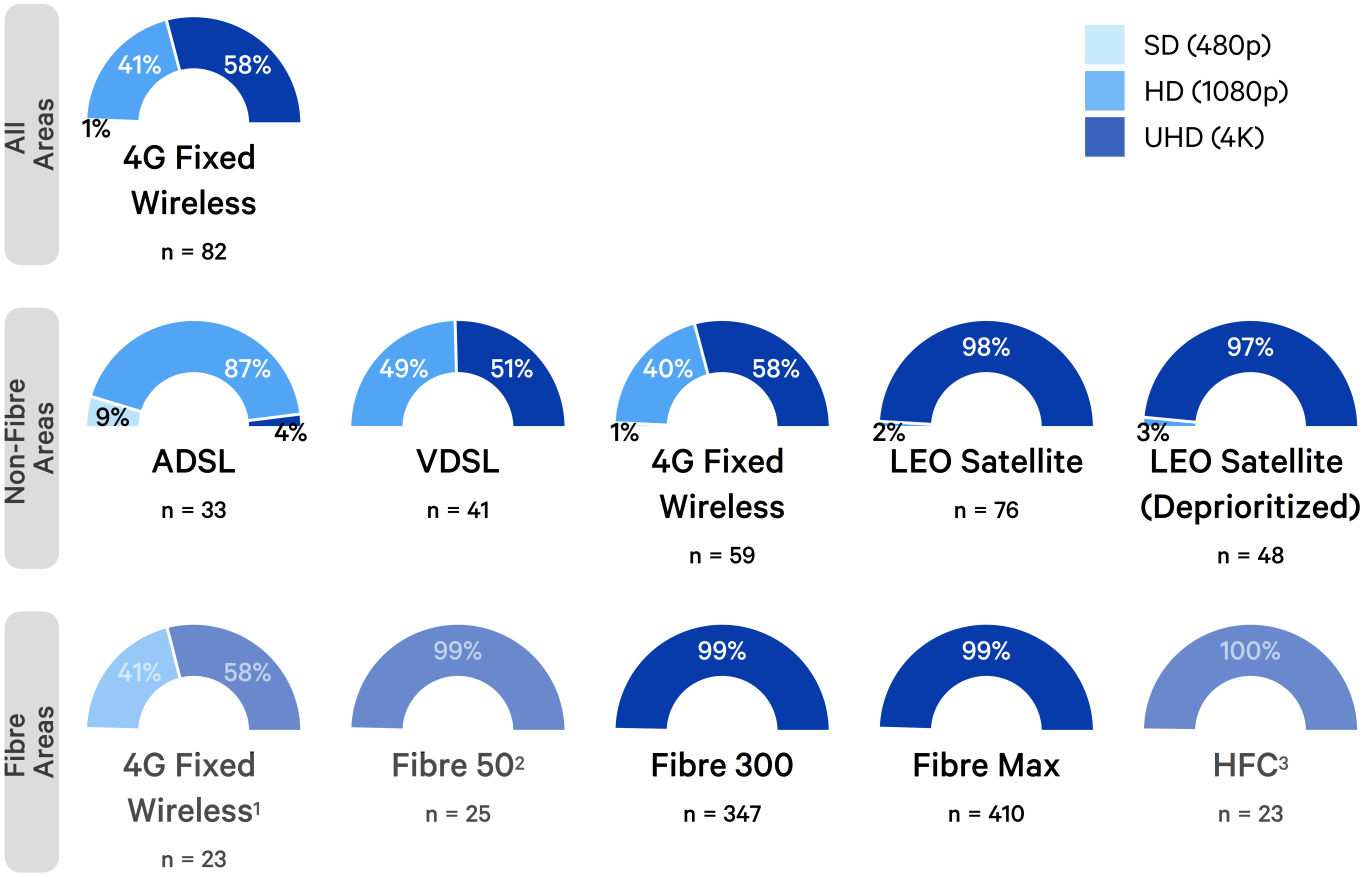
YouTube

The YouTube measurement streams a real video from the live YouTube service[4]. Traffic for this service is often delivered from within the broadband provider's networks, through the use of Google Global Caches (GGCs). These are servers installed by the broadband provider inside their network to cache YouTube and other Google content to improve performance.

Figure 12: Highest Quality that can be streamed over YouTube by Plan



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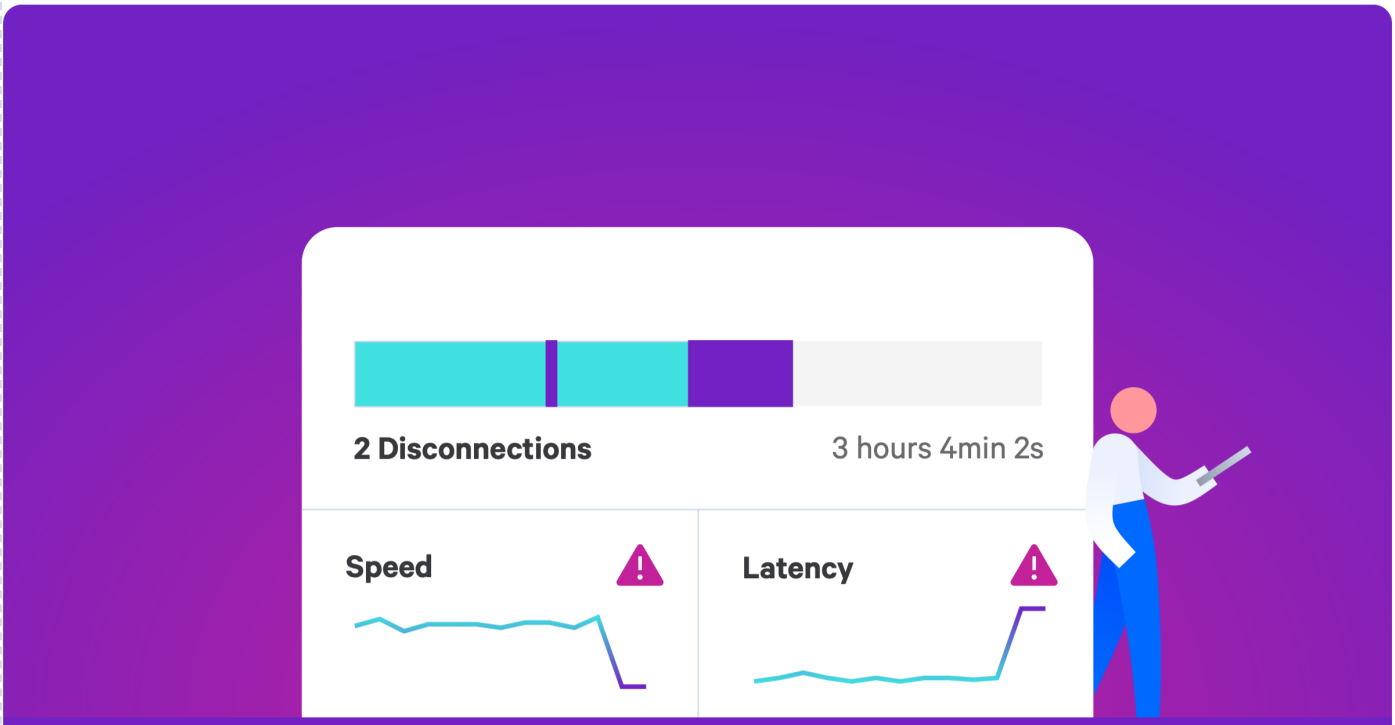
[4] This test runs on an idle connection, results may be affected with simultaneous usage. Results are also collected across all hours of the day, and peak hour performance may vary.

Key Observations

- 58% of Fixed Wireless households across New Zealand were able to stream an UHD YouTube video. In Fibre Areas, and non-Fibre areas, the percentage of households was also 58%.
- 51% of VDSL households in non-Fibre areas were able to stream an UHD video, compared to just 4% of ADSL households.
- 98% of LEO Satellite households, and 97% on the deprioritized service were able to stream a UHD YouTube video.
- Over 99% of Fibre 300, Fibre Max and HFC households in Fibre areas were able to stream a UHD YouTube video.



Quality of Service & Reliability

In this section we report on the performance of a number of popular plans across New Zealand for quality of service metrics.

Some results in this section are shown with error bars representing the 95% confidence interval for each plan. This means that if we had repeated our measurements 100 times, we would expect the result to have fallen within the black bands in at least 95 cases.

The transparent bars show plans with a sample size lower than we would typically include within reporting. These plans have larger error bars due to the smaller sample size and care should be taken when comparing these plans against others. We recommend consumers factor in the error bars when comparing plan averages, especially those with smaller sample sizes.

Disconnections

Realtime applications like video calls rely on a consistent connection between the home router and the target server. If the connection drops, even for a few seconds, the application will exhibit some form of stuttering. In the worst instance, a user might be disconnected and have to reconnect or wait for their broadband connection to come back online.

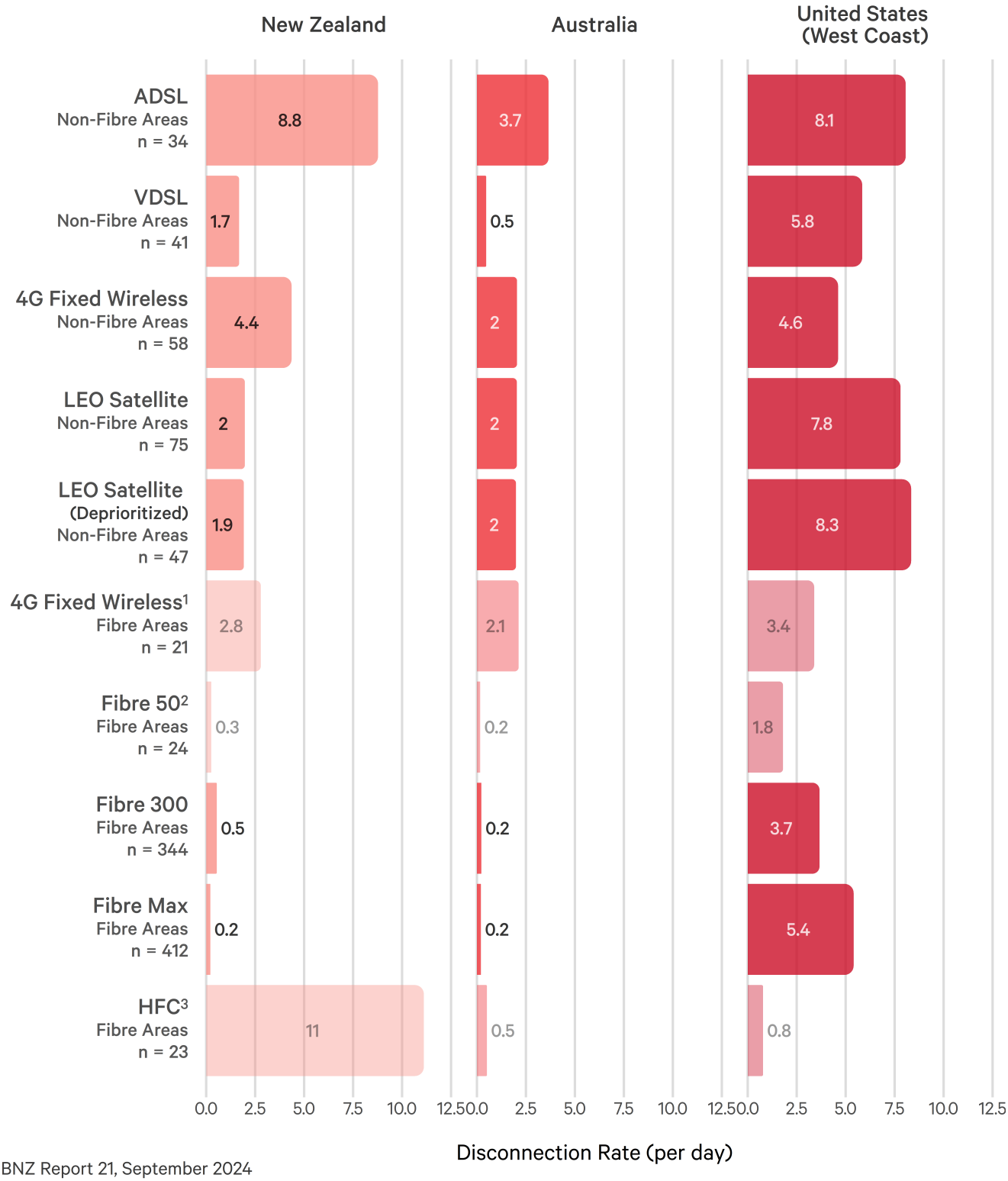
A brief disconnection very rarely means that, for example, a physical cable has been cut. Instead, the main reasons for network dropouts relate to congestion and the configuration of network equipment. The following graph compares daily disconnection rates across plans.

This graph shows medians across households. Taking VDSL as an example, 50% of households will experience no more than 1.7 disconnections per day for traffic remaining within New Zealand. This obscures the extremes of performance for each plan. While the median ADSL and Fixed Wireless results are comparable, ADSL connections are more likely than others to have disconnection rates far above the median, whereas Fixed Wireless plans are more likely to have results close to the median.

Many common applications, such as video conferencing applications or online gaming used by New Zealanders are served from overseas, mainly Australia, East Asia, and the USA. All New Zealand RSPs share capacity through four undersea cable networks which carry traffic to and from New Zealand across the Tasman Sea and the Pacific.

Figure 13: Median Daily Disconnection Rates. Lower is Better.

Medians of household daily rates. A disconnection means that two or more packets in a row don't complete a full round trip. Testing only covers periods where the line is idle.



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[1] Results for 4G Fixed Wireless are based on a sample size of 21 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fixed Wireless being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.
[2] Results for Fibre 50 are based on a sample size of 24 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fibre 50 being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.
[3] Results for HFC are based on a sample size of 23 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

Key Observations

- Most households see a very low rate of disconnections, at least while the line is idle.
- Disconnections have increased compared to the previous report, particularly for disconnections within New Zealand for HFC and ADSL. The number of disconnections increased across a handful of RSPs which has led to the overall increase in the median result for those plans.
- Traffic going overseas is more likely to be lost than traffic remaining within New Zealand.

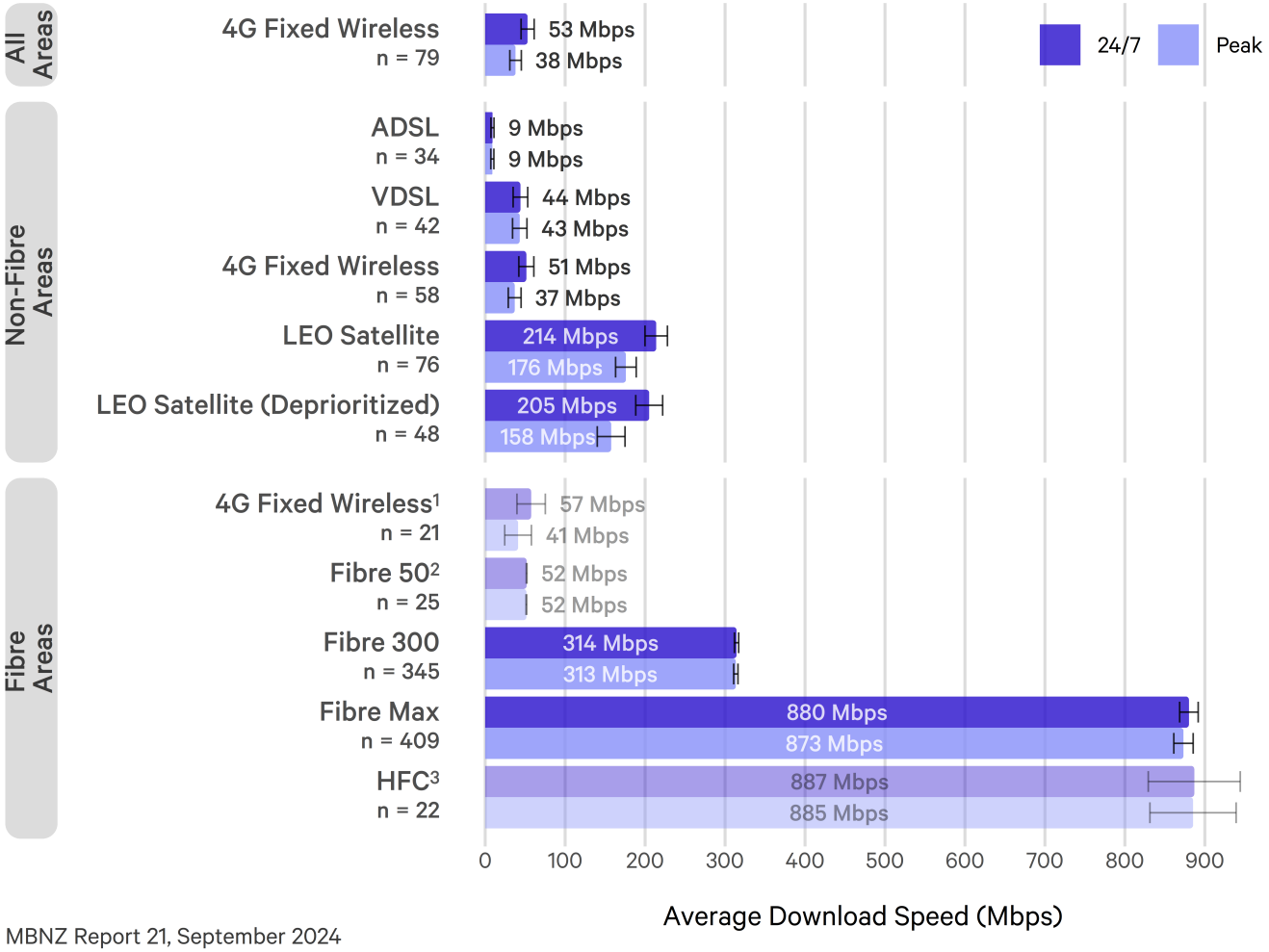
Speed Tests - Download

Figures 14 and 24 give an overview of download and upload speed across the country. These are included in every report to provide a benchmark that can be tracked over time. These results are split across Fibre areas, where Fibre is available to consumers and non-Fibre areas where Fibre is not available. There were not enough Whiteboxes to report ADSL and VDSL results in Fibre areas.

Peak hours are the times when people typically use the internet; in New Zealand this is 7pm to 11pm on Monday-Friday.

Figure 14: Average Download Speeds by Plan

Average of monthly household weighted averages. Peak hours are Monday - Friday, 7pm - 11pm. The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 79). Error bars show 95% confidence intervals of the mean.



MBNZ Report 21, September 2024

[1] Results for 4G Fixed Wireless are based on a sample size of 21 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fixed Wireless being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.
[2] Results for Fibre 50 are based on a sample size of 25 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fibre 50 being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.
[3] Results for HFC are based on a sample size of 22 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

Key Observations

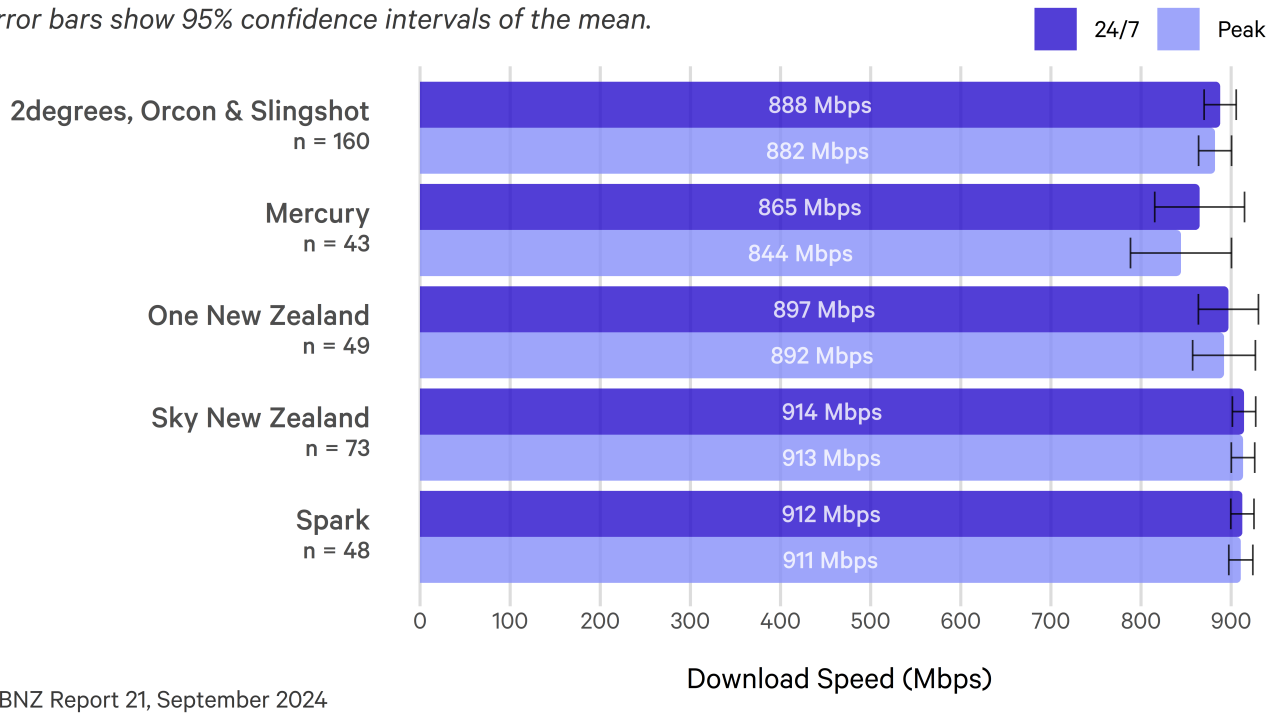
- ADSL and VDSL results are consistent with those seen in the previous report, showing similar results during peak hours.
- LEO Satellite results are broadly consistent with the previous report. Results for Starlink's deprioritized plan are also included in this report for the first time. These show a small decrease in speeds, particularly during peak hours compared to the standard LEO Satellite service.
- LEO Satellite and 4G Fixed Wireless show a larger variation between peak hour download speeds and all hour download speeds compared to fixed line plans. This could be due to these technologies being more sensitive to congestion during peak hours. 4G Fixed Wireless results in Fibre areas achieved similar speeds with non-Fibre areas during peak hours, and slightly higher results during all hours.
- Fibre 50, Fibre 300 and Fibre Max results are also broadly similar to the previous report, with Fibre 300 seeing average speeds above 300 Mbps, including during peak hours. Fibre Max average download speeds are consistent with previous results. RSP specific results for Fibre Max and Fibre 300 can be found in Figures 15 and 16.
- Results for HFC are broadly consistent with the previous report.

Fibre Max Breakdown by RSP

Fibre Max plans are derived from 'gigabit' wholesale products but, since around 6% of the data in HTTP traffic is given over to protocol overhead (IP packet headers etc), the highest speed test result that can theoretically be achieved by a Fibre Max line is around 940 Mbps.

Figure 15: Average Fibre Max Download Speed by RSP

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 160).
Error bars show 95% confidence intervals of the mean.



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Key Observations

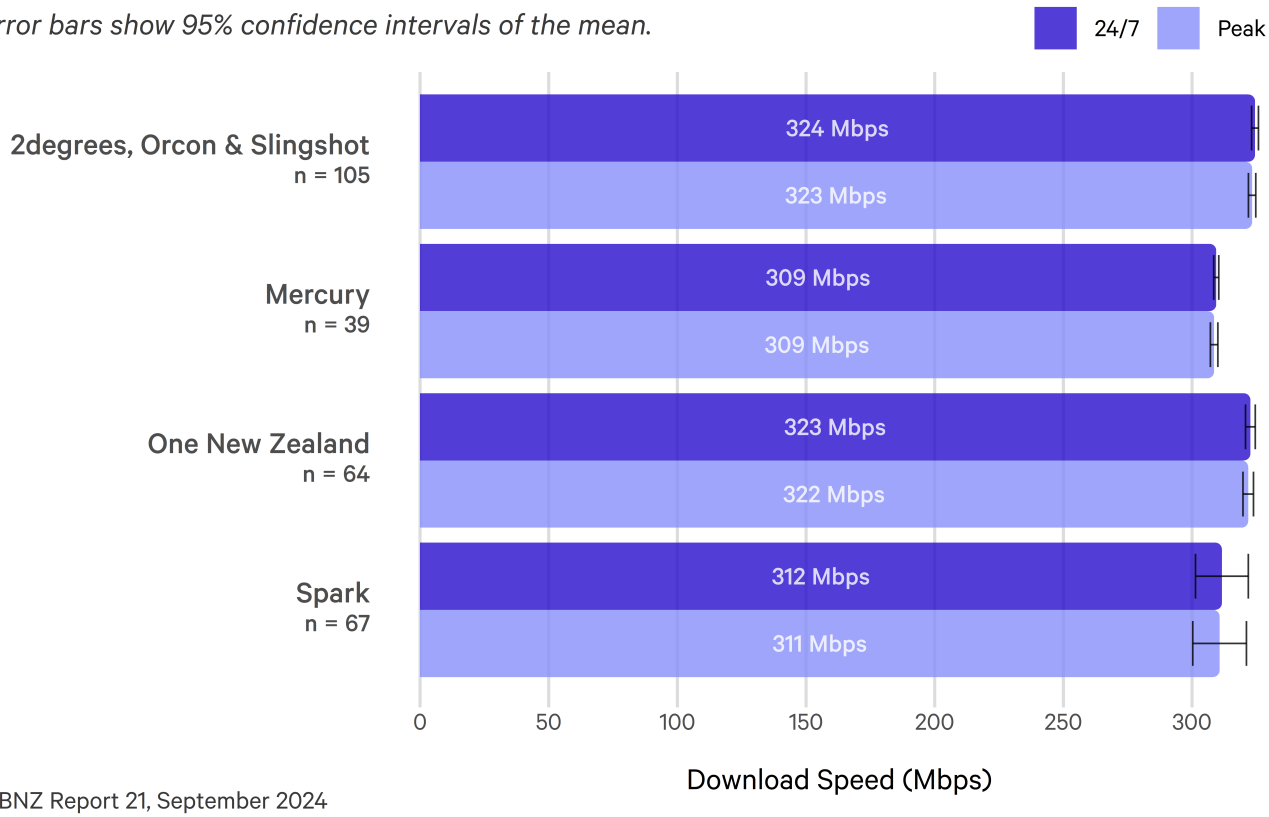
- All RSPs, the results are broadly in line with those seen in the previous report, with some RSPs showing an increase in average download speeds across all hours and peak hours.
- Results for Mercury can be seen in this report for the first time.
- There were not enough Fibre Max volunteers on Contact Energy, Electric Kiwi, NOW NZ, PureLink or Voyager during the measurement period to report results for these RSPs. All tested RSPs are included in the overall Fibre Max results shown in Figure 14.

Fibre 300 Breakdown by RSP

The speeds Fibre 300 is typically advertised to consumers are 300 Mbps download and 100 Mbps upload. In practice, since the provisioned speed is set slightly higher to allow for extra bandwidth used up by the network protocol overhead, it is quite common to see measured download speeds close to or slightly above 300 Mbps.

Figure 16: Comparison of Average Fibre 300 Download Speeds across RSPs.

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 105)
Error bars show 95% confidence intervals of the mean.



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Key Observations

- All RSPs tested previously continued to perform consistently in July, with all RSPs shown in the chart achieving average download speeds above 300 Mbps, including during peak hours.
- Results for Sky New Zealand are not included in this report due to a smaller sample size. This is due to a number of volunteers moving to Sky's Fibre Max plan over the last 3 months.
- There were not enough volunteers on Contact Energy, Electric Kiwi, Inspire Net, Mercury, NOW NZ, Sky New Zealand, Voyager or Wireless Nation to report results. All tested RSPs are included in the overall Fibre 300 results shown in Figure 14.

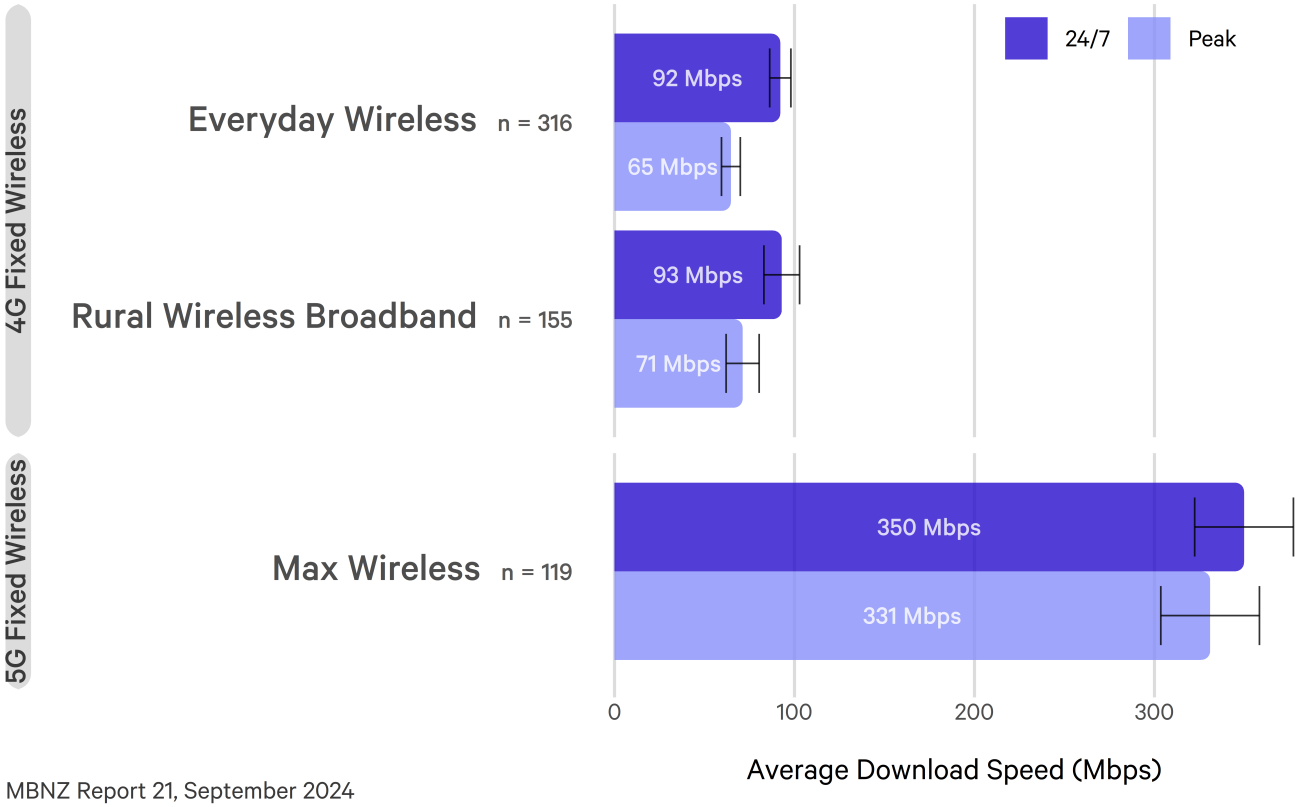
Spark Fixed Wireless Embedded Download Speeds

This report includes results from embedded agent testing, with SamKnows (part of Cisco) embedding its software directly into the modems of customers of an RSP. The embedded agent uses the same methodology as the Whitebox. Any customer with a modem that has the embedded software can become part of an RSP's test population. More details on this testing can be found in the technical FAQs on the Commerce Commission's website here.

Spark is the first RSP to submit results of embedded agent testing for inclusion in the MBNZ report. To do so, Spark randomly selected around 800 customers across their Everyday Wireless, Max Wireless, and Rural Wireless Broadband plans with Spark's latest Wireless Broadband modems (Spark Smart Modem 2 or a 5G Smart Modem), to be part of the sample group. We have ensured that this has resulted in a geographically representative sample of the plans being tested. The Spark modems with the embedded agent ran a comparable test schedule to the Whitebox agents used in the MBNZ project using the same off-net test servers, located in Auckland, Wellington, and Christchurch. This report currently contains only download and upload results, but we hope to include additional metrics in future reports.

Figure 17: Average Download Speeds for Spark Fixed Wireless Plans.

Average of monthly household weighted averages. Peak hours are Monday - Friday, 7pm - 11pm. The number of embedded agents contributing to each result is shown under each plan name (eg n = 316). Error bars show 95% confidence intervals of the mean.



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Key Observations

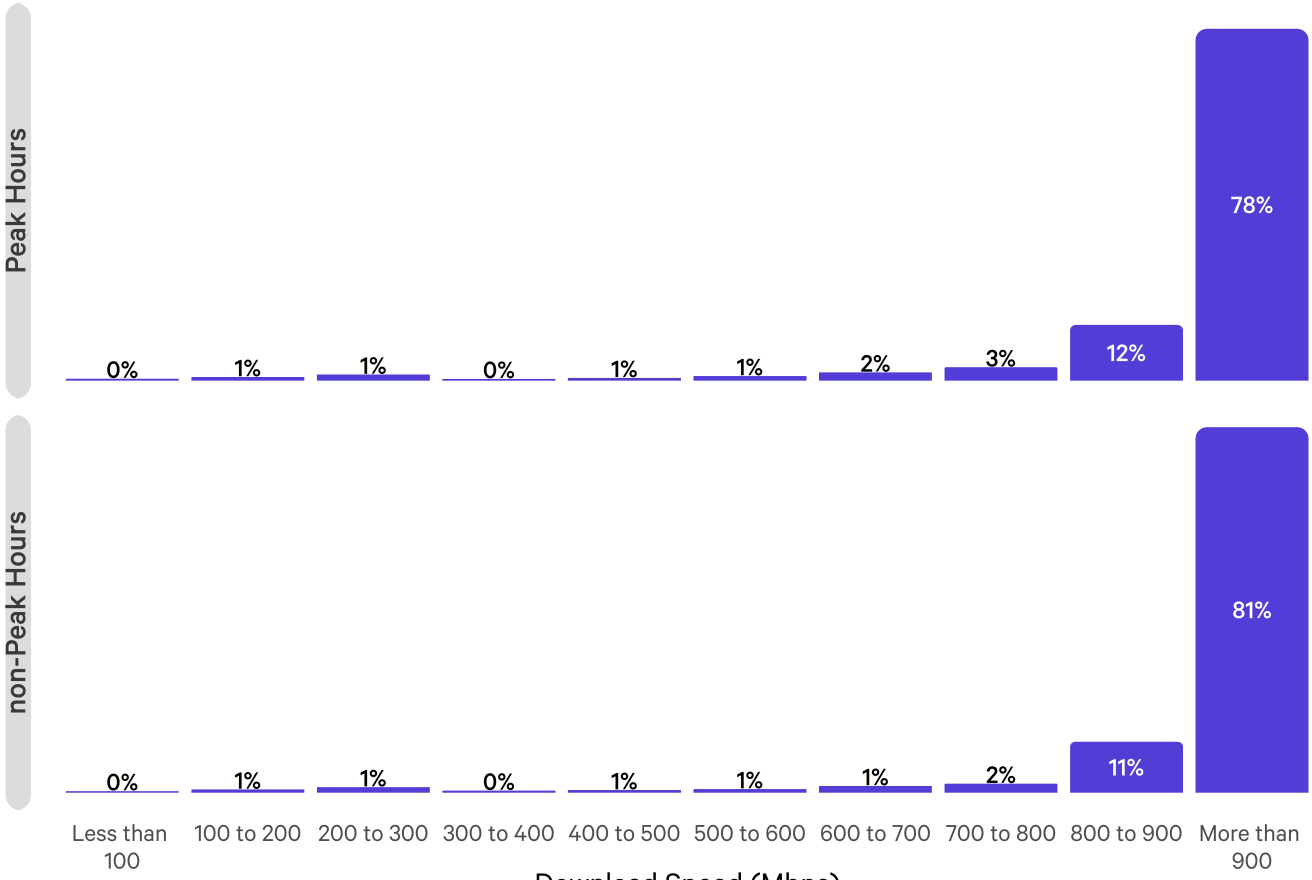
- There is minimal difference in average download speeds between Spark 4G Everyday Wireless and Rural Wireless Broadband, with both plans seeing slightly lower download speeds during peak hours.
- The average download speeds across all 4G Fixed Wireless plans and RSPs in NZ is 53 Mbps during all hours, and 38 Mbps during peak hours. All average results for the Spark 4G plans measured are higher than the average download speed of all 4G Fixed Wireless results.
- There are a number of factors that influence Fixed Wireless broadband performance including distance, and number of customers connected to the nearest cell tower. During peak hours, the number of customers connected to a cell tower in an urban area can be much higher than in a rural area, which could be one explanation for higher average peak hour speeds in rural areas.
- The average download speed measured for Spark's Max Wireless 5G Plan was 350 Mbps during all hours, and 331 Mbps during peak hours.

Distribution of Fibre Max Results

Figure 18: Download Speeds on Fibre Max Plans.

Distribution of test results across 409 Fibre Max households

Average (24/7) download speeds for Fibre Max plans is 880 Mbps; this varies by RSP and over time.



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Key Observations

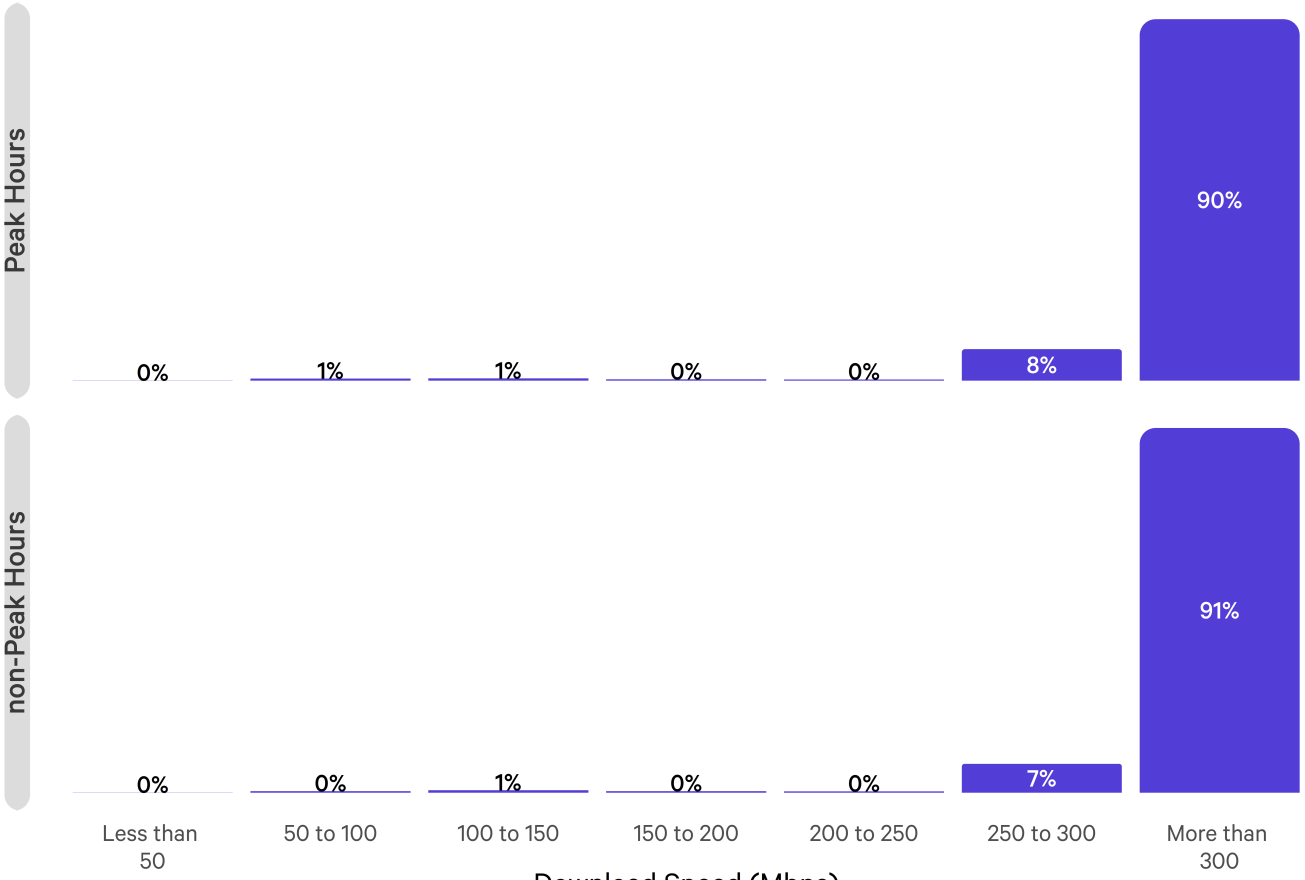
- 81% of speed tests run over Fibre Max lines achieved download speeds above 900 Mbps during non-peak hours, compared to 78% during peak hours.

Distribution of Fibre 300 Results

Figure 19: Download Speeds on Fibre 300 Plans.

Distribution of test results across 345 Fibre 300 households

Average (24/7) download speeds for Fibre 300 plans is 314 Mbps; this varies by RSP and over time.



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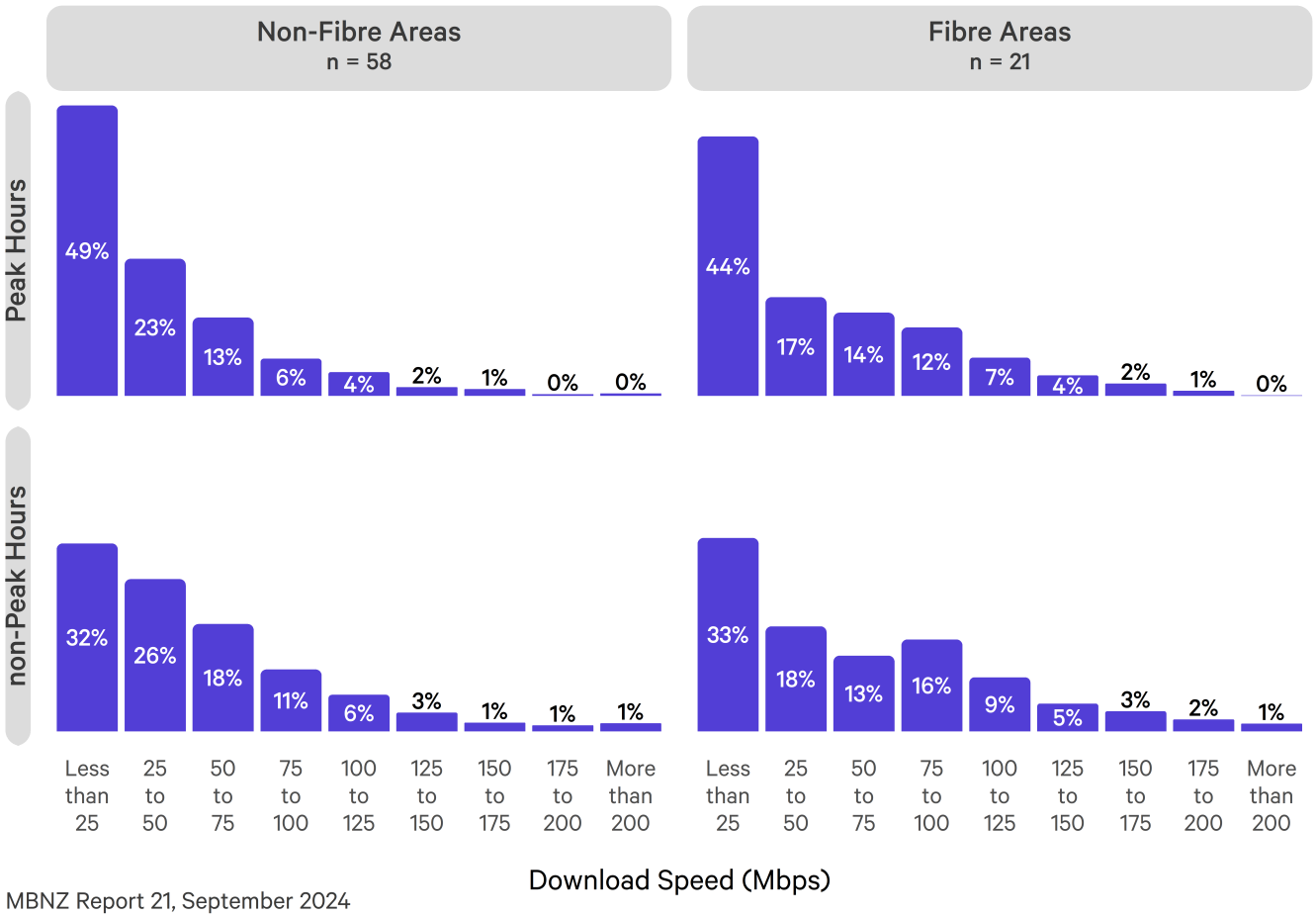
Key Observations

- 91% of speed tests run over Fibre 300 lines achieved download speeds above 300 Mbps during non-peak hours, compared to 90% during peak hours.

Distribution of 4G Fixed Wireless Results

Figure 20: Download Speeds on 4G Fixed Wireless Plans.

Distribution of test results. Average (24/7) download speeds for 4G Fixed Wireless plans is 51 Mbps in non-Fibre areas and 57 Mbps in Fibre areas; this varies by RSP and over time.



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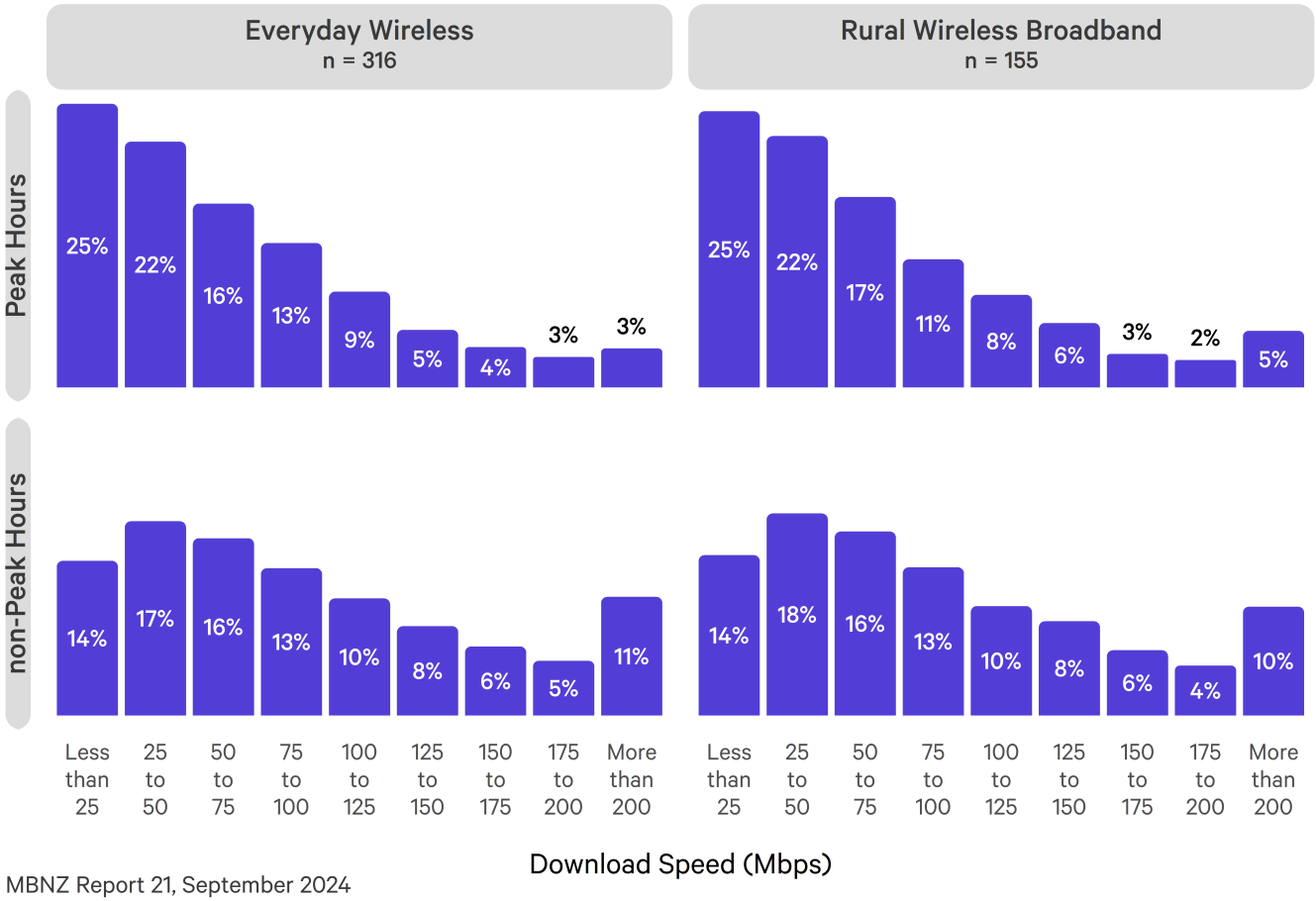
Key Observations

- 32% of speed tests run over Fixed Wireless lines achieve download speeds of less than 25 Mbps in non-Fibre areas during non-peak hours, compared to 33% in Fibre areas.
- 20% of download speed tests in Fibre areas achieved speeds of 100 Mbps or higher during non-peak hours, compared to 14% during peak hours.

Distribution of Spark Embedded Fixed Wireless Results

Figure 21: Download Speeds on Spark Embedded 4G Fixed Wireless Plans.

Distribution of test results.



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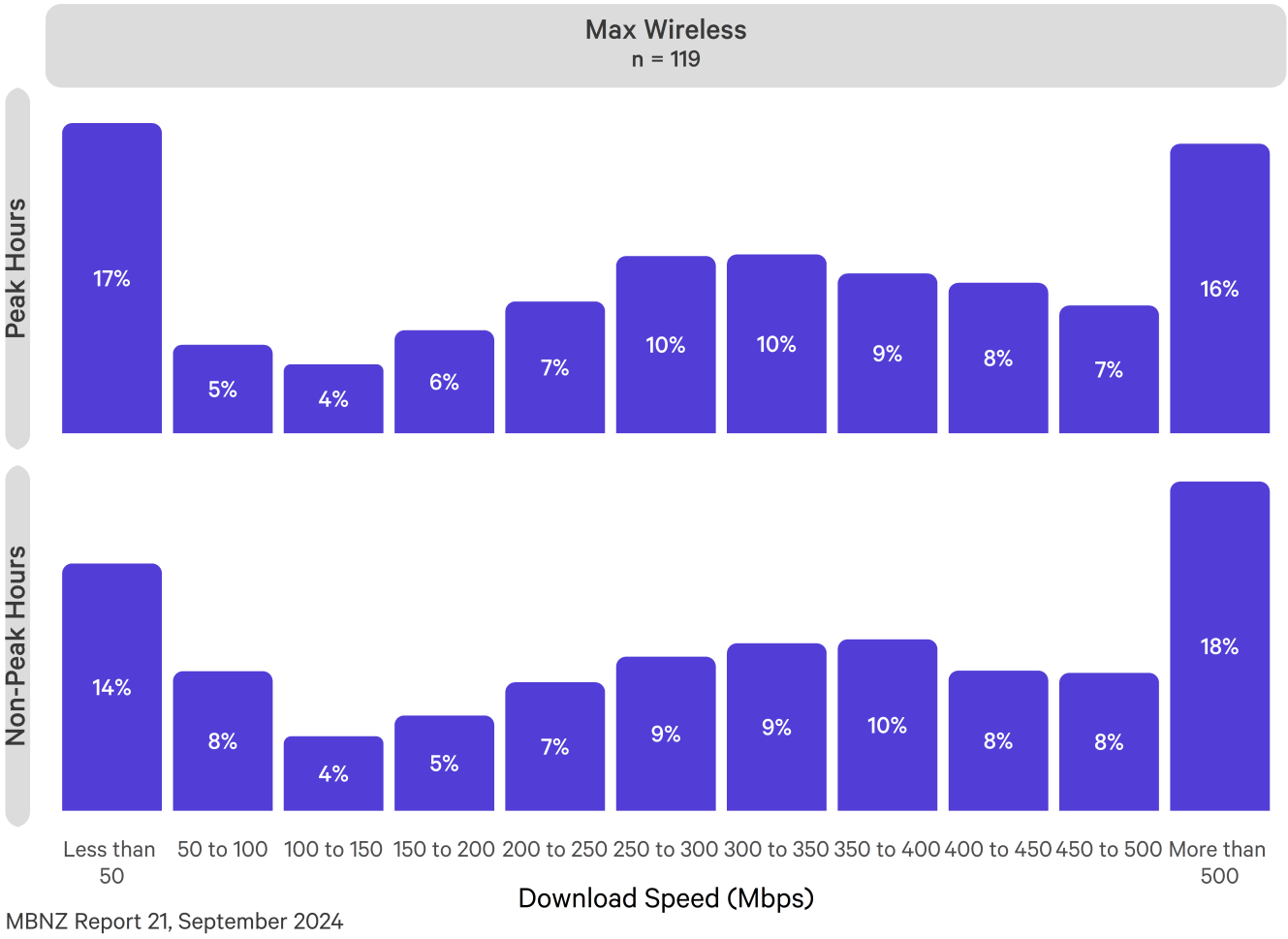
Key Observations

- During non-peak hours, 40% of Everyday Wireless download tests achieved speeds above 100 Mbps, compared to 38% for Rural Wireless Broadband. During peak hours, the percentage of tests over 100 Mbps for Everyday Wireless fell to 24%, and Rural Wireless Broadband also saw the percentage fall to 24%.
- For both plans, the percentage of tests below 25 Mbps increased during peak hours compared to non-peak hours. For Everyday Wireless plans, the percentage rose from 14% to 25%, and for Rural Wireless plans, it also increased from 14% to 25%.
- For both plans, saw similar percentages of tests achieve speeds over 200 Mbps during non-peak hours, at 11% and 10% for Everyday Wireless and Rural Wireless respectively. However, during peak hours, the percentage of tests fell to only 3% for Everyday Wireless, and 5% for Rural Wireless.

Figure 22: Download Speeds on Spark Embedded 5G Fixed Wireless Plan.

Distribution of download test results.



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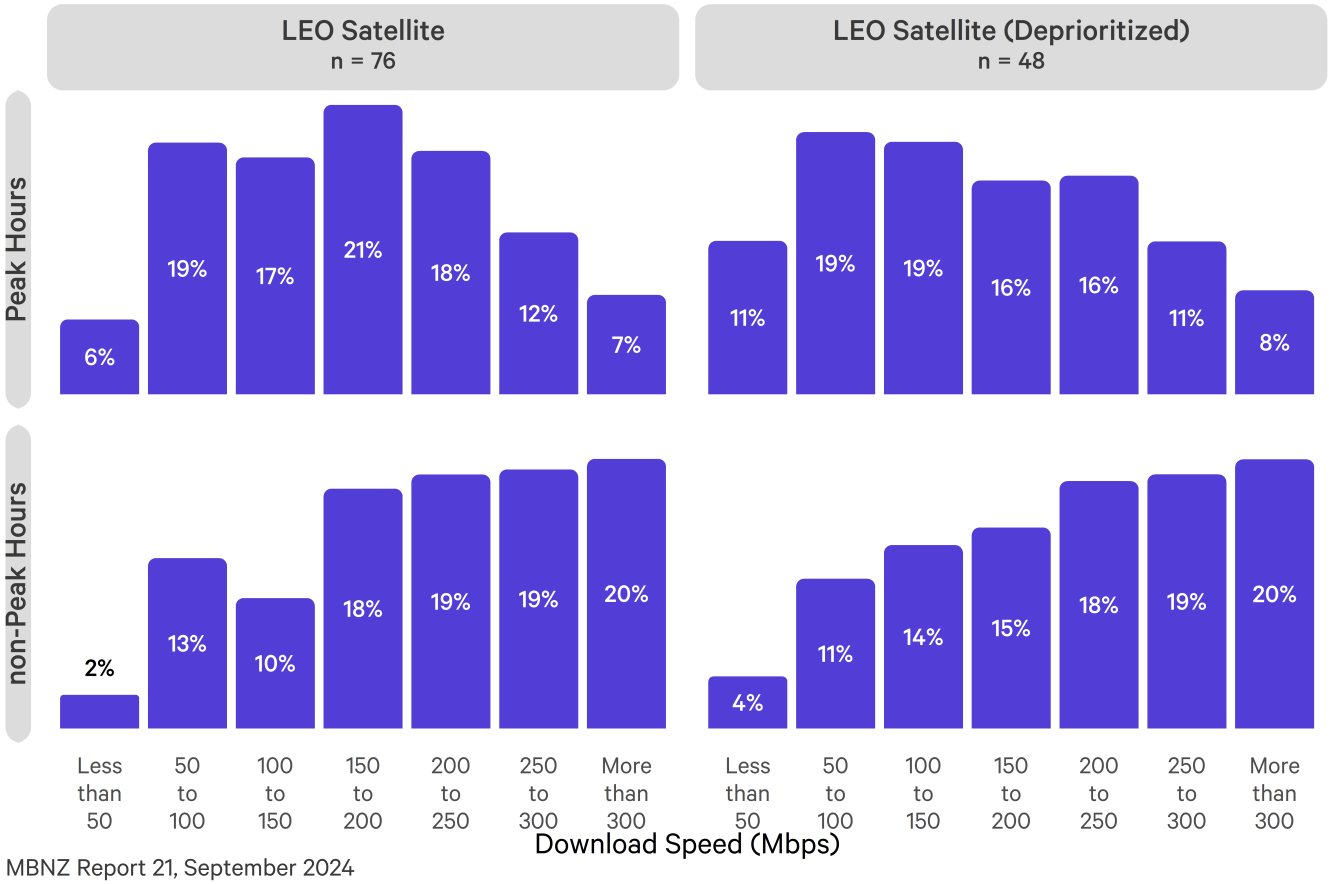
Key Observations

- The distribution of download tests for Spark 5G Max Wireless was broadly similar during peak hours compared to non-peak hours.
- 22% of tests run during non-peak hours, and 22% during peak hours achieved download speeds less than 100 Mbps.
- 53% of tests run during non-peak hours achieved download speeds above 300 Mbps. This decreased slightly to 50% during peak hours.
- During non-Peak hours, 18% of all embedded download speed tests run on Max Wireless plans achieved speeds greater than 500 Mbps, a small decrease compared to the previous report.

Distribution of LEO Satellite Results

Figure 23: Download Speeds on LEO Satellite Plans.

Distribution of test results across LEO Satellite households. Average (24/7) download speeds for LEO Satellite plans average 214 Mbps in non-Fibre areas on the standard plan and 205 Mbps on the deprioritized plan; this varies over time.



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Key Observations

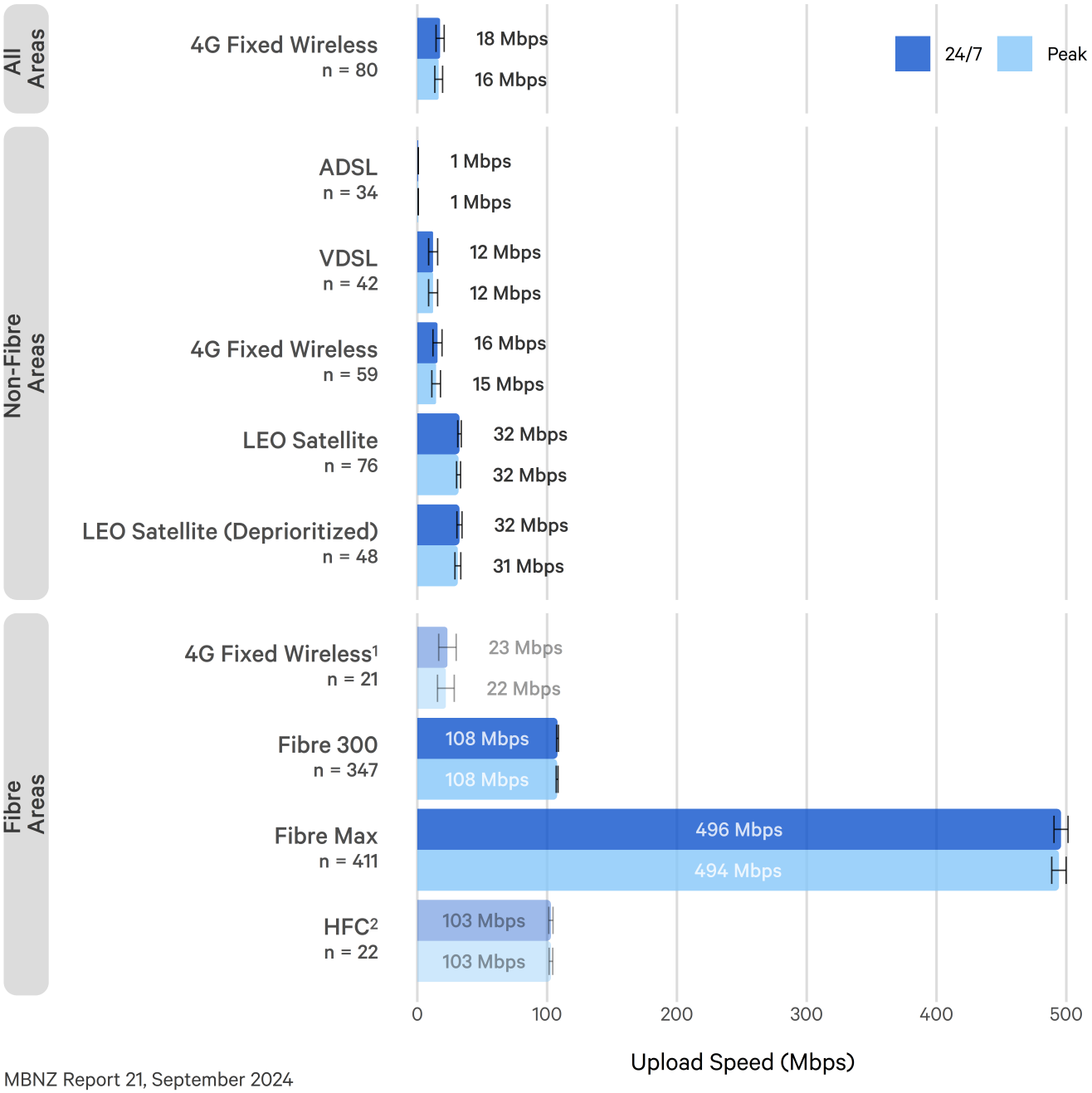
- Only 2% of speed tests run over LEO Satellite achieve download speeds of less than 50 Mbps, compared to 4% for Starlink's deprioritized plan. During peak hours, this increase to 6% for the standard Starlink plan, and 11% for the deprioritized plan.
- 20% of download speed tests during non-Peak hours achieved speeds of 300 Mbps or higher across both Starlink plans.

Speed Tests - Upload

Upload speeds should be considered alongside download speeds. The main applications where the impact of upload speed is apparent are file transfers and video conferencing. For example, a lower upload speed will mean that it takes longer for files to sync or email attachments to be applied.

Figure 24: Average Upload Speeds by Plan

Average (24/7) of monthly household weighted averages. Peak hours are Monday - Friday, 7pm - 11pm. The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 80). Error bars show 95% confidence intervals of the mean.



MBNZ Report 21, September 2024

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[2] Results for HFC are based on a sample size of 22 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

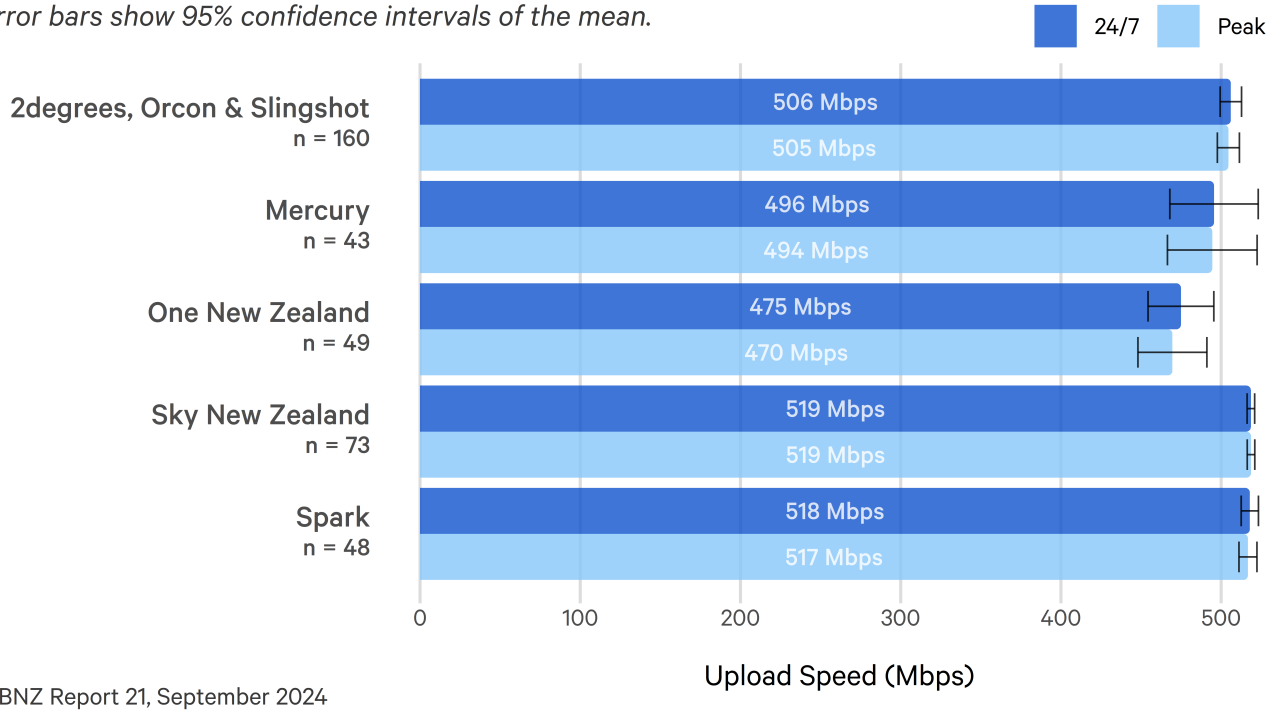
Key Observations

- The average upload speeds are broadly consistent with those seen in the previous report, with Fibre Max seeing a small increase in average upload speeds.
- Average upload speeds for Fibre 50 are not included in this report due to different upload allocations across local fibre companies. There were not enough Whiteboxes on Fibre 50 to split upload results by local fibre company.

Fibre Max Breakdown by RSP

Figure 25: Average Fibre Max Upload Speed by RSP

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 160).
Error bars show 95% confidence intervals of the mean.



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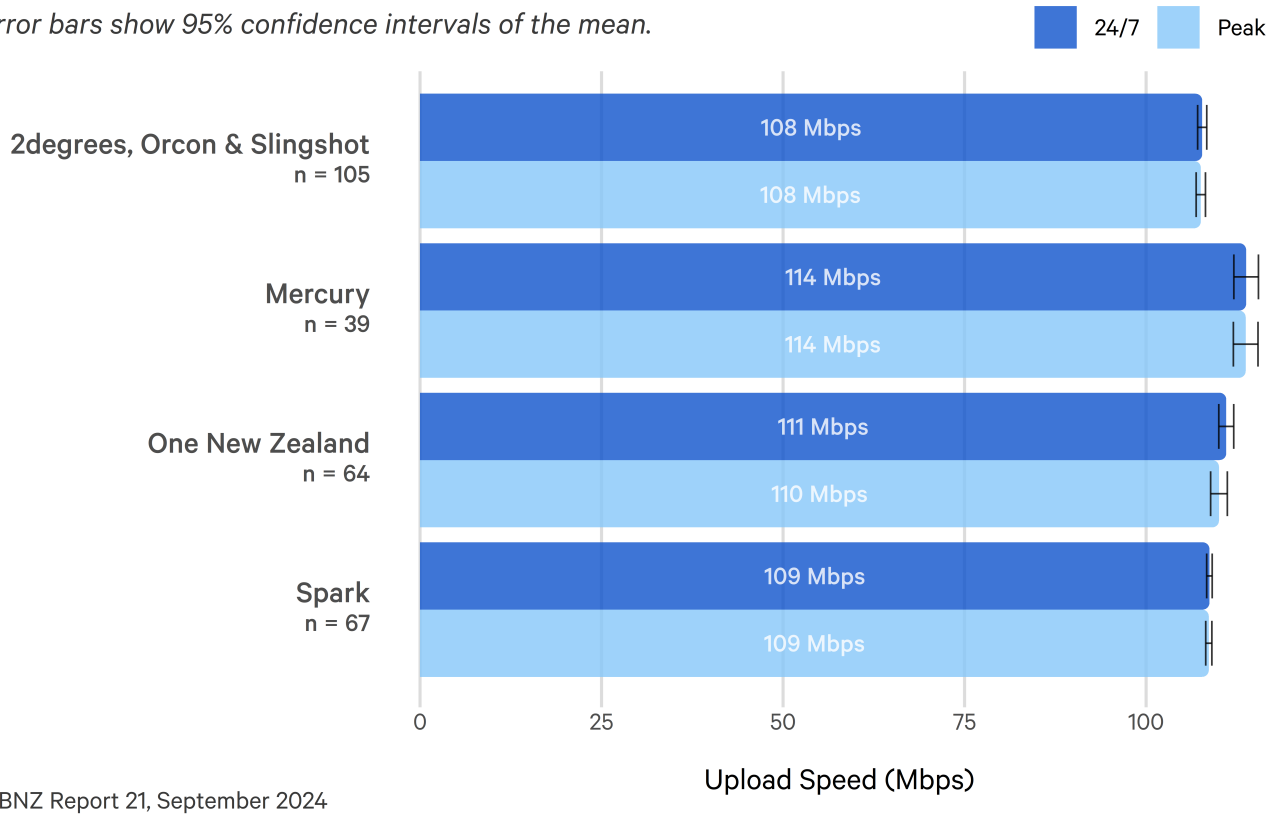
Key Observations

- All RSPs achieved average upload results above 450 Mbps, with 2degrees, Orcon & Slingshot; Sky New Zealand; and Spark achieving average speeds above 500 Mbps.
- Upload speeds were consistent during peak hours, with all RSPs only showing the same or a very small decrease in speed compared to their all hours result.
- There were not enough Fibre Max volunteers on Contact Energy, Electric Kiwi, NOW NZ, PureLink or Voyager during the measurement period to report results for these RSPs. All tested RSPs are included in the overall Fibre Max results shown in Figure 24.

Fibre 300 Breakdown by RSP

Figure 26: Comparison of Average Fibre 300 Upload Speeds across RSPs.

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 105)
Error bars show 95% confidence intervals of the mean.



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Key Observations

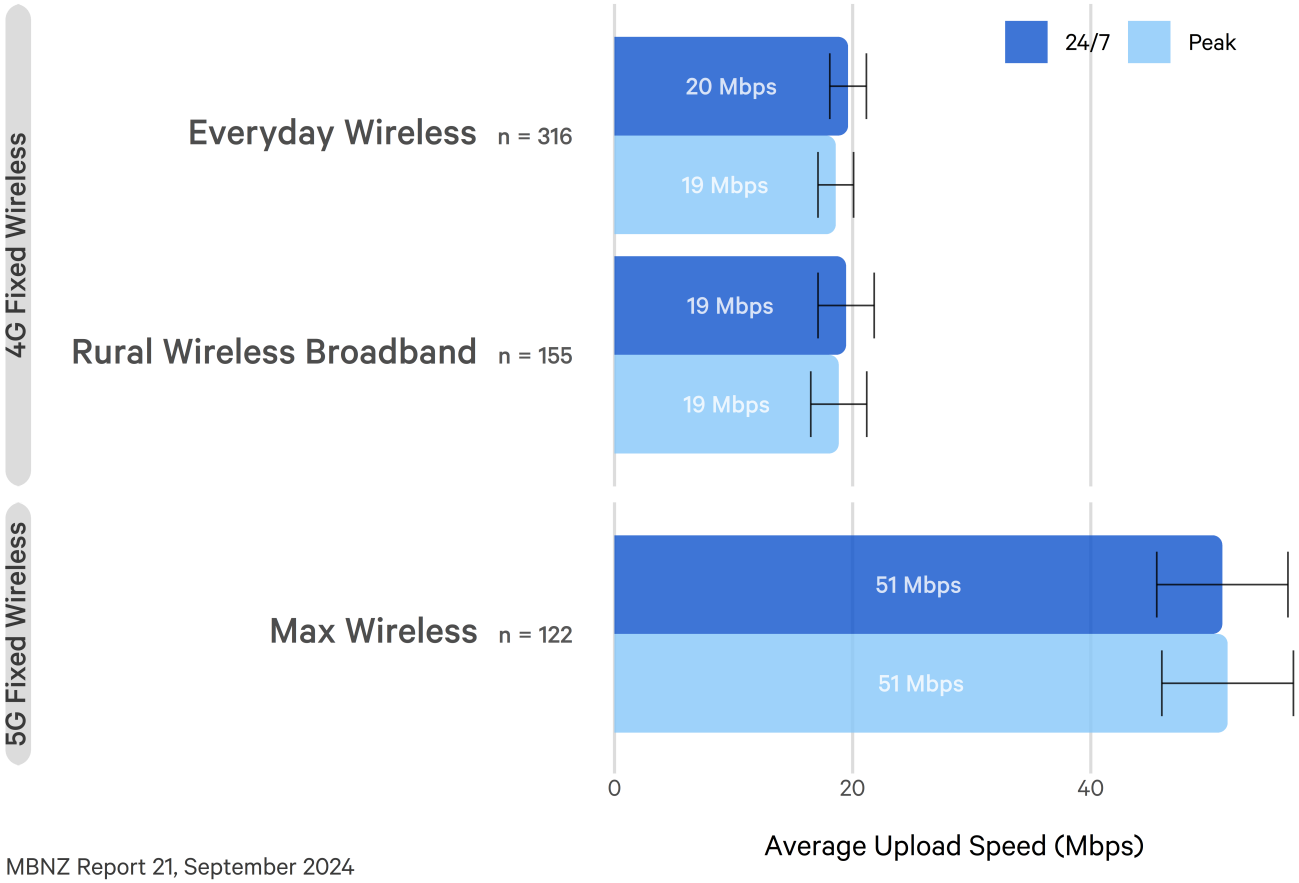
- All RSPs achieved average upload results above 100 Mbps.
- Upload speeds were consistent during peak hours, with no noticeable drop compared to average upload speeds across all hours.
- There were not enough volunteers on Contact Energy, Electric Kiwi, Inspire Net, Mercury, NOW NZ, Sky New Zealand, Voyager or Wireless Nation to report results. All tested RSPs are included in the overall Fibre 300 results shown in Figure 14.

Spark Fixed Wireless Embedded Upload Speeds

The results below are for some of Spark's 4G Fixed Wireless and 5G Fixed Wireless plans. More information on Spark's embedded testing can be found on page 35.

Figure 27: Average Upload Speeds for Spark Fixed Wireless Plans.

Average of monthly household weighted averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of embedded agents contributing to each result is shown under each plan name (eg n = 316).
Error bars show 95% confidence intervals of the mean.



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Key Observations

- There is minimal difference in average upload speeds between Spark 4G Everyday Wireless and Rural Wireless Broadband, with both plans seeing no noticeable decrease in upload speeds during peak hours.
- The average upload speed measured for Spark's Max Wireless 5G Plan was 51 Mbps during all hours, showing no noticeable decrease during peak hours.

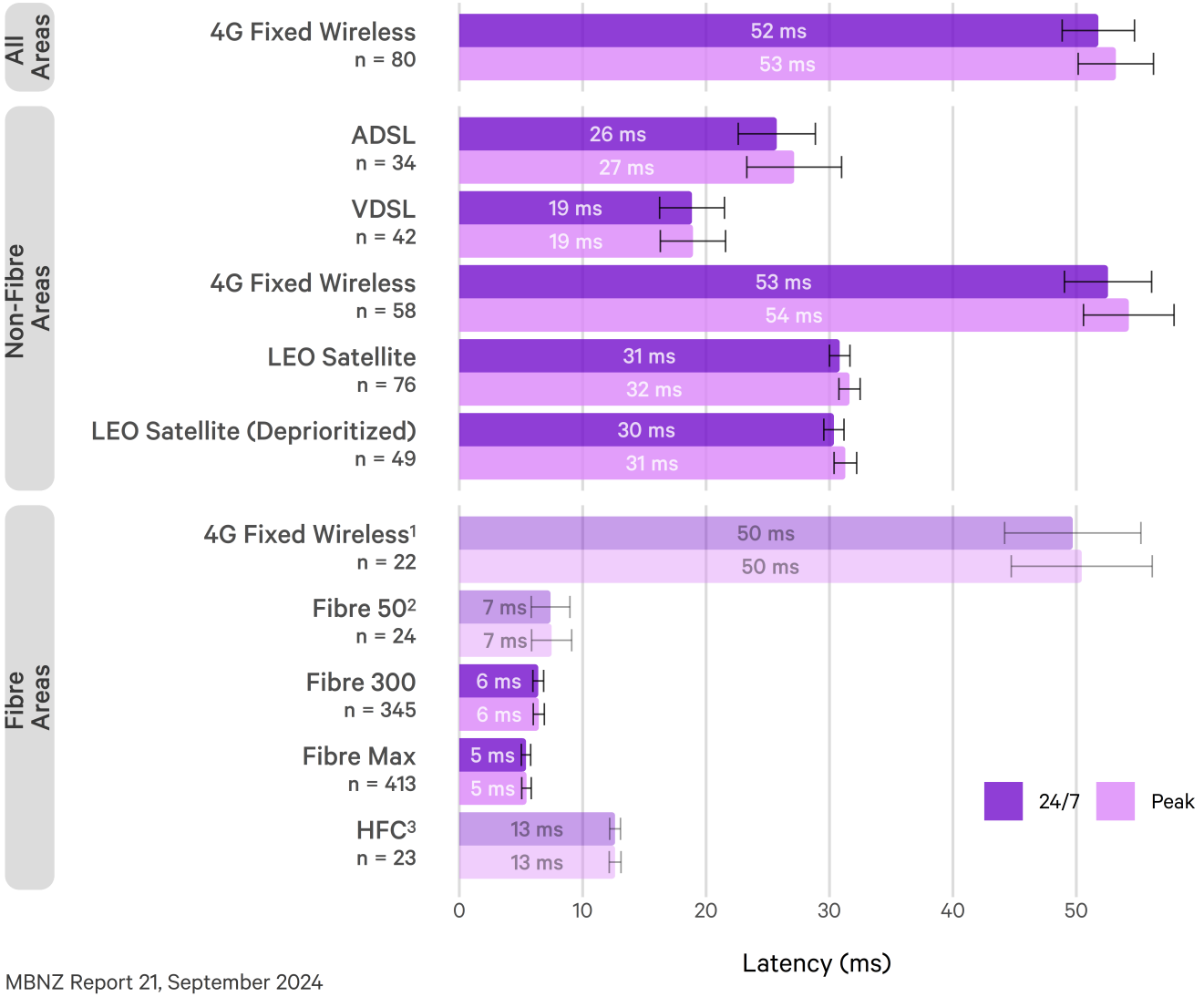
Latency

Latency is another key factor that should be considered when assessing broadband performance. The time it takes to transmit and receive messages between households and servers limits the responsiveness of realtime applications such as interactive webpages or video calls. Higher baseline latency makes realtime applications more vulnerable to jitter (also known as packet delay variation) and dropouts. Figure 28 only includes results relating to servers hosted in New Zealand.

Some plans show a wider variation of latency than others: latency across a Fixed Wireless connection will generally be more variable than over a Fibre line. The impact of latency on user experience relating to specific applications is discussed earlier in the report (Social Media, Online Gaming, Video Conferencing).

Figure 28: Average Latency to Test Servers by Plan. Lower is Better.

Average of monthly household weighted averages. Peak hours are Monday - Friday, 7pm - 11pm. The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 80). Error bars show 95% confidence intervals of the mean.



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Latency Under Load

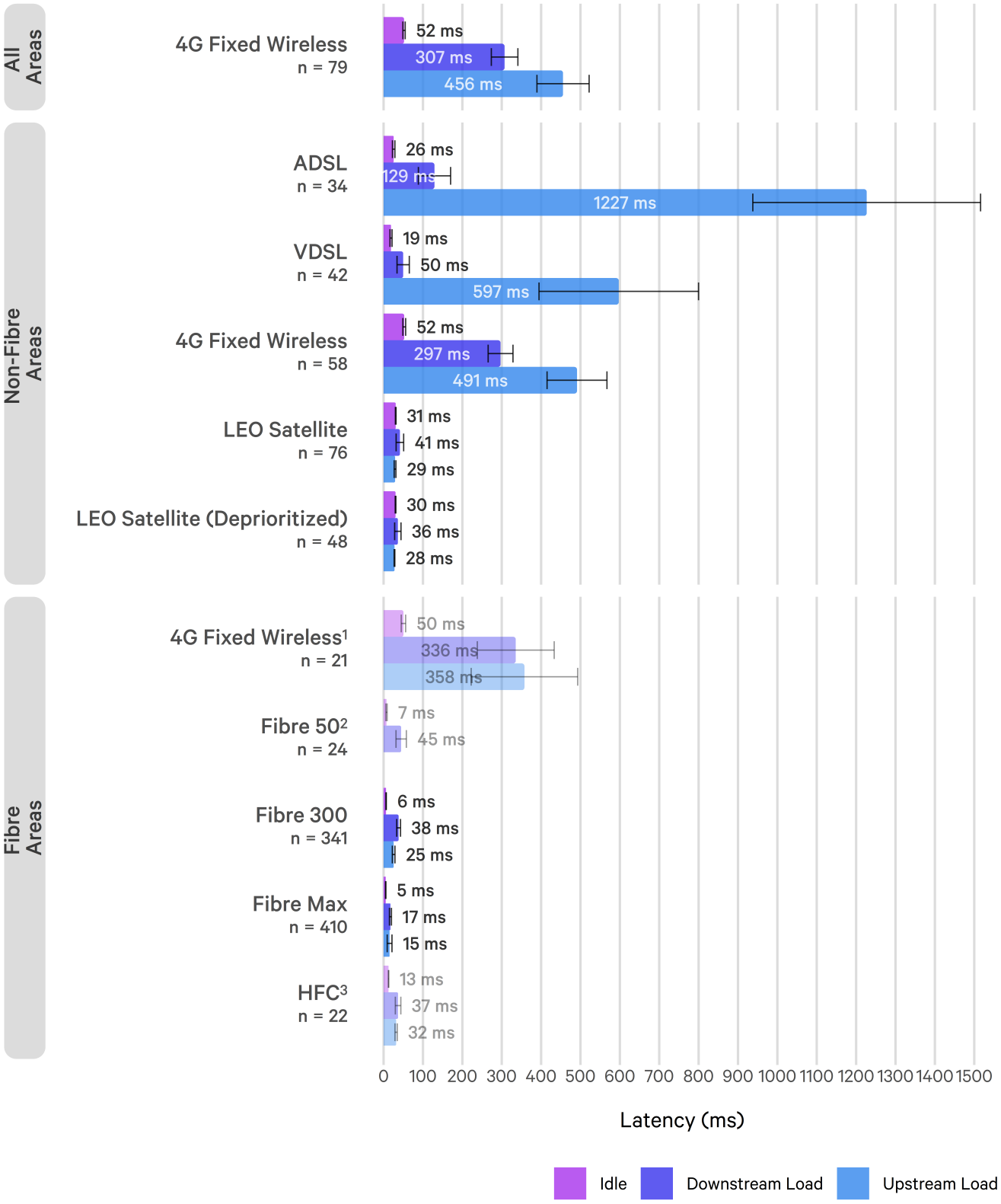
The latency under load test measures the latency when the broadband connection is heavily utilised (by the way of a speed test run in parallel). This is more representative of user experience than idle latency as it shows the impact of downloading or uploading data to the internet (e.g. watching Netflix or uploading a file) on latency (e.g. how long a webpage takes to load). The results are particularly illustrative of real-world experience for people who are using latency-sensitive applications like video conferencing or some video games.

The graph shows latency values while the connection is idle, compared with latency values while the connection under either downstream or upstream load. The latency under load test is performed while the download (or upload) speed tests are running, and this is compared to the idle latency measurement which is calculated when the line is idle. Differences in access technology and router models will result in different results for the user.

It is expected that the router model will be a factor in any latency rise, as the test is measuring what is known as bufferbloat, which is where the router or other network devices on the path are buffering large amounts of data. As such, differences in technology and router models will result in different results for the user.

Figure 29: Average Latency Under Load to Test Servers by Plan. Lower is Better.

Averages of monthly household averages. The number of Whiteboxes contributing to each result is shown under each plan name (eg n = 79).



MBNZ Report 21, September 2024

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[2] Results for Fibre 50 are based on a sample size of 24 Whiteboxes in Fibre areas. The lower sample size can be attributed to Fibre 50 being a new area of focus for the MBNZ programme and we hope to increase this number for subsequent reports.

[3] Results for HFC are based on a sample size of 22 Whiteboxes. The low sample size can be attributed to the relatively small coverage area of One New Zealand's Cable network and the competing influence of Copper, Fibre and Fixed Wireless in those areas.

Key Observations

- Idle latency over Fixed Wireless is higher than over Copper (ADSL, VDSL), Cable (HFC), or Fibre (Fibre 50, Fibre 300, Fibre Max). Fibre is faster due to both the lower latency over Fibre optics and the more recent infrastructure that underpins the Fibre network.

- All plans see latency increase when the line is running upload or download tests compared to when the line is idle. ADSL and 4G Fixed Wireless plans see a large increase in latency under load while both download and upload tests are running. VDSL shows a high latency when upload tests are running. These latency values are high enough to be noticeable to the user if multiple devices are used simultaneously, with one device heavily using the connection.

- Average latency under upload results for Fibre 50 are not included in this report due to different upload allocations across local fibre companies. There were not enough Whiteboxes on Fibre 50 to split upload results by local fibre company.

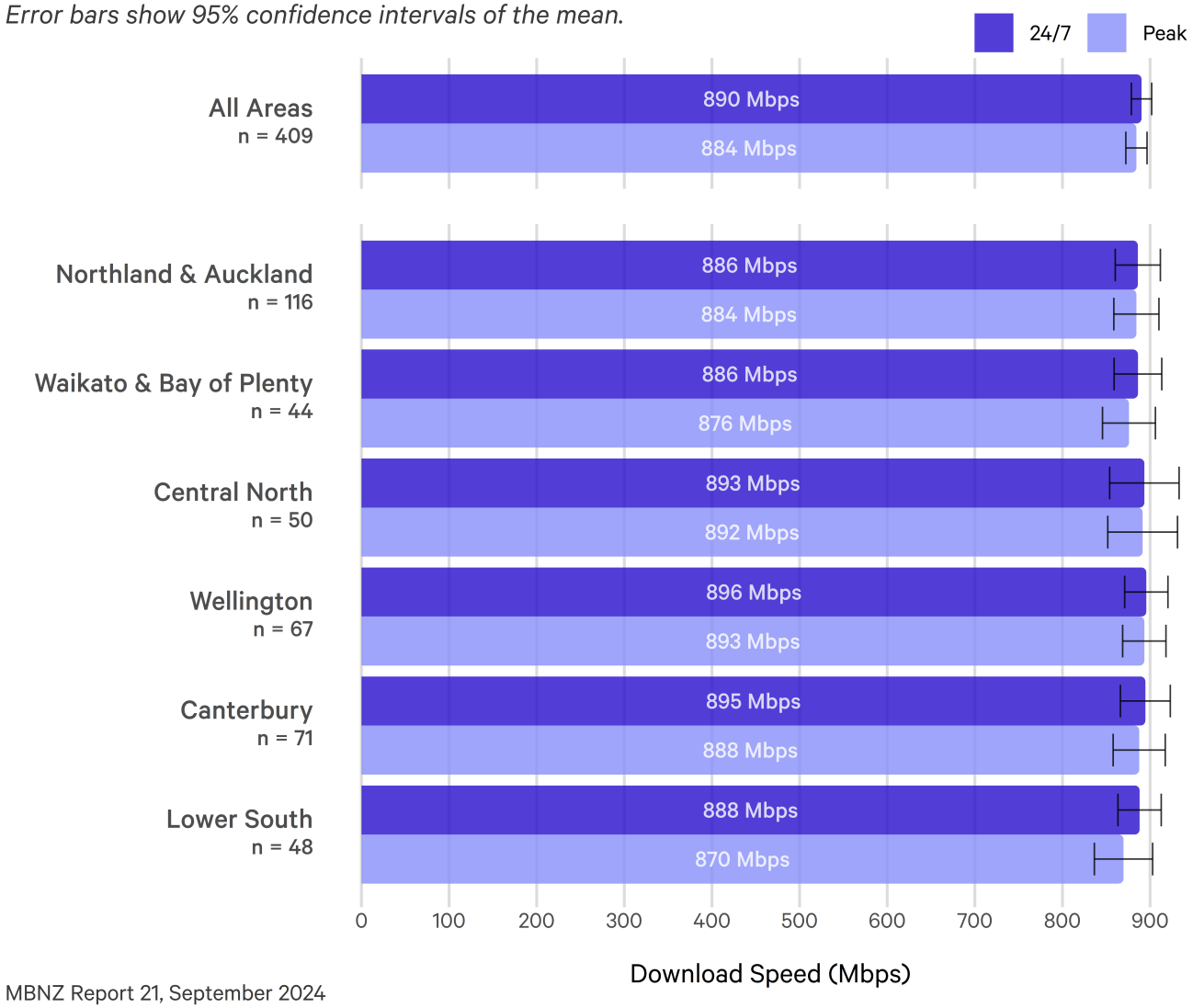
- Latency under downstream and upstream load is higher for the Fibre 300 plan compared to Fibre Max results. Fibre Max plans have lower latency results for latency under downstream and upstream load than HFC.

- LEO Satellite plans see a small increase in latency under load when download tests are running. Latency under upload shows a smaller increase on idle latency for satellite plans. While idle latency for satellite is higher than Copper (ADSL and VDSL), latency under downstream load is significantly lower for LEO Satellite than ADSL, and latency under upstream load is also lower for LEO Satellite than both ADSL and VDSL.

Fibre Max Breakdown by Region

Figure 30: Average Fibre Max Download Speeds by Region

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each geographical area (eg n = 409)
Error bars show 95% confidence intervals of the mean.



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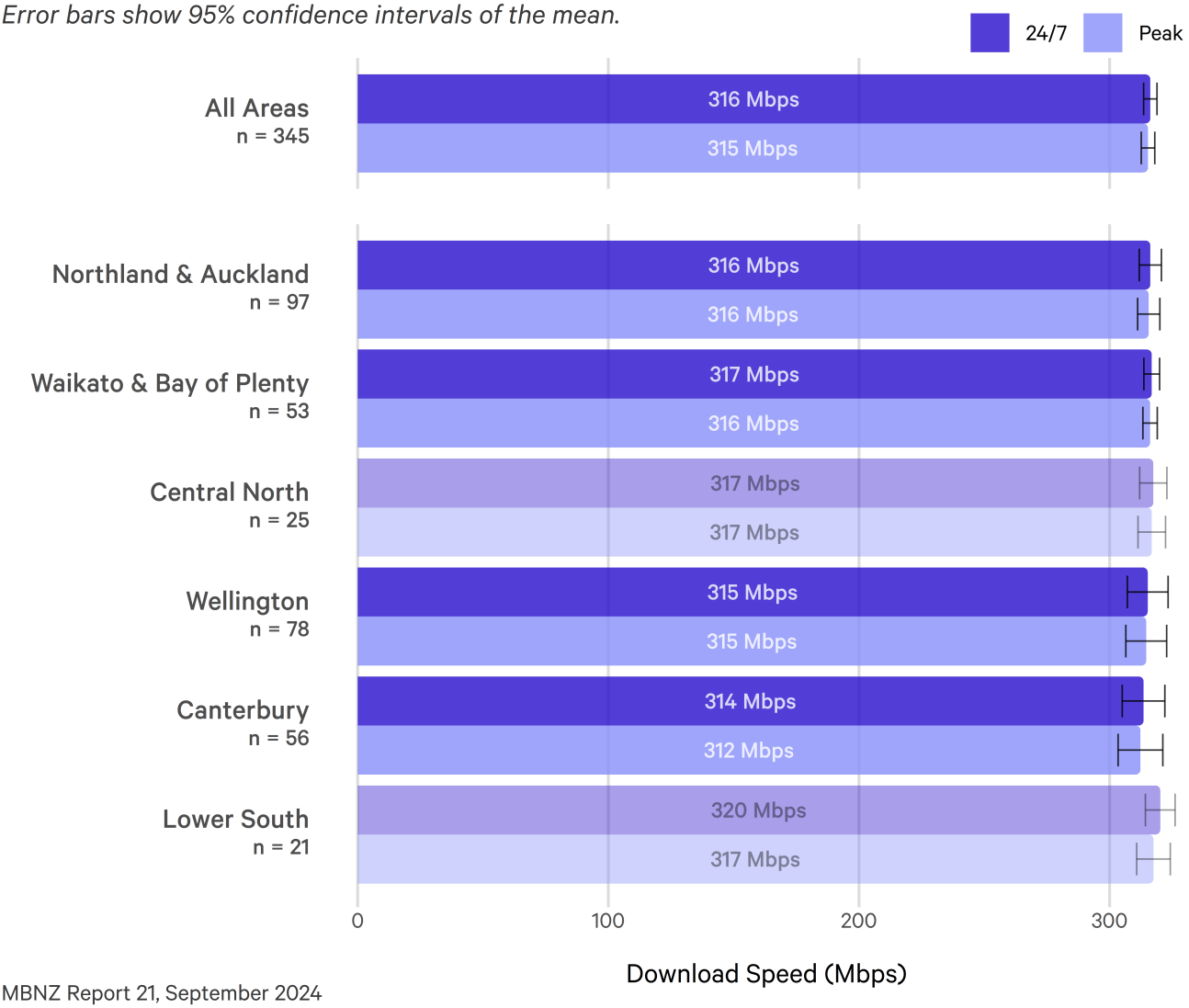
Key Observations

- Across all areas of New Zealand, there is very little difference between average Fibre Max performance.
- Results for the Upper South (Tasman, Nelson & Marlborough) are unable to be reported due to a low sample size.

Fibre 300 Breakdown by Region

Figure 31: Average Fibre 300 Download Speeds by Region

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each geographical area (eg n = 345)
Error bars show 95% confidence intervals of the mean.



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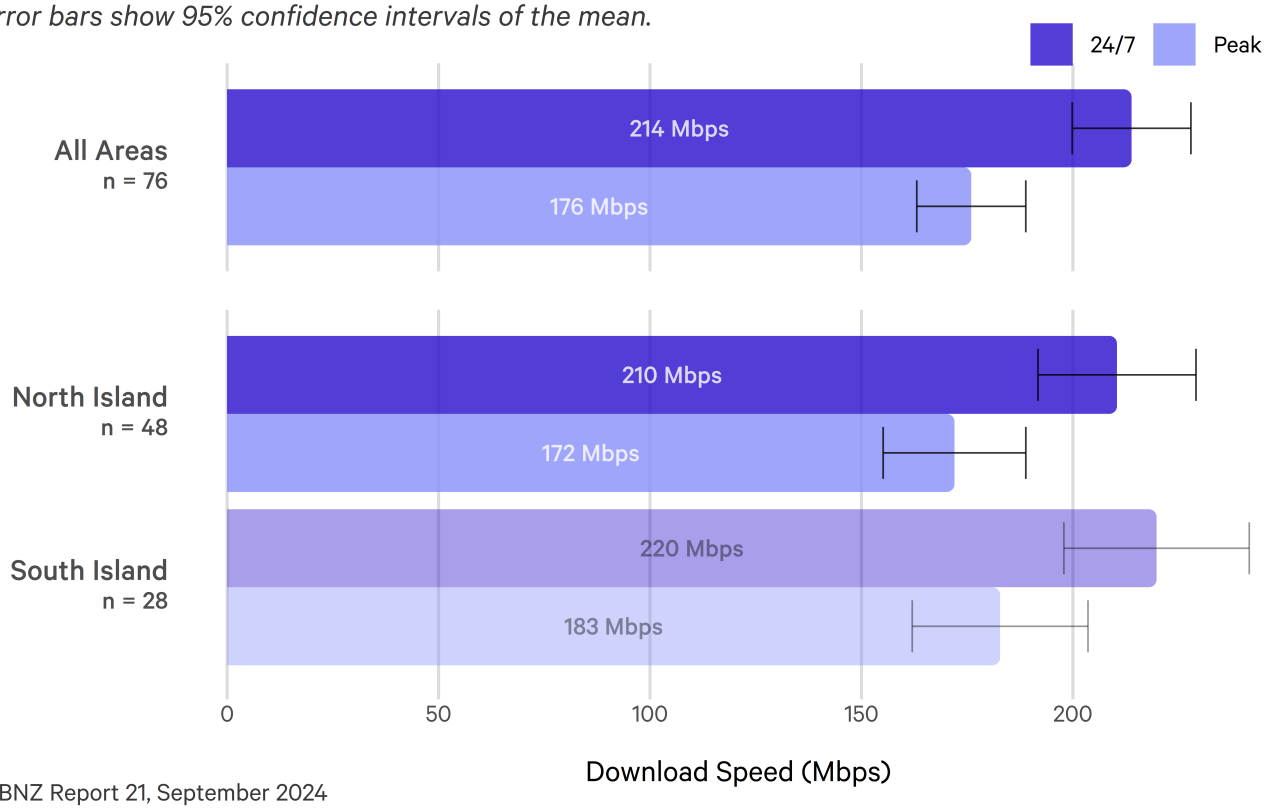
Key Observations

- Across all areas of New Zealand, there is very little difference between average Fibre 300 performance. All regions shown achieve average download speeds around 300 Mbps or higher.
- Results for the Upper South (Tasman, Nelson & Marlborough) are unable to be reported due to a low sample size.

LEO Satellite Breakdown by Island

Figure 32: Average LEO Satellite Download Speeds by Island

Average of monthly household averages. Peak hours are Monday - Friday, 7pm - 11pm.
The number of Whiteboxes contributing to each result is shown under each geographical area (eg n = 76)
Error bars show 95% confidence intervals of the mean.



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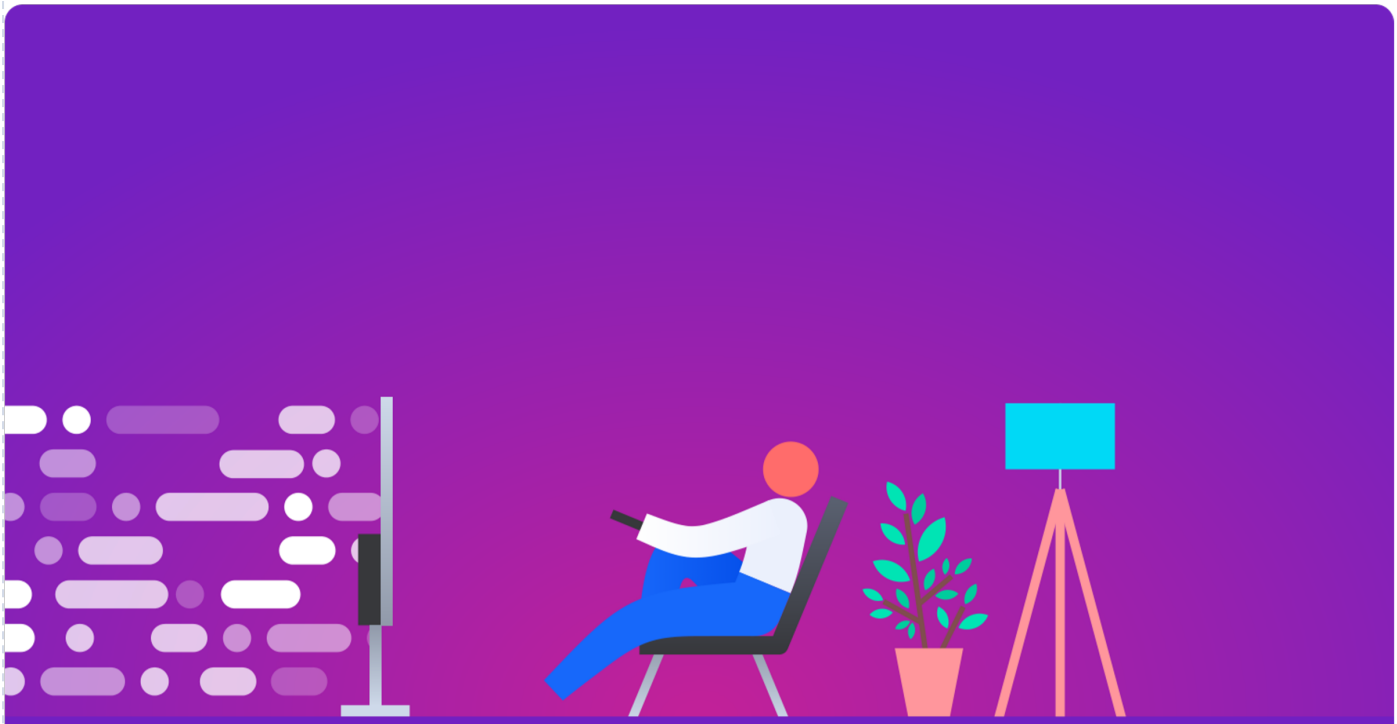
Key Observations

- There is very little difference between North and South Island results for LEO Satellite.
- There were not enough households on the deprioritized LEO Satellite plan to report separate North and South island results.



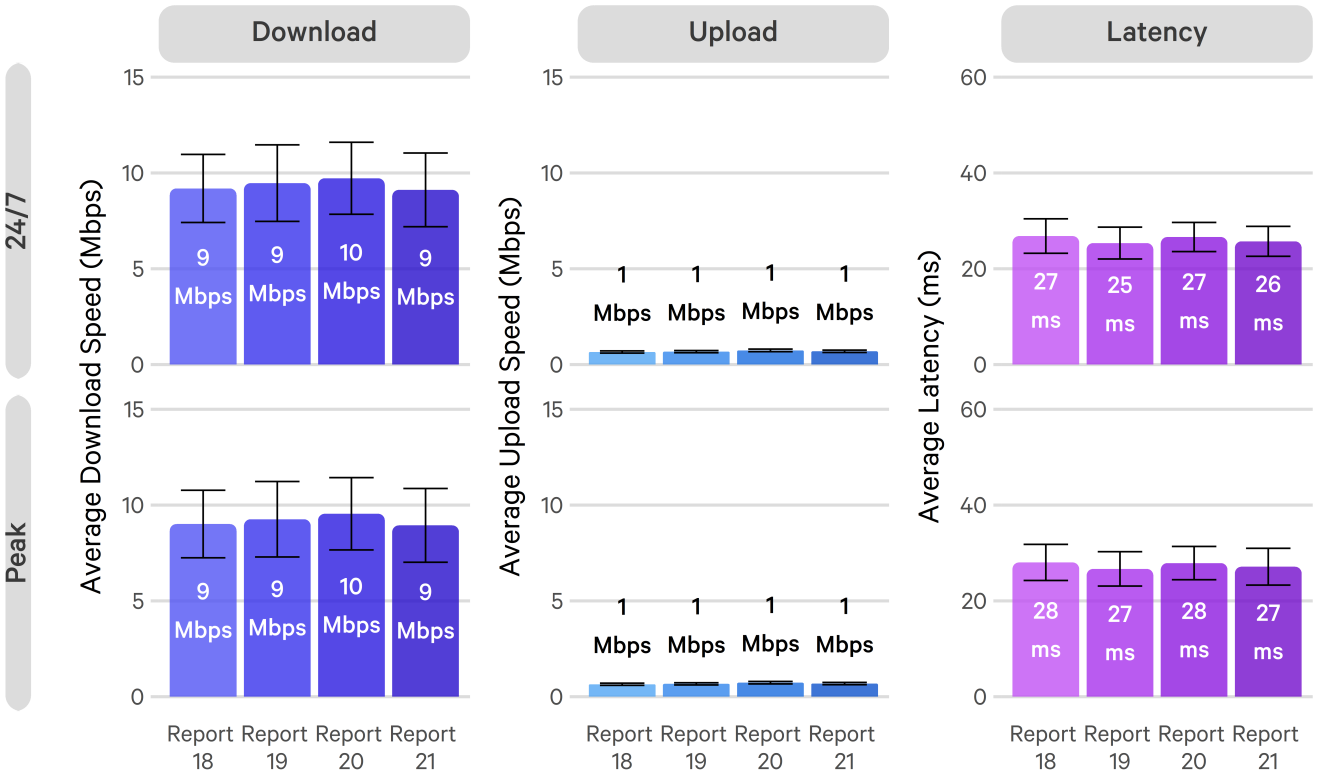
Previous Report Comparison

The following charts compare results from previous MBNZ reports across the past year for popular plans in New Zealand for quality of service metrics (download, upload and latency). ADSL, VDSL, Fibre 300 and Fibre Max plans have all seen consistent performance across reports. 4G Fixed Wireless and LEO Satellite plans have seen increases in average download speeds across the past year, with consistent upload and latency performance.

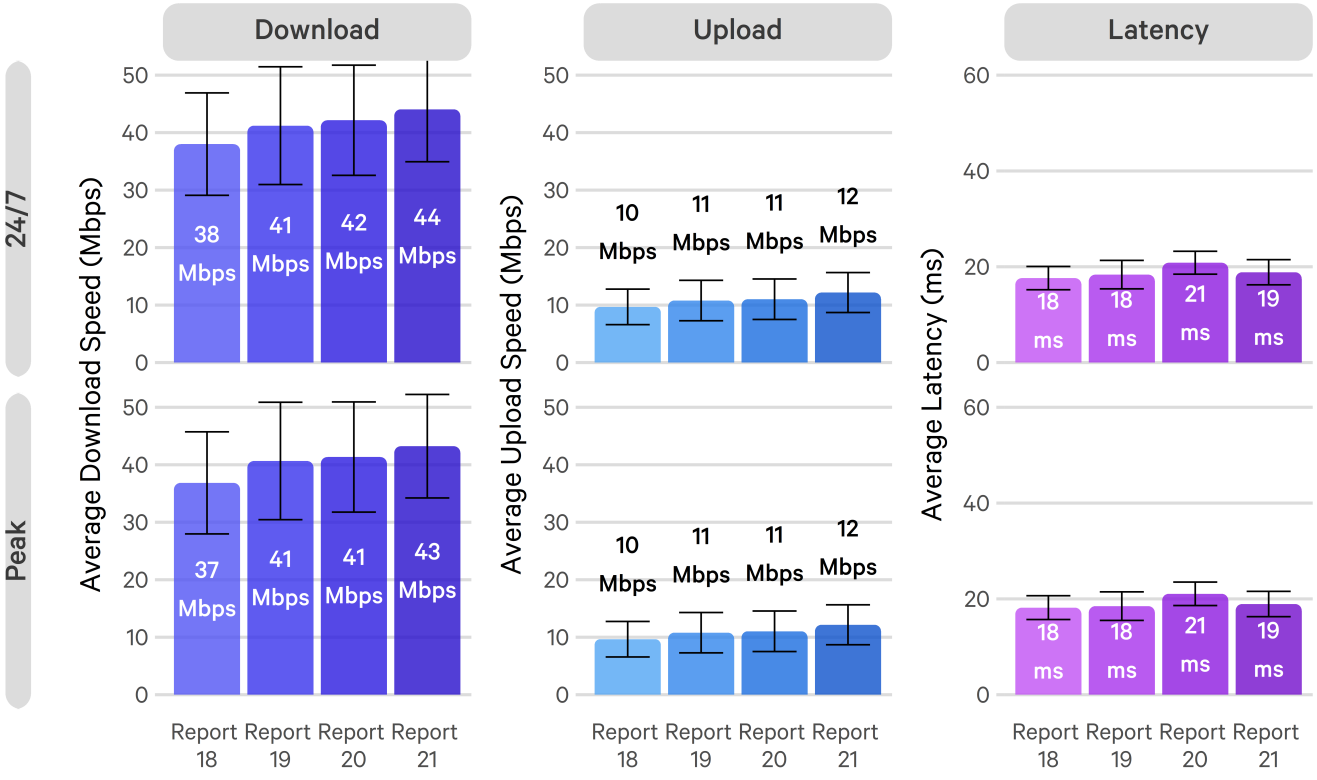
Table 1: Previous MBNZ Reports

MBNZ Report	Measurement Month	Publication Month
Report 18	October 2023	January 2024
Report 19	January 2024	April 2024
Report 20	April 2024	July 2024
Report 21	July 2024	September 2024

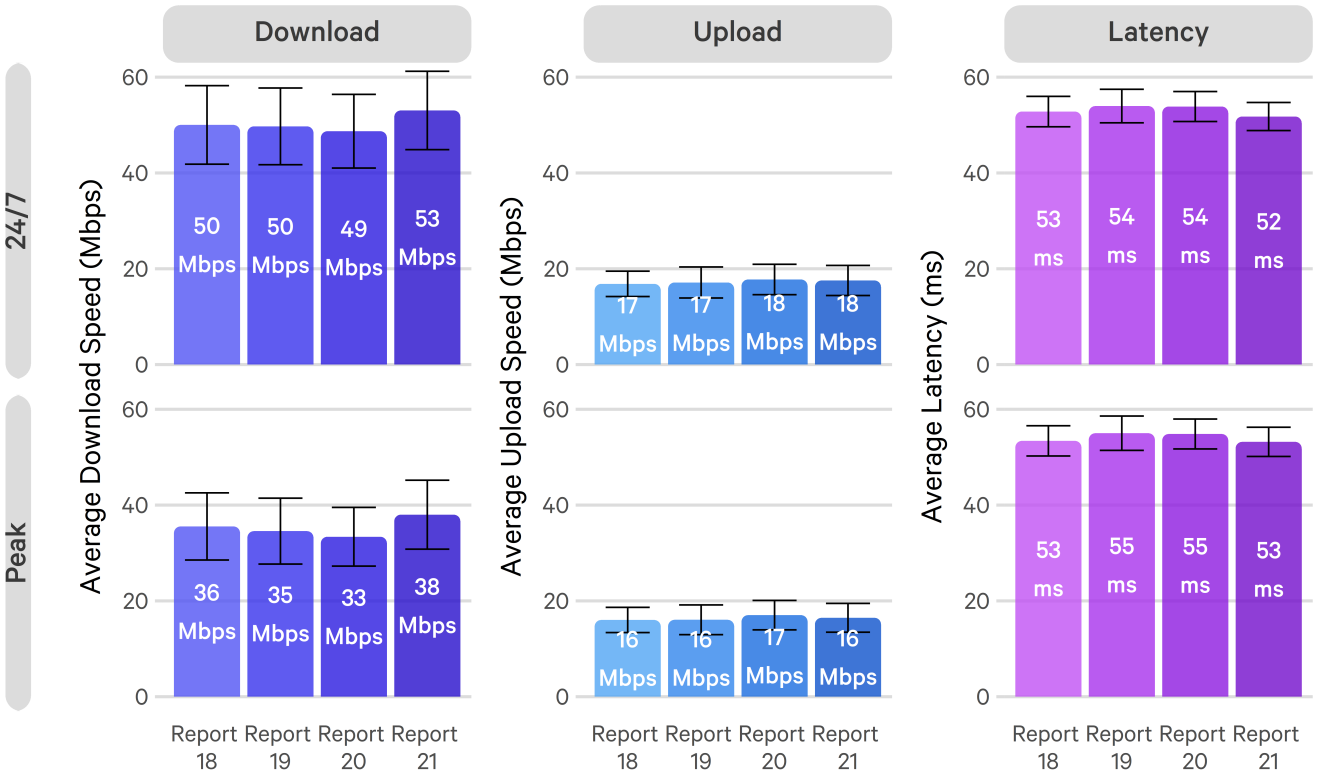
ADSL Performance across Reports



VDSL Performance across Reports

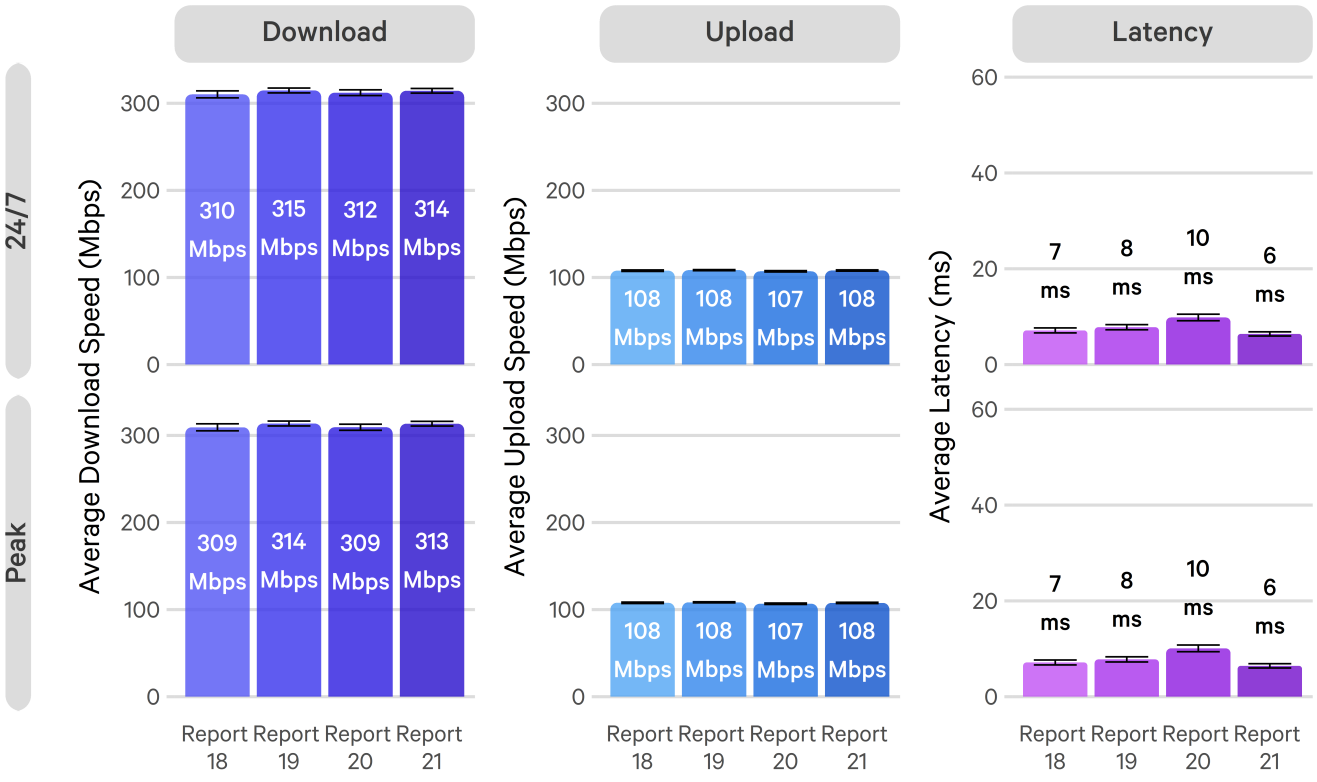


4G Fixed Wireless Performance across Reports



LEO Satellite Performance across Reports

Fibre 300 Performance across Reports



Fibre Max Performance across Reports

How we test

Measuring home broadband across New Zealand

- The SamKnows Whitebox is a purpose-built testing agent that connects to your router.
- It runs regular, automated performance tests to record the quality and performance of your internet connection without interfering with your network.
- The Whitebox does not record any personal information or browsing history.

Join the MBNZ Programme!

We are always on the hunt for more volunteers to help us expand on the technologies reported on in the MBNZ programme. Joining our awesome volunteer network enables us to gather even more data so we can continue shining a light on different technologies, RSPs and regions in New Zealand! Sign up at the following link[1], and if you're already a volunteer, encourage your friends and family to join too!

- Have 24/7 access to your own data.
- View all your data in one place via the SamKnows One platform.
- Create customised charts and save the results that mean the most to you.
- Track changes in your connection over time.

[1] https://www.measuringbroadbandnewzealand.com/sign-up

Our tests

	Test	Definition
	Download	The speed at which data can be transferred from the SamKnows test server to your device, measured in megabits per second (Mbps).
	Upload	The speed at which information is transferred from your device to the SamKnows test server, measured in megabits per second (Mbps).
	Latency	How long it takes a data packet to go from your device to our test server and back to your device, measured in milliseconds (ms). The shorter the latency, the better.
	Latency Under Load	How long it takes a data packet to go from your device to our test server and back to your device while a download/upload test is running, measured in milliseconds (ms). The shorter the latency, the better.
	Jitter	The variation in the delay of received packets, measured in milliseconds (ms). Essentially it is a measure of the stability of latency.
	Packet Loss	Packet loss counts packets that are sent over a network and do not make it to their destination, measured as a percentage of packets lost out of all packets sent.
	Disconnection	A disconnection means that two or more latency measurement packets in a row were lost. Measured as the median of household hourly rates.
	Video Conferencing	Measures round-trip latency and reachability of a selection of video conferencing services.
	Social Media	Measures round-trip latency and reachability of a selection of major social media services.
	Online Gaming	Measures performance for a number of major games and supporting services, such as game distribution platforms.
	Video Streaming	Measures the highest bitrate, and therefore quality level, you can reliably stream from real content servers.
	Webpage Loading Time	The time it takes for a specific webpage to fully load. This is a combination test that includes download, latency and DNS in one test that accurately mimics real-world usage.
	CDN Measurements	Measures download performance for the same (or very similar) object from a variety of popular Content Delivery Networks over HTTP.
	Voice over IP	Measures the suitability of a broadband connection for VoIP calls.

Glossary

Term	Definition
ADSL	Asymmetric digital subscriber line. A broadband connection that uses existing telephone lines to send data.
Advertised speed	The speed at which broadband services are typically advertised or marketed, usually described in Mbps (megabits per second). On some networks like ADSL or Fixed Wireless, these are not given as a general maximum but vary from line to line as they do not transmit data without depreciation across distance.
Broadband	A network service or connection which is defined as “always on”, as opposed to historical dial-up internet.
Broadband speed	The speed at which data is transmitted over a broadband connection, usually measured in megabits per second (Mbps).
Disconnection	A disconnection means that two or more latency measurement packets in a row were lost, resulting in stuttering broadband performance.
Download speed	The speed that data travels from our test server to your router. Measured in megabits per second (Mbps); higher is better.
HFC	Hybrid Fibre-Coaxial. A broadband connection that uses coaxial cables to send data.
Fibre	A broadband connection that uses Fibre-Optic cables to send data to and from a property directly. Sometimes referred to as FTTH (Fibre-to-the-home) or FTTP (Fibre-to-the-premises).
Fixed Wireless	A broadband connection that uses radio waves to provide internet access to a premises.
Latency	The time it takes for a data packet to travel from your router to our test server and back. Measured in milliseconds (ms); lower is better.
Latency under load	The time it takes for a data packet to travel from your router to our test server and back while a download/upload speed test is running. Measured in milliseconds (ms); lower is better.
LEO Satellite	Low Earth Orbit Satellite. A broadband connection that is transmitted wirelessly using a satellite and ground based satellite dish.
Mbps	Megabits per second. A unit measuring broadband speed. Mbps is the equivalent of 1,000 kilobits per second.
Packet loss	The percentage of packets that were lost somewhere between your router and our test server. Measured as a percentage of all packets sent; lower is better.
Peak hours	The time of day when people are typically using their internet connection, defined in New Zealand as between 7pm and 11pm.
RSP	Retail Service Provider. A company that provides consumers with access to the internet.
Upload speed	The speed that data travels from your router to our test server. Measured in Mbps (megabits per second); higher is better.
VDSL	Very high speed digital subscriber line. A broadband connection that allows higher speeds than ADSL technologies.

Summary Tables

Table 2: All RSPs Included in MBNZ Programme

All RSPs Included in MBNZ
2degrees, Stuff Fibre, Orcon & Slingshot
Spark (Including Skinny & Bigpipe)
One New Zealand (Including Farmside)
Starlink
Sky New Zealand
Mercury
Voyager
Netspeed
Inspire Net
Ultimate Broadband
WIZwireless
Wireless Nation
Yrless
Lightwire
NOW NZ
UniFone
Evolution Wireless
Evolution Network
Contact Energy
Vorco
Electric Kiwi
PureLink

Table 3: Download, Upload and Latency Performance by Plan

Plan	SFA Area	Peak or Off-Peak	Number of Units	Average Download (Mbps)	Average Upload (Mbps)	Average Latency (ms)
ADSL	All Areas	24/7	37	10 Mbps	1 Mbps	25 ms
	All Areas	Peak	37	10 Mbps	1 Mbps	26 ms
	Non-Fibre Areas	24/7	34	9 Mbps	1 Mbps	26 ms
	Non-Fibre Areas	Peak	34	9 Mbps	1 Mbps	27 ms
VDSL	All Areas	24/7	45	46 Mbps	13 Mbps	18 ms
	All Areas	Peak	45	45 Mbps	13 Mbps	19 ms
	Non-Fibre Areas	24/7	42	44 Mbps	12 Mbps	19 ms
	Non-Fibre Areas	Peak	42	43 Mbps	12 Mbps	19 ms
LEO Satellite	Non-Fibre Areas	24/7	76	214 Mbps	32 Mbps	31 ms
	Non-Fibre Areas	Peak	76	176 Mbps	32 Mbps	32 ms
LEO Satellite (Deprioritized)	Non-Fibre Areas	24/7	48	205 Mbps	32 Mbps	30 ms
	Non-Fibre Areas	Peak	48	158 Mbps	31 Mbps	31 ms
4G Fixed Wireless	All Areas	24/7	79	53 Mbps	18 Mbps	52 ms
	All Areas	Peak	79	38 Mbps	16 Mbps	53 ms
	Fibre Areas	*24/7*	*21*	*57 Mbps*	*23 Mbps*	*50 ms*
	Fibre Areas	*Peak*	*21*	*41 Mbps*	*22 Mbps*	*50 ms*
	Non-Fibre Areas	24/7	58	51 Mbps	16 Mbps	53 ms
	Non-Fibre Areas	Peak	58	37 Mbps	15 Mbps	54 ms
Fibre 300	Fibre Areas	24/7	345	314 Mbps	108 Mbps	6 ms
	Fibre Areas	Peak	345	313 Mbps	108 Mbps	6 ms
Fibre Max	Fibre Areas	24/7	409	880 Mbps	496 Mbps	5 ms
	Fibre Areas	Peak	409	873 Mbps	494 Mbps	5 ms
HFC	Fibre Areas	*24/7*	*22*	*887 Mbps*	*103 Mbps*	*13 ms*

Plan	SFA Area	Peak or Off-Peak	Number of Units	Average Download (Mbps)	Average Upload (Mbps)	Average Latency (ms)
	Fibre Areas	*Peak*	*22*	*885 Mbps*	*103 Mbps*	*13 ms*
Fibre 50	Fibre Areas	*24/7*	*24*	*52 Mbps*		*7 ms*
	Fibre Areas	*Peak*	*24*	*52 Mbps*		*7 ms*
5G Fixed Wireless	All Areas		*7*			
WISP Fixed Wireless	All Areas		*18*			

Table 4: Fibre 300 and Fibre Max Download, Upload and Latency Summary by RSP

Plan	RSP	Peak or Off-Peak	Number of Units	Average Download (Mbps)	Average Upload (Mbps)	Average Latency (ms)
Fibre 300	2degrees, Orcon & Slingshot	24/7	105	324 Mbps	108 Mbps	7 ms
		Peak	105	323 Mbps	108 Mbps	7 ms
	Mercury	24/7	39	309 Mbps	114 Mbps	6 ms
		Peak	39	309 Mbps	114 Mbps	6 ms
	One New Zealand	24/7	64	323 Mbps	111 Mbps	7 ms
		Peak	64	322 Mbps	110 Mbps	7 ms
	Spark	24/7	67	312 Mbps	109 Mbps	6 ms
		Peak	67	311 Mbps	109 Mbps	6 ms
Fibre Max	2degrees, Orcon & Slingshot	24/7	160	888 Mbps	506 Mbps	5 ms
		Peak	160	882 Mbps	505 Mbps	5 ms
	Mercury	24/7	43	865 Mbps	496 Mbps	5 ms
		Peak	43	844 Mbps	494 Mbps	5 ms
	One New Zealand	24/7	49	897 Mbps	475 Mbps	6 ms
		Peak	49	892 Mbps	470 Mbps	6 ms
	Sky New Zealand	24/7	73	914 Mbps	519 Mbps	6 ms
		Peak	73	913 Mbps	519 Mbps	6 ms
	Spark	24/7	48	912 Mbps	518 Mbps	3 ms
		Peak	48	911 Mbps	517 Mbps	3 ms

Table 5: Downlink Latency to Popular Social Media Platforms by RSP, Fibre Plans Only

Social Media Platform	Media Type	RSP	Number of Units	Average Latency
Instagram App	Image	2degrees, Orcon & Slingshot	280	8 ms
		One New Zealand	128	6 ms
		Spark	123	5 ms
		Sky New Zealand	97	8 ms
		Mercury	93	8 ms
Instagram Messenger	Text	2degrees, Orcon & Slingshot	280	18 ms
		One New Zealand	128	37 ms
		Spark	123	21 ms
		Sky New Zealand	97	13 ms
		Mercury	93	19 ms
	Image	2degrees, Orcon & Slingshot	280	8 ms
		One New Zealand	128	6 ms
		Spark	123	5 ms
		Sky New Zealand	97	8 ms
		Mercury	93	8 ms
Facebook App	Text	2degrees, Orcon & Slingshot	280	18 ms
		One New Zealand	128	37 ms
		Spark	123	22 ms
		Sky New Zealand	97	13 ms
		Mercury	93	19 ms
	Image	2degrees, Orcon & Slingshot	280	8 ms
		One New Zealand	128	6 ms
		Spark	123	5 ms
		Sky New Zealand	97	8 ms
		Mercury	93	8 ms
Facebook Messenger	Text	2degrees, Orcon & Slingshot	280	18 ms
		One New Zealand	128	37 ms
		Spark	123	22 ms

Social Media Platform	Media Type	RSP	Number of Units	Average Latency
		Sky New Zealand	97	13 ms
		Mercury	93	19 ms
	Image	2degrees, Orcon & Slingshot	280	8 ms
		One New Zealand	128	6 ms
		Spark	123	5 ms
		Sky New Zealand	97	8 ms
		Mercury	93	8 ms
Snapchat	Text	2degrees, Orcon & Slingshot	279	133 ms
		One New Zealand	128	134 ms
		Spark	123	133 ms
		Sky New Zealand	97	133 ms
		Mercury	93	132 ms
	Image	2degrees, Orcon & Slingshot	279	619 ms
		One New Zealand	128	612 ms
		Spark	123	606 ms
		Sky New Zealand	97	620 ms
		Mercury	93	603 ms
Whatsapp	Text	2degrees, Orcon & Slingshot	280	18 ms
		One New Zealand	128	37 ms
		Spark	123	21 ms
		Sky New Zealand	97	13 ms
		Mercury	93	19 ms
	Image	2degrees, Orcon & Slingshot	280	18 ms
		One New Zealand	128	37 ms
		Spark	123	21 ms
		Sky New Zealand	97	13 ms
		Mercury	93	19 ms
X (formally Twitter)	Text	2degrees, Orcon & Slingshot	280	64 ms
		One New Zealand	128	71 ms
		Spark	123	64 ms

Social Media Platform	Media Type	RSP	Number of Units	Average Latency
		Sky New Zealand	97	69 ms
		Mercury	93	174 ms
	Image	2degrees, Orcon & Slingshot	280	14 ms
		One New Zealand	128	18 ms
		Spark	123	16 ms
		Sky New Zealand	97	12 ms
		Mercury	93	14 ms

Table 6: Latency to Various Online Gaming Servers by RSP, Fibre plans only

Game	RSP	Number of Units	Average Latency
Among Us	2degrees, Orcon & Slingshot	279	160 ms
	One New Zealand	128	162 ms
	Spark	123	155 ms
	Sky New Zealand	97	161 ms
	Mercury	93	161 ms
Apex Legends	2degrees, Orcon & Slingshot	279	36 ms
	One New Zealand	128	36 ms
	Spark	123	36 ms
	Sky New Zealand	97	36 ms
	Mercury	93	35 ms
Diablo III	2degrees, Orcon & Slingshot	279	35 ms
	One New Zealand	128	37 ms
	Spark	123	36 ms
	Sky New Zealand	97	36 ms
	Mercury	93	34 ms
Dota 2	2degrees, Orcon & Slingshot	279	35 ms
	One New Zealand	128	36 ms
	Spark	123	35 ms
	Sky New Zealand	97	35 ms
	Mercury	93	34 ms
FIFA	2degrees, Orcon & Slingshot	279	37 ms
	One New Zealand	128	36 ms
	Spark	123	40 ms
	Sky New Zealand	97	38 ms
	Mercury	93	36 ms
Fortnite	2degrees, Orcon & Slingshot	279	37 ms
	One New Zealand	128	36 ms
	Spark	123	40 ms
	Sky New Zealand	97	38 ms

Game	RSP	Number of Units	Average Latency
	Mercury	93	36 ms
Heroes of the Storm	2degrees, Orcon & Slingshot	279	168 ms
	One New Zealand	128	206 ms
	Spark	123	168 ms
	Sky New Zealand	97	170 ms
	Mercury	93	179 ms
Overwatch	2degrees, Orcon & Slingshot	279	35 ms
	One New Zealand	128	36 ms
	Spark	123	35 ms
	Sky New Zealand	97	36 ms
	Mercury	93	34 ms
PUBG	2degrees, Orcon & Slingshot	279	37 ms
	One New Zealand	128	35 ms
	Spark	123	37 ms
	Sky New Zealand	97	38 ms
	Mercury	93	36 ms
Rainbow Six Siege	2degrees, Orcon & Slingshot	279	41 ms
	One New Zealand	128	41 ms
	Spark	123	45 ms
	Sky New Zealand	97	41 ms
	Mercury	93	40 ms
Rocket League	2degrees, Orcon & Slingshot	279	34 ms
	One New Zealand	128	35 ms
	Spark	123	34 ms
	Sky New Zealand	97	35 ms
	Mercury	93	34 ms
World of Warcraft	2degrees, Orcon & Slingshot	279	35 ms
	One New Zealand	128	37 ms
	Spark	123	36 ms
	Sky New Zealand	97	36 ms

Game	RSP	Number of Units	Average Latency
	Mercury	93	34 ms

Table 7: Latency to Various Video Conferencing Services by RSP, Fibre Plans Only

Video Conferencing Service	Free or Paid	RSP	Number of Units	Average Latency
Cisco Webex	Free	2degrees, Orcon & Slingshot	281	36 ms
		One New Zealand	128	36 ms
		Spark	123	36 ms
		Sky New Zealand	97	36 ms
		Mercury	93	34 ms
GoToMeeting		2degrees, Orcon & Slingshot	281	159 ms
		One New Zealand	128	155 ms
		Spark	123	155 ms
		Sky New Zealand	97	160 ms
		Mercury	93	143 ms
Google Meet		2degrees, Orcon & Slingshot	281	36 ms
		One New Zealand	128	36 ms
		Spark	123	36 ms
		Sky New Zealand	97	36 ms
		Mercury	93	34 ms
Microsoft Teams		2degrees, Orcon & Slingshot	281	46 ms
		One New Zealand	128	43 ms
		Spark	123	44 ms
		Sky New Zealand	97	46 ms
		Mercury	93	44 ms
Skype		2degrees, Orcon & Slingshot	281	50 ms
		One New Zealand	128	47 ms
		Spark	123	48 ms
		Sky New Zealand	97	50 ms
		Mercury	93	48 ms
Zoom		2degrees, Orcon & Slingshot	281	201 ms
		One New Zealand	128	195 ms
		Spark	123	202 ms

Video Conferencing Service	Free or Paid	RSP	Number of Units	Average Latency
		Sky New Zealand	97	202 ms
		Mercury	93	207 ms