

Measuring Broadband Australia Program



Twenty-third Report, December 2023

The Measuring Broadband Australia program provides information on the real-world performance of broadband plans. The program aims to better understand how Australians are experiencing internet performance in their homes, provide Australian consumers with accurate and independent information about broadband performance to assist their purchasing decisions, and encourage greater performance-based competition and better internet performance.

These reports are prepared quarterly by SamKnows, an independent testing provider appointed by the Australian Competition and Consumer Commission (ACCC). The metrics are also presented in a [public dashboard on the ACCC's website](#). Report 23 is based on data measurements taken from 1 to 30 September 2023.

The program relies on volunteers who host a testing device called a Whitebox on their broadband connection. The Whiteboxes, which are supplied by SamKnows, perform tests to measure internet performance using test servers maintained by SamKnows and hosted in Australia. More information about the program is available on the [ACCC's website](#).

Underlying data for this report can be found at www.data.gov.au

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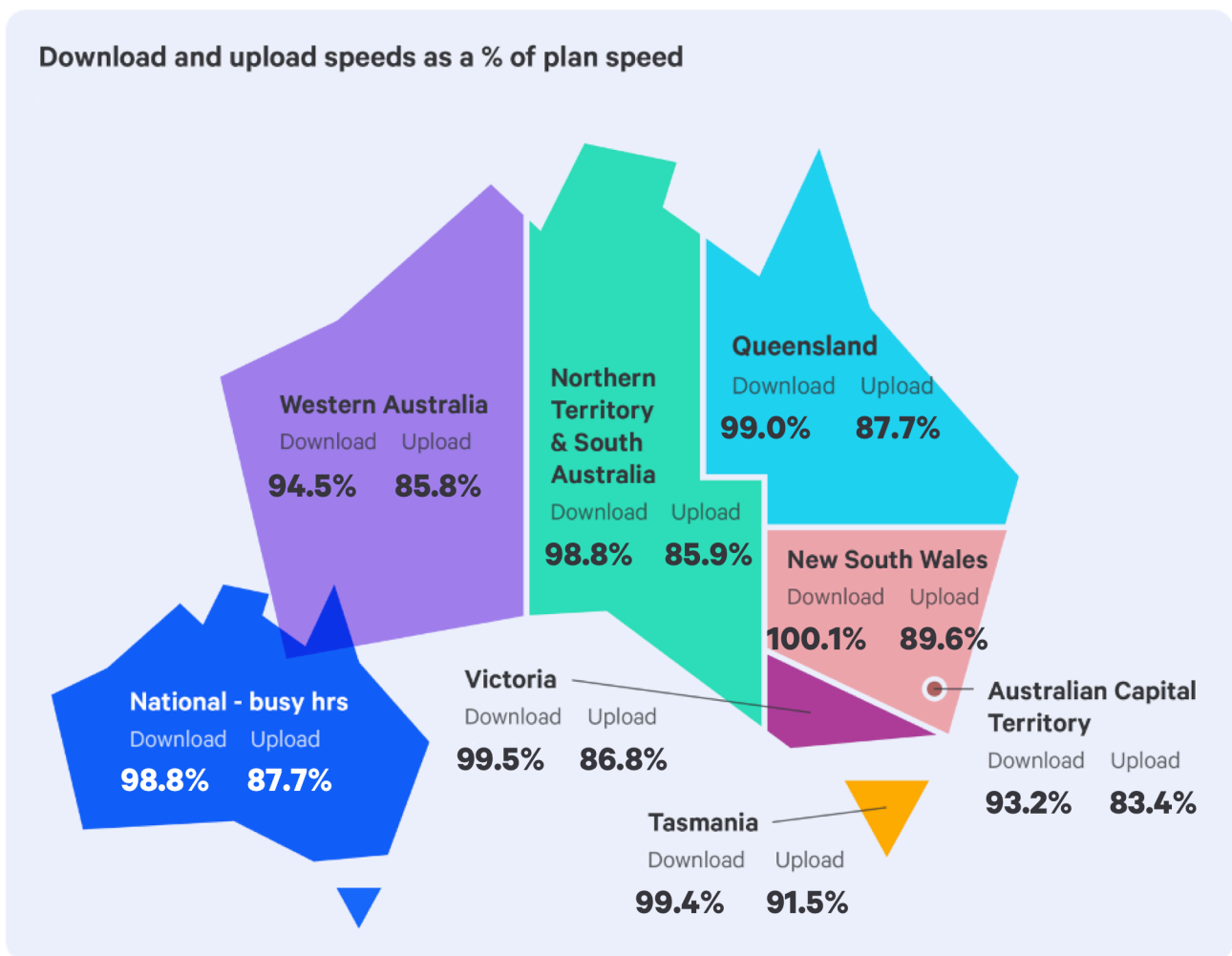
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Key results - September 2023

Performance during busy evening hours by state and territory

Average NBN fixed-line performance during busy hours (7-11 pm, Monday to Friday) by state/territory. Including underperforming and impaired services, excluding very high speed services.

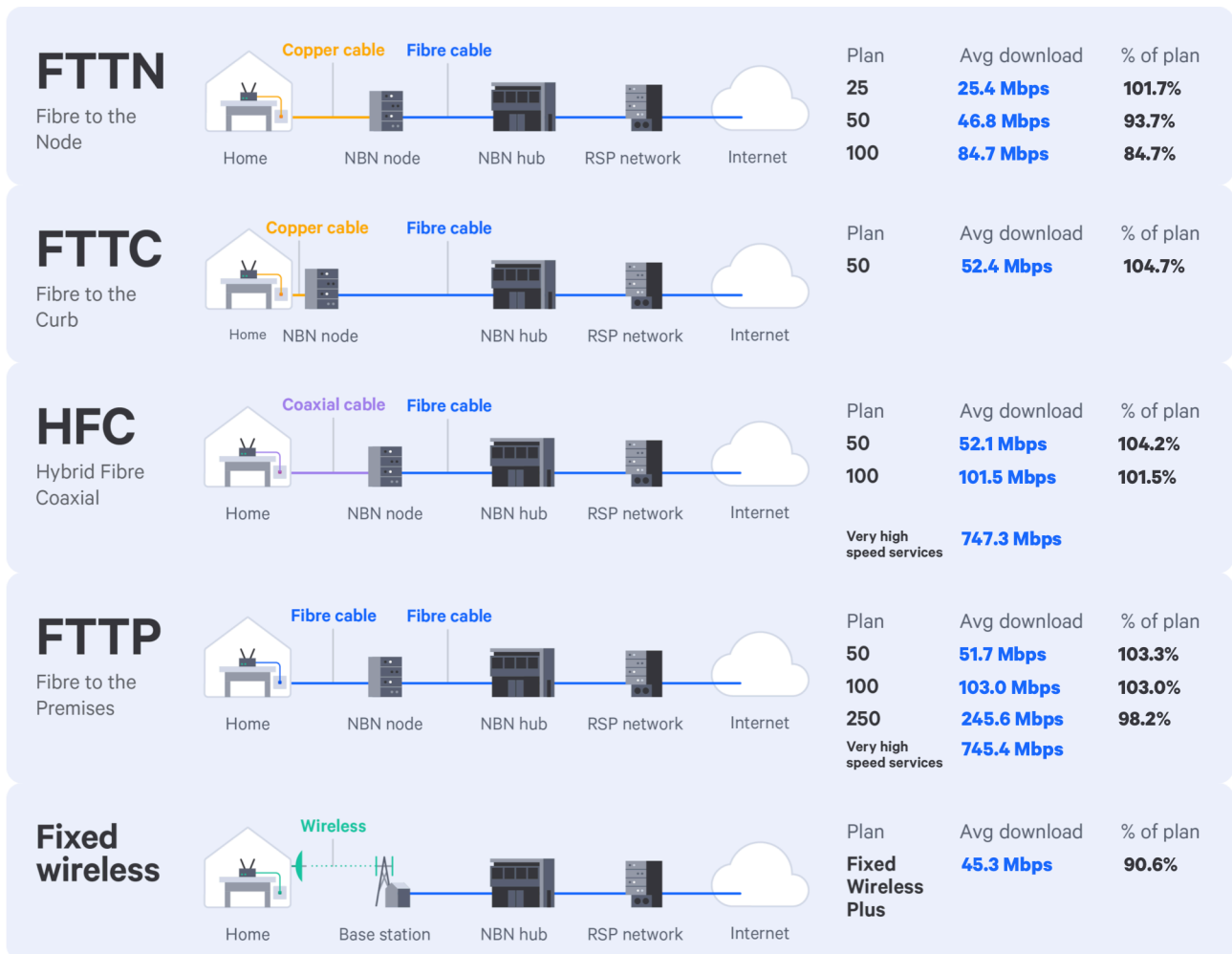
The speeds ranged from 93.2%-100.1% of plan speed for download and 83.4%-91.5% for upload.



NBN access technology

Download speeds during busy hours (7-11 pm, Monday to Friday), September 2023, including underperforming and impaired services.

Results are presented only for speed tiers and technologies having a sufficient panel size.



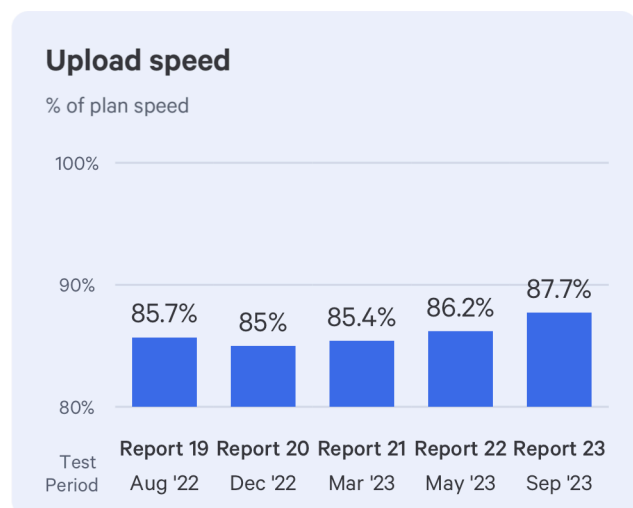
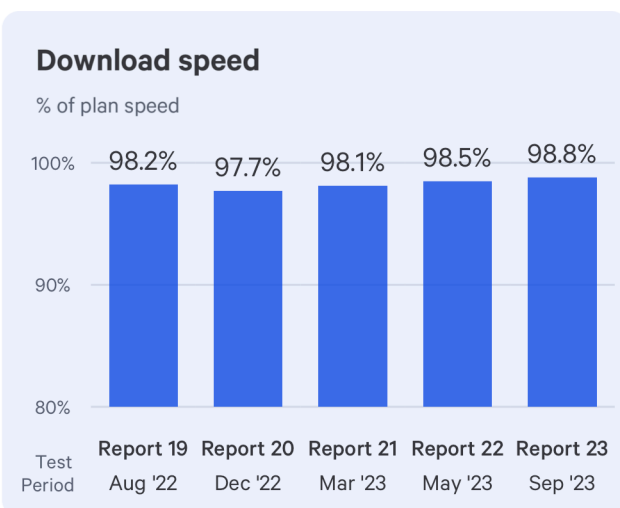
Quality of experience

Streaming full high definition (FHD) and ultra-high definition (UHD) video during busy hours (7-11 pm, Monday to Friday), September 2023, including underperforming and impaired services.¹

NBN plan speed	% that can reliably stream FHD & UHD videos from Netflix								
25	HD	HD	HD	HD	HD	UHD	UHD	UHD	4-5 Concurrent FHD video streams
	100.0%	96.9%	95.9%	91.8%	72.2%	0.0%	0.0%	0.0%	
50	UHD	UHD	UHD	UHD	UHD	UHD	UHD	UHD	0-1 Concurrent UHD video streams
	95.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
100	HD	HD	HD	HD	HD	HD	HD	HD	7+ Concurrent FHD video streams
	100.0%	100.0%	99.6%	97.8%	96.2%	93.2%	88.6%	84.2%	
250	UHD	UHD	UHD	UHD	UHD	UHD	UHD	UHD	2-3 Concurrent UHD video streams
	99.6%	93.2%	76.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Fixed Wireless Plus	UHD	UHD	UHD	UHD	UHD	UHD	UHD	UHD	5-6 Concurrent UHD video streams
	100.0%	98.6%	96.1%	92.7%	86.4%	72.0%	13.2%	0.0%	
Fixed Wireless Plus	UHD	UHD	UHD	UHD	UHD	UHD	UHD	UHD	7+ Concurrent UHD video streams
	100.0%	100.0%	98.2%	97.3%	96.4%	92.8%	91.9%	91.9%	
Fixed Wireless Plus	UHD	UHD	UHD	UHD	UHD	UHD	UHD	UHD	1-2 Concurrent UHD video streams
	94.7%	53.9%	27.6%	7.9%	0.0%	0.0%	0.0%	0.0%	

Long-term trends

NBN fixed-line services, during busy hours, including underperforming and impaired services.



¹ This test runs on an idle connection, results may be affected with simultaneous usage. In this report, FHD is measured at 5 Mbps, and UHD at 15 Mbps in accordance with Netflix guidelines.

Overview

Testing period

This report is based on measurements collected from 1 to 30 September 2023.

Access networks

This report includes results for NBN fixed-line services (fixed-line plans up to 500 Mbps download), other superfast access networks (fixed-line plans up to 500 Mbps download), NBN very high speed services and NBN fixed wireless services as regular items.

Performance across urban and regional areas

As a feature for this report, we present a comparative view between urban and regional NBN fixed-line services, across all RSPs and technologies.

Volunteers using speed constrained in-home equipment

As with previous reports, this report includes all services and plans that may be affected by a 100 Mbps link within the volunteers' homes. A common cause of this is customer premises equipment² (CPE) or other network devices that have Ethernet ports with a physical limit of 100 Mbps. Other potential causes are damaged Ethernet cables, intermediate devices that only support 100 Mbps (such as old switches and hubs) and configuration of network equipment within the home. Consumers affected by this issue are unable to receive the full benefit of plans with download speeds above 100 Mbps. The ACCC encourages RSPs to reach out to their customers who may be using a constrained network device.

For further information on broadband speed issues, see the ACCC's website.

Further metrics available on ACCC website

Further metrics beyond those included in this report are available on the ACCC's broadband performance data dashboard.

² Network equipment provided by an RSP (generally including a home router/gateway).

Important terms

Term	Definition	Significance
Advertised speed	The speed claim made by a retail service provider (RSP) for a given plan during a Measuring Broadband Australia reporting period. May be the same as or lower than the plan speed.	This report presents download speed results against RSPs' advertised speed claims for NBN50 and NBN100 plans. This metric shows consumers whether, and how often, units on our panel achieved the speed advertised by their RSP.
All hours	Data labelled "all hours" includes tests conducted at any time of the day.	
Busy hours	Data labelled "busy hours" includes only tests conducted between 19:00:00 and 22:59:59, Monday to Friday. For calculating the busiest hour and for determining the % of busy hours where the speed claim was attained, "busy hours" include 19:00:00 and 22:59:59, Monday to Sunday	Networks experience higher user activity during busy hours. As a result, network performance can deteriorate compared to other times of the day.
Busiest hour	The fifth-lowest hourly average download speed across each busy hour by RSP during the monitoring period. For this calculation, busy hours include tests conducted between 19:00:00 and 22:59:59, Monday to Sunday.	The busiest hour indicates the performance of each RSP when its network is under the highest levels of demand. When the busiest hour speeds are significantly lower than the average busy hour speeds, then the service may be more affected by particularly high demand peaks.
Confidence intervals	Indicates how certain we are that the true average for a metric lies between the upper and lower boundary indicated by the thin black lines. For example, if an RSP had an average download performance of 99.3% with a 95% confidence interval of $\pm 2.2\%$, this means that if we were to repeat our sampling 100 times, we would expect the average performance to fall between 97.1% and 101.5% in at least 95 cases.	Narrower confidence intervals indicate a more stable estimate than larger ones.
Download and upload speed	Download speed is the speed at which data can be transferred from the SamKnows test server to the consumer's computer, measured in megabits per second (Mbps). Upload speed is the speed at which information is transferred from the consumer's computer to the SamKnows test server, measured in Mbps.	The download and upload speeds associated with each retail plan are used by consumers to select a plan. Upload speed is especially relevant for applications where a user sends significant amounts of data to the internet, for example uploading files to cloud storage or running multiple simultaneous video conferencing sessions.

Term	Definition	Significance
Download and upload performance	Measured download or upload speed expressed as a percentage of plan speed. e.g. for an NBN50 service, 100% download performance would be 50 Mbps.	This metric expresses how well a unit performs compared to the plan speed. Expressing results as a percentage of plan speed also allows results across different plan speeds to be aggregated. Prior to NBN Co overprovisioning the downlink, both the download and upload speeds were capped at 100% for the fixed-line plans. Since NBN Co began overprovisioning the downlink for fixed-line services, download results above 100% are common.
Impaired services	Fibre to the node services where the maximum attainable download speed measured by NBN Co is below the plan download speed.	Consumers on an impaired service are unable to achieve the full download speed of their plan (see "underperforming services"). These services require rectification of technical issues to improve performance. If this is not possible, it may be advisable for the consumer to move to a lower speed plan that is achievable. This report presents results both including and excluding impaired and underperforming services. This information allows consumers to better understand the reported download and upload speed measures by removing the effect of services which, due to physical limitations, would be better assigned to another plan. At the same time, this comparison provides stronger incentives for service providers to improve service quality for customers on impaired and underperforming services.
Latency	The average time required to send a packet of data to the SamKnows test server and back to the consumer's computer, measured in milliseconds (ms).	The lower the latency, the better. Lower latency results in faster responses, providing a more reliable experience when using real-time applications such as video conferencing and online gaming. High latency may result in a lag or delay when using real-time applications.
NBN fixed-line	Monitored connections on NBN Co's fixed-line footprint that utilise a physical line to connect the household to the NBN. There are a number of fixed-line technologies: fibre to the premises (FTTP), fibre to the curb (FTTC), fibre to the node (FTTN), fibre to the building (FTTB) and hybrid fibre-coaxial (HFC) access technologies. In this report, the NBN fixed-line section includes results for major NBN plans up to 500 Mbps download speed. It excludes results from very high speed services, which are presented separately. FTTN and FTTB access technologies are treated as identical.	

Term	Definition	Significance
NBN fixed wireless	Monitored connections on NBN Co's fixed wireless footprint. These services transmit data over radio signals to connect a household to the NBN using technology similar to mobile networks. Data travels from a transmission tower to an outdoor antenna fitted at the household.	Fixed wireless allows households to be connected to the internet without having to establish a physical, wired connection. This type of service is more prevalent in regional and remote areas, but consumers in outer metropolitan centres may also use this service.
NBN very high speed services	Services on the NBN Ultrafast plan, which has a download/upload speed range of 500-990/50 Mbps.	
Other superfast access networks	Refers to households served by fixed-line networks other than NBN, for example, Uniti Group's LBNC0 and OptiComm fixed-line networks.	
Outages	This metric tracks how many times per day a broadband connection goes offline for at least 30 seconds. Outages between 12 am and 5 am are excluded, as this is when network maintenance typically occurs.	Outages can impact user experience, subject to their frequency and duration.
Overprovisioning	Refers to NBN Co providing higher data rates than the plan speed.	The purpose of overprovisioning is to accommodate protocol overhead. The protocol overhead contains address and other information required to enable data transfer to/from the end user and the internet. Overprovisioning compensates for the bandwidth taken up by protocol overhead, as it enables consumers to experience speeds closer to the maximum of their plan. Currently, NBN Co overprovisions certain plans on the downlink only. Hence download speeds may be closer to, or above plan speed, whereas upload speeds remain below plan speeds.
Packet loss	Packet loss counts packets that are sent over a network and don't make it to their destination, measured as a percentage of packets lost out of all packets sent.	At levels above 1%, packet loss can cause issues for certain types of applications. This may be detrimental to user experience.
Plan and plan speed	Plan refers to the retail broadband product. Each plan has an associated download and upload speed. For example, a 100/20 Mbps plan includes a 100 Mbps download plan speed and a 20 Mbps upload plan speed. The term "NBN100" refers to a download plan speed of 100 Mbps, but the upload plan speed may vary.	RSPs may advertise a maximum attainable speed and also state a different typical busy period speed that consumers are likely to experience, which may be the same or lower than the maximum attainable speed.

Term	Definition	Significance
Underperforming services	Services that reach above 75% of plan speed in no more than 5% of download tests. These are services which rarely or never attain plan speed.	This metric effectively identifies services with maximum attainable speeds that fall closer to the maximum speed of a lower plan than to the maximum speed of the consumer's current plan. This is often, but not always, caused by a known physical impairment to FTTN services (see impaired services).
Video streaming (Netflix)	The number of Netflix videos at Full High Definition (FHD) and Ultra High Definition (UHD) that can be streamed on a certain plan simultaneously.	
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. This metric combines test results for eight popular Australian-based webpages.	

NBN fixed-line services

Download speed test results

This section includes results for major NBN plans up to 500 Mbps. It excludes results from very high speed services, as these are presented separately.

Figure 1A shows that users on NBN fixed-line services attained an average download performance of 100.4% of plan speed during all hours in September. This decreased to 98.8% during busy hours (Monday–Friday). These results are similar to the previous report, where the corresponding figures were 100.1% of plan speed during all hours and 98.5% during busy hours.

The September 2023 measurement period had a total of 30 days with 4 busy hours per day, totalling 120 busy hours (Monday–Sunday) in the month. The busiest hour download speed results in Figure 1B are lower than the busy hour download speeds shown in Figure 1A. This indicates that periods of higher demand affected network performance.

The range of speeds for the busiest hour (Figure 1B) varied from 93.8% to 99.5% of plan speed. Some RSPs were more affected by high demand peaks than others. All RSPs achieved busiest hour speeds above 90% of plan speed, which is in line with the previous report.

Further detail on hourly average download and upload performance results for the main NBN fixed-line plans is available on the ACCC's dashboard.

Figure 1: Average download performance by RSP

NBN fixed-line plans. Including underperforming services. Error bars indicate 95% confidence intervals of the mean.

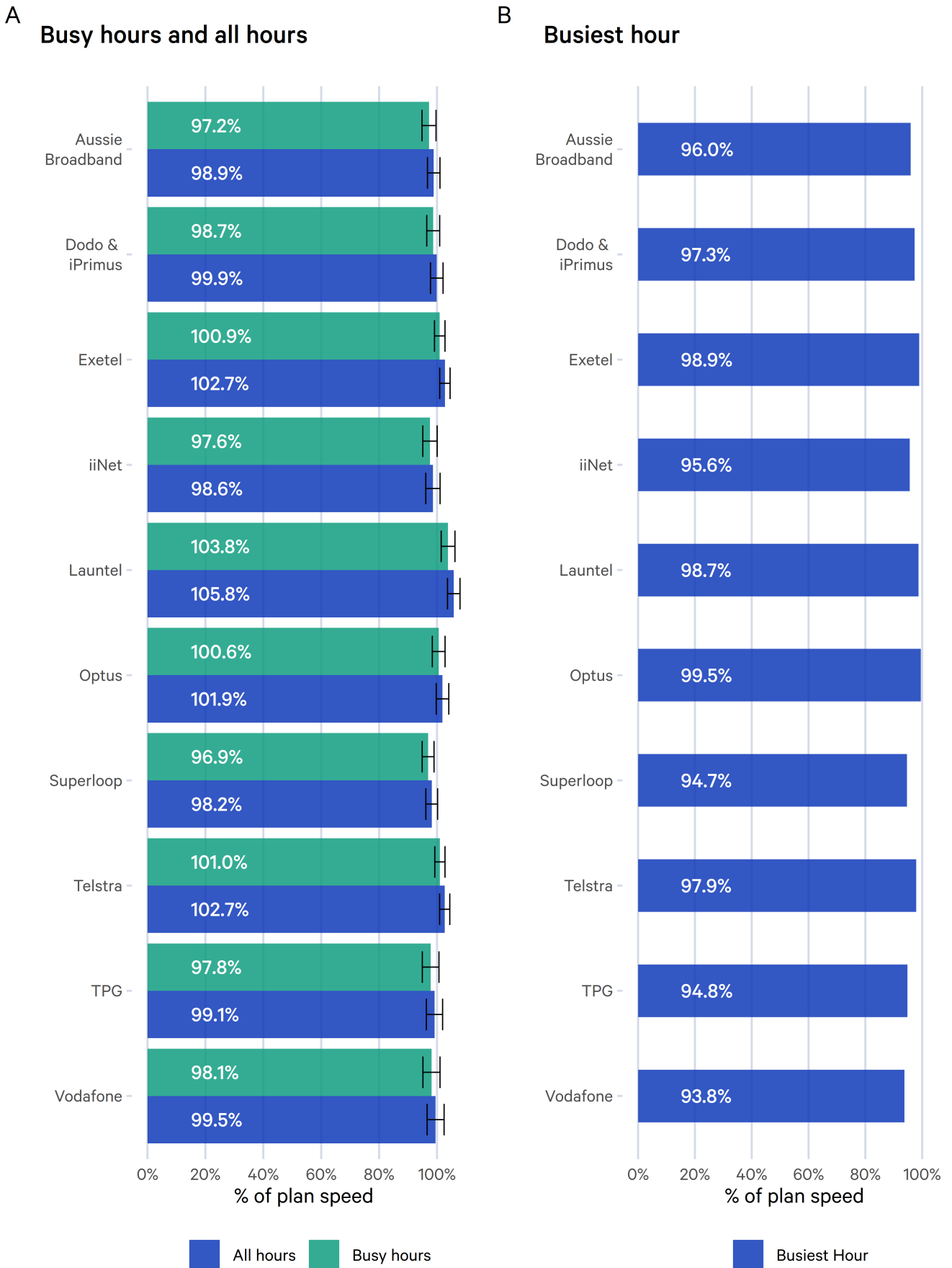
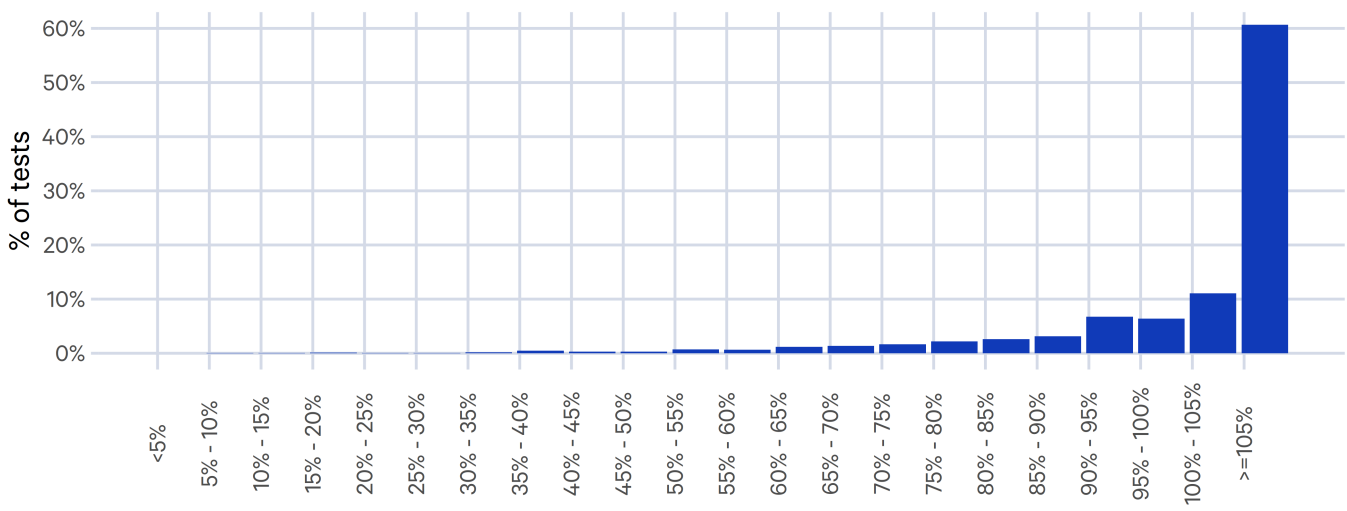


Figure 2 shows the distribution of 449,021 download speed tests performed across 1313 Whiteboxes connected to fixed-line NBN infrastructure during this period.

Of these tests, 71.8% achieved at least 100% of plan speed, and only 1.6% of tests achieved less than 50% of plan speed. In the previous report, 70.0% of tests were at plan speed or higher, and 1.2% of tests failed to meet the 50% mark.

Figure 2: Frequency of download speeds attained during tests

NBN fixed-line plans. All hours. Including underperforming services.

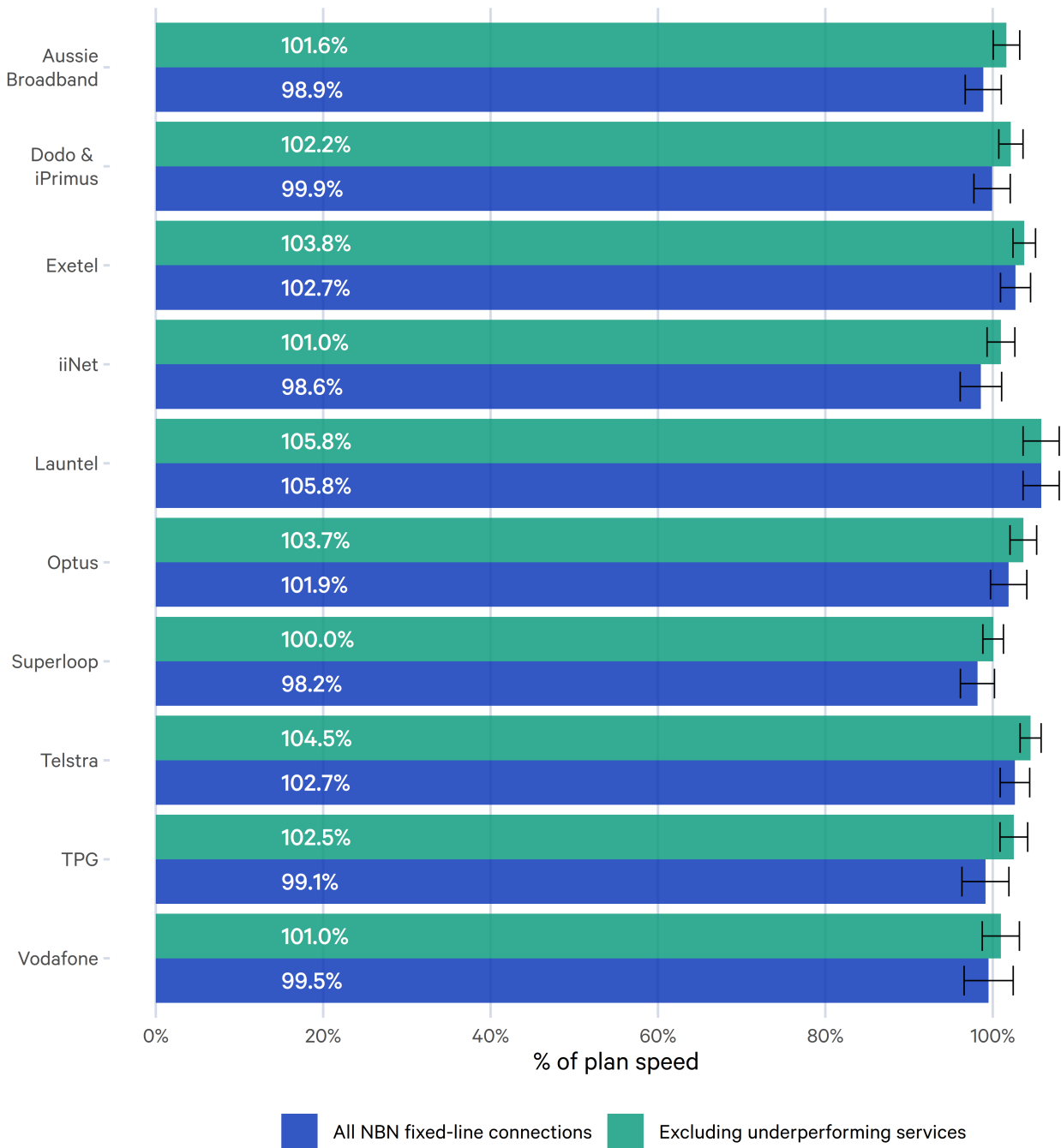


In Figure 3, we present separate download performance results including and excluding underperforming services. Underperforming services represented 4.6% of the 1313 NBN services tested for this report. In our sample, FTTN services made up 90% of underperforming NBN services, and NBN50 and NBN100 plans accounted for 93% of the underperforming NBN services.

Once underperforming services are excluded, the average download performance during all hours is 102.4% of plan speed compared with 100.4% for all services. Had underperforming services been remediated before the measurements were collected, the overall download performance would have been 2.0 percentage points higher during the period.

Figure 3: Average download speed by RSP - inclusive and exclusive of underperforming services

NBN fixed-line plans. All hours. Error bars indicate 95% confidence intervals of the mean.



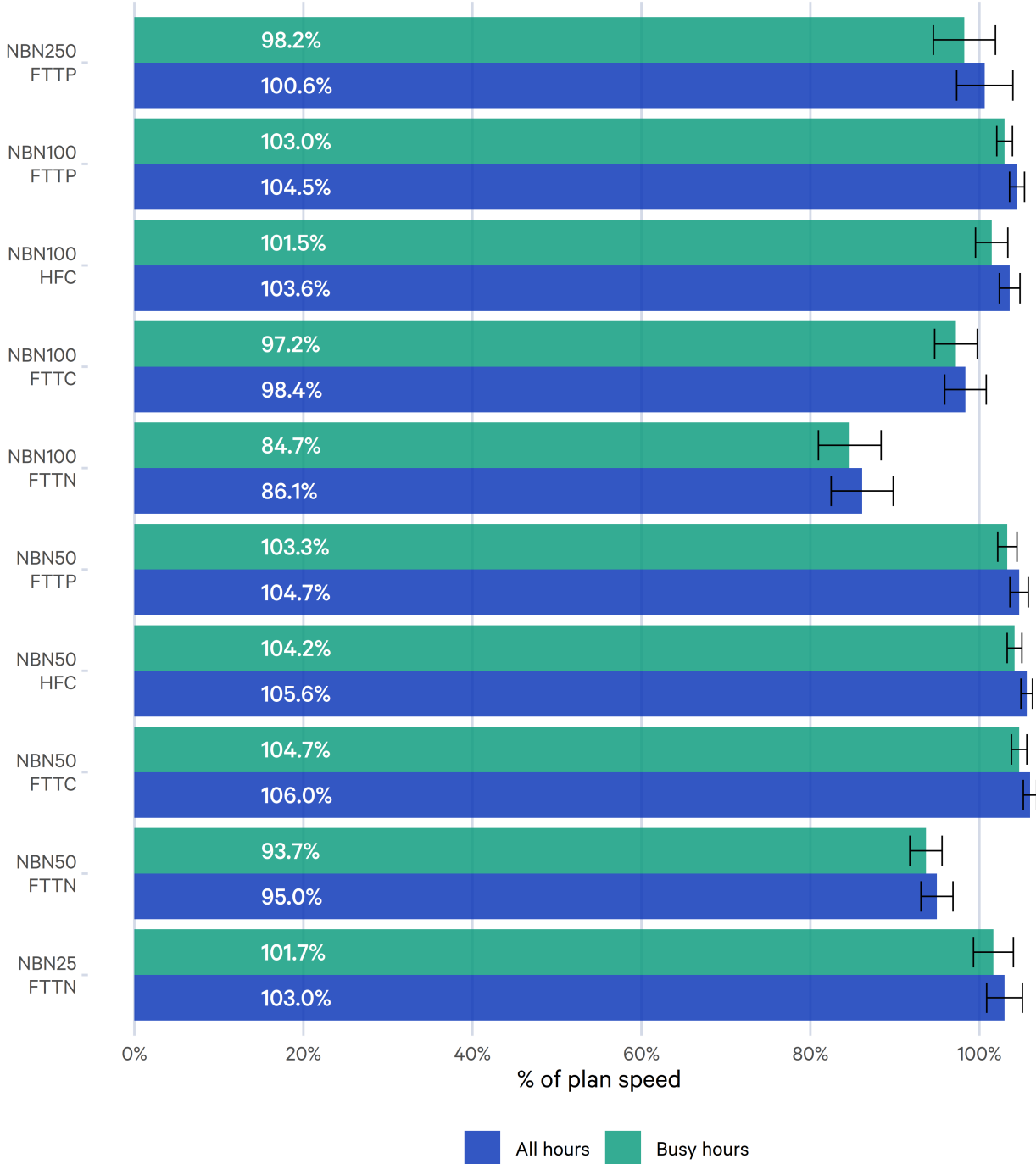
Within the NBN50 plan, FTTN services had an average download speed of around 5 Mbps lower than other technologies—a difference of 10%. Within the NBN100 plans, FTTN services had an average download speed around 17 Mbps lower than other technologies.

The results are similar to previous reports, with FTTN performing significantly below other access technologies for the NBN50 and NBN100 plans and accounting for the bulk of underperforming services across these plans. A comparison of NBN fixed-line download

performance results including and excluding underperforming services by access technology is available on the ACCC's dashboard.

Figure 4: Average download speed by plan and technology

NBN fixed-line plans. Including underperforming services. Error bars indicate 95% confidence intervals of the mean.



During the measurement period, RSPs advertised download speeds between 90% and 100% of the maximum plan speed for NBN50 and NBN100 products.

Figure 5A shows the typical evening hour speeds that were the combined predominant speeds advertised by RSPs during the measurement period separately for the 50 Mbps

and 100 Mbps download plans.³ It also shows the busy hour and busiest hour download performance by RSPs (combined results for services with 50 Mbps and 100 Mbps plan download speeds). The busy hour and busiest hour download performance is calculated against the nominal plan download speed (50 Mbps and 100 Mbps respectively), rather than the advertised speed claim.

These results show that had all underperforming services and impaired services been remediated, or moved to a more appropriate plan, the average download speeds of most RSPs would have met or exceeded their advertised speed claims during their busy hours.

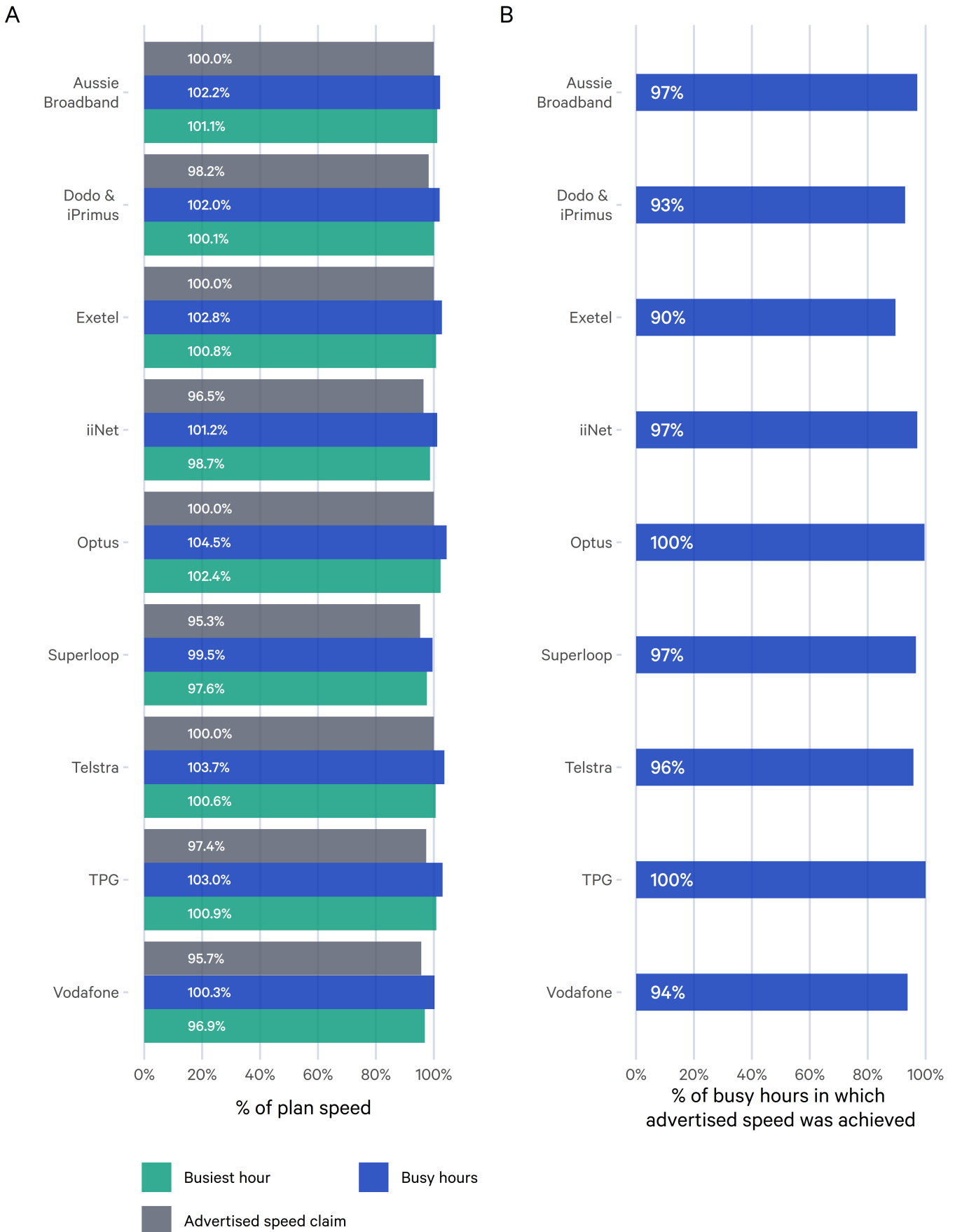
Figure 5B shows the percentage of busy hours (Monday–Sunday) during the period in which test speeds for NBN50 and NBN100 products met or exceeded the speeds advertised by RSPs. Had all underperforming services and impaired services been remediated, or moved to a more appropriate plan, the proportion of busy hours when RSPs met their advertised speed claims would have been no lower than 90% for the providers presented.

Figure 5B shows the proportion of busy hours where the advertised speed claim was achieved, rather than the proportion of busy hours where the nominal plan download speed was achieved. This means that an RSP advertising lower speed claims may achieve their advertised speed claim in a greater proportion of busy hours even when their busy hour download performance is lower. Conversely, another RSP advertising higher speed claims may only achieve their advertised speed claims in a lower proportion of busy hours even when their busy hour download performance is higher.

³ Results In Figures 5A and 5B are presented only for RSPs with a sufficient panel size.

Figure 5: Advertised speeds and average download speeds by RSP

50 Mbps and 100 Mbps NBN fixed-line plans. Excluding underperforming and impaired services.



Upload speed test results

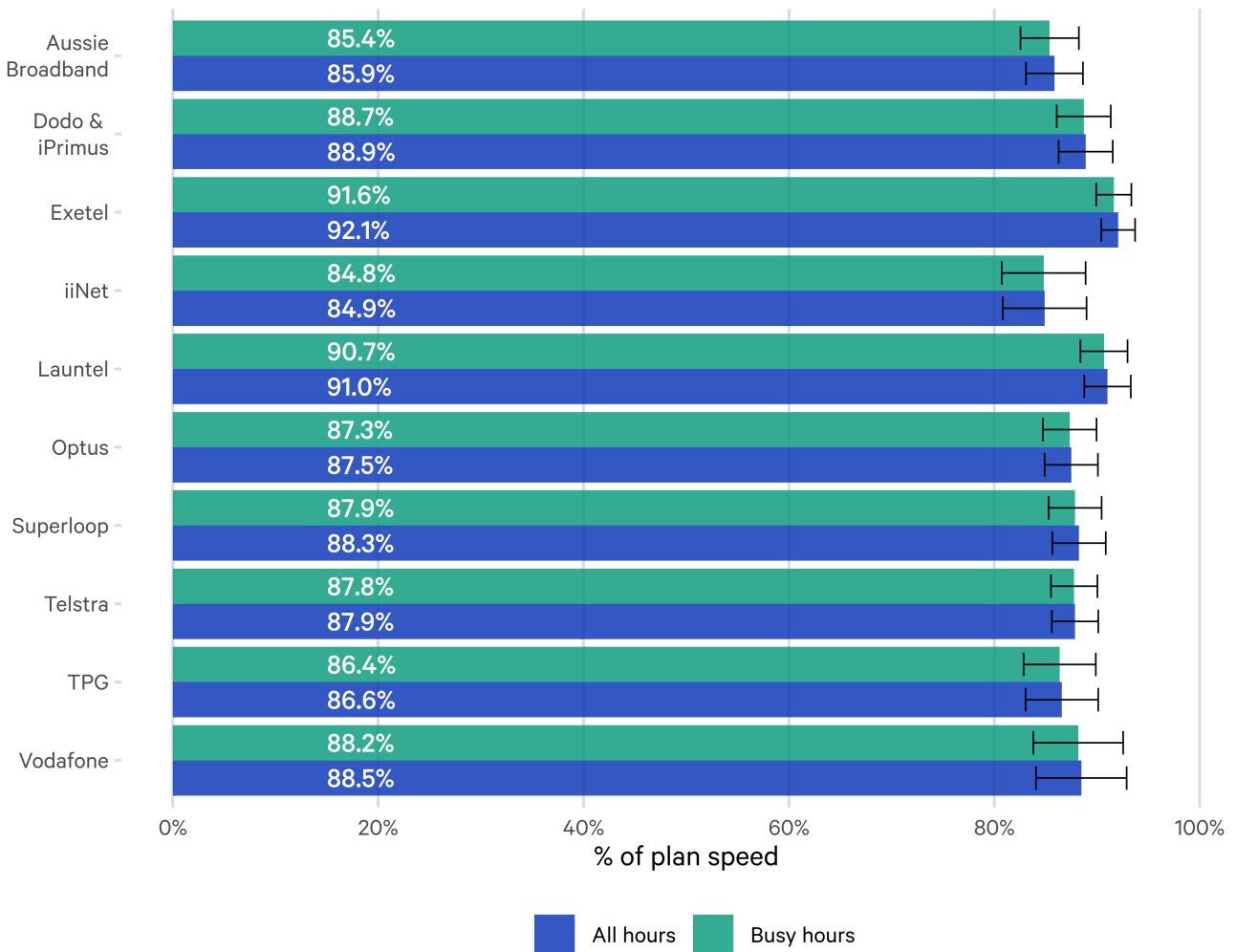
Figure 6 shows average upload performance for the main NBN fixed-line RSPs and plans.

Average upload performance ranged between 84.9% and 92.1% of plan speed during all hours across RSPs. The results are in line with the previous report.

NBN fixed-line services achieved an overall average upload performance of 88.0% of plan speed during all hours, compared to 86.5% in the previous report. During busy hours (Monday–Friday), NBN fixed-line services achieved an average upload performance of 87.7% of plan speed compared to 86.2% in the previous report. As the uplink is not overprovisioned, upload performance results are lower than download performance results.

Figure 6: Average upload speed by RSP

NBN fixed-line plans. Including underperforming services. Error bars indicate 95% confidence intervals of the mean.



Other metrics

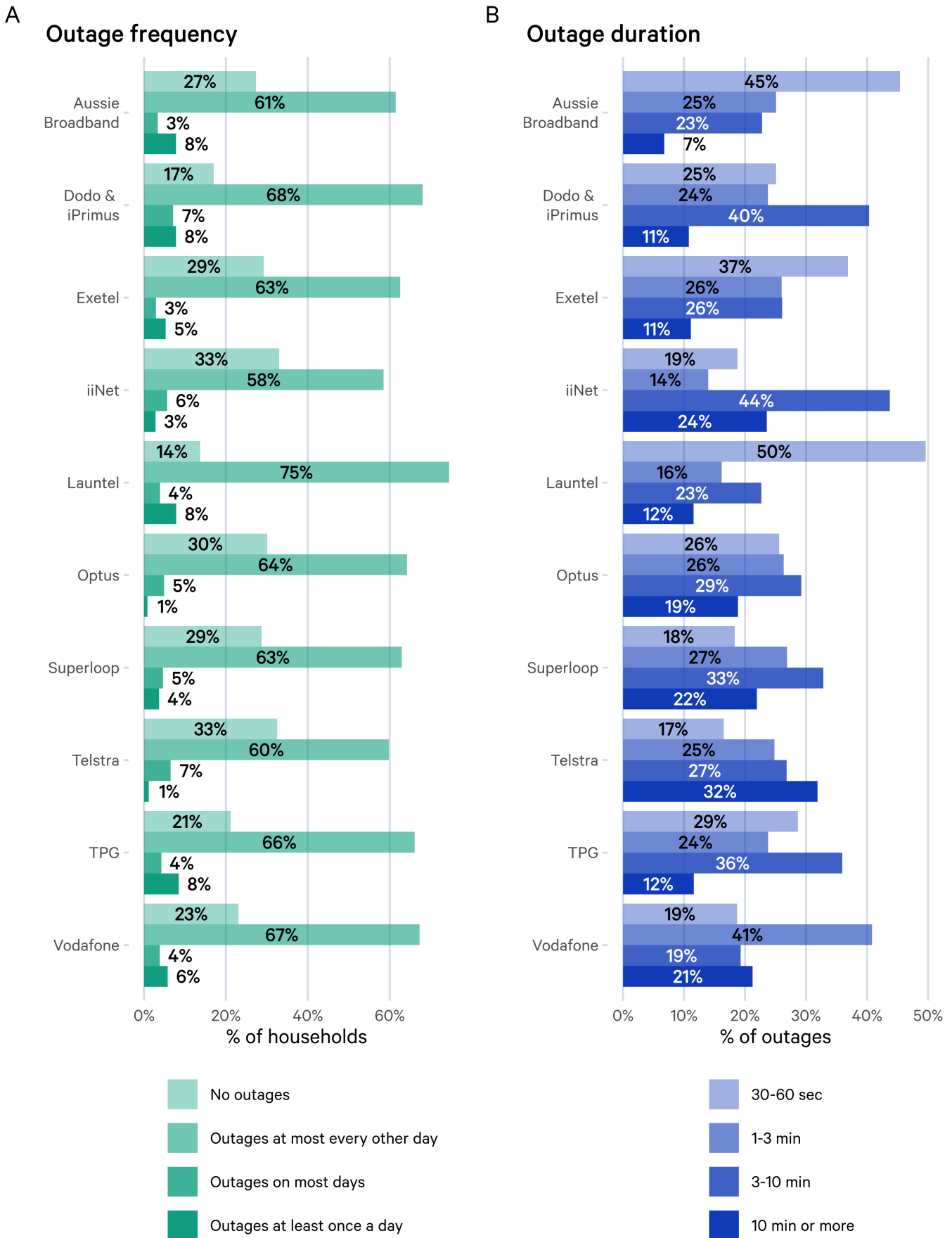
Average daily outages, latency and webpage loading results for each RSP were in line with results from previous reports, as were packet loss results across all NBN services. These results are available on the ACCC's dashboard.

Figure 7 shows the distribution of outage rates and the distribution of outage durations for each RSP. These metrics indicate respectively how often outages occurred and the severity of outages' impact on user experience.

The average daily rate of outages on NBN plans was 0.36 outages per day. 94% of households experienced fewer than 1 outage per day, and 61% of outages did not last longer than 3 minutes.

Figure 7: Outage characteristics by RSP

NBN fixed-line services. All hours.

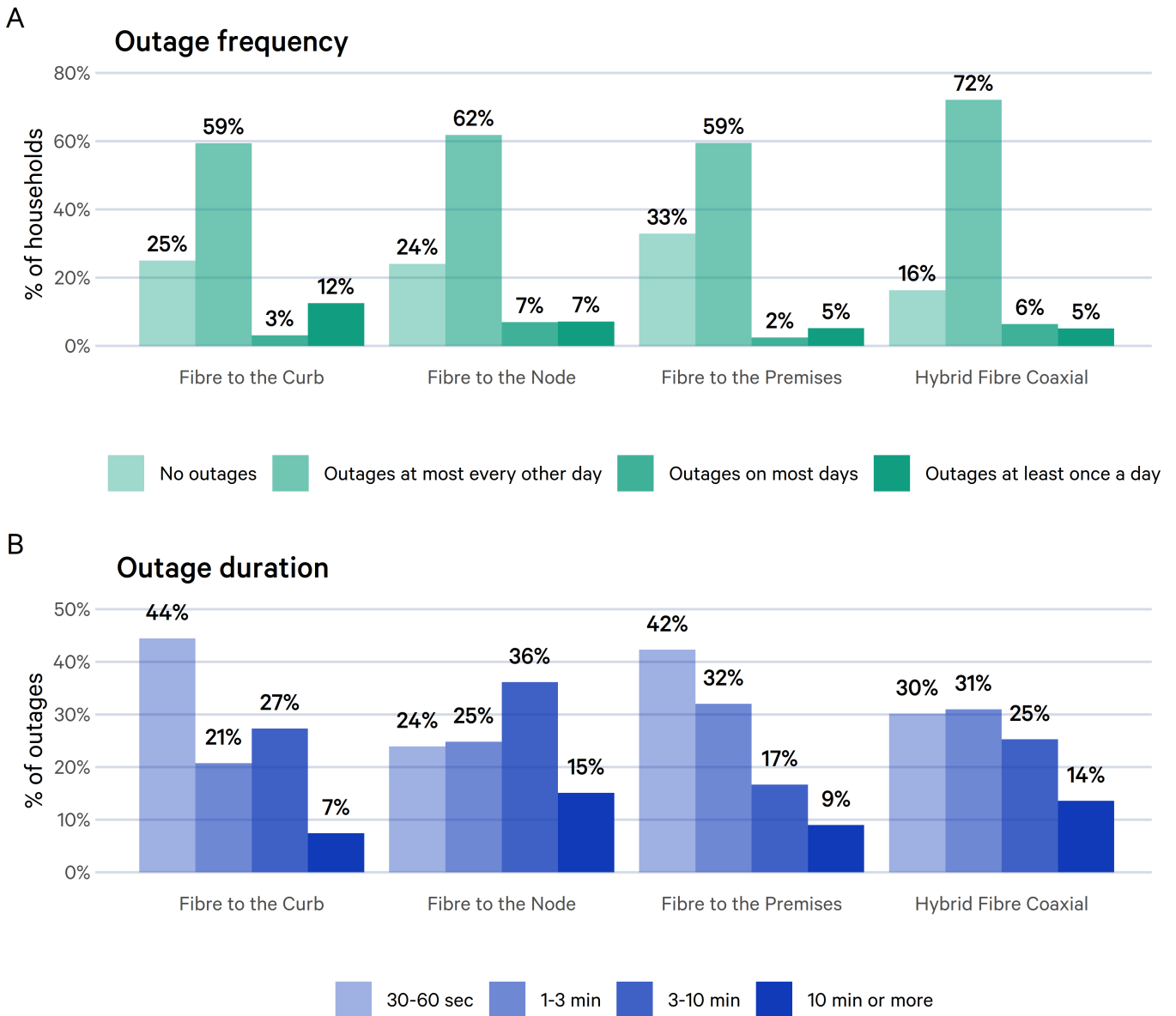


The volunteer panels of different RSPs have different access technology compositions, which may contribute to the differences between RSPs' results.

Figure 8 shows the distribution of outage rates and the distribution of outage durations for different access technologies.

Figure 8: Outage characteristics by access technology

NBN fixed-line services. All hours.



Other superfast access networks

This section presents data on 65 services on other superfast access networks on a variety of plans: 12/1 Mbps (1 unit), 25/5 Mbps (4 units), 50/20 Mbps (7 units), 100/20 Mbps (6 units), 100/40 Mbps (18 units), 250/25 Mbps (11 units), 250/100 Mbps (2 units), 400/50 Mbps (2 units) and 500/50 Mbps (14 units). The results presented are aggregated across the Uniti Group's LBNC0 and OptiComm fixed-line networks. Download and upload speeds are expressed as a percentage of plan speed.

These results are indicative only and should not be used to draw inferences about the performance of other superfast access networks.

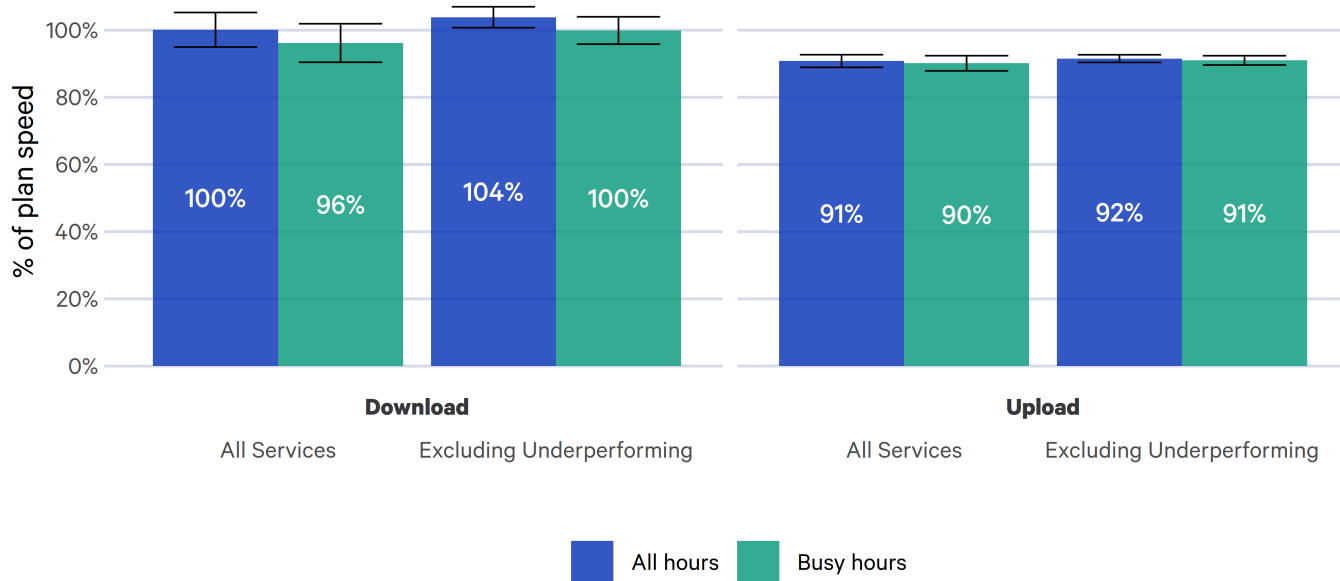
Speed test results

In September the sampled households on other superfast access networks attained an average download performance of 100% of plan speeds during all hours and 96% during the busy hours (Monday–Friday) across all services. However, when removing underperforming services, this increases to 104% of plan speeds during all hours and 100% during the busy hours.

The sampled services on other superfast access networks attained an average upload performance of 91% of plan speeds during all hours and 90% during the busy hours (Monday–Friday) across all services. When excluding underperforming services, this increases marginally to 92% of plan speeds during all hours and 91% during the busy hours (Monday–Friday).

Figure 9: Average download and upload speeds

Other superfast access networks. Error bars indicate 95% confidence intervals of the mean.



Other metrics

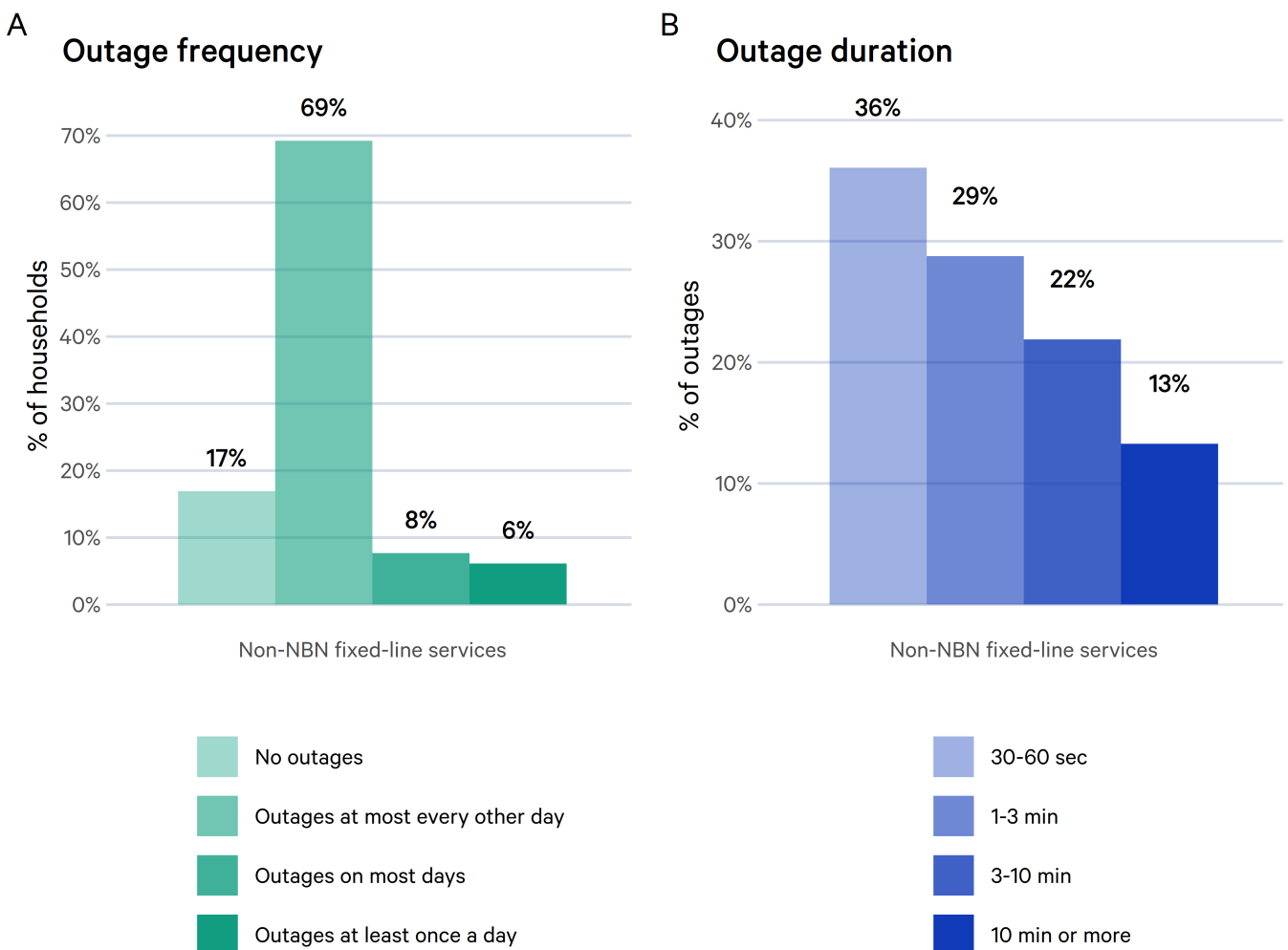
Latency, packet loss and webpage loading results were in line with results from previous reports. These results are available on the ACCC's dashboard.

Figure 10 shows the distribution of outage rates and the distribution of outage durations for other superfast access networks during all hours.

The average daily rate of outages in September on other superfast networks was 0.24 outages per day. 94% of households experienced fewer than 1 outage per day, and 65% of outages did not last longer than 3 minutes.

Figure 10: Outage characteristics

Other superfast access networks. All hours.



NBN very high speed services

This section is based on a total of 174 monitored very high speed services, across both FTTP and HFC technologies. The results include data from services where we identified that the volunteer most likely had a 100 Mbps link within the home and was unable to receive the full benefit of their high speed plan.

Unlike other NBN plans, NBN Co does not currently overprovision the download component of very high speed services. Coupled with the fact that the Whitebox connects via gigabit Ethernet to the home gateway, this means that the end-to-end link is limited to 1 Gbps. After deducting network/transport protocol overheads, the fastest speed we expect to observe on these plans is around 940 Mbps.

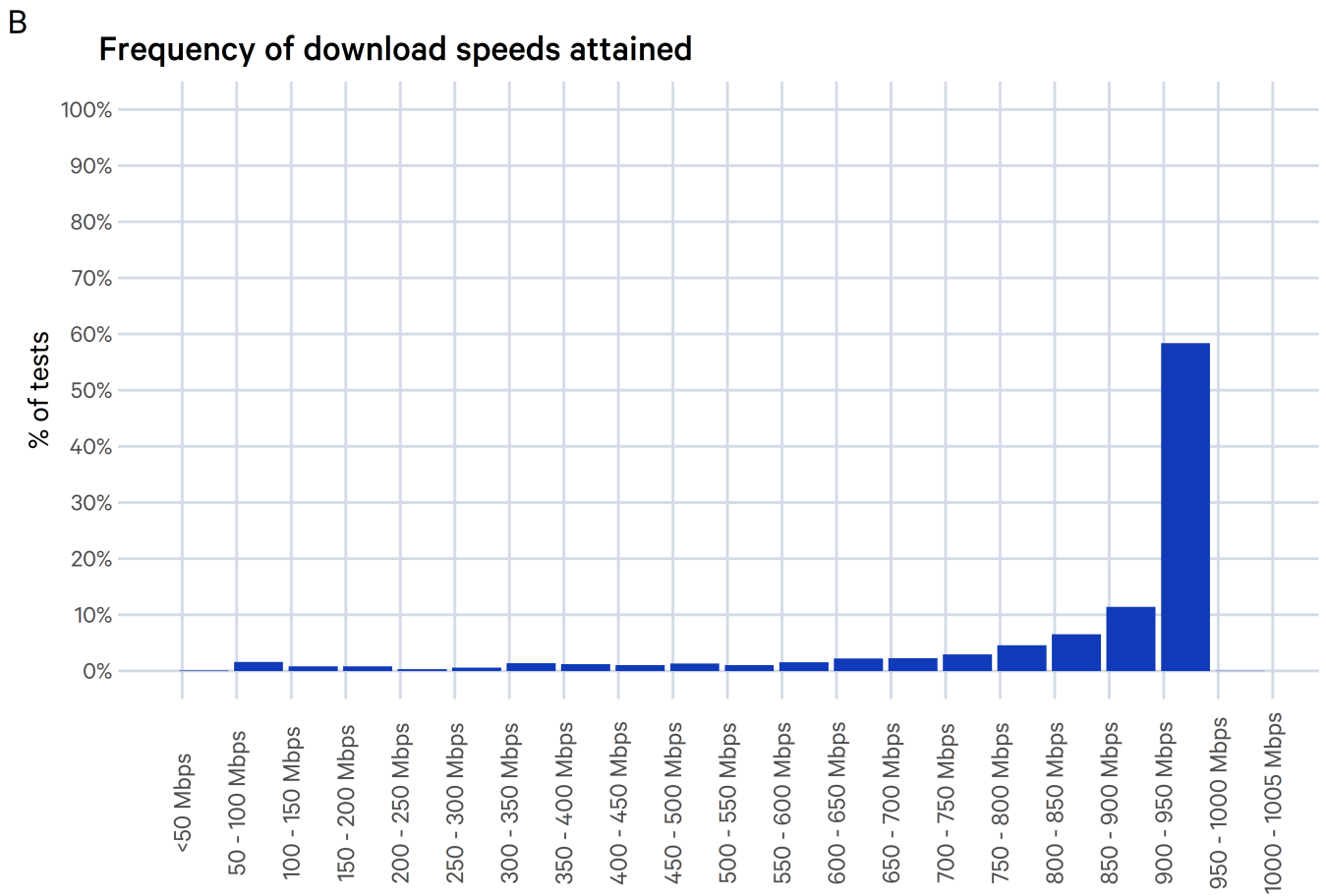
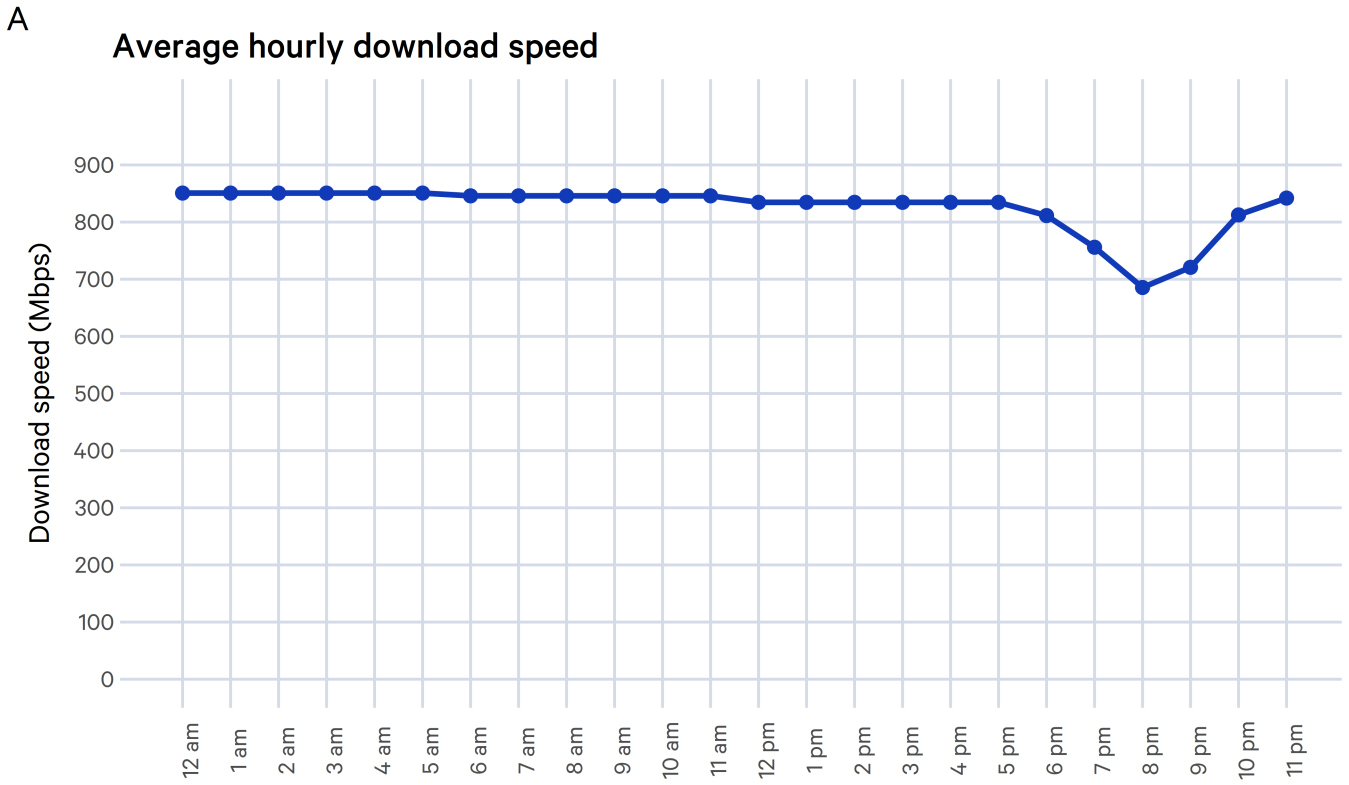
The hourly average download speeds attained by NBN very high speed services ranged across the day from 686 Mbps to 851 Mbps. Figure 11A shows that performance varied more during the busy hours and wider evening peak period. Speeds typically started to decrease during the evening, dipping to 165 Mbps below the day's maximum speed by 8 pm, and recovering later at night. This dip in speeds for very high speed services is greater than the dip observed on the other major NBN plans in previous reports, including NBN100 plans. This indicates that NBN very high speed plans are more affected by congestion during busy periods than lower speed plans.

The measured download speeds are in line with results from previous reports.

Figure 11B shows the distribution of 54,298 download speed tests performed across 174 Whiteboxes connected to very high speed services on fixed-line NBN infrastructure. Of these tests, 58.4% achieved a download speed of at least 900 Mbps.

Figure 11: Download speed test results for very high speed services

NBN very high speed services.



Other metrics

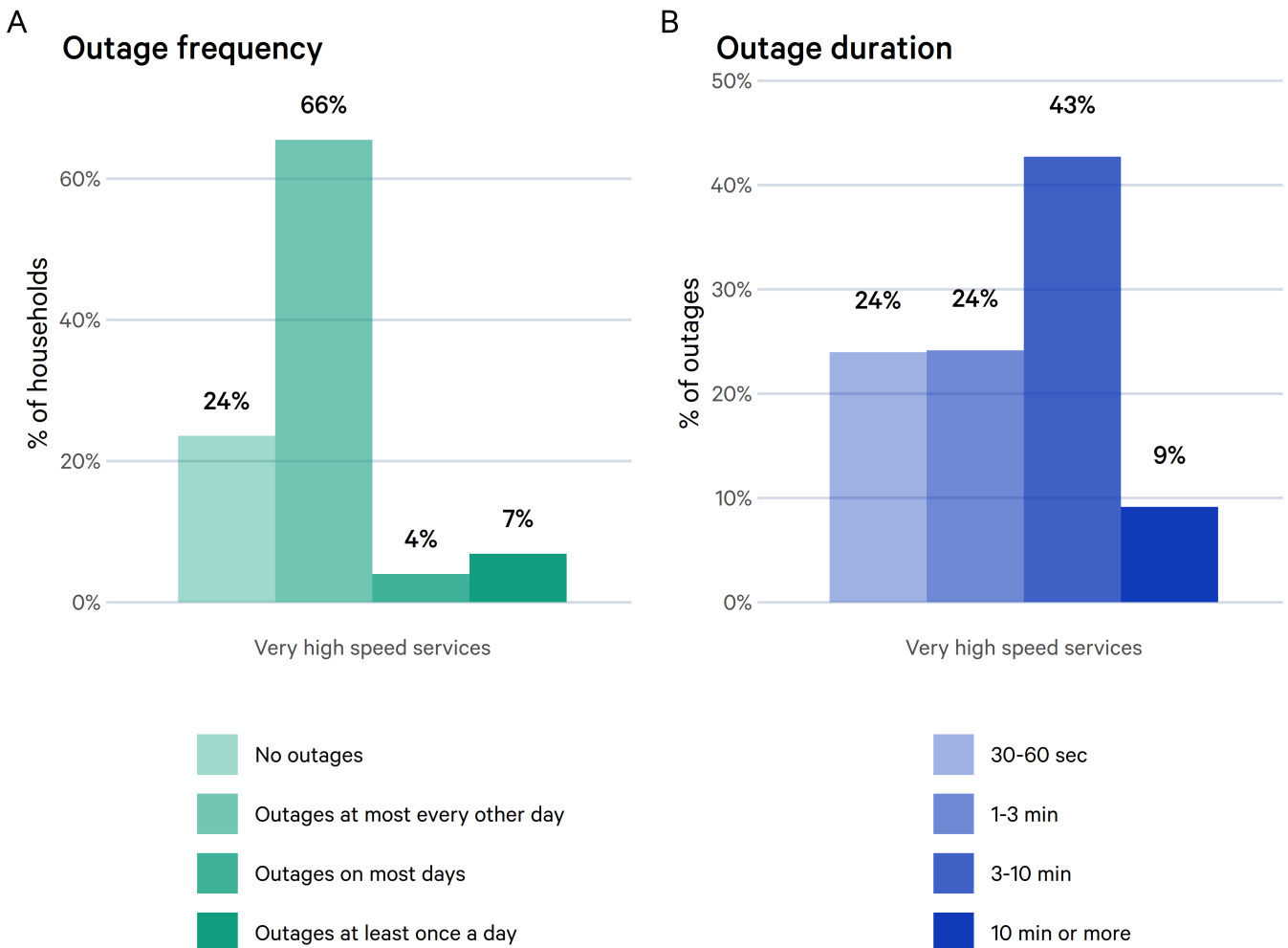
Latency, packet loss and webpage loading results were in line with results from previous reports. These results are available on the ACCC's dashboard.

Figure 12 shows the distribution of outage rates and the distribution of outage durations for very high speed services during all hours.

The average daily rate of outages in September for NBN very high speed services was 0.37 outages per day. 93% of households experienced fewer than 1 outage per day and 48% of outages did not last longer than 3 minutes.

Figure 12: Outage characteristics

NBN very high speed services. All hours.



NBN fixed wireless services

The following sections summarise key metrics from our NBN fixed wireless sample, for both the 25/5 Mbps (16 units) and Fixed Wireless Plus plans (77 units).

NBN fixed-line services and NBN fixed wireless services utilise different technologies that are not directly comparable in terms of performance.

The quality and maximum speed of a fixed wireless connection is often more variable than fixed-line technology. The following factors may affect fixed wireless performance:

- the distance of the consumer's premises to the fixed wireless tower
- whether there is a clear line of sight between the antenna on the roof of the premises and the fixed wireless tower, or if there is an obstruction (such as foliage)
- weather conditions such as extreme heat or heavy rain
- network congestion. Each fixed wireless cell has a finite amount of capacity (e.g. a certain number of megabits per second), that is shared between the households connected to that cell. Where more households in an area connect to a particular cell and/or those households increase their usage towards the limit of the cell, the cell can become congested. The impact of network congestion on the fixed wireless network is typically most noticeable during busy hours.

Speed test results

This section uses download/upload speed benchmarks of 50/10 Mbps for the Fixed Wireless Plus plan. The results of the Fixed Wireless Plus plan and the 25/5 Mbps fixed wireless plan are expressed as a percentage of plan speed.

The results in Figure 13A are based on a total of 93 NBN fixed wireless services across both the 25/5 Mbps and Fixed Wireless Plus plans.

During this period, users on NBN fixed wireless services attained an average download performance of 109.6% of plan speeds during all hours, decreasing to 89.5% during busy hours (Monday–Friday). This is in line with the results in the previous report, where average download performance was 109.7% of plan speeds during all hours and 87.5% during busy hours.

NBN fixed wireless services attained an average upload performance of 75.5% of plan speed during all hours, decreasing to 62.9% during the busy hours. In the previous report, average upload performance during all hours was 77.1% of plan speed decreasing to 63.4% during busy hours.

Figure 13B shows the variation in download and upload speeds during the day for units on the Fixed Wireless Plus plan. These results are based on a total of 77 NBN fixed wireless services on the Fixed Wireless Plus plan.

Average download speeds for the Fixed Wireless Plus plan showed considerable variation throughout the day. Speeds typically started to decrease during the evening, dipping to 24 Mbps below the day's maximum speed by 8 pm, and recovering to higher levels later at night. The average download speed for the Fixed Wireless Plus plan was 56.7 Mbps during all hours, decreasing to an average of 45.3 Mbps during busy hours (Monday-Friday). In the previous report, the average download speeds were 57 Mbps and 44.5 Mbps respectively.

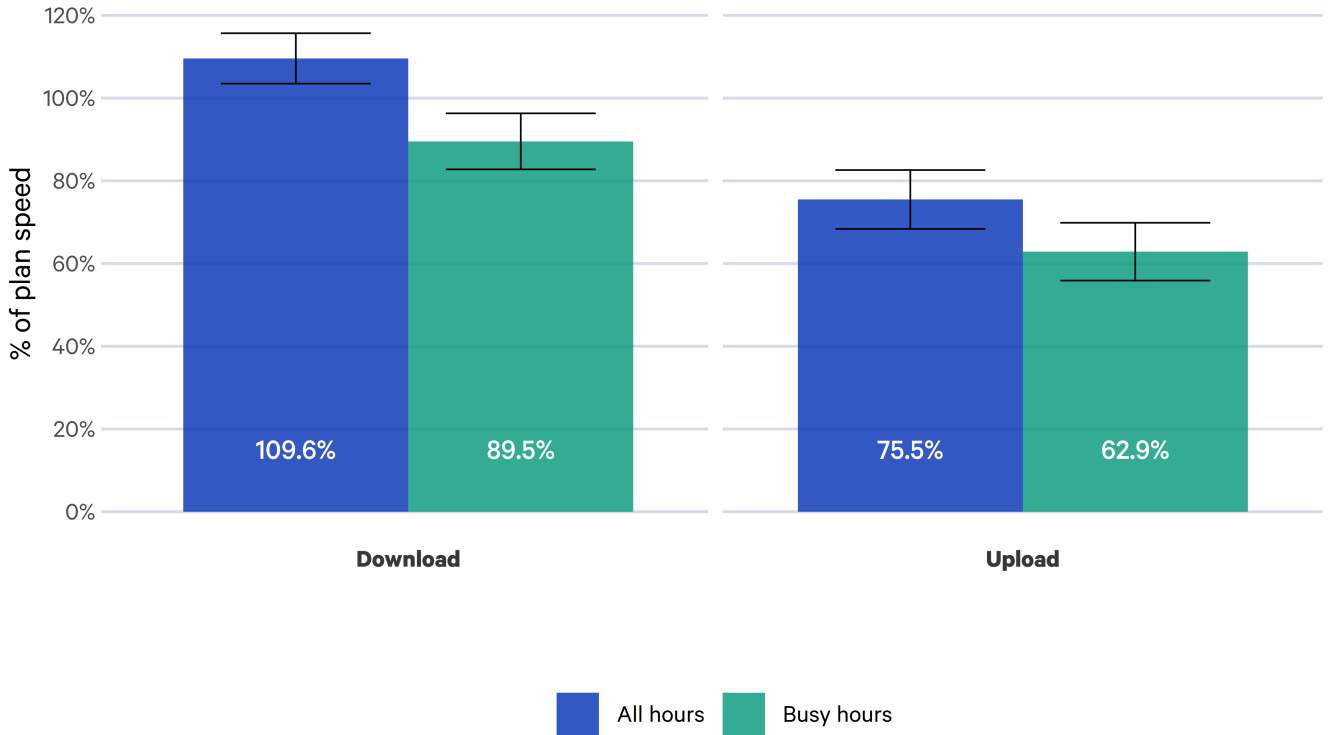
Upload speeds followed a similar pattern, recording lower values both during busy hours and during the afternoon. The average upload speed for the Fixed Wireless Plus plan was 7.4 Mbps during all hours, decreasing to an average of 6 Mbps during busy hours. In the previous report, the average upload speed was 7.6 Mbps during all hours, and 6.2 Mbps during busy hours.

Both download and upload speeds showed considerable daily variation for fixed wireless products, which is to be expected with fixed wireless products. Network congestion can affect the fixed wireless network, particularly during busy hours.

Figure 13: Speed test results for NBN fixed wireless

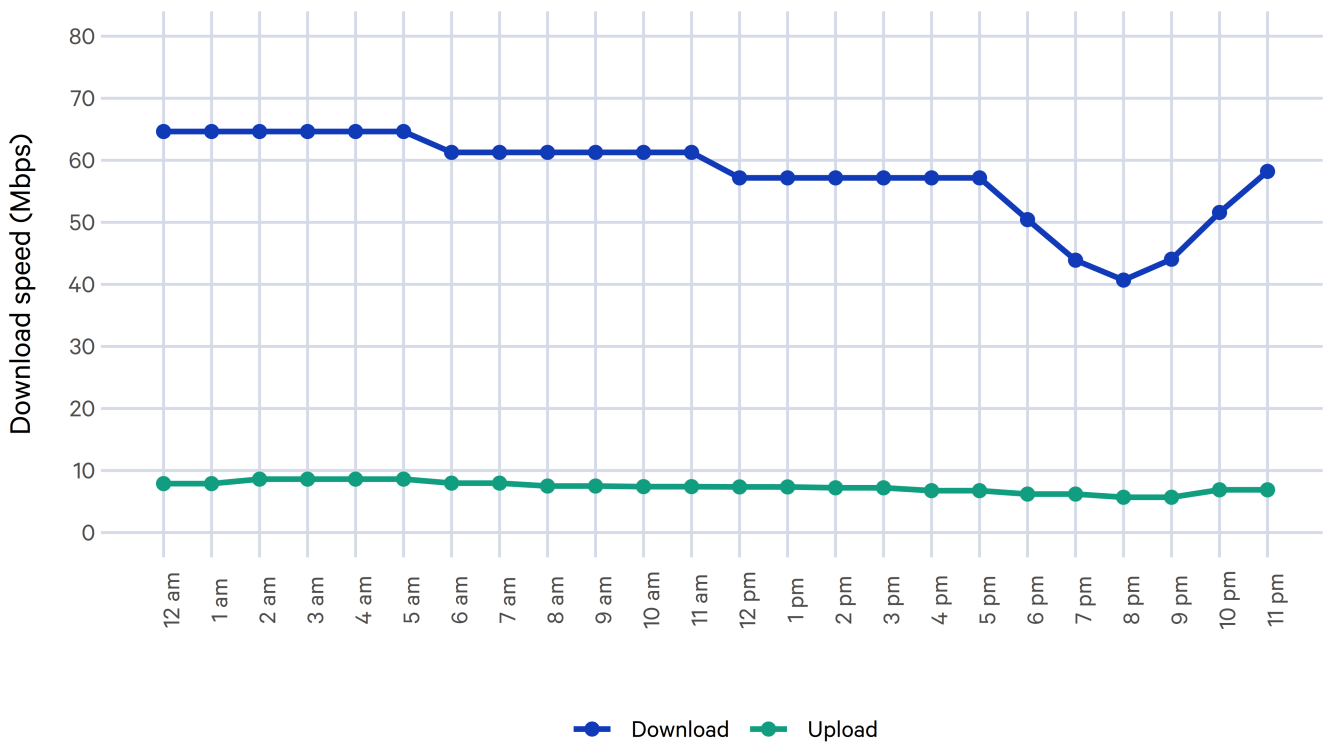
A Average download and upload performance

All fixed wireless plans. Error bars indicate 95% confidence intervals of the mean.



B Average hourly download and upload speed

Fixed Wireless Plus plan



Other metrics

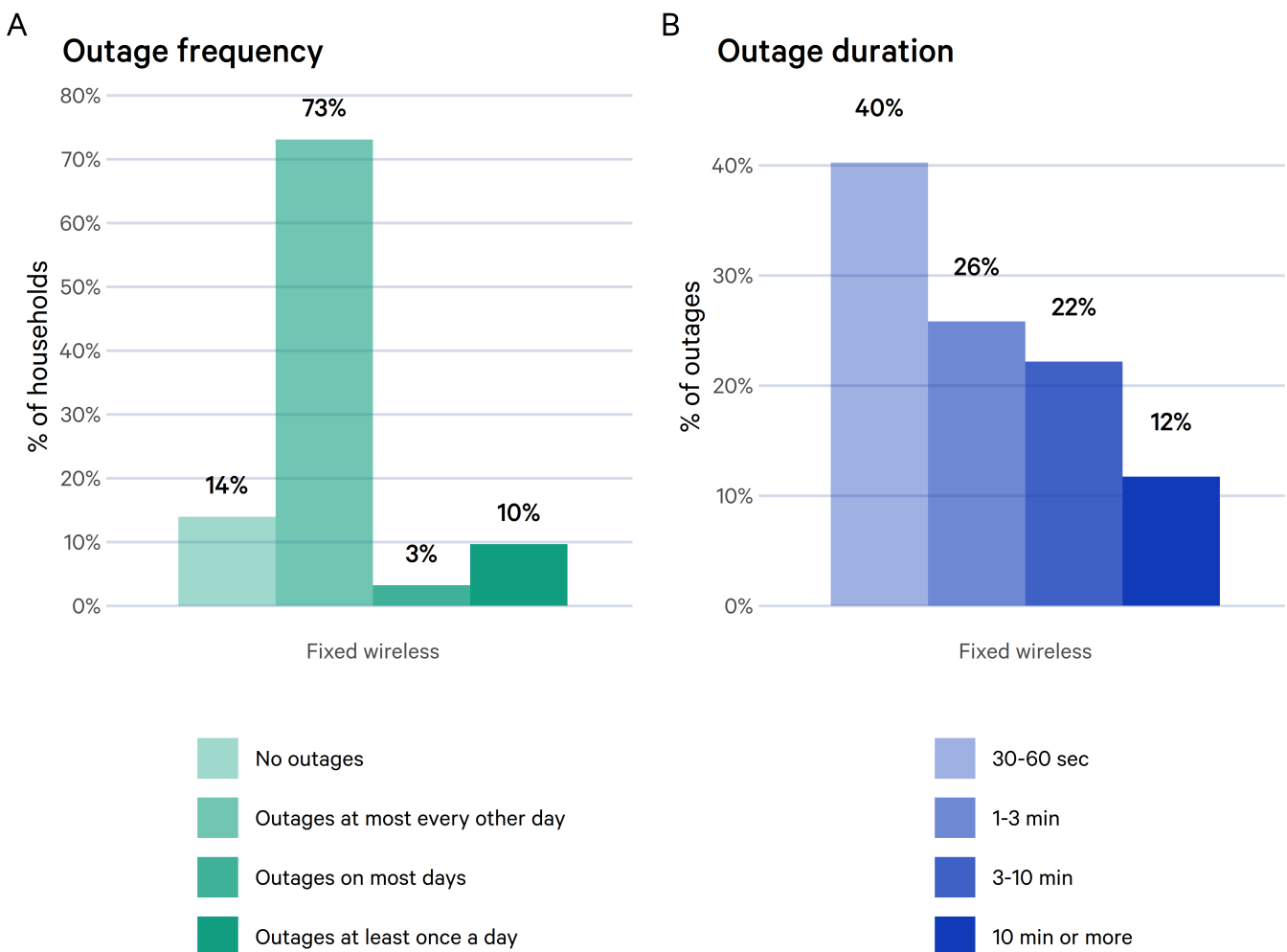
Latency, packet loss and webpage loading results were in line with results from the previous report. These results are available on the ACCC's dashboard.

Figure 14 shows the distribution of outage rates and the distribution of outage durations for fixed wireless services during all hours.

The average daily rate of outages in September for NBN fixed wireless services was 0.42 outages per day. 90% of households experienced fewer than 1 outage per day and 66% of outages did not last longer than 3 minutes.

Figure 14: Outage characteristics

NBN fixed wireless. All hours.



Performance across urban and regional areas

In this section we compare the performance of NBN fixed-line services in urban and regional areas. Addresses were classed as “urban” or “regional” based on NBN’s classification,⁴ in the same manner as in Measuring Broadband Australia Report 17.⁵ Although the classification used in this report is the same as that of Report 17, the results are not directly comparable due to changes in sampling and methodology since then.

Figures 15-18 show the download and upload performance as a percentage of plan speed for NBN fixed-line services in urban and regional areas, and Figure 19 shows the average latency measured by NBN fixed-line services in these areas. These figures include data from 1193 services in urban areas and 120 services in regional areas. The results of this analysis are presented at the network level, across all RSPs and fixed-line access technologies.

During the September 2023 measurement period, users in urban areas attained an average download performance of 100.6% of plan speed during all hours, decreasing to 99.0% during busy hours. Users in regional areas experienced a marginally lower performance at 98.5% of plan speed during all hours and 97.2% during busy hours.

When excluding underperforming services, the download performance is higher in both urban (102.5% during all hours, 100.9% during busy hours) and regional areas (101.2% during all hours, 99.9% during busy hours).

The proportion of underperforming services was 4% in urban areas, and 7% in regional areas, indicating that underperforming services were more common in regional areas. FTTN connections were twice as common among services monitored in regional areas compared to services monitored in urban areas which helps to explain the different proportions of underperforming services identified between these areas. As noted previously, FTTN connections accounted for 90% of the underperforming NBN fixed-line

⁴ An urban service is an NBN fixed-line service supplied in a population centre with 10,000 or more residents, while a regional service is an NBN fixed-line service supplied in smaller population centres. That is, the urban footprint is not limited to the metropolitan area of a capital or other large city, but also includes a number of population centres. This is a standard grouping used in the communications sector. For present purposes, it can signify a break point between areas where there could be significantly reduced civil infrastructure, or less proximity to technicians to support a high-quality supply of communications services.

⁵ MBA Report 17, June 2022, https://www.accc.gov.au/system/files/Measuring%20Broadband%20Australia%20-%20Report%2017%20-%20June%202022_0.pdf

services observed in this report. Excluding underperforming services increases the average download performance across all hours by 2.7% in regional areas, compared to a 1.9% increase in urban areas.

Figure 15: Average download performance by geography

NBN fixed-line plans. Including underperforming services. Error bars indicate 95% confidence intervals of the mean.

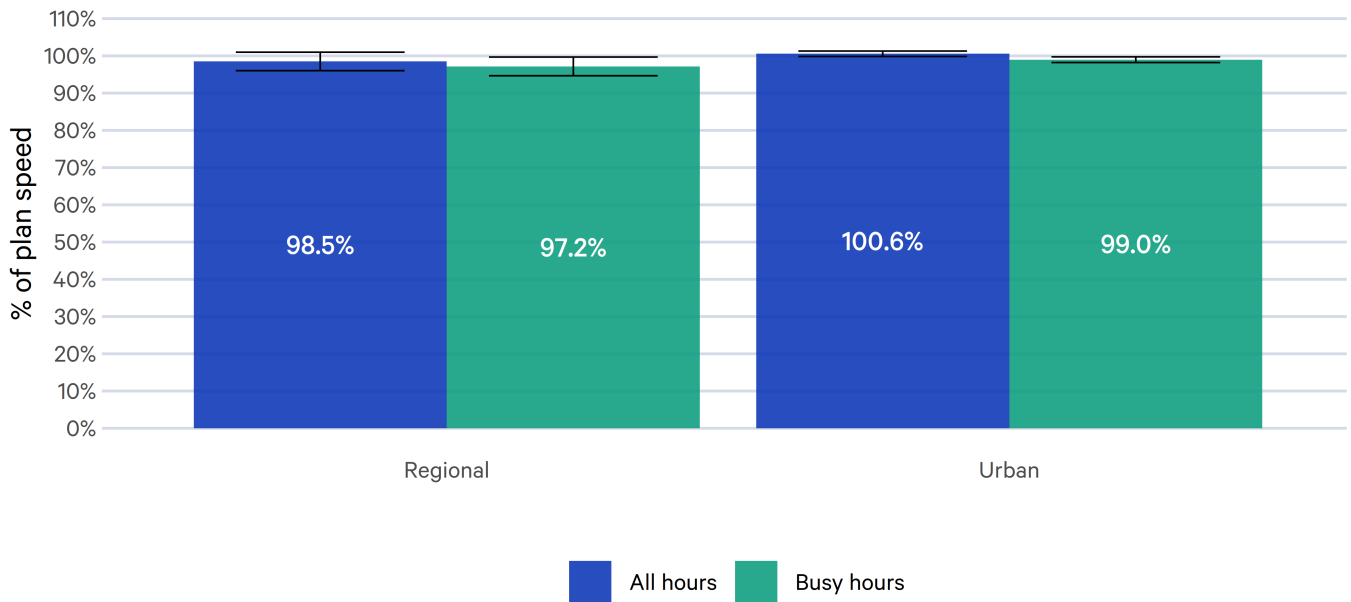
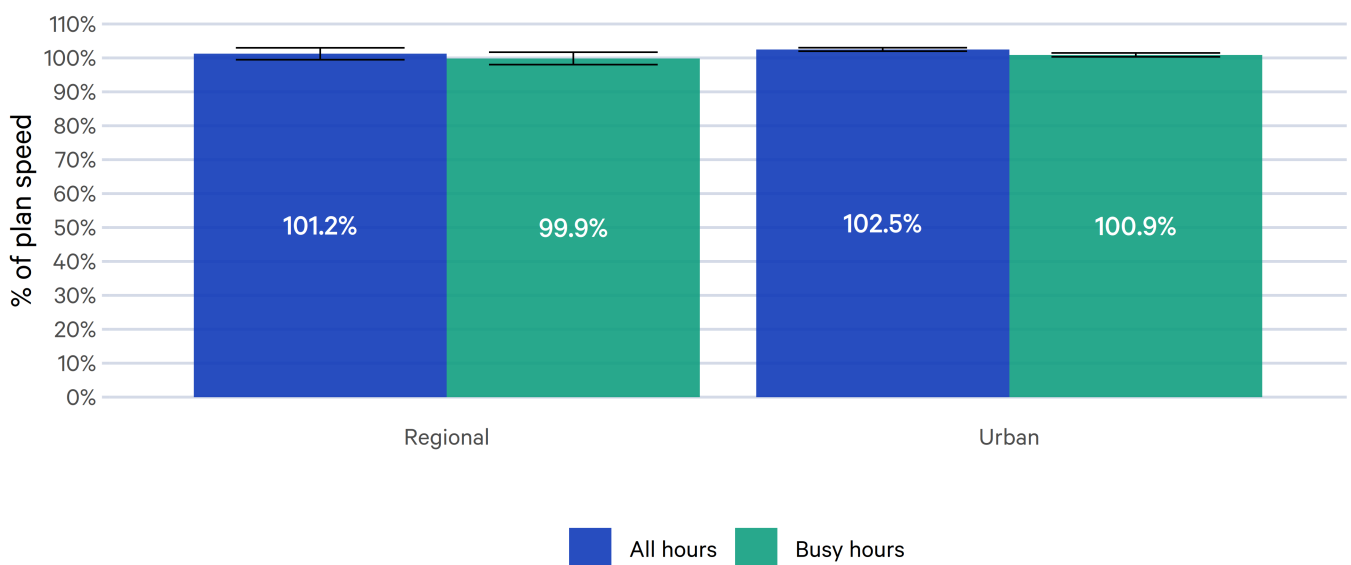


Figure 16: Average download performance by geography excluding underperforming services

NBN fixed-line plans. Error bars indicate 95% confidence intervals of the mean.



While urban services attained 88.2% of upload plan speed during all hours (87.9% during busy hours), users in regional areas attained 86.2% of plan speed during all hours (86.1% during busy hours).

When excluding underperforming services, the upload performance is higher in both urban (89.8% during all hours, 89.5% during busy hours) and regional areas (87.9% during all hours, 87.8% during busy hours).

Figure 17: Average upload performance by geography

NBN fixed-line plans. Including underperforming services. Error bars indicate 95% confidence intervals of the mean.

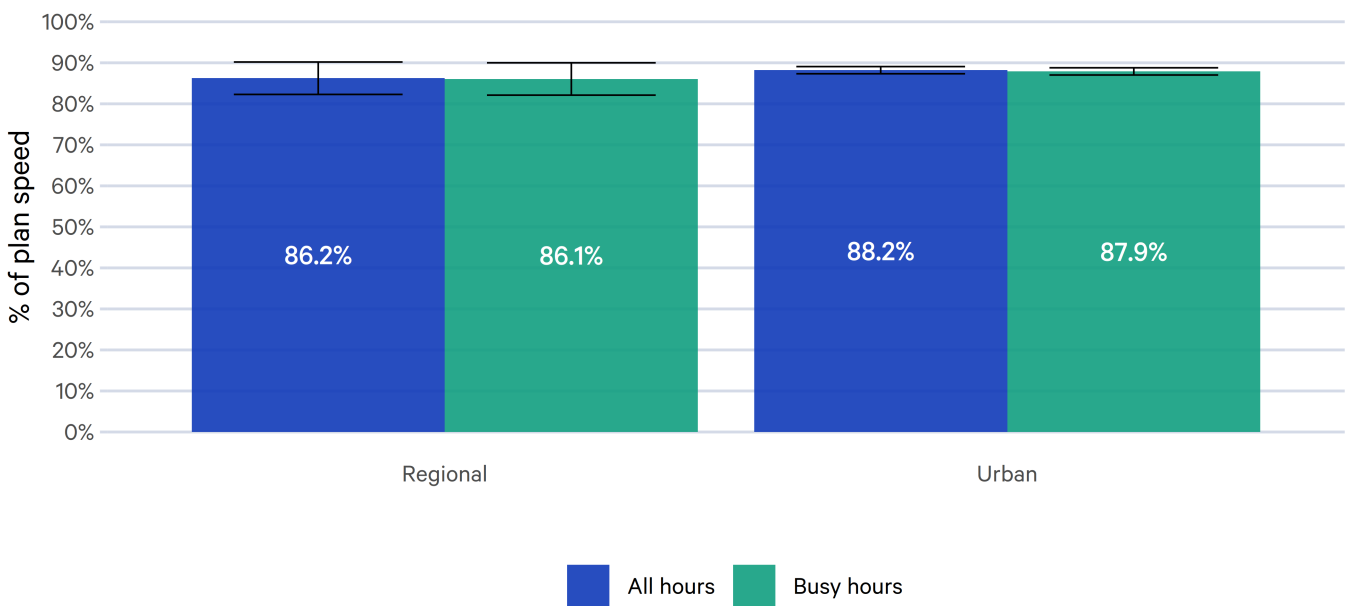
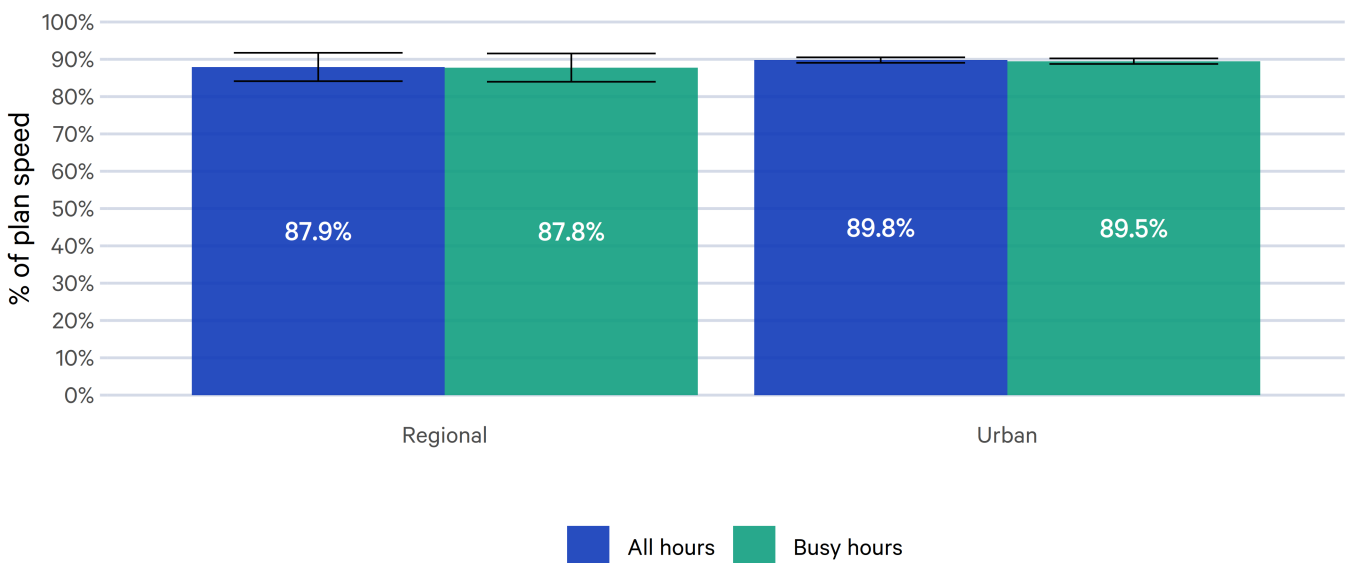


Figure 18: Average upload performance by geography excluding underperforming services

NBN fixed-line plans. Error bars indicate 95% confidence intervals of the mean.



During the September 2023 measurement period, NBN fixed-line services in urban areas measured an average latency of 10.3 ms during all hours. Services in regional areas measured a slightly higher average latency of 14.9 ms during all hours. As regional addresses are likely to be further away from test centres, higher latency is expected on average. This difference is very small and is not likely to be noticed by the end user.

Figure 19: Average latency by geography

NBN fixed-line plans. Including underperforming services. Error bars indicate 95% confidence intervals of the mean.

