



Measuring Broadband Australia



Report 17 Appendix, June 2022

NBN fixed-line services tables

NBN video streaming tables

The following tables show information on the proportion of NBN services on the main NBN fixed-line plans which would be able to reliably stream (with a low chance of stopping and starting) a varying number of videos from Netflix simultaneously during busy hours. Data from underperforming and impaired services is included.

A High Definition stream from Netflix takes up around 2.2 Mbps data rate on average. For consumers with premium Ultra High Definition (4K) video stream, an Ultra High Definition stream from Netflix takes up 12 Mbps data rate on average. The actual data rate will vary during video streaming: for example Netflix would use a higher data rate during a fast-paced action scene. The actual data rate will also depend on how many other users are using Netflix.

The Whitebox measures the total downstream data rate available from Netflix's servers. Therefore, by using multiples of 2.2 Mbps (for High Definition) and 12 Mbps (for Ultra High Definition) it allows us to infer whether a NBN fixed-line service would be able to support different numbers of simultaneous streams. This assumes no other use of the connection at the time, i.e. that Netflix is the only application running.

Download plan	1 HD (2.2 Mbps)	2 HD (4.4 Mbps)	3 HD (6.6 Mbps)	4 HD (8.8 Mbps)	5 HD (11 Mbps)	Panel size
NBN12	100%	100%	100%	100%	89%	19
NBN25	100%	100%	100%	100%	99%	101
NBN50	100%	100%	100%	100%	100%	622
NBN100	100%	100%	100%	100%	100%	404
Download plan	1 UHD (12 Mbps)	2 UHD (24 Mbps)	3 UHD (36 Mbps)	4 UHD (48 Mbps)	5 UHD (60 Mbps)	Panel size
NBN25	98%	74%	0%	0%	0%	101
NBN50	100%	98%	85%	62%	0%	622
NBN100	100%	100%	98%	95%	88%	404

RSP	Download plan	1 UHD	2 UHD	3 UHD	4 UHD	Panel size
Aussie Broadband	50	99%	95%	72%	39%	75
Dodo & iPrimus	50	100%	100%	87%	55%	48
Exetel	50	100%	100%	93%	83%	47
iiNet	50	100%	96%	86%	66%	85
Optus	50	100%	99%	97%	79%	72
Telstra	50	100%	98%	90%	72%	109
TPG	50	100%	100%	88%	74%	86
RSP	Download plan	1 UHD	2 UHD	3 UHD	4 UHD	Panel size
Aussie Broadband	100	100%	100%	97%	93%	77
iiNet	100	100%	100%	100%	93%	41
Optus	100	100%	100%	98%	98%	51
Telstra	100	100%	100%	100%	98%	58

NBN RSP tables

The following tables show statistical information on download speeds, upload speeds, and outages for each RSP across all NBN plans, and for individual NBN plans in instances where at least 40 Whiteboxes reported successfully during the test period.

- The overall speed is the average speed (download or upload) for the RSP, measured as a percentage of plan speed.
- Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set.
- The 95% confidence interval is a range in which the 'true' average value is estimated to lie and is a function of the sample size (i.e. number of Whiteboxes online) and standard deviation.
 - If the standard deviation is larger then the confidence interval will be wider, reflecting greater variability in the underlying data. If the sample size is larger then the confidence interval will be narrower, reflecting more certainty in the underlying data.
 - For example: during testing, we measured an average download performance of 98.4% of plan speed for Dodo & iPrimus across all NBN plans with a 95% confidence interval of $\pm 2.5\%$. If we were to repeat our sampling 100 times, we expect that this average would fall between 95.8% and 100.9% in at least 95 cases.

Period	RSP	Download average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Aussie Broadband	95.8%	14.7%	93.8% - 97.8%	201	37,688
All hours	Dodo & iPrimus	98.4%	11.8%	95.8% - 100.9%	84	16,410
All hours	Exetel	103.4%	9.9%	101.1% - 105.7%	70	13,568
All hours	iiNet	95.7%	16.3%	93.2% - 98.3%	157	31,231
All hours	Launtel	100.2%	13.3%	96.5% - 104.0%	49	8,397
All hours	MyRepublic	92.5%	13.8%	88.8% - 96.3%	52	9,683
All hours	Optus	100.7%	14.3%	98.3% - 103.1%	136	25,331
All hours	Telstra	99.3%	15.8%	97.1% - 101.5%	197	39,895
All hours	TPG	98.9%	13.5%	96.8% - 101.0%	163	28,635
All hours	Superloop	95.6%	12.6%	92.7% - 98.5%	70	12,544
All hours	Vodafone	96.6%	16.2%	92.0% - 101.1%	49	8,349

Period	RSP	Download average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Aussie Broadband	94.8%	15.0%	92.8% - 96.9%	201	11,306
Busy hours	Dodo & iPrimus	97.1%	12.4%	94.5% - 99.8%	83	4,925
Busy hours	Exetel	102.4%	9.9%	100.1% - 104.7%	70	4,053
Busy hours	iiNet	94.8%	16.3%	92.3% - 97.4%	157	9,337
Busy hours	Launtel	98.7%	13.3%	95.0% - 102.4%	49	2,542
Busy hours	MyRepublic	84.4%	16.3%	79.9% - 88.8%	52	2,860
Busy hours	Optus	99.6%	14.3%	97.1% - 102.0%	136	7,338
Busy hours	Telstra	98.1%	15.8%	95.9% - 100.3%	197	11,980
Busy hours	TPG	97.9%	13.6%	95.9% - 100.0%	163	8,624
Busy hours	Superloop	94.3%	12.6%	91.4% - 97.3%	69	3,647
Busy hours	Vodafone	95.1%	16.5%	90.5% - 99.7%	49	2,459

Period	RSP	Upload average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Aussie Broadband	82.7%	18.7%	80.1% - 85.3%	201	52,544
All hours	Dodo & iPrimus	86.2%	14.6%	83.1% - 89.3%	84	22,755
All hours	Exetel	88.6%	14.2%	85.3% - 91.9%	70	18,807
All hours	iiNet	83.0%	19.7%	79.9% - 86.1%	157	43,599
All hours	Launtel	87.8%	9.0%	85.3% - 90.3%	49	11,716
All hours	MyRepublic	85.3%	18.0%	80.4% - 90.2%	52	13,724
All hours	Optus	86.2%	15.6%	83.5% - 88.8%	136	36,125
All hours	Telstra	85.5%	17.7%	83.0% - 88.0%	197	54,850
All hours	TPG	82.3%	21.4%	79.0% - 85.6%	163	40,600
All hours	Superloop	85.8%	15.0%	82.3% - 89.3%	70	17,734
All hours	Vodafone	86.0%	17.2%	81.1% - 90.8%	49	11,593

Period	RSP	Upload average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Aussie Broadband	82.3%	18.9%	79.7% - 85.0%	200	5,715
Busy hours	Dodo & iPrimus	86.1%	14.7%	82.9% - 89.2%	83	2,489
Busy hours	Exetel	88.4%	14.2%	85.1% - 91.8%	70	2,118
Busy hours	iiNet	82.9%	19.7%	79.8% - 85.9%	157	4,799
Busy hours	Launtel	87.5%	9.0%	85.0% - 90.0%	49	1,265
Busy hours	MyRepublic	84.1%	17.7%	79.3% - 88.9%	52	1,451
Busy hours	Optus	85.8%	15.6%	83.2% - 88.4%	136	3,737
Busy hours	Telstra	84.9%	17.6%	82.4% - 87.3%	197	6,094
Busy hours	TPG	82.0%	21.5%	78.7% - 85.3%	162	4,365
Busy hours	Superloop	84.9%	15.9%	81.2% - 88.7%	69	1,895
Busy hours	Vodafone	85.3%	17.5%	80.4% - 90.2%	49	1,281

Period	RSP	Download plan	Download average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Aussie Broadband	50	94.2%	16.6%	90.5% - 98.0%	75	14,665
All hours	Aussie Broadband	100	96.3%	12.7%	93.4% - 99.1%	77	13,888
All hours	Dodo & iPrimus	50	97.6%	13.7%	93.8% - 101.5%	48	9,419
All hours	Exetel	50	103.5%	11.0%	100.4% - 106.6%	48	9,300
All hours	iiNet	50	96.2%	16.9%	92.7% - 99.8%	85	17,180
All hours	iiNet	100	90.5%	17.9%	85.2% - 95.9%	43	7,918
All hours	Optus	50	101.6%	12.5%	98.7% - 104.5%	72	13,518
All hours	Optus	100	97.5%	17.4%	92.7% - 102.2%	51	9,526
All hours	Telstra	50	99.1%	16.2%	96.0% - 102.1%	110	22,714
All hours	Telstra	100	98.4%	14.0%	94.8% - 102.0%	58	11,093
All hours	TPG	50	98.8%	14.1%	95.8% - 101.7%	88	15,583

Period	RSP	Download plan	Download average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Aussie Broadband	50	93.6%	16.6%	89.8% - 97.4%	75	4,406
Busy hours	Aussie Broadband	100	95.4%	13.0%	92.5% - 98.3%	77	4,176
Busy hours	Dodo & iPrimus	50	96.5%	14.2%	92.5% - 100.6%	47	2,867
Busy hours	Exetel	50	102.6%	10.9%	99.5% - 105.7%	48	2,759
Busy hours	iiNet	50	95.4%	16.9%	91.8% - 99.0%	85	5,052
Busy hours	iiNet	100	89.5%	17.8%	84.2% - 94.9%	43	2,399
Busy hours	Optus	50	100.5%	12.6%	97.6% - 103.4%	72	3,930
Busy hours	Optus	100	96.5%	17.5%	91.7% - 101.3%	51	2,735
Busy hours	Telstra	50	97.9%	16.1%	94.9% - 101.0%	110	6,816
Busy hours	Telstra	100	96.7%	14.0%	93.1% - 100.3%	58	3,301
Busy hours	TPG	50	98.0%	14.0%	95.0% - 100.9%	88	4,643

Period	RSP	Upload plan	Upload average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Aussie Broadband	20	82.4%	19.7%	78.8% - 86.0%	117	31,609
All hours	Aussie Broadband	40	88.6%	9.3%	85.8% - 91.3%	45	10,834
All hours	Dodo & iPrimus	20	84.6%	16.0%	80.6% - 88.7%	60	16,566
All hours	Exetel	20	86.7%	16.5%	82.1% - 91.3%	49	13,182
All hours	iiNet	20	80.1%	22.1%	75.6% - 84.5%	96	26,792
All hours	Optus	20	85.5%	17.2%	81.8% - 89.2%	83	21,940
All hours	Optus	40	86.7%	14.4%	82.2% - 91.1%	40	10,914
All hours	Telstra	20	84.4%	19.1%	81.4% - 87.5%	152	42,774
All hours	TPG	20	80.3%	22.8%	75.8% - 84.8%	97	23,868

Period	RSP	Upload plan	Upload average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Aussie Broadband	20	82.1%	19.7%	78.5% - 85.7%	117	3,426
Busy hours	Aussie Broadband	40	88.0%	9.3%	85.3% - 90.7%	45	1,159
Busy hours	Dodo & iPrimus	20	84.4%	16.1%	80.3% - 88.5%	59	1,831
Busy hours	Exetel	20	86.5%	16.6%	81.9% - 91.2%	49	1,484
Busy hours	iiNet	20	79.9%	22.1%	75.5% - 84.3%	96	2,888
Busy hours	Optus	20	85.1%	17.2%	81.4% - 88.8%	83	2,299
Busy hours	Optus	40	86.4%	14.3%	81.9% - 90.8%	40	1,108
Busy hours	Telstra	20	83.8%	18.9%	80.8% - 86.8%	152	4,677
Busy hours	TPG	20	80.3%	22.6%	75.8% - 84.8%	97	2,522

RSP	Average daily outages lasting longer than 30 seconds	Standard deviation	95% confidence interval of the mean	Panel size
Aussie Broadband	0.42	1.25	0.25 - 0.60	201
Dodo & iPrimus	0.64	2.44	0.12 - 1.17	84
Exetel	0.20	0.46	0.09 - 0.30	70
iiNet	0.16	0.41	0.10 - 0.23	157
Launtel	0.50	1.30	0.13 - 0.86	49
MyRepublic	0.43	0.53	0.29 - 0.57	52
Optus	0.36	1.83	0.05 - 0.67	136
Telstra	0.22	0.44	0.16 - 0.29	197
TPG	0.18	0.38	0.12 - 0.24	162
Superloop	0.63	1.75	0.22 - 1.04	70
Vodafone	0.45	1.55	0.01 - 0.88	49

RSP	Percentage of outages lasting 30-60 sec	Percentage of outages lasting 1-3 min	Percentage of outages lasting 3-10 min	Percentage of outages lasting 10 min or more
Aussie Broadband	23.2%	35.6%	30.4%	10.8%
Dodo & iPrimus	32.6%	19.7%	20.4%	27.3%
Exetel	18.5%	29.8%	31.9%	19.8%
iiNet	23.8%	28.7%	35.5%	12.0%
Launtel	32.7%	39.3%	22.2%	5.8%
MyRepublic	26.8%	31.6%	23.7%	17.8%
Optus	30.6%	29.9%	28.5%	11.0%
Superloop	20.4%	22.1%	31.1%	26.4%
Telstra	15.7%	20.6%	22.2%	41.4%
TPG	20.5%	41.3%	24.1%	14.1%
Vodafone	40.7%	27.9%	12.6%	18.8%

NBN plan tables

The following tables show statistical information on download and upload speeds for each NBN plan, including all tested RSPs.

- The overall speed is the average speed (download or upload) for the particular NBN plan, measured as a percentage of plan speed.
- Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set.
- The 95% confidence interval is a range in which the ‘true’ average value is estimated to lie.
 - For example: during testing, we measured an average download performance of 95.8% of plan speed for users subscribed to 100Mbps NBN fixed-line plans with a 95% confidence interval of $\pm 1.4\%$. If we were to repeat our sampling 100 times, we expect that this average would fall between 94.4% and 97.2% in at least 95 cases.

For the 12 Mbps plan, the sample size is considered low and results are indicative only.

Period	Download plan	Download average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	12	101.7%	5.5%	99.2% - 104.2%	19	3,552
All hours	25	101.5%	11.3%	99.4% - 103.7%	104	20,759
All hours	50	98.3%	15.0%	97.1% - 99.4%	630	121,481
All hours	100	95.8%	14.5%	94.4% - 97.2%	410	74,104
All hours	250	100.2%	14.3%	97.1% - 103.3%	81	14,657

Period	Download plan	Download average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	12	100.8%	5.4%	98.4% - 103.3%	19	1,095
Busy hours	25	100.3%	12.0%	98.0% - 102.6%	104	6,283
Busy hours	50	97.1%	15.0%	95.9% - 98.3%	629	36,110
Busy hours	100	94.2%	15.1%	92.8% - 95.7%	409	21,988
Busy hours	250	97.8%	15.5%	94.4% - 101.2%	81	4,395

Period	Upload plan	Upload average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	1	94.9%	10.7%	90.1% - 99.7%	19	4,998
All hours	5	88.8%	14.4%	85.3% - 92.4%	64	17,932
All hours	20	83.5%	19.4%	82.1% - 84.8%	807	215,348
All hours	40	86.6%	14.0%	84.8% - 88.3%	243	61,197

Period	Upload plan	Upload average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	1	94.3%	11.2%	89.3% - 99.3%	19	553
Busy hours	5	88.7%	14.4%	85.1% - 92.2%	64	2,043
Busy hours	20	83.1%	19.3%	81.8% - 84.4%	805	23,223
Busy hours	40	85.8%	14.5%	84.0% - 87.6%	242	6,592

NBN technology tables

The following tables show statistical information on download speeds, upload speeds, and outages on a per-technology basis.

- The overall speed is the average speed (download or upload) for the technology type, measured as a percentage of the plan speed for each subscriber.
- Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set.
- The 95% confidence interval is a range in which the ‘true’ average value is estimated to lie.
 - For example: during testing, we measured an average download performance of 103.3% of plan speed for fibre to the premises NBN fixed-line services with a 95% confidence interval of $\pm 1.1\%$. If we were to repeat our sampling 100 times, we expect that this average would fall between 102.2% and 104.3% (rounded to 1 decimal place) in at least 95 cases.

Period	Technology	Download average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Fibre to the premises - FTTP	103.3%	9.6%	102.2% - 104.3%	309	57,361
All hours	Fibre to the curb - FTTC	100.6%	9.1%	98.9% - 102.2%	116	20,794
All hours	Hybrid fibre-coaxial - HFC	103.1%	8.4%	102.1% - 104.1%	266	48,538
All hours	Fibre to the node - FTTN	92.1%	17.4%	90.7% - 93.5%	576	112,008

Period	Technology	Download average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Fibre to the premises - FTTP	101.7%	10.7%	100.5% - 102.9%	309	17,140
Busy hours	Fibre to the curb - FTTC	99.5%	9.6%	97.8% - 101.3%	116	6,180
Busy hours	Hybrid fibre-coaxial - HFC	101.4%	9.6%	100.3% - 102.6%	265	14,472
Busy hours	Fibre to the node - FTTN	90.9%	17.5%	89.4% - 92.3%	575	33,315

Period	Technology	Upload average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Fibre to the premises - FTTP	91.3%	7.5%	90.5% - 92.1%	309	80,672
All hours	Fibre to the curb - FTTC	90.9%	6.6%	89.7% - 92.1%	116	29,226
All hours	Hybrid fibre-coaxial - HFC	90.4%	9.6%	89.3% - 91.6%	266	68,011
All hours	Fibre to the node - FTTN	77.3%	22.8%	75.5% - 79.2%	576	156,029

Period	Technology	Upload average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Fibre to the premises - FTTP	91.0%	7.7%	90.1% - 91.8%	308	8,763
Busy hours	Fibre to the curb - FTTC	90.6%	6.8%	89.3% - 91.8%	116	3,135
Busy hours	Hybrid fibre-coaxial - HFC	89.7%	10.2%	88.4% - 90.9%	265	7,370
Busy hours	Fibre to the node - FTTN	77.0%	22.8%	75.1% - 78.9%	574	16,962

Technology	Average daily outages lasting longer than 30 seconds	Standard deviation	95% confidence interval of the mean	Panel size
Fibre to the premises - FTTP	0.18	0.82	0.092 - 0.28	308
Fibre to the curb - FTTC	0.39	1.29	0.159 - 0.63	116
Hybrid fibre-coaxial - HFC	0.56	1.89	0.335 - 0.79	266
Fibre to the node - FTTN	0.31	0.90	0.236 - 0.38	576

Technology	Percentage of outages lasting 30-60 sec	Percentage of outages lasting 1-3 min	Percentage of outages lasting 3-10 min	Percentage of outages lasting 10 min or more
Fibre to the curb - FTTC	36.5%	26.5%	20.0%	16.9%
Fibre to the node - FTTN	16.3%	28.7%	33.1%	21.9%
Fibre to the premises - FTTP	30.8%	28.4%	24.6%	16.1%
Hybrid fibre-coaxial - HFC	31.6%	31.1%	20.7%	16.6%

NBN state tables

This table shows statistical information on download speeds on a per-state basis. In this report, we have been able to draw upon all of the test results from a range of locations.

- The overall speed is the average speed (download or upload) for the state, measured as a percentage of the plan speed for each panellist.
- Standard deviation is a measure of how widely or narrowly test speeds are distributed in the data set.
- The 95% confidence interval is a range in which the ‘true’ average value is estimated to lie.
 - For example: during testing, we measured an average download performance of 93.9% of plan speed for NBN fixed-line services in WA, with a 95% confidence interval of $\pm 3.4\%$. If we were to repeat our sampling 100 times, we expect that this average would fall between 90.5% and 97.3% (rounded to 1 decimal place) in at least 95 cases.

Period	State or Territory	Download average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	NSW	99.1%	13.7%	97.8% - 100.4%	406	77,076
All hours	ACT	94.7%	16.6%	90.7% - 98.7%	67	12,630
All hours	VIC	98.1%	14.4%	96.6% - 99.7%	343	64,197
All hours	QLD	97.3%	13.9%	95.4% - 99.2%	205	37,807
All hours	WA	93.9%	18.0%	90.5% - 97.3%	108	20,554
All hours	TAS	99.0%	14.9%	95.2% - 102.8%	59	11,452
All hours	NT + SA	99.7%	12.4%	97.0% - 102.5%	79	14,985

NBN50 and NBN100 advertised speed tables

The figures in the following table are based on the typical evening hour speeds that were the predominant speed advertised by RSPs during the measurement period. The single weighted average speed claim is calculated based on the number of Whiteboxes online for each RSP for each plan (excluding underperforming and impaired services).

RSP	NBN50 advertised % of plan speed	NBN100 advertised % of plan speed	Number of NBN50 Whiteboxes (excluding underperforming and impaired services)	Number of NBN100 Whiteboxes (excluding underperforming and impaired services)	Weighted advertised % of plan speed
Aussie Broadband	96.0%	97.0%	52	65	96.6%
Dodo & iPrimus	100.0%	92.0%	40	17	97.6%
Exetel	96.0%	97.0%	44	14	96.2%
iiNet	100.0%	90.0%	67	33	96.7%
MyRepublic	100.0%	93.0%	19	22	96.2%
Optus	100.0%	100.0%	61	42	100.0%
Superloop	96.0%	93.0%	16	32	94.0%
Telstra	100.0%	100.0%	86	50	100.0%
TPG	100.0%	90.0%	76	28	97.3%
Vodafone	100.0%	90.0%	21	19	95.2%

There were 112 busy hours across the 28 day period from 1st February 2022 to 28th February 2022. The following table shows the proportion of busy hours in which each RSP's average speed for each plan met the advertised claims above.

RSP	% of busy hours in which advertised download speed met or exceeded	% of busy hours in which advertised download speed met or exceeded (excluding underperforming and impaired services)
Aussie Broadband	16%	99%
Dodo & iPrimus	50%	95%
Exetel	96%	98%
iiNet	35%	99%
Launtel	73%	91%
MyRepublic	4%	20%
Optus	36%	100%
Superloop	71%	91%
Telstra	5%	92%
TPG	48%	100%
Vodafone	63%	85%

NBN Whiteboxes connected to underperforming services

The following table shows the number of Whiteboxes on NBN services for each RSP, alongside the number of Whiteboxes connected to underperforming services.

RSP	NBN Whiteboxes	NBN Whiteboxes on underperforming services	% NBN Whiteboxes on underperforming services
Aussie Broadband	201	17	8%
Dodo & iPrimus	84	4	5%
Exetel	70	2	3%
iiNet	157	15	10%
Launtel	49	2	4%
MyRepublic	52	4	8%
Optus	136	8	6%
Other RSPs	39	2	5%
Superloop	70	5	7%
Telstra	197	16	8%
TPG	163	12	7%
Vodafone	49	3	6%
Total	1,267	90	7%

As highlighted earlier in the report, the majority of underperforming services are connected to fibre to the node infrastructure. The following table shows the number of Whiteboxes on fibre to the node services for each plan, alongside the number of underperforming services.

Technology	Plan	NBN Whiteboxes	NBN Whiteboxes on underperforming services	% NBN Whiteboxes on underperforming services
Fibre to the node - FTTN	12	10	0	0%
Fibre to the node - FTTN	25	68	2	3%
Fibre to the node - FTTN	50	360	52	14%
Fibre to the node - FTTN	100	131	27	21%
Fibre to the node - FTTN	Other NBN plans	7	0	0%
Fibre to the node - FTTN	All NBN Plans	576	81	14%

NBN very high speed services tables

The figures in the following table are based on very high speed services, where the underlying wholesale product sold by NBN Co has a download/upload speed range of 500-990/50 Mbps.









Period	Plan	Download average Mbps (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Very High Speed	774.9 Mbps	190.4 Mbps	742.5 Mbps - 807.3 Mbps	133	23,003
Period	Plan	Download average Mbps (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Very High Speed	723.1 Mbps	202.6 Mbps	688.7 Mbps - 757.5 Mbps	133	6,864
Period	Plan	Upload average Mbps (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Very High Speed	45.1 Mbps	3.6 Mbps	44.5 Mbps - 45.8 Mbps	133	32,896
Period	Plan	Upload average Mbps (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Very High Speed	44.7 Mbps	4 Mbps	44.1 Mbps - 45.4 Mbps	133	3,564
Plan	Average daily outages lasting longer than 30 seconds		Standard deviation	95% confidence interval of the mean	Panel size	
Very High Speed	0.33		1	0.2 - 0.5	132	
Plan	Percentage of outages lasting 30-60 sec	Percentage of outages lasting 1-3 min	Percentage of outages lasting 3-10 min	Percentage of outages lasting 10 min or more		
Very High Speed	22.5%	26.9%	21.2%	29.4%		

NBN fixed wireless services tables

The figures in the following table are based on both the 25/5Mbps fixed wireless plan and the Fixed Wireless Plus plan.

Period	Technology	Download average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Fixed Wireless	92.0%	25.8%	86.2% - 97.9%	74	13,482
Period	Technology	Download average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Fixed Wireless	74.7%	29.4%	68.0% - 81.4%	74	4,073
Period	Technology	Upload average % of plan speed (all hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
All hours	Fixed Wireless	61.3%	21.8%	56.4% - 66.3%	74	18,811
Period	Technology	Upload average % of plan speed (busy hours)	Standard deviation	95% confidence interval of the mean	Panel size	Number of tests
Busy hours	Fixed Wireless	47.2%	23.1%	41.9% - 52.4%	74	2,029
Technology	Average daily outages lasting longer than 30 seconds		Standard deviation	95% confidence interval of the mean	Panel size	
Fixed Wireless	0.17		0.31	0.1 - 0.24	74	
Technology	Percentage of outages lasting 30-60 sec	Percentage of outages lasting 1-3 min	Percentage of outages lasting 3-10 min	Percentage of outages lasting 10 min or more		
Fixed Wireless	25.2%	29.7%	17.1%	27.9%		

Test Definitions

	Test	Definition
	Download	The speed at which data can be transferred from the SamKnows test server to your computer, measured in megabits per second (Mbps).
	Upload	The speed at which information is transferred from your computer 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.
	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 don't make it to their destination, measured as a percentage of packets lost out of all packets sent.
	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.
	Outages	The outages metric tracks how many times per day your broadband connection goes offline for at least 30 seconds. Outages between 12am and 5am are excluded from this metric as this is when network maintenance typically occurs.
	Video streaming	Measures the highest bitrate (in Mbps), and therefore quality level, you can reliably stream from real content servers.

Glossary

Term	Definition
SamKnows	The independent testing provider appointed to conduct testing for Measuring Broadband Australia. https://samknows.com/
Whitebox	A purpose-built hardware measurement agent manufactured by SamKnows, installed in volunteers' homes.
Testing Infrastructure	SamKnows-maintained test servers hosted within Australia.
Customer-Premises Equipment (CPE)	Network equipment provided by an RSP (generally including a home router/gateway).
NBN Service	A proxy for a single household which accesses the internet through the NBN.
Very High Speed service	Services where the underlying wholesale product sold by NBN Co has a download/upload speed range of 500-990/50 Mbps (referred to by NBN Co as 'Home Ultrafast').
Underperforming service	Services which reach above 75% of plan speed in no more than 5% of download tests. These are services which rarely or never attain plan speed.
Impaired service	FTTN / Fibre to the Node services where the maximum attainable line speed measured by NBN Co is below plan speed.
Plan / Plan	A retail product, for example 50/20 Mbps or 100/40 Mbps.
Plan Speed	The download and upload speeds associated the relevant retail plan. For example, plan speeds for NBN50 are 50 Mbps down and 20 Mbps up.
Advertised Speed	The speed claim made by an RSP for a given plan during a Measuring Broadband Australia reporting period. May be the same as or lower than plan speed.
Download Performance	Measured download speed expressed as a percentage of plan speed. e.g. for an NBN50 service, 100% download performance would be 50 Mbps. Prior to overprovisioning this was capped at 100%. Since NBN has begun overprovisioning services, results above 100% are common.
All hours	Refers to tests conducted at any time of the day.

Term	Definition
Busy hours	Refers to tests conducted between 19:00:00 and 22:59:59, Monday to Friday.
Busiest hour	Fifth lowest hourly average speed out of all busy hours in the month (including weekends cf. 'busy hours').
Fixed-Line	For reporting, fixed-line encompasses the FTTP (Fibre to the Premises), FTTB (Fibre to the Building), HFC (Hybrid Fibre-Coaxial), FTTC (Fibre to the Curb), and FTTN (Fibre to the Node) access technologies.
FTTN / Fibre to the Node	Measuring Broadband Australia treats the FTTN / Fibre to the Node and FTTB / Fibre to the Building access technologies as identical for reporting.